

USE OF MODERN INNOVATIVE TECHNOLOGIES IN ARCHITECTURE AND URBAN PLANNING TO PRESERVE WORLD HISTORICAL AND ARCHITECTURAL HERITAGE

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The analysis of the events of the last decades, which have a negative impact on the process of preserving the monuments of the world historical and architectural heritage, shows four main reasons for their destruction:

- terrorism (for example, the destruction of the Bamiyan Buddha statues);
- human factors (for example, the fire in the Notre-Dame Cathedral);
- natural and man-made cataclysms;
- military actions with open disregard for international agreements and legislation.

As a result of the full-scale war in Ukraine, there is massive damage and destruction of both individual buildings and structures, as well as entire cities. Unfortunately, this terrible fate did not bypass the world historical and architectural heritage, which is part of our cities.

In the city of Odesa, during the Russian aggression, 2,023 real estate objects, including 711 buildings, were destroyed or damaged. 116 architectural monuments were damaged in the UNESCO protection zone alone.

These data provide grounds for asserting that the community, unfortunately, cannot protect the city's historical and architectural heritage from destruction, and this is a fact. But understanding the risk of "potential loss" of our historical and architectural heritage, we can already start working with it and implement countermeasures.

When developing countermeasures, we must understand that one way or another, any even the strongest engineering structure can be damaged or destroyed for various reasons. Therefore, introduced countermeasures should be aimed not only at physical protection.

Countermeasures should be comprehensive, part of them must necessarily be aimed at "physical" maintenance of the historical and architectural heritage, but the other part of them should be aimed at creating and developing an information base for the development of restoration projects or complete recovery in case of loss of object.

It is in the issue of "creation and development of an information base for the development of projects-restoration or restoration of objects of historical and architectural heritage" those modern innovative technologies in architecture and urban planning play a decisive role.

The combination of 3D scanning and 3D printing with the capabilities of modern software complexes for information modeling (which implement the principle of information modeling of buildings) create a reliable platform for the creation and development of an information base of objects of historical and architectural heritage for the development of design, estimate and construction works

The scanning of objects of historical and architectural heritage and the creation of point clouds for each of them, as a result of this work, lays the foundation for future information and construction models of these objects. As a result, designers are able to develop a detailed three-dimensional model of the object, and builders have a clear idea of what was before the "destruction" and how the object should look after the restoration works.

Therefore, the first stage of creating an information base of objects of historical and architectural heritage for the development of design, estimate and construction works is their 3D scanning, and the second is the creation of information and construction models based on point clouds and other data.

Information and construction models must contain all the necessary information for the restoration of the object.

The presence of an information base with "clouds of points" and information-building models for each of the existing architectural monuments in the departments for the protection of cultural heritage objects of territorial communities provides a whole range of advantages and opportunities:

- even with the complete destruction of the object of historical and architectural heritage, it will be possible to completely recreate it;
- the time of developing design and estimate documentation for restoration is reduced, and its quality is increased;
- the quality of control over construction and installation works increases;
- the availability of information models provides an opportunity to create virtual walks through objects of historical and architectural heritage.

The use of modern innovative technologies in architecture and urban planning, such as 3D scanning and software packages for information modeling, is the key to success in preserving the world's historical and architectural heritage and passing it on to descendants.