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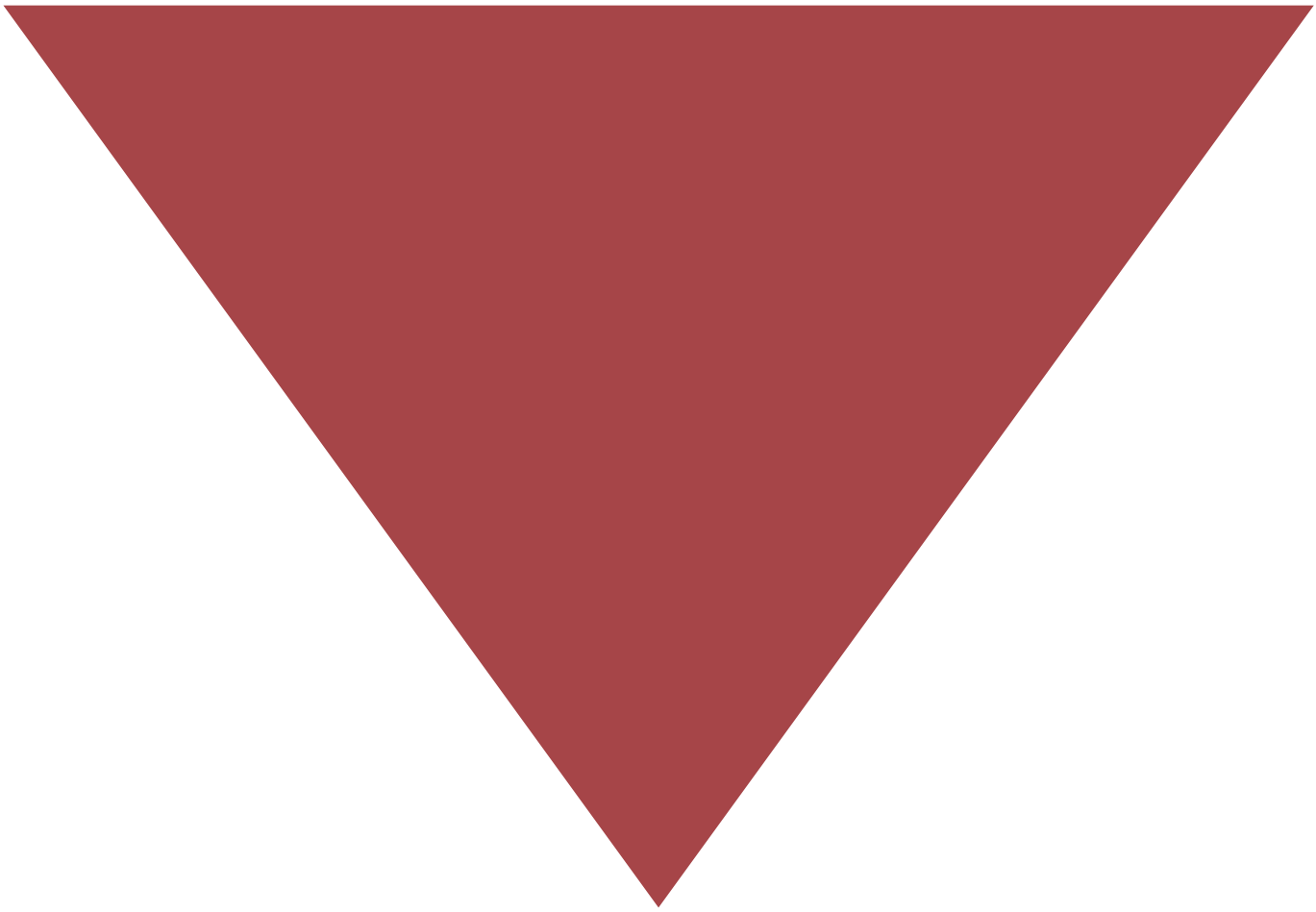

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English part of the proceedings

1/ Theory and philosophy of architectural design

SEARCHING FOR CONTEXT ARCHITECTURE

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Architect. A graduate of the Faculty of Architecture at the Silesian University of Technology (1981), there a long-term research and teaching employee. Developer and designer of numerous buildings of residential architecture in Bielsko-Biała, Będzin, Busko-Zdrój, Tarnobrzeg), services (Sfera Shopping Mall in Bielsko-Biała, transfer hub in Bielsko-Biała, Sfera Park in Grodzisk Mazowiecki)), hotels, cultural and sports facilities , single-family houses and residences. Interior designer of public utility architecture (shopping malls, hotels, entertainment clubs, offices). Winner of architectural awards and competitions.

ABSTRACT: Today's reality poses new challenges that must change our perception and criteria for evaluating architecture and urban planning. Climate change, political conflicts, the COVID-19 pandemic, growing economic problems create a new context for those who search for architectural solutions. The article analyzes a number of factors that, according to the Author, should be taken into account when designing and their impact on architecture.

Examples from the Author's architectural achievements are analyzed according to these criteria. They are investments of various scale (multifunctional commercial, service, hotel and residential facilities, a transfer center, residential complexes, single-family houses, small service pavilions). Author's conclusions from the research can be treated as important recommendations for shaping today's architecture and urban planning.

KEYWORDS: Architecture; Context of the place; Urban planning; Critical regionalism; Order; Beauty

SEARCHING FOR CONTEXT ARCHITECTURE

Today's reality poses some new challenges that should and must change our perception of functioning and, consequently, criteria for evaluating architecture and urban planning. Surely, changes are necessary for development and progress but their scale and pace are unprecedented and require very well-thought and quick responses (are we sure, however, that keeping pace with them all this race is reasonable?). Climate change, political conflicts, the COVID-19 pandemic, threats resulting from the rapid development of Artificial Intelligence and genetics, growing economic problems create a new context for those who search for architectural solutions. The article analyzes a number of factors that, according to the Author, should be taken into account when designing, and their impact on architecture.

The analysis includes:
• location of investment, location context (big city, town, suburbs, rural area and open landscape),
• cultural value of location, historical sites, history, elements of value,
• natural qualities of location,
• scale of the surrounding context, scale of the investment planned,
• functioning of the location's neighborhood,
• communication with surrounding areas,
• cost-effectiveness of investments.

Examples from the author's architectural achievements are analyzed according to these above criteria. They are investments of various scale (multifunctional commercial, service, hotel and residential facilities, a transfer center, residential complexes, single-family houses). Author's conclusions from the research can be treated as important recommendations for shaping today's architecture and urban planning.

Chaos which surrounds us has resulted from a number of factors: legal limitations, selfishness, ignorance and lack of respect for the existing values, what has already been described by the Author. [1]

The examples presented in the article are objects of different size (250 m2 – 142,000 m2), situated in different locations (city center – village) and representing different scales of investment. When analyzing the evolution of architectural ideas, philosophy and tools used in different designs (his own and others'), the Author came to a conclusion that one of the key architectural criteria is taking into account the widely understood location context: urban, architectural, cultural and environmental. Respect for a unique location of a designed building (each place is one of its kind) and humility towards the achievements of others allow an architect to set the design in the reality of the place in which it will be built.

EXAMPLES – OVERVIEW

EXAMPLE 1: Galeria Sfera in Bielsko-Biała.
Project team: Ireneusz Hendel (chief designer), Jan Lelątko, Piotr Pawłowski

The design was created in 2000, and the facility was completed in 2001 (38,000 m2 of total useful floor area, multifunctional purpose: commerce, services, offices, cinema, entertainment club with multifunctional hall, outside parking area for 800 vehicles).[2] When Galeria Sfera I was being designed, the idea to add another part was considered. The design of Sfera II was developed in 2008 and the investment was completed in 2009 (104,000 m2 of multifunctional floor area including: commerce, restaurants and food court, hotel, 101 residential apartments, underground parking for 1,400 vehicles).[3] The entire investment covers the area of approx. 6 ha. The complex is located in the center of the city which has 180,000 residents, in the spatial protection zone ¬– the post-industrial area along the river Biała. The ruins of old factories posed a threat of collapsing and the buildings were degraded.

Aspects included in design process

Location of investment, its context, scale of the object in relation to its surroundings

Galeria Sfera buildings are integrated into the urban fabric and complete it. The historical frontage of the streets was preserved. The outline of the buildings along the river and from the street's side was strictly replicated. The historical building alignment was re-created in the design. The parts that had not been built-up, were designed as a new city square. The scale of the buildings is determined by the hitherto height of the factory facilities and surrounding tenement houses. New parts which are higher than the original buildings were moved to the back to not interfere with the historical frontage. The façades of the factory buildings along the river were reconstructed. The façades of the factory owners' houses were preserved and revitalized. They were merged with the new building complex. Diverse façade materials were used depending of the context: former factory halls were made of brick (as were the original buildings). The façades of the residential part are composed of natural materials: brick, wood and plaster. The hotel's façade is made of glass while the entertainment club and cinema have metal panels. The façades of the offices are made of plasterwork and glass. The design included renovation of the factory owners' houses. Thus, their historical look, shape and details were reconstructed. During the façade works which, as already mentioned, were done in the spatial protection zone, small elements of old factories were used, e.g. bricks. Thanks to it, Galeria Sfera has been "naturally" incorporated into the city landscape.

Cultural values of the location, historical sites, history, elements of value

The complex was built on the grounds of old textile factories that were closed during the 1990's transformation. Four factories were built between 1836 and 1865, getting their final shape at the turn of the century. The owners' tenement houses were situated from the street's side whereas production halls were located along the river.[4] After the decline of the textile industry, the buildings were abandoned and damaged, some were destroyed in fire. The design included precious structural components (cast iron pillars) which were re-used to form the inside passageways, and reliefs from the 1950's, also built in the buildings' inner walls. The façades of two factory owners' tenement houses were preserved, while the façades of the production halls by the river were reconstructed and arcades were added. This refers also to the façade of the old boiler house at Grażyńskiego Street. The interiors were inspired by industrial architecture.

Communication

The building was to become an integral part of the urban fabric, be open to the city. Thus, the design provided numerous entrances which lead the pedestrian traffic to the facility's inner alleys (including 3 bridges on the river and a connector between both buildings). Easy access to the building is one of the important determinants of users' acceptance. Another important factor integrating the buildings with their context is the location of the main internal spaces with the square between the two parts of Galeria Sfera. Visual penetration of the interior-exterior allows to blur the lines between them. The building is optically open and integrated with the square. Bus stops located near Galeria Sfera provide easy access for visitors who use public transportation. Parking spaces are located on the opposite side than the entrance from the city (Sfera I) or underground (Sfera II). The goal was to avoid exposing cars in the urban landscape.

Continuation of functional structure of city center

Located in the city center, Galeria Sfera is surrounded with compact buildings, most of them built in the years 1850-1939. They create a dense urban landscape with narrow streets, shops and service facilities. The functional structure of a typical city tenement house was layered. The lower floors were for retail and services, above them were offices and residential apartments were located on the top floors. Galeria Sfera follows this principle. Its primary function is commerce (after all, trade was historically the motor of growth in most cities). The building, however, cannot be empty for the rest of the day. Functions that accompany trade (food services, entertainment, cinema, fitness) as well as offices, hotel and apartments, create a multifunctional conglomerate of buildings that are alive 24/7. Sfera has been also a venue for major cultural events: jazz festival, music concerts (both on the square and in the club), art fairs, photography festival, exhibitions. Thanks to it, the complex has become a part of the living city organism. All these numerous functions required very good operating conditions, therefore one of the solutions was the garden located on the roof of the commercial part, surrounded with three-floor residential complex which created a peaceful enclave in the midst of the city.

Relations with environment, concern for nature

The buildings were raised in 2001 and 2009 but the design already took into account the care for natural environment. In the older building of Galeria Sfera I, the debris from the old factory was used (to minimize waste) as well as old cast iron pillars. In Galeria Sfera II, there is a retention tank for rainwater which is used to water the plants and supply the restrooms. A garden was planted on the roof, using the intensive green roof technology, and the garage walls are covered with green climbers. The garden has 26 trees and about 3,000 perennials (such as rhododendrons, lavender, heaths, roses, vines, quinces). The inner garden has become an advantage of the residential complex, thanks to which the apartment prices on the secondary market are the highest in Bielsko-Biała.[8]

Friendly space

Both urban planning and architecture of the building create the framework of everyday life.[5] For this reason, spatial solutions used should be known to users.[6] The form of the passageway is determined by the site's history: it is a post-industrial, stone-paved alley with cast iron lanterns, benches, greenery, light and water. The square is a living place: concerts are held there, people sit on the benches under the plane trees and oaks by Bolek and Lolek statue, the space is lit up in the evenings. The basis for designing the space is its focus on people.[7] It is and inclusive space which is available for everyone.[9]

Cost-effectiveness of investment

Due to bank financing mechanisms, the building had to be designed in compliance with economic calculations. All decisions regarding the project had to be made based on cost-effectiveness, analysis of appropriateness of design and search for financially acceptable, good solutions (including materials used). Multifunctional and compact character of the buildings enables reduction of the costs of joint structural components (foundations, roofs, parking places, outside infrastructure – communication lines and networks). Synergy of functions makes them more attractive to visitors/users. All these tangible and non-tangible components determine the positive economic outcome of the investment. Another important factor is the re-use of the post-industrial areas and, consequently, revival of the city structure.

Fig. 1.: Galeria Sfera. View of bridges, reconstructed factory halls, hotel corner, Sfera I. (Photo by T. Kuczyński)

Fig. 2.: Garden on the roof. Residential apartments. (Photo by I. Hendel)

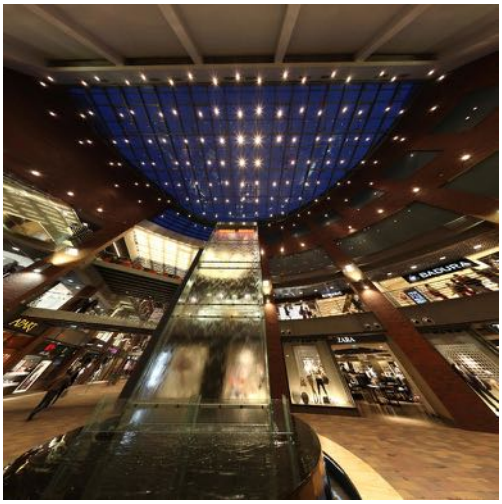

Fig. 3.: Galeria Sfera II interior – hall. (Photo by T. Kuczyński)

Fig. 4.: Square between Galeria Sfera buildings. (Photo by T. Kuczyński)

EXAMPLE 2: Residence in Katowice.
Designer: Ireneusz Hendel. Interior designer: Marlena Wolnik.

A residential house with three apartments (for the owners, their daughter and a maintenance person) with about 1,000 m2 total floor area. It was designed in 2007 and completed in 2013. The residence is located on the city outskirts, in a residential area. Part of the land is grown with forest groves. The house has two floors, a basement and a perpendicular wing with the maintenance person's apartment above the garage. The house sits on a 1.5 ha plot where a building from 1960's used to be situated.

Aspects included in design process

Location of investment, its context, scale of the object in relation to its surroundings

What is unique for this object located in the suburban area increasingly built-in with both individual and developers' investments, are parts of the land grown with pine groves. The property in this state was purchased by the Investor. The scale and quality of the surrounding buildings represent a suburban standard – mediocre, two-storey houses. The roofs of the houses are

Fig. 5.: Location of residence in Katowice. (Sources: Google Maps 01.07.2023)

Fig. 6.: View on the grove from a room. (Photo by I. Hendel)

Fig. 7.: View on the grove from the bathroom. (Photo by I. Hendel)

Fig. 8.: Residence seen from the grove. (Photo by I. Hnedel)

mostly flat. The same, two-storey scale was used in the design. The most valuable element of the property is the already mentioned pine grove to which the whole house opens. The windows in all living rooms and bedrooms overlook the trees which have become part of the interior, changing its character depending on the season. The neo-modernist architecture fits the suburban-forest landscape thanks to façade materials used: wood, glass, white plaster.

Relations with environment, concern for nature

The house was built by the grove and no tree was cut during construction. Only the driveway was paved. Roller blinds were installed to regulate the amount of sunlight entering the house. The façade turned towards the grove is the west façade. The trees shelter the house from excessive sunlight and absorb the heat. Unfortunately, a water plane in front of the southern, glass façade was not completed (its role was to reduce the temperature outside during summer). The heating and cooling system is based on geothermal heat pumps, rainwater is diverted directly to the ground.

EXAMPLE 3: House in the Beskids.
Design team: Ireneusz Hendel, Anna Midro-Hendel.

Located in the lower parts of the Beskids' slopes, the building was designed in 2017 and built in 2020. The house of about 350 m2 was constructed on a plot with a small, 70-year-old summer house and a ruined barn. The large (1.4 ha) property sits on the western slope by foothills of the mountains. The location is a typical brownfield. The neighborhood is a single-family house area with quite accidental layout (old wooden huts, cube houses, catalogue houses, intense "real estate development" houses, individually designed houses). The property is surrounded by old trees growing in ravines. The part of the land designed for construction in the local spatial development plan, located along the street, is grown with an orchard with old fruit trees.

Aspects included in design process

Location of investment, its context, scale of the object in relation to its surroundings

The mountainous landscape of the Beskids which begin "right at the doorstep", location on the slope, the abundance of old trees and the orchard, inspired the designers' decisions. The road along which the house is built is the highest edge of the plot. The building was situated right along the street, compliant with the local development plan. It is a one-floor house with a small mezzanine serving as a library. The building was partially built into the slope, using the level difference. The green roof was smoothly integrated with the natural shape of the terrain, blurring the borders between the building and its surroundings. Soft, organic lines of the roof refer to the mountainous landscape. The house is open from the inside, onlooking the land and the mountains, while from the street's side there is only the entrance. It is almost invisible from the road – one can see a mound that forms the green roof. The form of the roof merges fluently with the terrain. The retaining walls covered with the same material as the sandstone façades connect the building with the terrain.
Relations with environment, concern for nature

The house is an attempt to apply the principles of the bioclimatic architecture. Geothermal energy was used to heat the building (heat pumps with a ground source deriving energy from 100 meter deep drillings, and setting part of the house into the slope enable utilizing the fixed temperature of the ground to heat it in winter and cool it in summer). Overhangs (together with the old trees and roller blinds) shelter from hot sunlight in summer and enable penetration of heating sunlight in winter. Natural ventilation system formed by the system of window openings creates a system of "ventilation chimneys" that naturally cool down the building. Together with the roof densely covered with green plants (30 cm of substrate), they provide conditions for natural air conditioning. On the hottest

Fig. 9.: Vertical view from drone. House fitting its surroundings (Photo by A. Nowicka)

Fig. 10.: Green roof (Photo by I. Hendel)

Fig. 11.: Opening of house in the Beskids to wild garden and flowery meadow (Photo by I. Hendel)

days, the wind chill inside the house does not exceed 260C. Massive walls accumulate heat in winter and the humidity inside is regulated by the natural, thick (4 cm) clay plasters. The building uses the renewable sun (photovoltaics) and wind (windmill) energy and is equipped with power accumulators. Water from the well us utilized in the garden. Absorbing manholes evacuate rainwater to the ground. The finishing materials (except of some ceramic covers in bathrooms) are natural (unvarnished natural wood floors and furniture, non-impregnated stone, wood wool insulation). The façades are made of local stone (sandstone). The green roofs are covered with naturally self-sown plants forming flowery meadows. The primary goal of the design and its implementation was to incorporate the building in its surroundings and landscape in such a way so that – despite the range of modern architectural solutions used – it seems like it has been always there.

EXAMPLE 4: Residential complex "Rezydencja Parkowa" in Ustroń.
Design: Ireneusz Hendel

A complex of 110 apartments was designed including an adaptation of the oldest brick resort building – Hotel Kuracyjny. Located in the center of the health resort, near historic buildings from the 19th and 20th century and a century old park. The architectural concept emerged in 2019 and once the local spatial development plan was modified in 2023, the construction began.

Aspects included in design process

Location of investment, its context, scale of the object in relation to its surroundings

Ustroń is a small touristic-spa-industrial town with 16,000 residents. It sits at the foothills of the Beskids. It is an attractive place to live, especially for people who finish their professional activities and want to leave Silesia or simply "get out of the city". The residential complex consists of two blocks which fit the urban context – buildings on Hutnicza Street and a park (Kuracyjny Park) to the east. There is an inner garden between the buildings, which is a green roof over the underground garage. The neighboring houses are not higher than 3 floors (some have up to 15 m) and were built before the World War II. For this reason, the new project does not exceed the height of the surrounding buildings and its character refers to the most interesting period in Ustroń's architecture – the interwar modernism. The historical building of the former Hotel Kuracyjny was redesigned to perform new functions while the style of its façades was restored to the one from the turn of the 19th and 20th century.

Cultural values of the location, historical sites, location history, elements of value

There are some historical objects in the neighborhood: the headquarters of Klemens Ironwork (at present, the Museum of Ustroń), an old ironwork rebuilt to serve as a school building, a pond which is part of the 17th-century engineering canal called Młynówka, Kuracyjny Park and villas (including an interwar house designed by Tadeusz Michejda). Built in 1802, Hotel Kuracyjny has lost its historical value due to numerous reconstructions, however, it is still in the historical site register. The object has been out of use since 2015. The grounds and its surroundings have a valuable stand which will remain unchanged. The hotel building forms the frontage of the street. As a reminder of the industrial heritage of Ustroń, the entire complex is important for the identity of the local community. On the ground floor, an exposition space was designed, which will show the history of Ustroń resort and the structural elements of the resort hall (as a green shed), bowling club and baths building will be exposed in the complex. The historical façades will be restored.

Relations with environment, concern for nature

The roofs were designed as intensive green roofs. There will be a garden between the buildings, with trees, bushes and perennials, a flowery meadow will cover the roofs. Rainwater will be retained on the roofs and its excess will be directed to the historical canal serving as a retention pond. Energy will be produced using photovoltaics, while heat pumps will provide heating and cooling.

Fig. 12.: Visualization of the Park Residence. (Draw. A. Gacek)

EXAMPLE 5: House in Kraków-Częstochowa Upland.
Design team: Ireneusz Hendel, Krzysztof Hendel

Located in a single-street village, on a hitherto built-up plot, a new residential house was designed to replace a damaged barn. The previous residential building was turned into an art studio. A utility-garage part is a connector between the two buildings. The house was designed in 2021 and is now under construction.

Aspects included in design process

Location of investment, its context, scale of the object in relation to its surroundings

The village where the house is located is a typical single-street village with contemporary, two-floor buildings with steep roofs. The layout on the plot refers to a farm typical for this region, and the set of façade materials (local limestone, wood) are modern reference to the traditional, regional architecture. The scale of the building, its height and size of particular construction components are designed to keep the intimate, cottage scale.[10]

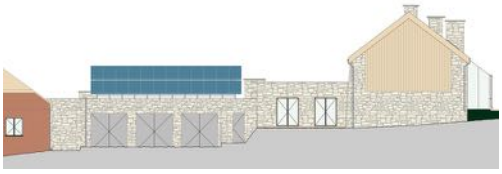

Fig. 13.: Drawing of the facade of the house in Kraków-Częstochowa Upland. (Draw. K. Hendel)

Fig. 14.: Drawing of the facade of the house in Kraków-Częstochowa Upland. (Draw. K. Hendel)

Relations with environment, concern for nature

Natural, local materials have been used (limestone, wood from the old barn as façade material). Extensive, green roofs to protect from overheating, photovoltaics, rainwater retention and biological sewage treatment plant have been included in the design. The house is to become an integral part of the local, upland landscape. And old lime-tree is the main spatial focus of the place.

EXAMPLE 6: Transfer Center in Bielsko-Biała.
Project team: Ireneusz Hendel (chief designer), Krzysztof Hendel, Agnieszka Nowicka, Anna Midro-Hendel

The architectural and urban planning concept was completed in June 2023. The neighborhood of the main train station in Bielsko-Biała is a degraded area where no new investments have been made in the last 50 years. Apart from the passenger station, there are railroad switches and unloading ramps of the cargo terminal. On the other side of the busy entry road to the city is a bus station situated among the residential buildings. Communication between the two stations is possible via the bridge connecting the post-industrial quarter and the bus station. The goal of the project is to arrange the railway area where an integrated transfer center for different communication means will be created (trains, long distance buses, city buses, cars, bikes, pedestrians) and, at the same time, to merge two parts of the city divided with the railway tracks and throughway. Ultimately, conditions will be created for changing the paradigm of the city functioning: from car-based to pedestrian city, and the prerequisites will be formulated for financing the investment from the EU funds in the spirit of New Bauhaus.

Aspects included in design process

Location of investment, its context, scale of the object in relation to its surroundings

The junction of the city center, the post-industrial and railway quarter is the best location for a communication node inside the city. The project utilizes the area which has already been modified to serve the needs of people, the so called brownfield. The buildings designed have been integrated into the urban layout, creating new frontages of the streets and the square. The height of the buildings is up to 13.5 m, in the scale of the surrounding post-industrial facilities. Only the clock tower is slightly higher and closes the perspective of the neighboring streets and the square in front of the transit center. The goal is to create a landmark in the train station and city area.

Continuation of functional structure of city center

The service building is a multifunctional object. It will activate the forgotten, abandoned part of the city. Apart from the passenger zone (waiting hall, checkpoints, information desk, ticket machines, luggage room, restrooms), a small passageway is provided with a commercial part on the ground floor, multifunctional space of cultural activation center on the first floor (exhibition hall, workshops, projection hall etc.) and a kindergarten on the second floor with a playfield on the roof. Above the railway platforms, a park is designed as a connector between the two parts of the city fabrics divided by the railway.

Communication

For the purposes of the transfer center, new access roads have been planned and some existing streets have been modified. In the old railway area, a road connecting the new city bypass with the investment area has been proposed (in a spatial form of a tree alley). The concrete and asphalt surface of the train station square will be reconstructed to add greenery and a pedestrian zone. New walkways over the railway

Fig. 15.: Location of transfer center, view from old train station. (Draw. A. Nowicka, K. Hendel)

Fig. 16.: Transformation of train station square into walking zone. (Draw. A. Nowicka, K. Hendel)

Fig. 17.: New transfer center building. (Draw. A. Nowicka, K. Hendel)

Fig. 18.: Arcades in new transfer center building. (Draw. A. Nowicka, K. Hendel)

Fig. 19.: Entrance to transfer center with clock tower. (Draw. A. Nowicka, K. Hendel)

tracks should integrate the city space. The entire project should contribute to limiting individual car traffic and promote walking, cycling and public transportation, for example by reducing the number of lanes for cars and turning them into bus lanes.

Relations with environment, concern for nature

Introduction of the green-blue infrastructure is one of the main means of architectural expression. The following design decisions have been made to facilitate users' comfort:

• Green roofs, green stops, green walls, preserving the existing tree stands (some trees will be replanted), flowery meadows, new tree plants, tree alleys, pocket parks are the elements to prevent urban heat island effect;

• Total retention of rainwater, using retention tanks to collect water for re-use and rain gardens help improve environmental conditions;

• Removing concrete from the existing surfaces, using shadowing surfaces to protect against overheating;

• The project utilizes renewable energy sources (photovoltaics and heat pumps) to minimize the need for primary external energy.

Friendly space

New buildings must be user-friendly. Good spatial orientation and easy communication are crucial for well organized public space. All principles of accessibility have been applied, including the needs of people with mobility disfunctions, sensory limitations, mothers with children and foreigners.

Analysis of solutions used in presented examples

Architectural and urban planning characteristics of the

	Galeria Sfera	Residence in Katowice	House in the Beskids	Rezydencja Parkowa Ustroń	House in Kraków-Częstochowa Upland	Transfer Center
Function	Multifunctional complex: service, commercial, cultural, entertainment, office, hotel and residential buildings.	Residential house	Residential house	Residential complex with museum	Residential house	Multifunctional complex: bus station, commercial, gastronomy and cultural buildings, and kindergarten.
Type of settlement	Center of a mid-size city	Big city suburbs	Small town suburbs	Center of a small health resort	Village	Edge of a mid-size city center
Location	Two city quarters along a river	Edge of a grove	Among other residential houses	Edge of a park	Farmstead	Between a city, factories and rail facilities
Type of investment	Brownfield	Brownfield	Brownfield	Brownfield	Brownfield	Brownfield
Urban fabric lines	Strictly preserved and completed (square)	Scattered houses	Aligned with existing lines	Aligned with existing lines	Aligned with existing lines	New communication network created
Development scale – relation with surrounding areas	Height similar to surrounding buildings	As in neighborhood	As in neighborhood	As in neighborhood	As in neighborhood	As in neighborhood
Cultural environment	Spatial protection zone, valuable historical relicts of post-industrial era (factory owners' houses, factory hall details)	N/A	N/A	Spatial protection zone of the first resort, ironworks, water canal with a pond	N/A	Historical train station and cargo station buildings
Communication services	Cars, buses, pedestrians, bikes	Cars, pedestrians	Cars, pedestrians	Cars, pedestrians, rail	Cars, bus	Rail, bus, car, bike, pedestrians
Relations with surrounding areas	Accessible from every side, multiple entrances, passageway in arcades along the river	Private house	Private house	Green areas of park and garden overlap one another	Private house	Access from each direction and with all communication means
Public space	New city square, inside passageways – city streets	Private object	Private object	Social space – garden for residents	Private object	New city square, restoration of Dworcowy square for pedestrians
Interior – exterior relationship	Visual penetration of the square and hall. Continuity of internal and external surface (paving stone)	Visual penetration of interior and adjacent forest	Visual penetration of interior and mountain meadow	Large, high windows onlooking the park or garden	Visual penetration with the field landscape, opening to inner yard	Visual penetration of the passageway and the arcade (pocket park, large windows onlooking the surroundings, greenery)
User-friendliness, accessibility, ease of navigation	Accessible building, multiple sitting places and social interaction facilities	Accessible building	Accessible building	Accessible building, multiple sitting places and social interaction facilities	Accessible building	Accessible building, multiple sitting places and social interaction facilities

Tab. 1.: List of references to the context in the presented projects. (Author's original compilation)

examples presented above are comparted in the table below.

Regardless of the scale, form, features, function and location of a building, a range of common architectural and urban planning characteristics can be identified that show the directions of creative explorations of the Author. These common features refer mainly to different aspects of the relationship between the object designed and its surroundings, and imperatives resulting thereof.

• **Urban planning regulation.** This wide term includes, for example: frontages, visual tramlines, space continuity, continuation of the scale of surroundings (height, mutual proximity between urban elements, angle of the urban interior), subordination of the form the design to the existing urban form, localization of spatial dominants and accents according to the logics of the place.[11] Practical application of these terms enables merging new buildings with their location.

• **Respect towards existing cultural values of the place.** Protection of the cultural heritage is the foundation of our identity and the evidence of the architect's culture. Finding answers to the question "How to respect the history and values of the place?" often guarantees a good design.[12]

• **Respect towards existing environmental values.** We are part of nature and our design activities and decisions must reflect this fact. It takes less time to construct a building than to grow a tree. We shall respect the landscape, the environment and nature. Our ideas cannot clutter the landscape. Our relationship with nature is also a reflection of our culture (including the design culture).

• **Continuation of urban fabrics.** It refers to both the urban form and, first of all, its utility aspect. New objects should continue the function of their surrounding, e.g. the inner city fabric is a multifunctional, content-rich structure attractive to users. Synergy of functions makes them more attractive. The hierarchy of functions must be taken into account in relation to the proximity from the city center. High intensity of such location is crucial for attractiveness of the space. New buildings should replace the ones already used up, increase the density of the existing buildings or transform the degraded areas (brownfields). Due to environmental reasons, one should not build on "greenfields".

• **Local architectural tradition.** Each object should originate from the place where it is being built. Not every building is designed, for example, for Dubai, Shanghai or New York. Emphasizing the place form which a certain architectural tradition comes from, using local (and recycled) materials and modern interpretation of the architectural context should contribute to the positive reception of the building. Architecture should not be the architecture of contrast separating itself from the local environment.

Road safety, parking	Separation of walking and driving traffic, underground garages	Private house	Private house	Separation of walking and driving traffic, underground garages	Private house	Separate walking and driving traffic, tiered garages
Ease of communication	Lack of architectural barriers such as stairs, vertical communication with escalators and elevators	Lack of architectural barriers such as stairs, vertical communication with elevator	One-floor house, slipways connecting different levels	Lack of architectural barriers such as stairs, vertical communication using escalators and elevators	Slipways connecting different levels	Lack of architectural barriers such as stairs, vertical communication using escalators and elevators
Façade materials used	Brick, wood, glass, concrete	Wood, plaster, stone	Stone, glass, wood	Plaster, glass, wood	Stone, glass	Brick, sheets
Relation with historical objects	Restored façade of the factory owners' house, restored façades of factory halls, historical elements used in the interior	N/A	N/A	Restored façade of historical hotel, architectural references to neighboring early-modern tenement houses	Front of the old house renovated	Using bricks as façade material (like in neighboring historical buildings)
Local materials	Brick, wood	Wood	Stone, wood, clay plaster	Original stone (recycled from demolition), wood	Stone, recycled wood	Brick
Relations with environment	Partially preserved tree stand, new tree plants	Tree stand preserved	Landscape composition, old orchard and tree stand preserved	Old trees preserved	Tree stand preserved	Tree stand preserved, wasteland transformed into parks
Green architecture	Green roofs – garden: trees, bushes and perennials, green walls – climbing plants	---	Green roofs, climbing plants on walls, blurring the building-landscape line	Green roofs, climbing plants on walls, garden on the roof	Green roofs	Green roofs, climbing plants on walls
Blue infrastructure	Retention tank, utilizing rainwater	Water retention	Water retention	Retention tank, utilizing rainwater	Water retention	Retention tank, utilizing rainwater
Renewable energy sources	Heat pumps	Photovoltaics, ground source heat pumps	Photovoltaics, ground source heat pumps, bioclimatic architecture	Photovoltaics, ground source heat pumps	Photovoltaics, heat pumps	Photovoltaics, heat pumps, bioclimatic architecture
Bioclimatic architecture	---	Roof covered with gravel	Shadowing overhangs, partially underground building, natural regulation of temperature, ventilation, shadow zone (patio)	Shadowing overhangs in summer, building passivity in winter	Shadowing overhangs in summer, building passivity in winter	Shadowing overhangs in summer, building passivity in winter, natural ventilation

Tab. 1.: List of references to the context in the presented projects. (Author's original compilation) - continued

• **Shaping user-friendly environment.** During the design process, users' reception of a building should be considered. Friendly architecture is the architecture which is accessible, comfortable, intuitive and safe. Users appreciate not only access to main functions but also, for example, window view, shading, sun exposure, safety or widely understood peace (noise, chaos including chaotic built-up). This kind of architecture meets the psychophysical needs of people.

• **Using climate-resilient architecture.**[13] Using blue-green infrastructure is a necessary means to adapt a design to the changing external conditions. Introduction of green elements to the portfolio of architectural forms, e.g. green roofs and walls, trees and plants, creates a new value of architecture that fits the context.[14] Respecting natural resources, including rainwater and its retention within the investment instead of distributing it to river basins is very beneficial for the environment. Skillful application of the principles of passive and bioclimatic construction are the trends architects cannot ignore.[15]

• **Cost-effectiveness of investment**. Respect for the resources, including using materials recycled from demolitions and natural local materials, is the key aspect of post-consumptionist society (the era of which is approaching). Construction complications resulting from purely formal ideas which will be out-of-date in several years from now (e.g. complicating the building structure by placing shifted blocks on top of one another) is an example of wasting materials and money. Also, the so called "conceptual ideas" which, for example, pierce historical buildings with sharp forms or a pile of bended titanium-zinc plates called iconic, are some examples of wasting material and funds to satisfy the architect's (sometimes investor's) ego.

• **Beauty in architecture.** It is something that sets apart architecture from construction. It creates an added value. Concern for the quality of our work is the reflection of respect to the users, investors, observers and future generations. Beauty does not shout, it does not have to. Beauty defends itself. Functional needs and esthetic standards change but quality architecture will survive as the image of our times.

SUMMARY

The Author's search for design principles which would be adequate to modern times are presented above. They focus on the context of location of the designed buildings. The design rules used are based on well known, yet often forgotten or ignored principles. The analysis of the design principles applied in the presented examples shows a number of well known trends. Urban planning in the spirit of New Urbanism,[16] continuity in architecture, urban composition rules, critical regionalism[17],[18], eclectic forms, organic architecture, feng shui, traditional, local construction rules and other are the main principles of good design, which in old times were passed on to architecture students by professors-modernists. These are the principles of good, timeless design regardless of style.

Each building is set in a certain urban space. Thus, design solutions influence the spatial and functional transformations of cities. All presently popular urban trends (city for people, happy city,[19] 15-minute city, soft city,[20] cycling city,[21] climate-resilient city etc.) further develop the principle of good design which focuses on people and their needs,[22] not on recognition (for the investor or the architect). The designer must be sensitive to human needs, respect the place and solve design problems with humility.

Well designed architecture with green components defends itself even many years since completion. One of the examples is northern Ursynów quarter (Warsaw) built over 40 years ago, which today is one of the most wanted addresses (even though they are "old" blocks). It is not by accident that old residential complexes adapted to modern needs (19th and mid-20th century) are good places to live. It is not by accident that we like visiting Italy, a country which respects its heritage – we feel well there and no one says that Italians live in ruins.

Particular attention should be paid to the above mentioned conditions resulting from the building location. Architecture of new objects should be thoroughly modern but it should consider the widely understood context.[23] It is not about the references to tradition which use the recently popular statement of "modern interpretation of form". It is a buzzword used to justify unclear and often clumsy designs. The new architecture cannot be a pastiche of the historical or regional architecture.[24] Setting a building in its location, in relationship with nature and history, reflection upon the local tradition which is an inspiration but it is not followed blindly, good proportions, façade composition, logical solutions, modern materials and techniques, context continuation – this is what I would expect from the best designs.[25]

To implement the above listed design principles on a wider scale, activities in the four following areas are necessary: education, legal, professional ethics and social culture.

• Education. Prospective architects should be taught that the very first step in every design involves exploring the object's location. Identification of the place's characteristics and learning how to merge the new object with the existing context – these topics are ignored in today's education. How can beginners approach their designs and locations with respect and humility if there is no one helping them? The trend of creating extraordinary, "iconic" forms should be replaced with architectural designs set within its spatial context.

• Legal. I believe that some changes are necessary in architectural design and urban planning regulations. They should be introduced in several areas: urban planning as a means to introduce the principles of good spatial continuity, harmony and order; urban composition; binding social negotiations regarding investments that exceed the surrounding scale; limiting urban sprawl (for the benefit of urban planning based on indicators and functional role symbols). As for architectural design, adjusting solutions planned to the character of location should be mandatory. In its initial phases, the formal aspect of a design should be also discussed on the local level (a practice already introduced in several European countries). In this case, the limits of creative "freedom" are very much desired because the lack of restrictions leads to iconization of every designed object and results in spatial chaos. Context should be one of these limiting factors.

• Professional ethics. It should be a designer's duty to raise investors' awareness of the spatial values of the given location and not only of the potential return of investment. Respect toward the place where the designed object is to be built should be one of the designer's ethical criteria.

• Social culture. The Author's dream is to live in times when every citizen knows what is acceptable and where their construction plans can be implemented. Not so long, 30-40 years ago, no one would even think to destroy native green areas for a short-term profit. It was part of the social cultural code. The same refers to respecting nature, historical objects, neighbors...

Architecture is not designed to gain temporary acclaim but to last for years. It has no expiry date. In order to not become another "Solpol" (Wroclaw), it should defend itself with its values. In my opinion, architecture set in the context of location (urban, architectural, cultural and environmental), is the right direction of

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ANCHORING CONTEMPORARY ARCHITECT PRACTICE IN LIQUID TIMES

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ABSTRACT: We try to define the current sociocultural perspective in the field of architecture as postmodern, considering the overcoming of modernity and the establishment of a new pluralistic view, not only in architecture. Through this lens, we aim to fit architectural works into the context of the present. However, this assumes deeper knowledge and a firm conviction regarding the definition of our era. When we stop perceiving our society as postmodern but as a late stage of modernity, as Zygmunt Bauman suggests, we will find a different approach to how we should approach contemporary architectural creation and how to interpret it. The thesis aims to define our time as liquid modernity, and by that open a discourse on anchoring architectural practice in the present. It intends to focus more on changes in interpersonal relationships and their influence on the interpretation of architectural works. Through these steps, we will achieve a deeper understanding of individual sociocultural phenomena. Our perspective will also broaden on how to perceive our society and how to work with the context of the place where architectural work emerges.

KEYWORDS: architecture; phenomenology; liquid times; dialog

INTRODUCTION

World of today is characterized by the concept of postmodernity, which interprets modernity as the "collapse or sudden disintegration of the early modern illusion – the belief that the path we are following has a certain end, an achievable telos[1] of historical change, that there exists a state of perfection to be reached tomorrow, next year, or the next millennium, a kind of just and conflict-free society in all or some of its many presumed aspects: that there will be a stable balance between supply, demand, and the satisfaction of all needs; that there will be a perfect order in which everything is in its right place, where nothing inappropriate persists, and there is no doubt about any place; that human affairs will be entirely transparent because everything worth knowing will be known; that there will be complete control of the future – so complete that all contingencies, all disputes, ambiguities, and unforeseen consequences of human actions will come to an end[2]." So when did postmodernity begin, especially in architecture, we can pinpoint it to a specific date and time. Its beginning is dated as "July 15, 1972, at 3:32 PM in St. Louis, Missouri[3]" when a fourteen-story housing project was demolished. According to Charles Jencks, this symbolic act marked the collapse of modernity. "In other words, when we talk about the 1960s, we are thematizing one of the final phases of the classic period of modern architecture – late modernism; after the 1960s, postmodernity emerged along with deconstructivism as its most radical expression, followed by neo-structuralism, neo- and meta-rationalism, techno- and eco-ism."[4] Architecture today, just like at any other time in our history, serves as a very good mirror reflecting our era, our thinking, and our attitude towards the world, so to speak, it shows what our contemporary horizon is in tangible form. The abandonment of the search for primary ideas that will guide our perspective on the world gives way to the hegemony of fragmented sciences, where one scientific discipline competes with another to ensure the audibility of their theories. We must also not forget the omnipresent imperative of economic growth. Nice example of this is the transition from the seriousness of historical buildings, labeled with demonized assessments of high energy consumption as very uneconomical and impractical due to the absence of elevators and other already automated requirements. On the contrary, we are presented with the instantaneous world.

THE INSTANTANEOUS WORLD

Desire accompanies our entire lives. As human beings, we are born entirely dependent on the help of others, without this help we would not survive for long. As child psychologists would say, desire drives us forward, but it is important to describe what we want and, above all, what we latently need, such as satisfying our needs, such as a place, security, stimuli, support, and limits. Even though we may not be aware of it, these basic needs determine our actions in this world and influence our desires. Each of us grows up in some form of home within a house, orients their home to a safe place, craves constant access to information, and the view of recognition is modified to the number of likes on social networks, and our limits are presented to us as ideally unlimited. This is one of the perspectives on how to look at the roots of our behavior, which influences our desires and is, according to Arthur Schopenhauer, determined within the context of the quote. "Man can do what he wants, but man can't want what he wants." To explain – a person is influenced by the fact that they cannot wish anything bad for themselves, and that is our limitation. To these a priori assumptions of human, accepting pluralistic knowledge forced by the context of the postmodernity is a time bomb, where the result of this explosion is a fragmented society that has found its place to relativize everything and turns its gaze towards hedonistic experiences in a postmodern environment. A beautiful example of a postmodern product is the creation of the IKEA retail chain. Whether we realize it or not, the spirit of the times (zeitgeist) is reflected in architectural design. If this is the case, we must address the question of whether we are trying to find a sufficient approach to interpret our horizon, or if architectural design simply responds to the needs of people in the present day.

UNDERSTANDING

Before any architectural work begins creating a piece ex nihilo begins, it is necessary to grasp the essence of creation. "Birth means here where and through what something is what it is and how it is. In other words, the origin of its essential determination. The question of the birth of an artistic work inquires into the origin of the essential determination of this work. In the common conception, a work arises from the activity and through the activity of the artist. But through what and from where is the artist what they are? Through the work, for the fact that the work of the master is praised indicates that it is only through the work that the artist becomes a master of art. In the artist, the work is born. In the work, the artist is born. One does not exist without the other."[5] Realizing this synthesis is a step that imposes significant responsibility on the creator of the work, who identifies with the existence of the work and vice versa. This step is a response to

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Cartesian dualism, where, according to Heidegger, we unify the subject-object view of the world with the word Desain. Explaining the perception of a human being in the world, how one works with their existence, where, according to Heidegger, there are two possibilities. We can create our existence through our awareness of our responsibility for our actions, but also for the creation of our own work. The second approach, relying only on superficial understanding, tries to delegate the existence of oneself to someone else, as if our existence were an instrument devoid of responsibility for our life and for the creation of our life in the world. The world makes sense only to us, and perhaps here, some already see a view of the world through the lens of phenomenology, which is deeply rooted in Central European thought and presents an approach that opens up possibilities for how to approach the work itself. No matter how hard we try, the world around us becomes more challenging to interpret, with an excess of technological progress and scientific monopolies, we attempt to calculate everything, quantify every individual element, describe them, and then work with them. We strive to understand this world, but we forget the realization that this world does not provide answers to fundamental questions; it merely describes, instead of explaining, we deepen the gap between the subject and the object, between what we are and what our perception is directed towards, we do not seek to connect these two phenomena but look for reasons for greater distance. Therefore, in architectural creation, we must start from a different foundation than that scientific-technical one, which deepens the gap of understanding. What other foundation could there be but the one from which all sciences have sprung, namely, philosophy.

THE CONTEXT OF THE TIMES

What perspective should we adopt to view the present era that influences architectural creation? How should we talk about architecture, how should we interpret it? In the case of our attempts to understand our times, we perceive this phenomenon as the horizon[6] of our era, just as the Athenian era had its horizon, our era has one too. When we look at a particular era and seek to comprehend[7] it, we must recognize the connection between the horizon of our time, from which we start, and the horizon of the era we are looking at. This state is perceived as the fusion of horizons. To avoid being too abstract, let us consider the following example. When we want to fill a gap in the city center, we engage in an interesting dialogue, where we are in contact with the past, an era when the perspective on our world was different, and it is challenging for us to grasp, as we lack the experience of living and understanding that time. Understanding always involves the "process of fusing these seemingly being for themselves horizons. We are primarily familiar with the power of such fusion from earlier periods and their naive behavior towards themselves and their origin."[8] This understanding, or the lack of it in our thinking, is fundamental in initiating a dialogue with a bygone era.

This may lead us to an answer to the question of why we struggle to intervene more into historical city centers and boldly imprint the Zeitgeist in the most prominent and visually dominant way that architecture offers because we lack a methodology for the dialogue between the past and the present. In essence, when a space lacks dialogue, a superficial expression is created, which is challenging to relate to, and to love something, you must have a relationship with it.

SCIENCE, ARCHITECTURE, AND PHILOSOPHY

A unique connection of three worlds that are losing in their race for dominance, especially in the postmodern era.

Science
Science is "an organized, systematic endeavor that gathers knowledge about the world and condenses this knowledge into verifiable laws and rules."[9] We strive not to disperse our knowledge into individual parts, as we do in a library; scientific disciplines branch out into subfields, and the boundaries of our description of the world seem limitless. Even though "the paths of science can be interpreted more prosaically. It could be said that progress can only be made in two ways: by accumulating new percentage experiences and by better organizing those that are already available."[10]

Architecture
There is much that architecture is, and we can present many definitions to describe it, but what we are concerned with here is a different matter: insight into the substantial roots of architecture. Here we can describe the various influences that the present era has on architecture, including political, economic, sociocultural, and others. From architecture emerges what represents our time. However, it is necessary to bear in mind that "in the current context, where architectural culture is dominated by concepts such as sustainability, digital production, parametric design, and the spatiality of globalization, it is more than necessary to insist on the fact that architecture is primarily epistemology or a form of thinking and interpretation that is exceptionally suitable for dealing with many conceptual paradoxes that people perceive in the world."[11]

Philosophy
What is philosophy - It is a path to decision-making. "The most important condition for decision-making is the conversation we have with the being itself, and for that, the most important thing is to be open to being, to dwell 'in der Lichtung,' in the light. This requires courage, temporal temporality, and the ability to gain insight into the essence filled with generality, as Husserl often articulates. Everything that is clarified requires clarity in which it shows - phenomenalizes the thing, emerging from itself, thanks to this clarity as a showing background or referent, as expressed with Jan Patočka. Human beings want to control this showing, in that lays the essence of the voluntaristic superhuman of recent decades."[12]

THE PATH OUT OF THE SHADOWS

Just as the Platonic allegory of the cave, in today's era, both science and architecture are imprisoned, as are all those who do not sense it. Similarly, as Plato states in the dialogue Symposium: "no one who is not aware of their deficiency desires what they do not sense a deficiency of." Gaining the courage to step out of the cave is the path out of the superficial, focusing one's perception on the essence of things is partly granted to us by the postmodern world with its pluralism and resignation. Similarly, architecture is born from insights into the essence, for even when we view an architectural work from a hermeneutical interpretive perspective, we must realize that the work has its own declarative value, serving many purposes and interpretations. Often, the object's purpose remains the same, but our thinking changes, just as "a young apprentice, when he first started working for Ford, could be sure that he would end his working life in the same place. The time horizons of heavy capitalism were long-term. The workers' horizons were outlined by a lifetime of employment with the corporation. (...) Today, the situation has changed. A fundamental component of the changes happening on many fronts is the mentality of 'short-termism'." Marriage in the style of "until death do us part" has certainly gone out of fashion today; it has become more of a rarity: partners no longer expect to stay together for an extended period. According to the latest estimates, a young American with a reasonable level of education expects to change

[6] A horizon is a view, which from one point contains and embraces everything visible. GADAMER, Hans-Georg. Truth and Method I: Outline of Philosophical Hermeneutics. Second, revised edition. Translated by David MIK. Prague, Triáda, 2020. Paprsek (Triáda). ISBN 978-80-87256-62-6 pp. 265

[7] To acquire horizon means to learn how to look out for what is close and very close, and not to look away from it but to behold it at some larger whole and more correct dimensions. GADAMER, Hans-Georg. Truth and Method I: Outline of Philosophical Hermeneutics. Second, revised edition. Translated by David MIK. Prague: Triáda, 2020. Paprsek (Triáda). ISBN 978-80-87256-62-6 pp. 268

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their occupation at least eleven times in their lifetime. If the thesis of capitalism is the imperative of growth, the thesis of[13] our time is not to stay in one place, not only in the working sphere but also in personal life. We are detaching ourselves from the course of humanity's history, which leads us to the question of identity.

IDENTITY

existence to clarify our thoughts with the aim of understanding the essence of architectural creation. An architectural work shapes the architect, as we've previously mentioned, but it is essential for the work to originate from an authentic and firmly anchored philosophy since if we only reflect societal demands in architectural works, the work lacks being but only presents it. "In the 20th century, architecture became a mass phenomenon under the influence of leading architects who exploited selected philosophical texts to support their ideals and assert themselves. Architecture detached itself from any higher principles of human existence, turned away from nature and the sacred. For the first time in human history, people began deliberately creating unnatural structures that are not comfortable to live in and are unpleasant."[14] The problem in this case is not one of existence but of ontology. Just as we confuse a message with information[15], we confuse being with existence, assuming that the pinnacle of our lives and its purpose is the hedonistic imperative of life to absorb as much as possible but not to understand life. Just as an architect approaches a project with the aim of superficially satisfying the client's demands, their work becomes superficial, and the client soon becomes satiated and seeks change. We'll explain the ontological scarcity here through ontological difference, which is given by the distinction between being and existence, where being cannot be transmitted as information, let's think of the existence as building, observe the building showing in the background, which is being but without existence, we would never penetrate into that being through which existence presents itself to us. We must decide whether we will skim the surface of beings or immerse ourselves in the essence of being and begin living an authentic, and, in this moment, truthful life because only from this do works emerge that contain truth within them. So, how is a work created? We will illustrate this through two questions following the creation of the work:

"1. What does it mean to be created and to create, as opposed to make and being made?

2. What is the most inner essential determination of the work itself, from which alone it can be assessed how much the work belongs to the fact that it is created and how it determines the being of the work in relation to itself?

Creation is always meant in relation to work. The essential determination of creation includes the happening of truth. We determine the essential determination of creation in advance from its relationship to the essential determination of truth as the disclosure of existence."[16]

CONCLUSION

In the thesis, we have tried to outline a perspective on the current era, which focuses more on achieving the goals of one's desires and anchoring one's liberal stance in a world that contains several dictionaries with various definitions depending on who we want to be at any given moment, however we are missing the important - being authentic to oneself because only from this demanding lifelong process, where we do not ask about the path but directly inquire those paths, does genuine work emerge. Architecture, as a visually expressive art, sometimes responds to society, but it is society that should provide deeper insights into our minds. Without these insights, we cannot fill the gaps because we do not know the language of dialogue, nor do we know the language of architecture. This leads us to the essence of the problem, namely that architecture should not be subservient to philosophy or science but should critically respond to the era in which we find ourselves, and philosophy contributes to that end with its methodological side as a quiet of the soul, and science with its unwavering joy of gained knowledge. An architect has great power in creation but also a great responsibility to let this awareness be born within, which is a great gift.

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[15] The concept of information is understood here as the realm of data that is directly relevant to an individual and influences their life. In contrast, the concept of a message is the content of data that does not have an impact on an individual's life. For example, information might be the weather conditions for a builder who wants to construct a house tomorrow, whereas for the life of this builder, it is inconsequential that the GDP has dropped by 0.003 points. Often, information is confused with a message and vice versa. (Page 7)

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THE NOTIONAL SPACE OF THE INTELLECTUAL LOAD OF THE ARCHITECTURE STUDENT: ARCHITECTURE SCHOOL - WHAT SHOULD IT BE? THE FRAMEWORK FOR A POSSIBLE DISCUSSION ON THE FURTHER DEVELOPMENT OF THE ARCHITECTURAL SCHOOL

Kolařík Radek

ABSTRACT: (My) current view of the teaching structure in schools of architecture. From my point of view, it is based on what is essential: the relationship between the main subject of the field - studio teaching and accompanying fields, or the period of self-study. A view after more than twenty-five years of successive and simultaneous work at four schools of architecture in the Czech Republic, with a short experience abroad (ETH Zurich). I created simple models of current and potential (often discussed) situations. The models simulate the relationship of the essential elements of the study in terms of their meaningful mastery by the student. Words and images are assembled into meanings in the brain's semantic space, creating a message that should be understood. At the same time, the models illustrate how the project communicates with two basic tools: non-verbally (pictures) and verbally. The form of reflection is motivated by the pursuit of accuracy of perception[1]. Because: we learn, among other things, by exposing our thoughts.

KEYWORDS: architectural education; university education; purpose of study; graduate profile; content of the study program; studio project; accompanying disciplines; self study

STARTING POINTS, COORDINATES[2]

The studio is the basic subject of the field, the royal discipline of the field, the focus of the actors (students and teachers).

Accompanying disciplines make the most of the possibility to communicate information in an applied form, directly on the basis of the work in the studio; not in an ineffective autonomous form "an sich" for possible "ad hoc" application; these are all disciplines from the whole range of disciplines that are offered for architectural education;

Self-study is the basic form of study; "College study is independent study under the direction of and/or in collaboration with a teacher";[3]

The aim of the study is the expansion of thinking, expressed (most often) by the project[4];

A project is a guide to the preparation, execution and maintenance of a work[5]; in the context of a school of architecture, it should then, of course, also meet the conditions imposed on research or scientific work; according to the year of study, not in terms of difficulty, but in terms of the nature of the work and the outputs.

ELEMENTS OF SPACE

Figure 1 is a model of a bachelor's degree, Figure 2 is a master's degree. From left to right: self-study, studio, accompanying disciplines.

Fig. 1.: Elements of space - bachelor's degree. (Created by: Author)

Fig. 2.: Elements of space - master's degree. (Created by: Author)

ELEMENTS-PRINCIPLE OF SYNERGY

For the display of the synergy (originally, or for the

Fig. 3.: Elements-principle of synergy - 100% hue saturation. (Created by: Author)

Fig. 4.: Elements-principle of synergy - attenuated hue saturation. (Created by: Author)

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[1] prof. PhDr. Rudolf Koutek, CSc.

[2] The unit of measurement for this balance sheet is the standard student. It does not take into account the 20% or so of students who navigate any acceptably conceived model of study structure, regardless of its addressability; or those who study in the sense of "I have never let school get in the way of my education." Mark Twain.

[3] Radek Kolařík, since 1996

[4] related to the study of architecture and urban planning; for the reasons stated in the conclusion, the consideration does not directly relate to the field of landscape architecture

[5] Jiří Plos, most often, since 1993

presentation at the conference) an illustrative CMYK colour model was chosen (colours are subtracted). The elements are displayed in proportion to each other, with a hint of blending (colour subtraction). In view of the black and white version of the proceedings, the symbol from the Japanese platform computer game Pac-Man[6] was used for the models in monochrome, allowing in contrast the addition of hue saturation. Figure 3 shows a model of 100% hue saturation and its sums. Figure 4 shows a model of attenuated hue saturation and its sums for selected situations where studio deployment is attenuated for various reasons.

They are crucial for the quality of teaching:

- proportion of elements
- their hierarchies
- relation to the imaginary centre of the study
- a measure of synergy

I look at the individual models from these perspectives and comment on them.

MODELS OF SPACE

They show the current state of the teaching structure prevailing at the faculties of architecture of technical universities. Taking into account the differences in the length of studies at the bachelor's degree level, or the total length of studies, the model of FA CTU was used as a basis. For the other schools, the model is then applicable in corresponding semesters. Thus, the normal or standard semesters are shown, not those in which a bachelor's thesis or diploma project is prepared. Similarly, it is necessary to take into account, for example, the specificity of the bachelor's thesis at the FA CTU: it is not a building design, but a documentation for a building permit with elements of documentation for the execution of the construction, based on the building design prepared in the previous semester as part of the study for the bachelor's thesis.

1st, 2nd and 3rd semesters of Bachelor studies:

- disproportion of elements;
- elements are perceived without prioritization, mutual relationship or hierarchy;
- it is not clear what is the centre of the study;
- the degree of synergy is practically zero.

The consequence is a distorted understanding of the goal of study and teaching by their actors. The distortion consists in the fact that students at the beginning of their studies have practically no opportunity to realize what is the main subject of the discipline and therefore the aim of studying architecture and urban planning.

Fig. 5.: 1st, 2nd and 3rd semesters of Bachelor studies. (Created by: Author)

4th semester of Bachelor's studies:

- disproportion of elements, self-study atrophies to disappear;
- position of elements reversed;
- central dominance of accompanying disciplines; studio often pushed out of the space;
- the degree of synergy is practically zero.

This is undoubtedly a crucial period in which the conditions for the meaningfulness of the remaining years of study are shaped-a key moment for discussion.

Fig. 6.: 4th semester of Bachelor's studies. (Created by: Author)

5th semester of Bachelor's studies:

- atelier and self-study are atrophied (little space for their development due to the dominance of accompanying disciplines); self-study is usually sporadic, without any noticeable reflection in the studio;
- elements distant from each other;
- the centre of the study is still not obvious;
- the degree of synergy is practically zero.

Fig. 7.: 5th semester of Bachelor's studies. (Created by: Author)

6th semester of bachelor studies-bachelor thesis:

- atelier and self-study are atrophied (disproportion between the development of thinking and the teaching of craft in favour of the teaching of craft due to the nature of the bachelor's thesis); self-study tends to be sporadic, with no noticeable reflection in the studio;
- elements are distant from each other;
- the centre of the study is still not obvious;
- the degree of synergy is insufficient.

Comment on the discussion: the teaching of craft should always be present, but should never overshadow the primary goal of architectural studies-the development of thinking.[7]

Fig. 8.: 6th semester of bachelor studies-bachelor thesis. (Created by: Author)

1st and 2nd semesters of Master's studies:

- the general reduction in the intensity of deploy-

Fig. 9.: 1st and 2nd semesters of Master's studies. (Created by: Author)

[6] Pac-Man (Source: https://cs.wikipedia.org/wiki/Pac-Man)

[7] "Today, I draw the opposite conclusion from this observation: anything that is not somehow related to practice and is not honed by it does not need to be taught at all. Hence such hatred of disciplines in which forms of thought can be recognized and practiced, disciplines that have no immediate relation to practice, i.e. classical philology, philosophy, mathematics, classical literature, art and music." LIESSMANN, Konrad Paul. The theory of uneducation: the fallacies of the knowledge society. Prague: Academia, 2008. XXI. century. p 46. ISBN 978-80-200-1677-5.

ment is a consequence of the current bachelor degree course

• synergy replaced by penetration

• self-study is not sufficiently developed

• deployment intensity slowly returns to normal; sometimes at the cost of exhaustion before DP processing

3rd and 4th semesters of Master's studies:

• significantly individual: It depends on how each student approaches his/her studies; whether he/she decides to prepare a pre-diploma project as a preparation for the culminating performance that he/she should submit in the diploma project, or whether he/she chooses the path of simply completing the studies without this motivation (more likely the model in Figure 10, usually valid for the 20% of students who show almost professional independence in their approach to studies; sometimes this time is used for a rush to accumulate credits, which results in the completion of up to three semester projects in one semester (more in Figure 11, usually applicable to the majority of students who pursue simple completion without further ambition or motivation).

• The distinctly differentiated approaches naturally lead to completely different models applied by students in the master's degree.

Fig. 10.: 3rd and 4th semesters of Master's studies. (Created by: Author)

Fig. 11.: 3rd and 4th semesters of Master's studies. (Created by: Author)

MODELS OF VISION

The models should be identical for all normal semesters of the Bachelor's and Master's degree.

Acceptable model (FA CTU)

• element proportions are uniform;

• their position is hierarchical;

• the studio is therefore not in the centre of the studio;

• a degree of synergy is absolutely necessary;

• disproportionate synergy of pairs of elements without synthetic link to the studio (low studio efficiency).

Fig. 12.: Acceptable model (FA CTU). (Created by: Author)

Optimal model (FA CTU)

• the proportions of the elements are uniform;

• their status is equal;

• the studio is in the middle of the studio;

• the degree of synergy is highest;

• the autonomous link between self-study and accompanying disciplines without direct link to the studio disappears.

Fig. 13.: Optimal model (FA CTU). (Created by: Author)

Fig. 14.: An idealistic model. (Created by: Author)

An idealistic model, probably from the point of view of all technical universities, but unrealistic with regard to the position of architecture faculties within technical universities, Czech education and accreditation of courses. Resp. ideal model (School of Architecture AVU, partly VŠUP, ARCHIP)

• the level of studio subsidy is higher than for other elements;

• their position is hierarchical in favour of the studio;

• the studio is in the middle of the studio;

• the degree of synergy is high;

• the autonomous links outside the studio space completely disappear.

The utopian model is valid for the present; in the future, theoretical considerations include

Often used as a reference model for the "classical college student"[8], though more likely to belong to pre-WWII times or be conceivable in top music, ballet, etc. schools;

• the level of studio subsidy is higher than for other elements;

• their position is hierarchical in favour of the studio;

• all elements are centrally arranged;

• the degree of synergy is high;

• the autonomous links outside the studio space completely disappear.

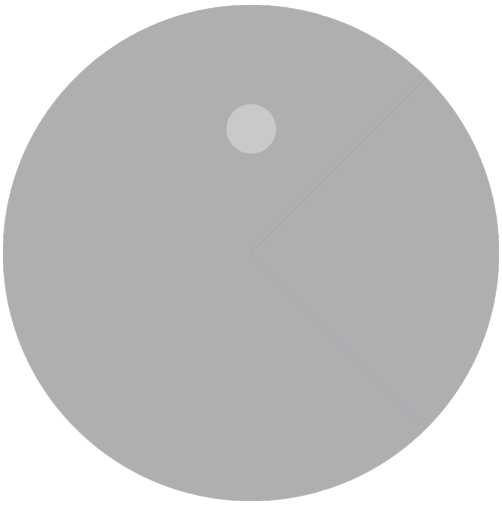

Fig. 15.: The utopian model. (Created by: Author)

Fig. 16.: Accompanying disciplines-commentary. (Created by: Author)

Accompanying disciplines-commentary
Their role is crucial to the achievement of the learning objective. They should pursue the following objectives:

• be in proportion with the other elements at each stage of the study (do not overload students out of balance);

• their position should be as their name says (to complement the main subject of the field-studio);

• they should never become the focus of study (the result is a distorted view of the students of its meaning and purpose);

• the degree of synergy with the studio should be maximal, commensurate with the fact that it is a study and not a practice (i.e. no matter what: the study is about simulated practice, not real practice).

Accompanying disciplines-form
The basis of the teaching of the accompanying disciplines should be a pair of lecture on a consistent topic and an immediately following exercise, in which the students verify the application of the topic of the lecture and thus fix its meaning. This is maximally true in the case of typology (buildings, cities), and subjects related to structures. In the spirit of the motto "Hard on the training ground - easy on the battlefield."[9]

• in contemporary terms,

• analogous to teaching the basics of a language or sport.

The other accompanying disciplines should then be taught in an analogous way: in a targeted manner, to the extent necessary and manageable, taking into account the needs of study and the profession after graduation.

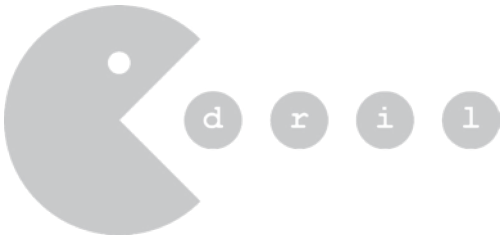

Fig. 17.: Accompanying disciplines-form. (Created by: Author)

Fig. 18.: Accompanying disciplines-form. (Created by: Author)

Accompanying disciplines-measure of the load
Architect's Notes: the slim book contained everything a builder could manage to complete a building (an apartment building) about a hundred years ago. Now there is multiply more to master. But the human brain-that is, the brain of the architecture student (as well as that of his teacher)[10] - is not twice as powerful. We should take this into account if we are discussing the demands placed on the student, or if we want those demands to be realizable, and above all, student-able. So that they are not a collection of student credits with no apparent meaning to students.

The outcome of a joint teaching effort could be, for example, this: "Give me a fixed point and I will move the Earth."[11]

• if we show the students this point, then maybe they will find it,

• and maybe they'll move something,

[8] i.e. a student undergoing an education characterised by Wilhelm von Humboldt, for example, who actually found his ideal in ancient Greece

[9] Alexander Vasilyevich Suvorov

[10] When designing a curriculum, we should always and always keep in mind that the student is studying a discipline (in this case architecture and urban planning) and the accompanying disciplines play a role in it. Teaching mathematics to architects is quite different from teaching it to information technology students. It is not a good sign that architecture students successfully complete a high-level course in descriptive geometry and yet subsequently discover that a stagecoach has a head at horizon height in perspective view; that they talk about a cube and show a prism; that they take a course in statics and talk about a pylon and present a projection at their thesis defense, etc.

[11] Archimedes. Once upon a time, 300 years BC.

• or they understand that they prefer not to move or not to want to move,

• but they'll have something to fall back on when they graduate.

The extracurricular world is not round, it is square. It's not round, it has sharp edges. We have to accept that the imagined intellectual space of the student is more a part of the extracurricular world than the one framed exclusively by the school. I guess that's right. The academic world, for all its respect for its role (not just the now disproportionately socially valued one)[12], should not be a world unto itself. It always has a chance to become a better version of itself.

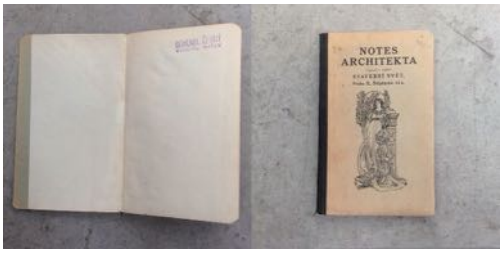

Fig. 19.: Architect's Notes. (Created by: Author)

PROFILES OF INDIVIDUAL SCHOOLS IN TERMS OF THE REPRESENTATION OF INDIVIDUAL ELEMENTS IN THE NUMBER OF HOURS OF TEACHING.[13]

The time shown for self-study is based on the assumption of maintaining the mental health of the students. It is therefore what is left in a 40 hour week.[14] An hour is defined as 45 minutes, i.e. an instructional hour. Again, standard or regular semesters are shown (excluding first years, semesters when a bachelor's thesis or diploma project is being worked on).

Studio project - number of hours per week at each school. Figure 20 in the bachelor's degree, Figure 21 in the master's degree.

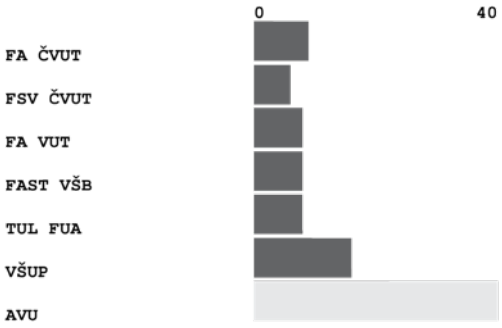

Fig. 20.: Studio project - number of hours per week at each school - bachelor's degree. (Created by: Author)

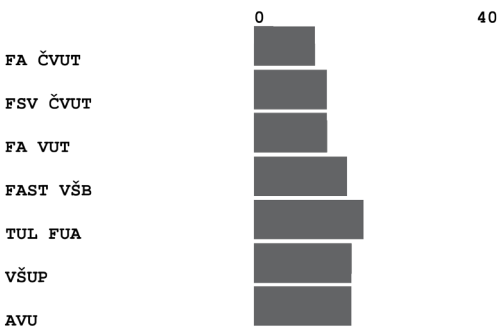

Fig. 21.: Studio project - number of hours per week at each school - master's degree. (Created by: Author)

Accompanying disciplines - number of hours per week at each school. Figure 22 in the bachelor's degree, Figure 23 in the master's degree.

Fig. 22.: Accompanying disciplines - number of hours per week at each school - bachelor's degree. (Created by: Author)

Fig. 23.: Accompanying disciplines - number of hours per week at each school - master's degree. (Created by: Author)

Self-study - number of hours per week at each school. Figure 24 in Bachelor's degree, Figure 25 in Master's degree.

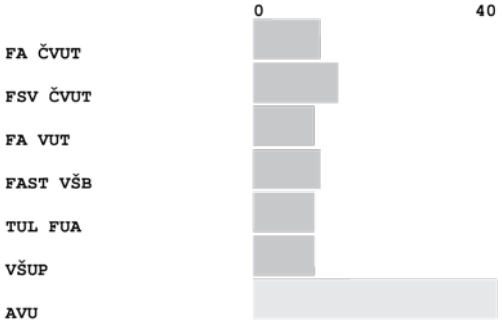

Fig. 24.: Self-study - number of hours per week at each school - bachelor's degree. (Created by: Author)

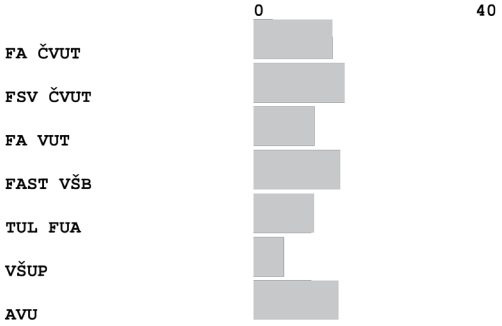

Fig. 25.: Self-study - number of hours per week at each school - master's degree. (Created by: Author)

The Avu School of Architecture in Prague is accredited only for its master's programme (and doctoral studies, as it is a university-type college). To a certain extent, it can be concluded that this school is the only one in the Czech Republic where the quality of the students it admits is directly dependent on the quality of the studies and the quality of the graduates of all the oth-

[12] "Remember, as long as we pay generals more than teachers, there will be no peace in the world." Jan Masaryk

[13] Of course, this figure is only relevant in certain circumstances. It is based on reality, which takes the state of affairs as it is and assumes that it is relatively the same at the schools mentioned. This is in full awareness of ideas such as "The European Credit Transfer System (ECTS), which is part of the Bologna Process, is supposedly a measure of 'student workload', i.e. the amount of work a student needs to achieve a particular goal. The credits or performance points awarded for certain student activities therefore do not represent any substantive equivalent of study, but only compare the time spent. It is one of the ironies of world history that the Marxist doctrine of the value of labour input, which economic science has relegated with contempt to the dustbin of history, has made a joyous return in European curricula. The value of a study is measured by the average amount of time spent on it. Such a renaissance of Marxism as the core of an educational reform that misunderstands itself as liberal cannot be underestimated." LIESSMANN, Konrad Paul. The theory of uneducation: the fallacies of the knowledge society. Prague: Academia, 2008. XXI century, p.77. ISBN 978-80-200-1677-5.

[14] The number of hours is derived for the purposes of this discussion from the weekly working time of 40 hours stipulated by Act No. 262/2006 Coll., the Labour Code.

er schools that prepare students for it at the bachelor's level (of course, not only the Czech ones). Thus, one could very simplistically say that the students of the School of Architecture of the Academy of Fine Arts could become a kind of mark of the quality of studies at the bachelor's level at other schools. The ratio of admitted applicants from Czech schools to those from abroad could then, very simplistically, serve as an indicator of how Czech architectural education compares to that abroad.

Basic elements - number of hours per week at each school, aggregate picture. Figure 26 in the bachelor's degree, Figure 27 in the master's degree.

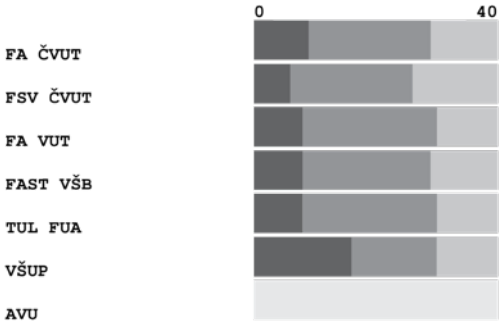

Fig. 26.: Basic elements-number of hours per week at each school - bachelor's degree. (Created by: Author)

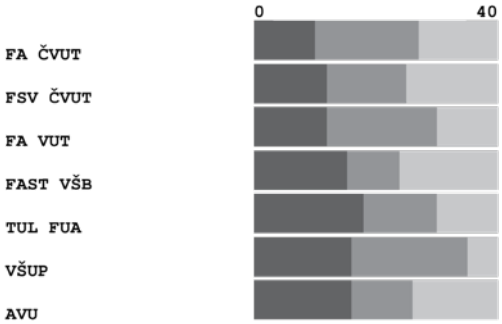

Fig. 27.: Basic elements-number of hours per week at each school - master's degree. (Created by: Author)

Basic elements - the number of hours per week at each school in the first year. This is the time when a

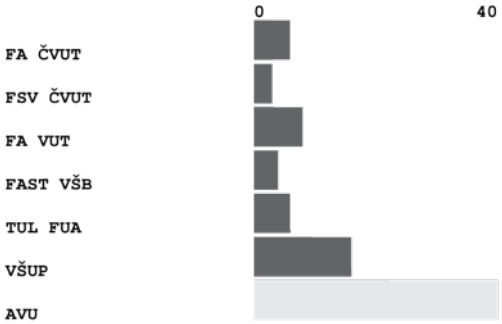

Fig. 28.: Basic elements - the number of hours per week at each school in the first year. (Created by: Author)

Fig. 29.: Basic elements - the number of hours per week at each school in the first year. (Created by: Author)

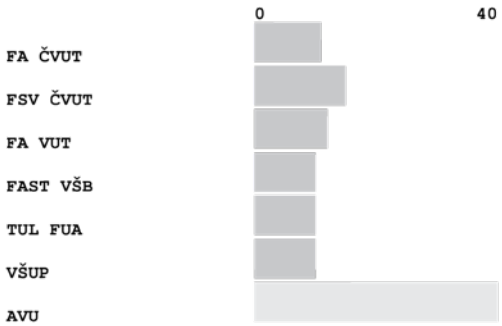

Fig. 30.: Basic elements - the number of hours per week at each school in the first year. (Created by: Author)

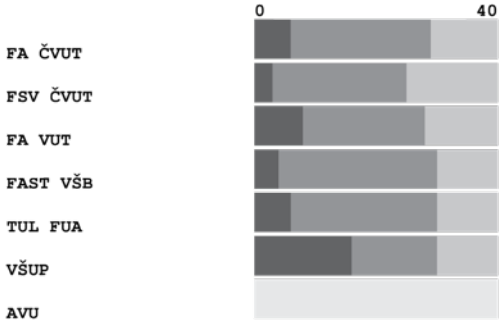

Fig. 31.: Basic elements - the number of hours per week at each school in the first year. (Created by: Author)

student's basic ideas about school are formed and thus his or her relationship to school and to learning. **From my own experience, I have concluded that the students admitted to each are basically the same (they are a reflection of their previous education). Their transformation occurs in the course of their studies. They become (again) an image of the school they graduate from. Understandably, always as a rule, not uniquely.**

Basic elements - the number of hours per week at each school in the year in which the bachelor's thesis is prepared. Here it is also good to take into account the different length of the bachelor's degree: the FA CTU has a three-year degree, other technical schools have a four-year degree. Also, the nature of the bach-

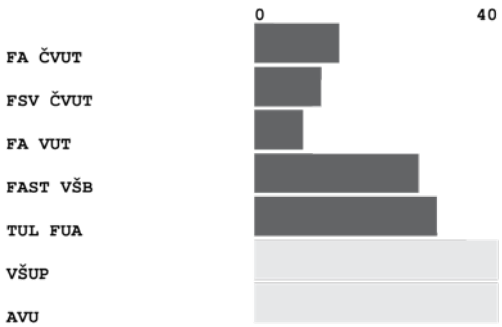

Fig. 32.: Basic elements - the number of hours per week at each school in the year in which the bachelor's thesis is prepared. (Created by: Author)

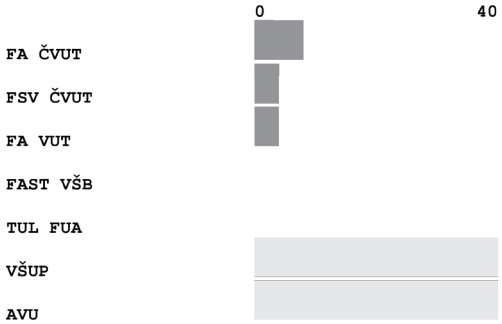

Fig. 33.: Basic elements - the number of hours per week at each school in the year in which the bachelor's thesis is prepared. (Created by: Author)

Fig. 34.: Basic elements - the number of hours per week at each school in the year in which the bachelor's thesis is prepared. (Created by: Author)

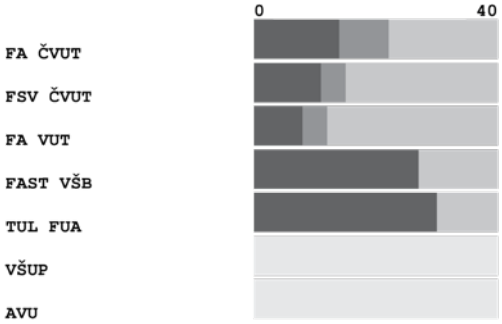

Fig. 35.: Basic elements - the number of hours per week at each school in the year in which the bachelor's thesis is prepared. (Created by: Author)

elor's thesis at FA CTU is different from other technical type schools: it is not a building design, but a hybrid of documentation for a building permit and documentation for the execution of the construction based on a previous study for the bachelor's thesis.

Basic elements - the number of hours per week at each school in the year when the diploma project is being prepared. The issue is not only the practical absence of accompanying disciplines in some schools, but also the meaningful form and content of those that are available. In any case, the question arises as to whom and to what extent students have the opportunity to consult their diploma project in terms of the accompanying disciplines and with regard to the nature of the topic, the assignment of the diploma project.

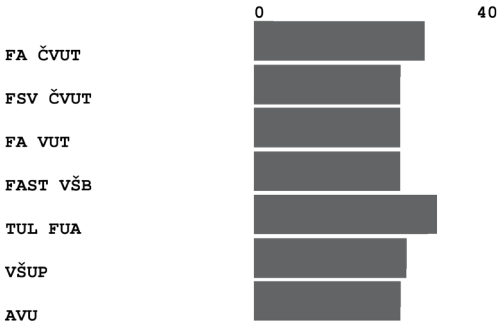

Fig. 36.: Basic elements - the number of hours per week at each school in the year when the diploma project is being prepared. (Created by: Author)

Fig. 37.: Basic elements - the number of hours per week at each school in the year when the diploma project is being prepared. (Created by: Author)

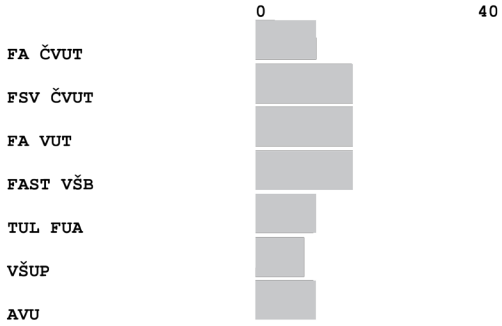

Fig. 38.: Basic elements - the number of hours per week at each school in the year when the diploma project is being prepared. (Created by: Author)

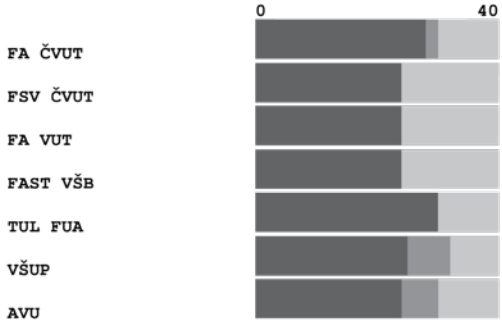

Fig. 39.: Basic elements - the number of hours per week at each school in the year when the diploma project is being prepared. (Created by: Author)

The number of teaching hours is based on the published data for the academic year 2022/2023. The average number of teaching hours per week is given for a normal/regular/standard semester or year, excluding semesters of architectural design fundamentals and those where a bachelor's thesis or diploma project is being prepared.

PROFILES OF INDIVIDUAL SCHOOLS IN TERMS OF LENGTH OF STUDY AT EACH SCHOOL

Left in the Bachelor's degree, right in the Master's degree. The anomaly of FA ČVUT in the bachelor's degree and the understandable longer length of the master's degree at AVU and VŠUP are noticeable.

Fig. 40.: Profiles of individual schools in terms of length of study at each school - bachelor's degree. (Created by: Author)

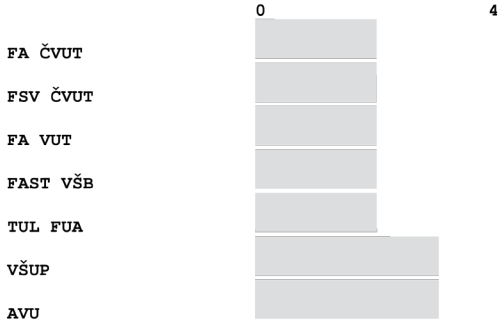

Fig. 41.: Profiles of individual schools in terms of length of study at each school - master's degree. (Created by: Author)

PROFILES OF INDIVIDUAL SCHOOLS IN TERMS OF NUMBER OF STUDENTS

in architecture and urban planning in the sum and in combinations of disciplines given by their accreditation at individual schools. For some specificity, with due respect to this field, it is not part of this basic consideration for the field of landscape architecture. In order to keep the focus on the essentials. The principles of consideration for teaching this discipline would then, of course, be analogous.

Number of students at each school. Figure 42 shows the number of students in the Bachelor's degree, Figure 43 in the Master's degree.

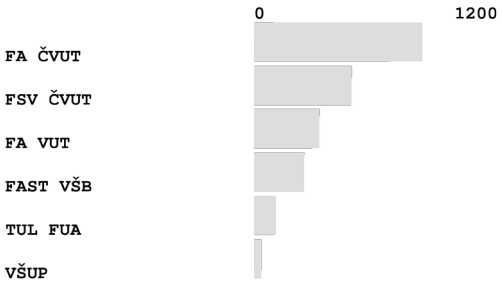

Fig. 42.: Number of students at each school - bachelor's degree. (Created by: Author)

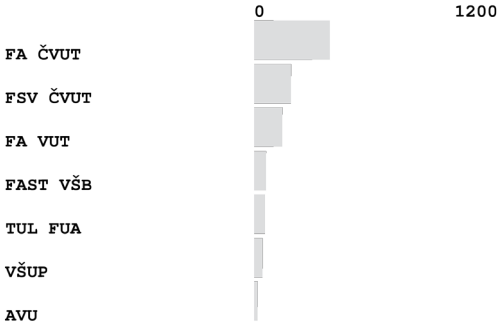

Fig. 43.: Number of students at each school - master's degree. (Created by: Author)

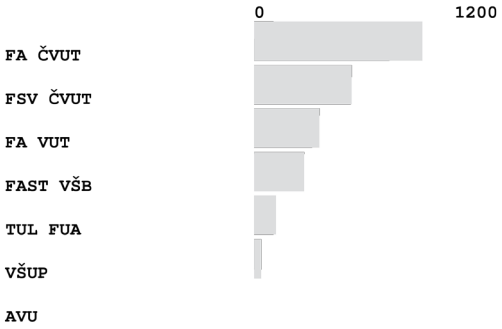

Fig. 44.: Number of students at each school-an aggregate picture of bachelor's and master's degrees. (Created by: Author)

Figure 44 shows the number of students at each school-an aggregate picture of bachelor's and master's degrees.

The student numbers quoted are based on data published for 2021. Specific numbers are deliberately not given as they are not material and the information would not be relevant (student numbers fluctuate according to demographic trends, among other things). I assume roughly proportionate to individual schools. The ratio is the most basic information for reference. [1], [2], [3], [4], [5], [6], [7]

EPILOGUE

The reflection focuses on the crucial relationship that determines the quality of architecture education, which is mentioned in the introduction. The relationship between studio teaching as the main subject of the discipline, accompanying disciplines and self-study. It deliberately omits other important prerequisites. These are, for example, the correct chronology of the accompanying disciplines and the topics of the semester projects. The accompanying disciplines should always precede in content what is to be used (subsequently) in the elaboration of the studio project (the subject Urban Construction should not follow the urban planning assignment in the studio). Equally important is the teaching of typology. In some schools, it is part of the studio teaching without the preceding series of lectures and exercises. The question is whether such a loaded management of the semester assignment is the right conception of the main subject of the discipline.

It goes without saying that a comparison of schools of technical learning is relevant. The University of Applied Arts in Prague and the School of Architecture of the Academy of Performing Arts in Prague are included for comparison. And in particular to make the difference in the models of the basic relationship obvious (and logical). One of the target groups of this reflection is (future) architecture students and this concentrated information can help them in their orientation. The main ones are those who influence the structure of teaching and its direction in the various schools. The reflection is in fact a prelude to the other parts entitled Graduate Profile, Content of the Study Programme, etc.

SOURCES

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[5] Annual report on activities for the year 2021 [online]. Faculty of Arts and Architecture of the Technical University of Liberec, 2022. [cit. 05.06.2023] Available from: https://doc.tul.cz/11309

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A MAN AND HIS SPACE – ARCHITECTURE IN RELATION TO HOME

Kozlová Linda

ABSTRACT: How a place becomes a home, what such a place looks like, and what it means for its residents, not only the place itself but also the objects within it. The relationship between house and home is not straightforward. Housing as an architectural form, in its physical embodiment, particularly from a functional perspective, often surpasses the concept of home as a specific human existence. On the other hand, home, in terms of experiences and emotions, often transcends housing, not only spatially but primarily on an existential level.

This article is a theoretical interpretation of the phenomenon of home with a focus on its material and spatial dimensions. The aim is to connect knowledge from the humanities with the field of architecture and provide a foundation for further research on single-person households of young adults in the Czech Republic and their connection to dwelling and the process of creating a home.

KEYWORDS: home; dwelling; house; place; space; architecture; materiality; sociology; sociology of housing

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INTRODUCTION

"Architecture is our primary tool in our relationship to space and time and provides a human scale to these dimensions. It domesticates the boundless space and infinite time that the human species inhabits, tolerates, and understands." [6]. During its evolution, architecture has changed from a mere means of protection to a distinct reflection of the character of society. It has become a kind of man-made extension of nature, providing us with a basic premise for perceiving and a horizon for understanding the world. [6]. It is obvious that architecture is strongly intertwined with other disciplines and, for the most part, with those of the humanities such as sociology, anthropology, and psychology. Knowledge of these disciplines thus seems almost indispensable for an architect. As the architectural theorist Dalibor Veselý says about architecture, "...architecture is not primarily a technical discipline, but a humanistic one". [12]

In the first part of this thesis, we will focus on the concepts of "dwelling" and "home" which multidisciplinary connect and anchor people in architecture. The term "home" has no precise definition, and it can be approached from various angles. Therefore, it is subject to scrutiny by different disciplines, particularly sociology and phenomenology, which explore its connection to the field of architecture.

The relationship between a house and a home is not clear-cut. Dwelling, as an architectural form in its physical form, especially in terms of function, often transcends the concept of home as a specific aspect of human existence. On the other hand, the notion of home, in terms of experience and emotion, often surpasses dwelling, not only spatially but primarily on an existential level. Home can be understood as the fundamental situation for anchoring a person in the world and as the central point of their existence. [2]

However, this point also has a physical form and substance that significantly influences the overall meaning and expression of a home. The material and spatial components of dwelling and home are largely architectural or are greatly influenced by it. How does a house or apartment become a home for someone? It is important to mention, in this regard, both possible approaches, namely the phenomenological and critical perspectives, which, given the disciplines involved and the breadth of the topic, have a significant presence in this case. The starting point of this text will be Martin Heidegger's phenomenological approach, which has served as the foundation for many other authors across various disciplines.

The text is an introductory theoretical background to research on single-person households of young adults in the Czech Republic and their relationship to housing and home-making. In particular, the focus is on the material and spatial dimensions of the home, which are most co-created through architecture, and an understanding of which is crucial to the field. This thesis aims to define the concept of home in relation to architecture and its perception and negotiation by the individual.

HOME AS A STARTING POINT

Dwelling and home are concepts that have been universally embedded and perceived in society for many years. The phenomenon of home has been explored across disciplines, and with this come different approaches to its definition. To begin, I will try to define the three fundamental concepts in this text, namely - architecture, house, and home. Subsequently, the text will offer definitions and perspectives on the concept of home from various disciplines.

Architecture is the creation of space and matter, forming the built environment where each of our lives unfolds. It serves as a backdrop but also a means through which we connect with a specific place and time. One of the most common products of architecture is the house, which exhibits various archetypal forms across the world and in different cultures. The house is distinctly characterized by its mass, which delineates the space and serves as the boundary between the outside and inside - the interior and exterior. When we talk about dwelling, we refer to a type of house with a well-defined primary function. The most abstract of these concepts is undoubtedly "home." Can home be defined as a place, or is it more about the relationship to that place? In my opinion, there is no single answer that entirely and precisely encapsulates this term. In the following lines, I will present key approaches from different disciplines that will provide us with partial definitions of the concept of home.

Heidegger's way of thinking and defining the concept of "living"[1] is crucial for phenomenology and will serve as the foundation for this text. At the core of his philosophy is the human being and their unique existence in the world, or dwelling. However, "dwelling" carries a different meaning in his approach compared to the conventional usage of the word. Heidegger perceives dwelling as a specific way of being in the world, involving the creation of places and things. In his work, architecture is seen as a phenomenon with the purpose of existentially supporting the human being; thus, "dwelling" becomes an integral aspect and purpose

[1] Home as a place, however, can go beyond our private spaces and can be understood in different ways, but at the same time these private spaces do not necessarily mean home for everyone. Home itself and how we experience it is influenced by the environment in which it is situated, and which surrounds it. [Vacková, Galčanová, 2014]

of architecture. This phenomenological approach to dwelling and home forms the basis for many other authors across various disciplines.

"A person lives insofar as they can navigate their environment and identify with it." "Housing, therefore, encompasses more than mere 'shelter.' It also implies that the spaces where life unfolds have a distinct and defined character." [5] There is no doubt that architecture plays a pivotal role in a person's life and their self-identification.

Looking at the issue of "home" is even more complex. Several disciplines, in which the topic of home is pivotal, offer a range of definitions for this phenomenon. In sociology, what's pertinent to the question of home is the household as a functional unit and its spatial configuration, specifically the relationship between individuals and their dwellings. However, sociology's primary focus is not on buildings and architecture but rather on the relationships that form within them, particularly interpersonal ones.

Phenomenological perspectives define home as a place essential for human existence because humans and the world don't exist separately; they are interconnected. Place represents the concretization of meanings within the world, and home serves as the central locus of human existence. [2] Given this nature, it's also crucial to concentrate on the material aspect of home, of which architecture itself is a part. These themes hold paramount scientific interest for us, especially concerning the anthropologist and sociologist Peter Gibas.

"Architecture articulates 'being in the world' and reinforces our sense of reality and self. It does not create worlds of mere invention and fantasy. Buildings and cities provide a horizon for understanding and confronting the conditions of human existence. It directs our consciousness back to the world and to our sense of self and our being." [6] Housing is a fundamental manifestation of human existence in the world, which is experienced through architecture. This connection between architecture and its human experience has been explored by Finnish architect and theorist Juhani Pallasmaa, who is one of the main proponents of the phenomenological perspective on this topic, which he relates to the field of architecture.

The home thus becomes a pivotal site for comprehending our relationship with the world and should receive maximum attention in the realm of architecture. Not only do we influence and shape it, but it, in turn, shapes us, our attitudes, values, and behaviour. Therefore, from a phenomenological standpoint, the home transcends the material aspect; it represents just one of its components. [2]

The connection between the material aspect of home and the meanings that home represents for us was emphasized in studies conducted by the French sociologist and psychosocial scientist Perla Korosec-Serfaty in the mid-1980s. She offers a slightly different perspective on the concept of home, with a primary focus on the process of home-making as an appropriation of place on both material and meaningful levels, which evolves. She also introduces another critical element in the study of home, which is the temporality and dynamics of this phenomenon.

According to Perla Korosec-Serfaty, any changes that impact the significance of a place also modify and influence our relationship with home. Therefore, it is clear that reconstruction, alterations, and even simple decorations in our personal spaces alter our relationship with these places and represent a form of appropriation, not just at the material level but also in terms of meaning. This approach shifts us away from the positivist perspective of phenomenology and guides us toward a different interpretation and exploration of the concepts of living and home.

This critical approach and study of home diverges from the original phenomenological concept of home as a place for existential grounding in the world. It transforms this concept into a complex space influenced by a variety of external factors. Critical approaches and studies of home are no longer phenomenologically universal, but look at the context in which the issue is studied.

For example, one of the current scholarly themes is the relationship between the material and the imaginative or signifying aspects of the home, which pushes and expands the techniques of studying material culture. It is primarily concerned with understanding the home as a place that helps people to co-create their identity. [2] Thus, we arrive at several levels of home - the first being the material side of home and the second being the meaning and experience side of home. It is the boundary between the house, as an architectural form, and the home that is very indeterminate and in a way fluid. For this reason, we can encounter phenomenological and critical approaches to this topic.

In this area, the thinking of the British political scientist and sociologist Anthony Giddens and his theory of individuation can be seen as a starting point, which may have implications for our understanding of home as a place where individual self-realization and the expression of identities take place. The home thus becomes an environment in which unique individual experiences and preferences are formed and expressed. It emphasizes interconnectedness and balance, particularly between the material and social components of the home.

It is clear, therefore, that the definition of home is not clear-cut and varies according to discipline and approach. However, home can be defined as a phenomenon that has material, spatial, temporal, and psychological dimensions. It becomes the central place in our lives, and at its core is our 'self.' It is a place that has a physical form, the scale and meaning of which may vary from person to person.

MATERIAL AND SPATIAL DIMENSIONS OF HOME

If we revisit the thoughts of Martin Heidegger and his concept of dwelling, we find that for him, the essential aspect is the place or the possibility of living and dwelling in a specific place. The negotiation of home and home itself is thus inherently connected to a particular place. Place and space are not synonymous in this context. Unlike space, place lacks clearly defined boundaries or scale. This distinction allows us to conclude that home need not be confined to a specific space; it often transcends it. However, they are interrelated and linked to time.

A similar perspective on the materiality of home is presented by Blunt and Dowling, who emphasize the multiscalar nature of home. They explicitly state that the home within the house is just one level of home. Other levels might include, for instance, the neighbourhood, city, state, and so on. [16]

In many ways, architecture becomes the instrument of birth, and the house becomes the subsequent imaginary vessel of the home, which, to some extent, can significantly influence its creation. Not only the private spaces themselves, but entire localities and cities, can assist people in the process of building and creating a home. We perceive the qualities of the space that surrounds us, the materials of the architecture, and its scale with all our senses. "An architectural work is

not experienced as a series of isolated images... we perceive it in its fully integrated material, embodied, and spiritual essence. [6] Therefore, it is necessary to pay special attention to these physical manifestations of home.

The material aspect of home is also dynamic and changes during the process of negotiating home. Often, material culture represents a compromise between the ideal and the real worlds and available resources. Some things we accumulate over many years, while others we forget after some time, and they become unnecessary. However, it is important to realize that these things co-create the home and have a significant influence; they are a part of us. This material aspect of our private space could be considered our life story, which we adapt to our own image. This image is influenced by a multitude of factors that work together in the process of negotiating home.

The process of creating a home is aided not only by architecture itself but also by the objects we place in the space and commonly use. How are these objects involved in this process, and how does it happen that a mere structure becomes a home? Adapting and modifying the space to our needs can be described as the initial negotiation of a home, initiating the process by which a foreign space becomes our home. [8]

ARCHITECTURE IN THE NEGOTIATION OF THE HOME AND THE ROLE OF THE ARCHITECT IN THIS PROCESS

Architecture is the primary context of our lives. It has certain functions assigned to it in advance, while others it acquires over time through interaction with humans. What is the role of the architect in this process, and to what extent can the architect influence the creation of a home? Given that the negotiation of a home is a long-term process influenced by a variety of factors, it is evident that the architect's role should not end with the mere delivery of a blank canvas, especially when we are discussing living spaces.

Unique research into people's preferences for the layout and furnishing of their apartments and houses was conducted by the Institute of Housing and Dress Culture.[2] Although this research remained primarily theoretical, it employed a sophisticated methodology that involved a broader spectrum of professionals, allowing it to yield unique data on the needs and desires of the inhabitants of that era regarding their apartments, houses, and furnishings. Psychological methods were also included to ascertain why people discounted certain dwelling layouts over specific furnishings and decorative items in their living spaces.

The comparison between the ideas of the ideal way of living and the actual state of affairs that generally prevailed in our country at that time was very important. The architecture of housing, which includes apartments and houses that become homes for us, is influenced by several types of factors. The external objective factors include the architectural form of the building itself and its layout. This involves the use of individual rooms and their physical form, which is composed in the smallest detail of furnishings and other items of daily use for each of us.

Research has revealed the basic requirements of the general public for furnishing flats and houses. Functionality and utility were the key and predominant requirements. In particular, for some specific rooms and specific furnishings, variability, and the possibility of change with respect to the life stages of the occupants of the dwelling also played a role. Furthermore, the importance of aesthetic and emotional aspects in furnishing apartments is very evident from the research. Often, the things to which we have an emotional attachment are the strongest catalysts for a home. [9]

It is clear, then, that home studies are a key tool for understanding the relationship between humans and architecture. Privacy is one of the fundamental rights of each of us, it is the right to determine what information we will communicate about ourselves to our surroundings and in what form. It is the private dwelling that provides us with a home that is the perfect reflection of us. If we want to understand architecture, we must first understand ourselves.

CONCLUSION

The text focused primarily on the topic of home, which is becoming an increasingly studied and addressed topic across disciplines. The intention was to present the issue of home and housing through the lens of different disciplines and their multidisciplinary interconnection with the field of architecture.

Architecture is a key tool for human relationships and understanding of space and time, through which we are able to comprehend the world. Linking architecture with the humanities, such as sociology, anthropology, and psychology, is essential in order to create architecture that has the potential to become an important factor in human identification, especially in the field of housing and the process of home-making. It articulates our existence in the world and provides us with a horizon for understanding and confronting the conditions of human existence. The home becomes a pivotal site for understanding our relationship with the world, and therefore, it is essential to give it the utmost attention in the architectural field.

In this respect, the architect as a creator has a very strong influence on the future use of the space and its possibilities for adaptation and modification in the process of creating a home. Space, layout, materials, and other architectural factors can have a significant impact on our feelings, mood, and well-being. A well-designed space can promote communication, interaction, and the creation of social connections. When choosing a house or an apartment, we often look for specific elements that reflect our identity and values.

Home is a very complex concept that can be viewed in many different ways, and its interpretation is influenced by a variety of factors such as culture, religion, geographic location, and so on. The concept of 'home' is defined in the introductory section from several perspectives, and basic starting points for understanding it are outlined. The phenomenological approach and the definition of home as the existential anchorage of the human being in the world serve as a springboard for further approaches.

Home negotiation can be defined as a process in which several factors come into play. One of the main ones is the materiality of the home, which includes the architectural form itself, as well as furnishings and daily necessities. There is a constant interaction between the individual and the material aspect of the home, which helps the person create the emotional and experiential dimensions of the home. This material aspect of home takes on even greater importance, especially for people living independently.

I believe that the material form of the home plays a key role in the process of creating a home, and the architect, from their position as a creator, can significantly influence it. However, it is important to mention that this is an initial stage in the process of negotiating a home, which raises the question of whether the architect's expertise can contribute to the creation of the home at other stages of the process. These stages

[2] ÚBOK (Ústav bytové a oděvní kultury) The Institute of Furniture and Clothing Culture was established in the Czech Republic after the Second World War and its main objective was to meet the needs of the time and to improve the industrial production of nationalized companies in the field of furniture design, lighting, textiles, clothing and other consumer goods.

are determined by changes in needs and the evolution of the human psyche over the course of a lifetime. Therefore, the role of the architect should probably not end with the delivery of an empty structure before 'moving in.'

The text is based on publications by architects and theorists with a phenomenological approach, as well as studies dealing with the issue of home in the field of sociology and other humanities in the Czech Republic. The aim of the text was to link these different disciplines and their approaches to the topic of home.

In conclusion, the relationship between architecture and home plays a key role in our perception, experience, and identification. Architecture has the potential to create environments that greatly influence our emotions, relationships, and overall quality of life, especially in the context of housing. Therefore, it is important to pay the utmost attention to this topic. As a further research question, it is suggested to explore to what extent and at what stage of the design process an architect can influence the process of home formation in the case of mass housing development without knowing the specific future occupant of the space.

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THE PHYSICAL ENVIRONMENT OF THE SCHOOL AS A SUPPORT FOR STUDENTS' INTERNAL MOTIVATION TO WORK AND LEARN

Polák Vít

ABSTRACT: The article presents ongoing research on the conection between the physical school environment and the intrinsic motivation of pupils. It identifies the support of internal motivation as one of the key principles of modern pedagogy. Based on the psychological Theory of Self-Determination, it poses the following research question: In what way does the physical environment of the school participate in satisfying the need for autonomy, competence and relatedness. It presents methods from the field of ethnography and a comprehensive research methodology, which is applied in the form of a multiple case study. It outlines several theses arising from the ongoing results of ongoing research.

KEYWORDS: architecture; education; theory of self-determination; physical environment of schools

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INTRODUCTION

Due to demographic development in the Czech Republic, there are currently being built again primary school buildings. At the same time, innovative pedagogical methods of teaching are becoming more and more popular, and clients require these methods to be taken into account when designing school buildings. If we as architects are to monitor the functionality of our proposed built environment, we need to understand what is going on in the school, what the current pedagogical view of the educational process is and what role the physical environment plays in this process.

A study of the pedagogical literature shows that the importance of the physical environment for the realisation of educational goals is clearly more emphasised in pre-school and primary school education. Interaction with the physical environment has a significant impact on the sensitivity of sensory perception, the development of cognitive functions and elementary skills, and the development of fine and gross motor skills, which are prerequisites for the subsequent acquisition of knowledge; for the successful development of those skills, it is the period of early and middle childhood that is crucial.

During primary and secondary education, as the importance of text, information and visualization and information technology increases, the attention paid to the physical environment decreases in terms of the contribution it can make to the acquisition of the educational curriculum, i.e. the content of teaching.

Looking more closely at current trends in pedagogy, one of the key themes that emerges is the support and development of students' internal motivation to work and study. In this sense, an attractive and supportive physical environment, if it ensures the satisfaction of certain natural needs of pupils, can play some role and be pedagogically helpful. What these needs are and how the physical environment of the school can contribute to their fulfilment is the subject of ongoing research. In this text I would like to present the focus and methodology of this research.

PHYSICAL ENVIRONMENT AND EDUCATION

Since the middle of the last century, there has been systematic research on the effects of the physical school environment on educational attainments of students. Initially, research focused primarily on easily measurable physical environmental characteristics such as light intensity, noise intensity, air quality and temperature. Later, the research dealt also with the structural characteristics of the school environment, the influence of the presence of natural features, and the typological diversity of educational premises. However, a key difficulty with such research is the limited ability to isolate the importance of the physical environment from other influences that contribute to students' academic achievement, which are usually more significant. At the same time, the very question of the method of testing learning outcomes comes into play.

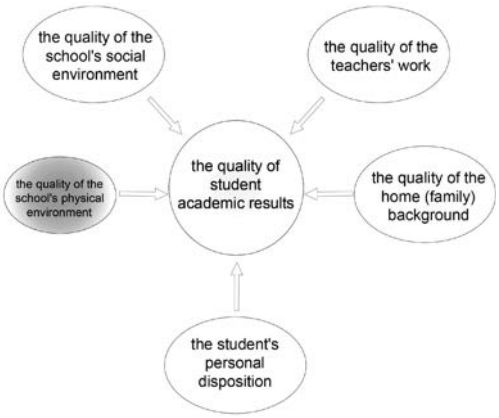

Fig. 1.: Influences on the educational process (Source: author)

For these reasons, a number of studies, often qualitative, have been conducted focusing on the links between the characteristics of the physical environment and specific sub-processes of learning, educational climate, social interactions, etc. Then, in recent decades, meta-studies comparing and verifying the results of many previous studies have been carried out.[1] One of the important conclusions regarding the influence of physical environment parameters on the course of study is the importance of the relationship that students, but also school staff, have towards their physical environment. [1] What then significantly influences this relationship is the possibility of participation, i.e. some form of involvement in the design, creation, modification or maintenance of school spaces. This finding corresponds with the findings of pedagogy, which increasingly requires pupils to do their own thinking and creative work rather than repeating memorised information. There is a departure from a transmissive conception of teaching to a constructivist conception, i.e. from the transmission of ready-made knowledge to the promotion of pupils' own construction of findings. This means that the learner does not passively receive the content of the schoolwork, but seeks, discovers and constructs knowledge and understanding.

The concept of key personal competences is emerging among the objectives of education and the impor-

[1] E.g. [1], where the authors present a compilation of the results of more than 200 relevant papers from several disciplines (architecture, pedagogy, psychology, ergonomics) published from 1911 to the present. Most of the papers come from the Anglo-American environment from the last 30 years.

tance of one's own skills and ability to orient oneself in complex problems and to respond creatively to the challenges of a changing world is growing. In education, the importance of internally motivated action and active personal participation of each student in the learning process is thus increasing. [2] A key principle appearing in various forms and to varying degrees in contemporary educational innovations seems to be the support of students' internal motivation to work and learn. This aspect is the focus of our research, which concentrates on the link between the parameters of the physical environment and students' internal motivation. Whether, and how, a correlation can be found between these phenomena is the first question to be answered.

INTERNAL MOTIVATION

Internal motivation is when the motivation for the learning activity stems predominantly from cognitive needs (the learner is interested in what they are learning) - it is therefore internal motivation in terms of the learning activity (the learning activity itself satisfies the need). In other cases, if different needs, originally independent of the learning activity, are satisfied through that learning activity (pupils learn in order to achieve a certain task, a goal that is set and the achievement of which brings a certain reward, e.g. praise from the teacher, joy of their parents, admiration of their classmates, admission to school, a gift, etc.), we speak of external motivation. Internal motivation is not only the most valuable in terms of the quality of learning, but it is also of the highest value for the future of the learner, where it persists as a lifelong ability to expand one's skills and knowledge. [3]

The nature and preconditions of internal motivation are dealt with in the Self-determination theory, which was proposed in the 1970s by psychologists Richard M. Ryan and Edward L. Deci. They formulated the theory on the basis of experiments in which they investigated differences in human behaviour motivated by external reward on the one hand or by one's own personal need on the other. They found that people motivated by their own need, who "enjoyed" the activity or found it interesting, worked with greater commitment and achieved better results than people who worked for financial rewards. In other experiments it even turned out that people who initially worked based on intrinsic motivation reduced their performance in the activity after switching to external financial rewards. [4]

Based on their research, the authors of the theory state that: ”Inherent in human nature is the proactive tendency to engage one’s physical and social surroundings and to assimilate ambient values and cultural practices. That is, people are innately curious, interested creatures who possess a natural love of learning and who desire to internalize the knowledge, customs, and values that surround them. “ [5]

The emergence and growth of internal motivation is only possible under certain circumstances. According to Self-Determination Theory, the satisfaction of certain personal needs is necessary. The authors of the theory have identified three key human needs, the satisfaction of which leads to the development of internal motivation. These needs are experiencing of one's own autonomy, perceiving of personal competence, and feeling of relatedness with other people. The authors further state that these needs are innate and that they are growth needs. It means that their satisfaction does not lead to a state of equilibrium, where the reasons for further activity disappear, but instead leads to further self-developing human activity. These three human needs can be characterized as follows:

Autonomy:
A state in which a person acts for themself. That is, when they perceive that the cause of their actions is only their own motives. The physical environment may or may not provide the space and opportunity for such behaviour.

Competence:
A state in which a person receives feedback from the environment confirming their actions as successful. Feedback here does not take the form of an external reward but rather information that the action was successful. For example, the learner may perceive satisfaction or even delight from the results of their action in their environment without that implying the receipt of any reward. Such feedback can also be obtained from the physical environment, for example, when one is satisfied with one's creation or knows how to handle an object or orient oneself in an environment.

Relatedness:
The state of feeling part of a larger social group with which one shares important aspects of one's life. For example the language, the values to which they subscribe, the story they live but also, for example, the place where they spend time together. What is significant then are the shared experiences, which are usually situated in a physical, spatial framework.

It should be emphasized, that a quality learning environment must provide for pupils' (and teachers') basic human needs[2] in the first place and that, in meeting these needs, the social environment of the school is largely involved. [6] However, the needs identified in Self-Determination Theory are precisely those that can be related to pupils' active actions and participation in their own learning, and at the same time it is possible to find support for their saturation in the physical environment. Thus, the presented research project focuses on the physical environment as the support for pupils' self-directed learning, which in some educational conceptions represents a diversifying adjunct but in others constitutes a key principle underpinning the entire educational paradigm.[3]

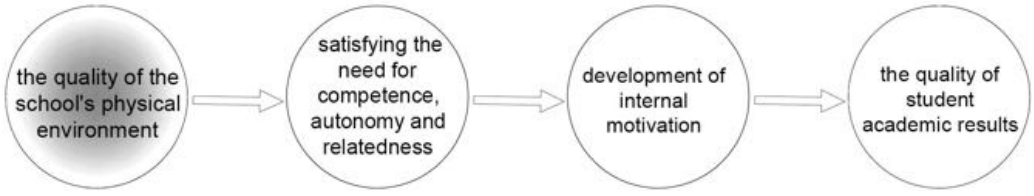

Fig. 2.: One of the possibilities of the physical environment influencing pupils' learning outcomes (Source: author)

RESEARCH METHODOLOGY

The research aims to clarify, through the examples of specific school premises, how the physical environment of these schools contributes to the satisfaction of students' needs for autonomy, competence and relatedness. We thus look for details in the school built environment that provide pupils with support and stimulus for their own personal interest in the world. We thus examined such structural features and phenomena of the school built environment where we identified some connection to pupil autonomous

[2] Biological and physiological needs, needs for security and safety, social needs, need for respect and recognition.

[3] Democratic schools, such as Summerhill in the UK or Sudbury in the USA, in their rejection of learning as a duty, represent such a different view of schooling that we can speak of a separate educational paradigm.

action is identified. Then, it is examined in detail how the physical environment contributes to satisfaction of these three above stated needs.

It is therefore initial research that seeks to understand the situation of users of the school environment through the concept of Self-Determination Theory, to describe this situation in as much detail as possible, and to isolate the significance that the physical environment has for this situation. That is why the research is conducted as a qualitative one, in the form of a multiple case study using a combination of methods from the field of social sciences. The individual cases are concrete campuses chosen to be as diverse as possible in their structural characteristics. For example, buildings with different architectural styles, different periods of construction and different spatial arrangements. The aim was to create the most diverse typology of places and physical objects with which it would be possible to relate the satisfaction of the three identified needs.

The emic perspective, i.e. the point of view from the perspective of the pupils themselves and their actions as they are actually carried out in the school environment, is crucial for the whole research. This approach places the thesis in the context of school ethnography and builds on, for example, research conducted between 1990 and 2005 by the Prague School Ethnography Group. [7] The research is thus focused on the parameters of the physical environment, but examines them through the minds and actions of the users of that environment.

The set of informants

For each school to be evaluated, a pool of informants will be defined in agreement with the school management. Due to the nature of qualitative research and the methods used, it is not necessary for the sample to be too large.

As children's relationship to their environment, both physical and social, changes during the defined period (7-14 years) [8], and the motivational spectrum also changes, it is important to select informants from different age categories. We therefore conduct the investigation within these three age categories:

7-9 years (preschool age reverberation)

10-12 years (peak childhood)

13-14 years (early adolescence)

The questionnaire survey in the first phase of the research is conducted in individual school classes, i.e. among about 20-25 children in each age category. It means 60-75 pupils in each school.

In the second phase of the research, for the survey in the form of a group interview, smaller numbers of informants are more appropriate, in this case groups of no more than 6 pupils. We envisioned one such group in each age category, i.e. 18 pupils from each school.

The initial research is conducted by a questionnaire survey using the free-naming method within a specified cultural domain [9] that consists in listing phenomena related to one specific characteristic. This one characteristic is called a cultural domain in ethnography. In our research, cultural domains are characterized by autonomous behaviours, such as "a place where I can read". Thus, the informant lists all the places in the school where they can read. It is important that they list the places they can think of, i.e. the places where they actually read or at least find suitable for reading. Of course, it may be that they list a place that they know is intended for reading (e.g. the library) but where they have actually never read because it does not suit them. For example, it is noisy, there is nowhere comfortable to sit, etc. Such a fact should be revealed in the next stage of the research. It is an in-depth interview with a small group of pupils, which takes place by having a group of children guide the researcher around the school building and talk together about why a particular place is significant.

By that time, the researcher already has the results of the written questionnaire that were collected in the first phase of the research. He therefore knows what to ask and at which places to stop. These methods can be supplemented by participatory ethnographic observation. Especially there, where group dynamics play a role in children's actions, observation seems to be the best method of finding out what usually happens in a given place and how this relates to the physical parameters of the space. The investigation conducted among the pupils is also complemented by a semi-structured interview with their class teacher, in which the pedagogical context of the identified phenomena is clarified. For each case, i.e. the school premises, a photographic documentation is also made, and the identified locations are marked on the building floor plans.

The formulation of the questions is adapted to the age of the pupils so that they are understandable to them and, at the same time, directly or indirectly reveal the presence of the saturation of needs according to the Self-Determination Theory.

Initial questionnaire questions

1. Do you have any favourite places at school where it is nice to be, to spend time? Which are they?

2. What are some places at school where you can read, study, or work? Which are they?

3. Is there anything beautiful in your school? Are there any beautiful places? Which are they?

4. Are there any places in your school where you can observe, explore, or try something interesting? Which are they?

5. Are there any places where you can create or make something? Which are they?

6. Is there anything in your school building that you created or participated in when it was created, or is there anything in the school that you take care of?

7. What are some places where you can talk or otherwise hang out with your classmates?

8. Do you think your school building is special in any way? In what way?

9. Are there any places where you meet and talk to teachers outside of class? Which are they?

10. Is there any other place in your school that is important to you that we haven't mentioned here? What is it?

The answers obtained from the questionnaires are then entered into a table. The table is arranged in such a way that in the first column all the answers are listed in each row, i.e. the specific locations of the school premises, as well as possible answers such as "all", "nothing", "don't know". There are therefore as many rows as there were specific items in all the responses to all the questions. Other types of responses are also recorded.

In the first row, the questions asked are then assigned to each column. It means there are 10 columns for the 10 questions of the questionnaire. Each column is further divided into two colour-coded sections to distinguish the responses of boys and girls. For each instance in which a given location appears in the answer to the corresponding question, a cross (x) is marked in the table and placed according to the gender of the child. Thus, if one location appears repeatedly as an answer to one question, the appropriate number of crosses is then placed in the appropriate box.

From the table we can then acquire the following data:

- the number of items listed for each question
- total number of items listed
- the order of importance of each site
- variability of responses, or, conversely, the degree of consensus within the group
- possible difference in the responses of boys and girls
- the ratio of the total number of items listed to the number of pupils completing the questionnaires.

For an in-depth interview with students, the following questions are key:

What is interesting or beautiful about this place? What can you do here (with this)? Why can you do this? What usually happens here?

After the second phase of the research, the sites relevant to the satisfaction of needs, as defined in the Self-Determination Theory, are identified. (Not all the sites described are related to the satisfaction of needs as defined by the theory.) For each of these sites,

location:	1. a popular, pleasant place	2. a place to work and learn	3.beautiful place	4. a place to observe and try	5.a place to make and create	6.own creation	7.meeting place with classmates	8. exceptionality of the school	9. meeting with teachers	10. another important place
swiming pool	x			x	x			x	x	
cafe point	x	x	x				x		x	
lookout tower (garden view)			x							
garden	xxx	xxxx	x	xx	xxxx	x	xx	xx	x	x
classroom	xxx	xxx x xxxxx	x	x	xxxx	x xxxxx	xx	xxx	xxxx	x x
nothing						x				
school canteen			x					xx	x	x
corridor	x					x	x	x	xx	xx
gym			xx	x	x					x
swing	xxx		x				xx			
library	x	x								
place around the fire pit (in the garden)			x	x						
after-school centre	xx	x	x	x	x		x	x	x	
school workshop				x	x xxx					
teachers' lounge									xxxxx	xxx
I dont now				x		xxx		xx		x
carpet (in the classroom)	xxx	x x	x				x	xx		
my school desk		x x	x		x	x				x
sofa	xx	xx	xxxx	x			xxx			
library			x							
insect observation				x						
English classroom						x	x			
art education classroom						x				
toilets							xx	x		x
Leonardo DaVinci?								x		
triangle room									x	x
terrace	xxxx			x			x			
corridor		x								
football field	x		xxx							
flowers, squirrels, trees				x						

Tab. 1.: Record of the results of the questionnaires completed by seventeen 5th grade students (Source: author)

locality	What is happening in the locality? What activity satisfies needs according to SDT.	How does the environment contribute to this?	Boundary conditions. Under what circumstances would this not be possible?
tea room ("niche" in the dining room)	**Autonomy** The very presence in the space is a matter of choice. They sit here in different ways (on the floor, on cushions, in the window) and informal conversations take place here. Older students come to work here and sometimes have lunch here. It is one of the possibilities where you can go to work in a smaller group as part of organized teaching. Thus, it expands the possibility of choice within this teaching as well.	**school institution** The school sets rules for the use of the space. Smaller children are not allowed to eat here, otherwise the space is free to use without conditions.	If the school allowed, for example, only teachers to use the space.
		interior equipment The space is separated from the dining room by a wooden structure woven with fabric. So it is not separated acoustically and visually only to a certain extent.	If the space was not separated in any way, it would lose its intimacy.
		school building It is a structurally designated space (niche) in the larger space of the dining room	If this space had not been separated from the dining room, it probably would not have been created at all.
	Competence Sometimes it is necessary to negotiate the use of the space with other pupils. If you eat here, care must be taken to maintain order. However, competence as a need is only satisfied in the sense that pupils experience (as a matter of course) that they can use the space without supervision according to their own needs.	**school institution** It allows all students free access. Holds students accountable.	If the time and method of use were organized and limited by the school.
		interior equipment Seat cushions can get dirty or damaged.	Pupils appreciate the design of the interior. If it were a bare space, the possibility of using it would have less weight (for some pupils).
		school building	---------- *
	Relatedness Children like to be together in a small group. They value "peace", i.e. a certain intimacy of the space.	**school institution** It allows all students free access.	If the time and method of use were organized and limited.
		interior equipment The partition separates the space from the dining room and thus promotes a feeling of intimacy. A separate space promotes a feeling of closeness	If the time and method of use were organized and limited.
		school building It is a structurally designated space (niche).	The dining room as one large space would not evoke such a feeling of closeness.

Tab. 2.: Site analysis (Source: author)

a table is drawn up which clearly names which of the mentioned needs is being satisfied, how this happens and how the conditions in the social environment of the school, the parameters of the interior furnishings and the parameters of the building contribute to this.

DISCUSSION

The proposed research seeks to gain as detailed an insight as possible into pupils' lives in the physical school environment and pursues a shift in education towards greater pupil autonomy. It is clear from previous research that where teachers allow children to be autonomous, i.e. where pupils are given the opportunity to work independently, work in small groups or work on optional projects, younger children in particular then seek out any place in the school space that is at least somehow separated. They work everywhere, including corridors, changing rooms and toilets. If the children have the opportunity, for example during afternoon playgroup time, they use the school premises in a similar way during their free play. This places on the school building demands for a high degree of complexity, multiple scales of space and variable usability of all spaces. Herman Hertzberger already worked with this principle in his designs in the 1960s. In the Czech Republic, however, it does not appear very often in the designs of school buildings.

There is also a clear difference in the approach to space between younger and older pupils. While pupils aged up to about 12 years use all the possibilities of space, preferring the natural environment of school gardens and playgrounds, older pupils turn their interest away from physical space towards the social environment of school. In a simplification, we can say that they are attracted only to places where they can be together and pay minimal attention to the physical context of the environment. This finding corresponds with results of research on childhood and children's relationship to the environment [8]. The exception are spaces that allow for some real activity (real in the sense, that it goes beyond mere school exercises). A professionally furnished workshop, studio, theatre hall or music rehearsal room tend to be real inspiration for their own activity and creativity in the upper grades. One important theme that emerges here is the competence of pupils in school. Although there is much talk in pedagogy about cultivating personal competences, school is usually a place where, for various, often understandable reasons, children's competences are largely taken away from them. Here, there is room for collaboration between educators and designers (and architects) to design environments with minimum risk so that pupils can use them independently as much as possible.

CONCLUSION

A plastic picture of what is really important or decisive for the satisfaction of needs according to the Self-Determination Theory and therefore for the promotion of students' internal motivation in the physical school environment can only be obtained by comparing similar situations in different school settings. Even completely identical elements may have different meanings in the lives of pupils depending on the social conditions in a particular school community.

Five school premises with different typological structures of the built environment were identified as a minimum number of cases.

The purpose of this research is to look at the primary school environment through the lens of Self-Determination Theory with emphasis on the importance of the physical aspect of this environment. Based on the findings, it is then possible to describe the general ways in which the physical environment could be involved in promoting students' internal motivation and suggest possibilities for further research using experiments and quantitative methods.

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THE GEOMETRY OF THE FLOWER OF LIFE AND ITS APPLICATION IN ARCHITECTURE

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ABSTRACT: In an ancient tradition that goes back to the beginnings of human consciousness, numbers and geometric shapes are archetypal metaphors representing the order of the universe. One of these basic archetypes is the symbol of the flower of life. It represents the geometry of the principle of all creation, the circle of life, the cosmic order and the living creative force from which everything comes. It appears in many cultures around the world, yet its discovery in architecture is not always that easy. It has been found, for example, in Egypt on the walls of the ancient temple of Osiris in Abydos and in palaces in Assur. In the Czech Republic, the master carpenter Petr Růžička shows unique examples of the use of circular geometry based on the Flower of Life. He gradually reveals that this symbol is not just a mere decorative element on a façade, but functions as an initial geometric measure and basic compositional and organisational unit for an entire structure. This is then harmonised in one scheme from the general layout to the details. The work connects everything with everything, everything is in everything, the small element is harmonised with the large. The architecture that arises from sacred geometry is filled with truth and beauty because it then incorporates these patterns into material reality. All the great architects of the past tried to bring a deeper order and understanding of a higher truth to architecture. Unfortunately, this tradition has not been preserved, which is why contemporary structures often look so empty and soulless.

KEYWORDS: geometry; sacred; flower of life; mathematics; order; structure; architecture; composition

"When we agree that numbers are derived from the parts of the human body, and that there is a symmetry resting on the module between the parts and the whole body, it follows that we pay homage to those who, in building the temples of the immortal gods, arranged the parts of their edifices so as to bring about, by means of proportion and symmetry, a correspondence between the parts and the whole." [1]

INTRODUCTION TO THE ISSUE

In earlier times, architects tried to design buildings to exude the order, mystery and magical power inherent in the universe. Architecture was then the art of embodying spiritual depth in the environment we built for ourselves to live, work, rest and pray in. It was an expression of spiritual understanding that was long considered to be the creator of the beauty of the building.

Numbers and geometry then served as the means by which buildings acquired their solemnity and harmony. The buildings, built according to the principles of sacred geometry, were meant to replicate the cosmic order and provide an immediate creative experience for the human being within its walls. The true spiritual and emotional effect on a person cannot then be questioned.

Real art and architecture reflect, through forms, an archetypal, instinctive and metaphysical consciousness that can be considered a priori inborn. Architects of the distant past knew that an innate, subconscious readiness precedes our conscious sensory perception. This knowledge emanates from the temples of ancient Egypt and Greece, or from medieval cathedrals. If we accept that the highest task of the architect is the exploration of the eternal truth found in the collective unconscious, then a keen awareness of the importance of archetypal phenomena will help to shorten the path in the search for deeper levels of spiritual knowledge.

Archetypes, or more precisely archetypal images, can be considered as certain guides to intuition: ways in which our intuition can be used to bring forth directly from the unconscious, especially the collective unconscious, shapes that will reflect fundamental metaphysical truths and that will express the essence of the harmony of the human being and the universe embodied in the structure of the building. According to Herbert Bangs, author of The Return of Sacred Architecture: "Architecture is both a symbol and a shield: a symbol of the Divine Reality and a shield of our material corporeality. Today we have forgotten, or lost, our knowledge of the mysterious function of symbols and architecture, whose function was to communicate eternal truth." [2] The most sublime function of architecture should therefore be the profound understanding of a great mystery and its subsequent expression through matter. Great architecture must satisfy the universal, archetypal and instinctive demands of the human soul. The sense of the ancient, spiritual role of the architect has unfortunately disappeared so completely that few people are aware of what they have lost. The master carpenter Petr Růžička compares it to a tree that grows and has its roots in history. But this tree has broken and we have lost our roots since the Middle Ages.

THE IMPORTANCE OF GEOMETRY FOR ARCHITECTURE

Geometry, the science of measurements and the interrelationships of objects in plane and space, was born at the very beginning of ancient cultures. It has been the basis of many sciences as well as architecture for thousands of years. Its uniqueness lies in its ability to link the parts to the whole. Its impressive flowering occurred during the Pythagorean school in ancient Greece in the 6th century BC.

Pythagoras was also one of the significant insiders of the Hermetic philosophy of antiquity. Hermeticism teaches that the substance of any category needs information, or an idea, for its organization. The law of analogy expresses that: What is below is the same as what is above, and what is above is the same as what is below. Or in short: Both down and up, both up and down. This law expresses the analogy of relations on different levels of reality. The law of analogy teaches us that phenomena at the macrocosmic level are subject to the same laws as phenomena at the microscopic level and allows us to judge relationships at one level on the basis of relationships at another level. [3] Above the entrance to Plato's Athenian Academy there was an inscription: "Nobody comes in here without knowing geometry." The philosopher Plato became the most important heir to Pythagoras' ideas about ordering the world on mathematical and geometrical principles. He taught that numbers are the basic building block, the root of this world. The thirteen books of Euclid's Foundations, a body of work that served as

an unsurpassed textbook of geometry until the 19th century, became a true monument of ancient learning. [10]

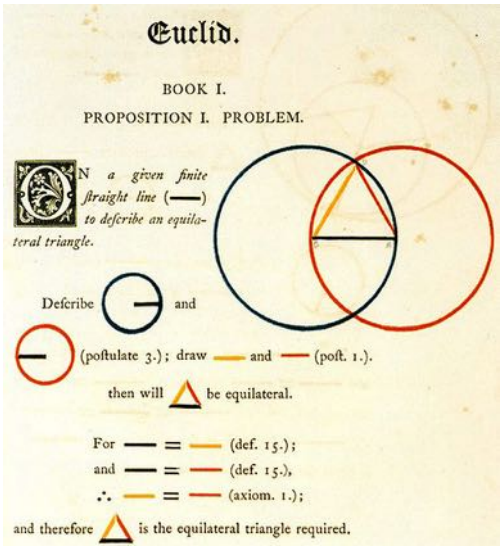

Fig. 1.: A mid-19th century illustration of Euclid's first design by Oliver Byrne. (Source: https://www.entertheearth.com/seedoflife/ [12])

Careful study of cultures, their art, architecture, religion, mythology and philosophy often reveals that surprisingly simple universal principles often lie at the root of the variety and diversity of styles and types. Plato argued that the purpose of aesthetics is not merely to copy nature, but rather to gain a deeper insight into its essence, by which we penetrate beneath its enchanting surface and seek to understand and exploit the sacred proportions of its beautifully simple but divine order.

The Greek philosopher Plotinus, the main representative of Neo-Platonism, mentions: "The wise men of old, who built temples and statues in their desire to have the gods beside them, looked to the nature of the All and knew that in the nature of the soul it is easy to be attracted, but that if one were to create something with which the soul was in harmony and able to accept a part of it, it would accept it most readily of all things. That which is in harmony with the soul is that which imitates it in the manner of a mirror that can catch the reflection of the form." [2]

In his habilitation thesis The Symbolism of Numbers, architect Jiří Oplatek writes that just like music, it is possible to influence the soul of a person through the numerical structure of space. The identical geometrical patterns according to which cult buildings of all epochs and cultures were built lead to the conclusion that the intention of their builders was not exhausted only by meeting the basic requirements for architecture in terms of purpose, strength and beauty. The conscious composition of space according to numerical laws was supposed to lead man to intuition. The knowledge of the laws of spirit and matter, expressed in numbers and their ratios, has been passed down from generation to generation and has been materialized in buildings that cannot be understood with a purely cultural-historical approach. Many buildings have been destroyed by ignorance and much knowledge has been lost. [3]

THE GEOMETRY OF THE FLOWER OF LIFE

Sacred geometry is common to all peoples and cultures around the world who have understood it as a means of connecting humans to the universe. In all parts of the world and in all religions and various ancient civilizations, the symbol of the so-called "Flower of Life" appears. This pattern is very significant because it is considered a symbol containing all the geometry of life as we know it on planet Earth. Itis a universal symbol of energy, life and connection between all that exists and captures the creation of all existence. [4]

The geometry, composed of 19 circles resembling a flower, represents the fundamental matrix of the creation of space, time and forms, the unity of life and spirit and all the interconnectedness of existing life and events in the universe. It holds the essence of everything. The symbol contains all the basic building blocks of the universe, which we call Platonic solids. [4]

Symbolically, it represents the moment when God (Unity/Substance/Source/Soul/Universal Consciousness - depending on what name we choose) activated His will to create the universe, when he left the state of stillness, non-existence, non-being, emptiness and darkness. When the Flower of Life was born, everything began and started its first cycle. We can define it as "God" - "all that is". The symbol has the ability to demonstrate how all things come from one source and are closely and permanently connected. [4]

According to Drunvalo Melchizedek, "The flower of life contains in its proportions every aspect of life that exists. It contains every mathematical formula, every law of physics, every harmony in music, every biological life form in relation to a particular body. It contains every atom, every dimensional plane, absolutely everything that exists in the wave-function of the universe." [2] Melchizedek further states: "It's not just mathemtaics and it's not just circles and geometry. It is a living map of the creation of all reality." [5]

The geometry of the Flower of Life developed from a basic central point. It is a dimensionless point, the place of the sacred centre, symbolizing "divine unity", the primordial spirit and the beginning of creation. The expansion of a point into space, the expansion of consciousness in all directions, creates a sphere or in 2D representation a circle. It symbolizes the universal consciousness, which is in a state of oneness. Consciousness without beginning or end, eternally existing and perfect in form and symmetry.

The symbol for God - Unity, Universe is a dimensionless sphere. Creation means separating from the base sphere a second sphere exactly the same as the first. It means the movement from unity to duality. Moving

Fig. 2.: Christ in a mandorla surrounded by an angel, an eagle, a bull and a lion, representing the four evangelists. (Source: https://www.entertheearth.com/seedoflife/ [12])

to the newly created and projecting another sphere of the same size as the first. The second sphere depicts God in matter and expresses the affirmation both above and below, both in heaven and on earth. The opposites are identical. [5]

The first movement creates a division of one sphere into two intersecting ones in the middle, representing the unfolding of unity into duality. This configuration is one of the most important and prevalent relationships of sacred geometry and is called the Vesica Piscis or "fish bladder". This shape was also historically known as mandorla (Italian for "almond") after the shape of the nut. The mandorla was commonly used in Christian art as a halo around the religious figures of Jesus and Mary to signify their role in uniting the divine and human realms. Vesica Pisces also symbolizes the first duality and the first day of creation.

Geometrically, it is a pair of intersecting circles with centres on their circumferences, i.e. the centroid has the length of the radius of one of them. There are two basic measures in Vesica piscis - one that extends through the centre (narrower width), and one that connects opposite points through the centre- these are the keys to great knowledge within this information. Vesica piscis can be used to construct regular polygons such as triangles, squares and hexagons. (Fig.3) It also has a unique relationship to several square roots. Historically, it was used as a geometric proof for the square roots of 2, 3 and 5 (Figure 4). It is well known that the square root of 5 generates the number fi, which is the basis of the golden ratio construction.

$$\varphi = \frac{1+\sqrt{5}}{2} = 1.6180339887\ldots.$$

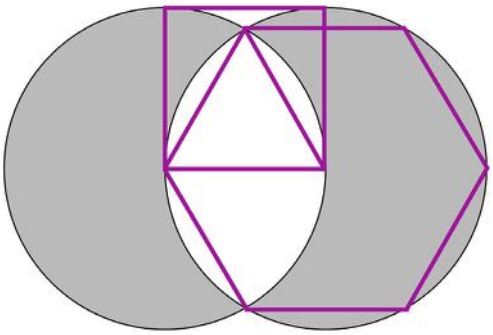

Fig. 3.: Vesica Piscis and the construction of polygons (Source: https://www.entertheearth.com/seedoflife/ [12])

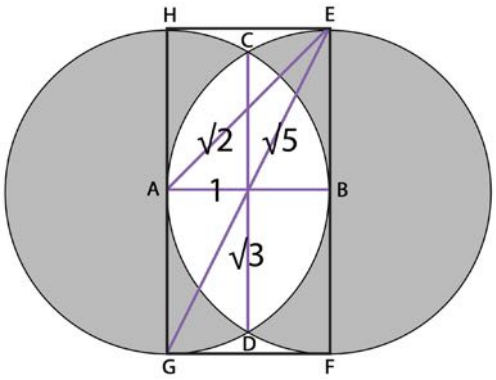

Fig. 4.: Vesica Piscis and its relation to the three square roots. If the distance A-B 1 is the radius of the two circles, then C-D = √3, E-G = √5 and E-A = √2 (Source: https://www.entertheearth.com/seedoflife/ [12])

At this point the division into two circles/spheres of consciousness is no longer unified, but divided into two perspectives. The intersecting space between the two circles/spheres depicts creation, specifically co-creation, where two perspectives meet to create something new. After the creation of this formula, there is only one instruction to follow. Always move to the innermost point of the circle and project to create another sphere. "Move toward that which is newly created until it is perfect." [5]

Then add another circle/sphere so that its centre is at the intersection of the previous sphere/circle. The result of this motion is the intersection of three circles/spheres, which is the geometric basis of the star - the tetrahedron. The trinity of circles/spheres and the essence of the number three has deep meaning in many religions. It symbolizes the divine, threefold nature of all things. It means the primordial division from unity to duality into matter and spirit. It is a combination of three levels into one. In Christian dogma it is the Holy Trinity of God the Father, God the Son and God the Holy Spirit, in Hinduism it symbolizes the trinity of gods, and in new philosophical trends a division into matter, soul and spirit is emerging.

By adding a fourth circle/sphere, the symbolism of the four, which characterizes the four elements, matter, the Earth, begins to take effect. It represents everything that is firmly and permanently anchored in matter. It is the division of duality into two parts again - expressed graphically by the square base of the pyramid or right angle in architecture. So number four is an escalation of number two to a new level.

The attached fifth circle represents the division of Unity twice into duality. In 3D projection, it creates a pyramid shape. In the 2D record, a pentagram symbolising a perfect man with outstretched arms standing on both legs - the so-called Vitruvian figure. Man then represents a living pentagram. Man has 5 senses, 5 fingers and toes, etc.

The sixth circle then forms a six-pointed star, which is a 2x equilateral triangle within itself. It thus contains the masculine and feminine principle.

The addition of the seventh circle creates the Seed of Life - the first and fundamental flower of life, representing the abundance of life and a symbol derived

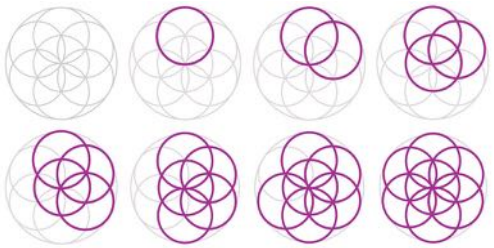

Fig. 5.: The construction of the Seed of Life. (Source: https://www.entertheearth.com/seedoflife/ [12])

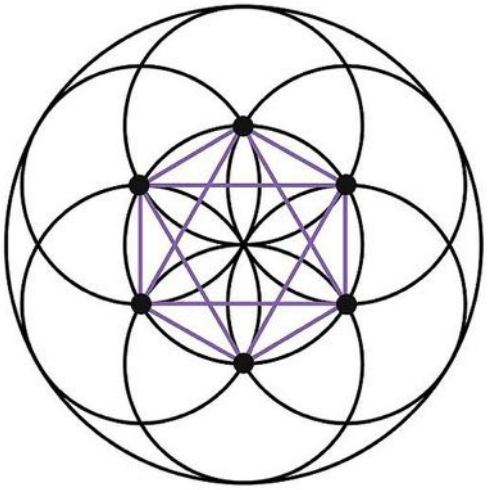

Fig. 6.: The Seed of Life construction used as the basis for the hexagon construction. (Source: https://www.entertheearth.com/seedoflife/ [12])

from Genesis - the 7 circles derived from the Vesica piscis representing the 7 days of creation of the universe in which we live.

“Seven spheres, seven days of creation, seven notes, seven colours, seven layers of muscles in the heart, seven chakras, seven endocrine glands. This geometric pattern repeats itself infinitely many times. It is the basis of all life. Thanks to it, flowers bloom in nature, and two, four, six or eight cells are formed from what was originally a single cell. On the same basis, a human body or a galaxy is formed. By multiplying the original eternal spiral, new spheres are created. In the third round, 19 spheres are finished and with them the Flower of Life. This pattern takes the form of a flower and is an eternal process. It contains musical harmonies, scales of light and a model of the growth of living tissues. Each sphere has the same possibility of development as the original sphere. Therefore, the Flower of Life produces the Fruit of Life, which composes its own flower. Each sphere has within it the five Platonic bodies, the union of masculine and feminine energy, straight and curved lines, along with two geometrical matrices which are the basis for all that is real." [7]

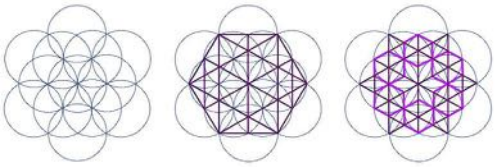

Fig. 7.: The Seed of Life design used as a template for more complex geometric shapes such as the basic grid in Islamic art. (Source: https://www.entertheearth.com/seedoflife/ [12])

By further expansion and drawing more circles on all intersections, an ever larger pattern is created. If it is circumscribed so that only 19 complete circles are visible, the **Flower of Life** is formed. It is often bounded by two circles which have their own meaning. It forms a precisely defined free space within which creation takes place. [4]

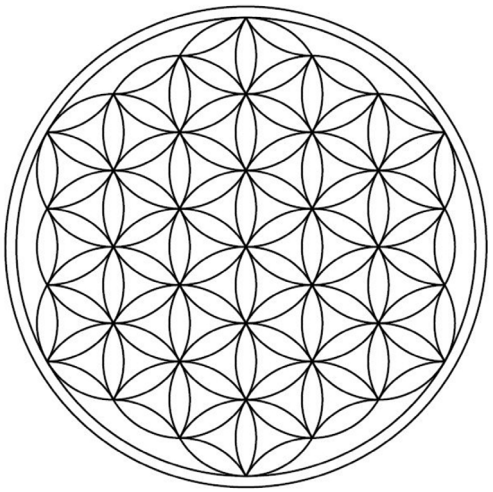

Fig. 8.: The flower of life. (Source: https://www.kamenzivota.cz/O-KVETU-ZIVOTA-a8_0.htm [13])

The joining of the centres of certain circles creates the **Tree of Life**, which is the central mystical symbol of the teachings of the Kabbalah. It is a tree, then a flower, then a seed. If these geometries do indeed have a parallel in the five cycles of the fruit tree found on Earth, then the beginning of the tree must be perfectly contained in the seed. If we place the pattern of the Seed of Life on the pattern of the Tree of Life, we can understand their relationship. They fit together perfectly! It's like a key in a lock or two parts of a puzzle - one fits exactly to the other. Here we see the synchronicity of the forms of sacred geometry and the way they move and fit together perfectly. [6]

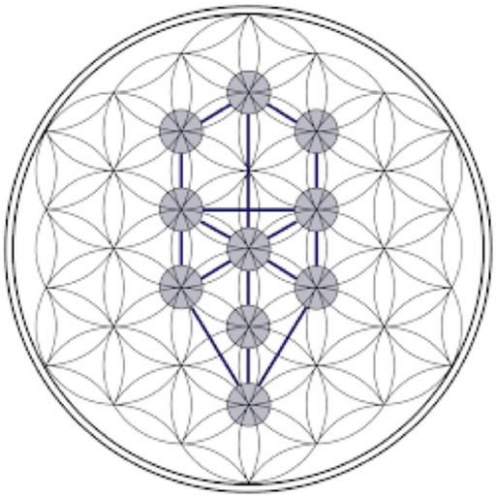

Fig. 9.: The Tree of Life. (Source: https://www.kamenzivota.cz/O-KVETU-ZIVOTA-a8_0.htm [13])

Each line in the Tree of Life, measures the width and length of the Vesica Piscis in the Flower of Life. And at the same time, they all have the proportions of the golden section. When we look at the Tree of Life laid out on the Flower of Life, we see that each line corresponds exactly to the width and height in the Vesica Piscis. [5]

By selecting the 13 central circles of the Flower of Life, the basis for the 7 circles of the Egg of Life can be obtained, which resembles an embryo in the stage of division into 8 cells. It is also given meaning because the union of the centres of the circles produces a two-dimensional projection of the cube, and the cube is also one of the Platonic solids. [5]

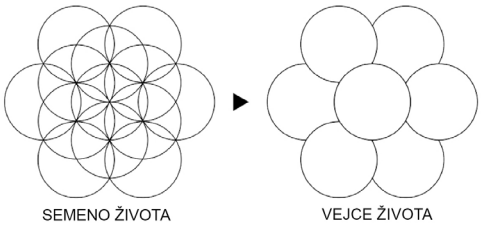

Fig. 10.: The egg of life. (Source: https://www.kamenzivota.cz/O-KVETU-ZIVOTA-a8_0.htm [13])

The completion of the Flower of Life is the **Fruit of Life**, i.e. by drawing the missing circles cut by the mentioned border and then selecting all touching circles (of which there are 11). Their centres lie on lines that divide 360° into sixths and intersect at one point - the centre of the whole image. [5]

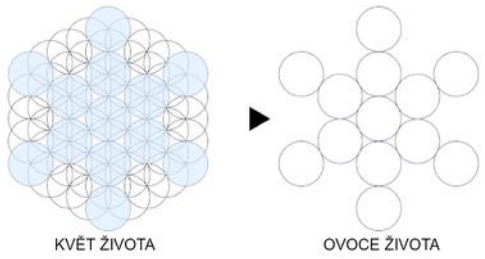

Fig. 11.: The fruit of life. (Source: https://www.kamenzivota.cz/O-KVETU-ZIVOTA-a8_0.htm [13])

The two-dimensional projection of the body that is created by connecting all the centres of the circles with each other in the Fruit of Life is the Metatron's cube. The geometry of the flower of life is also very closely related to the geometry of Platonic solids. However, I do not want to go into more details in this context. Such an analysis would require another separate article. [5]

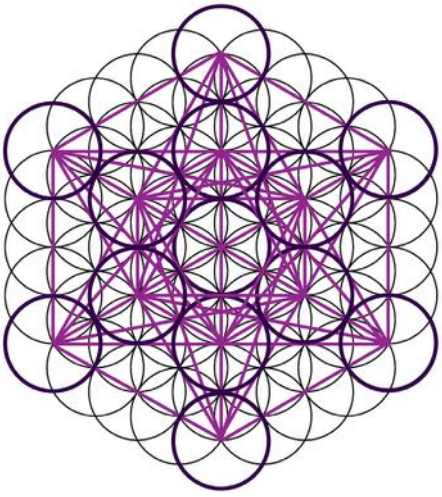

Fig. 12.: Metatron's cube. (Source: https://www.entertheearth.com/seedoflife/ [12])

The flower of life has almost the same name all over the world. It's a clean shape with clean proportions. It is called a flower not because it looks like one, but because it represents the cycle of the fruit tree. A fruit tree produces flowers that undergo metamorphosis and become fruit. The fruit contains a seed which, when it falls to the ground, grows into another tree. It is the cycle of the fruit tree from fruit to seed and back to tree in five stages.

The perfect geometry of the fascinating pattern of the Flower of Life has intrigued many a thinker. The renaissance Italian painter Leonardo Da Vinci was also captivated by it and wanted to find the essence of the universe and of man himself. On several pages in the book The Unknown Leonardo[8] we can find studies and analyses of the Flower of Life. Leonardo studied all the possible relationships of the core of the Flower of Life and calculated the angles that resulted from it, which he further applied to his physical inventions. Based on the findings of the Roman architect Vitruvius (who discovered that if a man spreads his arms, his body is approximately the same length in height and width), he managed to draw the human figure perfectly within the symbol of the Flower of Life, with the intersections of the circles exactly fitting where Da Vinci had drawn the outstretched arms, and the centre of the Flower of Life was located directly at the navel. He thus verified that this is indeed the symbolism of the beginning of the universe and the creation of man in his perfect form.

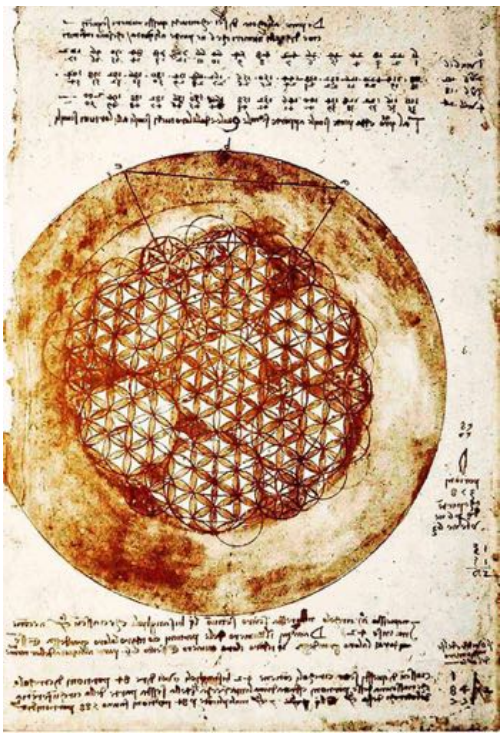

Fig. 13.: Sketch of the Flower of Life by Leonardo Da Vinci. (Source: L. Reti, The Unknown Leonardo, McGraw-Hill Book Co, England, 1974 [8])

An understanding of the basic geometry of the Flower of Life is essential for architects in addition to many other professions, and should be taught in all schools, as it weaves together all the basic geometric elements and relates them to the philosophy of creation and the deeper cosmic order. Buildings designed on the basis of these proportional relationships are characterized by a fixed order, according to which the building's contours and its individual parts are interrelated and create proportional harmony. Buildings composed in this way can then be considered beautiful and true.

THE GEOMETRY OF THE FLOWER OF LIFE AND ITS FINDINGS IN ARCHITECTURE

Despite the importance of the Flower of Life symbol of geometry, its use in architecture is relatively rare and its discovery is not easy. Sacred geometry, which had been passed down and taught for generations in the building industry, among builders and architects, was passed down only as a secret teaching and was not recorded in writing and exposed to the common man. Moreover, the original geometry served only as the basic organizational unit by which everything was governed, yet it rarely surfaced. Therefore, the search for traces of it in architecture is rather difficult, although we can see from various evidence that it is quite certain that this symbol has been used all over the world and throughout the history of mankind. It is more often found as a pattern in stained glass windows, or as an element on altars or tombs, but also as a protective symbol on everyday objects.

Perhaps the oldest depiction of the Flower of Life is found in Egypt **in the Temple of Osiris in Abydos**. Here is a set of three successive temples dedicated to Osiris. The first is the temple of Seti I and behind it is another very old temple, also called the temple of Osiris. This nearly 6,000 year old temple is one of the oldest around the world, and its walls (probably one of the oldest walls in Egypt) are engraved with symbols of the Flower of Life. Other related designs of the Seed of Life appear on other walls. The temple was first buried in the ground before being excavated again. Unfortunately it is now mostly flooded with water due to the rising level of the River Nile, but when it was first discovered it was open and dry. Here on the wall there are pictures of the Flower of Life. The original ground plan of the temple also speaks of sacred geometry in that it contains two pentagons connected by a common edge. [5]

Another example shows the depiction of the Flower of Life as a flat band relief on the façade of the **court façade of the Parthian palace at Ashur**, which was the centre of the ancient Assyrian empire (in the north of present day Iraq) from 2500 BC. The stucco elements here date from the 1st century BC and were probably originally coloured, as was popular at the time. We can see them during a visit to the Pergamon Museum in Berlin, when visiting the exhibition from the Mesopotamian period on the wall opposite the reconstructed Ishtar Gate. It was a sculptural decoration, like the **screen decoration in China**, where the pattern was drawn on the screen separating the rooms. They made the screen in a rectangular shape and the pattern covered the entire surface of the screen right to the edges. The Flower of Life is ideal for graphic representation of any surface due to its infinite possibilities of replication. It works as a base row under more complex geometric patterns such as stained glass, window tracery and mosaics. A very beautiful rosette window can be found, for example, in the **Cathedral of St. Stephen in Vienna**.

Fig. 14.: Belt reliefs of the Parthian palace in Assur. (Source: Pergamon Museum in Berlin, photo by the author)

Fig. 15.: Rosette window of the Cathedral of St. Stephen in Vienna. (Source: https://www.entertheearth.com/seedoflife/ [12])

Fig. 16.: Interlocking rosettes as door decoration on a 19th century wooden church in Lozna, Romania. (Source: https://www.entertheearth.com/seedoflife/ [12])

In the Czech Republic, Petr Růžička, a master carpenter, was engaged in researching and revealing the geometries of older buildings. He used several examples and geometrical analyses of buildings to show that the geometry of the Flower of Life symbol was applied in a much more complex way than just as a decorative element and ornament on façades. At the **Church of the Assumption of the Virgin Mary in Plasy**, north of the city of Pilsen, he demonstrated the practical use of the geometry of the circle of life and revealed its deeper geometric layers. Practically shown step by step using the Flower of Life geometry on the West Portal of what was originally a Romanesque stone basilica. On the walls of this church he discovered geometric circular structures and stone corbels that gave a clue to how the building had been designed in Romanesque times. Old Czech measurements were used and importance was placed on the algebraic record of the cubit measure (1 prague cubit = 59.3 cm)based on knowledge of the relationship between the basic unit of length and proportional relationships. The Vesica pisces, the Seed of Life and the Flower of Life were then developed on a circular basis to the extent of one Prague cubit. Petr Růžička demonstrated that thanks to this figure it is possible to construct projection networks and to develop a local surface network.

Petr Růžička presented that in the Middle Ages there was a drawing room at each large construction plant that created these networks. The original base circle was subsequently omitted, leaving only the spokes. The solid circle was not visible. Thanks to this basic design network, the individual details of the building, such as the entrance portals and other parts of the building, were also created. Petr Ruzicka clearly proved the interconnectedness of geometry on the individual details of the building and the whole. He showed the connection of the basic unit of measurement - the initial circle - the matrix and its application both on the portal and in the entire layout of the building. We are then dealing with pure geometric abstraction. The building was thus aligned with one scheme from floorplan to fine details. The work connected everything with everything, everything was in everything, the small element was harmonized with the large element; just as in the idea of God's work of creation.

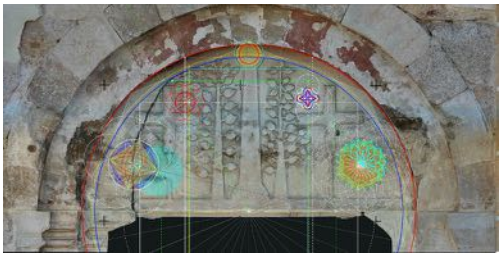

Fig. 17.: The western portal of the Church of the Assumption of the Virgin Mary in Plasy. (Source: Petr Růžička - presentation at the conference Architecture in Perspective 2022)

In this sense, the separate construction elements of the building can be understood as a set of geometric formations connected by a common compositional network, which then represents a whole of higher order. If the individual building elements are correctly arranged on the parent compositional grid, the external and internal dimensions of the building should be in harmonious proportion. Mathematically, this means that the parent composition network is in some way of higher importance than what we directly observe. In other words, the compositional network, undetectable by ordinary observation, has a function superior to the structure. From this point of view, sacred buildings are fully structuralist works. [10]

Master carpenter Petr Růžička showed the same principle of a uniform parent composition network - a hidden compositional structure of a higher order, on the plan of the Romanesque-Gothic church of **St. Peter and Paul in Načeradec** [11] (fig. 18), a small town in the district of Benešov in Podblanicko or at the early Gothic **Church of All Saints in Slivenec**. Petr Růžička also found circular drawings on the walls of the original **late Gothic Sokolov Château** in the centre of Sokolov.

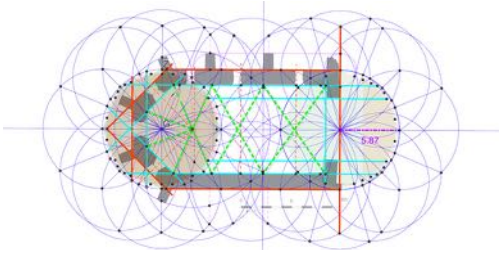

Fig. 18.: Floorplan of the Church of St. Peter and Paul in Načeradec. (Source: https://www.geogebra.org/m/nurzydr [11])

Similar research focused on the geometric analysis of the plan dimensions of sacral buildings was undertaken by Ladislav Moučka, author of the following books: Mother Cathedral - Geometry of Sacred Space [9] and Jan Blažej Santini Aichel, Geometric Legacy of the Czech Middle Ages to the High Baroque. [10] His study has confirmed the important function of geometric techniques in the foundation of Romanesque buildings and the tradition of transmitting geometric knowledge in building metallurgy, which goes back to the early Middle Ages. It discovers common features in buildings characteristic of the period of the entry of Christianity into our lands. This common feature is the geometrically defined proportions of the Tree of Life based on the circular geometry of the Flower of Life. Moučka considers the old Czech length measurements, especially the Czech or Prague cubit, to be very important. Ladislav Moučka is convinced that there is a common compositional key used in the design of all sacral buildings. The surveys and geometric analyses of rotundas confirmed the assumed similar geometric procedures in the floorplan designs. The buildings have common features that are variations on a unified proportional compositional scheme that has progressed through several centuries of development of sacred architecture in the Czech Republic. These links show that the proportions of the buildings did not arise arbitrarily, but were liturgically obligatory. This proportion is not a sign of a particular building style, but rather it seems that the compositional rules were imported to us from countries with wider construction experience and that they also had a wider application. It is almost impossible that these coincidences could have arisen by chance. On the contrary, there is a clear effort to connect the buildings ideologically - perhaps even to harmonize them as musical instruments of the orchestra.

CONCLUSION

In the past, architects were conscious of numbers and geometric shapes. They combined them with other shapes and numbers to express an inner understanding of a higher truth. This method had to be based on a systematic body of knowledge, a mathematical knowledge of mysterious numbers and shapes. Even if today's architects don't have this knowledge and rely on their intuitive visions, they can incorporate the beauty of mathematical truthfulness into their work. In order to create structures comparable to the creations of our ancestors, we must regain a systematic knowledge and a lost tradition of mathematical shapes.

The mysterious symbolism of numbers can be revealed through ancient sacred geometry, common to all peoples and cultures who have understood it as a means of connecting man to the universe. By studying and understanding the sacred science of mathematical symbols, architects will be able to design buildings, gardens, or complex landscapes that lift the spirit to an understanding of a higher truth.

Shapes, ratios, square roots, and transformations of numbers and geometry were considered by ancient philosophers to be analogous to the basic processes of life and the key to understanding the structure of the universe. Today, we can study these arithmetic and geometric systems in the context of modern mathematical science and our deeper understanding of the nature of their esoteric meaning will be slight. If we accept that these analogies are true and that they reflect an intuitive knowledge of a reality indescribable in words, we have a foundation on which to build architectural forms that are ageless because they are eternally true. If we introduce the symbolism of numbers and sacred geometry into our projects, we will only be following a long-trodden path. With architectural form we express something of the nature of the universe and the meaning of life.

If we all renew our faith in a full existence and reaffirm our belief in a cosmic order, surely architects will also recognize the importance of sacred geometry, which lies beyond our sensory perception. Geometry and numbers will then be seen not only as a way of representing quantity, but also as a symbolic expression of a higher reality. The study of this higher reality will be considered the highest and as such, primary interest of the human spirit. If we understand the principles behind the world of real things, the neglected laws of harmony and proportion will come to life again. The transcendental, spiritual meaning of our lives will then be expressed in a new, common vocabulary of architectural forms. [2]

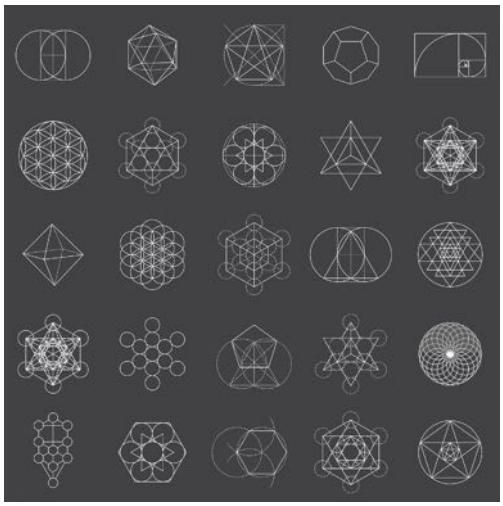

Fig. 19.: Geometry developing on the principle of the Flower of Life. (Source: https://www.gettyimages.com/detail/illustration/set-of-sacred-geometry-icons-royalty-free-illustration/503924230 [14])

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RESEARCH OF THE CREATION AND INTEGRATION OF SACRAL AND URBAN SPACE

Rosypal Dušan - Peřinková Martina

ABSTRACT: The interrelationship between sacred and urban space is intertwined, sacred space extends into the existing public space, participates in the space that surrounds it. The increase in the importance of blending is dependent on the change in the position of the Church in society at the beginning of the 21st century, when the church is not only used for liturgical ceremonies, but becomes a community and social element in the immediate urban environment.

Designing a new church building, including its vestibule, in an urban environment should always reflect the surrounding urban structure and accentuate the surrounding environment with its location and architectural expression.

The modality of being is made up of two different existential situations, the sacred and the profane.
For a religious person, there is an inhomogeneous space where on the one hand he perceives a sacred and fixed point and on the other hand he perceives an unsanctified space. As an atheist, a person perceives his profane world, and for him, entering a church means the border of another sacred world.

KEYWORDS: sacred space; urban space; blending; interweaving; modality of being; architecture of church building; liturgical space; II. Vatican Council

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INTRODUCTION TO THE ISSUE

The Christian church is an integral part of our more than a thousand-year continuity. Its outward manifestation anthropomorphizes societal changes and historical turning points. It has become an integral part of our life experience in space and time. [1].

The requirements for today's church buildings, which derive specific demands and criteria for their design, also arise from a theological understanding of church architecture. A church must meet the needs of the community, align with the liturgy, meaning it must be adaptable for various functions during religious ceremonies. Furthermore, the liturgy itself should significantly shape the church's layout, acting as the "architect" of the church. Ultimately, a church must also possess a symbolic character and serve as a challenge. Churches, as visible structures, are symbols; they are images proclaiming the heavenly Jerusalem, places where the mystery of the communion between God and people is already realized on earth. [2].

The integration of sacred and urban spaces is a significant theme in the historical development of urban environments. It combines architecture, urban planning, and religious practice, and its value can have a positive influence on the community, the spiritual life of people, and the aesthetic value of the city.

Sacred spaces (churches, cathedrals, and temples) often hold deep significance for a specific community and can serve as an important symbolic and cultural focal point in the urban environment.

SECOND VATICAN COUNCIL

A pivotal event in the history of the Catholic Church that shaped sacred space was the Second Vatican Council, which took place from 1962 to 1965. It aimed to update the liturgy and the church's life to bring them closer to the faithful and facilitate their participation, bridging the gap between secular and religious life. The liturgical space underwent significant changes. The traditional positioning of the altar was altered to have the Mass facing the people, emphasizing communal prayer involving all the faithful. There was greater involvement of lay participants in activities during the Mass, such as reading Scripture or distributing the Eucharist. In the design of church interiors after the Second Vatican Council, simpler architectural elements without excessive decoration began to be used, highlighting the pure essence of the sacred space.

The Council also emphasized the need for ecumenism and dialogue with other religions. This is reflected in sacred spaces that reflect societal values and acknowledge various religious traditions. It opened up the possibility of creating a fusion of sacred and adjoining urban spaces.

Changes in the organization of sacred space were not uniformly implemented after the Second Vatican Council. Many traditional and historically significant church buildings remained unchanged, but newly designed churches reflect new approaches and changes brought about by this council. The Second Vatican Council had a significant impact on how people perceive and use sacred space in the urban environment.

"I haven't come to turn you around, sir,
Besides, all the wise sermons have flown out of my head,
I've long lost the sheen like a hero of slow pace,
I won't probe you with a question
about your thoughts on Thomas Merton.
I won't hop around in the discussion like a turkey with a red drop on its nose,
I won't uglify like a duck in November,
I won't advise you on the tears, which are an admission to everything,
I won't start pouring sacred wisdom into your ear with a spoonful.
I'll simply sit beside you
and confide my secret,
that I, a priest, believe in the Lord God like a child."

(Jan Twardowski) [3]

NEW PRINCIPLES OF CREATING SACRED FORECOURTS

For social interaction with sacred objects, the key connecting spaces are often urban areas such as squares and streets. The fusion of these two types of spaces can take on various forms and purposes.

In some cities, sacred spaces are located directly in the city center, often on squares, serving as dominant focal points in the cityscape. Another possibility is to connect sacred and urban spaces through architec-

tural elements, placing the church as part of an open courtyard, which can become a part of the urban area. The blending of sacred and urban space can lead to new opportunities for social interaction and the creation of community activities. Churches and other sacred spaces can be used as venues for cultural and social events, such as concerts, lectures, workshops, and more. In doing so, they can become centers of cultural and social life in the urban environment.

The connection between the sacred interior space and outdoor entrance spaces can be designed and arranged in various ways through architectural design :

• The portal
A portal is an architectural element located at the entrance to the sacred space. The portal can serve as a transition from the everyday world to the sacred space, with the exterior space designed to evoke a sense of reverence and preparation for entering the sacred.

• The antechamber
The outdoor entrance area can serve as an antechamber before the actual sacred space. This antechamber can serve as a place for gathering, greeting, and preparation for entering the sacred space. It may include elements that provide a tranquil and comfortable space for people who are preparing to enter the sacred area.

• The path
The path leading to the sacred space can be designed to represent a spiritual and symbolic journey. This path can serve as a space for meditation, reflection, and gradual preparation for entering the sacred space.

• Garden or Surrounding Nature
The sacred space can be surrounded by a garden or the surrounding nature, serving as an extension of the outdoor space and allowing believers to feel a connection with nature and the divine. This garden may include flowers, trees, fountains, or other elements that contribute to serenity and harmony.

At the same time, it is important to respect the principles:

• Openness and Accessibility: A key aspect is the creation of open and accessible spaces that welcome a wide public regardless of their religious affiliation, as they seek peace and reverence.

• Aesthetic Harmony: Balancing historical and religious heritage with modern elements of urban architecture.

• Cultural Integration: Cultural integration can be facilitated through artistic installations and mutual educational and cultural events.

• Respect for Appropriate Religious Practices: Through appropriate design, the sanctity and reverence of the place should be preserved.

The connection between the sacred interior space and outdoor entrance areas is crucial for creating a welcoming and respectful environment that supports spiritual feelings and the transition from the everyday world to the sacred.

The Chapel of St. Anthony in Černá is situated at the heart of the village square, urbanistically connected to the space in front of the municipal office, naturally bridging the regular daily activities with the tranquil secular architecture in the central part of the village. The chapel is designed as a subtle landmark that harmonizes with the surrounding older buildings. The public antechamber is bordered on one side by a road, on the other side, it is flanked by a solitary green space adjacent to a water feature. The chapel structure has a compact elongated arched shape, extending into the outer elongated space. The only disruptions to the geometric purity of the shape are the entrance

Fig. 1., 2.: An example of the fusion of public and sacred spaces in the village square of Černá near Měřín. (Authors: Akad. Ing. arch. Ladislav Kuba, Ing. arch. Tomáš Pilař)

doors and the console with a bell from the renowned Dytrych family bell foundry on one side, and a square window on the other side. The connection between the exterior and interior secular space is achieved through the use of dark-colored wooden horizontal cladding. Wood is used on the walls and the ceiling, while the floor is made of black terrazzo. All the furniture is crafted from wood in black lacquer. In the newly built Chapel of St. Anthony, there is a wooden statue of St. Anthony from the former castle chapel. [4].

The Chapel of St. Anthony in Černá has, after several years since its completion, become a natural part of the life and appearance of the village. The unconventional, modern style of the new sacred structure in the Černá square has captured undivided attention from the very beginning of its construction.

Fig. 3., 4.: Integration of the existing sacred space of the Holy Spirit Church in Ostrava into the architectural competition for the public antechamber. (Source:)

The immediate surroundings of the existing Holy Spirit Church in Ostrava Zábřeh are conceived as a gradual transition from the external material world to the internal spiritual realm. The individual layers of this transition are like stages of quietness: the plateau - the Stations of the Cross - the recess - the outer wall of the

church - the crown of side spaces - the inner protected intimate core. A fundamental element of the urban design is the delineation of an elevated square plateau - a sacred area. The actual temple is defined by an ellipse - a bipolar form with two focal points - symbolizing the relationship between these focal points, the relationship between the two poles, the relationship between man and God, expressing human sonship, and representing the unity of the church. In terms of geometry, every point on the ellipse has the same sum of distances from the foci.[5].

The material character of the structure contrasts with the dematerialized effect of light filtered through abstract fractal stained glass. Light thus becomes an element that creates a non-existent boundary between what is perceptible by the senses and what lies beyond the realm of material reality.

Fig. 5.: Urban design concept for the competition on the adjacent antechamber of the Holy Spirit Church in Ostrava. (Source:)

In 2022, an accompanying architectural and urban design competition was announced for the enhancement of the external surroundings of the Holy Spirit Church. The competition winner proposed a universal open space in the form of a unifying park that surrounds the church building from the remaining three sides. A parking area is located under the trees along Kotlářská Street, and in the section in front of Kotva, there is a children's and parkour playground. The emphasis on respecting the axis of the church and extending it into the representative antechamber with a community table is positively evaluated.

Its location in the city center makes it a significant point of reference and a focal point in the public space, contributing to the formation of the character of the surrounding urban environment. [6].

CREATION OF A SUPPORTIVE INNER SACRED SPACE FOR MULTI-PURPOSE USE

Multi-purpose utilization of sacred space means that these environments are not limited solely to religious rituals and worship but also serve additional purposes, which can be social, cultural, or educational. Multi-purpose use of sacred space allows opening these places to a broader public and engaging them in community life.

• Cultural Events
Sacred spaces can be used for cultural events such as concerts, musical performances, theatrical productions, or art exhibitions. These events can attract a wider audience and allow them to explore and appreciate the beauty and history of the sacred space.

• Community meetings
Sacred spaces can serve as venues for community gatherings, such as conferences, seminars, workshops, or forums. People can gather here to discuss social, ethical, or religious issues.

• Educational Activities
Sacred spaces can be used for educational activities such as courses or lectures. These activities can provide an opportunity to delve deeper into religious and secular topics.

• Charitable and Humanitarian Activities
Sacred spaces can be used for charitable and humanitarian activities, including volunteer events, food drives, clothing drives, or other aid for those in need. These activities help build and strengthen community bonds and bring assistance and hope to those who require it.

• Healthcare and Social Services
In some sacred spaces, healthcare and social services may be provided, including counseling, support in challenging life situations, care for the elderly, or assistance to people in need. This way, the sacred space becomes a place where comprehensive care is provided for the entire community.

Fig. 6., 7.: Reconstruction of the Church of Neratov, Installation of a Glass Roof, 2006. (Source:)

A church that got a second chance, an amazing place without compare. In the early 90s, the church literally rose from the ashes, and in 2006, it was partially covered with a glass roof, and work on its restoration continues. Daily religious services are held here. Exhibitions and concerts are organized. In 2011, it was included in the pilgrimage sites of the Hradec Králové Diocese, and thousands of pilgrims gather here every August. This miracle was achieved thanks to the Neratov Association, whose goal is not only to bring life back to the displaced village and restore the damaged pilgrimage site of reconciliation in Neratov but also to help people with disabilities and abandoned and handicapped children. The overall atmosphere of the interior space is enhanced by the glass roof structure,

allowing sunlight to penetrate into the interior of the church, creating a sensory connection between the interior and exterior spaces.

The result of the reconstruction is the creation of an educational path that, in addition to providing factual information, helps people experience the sacred building from abstract spatial perception to the specific elements of the construction craft. [7].

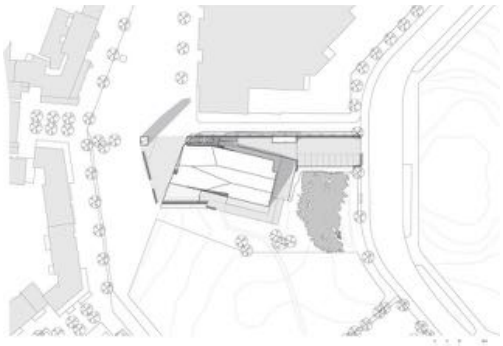


Fig. 8., 9.: New Church Building in the Urban Environment of Kukuokall, Norway, 2006. (Source:)

The construction of the church building became the focal point of the suburban district of Kukuokalla in Jyväskylä, supporting the identity of the entire district as an independent community. The brief called for the church to provide various functions for the parish, a parish center, and a community center, integrating them into an innovative urban district structure.

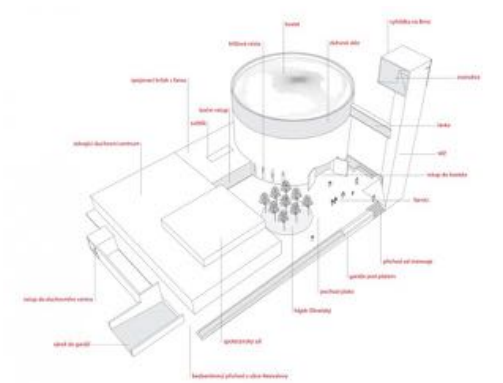


Fig. 10., 11.: Church of Blessed Mary Restituta, Roman Catholic Parish of Brno-Lesná. (Source:)

The multi-purpose space of the church is spread across three floors. On the main floor, the church hall is flexibly combined with the parish meeting hall, which is connected to facilities for children and youth. The church and the internal halls can be merged into one large sacred space with adjacent spaces for youth activities or used separately for musical productions. The gallery between the halls serves as a location for the organ and offices for the cantors.

The location of the church construction lies in the core area of the Brno Lesná housing estate. The development here consists of tall residential panel buildings, primarily linear in shape. The church cannot compete with the surrounding panel buildings in terms of size, but it stands out with its simple and legible architectural expression. Its scale is large, thus distinguishing itself from the surrounding residential blocks and creating a dominant presence on a different level. Its geometry is straightforward to make it easily readable for visitors. On the given plot, a rectangular plateau emerges from the terrain, clearly separated from its surroundings by height, perceived as a sacred precinct. This explicitly defines both the entrance and dispersal space of the church, as well as a psychologically distinct area that is perceivable as part of the community of believers.

On this plateau, there are three basic masses - the church, the tower, and the existing spiritual center. The existing center and the tower are rectangular, in harmony with the surrounding housing estate, while the church is circular, and its geometry shifts towards the sacred, symbolizing its distinctiveness and sanctity. An intimate atrium space with a grove is formed between the church and the existing center. Along the path, greenery is planted to rhythmically shape the approach, culminating in a visual landmark in the tower. It partially shields the surroundings, protects the entrance area, and introduces a smaller scale. The area between the church, the tower, and the existing spiritual center is complemented by a symbolic grove in a regular geometric pattern, serving to enhance the intimate atmosphere and symbolically representing the Garden of Gethsemane. The natural element, with its changing nature over time, thus becomes a deliberate balancing counterpoint to the solid and unchanging building structure. [8].

AN EXAMPLE OF URBAN PLANNING PROPOSAL FOR AN ALTERNATIVE SOLUTION TO THE EXISTING INADEQUATE FORECOURT OF THE CHURCH OF SAINTS CYRIL AND METHODIUS IN OSTRAVA PUSTKOVEC

To select an example of a possible urban design modification for the existing surroundings of the Church of Saints Cyril and Methodius in Ostrava Pustkovec, the forecourt at the entrance to the church of St. Cyril and Methodius in Ostrava Pustkovec was chosen. The church is located in close proximity to a busy intersection of 17th November Street and the access road to the district of Pustkovec. In the immediate vicinity of the Pustkovecká access road, there is an entrance and emergency parking lot in front of the church, from which an entrance staircase with access to the church is connected. The external appearance and architecture of the building are strongly influenced by the parking lot in front of the main entrance portal.

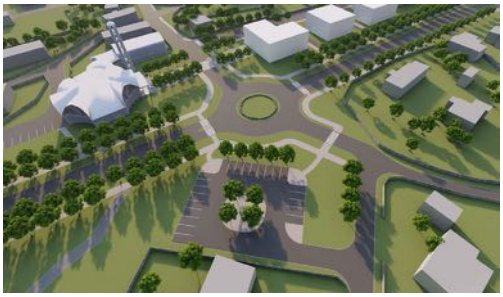
The concept of the church is based on the floor plan of a Greek cross with four dominant glazed window surfaces. The wall behind the altar is plain and whitewashed, with the focal point being a large Baroque polychrome carving of Christ. The cross on which He is suspended has arms pointing upward, which is unusual in Christianity, especially since the same shape corresponds to the Algiz rune. The entire interior space is bright and airy. The architectural design was executed

Fig. 12., 13.: Existing urban design concept of the surroundings of the Church of Saints Cyril and Methodius in Ostrava Pustkovec. (Source: xxxxxxx)

by Tomáš Černoušek. Urbanistically, the church is situated at the intersection of the significant transportation routes of November 17th and the access road to Pustkovec. There is a large-capacity parking area in front of the church, and the rear part is comprised of an asphalt surface.

For the improvement of the church's forecourt, different options were considered for altering the traffic intersection, including the creation of a calming roundabout or shifting the intersection further away from the church.

The first solution option for the redesign of the Church of St. Cyril and Methodius's forecourt involves the creation of a new calming roundabout and the establishment of an axial approach with an alley of greenery, in alignment with the new urban development along November 17th Street. The axial entrance area to the church is complemented by a promenade and resting pedestrian area paved with granite cobblestones and a paved spatial cross. Visitor parking is relocated to the new development across Pustkovecká Road.



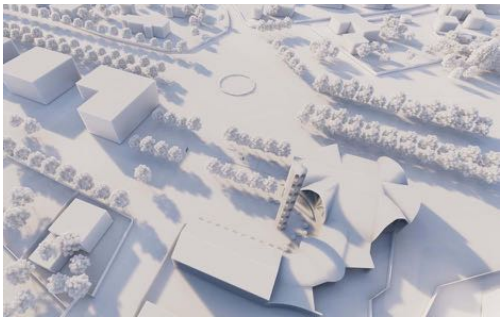


Fig. 14., 15.: Option for redesigning the forecourt of the Church of St. Cyril and Methodius in Ostrava by creating a calming roundabout. (Created by: Ing. arch. Dušan Rosypal and Ing. arch. Veronika Paulerová)

For the second option for redesigning the forecourt of the Church of St. Cyril and Methodius, the proposal includes relocating the existing traffic intersection, and Pustkovecká Street is also calmed by its winding course. The relocation creates the opportunity to create a new public space as the dominant entrance to the residential part of Pustkovec, as well as a peaceful and relaxing area in front of the church.

The forecourt in front of the church is based on the symbolism of the Holy Trinity, God the Father, God the Son, and God the Holy Spirit. At the center of the space is a water feature - a fountain symbolizing the all-seeing eye. Artistic works are placed at the vertices of the triangle, and the entire forecourt is lined with a green avenue as a screen from traffic congestion. The triangle is turned with one vertex towards the entrance to the church and two different vertices facing the east exit of the church, evoking the journey of life.

Fig. 16., 17.: Solution Variant for the Forecourt of the Church of St. Cyril and Methodius in Ostrava by Creating a Roundabout to Calm Traffic. (Created by: Ing. arch. Dušan Rosypal and Ing. rch. Michaela Kantorová)

CONCLUSION

After the Second Vatican Council, the perspective on sacred spaces and their use underwent a change, not only for religious ceremonies but also as community and educational spaces. The breadth of their utilization expanded to provide services to all who are willing to listen and engage, enlarging the accessibility to religious facilities. Through the historical evolution of sacred buildings, it becomes evident that their use changes over time. Newly designed structures are always part of the urban space, encompassing the original religious function and new uses for the broader public.

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2/ Urbanism and public space

FACTORS AFFECTING ACTIVE PUBLIC SPACE

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ABSTRACT: The paper contains the creation, form and results of a quantitative questionnaire survey. The content of the questionnaire managed to define the basic factors that make living and active space. In addition to the most basic characteristic of public space, which is unrestricted public access, in our opinion, the most fundamental factors of public space are important. There were 18 questions written in the questionnaire, which are built on the theoretical basis of public space by Ben Rogers, John Montgomery and Ján Gehl - see Research theory. Using the questionnaire, respondents chose the most important factors that should contain active and lively public space. The data were subsequently evaluated and compared between the lay and professional public.

KEYWORDS: questionnaire; factor; public space; principles of public space; quality; participation; evaluation; city

INTRODUCTION

Coexistence between individuals makes urban space and its municipal spaces the basic framework for the functioning and quality of life, contributing to the improvement of economic development, health, socialisation, sustainability, ecology and biodiversity, ... The city and its parts, as a living and constantly changing organism, has been adapting to the various elements and changes since the first sign of settlement in the countryside. "History can point to two ways of developing a city: evolutionary and revolutionary. Evolution can be seen as a transformation of the urban form without significant changes in its patterns, ... In the case of an urban revolution, even if the form looks only a little changed, its pattern or genotype demonstrates fundamental changes." [1, pp. 1]

The first homogeneous settlements, slow development and changes in society provided easier connections between different social, economic and cultural situations. [1] The development of urbanism from ancient structures to the present has undergone several significant changes, which have been typical of different historical periods. We can consider among the more radical interventions the Renaissance period, the Industrial Revolution and the direct reaction to urbanisation, population growth and worsening sanitation - modernism and functionalist urbanism. The transition from traditional shared space streets to multifunctional uses, the segregation of pedestrians and traffic into dedicated lanes, functional segregation within a city, the emphasis on sanitation, lighting and separate point development and the emergence of micro-neighbourhoods has led to a distinct lack of human scale and connection to the surrounding context. [1; 2; 3; 4] The current rapid development and climate change, the still high impact of pollution and overpopulation are the main challenges for today's approach to urban planning and the creation of public space. "Today, more than half of the world's population lives in cities, and it is projected to be 68% by 2050." [5, pp. 19] The still ongoing massive urbanisation requires the design of cities that meet current conditions and requirements without compromising development opportunities for future generations. Criteria such as sustainability, viability, resilience, participation, ecology, emission reduction and environmental impact are a necessary part of EU, UN and other international agreements. [3]

PUBLIC SPACE

"Public spaces means all squares, streets, marketplaces, pavements, public green space, parks and other spaces accessible to everyone without restriction, i.e. serving for general use, regardless of the ownership of the space." [6, Section 34] One of the few definitions of public space. From the viewpoint of Czech legislation, the definition is enshrined in Act No. 128/2000 Coll.: Act on Municipalities (Establishment of Municipalities). In addition to national regulations, we may encounter definitions in regional and supranational directives, decrees and other documents. "The term public space is used to refer to a publicly accessible, complex physical part of the environment, which, in addition to municipal spaces, includes, for example, the publicly accessible space of the exterior of a city, courtyards and the interior of buildings. Public accessibility also precludes a restricted-use regime except for a time-limited regime. At the same time, the term public space is used for the immaterial level of the environment, including relationships, ideas, events, media, etc. The term public space can also be perceived as a whole or a continuum," [7, pp. 16] , says the Manual for Public Space Creation, published by IPR Prague in 2014. The United Nations Human Settlements Programme UN HABITAT (2015) states, "Public spaces are all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive. Public spaces are a key element of individual and social well-being, the places of a community's collective life, expressions of the diversity of their common, natural and cultural richness and a foundation of their identity." [8, pp. 6]. Most of the available definitions of public space assume that public accessibility is the main factor. On deeper examination and awareness of all the variables that may be present in public, the definition seems rather more complicated, especially in terms of the needs of individuals or different groups. The public's needs are constantly changing and therefore public spaces must accommodate all kinds of users, different situations, feelings and perspectives. Just as definitions of public space vary, so too do approaches to the creation, restoration and sustainability of public spaces from the perspective of the landscape, city governments and the inhabitants themselves. In his book *Městský veřejný prostor (Urban Public Space)*, Petr Kratochvíl describes definitions and different approaches to the understanding and creation of public space and argues that the most interesting and fundamental approaches to public space are those that deal with three basic factors linking philosophical, sociological, and political science issues, the use of public space and the form of public space itself - the meaning, activities and form of public space. [9]

THEORY OF RESEARCH

Defining the ideal public space is based on theoretical and empirical research and preferred focuses, ranging from aesthetic layout and cognitive relations to direct activities and interaction between people and space, ... Some of these include research and works by authors such as Hanna Arendt, Kevin Lynch, Christian Norberg-Schulz and a number of studies and research projects by the Danish architect Jan Gehl. [9; 10] "When we talk about streets and other public spaces in the city, we are really talking about the city's own identity. It is in these spaces that human exchanges

and relationships, a variety of uses, conflicts and contradictions in society are manifested." [11]

The works of Jan Gehl, Ben Rogers and John Montgomery were essential to our research and the construction of the questionnaire content. The works of all three authors define the characteristics and parameters of "ideal" public space. In one of his articles: "In defence of the realm: 10 principles for public space," Ben Rogers defined 10 principles that public space should contain. [12] On the other hand, John Montgomery, with a similar approach, divided public space according to the activities that the public performs in it – primary and secondary activities, identified 3 components through which public space influences feelings – activity, form, and image, and then established twelve identifiers of successful public space. [13] Subjective perception of space, interaction with space, defining 3 groups of activities – necessary, optional and social, the necessity of human scale, "eye-level city", "a city for people" are just a few of Jan Gehl's [14] fundamental contributions, which he has described in several key publications such as Life between Buildings, Cities for People and How to Study Public Life. [15; 16; 17]

By researching and studying works by more than just these authors, we developed questions that formed the basis for our observations and form of research: What does the "ideal" public space contain? Does it have to consist of all the elements listed? Is the view of the general and professional public on the issue of public space fundamentally different?

RESEARCH METHODOLOGY

One of the research methods was a quantitative questionnaire survey, which was completed by 94 respondents. The questionnaire was published online with free access. Data collection took place over a period of 2 months, with it being published on 8 April 2023 and withdrawn on 8 June 2023. The questionnaire was also created in Slovak and English versions. We did not influence respondents' opinions or responses in any way when they were completing the data. The questionnaire was designed to be anonymous. The questionnaire had 18 questions, which are built on the theoretical basis of active public spaces developed by Ben Rogers, John Montgomery and Jan Gehl, see Theory of Research.

Almost every question was asked in such a way that the answer could be rated on a scale of 1 to 5, with 1 always being the least and 5 the most. In addition to questions about public space, we asked respondents about their gender, field of study and level of education. These supplementary questions were essential for comparing the views of the professional public on the issue of active and complete public space with the views of the general public with education outside the fields of architecture, urban planning and related disciplines, and also for comparing the perception of public space from the perspective of women and men. Respondents had the option not to answer these additional questions.

Questionnaire questions:

1. How do you most often move around public space? (walking, bicycle, scooter, skates, car, public transport)

2. On average, how much time do you spend actively using public space during the day (on a square, on a residential street, in a park, ...)? (up to 10 minutes, 10–30 minutes, 30 minutes–1 hour, 1–2 hours, 2 or more hours)

3. VARIETY OF USE: Do you think that public spaces offer a wide variety of uses to the public?

4. VARIETY OF USE: What elements of variety of use do you think are most important for vibrant and active public space? (long-term housing, short-term housing, offices, local/traditional shops, crafts, civic amenities, cafés, barbers, bars, refreshments, restaurants, leisure activities, playgrounds, urban furniture, shopping malls, artworks)

5. ACTIVE PARTERRE: Do you think that an active parterre (linking the ground floors of buildings to public space - shopfronts, interesting building façades, ...) has a significant impact on lively and active public space?

6. HUMAN DIMENSIONS AND SCALE: Do you think it is important for urban life to happen at eye level? (As far as possible, activities take place from the ground floor to the second floor for the best possible contact between the space and the visitor)

7. HUMAN DIMENSIONS AND SCALE: What elements do you think are most important to create human dimensions and scale in public space? (buildings with an average height of 5–8 storeys, the ratio of the height of the building to the width of the public space is 1:1 to 1: 3, walking distance to services, public transport, ... up to 10 minutes, more smaller blocks = more side streets, corners and crossing possibilities, development defines the shape of public space = defined street line, more frequent articulation of building façades e.g. entrances, windows, variety of architectural styles, accessibility = number of roads leading to/ from the site)

8. SAFETY: Rate how safe you feel in public space.

9. SAFETY: Rate how safe you feel in public space at different times of the day.

10. LIGHTING: Do you think that public lighting is appropriately selected and placed in public space?

11. STIMULATING THE LOCAL ECONOMY: Do the public spaces support the local economy – small businesses, markets, traditional local shops, ...?

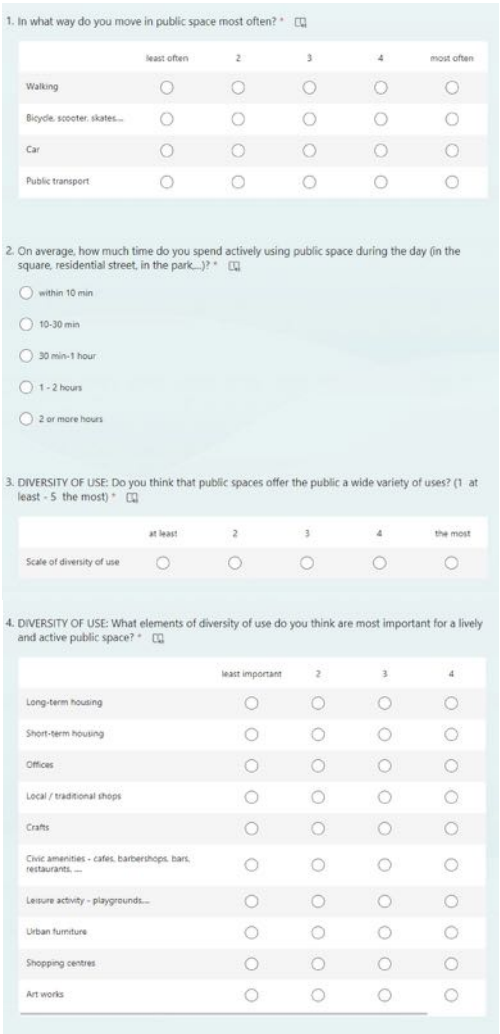

Fig. 1.: Questionnaire Image. (Source: Authors - own developed questionnaire)

12. LOCAL IDENTITY: Please rate how important you think it is to create a strong relationship between the public and public space, e.g. by supporting local businesses or using traditional and local elements.

13. STREET COMPLETENESS: Are there elements in public spaces that are necessary for complete, lively and active public space? (Pavements, benches, bike racks, information boards, infrastructure, green space, bus stops, ...)

14. SHARED SPACE: In your opinion, is it important that public space serves pedestrians, cyclists, traffic, ... or should it be reserved for pedestrians only?

15. GREEN and BLUE AREAS: Do you think there is enough green space and water features in public spaces?

16. SOCIAL PARTICIPATION: Do you think that the public's views and comments should be taken into account when planning and designing public spaces?

17. Which of these elements do you think are the most important for lively and active public space?
(VARIETY OF USES, ACTIVE PARTERRE, SOCIAL DIMENSION AND URBAN VITALITY, HUMAN DIMENSIONS AND SCALE, SAFETY, LIGHTING, STIMULATION OF THE LOCAL ECONOMY, LOCAL IDENTITY, STREET COMPLETENESS, GREEN AND BLUE SPACES, SOCIAL PARTICIPATION)

18. What do you think is lacking in public space? What do you perceive as the biggest deficiency in public space?

19. Your gender

20. Your education

DATA, COMPARISON AND RESULTS

A total of 94 respondents completed the quantitative questionnaire, independently completing the anonymous online questionnaire without their responses being influenced by members of the research team. The issues and concepts addressed were partly presented to the respondents in the wording of a question. The questionnaire was general and the questions were not directed at a specific public space. Respondents expressed their subjective view of public space they know and move in on a daily basis. In addition to the 18 questions focusing on public space issues, respondents were given the opportunity to voluntarily answer questions on education and gender. These voluntary questions show that the questionnaire was completed by 55 women, 34 men and 6 respondents who did not want to answer this question. Of the 94 responses, 21 people were recorded as having an architectural or related degree, with 2 respondents unwilling to state the level of education completed. The initial questions were aimed at defining the method of use of public space. The most common way of moving around in public space is the most natural way - walking, followed by public transport and car transport. Bicycles/scooters came out as the least used mode of transport. From the answers we conclude that the majority of respondents live in regions where cycle routes are not well developed. Respondents spend 30 minutes/day actively using public space on average. When asked about variety of uses, 50.5% responded neutrally, with 29.5% indicating that public space does not offer enough variety of uses for active public space. The most desirable types of variety of uses were selected as - leisure activity (playgrounds, ...), civic amenities, urban furniture and local/traditional shops.

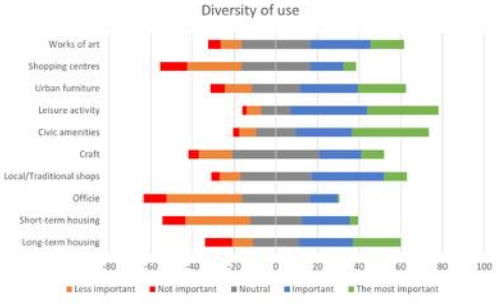

Fig. 2.: Types of Variety of Use Chart. (Source: Authors - own data processing based on the result of the own developed questionnaire)

The influence of an active façade emerged from the questionnaire as one of the most important factors in public space, with the majority of respondents (62.1%) stating that an active façade was important to them. 49.4% of respondents are inclined to the view that human dimensions and scale are important in public space, 31.6% of respondents are neutral. Respondents considered the most important human scale factors to be - walking distance, accessibility and built-up public space.

Fig. 3.: Human Scale Elements Chart. (Source: Authors - own data processing based on the result of the own developed questionnaire)

The question of stimulating the local economy came out with a more or less neutral result. On the other hand, the influence of local identity came out as an important factor in public space (70.6%). The majority of respondents regard the demarcation of public space separately for pedestrians as important.

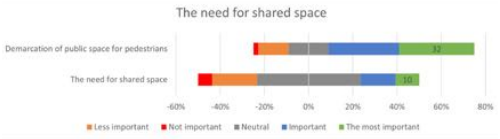

Fig. 4.: Need for Shared Space Chart. (Source: Authors - own data processing based on the result of the own developed questionnaire)

47.3% of respondents reported that there is a lack of green and blue spaces in public space, with 26.3% responding neutrally. The majority of respondents believe that citizen participation in the creation of public space is necessary. Only 11.6% of respondents answered that participation was unimportant. The results of the individual questions were confirmed by question 17, where the respondents had the opportunity to select the 3 most important elements for public space. Green and blue areas, safety and variety of use were the most frequently chosen.

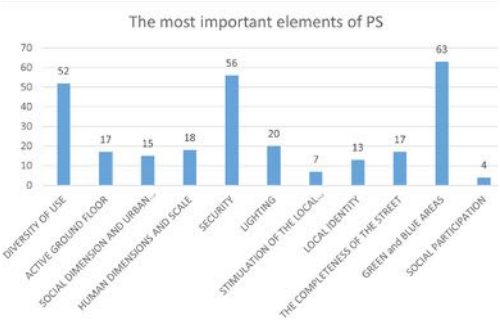

Fig. 5.: Most Important Elements of PS Chart. (Source: Authors - own data processing based on the result of the own developed questionnaire)

In question 18, the respondents had the opportunity to volunteer their own opinion and name what they think is most lacking in public space. Of the 50 responses, the most common answer was lack of green space, water features, furniture, cleanliness and the

overall quality of public space. 44 respondents did not answer this question.

CONCLUSION

Despite the effort to create a simple questionnaire, the average time taken to complete it was about 11 minutes. Based on feedback from respondents, who acknowledged the complexity of the questionnaire, we agree that it would be more beneficial in the future if a quantitative questionnaire without direct contact with the respondent was developed and composed of more simply worded questions. On the other hand, the professional public criticised the over-generalisation of the questions. Based on the feedback, we consider that it might be more advantageous in the future to create 2 separate questionnaires designed separately for the general public and professional public.

The difference between professional and lay public opinions on the completeness of public space was not significant, with almost every question showing similar percentages on the importance or unimportance of each factor, with a 5-10% difference. The only exception occurred on the question of human scale. The difference was in the range of about 20%, with the lay public leaning towards a lower importance compared to the professional public, which gave human scale an important position in public space. This more pronounced difference in a single question may have been due to the complexity of the questions asked, focusing on human scale issues.

Questions directed at safety and lighting should not be asked in general terms as they are site-specific. In a possible future questionnaire survey or similar research, we would not include a question about safety in a general way. Safety in public spaces almost always exists when the condition of an active and vibrant public space - collective safety - is met. Having gained experience, we think it would be more beneficial for the research to examine specific safety features or to focus on specific locations in public space. It is easier to directly find and verify the reasons for danger in a particular location.

The results of the questionnaire survey point to the need to adapt public space to a human scale.

It is important to ensure not only the necessary activities, but also the forms of optional activities and their variety, which will subsequently lead to an increase in social activities - spaces for leisure activities, a variety of civic amenities, well-maintained urban furniture and the overall multi-functionality of an area, i.e. variety of use. The main factor affecting the quality of the public environment is the amount and condition of blue and green infrastructure, which influences the micro-climatic conditions of a location.

The results of the questionnaire survey are not the final output. The results of the research and its subsequent use will be known after the overall completion of the individual parts. The research will continue by directly following on from the questionnaire survey, the data and information collected will be observed in specific localities. Observations will take place in the central parts of Ostrava and its partner cities, Košice, Katowice and Dresden. Attention will be focused, in particular, on historic centres, squares and areas within a 10-minute walking distance of them. The data and information collected will be applied to a case study - the revitalization of a central public space. The output will be a guide/manual that will help to create active public space in terms of functional use and amenities.

SOURCES

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THE INFLUENCE OF TRANSFORMATION AND DEVELOPMENT SITES ON THE FORM OF SPATIAL PLANS

Pásek Jiří

ABSTRACT: The Influence of Transformation and Development Sites on the Form of Spatial Plans. Sustainable urban planning will increasingly have to address how to reutilize already urbanized areas that do not meet current requirements. These requirements include both functional and urban-forming aspects, as they do not create a fully viable urban structure.

This contribution focuses on the analysis of transformation and development sites in selected Western and Central European cities. Specifically, it examines the legislative framework that defines such areas within the scope of spatial planning. Additionally, the contribution emphasizes the characteristics and parameters of specific areas in relation to the city and the spatial planning structure.

The introduction presents how the selected cities define development and transformation areas within the spatial planning framework and how they identify them. The contribution also describes the delineation of individual areas, their typology, and the parameters observed for these areas. The final part quantifies the individual areas.

The aim of this contribution is to describe important principles for urban development that are currently marginal in the Czech legislative context. Our cities often struggle to effectively utilize their territories and are frequently forced to expand into the surrounding landscape, thereby diminishing the urban quality of our cities.

KEYWORDS: spatial plan; development sites; transformation sites; strategy

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SOURCES

In cities that offer sought-after job opportunities and simultaneously boast a high quality of life, there is an influx of new residents from surrounding areas. Cities attracting new inhabitants are faced with the challenge of finding solutions for creating new housing and job opportunities. Given the cities' economies, the intention is for development to occur within built-up areas. This contribution outlines the efforts of individual cities in addressing these challenges from the perspective of urban planning.

LONDON

Greater London includes the city of London with its 32 boroughs. The governance and strategic management of Greater London are the responsibilities of the governmental body known as the Greater London Authority (GLA), which was established by the Greater London Authority Act of 1999. The GLA consists of two components: the Mayor of London and the London Assembly.

The Mayor of London is the executive leader of the GLA and is responsible for strategic decision-making, policy development, and advocacy for the interests of London. The Mayor is directly elected by the city's residents for a four-year term and has powers in areas such as transportation, planning, policing, housing, the environment, and other key areas.

The second part of the GLA is the London Assembly, which is responsible for overseeing the work of the Mayor of London. The Assembly monitors the activities of the Mayor, approves the budget, and has the authority to conduct investigations into matters important to local residents. The Assembly, consisting of 25 members, is elected by the residents of London.

The GLA plays a crucial role in various areas of city governance, particularly in strategic planning, transportation, housing, economic development, and environmental issues. According to the legislation estab-

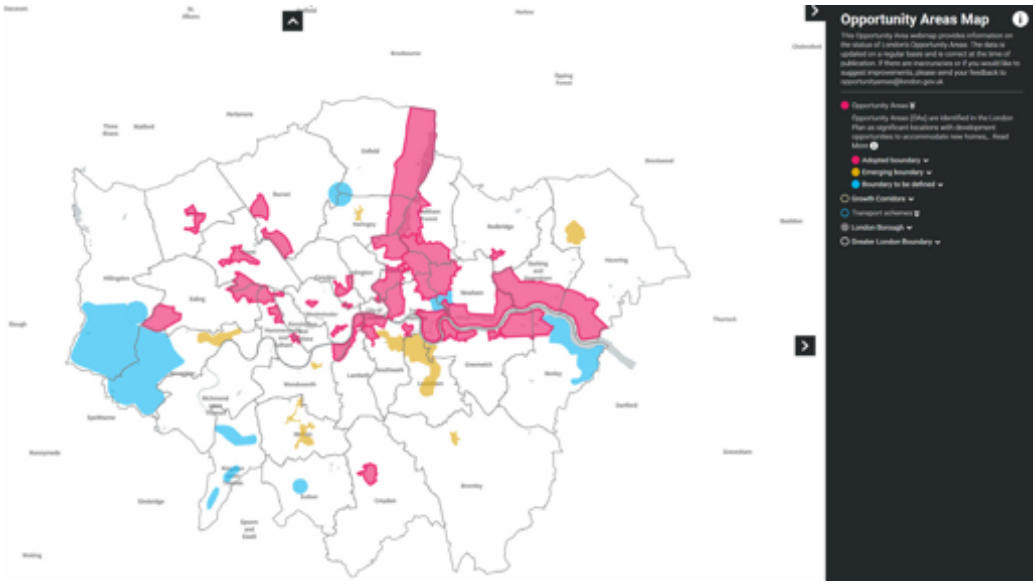

Fig. 1.: London - Map of oportunity areas. (Source:: https://apps.london.gov.uk/opportunity-areas/)

lished for the GLA, the Mayor is required to publish and regularly review the Spatial Development Strategy. The overall strategic plan for the city of London sets the economic, environmental, transportation, and social framework for the next 20 to 25 years, known as the London Plan 2021.

The legislation stipulates that the London Plan should focus on promoting economic development and wealth creation, supporting social development, and improving the environment (GLA Act 1999, Section 30). The London Plan is a legal component of every local London planning authority's development plan and must be considered in decision-making within Greater London. The current London Plan is valid from 2019 to 2041, and the version over which this text is based is from March 2021.

The London Plan addresses a wide range of planning issues, from the number of required homes to street design, with an emphasis on feasibility and clarity. These policies ensure good development: Building strong and inclusive communities, Optimizing land use, Creating a healthy city, Providing homes, Developing a strong economy, and Increasing the efficiency and resilience of the city.

In the policy of land use optimization, the London Plan focuses on brownfield development, especially in opportunity areas, surplus public sector land, and locations in city centers and their peripheries. It also prioritizes areas well-connected to existing public infrastructure and mass transit, pedestrian, and cycling transport. In areas with access to job opportunities and services, there is an effort to optimally increase development intensity for additional homes and workspaces.

VIENNA

The planning of Vienna consists of several strategic documents: the Vienna Urban Development Plan (STEP 2025), a technical concept for mobility, a technical concept for green areas and undeveloped land, and a specialized concept for high-rise buildings.

Vienna's spatial planning is governed by Law No. 11/1997 on spatial planning and urban development (Wiener Stadtentwicklungs- und Stadtplanungsgesetz, abbreviated as WStG). This law provides the legal framework for the creation, approval, and implementation of spatial plans in the capital city of Vienna. The WStG defines procedures, rules, and principles for spatial planning, including public participation, nature and landscape protection, and how various aspects of urban development, such as housing, transportation, the environment, economy, and social infrastructure, should be considered.

STEP primarily has a strategic character and sets the direction for the development of the city at the societal level until 2025. Vienna's Urban Development Plan continues the implementation tool called "Target Areas of Urban Development," which was introduced in the 2005 City Development Plan STEP and has been successfully tested and applied since then. Target Areas are areas important for the city as a whole. They are locations with high development potential or specific challenges that require coordination among various stakeholders, creating a framework that necessitates collaboration and consultation between the private and public sectors.

Based on experiences from recent years, key factors for the success of implementing Target Areas have been identified. This includes active management of planning processes, providing ample room for Target Areas coordinators to work on building relationships between different stakeholders, especially in projects involving multiple districts. Coordinators offer information and input, moderate processes, formulate recommendations for actions, initiate key planning documents, and highlight spatial and chronological priorities.

The involvement of coordinators in managing Target Areas has allowed the city of Vienna to enhance the efficiency of its efforts in favor of urban development projects. The coordinators aim to reach consensus among various stakeholders regarding necessary actions, ensuring that the implementation of individual measures is secured without a central governing body.

During the first evaluation of Target Areas, the Vienna City Council decides on the continuation or modification of individual Target Areas and potential future ones. These decisions are not dependent on STEP 2025 and are based on the progress of development or the needs of Target Areas arising from the dynamics of urban development. This system, therefore, requires

Fig. 2.: Vienna - Target areas. (Source: https://www.wien.gv.at/stadtentwicklung/projekte/pdf/20190515-gesamtkarte-zielgebiete.pdf)

continuous monitoring and appropriate adaptation to current situations and challenges.

At the same time, one of STEP's tasks is to initiate new partnerships, where urban development does not depend solely on regulatory bodies in the public sector. This process involves actions by various political departments and administrative units representing public institutions and private businesses, landowners, investors, organized civil society, and individual citizens as stakeholders with their own interests in shaping the future of the city, who are willing to influence this development with their own commitment. It involves a shared responsibility between public administration and individual interests, always for the common good.

Enabling functional urban development planning among various stakeholders by integrating different intentions is ensured by a process that includes mechanisms of cooperation and control and implementation competencies. This cooperation systematically evolves through mutual agreements on goals, project organization, and the development of new negotiation and financing models.

STEP monitors the city's interests as a whole by defining positions and strategies. However, specific solutions in individual locations are proposed by local stakeholders, including the municipal districts. This requires the direct involvement of municipal districts in spatial planning processes, where, considering the overarching or overall context of the spatial plan, they manage Target Areas.

Interactions with the population and interest groups involved in urban planning processes represent a fundamental cooperative element in urban development. The diversity of possible solutions proposed in the context of participatory procedures can provide important inputs for decision-making. Participation requires mutual respect, willingness to communicate, and learning from all involved stakeholders. It is crucial to involve all stakeholders from the beginning through open discussions about development in Target Areas.

BERLIN

The urban area of Berlin is composed of 12 urban districts, each of which has the population of a medium-sized city. The Berlin plan establishes a framework for proper, integrated, and coordinated urban planning for the capital city of Germany.

The spatial plan "Flächennutzungsplanung FNP für Berlin 2020" (FNP) covers the entire urban area of Berlin and designates areas suitable for housing or business while preserving open spaces. Among the main goals of Berlin's FNP is ensuring housing within the city, urban diversity, a balanced offering in all parts of the city, good public transportation accessibility, and the protection of recreational and open spaces.

The challenge of spatial planning lies in harnessing the potential associated with growth for sustainable and socially just urban development. This involves modernizing existing urban structures and creating new development opportunities to strengthen Berlin's appeal as a metropolis.

Through targeted planning processes, FNP defines the use and ensures compatibility of new spatial requirements with the principles of strategic planning, thus ensuring that the plan is always up to date. The spatial plan includes sectoral development plans.

The growth in Berlin's population requires addressing housing concepts, job accessibility, green areas in the city, infrastructure, and mobility options. FNP emphasizes the need to more intensively utilize and qualitatively develop existing urban structures and to implement an active real estate policy. The current FNP plan for Berlin 2020 includes plans for 16 new neighborhoods. In Berlin, the priority is the inner development of vacant areas and brownfields, although spatial reserves within the city are limited. Attention is increasingly shifting to integrated areas on the city's outskirts, where more intensive use and the creation of new neighborhoods need to be explored.

Reliable integrated planning that coordinates various requirements, stakeholders, and interests is required for the city's development. To guide integrated urban development, a housing development plan for 2030 (STEP Wohnen 2030) has been included in the spatial plan. STEP demonstrates the potential for approximately 200,000 housing units in various locations

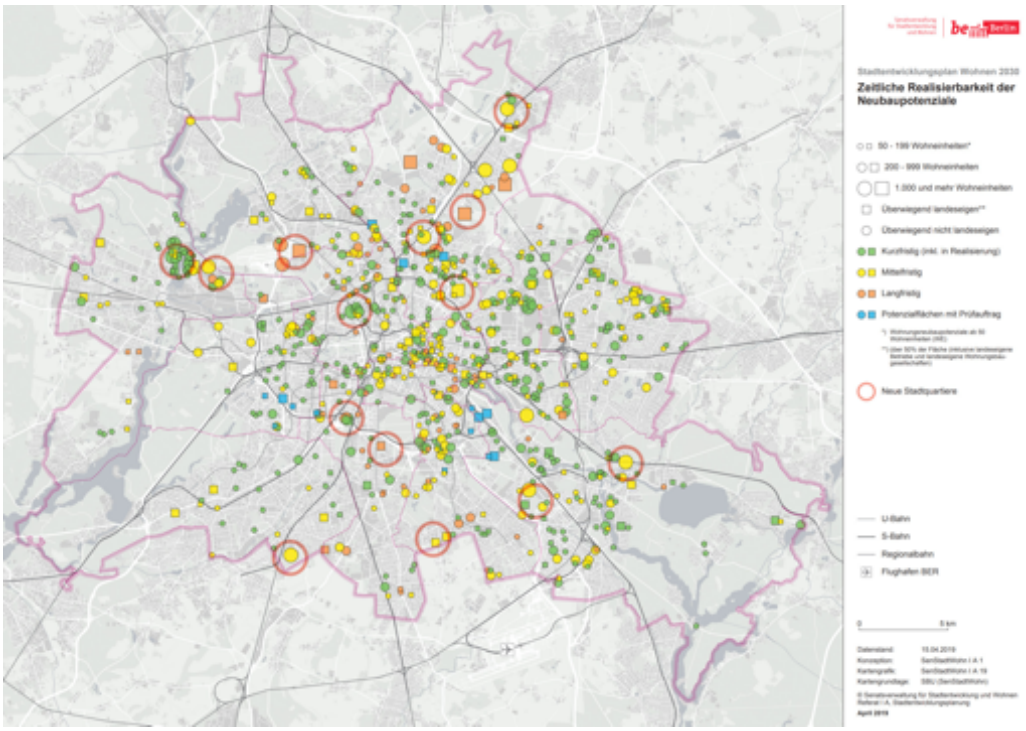

Fig. 3.: Berlin - Feasibility potential of housing. (Source: https://www.stadtentwicklung.berlin.de/planen/stadtentwicklungsplanung/de/wohnen/download/StEPWohn_Neubaupotenziale.pdf)

to meet the demand for new construction by 2030. Roughly a quarter of these areas are state-owned.

Potential areas in the inner city are becoming scarcer. As a result, the outer city is gaining importance as a residential area.

StEP Wohnen 2030 introduces 14 new urban districts with the aim of creating vibrant, socially and functionally mixed neighborhoods closely connected to their surroundings. In addition to efficient transportation connections, especially for public transport, they require good infrastructure, including social and educational institutions, retail offerings, service availability, and green spaces.

The main task of StEP Wohnen 2030 is to activate potential areas, requiring joint efforts from all stakeholders involved in housing development, including private, community, and cooperative housing, construction, public administration, politics, and urban companies.

To determine priorities for housing development, various criteria should be used, such as urban integration into existing residential structures and buildings, public transportation accessibility, significant quantitative contributions to housing development in the city, contributions to housing development oriented toward the common good, planning readiness, willingness of property owners to participate, urban economic aspects, environmental aspects, and balanced city distribution.

In all housing planning, the need for technical, transportation, social, and green infrastructure should be examined and planned from the outset. Specific concepts are needed to ensure infrastructure, such as social infrastructure concepts for districts or integrated urban development concepts.

Potentials are presented in three size categories: 50 to 199 housing units, 200 to 999 units, and 1,000 units and more. The time estimate for feasibility is color-coded and differentiated as follows: green - short-term (achievable within 3 years, including realized projects), yellow - medium-term (achievable within 7 years), red - long-term (attainable within 12 years), and blue - potential areas in the process of verification.

WARSAW

The spatial plan of Warsaw is called the " Studium uwarunkowań i kierunków zagospodarowania przestrzennego miasta stołecznego Warszawy," or simply "SUiKZP." It is an official document that sets out the directions and regulations for the development and use of land within the city. SUiKZP is prepared by municipal authorities and contains strategic guidelines and plans for various aspects of the city's development, including areas such as housing, transportation, infrastructure, and environmental protection.

To determine the purpose of land, including investments for public purposes, and to define the ways in which they are to be developed, local spatial plans, called "local plans," are prepared. A local plan is a local law document.

The study divides the city into three zones: central, urban, and suburban. Each zone has a different approach to development, including transportation planning. From a transportation perspective, the study emphasizes the completion of the three-ring road system, connecting the banks of Warsaw, the expansion of the metro and tram networks, support for public transportation, and other goals outlined in the Sustainable Transport Development Concept for 2015 and subsequent years.

The study of the conditions and directions of spatial development for the capital city of Warsaw was prepared based on the provisions of the Spatial Planning and Development Act in 2003. The current version is from August 2021.

The study is a planning document that defines the municipality's spatial development policy, covering the entire area of Warsaw and providing guidelines for local planning. The study also serves as a coordinating tool for managing the city's development as set out in the Warsaw Development Strategy.

Development areas within the functional urban and central zones are designated in places where imple-

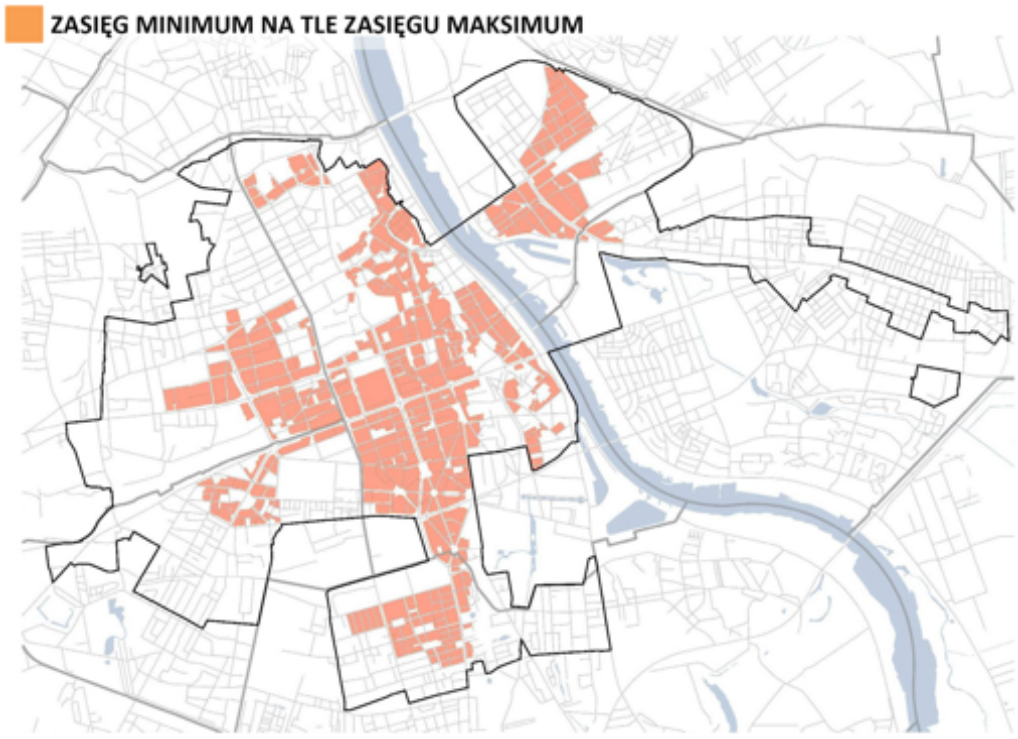

Fig. 4.: Warsaw - Comparation of minimum and maximum development. (Source: https://sarp.warszawa.pl/wordpress/wp-content/uploads/2020/04/Prezentacja-zabudowa-s%CC%81ro%CC%81dmiejska_24_03_2020_OWSARP-i-MOIA.pdf)

menting multifunctional activities can yield measurable improvements in the city's development standards and enhance public spaces. Construction development focuses on intensifying development, particularly in the city center and local neighborhoods.

Warsaw is addressing issues in the city's spatial structure, where there is an imbalance in territorial development between the left-bank and right-bank areas. The priority is to focus on complementing and modernizing the Praga side and efficiently connecting it with the left-bank part of the city.

The largest areas for new construction are located on the city's outskirts and in suburban areas. These are typically agricultural areas, often no longer in use, adjacent to investment areas. Documentation has been prepared for some of these areas, and land-use change permits have been obtained. Another significant portion of transformational land is defined in so-called "urban wastelands" with temporary unsuitable or degraded structures and brownfields from activities such as railways.

Construction development within the city, using buildable areas, is addressed by a study that defines the boundaries of development areas in the city center. This study also adjusts the construction requirements in the city center, reducing requirements such as minimum building setbacks that affect shadowing and the minimum duration of sunlight, which are also reduced.

The study analyzes two scenarios for the city center's development: a minimum and a maximum development extent. The plan for the minimum extent designates a smaller area in the city center using adjusted technical requirements and provides the basis for building permits. The minimum extent is defined in areas with a good concentration of city functions. In contrast, the maximum extent defines only the allowable use in these areas in the local development plan and cannot be used for building permits. The minimum extent covers an area of 1,300 hectares, while the maximum extent encompasses 3,700 hectares.

As of April 1, 2023, statistics on spatial development plans show that Warsaw currently has 337 local spatial development plans covering an area of 21,971 hectares (42.49% of the city's area), and 201 procedures for preparing local spatial development plans are in progress. The planned plans cover 14,322.1 hectares (27.70% of the city's area).

BRATISLAVA

The spatial plan of Bratislava is developed based on the Construction Act by the Metropolitan Institute of Bratislava and the City of Bratislava Municipal Office. The current spatial plan was approved by the City Council in November 2021.

The process of developing and amending the spatial plan is defined by the Spatial Planning and Building Order Act. It's a lengthy and complex process with multiple stages involving various public and state authorities, the public, utility managers, and other legal entities or individuals.

The development of multi-story and low-rise housing forms is predominantly carried out by the private sector and currently focuses mainly on open spaces within the built-up areas, where there are no significant demands for additional infrastructure development, often in areas designated for greenery or public amenities. Shaping the inner structure of the city is planned while preserving the historical core of the city and protecting the values of stabilized areas. The development of urban structures on new sites is oriented towards the axes radiating from the city center, forming the development areas that connect to the urbanization axes within city districts.

In the development and proposed expansion of Bratislava, a comprehensive solution to the functional use of areas and spatial organization is applied. This creates conditions for effectively managing the costs of land preparation and for creating a quality and diverse urban environment. The city's development plan is based on the principle of meeting the needs of all layers of the population and visitors.

Development areas are parts of the city where the spatial plan proposes new construction on undeveloped land, involving a significant change in land use or a major change in the scale of development.

The primary goal of the spatial plan is to propose regulations for the intensity of land use in development areas based on eight urban functions (multi-story residential development, low-rise residential develop-

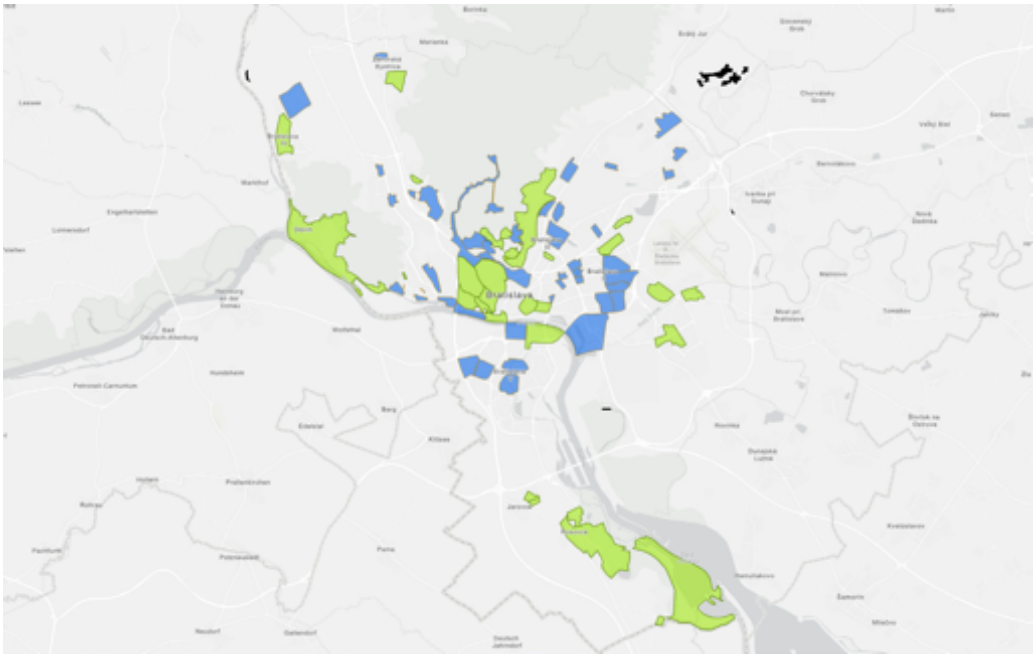

Fig. 5.: Bratislava - Map of the zoning plans. (Source: https://geoportal.bratislava.sk/pfa/apps/webappviewer/index.html?id=6f055b1431754b09aa3fcb5e5bb5734a)

ment, public amenities of citywide and regional significance, local public amenities, industrial production, distribution centers, warehouses, construction, and mixed residential and service functions). Bratislava aims to designate the use of approximately 1,000 development areas by 2030, which make up eight large areas. Furthermore, the plan works with the intensity of land use in development areas based on their location within the city.

To guide property owners and potential investment actions within Bratislava, it's necessary to provide detailed zoning documentation for each development area, offering regulations at the level of the municipality's spatial planning documentation.

CONCLUSION

In the examined cities, the resolution of development transformation areas is approached through strategic tools and subsequent regulation of individual areas. The process in these cities, within their spatial plan, is quite similar and can be summarized in 5 points.

1. Identification of transformation areas - survey and analysis of urban areas with potential for transformation and development.

2. Establishment of goals and strategies - defining goals and long-term strategies for each transformation area, including the anticipated character of development, urban layout, functional usage, etc.

3. Development of detailed plans - creating detailed plans for transformation areas specifying details concerning construction, transportation, infrastructure, greenery, and other aspects of development.

4. Public participation - involving the public, local residents, property owners, and other stakeholders in the planning and decision-making process.

5. Regulation and construction management - issuing building regulations and rules that determine the conditions for construction and development in transformation areas.

These cities handle transformation and development areas through urban planning and regulation of the development of these areas. The spatial plan sets forth the intentions and directions for the city's development and establishes rules and restrictions for construction and development.

The aim of working with transformation areas is to achieve balanced and sustainable development that respects the city's needs, the environment, and its residents. Transformation areas are designed and regulated in line with long-term strategies and the city's needs and those of its residents.

The emphasis that cities place on the use of individual development areas, as set by the spatial plan, depends on the city's needs and demands for the intensity and pace of development. In cities where many people migrate in search of work and housing, there is a need to intensify urban development and use open spaces within the city, making use of established infrastructure, services, and sustainable mobility.

Cities define development areas both within the city and its peripheral parts, creating long-term plans for the future. Some rapidly developing cities are already approaching the current limits of development intensity based on current social and political factors. Cities with high demands for increasing the number of housing units and jobs evaluate development areas based on their potential capacity, development possibilities, and readiness for construction. These cities create detailed plans for the strategic and efficient use of all development areas for a specific time frame. In contrast, cities with lower pressure to increase housing and job numbers focus on regulations and development guidance for these locations, selecting development areas with good infrastructure readiness and suitability for construction. These cities do not need to intensify urban development, and their development decisions are based on ease of implementation.

The delineation of transformation and development areas is represented by the layouts of individual development areas, either as part of the visual component of the spatial plan or in an interactive browser created using a geographic information system. Each city categorizes these areas according to various criteria, such as housing and job capacity, the time required for development, or the state of regulatory preparation for a given area.

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THEMES OF OSTRAVA'S SPATIAL DEVELOPMENT

Řihák Pavel

ABSTRACT: The paper focuses on individual topics of spatial development of Ostrava, which are based on the Themes of Ostrava's spatial development, prepared by the Municipal Studio of Spatial Planning and Architecture (MAPPA) in 2020 as its basic tool for city planning. The individual themes are linked to the twelve panels, which indicate general urban planning principles based on the analysis. The paper further develops these principles into individual themes and highlights the specificity and uniqueness of Ostrava. The goal is to verbalize the idea of the city with an accompanying schematic expression.

KEYWORDS: strategy; spatial development; Ostrava; planning; urbanism; spatial planning; strategic planning; city idea; quality of built environment

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INTRODUCTION

Spatial development issues are key to city planning. It is not important whether it is strategic or spatial planning. Both of these plans should include spatial development themes if they have the ambition to deliver the quality of the built environment. The themes are based on the existing form of the city, trends, developments and causes of the current form. At the same time, the themes have a close relationship with other cities and it is therefore appropriate to take inspiration from other cities to possibly set parameters or assessments for the implementation of spatial planning. [1]
Ostrava has a relatively stable spatial plan compared to Czech cities, especially in terms of its degree of adaptability. [2] At the same time, it has a strategic plan that is relatively well evaluated due to the wide participation in its creation. [3] The spatial plan is a continuation of the urban concept of Ostrava, which was created in the 1970s and was slightly supplemented in the 1990s. In principle, therefore, it lacks a contemporary urban concept that would reflect the development themes of similarly sized cities. The strategic plan defines socio-economic objectives quite precisely and also contains a list of projects, often architectural, landscape and urban planning projects, which should lead to the fulfilment of the strategic plan's objectives. However, it does not include a benchmark between socio-economic objectives and specific projects. It is this scale that corresponds to the Spatial Development Themes for Ostrava.

THEMES OF OSTRAVA'S SPATIAL DEVELOPMENT

CARE FOR THE OLDEST PARTS

The oldest parts of towns tend to be the most important areas and help create a genia loci, a mental connection between the inhabitants and the town. It is by respecting the original historical layers and working with them in a meaningful way in the development of the city that we are able to complement them with contemporary requirements. [4]

Thanks to its industrial development, Ostrava does not have such a varied and layered development as historical cities. On the contrary, it has relatively small atomized parts of villages and colonies that are essentially unrelated. Although these historical layers are not particularly unique, they need to be approached sensitively. Not because they are endowed with extraordinary value within the Czech Republic as a whole, but because they aid identification with the town and its history.

The aim is not to prevent additions, but rather to be aware of the value of these areas and to be able to restore and complement them. For existing public spaces and for new buildings, the rule is that they must respect character, scale, proportion and materiality. As the oldest historic districts are defined, it is possible to describe each of them in terms of public spaces as well as in terms of urban blocks and houses.

This topic is not important in terms of prioritising investment, but rather in terms of what characteristics specific designs for public spaces and buildings should meet, and therefore it is possible to define individual regulations to some extent on this basis. The stricter regulation for these areas can be explained by the importance of the area.

CREATING A MORE DIVERSE CITY

If we want to live in sufficiently resilient cities, one of the key features is a multifunctional urban fabric. This is characterised by a functional diversity that creates a more diverse city in which people can live, work and recreate, which is consistent with the contemporary 15-minute city approach. [5]

The development of Ostrava has been linked to the building of ever new districts, which have generally been built on greenfield sites and not so much on pressure to redevelop existing areas. This lack of historical layering in the individual areas results in monotonous areas where the architectural concept is evident, but which do not provide a sufficiently varied city.

It is necessary not to be afraid to enter boldly into originally planned and often valuable urban structures and to add new layers to meet the requirements of contemporary urban life.

The additions to existing housing estates are a typical manifestation of this. The aim is to support the urban fabric while complementing the missing functions (usually amenities, offices, non-disturbing manufacturing or alternative housing types) in the area.

By adding new layers to existing monofunctional areas, it is possible to use the existing area efficiently (without major investment and operating costs) without the need to extend the city into the landscape. At the same time, this can make individual areas much more attractive to their residents, as they will contain all the features important for living and living in the city.

INTEGRATION OF THE OLDEST PARTS

It is crucial for the city that its different parts are connected into a continuous and coherent whole with smooth transitions across different locations with different character. This coherence through public spaces reduces the demands on individual car traffic and also

helps to increase the vitality of public spaces by making them more comfortable to navigate on foot or by bicycle. [6]

Due to the historical development of Ostrava, it is quite often the case that individual Ostrava locations do not relate to each other and it is very complicated to connect them. The aim is to connect the oldest parts of the city towards the newer parts, especially within a compact urban structure. Primarily, this involves connecting public spaces and streets in particular. Secondarily, a structure of urban blocks should be created within which there will be a gradual transition between the different character areas.

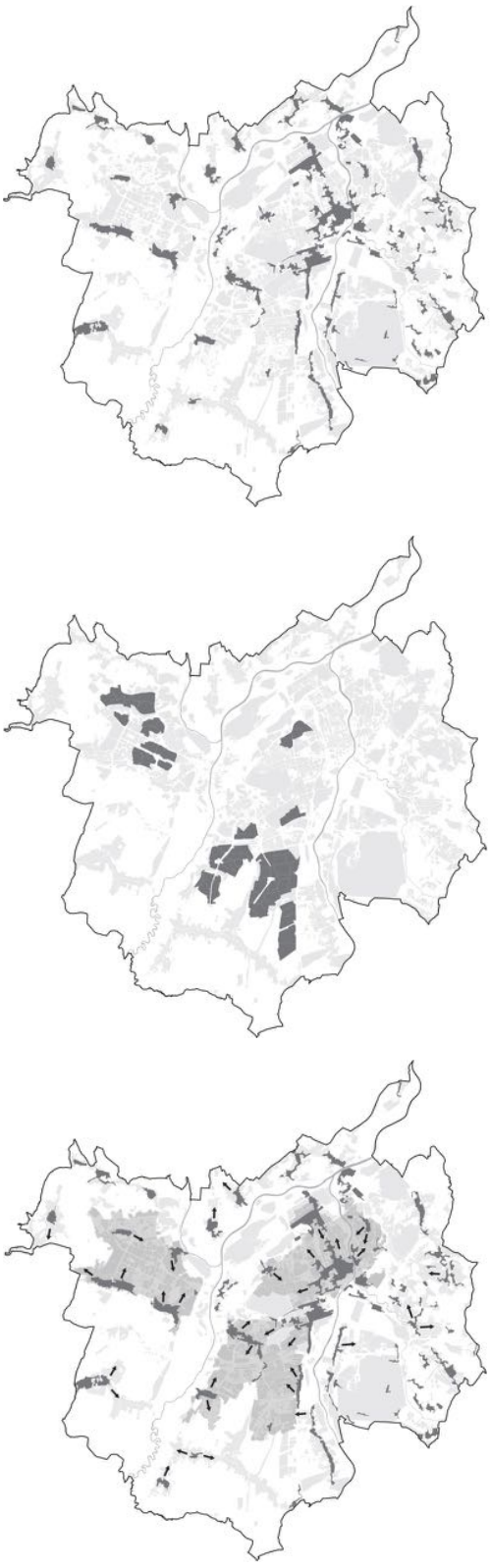

Fig. 1.: Care for the oldest parts; Creating a more diverse city; Integration of the oldest parts. (Source: author, MAPPA p.o.)

This will be manifested by the ability to pass easily between different parts of the city without the pedestrian or cyclist moving through unattractive or even dangerous places. At the same time, the character of the development will transition smoothly between localities so that there are no stark contrasts between e.g. detached and semi-detached houses.

Smooth transitions in the pattern of development between existing sites rather than wide gaps increase the permeability and usability of the town for its residents.

CARE FOR URBAN ENSEMBLE

Not all of the area values in urban areas are protected by legislation, nor is it desirable that every part of the area be under conservation protection, but it is necessary to understand what parts of the city are valuable and how they help to co-create the image of the city. In the case of Ostrava, four urban conservation zones are identified in this way. At the same time, there are a number of original villages or several workers' colonies. Some parts have disappeared, but there are still elements that can still have an influence on the current image. There are also valuable modernist buildings with preserved and undisturbed concepts.

The aim is to take care of valuable urban ensembles and thus promote the identity of the post-industrial city. By working appropriately with these layers it is possible to develop and promote the local identity and attractiveness of the city.

Appropriate additions to original structures and reconstruction of public spaces can help to make places more attractive to residents and visitors. These are generally relatively stabilised areas that are not in good condition.

Within specific areas there are usually public spaces, whether squares, town squares, piazzas or various plazas, the reconstruction and restoration of which can also help the wider area by restoring the original attractiveness of these places and by restoring and complementing the urban fabric.

INCREASE THE VALUE OF THE CITY

The quality of public spaces is related to the architectural, urbanistic and artistic values within the city. It is one of the characteristics that helps to determine how attractive life in a city is. If cities are to remain relevant, it is essential that residents want to live in cities, not have to.

Ostrava has a relatively large number of public spaces and a smaller number of valuable places. The main centre of gravity is the historic centre of Moravian Ostrava, where there is probably a sufficient number of such valuable places.

The main emphasis on architectural and urban quality should be in those parts of the city that are more important in terms of population. It is therefore also important to be able to identify priority areas where it is appropriate to direct energy in the first phases so as to promote permeability through high quality public spaces, usually associated with important buildings and functions.

SUPPORT THE IMPORTANCE OF THE REGIONAL METROPOLIS

The regional metropolis forms the backdrop and key infrastructure for its immediate surroundings, which are made up of other towns and villages. To a large extent, the quality of the region is linked to the quality of the regional metropolis. [1]

Ostrava is undoubtedly the regional metropolis of the Moravian-Silesian Region and contains a number of unique features within the region. Nevertheless, due to its historical development, the position of the regional metropolis is less clear than in the case of Prague or Brno. At the same time, together with the Polish and Slovak parts, Ostrava is part of the region centred on Katowice. The aim is to promote the city as the centre of the region, which is attractive not only for its inhabitants but also for visitors and tourists.

It is not only about individual functions, but also about the relationship of the buildings to the public space. From this perspective, Ostrava is highly problematic, as many important places have very poor quality public spaces.

It is not just about the regional functions themselves, but also about making them stand out in terms of the quality of the architecture of the buildings and the public spaces that are connected to them. It is to these places that increased investment and funding for maintenance and operation should be directed.

Fig. 2.: Care for urban ensemble; Increase the value of the city; Support the importance of the regional metropolis (Source: author, MAPPA p.o.)

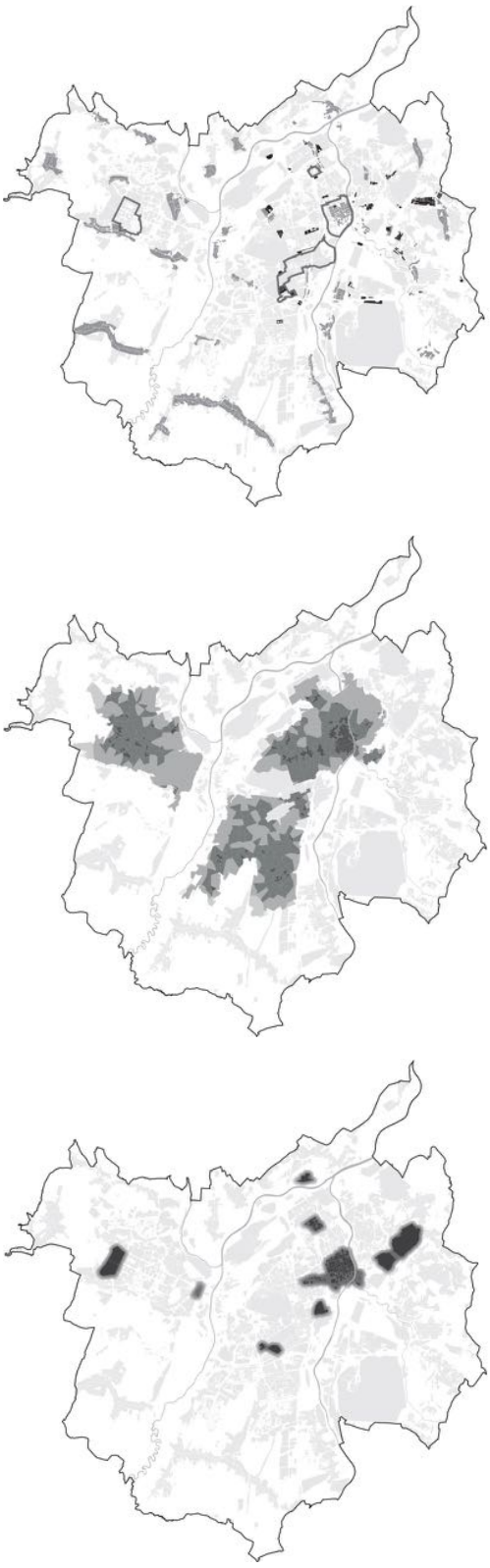

Fig. 2.: Care for urban ensemble; Increase the value of the city; Support the importance of the regional metropolis. (Source: author, MAPPA p.o.)

TURN THE CITY IN ON ITSELF

For Shrinking Cities, it is important that the compact urban structure is strengthened by sensible densification of existing built-up areas. This makes it possible to develop the city even though the population will decline slightly. Such development could be called positive stagnation. [7]

Ostrava's population is still slightly decreasing. Although this decline is not dramatic, it is deteriorating the efficiency of the city's operation, its vitality and attractiveness in the long term. Turning the city in on itself means that the city will be better able to manage its urbanized area and will not have to build and expand infrastructure outside the previously built-up area.

The goal is to create more compact parts of the city with clear buildable boundaries. This will limit the development of the surrounding landscape and make better use of brownfield localities and internal space reserves. All this improves the cohesion of the city. Three residential centres are defined within the proposal.

If the structure and boundaries of the residential centres continue to expand, then this will not only result in a less efficient area, but will also result in existing residents having less access to the surrounding countryside, placing greater demands on the green public spaces within the city's intracity and reducing the quality of life in the city.

Ostrava should not allow uncontrolled development outside residential centres, while at the same time encouraging land within residential centres to be used efficiently.

USE OF URBAN LAND RESERVES

One of the main theses of sustainable urban development is to use the free areas within the built-up area. This minimises spatial barriers while promoting the physical cohesion of the city. All of this has the effect of promoting a multifunctional urban structure, or a city of short distances. [8]

Ostrava contains a number of internal reserves, both within already defined urban blocks and large areas for which a more detailed plan is needed.

Within the framework of the proposal, areas are defined for which the urban structure is clear and the completion of part or the whole block can be clearly identified. At the same time, there are a number of areas in the territory for which it is necessary to have a more detailed plan that describes the urban structure of the territory, the form and significance of public spaces and the character of individual urban blocks.

The aim is to promote the use of the land within the city and therefore to prepare plans for the development of individual areas in such a way as to increase the physical cohesion of the city and to complete the

appropriate urban structure. Great emphasis will be placed on the elimination of individual barriers in the form of traffic routes.

USE EXISTING INDUSTRIAL SITES

The use of brownfields is one of the problems of urban development. These are areas that have been degraded by human activity and are often areas whose future use is very challenging in terms of remediation of environmental burdens. At the same time, it is an area in close proximity to existing buildings and therefore directly offers new use and development [9].

Ostrava, as a post-industrial city, has a number of large brownfield sites spread over a large part of the territory.

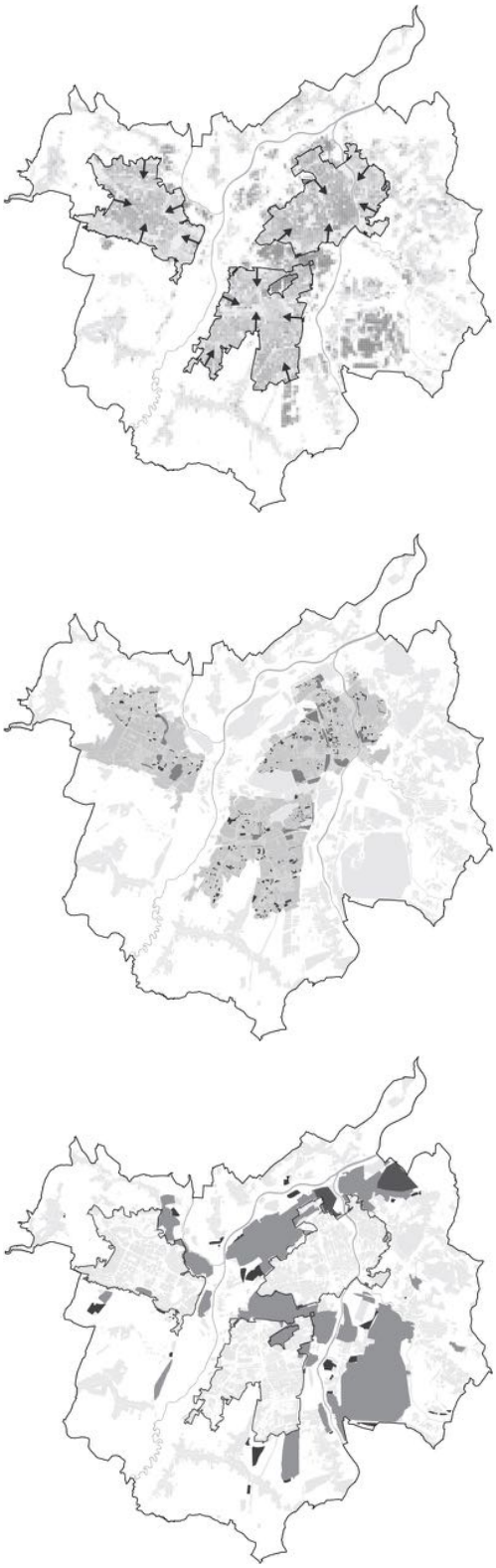

Fig. 3.: Turn the city in on itself; Use of urban land reserves; Use existing industrial sites. (Source: author, MAPPA p.o.)

The aim is to define to what extent the existing industrial sites should be integrated into the urban structure of the city and to what extent it is more appropriate to return them to the surrounding landscape and use them for, for example, recreational or ecological services.

The main task is to have plans for individual brownfield sites and not to allow uncontrolled development in these parts that could have negative consequences for the future shape of these areas, especially so that they do not continue to be a burden on their surroundings. It is the design of the specific form of future use that can lead to the creation of an agreement between the municipality, the city districts and private owners or infrastructure managers.

ENHANCE THE QUALITY OF RIVERS AND THEIR SURROUNDINGS

Rivers and their surroundings are the most attractive places in cities, because they also change the urban space, which usually acquires a different scale, dominated by the dynamics of the river. This has not always been the case. Quite commonly, cities have turned away from rivers. [10]

There are four important rivers with three confluences in Ostrava. In most cases, the river does not pass through and adjoin urbanised areas, but often touches industrial areas. A very specific feature of Ostrava and a demonstration of the city's lack of respect for rivers and their confluences is that all the confluences are crossed by large transport structures.

From the point of view of development and accessibility of the rivers and their surroundings, it is important what use the localities adjacent to the riverbanks have. Only a very small part of the Ostravice River from the confluence with the Lučina towards the Odra has the potential to create an urban waterfront. In other cases, the potential of the rivers and their surroundings is rather landscape. The southern part of Poodří, which is connected to the protected landscape area, is exceptional in this respect. Most of the solutions in the Ostrava area should be close to nature, with meandering riverbeds slowing down the flow of water.

The aim is that the localities around the rivers should be highly permeable and provide a good link between the river and the city. Localities around rivers will be located for landscape or residential use and will eliminate productive uses that generally degrade the river and immediate surroundings. The primary goal is to return the river to its natural character, possibly a stone embankment.

CARE FOR THE DIVERSITY OF THE LANDSCAPE

Especially due to the collectivisation of agriculture, the Czech landscape lost its diversity and small scale. Since the Baroque period, people have been trying to make the surrounding countryside more accessible and have made demands on it not only in terms of agriculture and farming, but also in terms of residence. These are reflected in the creation of more attractive places in close proximity to urbanised areas. [10]

There is a relatively large number of different types of landscape in the territory of Ostrava, whether it is close to nature, economic and agricultural and post-industrial landscape.

Although Ostrava is a very green city, it is often a green space that is neglected and polluted. The emphasis should be on gradually improving the suburban landscape. At the same time, it is crucial to increase the diversity of the landscape, to strengthen microdiversity, to increase the ecological stability of the landscape and

thus its attractiveness for the inhabitants.

The challenge is to make post-industrial landscape localities more accessible and attractive, respecting both natural and anthropogenic components and promoting landscape composition. In the case of economic landscapes, to enhance permeability and reduce the scale of individual areas to make the economic landscape more welcoming and residential. In addition, create more space for nature-friendly solutions around rivers and return water to the landscape.

CARE FOR THE POST-INDUSTRIAL LANDSCAPE

For most cities, the landscape is something unchanging, because in our conditions cities have tended to adapt to their natural framework. An exception to this approach are cities affected by mining, where the landscape has been very significantly altered by humans over the last 200 years. However, this has given rise to completely different biological types and allowed unique places to emerge. [11]

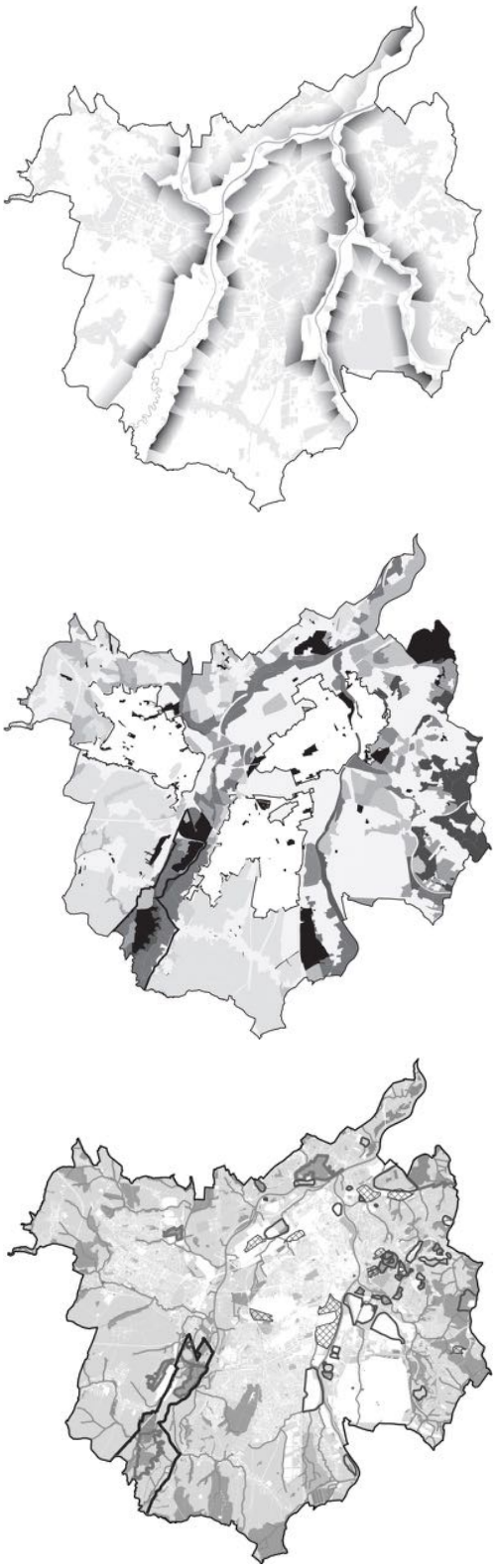

Fig. 3.: Turn the city in on itself; Use of urban land reserves; Use existing industrial sites. (Source: author, MAPPA p.o.)

A large part of Ostrava has been affected by mining and undermining, which has significantly changed the landscape character.

The main goal is to reclaim the post-industrial landscape and find new nature-friendly uses. So that this anthropogenic human intervention on the landscape helps to create unique places and sites that can support the diversity of the landscape. The challenge is to preserve and make accessible the heaps as local landscape features. To further connect the post-industrial landscape into a single system and to ensure the biological uniqueness of these areas through managed succession.

By creating the conditions for individual heaps to be gradually transformed and made accessible as landscape features that can take on a different character. In particular, the Ema heap and the Trojické valley, which are located in close proximity to the historic centre, are key in this respect.

CONNECTING THE GREEN AXES

Within the city and its surroundings, we can find a number of unique parks or suburban landscapes whose quality is not in themselves, but in how they are interconnected. If these green spaces are linked into a single system that is accessible to the city's residents, the use of each area increases and therefore indirectly increases the quality of life in the city. [12]

The aim is to design a system and hierarchy of green axes, from the main ones around rivers to the landscape green axes around residential centres to the fine tissue that connects individual green public spaces within urbanised areas to each other and to the surrounding landscape.

The first task is to reinforce the nature-like character of the rivers' surroundings. The second task is to connect green axes in relation to residential centres. The third task is the individual green public spaces themselves within the built-up areas.

It is important to enhance the quality and importance of existing green public spaces and especially parks. To improve the suburban landscape in the form of urban parks and woodland parks. Strengthen links between green spaces within the city. Ensure good accessibility of green spaces in the suburban landscape for residents, whether for short, medium or long term recreation. At the same time, create suitable conditions for the migration of animals and plants.

DEVELOP BLUE-GREEN INFRASTRUCTURE

If we want to ensure adequate conditions for the life of the inhabitants in the city, it is necessary to reflect contemporary approaches leading to water retention in the landscape, which results in a higher quality of greenery and microclimate. Minimising heat islands and ensuring the availability of sufficiently large green spaces in urbanised areas is a major issue. [12]

Ostrava has a huge potential in terms of landscape accessibility due to its zoning. Nevertheless, there are heat islands in both built-up and unbuilt-up areas.

From the point of view of the quality of life in the city, the availability of sufficiently large green public spaces

from the place of residence is important. This is particularly enhanced in more compact and dense developments, but where maintenance may be more intensive and thus have a greater ability to withstand more visitors. A second important consideration is that trees and stormwater detention measures should be part of every public space. The final task is to minimize heat islands in agricultural areas so that economic use is not diminished. Thus, there is a need for more subdivision of agricultural areas into logical units.

CARE FOR THE URBAN-RURAL BOUNDARIES

An important issue in terms of the quality of the built environment is the boundary between the city and the landscape. This boundary has historically been very clearly articulated, but over time it has lost its significance and become blurred. With this, the link between the city and the landscape began to diminish. This boundary both helps to identify clear urban figures that are important in terms of a shared image of the city, but also has its own significance in terms of identifying individual places. [13]

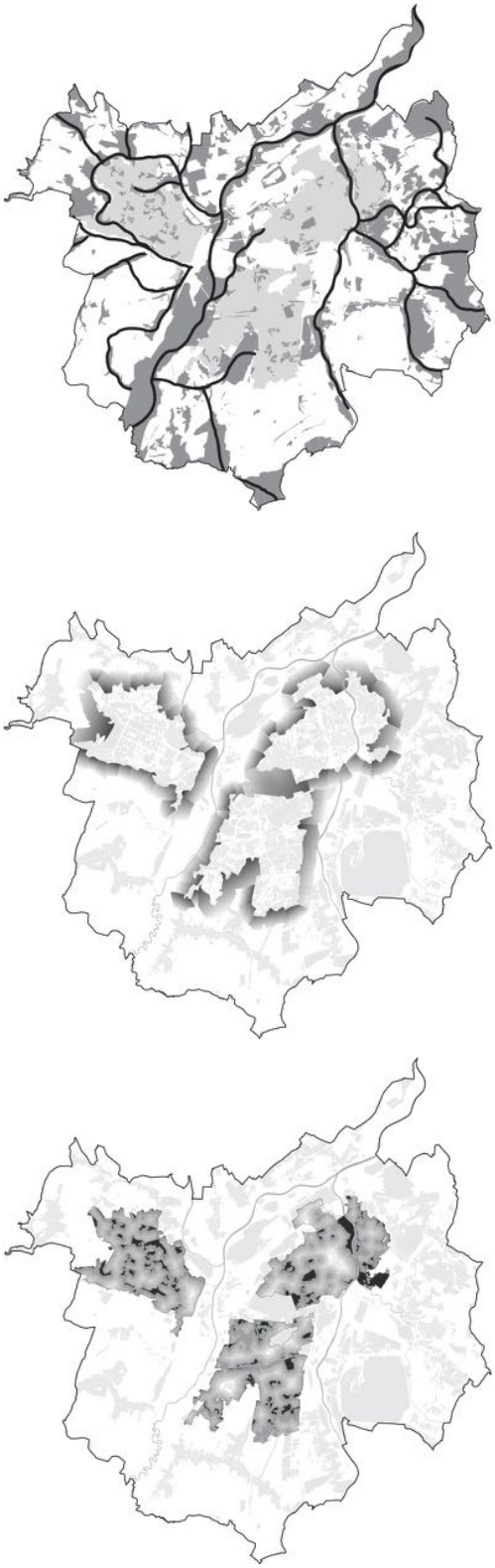

Fig. 5.: Connecting the green axes; Develop blue-green infrastructure; Care for the urban-rural boundaries. (Source: author, MAPPA p.o.)

Some parts of Ostrava have a boundary between the settlement and the landscape defined by impenetrable transport structures or industrial estates. Thus, although Ostrava is essentially green there are a number of areas that are on the edge of the buildable area and yet do not have good accessibility with the suburban landscape.

The aim is to increase the permeability of the boundary between the city and the countryside, whether the area has natural or productive uses. Further, to eliminate productive uses at the urban-rural interface and to enhance landscape character.

There is great potential to build urban parks or woodland parks at the interface between the city and the landscape, which will include residential functions and at the same time eliminate the negative impacts of production zones or transport structures, which in many cases create a boundary between the city and the landscape.

DEVELOPMENT ACCORDING TO THE CHARACTER OF THE LOCALITY

Cities take many forms. These forms can best be identified through the character of the localities, which describes not only the functional use of the area as it is today in the zoning plans, but more broadly the overall built environment of the city. Development by destination character allows the city to be divided into localities, which is one of the traditional tools of urban planning that allows each logical district to be treated with a unique character, promoting diversity while maintaining the linkages between districts. [14]

In terms of the character of its localities, Ostrava is a typical post-industrial city with many industrial estates, modernist housing estates and garden cities. Only a small part of it forms a compact city or historic core.

The aim is to be able to identify the character of individual localities and enable their development while not preventing the addition of individual buildings. By using the character of the localities, it is easy to identify how new development can be added to the area and also to determine what specific public spaces should look like. All of this allows for easy identification with different parts of the city.

It is important to add new houses to stable localities and to create public spaces that support the overall character of the localities.

ENLARGE COMPACT CITY

From the point of view of the sustainability of urban development, the key is how much of the urban structure is of a compact city character. The compact city is not only an economically and operationally sustainable model, but it is also the character of localities that allows the greatest degree of social interaction in the city and creates intelligible public spaces of appropriate size.

Ostrava has a very low proportion of compact districts, even if we include, for example, some of the Sorel housing estates. However, even these compact parts suffer from a number of gaps and the need to add new

buildings. [6]

It is important to promote the use of individual gaps within existing localities. Furthermore, it is important to transform existing localities that do not have the character of a compact city and to transform them, especially for those localities that are lower in terms of attractiveness and quality of the built environment.

ENHANCE THE STABILITY OF LOCALITIES

From a city planning perspective, it is important to be able to identify which localities are stabilized and can be easily entered by specific building or public space projects. It is equally important to know which localities are not stable.

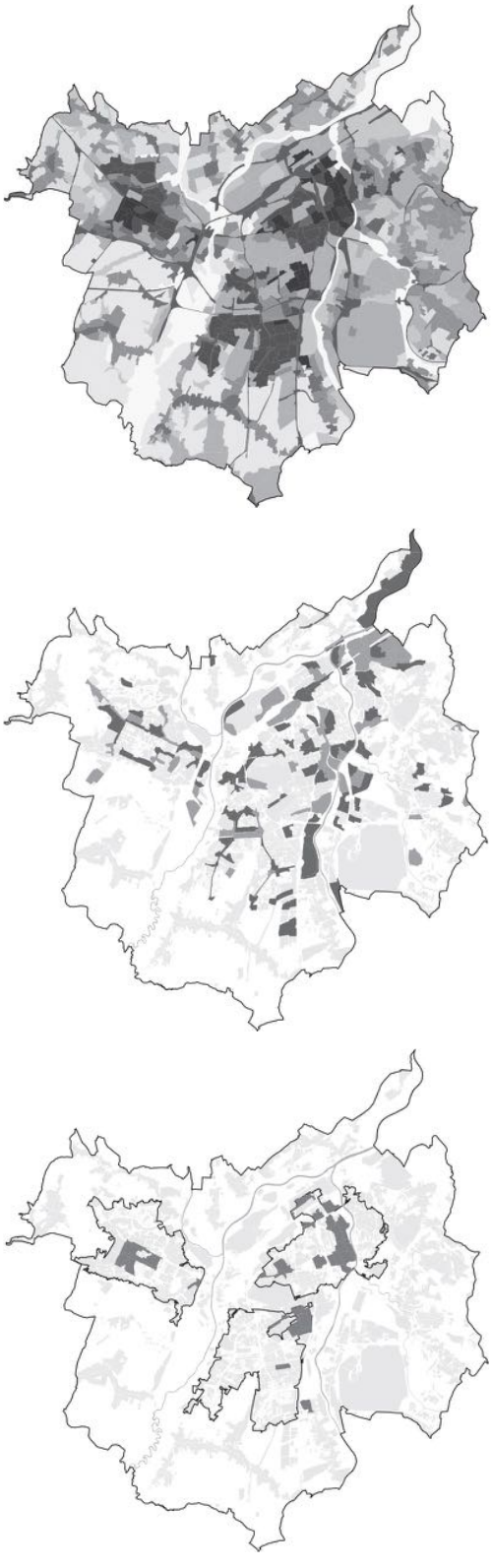

Fig. 6:. Development according to the character of the locality; Enlarge compact city; Enhance the stability of localities. (Source: author, MAPPA p.o.)

In Ostrava there are a large number of transformation and development localities located within and around residential centres. From the point of view of urban development, those localities that are located inside urban centres and create spatial barriers between different parts of the city are more important.

It is important to prepare a long-term urban plan for the development and transformation of these localities. However, individual non-conceptual interventions in transformation and development localities are a major problem.

The aim is to work proactively with regulatory plans and land-use studies for transformation and development localities to avoid inappropriate placement of individual buildings in large areas, which could result in complicated future developments.

ENHANCE THE QUALITY OF CITYWIDE FOCAL POINTS

Within the citywide system, it is important to care for those individual places, public spaces and buildings that are particularly important to the functioning of the city as a whole or the wider region. [15]

A specific feature of Ostrava is the relationship of citywide focal points to individual residential centres. Whether it is in terms of the number of focal points, which is the largest within Moravian Ostrava, or in terms of their distribution within residential centres, their connectivity or their uses and functions.

It is important not only to take care of individual focal points, but also to perceive that they are part of a continuous network. It is appropriate to look for the uniqueness of individual places and the way in which they can complement their surroundings. As individual places are strengthened there will be more pressure to strengthen each other.

Ostrava has a relatively large number of such places, but they lack energy and vitality. It is therefore important to strengthen the focal points and increase their quality and attractiveness. Only in exceptional cases is it advisable to expand these places with new ones, because otherwise we lose energy in the form of the number of people who visit and use each place.

The primary objective is to improve existing places and to seek their maximum potential in the significance of the city and in the significance of the other places that link to them.

CARE FOR LOCAL FOCAL POINTS

Local focal points represent places in the fabric of the city that are closely related to individual localities. These are mainly places that residents visit in the normal course of their daily lives. [15]

As the population of Ostrava is declining and the social composition of the population in some parts of the city is changing, so is the demand for local focal points. These are sufficient especially in housing estates. Sometimes even to the extent that existing focal points are declining. At the same time, there is a shortage of such sites in the peri-urban area.

We know where the number of localised focal points is adequate and it is more appropriate to add new features, whether they are buildings or public spaces. At the same time, we can see those locations where the number of hotspots is insufficient.
The positive impact of the strategy should be that individual local focal points will be sufficiently attrac-

tive and visited, thus promoting social interaction and strengthening local communities. At the same time, adequate local focal points will be created in places where they do not exist.

The lack or absence of local hotspots is a symptom of poor planning, as residents move within the statutory city or within the region, weakening those local focal points that were previously functioning.

FOCUS ON DECLINING FOCAL POINTS

The decline of already established local or citywide focal points has a major impact on the declining quality of life in the city and the creation of nuisance or hazardous areas. [15]

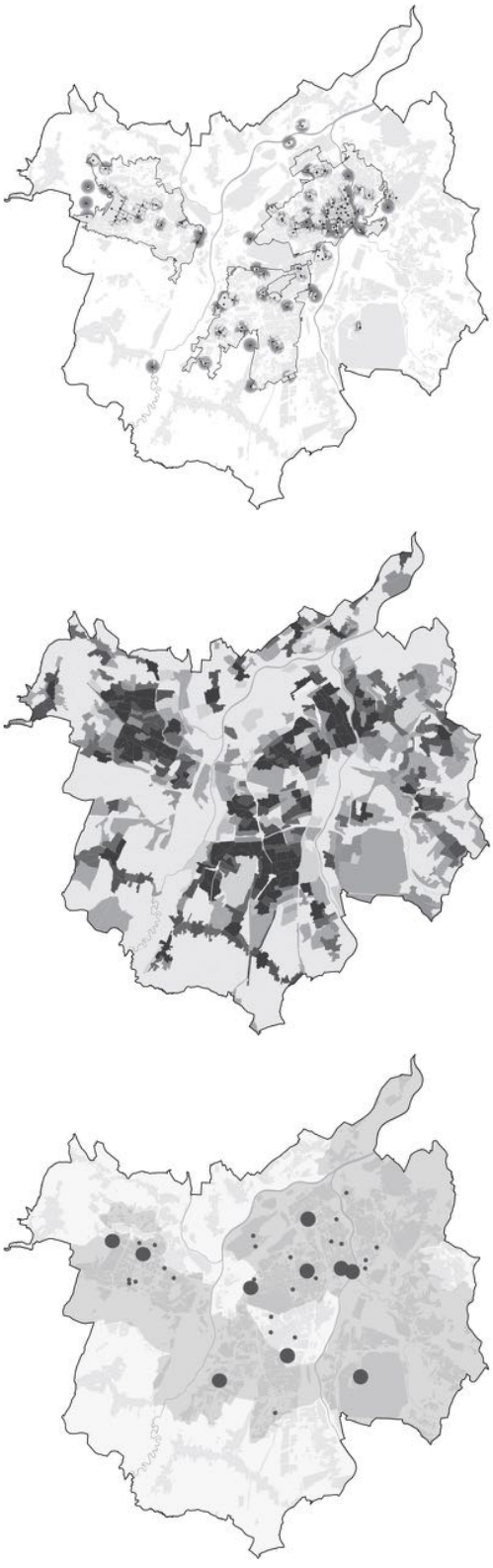

Fig. 7:. Enhance the quality of citywide focal points; Care for local focal points; Focus on declining focal points. (Source: author, MAPPA p.o.)

In the case of Ostrava, this trend is also related to the fact that the number of inhabitants and thus the number of users of individual focal points is decreasing.

The aim is undoubtedly to prevent the creation of such sites. These are especially places with amenities that are unoccupied for a long time and that degrade their immediate surroundings.

It is necessary to correctly identify individual focal points and to respond adequately to their possible decline. Properly determine whether to close the focal point or whether redevelopment is possible. It is not always necessary to attempt to correct declining foci, especially if there are similar foci in the vicinity that have replaced the original ones.

RULES OF CONSTRUCTION ACCORDING TO THE CHARACTERISTICS OF THE LOCALITY

It is important for planning and new development in the city to respect the character of individual localities. Since the last century, we have been planning the city more by function than by character. This has led to situations where buildings are created which, although similar in function, still interfere with each other. [16]
Ostrava is very specific in that it has a very small part of a historic or compact city. On the contrary, a very significant part of the territory is made up of modernist and garden city. Both characters have dominated the development of the city since the industrial revolution. Other development characters have been suppressed. Ostrava urgently needs a greater degree of compact urban development. This may be in the construction of new sites or additions, but it is also necessary to apply these principles to existing sites, particularly in the case of the modernist city, but also in some cases the garden city, which needs to have places in its structure that will be the centre of gravity for the wider area.

In urban design, care should be taken to ensure that reasonably compact developments with sufficient density are created.

Character should determine the conditions for development, whether in the form of more intensive compact urban fabric in the form of housing with commercial partners or, for example, in the case of the Garden City, the use of terraced houses, semi-detached or terraced houses in front of detached houses with large gardens.

DEFINE RULES FOR PUBLIC SPACE

By using the character of the localities, it is possible to determine very well, in addition to the rules for urban blocks, also the requirements for individual public spaces so that their facilities and appearance correspond to the wider area. In addition to public spaces such as squares and parks, emphasis should also be placed on the transformation of streets.

A large part of the public spaces in the individual residential centres of Ostrava is made up of street spaces, but these do not include streets in their complexity, i.e. public spaces where all modes of transport are equally represented and which contain an appropriate level of tree planting. Wide carriageways are far more common, but are a barrier to permeability through the area.

Emphasis should be placed on building streets rather than roads in the city. This translates into ensuring that the main and most important streets in the city and in individual residential centres include adequate space for public transport and, in particular, sufficient space for trees, pavements and cycle paths in addition to the

carriageway.

The key streets in this respect are those that connect the residential centres to each other.

INCREASE URBAN PERMEABILITY

The urban permeability is one of the important parameters, because how different types of movement around the city are used and how much it is possible to use public spaces that are not in close proximity to the residence.

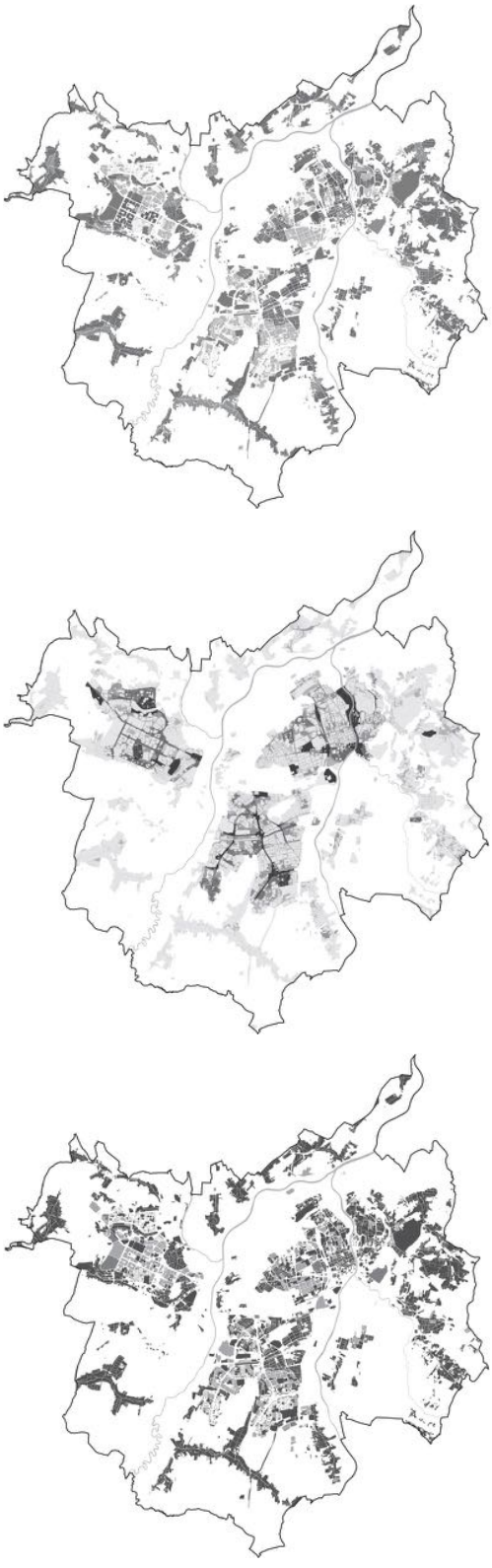

Fig. 8.: Rules of construction according to the characteristics of the locality; Define rules for public space; Increase urban permeability. (Source: author, MAPPA p.o.)

Ostrava is plagued by two extremes here. Firstly, it has a relatively large number of industrial estates that are too large and impenetrable. These complexes degrade their immediate surroundings by reducing the number of residents and users who could use the public spaces. At the other extreme are large-scale modernist housing estates which allow an extremely high degree of permeability but at the same time offer no semi-private or private spaces for residents. This also largely degrades their immediate surroundings.

The main public spaces such as squares, waterfronts, parks and streets need to be properly identified. In those places where large urban blocks are being created, it is advisable to complement these blocks with solutions that provide secondary permeability for pedestrians and cyclists.

The aim is to segment those areas that are too large, impenetrable and prevent the connection of existing and functioning parts. At the same time, it is appropriate to use existing courtyard blocks for semi-private or private purposes as long as the permeability of the area is not reduced.

ENHANCE THE QUALITY OF PUBLIC SPACES

In today's society, the quality of public spaces is one of the key aspects of the quality of a city and one of the reasons to live in a city. This is why the design of public spaces that would deliver the quality of the built environment is increasingly mentioned. [17]

Ostrava has a large proportion of public spaces due to its historical development. At the same time, these public spaces are not used enough to be sufficiently cared for.

The aim is to concentrate on those places that are already in a position to be used today, given the size of Ostrava and the intensity of use. In other words, there are sufficient functions, good transport accessibility and a sufficient number of people living there.

In the long term, there is a need to reduce the proportion of public spaces and increase the proportion of private and semi-private courtyards. Furthermore, it is important for Ostrava to take into account whether these are public spaces that already have all the prerequisites to be actively used today or whether they are public spaces that are of lower importance for the city and a less demanding solution is more appropriate.

The challenge is to systematically improve the quality of public spaces that will build on each other. This will also increase the sustainable mobility and attractiveness of the city.

ELIMINATE BARRIERS IN PUBLIC SPACES

Over the past century, a number of spatial barriers have been created that impede the natural permeability of the city and require various, often very complicated solutions that degrade individual places and the wider environment. [17]

In the case of Ostrava, these barriers are mostly traffic roads and partly also industrial complexes.

The aim is to turn selected roads into urban streets. Those that are not possible for various reasons must be adapted so that they do not continue to degrade their immediate surroundings.

This can be achieved both by completing the streets and, in particular, by arranging the street profile itself to accommodate wide pavements, cycle paths, tree planting and space for public transport. Alternatively,

large transport structures (expressways and railways) need to be bridged out of alignment in such a way as to avoid the creation of complex footbridges or ramps with stairways, which are not attractive to residents and are generally avoided.

TARGET UNSTABLE PUBLIC SPACES

Stable public spaces can be identified and correctly typologically classified, determining their importance and character. The transformation is therefore related to the reconstruction of the public space itself. In the case of unstable public spaces or areas, the transformation is more complex because it is related to the changing structure or layout of the streets.

Fig. 9.: Enhance the quality of public spaces; Eliminate barriers in public spaces; Target unstable public spaces. (Source: author, MAPPA p.o.)

In the majority of cases, the unstable public spaces in Ostrava include large traffic roads and their immediate surroundings. This applies less to development and transformation areas.

The aim is to have plans for the completion of individual areas and to define where individual public spaces should be directed. Where appropriate, whether there is an appropriate amount of them in relation to their immediate surroundings. The second objective is to turn the roads and their immediate surroundings into normal streets.

Plans will be created for the area, whether it is linear buildings and their surroundings or development and transformation areas with specific conditions for new construction in the city's intracity. For both of these plans, emphasis will be placed on ensuring that there is sufficient public open space.

ENCOURAGE FAST TRANSIT

Expressways are important within the city and especially for its connection to the region. However, if these roads pass through the city's intracity area, they can have a very negative impact on the whole of their immediate surroundings.

Ostrava, unlike other historically growing cities, has a significantly different transport system. It is based on three tangents: motorway, Rudná, Místecká. Two of them pass through residential centres.

The aim is to define that these tangents are primary for expressways and do not serve other modes of transport. At the same time, if these roads pass through a residential centre, it is necessary to design solutions for them that will not degrade the immediate surroundings or limit the traffic function.

An important aspect is that we will not require other streets to be expressways and will accept that they are part of the urban street network. Within residential centres, these roads will be underground or elevated. The main tasks are to complete the construction of Místecká and to integrate the building into the fabric of the city in order to create an attractive public space on its roof. It is also necessary to prepare a plan for the transformation of Rudná, which today represents a significant limit to its surroundings and at the same time does not allow for efficient traffic on the expressway.

CULTIVATE THE AVENUES

The city's avenues are important streets that co-create the city's fabric and provide key permeability through the area. In addition, they contain public transport and also contain key services and commercial parterres in their immediate vicinity. [16]

Due to the division of Ostrava into three residential centres, the urban streets that connect these residential centres are important. In the case of Ostrava, major public transport routes and important amenities are key to defining them.

The very naming of the three main urban avenues that connect the residential centres is important. These urban avenues need to be transformed into full-fledged streets that are expected to provide more than just space for individual car traffic.

In addition to car traffic and tram traffic, all of these urban avenues will allow for the smooth movement of pedestrians and cyclists, either longitudinally or laterally.

ENCOURAGE RAIL TRANSPORT

Rail transport is regaining an important role in urban development. With fluctuations, this has been happening since the inception of the railways, when it determined how urban development was accelerated. It is therefore relevant to believe that rail will continue to be important in this respect in the future. [18]

Ostrava is located at the intersection of four lines that enter the city at different points and are, moreover, linked together in a circle. The main advantage of this solution is that it allows connecting different parts of Ostrava with the wider region without the need to use public transport.

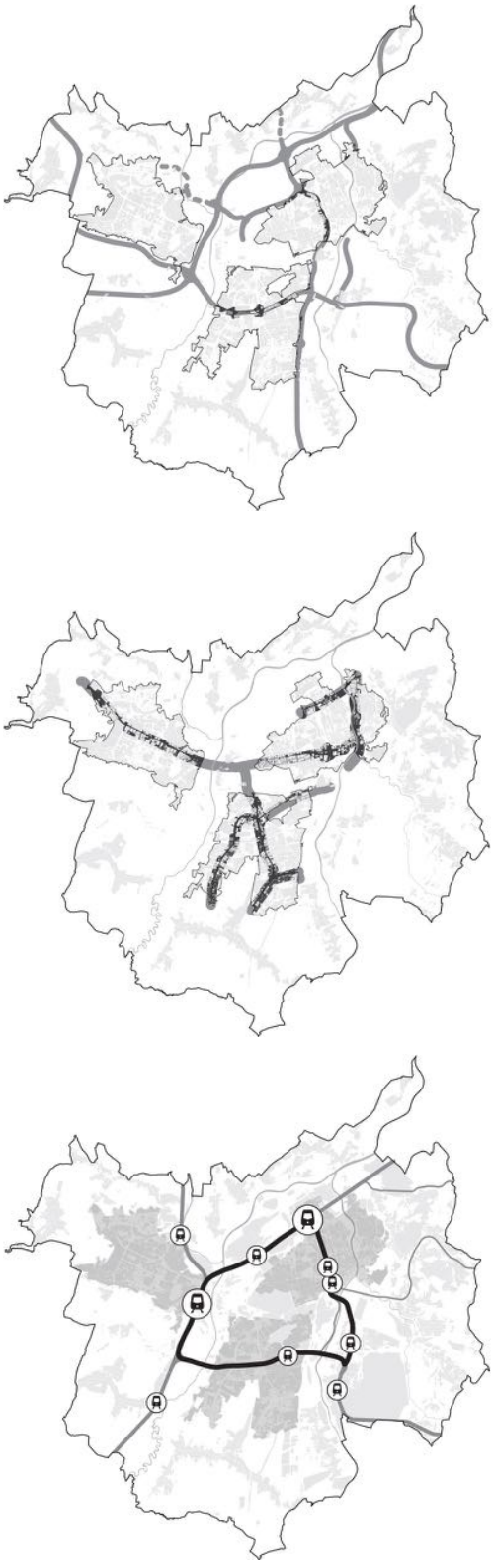

Fig. 10.: Encourage fast transit; Cultivate the avenues; Encourage rail transport. (Source: author, MAPPA p.o.)

The aim is to complete the railway circuit so that trains can pass through in different ways. It is also advisable to add new stops so that they are easily accessible within the immediate area and thus become attractive and interesting places for future development.

Infill will be seen as new stops are created around which new structures will be created to better integrate them into the existing fabric of the city.

CREATE CALM ZONES

Increasingly, the principle of calm zones, superblocks, short-distance cities, school zones or zones 30 is being emphasised in urban development. The aim is a more varied and multifunctional design of street spaces, although there is no restriction of movement around the city. [19]

Ostrava has no relevant limits why this principle cannot be applied. At the same time, it has very small parts of the territory where building solutions are implemented that do not allow cars to travel at higher speeds.

The aim is to build calm zones with a maximum speed of 30 km/h, which allow creating higher quality public spaces and building relevant alternatives for other types of movement in the city.

For these areas, a system of one-way lanes for cars will often be applied, which will allow sufficiently wide sidewalks, two-way lanes for cyclists, or sufficient space for parking and tree lines to be created. Raised intersection areas will be implemented on these streets to emphasize that the pedestrian is the priority in these areas.

STRENGTHEN CYCLING INFRASTRUCTURE

In cities that are attractive to their inhabitants, cycling is a relevant way of getting around the city. Key in this respect is a network of safe cycle lanes on streets where cars travel at around 50 km/h.

Ostrava today has a fairly robust cycling infrastructure, especially for recreational and sporting purposes, and in some cases we can already find the beginnings of cycling.

The key is to identify the main city avenues and major streets where higher traffic volumes and car speeds of around 50 km/h are expected. In such streets, it is necessary to build a separate cycling infrastructure that takes place primarily in the associated space outside the roadway.

In this case, construction may also take place by placing cycling infrastructure in existing street spaces, but is more likely to involve comprehensive street reconstruction.

The primary challenge is to get bicycle infrastructure into any comprehensive street reconstruction, which is typically associated with technical infrastructure reconstruction. This will be manifested not only by space for cyclists, but also by creating space for trees and blue-green infrastructure to separate the main traffic area from the associated one.

ENHANCE PUBLIC TRANSPORT

In addition to cycling and walking, sustainable modes of transport include public transport. A sufficiently dense network with a higher frequency of connections, linked to sufficient density of development and population, is important for this. [5]

Ostrava has a relatively dense network of tram lines, bus and trolleybus lines. A major deficit in terms of tram routes is especially in the connection of the 7th and 8th Poruba districts with the rest of the city. Furthermore, the lack of a second connection between the DOV and the centre of Moravská Ostrava is problematic, resulting in the creation of a single nodal point in the form of the Frýdlant bridges.

The primary task is to support the construction in the vicinity of the already functioning public transport, thanks to which it is possible to expect an increasing intensity of line traffic and thus increasing the attractiveness of public transport without the need to expand this infrastructure. The second round is to build some tram lines to serve the existing area.

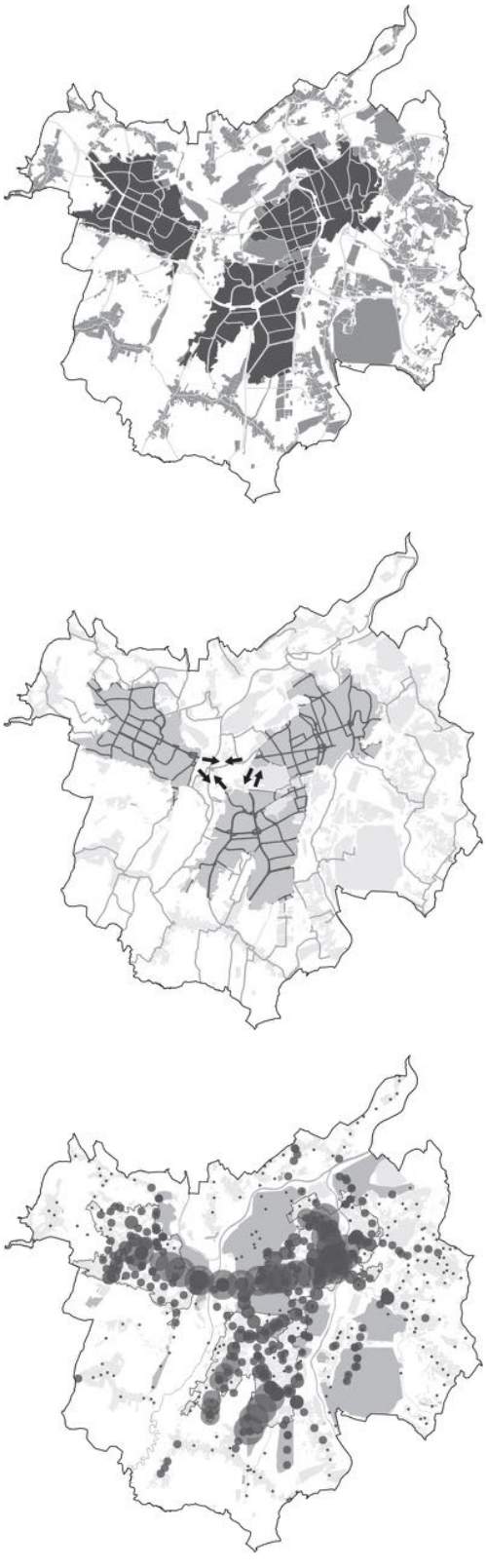

Fig. 11.: Create calm zones; Strengthen cycling infrastructure; Enhance public transport. (Source: author, MAPPA p.o.)

THE EFFICIENCY OF TECHNICAL INFRASTRUCTURE

An important aspect that must not be forgotten when planning and operating a city is the efficiency of the technical infrastructure, which is largely related to the structure of the built-up area and the density of the population. The more efficient a city's technical infrastructure is, the more room it will have to implement quality buildings and public spaces. [5]

In this respect, Ostrava has a very sparse built-up area and therefore relatively high operating costs, so it is important to use existing gaps and undeveloped and unused urban blocks, which will help to increase the efficiency of the existing infrastructure.

Greater efficiency will enable the implementation of those projects that improve the quality of the built environment and urban life. For this purpose it is important to define new development areas adequately and to use and complete existing residential centres efficiently with good access to technical infrastructure.

SPINAL TECHNICAL INFRASTRUCTURE

The spine infrastructure shows where the key routes are to connect existing sites to sewerage, water, electricity and gas. These spine infrastructures and an assessment of their capacities are key in the case of completing existing sites and for connecting new sites. [5]

In the case of Ostrava, the geographical centre of the city with the Třebovice power plant and the Novovice water plant becomes the hub. Other networks already have a structure skewed, for example, towards the wastewater treatment plant. It is worth mentioning the absence of backbone routes in the eastern part of the city.

The spine networks can be assumed to make it easier to connect new locations to sufficient capacity sources and thus not to trigger the need to rebuild existing networks. Unfortunately, the current analytical documents only work to a limited extent with the use of backbone routes, which results in complications for use in the context of the city. We know that the networks run through the area, but we do not know how much more we can "load" them by connecting new development without having to reinforce them.

POOLING OF TECHNICAL INFRASTRUCTURE NETWORKS

A major problem in reconstructing streets, but also in creating new developments, is how unsystematically the networks have historically been placed. For these reasons, complex reconstructions are necessary because they allow for changes in the surface layout as well as the possibility of bundling networks and, exceptionally, the construction of collectors. [16]

Ostrava today makes only limited use of existing collectors. Far more often, networks are uncoordinatedly placed within individual public spaces.

It is important to know the areas that today are facing lifetime or capacity limits and will need to be reconstructed. This will trigger an intervention in the street space and it is possible to further investigate a more appropriate layout of the networks in the street pro-

file, while possibly adjusting the capacity to match future developments.

The aim is to encourage combined technical infrastructure routes which create scope for a more appropriate street layout as it is not possible to continually extend the width of the street space.

CONCLUSION

The paper maps the intended topics of spatial development of Ostrava. These are based on the use of information about the city, which makes it possible to eliminate the subjective evaluation of the individual. [20] A generally shared picture of the built environment should help avoid potential mistakes in key areas or projects. At the same time, we can place more emphasis on the quality of individual projects, whether they are buildings or public spaces.

Fig. 12.: The efficiency of technical infrastructure; Spinal technical infrastructure; Pooling of technical infrastructure networks. (Source: author, MAPPA p.o.)

Spatial development themes can provide arguments and justifications for individual projects at the pre-design stage. The aim should be to identify the importance of the project in the city system. Investment in a particular project will have the greatest possible impact on the functioning of the neighborhood and the appearance of a particular place.

The spatial development of the city should aim to provide a shared picture of the possible future development of the city and, in particular, should show a strategy for how to get there. The aim is also to avoid disagreements on individual projects and to declare demands and requirements for specific projects or sites in a timely manner. This should have a positive impact on creating clear and understandable rules for developers.

It would be interesting to compare the spatial development issues of Ostrava with other cities or to generalise them and reflect them in the requirements for spatial and strategic planning.

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URBAN RESILIENCE IN THE INNER CITY OF PRAGUE: SMÍCHOV

Salahieh Diana - Tobišková Kateřina - Koucká Michaela

ABSTRACT: In the "Czech Republic 2030 Vision" document, published in 2017 by the Department for Sustainable Development at the Czech Republic Government Office, urban resilience was a prioritized parameter for assessing urban capacity to mitigate vulnerabilities to socioeconomic and environmental perturbations. However, efforts to assess and reflect on the measures and conditions of urban resilience are somewhat lacking in the Czech context. In retrospect, this paper aims to review the resilience of a distinct inner-city neighborhood in the city of Prague: Prague-Smíchov. Methodologically, the paper begins with a review of the strategies and implementation plans for urban resilience in Prague and Smíchov's municipality, followed by a historical reading of the area's urban development and adaptability to turbulences and changes. Finally, the paper unveils a preliminary examination of Smíchov's central area contemporary urban conditions in conjunction with the walkability of its public spaces and vitality of its blue-green infrastructure. The paper highlights the need for further research to address and enhance the scope of urban resilience within the city of Prague.

KEYWORDS: resilience; urban resilience; Prague; Smíchov; walkability; blue-green infrastructure

INTRODUCTION

Urban resilience is considered an essential assessment criterion for cities' vulnerability to socioeconomic changes and their capacity for adaptation during and after shocks and stresses. The recent global crisis induced by the COVID-19 pandemic and subsequent lockdowns served as a profound moment of reflection, revealing the manifold inadequacies in design strategies. It also shed light on the strengths and weaknesses of urban environments in fulfilling fundamental physio-psychological human needs amidst constrained mobility and disrupted work-life equilibrium. This calamity served as a poignant reminder for local communities and decision-makers to instigate initiatives that bolster the adaptability, quality, and vitality of urban spaces for the present and future generations. In tandem a shifting paradigm is arising, "the power of care" as French urbanist Alice Cabaret frames it, that is urging architects and urbanists to refocus on bulletproofing the existing urban environments for a dynamic and unpredictable future. While resilient thinking has been developing in urban studies since the 1960s, frameworks for adopting resilience only became prominent around the mid of 2010s in various global agendas (e.g., the Sustainable Development Goals, the Paris Agreement, the World Humanitarian Summit Commitments to Action, and the New Urban Agenda) [17]. The polysemic nature of resilience as a concept makes it complicated to define and measure within the scientific and professional fields [42]. However, generally it has been recognized that resilience to either environmental or socioeconomic uncertainties coincides with the design of more equitable and livable cities [14].

In 2017, the "Czech Republic 2030 Vision" document was published by the Department for Sustainable Development at the Czech Republic Government Office, iterating great emphasis on urban resilience as a key factor in evaluating a city's ability to address and reduce vulnerabilities to socioeconomic and environmental disruptions. In preceding years, the Czech capital city pursued multiple efforts, drawing on strategic plans, in aim of fulfilling the goals of the Vision document. However, efforts to assess and reflect on the implementations and their impact on an urban environment's resilience continue to be viewed as challenging and difficult to grasp. Furthermore, recent attempts in Prague have largely focused on adapting a 2050 vision of resilience towards climate change.

The aim of this paper is to scrutinize how resilience is understood and planned for in Prague to highlight a critical reflection on what is lacking and needs attention in future policies and strategic plans. In the process, the authors narrowed their focus on an inner-city neighborhood, central Smíchov, due to its central location and history of urban revitalization efforts in the 1990s that transformed it from a working-class industrial neighborhood into a modern inner-city commercial hub. Smíchov stands out as an already stabilized urban center except for the ongoing development of Smíchov City in the southern part of this area holding unforeseen potential to reshape its dynamics and character. In urban studies, Smíchov's transformation has attracted much interest, yet there is a lack of reflection on its urban resilience and adaptability of its urban form in regard to meeting essential physio-psychological human needs, i.e., vital public spaces and blue-green infrastructure. Tracing central Smíchov's history while studying its present context, reveals a complex interplay on both the local dynamics and the overall fabric of the city. In this pursuit, the authors call on Prague to learn from its past and localize its strategic resilience thinking and approach.

RESEARCH METHODOLOGY

This paper begins with a brief literature review on the evolution of (urban) resilience thinking and developed urban frameworks. The work then inquires on Czech documents, strategies and implementation plans that deal with tackling urban resilience in the Czech capital city. As the authors have narrowed their research area to central Smíchov, a section will follow to examine the strategies and approaches to resilience in Prague 5 district, to which Smíchov is part of. Subsequently, a thorough historical reading of Smíchov is presented to familiarize the events and transformation that impacted the role and function of this urban context in relation to the city and its resilient adaptability.

For the case of this paper, the authors have focused on the realm of urban resilience by observing the vitality of public spaces and green infrastructure in central Smíchov. As such, with an aim to investigating walkability and vitality of public spaces in an urban hub that is equally a cultural heritage site, the authors borrowed parts of a research methodology, Interactive Walking, developed by Gisèle Gantois [18] to explore in their research. In particular, they have utilized the first step of this three-step methodology, namely "Interactive Journeys". The adoption of this approach holds manifold significance. Gantois's research methodology is rooted in an alternative reading of the deep significance of heritage sites, encouraging the researcher, often an outsider to the case study, to immerse themselves in the site. This immersive experience involves "serendipitous wandering while meticulously docu-

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menting observations and experiences in small jot booklets" [20]. Inspired by this approach, the authors sought to employ this walking and sketching method to capture the nuances of people's movements and everydayness, thereby unveiling the sense of vitality that characterizes central Smíchov.

In total, the authors conducted five site visits, two group ones (April and June 2023) and three (May and June 2023) were employed by DS at different times of the day and week. The reflections were discussed in tandem with the emotional map carried out in Prague, in 2021, withholding data about citizens' perception and experience in the city [35]. Building on the reviews and preliminary analysis, the authors conclude with a reflection on future necessary research steps.

WHAT IS RESILIENCE?

Tracing the definition of resilience within urban studies highlights the challenges of this term to capture the complexity of changes in an urban context. Ecological and engineering resilience were key concepts that developed the spectrum of resilient thinking [9]. Both perspectives, despite their disciplinary differences and rootedness in distinct traditions, converge on the fundamental belief in the presence of equilibrium within systems, whether it is a pre-existing state for resilient systems to rebound to, i.e., engineering, or a new state for them to advance towards, i.e., ecological [9]. The engineering resilience perspective is rather popular in governmental and everyday discourses, placing a significant emphasis on the concept of bounce-back-ability which in other words focuses on the return to "normal" without critically examining the underlying assumptions and implications of what constitutes "normality" [9].

In contrast to both the ecological and engineering lens, the concept of evolutionary resilience challenges the notion of equilibrium, emphasizing that systems undergo inherent changes over time, regardless of the presence or absence of external disturbances [9]; therefore, asserting that we can hardly ever return to where we were. Furthermore, Davoudi [9] connects the framework of evolutionary resilience, which at its core contextualizes places as intricate socio-spatial systems with interconnected feedback processes and operating at various scales and timeframes, with the relational understanding of spatiality, as described by Massey [28]. Framing these analogies, as Davoudi did, enriches the lens of resilience within urban planning and strategies as it highlights the necessity to incorporate the nature of spontaneity, flexibility and dynamicity of urban places and their users.

Following Davoudi's line of thinking, Sharifi and Yamagata [41] developed an adaptive approach to resilience. They implore adaptive resilience as a framework that assesses a system's capacity to mitigate socioeconomic changes based on characteristics such as flexibility, diversity, resourcefulness, and collaboration. Adaptation, in this context, refers to learning from past experiences to outline better solutions, instead of restoring the original condition [42]. Recognizing the conceptual foundation of these different resilience frameworks will guide in understanding the direction and goals planners and practitioners strive to fulfill in their strategies and implementation.

URBAN RESILIENCE AND CLIMATE CHANGE ADAPTATION

In line with the evolution of resilience theories, emerging concepts on urban resilience have developed on four main themes: vulnerability and climate change adaptation, urban and regional disaster resilience, sustainability management and institutional transformation, and the impact of the COVID-19 pandemic [1]. Urban resilience to climate change is often discussed through the implementation of various ecosystem-based measures in urban planning and structures [30]. Ecosystem-based Adaptation (EbA) is a strategic approach recognized "for adapting to climate change (while) harnessing nature-based solutions and ecosystem services" [46].

Ecosystem services can, through green and blue infrastructure, generate services at the local level, such as microclimate regulation, stormwater infiltration, and flood risk reduction, air and wastewater treatment, and recreation [2] [50]. Ecosystem-based solutions can not only be highly efficient but also budget-friendly in comparison to unpreparedness to climatic crises i.e. floods and drought. Examples include streams, lakes, reservoirs, artificial wetlands, or rainwater retention basins [13]. Ecosystem-based measures can play a crucial role in adapting society to climate change and promoting resilience [30]. Specifically, urban green infrastructure supports planning measures [25] [48] while serving for recreation, biodiversity enrichment, air purification, and water retention and storage [12]. According to the New York City Green Infrastructure Plan [6], green and blue infrastructure can be a very effective way of adapting to climate change in urban environments by reducing CO2 emissions, reducing electricity consumption, increasing air quality, relieving the demand on sewage system, and increasing the value of surrounding properties. Although ecosystem-based adaptation approaches have proven to be cost-effective [32], benefits still need to be considered in the long term. For example, the potential value of green roofs in Toronto in a citywide context saves more than $12.3 million per year, or €10.4 million, as an urban heat island adaptation tool [3].

URBAN RESILIENCE IN THE CZECH CONTEXT

The Czech Republic follows global and European leadership of Sustainable Development Goals under the United Nations, established in 2015. In 2017, the vision document "Czech Republic 2030," was published by the Office of the Government of the Czech Republic and its Department for Sustainable Development, marking a significant turning point in acknowledging the importance of resilience in the region. Serving as a strategic framework, this visionary document emphasized the role of resilient thinking to enhance the quality of life while fostering sustainable development encompassing social, economic, and environmental dimensions [21]. Understanding resilience was based on Mitchell's definition [31] as "the ability of households, societies, and nations to absorb unexpected hazards and recover from them, and at the same time to adapt positively and transform our structures and ways of life face-to-face with long-term tension, change, and uncertainty" [31]. Notably, in the dimension of 'municipalities and regions', strategic objectives were addressed for climate change concerns. As such, the document called for improved accessibility of public services, brownfield regeneration support, mitigation of urban heat island effects, and the development of infrastructure promoting active mobility for pedestrians and cyclists.

Simultaneously, numerous Czech cities and regions devised their strategies to adapt to climate change and formulated corresponding implementation plans. These regional adaptation strategies aligned with the National Strategy for Climate Change Adaptation [34], which coordinated with the EU Adaptation Strategy [7]. While some cities have initiated the implementation of specific measures, others have future projects in progress. Regardless, there is a lack of systematic approach in planning and executing these measures. This deficiency exists at both the national and regional levels, resulting in a substantial disparity between the

declarations outlined in the strategy documents and their practical implementation.

URBAN RESILIENCE IN PRAGUE

The Climate Change Adaptation Strategy of the Capital City of Prague [37], prepared by the Environment Department of the City of Prague and endorsed by the City Council in 2017, is part of their commitment to the Mayors Adapt initiative, an initiative by European cities for climate change adaptation. The vision of this strategy focused on increasing long-term resilience and reducing vulnerability of Prague to the impacts of climate change through gradual implementation of appropriate adaptation measures; consequently, safeguarding the quality of life of the city's residents. The strategy developed its objectives, based on an analysis of the present state and future projections of climate change impacts on the Prague region. Primary objectives were to reduce the negative impact of extreme temperatures, heat waves and urban heat island on the health of vulnerable groups of Prague residents. This was specified through specific actions: a) to create a functional green infrastructure system, complemented by blue-green infrastructure elements; b) to apply landscape considerations in urban planning; c) to establish and revitalize urban green spaces [8].

In response to these ambitious goals, Prague became a participant in the UNaLab project, funded under the European Union's Horizon 2020 research and innovation program, from June 2017 to November 2022, joining a consortium of ten cities across Europe and beyond [45]. In collaboration with national and international partners, workshops were conducted to pave Prague 2050 resilience vision using Nature-based Solutions (NBS). During a 2019 session a System Analysis scheme identified potential NBS sites, particularly Novy Smíchov with a specific focus on mitigating the urban-heat island effect in that area.

By utilizing the expertise of the UNaLab project and learning from other cities' experiences, Prague's representatives (The Prague Institute of Planning and Development (IPR Prague) and Prague City Hall) drafted advanced implementation plans in accordance with their climate change adaptation strategy in two-time frames, 2018-2019 and 2020-2024. Implementation plans contained specific projects and activities, however, from their examination, it is evident that they are not planned systematically. For some projects, their initial intention has little to do with adaptation to climate change, as the case of the reconstruction of gardeners' building in Grebovka park. The distribution of projects on the territory of Prague is also not proportional, nor does it directly reflect the heat islands of the city (see Figure 1).

It is important to mention the existence of the Climate Plan of the capital Prague until 2030 with the subtitle Prague on the way to carbon neutrality. The vision is towards sustainable energy and transport, a circular economy, and a climate-adapted city. It wants to achieve the latter by improving microclimatic conditions, reducing the impact of extreme hydrological phenomena, adapting buildings and public spaces, and at the same time improving preparedness in the area of crisis management. However, no specific measures are listed in the implementation part of the document [38].

URBAN RESILIENCE IN PRAGUE 5 – SMÍCHOV

Upon analyzing strategic documents and actions related to Prague 5 - Smíchov, the district lacks adequate measures for building and defining urban resilience. In terms of community engagement and social cohesion, there is a notable absence of projects that promote inclusive governance and effectively address the diverse needs of various groups. According to the City of Prague's strategy on climate change and related activities, the primary focus appears to be on green infrastructure and nature-based solutions. However, surprisingly, considering its status as one of the largest districts, there is a scarcity of blue-green infrastructure measures, as adaptation measures, in public spaces. The few existing projects primarily serve as pilot reconstructions with added pro-climate functions.

The central area of Smíchov, which encompasses the bustling transportation hub around the Anděl metro station, underwent development in the early 21st century. It is intriguing to contemplate why the entire area was not designed in a more sustainable and climate-change-resilient manner, especially considering that architects and urban planners of that time were well aware of the global sustainable goals and the threat posed by the climate change crisis [43]. Apart from a limited number of planted trees and a pioneering green roof on the shopping mall at Anděl, there are minimal observable sustainable solutions in place. Referring to the Urban Heat Vulnerability Index (UHVI) map, several vulnerable areas can be identified, with the five most vulnerable locations including the vicinity of the Anděl metro station in Prague 5 (see Figure 1). This area serves as a convergence point for tram, car, and pedestrian traffic. While the area appears open and well-maintained, it lacks preparation and adequate adaptation to climate change, thereby rendering it highly vulnerable according to the UHVI map [43]. The pedestrian area is less than 5000 m2, with a limited number of small trees that provide insufficient screening, and the absence of permeable surfaces exacerbates the vulnerability of the space.

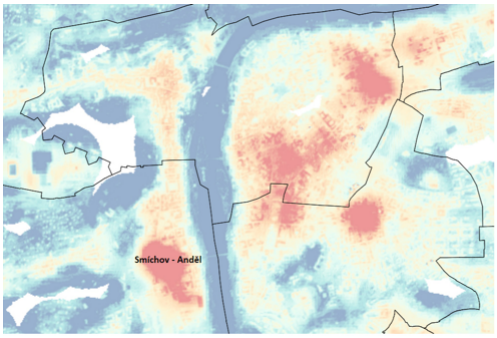

Fig. 1.: Map of the Urban Thermal Vulnerability Index in Prague. Vulnerability is represented on a scale of 0-10 from lowest to highest. The highest vulnerability is shown in red. (Source: Czech Globe, 2017; Capital City of Prague Climate Change Adaptation Strategy, 2023.)

HISTORICAL DEVELOPMENT OF SMÍCHOV (PRAGUE 5)

To evaluate the level of resilience of Smíchov in an informed manner, we must take a deep yet brief dive into its history highlighting its past capacity to drastic changes, transformations, and natural disasters. Over the centuries, the area faced several fundamental threats, largely due to its location outside the historical fortifications of Prague and at the same time near the Vltava River and smaller Motol and Radlice streams. Such menacing included raids by troops, floods, industrialization, and related health problems of the inhabitants.

The area of Smíchova today belongs to the Prague 5 district (one of the largest in Prague, with an area of 27.49 km²). On its territory, there are many green areas – for example Santoška Garden, Mrázovka Park, Sacré Coeur Park and Kinsky garden). These are the remains of the original vineyards and agricultural areas typical for the village of Smíchov, founded in 1380. Smíchov was an agricultural area with fields, vine-

yards, and hop fields, complemented by homesteads scattered over the hills. The peak medieval development of Smíchov located along today's Štefánikova and Nádražní streets going from the city walls (built in the 14th century and later expanded at the turn of the 17th and 18th centuries) and the Újezd gate, was one of the most frequented entrances to the city. The popularity of Smíchov among the courtiers and the absence of police power by the city magistrates caused the gradual transformation of the village into a recreational area with residences and ornamental gardens of families such as the Slavats, Kounits, Defours, Clam Gallas, or Kinsky [23].

Due to its frail defense, Prague was often besieged and Smíchov´s vineyards, ornamental gardens, and buildings were repeatedly destroyed during attempts to recapture Prague – for example by the Pasovský campaign in 1611 [36]. The Thirty Years War then led to eradication of viticulture and hops from the area so fields for the production of grain and vegetables appeared instead. In 1757 Smíchov hills were used as firing positions as part of the Prussian siege of Prague, and the Újezd gate was besieged too. Even though there were only 8 landowners after this conflict, the area recovered quickly and in 1782 there were 84 townspeople and peasants.

In the middle of the 18th century, manufacturers producing leather, fabric, and "Lyon goods" were built on the site of the devastated gardens as a harbinger of the massive industrialization of the area in the first half 19th century. At Maria Theresa's wish, a botanical garden was founded here in 1775 – unfortunately, located in a floodplain, which was repeatedly destroyed by floods in 1784, 1799, 1824 and 1845 at the end of the 19th century it was moved under Slupská stráň to Nové Město [29].

The 19th century – eventful tides

The development of industrialization was quite fast in the Smíchov area. Even though, in the first third of the 19th century, most of the local population made a living from farming in the fields and gardens, already in the middle of the century factory operations began to predominate, located mainly on land near the banks of the Vltava River including factories of the textile, chemical, and food industry. The volume and distribution of industry at Smíchov in the 19th century are illustrated by Václava Horčáková's reconstruction map. The arrival of the Czech Western Railway in 1862 caused a rapid acceleration of the industrialization process of the area and its economic prosperity.

At the same time, summer houses and their gardens were disappearing from the area giving way to factory operations, development of residential buildings along Štefánikova and Nádražní Streets, public buildings and also to emergency housing near farmyards. The last representative garden in the area remained the Kinský garden. It was transformed from a derelict vineyard into a park with a villa in the 1820s [23].

However, with the growing population, health problems were increasing. In 1866, Prague was occupied for more than a month by the Prussian army, which was associated with the last major cholera epidemic. These epidemics were caused by the pollution of drinking water in wells (often in connection with floods) and were complicated by the absence of a hospital in the locality, as it was forbidden to transport such infectious patients. Poor sanitation also resulted in smallpox epidemics (the largest between 1873-6). A slight improvement was brought only by the Smíchov waterworks built in 1872, which provided filtered water from the Vltava. Only in 1913 was drinking water brought to Smíchov from the Káran waterworks complex [24].

The floods did not mean only the threat of diseases, but also significant interventions in the construction fund. In particular, mills and factories located on the then unregulated and gradually sloping bank of the Vltava were regularly damaged (floods in 1845, 1862, 1872, and especially 1890). Also the buildings in the vicinity of the Motol and Radlice brooks were repeatedly flooded. The solution came with the canalization of streams, as well as the regulation of the Vltava and the related construction of river banks (in Smíchov since 1874). However, Smíchov recovered even from these problems. Floods were usually followed by a construction boom. Lucrative residential buildings were built on the site of the original botanical garden and after the construction of the river banks, the city began to face the river. A villa colony also emerged in the west of the area.

The economic crisis of the 1870s accelerated the demise of local smaller operations, replaced by residential development but also marked an opportunity for Ringhoffer's railroad freight car factory which became the largest wagon factory in Austria-Hungary. The demolition of the Prague fortifications (in the area of Kinský Square) in 1891-2, on the other hand, did not bring about the proposed transformation of the area (ring road, park). Due to a lack of funds of the municipality, construction plots were created here and subsidized the preparation of the land for construction with the collected money, resulting in a compact block connecting Smíchov with Malá Strana.

The 20th century – transformative revitalization

In the 20th century (due to the excess demand for housing oversupply) the area became the location of emergency workers' colonies. Which represents the worst kind of worker's housing during its era. In 1922 Smíchov became a part of Prague. The bombing of Prague at the end of World War II fortunately had marginal damage to the district. From the middle of the 20th century, the city spread far beyond the borders of Smíchov and the area became an important transit hub for Prague public transport.

Because of that, various radical solutions related to the issue of transport have been proposed in the Smíchov area, and the architects anticipated the widespread demolition of many buildings. Various plans proposed creating a system of east-west and north-south high-capacity car routes through the area. But only three transport structures were implemented: the subway B with the station Moskevská/Anděl (1979-1985), the Strahov tunnel (1985-1997) and the connection of V Botanice and Kartouzská streets. All these realizations were connected with the large-scale demolition of several blocks of flats, often the oldest buildings in Smíchov.

The Golden Angel building from 1994-2000, designed by Jean Nouvel, became a symbol of the transformation of Smíchov into a modern district of the 21st c. It is located at the main Smíchovská intersection of Nádražní and Plzeňská streets at the exit from the Anděl metro station. Thanks to this realization, Smíchov got onto the imaginary map of modern architecture. Crucial was also the privatization of apartment buildings in 1989 which intensified the gentrification of the area. The demolition of the former Ringhoffer factory (between 1996 and 1999) was a crucial step for the construction industry in the area – shopping Centre OC Nový Smíchov, office centers such as Anděl Park Smíchov, Anděl City and various accommodation structures appeared in its place [23]. The area of the former Buštěhrad railway station between Ostravského, Radlická and Nádražní streets, extending to Smíchov railway station, then became a development area where the project Smíchov City is currently under construction.

URBAN RESILIENCE READING OF CENTRAL SMÍCHOV

To begin with, group site visits of the case study were

aimed at visiting the surrounding parks that can be reached within walking distance from central Smíchov, such as Sacre Coeur, Na Skalce park, and Mrázovka park. The objective of such walking visits were to observe the vitality of the green spaces and the (walkable) accessibility to them. Visiting these spaces was also an attempt to witness the traces of the once green lush gardens, vineyards, and orchards that Smíchov luxuriously possessed before its industrialization (19th c.) and urban revitalization (20th c.).

The parks in question have limited and peculiar accessibility, as in the case of Sacre Coeur, which can be reached via a pedestrian bridge through the Novy Smíchov shopping mall. Despite their varying levels of maintenance and their favorable topographic features that offer picturesque viewpoints, the parks appeared noticeably empty. Furthermore, the parks exhibited an assortment of interventions and historical elements, ranging from gazebos and meandering pathways to monuments and incompatible colorful playgrounds. This mishmash of elements dilutes and obscures the parks' distinctive sense of identity and sense of place, leaving an impression of a confused experience.

Interactive Journeys

The following site visitors attempted to read the case study in more depth by utilizing Step 1. Interactive Journeys from the Interactive Walking research methodology (see Figure 2.). The goal was to maneuver slowly, taking the time in sketching, while observing the atmosphere and character of the urban landscape, in relation to the movement of people and their activities. In addition, such a method allowed the researcher to "merge with the way that local people traverse their familiar environment and unconsciously appropriate it" [19]. Furthermore, one of Gantois's aims is to abstract local meaning through interactions with 'undisclosed protagonists'. The authors were challenged in this context as no such interactions occurred during the application of this method.

a choreographed disarray. All sorts of people can be found here, each enacting their different ideals and beliefs within this urban space.

In that sense, the Golden Angel remains a thriving center, drawing in a constant stream of energy and activity and solidifying its role as a bustling hub for commerce, work, transportation, and social engagement. Its flagship status penetrates that it was and still is a product of 'powerful place-marketing instrument', displaying an urban image of successful development and urban life [44]. By leading the charge in the physical revitalization of Smíchov, assuming a position of prominence as a local symbol, drawing the attention of the media and investors, while fostering a fruitful collaboration between private and public entities [44], it is arguable that the Golden Angel instills a sense of assurance in fortifying the resilience of central Smíchov. Notably, however, within the vicinity of the Golden Angel, a conspicuous presence of police cars and officers permeates, indicating a prioritized need for security and control. Instances of police intervention with homeless individuals and drug users highlight ongoing concerns. Regardless of these expositions, the streets around the Golden Angel were bursting with constant movement and life. Foreign languages were often overheard, indicating the centrality of this location for foreign businesses and tourists.

The area around the bus station, despite its lesser activity compared to the rest of the study case, raises the most confusion during the site visits. Its atmosphere has been recently transfigured with the emergence of a new installation called Manifesto. Manifesto is a pop-up project that proposes to utilize and (temporarily) transform brownfields and idle areas into 'a next-generation food market hall brand' [26]. It recently opened its third stage in central Smíchov, Anděl, where there used to be a low-cost Vietnamese market and restaurant. It is unclear at this point how and why Manifesto managed to intervene in a space that was

Fig. 2.: Map of central Smíchov and study area. (Source: Authors, 2023.)

Arriving at the case study through the metro and exiting at E7, leads to an open pedestrian space just underneath the Golden Angel building, one of the busiest spots in Andel, busily occupied by various activities. This urban space captivates with its vibrant atmosphere, enhanced by the presence of inter-changing musical performances and stalls brimming with fresh early summer fruits tempting the hurrying pedestrians. Corners are crammed with jumbled electric scooters and rental bikes. Trams are endlessly gliding left, right, south and north. People are flowing like

neither a brownfield nor idle. However, recognizing that Smíchov City is under development it could make sense that this location will be significantly altered in the upcoming years.

In sum, navigating the streets of central Smíchov reveal conflicted and negotiated layers of architecture, use of urban spaces and interactions of social groups. Remnants from the industrial age, pop-up hipster interventions matched with the condensed mixture from the 20th c., characterize the unique mosaic of this central

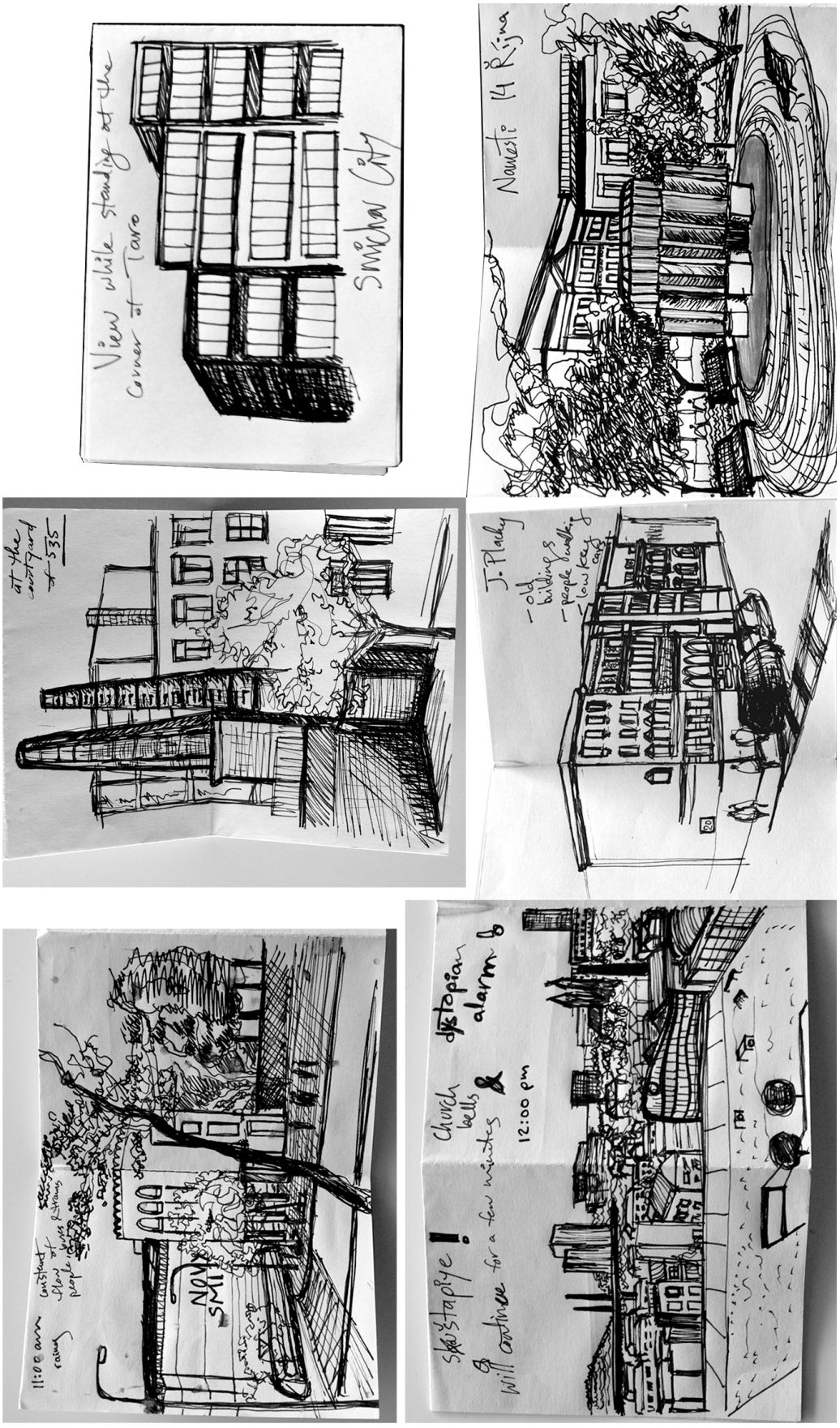

Fig. 3.: Sketches during the Interactive Journeys in central Smíchov, June 2023. (Source: Authors, 2023.)

area. Yet maintaining urban diversity clearly derives challenges to which future urban developments, such as Smíchov City, must consider to ensuring social and urban resilience without the dilution of urban character, sense of place and social diversity.

The Emotional Map of Smíchov

Data from participatory emotional mapping in Prague was collected through an online platform between April and September 2021, offering valuable insights into the diverse experiences and perceptions of citizens across various districts of the city [35]. In the case of Prague 5 district, 322 people participated and indicated a crucial assessment of the area with regard to its public spaces, traffic and overall condition. While some aspects were obvious such as the sense of frus-

tration in the teeming Anděl junction with waves of trams and people, a lot of comments highlighted a serious sense of disturbance and danger with the abundance of 'suspicious' people. This repeated term was associated with drug addicts, drunks and the homeless, specifically found near the bus station, the public parks such as Na Skalce and Mrázovka park, and the vicinity of St. Václav Church.

Despite recent revitalization efforts, Mrázovka park's reputation as a place for drug addicts persists, impacting its usage and overall image. Furthermore, locals expressed their concern with the lack of performance streets have within harsh climatic conditions. Several comments also point out how Manifesto stands as a symbol of consumerism, in which a communal or green space is highly favored.

REFLECTION ON FINDINGS

The preliminary reading of central Smíchov by tracing its history, overviewing of its municipal approach to resilience, and walking its streets in the present day, has shown the complex and demanding nature of dealing with such a diverse and dynamic urban context. Smíchov's history has portrayed the cathartic transformations this place has witnessed throughout the centuries. The location of central Smíchov in the past fulfilled several essential roles. From the turn of the 18th and 19th centuries it was economically the richest settlement in the vicinity of Prague thanks to the local railway and factory production.

Currently, the area not only serves as an integral part of Prague's transportation system but also functions as a secondary center for business, social life, commerce, and culture. These historical transformations, aligned with current urban status, embark Smíchov as one of Prague's essential urban images. Despite Smíchov's central position in Prague, adaptation strategies and implementation plans don't truly reflect on its status as one of the most vulnerable areas to climate change. Blue-green infrastructure and adaptation solutions are not systematically implemented in Smíchov.

FUTURE RESEARCH DIRECTIONS

During the Ambition Workshop in 2018, depicting Prague's reality regarding implementing NBS, it was emphasized that the city's administration is seen as complex, involving multiple stakeholders, and lacking an economic approach, thus hindering a comprehensive sustainable urban approach [10]. Consequently, solutions within the city often focus on addressing single issues due to a fragmented, sectoral arrangement [10].

However, as Prague continues its journey towards acquiring NBS, it does not stand alone in facing multiple barriers during the implementation processes. For example, Sarabi et al. [39] reviewed the case of three (frontier) cities (Tampere, Eindhoven and Genova), involved in the UNaLab project, and their common difficulties, signaling the overall, arguably, frailty of implementing NBS. In line with the discovered barriers, the authors reflect and recommend three essential research steps to pursue effective resilience planning in Prague.

Examine and adapt existing indicators
Prague in recent years has developed multiple plans and strategies with strong claims and visions yet continues to fall short in integrating monitoring measures and appropriate prioritization of measures and projects. While recent reports, [15] [49], exemplify the expanding knowledge base in NBS monitoring and evaluation, there remains a significant gap in effectively integrating these valuable insights and diverse measures by local practitioners across European cities [39]. Furthermore, it is critical to adapt these standardized metrics for Prague to facilitate implementation and effectively measure the multidimensional impacts of NBS across different scales and social-ecological scenarios [40].

Explore alternative methods and approaches
Public participation and co-creation knowledge tools are endorsed within the processes of NBS. Often, they are carried out through formal calls and workshops, appealing to citizens who are already active in public realms and disregarding underrepresented social groups. This calls for innovative methods that capture the experiences and needs of different social groups whose problems are often forgotten. The method of Interactive Walking, while it was partially employed in this paper, holds that potential to absorb deep information about urban sites while embracing interactions with 'undisclosed protagonists'. However, as evident the failure of interactions with locals necessitates exploring and combination of other research methods that work with the Czech cultural context. The emotional mapping tool was a creative approach that can be further analyzed and implored to get a closer look at citizen's needs and perspectives.

Reconceptualize resilience strategies: towards a context-based and interconnected approach
The failure to consider synergies and trade-offs between the interconnected challenges of climate change, biodiversity protection, and human well-being hampers progress in achieving targets by 2030 [40]. Furthermore, major systemic change is needed in interdisciplinary research, communication, institution organization, and economic thinking to fully integrate Nature-based Solutions (NbS) as solutions to the climate and biodiversity crises within safe biophysical limits [40]. The authors advocate for a reconceptualization framework in the Czech context which represents a progressive approach and transition towards a dynamic, multi-faceted, and place-specific notion' [1]. This paper concludes with the necessity to develop and execute simpler, effective implementation processes.

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3/ Court architecture of housing, civil equipment and construction engineering

CHANGE IN THINKING ABOUT ACCESSIBILITY IN CULTURAL FACILITIES

Kolimárová Simona - Schleicher Alexander

ABSTRACT: Museum, gallery and library buildings are spaces for communication, learning and creating cultural experiences from exhibitions or events. They serve as evidence of the presence of humanity and nature. They should create opportunities for the inclusion of a wide range of visitors with different abilities, physical and mental needs, as well as preferences.

This paper focuses on presenting the implementation of various universal design principles in cultural buildings, but also the developments that have taken place in the requirements for accessible public buildings following the adoption of the UN Convention on the Rights of Persons with Disabilities in 2006. These changes in the thinking of society, but also of individuals, can be observed in terms of architecture, but also in the approach to the presentation of individual collection objects and other programming, taking into account the needs of diverse visitors.

The paper presents a comparison of case studies of new cultural buildings from the Norwegian capital Oslo that were realized with a gap of one decade - such as the Astrup Fearnley Museum of Modern Art (Renzo Piano, 2012) and the National Museum (Kleihues + Schuwerk Gesellschaft von Architekten, 2022) - and the different approaches to the application of universal design principles in their spaces and presentations.

KEYWORDS: architecture; public space; civic buildings; museum; gallery; accessibility; universal design

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INTRODUCTION

The following paper presents and compares two cultural institutions built in the last decade in the Norwegian capital, Oslo. Specifically, the buildings in question are the Astrup Fearnley Museum of Modern Art and the new Norwegian National Museum.

The National Museum building is presented in the paper as a realization of a vast national cultural institution completed in 2022, the second realization of the Astrup Fearnley Museum of Modern Art was already commissioned in 2012 and is presented in the paper as an opportunity for reflection and comparison of the developments that have taken place in the field over the last ten years - whether in architecture and its relationship to universal design[1], or in the preparation of exhibitions and access to visitors.

Both buildings were constructed after the adoption of the UN Convention on the Rights of Persons with Disabilities in 2006, which was later adopted and ratified independently by individual countries - Norway adopted the Convention in 2007 and ratified it in 2013[2] - and after a number of legislative changes were adopted, including, for example, the revision of the Planning and Building Act and the simultaneous adoption of the new Discrimination and Accessibility Act in 2009. The Act and its Regulations set out guidelines and require new developments to comply with universal design rules for buildings, facilities and outdoor spaces[3]. A number of measures have been introduced in line with these guidelines, including the National Programme for the Development of Universal Design in Districts and Municipalities (2009-2013) and a website that provides information on good local and regional practices and examples. [10]

Universal Design has seven internationally recognised principles:

- Principle 1: Equitable, fair use,
- Principle 2: flexibility in use,
- Principle 3: ease and intuitiveness of use,
- Principle 4: perceptible information,
- Principle 5: tolerance of error (and safety),
- Principle 6: low physical effort,
- Principle 7: size and design of space; space is usable by all. [1]

We can apply these principles in various ways and forms to selected buildings, and we will gradually demonstrate the changes in design and thinking about universal design that have occurred despite the basic premises remaining fundamentally the same.

URBAN CONTEXT

The presented buildings are located in the same area - in revitalised urban areas on the site of the former industrial districts - ports and transhipment yards of Oslo. The construction of a new urban structure, or alternatively a larger intervention into it, gives room for straightforward solutions, the possibility of creating collision-free transport and reflecting the city's current requirements for both functional saturation and spatial layout.

The Aker Brygge district, where the National Museum is located, has been undergoing revitalisation since the 1980s. The district has preserved a number of buildings referring to its industrial past. It is characterised by a pedestrian promenade along the sea, with car traffic passing along its perimeter and a tunnel under the district, and public transport stops are located directly in front of the National Museum. There are designated parking spaces for disabled visitors next to the museum, approximately 100 metres from the main entrance. [2]

The city's Tjuvholmen district, where the Astrup Fearnley Museum of Modern Art is located, served as a cargo terminal until 2000. It consists of two islands

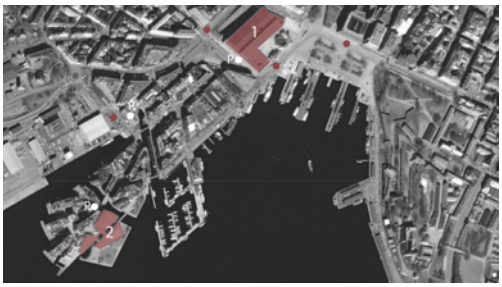

Fig. 1.: Location of the presented buildings in the context of the city. 1 - National Museum, 2 - Astrup Fearnley Museum of Modern Art, public transport stops, parking options. (Image source: authors based on openstreemap.org 2023)

- the first has a pedestrian promenade along the sea and car traffic situated in a parallel street, on the second island, car traffic is stopped at the beginning of the island and other public spaces are reserved for pedestrians only. Public parking is situated in a public parking garage 400 m away from the islands, directly on the museum island there are 5 parking spaces for disabled persons, which, in this case, are not located on the terrain, but in a private underground garage. The nearest public transport stops are identical to the National Museum. [3]

ARCHITECTURAL DESIGN

The architectural design of the new National Museum was developed on the basis of the winning design of an architectural competition from 2010. The authors of the design are architects Kleiheus and Schuwerk. The architects wanted to create a building that would stand the test of time and paid great attention to the fine materials and details applied. The third, top floor of the building is distinctly different and is called the "light hall". The perimeter cladding of this floor is made up of translucent marble with built-in LED luminaires that highlight the museum building after dark in the city's texture.

Fig. 2.: Collage of images: architectural expression of the National Museum and Astrup Fearnley Museum of Modern Art. (Photo source: authors 2022)

the surrounding fjord, and the individual objects are connected to the visitor and user only by a roofed exterior - a dynamically shaped glass roof covers the entire building and museum complex and is the dominant motif of the museum's architectural design. One of the exhibition buildings houses a museum shop and café as an additional function. [6,7,8]

ACCESSIBILITY AND ENTRANCE TO THE BUILDING

The main entrance of the National Museum can be accessed from several directions through the barrier-free public space. The floor of the public space is made of granite blocks - however, it is formed with minimal gaps, and is thus suitable and comfortable for the movement of people with prams, people in wheelchairs, people with mobility limitations, walkers etc. An artificial guiding line serving people with visual impairments leads to the main entrance.

The Astrup Fearnley Museum of Modern Art building is accessible by one route via a wheelchair accessible paved bridge and walkway with minimal gaps. The individual buildings of the Astrup Fearnley Museum of Modern Art are connected to each other only by an accessible exterior space. The main exhibition building is surrounded by the museum's sculpture park, which is wheelchair accessible.

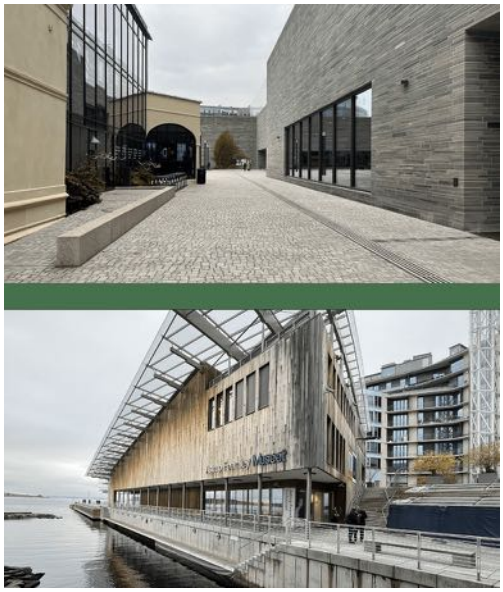

Fig. 3.: Collage of images: access route to the entrance of the National Museum and Astrup Fearnley Museum of Modern Art. (Photo source: authors 2022)

	NATIONAL MUSEUM	ASTRUP FEARNLEY MUSEUM OF MODERN ART
author	Kleiheus + Schuwerk Gesellschaft von Architekten	Renzo Piano
location	Aker Brygge	Tjuvholmen
opening year	2022	2012
area	54 600 m² 12 500 m² exhibition spaces	7 000 m²

Tab. 1.: Basic data about the buildings of the National Museum and the Astrup Fearnley Museum of Modern Art. (Source: authors 2023)

In addition to exhibition space, the three-story museum building offers spaces for a library specializing in art, cafés, a museum store, an auditorium, and several smaller gathering spaces. In the part of the building further away from the main entrance there are offices, restoration workshops, workshop rooms, photographic studios and the museum's depositories. [4,5]

The Astrup Fearnley Museum of Modern Art is the earlier and smaller of the pair of presented projects. The museum consists of three buildings - two are dedicated to exhibitions, the third is devoted to rentable office spaces. The object composition forms views of

The main entrance of the National Museum is wheelchair accessible, with the floor level of the exterior and interior at the same height level. Entry is via a revolving turnstile door or directly through the adjacent opening doorway, to which the aforementioned artificial guiding line leads. The opening door is equipped with a button for automatic opening on impulse for wheelchair users for persons with mobility limitations, blind persons or parents with a pram. The main en-

Currently, the concept of universal design is a high-priority political goal in the Norwegian government. Several action plans have been developed with the aim of becoming a society where all components are universally accessible. The Parliament there has set itself the goal of making all types of housing and buildings accessible to all. Responsibility for implementing the concept of universal design is divided between three government bodies: the National Resource Centre for Participation and Accessibility under the Ministry of Children, Equality and Inclusion; the Ministry of Climate and Environment; and the Ministry of Local Government and Modernisation. A chronological overview of Universal Design implementation milestones is available on the WHO website. The most important year can be considered 2009, when the Law on Spatial Planning and Construction was revised and the new Law on Discrimination and Accessibility was adopted at the same time - with the approval of these two laws, a significant milestone was reached, promoting universal design in local and regional activities.
https://extranet.who.int/agefriendlyworld/wp-content/uploads/2015/06/Timeline-Universal-Design-in-Norway.pdf

The authorities are currently making a systematic effort to promote knowledge and set requirements for universal design in the development of the man-made environment. Key areas in this regard are buildings and facilities, planning, outdoor spaces, transport and ICT (Information and Communications Technology). The Norwegian Government is currently preparing a new action plan for universal design and increased accessibility, ICT and social technologies are a priority in this plan.

[3] The Norwegian Building Authority contributes to increasing knowledge of building quality, regulations and application processes in society, industry and municipalities. Supervisory measures must protect the public interest so that buildings maintain a high quality and protect users from injury or discomfort and other inconveniences. Supervision is a duty of municipalities and fines, remedial orders or stop work orders may be imposed on the builder. The Building Authority has prepared a manual for the supervision of universal design. It also publishes information on universal design and accessibility on the internet.

trance is therefore accessible to all. The entrance hall of the National Museum is adequately large for a large gathering of people, with ample manoeuvring areas. There are two counters to which an artificial guiding line leads - the ticket counter and the information counter - these are designed at two different heights for better accessibility for wheelchair users with mobility restrictions, equipped with an induction loop. The information desk offers materials in several languages. There are orientation plans in the lobby for easy understanding of the museum's circulation.

The Astrup Fearnley Museum of Modern Art has two buildings, and therefore two entrances to the buildings. Both entrances are wheelchair accessible, with the exterior and interior floor levels at the same elevation. The entrance doors are double-leaf opening and open automatically upon the arrival of a visitor. The entrance hall provides sufficient manoeuvring space, there is an information desk, but this is single height, so it is not suitable for wheelchair users or for people with mobility restrictions or visitors of lower height. There is no artificial guiding line leading to the counter and the counter is not equipped with an induction loop.

The National Museum is aware of the importance of not only physical accessibility to the building, but also

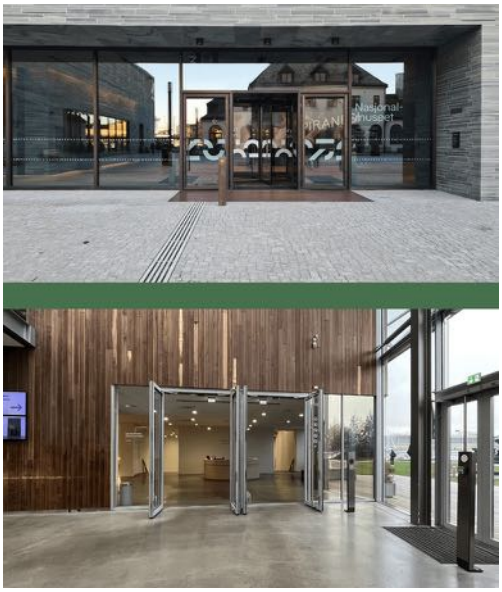

Fig. 4.: Collage of images: entrance to the National Museum and the Astrup Fearnley Museum of Modern Art. (Photo source: authors 2022)

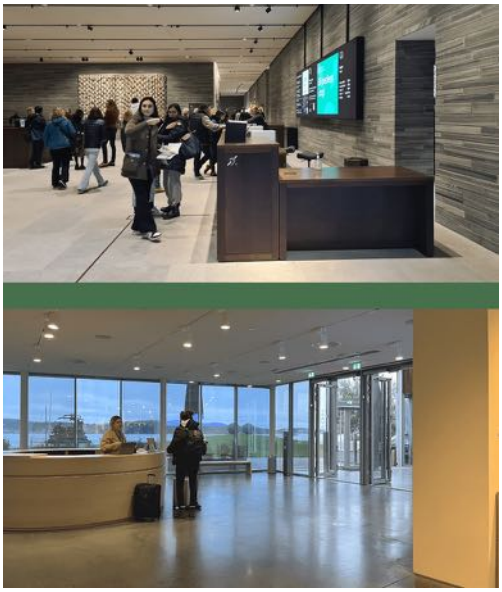

Fig. 5.: Collage of images: the entrance hall of the National Museum and Astrup Fearnley Museum of Modern Art. (Photo source: authors 2022)

the institution's website as a potential medium of first contact with the potential visitor. On their website, in an appropriate font size and graphics, they provide all the necessary information to prepare for a smooth visit to the museum, also with a separate page dedicated specifically to accessibility in the museum (information about wheelchairs for people with reduced mobility, information for visitors with hearing and visual impairments, information about guided tours, access with an assistance dog, accompanying persons, visiting with a pram or small children, information about accessible parking), they also offer the possibility of downloading a supporting Museum app[4]. The Astrup Fearnley Museum of Modern Art, on its website, has also opted for an easy-to-read web design, but does not place emphasis directly on the museum's accessibility information.

DESIGN OF INFORMATION AND ORIENTATION SYSTEM, VERTICAL COMMUNICATIONS, SANITARY FACILITIES AND CLOAKROOMS

The essential facilities for the visitors of the National Museum are concentrated in the 1st underground floor directly below the entrance hall and are accessible by two staircases and lifts, symmetrically situated in the hall.

In the underground floor there is a cloakroom, toilets, areas for parents with children and areas for digital workshops (equipped with an induction loop), which visitors can visit independently of visiting the museum. All spaces are accessible, in common areas with sufficient contrast between floor and walls.

Two staircases run through the entire building with an elevator in close proximity. The staircases are equipped with a pair of handrails on either side of the staircase, set at different heights. On the top step of the staircase there are warning tactile indicators - warning tactile studs of a circular shape - on the lowest step of the staircase there are tactile indicators of a linear shape, on each step there is also one linear element on the edge. The lift had buttons marked in Braille.

There are a number of information panels and plans of the museum throughout the building for easy orientation - all the rooms are individually labelled with a description or number. All the descriptions are easy to read, large enough and contrasting, often done in embossed writing in two languages and in Braille.

Upon entering the Museum of Modern Art, the first exhibition spaces are sunken - they are located on the 1st underground floor. The height difference is bridged by a staircase or a vertical lifting platform. The staircases are smooth, without landings, with a pair of handrails on both sides of the staircase. However, the staircases are constructed without warning elements for the visually impaired. The location of the barrier-free vertical communication is in an ambiguous position in relation to the main exhibition route, which is accessed via a staircase - the lifting platforms are not clearly perceptible in the entrance area, in both buildings they are located in the museum shop or in auxiliary areas. Users who have to use the lifting platform thus go through the exhibition in both buildings partly in a different order and by a more complicated route than other users.

In the main exhibition building, there are also exhibition or facilities areas on the other floors. Vertical communication between the 2nd underground floor (cloakrooms, hygiene), the 1st floor and the 2nd floor (exhibition) is provided by an elevator located at the edge of the museum shop.

The operation is more difficult to understand despite

[4] The National Museum Visitor's Guide app makes it easy to navigate through the museum. It includes an audio guide, an interactive map and other content.

the smaller size and the museum does not have an information system in place to help visitors understand the continuity of the exhibition spaces. The colour contrast of the walls and floor is sufficient, but the building lacks orientation features for the visually impaired.

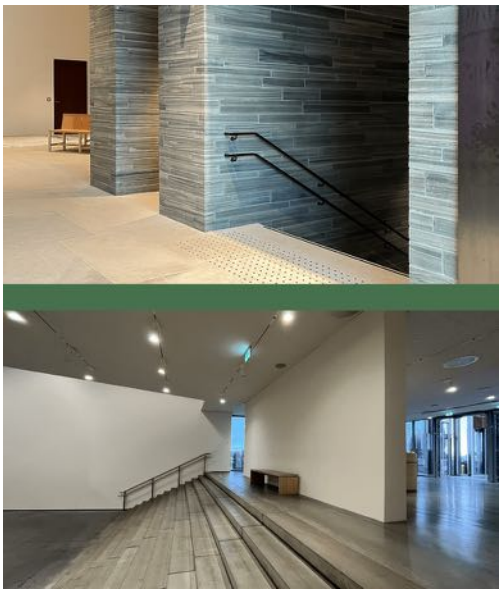

Fig. 6.: Collage of images: vertical communications of the National Museum and the Astrup Fearnley Museum of Modern Art. (Photo source: authors 2022)

Both museums have adequate cloakroom and hygiene facilities. Lockers are provided at different heights for ease of use by seated users or users of shorter height. The necessary hygiene facilities are made in a high spatial and material standard, marked with a sign with a contrasting pictogram, and in the National Museum also with a description in embossed and Braille. What could be criticised is perhaps only that the toilets are segregated - for men, women and users with health limitations - which is not fully in accordance with the principles of universal design; it would arguably have been more appropriate to integrate an accessible stall directly within the women's and men's toilets, or to create unisex toilets.

EXHIBITION SPACE DESIGN

All exhibition spaces of the National Museum, the sculpture garden and the roof terrace are wheelchair accessible by lift, there are no other barriers within the exhibition spaces.

The exhibition provides a historical cross-section of the Norwegian National Museum's art collection. The exhibition is arranged as a tour of the individual floors, which can be tiring and overwhelming for users - however, this being a National Museum, the scale is understandable and appropriate. The exhibition spaces are equipped with furnishings for visitors' relaxation. The seating offers both seats with and without backrests, with and without armrests, according to the visitor's preference.

The vitrines for displays built on the floor have a recessed plinth for easier approach to the displays, and there is sufficient manoeuvring space in the area surrounding the displays. Smaller wall-mounted vitrines are fully wheelchair-accessible for people with mobility limitations. What could be criticised is the lack of marking of the display cases at floor level to identify obstacles using the white stick technique.

The museum has also created a number of interactive and multisensory exhibits to present different parts of the exhibition in a variety of ways - to illustrate and complement the exhibits, for children to play with, or to present the exhibition to people with disabilities.

The exhibition spaces of the Museum of Modern Art are, despite the segregated and ambiguous route mentioned above, accessible to all users. The exhibition presents modern art, the spaces provide enough room for a smooth perception of the individual exhibits, for undisturbed interaction and for the possible manoeuvring of wheelchair users for persons with mobility limitations. The exhibition spaces are not equipped with seating for users to rest or for the possibility of extended observation of the artworks. However, resting furniture can be found in circulation areas, which could eliminate possible fatigue for users.

Individual exhibits are not complemented with multisensory exhibits to complete the museum experience for different users and children.

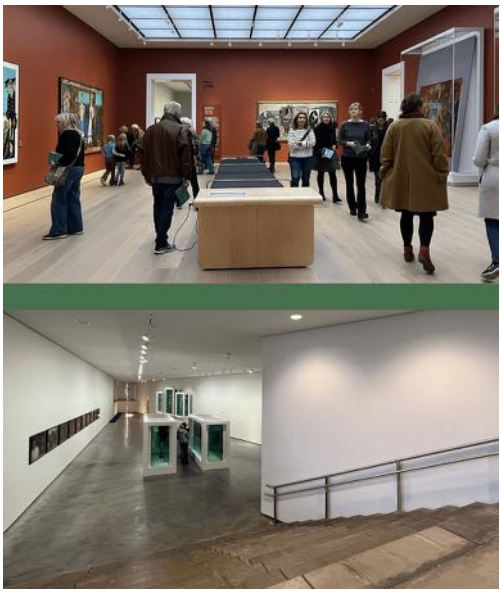

Fig. 7.: Collage of images: exhibition spaces of the National Museum and the Astrup Fearnley Museum of Modern Art. (Photo source: authors 2022)

Fig. 8.: Collage of images: exhibition spaces of the National Museum and the Astrup Fearnley Museum of Modern Art. (Photo source: authors 2022)

CONCLUSION

The case studies were prepared after an in situ visit as part of the national project PUN - Project of Universal Design 312041APA3 with the intention to present cases of good practice, to broaden the awareness of

the general and professional public, for application in the preparation of new legislative documents, for the creation of design manuals and for inspiration in the practice of architects.

The case studies present how universal design principles can be implemented, and how much impact changes in design can have on the user experience for people with special needs and thus promote the inclusiveness of architectural design. Implementing universal design principles throughout the solution feels natural and does not interfere with the overall expression of the design at all. A more detailed comparison of the application of the different universal design principles can be seen in Table 2. [1]

It can be concluded that while in the new National Museum (2022) all the principles of universal design were applied, in the Museum of Modern Art (2012) mostly only debarering elements were applied. Thus, the examples in this paper illustrate the difference between applying accessibility in design and thus making the building accessible to people with physical limitations, and applying all the principles of universal de-

	NATIONAL MUSEUM	ASTRUP FEARNLEY MUSEUM OF MODERN ART
1st principle: equal, fair use	*the main entrance to the building is barrier-free, it is not segregated, it can be shared by all visitors *the exhibition route is accessible and the same for all users, staircases and lifts are clustered in one position within the layout	*the main entrance to the building is barrier-free, it is not segregated, it can be shared by all visitors *the exhibition route is accessible to all users, but is different for users who have to use the elevator/ lifting platform, and thus segregates
2nd principle: flexibility in use	*alternative to the staircase is always a closely adjacent elevator *within the exposition there is also furniture for rest- with or without a backrest, with or without armrests- so that the possibility of resting is offered at the user's preference *multiple exhibits are presented in a multisensory way, each visitor chooses a suitable way of obtaining information and experiences -part of the furniture for relaxation is also a multisensory element- Braille signs, objects related to the exhibition- scents, materials, exhibits for children- each visitor chooses a suitable way of obtaining information and experiences	*alternative to a staircase- the lift or lifting platform is in a different position *there is no furniture for rest within the exposition *the exhibition does not provide interactive or multisensory exhibits
3rd principle: simple and intuitive to use	*guiding system to the entrance *orientation in the exhibition spaces is made easier by using the numbering of exhibition spaces *positioning of facilities for visitors in the building in one place	*positioning of facilities for visitors- the splitting of the exhibition into two objects causes, that the cloakroom and sanitary facilities are only in one of the exhibition objects, between which there is only a passage through the covered exterior
4th principle: perceptible information	*system of guiding lines in front of the entrance *information desk is equipped with induction loop *there are alternative formats of information at the entrance- easy to read texts, audio guide, information in several world languages *exhibits use a multisensory form, are diverse and presented in a variety of ways of communication and information, exhibits are well illuminated *the design is easy to read, visually appealing, easy to understand and all safety features are in a uniform design adapted to the museum's unique logotype	*guiding lines are absent in the museum and surrounding areas *the information desk is not equipped with an induction loop *there are alternative formats of information at the entrance- simple texts (easy to read), audio guide, information in several world languages
5th principle: tolerance of error (and safety)	*glass entrance doors are marked with a distinctive pictogram so that the glass is clearly perceptible *floor surfaces are non-slip, matt and glare-free *sufficient contrast between horizontal and vertical surfaces *stairs with full steps, straight, with no overhanging profiles, on the first and last step of the staircase with safety features *the question of evacuation of persons unable to move and navigate themselves independently is addressed	*glazed surfaces do not have safety features *floor surface is non-slip, matt, without glare *sufficient contrast between horizontal and vertical structures *stairs are with full treads, straight, without protruding noses, without warning elements
6th principle: low physical effort	*the main entrance is designed as a turnstile door or a door woth leaf opening on impulse *surfaces in the museum are barrier-free and threshold-free *seating is equipped with back and arm rests	*the main entrance is designed as an automatic opening door *floors in the museum are barrier-free and threshold-free
7th principle: size and design of space; space is usable by all	*suitably designed sales/information counter with lowered height is friendly for all visitors, the lowered part is designed for easy approach for wheelchair users *sufficient width of corridors, doors, ramps, lifts and stairs, manoeuvring areas are met *suitable design of display cabinets- allowing the wheelchair to be slid under the display cabinet, with sufficient space around the display cabinets for manoeuvring the wheelchair *nteractive elements are installed in two heights- at a reachable height suitable also for children and wheelchair users *table with variable height for children's workshops- providing a comfortable place for children of all ages to work	*adequate width of corridors, doors, ramps, lifts and stairs, manoeuvring areas are met *exhibits cannot be identified by white cane technique

Tab. 2.: Summarised comparison of the application of universal design principles. (Source: authors 2023)

sign, which make the space, its content and services accessible "for all".

Universal design and accessibility had become standard and the norm in recent years. The understanding of this concept, which was initially perceived only in terms of the physical environment and architecture, is also changing into the activities of the whole institution. Institutions are adapting their visual communication, publications and materials, websites, as well as the planning of events and activities inclusively for visitors with specific requirements, in order to reach the widest possible range of users. Institutions become open to people with disabilities in their use, not only for visitors but also for their employees.

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THE INFLUENCE OF THE ARCHITECTURAL VALUE OF THE BUILDING ON ITS FUTURE LIFE

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ABSTRACT: The length of the building's life cycle largely depends on the possibilities of its usability. It is influenced by either the social need for the building and its economic profitability, or at least the ability to generate a significant part of the funds necessary for its operation. The optimal, or least sustainable use of a building can be hindered by a number of factors, including its architectural or even historical value, as well as the related construction and technical design. Extensive research into the use of real estate in the Czech Republic has shown a very different approach to architecturally or historically significant buildings, covering a range from exemplary to frightening examples of the use of buildings in technical, social, cultural and economic contexts.

KEYWORDS: architecturally valuable building; protection of cultural heritage; structural engineering design of the building; sustainable use of the building; building management and maintenance; building life cycle

INTRODUCTION

For its owner, a building usually represents a different degree and form of monetary and non-monetary benefit, but it is also an obligation associated with the fulfilment of responsibilities and often a cause of complications. Even the building of a private owner is not only part of the public space, in which it leaves an imprint for a long period of time, but often significantly affects life in the near as well as more distant surroundings. In addition, the building can be the bearer of added values of social significance that must be respected - usually these are historical, architectural, technical and other values.

The architectural value of each individual building can be perceived in terms of a number of parameters, few of which can be considered measurable. These are usually buildings of a specific architectural and technical solution, often with a worn-out structure which requires an individual approach and attention of all involved stakeholders in creating their new life, especially in the case of unused or even abandoned buildings. This approach must include both a sensitive search for a suitable new purpose for the building and a certain degree of tolerance of the parties involved so as to ensure a sustainable future for such a building (see Figure 1). An architecturally valuable building may or may not have the status of a cultural monument, i.e., be under the supervision of a state monument protection authority.

Fig. 1.: The building of the former rectory in Vratislavice nad Nisou, after extensive reconstruction and a modern extension, used as the federal IGI leisure centre with a library and reading room, a cinema hall and a lobby. (Source: authors)

FACTORS AFFECTING THE USE OF ARCHITECTURALLY VALUABLE BUILDINGS

In the Czech Republic, two key laws deal with the management of buildings – the Building Act [1] and the Monuments Act [2]. The protection of the architectural values of buildings is ensured by spatial planning authorities and state heritage conservation authorities. According to §18, paragraph 4 of the Construction Act, spatial planning in public interest protects and develops the natural, cultural and civilizational values of the territory, including the urban, architectural and archaeological heritage [1]. When the plan for construction is assessed, a situation may arise where the plan is in accordance with the spatial planning documentation, but inconsistency with the architectural (and urban) values in the area, a positive binding opinion of the spatial planning authority cannot be issued. The bodies of state monument care are the Ministry of Culture of the Czech Republic, regional authorities and municipal authorities with extended powers. They carry out state monument care in the Czech Republic, i.e., in accordance with social needs, they ensure the preservation, protection, accessibility and appropriate social use of cultural monuments (such as historical buildings) [2].

The use and future of each building, regardless of its architectural value, is primarily influenced by its owner, in the case of discussion of building modifications or a change of purpose, the participants in the territorial and construction management are particularly influential. Each of the relevant parties has its own spectrum of requirements depending on its relationship to such a building, while the views of the various participants can often be at odds. The following examples can be documented as typical views and interests of individual participants in territorial and construction management in relation to an architecturally valuable building:

• The owner of the building primarily prefers the economic point of view. Then the building is a tool for his business and profit, or securing his needs (e.g., housing, personal representation), or legal obligations (concerns municipalities, regions, the state and their institutions). The so-called the enlightened owner also considers other values of the building (including architectural ones), which may not bring profit to him alone, but may be important for the society.

• The tenant of the building usually shows a similar economic, personal or legal interest as the owner of the building, but usually without sentiment towards the very essence of the building and its non-monetary values. However, they can accept the use of an architecturally valuable building as part of their prestige. The tenants are usually not a participant in zoning or construction proceedings; their behaviour towards the building, especially if it exhibits cultural values, is supervised and directed by the owner of the building.

• On one hand the owner of the neighbouring property typically takes the approach of "having peace and a nice view", i.e. He demands that the neighbouring building be maintained not only for visual reasons, but also, for example, so that non-adaptable people do not move into it. At the same time, if possible, the building is used in such a way that it was not disturbed by noise, traffic, etc. The intolerant approach of a neighbours can significantly limit the possibilities of using the building but his requirements may not be taken into account in the proceedings. On the other hand, the existence of an architecturally valuable building usually increases the value of buildings in its vicinity.

• The municipality (but similarly also the region or the state) through its representatives usually monitors the interests of its citizens so that the building in question ideally serves their needs through its use. In this context, the municipality acts on two levels – in relation to the buildings in its ownership, and in relation to the buildings of other owners on its cadastre. Ideally, buildings owned by other owners should complement the portfolio of purposes of municipal buildings, or at least participate in high-quality public space without negative impact on the citizens themselves (to a certain extent, a "neighbours" approach). If the municipality (region, state) is in the position of owner of the building, it is the duty of its representatives to manage this property with the care of a good manager, i.e., to use the property of the municipality efficiently and economically in accordance with its interests and tasks resulting from the scope defined by law, and at the same time to take care about its preservation and development.

• The state preservation authority is usually not interested in the efficiency of use and the economic profitability of the building's existence, as a rule it completely ignores the economic interests of the owner (including the municipality, region, state) or tenant, and primarily pursues the goals of preservation of the value of the building. The state preservation authority is characterized by high powers and can decide not only on the possibility or impossibility of ensuring the sustainable future of the building, but also often on the quality of life of citizens in the vicinity of such a building and the public space around it, in both a positive and negative way.

• Various personal interest and pressure subjects with their interests are largely unknown in the process of deciding on the future of an architecturally valuable building, they can have both positive and negative motivations. The process of using and trying to save such a building and its future can in many cases be very complicated.

Compared to zoning and building regulations for building modifications or changing the purpose of an ordinary building, the owner and builder of an architecturally valuable building is faced with requirements that significantly limit his intention with the building in addition to ordinary regulations. Restrictive regulations mean a significant increase in the price of the entire project, or its impossibility of realization - either due to the unbearable amount of investment costs, or the amount of operating costs, against which the use of the building will not generate sufficient profit. If the owner, who is not economically strong enough (in addition to a private owner, it can also be a municipality or a church), it is impossible to carry out construction modifications to the building to reduce its uneconomical value, or even in combination with changing the purpose of the building so that it is at least economically self-sufficient, or more profitable, he may withdraw from his intention. A worse option is that they start the implementation in accordance with the requirements, but in the course of it they run out of funds and the building stays under construction, often unsecured, exposed to the environment and quickly degrading. Finding a universally suitable solution for the building's new life is not always easy, but all the more satisfying (see Fig. 2).

Fig. 2.: The castle and court in Zruč nad Sázavou is characterized by multifunctional use, combining both ensuring the fulfilment of legal obligations of the municipality and social needs, and commercial use generating funds for operation. The extensive castle complex with a park and courtyard includes the seat of the municipal office, an information centre, 3 museum exhibits, sales of building materials, a veterinary surgery, a cafe, a bar and a public toilet, all with respect for the values of the buildings and their surroundings. (Source: authors)

ARCHITECTURAL VALUE OF THE BUILDING AND PRINCIPLES OF ITS PROTECTION

The architectural value of buildings is a term which is not a clearly defined in the Czech environment. On the basis analysis of legal and professional documents, it can be stated that the architectural value of a building is characterized by its own architectural quality (aesthetic and technical solution), social significance, level of preservation and authenticity of historical constructions, layout and outer shell, or at least some of these attributes. The measure of architectural value cannot be only the appearance of the building, such an approach would leave behind a huge group of modern, industrial and technical buildings in general, as well as other type of buildings. Architecturally, buildings can be valuable not only in their original layout (stylistically pure), but also buildings that have undergone several reconstructions and building modifications, after which they are characterized by a valuable individual design (see Fig. 3). Modern buildings (constructed in the last 50 years or so - so-called architecturally valuable new buildings - see Fig. 4) can also be architecturally valuable, but they cannot be historically valued. However, they can show the potential of possible historical (historical) value for the future.

The meaning of the term architectural value of a building is broader than the term heritage protection of a

Fig. 3.: The lock of the lock chambre with the Hořín bridge and hydroelectric power plant, part of the Vraňansko – Hořín navigation canal cultural monument. The profile of the lock chamber no longer fits the dimensions of contemporary ship assemblies. The preservation of the structure was achieved by technically demanding widening of the bridge span by 1 m and increasing the underpass height by building a unique hydraulic system to raise one of the spans of the historic bridge by 5 m. (Source: authors)

Fig. 4.: The utilitarian building of Pavilion Z at the České Budějovice Exhibition Center underwent a renovation that removed the limitations and single-purpose use of it, and achieved maximum flexibility guaranteeing its high commercial potential and thus the economic sustainability of further operation. While respecting its original material solution and layout of the exhibition area, the building was visually lightened inside and out. (Source: authors)

building. The building's historic value is based on its preserved historical foundation. It is not related to its structural and technical condition (ruins are often protected as monuments - the torso of historical buildings, see Fig. 5), but also to potential legal protection under the Monuments Act - many valuable buildings do not yet have the status of a cultural monument. Cultural monuments in the case of buildings are architectural monuments characterized by a valuable architectural solution or used procedure, or immovable technical monuments, documenting the development of science, production and technology in a certain area. These monuments are important documents of the historical development, lifestyle and environment of society from the earliest times to the present, as manifestations of the creative abilities and work of man, for their revolutionary, historical, artistic, scientific and technical values [2]. Monument care is characterized by several levels of protection, or by types of monuments.

The purpose of heritage protection is to protect the attributes of architecturally or even historically valuable buildings, and to prevent them from deterioration or even extinction. The approach of the state conservation authorities is aimed at preserving historic values, i.e., architectural values, both in the exterior and interior. This entails the tendency to prevent unwanted changes to the appearance of the building (facade, roof, including the installation of PV panels), disruption of mass and scale (extensions, superstructures, conversion of gabled roofs to pseudo-mansards, etc.), removal of historical structures, etc. The building should not be rebuilt in a substantial way or even demolished. Only maintenance and repairs, restoration of defunct original elements are permitted, rehabilitation of the original layout, appearance (adjustment of potentially disturbing parts of facades, roofs, etc.), modernization of utilities and replacement of surviving elements with respect for classic technologies and

Fig. 5.: The listed ruins of Helfštýn Castle have undergone modern construction interventions that have sparked controversy and extensive debate. The static securing, safe access to the building and its partial roofing with structures made of weathering steel, concrete and glass is extremely unique and at the same time respects the torsional character of the building. In addition to the visual effect, the process of destruction of historical structures was stopped and their further life extended by several generations. (Source: authors)

Fig. 6.: Exterior and interior of the functionalist former palace of the Electric Companies in Prague, transformed into a modern commercial administrative building with a multifunctional ground floor. Despite the modernity of the original design of the building from the 1930s, which allowed considerable preservation of its design (and therefore a by no means conflicting approach to historic preservation), huge costs had to be incurred to adapt the building to the needs of the 21st century, especially in the area of energy efficiency and technical devices. (Source: authors)

materials is supported [3]. This formulation of requirements essentially creates an artefact from the building, often with minimal possibilities of its involvement in the life of contemporary society.

From the point of view of society's relationship to the architectural and historical values of buildings (and their importance for society as bearers of evidence of its history, culture and technical sophistication), there is an obvious need to search for, protect and preserve these values. The question is to what extent (and in what cases) they should be superior to the factors that ensure these buildings at least some chance for the future, and whether this approach should be applied across the board. When looking for the use of a building and its adaptation to a new purpose, it is necessary to distinguish between a historical building such as a church, monastery or palace building, and an administrative building from the 1930s with built-in modern technologies, which can be more easily moved closer to the needs of contemporary society (see Fig. 6).

Efforts to protect the values of buildings often clash with the possibilities of saving buildings as a technical whole. Economic and social parameters, reflecting changes in social needs, technical development and the development of modern technologies, enter this process in a fundamental way. he reconstruction and maintenance of an architecturally valuable building according to the rules of historic preservation is very expensive, moreover, the building in its original form is very often difficult to use in the conditions of the needs of modern society. There is thus a conflict between the requirements of state institutions with jurisdiction in the field of historic preservation and relevant legislation, and the needs of the owner of the building. The ownership of cultural monuments in the Czech Republic is governed by generally binding legal regulations. The law [2] does not regulate the ownership of cultural monuments, nor does it specify that certain categories of monuments should be owned by the state. Only in relation to certain monuments, it lays down the rules for the state's pre-emption right. Although the law talks about the social importance and mission of cultural monuments, it does not directly order their owners to make them available to the public. From the point of view of the owner of an architecturally valuable building, the wording in the Charter [4] is still significant: Ownership binds. It must not be misused to the detriment of the rights of others or in conflict with general interests protected by law. Its performance must not harm human health, nature and the environment beyond the level set by law. The law [2] defines 2 basic obligations of the owner of a building that is a cultural monument, as follows:

1. The owner of a cultural monument is obliged at his own expense to take care of its preservation, keep it in good condition and protect it from danger, damage, deterioration or theft.

2. The owner is obliged to use the cultural monument only in a way that corresponds to its cultural and political significance, historical value and technical condition.

Regarding the owner, these are very demanding requirements, which are aimed not only at the preservation of historical structures and elements, the overall concept and appearance of the building, but also at the regulation of the way the building is used - that is, preventing damage to the monument at an intangible level. In real practice, there is thus the necessity to use very expensive procedures and materials in the reconstruction or renewal of such buildings, the impossibility of their expansion, and, on the contrary, a fundamental limitation in their use. The effort to preserve the historical building in the most authentic state can then lead to the fact that it will not only be unusable and, as a result, unrentable or unsaleable, but also its basic maintenance will not be financeable; In addition, in many cases, the financing of extensive and sensitive restoration is beyond the means of the owner, despite the possible possibilities of subsidy support. Instead of a compromise when looking for ways to use the building for current needs, the state heritage protection authorities often prefer the process of its controlled deterioration in such a way that its age and the corresponding technical condition are evident [5] - see Fig. 7. It is questionable how far this approach is in accordance with the very concept of historical building protection.

Fig. 7.: Villa Lil in Mariánské Lázně from the beginning of the 20th century, a historical building. During its life it was used as a residential villa, spa hotel, administrative building, restaurant, casino, since the beginning of the 21st century it has been empty without use. Attempts at reconstruction or sale come up against the strict requirements of the state preservation authority to preserve the authenticity of the original solution. On the one hand, this enormously increases the price of the reconstruction itself by tens of millions of CZK, and on the other hand, it makes it impossible to modify the building for such a use that would at least finance the costs of its operation. Although the building is secured, it is attacked by moisture and wood rot and gradually deteriorates. The costs necessary for its preservation and further use increase significantly every year. (Source: authors)

On the other hand, the effort to find a compromise between the state heritage preservation authority and the owner of the building may result in allowing such construction interventions, which may even lead to modern modifications of some parts of the building or modern additions. The building is not only preserved, but also used appropriately and therefore maintained,

Fig. 8.: Administrative and development building of LASVIT Nový Bor. Two existing heritage-protected houses were renovated using traditional methods, and supplemented by two new ones, materially respectful of the surroundings, but completely modern and futuristic in terms of material and shape. Their surfaces are translucent glass templates in one case, and black cement templates in the other. (Source: authors)

with a view to the long-term future (see Fig. 8 and others). This approach should be a matter of course on the part of the state heritage preservation authorities in cases where the building is no longer sustainable in its original technical solution for objective reasons, and it is not a building of unique importance.

PROPERTIES OF ARCHITECTURALLY VALUABLE BUILDINGS VS. NEEDS OF MODERN SOCIETY

Each building was built or modified in its time for a purpose that was in demand at that time and place, or at least the appearance of this demand was created. For this purpose, the building was designed and executed with a certain degree of success, using modern materials, technology and knowledge. Some of these buildings are today considered architecturally valuable, and in the case of monuments, other values are also added. Despite the respect that an expert and perceptive observer has for these buildings, it must be stated that, from today's point of view, these buildings show a huge number of defects, even in cases where it is possible to use them for their original purpose. The most significant types of defects include:

• unsatisfactory rigid layout arrangement, due to the considerable mass of the vertical supporting structures and the material-technical solution of the ceilings, the layout is practically unchangeable without drastic interventions in the structural system;

• from the point of view of the requirements of the current regulations, the undersizing of some load-bearing structures serving either the original purpose, or in the case of a required increase in load related to partial changes in the purpose of some rooms;

• unsatisfactory hygienic conditions in the interior, such as insufficient capacity of social facilities, parameters of daylighting, ventilation, etc.;

• high energy demand, when the impossibility of reducing heat losses due to the inviolability of the outer surface of the perimeter walls (internal insulation is technical nonsense) and at the same time the usual impossibility of installing energy sources such as solar systems or heat pumps due to the inadmissibility of interfering with the design of the building or spatial constraints;

• high operational complexity in terms of administration, starting with the complexity of cleaning (a large number of small windows and rooms, difficult-to-access places, valuable and at the same time sensitive surfaces, etc.), through security to the frequency and technical complexity of maintenance or repair operations;

• the absence of the necessary infrastructure, especially insufficient capacity connection, parking or modern communication technology.

Over the centuries, society has undergone changes in almost all areas of life, and the dynamics of these changes have been extraordinary in recent decades. This is reflected in the reduction or complete disappearance of the need for certain types of buildings or their purpose (residential or administrative palatial buildings, village elementary schools, city barracks, industrial sites and train stations in city centres, water towers, electricity transformers, etc.) and, conversely, the emergence of new building purposes. In light of these changes, there is either pressure to convert unused traditional buildings for new needs, or to abandon a significant number of such buildings. This process entails a significant risk of irreversible damage to architecturally valuable buildings, or even their destruction. Currently, there are several thousand unused buildings or areas of the brownfield in the Czech Republic, which degrade their surroundings, contribute to the creation of socially excluded locations and devalue neighbouring properties. A significant share of this group is occupied by buildings and premises in the historic centres of cities, i.e., buildings of architectural value and often with heritage protection - see Fig. 9.

Fig. 9.: The area of the former spinning mill of F. A. Hiebsch, later Josef Schubert, with a core from the turn of the 19th and 20th centuries near the centre of Hrádek nad Nisou. Since 1999, individual buildings in the area have been either empty or inappropriately used as warehouses or car workshops; the already dilapidated site became the property of the city in 2015. There is no investment in the buildings, the poor technical condition requires unattainable investments in renovation, it is not possible to find a new way of use. (Source: authors)

In order for the building to survive into the future, it must meet the requirements of the applicable legislation. Among the most fundamental are the requirements of static reliability, fire safety, energy efficiency and others. At the same time, it is often necessary to repurpose it with sustainable features and management options. This needs to be predicted in the horizon of tens of years, which is why the multifunctional use of these buildings is often resorted to. Conversion is usually easier for buildings of smaller size, conveniently located and connected to the infrastructure - see Fig. 10 et seq.

Fig. 10.: The building of the multifunctional community canter in Hrádek nad Nisou, created by the conversion of the villa of the manufacturer Josef Schubert near the premises of his former spinning mill (Fig. 9). The villa from 1924 has been a cultural monument since 2016 and is owned by the city. (Source: authors)

PRINCIPLES OF SUSTAINABLE USE OF ARCHITECTURALLY VALUABLE BUILDINGS

When analysing the optimal use of real estate at a given time and place, it is the most significant (at the same time the most complicated) and the most limiting the technical side, the economical and legislative side directly related to it. Especially in the case of objects of the traditional building stock, their material, construction technical and layout solutions (contrary to the current typological requirements) provide very limited possibilities of adaptation for the needs of modern use with their current high energy demand, or operational demands in general. A specific group of buildings, forming a significant part of the cultural heritage, are sacral buildings, represented mainly by churches and monastery complexes. These buildings, with exceptions, serve and will always serve their original purpose without major modifications (see Fig. 11). Despite all the negatives of their construction and technical solution, which from the point of view of today's requirements contains a number of defects,

they are completely satisfactory for the given purpose. These buildings document the historical development of architecture and construction and have had the same owner for centuries, who today is relatively financially secure. Rather, his goal is to involve these buildings more in the life of modern society, so that even with these buildings, their primary purpose is expanded to include additional uses, whether it is social events, exhibitions, etc. (see Fig. 11).

Fig. 11.: Interior of the Church of the Assumption of the Virgin Mary in Plasy, part of the national cultural monument of the monastery in Plasy. The church, in a state of disrepair, underwent extensive revitalization, including, among other things, the expansion of the sightseeing route for the public, the installation of an exhibition about the history of the place, and adjustments for the organization of cultural events. In essence, this is a multifunctional building with a significant expansion of the original use. (Source: authors)

The optimal use of real estate does not always have to coincide with the so-called ideal use, even according to the ideas of its owner. Some of the limiting parameters of architecturally significant buildings can prevent the realization of these ideas - even with a satisfactory technical, financial and well-founded overall solution, the plans can be hindered by the requirements of the historic preservation authority. The discrepancy between the ideal and optimal use of the property leads to the determination of 5 categories of its use according to the assessment of the level of optimization of the given building, for consideration of its further future [5]; with the inclusion of the aspect of protection of its architectural value, these categories can be modified as follows:

1. The existing use of the building is optimal, or even at the level of ideal use. The building currently shows maximum use even while respecting the requirements of the state monument preservation authority. Nothing fundamental can be done to improve its use.

2. Very good use of the building. The building may not show optimal use (but its use is close to this state), but it provides the owner with reasonable benefits. Depending on the possibilities, a sensitive reconstruction or expansion of the building to further improve its use is also permissible.

3. Improper use / overuse of the building. The building in its current form violates zoning, historic or construction technical requirements. It is essential that, in the near term, large-scale investments in the building take place and such adjustments are made that it complies with legislative regulations and its historic value. Overuse can also be associated with partial use of the building (a certain part is completely unused, or the use capacity is very low considering the costs). The economic benefit of abandoning (not using) the building cannot be clearly evaluated.

4. The building is not and will not be used appropriately. The overall circumstances do not allow the building in its current state to be brought closer to optimal use by adequate technical measures and/or financial costs. With regard to its architectural value, fundamental construction modifications are not acceptable, it is more economically advantageous for the owner to abandon the building. In exceptional cases, the building will be sold to a financially secure and philanthropically oriented investor, who will subsequently provide investments in the reconstruction and rescue of the building, despite the impossibility of achieving a return on the invested funds. The reason may be the owner's sentimental relationship to such a building, or the prestige that such a building provides to the owner.

5. The building is not and will not be used not only optimally (rather not used at all), there has been a cumulation of all limiting factors - the building is architecturally very valuable or even protected as a historical building, the requirements of the monument protection authority are so strict that they make it impossible to adapt it for the needs of any effective contemporary use. Perhaps also as a result of this claim, the building is in neglected or poor technical condition, there is no demand for its use for any purpose for which it is structurally suitable, the financial demands for its maintenance or conservation in its current state are unbearable. Such a building is therefore not only unusable for any needs, but also unsaleable, it is doomed to gradual extinction. It must be stated that the obstinate attitude of the heritage preservation authorities is by no means exceptional (although it cannot even be called the rule), and there are at least dozens of valuable buildings in the described situation in the Czech Republic.

PRINCIPLES OF SUSTAINABLE MANAGEMENT OF ARCHITECTURALLY VALUABLE BUILDINGS

The goal of the management of any real estate is to achieve the maximum benefit of the building itself and its investment plans, i.e., to make its operation financially optimal, efficient in terms of time, resources, material and personnel, and reasonable even with regard to the impact on the environment [6]. In common situations of a sustainable approach to building management, in the case of long-term financial losses, it is considered to sell, rent or change the way and level of use. The approach to the management of an architecturally valuable building cannot be conceived in this simple way. The high financial demand for building management and maintenance, in addition to the sub-optimal financial efficiency of the building, puts the facility manager in a difficult position. The latter must make a considerable effort to maximize the efficiency of management and maintenance, and minimize the financial costs needed for support services, even though the requirement in facility management constructed in this way does not bring optimal results. For this type of buildings, 3 basic concepts of approach to their management are distinguished, depending on the type of ownership [7], although their goals are the same:

1. Administration of buildings owned by the state, usually provided through the National Institute of Monuments. With regard to the extensive structure of interested entities in this area, excessively lengthy approval procedures occur, which have a direct impact on the effectiveness of the management of facility management activities.

2. Management of buildings in private ownership. The construction manager is usually directly subordinate

to the owner, or top management of the ownership entity. The management of facility management activities is thus usually very flexible and efficient.

3. Management of buildings owned by churches. Considering the prevailing nature of church buildings, their administration is usually entrusted to parish priests of individual territorial areas - parishes. In this area, the lack of sufficient professional competence to perform facility management can be a problem.

An architecturally and historically valuable building will always be more demanding to manage and maintain, even after a high-quality reconstruction and a high investment in the renovation, compared to an ordinary contemporary building of similar use. The financial and professional demands of managing and maintaining an architecturally valuable building are related to its irreplaceable value and historical significance, which "complicates" its daily care. An illustrative example of the specificity of the maintenance of an architecturally valuable building is a support service such as cleaning in a historical building of a château or castle (see Fig. 12 and 13). In addition to regular and sufficiently effective cleaning of social areas and areas with a high concentration of visitors, such as the cash desk or gift shop, it is necessary to approach various historical and valuable surfaces of the exhibition parts of the building with sensitivity. The performance of time- and financially efficient cleaning is made even more difficult by the irregularity of surfaces, their different surfaces and finishes, often a large number of small and irregular rooms and complex or poorly accessible cleaning facilities.

Fig. 12.: Vranov nad Dyjí castle grounds, cultural monument. The vastness and fragmentation of the castle area clearly shows the demanding nature of its care. (Source: Construction of the Year)

Another specific discipline of management and maintenance of the castle object is the monitoring and precise balancing of the quality of the internal environment. When underestimating the balance of the quality of the indoor environment, such as humidity, temperature, CO2 concentration, etc., the surfaces and structures themselves, as well as the exhibited artefacts, historical furniture and equipment, will gradually deteriorate. Cyclical bursts of visitors alternating with periods without visitors, or the organization of cultural or social events, create significant fluctuations in the quality of the indoor environment, which must be responded to promptly. Ensuring the safety of the building and its components is an obvious part of the management and maintenance of the castle. Not only in connection with the threat of fire, prevention of theft and deterioration of the building and its equipment, but also in connection with the safety of visitors, employees or event organizers. In connection with health and safety regulations, there are not exceptional structural non-standardizations, such as lowered ceilings and therefore insufficient underfloor heights, uneven or slippery floors, etc. All this complicates and increases the cost of the facility manager's work in ensuring and complying with safety rules.

From the above-mentioned brief example of the specifics of administration and maintenance of one of the many types of architecturally valuable buildings, the high financial demands of caring for their smooth operation follow. To the costs of the described care of the building, the costs of care for visitors, administrative costs, etc. must also be added. Renting a part of an architecturally valuable and attractive building for social events brings a certain financial benefit to the budget of its administration, but the coverage of investment and operating costs coming only from the entrance fees or rental fees are very rare, usually only in a case of the most important monuments. A long-term rent of part of the building for one purpose is more economically efficient. In general, however, the mentioned type of buildings must be subsidized, which can be afforded by the state or cities. This is exceptionally the case with private owners, for example when it comes to a family residence or other building with an emotional bond. The specific and demanding environment of architecturally valuable buildings requires effective and at the same time sensitive management. Its performance must be ensured by a truly experienced and professionally competent provider of selected support services. Only awareness of the financial demands and at the same time the social value of an architecturally valuable building managed is a necessary part of its optimal, sensitive and sustainable future.

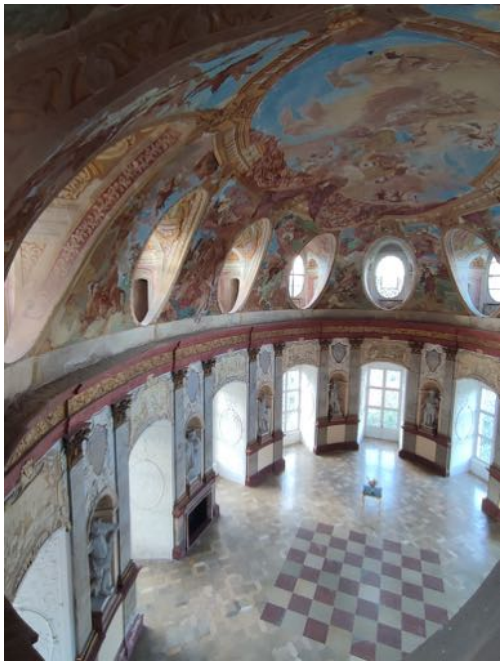

Fig. 13.: Interior of the castle Vranov nad Dyjí. The variety, detail and artistic value of the surfaces requires a careful and professional approach to cleaning and maintenance, their protection against damage and safety in general, but also high-quality and stable parameters of the internal environment with a tendency to fluctuate according to the intensity of visitors and climatic conditions. (Source: authors)

CONCLUSION

The future of an architecturally valuable building is influenced by its location, architectural and technical solution and spatial possibilities, social value, owner's needs, requirements and interests of the state preservation authority, in the case of structural modifications to the building, and other participants in zoning and construction management. An essential parameter is the economic balance of its remaining life cycle, related to the usability and integration of the building into the public space and the life of the locality.

The preservation of an architecturally valuable building always requires an individual approach that respects the specifics of the given building and its surroundings, but also includes a wide group of technical, legislative (legal), economic, social and other param-

eters and requirements. Ownership of an architecturally valuable building is a big commitment for the owner, which the other interested parties should not make unbearably difficult for him. The most important external entity in this matter is the state monument preservation authority with its powers. It is indisputable that if the owner owns an architecturally valuable building, he can perceive this fact as a form of prestige, but at the same time he must be aware of certain limitations when dealing with it. On the other hand, even the state monument care authority should differentiate its approach and distinguish situations when it must maintain an uncompromising and prohibitive attitude, and when it should be a partner to the owner of the building, with whom it seeks ways for its future. As suitable contrasting cases, it is possible to cite a practically inviolable historical sacral building or complex, and a functionalist administrative building, where there is more room for pushing the boundaries. If both sides stand by their arguments and neither side wants to back down, the current owner will most likely stop believing in his intention, sell the building and it will continue to deteriorate, or he will not succeed in selling it, so it will deteriorate under his ownership. The result of the negotiations of both parties involved should be the use of each building in such a way that its future is at least economically sustainable, if not directly self-sufficient or even profitable, of course with maximum respect for its values. Such economic considerations include not only the costs of structural modifications of heritage-protected buildings, but also operating costs – in both cases relatively high costs. Then it is necessary to develop procedures for the management and maintenance of such valuable buildings, which will preserve their values and at the same time ensure their future. As the above examples show, such an approach is to the benefit of all parties involved, including the building itself, when agreement is reached.

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CZECHOSLOVAK SPORTS INFRASTRUCTURE 1918-1938 AS AN INSPIRATION FOR THE DEVELOPMENT OF SPORTS FACILITIES IN THE 21ST CENTURY

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ABSTRACT: "Czechoslovak Sports Infrastructure 1918-1938 as an Inspiration for the Development of Sports Facilities in the 21st Century" presents the successful twenty-year history of building of Sokol and Orel sports infrastructure during the First Republic and its relevance for the present. The text focuses on the need for objective direction of state grants to sport and highlights that the path to fulfilling Tyrš's motto "in a healthy body a healthy spirit" begins with an addressed mapping of the range of physical activities in the Czech Republic.

The article also points out the uniqueness of sokol halls as multi-purpose buildings, which are characterised by many modifications and architectural forms. Their location within walking distance of densely built-up urban areas and their almost ideal urban distribution within settlements is an important feature that should be considered when planning sports infrastructure in urban areas.

Mapping current sports facilities and system planning of changes in preferences is key to supporting the development of the most needed sports facilities for public health. Affordability will also be an important aspect for the optimal placement of these facilities in an area, which will become increasingly important in the near future. The aim should be to build sports facilities for a healthy lifestyle that are in accordance with the strategic and conceptual documents of the Czech Republic and the EU and do not contradict the theory of sustainable development.

The text provides valuable insights and inspiration for the development of sports infrastructure in the 21st century, taking into account historical experiences and current needs.

KEYWORDS: Sokol halls; sports infrastructure; sustainable development; public health; planning; sports facilities

INTRODUCTION

In the realm of health and well-being, sports and physical activity play a pivotal role. The effective utilization and development of sports infrastructure in the Czech Republic necessitate a systematic approach to the spatial planning of these facilities, rooted in a comprehensive and thoughtful strategy. The "State of Art" in the field of functional spatial planning of sports facilities takes into account specific accessibility and location considerations and encompasses a wide array of critical aspects.

The historical sports infrastructure in Czechoslovakia from 1918 to 1938 was unique and significantly influenced by socio-political changes accompanying the birth of the new state. Concurrently, with the consolidation of the state, the Sokol movement, founded in the mid-19th century, reached the pinnacle of popularity and became a key player in the development of sports infrastructure. The primary aim of this article is to systematically examine the evolution of sports infrastructure in Czechoslovakia from 1918 to 1938, with a focus on the influence of Sokol organizations. Additionally, we will attempt to identify how these historical experiences can inform and inspire contemporary sports facility development in the 21st century [1].

This current review will cover a wide range of topics related to Sokol infrastructure, including historical roots, development, and architectural forms, up to possibilities of integration into the modern sports environment of the 21st century. It will address the unique Sokol infrastructure that played a fundamental cultural and sports role in the 20th century. Despite the well-documented history of the Sokol movement, there is still room for further exploration and analysis of this exceptional infrastructure and its role in today's society. Beyond its historical and cultural significance, it will also explore the potential of Sokol infrastructure for the future development of towns and municipalities in the Czech Republic.

In today's context, it is crucial to consider not only traditional sports facilities but also the integration of physical activities into the daily lives of citizens. The increase in the decline of areas designated for sports in spatial plans highlights the need for alternative approaches and strategies to support physical activities. This section of the text will delve into proposals and possibilities for expanding physical activities beyond traditional sports facilities and emphasize the necessity of a coordinated and systematic approach. Furthermore, we will develop ideas regarding the use of higher floors of buildings, the integration of sports facilities into other types of buildings (e.g., schools or hotels), and flexible architectural elements for multifunctional spaces. Simultaneously, the need for a national concept, including a unified overview of the current state of sports and physical activity infrastructure, will be emphasized.

A challenge is also the decline in development areas designated for sports in spatial plans in the Czech Republic over the past 30 years. This trend, which directs more construction toward housing at the expense of sports areas, requires measures to compensate for and prevent further losses. Finding tools at the national level to prevent adverse changes in spatial planning is crucial [2].

In the following section of the text, we will analyse specific existing databases related to sports facilities and organizations in the Czech Republic. Simultaneously, we will assess whether these databases align with the current context. We will underscore the need for a comprehensive and interactive registry that would facilitate coordination, efficiency, and accessibility of

sports infrastructure and activities for all. This section will provide insights into current issues and potential solutions in the field of spatial planning for sports infrastructure in the Czech Republic. It can serve as a foundation for future discussions and be a source of inspiration for researchers, urban planners, architects, and other experts striving to connect sports and physical activity with modern lifestyles.

Overall, this text aims to present new perspectives on sports infrastructure in the Czech Republic, evaluate its current state and direction, and propose practical solutions for future development. It should serve as a catalyst for discussion and reflection and could inspire those involved in the development and innovation of the sports environment in the present day.

THE CONTRIBUTION OF SPORTS ASSOCIATIONS AND SOKOL GATHERINGS TO PHYSICAL EDUCATION IN THE CZECH LANDS

The origins of physical culture and sports in the Czech lands can be traced back to the first half of the 19th century when the first private gymnastics institutes began to emerge, laying the foundation for the future development of this field. Following the fall of Bach's absolutism in 1859, various associations with different focuses started to emerge, and they had a significant impact on the development of the national movement and the establishment of nationally oriented physical education units. This era was characterized by the fusion of physical culture with social and national issues [1].

One of the most prominent examples of these associations was Sokol, founded by Miroslav Tyrš and Jindřich Fügner on February 16, 1862, in Prague. This organization held a unique position in society and ushered in a new era in which physical education ceased to be an activity reserved exclusively for the nobility and the affluent classes. The founding of Sokol symbolized the entry of physical culture into the life of modern society, with an emphasis on the comprehensive development of the individual.

The Sokol idea became a global phenomenon that also influenced the architecture and financing of Sokol halls. Throughout the year 1862, units were established in the Czech countryside, with more being added each year, not only in the territories of Bohemia and Moravia but also abroad. During these years, the Sokol idea spread among Czech settlers in the United States, who played a significant role in raising funds for the construction of Sokol halls, among other endeavours [3].

Towards the end of the 19th century, sports Sokol gymnasiums began to integrate into school buildings, serving local physical education units until the construction of dedicated Sokol halls. School gymnasiums were used for various occasions, including student gatherings, thus following the multi-purpose model of large Sokol halls. The increase in Sokol membership, and particularly the increasingly successful and massive Sokol gatherings, led to the construction of impressive Sokol stadiums with monumental sculptural decorations even before the First World War. Sport and physical education became an integral part of the lifestyle of many residents of Prague, whether as active athletes or spectators [4].

The history of sport and physical education in the Czech lands is a complex and fascinating subject that reflects societal changes and cultural development in the region. Sokol, as a key element of this history, illustrates the power of sport and physical culture as tools for national consciousness and social development. Over time, there was a transformation in the understanding of physical culture, which evolved from being the privilege of the nobility and the wealthier bourgeoisie to becoming an integral part of modern society, a key element of national awareness, and a symbol of social progress.

THE POTENTIAL AND INTEGRATION OF SOKOL INFRASTRUCTURE INTO MODERN SPORTS FACILITIES OF THE 21ST CENTURY

Sokol infrastructure and its potential for integration into modern 21st-century sports facilities are key aspects for the future development of physical education and sports in the Czech Republic. In the context of historical evolution, Sokol halls have become unique elements of sports and social infrastructure with great potential for further development and adaptation.

Sokol complexes were never just sports facilities; they were multifunctional centres that combined sports, culture, and gastronomy. This combination provides opportunities for the expansion and revitalization of these spaces in the 21st century, with the primary goal being the creation of modern and sustainable sports and recreational centres.

Transforming Sokol halls into wellness centres for the public represents an opportunity to expand their function and strengthen their role as community hubs. This would not only enable better utilization of existing capacities but also broaden the range of sports and recreational activities available to citizens of all age groups. This strategy would also contribute to promoting a healthy lifestyle and physical fitness among the population.

However, the key to the success of this process lies in detailed analysis and planning. It is essential to analyze the number and condition of existing Sokol halls, their utilization, accessibility, and amenities. This process should also include an analysis of the connections between Sokol buildings, schools, and other sports facilities because these relationships play a crucial role in providing quality physical education and sports activities.

Overall, this chapter demonstrates that there is significant potential for further utilization and integration of Sokol infrastructure into modern 21st-century sports facilities. Realizing this potential would not only improve sports infrastructure but also strengthen social cohesion and promote a healthy lifestyle.

The images below depict the contrasting evolution of sports infrastructure between the past and the present. On one side is the historical Sokol hall building with its distinctive architectural features and the ambiance of the 20th century. On the other side is a modern sports center with multifunctional spaces, modern technology, and innovative design that reflects the needs and trends of the 21st century.

Fig. 1.: Sokol gymnasium Hradec Králové – preview including search functionality (Source: https://kam.hradcekralove.cz/objekt/14-sokolovna accessed: 3.8.2023)

Fig. 2.: National Sports Center - preview including search functionality (Source: https://www.asb-portal.cz/architektura/obcanske-stavby/sportoviste/narodni-sportovni-centrum accessed: 3.8.2023)

AN INNOVATIVE MODEL OF COLLABORATION BETWEEN SCHOOLS AND SOKOL FOR THE TRANSFORMATION OF SOKOL SPACES INTO WELLNESS CENTERS AND SPORTS FACILITIES

There is an increasing demand for wellness services and accessible sports facilities for the public. This creates a need for an innovative approach to utilizing Sokol spaces, which have a rich history and tradition. Shifting the focus of these spaces towards providing wellness services and sports activities for schools could yield many benefits and contribute to the overall development of physical culture and public health. It is essential to renovate Sokol spaces and ensure the provision of essential wellness services such as fitness swimming, sauna, massages, and relaxation. These measures should be available not only to the general public but also to schools as state institutions with funding capabilities. In addition to schools, which have limited timeframes for using sports facilities, there is room for commercial utilization. In many cases, the renovation of existing facilities would be considered, as well as the construction of new or outdoor sports facilities. Therefore, it is imperative to establish collaboration with the Sokol association and create a cooperative model between private ownership (Sokol) and public interest (providing the best services to citizens) with the possibility of financing through grants or other state contributions and joint management.

The analysis and research would focus on two possible forms of collaboration between schools and Sokol. The first option would involve using school-owned land for the construction of new sports facilities and wellness centres. The second option would involve using Sokol-owned spaces to expand the offering of wellness services and sports facilities for schools. During the research, it would be essential to analyse and propose the optimal transformation of these spaces that would meet the needs of all stakeholders. This would include designing efficient logistics for rentals and coordinating the use of sports facilities by schools and the potential for commercial rentals.

THE KEY ROLE OF FUNCTIONAL SPATIAL PLANNING FOR SPECIFIC ACCESSIBILITY AND LOCATION OF SPORTS FACILITIES

Another way to expand the range of physical activity options for the public is to consider areas and spaces designated for sports and movement other than just Sokol spaces, although they serve as a suitable model. Functional spatial planning for sports and recreation systems, which deals with the context of the placement of sports facilities in the area and their interaction with other systems, needs, in our opinion, a more targeted designation of suitable locations in terms of their specific accessibility when planning areas for physical activities. Currently, in the case where an investor decides to build facilities suitable for physical activity or sports, it is usually approved without objections and is positively received. However, not always is the suitable location chosen in terms of the catchment area of the population or the appropriate physical activity. If the establishment were subject to a national concept that defined the parameters and conditions for where and what facilities should be created, we could achieve a positive response along with the combination of a suitable location and activity. The time horizon for the real implementation of construction on functional sports and recreation areas is long-term, which is why it requires starting the update of spatial plans as soon as possible.

LOSS OF DEVELOPMENT AREAS FOR SPORT IN LAND-USE PLANS

Over the past 30 years, there has been a significant loss of development areas for sports compared to land-use plans from the 1990s, which is not quantified and has primarily favoured residential functions. Unfortunately, residential property development does not always include provisions for sports facilities, resulting in the gradual reduction of so-called "yellow areas" from land-use plans. On a national level, we should seek tools to prevent further changes in land-use plans that work against sports.

One form of compensating for the loss of these areas is planning integrated facilities in other functional spaces, such as schools, Sokol halls, hotels, office buildings, etc. Schools, especially primary schools, are suitable due to their proximity to population centres and often already have Sokol gymnasiums that can be rented to the unorganized public in the afternoon and evening hours when a significant portion of the adult population is not working. These school facilities usually lack wet zones for physical activities, which would be a valuable addition. Sokol halls and their utilization have already been mentioned in a previous part of the text and can be considered similar to schools in this regard. Integrating facilities for physical activity into hotels is also feasible, as many of them already include amenities such as swimming pools, whirlpools, saunas, or multipurpose halls in their services. Here, it is important for these services to be accessible to local residents who are not staying in the hotel but live nearby [2].

Another option to address the shortage of areas suitable for daily physical activities in desired locations is utilizing higher floors in buildings, which is not currently a standard practice in sports facilities. It is obvious that not all activities are suitable for this approach, but it presents a viable solution for some. However, when designing such spaces, it is crucial to maintain a connection with nature and access to fresh air. Another principle that could help is the mobility of certain parts of the building. For example, installing a retractable roof above a water area could provide both an indoor and outdoor pool in one space, or a sliding facade could be used for a climbing wall. Ensuring year-round use of various areas for physical activity should now be a standard practice [2].

PASSPORT OF THE CURRENT STATE OF SPORTS INFRASTRUCTURE IN THE CZECH REPUBLIC

To develop a national-level concept, it is first necessary to create a uniform passport of the current state of sports and physical activity infrastructure throughout the Czech Republic. Current legislation obligates municipal entities to prepare sports development concepts for specific periods, including the registration of sports facilities in their respective areas, although the method of preparation is not defined. Often, this only involves an electronic document published on the

city's website. The approaches to data processing vary, and as a result, they are not compatible with each other. However, the ability to draw data from these sources and interconnect them is crucial for evaluating the current state and sustainable development. This database or registry should not only record the current state but should also be an interactive system linked to a map, allowing any citizen to find sports facilities in their locality with additional necessary information (services offered, equipment, opening hours, types of admission, price list, transportation options, parking, photographs, etc.). The categorization in this system should also include areas for unorganized public activities, wellness facilities, or areas for physical activities. Additionally, the database should highlight optimal areas for building facilities for physical activities, accompanied by capacity requirements verified during the selection process (content, floor space, and division into indoor and outdoor for year-round operation). In other countries (Finland, Denmark, the Netherlands, etc.), national databases are typically managed under the auspices of the Ministry of Sport in cooperation with specialized institutes or universities. The passport of the current state is created, followed by an interpretation in the context of the population and its concentration in specific locations, accessibility, usability, and the suitability of specific sports. However, these databases and evaluations usually focus only on sports, with facilities for movement or relaxation not being recorded or evaluated.

In the Czech Republic, there are currently several databases that collect information about specific types of sports facilities, each created for a specific purpose, which is why they do not contain all the data and facilities that a national database should include.

For instance, there is the Information System of the Czech Union of Sports (ČUS), which records over 8,000 sports facilities across the Czech Republic, predominantly those managed by sports clubs and physical education units, members of regional ČUS associations. An exception is the South Bohemian Region, which, in cooperation with the regional branch of ČUS, registers all sports facilities in the region. This database does not include evidence of locations suitable for physical activity or wellness. The Information System also records affiliated sports clubs, federations, physical education units and clubs, sections, and individuals [5].

The second example is the Sports Registry established by the Ministry of Education, Youth, and Sports (MŠMT) and currently managed by the National Sports Agency (NSA). This registry contains information about sports organizations, athletes, coaches, and sports facilities. Registration in this database is a prerequisite for obtaining state subsidies, which is a significant motivation for most entities. The registry has a public and a non-public section; the public section only displays the total number of sports facilities, individual names with addresses and types of sports venues, but it does

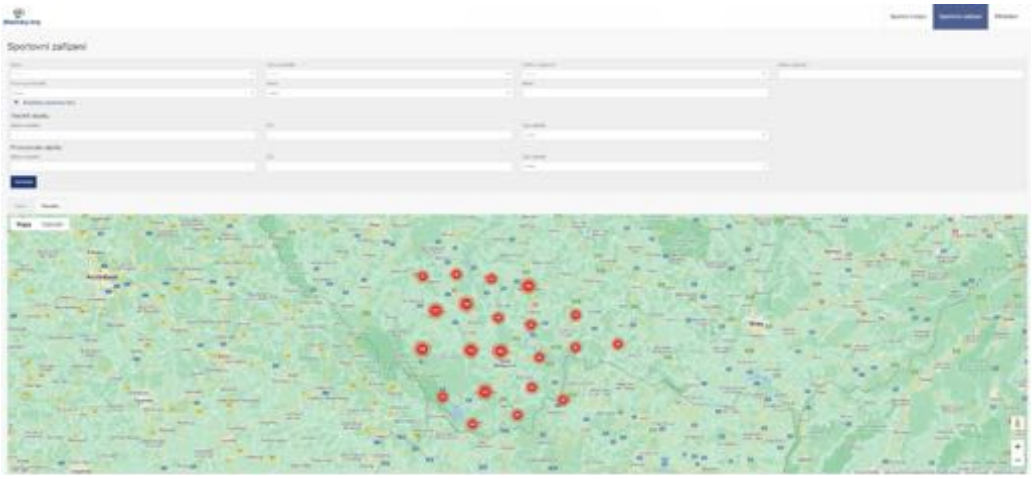

Fig. 3.: Czech Union of Sport Database – search filtr (Source: https://iscus.cz/web/pasport/?is_map_active=0, accessed: 17.03.2023)

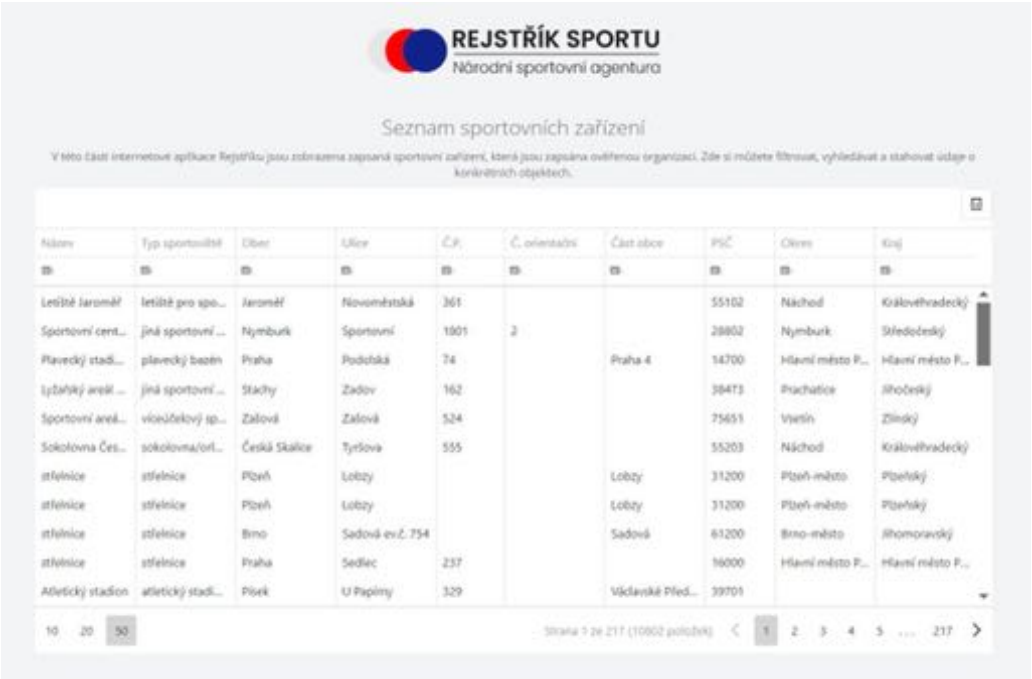

Fig. 4.: Sports Registry – preview including search option (Source: https://rejstriksportu.cz/dashboard/public/agenda/sportoviste, accessed: 25.03.2023)

not provide links to maps or other additional information. This database also does not address the category focused on unorganized public activities or areas for physical activity [6].

SPORTS INFRASTRUCTURE AS A KEY ELEMENT IN THE FIGHT AGAINST CIVILIZATIONAL DISEASES AND IN PROMOTING A HEALTHY LIFESTYLE

Civilizational diseases, which represent a growing health threat in today's society, are closely related to the lack of physical activity among individuals. One of the effective means of preventing these diseases is the implementation of a healthy lifestyle, in which regular physical activity plays a crucial role. This article emphasizes the importance of accessibility to physical activities for all citizens without restrictions based on socioeconomic factors or geographical location [7].

Investments in sports infrastructure may be perceived as costly, but in a broader context, they are investments in the health and well-being of citizens, which is crucial for sustainable societal development. In light of the growing problems of obesity and chronic diseases, promoting physical activity has become not only a health but also an economic priority, contributing to reducing healthcare costs and increasing the productivity and quality of life of citizens [8].

Investments made in preventive programs and support for physical activity will translate into future savings in expenditures on outpatient medical care and the elimination of medical procedures. Specific financial predictions are not currently available and are not the main focus of this text; the aim is to emphasize the importance of prevention. Globally, 1 in 4 adults does not meet the recommended levels of physical activity according to the World Health Organization (WHO), and more than 80% of the global adolescent population is insufficiently physically active. Any physical activity is better than none, and being more active on a daily basis through relatively simple means leads to achieving the recommended activity levels [9].

Securing resources for sports infrastructure is a key element in promoting physical culture and a healthy lifestyle. Currently, state support often focuses on professional sports, which may limit the accessibility of facilities for amateur sports and the unorganized public. The public sector plays a crucial role in providing resources for sports infrastructure, as its main goal is to promote a healthy lifestyle.

This also includes seeking alternative sources, such as public-private partnerships, or establishing funds that can come from various public or private sources. It is also important to thoughtfully allocate financial resources to support the construction and maintenance of sports facilities in different parts of the country, ensuring equal access to sports infrastructure regardless of the socioeconomic status of citizens. This strategy requires a deep understanding of the current situation and future needs in the field of sports infrastructure.

CONCLUSION

The Sokol movement, historically pivotal in the process of national education, plays a significant role in the development of physical culture and sports in the Czech lands. Currently, its facilities become an exceptional platform for innovative and sustainable development. Leveraging their strategic location, multifunctionality, and historical value, these facilities can bring benefits to schools, the public, and society as a whole.

This article presents a new model of cooperation between schools and Sokol. It aims to transform Sokol spaces into wellness centres and sports facilities, with an emphasis on optimizing existing infrastructure, adding new elements, and improving service accessibility. The synergy between the public and private sectors plays a crucial role here, enabling efficient planning and implementation of projects that can be beneficial to the entire society.

An analysis of sports infrastructure in the Czech Republic is essential for its effective development. This analysis should include a comprehensive database covering all sports facilities and areas suitable for public movement throughout the country, simplifying access to information for citizens, whether regions have access to comprehensive databases or utilize less complex resources. The results should contribute to the sports and physical education debate, taking into account both the present and future generations. Through territorial planning and targeted coordination, opportunities for locally suitable sports facilities are created. This approach promotes physical activity, strengthens public health, and highlights potential risks associated with the loss of development areas for sports.

The overall research framework emphasizes integration, cooperation, and innovative approaches to the development of wellness and sports infrastructure. It can serve as inspiration for communities and regions seeking ways to support a healthy lifestyle. Its potential is extensive, offering new paths for the development of physical culture, improving the quality of life, and enhancing community collaboration.

The targeted coordination of the transformation of Sokol facilities, along with the planning of facilities for physical activity, represents a promising step towards the future sustainable development of the public in the Czech Republic. This work not only underscores the importance of the historical and cultural heritage associated with sports but also demonstrates new possibilities for improving the quality of life and strengthening community collaboration. The potential for further research and implementation of this model is substantial, opening up new opportunities for the entire field of physical culture in the region.

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4/ Monument care, renovation and conversion of buildings and architectural complexes

CONVERSION: ONE SPACE, MULTIPLE FUNCTIONS

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ABSTRACT: Changing the function gives the existing architecture a chance to be reborn and integrated. The paper extends the knowledge of approaches to conversions, which are primarily understood as changes to functions in perpetuity. The paper focuses on a specific type of conversions characterized by their temporary duration and minimal or no structural intervention. Using case studies, we analyze and explain the phenomenon of multiple conversions of a single space over time. One of the case studies of such a space is the boiler room at the Faculty of Architecture and Design of the Slovak Technical University in Bratislava. The boiler room in the basement of the building has lost its original function as a result of the modernization of technologies and has remained empty. In time, various forms of artistic and cultural activities began to take place in it on the initiative of artists, lecturers and faculty. Such forms of conversions incorporate the existing space into their concept, and the architecture is not only a framework but also a real stage for various site-specific artistic and cultural projects.

KEYWORDS: architecture; conversion; temporality; unused boiler room; theatre scene; scenography; experimental space; FAD STU Bratislava; Bratislava; Slovakia

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INTRODUCTION

Architectural reuse, architectural recycling, is a fundamental theme of our time on the way to sustainability in our lives. In this process, one of the key concepts in thinking about architecture alongside its revitalization is a more fundamental change of content in the form of conversion. It represents a chance to reborn the building, to integrate it into the neighbourhood and to reuse it.

In a broader context, conversion can be understood as the act or process of changing an object from one form, use or system to another [1]. It is therefore a type of change that respects the existing condition and conversion brings to it the possibility of change. This change will ideally improve the quality of the overall result. The term conversion is used in many areas and in each of them it is strongly adapted to a specific sphere.

ARCHITECTURE AND CONVERSION

In urban structures we often find places, objects or areas that have lost their function in time and are waiting for their next fate. "The reasons for the existence of empty places are manifold, probably mainly related to their function and type of ownership." [2] Such buildings require some form of revitalisation or they will disappear in time. One of the principles of revitalising and reusing vacant buildings is conversion.

In relation to architecture, conversion is a typological or functional change in which the original character of the building must be preserved. The form should remain largely unchanged and the content changes during conversion. Despite the frequent use of the term conversion in both theory and practice, the explanation of this phenomenon in architecture is somewhat relative and abstract, not describing any concrete conditions or parameters that define what is and what is not a conversion.The definitions do not speak of a specific possible minimum or maximum level of interventions and modifications that define conversion.

H. Zemánková characterizes conversion[1] as "a set of processes by which, after the extinction of the original purpose of a building or a set of buildings, their spatial structures are preserved and adapted for new use in an appropriate manner." [3] From the above it follows that the degree and manner of intervention is individual for each building and depends on the authorial approach of the particular architect.

On the basis of the analysis of the current realisations of conversions[1] it can be stated that the conversion is mainly carried out on the buildings which, by their design, allow for a spatially non-conflicting location of the newly required function. This condition is sufficiently fulfilled to a large extent, especially by industrial buildings due to the application of large-span load-bearing structures and the use of large structural or clear heights. The frequent conversions of industrial buildings also imply the phenomenon that the term conversion is often associated primarily with industrial building types.In our paper, we are concerned with the marginal positions of conversions, to which the conversion procedures as for industrial buildings cannot be applied, because by their specific nature they also require the need for a specific, individual approach.

Conversion has potentials and risks based on the nature of the process. Risk factors for conversions include ignorance of the technical condition of the hidden structures and the difficulty of predicting the need for the level of intervention. Existing spatial structures also have their layout and operational limits which must be accepted during conversion.Strengths may be ecology in terms of reuse of the existing physical building stock, less need for new materials and minimisation of logistical flows. Conversion also enters the consciousness of the general public and subconsciously builds their attachment to architecture and its values. From the point of view of the circular economy[2] , conversion is also an appropriate solution. Local governments are sometimes inclined to sell off properties to investors who are not interested in bringing a quality environment to the site for its inhabitants, in pursuit of a vision of profit, relieving themselves of the responsibility of managing or restoring the property. Filling a vacant building may bring more benefit to the locality in the long run than a one-off financial gain - a sale [2]. Conversion, especially to a cultural function, also generates community benefits and has the ability to activate the zone in which it is located. The aesthetic aspect of conversion is a subjective variable, but according to current trends, it seems to be attractive to admit and reveal old support systems and other technical and structural specificities of buildings.

CATEGORIZATION OF CONVERSIONS

Due to the ambiguous definition of conversions, it is currently difficult to grasp certain types of approaches to conversions terminologically and to name them. Therefore, for the purpose of our paper, we categorize conversions as follows:

1. By the expected duration of the newly proposed feature:

[1] The representative sample included conversions that have been nominated or won an award from the Slovak Chamber of Architects CEZAAR in recent years.

[2] The circular economy (circular economy) is based on the efficient use of natural resources through effective recovery. The circular economy has been a key theme in the EU since 2015.

• Conversions temporary (planned for a fixed period of time),

• Permanent conversions (planned for an indefinite period).

2. According to the size of the building intervention for the needs of the newly proposed function:

• Conversions without the need for structural intervention,

• conversions with the need for minimal structural intervention,

• conversions with the need for structural intervention.

Temporary / fixed-term conversion
Temporary conversions are already planned for a specific operating period at their inception. A specific duration is foreseen in advance, or only an assumed duration for conversions for functions where a specific duration cannot be determined. As S. Kolimarova explains, temporary structures are usually of the nature of buildings for crisis management or buildings for temporary events such as festivals...[4] For the purposes of this thesis, it is the temporary functions related to art and culture that are of interest to us. The period covered by the conversion can vary in duration from a happening[3] of a few minutes to a duration of several months.

Permanent / Indefinite conversion
In this thesis, permanent or indefinite conversions are those conversions whose occurrence does not consider a bounding frame for their duration. Spaces are made ready for long-term use with a new functional content without a planned end by means of a conversion. This approach to conversions is the most common, it can be said to be the traditional case.

Conversion without need structural intervention
A conversion that occurs without structural changes to the space. The newly proposed functions draw on the condition and character of the space as it is at the time they enter it. The new function may bring small, independent structures and built-ins into the space, but these are not fixed to the building. The conversion can draw on the space and, as a result, site-specific projects can emerge within it. Conversion without structural intervention is therefore a conversion of feeling, programmatic, not structural.

Conversion with minimal construction intervention required
We consider that minimal construction intervention is necessary. A minimum intervention conversion uses structural alterations only as a necessary component without which the space would not function, be safe or suitable for human occupancy. Examples of minimal structural intervention are: safety measures, rehabilitation of parts of the space, repair of structural complications, etc.

Conversion with the need for structural intervention
A conversion during which physical changes are made to the building structure in order to alter the layout or change the quality of the environment. Such conversions are usually conversions planned for an indefinite period of time. One of the reasons for this may be the higher cost and time spent making the structural changes. A building change is implemented because of the specific requirements of a new, proposed function.

Temporary conversion without structural intervention
From the previous categorization of conversions, we next describe a combination of two less frequent approaches. Combining them results in the type of conversion we discuss next. The combination of temporariness and no need for structural intervention creates a distinct group of conversions that are numerous, especially abroad. They represent the entry of an activity, process, action or element into an existing space. Since it is a temporary infill - planned for a definite period of time, the conversion is also temporary. Temporality allows for the penetration of disciplines, the infiltration of ideas and the experimental testing of new concepts [4]. Most often, we might characterize this form of conversion as an event[4] or happening. A short-term filling requires fewer demands, so it largely dispenses with structural intervention. Actors interested in short-term use of space are often attracted by the character and condition of the space and use it as part of an architectural, artistic look or part of an artistic intention, as a setting to a temporary function that reflects or harmoniously follows the temporary function. Because of the specifics of temporary conversion without structural intervention, it appears to be an ideal function of culture and art that can temporarily enter the space and function symbiotically with it. This relationship of space as a site-specific scene is described by theatre artist and architect P. Mazalán "Stage design has a license to work with place in an unpredictable way. It can help to anticipate new ways of using a space given the motivations of its users and can become a critical architectural project." [5]

ONE SPACE, MULTIPLE CONVERSIONS

The building of the Faculty of Architecture and Design of STU at 19 Námestie Slobody was built in 1947-1950 according to the design of architect Emil Belluš. The building originally served as the Pavilion of Theoretical Institutes with rooms for teaching physics, mathematics and architecture. It is considered one of the author's masterpieces, as it stands out for its artistic, material and technical design. The building also includes a large underground part, which contained mainly spaces for technical equipment. One of the largest spaces in the basement was the coal boiler room. This space is specific in its shape, scale, proportions and details that relate to its original function. Over time, technologies were replaced with more progressive ones and rooms in the underground parts of the building were vacated. The faculty thus acquired specific windowless spaces that had been empty for several years. Gradually, ideas for a new functional filling of the boiler room started to come and this made it accessible. The space was cleared of machinery, a new double lightweight floor, a connecting walkway, new wiring and lighting were added. A lift was also built to this basement area to en-

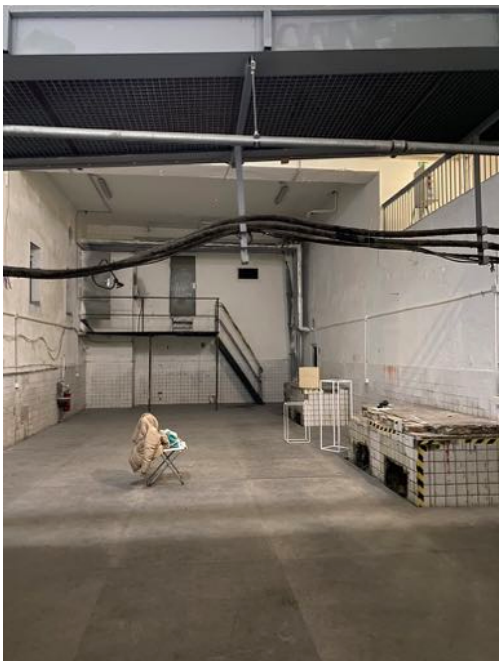

Fig. 1.: Boiler room space at FAD STU BA. (Source: author)

[3] event - planned event

[4] happening - noun happening, event; something that happens, often something unusual. A performance or similar event that takes place without preparation. More at: oxford learners dictionaries. website. 2023 [online]. [cited 2023-03-25] available at: https://www.oxfordlearnersdictionaries.com/definition/english/happening_1?q=happening

sure the space is accessible to wheelchair users. In this way, the space meets the basic conditions of usability.

The boiler room is located in the university building, which means that it falls into the group of buildings that must meet the barrier-free conditions based on the applicable legislation. The whole building has been retrofitted to make it suitable for use by all groups of people. The entrance to the building is also wheelchair accessible. In addition to easy accessibility for all, the building also has wheelchair-accessible sanitary facilities. The premises of the Faculty of Architecture are welcoming to all groups of people, as indicated by the long-standing presence of a small café staffed by people with disabilities. All the integrated changes to the building have been incorporated in a very sensitive way to the character of the building and the value of the building.

The former boiler room has become an attractive space for culture and art creators. The use of the space has never been defined, which has shown that one space can function differently over time and can be filled with different functions. One of the larger temporary projects was the theatre play Electric Angel, which turned the boiler room into a site-specific experimental theatre for about a year (February 2022-June 2023). In the final design of the temporary theatre, the stage is located along one of the longer walls of the boiler room.

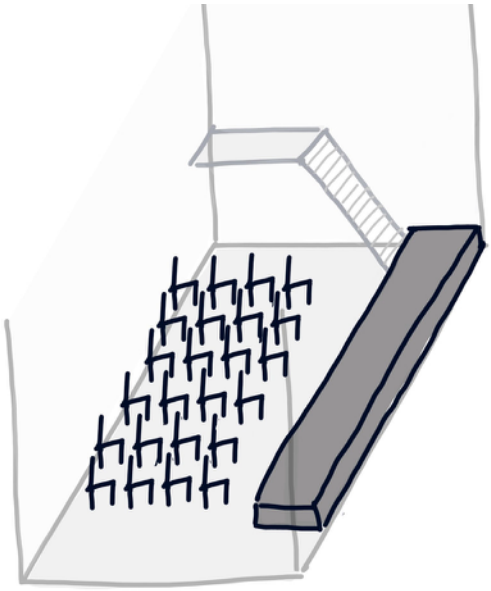

Fig. 2.: Schematic of the spatial design of the Electric Angel theatre in the boiler room of FAD STU BA. (Source: author)

The stage is relatively shallow and long. The shallowness ensures a closer relationship to the spectator, the length in turn the possibility to divide the stage into different functional parts side by side. Placing the stage in this location allowed the existing staircase and platform structure to be used and incorporated into the design, which increases the playing area and does not take up space for the audience. The auditorium is rectangular in shape, with a longer side adjacent to the stage. This unconventional principle of turning the auditorium towards the stage ensures the proximity of the spectator to the action. The audience is seated only four rows back, more immersed in the action, and the actors are only inches to metres away from each other. The two largest specific elements of the boiler room, the old brick furnaces, are integrated into the play in their current state. One furnace is the structure of the bed on which the mattress is laid, the other furnace is part of the bathroom. The photo 3 shows the position and relationship between the auditorium and the stage and the character of the spatial and visual design. All parts of the boiler room are left untouched. They are acknowledged. They are unrepaired, uncleaned, unmasked. "The boiler room completely represents the

Fig. 3.: Photograph from the premiere of the theatre play Electric Angel in the boiler room of FAD STU BA. (Photo: R. Tappert)

chosen play, it is raw, true and cold..." [6]

A different spatial arrangement was chosen by P. Mazalán, when his music-dramatic work Decameron (2021) was performed in the same space on one occasion. The spatial arrangement was rotated 90 degrees compared to the play Electric Angel. The stage and auditorium were on a single line in the longitudinal direction of the longitudinal space of the boiler room. The audience was seated in several short rows behind each other.

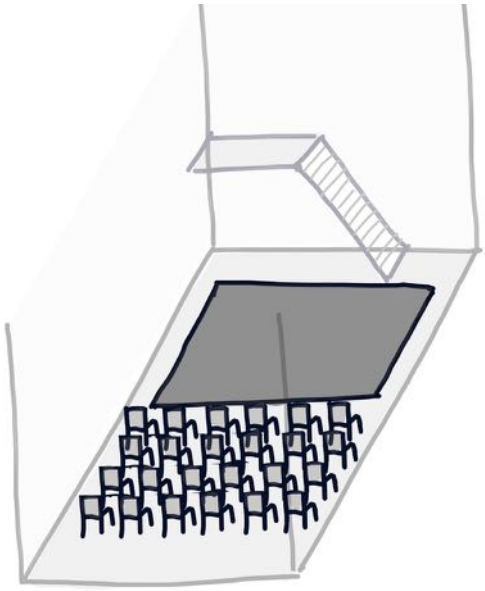

Fig. 4.: Schematic of the spatial design of the musical theatre Dekameron in the boiler room of the FAD STU BA. (Source: author)

The strength of the space for this performance was the excellent acoustics of the tall, non-compact, perforated space of the boiler room. In this case, the landing with the staircase remained clear and was used in the piece for small interventions during which the actors appeared on it. The wall behind the staircase and landing was used to project the texts for the work. Its imperfection and current state stood out during the projection.

In addition to external projects, the faculty also uses the space for its own events. An exhibition of semester student works from the field of design was organised in the former boiler room on the occasion of the regular event Night of Architecture and Design. The works were installed around the perimeter of the longer walls of the boiler room, the centre of the space was left free as a manipulation area. The different nature of the works required different forms of presentations and exhibitions, for which the most specific elements of the boiler room - old furnaces - were used.

The space of the former boiler room was also used for musical accompaniments to faculty events. The spatial arrangement at that time consisted of a completely

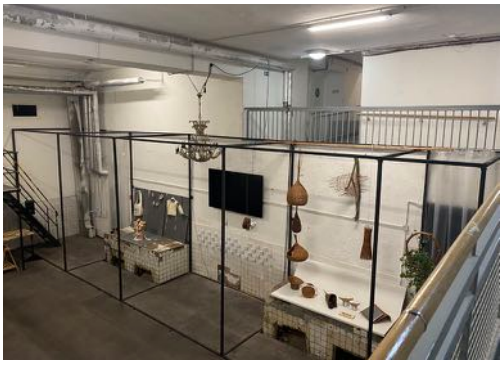

Fig. 5.: Photo from the preparation of the exhibition of student works in the boiler room of FAD STU BA. (Photo: author)

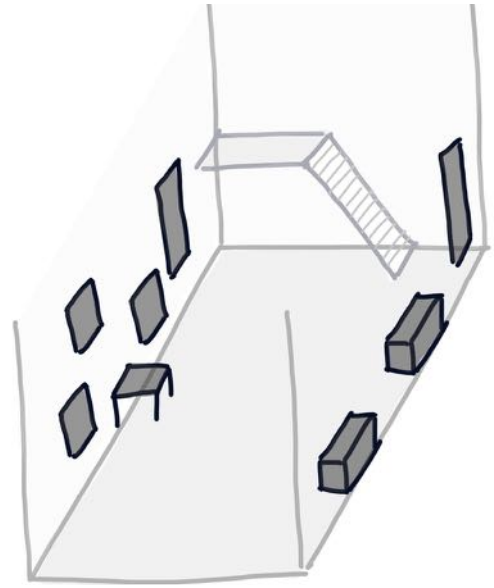

Fig. 6.: Schematic of the spatial design of the exhibition in the boiler room of FAD STU BA. (Source: author)

open space of the boiler room in the lower part and situating the musical artist on a raised platform. The entire space was open, designed for passage and entertainment. The placement of the musical artist on the raised platform provided better visibility of the visitors to the artist, but also vice versa.

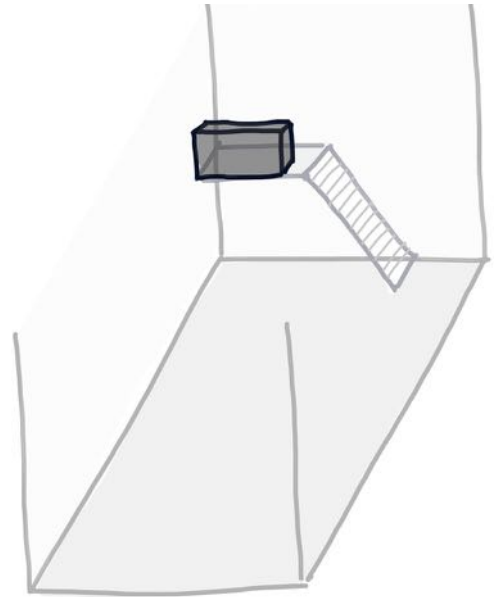

Fig. 7: Schematic of the spatial design of the musical event in the boiler room of FAD STU BA. (Source: author)

This experimental space at the Faculty of Architecture and Design is always open to other temporary uses that bring new forms of arrangement and programming to this specific space. In the last period of its more active functioning, the space has been, for example, a theatre, a gallery, a space for discussions and talks, a music theatre or a space for musical performances.

CONCLUSION

The freedom in thinking about conversion allows for the emergence of different authorial views and approaches to the reuse of empty spaces. Specifically defining the function or mode of operation of a vacant space may not be the only solution when considering its reuse. Different spaces have their limits and these can serve as boundary locations for entry points. The possibility of thinking freely about the functioning of a space tests its possibilities of variability. Revisiting one space in a short period of time brings different experiences. In contrast to a multifunctional hall, where the filling or layout is to some extent predefined, for example by the location of the stage, technical equipment or the stage, a temporary conversion is more open to an authorial approach. Nor does it attempt to predefine the basic framework of use, such as the entrance to the space or its division into public, semi-public and private zones. Each temporary function thus creates an original temporary access to spatial, functional and layout possibilities.

Temporary conversion is one possible form of enriching cultural life and activating empty objects. When the absence of structural intervention is added to temporary conversion, it becomes an ecological and economic option that can contribute to the preservation and necessary maintenance of empty spaces, as well as raise awareness of the potentials and possibilities of disposing of unused spaces.

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(BUJDÁKOVÁ, K. author's statement in an interview on the design of a temporary theatre space in the former boiler room and theatre stage for the play Electric Angel)

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PROTECTIVE BELT – BUFFER ZONE OF HERITAGE PROTECTION

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ABSTRACT: The protective belts of a heritage-protected buildings or areas are reaching their limits. Territories defined in this way are not the subject of protection themselves. Some protected belts had the task of protecting themselves at the time of their declaration, not only the object of protection for which they have been declared. Protective belts are evidenced by the formulated conditions of protection, precisely defined. The status of these territories has not been changed, but access to the implementation for the protection of historic values is increasingly limited. The definition of protective belts is strictly intended from legislative point of view. But from the point of view of applied heritage care, this concept is a path of a degradation for the heritage values of some areas. The vision of ensuring the protection of cultural values by declaring protected zone is out of sight. An analysis of the importance of the protective belts is a must.

KEYWORDS: protective belt; heritage protection; urbanism; heritage urbanism; urban values; urban protection of the settlement; land-use planning tools; heritage protection of the settlement; Opava; Havířov

INTRODUCTION

The topic of protective belts (PB) in heritage protection is specific. The aim is to outline the development, the meaning and the problems of the PB, especially to point out the problems associated with them. The most significant ones arise with anomalous cases of PB, which have a major impact on the approach to the protection of the areas in question. The approach to PB varies from municipality to municipality, region to region. It is all the more difficult to deal with very specific problems of some areas. The topic has been developer so that it can be further specified and, above all, become the subject of discussion and efforts to improve the situation.

In order to frame the topic with a focus on protective belts form the point of view of heritage protection, the terms used in this context are specifically defined. Town, village, historic settlement, monument – these are terms that can be based on commonly known definitions. One of the terms that can be interpreted differently is urbanism. It is often defined as a discipline, a planning science, a planning process or an artistic and creative design discipline. [1] For the purpose of the topic, it is sufficient to define that urbanism is a discipline and practical activity, having close links to the field of architecture, from which urbanism developed and specified to the practical planning activity – land-use planning. As a scientific discipline, urbanism investigates the theoretical and practical problems of the creation and transformation of settlements, settlement formations and their structures, reveals tendencies and regularities of their development and formulates principles for their solution. [2]

The concept of heritage urbanism combines historical urbanism, as the knowledge of the development of individual settlements, and an active approach of the field of monumental care to the protection of preserved values, their documentation, consultation of planned urban building interventions and proposals for the overall regeneration of urban heritage, including the appropriate addition of settlements with new buildings that will be harmonious in relation to existing buildings. [3] The term heritage urbanism is also understood as a broad set of activities aimed at a thorough understanding of the heritage values of historic settlements, and, above all, their protection and regeneration. [4]

PROTECTION OF SETTLEMENTS – SPATIAL PLANNING TOOLS

The urban planning and development of settlements is related to the need to specify their protection. Urban protection of settlements consists in the effort to preserve the character of the area and to promote meaningful development with respect to the existing qualities of the area. Land-use planning tools help to protect the area. Spatial planning systematically and comprehensively addresses the functional use of the territory, establishes the principles of its organisation and coordinates construction and other activities affecting the development of the territory in terms of subject matter and time. Spatial planning creates the conditions for ensuring the permanent harmony of all natural, civilizational and cultural values in the territory, particularly with regard to the care of the environment and the protection of its main components – soil, water and air. [5]

The tools of spatial planning are spatial planning documents consisting of spatial analytical documents and spatial studies. On a national scale, it is the spatial development policy. The spatial planning documentation is binding and at the regional level it consists of spatial development principles. The greatest influence on the protection of the urban values of settlements is the spatial plan, which must be in accordance with the superior documentation and is a binding document for decision-making in the territory. The detailed conditions for the area are then set out in the regulatory plan, which establishes spatial conditions and, given its scale, is better able to protect the cultural and historical values in the area. A new spatial plan with elements of a regulatory plan is being applied.

URBAN PROTECTION OF SETTLEMENTS

The conservation of settlements represents an important component for the preservation of the urban values of the territory. The basic requirements for the protection of settlements are enshrined in international documents, in particular in the Washington Charter of 1987. This document defines and explains the principles of heritage urbanism. Historic preservation of the historic cores of Czech, Moravian and Silesian towns has been applied in our territory since the 1950s. The process of creating the concept of the protection of settlements has undergone a development that began with the monument categorisation of historic towns. The actual process of declaring conservation areas and zones has been underway since 1989. At the same time, territorial protection was prepared by declaring conservation areas and zones with preserved ensembles of vernacular architecture. In the 1990s, the number of protective belts of heritage reserves, heritage zones and cultural monuments was extended. Since 1996, landscape heritage zones have also been declared to help protect the settlements included in them. The declaration of heritage reserves and heritage zones has legalised the possibility of di-

recting construction activities in these areas on a legislative basis so that not only the modifications of individual of individual preserved monuments listed in the Central List of Cultural Monuments (ÚSKP) are mandatorily consulted, but also so that their environment can be protected and regenerated as a whole. [4] To the list of protection of heritage urbanism can be added the United Nations Educational, Scientific and Cultural Organization – UNESCO, to promote world peace and security through international cooperation in education, science and culture.

Act No. 20/1987 Coll., on State Monument Care, defines the protection of the territory at the level of a heritage reservation, a heritage zone and specifies the obligations for protection plans for heritage reservations and heritage zones. A heritage reservation is an area whose character and settings is determined by a collection of immovable cultural monuments or archaeological findings. The Government of the Czech Republic may, by decree, declare an area to be a heritage reservation as a whole and lay down conditions for ensuring its protection. These conditions may also apply, to the extent necessary, to properties in the territory of the heritage reservation which are not cultural monuments. A heritage zone is an area of a settlement or part of a settlement with a smaller proportion of cultural monuments, a historic environment or part of a landscape unit. The Ministry of Culture, after consultation with regional authority, may declare such an area of significant cultural value to be a heritage zone by measure of a general nature and determine the conditions of protection. Plans for the protection of a heritage reservation and heritage zone may be issued by a measure of a general nature for the protection of a heritage reservation or a heritage zone or parts thereof, after consultation with the Ministry of Culture, the regional planning authority and the relevant municipality as the authorities concerned. [6]

The protective belt is issued by municipal authority of the municipality with extended competence, if the protection of the immovable cultural monument or its environment requires it, after the statement of the expert organization of the state monument care by the decision on the PB (newly by a measure of general nature) and determines for which properties in the PB, if they are not cultural monuments, or for which types of works on them, including the treatment of trees, the obligation to request a binding opinion in advance according to the Heritage Act is excluded. This obligation is always excluded in the case of construction, alteration of construction, maintenance work, location of removal of facilities, the execution of which does not interfere in any way with the external appearance of the property. The municipal authority of the municipality with extended competence may, after the opinion of the expert organisation of the state heritage protection, amend a final decision issued under the Heritage Act of the purpose for which the PB was defined has changed, and may also cancel it if the object of protection has ceased to exist. [6]

PROTECTIVE BELTS

A protective belt is a legal concept that aims to protect the public interest. It is the area defined around the object (point, line, cluster of objects, etc.) to be protected, or around the object to be protected, or both. The protective belt has an areal or spatial extent. For example, in the case of protection of a linear object, it is a strip of territory along the object, which is defined by vertical planes running at a horizontal distance from the ground plan of linear device (measure perpendicular to its contour). [7] In general, PB can be defined as a defined area surrounding a protected property, tree, natural formation or territory. Some activities are prohibited or even mandated within the protective belt. [8] The Building Act defines the decision on the protective belt, which provides as follows: A decision on a protective belt protects a building, facility or land from the negative effects of its surroundings or protects the surroundings of a building or facility or land from their negative effects. [9]

The mission of the heritage protective belt is to eliminate the potential for disturbance at the interface of the heritage protected area and to maintain an organic transition of quality and historic fabric into the surrounding parts of the town or landscape. Typologically, the protective belt can be divided according to the object for whose protection it has been designated. The PB of a (national) cultural monument is the area defined around one or more monuments and aims to protect this object of protection form adverse influences, usually visually intrusive from a conservation point of view. The PB of heritage reservations and heritage zones (urban, rural) aim to protect the defined territorial unit from negative impacts in its immediate surroundings. In this case, they form a buffer, protective barrier around a more valuable (better protected) area. A specific, but not unique, case is the case of protective belt defined for the protection of cultural monuments in the area of the historic core of the settlement. It is the problems associated with this type of PB that prompted the development of the topic.

Examples of protective belts defined for the protection of cultural and national cultural monuments in the Moravian-Silesian Region (MSK) [10]:

Protective belt of historical centre of Starý Bohumín (ÚSKP register no. 3077), Protective belt of the historical centre of Krnov (ÚSKP register no. 3400), Protective belt of the historical centre of Orlová (ÚSKP register no. 3389), Protective belt of the historical centre – square in Jablunkov (ÚSKP register no. 3343), Protective belt for cultural monuments in Malá Morávka (ÚSKP register no. 3311), Protective belt for all immovable cultural monuments in the territory of the municipality of Karlova Studánka (ÚSKP register no. 3312), Protective belt for the set of cultural monuments in Ostrava-Vítkovice (ÚSKP register no. 3370), Protective belt for set of cultural monuments in Ostrava-Přívoz (ÚSKP register no. 3326), Protective belt for immovable cultural monuments in municipality of Horní Benešov (ÚSKP register no. 3310), Protective belt for residential complex documenting construction in 1950s including three immovable cultural monuments in Havířov (ÚSKP register no. 3410).

Examples of protective belts defined for the protection of heritage zones and reservations in MSK [10]:

Protective belt of the urban heritage zone of Bruntál (ÚSKP register no. 3038), Protective belt of the urban heritage zone of the town of Opava (ÚSKP register no. 3042), Protective belt for urban heritage reservation of Příbor (ÚSKP register no. 3060).

The PB area is defined in terms of area, has specific boundaries and often specified conditions of protection. Despite this, problems arise with the interpretation of powers in conservation areas – protection of cultural and historical values vs. legal interpretation of the concept on the basis of the Heritage Act. Similar contradictions can be traced in the interpretation of the concept of the term environment of a cultural monument.

The first stage of the assessment of the plans in the PB is the assessment of the National Heritage Institute (NPÚ) – expert conservationists. NPÚ issues a written expert opinion as a basis for the executive body of the state administration; it has no decision-making power. The second stage is the examination of the written expert basis of the NPÚ by the executive bodies of the state administration (The Ministry of Culture, regional authorities, magistrates and municipalities with extended competence) and the issuance of an opinion

on the matter under consideration. The state administration authorities have decision-making power. [6] Even in cases where the expert opinion of the NPÚ is based on the conditions of protection set out in the specific PB, the executive authority is not able to turn the opinion into a binding opinion in favour of the protection of the cultural and historical values of the territory. This is because the PB is intended to protect the object of protection, but not the area for which it is defined, which conflicts with the conditions of protection. This anomaly is particularly evident in the case of historic cores of towns and villages.

From the above list of protective belts in the MSK, we can select specific examples of anomalies in the protective belts: the protective belt of the historical centre of Starý Bohumín, the protective belt of the historical centre of Krnov, the protective belt of the historical centre of Orlová, the protective belt of the residential complex Jubilejní kolonie from the period of the 1930s in Ostrava-Vítkovice, the protective belt for immovable cultural monuments in municipality of Horní Benešov, the protective belt for residential complex documenting construction in 1950s including three immovable cultural monuments in Havířov, the protective belt of the urban heritage zone of the town of Opava.

The reason for creation of above-mentioned protective belts was not only the need to protect the environment of cultural monuments from negative effects on their cultural and historical values, but also the desire to protect the area itself. The process of declaring valuable historic cores as a heritage zones was replaced by the procedurally simpler protective belts (municipal authority with extended competence in the form of a planning decision under the Building Act). This is evidenced by the conditions defined in the PB decisions. Over time, some protective belts areas have been declared heritage zones. Here, the heritage zones have not been abolished, but have overlapped with each other. When the heritage zones and reservations were declared in masse, the specific conditions of protection for the areas in question were not defined. In these cases, it is possible to rely on the conditions of protection laid down in the PBs. However, the interpretation of the NPÚ and the executive authorities, which are not able to translate the conditions relating to the protection of urban values in the PBs declared for the protection of cultural monuments into their binding opinions and require an assessment of the area only on the basis of the requirements arising from the status of the zones and reservations, is also questionable here.

Fig. 1.: Overlapping of the protective belt with heritage zone – Malá Morávka, Karlova Studánka. (Source: geoportal.npu.cz)

In PBs units where there has been no declaration of a heritage zone or reservation, urban values are degraded. The areas are not themselves the subject of protection, they only serve to protect the object of protection. The regulation of the external appearance of buildings in protective belts is becoming more and more demanding. If the appearance of buildings or public spaces is not negotiated before the official start of the procedure, it is very difficult to influence the colour of facades, material design, roof shape, newly applied technologies and other architectural changes, if these do not have a direct visual or spatial relationship to the object of protection – the cultural monument or heritage zone or reservation. The same problem arises when assessing new buildings in the area, changes in public space, park landscaping, material design of public spaces, etc. From a legislative point of view, such an interpretation is understandable. From the point of view of heritage urbanism, maintaining a consistent and high-quality environment of the protective belt area, not only in the very neighbour of the object of protection, is almost impossible.

Fig. 2.: View of the Opava heritage zone from the protective belt area. (Source: Lehnertová, 2022)

EXAMPLES OF ANOMALIES IN PROTECTIVE BELT AREAS

OPAVA

Specifically, the issue can be demonstrated on the example of the Protective belt of the heritage zone of the Opava city (1996). It is situated at the interface with the historic core at its eastern and western boundaries. The entire part of the PB at the western boundary was proposed for designation as a heritage zone because it is an important example of late 19th and early 20th century architecture and urbanism and exhibits a number of undisputed historical, architectural and urban compositions values, encompassing a wide range of styles form late classical to socialist realism. The time lapse, now more than 10 years, since the application for designation as a heritage zone has resulted in the gradual reconstruction and modernisation of buildings, infill development and redevelopment, leading to irreversible changes to the area, as the protective belt status alone is unable to protect the area. This is the case even when the conditions of protective belt are specifically defined, form example [11]:

- full-area – preservation of the original subdivision, street lines, respect of the height level, roof shape, preservation of spatial and visual links in relation to the historic core of the town;
- individual – respecting the basic tectonics of the

Fig. 3.: Bezručovo náměstí in Opava – historical photo. (Source: NPÚ archive)

original buildings, respecting the scale and mass adequate to the historical building in the case of additions, using classical building materials and technologies;

• related to advertising and signage – not allowed in cultural monuments, limited to the lowest level in the PB;

• related to public spaces – to respect for the composition of the square including greenery, pavement treatment and the exclusion of poured asphalt.

HAVÍŘOV

Difficult to enforce conditions for the protection of preservation belt can be illustrated by the example of the city of Havířov. The protective belt for a residential complex documenting construction in the 1950s, including three immovable cultural monuments in Havířov, has been declared since 1992. The PB in Havířov was issued to protect the values of cultural monuments and the urban ensemble build in the style of socialist realism architecture, called Sorela, with an emphasis on urbanism and classical city-forming compositional principles – axis symmetry in the plan, landmarks, vistas, the conclusions of urban axes, parks, greenery and orchard landscaping. The value of the ensemble lies in the architectural rendering of all buildings, the period material solutions, including the compositional design and proportions of individual elements in the façade, the subtlety of windows and the concept of facades, roofs and details.

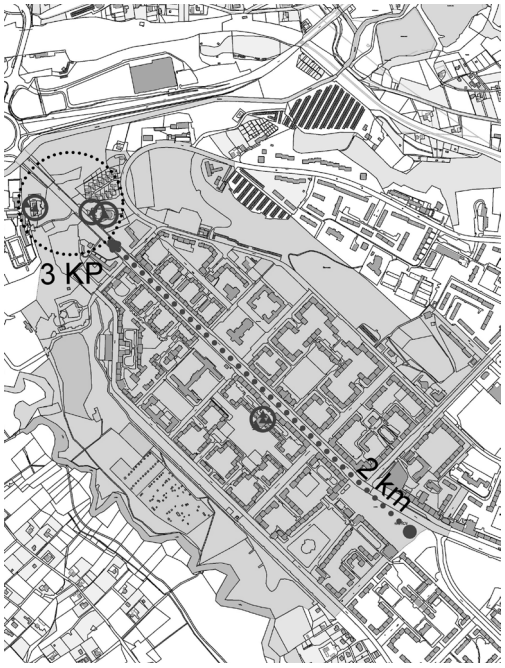

Fig. 4.: Protective belt of Havířov – distance of the objects of protection from the protective belt boundary. (Source: geoportal.npu.cz, Lehnertová, 2023)

Declaring the PB for a residential complex that is not a cultural monument, a heritage zone or reservation is problematic by its very principle and was done with the vision of at least some protection of the area and the hope of future declaration of the area as a heritage zone. This has not happened and the future is unclear. The three immovable cultural monuments mentioned in the name of PB are located on the very edge of the PB and the distance from the outermost boundary to these cultural monuments is 2 km. If there is construction activity taking place in the area, it is assessed by the executive only and only in relation to these three cultural monuments, not in relation to the values of the residential development itself.

The conditions of protection in this PB are given as follows [12]:

• to respect the existing urban and spatial structure of the development;

• to leave the area of the Divadelní náměstí in the existing orchard arrangement, with the possibility of placing a solitary amenity building, will be the subject of an architectural competition;

• the existing spaces in the ground floor of individual buildings for civic amenities continue to be used in this way;

• to retain the facades including all details and artistic additions, to retain the pitch of the roof planes including the colour of the roof planes;

• to provide emergency maintenance;

• the peripheral parts will continue to fulfil their basic function of short-term recreation, while maintaining the existing terrain relief;

• to create a pedestrian zone throughout the area by means of organisational measures;

• to develop a general colour scheme for individual buildings including urban furniture.

Some of the conditions of protection are currently not applicable, as the area has already been modified (redevelopment of Divadelní náměstí) or cannot be applied due to the continued development of the area regardless of them (pedestrian zone, etc.).

Fig. 5.: Protective belt of Havířov – detail of one of tha last original shop windows, now no longer existing. (Source: Lehnertová, 2019)

CONCLUSION

These examples demonstrate the practical problems that arise when assessing the value of an area based solely on the status of the protective belt. The question is how this situation can be addressed. Ideally, all areas with valuable urban units should be protected from irreversible loss of cultural and historical values by a full-fledged degree of protection, in the form of heritage reservation or heritage zone. In practice, however, the achievement of such a goal is unlikely, both for reasons of capacity and time (documents for the declaration of areas of conservation value are prepared by National Heritage Institute, each such document is a matter of detailed specification and definition), and because of the uncertain outcome (the application for the declaration of the Opava-Předměstí as heritage zone in the Opava-Předměstí protective belt area has been pending for more than 10 years). In the meantime, society is irretrievably losing valuable urban (and architectural) values. We should also consider the possibility of redefining the term “protective belt”, or seeking a more benevolent acceptance of the requirements of the expert component of the state conservation in relation to the values of the area as such, not only to the subject of protection, or a return to the enforceability of the conditions of protection set out in the decisions on the protective belts.

At the outset, the tools that can be used to protect the territorial integrity and urban values of the area

were defined. In conclusion, it can be stated that even these are not sufficiently flexible and at the same time unambiguous to prevent the loss of cultural and historical values. The best way to deal with matters of protection of cultural values is to work with a spatial plan with elements of a regulatory plan and a regulatory plan. However, even these cannot assess the area in terms of heritage values in the same way as the instruments designed to do so.

From the point of view of Heritage Act, a protective belt is an instrument that has a clearly defined function. It protects a valuable property from the negative influences of its surroundings. Only in some cases can such a strict definition be applied in a way that makes sense. In cases of protective belts of valuable urban units, the protective belt lacks meaning, as there is no legally enforceable application of the conditions of protection. This problem needs to be discussed and a way found to prevent the degradation of valuable areas from the point of view of heritage urbanism.

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ARCHITEKTURAL AND CONSTRUCTION INTERVENTIONS IN THE AREA OF PRAGUE CASTLE IN THE 1980S

Šnorbert Martin

ABSTRACT: The presented contribution builds on previous research and focuses on building modifications, the design or implementation of which were created in the 1980s in the area of Prague Castle. First, the position of architects during the period under study is discussed, with an emphasis on the position of architects working directly at the Castle - within the commissions, employees of the Office of the President of the Czechoslovak Socialist Republic, and especially those working in the Castle studio of SÚRPMO (State Institute for Reconstruction of Monumental Towns and Buildings). It contains a general description and list of building interventions in the 1980s. It describes the extent to which reconstructions, conversions, new interventions in old buildings were used and how this affected the appearance of Prague Castle. It looks in detail at the most significant interventions that occurred in the area under study during this period. This was the reconstruction of the Lobkowicz Palace for the needs of the National Museum. Attention is also paid to the construction interventions that were required to ensure the technical functioning of Prague Castle. Information is obtained in the context of archival research in the Archives of Prague Castle, the Archives of the Office of the President of the Republic and the Archives of the National Museum. Interviews with the architects who worked there during this period proved to be a good source.

KEYWORDS: monument care; Prague Castle; architectural interventions; old and new; reuse; expert commissions; SÚRPMO

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INTRODUCTION

My research focuses on architectural interventions in the Prague Castle area in the second half of the 20th century. I am continuing my last year's paper, in which I focused on the period of the 1970s, and I am also discussing the not-so-explored 1980s. The initial chapter outlines the position of architects in the period under review, discussing in more detail the situation at the Castle, where the work of the expert commissions and sub-commissions of the previous decade was reverberating at the time. Next, emphasis is placed on the staffing of the departments of the Office of the President of the Czechoslovak Republic, which were responsible for building activities at the Castle. Much attention is paid to the projects and activities of architects from the Castle Studio (Architectural Centre 05) of the SÚRPMO.[1] The article contains a list and a general description of the construction activities and interventions whose design or realisation took place during the period in question. The discussed area of research is presented not only with examples of architecturally significant projects implemented, but also construction works related to the technical use of the Castle (securing of heat and cold sources, distribution of networks in the area) are not omitted. The reconstruction of the Lobkowicz Palace for the needs of the National Museum, designed by Zdeněk Hölzel, is discussed in detail. Other interventions, not only of a technical nature, are associated with the architects from the castle studio SÚRPMO. These included Karel Firbas, Pavel Kupka, Věra Hlaváčková, Maria Švábová, Miloslav Burian, Eva Růžičková, Bohumil Pirout. Most of the material is drawn from archival sources and information obtained by reading period and contemporary literature is used. Further suggestions were provided by interviews with witnesses who worked at the Castle.

THE POSITION OF ARCHITECTS IN THE 1980S

The period of the 1980s in Czech architecture is characterised by centralisation in the design process in many aspects. The standardisation of design had already begun to run out of post-war enthusiasm and motivation to engage in the reconstruction of the country and to solve some pressing problems – for example, the housing crisis.[2] Gradually, feelings of sobriety and even helplessness emerged. The authorities have tried to respond to these issues by making adjustments to the overall organisational structure. Nevertheless, it became more typical to search for the meaning of the architectural profession. Some authors have even managed to find alternative ways[3] of dealing with the limitations of industrialised construction. [1]

The most influential factor in the local architectural field has been the large construction companies, the so-called contractors. They had more influence than the Communist Party or the Ministry of Construction. The architect Osvald Döbert mentioned this problem on the occasion of the congress of the Association of Czech Architects in 1987: „Perhaps everyone agrees that the main cause (of the crisis in architecture) is the monopolization of construction production and the resulting dictatorship of the contractors.“ [2] As a result, questions have been raised as to why the outcome of the building process is not influenced by the needs of future users (ideally in cooperation with the architect's ideas), but mainly by the needs and resources of the construction companies, which are informally agreed with the panel companies. Contractors preferred projects that were the most organisationally predictable, the simplest in terms of construction, and of sufficient scale to make a large profit and meet a large part of the five-year plan. The construction companies placed enormous emphasis on easy accessibility and ample space for site facilities, which led to their resistance to contracts dealing with building alterations within urban centres. [3]

Only independently functioning design-engineering organizations, which were managed either by ministries with national competence, national committees for local construction, or other lower forms (general directorates, management of economic enterprises), could participate in the design system. The operation of the ministerial design institutes depended on the focus of the respective parent ministries. Examples include Healthprojekt, Sportprojekt, Ceramoprojekt (Ministry of Construction), as well as various institutes corresponding to the individual industries under the ministries' responsibility.[4] Work in these studios was sought after because they were mostly specialised design tasks that allowed partial freedom from typification. Local design institutes, which were subordinated to regional national committees, dealt with housing

[1] SÚRPMO = Státní ústav pro rekonstrukce památkových měst a objektů (State Institute for the Reconstruction of Monumental Towns and Buildings)

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and civil construction. These were large design firms - Regional Design Institutes (KPÚ), Stavoprojekty and the Chief Architect's Office. Most of the then 5,000 architects and architects worked in them. The third group consisted of institutes under the cooperative associations. The Union of Production Cooperatives had design units ČSVD (Czech Union of Production Cooperatives) and SZVD (Slovak Union of Production Cooperatives), for the Union of Consumer Cooperatives this was the Business Project and for the Union of Housing Cooperatives it was Drupos[5]. Prague had a special position within this structure. Not only the standard design institutes focused on residential and civil construction (PÚ VHMP[6], PPÚ[7]), but also other large specialised enterprises (SÚRPMO, PÚDIS[8], Metroprojekt, the Office of the Chief Architect of the City of Prague) operated there. [1]

The architect's work was conceived in an almost scientific way. There was a precise hourly allocation for the elaboration of the project according to the professions. Above all, compliance with the set deadlines was controlled, so that the result of the design process was essentially a creation with a set content, created by the routine repetition of activities. This led to dissatisfaction among architects and especially among the younger generation, who envisioned greater use of imagination, creativity and flair for design. Another negative was the financial aspect, where the difficulty and time required for each activity was not taken into account and everything was evaluated in a uniform way. Hence, disillusionment and disinterest were also experienced in the work activities in some institutes. „The work ethic was varying in different studios. In the good ones it was quite high, in the mediocre ones often quite poor. If people weren't interested in the work, they tried to turn it down. During working hours, personal anniversaries were celebrated, women went shopping during the day, lunch breaks were extended and so on. If they could, employees often took home work supplies, drawing materials, a tracing paper for moonlighting jobs, etc.“ [4]

Private studios were not allowed, yet there were opportunities to design independently. If an architect obtained a so-called special competence certificate for certain construction activities[9], he could conclude a contract and design a building with a maximum cost of 500 thousand CZK (Kčs). In the second half of the 1980s, there was a relaxation in this area as well and the first private studio was established (D.A. Studio in 1986). Another opportunity was the cooperation with artists through the ČFVU.[10] Several quality art-architectural solutions were created, but unfortunately some others were not created because they were not allowed at the meeting of the relevant art committee of the ČFVU. There was a chance for members of the Architects' Union to work out commissions (especially studies) within the Architectural Service.[11] There was also another way outside the design system, which also meant avoiding the unpleasant review of designs by expert committees and further interference in projects by outsiders. This required an agreement with members of the International Organization of Journalists (Mezinárodní organizace novinářů = MON), who had the necessary authorization and could stamp individual projects (very often for a fee). [1]

THE POSITION OF ARCHITECTS IN THE CASTLE AND THE ACTIVITIES OF THE EXPERT COMMITTEES

While several expert commissions and sub-commissions were active at the Castle in the 1970s[12], their activity and number decreased in the 1980s. Most of the subcommissions had their last meeting in 1975 or 1976. Only the art subcommission met until October 1982. Nevertheless, there was a commission that met throughout the 1980s, even several times a year. This was the Commission for the Assessment of Investment Plans at Prague Castle, the Forest Administration in Lány and the Lány Castle (the so-called Investment Commission). It was established as early as 18 March 1975 as an advisory and auxiliary body to the head of the KPR[13] and consisted of Ing. Jiří Růžička, Ing. Josef Prokůpek, JUDr. Jan Koláčný, Jan Svoboda. The Commission's activities are reported as follows: „The task of the commission will be to submit to the head of the CPR comprehensive opinions together with an analysis of the prospective use of the intended investment, the provision of manpower for its maintenance, etc.“ [5] The membership of the commission was gradually expanded to include other KPR staff. The Commission continued to meet until the revolutionary year of 1989 (a total of 8 meetings were held in that year), the last meeting being held on 15 November 1989.

Most of the architects employed by the KPR at the Castle worked in the Department of Construction and Utilities (OSIS) and the Department of Preservation (OPP). These departments were combined into one department (OSPS) until 1978. In OSIS continued their activities akad. arch. Osvald Döbert and Ing. arch. Vojtěch Veverka. During this period, the head of the department was Ing. Josef Prokůpek, at the end of the 1980s he was replaced by Ing. František Dohnalík. From the plans of the department's activities for each year, it can be seen that the main tasks were to refine the draft plan of capital construction, the plan of repairs and maintenance and the plan of research and project work for a given year, to draw up reports, to provide information on the progress of construction work and to create specifications for the preparation of project documentation, and to ensure the technical operation of historical expositions. [6] In the OPP Ing. arch. Viktor Procházka still worked as a specialist officer, during the 80's Ing. arch. Petr Chotěbor was added to this team. In the 1980s, the KPR contributed to the preservation of historically unique monuments, but also to their cultural and political use (exhibitions, concerts). [7] The Monuments Department also participated in the task of improving the quality of project preparation for investment construction and maintenance by preparing monument guidelines (as a basis for documentation of buildings) and monument opinions on the documentation under consideration. The Department also ensured and monitored the progress of restoration works, cooperating with scientific institutions (e.g. the Institute of Archaeology of the Czechoslovak Academy of Sciences, the National Museum in Prague, faculties of the Czech Technical University, etc.). He carried out an inventory of all art objects and historical collections. The Department also dealt with improving and raising the professional level of the guide and curatorial service. [8]

Most of the project documentation dealing with the Castle area was prepared in the SÚRPMO. The SÚRMPO consisted of several centres of different sizes, but usually 60 to 100 people worked in one. Within the centre there were 3 to 5 independent architectural groups (studios) and groups of individual specialists (electrical, HVAC, BTI, statics, transport). The Institute had centres in Prague, Brno, Hradec Králové, Pardubice, Olomouc. [9] The architectural centre 05 (the so-called castle studio) was part of the SÚRPMO. This studio was located in the houses provided by KPR in Jelení Street. The same names appear on the project schedules as in the 1970s. The head of the aforementioned centre was the architect Karel Firbas until 1986, when he was replaced by the well-known architect Pavel Kupka. Other designers included Miloslav Burian, Bohumil Pirout, Marie Švábová, Eva Růžičková, Věra Hlaváčková. At the end of the 1980s, new names appeared Ing. Pavel Jakoubek and Ing. Petr Wollner. From the point of view of understanding the structure of the SÚRPMO, interviews with Ing. Jakoubek and Ing.

[5] Drupos = Družstvo pozemních staveb (Co-operative Building Society), dedicated to designing houses and distributing their catalogues throughout the country.

[6] PÚ VHMP = Projektový ústav Výstavby hlavního města Prahy (Project Institute of Construction of the City of Prague)

[7] PPÚ = Pražský projektový ústav (Prague Project Institute)

[8] PÚDIS = Projektový ústav dopravních a inženýrských staveb (Project Institute of Transport and Engineering Construction)

[9] In order to obtain the licence, it was a requirement to have a university degree and five years of experience or a secondary vocational education and 10 years of experience.

[10] ČFVU = Český fond výtvarných umění (Czech Fine Arts Fund)

[11] The Czech Fine Arts Fund has established several organizational units to fulfill art commissions. Their establishment was made possible by the Copyright Act, which allowed the Fund to set up enterprises that could assist in the performance of its tasks. Thus, in the structure of the ČFVU, the Works enterprise began to operate with subordinate units of the Art and Architectural Services.

[12] The period of the 1970s is discussed more thoroughly in a contribution to the proceedings from last year: M. Šnorbert, Architektonické intervence v areálu Pražského hradu v 70. letech 20. století = Architectural Interventions in the Prague Castle Area in the 1970s, in M. Peřínková, S. Jüttnerová, L. Videcká, 14th Architecture in Perspective 2022, Ostrava: Vysoká škola báňská - Technická univerzita Ostrava, Fakulta stavební, 2022, pp. 189-196.

[13] KPR = Kancelář prezidenta republiky (The Chancellery of the President of the Republic), in this period often referred to as KP ČSSR (Chancellery of the President of the Czechoslovak Republic).

arch. Švábová. Architect Švábová was the head of the studio for the reconstruction of buildings owned by the Office of the President of the Republic. In her studio there were 8 people, of whom one architect (arch. Kotrba) was working, the others were designers and draughtsmen. In the 1980s, approximately 80 people worked in the castle studio. [10]

ARCHITECTURAL INTERVENTIONS IN THE 80S

Clear information about the repairs and construction works started in the period of the 7th Five-Year Plan (1981-1985) is provided by a document prepared by the individual heads of the KPR departments for the XVII Congress of the Communist Party of Czechoslovakia, which was held from 24 March to 28 March 1986. In the document we read about the fulfilment of the basic objectives of the following:

"In the years of the 7th Five-Year Plan, the basic objectives were fulfilled as follows:

• the architectural and historical-heritage values of a number of Prague Castle buildings were restored and the level of technical equipment was raised. Among the largest projects were the reconstruction of the PC Riding School, the Old Provost's Office, building no. 73 in Kanovnická Street, the repair of the Mocker Houses' shell, and the interior renovation of the Basilica of St. George. As part of the preparation of other events, the reconstruction of the old salons of the South Wing of the PC was prepared.

• The external appearance of the Prague Castle was significantly improved, especially by carrying out repairs to the facades and roofs. Repairs and new facades were carried out, especially on the South and West wings and the northern facade of Prague Castle, all the buildings of the northern access road, the western part of the Old Palace, the Prague Castle Riding Hall, the Old Provost's Office, No. 2. The reconstruction of the roofs of all buildings of Prague Castle was basically completed, with the exception of St. Vitus Cathedral and minor repairs in Vikářská Street.

• The issue of comprehensive modernisation of utility networks and technical facilities was addressed by way of

• reconstruction of utility networks and distribution systems inside some buildings during the reconstruction and modernisation of technical equipment

• preparation of a comprehensive modernisation of the energy facilities of Prague Castle in order to ensure the reliability of heat and electricity supply and the function of the energy distribution systems and equipment on the territory of Prague Castle. The implementation of the prepared energy structures will take place in the years of the 8th Five-Year Plan.

• The objective of completing the economic facilities of Prague Castle was partly solved by reconstruction of the Pohořelec Riding School, the Prague Castle Riding School and minor repairs of the warehouses and workshops in the Riding School Yard. A major solution to the greenhouse management will be implemented by the construction of a new greenhouse in the years of the 8th Five-Year Plan. The construction of the Energy Centre behind the Prague Castle Riding School, which will include the necessary facilities for the maintenance of energy equipment, will contribute to improving the situation in the workshops.
(…)

• Modernization and reconstruction of a substantial part of the housing stock of the KP ČSSR was carried out and 37 flats of the first category and 3 dormitories for KP ČSSR employees were acquired – the total cost of modernization amounted to 6 459 thousand CZK (Kčs)." [11]

Critical investment actions and major repairs are also mentioned. Firstly, pending actions that were started in the previous period are listed. These included the **Lobkowicz Palace**, where comprehensive reconstruction began as early as 1973. The general designer was SÚRPMO and the contractor was Pražský stavební podnik. It is stated that the reconstruction will be completed in 1986 and the building will be handed over to the National Museum, which will run a historical exhibition there. By the end of 1985, 78.7 million CZK had been spent on the building. The budgeted costs increased to 103.7 million during the implementation. (this amount includes a reserve of 6.2 million CZK). For more on this building and the reconstruction, see the following chapter. Another project under construction was the project called **Slevárna (Foundry) – Collector Building 2A**. This is the construction of another section of the Northern Collector, which started in 1978, was completed in March 1983 and was approved in 1985. The budgeted costs of 5,4 million were respected. The general designer and contractor were the same as for the Lobkowicz Palace. In 1979-1981, **the interior modifications and lighting were carried out in the Basilica of St. George**. New electrical wiring was installed, the quality of the interior lighting was improved and new furniture was added for chamber concerts and other cultural events. The budgeted costs amounted to 2.24 million CZK.

In the course of the 7th Five-Year Plan, **repairs to the facades and roofing** were carried out on an even larger scale than originally planned. The facades of the 1st and 2nd courtyards were completed in 1981-83, the facades of the 3rd courtyard in 1983-85, and the western facade of the Old Palace was completed in May 1985. The facades of the northern facade were completed in 1983, the facades in the area of the Powder Bridge, the Riding Yard including the entire Riding Hall were repaired in 1984-85. In 1985, the facade of building No. 2 facing the South Gardens was also completed. The facades of buildings 8, 9 and 10 were completed off plan. During this five-year period, repairs were completed on almost all the buildings of the Castle. The contractors Průmstav Praha, Pražský stavební podnik, Prague Building Renovation Company, Štuko, Pamiatkostav Žilina and other small contractors participated in these works. The originally estimated cost of 41 million CZK were not used in full. Further modifications in order to obtain suitable storage areas and workshop spaces for the KP of the Czechoslovak Communist Party and for suppliers took place in the building of the **Pohořelec Riding School** in 1981-1985. The contractor was the company Průmstav Praha, the budgeted costs were exhausted to the tune of 5.4 million CZK. In **the engine rooms under the Spanish Hall**, the aged electrical wiring and ventilation of the engine rooms were renewed. The modifications were started in 1983, finished with defects and incompletions in 1984, and the final removal of these defects and the final approval took place in 1985. The budgeted costs of 1.1 million CZK were respected. Further reconstruction was carried out on **house No. 73 in Kanovnická Street** in 1983-85. The construction work leading to the modernisation of the housing stock with low-category flats was carried out by the Prague Building Renovation Company, the project was carried out under the direction of the Project Institute of the Capital City of Prague. 22 flats of the first category were built here. 4.4 million CZK was used for the construction of the apartments. The reconstruction of the **Slévárna (Foundry)** area was carried out between 1981 and 1985 and a passageway was created as part of the planned northern sightseeing route through Mihulka. The space was to be used for small refreshments, souvenir sales, and possibly for small occasional exhibitions. The total cost amounted to 4.4 million CZK. The project documentation was prepared by SÚRPMO and the contractor was Pražský stavební podnik.

Other projects included the reconstruction and

strengthening of the internal electrical power distribution, improvement of lighting, and the renewal and addition of an electrical fire alarm system in the building of **St. Vitus Cathedral**. The implementation was underway since 1983 and was to be completed by the end of 1986. 3 million CZK were spent on the project. The project was prepared by SÚRPMO, the construction works were provided by the Prague Construction Company. **The reconstruction of the house No. 10 in Jiřská Street** was to bring additional flats and a hostel for the needs of the KPR. The project was prepared by SÚRPMO, the contractor was Průmstav Praha. The works were carried out between 1983 and 1985, with full completion planned for March 1986. 3.2 million CZK was used. The next planned construction was **the reconstruction of the installations in the House of Czechoslovak Children**. The aim was to reconstruct the electrical and HVAC installations and the central heating. Originally, the construction work was to take place in 1983-85, but due to the connection with the general design of the utilities in the area, the construction was not expected to start until 1987. Further action was triggered by the problem of leakage into the garages under the terrace of the **Prague Castle Riding School**. In this building, structural modifications were carried out to improve the operational condition of the building, the level of technical equipment was raised, the roof trusses and the entire shell were repaired, which involved a new colour scheme for the facades. The works were carried out from 1983 to May 1985 according to the project documentation of the SÚRPMO and were provided by Průmstav Praha. The costs amounted to 7.5 million CZK. Another construction started was **the collector at buildings No. 34, 35, 36**. These are other sections of the Northern Collector, the projects were prepared by the SÚRPMO and the implementation was carried out in 3 separate actions. The first of them, called Slevárenský dvůr – collector object 3A, was started in 1984 and was to be completed in 1986, the costs amounted to 3.7 million CZK. The second construction (North Park Road and collectors) started in 1984, the underground part was to be completed in June 1986, the above-ground part in April 1987. The budgeted costs were set at 5.3 million CZK. The contractor was Pražský stavební podnik with VKD Kladno[14] as a subcontractor. The last project (collector in the section of houses Nos. 35 and 36) was started in 1984 with a completion date of June 1986. The cost was proposed at 4,5 million CZK. The construction company was VKD Kladno. **The final paving of Jiřské Square** was to be carried out, following the completion of all other construction work in the area and an archaeological survey. It was planned that the action would take place in 1985-88. This assumption turned out to be odd for capacity reasons and the implementation was to take place at the end of the 8th Five-Year Plan period. Another unrealised project was called **Courtyard III – upgrade works**. It was contemplated to replace the waterproof insulation layers under the courtyard pavement, to prevent water seepage and therefore to lower the reinforced concrete structures, to level and renew the pavement with granite slabs. The original assumption was to start in 1983 and finish in 1985. Also, due to the concurrence of a number of demanding projects and capacity reasons of the contractors, the planned implementation was postponed to the beginning of the 9th Five-Year Plan period.

In addition to the above-mentioned major actions and repairs, there were several minor modifications, which, however, in aggregate, constituted a substantial intervention. These include repair of the shell of the houses no. 34, 35, 36 (Mocker houses) and reconstruction of the factory canteen (1981-1985; 5.8 million CZK), continuation of the repair of the shell of the St. Vitus (0.8 million CZK), minor repairs and reconstruction in the utility gardens of Prague Castle (2.8 million CZK), repairs in the underground roads - southern gardens, galleries of the second and third courtyards, repair of the sewerage system in the southern gardens (1981-1985; 7.5 million CZK), reconstruction of the Ballroom and buildings in the Royal Garden (1981-1985; 1.7 million CZK) and other minor works.

The document also contains a concept of investment actions and major repairs in the next 5 years (until the end of 1990). Firstly, **the innovation of energy systems and management** is mentioned. The aim was to rebuild the electricity and heat energy system with a view to modernising and ensuring greater reliability and economy in supply and operation. This action was divided into 4 constructions – EZ 402 construction I (February 1986 - August 1988; 19,8 million CZK), EZ 402 construction II (1987 - May 1988), EZ 402 construction III (July 1987 - September 1989; 39,3 million CZK); EZ 402 construction IV (1987 - May 1988). The next planned action was the construction of the energy centre itself. It was to be built to the west of the Prague Castle Riding Hall and was to include a substation, a replacement power supply, a central cooling station, and an input heat exchanger station for the steam supply from the Holešovice power plant. Of course, the connection to the collector system in the Castle area was envisaged. The implementation was to take place from September 1987 to September 1989. The costs were estimated at 67.0 million CZK. The construction of **the central DC power supply** providing for the construction of an acoustic station in the basement of the Middle Wing was planned for the period from January 1987 to July 1988. The budgeted costs amounted to 2.3 million CZK. The focus was also on **greenhouses in commercial gardens**. Outdated and aging greenhouses were to

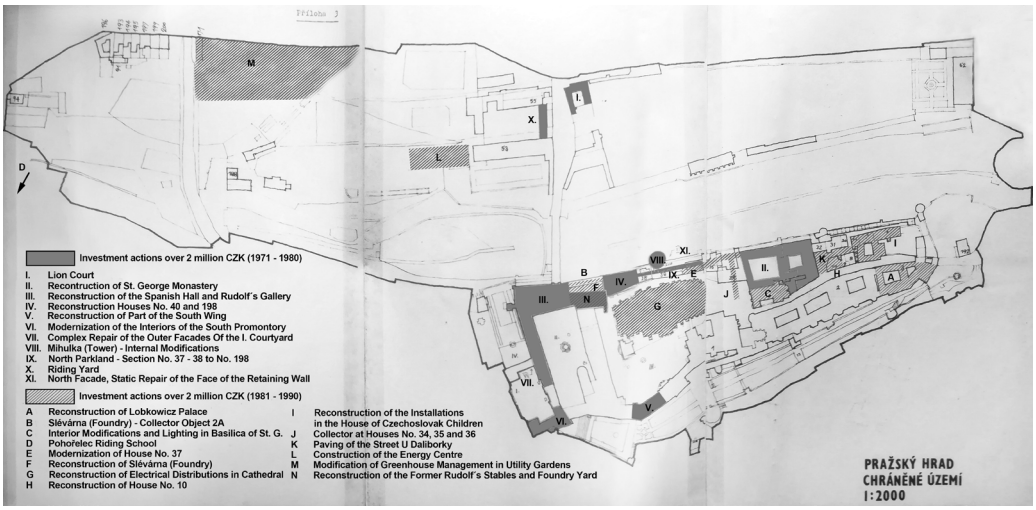

Fig. 1.: Designation of investment projects over 2 million in 1971-1980 and 1981-90. (Source: Archive of the Office of the President of the Republic, Gustáv Husák, Carton No.12, KPR and PH, Šalda, kolegia etc., Materials for the Head of KPR, No.404.448/81, Programme of Restoration and Care of Prague Castle in 1981-1990)

[14] VKD Kladno = Výstavba kamenouhelných dolů Kladno (Construction of Coal Mines in Kladno)

be renewed in order to make it cheaper and easier to grow the plants needed. Construction was scheduled to begin in 1987 and to be completed in 1989-90. **The reconstruction of the former Rudolf's Stables and the Foundry Yard** was to provide a gathering hall for the KPR, including the necessary facilities. This project was originally planned for the previous five-year period, but was delayed due to links with the collector works under construction and also due to contractors' capacity considerations. A new start date for construction was set for 1987. At the time of the document's publication, the documents were being prepared to update the design brief for **the reconstruction of the Old Royal Palace**, divided into six phases. Due to similar problems, implementation was to be envisaged at the end of the 8th Five-Year Plan or after 1990. Most of the actions mentioned in this paragraph were implemented later than planned and some only after the regime change.

At the end of the document, the costs of these actions and repairs are listed by year. In total, 95.4 million CZK for investments was spent during the 7th Five-Year Plan period and 154.5 million CZK for repairs. [11]

LOBKOWICZ PALACE

The first thoughts about the creation of a history museum at Prague Castle were already in the 1950s, and these ideas crystallized in the early 1960s into thoughts about the creation of the Memorial to the History of the Czechoslovak People at the Castle. It was to be a representative and magnificent project in which visitors would learn about the history of Prague Castle and its art collections. Several buildings were considered, with the St. George Monastery proving to be the most suitable. [12] The Lobkowicz Palace was scrapped because it was to become the Palace of Labour. The conceptual design from 1960 states the following: „The mission of the Palace of Labour is to celebrate the creative work of workers, cooperative peasants and the working intelligentsia and its outstanding results, to depict the magnificent development of our society, to document the fact that socialism has triumphed in our country, and to show convincingly the perspective of communist development. An effort will be made to show that for all our achievements we must give credit to the great struggle, diligence and initiative of our people who, under the leadership of the Communist Party, in indissoluble friendship with the Soviet Union, are building their socialist homeland." [13] In 1964, the National Museum was divided into 4 specialist museums and in the following year it was considered to move one of these museums (the NM Historical Museum) to Prague Castle. All these ideas were slowed down after August 1968 and finally stopped in 1969. The idea of locating a separate historical exhibition of the National Museum at Prague Castle, in the building of the Lobkowicz Palace, reappeared. In 1973, the NM worked out a project for the exposition and a method of using the palace for museum purposes. In the exposition one was to learn about the development of the Czechoslovak state and nation from the arrival of the Slavs to the revolutionary year 1848. The development of Czech statehood was to be traced on three levels - state-political, economic-social and cultural. The Lobkowicz Palace with its historical exposition was put into use by the NM only in 1987. [14]

Fig. 2.: Opening of the exhibition Monuments of the National Past in the Lobkowicz Palace in the presence of President Gustáv Husák. (Source: Archive of the Office of the President of the Republic, Photograph Collection, Gustáv Husák, carton 1987, photo Jiří Krulíš)

Geological and civil engineering surveys were carried out as early as 1961. After that, a project for the reconstruction of the Palace of Labour was prepared. It was created by the architect Zdeněk Hölzel within the framework of the SÚRPMO. The same author, in cooperation with architect Věra Hlaváčková, developed the initial project in 1963. In 1966, the roofing, roof trusses and chimneys were overhauled. In the following year, the structural condition and foundation conditions were investigated. From 1969 to 1972, a project for the structural safety of the building was developed. The work itself took place between 1971 and 1973. The first phase of reconstruction began in 1973 (demolition and securing work). In 1974 the basement was structurally secured. In the second phase of the reconstruction, the architectural and interior design and technical equipment were designed.[15] In 1973, architect Václav Bašta and architect Jarmila Nováková contributed to the project documentation. During the implementation of the first and second phase, an art-historical survey was carried out. The third phase, consisting of a complete restoration of the painted decoration, a new flooring solution, installation of security equipment and a lighting and technical project, was proposed at the end of 1975. In December 1977, the project documentation was activated, during which the detailed construction drawings were refined. Some of these drawings were updated in November 1978. The construction addenda followed the detailed design and were issued first in November 1979 and a second time in June 1986. Further changes and additions were made in 1981, 1983 and 1984. The installation of floor outlets was designed in October 1983. Architect Hlaváčková created the project documentation[16] for the modification of the passage and terrace at the Lobkowicz Palace in February 1986. As can be seen from the above list of project documentation, the reconstruction was complicated and took a very long time (from 1973 to 1986). The estimated cost for the first phase was 25.8 million CZK, and for the second phase 38.7 million. The summary budget for both phases, dated July 1981, set the total cost at 82.9 million CZK. In April 1984, the total budgeted cost was 109.5 million. In the end, 103.7 million was spent.

Fig. 3.: Part A - section A-A1 and the southern facade of the courtyard (Source: Prague Castle Archive, New Plan Collection, signature 10 601 Lobkowicz Palace, Reconstruction of Lobkowicz Palace, detailed design, August 1973)

The reconstruction did not affect the mass, the shape of the roof and the early Baroque character of the palace facades. All non-valuable utilitarian interventions from the 19th and 20th centuries were removed. The palace layout, art and craft decoration were rehabilitated, technical equipment was added, and the pre-Baroque spaces were restored. The only significant inter-

[15] In the second phase, the surfaces, floors and fillings of the openings; internal installations of hot, cold and fire water, sewerage, central heating, air-conditioning and ventilation, power and low-current wiring, technical equipment of the cafeteria preparation room, refrigerated beverage storage were designed; plumbing, joinery, locksmith work, stone work, wall cladding, painting, upholstery, glazing, plastering, restoration work, new art decoration, light fittings; internal fittings

[16] construction drawings, statics, dehumidification, electrical power, health installations, budget, POV

vention in the architectural expression and external appearance of the building was to increase the plasticity of the facades, which was achieved by restoring the stone lining with the original form of recessed windows. There were not many new interventions in the artistic design and they complemented the decoration of the palace complex. These included a proposal for glazing the windows in the chapel and softening the then secular character, a proposal for glazing the windows in the public spaces on the ground floor facing Jiřská Street evoking the pre-Baroque character of the palace, a simple sculpture with a water motif at the intersection of the axes of the passages in the large courtyard, the restoration of the fountain in the small courtyard and the design of several metal grilles on the ground floor and basement. In terms of the layout and communication system, maximum care was taken to restore the original palace character. The exceptions were the new vertical circulation from the ground floor to the first floor to the large exhibition hall and the body of the 2 freight and passenger lifts. The building was of course completed and equipped with appropriate sanitary and technical facilities. The main entrance and communal areas were located on the ground floor, and both courtyards became part of the communal areas. The exhibition was concentrated on the 1st and 2nd floors in the hall passage rooms around the large courtyard. Period exhibitions were held in the restored large two-storey hall on the 1st floor of the east wing. A new function was brought to the building by the lecture room, which was located on the ground floor next to the new staircase to the first floor.

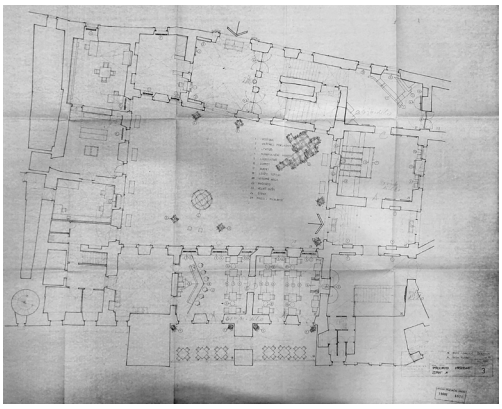

Fig. 4.: Ground floor plan – part A. (Source: Prague Castle Archive, New Plan Collection, signature 10 601 Lobkowicz Palace, LP - Non-exhibition spaces, technical description for the detailed design, September 1984)

The non-exhibition spaces were designed in 1984 by architect Vladimír Rubek from the national company Výstavnictví. The exhibition part of the historical exposition was created in 1983 and 1984 by the projection

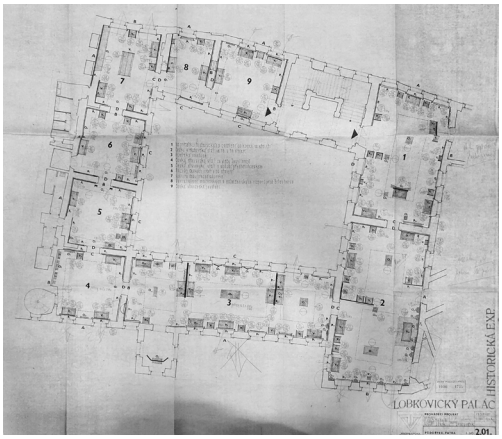

Fig. 5.: Floor plan of the second floor. (Source: Archive of Prague Castle, New Plan Collection, signature 10 601 Lobkowicz Palace, Lobkowicz Palace - Historical Exposition of the National Museum in Prague: exhibition spaces, implementation project, June 1984)

studio of n.p. Výstavnictví, the architects Jiří Fejk and Josef Václavíček are listed. In October 1986, a modification of the project was prepared under the direction of architects Rubek and Miroslav Rouse. The location of the exhibition elements, the content of individual rooms and the production documentation of showcases and panels, the required cooperation with individual professions (e.g. electrician) were addressed here. The libretto, introductory and professional scenario of the exhibition was created by experts from KPR, NM and ČSAV.[17] The management was entrusted to prof. PhDr. Josef Kočí, DrSc. a PhDr. Helena Johnová, CSc., other members were PhDr. Jiří Burian, CSc., doc. PhDr. Jiří Dvorský, CSc., PhDr. Richard Sedláček, PhDr. Zdeněk Smetánka, CSc., PhDr. Vlastimil Vondruška, CSc., PhDr. Jaroslav Vrchotka, CSc., PhDr. Josef Žemlička, CSc.[18]

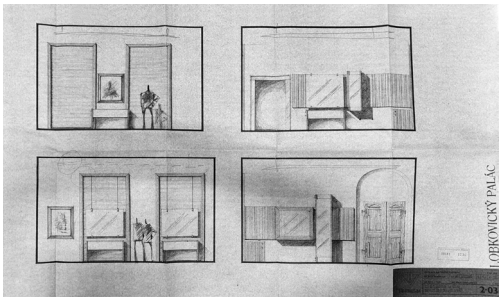

Fig. 6.: Hall No.9: views of the walls, use of designed elements. (Source: Prague Castle Archive, New Plan Collection, signature 10 601 Lobkowicz Palace, Lobkowicz Palace - Historical Exposition of the National Museum in Prague: exhibition spaces, installation of historical exposition, November 1983)

ENGINEERING PROJECTS

As already mentioned above, the gradual reconstruction of the electricity and heating system has been given great emphasis also from a financial point of view. Utilities and wiring inside some buildings were reconstructed, resulting in significant technical upgrading and reliability. This has also resulted in financial efficiency and sufficient energy supply capacity. The design work was carried out by specialised organisations such as Energoprojekt Praha (electrical systems) and Vojenský projektový ústav Praha (heating system) and by specialised studios in SÚRPMO.

Among the important constructions was the construction of the collector network, which contributed to improving the function and reliability of the utilities. The collectors still contain the backbone of the utility. The construction of the collectors required the demolition of some parts of the buildings and was associated with minor structural interventions (e.g. resurfacing of the northern parkway, lighting, grates to prevent unwanted access to certain areas, repairs to stone lining). Already in the 1970s, a technical gallery (object 1A) was built on the parkland of no. 37-39, followed by object 2A, a technical gallery (collector), which ran from no. 39 to no. 198 and ended at the Foundry Yard. The lead designer was architect Karel Firbas and the responsible designer was engineer Ivana Matičková. Several variants were worked on, the original route of the collector was changed because it would have interfered with the exposed foundations, which would have led to complicated underpinning. The project (1979) and construction were delayed and building 2A was finally completed only in 1980. As part of the early 1980s refurbishment of the Foundry (planning permission 1983), 2 rooms were designed and constructed for a temporary heat exchanger station and a room for the chillers with access from the 2A collector. A downstream collector 3A was designed in the Foundry Yard. The single-stage design was prepared in March 1984 by the Ore Project staff and construction took place from May 1984 to December 1986. The contractor was the state enterprise VKD Kladno. The whole construc-

[17] ČSAV = Československá akademie věd (Czechoslovak Academy of Sciences)

[18] For more information on the preparation of the exhibition, the course of exhibitions, the libretto and the script, see T. Koplová, Permanent Exhibition of the National Museum in the Lobkowicz Palace, Bachelor's thesis, Faculty of Arts, Prague 2020. Or the unprocessed fund of the National Museum's Registry – National Museum Archives, National Museum Registry, Department of the Historical Exposition of the Lobkowicz Palace (1983-2006), not inventoried.

tion was divided into a collector, which started in the substation in the third courtyard and ended with the connection to the existing collector under the North Gate. The cable tunnel, which ran parallel under the collector, started under the extension in the Foundry Yard, passed under the North Gate and terminated at the T1616 substation at the North Gate. The collector was partly constructed in an open trench and the other part was mined in a shaft. The cable tunnel was mined by mining. According to the final invoice, 3,64 million CZK was paid. [15]

(tunnel) and the construction of a part of the park path in the North Parkland with a staircase and modification of the Gothic wall. The new section of the parkway and the collector underneath it were to be connected to the east to the already built parkway of St. George Monastery and the collector underneath it. The total cost was set at 6.5 million CZK. The building permit was granted as early as 1984, and according to the construction diary, construction activity took place from February 1985 to July 1988. [16] The collector of Nos. 35, 36 passed under the courtyard wings of Nos.

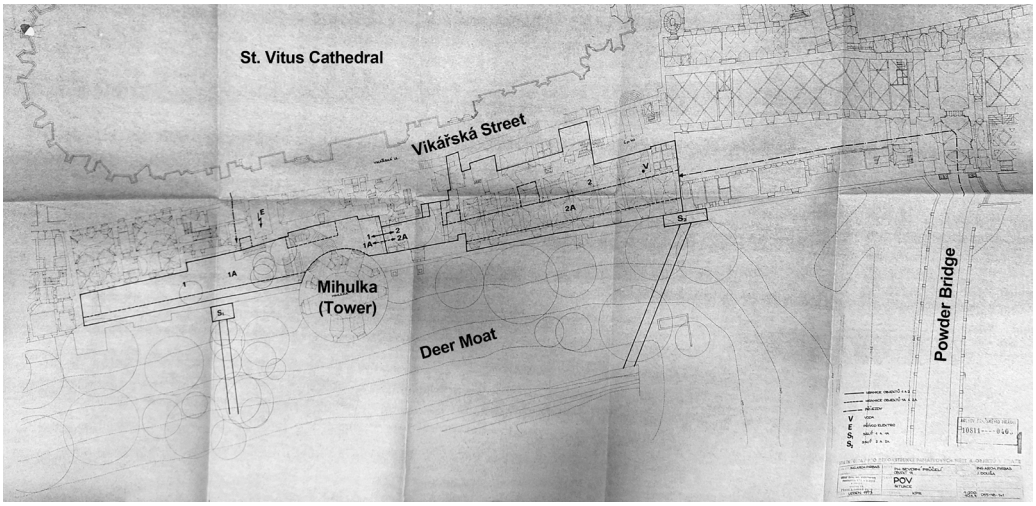

Fig. 7.: POV - situation (object 1A). (Source: Prague Castle Archive, New Plan Collection, signature 10 811 North facade, North facade of P.C. - object 1A, project documentation, November 1972)

On Jiřské Square, collector No. 34 was built in connection with building 1A and collector No. 35, 36. The one-stage project was prepared in 1982 in the castle studio of SÚRPMO under the direction of arch. Hlaváčková. The engineering project consisted of a collector which was routed under Jiřské Square through the basement of the house No. 34 and under the yard of No. 34. The project also included the induced modifications of a part of Plečnik's tunnel, the existing smaller gallery

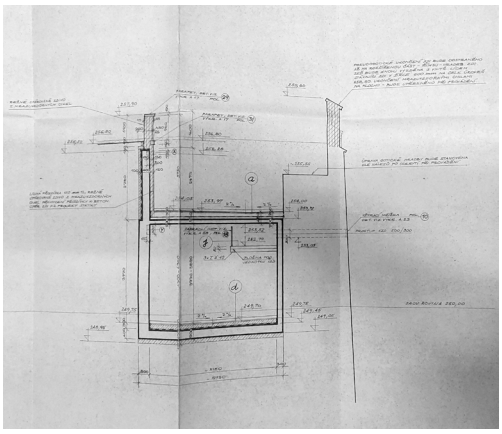

Fig. 8.: Section B-B´ (Collector No.34). (Source: Prague Castle Archive, New Plan Collection, signature 10 811 North façade, Collector No.34, Jiřské Square - P.C., one-stage project, December 1982)

35 and 36. The project was also developed in 1982. Several variants were considered and therefore several changes and additions were made, the implementation took place only in 1985-1987.

All these collectors (3A, 2A, 1A, collector No. 35, 36, collector No. 34 including the branch to the collector chamber under Jiřské Square, collector along the northern and eastern facade of St. George Monastery) formed the so-called Northern Collector of Prague Castle. It was connected to the collector from the Powder Bridge in the west under the North Gate. In the east it ended at the level of the south-eastern corner of St. George Monastery. In 1988, a project was developed (led by Ing. Pavel Jakoubek on behalf of the SÚRPMO) to equip and retrofit this collector. The project dealt with the construction works connected with additional locksmith constructions, removal of some non-functional constructions from previous stages, modifications of the collector surfaces, entrance openings and fire partitions. For the equipment itself, racks with cable trays, pipe racks with metallized surface and single point fixing were designed.

The most significant investment was the construction of the energy centre. Already in 1983, the urban and architectural conditions for the construction were studied. Two years later, the basic concept of the solution and a comparative study of the SCZT[19] were prepared. Since 1986, the construction of the energy centre (EGC), the necessary demolition works, the rebuilding

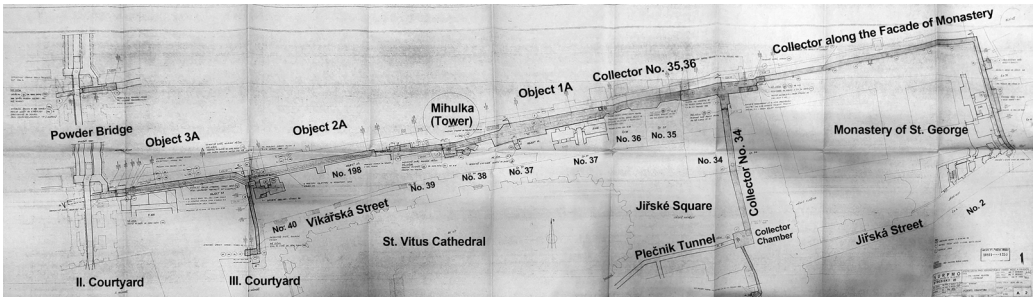

Fig. 9.: Floor plan of the collector (North collector). (Source: Prague Castle Archive, New Plan Collection, signature 10 811 North facade, North collector - construction, one-stage project, December 1987)

[19] SCZT = systémy centrálního zásobování teplem (central heating supply systems)

of the demolished buildings and the connection to the collector network were planned. The design work was completed in 1990, during which time the implementation took place, with some minor modifications still taking place in 1991. The actual EGC building was constructed to the west of the Riding School. It contained the R1 substation, the GG1 substation, the central cooling station, the steam inlet exchange station from the Holešovice power plant, the workshop, sanitary facilities and the water treatment plant. The connection to the collector network was either through a tunnel or through a tunnel and canal from the EGC building itself to the chamber on the bridgehead of the Powder Bridge at the Paccasi Gate.

CONCLUSION

This paper focuses on architectural interventions at Prague Castle in the 1980s. The topic has not been systematically discussed yet, most of the information comes from archival documents and interviews with witnesses. The article focuses on the often overlooked building interventions by often unknown architects. The period under study is characterised by reconstructions and renovations of the internal and external spaces of the Castle, which were of a rather lower quality (especially compared to the 1960s). Most of the major changes were still taking place in the 1970s, and the interventions of the 1980s did not manifest themselves much externally and did not fundamentally change the architectural form or function of the Castle. Financially, the construction work was still a priority. During 1981-1985, 249.9 million CZK were spent on repairs and investments. In the following five years it was planned to spend even more 561.6 million. After the Velvet Revolution, most of these works met the same fate, namely gradual destruction, reconstruction or return to the form of the First Republic. To this day, a minimum of realisations have survived, with the exception of very practical engineering projects.

The most important intervention was the creation of the historical exposition of the National Museum in the Lobkowicz Palace. However, even this major action was started in the 1970s. Furthermore, the reality of socialist construction at that time was clearly shown here, when, due to various setbacks (mainly on the part of contractors), construction was carried out from 1973 to 1987. Although the building was returned to the Lobkowicz family in 2002 and the historical exhibition was moved in 2006, the premises have retained their character and are used as a museum and picture gallery.

The second half of the 1980s was marked by engineering projects - the power system was reconstructed and modernized in the area of electricity and heat and cold supply. The construction of the collectors involved minor construction work (modifications to the lining, surfaces, new elements such as grilles) and demolition. A significant intervention was the irrigation of the spaces above the tunnels with the networks. The collectors and the energy centre are still in operation today, they were assessed as important projects and therefore their construction was continued after the Velvet Revolution, unlike other projects. Today's planners appreciate their creation, because they benefit from the advantages of the design of the time. From a technical point of view, the usefulness and necessity of these projects cannot be denied, but from a conservation point of view, they posed certain problems and were not evaluated positively, and from an archaeological point of view, they were essentially a major devastation, because a lot of strata disappeared, which unfortunately could not be sufficiently investigated because the excavated soil was immediately removed.

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5/ Countryside and rural architecture

LIFE IN THE RUINS OF OLD BARNS (USE OF THE FRAGMENT IN CONTEMPORARY RURAL ARCHITECTURE)

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ABSTRACT: The rural lifestyle is dynamically changing. A significant number of country houses remain unoccupied, with only a small percentage of buildings being recognized and protected as cultural monuments. While barns no longer serve their original purpose, they still retain the characteristic essence of the countryside and serve as a reminder of the sustainable lifestyles of previous generations. (Koolhaas, 2020; Council of Europe, 2022)

How does contemporary architecture respond to the conversion of homesteads? This article delves into the integration of new construction within structures that are in a state of severe disrepair. These projects purposefully utilize only a fragment of the former barn, embracing its decay as an integral part of the design. By examining various approaches to ruins, ranging from romantic aestheticization to pragmatic functionality, we can gain insight into the transformation process.

The influence of a globalized supply of materials and inspiration from the internet and social media has had a significant impact on architectural practice, often leading to the erasure of regional nuances. Are the claims about the use of local materials true? And can the restoration of techniques from the past be genuinely sustainable?

KEYWORDS: barn; ruins, remains; village; renovation; heritage; architectural conservation; sustainable architecture; vernacular architecture

FOUNDATIONS

The modern lifestyle places completely different demands on rural architecture (formerly used for agricultural production) [1][2]. Social sciences such as ethnology or social anthropology pay a lot of attention to the current situation in the countryside, addressing the cohesion of the local community or the maintenance of traditions in the environment of cultural houses [3]. However, the Czech literature dealing with rural architecture still focuses on the knowledge and description of historical constructions or craft practices [4][5]. Detailed theoretical background mapping the contemporary architects' input into these buildings is minimal. For example, Jana Tichá devotes a chapter to entries into the historical environment in Czech architecture in her book Space and Place (Architectural Creation in the Czech Republic 1989-2014) [6], but the examples presented come only from urban environments.[1] We can look for inspiration in research on industrial heritage ruins and their conversions [7].[2] Tim Edensor's work has also been useful to us, describing, for example, the way factory ruins are perceived when walking through them [8].

The reuse of old village houses, especially their outbuildings, does not only have practical or ecological aspects, but also becomes an opportunity to at least partially preserve historical memory [9]. We are in dynamic times, where the boundaries of what can be considered a monument are constantly shifting [10], but at the same time there is a massive degradation of older houses [11]. And most buildings remain outside the regulation of building heritage protection [12].

The work of Iida Kalakoski and Sigrun Thorgrimsdottir [13] was fundamentally important to us. The authors focus on barn conversions mainly in Scandinavia and deal also with the influence of globalised databases on the work of the architect. They have created a clear classification of five approaches to how designers work with the barn. For the first three, the material essence of the original house is necessary. It is 1. the conversion of the building, 2. the reuse of the material and 3. the relocation of the house to another location (mainly related to lightweight wooden structures). The other two approaches are already material independent. We can find 4. reinterpretation of a house that previously stood on the site or 5. imagination, if the new building bears elements of a barn but there was never any outbuilding on the site. As in the case of Kalakoski and Thorgrimsdottir, the authors of the projects we have examined do not consider themselves to be narrowly focused on rural architecture and the portfolio of their work is much broader.

In our research, we used mainly qualitative methods close to ethnology, social anthropology and phenomenology [14]. The basis of the research were interviews with architects, residents and neighbours of individual projects. In line with the literature cited above, we are aware that the personal experience of visiting a place influences, for example, the selection of elements and features that are described below.

In order to get a more comprehensive picture of how the projects and their presentations can influence other potential stakeholders in the countryside, we also carried out a meta-analysis of the available articles or video content about these projects in the Czech media.[3] Apart from the mainstream media and news servers (iDnes, Hospodářské noviny), articles or mentions also appeared on specialized websites about architecture (Earch.cz) or a certain technology (as carpentry - Dřevostavitel). However, women's magazines (Marianne) also have a strong place in communicating this segment of architecture to the general public.[4]

STATE INTERVENTION?

The opinion of the monument care institutions is only necessary if the barn is a cultural monument or the building is located in an area with general protection (conservation zone or more strict reservation). It can be stated that official supervision is lower in rural environment than in urban areas. The number of urban areas under monument protection (297) is similar to the number of rural zones and reservations (277). Thus, a large share of the historic cores of towns are part of such an area, while protection of (more numerous) villages is rather exceptional.[5] Looking abroad, we find that, for example, the British organization English Heritage published a manual The Conversion of Traditional Farm Buildings [15] in 2012, with a number

[1] A number of questions were also raised in the 38th issue of the Zlatý řez magazine with the central theme Countryside.

[2] The extensive and regular publication activity of the Industrial Heritage Research Centre of the FA CTU examines issues according to their original use, region or time of establishment.

[3] The Monitora database was used with the expert cooperation of the staff of the National Technical Library, Information Support and Corporate Services Department.

[4] In the articles we can notice the search for parallels between traditional rural life and new construction, even when they may be limping a bit. For example, the open studio space of the house in Kojetín "refers to traditional architecture, where family life took place in one common room." (marianne.cz, 22.10.2022)

of examples. This type of methodology is currently missing among those published by the Czech National Heritage Institute.

When interviewing architects, we found out that they perceive the influence of nature protection in the countryside (protected landscape areas, national parks) more than the requirements of monument protection. The nature reservations have determined requirements for the volume and orientation of buildings, wall proportions, openings, roof pitch, etc. [16] The Krkonoše National Park has also published an inspirational guide for builders, which presents typical features and bad examples. (Moreover, the publication itself questions whether it is even possible to give advice when the new function of the building is often completely different from the requirements of the house in the past.) [17]

Our goal is not to evaluate whether the current demands of nature protectionists (e.g. on roof slopes) are reasonable and professionally based. However, we would like to draw attention to this holistic approach, which understands landscape care also as the protection of the character of the built environment.

EXAMPLES COMPARED

In order to compare the different approaches to the barn ruins, we have selected six projects from the Czech Republic:

Bukovec (projectstudio8)

The reconstruction of the Bukovec farmstead was created as a joint project of three families (baugruppe principle) on the ground plan of the farmstead in the village conservation area, which is now part of the city of Pilsen. The design preserves the footprint of the barns and stables. The building also sheds an interesting light on the current social situation of the elderly in the countryside. The previous owner sold the house when his father was still living there. The authors adapted the project to this situation.

Kojetín (Kamil Mrva architects)

Kamil Mrva's intervention in Kojetín was carried out in two phases approximately ten years apart. First, the pillars of the barn were used, the space was roofed over and the built-in structure served as an artistic studio. In the second phase, two bedrooms and a bathroom were placed in the extension and the building began to be used for permanent family housing. The second extension also protects a solitary fragment of the stone wall of the original house.

Loubí (atelier SAD)

The barn in Loubí near Lake Mácha was repaired and a wooden core was put inside. Atelier SAD is quite specific, because it also directly offers the services of a construction company.

Stará Červená Voda (TŘI.ČTRNÁCT architects)

The house for the architect's parents in the Rychleby Mountains near the Polish border used the stone parts of the original barn. The timber building was built with self-help and the project also includes another smaller building of a shed. The buildings are located on the site of the demolished house, but have a different orientation.

Verneřice (LABOR13)

The main author and at the same time the user Albert Pražák speaks of the small recreational object in the abandoned landscape of the Central Bohemian Uplands as conceptual. Thanks to the connection with the exterior, the interior space can be relatively small. The aim is to try out different methods and eventually modify the object. The authors used leftover materials (they adapted the size of the window to the large piece of glass they managed to obtain). The inner surface of the walls is created by plasterboard with no finish (you can see the puttying or green plasterboard in places of increased humidity).

Zadní Arnoštov (ORA)

Atelier ORA fixed the romantic state of the ruin and inserted a new structure with an elevated space into the two-storey house, which was previously used as a granary. The house is used for short-term accommodation.

SPECIAL AND REPETITIVE QUESTIONS

Monument care

Due to the situation described above, only architect Ondřej Janout entered into discussions with representatives of the conservation authorities during the reconstruction of the yard in Bukovec, which is a rural conservation zone. During the interview, the architect mentioned the difficult path to a permission, the different opinions of the responsible persons, the erudition of some of the representatives of the conservation authorities or, on the contrary, the unprofessional argumentation of other participants. At the same time, he admits that communication during the permitting process was partly easier because he has been working in Pilsen for a long time and the officials already know the methods and results of his work.

The debate was primarily about the percentage of preserved structures and about the creation of a new lapidary entrance next to the original arched gateway. Its construction was important to the creators in order to preserve the space around the original residential building for the former owner. However, it clearly indicated the breaking up of the farmhouse into several smaller units (pic. 1).

Fig. 1.: New entrance next to the original gate in Bukovec. (Source: Pavel Fuchs)

Preservation and completion of the existing structure

Continuous repairs were a normal part of the life of the peasants [18]. Highlighting a raw fragment of a historic structure brings a number of pitfalls, as the structure cannot be maintained using traditional methods. The masonry of barns in most of the Czech territory was protected against degradation by plastering [19]. Today, the goal is often to stop the decay at the right moment and to obtain an attractive background for a new entrance. For example, the walls around the building in Verneřice were repaired with material found in the vicinity (bricks not necessarily from the construction of an otherwise mostly stone barn) and finished with a concrete layer of minimal thickness (pic. 2).

In the first phase of the construction of the studio in Kojetín, Kamil Mrva reinforced the pillars with a concrete wreath and drilled columns with chemical anchors into them. A maximalist concept of preservation

[5] Determining the number of villages is very complicated. For the sake of illustration, however, we base our calculation on the number of towns (605), compared to all municipalities (6254). In addition, a number of municipalities were created by merging several separate units (villages). We also bear in mind that some towns have more conservation areas. In addition, village zones can protect parts of towns that we would probably not classify as rural, but there is enough vernacular architecture - Trávníky in Železný Brod or Betlém in Hlinsko.

Fig. 2.: The ruins of the barn around the object in Verneřice were partially refilled and stabilised by the authors. (Source: Labor13)

and presentation of the historic structure can be found in the second phase of the restoration, when a concrete roof is built over the rest of the wall in the front part of the plot, supported by columns surrounding the protected structure. The wall itself, in addition, has been reinforced with a concrete layer at the crown (pic. 3, pic. 4).

Fig. 3.: Different approaches to the fragment in Kojetín. (Source: Kamil Mrva Architects, photo: Studio TOAST)

Fig. 4.: Kojetín - overall view on the first phase (top) and the second phase of the extension protecting another part of the ruins (bottom). (Source: Kamil Mrva Architects, photo: Studio TOAST)

The architect Ondrej Palenčar also refers to the house in Kojetin when describing the building for his parents in Stará Červená Voda. However, he himself notes that while in Kojetín the old construction was structurally involved, he was driven only by aesthetic reasons, wanting to remind the precise craftsmanship of the original German inhabitants. At the same time, he is convinced that the stone walls will survive the wooden building he has inserted and will be supplemented by another layer by next generations.

In Bukovec, a fragment of the original construction is involved complicatedly. Only one third of the length of the original barn has been preserved. The new residential part of the new house is built on the remaining area of the barn. The volume in the original mass serves as a common community room for all the families living in the estate and it is not heated; the insulated part of the house begins behind it. The architects also retained another part of the old wall facing the courtyard, visually integrated into the supporting structure of the new building. In reality, however, the new construction is built independently. The owner, who is also an architect, changed the decision to leave the stone wall exposed. The spectacular exposure of the stones led to degradation of the structure and the traditional plastering reversed this process (pic. 5).

Fig. 5.: Photo from the official presentation (left) compared to the state in 2022. A fragment of the stone wall was plastered using traditional technology. This solution is less spectacular than the presentation of exposed masonry and preserves the authenticity of the original building. (Source: projectstudio8, Pavel Fuchs)

The solution in Bukovec, especially from the main views, does not give the possibility to determine at first sight what is old and what is new and how the structures interact. It is an extraordinary example of how an impressive entity can be created even without clear divisions. The side view from the adjacent property, where the separation is in contrast very clear, may seem problematic and perhaps too intrusive (pic. 6).

Fig. 6.: The fact that only a fraction of the barn was preserved is primarily revealed by the side view from the neighbouring property. (Source: Pavel Fuchs)

Because our sample was devoted to projects that work with ruins, our comments are mostly about the more resilient stone parts. In Verneřice, however, preserved wooden beams were reused and the work with wood in Loubí is also extremely interesting. Here the architects replaced the top strip of planking because they wanted to lighten the interior space. The carved planks are a not very common example of a new ornament in contemporary architecture, which can be

mistaken for an original historical element especially by a non-professional audience (pic. 7).

Fig. 7.: Comparison of the barn in Loubí before and after renovation (left). The planking has been replaced with carved wood. The purpose was to lighten the space, but the solution remotely resembles the ornaments of folk architecture. (Source: atelier SAD)

Gap between existing and new construction

Due to its tiny dimensions, the building in Verneřice is completely independent of the original construction; the fragments of the barn function as a demarcation between the intimate living space and the surrounding landscape. The division of the site by the new building creates two differently sized courtyards, with the smaller one intended to serve mainly for access, car parking and quick entry into the house. The larger yard serves as a garden and is connected to the house by a fully opened facade.

A number of built-in houses to (re-roofed) barns also function on the principle of independence. The object built into the barn in Loubí uses the archetypal shape of a house with a pitched roof, but the new house cannot exist without the original barn. Inside the modern structure, there are a minimum of corridors, the user enters the bathroom or toilet from outside the house (but inside the barn). The kitchen is located in the exterior gable and the main living space is therefore created in the original barn. This solution creates a very fragmented boundary between interior and exterior (pic 8).

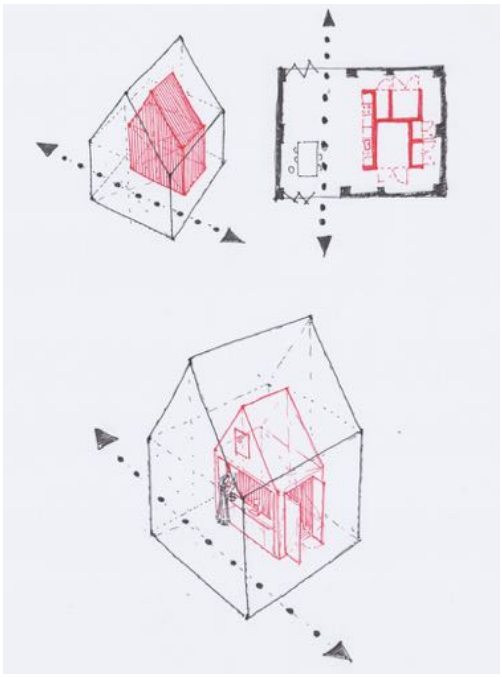

Fig. 8.: The barn in Loubí is open to the surrounding landscape thanks to the slots in the planking. At first glance, the new structure is completely independent, however, it does not have a classic closed interior. In fact, the built-in house forms one functionally connected unit with the barn. The realisation blurs the distinction between the inner "dwelling" and the outer space. (Drawing: Matyáš Gál)

The gap in Stará Červená Voda is about 60 cm wide and is used practically as a nut drying room or tool storage. The owners also do not expel robins and other animals. However, the distance, allowing only one person to pass through, made the construction of a new house quite complicated. The northern and southern walls had to be built entirely on the ground, including the exterior cladding.

The house in Arnoštov fills the ruin of the building completely, except a minimal (several centimetres) gap between the old and the new wall. The protection net, against birds and rodents, stands out in detail around most of the window and door openings (pic. 9).

Fig. 9.: Detail of window and door openings in Arnoštov. Air gap between old and new wall is covered with a protection net. (Source: Pavel Fuchs)

Sustainability, energy efficiency and materiality (ethics of authenticity)

In the current mood of seeking the most efficient buildings, often at the cost of very inefficient and costly construction [20], dealing with ruins offers a different view on sustainability. The favourable ecological aspects arise from the use of original material that continues to serve structurally or at least does not have to be costly recycled or landfilled.

A more complicated situation occurs when we use traditional materials that were obtained locally. Today we rely on mining of natural resources in (sacrificed) remote locations. Returning to former resources can help create an attractive building (healthy, connected to ancestors, sustainable). However, such procedure is often no longer possible today, as illustrated by the story of one of the architects: The builders obtained material from the same places as their ancestors, i.e. from the surrounding nature. Small quarries, for example, are now natural monuments, though. More activity would certainly generate legitimate interest from landowners and preservationists of nature.

The reuse of materials was common in the countryside and rather hidden [21]. The current trend is characterised by the highlighting of the inserted structure, by the accentuation of the contrast between the old and the new. In the past, the reuse of the house and the change of function always resulted in a reduction of its

Fig. 10.: The house in Arnoštov, offered for short-term rentals, is equipped with luxury materials and furniture. (Source: ORA)

status [13] (from an inhabited house to barn/granary, which was the fate even for many fortresses in Czech conditions). The use of the barn as the main representative living space is therefore a recent innovation. It offers new residents a generous space resembling a loft-housing (pic. 10) with high structural height and the possibility of inserting elevated spaces / galleries. On the other hand, the reduction of representativeness occurs in the case of an original house, if it has been preserved at all. The former dwelling often suffers from a relatively small living area, low ceilings or tiny window openings.

An interesting turnaround happened in Arnoštov: a two-storey house was turned into a granary during socialism, which meant a change in openings and floor plan. The expensive renovation by Studio ORA gives the impression that new interventions have been inserted into the ruin as found by the architects on the site. However, a close examination of the historical images and the authors' report shows that the architects tried to erase the changes from the socialist era. They returned the remains of the window openings to the gable of the ruin as they would have looked without the intervention of the socialist farmers. This may provoke a feeling in the attentive viewer whether such a ruin is really authentic and truthful? (pic. 11)

Fig. 11.: The ruin in Arnoštov underwent modifications that erased part of the post-war interventions. (Source: mapy.cz, ORA)

Foreign literature has noted the unification of architecture, evidenced by globalised web inspiration portals such as Archdaily or Cabin Porn [22]. Previously, the limited amount of materials and the need to rely on local options led to a very high variety of craft details. Today's globalised (and seemingly) unlimited supply, on the other hand, brings a unification of elements that are used for new inputs into the old structure.

Influence on village urbanism

Sustainability can also be seen in a broader perspective as the preservation of historical values or seeking a rational approach, how to preserve the memory and matter created by past generations in a modernised form. Maintaining the qualities of the whole village and the local community is also important. The use of vacant parts of farms may limit the taking of additional land in the village exterior, but this is not simple mathematics. This solution poses further challenges for architects and their partners (neighbours, community, municipality). These come from the extensive size of the farms and the change in lifestyle, represented mainly by a greater desire for intimacy and the use of different tools (mainly cars).

In the past, estates were also occupied by a larger group of people than today's nuclear family, but the demands of the individual inhabitants were different. If the farm creates space for the equivalent of 4 family houses, this means a greater pressure on the surrounding area as well. We have already mentioned the necessity of establishing new accesses when discussing the monument care in Bukovec.

However, the division of the original estate could have been done before the architect's intervention. In Loubí, e.g., a long access road was built in the past decades, bypassing the rest of the farm. The task of the creators was therefore to deal with the complicated access and adapt the way. However, architects also mention general limitations caused by legal regulations, which they consider unsuitable for rural areas. Ondřej Janout considers construction right on the border of the plot to be a typical village element and promoted it in his other projects in the countryside. However, this procedure is made almost impossible by the current building law, which specifies a minimum distance of 2 metres from the boundary.

Rotation of the ground plan

By saving the barn, the owner satisfies a greater desire for intimacy. The part of the old house with the main living room often faced directly the street space [19]. In Stará Červená Voda, a shed was built in place of the old dwelling, moreover with a ninety-degree rotated gable. Due to the sparse pattern of houses in the surrounding area, it is unlikely this solution causes any serious disruption to the character of the village, but layout is certainly not applicable everywhere (pic. 12, pic. 13).

Fig. 12.: The construction of the house is inserted into the furthest part of the original building. (Source: TŘI.ČTRNÁCT architects)

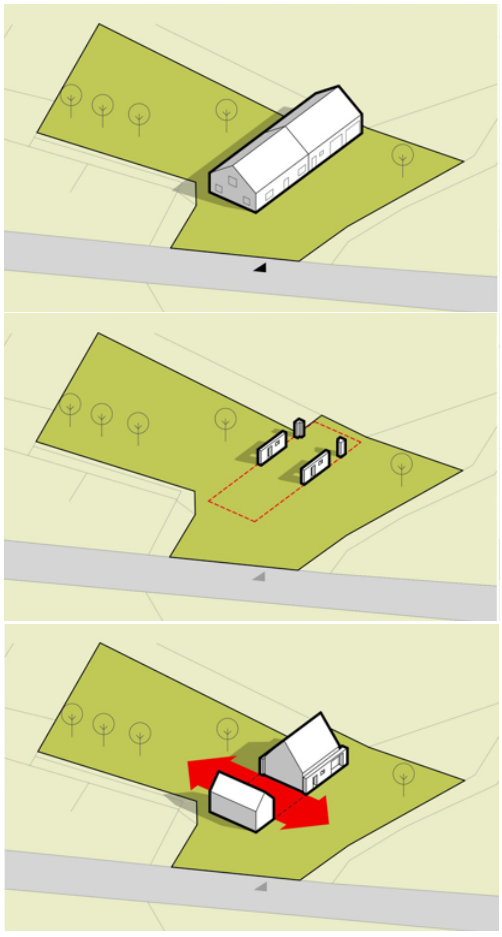

Fig. 13.: The house in Stará Červená Voda stands on the ground plan of the original house. However, the orientation and connections to the public space have completely changed. (Source: TŘI.ČTRNÁCT architects)

Matěj Beránek, for example, mentions the complete privacy in his article about the house in Kojetín and notes that this effect was achieved despite its location in the centre of the village [23]. But does such a design reinforce the street space of the village centre or the community? The house is set well back from the street line and a rather large area is left fallow (pic. 14).

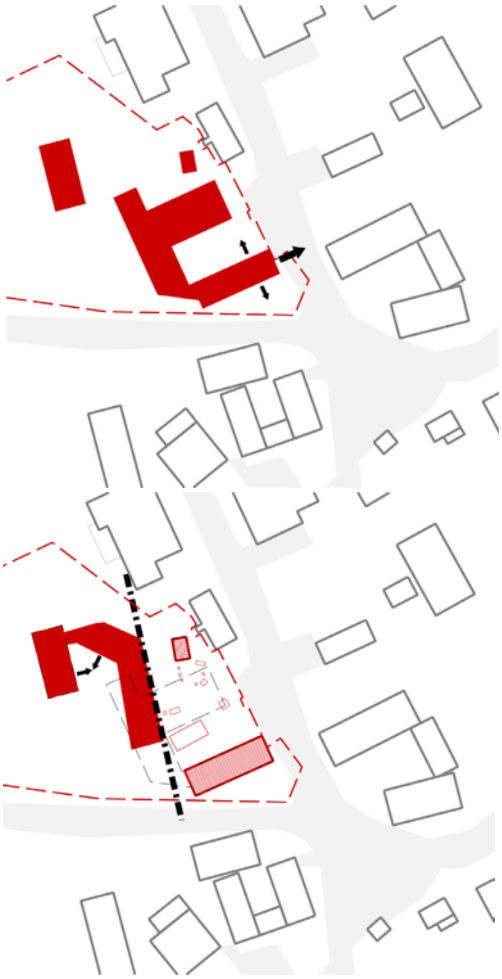

Fig. 14.: The farmhouse in Kojetin was built close to the public space (left). The new house uses the remains of a barn at the back of the property to create an intimate space for its occupants. The front part, facing the village centre, serves more as a warehouse (right). (sketch: Matyáš Gál)

Criticism of top buildings as a guide for the ordinary owner?

The article presented different approaches to the ruin of a country house. Even highly rated projects may not meet all of the often contradictory requirements. Media discourse, however, prefers only laudatory phrases. These buildings certainly deserve a positive response. But the assessment is often based on an idealised idea of rural life, the influence of the realisations on the whole urbanism of the surrounding houses is practically neglected. A deeper analysis of high quality projects could help shape society-wide opinion and requirements for building interventions in rural areas. The topic of reuse of rural assets is increasingly supported by state organisations and subsidies, but these only address energy consumption and rather tend to degrade quality architecture (e.g. by supporting demolition or insulation of old houses from the Nová zelená úsporám subsidy programme).

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6/ Ecological aspects in architecture

EARTHEN DECORATION – VARIETY OF DECORATING ENTRANCE PORTALS OF EARTHEN BUILDINGS. RESEARCH REPORT.

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ABSTRACT: Earthen decorations on earthen buildings are found variously around the world and are characterized by visible differences according to the original site. In our paper we search for and discuss common aspects influencing the final form of the decorations. In particular, our main focus is on the African continent and the exterior design of the entrance portals of the buildings there, which has been supported by the available visual materials.

The entrance portals of residential buildings are interesting mainly due to the variety of their details. There are earthen decorations of various scales in both spatial relief and surface. The colour representations are another layer that is reflected in the final form of the decoration. Playing with the inherent and typical colouring of the natural material, as well as engaging sophisticated work with the admixture of coloured pigments and other organic or inorganic materials. Richly decorated colour realisations and, on the other hand, austere monochrome.

The article also summarizes the results of two years of research work on the topic of earthen decorations, which were developed within the specific research project “Hlína pro lidi” at the Faculty of Architecture of Brno University of Technology.

KEYWORDS: earthen decoration; earthen building; portal; relief; colour; painting; ornament; meaning of decoration

FOUNDATIONS

In Africa, there are many types of patterns and decorations appearing on structures made of earthen building material. These include relief structures, extensive colored paintings, and their combinations. The shape of the pattern is influenced by religion, cultural values, history, education level, location, and other possible factors.

The diversity of earthen decorations within the wide spectrum of influences in the African region led us to one common element, which we would like to focus on, and that is the decorated portal entrance (meaning windows and doors/entrance and window openings) of individual structures.

We would like to present our findings on the following realizations in the broader context of the entire continent. For better visual clarity, we chose the method of graphic schematization of characteristic motifs.

1. TOPIC SELECTION

The research report builds upon the partial activities of the specific research project " Earth for People. Ecological and economically friendly community constructions from earth." at the Faculty of Architecture, Brno University of Technology.[1] For the purposes of this research, we will use the abbreviation "HPL" to refer to this project.

Fig. 1.: State of the oven decoration just after completion in a wet state. (Source: Private archive of Ing. Zdeněk Vejpustek Ph.D.)

The narrower specification of this theme was preceded by a period of work on research related to earthen decorations last year. The information gathered during that time led to the creation of a private database and the subsequent practical outcome in the form of a completed decoration design for a faculty steppe oven of the Spanish type, along with the publication of an article. This oven was realized by students within the "HPL" project and the teaching of the "HLS - KE Earthen Architecture" course, supervised by an expert lecturer. (see Fig. 1.) In contrast, this year, we focused on finding common features and the potential for categorization, which we will specify in the text below.

As part of the research, we explored locations worldwide. For the purposes of this contribution, we focused our attention solely on the African continent because earthen construction has a preserved and still vibrant deep, cultural and symbolic tradition here, as confirmed by research using freely accessible photographs and sources. There are many variations, color combinations, and forms that deserve greater attention. This fact is likely linked to the availability of building earth, limited possibilities of using other building materials, and the delayed onset of globalization in society. In African architecture, earthen buildings are, therefore, a relatively common element.

The theme of earth in construction is, from our perspective, insufficiently explored in the Czech region. However, there is a progressive worldwide expansion of valid information about building with earth. Besides other institutions, systematic research has been ongoing at our faculty for a long time.[2] As a part of the broader faculty research "HPL," our team focuses exclusively on earthen decorations, specifically elements made from prevailing natural materials (or those occurring in nature) with potential hidden symbolism and significance.

Further specification of the theme focused on earthen entrance portals, since they are excellent examples of functional decoration in architecture for us. Similar to how a window is an entrance to the soul of a house, the ornamentation of the portal and its immediate surroundings can be a path to the soul of the owner or artist. The motifs used, serve not only an aesthetic

[1] Information taken from the source [12]

[2] The main personalities involved in earthen construction at the Faculty of Architecture of the Brno University of Technology: doc. Ing. Ivana Žabičková CSc., Ing. Ing. Kateřina Šmardová Ph.D., Ing. Eva Neumayerová, Ph.D.,and the project leader of the "HPL" project responsible for this research report: Ing. Zdeněk Vejpustek Ph.D.

role, but also function as carriers of a certain type of information. Individual decorations can vary significantly and, for example, function as a visually important point in relation to the urban space.

2. IMPORTANCE OF DECORATION IN ARCHITECTURE

Right from the start, we can pose a simple question: decoration, yes or no? And what about the relationship between decoration and architecture as such? Is there any connection or their intrinsic importance? There were many discussions and passionate debates about this phenomenon in the past.

Let's start with a well-known statement by architect Adolf Loos: "Ornament is a crime."[3] We could consider any decoration as a crime, based on this statement. Additionally, we can add the opinion of architect and urbanist Otto Wagner emphasizing the idea: "the sole starting point for our artistic creation can only be modern life" and also "what is not practical cannot be beautiful either."[4] With these statements, trust in decorations is not very likely to be gained. Debates about the usefulness from a pragmatic perspective are entirely appropriate, but we all know how it was for these experts in reality. Renowned architect and urbanist Le Corbusier directed his thoughts towards the idea that "architecture begins only where questions of use are resolved" and demands a clear purposive solution with practical and aesthetic functions.[5] Here, we already find slight commonalities that could lean towards positive reasons for the yes in decorating.

Moreover, if we add insights from contemporary practice, minimalist and simple design allows for faster construction processes, easier maintenance, and places greater emphasis on the function of the object itself. In the modern era, the speed of creation and efficiency emphasis, are are reasons for the deviation from decorative elements, where this possibility has quietly disappeared from the perspective of artists as well as customers.

Not to mention only a negative view in this area, positive opinions on why to implement decoration in architecture are brought forth for instance by Dr. Kočí in an interview for Archspace: *"Art has always been part of architecture and always will be, by principle. [...] Even when cave people impressed their hands on the walls of their dwellings and temples, they painted their imprint in the world they somehow understood and through artistic techniques of drawing and painting (with charcoal, earth, blood...) wanted to evolve this understanding."*[6]

If we look for a connection between decorations and architecture, decorations can contain hidden meanings. We can include identification and informational elements, such as the marking of entrances and portals.

From an artistic perspective, decoration plays a crucial role in creating the overall impression of an environment or object and complements it aesthetically. Architectural decorations add unique character, style, and context to the object. The context can derive from historical context, traditions, culture, or the local population, depicting the symbolism of its story.

With this article, we would like to stimulate a discussion about decorations and decorativeness in contemporary architecture. It is possible that now is the right time for a revision of perspectives. It is also a question of how we can precisely distinguish the boundary when a building can be said to be decorated or not? Furthermore, with new trends returning to original, traditional and ecologically sustainable values, there is also a return to earthen buildings typically associated with decorations.

2.1. DEFINITION OF THE TERM DECORATION

This contribution does not aim for a general and fully generalizable definition of the term, but is only concerned with decorations on objects in correlation with natural construction, especially on buildings made predominantly of earth and its derivatives.

For our research, we considered decorations as any elements exhibiting aspects of conscious transformation of the visual surface in the immediate vicinity of entrance portals and adjacent front facades (or entrance gate objects) of earthen buildings for purposes other than structural ones, where an aesthetic overflow is clearly evident.

From the perspective of earthen decorations, our main concern was to ensure that the building or decor element met significant criteria defined by us—construction from earth or the prevailing material of decoration have an earthen character.

2.2. THE POWER OF EARTHEN DECORATIONS

Natural materials, by adhering to simple techniques and working procedures, offer the potential for individual creative expression for anyone with minimal input of expended forces, their achieved education or craft skills, and without the need for special equipment. Economic efficiency and good availability, freedom, and uniqueness are essential.

Earth, as a basic natural material, has excellent formability from its elemental nature, encouraging simple and intuitive handling. The creative process itself offers a narrow physical contact, a material pleasant to the touch with an experimental nature. Regarding a similar relationship, though referring to decorations in general, Dr. Kočí also says: *"Human beings crave ornament (decoration), not just because it is beautiful, but because they imprint in it, reflect cognitive experience from the surrounding world."*[7]

To avoid only speaking about the positives of this medium, the significant exclamation point and unavoidable fact is, of course, the effect of water and the associated durability, i.e., subsequent degradation. But this is one of the fundamental properties of earthen material, with which one can work. With proper design and execution, earthen material, of course, fulfills all the requirements placed on a specific building or its part.

3. DECORATION ON THE SURFACE

From the perspective of the classification of earthen decorations based on their appearance, plane decoration is the first category since the plane, as a pure painter's canvas, is a basic element for creating colored decorations. This involves the simplest form of ornamentation—pure painting on the earthen surface around entrance openings. Depending on the color spectrum used, the category can be further divided into simple coloring, where only one color is applied. The following chapter refers to the use of multiple colors in the plane—multicolored realizations of entrance portals.

3.1. SIMPLE COLORING

The first example of simple decoration around the entrance is from Burkina Faso in Africa[8], where exterior painting smoothly transitions into the decoration of the entire front facade. (see Fig. 2.) The color base is formed by the natural shade of earthen material, contrastingly underscored by a dark line/surface of the depicted patterns. Monochromatic geometric decora-

[3] Haas, 1980, p. 164. - translated from a Czech language source

[4] Haas, 1980, p. 89. - translated from a Czech language source

[5] Haas, 1980, p. 334. - translated from a Czech language source

[6] Gerich - translated from a Czech language source

[7] Gerich - translated from a Czech language source

[8] Factographic and geographical information from the source [14]

tion alternates with triangular patterns, which further graduate into a stylized depiction of human and animal figures. For a European-minded person, the resulting representation lacks deeper rationalization and evokes an incidental arrangement.

Fig. 2.: Illustrative scheme of a key part of the earthen facade in Burkina Faso. (Source: Author's illustration created based on freely available materials from: https://www.designboom.com/architecture/vitra-design-museum-learning-from-the-vernacular/?utm_campaign=Saturday&utm_medium=e-mail&utm_source=subscribers)

In contrast, an object located in Ekibondo village in the northern region of the Democratic Republic of Congo[9] is relatively precisely anchored, concerning the painted images, in purely geometric patterns emanating from radially advancing centers. (see Fig. 3.) Patterns run around the entire surface of the facade and are horizontally terminated by the perforation of the entrance space. The essential here is again the contrast between dark and light areas.

Fig. 3.: Illustrative scheme of a detail of a contrasting pattern at the portal from Congo. (Source: Author's illustration created based on freely available materials from: https://africa.si.edu/exhibits/focus/images/12.2-Central_Africa115a.jpg)

3.2. MULTICOLORED REALIZATIONS

The category of multicolored realizations encompasses various color combinations applied to the surface. We were intrigued by the realization of a portal richly adorned with geometric patterns in South Africa. Specifically in the eastern part, where the village of Ndbele is located.[10] (see Fig. 4.) Patterns on a uniform white background are bordered by a prominent black line and filled with vivid colors. The diversity of colors ranges from shades of vibrant blue through green, red to delicate pink or, for example, purple.

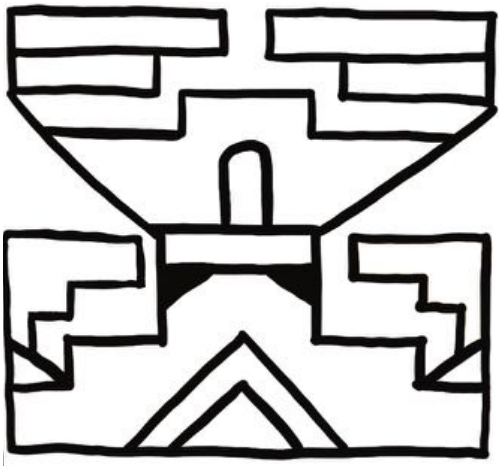

Fig. 4.: Illustrative scheme of a part of the decor in South Africa. (Source: Author's illustration created based on freely available materials from: https://elephant.art/wp-content/uploads/2020/11/BP0K3W.jpg)

Clear color shades are also present in paintings in the Niamey location in Nigeria.[11] The open entrance to the building is shaped into a pointed arch, formed by a planar framing, outlined in natural shade of earth. A simply framed entrance is complemented by the gradual layering of colored stripes with patterns, alternating in horizontal lines. Exact alternation of 4 colors – yellow, blue, red, and green, with white accents in the rhombus form. (see Fig. 5.)

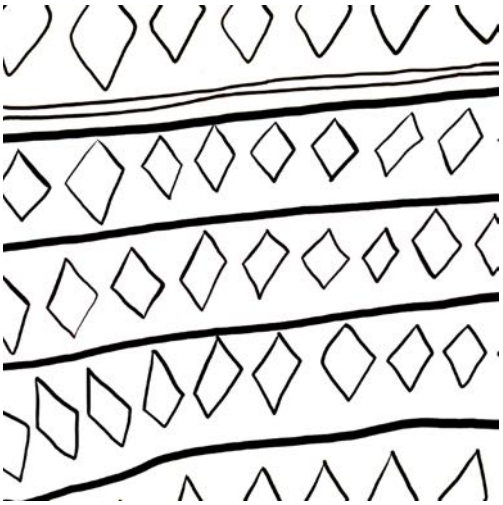

Fig. 5.: Illustrative scheme of a pattern on a portal in Nigeria. (Source: Author's illustration created based on freely available materials from: https://courier.unesco.org/sites/default/files/styles/paragraph_medium_desktop/article/courier/photos/cou_04_19_idea_amin_eng_internet_site.webp?itok=rotem6f6)

A certain simplicity and moderation in the process of working with decoration is exemplified by the entrance from Dongola in Sudan[12]. (see Fig. 6.) In a contrast to the aforementioned realizations, here appears a motif of eight circles of four represented shades, on

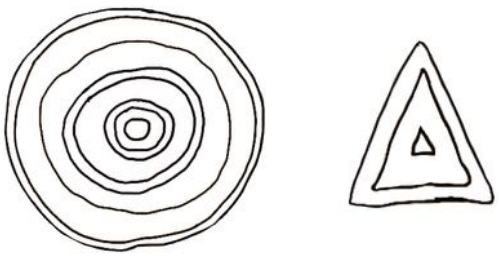

Fig. 6.: Illustrative scheme of motifs used to decorate the portal of Dongola in Sudan. (Source: Author's illustration created based on freely available materials from: https://upload.wikimedia.org/wikipedia/commons/thumb/5/51/Dongola_trad.jpg/1600px-Dongola_trad.jpg?20090128075623)

[9] Factographic and geographical information from the source [10]

[10] Factographic and geographical information from the source [8]

[11] Factographic and geographical information from the source [2]

[12] Factographic and geographical information from the source [3]

a white background. These shapes are located in the vertical direction of the decoration, along the raised mass of the entrance edge reminiscent of a pilaster. In the horizontal level of the missing lintel, the overall composition is complemented by three color-layered triangles.

4. DECORATION IN SPACE

The second category, where the earthen portal decorations gain volume and progress into other spatial dimensions, we labeled as decoration in space. It includes all spatial elements, relief structures, and 3D objects that are part of the decoration and emerge from the earthen surface of the walls.

Various types of relief can either be scratched out, by removing the material of the earthen walls to create the desired shape, in this case, we mostly refer to the sgraffito technique. Although we are still remaining in Africa, which may seem distant to our own environment, there are references from our geographical latitudes, too. In the Czech Republic, sgraffito is relatively often used as decoration for earthen plaster in the last decade. Materials for creating sgraffito in earthen plaster have long been developed, supplied, and technologically supported by, for example, the Moravian company Picas of the Navrátil's family.[13]

Another possibility is raised reliefs, where material is added. Working with this type of relief creation is similar to sculpting with ceramic earth with the exception of the final firing phase. In terms of comparison with the previous techniques, we believe that this type allows for the greatest possibility of gradation in artistic expression. Relief structures appear either in simple colors or again with the representation of a larger color spectrum.

4.1. SIMPLE COLORING

An example from the southern region of Ghana represents traditional Asante architecture[14]. (see Fig. 7.) The almost square entrance is framed by an allegory of the European understanding of an architectural frieze, in the inner field with plastic curves played out organically. Significant is the absence of a symmetrical appearance of the decor on all sides of the entrance. The contrast of the precise line of a brown-colored transition to the dark shade of the plinth complements the white surface with the representation of natural motifs.

In a same manner is also processed the decoration in western Africa. This time in the town of Ségou in the state of Mali[15]. (see Fig. 8.) A distinctly orange, monumental site of the entrance, framed by a massive spatial relief of a pointed arch, is solved by six prisms in different lenghths, ending with a regular pyramidal spike. Interspaces are complemented by decorative perforation of circles touching vertical elements. In the places of the imaginary tympanum, only two rounded protruding objects are represented on an otherwise smooth surface.

Fig. 7.: Schematic representation of the relief of traditional Asante architecture. (Source: Author's illustration created based on freely available materials from: https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/decorated_surfaces_vl.pdf, p. 141, Figure 7)

Fig. 8.: Illustrative scheme of a part of the motif of a monumental scene in Mali. (Source: Author's illustration created based on freely available materials from: https://www.flickr.com/photos/27784269@N06/5778572276/)

As mentioned earlier about the sgraffito, it is an ideal time to delve into this phenomenon with an interesting realization from the village of Hausa Tubali in Nigeria[16]. (see Fig. 9.) Above the entrance of this example are three dominant patterns with the theme of flower calyxes extruded above the wrinkled exterior of the building wall. The protruding surface of the relief has a yellow-green or blue-white color and, compared to the natural color of the scratched facade, attracts all attention to itself.

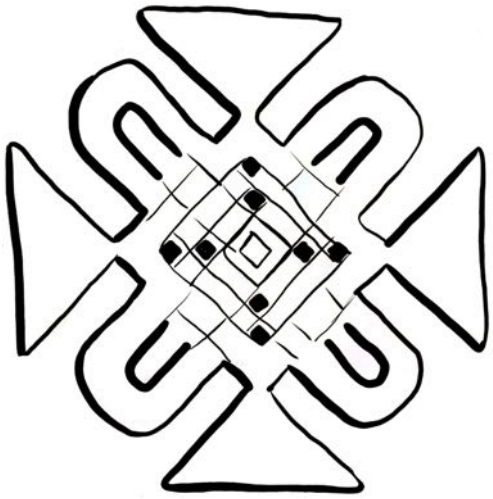

Fig. 9: Illustrative representation of a motif on the scratched facade of Hausa Tubali. (Source: Author's illustration created based on freely available materials from: https://www.nairaland.com/attachments/2212862_db05b6abab4149bc96826ed693e29dc0_jpega12698f030fe2028cd2958043199ad8b)

4.2. MULTICOLORED REALIZATIONS

The village of Ouadane in Mauritania[17], listed on the UNESCO World Heritage List, is unique for its beautiful decorations on local houses. (see Fig. 10.) This is well illustrated by the pattern of the entrance portal framed by borders decorated with reliefs and surface painting. Wooden doors are emphasized by traditional ornaments, placed on the side along the opening and interestingly complement everything. Overall, rich

[13] A family company engaged in the creation and development of earthen plasters in Moravia:: https://www.picas.cz/sgrafita/

[14] Factographic and geographical information from the source [13]

[15] Factographic and geographical information from the source [9]

[16] Factographic and geographical information from the source [7]

[17] Factographic and geographical information from the source [4]

warm shades are used here, contrasting with the light surface. For interest, a uniform layer of red is complemented by the representation of a circularly conceived colored target.

Fig. 10.: Illustrative scheme of a decorated target on a house in Mauritania (Source: Author's illustration created based on freely available materials from: https://whc.unesco.org/uploads/thumbs/site_0750_0007-500--20151105122721.jpg)

In contrast to the warm carmine red of the previous Mauritanian example stands an object with cool Nigerian shades. The white-blue wall of the Boubou Hama National Museum in Niger[18] is also an example from this category. Diverse lines transitioning into curves are tuned to light blue and protrude from the brightly white background. In dialogue with the simply framed entrance, continuing to the colored wall, is the door panel, also tuned to the same pigments. (see Fig. 11.)

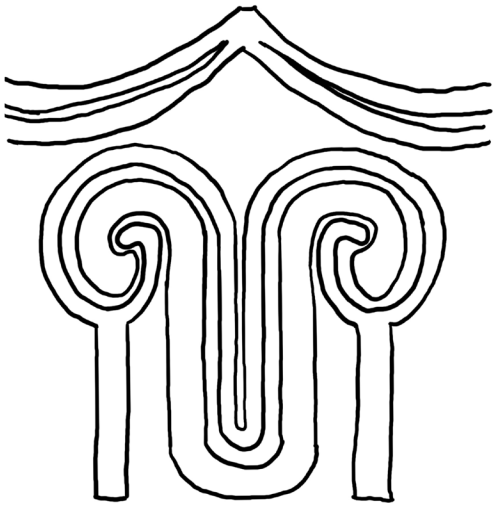

Fig. 11.: Schematization of a protruding relief on the facade in Niger. (Source: Author's illustration created based on freely available materials from: https://www.messynessychic.com/wp-content/uploads/2020/06/d164nx0vhpj41-930x831.jpg)

5. OTHER COMBINATIONS

The above-mentioned division into individual groups did not allow us to include intersections of both variants. Although it is not a fully strict division, we needed an additional class. Other combinations of earthen decorations are a category where creators partially take knowledge and techniques from the surface or space, leading to free mutual interweaving and far-reaching overlaps.

This category is exemplified by the village of Tiebele in the state of Burkina Faso[19]. (see Fig. 12.) Both flat monochromatic paintings and colored combinations of protruding reliefs appear here. A characteristic motif is a geometrizing illustration on the surface complemented by spatial representation of cylindrical structures orbiting in one or more layers around the edge of the portal. It is not a single shape of the wall, the surroundings of the openings are additionally enlivened by reliefs representing the animal kingdom. We can talk about connecting two worlds of technological procedures.

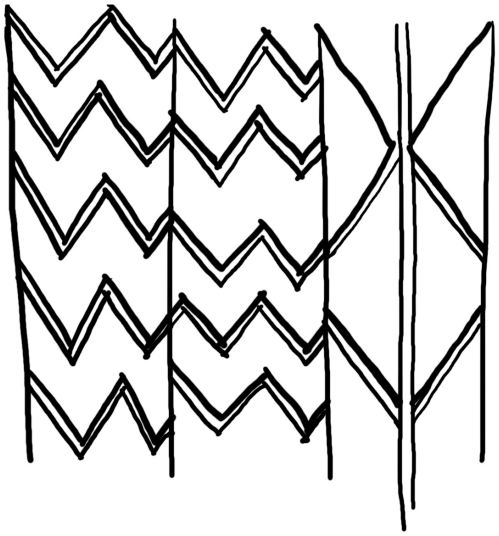

Fig. 12.: Illustrative scheme of a part of the pattern of a earthen wall in Tiebele. (Source: Author's illustration created based on freely available materials from: https://i0.wp.com/www.tpoty.com/wp-content/uploads/2018/08/TPOTY2011WinnerLouisMontrose1.jpg?fit=1000%2C667&ssl=1)

CONCLUSION

The article summarizes current findings in the research of earthen decorations covered by the specific research project "HPL" of the Faculty of Architecture at Brno University of Technology[20].

The research report defines the concept of earthen decorations as considered within the research project and adds a basic description based on the relationship to architecture, its own function, and its potential. Decoration in architecture is a element that is sometimes overlooked but can fulfill its important function in reality. Decorated entrance portals are a unique example where, at first glance, a seemingly supplementary substance, in addition to its aesthetic element, also performs an informational and identification function. To some extent, in connection with the mass of objects, they visually separate individual zones and arrangements, thereby contributing to better human orientation in space.

We are still talking mainly from our perspective about an artistic branch that in the vast majority of cases is not subject to any exact rules. Therefore, our above-defined division of the decorativeness of entrance portals is mainly indicative and should primarily serve an educational function. One of the main goals of the research is also to enable the general public to better navigate the issues and possibilities of earthen decorations.

We have divided earthen decorations into three main groups with their own subgroups, diviging plane decoration into simple coloring and multicolored realizations. We include examples with pure painting on the earth surface, where simple coloring is only used for symbolic outlines and multicolored realizations include colored paintings in the plane. The second subgroup includes decorations in space, which works with the same division scheme as plane decorations, and for a more precise description, these comprise simple coloring and multicolored realizations. The last men-

[18] Factographic and geographical information from the source [1]

[19] Factographic and geographical information from the source [11]

[20] Information taken from the source [12]

tioned category consists of other combinations including those examples where it is not possible to clearly define an inclination to one or the other group.

The main goal of the article is to contribute to the expansion of knowledge and the provision of information related to decorations in earthen construction and generally contribute to the development of building with earth. We would like to inspire others to discuss the topic of ornament in architecture and ideally to further continue and develop knowledge in this field.

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7/ Trends and technologies in architecture

ROBOTICS, AUTOMATION AND MATERIALS FOR ARCHITECTURE

Bolcek Roman - Vejpustek Zdeněk - Hodulíková Diana

ABSTRACT: The architecture and construction industry is about to take a big development leap, due to massive robotization, automation and technological and social changes. Our buildings will face new challenges, both in the form of construction and architecture. In the context of current issues, the society is looking for efficient working methods and materials for these modern buildings. This paper deals with the comparison of currently available materials for additive manufacturing using automated processes in the construction industry. As a basic topic of the article, 3D printing of earthen building material is described in depth. This basic material (in several variations) is compared with other building materials that may also be suitable according to the set evaluation criteria. The main factors for evaluation are economics, ecology, technological properties of the mixture, difficulty in carrying out the construction or time. We will also compare materials commonly used for 3D printing today based on concrete, earthen material, metal and plastic. The conclusions presented in the paper will be further used in the specific research project „Earth for People" and follow-up research at the Faculty of Architecture of Brno University of Technology.

KEYWORDS: industry 4.0; automation; robotics; additive manufacturing; materiality; global issues; architecture

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INTRODUCTION

Today's world and society is facing new challenges, including the depletion of natural resources, labour shortages, lack of suitable housing, and new technological opportunities [1,2]. In the context of these global issues and new technological opportunities, we are beginning to see robotization, automation and A.I. not only in civil engineering but also in other industries. All these, including other phenomena, are usually unified under the name Industry 4.0 [3]. Today's research on the possible production of structures most often points to the process of additive manufacturing (controlled layer formation of a material) using semi-automated machines. 3D printing is one branch of additive manufacturing in which the controlled layer formation of material into a desired volume is involved. This volume, or better the geometric shape of the resulting object, is created with the help of 3D modelling, scanning of the desired object, artificial intelligence, etc [4]. Another manufacturing option is the subtractive manufacturing process, in which the material is removed in stages. The main disadvantage of the subtractive process is the large amount of residual material.

In general, the most commonly used materials for additive manufacturing are plastic, glass, metal, earth, stone or concrete. Devices designed for layered manufacturing can be divided into stationary (free-standing, placed on a running platform or fixed to a base) and mobile (most commonly wheeled, e.g. robotic arms designed to move, autonomous vehicles). Other robotic arms are classified according to their use (floating, flying, etc.) In today's civil engineering research, stationary robotic arms are most commonly used because of the cost of the equipment or low error rate. These devices most often produce models in concrete or earth, but occasionally plastic, metal or other materials can also be used.

3D printing can be seen as a developing industry and we have already summarized the basics of this issue in the article Additive manufacturing in construction using natural materials [5]. The aim of this paper is to compare the most commonly used materials for 3D printing, which are concrete, earth, metal and plastic according to our chosen criteria and to highlight the materials that seem to be the most suitable for future use in construction practice. For the time being, the most commonly used stationary arm technology has been selected for evaluation and comparison of materials with respect to the environmental, technological and physical aspects. On a practical level, the FA BUT is currently printing test objects from earth on a six-axis robotic arm.

The use of earth in the civil engineering industry as a progressive material with great potential is being investigated by the authors of the article within the framework of several research projects, which are being carried out simultaneously at the Faculty of Architecture of Brno University of Technology. "Earth for People. Ecological and economically friendly community constructions from earth." [6], "One of the most endangered groups in the Historical Building Fund of the Czech Republic: unique technologies of earth buildings using piece building materials (mud lumps) and ways to save them." and "BIOM. "

WHAT MATERIALS ARE USED FOR 3D PRINTING. TYPICAL TECHNOLOGIES AND EXAMPLES OF BUILDINGS.

In today's architecture and construction industry, the most common materials used for 3D printing objects are concrete, earth, metal or plastic. Each material has its own specifics, to which the technologies for production and construction sites are adapted. Today's research mostly works with technology that is based on a proven method of material extrusion namely FFM / FDM (Fused Filament Fabrication/ Fused Deposition Modelling). This involves extruding the material through the nozzles of different thicknesses. This is usually chosen according to the detail required in the final product. Today, the most widely used machines in laboratories and research facilities are industrial multi-axis robotic arms (using running gear for greater serviceability, such as the robotic station at FA BUT in Brno), cartesian (gantry) machines or Scara robotic arms. Each technology is primarily designed for a different material.

CONCRETE

Basic issues of 3D printing from concrete

Devices for 3D printing from concrete, are ranging from the most commonly used 3D printer is called D-shape, from 3D Concrete printing up to new technologies (e.g., printing dry cement mixture that is hardened with water in layers) [7]. These technologies have already been tested in operation and are able to print without formwork components, supports or the requirement to compact the concrete by vibration. The mechanical and physical properties of the print-

ed product are dependent on the chemical composition of the mix used for extrusion [8]. Furthermore, the chosen parameters of the given mixture (printing speed, extrusion of materials, resting time for solidification, distance of the nozzle from the printed shape or the designed geometry of the object) must be optimized. A major issue are the mechanical properties of the resulting concrete, as many voids are usually created in the mix during the printing of the individual layers. If we do not have a machine-mixed mix, it is always necessary to optimise the printing parameters of the machine (speed, passes or layer height).

The material itself (concrete mix) for 3D printing must be modified to have a higher initial strength and shorter setting time compared to the commonly used mix for standard reinforced concrete [9]. Due to the full automation of construction, we do not want to introduce other technologies (reinforcement, formwork, etc.) into the production process. The mixes that make this possible are specially modified and we add reinforcing fibres (carbon, glass or basalt, for example). These admixtures improve the tensile and flexural strength of the resulting material without significantly changing the compressive strength [10]. These specific requirements for the concrete mix cause the price increase of the final product. As a consequence, it is at an economic disadvantage compared to today's standardized work practices. Another problematic part is the bonding of the layers together, which exhibits lower strengths than the base material. A large number of voids and inhomogeneities are formed in the lay-up of the layers, resulting in different physical properties of the final product in different directions. This creates an inhomogeneous material with weaknesses at the joints between the layers. Research has shown that the mechanical strength of concrete is dependent on the orientation and loading of a given printed layer [11].

3D printing of concrete in practice

Today, the standardized and most commonly used printing method is the extrusion of a thin cement-based material by a multi-axis industrial robotic arm (stationary or travelling). This method has been tested, is used commercially and is used in the Czech Republic by companies such as ICE Industrial Services, 3 Deposition or the universities of Brno University of Technology and Czech Technical University in Prague. However, for the reasons mentioned above, new 3D printing methods and mixtures are now being tested to bring new solutions and applications into practice. One of these methods is Contour Crafting and D - Shape. Contour Crafting - this is a method that is being researched by Behrokh Khoshnevis from the Institute of Information Sciences at the University of Southern California. It is a multi-material technology that first prints the outer shape of a part of the structure and then fills it with the concrete material continuing to the next part of the structure. This technology is also being explored in the context of printing new structures that will be used to protect humans colonizing planets [12].

Fig. 1.: Printing technology Countour. (Source: Crafting, C., 2017. Countour crafting for space aplication. Countour crafting. Available at: https://www.contourcrafting.com/space [Accessed June 30, 2023])

Fig. 2.: Countour Crafting technologies used for space applications. (Source: Crafting, C., 2017. Countour crafting for space aplication. Countour crafting. Available at: https://www.contourcrafting.com/space [Accessed June 30, 2023])

One of the other technologies tested is D-Shape. This is a three-dimensional printer that prints in layers, using sand as the filler, a carbon-based binder and curing with inorganic seawater. The final structure should resemble stone as closely as possible [13].

Fig. 3.: Radiolaria pavilion using D - Shape technology. (Source: Shiro, studio, 2009. Radiolaria pavilion by Shiro Studio. Dezeen. Available at: https://www.dezeen.com/2009/06/22/radiolaria-pavilion-by-shiro-studio/ [Accessed June 30, 2023])

Concrete is one of the most widely used and popular building materials used in architecture and construction today. We, however, are still unable to optimally recycle and reuse this material at low cost. In the context of today's issues (depletion of natural resources, overheating of urban areas or increasing greenhouse gases production), we need to think more comprehensively about whether the concrete is a suitable material for the 21st century along with its use for 3D printing technology [13]. New research projects are trying to work with these problems and find optimal answers.

The future of 3D printing from concrete

Researchers at UC Berkeley have introduced a new method of 3D printing from concrete with minimal waste. This method applies cement powder in the first stage, which is cured with water in the next one. Curing takes place after each layer. This university created an experimental pavilion (Figure 4) that consisted of a total of 840 printed blocks and the entire construction took almost a year [7].

Research at the Self-Assembly Lab at the Massachusetts Institute of Technology, in contrast, looks at the recyclability of buildings printed from concrete.

Fig. 4.: Pioneering research at UC Berkley using powder-based material. (Source: Williams, A., 2015. Berkeley researchers pioneer new powder-based concrete 3D printing technique. New atlas. Available at: https://newatlas.com/berkeley-researchers-pioneer-powder-based-concrete-3d-printing/36515/ [Accessed June 30, 2023])

Experts have come up with a technology that can be printed and dismantled without wasting or hoarding material. The researchers were inspired by the commonly used powder 3D printing technology (SLA/SLS some of the most used technologies in today's 3D printing workplaces). The robot places the filler (aggregate) and connects it with steel wire in each layer. The authors hereby present a new way of environmentally friendly, recyclable and renewable 3D printing that answers today's questions about the self-sufficiency, sustainability and recyclability of our buildings [14].

Fig. 5.: Additive manufacturing using reversible concrete. (Source: MIT, 2015. Reversible Concrete. Web urbanist. Available at: https://weburbanist.com/2015/10/10/reversible-concrete-3d-printing-for-easy-deconstruction-reuse/ [Accessed June 30, 2023])

METAL

Basic issues of 3D printing from metal

Today's technology industry doesn't work much with 3D printing of metal parts, components or parts for architectural structures. The main disadvantages are the high economic costs and difficult to predict defects in the final products. These defects are very often an integral part of products produced using additive manufacturing. For these reasons, metal is not the main domain of today's 3D printing research institutes and the construction industry is no exception. However, within the European Union, we can mention the Intergrade project [15], which deals specifically with metal 3D printing. The aim is to link the entire production process from design to the production. A part of this project is the company MX3D, which deals, among other things, with structures that are suitable for the architectural and construction sectors. The company's research projects show what is possible with this material. In their portfolio we can find, e.g. joints for the construction industry, a bridge, printing solutions for designers or a floor for a lunar module [16]. The researchers state that 3D printing from metal will increase design flexibility, design variety, production efficiency, reduce carbon dioxide production or optimise the use of the material. Research points to these benefits mainly in the use of this technology in the aerospace industry, where it is expected to save up to 90% of the materials used.

The technology for producing the metal product is similar to other materials, the metal is being added in layers using melting with precise placement of the metal wire until the desired shape is achieved. MX3D states that we can use the following 3 types of welding for printing.

1. MIG – offers high speed production, usually used to print larger parts without the need for a closed chamber, relatively easy to produce
2. CMT – similar to MIG with lower production speed but lower process error rate
3. TIG (GTAW) - offers higher product quality during processing, need for manual/automatic rotation of the mechanism when feeding the wire during the production process.

3D printing from metal in practice

Researchers from the Joris Laarman lab wanted to create a project that would display all aspects of MX3D's technology. They came up with the idea of creating a bridge over a canal in Amsterdam that would connect the city's history with the technology of the future. The authors say that after a long process, they finally succeeded. The form of the bridge is designed to be convenient for 3D printing from metal. The researchers were able to optimise the form appropriately using intelligent tools, this results in reducing the material used to a minimum. The bridge is 12.5 m long and 4.5 tons of steel was used [17]. In addition, the project, which has the name "Smart bridge", follows its characteristics, which can be seen in its digital twin online (https://www.smartbridgeamsterdam.com/#bridge). This will help, according to the authors, for future developments.

Fig. 6.: Metal bridge created using 3D printing. (Source: MX3D, 2019 Smart bridge (Source: Smart bridge, 2019. In: MX3D [online]. Amsterdam: MX3D. Available from: https://mx3d.com/industries/design/smart-bridge/) [Accessed June 30, 2023])

Another MX3D project is a skeleton floor for the ESA lunar station, in collaboration with architects Skidmore, Owings and Merrill, which was exhibited at the Venice Biennale 2021. The floor was printed using the GTAW method in stainless steel in impressive 246 hours. 395kg of steel was used for the 3D printing and the final product was 4.5 metres in diameter. Again,

the designers analysed the structure to use as little material as possible and to meet all the constraints imposed by the metal 3D printing method [16].

Fig. 7.: Metal bridge created using 3D printing. (Source: Crafting, C., 2017. Countour crafting for space aplication. Countour crafting. Available at: https://www.contourcrafting.com/space [Accessed June 30, 2023])

PLASTIC

Plastic is the most commonly used material in industrial 3D printing of small products due to its undeniable advantages. This material is highly recyclable, reusable, has good filament extrusion properties and is very fast rigid after extrusion. We are able to use a large variety of plastics for printing or use this material together with composite materials. In architecture and construction, we are not yet using the full potential of this material, as it has very different properties from standard materials and the necessary research and management processes towards the certification are very lengthy in our industry [18]. It is the recycling of this material that inspires many researchers, especially in the development of formwork for reinforced concrete structures. This is because traditional formwork accounts for up to 40% of the total budget of reinforced concrete monolithic buildings, and by using a plastic form we are able to optimize the amount of concrete and shorten the schedule without increasing the cost [4,19]. The new design methodology using intelligent tools allows us to use new forms of formwork that offer recyclability, new aesthetics, great material savings or reusability [19,20].

Another innovative feature is the use of plastic material as a 3D printed structure in the space, which serves as a support structure for the application of concrete (e.g. by torquing), without the need for additional formwork [21]. The surface is subsequently smoothed. Again, there are limitations and difficulties with these systems as well. An interesting finding was that the presence of mesh increases the tensile strength of concrete and can be a substitute to the conventional steel reinforcement [22].

In today's literature, many new structural elements and architectural forms using the aforementioned 3D printing methods with plastic material [23] are appearing. Unfortunately, nowadays we have not reached the application to the real operation. One of the many reasons is the unsuitability of the material used or the paradigm of today's architectural processes, both from the design side and from the investors' side. The problem with today's research is that most of the additive processes have focused on the production of concrete mix-based load bearing elements [24]. For these, above mentioned, reasons, we are unable to objectively evaluate the contribution of other materials. The research by Labonette et. all states that we should go in two directions in the future:

1. Research should investigate additive design processes for inhomogeneous materials to facilitate the production of versatile building materials [24].

2. Today's research should develop new innovative materials that exhibit a good combination of all the basic material properties. Define new materials, then optimise them and apply multi-level analysis to them where appropriate. This would eventually become an important part of the development phase of building materials developed to suit specific structures [24].

EARTH

Earth and its use as a building material dates back to ten to fifteen thousand years BC. It is a material that is easy to use, renewable, mechanically resistant and easily recycled. For these reasons, we still use earth today and it is one of the most commonly used building materials worldwide, although it has been unjustly neglected until recently. In the "Earth for People" project, we are trying to change this established paradigm and highlight its potential both in traditional construction and its place in modern technology.

Currently, small earthen 3D printing machines are used to create ceramics (usually the printing material is based on a special clay that allows firing) and large machines for printing buildings (the printing material is an ordinary earth, but it must meet the requirements for transport and passage through the printing nozzle). Ceramic 3D printing produces small models and objects of daily use as well as design accessories or aids for projection or easier presentation of a building or product. Large machines are already making realistic builds, and they are also able to print from local earth (depending on the type of earth, partial adjustments to the mix may be necessary).

Technology for ceramic 3D printing

Feedstock form	Type of ceramic 3D printing technology	Abbreviation
Slurry-based	Stereolithography	SL
	Digital Light Processing	DLP
	Two Photon Polymerization	TPP
	Inkjet Printing	IJP
	Direct Ink Writing	DIW
	Three Dimensional Printing	3DP
Powder-based	Selective Laser Sintering	SLS
	Selective Laser Melting	SLM
Bulk solid-based	Laminated Object Manufacturing	LOM
	Fused Deposition Modelling	FDM

Tab. 1.: Technologies suitable for 3D printing from ceramics. (Source: ZHANGWEI, Chen, 2019. 3D printing from ceramics: A review. Journal of the European Ceramic Society. 4(39), 661-687. Available from: doi:https://doi.org/10.1016/j.jeurceramsoc.2018.11.013)

Solid-based materials are generally used for architecture and construction, and FDM is the most widely used technology. For this technology, the following machines are currently most commonly used: stationary printers, industrial multi-axis robotic arms, autonomous vehicles or drones [26]. The technology with industrial robotic arms for small models is also used at our department within the Institute of Experimental Design at the FA BUT in Brno under the direction of B. Arch, Martin Kaftan, Ph.D. We are currently in test operation (Fig. 8,9).

The initial tests were conducted under the following conditions:

1. Kuka industrial multi-axis robotic arm

2. Extruder holder modelled and produced on a Stratasys F120 industrial

3. Eco extruder Lutum with earth tray

4. Printed at standard room temperature

5. Moisture of the earth was not directly measured

6. The models were produced in Rhino software, the print program was created in Grasshopper software and exported in KRL (Kuka Robot Language).

Participants of 3D printing tests: Martin Kaftan, Marco Palma, Efilena Baseta, Jakub Brahmi, Roman Bolcek

Fig. 8, 9.: 3D printing, Institute of Experimental Design, FA BUT Brno. (Source: Bolcek, R. 3D printing by robotic arm [foto]. FA BUT Brno 2023. In: Roman Bolcek Archive [Acessed. June 8, 2023])

Over time, it has been shown that earth (clay) has good results even in additive manufacturing. The clay-like material is easy to fill into the print tray, does not require highly trained forces to prepare the material, is fully recyclable, inexpensive, mechanically durable, easy to print, fully natural and aesthetic at the same time [25]. The disadvantages are the use in small scale project, the need for supports (these can of course be recycled and reused), slow printing speed (material takes a long time to dry), the frequent occurrence of air bubbles (causes gaps in the cartridge, if not filled by machine we cannot achieve optimal results) and the need for manual operation of the arm to optimize the machine parameter (operator manually optimizes the printing speed or height above the printed layer) [25].

All the advantages and disadvantages of printing from this material can only be confirmed after deployment in live commercial operation. We are currently testing the structures on a smaller scale and testing different moisture blends (we are recording the results and plan to continue applied research in the future). After a few tests, we will probably focus on design products. Unfortunately, we do not have the space and economic background for large-scale technology nowadays.

3D printing from earth in civil engineering practice

Basic research and technology for 3D printing from earth in the civil engineering and architectural sectors is being developed by 3D WASP, which for example was the first to print an earthen house using its equipment (Crane WASP 3D). Their equipment is modular, so they do not have to limit themselves to horizontal dimensions, but the printing height is limited to three metres. They created a house called Tecla (technology of clay) [26].

In 2021, the company completed the Dior pavilion, which uses the same printing system (Crane Wasp) as the aforementioned Tecla house. The aim of the project was to reduce the environmental impact compared to traditional technologies or 3D printing from concrete. The structures of the Dior pavilion were built by two simultaneously printing arms. The total area of the building is 80 square meters and 55 tons of printing material was consumed. The total production time took 120 hours. Most of the other projects use similar technology, as 3D WASP is one of the few companies that produce large-scale prints for architecture and construction [26].

Fig. 10.: 3D Printed Earthen Pavilion for the fashion company Dior. (Source: 3D WASP, 2021 Concept store Dior, 2021. In: 3D Wasp [online]. Italy: 3D Wasp Available from: https://www.3dwasp.com/en/3d-printed-pop-up-store-wasp-dior/) [Accessed June 30, 2023])

Scientists at the Institute for Advanced Architecture in Catalonia (IAAC) wanted to create a prototype 3D printed wall that would introduce earth as an acceptable construction material, all with the help of additive manufacturing and an optimised production process. The wall consists of individual modules. In tests, they demonstrated that a local material coupled with a digital process will yield the desired result [26].

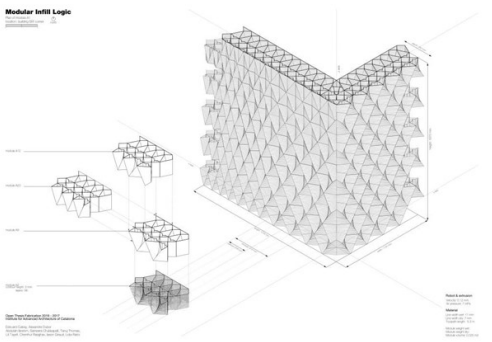

Fig. 11.: Prototype of the 3D printed IAAC wall. (Source: IAAC, 2017. TERRAPERFORMA. IAAC. Available at: https://iaac.net/project/terraperforma/ [Accessed June 30, 2023])

It's no wonder that WASP and IAAC have joined forces to present an innovative wall prototype (designed by IAAC, implemented by WASP) as part of Open Thesis Fabrication research focused on additive manufacturing in the construction industry. This is a continu-

ation of the earthen wall printing research mentioned above. The researchers state that this is an affordable alternative to today's building systems. The 1:1 prototype is a 400 mm thick wall with timber walkable elements. The printing process took 40 hours and used 2 cubic metres of material. The authors state that this is the first significant step towards the realisation of load-bearing structures from this natural material. If we, however, compare such a product with traditional construction technology, the process is still very lengthy [26].

Fig. 12.: Prototype of a 3D printed earth wall. (Source: 3D Wasp, 2022. 3D printed earth wall with embedded staircase. 3D Wasp. Available at: https://www.3dwasp.com/en/3d-printed-wall/ [Accessed June 30, 2023])

Today's technological advances in additive manufacturing using earth are enormous. However, researchers Chen et. ali. emphasize that there are still barriers to optimizing parameters and post-processing for wider use of earth 3D printing. Industrial large-scale production can be very challenging, and high-volume prints are rather rare today. Again, they stress the importance of developing research on the materials in question to progress in the future, as with previous materials (metals, plastic, concrete). We must continue to emphasize the production of high performance components, in pure form, and reduce today's costs and overall production time. If we make a simple summary, then today's production technologies are at a very high level, but we are lagging behind with research on the materials used [25].

Material	Advantages	Disadvantages
Concrete	Print speed, high-volume printing equipment	Occasional need for formwork / additional reinforcement
	Mechanical properties	Difficult recycling
	The most widely used research	High carbon dioxide production
	Nowadays affordable printing materials, unless they contain special fibrous materials (reinforcement)	Drying of the material in the nozzle, need for special mixtures with hardening accelerator
	Possibility of combination with other materials	Requirement of additional treatments to obtain an aesthetic surface
Metal	Print speed	Very expensive material price
	Material saving	Printing defects, difficult to process
	Possibility of new shapes	Necessity of closed chambers for printing in some technologies
	High mechanical resistance	High temperatures during material processing
Plastic	Print speed	Insufficient mechanical properties
	Spatial printing capability	Insufficient resistance to climatic influences
	Material recycling	Non-ecological
	Low cost	High temperature and fumes during printing, need for a flat substrate and enclosed room
Clay	Fully natural, ideal for locations with poor accessibility to industrially produced building materials	Slow printing. Instability in contact with water.
	Health friendly, easy to handle and repair without the need for special tools	Slow solidification, air gaps
	Fully self-sufficient and recyclable	Frequent spoilage of prints
	Possibility to recycle supports with subsequent use of printing	Very difficult/high cost high volume printing

Tab. 2.: Summary of advantages and disadvantages of the materials. (Source: Authors)

CONCLUSION

The article summarizes the current state of the art in 3D printing and compares the most frequently used materials for 3D printing, which are concrete, earth, plastic and metal. Our conclusions from the research conducted so far are consistent with the research presented in the paper [18,19,24,25], i.e., that today's extrusion equipment for most materials is of a high standard and capable of printing real objects. The reality, however, is that most of today's research facilities are dealing with concrete extrusion, which in our opinion cannot be considered too innovative compared to the revolutionary nature of this technology. Therefore, research should be directed towards the discovery of new or at least evolutionarily modified materials, whether they will be homogeneous or heterogeneous based. From the history and theory of architecture, we know that for a new technology or material is always adapted the form of the building and the whole production sector. Today's additive manufacturing goes in the opposite direction, working with traditional materials and often not even adapting the form of the structure. Today's technologies allow us to topologically optimize the network, production materials and other production mechanisms. Due to the lack of skilled labour, it is problematic to achieve very good results in most cases [18,19,24,25].

These conclusions should be a major challenge for us as architects in the future. In our opinion, the repetition of modernist and simple forms using promising technology and traditionally used materials is the wrong way to think about today's 3D printing issues. Especially when today's research already offers new materials (based on composite materials - carbon fibre etc.) associated with this technology that have the potential to cause a real revolution in the architectural and construction process [23]. It is up to us to decide which path to take.

Other challenges to consider in the future [18,19,24,25]:

- use of additive manufacturing on a closed site / on site
- we should fully automate the production process, incorporating artificial intelligence
- start testing liquid/powder based materials and adapt our technology to this
- start using more collaboration between architects, engineers and builders
- we need to clearly define whether buildings will be assembled with this technology (partial automation) or printed in their entirety (full automation)
- develop a design approach that allows us to work with more of the constraints that are important for today's performance indicators: speed of construction, cost, sustainability, self-sufficiency, durability, pollution or recyclability
- to develop a new way of designing with rules that will directly address additive manufacturing

Additive manufacturing may cause a change in established building and architectural processes in the future [24,25]. All indications are that this will not be the case with traditional building materials (concrete, metal, earth, plastic) that are used today [24,25]. Additive manufacturing with these materials is difficult to compete with traditional and time-tested manufacturing technologies. The extrusion of conventional building materials is economically, time and personnel consuming (need for highly skilled labour) and often does not even achieve the same quality as the standard products produced by traditional methods (casting, folding, welding, etc.). This, however, does not mean that we should not continue research and training in this area. We should be more open and explore new material and technological possibilities of additive manufacturing for construction and architecture [24,25]. This technology has the potential to change the construction industry. It is up to us to make it happen in an environmentally, economically, personnel and technologically sustainable way.

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TRENDS IN DESIGN AND INTERIOR 2023

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ABSTRACT: The future perspectives of interior design and furniture production are assumed by several strong current trends. In the long-term context of design, new aesthetic paradigms are currently being opened up. Societal aesthetic values are being shaped or innovative approaches are introduced into practise and everyday life. Visual inspirations are regularly presented at competitions, world design shows, and fairs, in particular at Milan Design-week, composed of exhibitions at Salone del Mobile, Salone satellite, Euroluce, the presentation of innovative design at Tortona district, or Brera and Triennale, Alcova. By studying the latest expositions at contemporary trade shows, the strongest trends were studied and can be divided into four groups with a similar genesis of inspiration and key factors.

New technologies are essential for the evolution of design. However, nowadays, visual reference to technology is more strongly influencing the shape and aesthetics of furniture. The use of Artificial Intelligence, also referred to as Artificial Intelligence (AI), is also an important issue. New technologies also focus on another strong theme, sustainability, the circular nature of design, and the move toward natural elements. These themes have affected design fundamentally with an overlap in color, shaping, and material interpretation. Inspirations often repeat and build on earlier periods, putting their visual values into a new context and interpretation. Inspiration from the design of the period around the 1980s and the Memphis Milan movement has affected multiple exhibitions and has the potential to create a strong trend. Eclecticism of styles is one of the traditional approaches in design. From the combination of two strong cultures of interior design, Japanese and Scandinavian cultures, a new style has emerged that has hit the interior sphere as a trend. It is called Japandi style.

These key themes, trends, and research are fundamental in terms of development that they are transforming the understanding of materials and construction, as well as the aesthetic perception of design.

KEYWORDS: interior design trend 2023; product design trends; innovative materials; future design perspectives

TRENDS IN DESIGN PERSPECTIVE

The evolution of architecture, interior, and design is shaped by several factors such as cultural, economic, and technological changes. In the wake of these changes, design and interior creation respond with developments and preferences that are later replicated in the form of trends. Sometimes trends may follow marketing objectives, at other times they may mean a flat mindless copying of visual motifs. However, several trends have emerged in recent years that respond to strong societal themes, provide significant inspiration, and may shape the industry in the future.

Why are renowned furniture manufacturers and designers embracing trends? Trends mirror the changing needs and opportunities of society, correspond to innovations in technology, and reflect the blending of cultures. Trends in interior design show the way and open up new perspectives. Design has great potential to change people's thinking and shape aesthetic perception in the long term. For timeless design and products with a long moral life, trends should be followed in the context of societal development, not by copying superficial fashions.

The strongest contemporary trends can be divided into several groups according to key factors:

• Technology is the fastest aging factor in development, yet its influence on furniture and interior design is fundamental. In the long term, however, the inspiration of technology does not lead to the timelessness of individual products but influences the perception of aesthetics and function.

• The factor with the broadest impact is the need for sustainability, material saving, and a return to natural elements. It is linked to a whole range of design trends, from shaping to material interpretation.

• The returns typical of fashion and clothing design also influence design. Currently, the inspiration of poetry and neo-surrealism is replacing the influence of the culture and design of the period around the 1980s.

• A final factor is the mixing of cultural influences resulting in a desire for different styles of living. Gradually eclectic combinations emerge, the most recent being the Japandi style.

1. TECHNOLOGY

The furniture and design sector provides a field for research and exploitation of new technologies. Strong design manufacturers at this year's Milan Design Week showed three different approaches to how technology is making its way into the industry in the creation of intelligent and unexpected solutions.

On the one hand, the use of devices, sensors, and chips that respond to lifestyle changes [1]. Contemporary dwellings are becoming smaller and functionally intertwined. They must have the potential for different uses such as a temporary office, relaxation, or lounge. Individual pieces of furnishings, through the addition of technological parts and components, make it possible to transform the home into a polymorphic, multifunctional space. Kitchen technologies and designs have evolved to become invisible, multi-purpose yet highly functional interior elements. Modularity permeates every detail. Caimi, for example, is involved in acoustic technology and the development of acoustic materials, particularly fabrics, and holds several awards and patents. Designer Paola Navone designed for them the Snowpouf and the Napwork sofa (Figure 1), multifunctional seating, and storage furniture with acoustic function [2]. Gessi received the IF Design Award 2023 for its innovative digital water distribution system. The Vita faucet can be controlled either by touch screen, app, or voice command and can deliver plain or sparkling water, hot or cold, and can remember a range of quantity levels, from cup to water bottle. The result is economic and resource-friendliness [3].

The second approach shows how the digital world affects aesthetics. The Roche Bobois brand exhibition, designed by Joana Vasconcelos, impressed visitors not only at Salone del Mobile 2023. The space and the furniture itself, composed of colorful 3D layers, appear as part of an illusory computer game space [4]. A similar motif was used by Driade in its exhibition, which decided to present products in a tunnel of colors (Figure 2). In successive segments, it exhibits conceptual

designs in a color scheme identical to the background color. The refined monochrome lets the viewer focus on the design concept itself.

The third approach is the penetration of Artificial Intelligence (AI) technologies directly into the design process. ArchDaily published its first article on automation in 2017. Since then, the development of AI has rocketed and has been integrated into the daily work of architects [5]. This year, the Kartell brand came out with two new products, A.I. Lounge and A. I Console. These are designs designed by Philippe Starck with the help of an artificial intelligence algorithm. The brief was to maximize comfort, structural strength, and stability with minimal material consumption, which is 100% recycled thermoplastic technopolymer. "Kartell, Autodesk, and I," says Philippe Starck, "asked the AI the question: Artificial intelligence, if you know how we can let our bodies rest using the least amount of material? The artificial intelligence, without culture, without memories, without influence, responded only with its "artificial" intelligence. A.I. is the first chair designed outside of our brains, outside of our habits, and without how we are used to thinking. And with it, a new world opens up to us. Unlimited."[6].

2. "ORGANIC IS NEW BLACK."

Environmental sustainability and energy saving are key themes across the industry. Much attention is paid to material sourcing, production methods, geographic proximity, disassemblable and reusable components, and products designed around recycling [7]. Almost every self-conscious furniture brand introduces products with an ecological theme in their portfolio. In some cases, it is more about clever marketing responding to a general trend, sustainability. This also clearly points to a distinct development aspect.

In the 1950s, synthetic polymers dominated the design world, allowing furniture to be sculpted or futuristically shaped; the iconic Pantone chair (1959), from a single piece of molded material to an abstracted figure, was a revolution, as was the iconic Ball chair E. Aarnia (1963). The technological possibilities of plastics have shaped fundamental aesthetic norms such as subtlety and 3d sculpting, especially in seating furniture. In the 1990s, designers like Enzo Mari began working with recycled plastics [8]. Today, sustainable design in plastic is the focus of many projects. The Guiltless Plastic initiative by curator Rossana Orlandi is highly appreciated, highlighting responsible design from this material. Focusing on collectible design related to the shaping of plastic, designer Dirk Vander Kooij is recycling plastic, melting and reassembling pieces of plastic, or printing design artifacts using robots (Figure 3). Vitra's exhibition, Plastic, Remaking Our World, showed new perspectives on the whole issue, and the history of production and presented design icons made of plastic, as the ageless design does not lose value and thus does not become waste [9].

However, the current trend is to replace plastics with recycled or innovative alternatives. New materials bring different technological possibilities and a new form of aesthetics turning to nature, naturalness, and imperfection. Organic textures and natural surfaces are coming to the fore. Research into the transformation of bio-waste into composite materials using organic binders is providing alternatives to formaldehyde-based boards and plasterboards. Selected recycled raw materials such as lentils, grass, coffee pulp, corn husks, orange peel, wood shavings, hemp, seaweed, kelp, and others carry the natural visual value of innovative materials. [10] The production of such organic refuse bio compounds has been undertaken by companies such as Ottan [11] or Biohm [12]. Startup Kaffeeform [13] processes coffee grounds for the creation of small-scale designs in an exclusively local way, with minimal transport burden. BlueBlock is working on the production of composites using seaweed growth for their creation, researching bioplastics created by fermentation of bacteria and yeast, or creating natural dyes [14]. Seaweed is also pressed into thin compact plates by Metis seagrass [15]. A very effective material is Foresso developed by Conor Taylor. It consists of a slab of wood scraps pressed like artificial stone into a material with the visual appearance of traditional terrazzo [16]. However, the slabs joined by pressing do not allow the shaping we are used to with plastics. For more than a decade, materials have been developed from non-derivative biopolymers, called "liquid wood", which allow products to be shaped by injection molding like plastic. Liquid wood can be based on pure biopolymers such as lignin (e.g. "Arboform") or on blends of biopolymers (e.g. "Fasal" and "Fasalex"). Liquid wood is harder and suffers less than conventional plastics. On the other hand, it is quite brittle [17]. Designers Nipa Doshi and Jonathan Levien designed the Impossible Wood chair for the Italian company Moroso with a seat made of a single piece of cast wood made precisely from Arboform.

A significant discovery was the use of mycelium to create composites. Mycelium connects organic particles of residues from agriculture or the wood processing industry through a 3D network of fibers. It naturally forms a compact material that can grow into a given shape. The key advantages of the resulting nanocomposite are the low cost of feedstock, rapid biodegradability, recyclability, and minimal carbon footprint [18]. For use in design and architecture, properties that meet the requirements for fire resistance, and thermal and acoustic insulation are of interest [19]. Mycelium composites present a new aesthetic of natural irregular form due to natural and spontaneous growth, thus achieving a unique structure. The research shows great potential and is still not over. Experiments with mycelium were carried out in 2020 by the design couple Mochal (Llev) when they presented a collection of tables and candlesticks made of pigmented as-grown mycelium sheets at the Prague Designblok. The collection received a nomination in the Best Home Accessories Collection category. Currently, the glass company Lasvit is creating a collection of glass artifacts blown into molds grown using mycelium, based on a design by Llev Studio (Fig. 4). The Italian company Mogu has developed acoustic panels and floor panels using mycelium [20]. Another producer is the American Ecovative.

The spontaneous appearance of the new bio-based materials adds individuality to interiors that are so sought after that designers are looking for other finishes based on the beauty of natural chance, such as ombré effects, hand-etched metals, watercolor or reverse staining of plywood. Uneven surfaces reminiscent of sponges, stone, or orange skin are trending. This surface is the concept of sanitary ware or lighting. For Diesel living, Lodes produces the Mushroom lamp, which works with the mushroom-like uneven surface to create random optical effects and shadows. Tom Dixon presented the Choice collection (Fig. 5). Creative variable lights, combining basic shapes with imperfect surfaces, organic curves, and colors under the motto "we want more" of shapes, effects, and emotions.

Imperfect surfaces are complemented by more massive shaping referring to primitive cultures and archetypes. In addition to cultural overlaps, the massive shaping is influenced by changes in future material possibilities. Subconsciously, visual preferences are transformed from subtlety to massiveness. Round organic shapes, massive legs, or arches are a more bland trend in contemporary design. It appears not only in the scenographic modeling of interior space, it is also an important part of product design. Typical examples are central table bases modeled using arched or organic shapes, such as the Peyot table, E-ggs (2019) for the Bolia brand, the Elefante table, Marcantonio (2022) for

Mogg (Fig. 6), the Odyssey tables by Jiří Krečřík (2019), which are part of the collection by curator Rossana Orlandi, or the Meet table, Daniela Lago (2021). Massive shapes also dominate chairs and armchairs, with some of the most striking designs of this type being the Roly Poly collection by Faye Toogood for Driade or the Knitty chair, Nico Zupanc (2023), for Moi (Fig. 7). Front designers, in turn, designed the modular Pebble Rubble sofa for Moroso, inspired by stone blocks. A natural aesthetic is the basic concept behind the designs of Imperfettolab, the duo of Verter Turroni and Emanuela Ravelli (Fig. 8) Imperfect surfaces and shapes strictly extracted from nature impressed at both Maison object 23 in Paris and Salone del mobile 23 in Milan. The design has great power to transform society's predilection from perfect cool surfaces to a new aesthetic based on nature and its naturalness [21].

Wood, or wooden surfaces, is making a big comeback as a natural, sustainable, and visually eclectic material. The wood itself brings a sense of relaxation and comfort and has enjoyed long-lasting popularity. However, contemporary wood furniture design requires minimal material consumption, economical subtlety, a minimalist approach, and the preservation of a natural appearance. It is often combined with other natural materials and recycled textiles.

Color schemes vary from cool minimalism to a preference for warm ochre, clay, or terracotta shades thanks to the inspiration of nature. In interiors looking for warmth and comfort, designers opt for warm orange and beige undertones, avoiding anything in the spectrum of cool colors, grey, white, and black. Bright rich hues and powdery broken tones of flesh colors, earthy taupes, or soft sand tones are on trend. Bold textures and layering of sculptural furniture silhouettes along with colors create a novel environment, sometimes called natural maximalism.

3. „RETURN TO THE FUTURE“, 80S INSPIRATION.

In design, we are used to the recurring inspirations of a previous era. In the past years we could see the admiration of retro and scandi, the big wave of minimalism with industrial aesthetics going back to the space race of the 60s and 70s. In the pandemic era, a trend of dream poeticism emerged, creating almost surrealistic motifs that reveled in illusory digital print, metaphor, or proportional exaggeration. This trend gradually evolved into a playful throwback to the culture of the 1980s, sometimes called Memphis style. Neons, cotton candy colors, playful geometrics, and glass blocks can all have a place in contemporary interiors. Brands such as Kartell, Miniforms, Hay, or Driade along with designers such as E-ggs, Paolo Cappello, and Nika Zupanc paraphrase the themes of the 80s period in new designs. The distinctive brand Driade was born in the 60s out of a desire for eclectic, extravagant, yet elegant and timeless design. Throughout this time, it has collaborated with world design leaders such as Enzo Mari, Ron Arad, P. Starck, Borek Šipek, Constantin Grcic, Fabio Novembre, and others. Fabio Novembre, the artistic director of Driade and a key figure in contemporary design, is a proponent of eclecticism and experimentation. His work is conceptually linked to the principles of the Memphis movement, as he is a disciple of Ettore Sottsass and Alessandro Mendini, founders of the Memphis group [23]. Memphis Design was founded in Milan in 1980 as a rebellion against the minimalism and straight lines of the 1970s. The group's official debut at the Salone del Mobile in Milan introduced shapes that moved between geometric and organic, creativity and humor, and marked a major success and influence on postmodern design. Its garish colors, pop art inspiration, exaggerated patterns, and compositions did not leave the works without criticism. Despite its short existence, Memphis left a major legacy for the history of architecture and design and today, more than 30 years later, is experiencing a special revival [24]. It can be seen, for example, in the Magis or Kartell exhibitions, which present design icons in bright, straightforward colors and contrasts. Fabio Novembre designed the Love sideboard, which is an expressive manifesto, a two-dimensional poster about love. From the connection between aesthetics and function, the lines become three-dimensional, available in pop colors (Fig. 9). The Miniform brand presents designs in an explosion of colors and materials. The Super Pop table by Paolo Cappello is made from waste plastic and recycled paint. The result is a pop of color with a multifunctional retro shape. Blown as a single piece of glass, the Soda table is reminiscent of an 80s soda glass. It was designed by Yiannis Ghikas and has won numerous awards (Fig. 10). In 2018, designer Marantonio designed mirrors in the form of letters with retro typography. These examples show that the company is looking for maximum emotion, playfulness, style, and color.

4. JAPANDI STYLE

The eclecticism in the blending of inspirations is reflected in the emergence of the Japandi style, which is a combination of Scandinavian and Japanese aesthetics. Japandi has become a sought-after trendy style as it has a minimalist yet warm feel. The calming elements of these interiors speak of a love of imperfection according to the wabi-sabi philosophy. Although the connection seems disparate at first glance, there have been inspiring links between Denmark and Japan for 150 years. In addition, the two home cultures share an approach to design based on open space, spare minimalism, the purity of quiet lines, respect for craftsmanship, and humility towards natural materials, especially wood. There are many parallels between the philosophy of Hygge and Wabi-sabi. The rustic directness and love of imperfection of wabi-sabi, together with hygge, mirroring the Danish sense of life, softens slightly the Asian austerity, and Scandinavian restraint. Japandi interiors are very timeless, not only because of the foundation of two strong cultures but also the use of natural local materials and attention to detail. While Japanese interiors are dominated by black and white, often complemented by a small selection of earthy tones, Scandinavian color schemes are based on greys and whites, enlivened by pastel tones. The Scandinavians do not shy away from pastels in mint or strong red [25].

CONCLUSION

Contemporary design and interior creation are characterized by entropy and diversity of influences. Four distinct trends based on technology, sustainability, the search for concepts from design history, and the timeless blending of the phenomenal housing cultures of Japan and Scandinavia show the direction and future development. The ecological direction of design is the strongest motif of creation transforming design in all stalls, shapes, colors, function, and material. Research into new materials and a return to nature is bringing about changes in the understanding of appearance and aesthetics, but the genealogy of the product itself, the material, distribution, conditions, and location of production are also important to designers. Raw materials are treated with restraint and minimalism, with humility towards nature and craft. These principles can also be perceived in the trendy style of Japandi. The post-pandemic era has brought a revival and a desire for free, extravagant, and colorful creations. The retro 80s and the Memphis Milano movement brought great inspiration. This resulted in new concepts with a nod to post-modern and pop-art culture. These key themes, which design work addresses in the context of trends and research, are so fundamental in terms of development that they change the aesthetic perception of residential culture and open up new aesthetic paradigms.

Fig. 1.: Caimi, exhibition of Salone del Mobile, Milan 2023. (Photo by the author, 2023)

Fig. 2.: Driade, exposition of Salone del Mobile, Milan 2023. (Source: https://www.driade.com/news)

Fig. 3.: Not just a hollow chair, Dirk Vander Kooij. (Source: https://dirk-vanderkooij.com/not-only-hollow-chair)

Fig. 4.: Symboll. Studio Llev. (Source: https://www.lasvit.com)

Fig. 5.: Mushroom lamps, Tom Dixon, Exposition Salone del Mobile, Milan 2023. (Source: photo by the author)

Fig. 6.: Elephant table, Moog. (Source: https://www.mogg.it)

Fig. 7.: Knitty chair, Nica Zupanc, Moooi. (Source: https://www.moooi.com)

Fig. 8.: Flow chair, Imperfettolab. (Source: https://www.imperfettolab.com)

Fig. 9.: Love. Fabio Novembre. (Source: https://www.driade.com/)

Fig. 10.: Soda, coffee table, Yiannis Ghikas. (Source: https://www.mini-forms.com/en/)

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THE USE OF WOODEN MATERIAL IN THE KINDERGARTEN'S INTERIORS IN ORDER TO SUPPORT INCLUSIVE EDUCATION AND THE QUALITY OF LIFE OF CHILDREN

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ABSTRACT: The aim of this paper is to point out the influence of the wood material in the interiors of kindergartens on its positive impact on the child's development and its inclusiveness in education. The use of furniture and interior elements made of wood in the architecture of kindergartens opens a new area of research and interest in the context of promoting diversity and access for every child, regardless of his abilities or limitations. The article assesses how this architectural and design change can contribute to the inclusive education of children and can positively affect children's cognitive abilities and ultimately improve their quality of life. The obtained results presented in the article can contribute to the creation of new ideas and solutions for the creation of kindergarten architecture, which strive to create an inclusive environment for children and offer the development of knowledge, experience and design thinking in practice.

KEYWORDS: well-being; kindergarten; wood; restorative environmental design; biophilic design; salutogenic design

INTRODUCTION

The influence of the physical environment on children's health and well-being is becoming an increasingly important social issue. Opportunities for direct contact with nature are diminishing due to modern urban lifestyles and inappropriate architectural solutions. Wood, with its pleasant color, texture, softness, and even scent, reminds children of something they intimately know and instinctively feel close to [1]. It has a positive impact on their physical and mental health, and children don't have to make an extra effort to familiarize themselves with this material. The contact of children with nature in the interior environment of kindergartens can reduce stress, and improve concentration, cognitive abilities, and a sense of security.

We believe that due to the aforementioned positive qualities, wood is an excellent material for creating an inclusive-friendly architectural environment in kindergartens. The Salamanca Statement (UNESCO, Salamanca, 1994) introduced the principles of inclusion and stated: "The principle of inclusive education implies that schools should accommodate all children regardless of their physical, intellectual, emotional, social, linguistic, or other conditions" [2]. The use of structural elements, built-in furniture, and standalone solid wood furniture in the interiors of kindergartens opens up a new area of research and interest in the context of supporting diversity and access for every child, regardless of their abilities or limitations. The application of solid wood in the environment of kindergartens can contribute to inclusive education for children, influence their cognitive abilities, and ultimately improve their quality of life. Educational processes, inclusion, and the well-being of users of the physical/built environment could be supported by implementing designs based on modern philosophies such as biophilic design, restorative-environmental design, or salutogenic design.

The main goal of inclusive approaches in education is to provide all children with the opportunity to develop their potential in a school closest to their place of residence and to develop their potential in life and later in the job market. A kindergarten that nurtures and educates a child must be structured in a way that, within an inclusive approach to education, respects the uniqueness of each child. At the same time, it should adapt goals and educational content, as well as teaching methods and forms of assessment, to their abilities.

This article aims to highlight the impact of wood materials in the interiors of kindergartens on the child's development and inclusiveness in education. We focus on existing timber constructions in Slovenia, one of the "Alpine countries" where timber kindergartens are relatively widespread, influenced by the cradle of timber architecture in another "Alpine" country, Austria (Styria and Vorarlberg). A case study presents research conducted in five selected Slovenian kindergartens. The study analyzes the presence of solid wood in their structural, architectural, and furniture design aspects. The results obtained in the article are presented as inspiration for the creation of new ideas and solutions for the creation of kindergarten architecture that strives to create an inclusive environment for children, offering the development of knowledge, experience, and design thinking in practice.

BACKGROUND / THEORETICAL FRAMEWORK

Biophilic design

Combining the philosophy of biophilic design with the creation of physical environments in kindergartens using structures and furniture made of solid wood creates a harmonious and nature-evoking setting for children. This concept is suitable for the inclusion of children as it brings numerous benefits to their physiological and psychological well-being. As studies [3] have shown, the disconnect between people and nature has a negative impact on human physiology and well-being, leading to various disorders and health problems associated with stress. The stress induced by an unpleasant environment can trigger feelings of anxiety, sadness, or helplessness, raising blood pressure, and heart rate, causing muscle tension, and suppressing the immune system.

Conversely, the presence of natural elements such as solid wood in the physical environment of kindergartens helps reduce anxiety, and stress, and improves mood and well-being. For children with specific needs, the presence of solid wood can create a stable and predictable environment that helps optimize their emotional balance. Additionally, the presence of wood can support children's sensory development, stimulate their sensory perception, help create an environment that enhances mood, reduces stress, and provides a pleasant and natural space in which children can feel

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comfortable and safe.

Restorative environmental design (RED)
The materials used in the environment surrounding children have a tremendous impact on their well-being, providing children with a tangible and real world. Instead of spaces in kindergartens that foster a sense of restoration, we often encounter materials that, while practical and efficient, are primarily cheap and often unsuitable, evoking undesirable emotions. The plastic feels artificial, the stone feels hard, the concrete feels cold, and even walls painted white evoke little emotion. In contrast, wood always creates a warm and pleasant impression. Furthermore, it is the only sustainable/renewable natural material among all the mentioned materials.

Lately, there has been an increase in the use of wood imitations (various laminates or ceramic tiles with wood prints), which, at best, offer only a positive visual experience. This artificially created product may look good, but it lacks tactile qualities, scent, and, above all, it is a material that deceives. Compared to authentic solid wood, it is always artificial, and fake, and can negatively affect children's spatial experiences.

Salutogenic design
Health and wellness are gaining increasing importance in the world of interior design. However, it is important to note that salutogenic design and biophilic design are not identical concepts. The biophilic design explores our relationship with nature and natural elements, not only through the presence of plants, trees, and natural wood but also by incorporating concepts such as natural lighting, improved air quality, and the presence of water elements. Salutogenesis goes further and focuses on promoting active health, productivity, and efficiency. It is measurable and motivates us to achieve maximum performance, both mentally and physically. Salutogenic design is a key component of WELL building certification.

In addition to biophilia, the salutogenic design also addresses comfort, nutrition, fitness, and mental state in the environment. For example, the salutogenic design focuses on designing stairs that encourage people to use them instead of elevators or creating active courtyards, terraces, and atriums that promote personal interactions instead of screen-watching and media consumption. It is not concerned with carbon footprint or renewable resources but rather focuses on whether a space contributes to improving people's health and enables them to achieve mental, social, and physical well-being [4].

RESEARCH METHOD

The case study presents a conducted research in five selected kindergartens in Slovenia:

1. Vrtec Loče, Šolska ulica 2, 3215 Loče
2. Vrtec Poljčane, Dravinjska cesta 28, 2319 Poljčane
3. Vrtec Šoštanj, Kajuhova cesta 8, 3325 Šoštanj
4. Vrtec Polzela, Glavni trg 1, 3313 Polzela
5. Vrtec Škofja Loka, Partizanska cesta 1e, 4220 Škofja Loka.

These kindergartens were implemented by the Slovenian architectural studio KONTRA Arhitekti. It analyzes the presence of solid wood and wood-based materials such as plywood in the structural, architectural, and furniture design aspects. The obtained results, presented in the article, serve as an inspiration for the creation of new ideas and solutions for the development of kindergarten architecture, aiming to create an inclusive environment for children and offering the advancement of knowledge, experience, and design thinking in practice.

Fig. 1.: Playroom in kindergarten Loče, nŠolska ulica 2, 3215 Loče. (Photo author: arhiv biroja, available at: https://www.openhouseslovenia.org/objekt/kindergarten-loce/)

Fig. 2.: Playroom in kindergarten Poljčane, Dravinjska cesta 28, 2319 Poljčane. (Photo author: Jakub Hanták, 2021)

Fig. 3.: Playroom in kindergarten Šoštanj, Kajuhova cesta 8, 3325 Šoštanj. (Photo author: Jakub Hanták, 2021)

Fig. 4.: Fig. 4. Playroom in kindergarten Polzela, Glavni trg 1, 3313 Polzela. (Photo author: Miran Kambič, available at: https://www.openhouseslovenia.org/objekt/vrtec-polzela-z-medgeneracijskim-centrom/)

This research is part of a broader study conducted during the preparation of the first author's (currently unpublished) dissertation. The methods used included discussions with teachers in kindergartens, observation, and photography, and the results are described in this article. Digital photography was used to document the presence of solid wood in the structural, construction, architectural, and furniture design aspects of the playrooms and the spatial organization of these rooms. Teachers were asked for their opinions on interior design, architecture, necessary space, furniture, and equipment. The interviews took place during reg-

Explanatory notes:
Biophilic design - represents a holistic approach to the design of interiors and exteriors, where the focal point is the human being and its impact on their psychological and physical well-being and health. In combination with an approach that considers the long-term impact on the natural environment, we refer to it as restorative environmental design, which promotes individual health [5].

Restorative environmental design - is a paradigm of architectural design that combines sustainable construction practices with building methods that are beneficial to the health of occupants [6].

Salutogenic design - Salutogenic design is a concept and approach to environmental design that aims to support and enhance the health and well-being of individuals. Its focus is different from the traditional approach, which concentrates on disease prevention and addressing negative environmental impacts. Salutogenic design instead emphasizes strengthening factors that contribute to health and creating conditions for prosperity and a better quality of life for individuals [4].

Fig. 5.: Playroom in kindergarten Škofja Loka, Partizanska cesta 1e, 4220 Škofja Loka. (Photo author: Jakub Hanták, 2021)

ular daily activities in all observed kindergartens in October 2021.

RESULTS AND DISCUSSION

In the visited interiors of kindergartens, architects enthusiastically incorporated wooden elements, structures, and solid wood furniture. These elements add a natural and warm aesthetic touch to the space and create a pleasant and organic environment for children. They evoke a pleasant atmosphere and bring a sense of warmth to both children and teachers or caregivers. The solid wood material is prominently featured in the structural components of walls, ceilings, and floors, as well as built-in and freestanding furniture. Wooden floors are highly popular and offer various design options and textures. Most flooring surfaces in the case studies were implemented in the natural color, shade, and texture of wood in a brownish-honey hue.

The use of wooden elements in the interior of the kindergarten was employed on various levels. For instance, low-lying wooden shelves, racks, and toy shelves were positioned at an accessible height for all children, including those with limited physical mobility. This ensures a friendly, inclusive environment where all children have equal access to toys and materials. Solid wood provides children not only with natural and aesthetic value but also contributes to the creation of an environment that is accessible and friendly to all children, regardless of their abilities and needs.

Unfortunately, the wooden furniture in the kindergarten did not offer adaptability and flexibility. For example, tables and chairs with adjustable height could be modified according to the individual needs of children with different body proportions and physical abilities. This would allow each child to find comfortable and ergonomic seating, promoting their participation and engagement in various activities.

Equally important was the use of contrasting, predominantly plastic materials executed in a basic color palette, which assists children with visual impairments in perceiving the space and distinguishing individual elements better.

When the space is effectively arranged with open pathways that clearly led to activity centers, children gain the ability to independently participate in specific activities or engage in play. They enjoy the freedom to move around and transition from one activity or center to another without requiring constant guidance from a teacher. Conversely, when the space is disorganized, children become reliant on the teacher for direction, resulting in the teacher's behavior becoming more controlling [7].

Teachers who spend more time managing group behavior find themselves with less time to provide individual support to children, consequently limiting the opportunities for free play. In poorly organized spaces, children depend on the teacher and experience restrictions in their choices and movements. For instance, by introducing a more complex or interactive play unit into the environment, children can actively engage in free play, exhibit increased self-sufficiency, and develop longer attention spans [8]. Preschool teachers, based on their observations, believe that the space where children spend time should offer flexibility in terms of furniture and partitions, allowing children themselves to rearrange items like toys, books, and furniture. Children feel at ease when they have control over their surroundings, enabling them to explore and create small spaces tailored to their activities. Conversely, when the space remains static, children feel uncertain and less independent. Moreover, each area of the play space should be well-organized, clearly indicating its purpose. A chaotic space hampers children's orientation and diminishes their capacity to engage fully because they struggle to navigate the surroundings. Therefore, it is crucial for communication paths within the space to be clear and concise, minimizing any disorientation. Incorporating color into corridors, walls, and the floor surface can contribute to achieving this goal [9]. Additionally, the space should offer visual accessibility since children value visibility, even when they seek separation or prefer playing in smaller groups. From a safety standpoint, visibility is advantageous as it allows teachers to maintain constant supervision. Visual accessibility should extend beyond playrooms and include other commonly used areas like dressing rooms, toilets, and communication devices. Nikoloska [10] highlights that the size of the spaces and the available resources within them are important factors for fostering social interaction. If the playroom is too small, it may lead to increased aggression and emotional excitement. Conversely, excessively spacious rooms can cause children to feel overwhelmed and disoriented if the space is not properly organized. The selection of toys also influences children's interactions, as each child typically has their favorite toy at a specific time of the day. Conversely, reducing the number of toys provides children with greater opportunities to socialize with one another, thereby promoting increased social interaction.

So when we look at the furniture and the overall environment in which children spend time in preschools, we cannot fully agree with Dorfles' [11] statement about good construction. The furniture found in preschools has essentially remained unchanged for the past hundred years [12]. Haviarová et al. [13] point out that "today's concept of school furniture design is mostly traditional (...) The most common forms of tables are small, four-legged, with flat work surfaces, as well as tables with plywood veneer and steel tops. Nowadays, work surfaces are most commonly constructed from laminated particle boards attached to a welded base structure. Unfortunately, the existing furniture is mostly guided by construction and design solutions that are not in line with the current needs of modern education, students' anthropometric dimensions, and new standards. It is ergonomically poorly designed, structurally unstable, and lacks durability and strength."

In most countries, school furniture is made of three basic materials - wood (solid or wood products), metal and plastic [14]. A school desk and chair made of solid wood are the most expensive, but at the same time the most suitable for the student, especially in terms of tactile properties, warmth, softness, and the impression of naturalness. Wood materials such as veneer board (from which back and seat moldings are made) have similar properties. Given the price of solid wood, most wood materials (chipboard and plywood) are veneered or covered with foil or laminate. Metal is

most often used in the form of pipes for making plinths, which must be structurally strong and stable, so a bent or welded pipe is the most common choice. Due to the economic demands for a cheap product of large series, more and more plastic furniture is produced (back and seat of chairs, table tops and even pedestals) [15], but it showed the worst properties in terms of durability, strength and maintenance. Hedge's [16] research also shows that plastic, beside that is not an environmentally friendly material, retains more bacteria than wood at the surface.

Unfortunately, existing furniture most often is redesigned visual and construction solutions, inconsistent with today's needs of modern education, anthropometric sizes of students and new norms, non-ergonomically designed, unstable construction and inadequate durability and strength. With the development of new materials and new technologies, pedagogical equipment and educational interiors, it is expected that in the near future the current classic way of equipping children's workplaces will change significantly, certainly in anticipation of rising standards and economic opportunities.

A good designer must be aware of his social and moral responsibility. The designer should know how to shape his products and his environment, and thus, he must analyze the past, predict the future, and the consequences of his actions. Especially today, when the super-technologically, sterile, and inhumane environment in which a person lives, has led to a planet that is constantly choking in the gray polluted air [17]. Using of environmentally degradable materials and giving preference to wood.

The selection of structural elements and furniture made of solid wood and wood-based materials such as plywood plays a crucial role in creating an inclusive environment in kindergarten architecture and is an essential step in establishing an environment that promotes equal opportunities and children's involvement in educational processes. The presence of solid wood material allows children to feel accepted, comfortable, well, and safe, as they do not have to exert extra effort to familiarize themselves with this material. They can freely and successfully interact with the environment and develop their abilities and potential regardless of their physical or psychological limitations.

CONCLUSION AND RECOMMENDATIONS

The presence of solid wood in the interiors of kindergartens has a positive impact on children with various psychological and physical issues. The elements of solid wood in the structural, architectural, and design aspects can help reduce feelings of anxiety and stress, improve mood and well-being, and support inclusive education.

Solid wood as part of the physical environment in kindergarten architecture provides an aesthetic and visually pleasing space that is naturally connected to nature. The visual appeal of wood, its natural patterns, and even its scent can remind children of something familiar, increasing their sense of security and stability, which is crucial for children with special needs. Architectural and interior elements and wooden furniture, in combination with the proper spatial organization, can create a predictable environment for children, helping them with multisensory integration. Additionally, it is important to emphasize safety, ensuring that the wooden elements and furniture are made from smooth and non-splintering wood material to minimize the risk of injuries.

The use of wooden elements also opens up opportunities for flexibility and adaptability. Folding or modular constructions of wooden furniture allow diverse arrangements and customization of space based on individual needs and group or individual activities. Children with different abilities can effectively utilize the space and adapt it to their individual preferences and learning styles.

Solid wood is tactile and interactive, allowing children to engage in sensory and motor activities. Children with various physical limitations can use solid wood to support their physical development and rehabilitation. Furthermore, solid wood can serve as a tool for developing children's cognitive abilities. Its natural patterns and creatively tactile qualities can promote creativity, imagination, and object manipulation. Children with different psychological issues, such as ADHD, may benefit from an environment in the kindergarten that incorporates solid wood, as it can help them focus on learning and improve their ability to sustain attention.

One of the negative aspects of using wood in kindergarten interiors is its susceptibility to scratches and other surface damages that can create wood splinters. Small protrusions - wood splinters or deeper knots - can pose a potential risk to children, especially if the splinters remain unremoved and children can get injured, inhale them, or even swallow them. Therefore, it is important to regularly inspect wooden elements and furniture in the kindergarten.
Another significant disadvantage of using solid wood is its high cost in terms of investment. Architects and designers often have to resort to cheaper alternatives due to budget constraints. The increased costs can be associated with the fact that wood is a valuable and natural material that is typically sourced and processed with sustainability in mind. The problem arises not only from furniture manufacturers and clients (preschools) but also from the deficiencies of relevant institutions that inadequately monitor this crucial issue. Furniture in preschools is an integral factor in the overall conditions of preschool institutions.

The design and ergonomics of furniture in preschools are crucial as they have a significant impact on children's comfort and health. It is necessary to consider the correct dimensions and form of furniture to meet children's needs and promote proper posture. Designers have a responsibility to create furniture that is not only aesthetically pleasing but also functional and ergonomic.

It is necessary to systematically conduct further empirical studies that explore and validate the salutogenic model and identify various wellness factors in psychosocially supportive design. The study supports decision-makers to implement psychosocially supportive design, which in turn promotes health and well-being. It is time to step into a new millennium where the salutogenic approach and psychosocially supportive design lead the way to a new paradigm. Finally, it is essential to understand the quote by Winston Churchill - "We shape our buildings, and afterward, our buildings shape us," which speaks to the significant impact that the buildings we design have on human behavior.

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THE IMPACT OF DIGITAL SOLUTIONS ON THE FUTURE OF CONSTRUCTION PROJECT MANAGEMENT

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ABSTRACT: The role of the architect after 2020 will never be the same. For everyone, 2020 was a challenge that we have not yet been able to face. Temporarily, many processes of drawing up construction projects have stopped. Some tasks were cancelled or postponed. When the design work finally resumed, the architects' responsibilities expanded significantly and were subjected to enormous time pressure at various stages of the building design process. The use of technology for online communication has become easier and even indispensable. It is becoming more and more natural to use project management software. There is also a huge emphasis on using applications and tools to prepare reports and manage changes in projects. How will digitization change the work of an architect?

What are the changes in the way of drawing up construction projects and how they affect the work of an architect.?How can right and proper digital transformation of an architect's work improve it?

KEYWORDS: digital solutions; project management; checklists; BIM; AR; IoT

INTRODUCTION

The future of construction project management seems promising, and many changes and new trends may influence the way construction projects are conducted. Among the numerous areas that may impact the future of construction project management, it is worth analyzing a few of them.

The first crucial aspect is digital technology and Building Information Modeling (BIM). Digital technologies, such as BIM, are playing an increasingly significant role in construction project management. BIM allows for the creation of digital three-dimensional models that integrate information about geometry, materials, schedules, and costs. This enables better management of construction processes, prediction of conflicts, and project optimization. Based on experience, it is difficult to imagine design today without simultaneous 3D modeling. It is not only a time saver but also reduces unnecessary risks and errors.

Another key element is sustainable construction. In the face of climate change and growing ecological awareness, sustainable construction will become increasingly important. Project management in construction will consider aspects related to energy efficiency, waste reduction, eco-friendly building materials, and green technologies. Today, Polish legislation concerning architectural design documentation already obliges architects to implement many sustainable development solutions, ranging from guidelines for external partitions, water retention, renewable energy sources, to recycling materials used during construction.

Equally important is the issue of collaboration and team management. In the future, construction project management will be more focused on connecting the various parties in the construction process into a tightly-knit network of connections. Communication between different project stakeholders, such as investors, architects, contractors, and suppliers, will play a crucial role in achieving successful project completion.

By working on multiple projects and having online collaboration tools at hand, we accelerate and optimize the work process on specific projects. Furthermore, we observe significant mobility in an architect's work today and many opportunities for remote management. The development of mobile technologies enables construction project management from anywhere. Architects can monitor progress, review documentation, communicate with the team, and make decisions even while being away from the office at the construction site.

Research into the impact of digitization in architectural design aims to understand and utilize advanced digital technologies throughout the entire design, construction, and construction management process. In this context, digitization refers to the application of information and communication technologies and information technology in various aspects of the construction industry. The main goals are to understand how digital technologies can contribute to increasing the efficiency and effectiveness of the entire design and construction process. Whether the use of modeling and analysis software helps in project optimization, early problem identification, and error elimination, and whether it translates into time and resource savings. Digital technologies enable more accurate modeling, analysis, and simulations, contributing to the improvement of the quality of construction projects.

The analysis focuses on how technologies can facilitate communication and collaboration between different project teams and those involved in construction. The state of research on digitization in construction reflects the overall trend of advanced technologies in the industry. With the growing interest and investment in this area, further innovations and improvements can be expected in the construction industry in the future.

Just like in any process, humans strive for optimization, and nowadays, also for robotics. Progress in robotics can lead to the automation of certain construction tasks. Construction robots can assist in performing repetitive and time-consuming activities, speeding up project execution, and reducing the risk of human errors. This will directly contribute to improving safety during the construction phase.

One cannot overlook the use of artificial intelligence and data analysis in construction. Artificial intelligence and data analysis can assist in analyzing large amounts of information, such as schedules, costs, risks, and energy efficiency. As a tool, they can provide optimization insights, automate routine tasks, and aid in making better decisions. When combined with a designer's experience, it becomes a new tool that streamlines the entire construction process.

Today, we already make use of Augmented Reality (AR), which plays an increasingly significant role in construction project management. It enables more effective management of project data, process op-

timization, risk forecasting, and resource utilization optimization. Furthermore, it offers a more accessible way to showcase the project to investors or future users. Another rapidly developing area of digitization is the Internet of Things (IoT). The use of IoT systems is becoming noticeable in the planning phase of investments, where information about sunlight exposure, shading, traffic, or air pollution can be obtained. The concept of communicating devices or machines on the construction site extends beyond the site itself and also includes those connected to the project's network but located elsewhere. The Internet of Things is playing an increasingly significant role in the field of architecture, introducing innovations and changes in the way buildings are designed and managed. Among many examples, smart buildings are a key component. This internal system enables the creation of intelligent building objects, where various devices and systems are interconnected. This allows monitoring and controlling various parameters such as lighting, ventilation, heating, security systems, and the collection of data on energy use and building efficiency. In the field of building automation systems, internal communication allows the integration of different systems such as lighting systems, air conditioning control, energy consumption management, monitoring systems, and fire safety. This ensures optimal working conditions, safety, and comfort for building users.

Intelligent energy systems, utilizing the Internet of Things, can create intelligent energy management systems in buildings. These systems can monitor energy consumption, control and optimize device operation to minimize losses and energy savings. They can also integrate renewable energy sources such as solar panels or micro wind installations. Monitoring and data analysis are crucial for sustainable development. With IoT, interactive and personalized environments can be created inside buildings. For example, using smart lighting systems and multimedia control, the atmosphere and functionality of spaces can be tailored to individual user preferences.

Furthermore, we are increasingly using 3D printing technology. Its potential also contributes to revolutionizing the construction industry. 3D printing can be used to create more efficient and precise structural elements, and even entire buildings.

Taking into account the above, any legal and regulatory changes, urban infrastructure development, and the increasing demand for sustainable and smart buildings will have an impact on the future of construction project management. Architects are always prepared, open to innovations, and constantly improving their skills to effectively meet the modern challenges of digitization. Most importantly, by implementing digital solutions, they can benefit the process of preparing documentation and carrying out construction projects.

Digital solutions have a significant impact on construction project management, contributing to increased efficiency, precision, and transparency in the construction process. Considering changes in Polish legislation regarding the scope of construction projects and their approval in the public administration, several digital solutions and their impact on construction project management should be mentioned.

In the realm of construction project documentation, traditional paper documents and plans are being replaced by digital document management systems. This allows all documents such as plans, specifications, contracts, and reports to be accessible in one place, facilitating their management, change tracking, and sharing with project stakeholders. Document management systems also automate processes like electronic signatures and deadline reminders.

Another module of digitization involves scheduling and time management. Dedicated project management software enables architects, engineers, and project managers to create schedules, plan tasks, and track progress digitally. Digital tools allow for task assignment, deadline monitoring, time tracking, and the identification of potential delays. Making changes to the schedule is easier, and all team members have access to current information. Everyone is interconnected, which minimizes the possibility of overlooking individuals who may influence the progress of the project.

Considering the execution of a construction project, resource and cost management are crucial. Construction project management systems allow for close monitoring and management of resources, including materials, equipment, and personnel. With digital tools, resource consumption can be tracked, costs controlled, and reports and forecasts generated. Project management software also facilitates the management of orders, invoices, and payments, making financial control of the project and budget optimization easier. At every stage of the project and its execution, control and correction of the project as a process are possible.

Due to the pandemic, digital communication and collaboration have become crucial and indispensable. Digital solutions enhance communication and collaboration among members of the project team. Online platforms, tools for collaborative work, and communication systems enable easy sharing of information, document exchange, coordination of activities, and real-time communication. All team members can access current data and stay updated on the progress of work. Participation in construction meetings and access to current industry foundations are now possible and easily coordinated.

Introducing digital solutions into construction project management contributes to better organization, increased efficiency, improved monitoring, and enhanced communication. They also facilitate data analysis, report generation, and more thoughtful decision-making, which translates into overall improvements in the construction process.

Based on practical project experience, a key aspect is the implementation of Building Information Modeling (BIM) as a foundation in the construction project planning process. The fundamentals of Building Information Modeling and the benefits of using an integrated approach to architectural design have been implemented in many countries for years. Everyday design work shows how the integration of various disciplines can enhance the efficiency of the design process.

Technologies and tools within Building Information Modeling, such as building information modeling software, project management tools, energy analysis, and visualization, are invaluable support for architects. The integration of these tools for effective project management is crucial for the success of the investment. One of the significant advantages of integrated design is the ability to collaborate with various project partici-

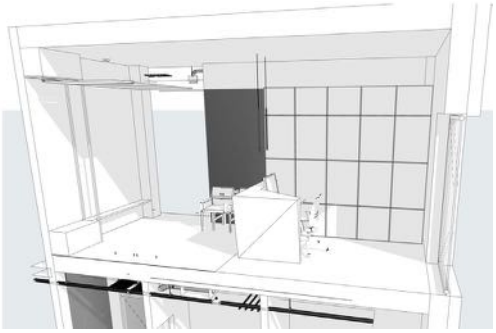

Fig. 1.: BIM Elements in a 3D Perspective - a part of the author's project. (Source: xxx)

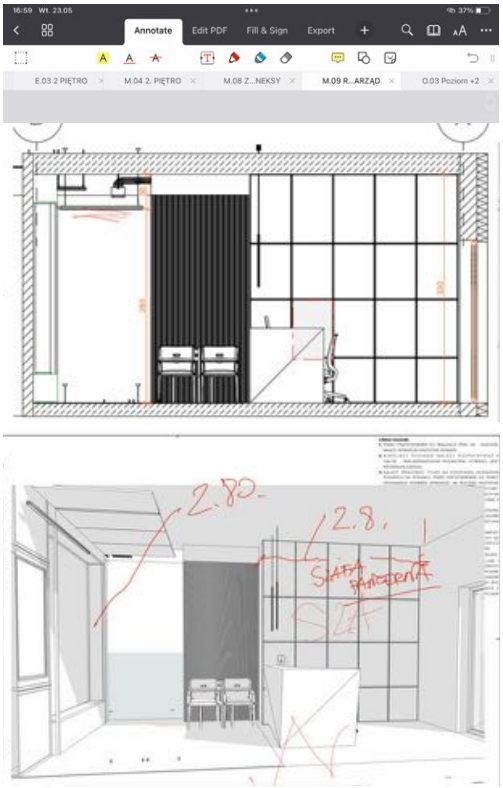

Fig. 2.: BIM Elements in a 3D Perspective with on-site parameter adjustments using a mobile application - a part of the author's project. (Source: author)

Fig. 3.: BIM Elements in a 3D Perspective before applying textures for visualization application - a fragment of the author's project. (Source: author)

Fig. 4.: 3D view after applying textures in the visualization application - a fragment of the author's project. (Source: author)

pants, such as architects, engineers, contractors, and building owners. Managing information in a project based on building information modeling, using a central information model representing the building, allows for smooth change management, version control, and sharing of project data.

Working on a project process model based on BIM illustrates how effective communication and collaboration among architects, engineers, and other specialists can lead to better project results.

In the context of construction project management, the next digital solutions, such as virtual reality, artificial intelligence, cloud computing, and data analysis, offer broader possibilities for the development of the construction process. The impact of information and communication technologies, automation, artificial intelligence, and data analysis on the construction management process is a crucial branch of development in the construction industry. The Internet of Things (IoT) and smart buildings, equipped with numerous sensors, wireless networks, automation systems, and data analysis for monitoring and optimizing building operations, will contribute to the optimization and improvement of design. Artificial intelligence, through data analysis, provides numerous opportunities for machine learning algorithms, forecasting, and optimization to improve construction processes and decision-making.

Today, the ubiquitous technologies of virtual reality and augmented reality demonstrate the immense potential of these technologies in construction management. Based on visualization, construction meetings are convened online using active 3D models, controlling the quality and scope of projects. These technologies are used to clarify and resolve project-related issues in a straightforward manner. In the next stage of implementation, the role of the Internet of Things is crucial in selecting sensors, communication infrastructure, data analysis, and security issues in the built environment.

THE SCIENTIFIC ASPECT: ANALYZING THE IMPACT OF DIGITAL SOLUTIONS ON CONSTRUCTION PROJECT MANAGEMENT

Architectural design is not just a process; it's also a creative response to a designer's task. Among the many scientific studies that analyze the impact of digital solutions on construction project management, "Metric-based BIM Implementation Assessment: A Review of Research and Practice," conducted by H. Abdirad, examines the influence of Building Information Modeling (BIM) on the outcomes of construction projects. The analyses conducted unequivocally point to improvements in project efficiency, better coordination among teams, reduced risk of errors, and shorter project completion times when using BIM. Furthermore, the study has practical applications for the development of BIM models as it synthesizes existing achievements in this field while highlighting gaps and limitations.

Among the studies on immersive technologies, the use of virtual reality (VR) goggles in architectural design has been analyzed. The revolutionized experience of the physical world as a virtually created interactive environment has expanded the horizons for young architects' education. In the initial stages of education, virtual technology holds significant potential, allowing students to explore real scenarios in a safe and controlled environment that might otherwise be unfeasible or dangerous. It's analogous to the training of young pilots using flight simulators. Today, we have the ability to impart experience to young enthusiasts in a more accessible manner. Analyses during the research compared groups of students and their understanding of the subject when using a set of two-dimensional architectural drawings and Critical Path Method (CPM)-based construction schedules, with and without immersive environments. The results clearly showed that the use of immersive technology significantly improved students' ability to comprehend technical concepts and identify errors compared to traditional methods.

EXAMPLES OF DIGITAL SOLUTIONS IN THE PROCESSES OF BUILDING PROJECTS IN AUSTRALIA AND GERMANY

Similar to Poland, architects in Australia utilize Building Information Modeling (BIM) applications. Platforms like Revit and ArchiCAD enable architects, engineers, and contractors to create three-dimensional models that integrate information on geometry, materials, installations, and schedules. Digital modeling facilitates collaboration, coordination, and project analysis. Based on my own projects modeled on the ArchiCAD platform, I am familiar with the real-time coordination capabilities, which result in quick agreements among stakeholders in the construction process while also identifying clashes and threats.

Several digital project management applications are used in Australia for tracking and organizing tasks, schedules, budgets, and documents. Examples include Procore, Aconex, Asite, and TeamBinder. These tools allow for efficient project management, team communication, and progress monitoring. Doctoral programs are implementing checklists to help track changes, maintain schedules, and allocate tasks. Combined with online meetings, these tools ensure a smooth progression through the project process, even when changes or corrections are required.

The created tool in the form of checklists offers a straightforward way to present the progress of the project to the investor, highlighting potential areas of concern during the preparation of the building project. When entering the phase of negotiations and implementing changes requested by the client, it's possible to present clearly whether the given assumptions comply with Polish legal regulations or require modifications.

The next step involves tools for virtual reality (VR) and augmented reality (AR). VR and AR technologies are used both in Australia and Poland for visualizing construction projects. They allow for the creation of interactive three-dimensional visualizations that enable clients and project teams to better understand the space and project details. Examples of applications include Enscape, IrisVR, Prospect, Artlantis, and Twinmotion.
With project documentation available in digital format, solutions for online document management are also utilized. Digital document management platforms like Aconex and ProjectCentre are popular in Australia. They enable the storage, sharing, and tracking of project documents such as plans, specifications, contracts, and reports. Integrated version control systems and change notifications help maintain document consistency. During my own professional practice, I often use created Dropbox folders, which, when combined with checklists, provide constant control over the managed project.

Each of the technological sectors involved in building project development offers dedicated tools for analysis and simulation. In the Australian construction industry, tools for energy analysis, airflow analysis, and lighting simulation are also used. Examples include programs like IESVE, DesignBuilder, and Rhino. The above examples represent only a fraction of the various digital solutions used in the building project preparation process in Australia. The industry continually evolves and introduces new technologies to enhance efficiency, precision, and collaboration in design and construction.

Analyzing a few examples of German digital solutions used in the building project preparation process, such as Nemetschek Allplan, the most actively developing module is the area of Building Information Modeling (BIM). In the mentioned example, a comprehensive tool is provided for creating 3D models, managing project data, conducting energy analysis, and planning structures. A popular project management solution is RIB iTWO, which integrates construction project management, cost planning, scheduling, and document management. It is used in the German construction sector to optimize project processes and cost control. Similar to Poland, the ArchiCAD platform is often used, allowing for collaboration among project teams and parametric analysis. An interesting support tool is Thinkproject, a digital platform for managing construction projects. It provides tools for document management, scheduling, task management, and team communication. For lighting analysis and design, as in Poland, DIALux is often used. It is lighting design software that allows for lighting simulation in buildings, energy efficiency analysis, and report generation. Among the numerous digital solutions, modern technologies and digital tools are applied to improve efficiency, quality, and collaboration in design and, consequently, in the construction and operation of buildings.

Introduction of digital technologies in the building project preparation process brings along several negative consequences. The first barrier is the substantial investment costs. Purchasing specialized software, infrastructure, and training staff in the use of these tools require significant capital. Some design firms, especially smaller ones with limited funding, have limited capability to fully utilize advanced technologies in their designs.

Integrating different systems and software is often complex and requires a significant amount of time and resources. Compatibility issues among various tools lead to incorrect data transfer and errors in the design process, often resulting in delays and additional costs. Training staff in the use of modern digital tools is time-consuming and costly. Many employees in the design sector have no prior experience with advanced software, affecting their productivity and initially reducing the team's efficiency.

The introduction of advanced digital technologies carries the risk of technical failures, IT infrastructure issues, or unforeseen software errors. This leads to data loss or project progress slowdown, affecting the project schedule and budget.

Technological advancements also bring increased cybersecurity risks. A construction project may be vulnerable to data theft, the leakage of confidential information, or the destruction of critical documents if proper security measures are not implemented.

Implementing new technologies requires changes in traditional work methods, which often face resistance from employees. Embracing a new approach demands additional effort from the team to adapt to new processes and procedures. In case of technical failures or issues related to digital tools, the project team becomes overly reliant on technology. Without suitable backups or alternative work methods, this can lead to project delays and frustration among team members. Creating digital backups - digital twins - on additional network drives is essential, especially in the face of complete digitization when reconciling documentation with public administration.

Adapting advanced technologies to the specific requirements of a construction project is exceptionally challenging. Digital tools are often developed to handle a wide range of applications, meaning they are not perfectly tailored to the unique needs of a particular project. Working as an active architect, a significant hindrance in design is the constant software and tool updates necessary to stay compliant with the latest standards and technologies. This is burdensome and

requires a considerable amount of time and effort for the entire team to collaborate effectively. Technical issues, including updates, lead to project delays and affect the completion deadlines. Furthermore, it often makes it impossible to return to a project developed in an older version of the software.
While the use of digital technologies in the building project preparation process comes with these negative consequences, proper planning, training, monitoring, and the implementation of adequate safeguards can minimize the risk of their occurrence and enable the full utilization of the benefits of digital technologies in the construction project management process.

During my doctoral research, time was dedicated to studying the impact of utilizing Building Information Modeling (BIM) on the design and construction process of a new building using a mixed research methodology, including heuristic techniques. The research began with the selection of a specific construction project, which served as the basis for the study. Initially, an analysis of the traditional design process for the selected construction project was conducted without the use of modeling technology. The focus was on identifying potential issues such as errors in drawings, lack of collaboration between teams, or suboptimal design solutions. This analysis was carried out using a heuristic approach, in which industry experts assessed the project against specific criteria and identified potential problems.

Subsequently, digital modeling technology was introduced into the design process. A digital information model of the building was created, containing all the necessary information related to architecture, structure, installations, etc. It was ensured that all project teams (architects, engineers, contractors) used the same model. The collaboration process between project teams was continuously monitored, and the effectiveness of using digital modeling was assessed in comparison to the traditional process. Finally, the quality of the final building design that utilized information modeling was compared to the traditional project in terms of coherence, precision, and compliance with requirements. This evaluation included both quantitative analysis (e.g., dimensional accuracy, data consistency) and qualitative analysis (e.g., aesthetics, functionality) and was supported by a heuristic approach in which experts assessed the project against specific quality criteria.

Particular attention was paid to time and cost savings through the use of digital technology. In this case, the mixed approach combined numerical analysis of cost and time data. Interviews with members of project teams and surveys among stakeholders (e.g., architects, engineers, contractors, owners) aimed to gather opinions on the benefits and challenges of using modern technologies. The research findings include an assessment of the impact of digital modeling on design efficiency, quality, costs, and time. Based on this, recommendations were formulated for further utilization of technology in future projects in the form of a developed checklist for construction project management.

For the purposes of the article, a section of the developed checklist is included:

A.1 Team Collaboration:
Does the project team, including architects, engineers, contractors, and other stakeholders, use a common BIM model?

Has the use of BIM facilitated communication among different parties in the process?

Have any design conflicts been resolved through better data integration in the BIM model?

Have improvements in collaboration efficiency among various specialists been observed due to the use of BIM?

A.2 Precision and Parameter Consistency:
Does the BIM model contain comprehensive and accurate information regarding architecture, structure, installations, and other aspects of the building?
Are there any discrepancies or inconsistencies in data between different parts of the BIM model?

Has the use of BIM allowed for the avoidance of design errors and a reduction in the number of revisions?

Have improvements in data accuracy and consistency compared to traditional design been observed?

A.3 Project Costs:
Has the use of BIM enabled the identification of optimal design solutions?

Have analyses and simulations using the BIM model been conducted to assess the performance and costs of different solutions?

Have more efficient solutions been found through the use of BIM?

Has a reduction in the number of design changes compared to traditional projects been observed?

A.4 Project Process Management:
Were changes in the project easier to manage with the BIM model?

Were changes communicated and updated more easily in all parts of the BIM model?

Did the use of BIM help minimize the impact of changes on the schedule and budget?

Was a reduction in delays and additional costs associated with changes observed compared to traditional projects?

A.5 Coordination and Interdisciplinary Collaboration:
Was the BIM model used for detailed execution plans and prefabricated elements?

Were BIM models from other specialists (e.g., architecture, structure, installations) coordinated and prevented conflicts during construction?

Did contractors use the BIM model during the construction process?

Was an improvement in the accuracy and precision of construction observed through the use of the BIM model?

A.6 Team Feedback:
Did members of the project team express greater satisfaction with working using the BIM model?

Does the project team believe that the use of BIM has influenced the quality of the project and the design process?

Does the project team consider BIM to be a useful tool for problem-solving and decision-making?

Have improvements in team collaboration and communication been observed due to the use of BIM?

SUMMARY

Digital transformation has a significant impact on the design industry, bringing with it numerous benefits, primarily in terms of efficiency and productivity. The use of digital tools, such as design software, project management, and visualization tools, greatly enhances the efficiency of architects' work. Process automation, data integration, and real-time information sharing contribute to reduced task completion times and increased overall productivity of the project team, while simultaneously eliminating errors and risks. Additionally, digital design tools allow for precise modeling, simulation, and analysis of various project aspects. This enables more accurate predictions of outcomes, identification of potential issues, and the ability to make corrections during the design phase. This results in higher quality final products, such as

building designs, and reduces the risk of errors during construction and operation.

Digital tools facilitate easy information exchange and collaboration among various project stakeholders. Designers, engineers, investors can work together in real-time, share documentation, provide comments, and make changes to the project. This enhances communication efficiency, reduces the risk of mistakes, and speeds up the decision-making process. It also eliminates poorly made decisions and allows for alternative solutions to be discussed.

With the ability to visualize and present projects, realistic project presentations can be created. 3D models, animations, virtual reality, and augmented reality enable stakeholders to better understand and visually experience the project before its implementation. This helps improve understanding and decision-making regarding the project.

Regarding architects' coordination of work, there is the possibility of easier data and documentation management. The transition from traditional paper documents to digital formats offers numerous opportunities for active project work. Central data repositories, shared workspaces, and advanced tools for data search and organization facilitate access to necessary information at any time and enable effective process management by all participants in the construction process.

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INTERVENTION ARCHITECTURE - A DESIGN ISSUE IN THE CONTEXT OF EUROPEAN REALIZATIONS FROM THE 21ST CENTURY

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ABSTRACT: Intervention architecture is an approach that involves designing buildings or spaces to quickly resolve crisis situations. In the first decades of the 21st century, a period of conflicts, wars, social tensions, migration crisis and also extreme weather and natural disasters, intervention architecture plays a major role in shaping the urban and social landscape.

Contemporary intervention architecture engages in projects dealing with humanitarian crises such as migration and refugees. Such projects include the design of refugee shelters, camps for homeless people, as well as public spaces that promote social integration and acceptance of cultural diversity. The scope of the research covered events taking place from 2000 to the present day in Europe, in which intervention architecture plays an important role. Reference was made to the current state of knowledge, scientific research and the media situation. The article analyzes the typology of architectural, functional and technical solutions for temporary accommodation and housing facilities and attempts to determine their suitability for individual users.

KEYWORDS: intervention architecture; natural disasters; disasters in 21st century Europe

INTRODUCTION

Intervention architecture, is playing an increasingly important role in the context of European architectural developments of the 21st century. This hitherto fringe current of design, associated rather with activities in regions such as Asia or Africa, has for less than two decades become increasingly necessary in Europe as well. Intervention design is particularly important in the context of random, unpredictable catastrophic events. This trend is inextricably linked to the growing awareness of sustainable development, the need to adapt existing buildings or spaces, and dynamic changes and social problems that cannot be ignored by contemporary architects and designers. The purpose of this publication is to present the directions of development of this architecture in Europe, against the background of the historical context in the 21st century. Intervention architecture allows a flexible response to these changes and makes it possible to create new solutions using the existing infrastructure. The concept of intervention architecture was formulated as a result of research and used in this article to describe widely occurring phenomena:

- buildings and facilities that are created as a response to emergencies and disasters (natural or anthropogenic) that have already occurred.
- Solutions that prevent emergencies and have protective functions (so-called preventive architecture, bunkers, shelters)
- Residential or accompanying architecture, the main purpose of which is to respond to the needs of the poorest people and also to strengthen social ties and improve the quality of life
- Civil protection buildings, military buildings
- "Field" hospitals.

To date, the English-language literature speaks of "architecture as intervention," describing phenomena and implementations of various scales, the main purpose of which is to achieve positive changes or social behavior [1] and also to equalize disparities in access to services or housing resources [2]. Architecture that responds directly to crisis phenomena is called "humanitarian architecture" [3]. According to Lubelska [4]: "Humanitarian architecture involves offering professional design services to communities in need, i.e.: the destitute livelihoods, the socially excluded, refugees, ethnic minorities, populations rendered homeless by a disaster or armed conflict." The concept of intervention architecture is therefore broader, encompassing both humanitarian architecture, reconstruction efforts and first aid shelter provided to victims of catastrophic events (Fig. 1).

Fig. 1.: The concept of intervention architecture. Elaborated. (Author: Yaryna Posuniak)

This paper focuses on the first group of buildings, analyzing realizations in Europe created in the period 2000-2023.

The loss of a residence as a result of disaster events is the reason for the need for what can be described as intervention architecture. It can be noted that depending on the type of disaster, approaches to the design of such facilities may vary. Events that can result in the loss of a residence can cause a number of factors, depending on the cause - natural or anthropogenic (Fig. 2).

The main reasons for the introduction of contingency architecture should be considered both phenomena of a sudden and increasing nature. The former can include: natural disasters, technogenic disasters and warfare. Cumulative phenomena, such as social problems, migration crises, epidemics or sanitary disasters, also necessitate the introduction of intervention architecture, but in this case, the course of the process can give a little more time to prepare, or test confident solutions. As Carey Clouse and Zachary Lamb note, [4] designing after a crisis is a particularly difficult task, because the courage or even bravado of designers, many times desirable in other activities, in this case can hurt. The users for whom intervention architec-

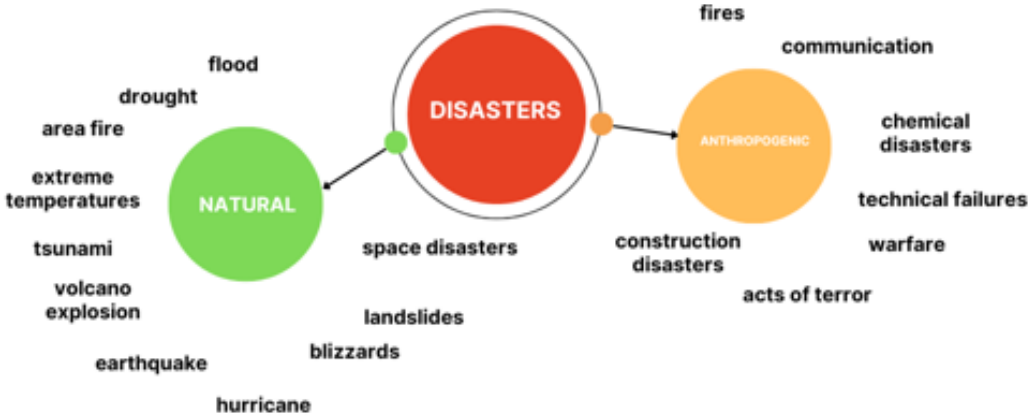

Fig. 2.: Diagram of the types of disasters resulting in loss of residence. Elaborated. (Author: Yaryna Posuniak)

ture solutions will be dedicated are a particularly vulnerable group.

Intervention architecture, in its concept, is intended to serve the ongoing provision of a place to live, as well as to support the local community, to restore self-confidence, to strengthen its sense of dignity enough to change the situation in which it finds itself [2]. This can be achieved by involving the population in the design process at its various stages. Architect [6] refers to this as community design, or community design. This means designing with the community, involving them in the creation process by expressing their preferences, treating them as "local experts." The slogan of the charity, Habitat for Humanity, is "We build strength, stability, and self reliance through shelter," and perfectly describes this design idea [7]. Unfortunately, in some cases, the need for quick action, precludes this type of approach.

RESEARCH STATE AND RESEARCH METHODS

Intervention architecture, which emerges when responding to various types of emergencies and threats, is the subject of research and design interest first of all for architects and researchers in the regions where its occurrence is most common. Many research works and implementations have been produced in Asia [8]. The second major center is North America, within which there are regions particularly prone to destruction (New Orleans), and their cyclical nature and the desire to rebuild in the same place made the region even a "testing ground" for innovative solutions [9] [10][11]. Promoted among practicing architects is the AIA's Disaster Assistance Program, which "equips architects with the knowledge and skills to mitigate, prepare for, respond to, and recover from a disaster. As a result, architects' disaster response processes, protocol, and training are aligned with federal framework"[11].

Research is looking at both the use of appropriate building materials, for example, natural ones based on straw, clay and earth [13] and the possibility of using state-of-the-art design methods such as parametric modeling [14]. However, it is not only the type of "construction" used, but the process of managing and planning how to deal with disasters, as well as the provision of additional spaces and places with public functions, that are crucial to the success of the action carried out [15].

The paper mainly uses theoretical research methods, analysis of literature, media information and reports of international organizations such as the European Environment Agency and UNDR, for example. A particularly valuable item of a textbook nature is the original 1982 Shelter after disaster Guidelines for assistance, published by UNDRO, now available as an updated electronic document [16]. In 2016, UNHCR published a catalogue-like solutions manual, pictorially and accessibly giving guidance for erecting intervention facilities of varying scale, durability and difficulty of construction [17].

HISTORICAL BACKGROUND

Against the background of the rest of the world, at the dawn of the 21st century, Europe had formed its image as a livable, safe and prosperous place. However, in January 2011, the European Environment Agency (EEA) published a report which found that the frequency and damages from disasters had increased in Europe between 1998 and 2009 [18]. In the first years of the new century, there were a series of important political and historical events, as well as economic changes that had a significant impact on the region. In 2004, in an atmosphere of optimism, a number of new countries joined the EU as a result of the enlargement of the European Union, which contributed to the deepening of European integration. Unfortunately, the global financial crisis erupted in 2008, which also affected Europe. Many European countries, such as Greece, Spain and Portugal, struggled with high public debt and economic difficulties, necessitating the introduction of strict fiscal control and structural reforms. In 2016, the UK held a referendum on EU membership, which ended in a vote to leave the EU. The process of Britain's exit from the EU, known as Brexit, has had a major impact on European and British politics and has shown that the hitherto existing "secure monolith" is in fact marked by numerous divisions.

European security, affluence and quality of life, have caused Europe to face a migrant crisis on an unprecedented scale over the past two decades. The increase in the number of refugees and migrants, especially from Africa, Syria and other conflict-affected countries, has prompted a debate on migration policy and the introduction of various measures and policies to manage the influx of migrants.

There have also been major terrorist attacks in Europe that have rocked the region. Attacks in Madrid, London, Paris, Brussels and other cities caused loss of life and had a long-lasting impact on security and anti-terrorism policies in Europe. Finally, Europe has also witnessed a number of protests and social movements expressing dissatisfaction with various issues, such as social inequality, climate change, immigration policy and civil rights.

These events and developments become the historical backdrop of the first decades of the 21st century in Europe, which influenced the region's society, politics and economy, shaping the current situation and the challenges the region faces (Fig. 3).

Among the most recurrent disasters in Europe in the 21st century, causing damage to human dwellings and the need for intervention architecture, are those

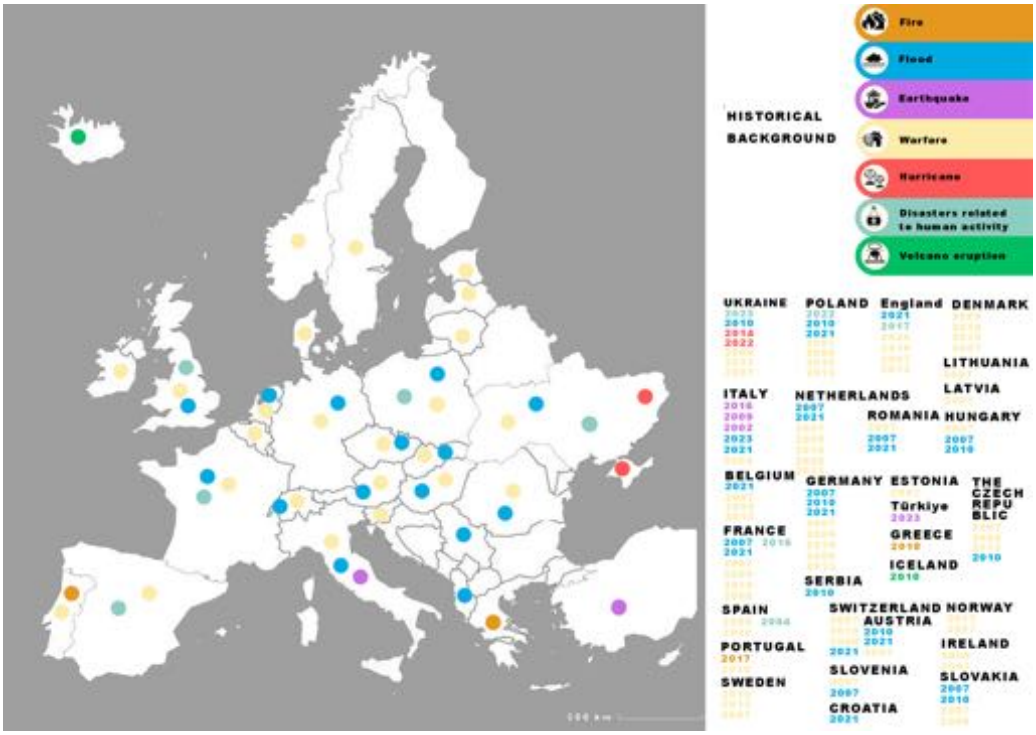

Fig. 3.: Crisis events across Europe in the 21st century. Elaborated. (Author: Yaryna Posuniak)

caused by natural phenomena. More than half of these are sudden winds, which most often cause damage to parts of buildings: roofing and roof structures, or smaller structures. The destructive power of wind is compounded by the fact that in many countries there has been a shift away from traditional roofing materials that put more strain on the structure (such as clay tiles or slate) to lightweight modular roofing sheets. An additional problem is the frequent deprivation of residential neighborhoods of sufficient tree plantings, which take on the force of the wind and can weaken its effect. Another catastrophic natural phenomenon occurring with increasing frequency in Europe is flash floods. Unlike hurricanes, this phenomenon can be more easily predicted, while the location of buildings in vulnerable zones can be limited or excluded through the use of planning tools. Unfortunately, the reason for much flooding and flash flooding is the inability to drain water into floodplains due to 20th century river regulation. Flood barriers, a solution ostensibly providing safety, caused people to settle closer than ever to rivers, and regulated river beds increase the speed of water flow, which is a very dangerous phenomenon in flood events. In Poland, the discussion about the technical condition of embankments, the sense of regulating rivers and the settlement structure along them began after 1997, when the so-called "flood of the millennium" affected a number of localities in Lower Silesia and caused huge material damage in Wroclaw and the death of dozens of people.

The most tragic natural disasters occurring in Europe are earthquakes. In the 21st century they were experienced by Italy and Turkey. These disasters demonstrated the powerlessness against nature and the danger posed by massive building structures (Fig 4).

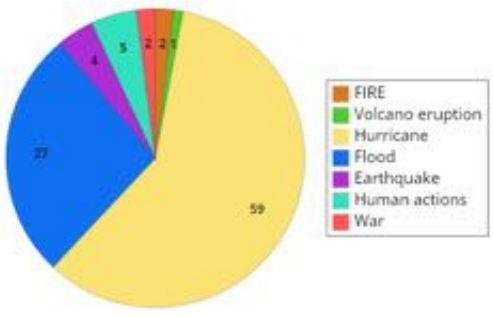

Fig. 4.: Frequency distribution of disaster-like phenomena across Europe in the 21st century. Elaborated. (Author: Yaryna Posuniak)

The most tragic, because completely avoidable, are catastrophic phenomena caused by intentional human action. The outbreak of war in Ukraine, showed that even in "civilized" Europe we can have intentional actions against civilian humanity and even cause humanitarian disasters. The blowing up of the Novaya Kakhovka dam brought direct deaths to more than a dozen people, the destruction of thousands of homes and difficult to estimate natural, economic and social losses.

The humanitarian disaster of the 21st century, requiring a specific type of intervention architecture, was the Covid-19 epidemic on a global scale. It caused the large-scale construction of temporary health facilities, infectious hospitals, isolation facilities, vaccination or testing sites [19].

It is worth noting that the demand for contingency architecture is not only the result of events within Europe, and also depends on geopolitical changes in the world. Humanitarian crisis, natural disasters and social problems in other parts of the world, increase the number of migrants [20], and this in turn increases the need for housing and supporting infrastructure. Climate change is largely responsible for the increasing number of natural disasters.

EXAMPLES OF SOLUTIONS IN 21ST CENTURY EUROPE

The most recognizable example of intervention architecture created in recent years in Europe is the buildings at the marketplace in Calais, France (2009-2016). In Calais, northern France, temporary housing buildings were constructed in an area known as the "Jungle," where migrants and refugees were settling. These were simple, portable structures designed to provide basic shelter for those in the temporary camp. In Dunkirk, northern France, a temporary refugee house was built. It was a modular building made of wood that offered shelter and basic amenities for those seeking asylum [21].

Modular architecture for refugees in Berlin, Germany

(from 2015) was created in response to the wave of refugees,[22] arriving in Europe in 2015. These are temporary modular housing units. They consist of prefabricated modules that can be combined to form larger housing complexes. These apartments offer basic amenities, such as bathrooms, kitchens and sleeping areas. At the same time, it should be noted that Germany is an example of a country where, in order to avoid marginalization and ghettoization of migrant communities, efforts are being made to integrate newcomers into long-term residents [23].

At the same time, plastic structures were introduced in Sweden to meet the needs of refugees. These were portable housing modules that could be easily assembled and disassembled. They provided basic living conditions and could be installed in temporary refugee areas.

A specific social group, the prevalence of which in affluent countries is an ever-present phenomenon, is the homeless. This social problem has different backgrounds and different paths leading to homelessness. The response to this phenomenon largely depends on the level of culture in a country and the social sensitivity and tolerance that goes with it. In Amsterdam, modular housing for the homeless was introduced in 2015. These apartments are designed as portable units that can be easily combined and expanded, providing safe living spaces for vulnerable people [24].

Intervention architecture is being introduced into disaster areas in the case of Europe, differing from the rest of the globe in that the use of tents is rare. After the 2010 floods in Szczecin, temporary housing structures were introduced for those affected. [25]

After the earthquake that occurred in L'Aquila, Italy (2009), temporary housing was designed for those affected. The dwellings consisted of containers and were located near damaged buildings to provide immediate shelter. After the earthquake, temporary housing containers were designed for those affected in Lorca, Spain in 2011. The containers were provided as immediate shelter for residents who lost their homes. In Amatrice, Italy, in 2016, temporary homes were designed for residents. Housing modules were used that could be easily transported and assembled on site. The dwellings were designed to provide safe shelter for people who lost their homes in the disaster. Intervention architecture for victims of war damage by the Russians in Ukraine is a particular challenge. Modular townships were built in 2022 in Kiev, Lviv, Borodzianka and Bucha, Hostomel and Chernihiv. They consist of housing blocks made and adapted from cargo containers [26]. This is a temporary solution, and the question of how to answer the question of how to rebuild Ukraine and provide adequate housing for war victims will become one of the most important planning, economic and architectural issues in the coming years.

INTERVENTION ARCHITECTURE - AN ATTEMPT AT TYPOLOGIZATION

Intervention architecture includes both temporary and permanent structures. A common phenomenon is the gradual transformation of a temporary form into a permanent one (hybrid form). The types of intervention architecture most often depend on the time elapsed between the crisis and its creation. According to the UN handbook [16], the following phases can be distinguished, varying according to local conditions and the type of disaster:

- Phase 0-Pre-disaster phase
- Phase 1-immediate relief period (impact to day 5)
- Phase 2-Rehabilitation period (day 5 to 3 months)
- Phase 3-Reconstruction period (3 months onward)

Quarantelli [10] distinguish the following phases of creating and providing shelter and housing after a humanitarian disaster: emergency stay, temporary accommodation (up to a few weeks), temporary quarters - (stay from six months to three years) and permanent housing.The simplest form of mobile intervention architecture for the first phase after a disaster, are tents and halls, which can be easily transported and erected in a short time in virtually any conditions. However, this is a type of short-term shelter, practically impossible to use in adverse weather conditions.

In the case of European implementations, one can see a relatively small share of the erection of new forms of shelter for Phase 1, which is characteristic of other regions of the world. This is due to the relatively good infrastructural and financial facilities, as well as organizational capabilities, allowing the translocation of affected persons. Victims are most often located during this period in other facilities adapted for such purposes, such as schools, day care centers, market halls, train stations, etc. Temporary, makeshift tents are rare. Among the building materials used, the dominant ones are those whose erection technology is fast and relatively cheap. Steel is often used because of its strength, durability and ability to be assembled quickly. Steel structures can be easily transported and assembled into various configurations, providing stable and safe intervention housing. It is used for both small-scale structures and large-scale forms (such as multi-person tents). For tents or other temporary structures, technical fabrics are used to provide shelter. These fabrics are usually lightweight, flexible and weather-resistant. They can be specially reinforced and treated to provide additional thermal insulation and protection from the elements.

Wood is a popular material because of its accessibility, light weight and ease of processing. Wooden structures can be erected and dismantled quickly, which is important in emergency situations. In addition, wood, unlike steel, can provide good thermal insulation. Wooden frame structures are the most commonly used.

- Modern building materials include plastics, such as composites, polycarbonate or plastic panels, which are lightweight, easy to transport and install, and relatively inexpensive. They can be used as components for walls, roofs, floors or windows, providing durable and easy-to-maintain solutions.
- When erecting structures on a post-disaster site, it is important to reuse as much building material as possible that is available "at hand," i.e., comes directly from destroyed buildings [16]. The use of these materials and elements provides a kind of recycling and is a solution that optimizes financial and environmental costs. An additional advantage of such a solution is to allow disaster victims to stay as close to their homes as possible, provided, of course, that the nature of the incident allows such a solution.
- Among the masonry materials most commonly used to erect intervention architecture is cellular concrete, also known as aerated concrete or foam concrete, which is lightweight and insulating. It can be used for walls and other structural elements, providing durable and well-insulated housing.
- Intervention architecture found in Europe can be classified according to the user groups to which it is dedicated. We can distinguish:
- Housing for post-disaster survivors - most often forms of adaptation of existing buildings (schools, halls, cultural facilities) or in the form of modular development, where individual units meet the needs of individual families. Both residential and communal use modules (containing, for example, kitchens or bathrooms, administrative areas, etc.) are used.
- Closed and open centers for migrants - emerging as a

response to the wave of refugees in Europe after 2015. They have different urban and architectural forms, taking as a basis for the organization of space the principle of not separating families and ensuring, as far as possible, normal functioning during the transition period. In these places, communal spaces, recreation and leisure zones, which usually unemployed refugees have in excess, play a huge role, which has a destructive effect on social relations.

• Refugee housing - is a type of residential intervention architecture geared toward longer-term stay for individuals or families in refugee crisis. They take various forms: from adaptations of existing housing, to the creation of housing in facilities with other functions, to new facilities. In this case, the key is the relationship with the location, its social context and infrastructural facilities (transportation, schools, health centers, etc.). The shaping of this type of intervention architecture is a national responsibility.

• Residential places for the homeless - are intended for people who do not have a permanent place of residence and are in a difficult life situation. Such places often function in addition, for example, counseling centers or other institutions providing social assistance to the homeless. Such centers are often organized in buildings adapted for this purpose with a different function.

• Housing for families in financial crisis - are granted to families who, due to low income, are unable to rent or buy housing on the open market. This type of housing can also be granted to single parents or elderly people. This is a broad issue, relating directly to the housing policies of individual countries and looking different in countries with different cultural, economic and social contexts. Residential buildings erected for this group of users differ are of broad research interest and are not directly relevant to the subject of this study.

• Facilities with a non-residential function, necessary for the proper operation of the local community in a moment of crisis, such as temporary schools, health centers. They are built in various forms: as adaptations of other buildings, in modular form or erected using low-cost construction technologies, most often frame (Fig 5).

The architectural solutions that can be observed vary in ideology of design and relief, and thus in form, function and design. The most common are all types of mobile or modular forms and adaptations of existing buildings for relief functions. A less common approach is new mixed-use construction.

In summary, the basic, general division of intervention architecture can be carried out as follows:

• temporary shelters (tents, halls, modular facilities, adaptations)

• shelters for a short stay or temporary function (modular facilities, adaptations)

• forms for a long-term stay (modular facilities, adaptations new buildings in low-cost and quick-to-wear technologies, use of ecological and recycling-based solutions)

• objects with a non-residential function (modular objects, adaptations, new buildings in low-cost and quick to abolish technologies, the use of ecological and recycling-based solutions)

Another typological division of intervention architecture can be made by location:

• at the site of the event

• in a "safe" place near the event

• at a remote location.

Due to the way aid is organized, planned and managed, intervention architecture can be implemented with the participation of the following 'actors':

• local governments

• non-governmental organizations (NGOs)

• relevant state authorities - crisis management decisions at the state or provincial level

• with the participation of support from other states and within the framework of community policies.

CONCLUSIONS

Intervention architecture in Europe in the 21st century often focuses on solving social and environmental problems. Unlike in other parts of the world, shelters such as tents or folding halls are a marginal phenomenon. An increasingly common trend is the transformation of existing facilities to meet new needs. Examples include the transformation of abandoned factories into cultural spaces such as art galleries, museums or community centers, while on the scale of temporary solutions, the organization of accommodation or aid stations in schools, train stations, exhibition centers, etc.

Intervention architecture is increasingly emphasizing sustainable and ecological solutions. Renewable energy, thermal insulation, water technologies and materials with low environmental impact are being used. Buildings are designed to minimize energy consumption and environmental impact.

When it comes to designing public spaces, social goals

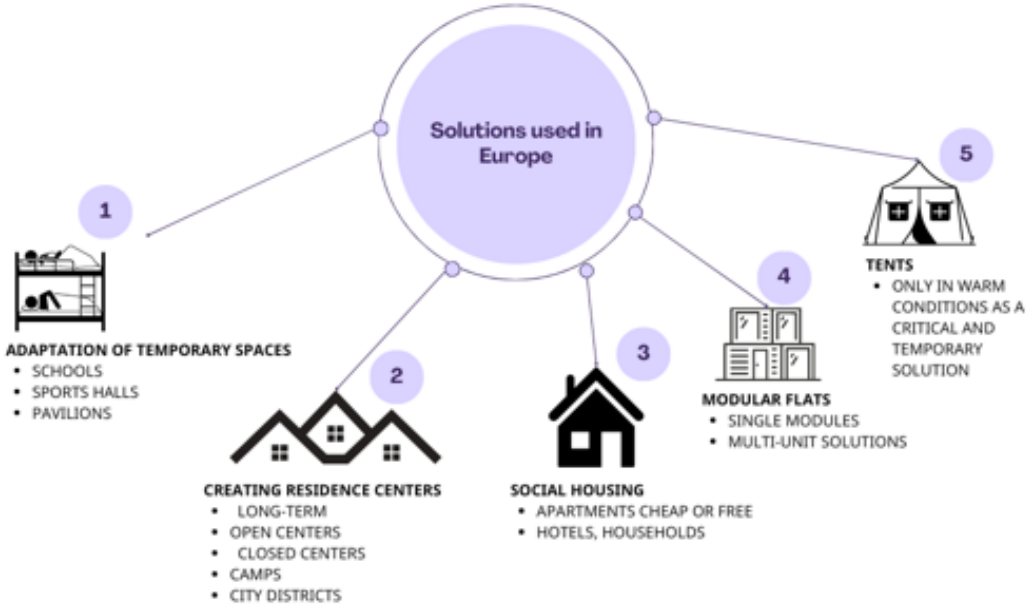

Fig. 5.: Types of intervention architecture most common in Europe, numbered by frequency of occurrence. Elaborated. (Author: Yaryna Posuniak)

are paramount. New or transformed plazas, parks, alleys or squares are designed to improve the quality of life for the community. These spaces can be designed to encourage physical activity, social integration and stimulate human interaction.

Public participation, or the involvement of residents and local communities in the design and decision-making process, is playing an increasingly important role in intervention architecture. Examples include organizing workshops, public consultations and working with local community groups to understand their needs and aspirations.

In intervention design, it is desirable to maintain a holistic approach and to participate with the people for whom the architecture is being created. Solutions are to be quick, sustainable, flexible and multifunctional.

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APPLYING INTELLIGENT BUILDING CONCEPT PRINCIPLES IN THE CREATION OF COMMUNITY SOCIAL SERVICE FACILITIES

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ABSTRACT: Architectural studies for the Recovery and Resilience Plan - Component 13: Affordable and Quality Long-Term Social and Health Care were prepared at the Faculty of Architecture and Design of STU in Bratislava. In the next few years, over 100 community-type social service facilities, so-called family-type housing, are expected to be built in Slovakia. The Ministry of Labour, Social Affairs and Family in cooperation with the Faculty of Architecture and Design of STU has prepared a catalogue of facilities meeting the criteria of community housing in smaller groups, universal design principles as well as environmental requirements. The paper analyses a case study of a community-type residential social services facility in the form of an atrium family house. It presents specific architectural-constructional and technological determinants of the smart building concept design on a selected community housing case study.

KEYWORDS: social service facilities; intelligent buildings; architecture; community housing

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INTRODUCTION

Smart technologies are slowly becoming a part of our lives, forming an integral element of the intelligent building technology concept. On the other hand, they are becoming a part of domestic appliances and ordinary households due to the concept of the "Internet of Things". As Intelligent Buildings expert G.J. Moreno pointed out As is pointed out by intelligent building expert G. J. Moreno from the Autónoma de Querétaro University in Mexico: "One of the main challenges of intelligent residential buildings is to provide comfort to the occupants, along with increasing their performance at low energy costs."[1] In order to spread smart technologies globally into our lives, they must be universally accessible to meet the needs of a wide range of users and take into account less tech-familiar users as well. Many of the benefits of intelligent homes relate to the provision of better healthcare and convenience for users with specific needs. Communication and monitoring equipment allows users to be interactively connected with the health centre, hospital, general practitioner, and relatives. Smart building technologies are useful for users in situations where they need immediate assistance, monitoring physiological data, checking the condition of the home.

They can be a very effective aid in the provision of social services. They can increase the level of independence of clients in social care services, improve working conditions for service providers or reduce the costs of running buildings. Smart technologies in an intelligent building should improve not only its environmental sustainability, but also its economic sustainability in terms of improving the efficiency and effectiveness of the building and its users, as well as its social sustainability in terms of improving the safety and user quality of the environment.

COMMUNITY HOUSING

The architectural study of the presented atrium house will be used as a platform for the development of further stages of design documentation in order to build community social service facilities financed by the Rehabilitation and Resilience Fund. The goal of the architectural study is to present a model building layout and spatial design that meets the criteria of deinstitutionalization, universal design requirements, as well as environmental requirements, based on the intelligent building concept. The criteria for the deinstitutionalisation of social service facilities applied in the study include the creation of small groups (up to 6 clients) in housing, creating a sense of home for the clients. The layout and operational design of the house respects the above-mentioned requirement. The achieved goal

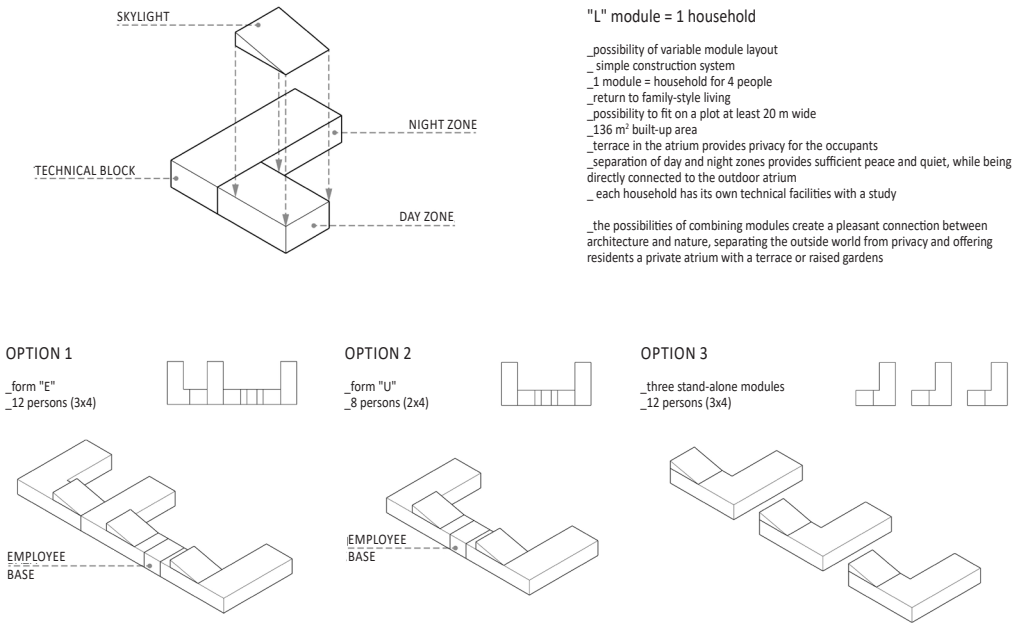

Fig. 1.: Variation of the proposed L-shaped atrium house for community housing of the social services facility. (Source: Puškár,B., Hencze, J. Architectural study.)

[1] BRAD,B.S., MURAR M.M. Smart buildings using IoT technologies, 2014, p. 17.

of the universal design approach of the house is the creation of an accessible and comprehensible environment that can be used by the largest possible segment of population, regardless of age, abilities and limitations.

The L-shaped house floor plan allows a high degree of variability in the arrangement of the E, U, 3L structures. The built-up area of the building in the basic layout shape - E (3x4 clients) is 422 m^2, the usable area is 363 m^2. The built-up area of the building in the shape - U (2x4 clients) is 286 m^2, the usable area is 249 m^2. The optimal orientation of the living rooms is south, southeast and southwest. Orientation of the plot entrance: north, east. The creation of a community space in the atrium area is an important aspect. There are designed spaces for relaxation and activation of the clients in the garden area, with benches for sitting, and raised flower beds. A wide paved walkway connects the street with the entrances to the individual apartments. The outdoor living environment is designed in the atriums as wooden outdoor terraces, partially screened by light steel pergolas.

Fig. 2.: Entrance zone of the atrium house for community housing in the social services facility. (Source: Puškár, B., Hencze, J. Architectural study)

HOUSE VARIABILITY

Variant 1 - for 12 (3x4) occupants - in E-form has a built-up area of 422 m^2, the usable area of the house is 363 m^2. The main entrances to the building are oriented at the long side of the plot, accessible by a pavement on the main street. Each of the three separate households (in an L-shaped floor plan) is divided into an entrance, day and night zone. Entrance is through a lee area providing protection from rain and snow and a vestibule providing a temperature filter. There is a kitchen, dining room and living room integrated into one space in the day zone, allowing free connection to the terrace located in the atrium. The night zone consists of three bedrooms with accessories. One bedroom is shared by two clients (19m^2), two separate bedrooms (2x10m^2) allow variable connection or division of rooms. The night zone includes two wheelchair accessible bathrooms, laundry room, and a maid's room connected to the HVAC space. There is an employee base located between two mirrored households with a separate entrance from the vestibule. The base contains a staff day room with bathroom and locker room with a storage.

Fig. 3.: The community zone of the atrium house in the social services facility. (Source: Puškár, B., Hencze, J. Architectural study)

Variant 2 - for 8 (2x4) recipients - U-shaped floor plan has a built-up area of 286 m2, the usable area of the house is 249 m^2. The main entrances to the building are oriented at the long side of the plot, accessible by a walkway from the public road. Each of the two separate households (L-shaped) is divided into an entrance, day and night zone. The entrance to the building is through a lee area providing protection from rain and snow and a vestibule creating a temperature filter. In the day zone, the kitchen, dining room and living room are integrated in one space, allowing a free connection to the terrace located in the atrium. The night zone consists of three bedrooms with accessories. One bedroom is shared by two clients (19m^2), two separate bedrooms (2x 10m^2) allow variable connection. The accessories of the night zone consist of two wheelchair accessible bathrooms, a laundry room, a maid's room connected to the HVAC room. Between the two mirror-oriented households is a staff base with a separate entrance from the vestibule containing a staff day room with hygiene and locker room along with a storage room.

ARCHITECTURAL DESIGN

The architectural design of the building uses simple shape elements, which are subordinated to the housing function. A key aspect of the design is keeping the principles of universal design. The basic compositional element of the various urban alternatives is the atrium house of the shape - L. The atrium is often found in the world as a layout criterion for intelligent buildings. It represents a design criterion of intelligent buildings according to the Japanese definition of intelligent buildings. In the development of intelligent residential buildings, for example, family houses, the atrium could also become part of the intelligent building concept in our conditions.

A strong expressive element of the house's architecture are the rooflights in the counter slabs above the day zone. All designed rooms have sufficient lighting and natural ventilation provided by windows. Most of the living rooms have direct contact with the exterior through large windows without sills. The façade of the building uses white plaster with an accent - large format coloured cladding at the main entrance, visually differentiating each residential unit. The flat roof of the building and the flat roof of the rooflights is designed as an extensive vegetation, allowing for the efficient placement of photovoltaic panels.

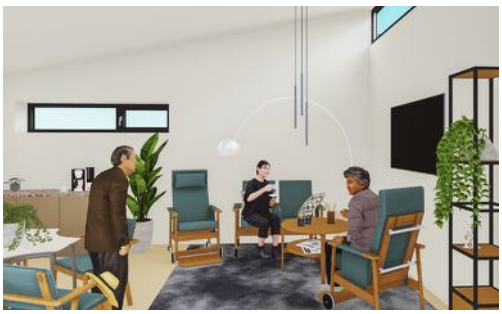

Fig. 4.: Community living room of the atrium house in the social services facility. (Source: Puškár,B., Hencze, J. Architectural study)

The three separate entrances to the building are oriented to the access sidewalk. The ground floor solution of the building contributes to easy accessibility from ground level. The design takes into account the principles of universal design, all spaces for clients and staff are suitable for use by all potential target groups, they are designed for wheelchair users / partly for the movement of people in beds (Most of the living rooms have double doors with the possibility of enlarging to a clear width of 1200 mm). The open plan layout of the day zone allows spatial adaptability in the same way as single rooms with the possibility of interconnecting.

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Fig. 5.: Layout of the E-shaped community house. (Source: Puškár,B., Hencze, J. Architectural study)

INTELLIGENT TECHNOLOGIES

Technical equipment is designed with regard to ecological and energy sustainability of buildings - heat pump, recuperation, water heating through solar collectors, photovoltaic panels for lighting, rainwater collection into a collection tank, use of rainwater for flushing toilets. During the creation of the project, it is necessary to take into account the installation of electrical installations, power and low-current wiring compatible with smart solutions and assistance systems, internet connection is essential. The installation of electric window roller shutters, automatic door opening systems or automatic sliding partition walls is recommended. All installations must be implemented without compromising the adaptability of the spaces. According to B. S. Brad: "The requirements for creating intelligent buildings are derived from performance and operational criteria with respect to comfort, adaptability, life cycle, cost and better control over available resources". The domestic environment in a family house represents a significantly wider range of users (seniors, children or disabled users) than in an office or industrial building. Dealing with these diverse and often demanding needs is a significant challenge for the intelligent building concept. The application of the intelligent building concept to residential buildings for users with specific needs allows the user comfort to be increased. The comfort feeling for the users is largely dependent on the architectural concept of the building - according to the quality of the layout, the area of the rooms, the use of scale and proportion, and the screening and over-lighting of the living rooms. In this context, the architectural concept forms the basic, supporting condition, the starting point for further creation.

The comfort increase is connected with the possibility of easily controlling a multitude devices directly from the mobile phone, smartwatches, smart wall switches. "Internet of Things" (IoT) - a concept that enables the interconnection of devices with built-in internet connectivity. It brings interaction between systems, but also the ability to control, monitor and provide advanced services to devices. The control of peripherals via the Internet allows automatic and manual control of a large number of devices: lighting, external blinds, household appliances, temperature, audio-video equipment, etc. It forms part of the technological concept of intelligent buildings, on the other hand, it is becoming part of ordinary homes and buildings through current domestic appliances.

Along with the development of information technologies, their operation is also becoming easier. Ease of use, its user-friendly design is an important moment for the spread of the concept among users with specific needs. The general operating platform of intelligent buildings has become the smartphone because of its good accessibility and familiarity. A well-known device is given to intelligent building users with specific needs, through which they control a large number of peripherals (communication, lighting, heating, ventilation, fire and intrusion security) via free applications. The alternative possibilities for controlling intelligent buildings, developed, for example, for people with reduced mobility, are interesting. They can be transformed, for example, into geometric shapes (cube), which, by turning on the bed of a reclining user, allows intuitive control of individual peripheries (artificial lighting, shading, info and entertainment, etc.).

The integration of haptic braille labeling is also important in the creation of user control elements. Intelligent building environments make it possible to integrate security systems that monitor users with specific needs, their behaviour, habits, stereotypes and biorhythms, analysing the information intelligently. They use the collected data to improve the safety of users. This enables them to create a sense of security in smart building environments, which is essential for the users' peaceful lives. The security system reacts to the movement of unauthorised persons and ensures the transmission of information to the organisation that provides security for the building. Alarm system devices are a set of technical means - control panels, sensors, signalling and supplementary means forming a system that serves to signal the location of an intrusion into the protected system. The security system includes digital video monitoring, intelligent video and audio analysis. For the safety of users with health limitations, in addition to securing buildings against burglary, it is also important to have a superior fire safety solution to prevent the start and spread of fire, locating and eliminating fire (electronic fire alarms, automatic fire extinguishing systems). Demiris has defined the categories of seniors' needs for which a intelligent home can assist with living: "'Intelligent building' technologies are useful for seniors in situations where an elderly person needs immediate assistance, help with hearing or vision impairment, fall detection, indoor and outdoor temperature monitoring, automatic lighting control, monitoring physiological data (blood pressure, glucose levels) checking closed or open windows, monitoring water flow, security systems, activating fire alarms, reminding of appointments or planned events, timely and accurate contraindication of medications."[2]

The electronic security of entrances is important, for example via fingerprint and face ID, which allows getting rid of standard keys and electronically unlocking entrances in the event of a fire. A higher level of fire safety is the fire suppression function, which activates the automatic fire extinguishing system, initiating sprinklers in and around the site of the fire. By extinguishing before the arrival of emergency services, it seeks to isolate the fire, reducing loss of life and material loss in the building. The evacuation system uses motion sensors and a security system to locate the location of building occupants to be evacuated by the integrated control system. By activating the fire alarm and by means of an audio-visual system, it alerts the

[2] DEMIRIS, G., RANTZ, M., AUD, M., MAREK, K., TYRER, H., SKUBIC, M., HUSSAM, A. Older adults' attitudes towards and perceptions of smart home technologies, 2004, p. 90.

direction of escape and the location of fire escape routes. It is also possible to integrate subsystems for fire ventilation, fire lighting, and a system for emergency shut-off of connections.

Assistance technologies are useful in situations where the client needs immediate assistance, help with hearing or vision impairment, fall detection, monitoring of physiological data (blood pressure, glucose levels). Video analytic devices scan the area, monitor clients and evaluate the recording. The recording is automatically evaluated by intelligent tools that are able to instantly recognize, according to the analysis of the video and audio recording, a threat to the client's health (e.g., epileptic seizure, falling, accident). In case of a positive evaluation, it triggers an alarm and summons help. According to Victoria Haines and Val Mitchell of Loughborough University, UK, "Many of the benefits of intelligent households are related to the better healthcare service and convenience for older people and people with disabilities."[3] Smart Band technology - a device in the form of a smart bracelet, can effectively monitor pulse, temperature, pressure, glycemia directly from the client's wrist. Smart Band senses the client's location within the building, it can detect what position the client is in by rotation, position and time data from the wristband. The recording is automatically evaluated by intelligent tools that are able to instantly recognize a client's health risk based on the data from the wristband. In case of a positive evaluation, it triggers an alarm and summons help. The advantages are the simple installation, the device's collision-free compliance with GDPR regulations (no video and audio recording of clients' privacy) and the low investment costs. According to Sabine Koch: " To design optimal technology devices for the elderly, there is a lack of accurate findings on the needs of seniors. A particularly missing aspect is interdisciplinary research on applications for different age groups of users."[4]

Monitoring devices for physiological functions of users with specific needs represents an initial higher investment cost for investors and operators. However, in the future they are also economically beneficial for facilities providing care for users. They significantly reduce staff costs, especially in decentralised types of facilities - with housing dislocated from the administrative and economic part. A complex issue is the collision of these systems with user privacy and GDPR. With advanced technology, it is possible to resolve this collision as well and monitor physiological functions and location of users even by means without the need for video and audio recording. It is important to consider the fact that the clients of a social services facility have different requirements for buildings compared to ordinary users in order to select intelligent and smart technologies. The fact that the mix of clients in the facility is variable over time is also important, as are their requirements. Therefore, it is important to select smart technologies that are adaptable and adjustable to changing criteria.

CONCLUSION

The accommodation for disabled residents occupying intelligent buildings has undergone progressive development in the last decade. In the early stages of intelligent buildings design, the environment was limiting for these users, especially in terms of controlling and managing advanced technologies. Nowadays, the development of technology design and applications is also oriented towards users with specific needs. Intelligent buildings enable users with specific needs to improve the quality of life and prolong living in their own homes.

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