

Restoring pieces of architectural heritage as a factor contributing to biosphere compatible urban space development

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Abstract. The mission of the research is to study the main problems, arising in the course of restoring pieces of architectural heritage in the age of globalization and fast-paced expansion of urban areas, and to identify the influence produced by traditional built-up areas on formation of a biosphere compatible urban environment. In the 21st century, destruction threats in respect of pieces of architectural heritage aggravate due to their exposure to aggressive environments. Principal research methods, employed by the author, include the retrospective analysis of sources of law, media posts, and a comparative historical method. The following findings were obtained in the course of the research: firstly, it was identified that historic buildings serve as screens preventing the psychological decline of urban areas. Secondly, the author proved that this decline was a consequence of the destruction ideology that found its adherents both in the 20th and 21st centuries. Thirdly, the author offered the key to solving this problem: the solution is to enhance the training of future restorers and urban planners at universities of architecture and civil engineering. The events, delivered at the Moscow state university of civil engineering, may serve as an example.

1 Introduction

Today, in the early 21st century, maintenance of the biosphere compatible environment in urbanized areas in the context of the accelerating urban civilization becomes a most relevant objective that captures the attention of specialists in versatile areas of knowledge, including environmental experts, architects, politicians, and representatives of urban authorities. Today urban living is the dominant form of social co-existence for the majority of our contemporaries. According to UNESCO, in 2008 urban population figures exceeded rural ones worldwide. L. Hollis believes that if current trends persist, it may happen so that by the late 21st century all inhabitants of Earth will have become urban residents. The urban civilization has roots deep in the past. Many existing megalopolises are hundreds or even thousands years old. First large settlements, or predecessors of contemporary cities, emerged 10 to 12 thousand years ago. Ancient urban buildings are samples of historical built-up areas, available for observation by urban residents in the 21st century. Any new

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construction must be initiated with account for these pieces of history, embodied in stone, timber, concrete, metal or glass.

The author discusses training-related actions implemented at NRU MGSU and several other educational institutions of civil engineering within the framework of the problem-oriented analysis needed to nurture contemporary restorers and to demonstrate recent restoration bottlenecks caused by growing urban built-up areas, aggravating environmental problems, developing transportation networks in megalopolises, and the ever growing urban development rift. The author raises the issue of developing a biosphere compatible urban environment. Particular attention is drawn to the analysis of restoration actions in an effort to develop a comfortable urban environment. Restoration funding is also considered in the article.

The author believes that one can boost the biosphere compatibility of urbanized areas by enhancing the training of future urban planners and restorers. The preparation of highly qualified specialists in restoration and reconstruction of architectural monuments and structures, pieces of cultural heritage is a particularly important topic discussed by the author. The ideas that may enhance the training of future restorers are prefaced by the analysis of new challenges caused by alterations in the urban environment in the early 21st century. Here we focus on the rising pollution of the geosphere shells in major cities.

2 Literature overview

The author applies to the conclusions made by restoration theorists and experts, social psychologists, and urban environmentalists. The research works written by P.D. Baranovsky (his life and research are covered in [1]), V. Sarabyanov [2], I. A. Grabar (see [3] to learn more about Grabar's school or restoration), art theorist and historian I. Glazov [4] are particularly significant for the training of future restorers. Important conclusions were made by contemporary urban environmentalists A. Meyer-Grandbastien, F. Burel, E. Hellier and B. Bergerot [5].

The author uses the information on the condition of pieces of architectural heritage in Moscow and Moscow region, published by the central and local media, including *Moskovskoye nasledie*, *Storitenlye kadry*, and *Rossiya v okruzhayushchem mire* magazines.

3 Materials and methods

The author employs the retrospective analysis of media sources and curricula, as well as geomonitoring findings in his research. He analyzes conclusions made by the specialists in urban geography to identify geochemical urban anomalies, psychological pollutions of landscapes, and factors preventing preservation of old buildings.

This research project is implemented with account for the environmental approach to urban planning and architecture and its mission is to overcome the biased pragmatic socioeconomic approach. The latter is capable of ensuring high efficiency of restoration, rational urban planning, preservation and enhancement of the man-made environment, generated in the course of natural urban development.

4 Poll findings. Protection of cultural heritage from demolition and destruction as a biosphere compatible action aimed at environmental development

“Nothing is as sad about our lives, as the sense of the present day's and moment's desolation. Probably, this time-driven desolation of the whole humankind is more gloomy

and terrible, because it's deeper and more significant than the desolation of an individual, heavily discussed in the 19th century. Here is this present day, and there is nothing before and after it... There used to be atoms, they stick together and fall apart... Religion and art, its faithful servant, only they can connect these pieces torn apart, build bridges from the ancient times into the present day and further into the future eternity”, said Alexander Benois, a well-known Russian art expert. Cultural heritage, whose preservation turned relevant in Europe and in Russia in the late 19th century, helps to regain spiritual fundamentals, to ensure further progressive development of the society or the people, and to overcome alienation from the historical experience, accrued by the generations of ancestors. Accumulation of historical facts, development of self-consciousness in European nations, diversification of new sciences, including those studying the past, successes of natural sciences and chemistry, emergence of archaeology – all of these factors contributed to the scholars' efforts aimed at the research into the past epochs. Much attention was and is drawn to restoration and restructuring of architectural monuments. And it's not an accident. Maybe the idea of architecture as a factor that produces a decisive impact on the cultural environment may sound hackneyed. For a human being, architecture embodies the essence of culture, because it represents a unique anthropological space created by humans. This space serves as the repository of the human creative spirit. It is architecture that determines the artistic style of an epoch, as well as urban and suburban lifestyles. In the 21st century attention is drawn to the role of architectural heritage in generating ecological and comfortable urban environments. Indeed, traditional historical urban planning implements the ideas of “a green city”, “green architecture” which are taken advantage of by architects and civil engineers. However, everything old is new again [6] [7]. Therefore, contemporary architects must learn from those of the past. This commitment converts into a challenge to be met by higher professional education in civil engineering and architecture. Awareness of the conclusions drawn by urban ecology, material engineering, art history, art history and social psychology is a must.

It has been acknowledged that any disappearance of architectural monuments causes psychological decline of landscapes. In its turn, this decline involves the ever growing deterioration of aesthetic properties of suburban and urban areas due to their nondescript look, and the structure of this architectural space cannot meet the residents' needs. Identical districts composed of apartment buildings resembling one another appear now and then. The conclusion made by the Russian environmentalist V.V. Vladimirov is quite clear: “Nondescript built-up urban areas, disregard for the laws of composition, coloristics, eurhythmics, etc., emergence of identical, dull and inconvenient residential houses create an antihuman environment not only in terms of its functional features, but also in terms of its negative impact on the human nervous system. These nondescript built-up areas coupled with irrational land use increase the number of so-called “wastelands”. Robert Rozhdestvensky, a 20th century poet, wrote:

*Aerodromes,
piers
and platforms,
forests without birds
and land without water...
Less and less wilderness.
More and more unnatural environments.*

These consequences are avoidable, if elements of old built-up areas are preserved, as even industrial buildings, constructed, for example, in the early 20th century, were to produce a favourable aesthetic impression. Therefore, many of the buildings, constructed on the eve of industrialization, including the Shabolovskaya radio tower [8], Miusskoye tram depot, buildings of the Yaroslavsky, Kazansky and Kievsky railroad stations, the

garage of the State Planning Committee and several other similar structures are monuments of architecture of federal significance (**Fig. 1**). Prevention of their destruction, as well as preservation of numerous other monuments of history and architecture is the mission of contemporary restorers.



Fig. 1. The radio tower in Shabolovskaya street became a calling card of the Russian capital a long time ago.

Being limited by the article format, the author will cover particular difficulties arising in the course of restoration activities. These difficulties are mainly caused by technoplagenic processes boosted by the rapid growth of cities and urban industry in the 20th century. The author will analyze consequences of environmental pollution that produce adverse impact on the monuments located in urban areas.

5 Results. Restorers' objectives in the context of contemporary urbanism and its development

Any mature civil society draws primary attention to restoration of architectural monuments. The willingness to preserve the memory of generations and to find answers to such questions as “who are we?” and “where are we going?” – these are the problems to be solved by the humanities today. Against this background, restoration must be considered as a constituent of any activities aimed at protection of historical and cultural monuments. Its contribution into general historical development and history of arts is incontestable. It is noteworthy that historians, who are willing to reconstruct the past, are interested in developing the theory of restoration. In the Russia of the 20th century, theoretical and practical restoration was supervised by the Archaeological Commission of the Russian Archaeological Society. Many pieces of architectural heritage were restored with the participation of this research organization.

Young restorers should be regularly recruited by respective companies, and their training should keep up with the most advanced restoration technologies, the scope of our knowledge about the past, the succession of architectural styles, and advanced construction technologies. Besides, any restoration works are preceded by thorough and comprehensive study of a facility to be restored. Field (architectural and engineering) research studies, as well as archival researches precede restoration works. They frequently enable researchers to reconsider patterns of historical urban development and to reconstruct the life in the past. Indeed, the restoration of the Uspensky Cathedral in Vladimir-on-Klyazma was accompanied by the restoration of the ancient city that dates back to the pre-mongolian period.

Restorers, historians, architects and urban planners are to solve a wide range of problems that are within the competence of restoration companies in the context of the

ambitious expansion of built-up urban areas and emergence of large urban agglomerations [11]. Environmental problems of restoration multiply, because pollutants accumulated in the surface layer of the urban atmosphere destroy the material of architectural monuments. Changes in the natural environment that occur in the major cities of the 21st century are accompanied by profound, extensive and concentrated anthropogenic loads. Environmentalists make the point that urban areas and urbanized districts are exposed to tremendous anthropogenic changes; they are the unique foci of the ever intensifying human activities.

Timber houses of the Golden Ring and the capital megalopolis are particularly susceptible to damages. Architectural ensembles, composed of wooden residential houses, represent important elements of historical urban environments. The towns of the Golden Ring, historical villages by the Volga river, suburbs of the Russian capital have wooden houses decorated with beautifully carved window surrounds, blinds, cornices, facades with ornamental patterns; there are standalone huts having heavy gates. All of them make up small and picturesque urban ensembles (see **Fig. 2**) [9] [10]. Wooden houses, built in the past century, need protection and restoration. Contemporary restoration practice has technologies for the restoration of charred wood. They may turn relevant due to barbaric arson attacks on wooden pieces of cultural heritage. Students, majoring in restoration, must be made aware of these advanced technologies.



Fig. 2. The town of Sviyazhsk. A residential house and a garden house as components of historical built-up areas on the island that has the status of a conservation area (the photo is made by the author).

It is noteworthy that preservation of historic architectural complexes will stimulate historical tourism, whose share in the Russian travel market is substantial today (see. Fig. 3):

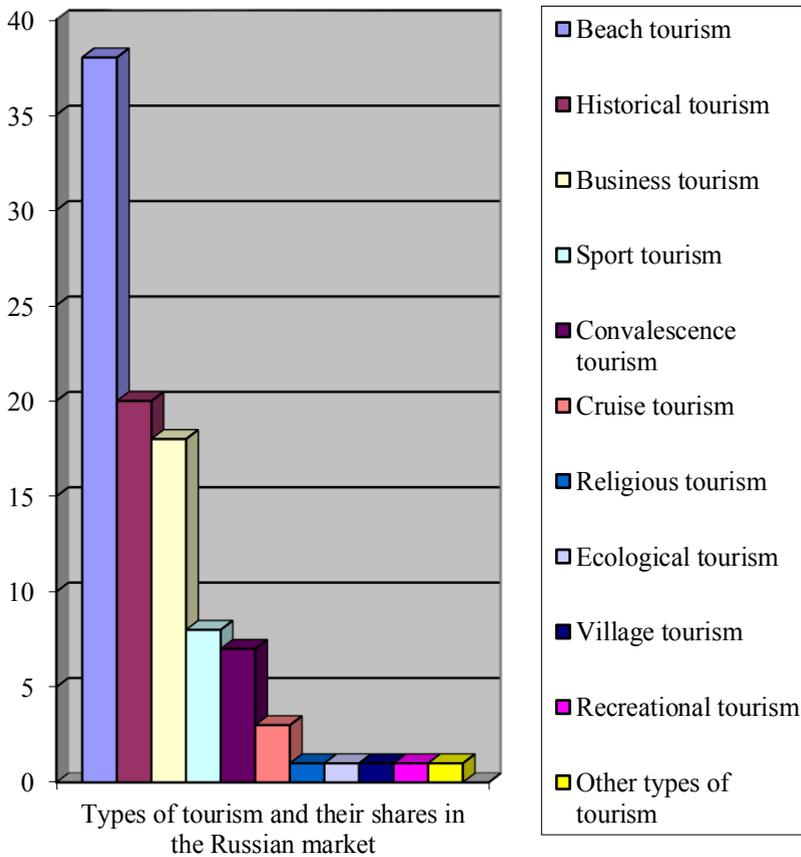


Fig. 3. Types of tourism and excursions and their shares in the Russian market.

It is vital to preserve open-air murals, sculptures and monuments: hazardous admixtures, that flood the surface layer of the urban atmosphere, can destroy masonry. Tuff, limestone and marble are destroyed by pollutants that evaporate from the surface of the water bodies and reach the earth surface as raindrops, snowflakes, fog and dust [11]. Silicates and carbonites leach out of concrete and glass, and these processes threaten stained glass artwork that decorates windows of churches, cathedrals and palaces.

Awareness of chemical and physic-chemical processes, that can protect buildings and structures from the adverse impact produced by the urban environment or pollutants penetrating from other geosphere shells, is particularly vital for students majoring in restoration. One must study deflation and peeling processes typical for painted surfaces (interesting facts on the dating of monuments of art and architecture may be found in [12]) to know how to restore the paintwork of murals, painted walls, and to create conditions for the storage of monumental art works [13].

Departments of construction materials and material engineering, metal and timber structures, architecture, comprehensive safety in civil engineering, design of buildings and structures, technologies and organization of construction processes are engaged in the training of restorers at the Moscow state university of civil engineering. Students majoring in the above-mentioned areas of knowledge get to know the restoration methods applicable to pieces of architectural heritage. Their theoretical training encompasses such disciplines

as restructuring and restoration technologies, material engineering in architecture and restoration, engineering networks of restored and restructured buildings, history of restructuring and restoration, etc.

However, any “field” work is particularly significant for those civil engineers who are going to specialize in restoration of buildings and structures, as this is the way they can develop the ability to apply their theoretical knowledge in their practical work. However, enthusiastic craftsmen can make a more extensive contribution into the restoration of masterpieces of wooden architecture than competent government agencies. Restorer Savely Ivanovich Yamschikov wrote about one of them, Pyotr Karelin, a skilled carpenter. Who would have generated awareness about these enthusiasts unless their work was mentioned by major media agencies? Karelin and his team gained extensive experience in restoring wooden masterpieces. Let alone the effective assistance provided to his team by S.I. Yamschikov, a true master and a restoration classic, back in the 90s of the 20th century.

Practical restoration skills are developed in internship trips, where students have an opportunity to plunge into practical activities. The mission of these creative assignments to be completed by future civil engineers and architects is to restore wooden buildings in the North of Russia, namely in Vologodskaya, Kostromskaya and Arkhangelskaya regions. Indeed, volunteers from NRU MGSU get regularly engaged in restoration projects and restore unique chapels in the Russian North. A detailed report on restoration projects is available in the article [14].

6 Discussion. Restoration of architectural heritage as restoration of culture

In the final sections of our article we will address debatable problems of restoration, outline the horizon for emerging problems that accompany the preservation of the architectural heritage and, in particular, restoration of the historical appearance of cities. Polluted urban environments are just one of several consequences of transformative activities performed by humans, as their efforts are aimed at fulfilling immediate needs. As early as in the first decade of the 20th century industrial civilization aggressively cleared “the historical garbage” away from the urban areas to give way to new construction projects. These efforts involved the need to blow up the Christ the Saviour Cathedral and to give up Pushkin’s historical heritage. I.R. Shafarevich, an outstanding mathematician, political philosopher and dissident, pointed out that “massive demolition of churches and old buildings” had the purpose of generating the “kind of a tabula rasa”, or the clear space that “could accommodate any new construction project” (one can address [15] to learn more about him). Destruction of historical built-up areas could not help breaking the links between the man, the landscape that fed him, and the memory of the past epochs. An anthropological catastrophe aggravated and turned more distinct in the early 20th century. However the objective was different back then. Adherents of industrialization, who had no idea of their past, were replaced by irresponsible bugmen who hated the history of their homeland, who were indifferent to its future, and who would turn angry and dissatisfied in the days of crises. And if these characters make up the majority, we can state that the cultural ecology will be at risk. Monuments of history and architecture will be doomed in this environment.

7 Conclusion

The author raised the problem dealing with a range of restoration works performed in contemporary megalopolises [16] [17].

It was identified in the course of the research that historic buildings serve as screens preventing the psychological decline of urban landscapes. The author is convinced that the monuments, that are being restored, are a factor contributing to development of a comfortable and biosphere compatible environment, the one that ensures a positive mindset in urban residents and travellers. The author draws attention to the role played by traditional wooden buildings in a contemporary city. Particular attention is drawn to historic wooden buildings and pieces made of natural materials. According to the author, the aforementioned decline is nothing but a consequence of the destruction ideology that found its adherents in the 20th and 21st centuries. The key to the problem is to enhance the training of restorers and urban planners at universities of architecture and civil engineering. Actions launched by the Moscow state university of civil engineering are also listed in this article, namely, those performed within the framework of the “Joint Activity” undertaking.

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