

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,

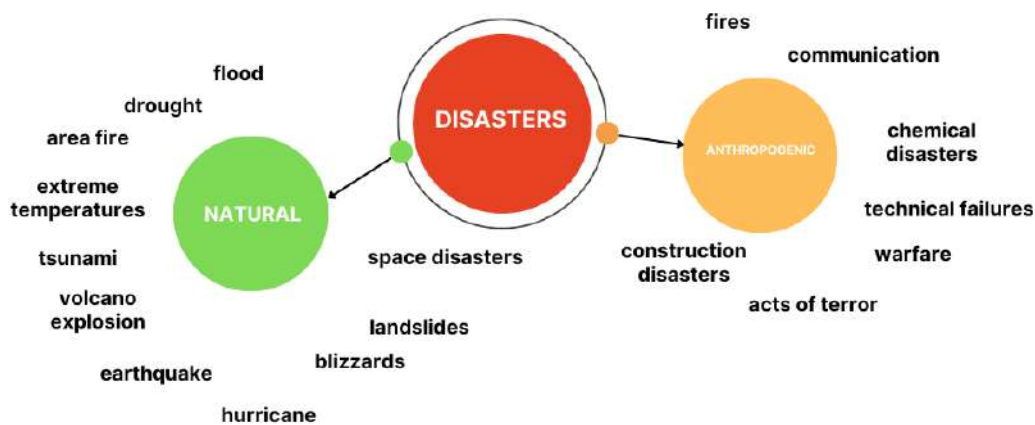


Fig. 2.: Diagram of the types of disasters resulting in loss of residence. Elaborated. (Author: Yaryna Posuniak)

many times desirable in other activities, in this case can hurt. The users for whom intervention architecture 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

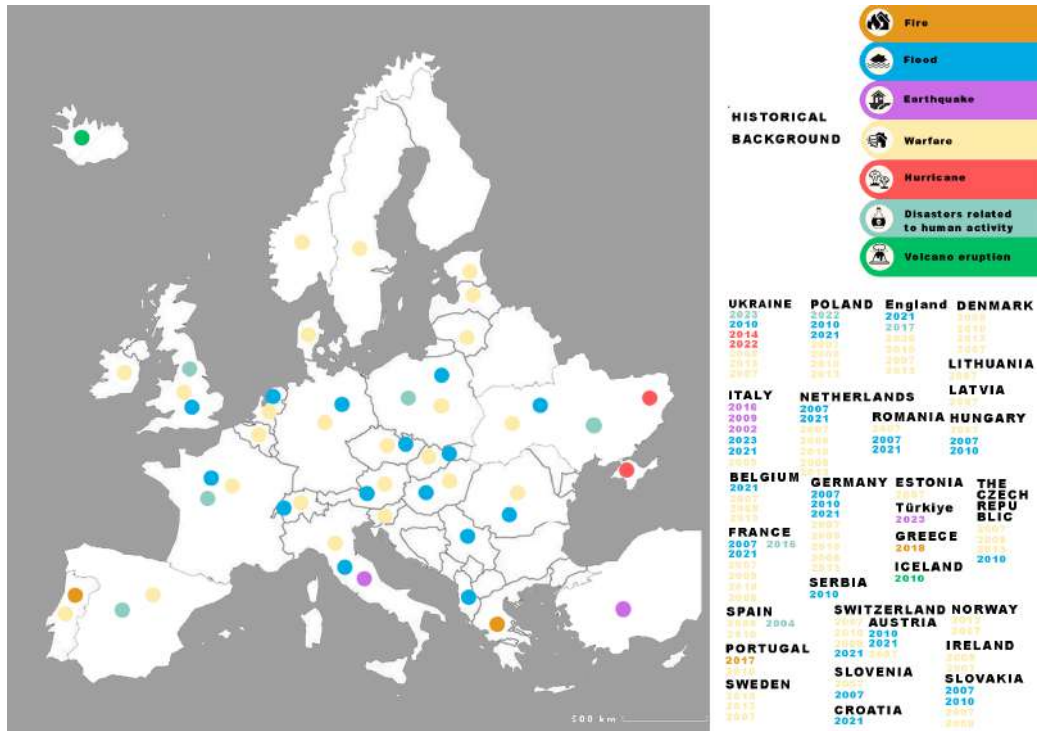


Fig. 3.: Crisis events across Europe in the 21st century. Elaborated. (Author: Yaryna Posuniak)

21st century, causing damage to human dwellings and the need for intervention architecture, are those 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.

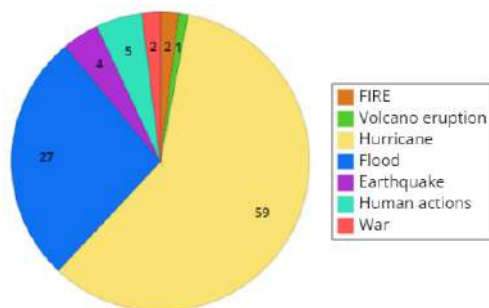


Fig. 4.: Frequency distribution of disaster-like phenomena across Europe in the 21st century. Elaborated. (Author: Yaryna Posuniak)

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).

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 and 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 transforma-

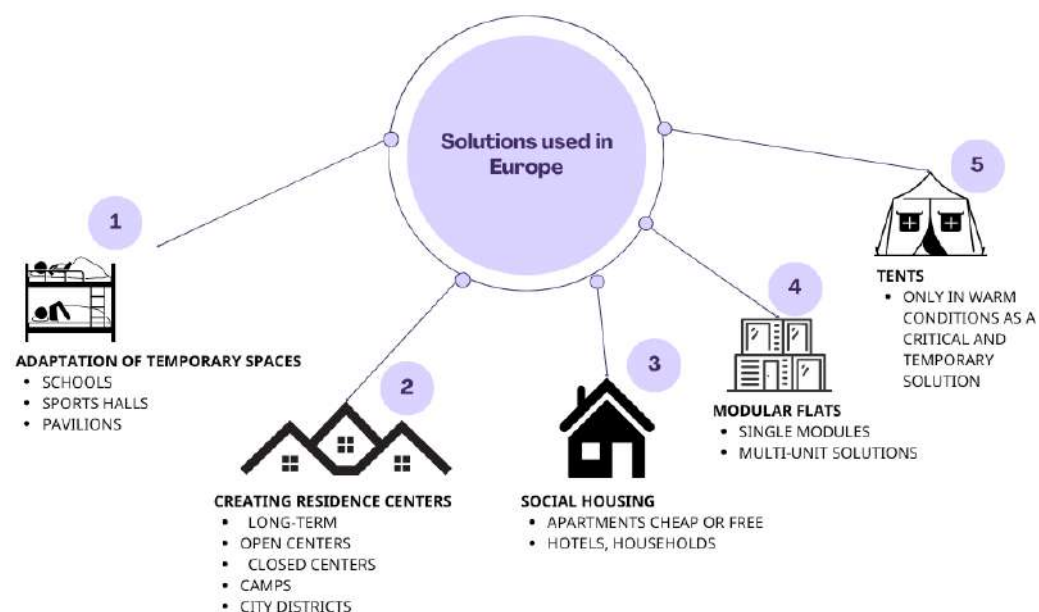


Fig. 5.: Types of intervention architecture most common in Europe, numbered by frequency of occurrence. Elaborated. (Author: Yaryna Posuniak)

tion 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 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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