KAPITEL 11 / CHAPTER 11 [11]
ARCHITECTURAL HERITAGE OF UKRAINE DURING THE WAR:
LOSSES, CHALLENGES, AND SOLUTIONS

Introduction

Every year a large number of military conflicts are observed in the world. Over the last twenty years of the 20th century, they took place in more than 50 countries. The negative experience of wars continues even now in the 21st century. Prolonged wars took place in Iraq, Syria, Afghanistan, Yemen, Lebanon and other countries [1]. In 2014, russia invaded Ukraine. In 2022, it began a full-scale war that continues to this day.

Countries in which military conflicts are taking place or have taken place find themselves in an extremely difficult situation. War leads to the destruction of critical infrastructure and industrial facilities, the degradation of human capital, the loss of investment in development, the severance of economic ties with neighboring states, and the depletion of the state budget. It leads to an increase in the level of poverty and an increase in the number of citizens who need social support. Wars and armed conflicts cause large-scale destruction to countries and their cities, lead to huge human losses, significant migration processes, and cause untold suffering. Cities and their residents who have survived armed conflict must adapt to a new traumatic or post-traumatic reality. This process is painful, complex, and ambiguous.

Post-war reconstruction is an extremely difficult test for any country that has ended a war. Not all states have been able to successfully overcome it. World experience shows that recovery was effective only where countries and cities were able to rethink their further development. They chose new approaches and mechanisms that corresponded to their current situation and took into account the specifics of local conditions. Each armed conflict has its own unique characteristics. These are the duration, level of intensity, scale of destruction, as well as the starting conditions for

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recovery, in particular the state of infrastructure and the availability of human capital. Although significant experience has been accumulated in the field of post-war reconstruction over the past decades, there is no universal solution or model that Ukraine could simply copy. That is why studying international experience is important. But it needs to be adapted creatively, taking into account the unique circumstances and challenges that will be faced by the country after the war.

International experience shows that in the context of armed conflicts, post-war monuments restoration and cities reconstruction require a delicate approach that combines preservation, cultural sensitivity and architectural sophistication. Restoration work should begin with careful analysis and documentation to create a comprehensive picture of the damage caused and to form the basis for further steps in the restoration.

A key element of this process is a deep respect for the cultural value of the places, ensuring authenticity and involving local communities. The harmonious combination of traditional methods and materials with modern conservation principles allows for a balance to be found – between the need for reconstruction and the preservation of historical integrity. Such reconstruction is not only a physical restoration, but also an act of preserving cultural identity and heritage [2].

Today, Ukrainian scientists and practitioners are conducting fruitful work on the issue of documentation and digitization of architectural heritage. This is done with the aim of studying, preserving, popularizing, and restoring it in case of destruction after the war. Previous work by the authors of the article concerned the study of the Ukraine architectural heritage [3, 4, 5, 6, 7, 8, 9], Ukraine national traditions [10, 11, 12, 13], and the formation of the historical buildings interiors [14, 15].

11.1. Key Legal Documents on the Protection of Cultural Heritage in the Context of Its Destruction Due to Armed Conflicts.

The issue of protecting tangible and intangible heritage during armed conflicts has concerned mankind since ancient times. The Final Act of the Intergovermental Conference on the Protection of Cultural Property in the Event of Armed Conflict

(1954) stipulates that the parties to the conflict are obliged to respect and protect cultural heritage, to prohibit and stop any acts of theft or misappropriation of cultural property in any form, including any acts of vandalism. During military operations, the parties must take particularly careful measures to avoid damage to cultural heritage and cultural property. The conversion of monuments into military objects is an exception [16]. But the history of mankind shows otherwise. The aggressor country does not try to preserve the heritage of the country-victim of aggression. On the contrary, the otherness of the culture of another people is used by the aggressor country as a justification for its own criminal actions. The destruction of cultural heritage sites is deliberately carried out with the aim of destroying the nation. This is a terrorist crime that undermines peace and international security. Thus, russia, which is a party to the "Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict", deliberately destroys everything Ukrainian. By doing this, it demonstrates to the world every day that it does not adhere to any international legal documents.

A painful example of being under russian occupation is the UNESCO World Heritage Site, the Tavrian Chersonese Museum-Reserve. UNESCO does not monitor its preservation due to the occupation. International experts have repeatedly expressed concern about the militarization of the cultural space of Crimea and the use of historical sites to legitimize the occupation. UNESCO and other international organizations have condemned such actions, emphasizing that Crimea is the territory of Ukraine within internationally recognized borders. The Tavrian Chersonese Museum-Reserve was included in the 17th package of sanctions imposed by the European Union against russia [17]. However, the real situation suggests that there are no effective instruments of influence that would stop the destruction, reconstruction and preserve the authenticity of the monument. Since the beginning of the occupation of Crimea, Tavrian Chersonese has been destroyed by the russians. New buildings are being built on the territory of the reserve. Some archaeological finds have been taken to russian museums. On July 24, 2024, Ukraine appealed to the United Nations and UNESCO regarding the destruction of the world-famous Tavrian Chersonese monument in the temporarily occupied Crimea [18].

In 2003, the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage was adopted. The aggressor country, russia, joined the Convention in 2006. Ukraine ratified it in 2008, entering into force on August 27, 2008 [19]. This international document aims to protect the intangible cultural heritage of the participating states, which includes certain types of cultural manifestations that are recognized by communities as part of their cultural identity. However, it should be noted that for centuries, Ukrainian culture has fought with titanic efforts for the right to form and preserve its own national identity. And today, russia, once again, violating international legal documents, is trying to destroy Ukrainian identity in all its manifestations. This is especially painful in the occupied territories.

An important document for the restoration of Ukraine's cultural heritage is the "Charter for the Convtrsation of Historic Towns and Urban Areas (Washington Charter)", which was adopted by ICOMOS General Assembly in Washington D.C. in October 1987. The document speaks about the preservation of historic cities and urban areas and emphasizes that:

- "The conservation of historic towns and other historic urban areas should be an integral part of coherent policies of economic and social development and of urban and regional planning at every level" ([20], Principles and Objectives, position 1, p. 1);

- "Before any intervention, existing conditions in the area should be thoroughly documented. The conservation plan should be supported by the residents of the historic area" ([20], Methods and Instruments, position 5, p. 2);

- "The improvement of housing should be one of the basic objectives of conservation" ([20], Methods and Instruments, position 9, p. 2);

- "When it is necessary to construct new buildings or adapt existing ones, the existing spatial layout should be respected, especially in terms of scale and lot size" ([20], Methods and Instruments, position 10, p. 2).

The value and authenticity of architectural heritage cannot be based on fixed criteria. This is important because respect for all cultures also requires that physical heritage be considered in the cultural context to which it belongs. The value of architectural heritage lies not only in its appearance, but also in the integrity of all its

components as a unique product of the specific construction technology of its time. In particular, the dismantling of internal structures while preserving only the facades does not meet the criteria for conservation.

The "Warsaw Recommendation on Recovery and Reconstruction of Cultural Heritage" of 2022 is significant. It expresses deep concern about the growing impact of armed conflicts and natural disasters on significant cultural and natural heritage sites. This also applies to World Heritage sites. In recent years, they have suffered large-scale destruction on a scale comparable to that caused by World War II. This is especially true for areas within historic city districts and archaeological sites [21]. Scientists note such an important point as the understanding and integration into the process of restoration of the values identified in the heritage sites by local communities. This includes new values that have emerged as a result of traumatic events associated with the destruction. The Charter stresses that communities should consider the possibility of perpetuating the memory of the destruction. This can be done through the interpretation or presentation of the site, preserving selected remnants of the destruction for remembrance, education and tourism information, as appropriate. It is worth considering the possibility of preserving the destruction in the memory (memorialization) of communities and interested parties. This task can be solved by interpreting or presenting sites, preserving individual remnants of the destruction in memory, educating and informing visitors, as appropriate. In the context of recovery and reconstruction, after the end of the conflict, such sites should integrate a shared narrative of the traumatic events that led to the destruction as much as possible. It is necessary to reflect the views of all groups in society in order to promote mutual recognition and social cohesion, as well as create conditions for reconciliation.

An example of such commemoration is the Warsaw Uprising Mound in Warsaw, Poland, which will be opened in 2023 (Figure 1). For many years, this place served as a repository for the rubble of Warsaw after its destruction during World War II. Over the years, this rubble has turned into an artificial hill 35 m high. But a revitalization project has transformed the former post-war garbage dump into an unusual and lively public park. The project is dedicated to the memory of the victims of the destruction of

the city during World War II, as well as the struggle for its revival. In fact, cultural meaning has been derived from the pile of rubble.

The gravel extracted during the earthworks was used as filler for the gabions. The gabions display the cleaned debris and serve as exhibition structures. The panels contain information about the post-war history of Warsaw and the Czerniaków mound. Photo: Michal Szlaga
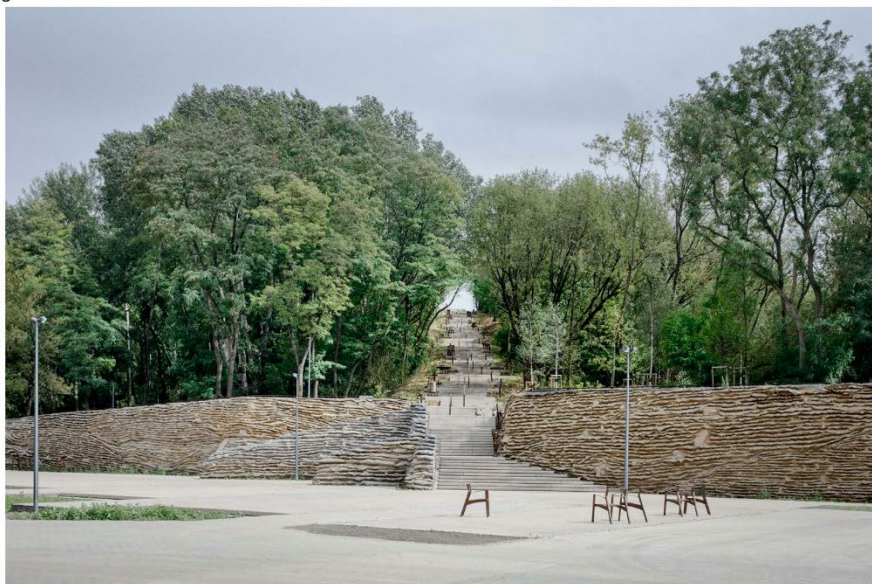
The artifical ravine with rubbleconcrete

Tthe rubble exposed in the park

The retaining walls of the ravines and the base of the burial mound are made of 'butobetone': an artificial concrete layer into which fragments of a building found on the mound have been embedded. Photo: Michal Szlaga

Figure 1 – Warsaw Uprising Mound in Warsaw, Warsaw, Poland, 2023 p. Architectural bureau "Archigrest" and landscape bureau "Toposcape".

A source: [22]

It should also be noted that at the ICOMOS General Conferences in Xi'an (China, 2005) and Quebec (Canada, 2008), the concepts of "context" and "spirit of place" were introduced into scientific circulation. Spirit of place (in ancient Rome there was the concept of "genius loci") as the personification of unique, distinctive and valuable

aspects of a specific area, part of the landscape.

So, international documents have one common goal. This is the preservation and protection of cultural heritage. However, unfortunately, it can be argued that these documents cannot work in practice. This happens because the aggressor state does not comply with their implementation, even if it is a party to the convention or a member of the relevant international organization.

It should also be noted that international documents on the preservation of cultural heritage are mainly of a recommendatory nature. They cannot always act as a clear guide in practical activities. In this context, the professional competence of the architect plays an important role. It is she who provides an understanding of the origins and development of ideas that form a wide range of solutions in the field of architectural and urban planning activities within the framework of cultural and natural landscapes, individual objects (sites) and the historical environment.

11.2. Practical Experience in the Restoration of Cultural Heritage Damaged as a Result of Armed Conflicts.

Decision-making processes for heritage restoration and reconstruction should be implemented using people-centred approaches. They should fully involve local communities and, in some cases, indigenous peoples, as well as other stakeholders. Restoration and reconstruction processes should enable societies to maintain a connection with their heritage, identity and history. Heritage restoration should take into account aspects of social justice and property rights. A human rights-based approach should also be applied, ensuring full participation in cultural life, freedom of expression and access to cultural heritage for all individuals and groups, including, in some cases, refugees and internally displaced persons.

Scientists note that the creation of social spaces is important in the process of heritage restoration. They take on significant importance in post-traumatic environments. Such spaces become centers with the potential to promote mutual understanding, communication, and post-conflict settlement. Restored and

reconstructed places become carriers of memories of better times, as well as reminders of crimes committed. Sometimes they also represent hope for a better future, thereby helping communities cope and overcome traumatic events [23]. The opinions of European scientists suggest that when restoring cities, it is not necessary to remove absolutely all evidence of war from the urban environment. Reminders of the terrible events should remain in the urban space. An example is the aforementioned Warsaw Uprising Mound in Poland. However, this issue is currently difficult for Ukrainians. Since the opinions of community residents differ. Some residents who have survived occupation or significant shelling find it psychologically unbearable to be in such post-traumatic urban environments. Other residents feel more or less normal in such environments. Therefore, for Ukraine, the solution to this issue must take into account the opinion of the community and be based, among other things, on the study of the experience of scientists-practitioners who restored destroyed cities after armed conflicts. Each situation requires careful study and an individual approach. The final solution to this issue for Ukraine is still ahead, since the war is ongoing.

Of course, Ukraine already has experience in urban reconstruction after World War II. But it is important to study modern approaches that have been developed by scientists and practitioners today. The experience of various countries that have experienced armed conflict is instructive, including:

- Warsaw, the capital of Poland, which was completely destroyed as a result of World War II;

- Tokyo is a city that was also almost completely destroyed after World War II, but quickly revived and became one of the most attractive cities for living and doing business in an economically developed country in the world;

- Sarajevo, the capital of Bosnia and Herzegovina, was under siege for 3.5 years and was severely damaged as a result of the 1992-1995 war; support for the reconstruction of this city was provided by a large number of donors and international organizations, which made it possible to rebuild it quite quickly;

- Mosul is the second most populous and largest city in Iraq, a major industrial center and an important transportation hub; the city was captured by the Islamic State

militants and was considered the capital of ISIS from 2014 to 2017. The city suffered significant damage after the occupation by the extremist group Islamic State (Figure 2). The reconstruction process of Mosul continues to this day.

Destruction in Mosul   Destruction in Mosul

Jameh Nabi Yunus (Mosul), built in 1365. A historic mosque in the city of Mosul. On July 24, 2014, the building was destroyed by Islamic State militants.

Figure 2 – Destruction in the city of Mosul in Iraq after the occupation by the extremist group "Islamic State" from 2014 to 2017.

A source: [24]

In this article, we would like to draw more attention to the instructive example of the reconstruction of the city of Mosul in Iraq. It was almost completely destroyed. East Mosul was severely damaged. West Mosul, where the old city was located, was destroyed by up to 80%. It is estimated that 7.6 million tons of rubble remained in Mosul, largely contaminated with unexploded ordnance and booby traps [1, 25].

In the process of reviving Mosul, local authorities implemented a "Build Back Better" approach, similar to what is currently being declared in Ukraine. When

planning residential development, significant attention was paid to the preservation of historical heritage, the development of green areas and public spaces. The city authorities adopted a decision that prohibited the dismantling of severely damaged but surviving buildings without the participation of specialized groups responsible for the protection of heritage. Separate teams were created to assess the condition of cultural monuments. Their goal was to determine which structures should be preserved and which elements should be dismantled and transferred to storage before clearing the territories in the Old City. In addition, the owners of free plots were offered incentives for the temporary arrangement of inexpensive sports grounds for young people on them [1]. Mosul's population is growing quite dynamically today. After the city was liberated from ISIS, a significant number of historical buildings were restored. Thanks to the support of UNESCO and funding from the United Arab Emirates, the Great Mosque of Al Nouri, along with its famous leaning minaret, was restored. Christian churches are being reconstructed, and the main library of the University of Mosul has also been rebuilt. However, a significant part of the Old City still remains in ruins. Mosul faces a shortage of transport infrastructure - there are no roads and bridges. The level of health care for the population remains low. Mosul's revival is ongoing, and there is still a long way to go before full recovery.

11.3. Challenges in Preserving Ukraine's Architectural Heritage During the War.

Ukraine, which has been experiencing a full-scale russian invasion for the fourth year, is experiencing significant destruction every day. Therefore, the preservation of its architectural heritage is an extremely difficult and important task. On the one hand, a significant part of historical buildings is under threat of destruction or has already suffered serious damage. On the other hand, it is the protection and preservation of cultural values that acquire a special symbolic meaning. They are part of the struggle for national identity, stability and further restoration of the country.

Today, work continues on constant monitoring of the condition of immovable monuments, recording their destruction and losses. Ukrainian society is actively

working on this. Thus, on February 26, 2023, the Ukrainian Center for Cultural Studies began recording destroyed cultural heritage sites. On April 5, 2022, the Ukrainian Cultural Foundation launched an interactive "Map of Cultural Losses" [26]. Preservation of information about cultural heritage will allow its further restoration. This will make it possible to apply procedures for their repatriation and compensation.

As of the end of January 2025, 1,390 cultural heritage sites in Ukraine have been destroyed or damaged as a result of the russian-Ukrainian war. To date, cultural monuments in 18 regions of Ukraine have been damaged. Cultural monuments in Kharkiv region (325 damaged sites), Kherson region (269 damaged sites) and Donetsk region (164 damaged sites) have suffered the most [27].

In 2023, a special unit was created in Ukraine. It works in the combat zone to record damage to cultural heritage sites. The creation of a special unit is another measure to implement at the national level the provisions of part two of article 7 of the 1954 "Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict". The new unit includes military personnel who have education and previous experience in the field of culture, archaeology, history and museum work.

There is an increase in the activities of international organizations in Ukraine aimed at preventing large-scale losses of immovable monuments and supporting measures for their protection. At the same time, there is significant financial support from the international community aimed at protecting cultural heritage. This is expressed in the provision of scholarships, grants, specialized equipment and other resources that contribute to the preservation and restoration of objects of cultural significance in conditions of military challenges.

Thus, in Ukraine, from January to June 2025, an international project to train teachers of higher education institutions under the program "Architectural Heritage Preservation in Times of War: The Ukrainian Model" was in operation. The project is the result of cooperation between The Heritage Management Organization (HERITΛGE), the Kharkiv School of Architecture, and the company "Skeiron". It is implemented with the support of the US Embassy in Ukraine [28]. The initiative aims to protect Ukrainian architectural heritage through careful documentation of

monuments, development of new restoration technologies, and involvement of young architects in the process of preserving historic buildings. The main goal of the project is to train specialists in order to transfer modern knowledge to a new generation of architects about the preservation and restoration of architectural heritage, especially in the context of post-war reconstruction. The project brought together 10 scientists in the field of heritage preservation and representatives of higher education institutions in Ukraine. It provided them with highly relevant knowledge on photogrammetry, 3D modeling, terrestrial laser scanning, modern conservation practices, etc.

The study of international experience in the protection of cultural heritage in armed conflicts, as well as the analysis of the causes and motives for the deliberate destruction or destruction of immovable cultural heritage objects during war, has become particularly relevant. Several categories are distinguished among the main motives for attacks on such objects. In particular, destruction may be part of the goal of the conflict itself – as a way to demonstrate strength to the enemy or the international community. Another reason may be the desire to achieve strategic or tactical military advantage. Often, the destruction of cultural heritage also occurs for ideological reasons – as an expression of a political position or a deliberate attempt to erase national identity.

Thus, the war significantly changed the approaches to the study and protection of monuments. They are increasingly considered as an element of national security. This new context led to changes in the content and forms of monument protection activities. It actualized the need to form new strategies that meet the conditions of martial law. The search and implementation of effective mechanisms to prevent the destruction of cultural heritage sites, the active involvement of international experience, partners and Ukrainian society in their preservation are key tasks today. Recording and documenting crimes against cultural heritage, assessing the losses caused, as well as the urgent inclusion of monuments in the State Register of Immovable Monuments of Ukraine are gaining special importance today.

It is also extremely important to constantly and openly voice at the international level all the crimes committed by russia on Ukrainian territory. Only by joining efforts

– internal and external – will Ukraine be able not only to win, but also to preserve its cultural heritage. After all, it is an integral part of our national identity.

11.4. Digitalization as an Important Component of the Modern Cultural Heritage Protection Strategy.

Digitization of architectural heritage is the process of converting data about architectural objects into digital format. This process includes the creation of 3D models, high-resolution photographs, videos, and other digital copies. All of them serve to preserve, study, and promote cultural heritage objects.

Digital fixation not only allows us to archive the appearance of an object at a given point in time, but also to create an accurate basis for its restoration in the event of its destruction or loss. This approach opens up new possibilities in museum work, architectural restoration, educational projects, and virtual tours.

Digitization plays a key role in the preservation of architectural heritage, especially in the context of threats of destruction or damage already caused. By creating digital copies, it is possible to preserve accurate information about objects, allowing them to be worked with even after physical destruction. The advantages of digitization include:

- *Preservation*: digital copies of architectural monuments record their state at a specific moment, which is extremely important in risk areas;

- *Accessibility*: digitized objects become available to scientists, researchers, students and the public from any corner of the world;

- *Popularization*: virtual tours, online galleries and digital archives stimulate interest in cultural heritage, making it part of the global cultural space;

- *Restoration*: using digital models, photo and laser scanning, damaged or destroyed architectural elements can be accurately restored. This is especially important during reconstructions after hostilities.

Such tools are becoming an important component of the modern strategy for the protection of cultural heritage both in Ukraine and in the world. Almost the entire

UNESCO heritage in Ukraine has been scanned. In total, about 300 monuments of local and national importance have been digitized in Ukraine [29]. Among the objects that are important to digitize are: monuments in frontline areas; monuments of national importance; objects that are easily destroyed by time (or due to human negligence), for example, wooden churches. But not only architectural monuments are subject to digitization. These can be places of acts of vandalism, mass graves and other objects that have witnessed tragic pages of history. This is not only a tool for preserving historical memory, but also the basis for the further physical restoration of cultural heritage. This is also the possibility of preserving a database of evidence of vandalism in order to obtain reparations.

Among the most effective modern digitization technologies, laser scanning stands out. It allows you to accurately record the architectural details of objects. A vivid example of the effectiveness of this technology was the restoration of Notre-Dame de Paris Cathedral. It was here that, thanks to a preliminary scan, it was possible to completely reconstruct the damaged structure (Figure 3). A monument of world importance and its restoration became a great challenge for the architectural community. 3D scanning played an important role in the restoration project. The results of the scan, conducted in 2015, allowed architects to create detailed drawings for the restoration of the building after the fire in 2019. This example shows how important it is to take care of digitization and heritage preservation.

Digitization of cultural heritage in Ukraine is a relatively new initiative. In particular, the "Skeiron" team promotes the cultural heritage of Ukraine through digital technologies and global promotion. Their work is an invaluable contribution to the preservation and promotion of national identity and cultural heritage. A powerful Skeiron project is the creation of a 3D model of mass graves near the city of Izyum in the Kharkiv region, the police station in Izyum, where people were tortured, and the destroyed village of Kamyanka. This was achieved thanks to the initiative of the Howard G. Buffett Foundation. These objects are tragic testimonies of the horrors that Ukrainians experienced during the occupation. This project is of great importance for the preservation of historical memory. Accurate digital copies will help historians,

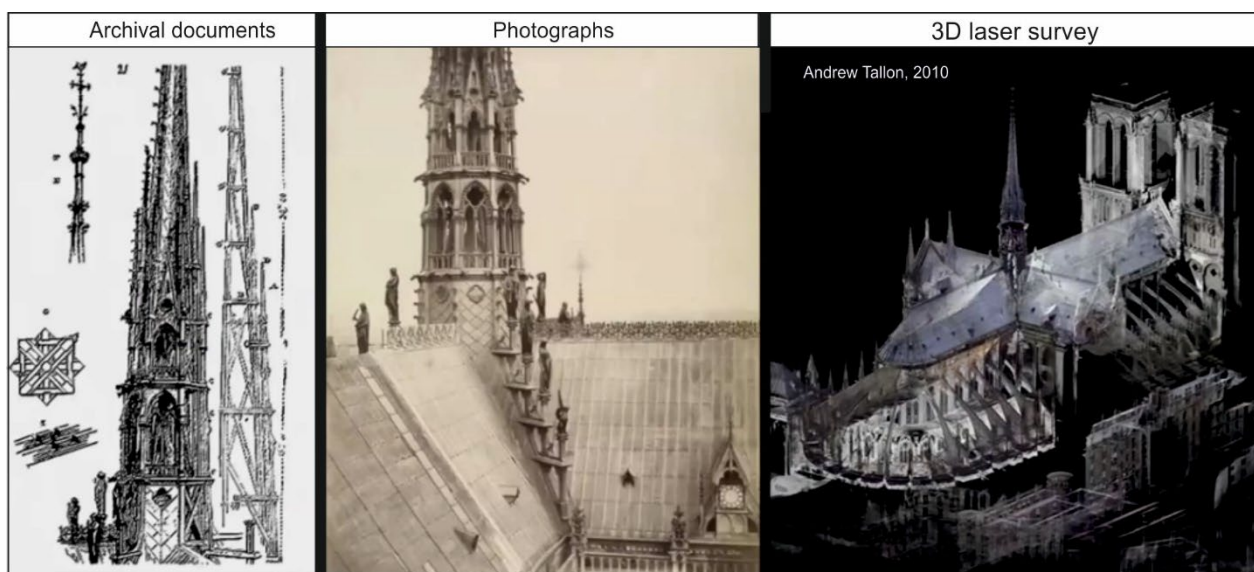archaeologists, and researchers to better understand these events and honor the memory of the victims.

| Archival documents | Photographs | 3D laser survey |

Figure 3 – The restoration of Notre-Dame de Paris Cathedral in Paris was made possible thanks to timely laser scanning.

A source: [30]

In September 2024, russian missiles hit the center of Lviv, damaging the historic area and the UNESCO buffer zone where architectural monuments are located. The shelling resulted in numerous casualties and injuries, and also damaged Villa Franz, one of the city's most valuable buildings. However, the "Skeiron" team digitized Villa Franz in 2022, creating a digital copy of it. This will help in the future restoration of the monument.

So, for Ukraine, in the conditions of military operations and destruction, digitization of heritage is a strategically important step. Thanks to 3D scanning and modeling, it is possible to create digital passports of historical and architectural monuments, which record the exact parameters of decor, forms and details. This data allows for digital reconstruction, which can later be embodied in physical objects.

Summary and conclusions.

Unlike ordinary buildings, immovable monuments cannot simply be demolished and something new built on their site. They must be restored. However, a number of different problems arise here. Today, it is urgently necessary to approve a simplified procedure for the stabilization of immovable cultural heritage sites to enable urgent emergency and conservation work to be carried out on such sites.

The authorities should involve professional specialists and experts, private business and civil society institutions in the development and implementation of recovery programs. This will not only ensure a high professional level of training and the realism of these programs. It will also help maintain social cohesion and strengthen the public's trust in the proposed management solutions. This approach has proven itself very well in cities in Germany, Finland, Japan, South Korea (in the second stage of recovery) and in Bosnia and Herzegovina.

According to research, public sentiment is very fragile after a war. The reasons for this are that many people are in a difficult psychological state. There are many problems with organizing livelihoods and employment of people, etc. At such moments, the risks of conflicts on religious, national and linguistic grounds increase. They can very quickly destroy the unity of society and form a negative attitude towards the transformations proposed by the authorities after the war. To prevent such a development, caution is needed in discussing and resolving sensitive issues for people. Countries that did not cope with this after the war, for example, Lebanon and Iraq, very soon had new long-term conflicts.

Therefore, successful urban regeneration is possible only if there is effective cooperation between central and local authorities. The best results are achieved when the central government does not usurp the powers of local communities. This primarily concerns issues of urban planning regulation and the selection of priority projects for reconstruction and development.