

CHARACTERISTICS AND REASONS FOR ROOFTOP EXTENSIONS OF RESIDENTIAL BUILDINGS

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ABSTRACT

Rooftop extension of existing residential buildings results in various consequences. These are, first of all transformations in the architectural, functional and structural framework, and after that changes in the environment and neighboring built area, because it establishes new relations in the given space, from the perspective of urban planning. The fact that the rooftop extension affects changes and consequences in the sense of urban planning, architecture, function and structural stability, reflects the complexity of this issue. Therefore, such interventions require special attention in the process of dealing with this issue.

Key words: Rooftop extension; typological classification; repair; urban-planning, architectural, functional and structural framework.

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1. INTRODUCTION

The residential construction in recent decades in the cities of Serbia has been marked by, among other things, numerous upgrades to existing, multi-family residential buildings and the formation of attic floors. The aim of the upgrade was to obtain new, affordable housing in market conditions. The appearance of large numbers of occurrence of apartment building upgrades has often resulted in poor quality design and technical solutions for upgraded apartment buildings, and this fact caused criticism not only of professional and other public, but also of users of these housing estates.

Two basic cause-and-effect problems has caused the possibility of upgrading residential buildings: how to repair flat roofs in residential buildings, and at the same time determine aesthetically shaped and functional criteria for upgrading, so that the proposed upgrade solution preserves the existing concept of the building being upgraded. That is why the question arises: “Upgrade, yes, but how?!” [1]

The need for the reconstruction of flat roofs, as well as the housing shortage and high costs of the apartments in new buildings, caused a large number of the upgrading of the residential buildings. The upgrading of residential buildings increased the number of dwellings and affected the visual identity of the settlement, but also caused significant characteristic of the Moderna period to disappear, namely a flat roof. [2]

Of course, this opens up an architecturally engineering dilemma the flat roof or sloping roof, as the two opposite roof forms, which in the previous periods were mutually exclusive as carriers of different aspirations. The first appeared as a representative of the Moderna movement, with a strong insistence on the International style and the erasure of all local features. On the other hand, the sloping roof in our region is a traditional form, functionally logical and justified. [3]

2. CHARACTERISTIC UPGRADES

Looking at the upgraded buildings with certainty, we come to the conclusion that they have greatly changed the structure and architectural elements of the entire settlements and caused many parts of Novi Sad, Nis and other cities to lose the former attributes of well-planned and highly aesthetically designed residential settlements. Characteristic upgrades can be divided into three groups [4]:

The first, and unfortunately, a small group of upgrades (Fig. 1) is one that includes quality upgrades in which new authors, following the architectural ideas of the previous ones, managed to unobtrusively increase the number of floors by upgrading or renovating the highest parts of buildings. This group contains objects that did not lose their architectural identity by upgrading and which during the upgrade respected the legality of the existing architecture and used the design elements characteristic for the existing object.



Fig. 1 - Examples of quality upgraded buildings

The second group, which is the most numerous, consists of upgraded objects, which in the architectural sense are given a completely new expression, and the upgraded part of the object cancels the existing architecture (Fig. 2). Upgrades like this are non-expressive, and roof elements are used which are not suitable for existing architecture (such as roof "badges" or roof attics) and very often in the formative sense give the opposite effect to the one conceived by the author of the object.



Fig. 2 - Examples of poorly upgraded buildings

The third group includes interventions (Fig. 3) which from a static point of view can be considered as dangerous and which will probably have to undergo reconstruction in the near or far future, as they could lead to the demolition of the upgraded parts of the building. There are few such facilities and these examples show the negligence of investors when upgrading residential buildings.

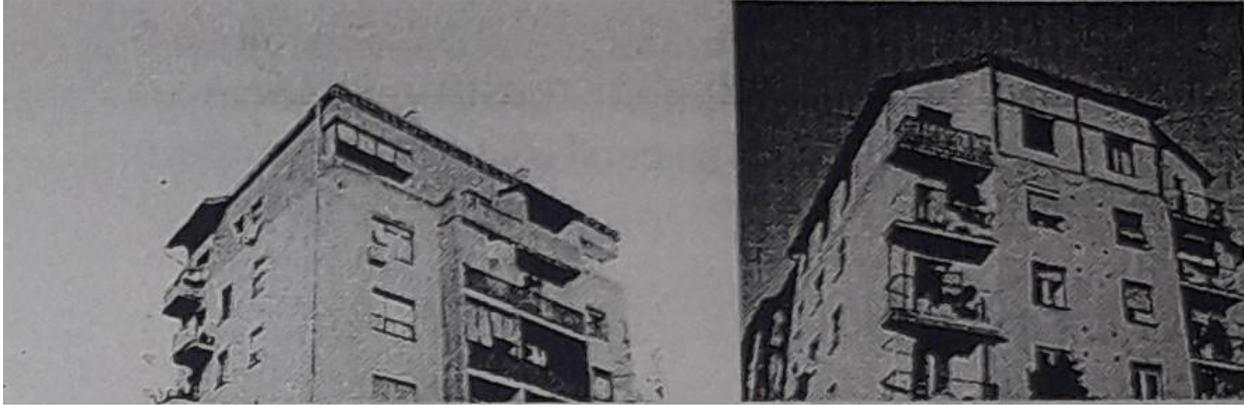


Fig. 3 - Examples of unfinished upgraded buildings

The collection of examples of upgrades and the typological approach of selecting upgraded objects to be analyzed enables the grouping of specific entities and characteristic groupings that will be the basis for considering the overall problem of upgrading residential buildings. "The object of typology in architecture is to classify it through specific forms of examination of architectural elements, parts and entities, with the aim of identifying, separating and grouping examples that have common characteristics, and therefore can be classified into one particular type. However, it is not only the intervention of common characteristics, but also the nature of those characteristics, which may or may not be visible." [5]

3. REASONS FOR UPGRADES

The problem of maintaining flat roofs, due to frequent repairs and high costs, has been present practically since the construction of the first flat roof structures. Flat roofs can be repaired if they are replaced by sloping roofs in accordance with predefined urban technical conditions. However, building a sloping roof requires very high financial resources that homeowners are not prepared to provide (low standard of living, different interest of homeowners, etc.). It follows from this, and this is one of the main reasons for the appearance of upgrades, that the problem of financing the construction of a sloping roof imposes the need to seek a solution in establishing an economic interest in such construction. From the point of view of potential investors, the main economic reasons that would determine him to invest in the upgrading of existing buildings, that is, to build a residential or commercial space on flat roof buildings are the following:

- A lower cost of construction than that realized by the construction of free space,
- The high value of the location where the upgrade takes place.

Considering these two reasons, it can be said that the investor interest is to build a residential or commercial space in the most attractive location at the lowest price, because it achieves this maximum profit on invested capital. The cost of constructing a residential / commercial space that would be obtained by upgrading a flat roof building depends objectively on a number of factors. The most important are the following:

- Technical conditions of construction,
- Volume of construction (size of usable space),
- Construction land compensation.

4. CONSEQUENCES OF UPGRADES

The consequences of the process of upgrading residential buildings are visible at every step. The mismatch of the upgraded residential buildings with the environment, the existing architecture and design

of the buildings, and the inappropriate way of realization of the upgrades with low technical quality of construction, led to the disruption of the existing housing stock and raised the topic of whether the upgrading of the residential buildings was conducted in the right way. The consequences of the chaotic running of the entire process of upgrading residential buildings have produced a lot of dissatisfaction with the process of creating the upgrades. Nevertheless, the positive effects of this process are visible.

After the analysis of selected upgrades of residential buildings, the basic valorisation in architectural and construction sense could be defined and it is divided into [6]:

- Successful or quality upgrades that have successfully implemented the continuity, that is, the connection of parts of the building in the architectural sense and the sense of the basic supporting structure,
- less successful, or less qualitative, in which some elements of the structural system, or architecture, are satisfactorily resolved and some are not completely,
- successful, some of them with insufficient safety factor in terms of load-carrying capacity and stability of the building, all with low architectural values.

Comparing certain upgrades, we can see the regularities that should be the basis for analyzing and evaluating the selected upgrades. Also, there are differences in the perception and monitoring of the implementation of individual upgrades. An example is two objects that have the same morphological role and build an angular object (Fig. 4) and are treated in a completely different way by the author of the upgrades.



Fig. 4 - Examples of upgraded corner buildings

In the second example, the different approaches of architects and their relationship to the upgrade of the building and what is perceived as the existing situation can be best viewed. Specifically, we have two examples that contrast the existing architecture (Fig. 5). One author fully supports and imitates the existing concept, while the other even partially mocks both the building itself and the previous author.

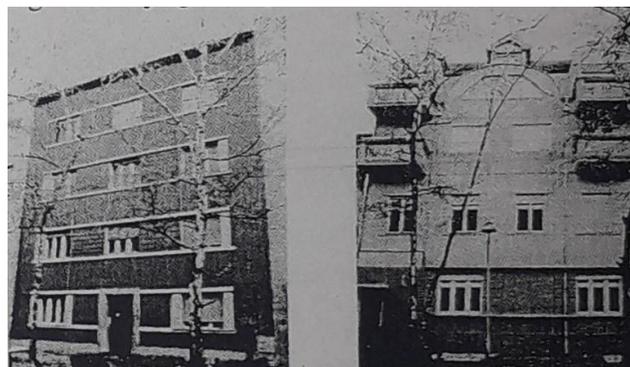


Fig. 5 - Examples of different approaches to building upgrades

And the third segment of considering the consequences of the upgrade process is the interpretation of the architectural work in relation to the period when it was created and the architectural epoch to which it belongs. Here we recognize two buildings (Fig. 6), one dating to the period of modernism and the other to the era of social realism. In the first building, the author tries to preserve the geometry and characteristic horizontality of the facade, and introduces a roof plane that supports the basic idea of the architecture of the existing building, while the second architect introduces a completely redundant and inappropriate element of traditional, primarily rural Vojvodina architecture, and designs a gable wall.

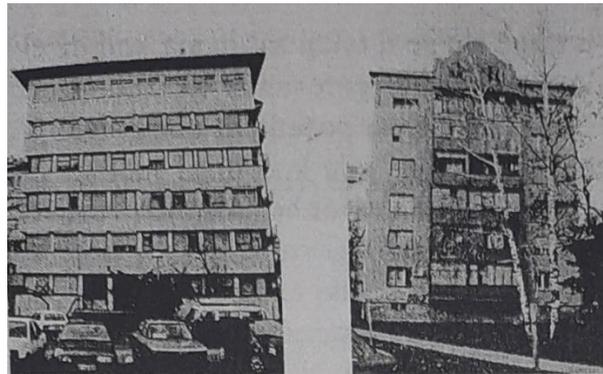


Fig. 6 - Examples of different endings of roof cornice upgrades

An important consequence of the upgrading process is that as the housing development process began, the authorship of the upgraded facilities began to be respected. For each intervention on the building, the consent of the author (designer) or the Society of Architects of Novi Sad had to be obtained when the authors were not available.

It should also be emphasized that at the time when the upgrades were made, there was an obligation that the elevators must have residential buildings that became P + 4 villas with the upgrade. In this way, many existing residential buildings were also given a lift.

One of the consequences is the construction of a significant fund of new housing units in newly upgraded apartment buildings. In a housing deficit situation, when flats in new buildings were still inaccessible to the average consumer pocket, the decision to upgrade existing residential buildings was a solution that would increase the useful floor space of the building as well as the utilization rate of urban construction land. [7] In addition, the upgrade also addresses other forms of urban development, such as height regulation and ambient design of individual parts of the city.

Upgrading of buildings may cause an earthquake risk due to changes in masses in parts of buildings. Also, the number of parking spaces is increasing significantly because a large number of flats with smaller areas are projected. [5]

5. CONCLUSION

A large percentage of residential buildings are subject to upgrades. The need to increase housing is certainly one of the main factors, as upgrading existing facilities in market conditions is a tempting way to get new housing.

In order to start upgrading at all, it is necessary to evaluate the success, that is, the failure to apply this way of expanding the living space. During this process, it is necessary to identify and adhere to the defined phases of work. [8] The upgrade itself also enables the overall renovation of the building itself, which influences the definition of the general condition of residential construction in today's socio-

economic conditions, and therefore it is necessary to define the place and role of upgrades in residential construction.

In addition to the urban aspects, the sociological and economic aspects make the process of control itself a specific form of residential building construction. Unfortunately, some of the consequences of this process have left a lasting mark on the residential architecture of Novi Sad, and much more needs to be done about all aspects that make up the process of upgrading residential buildings to minimize the negative consequences of upgrading buildings in the future.

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