THE METHODOLOGY OF DESIGNING IN ARCHITECTURE AND URBANISM: MULTI-FAMILY HOUSING IN NIS

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Abstract: The topic of the research work is the analysis of the problem of modern housing and the way of improving the quality of the living environment. The main goal of the research is to discover possible types of architectural organization that will satisfy numerous functional requirements of modern age and be in the function of sustainable housing. The paper presents the design process, from the analytical approach to the problem to the presentation of the conceptual design. The article includes an analysis of the urban and architectural project of a residential complex for multi-family housing of different types and forms at the location in Nis.

Key words: methodology, design process, models, multi-family housing.

1. Introduction

Architectural creativity is defined by the conceptual and appearance aspect, where in the chronological order before the physical manifestation there is a broad framework of theoretical consideration of the possibility of realization of the planned one [1]. The subject of research work is the creative process i.e. the development path that is essential in the design process. The design process and its course are put into the foreground so that the observer can get to know the work through his internal structure. The process of architectural creation can be defined as a comprehensive concept of process theory or design methodology.

Based on the definition of architecture, factors and approaches that influence the design process, the first part of the paper emphasizes the importance of design methodology in architectural creation. This chapter defines the theoretical frameworks, the development and the contemporary tendencies of the methodology in the design of residential buildings.

In the second part of the article emphasis is placed on basic methods of contemporary science – modeling methods and special methods of knowledge – methods of analysis and synthesis, and their importance and application in all phases of design. The role of the mentioned methods in the design process is presented in the paper through an example of an urban-architectural project of a residential complex for multi-family dwellings of different types and forms at the location in Niš.

The aim of the paper is to illustrate the own attitudes and interpretations related to the problem or significance of the methodology in urban and architectural design through the analysis of the case.

2. Development of methodology of designing and contemporary tendencies in architecture and urban planning

The methodology of designing in architecture and urban planning throughout history has changed the principles and endured the influence of the cultural, sociological and political events of that time. What is the world, such is architecture [2]. Turn in to man and life, architecture seeks and finds a constant and renewed inspiration and the meaning of its existence. Every historical epoch of architecture expresses some kind of its own particular philosophy of the organization of space.

In the design of modern apartment blocks the application of combined types of housing is actual. One of the best types of buildings is urban villas because they have the most optimal con-
ditions for sunbathing, ventilation and visual contact with the environment. All four sides are free, so it is possible to design housing units on the corners that will have a two-sided, or even three-sided orientation that is closer to the type of family home. It also allows such forms that will contribute to unit personalization and user identification with them. With a floor space of up to 4 floors and a number of apartments on floors 2 to 4, the urban villa provides significantly more humane living conditions. Another type of building that is often applied in modern architecture is the gallery type of the building. The use of this type is suitable near the traffic routes in order to protect the residents of the building from noise and gas emissions. In the gallery unit, the housing units are positioned along horizontal communication. Galleries can be with expanding’s that are intended for gathering and sitting, for the play of small children, as well as for providing space for the greenery, which contributes to the impression of a kind of raised pedestrian street from which it enters the apartments [3].

Of particular importance in the concept of design is the differentiation of the social zone from traditional family housing units, in order to ensure the privacy of users. On the other hand, all units have a private outer space, a terrace or a balcony. For the social aspect of the life of the inhabitants, it is important to form internal courtyards and common amenities within the housing block.

The aspect that is also important to satisfy in modern design is ecological. Green construction is one of the ways to improve the quality of life in residential areas. Construction of green roofs is becoming more and more popular as a way of returning nature to cities. This is today a growing urban trend in cities around the world, inspired by a desire for a better environment.

3. Methodology of designing in architecture and urban planning and application of modeling method and analytical-synthetic methods

“Designing is a description of the desired change of a complex system, which consists of people, constructed (artificial) and elements of the natural environment, as well as a description of the elements of the built environment (artefacts) that change is achieved” [1].

3.1. Designing – the process

The methodology of designing in architecture and urban planning explains the character of design problems and provides a choice of methods. These problems can be submissive, which are mostly technological by nature, and disobedient, which require a research, creative, dialectical approach [1].

The design process begins with the creation of a program in which the investor defines the requirements and needs of future users. The design process can generally be divided into four phases:

1. Analysis and Valorization of Impact Factors
2. Formation of strategic project definitions
3. Conceptualization
4. Developing the concept

Resolving a task begins with site analysis, while on the other hand the functional units are analyzed. Based on the analysis of the program (project assignment) and objective factors, the designer decides on a certain type of construction that could provide a higher quality of life with its spatio-functional characteristics.

Significant models arising from the design process are urban and architectural models. Urban and architectural models represent the product of the design process in order to solve and present the spatial-urban organization of a group of objects or a single object. Models are formed to define functional, use and design elements of the solution and / or present ideas / solutions to clients.
3.2. Phases in the design process

The problem of designing is not enough to observe only through the dimension of need, because it is about the complex problem that is determined biologically, psychologically, socially, culturally, ecologically and spatially [3]. The research strives to apply all phases of design, starting from the analytical approach to the problem, followed by the creation and presentation of the conceptual design. The project assignment, site analysis, the analysis of types and models of spatial organization of objects, the development of the concept of spatial organization and the choice of the architectural model are characteristic phases in the design process.

The whole process of designing will be presented through an example of an urban-architectural project of buildings for multi-family dwellings of different types and forms.

3.2.1. Projected task

Defining the project task is a professional basis for project design and design methodology in architecture and urban planning. The project task or program represents a clearly defined need and conditions for a particular new urban / architectural space. The project task defines the rooms or spaces that the building / complex should contain, the area and / or the volume of said rooms or spaces, a certain way of functioning of the future object or complex.

3.2.2. Location analysis

The analysis of natural and created conditions determines the potentials and limitations of a particular location for the possible design contents provided by the project task [4]. From the aspect of natural conditions it is necessary to determine the characteristics of the location in terms of terrain configuration, the exposure of the terrain, the geological composition of the soil, the level of groundwater, etc. From the aspect of created conditions it is necessary to determine which functions are in the immediate vicinity of the location, what is the connection with the transport network, as well as with public services, etc.

The location foreseen in the project task is located in the central part of the city of Niš. In its immediate surroundings this area has basic health care facilities, basic, secondary and higher education facilities, child care facilities, fire department, main city parks and smaller parks within residential blocks (Fig. 1). In this central city area there are also facilities for commercial and service activities. From the west and south sides, the area relies on the zone of family and multi-family dwellings of medium density, while business-residential areas are on the west side. A group of environmental factors determines the spatial, functional – position relationship of the potential site with the sites or activities realized or planned in the area of expected interaction. The natural environment is of great importance, which in this case is favorable due to the proximity of the main city parks. Also, primary traffic systems are in close proximity. The primary network of infrastructure and facilities of basic health care in the environment is also a benefit.

Fig. 1. The position of the block relative to the larger location [13]
3.2.3. Analysis of types and models of spatial organization of buildings for multi-family housing

A very important factor for the organization of multi-family housing is the relationship between location and housing. In this regard, the following criteria must be met:

- favorable orientation of buildings;
- sufficient mutual distance between buildings (favorable insolation);
- differentiation of motor and pedestrian traffic;
- possibility of motor access to the entrance to the building;
- required parking spaces;
- accompanying facilities (supply, recreational and sports facilities, greenery);
- security;
- spatial integrity [4].

The proposal of the urban solution of the selected urban block, with the disposition of facilities and the arrangement of free surfaces, was given on the basis of the conducted site analysis, the Detailed Regulation Plan and the defined project task. The following illustrations show possible systems of spatial organization - a block or free system, as well as possible architectural models from the aspect of the relationship between the orientation of the building and the optimal functional organization of the apartment (Fig. 2).

3.2.4. Development of the concept of spatial organization – selection of the model

The choice of optimal architectural models is based on the urbanistic analysis of the specific location and the urban and architectural properties of certain architectural models [5]. In this case, a closed block system was selected in the first phase of the development of the concept of spatial organization (Fig. 3). Two possible types of architectural models – gallery buildings and urban villas - were formed by making penetrations in desirable places. The next sketch shows the possible urban designs that, in this case, include gallery buildings and urban villas. Buildings form a coherent whole by shearing and tracking the street front line.

Fig. 2. Spatial organization systems and architectural models with different orientations [4]

Fig. 3. Developing the concept of a spatial organization [13]
3.2.5. Defining architectural solution – models

An important aspect of modern approach to design is the application of different types of housing and the increase in housing density [6]. In this sense, the solution envisages two types of housing: I) building – galley type and II) urban villas. These types of multi-family housing provide the opportunity to form a higher standard of living and quality of life, a higher degree of privacy and security, as well as ecological comfort [7]. The following figure shows some of the types of housing units in the gallery building type and the urban villa, i.e., the internal housing organization (Fig. 4). All units have a double-sided orientation.

Planned objects with their position and surface allow sufficient number of housing units. In the case of gallery buildings, the apartments on the ground floor have their own courtyards. The use of one-floor apartments and duplexes is combined. Vertical communications are all altitude illuminated and lead to a roof terrace that serves as a place for rest and recreation (Fig. 5). For gallery type buildings, parking is provided in underground garages, and some residential units have their own garage on the ground floor. In urban villas on the ground floor next to the apartments there are also common premises for tenants, as well as passage. Stairs and elevators set in the central part lead to units on other floors.
3.2.6. Urbanistic-architectural structure

The proposed urban-architectural solution is based on a compact physical structure and on the formation of several spatial-functional subcategories, each of which has a certain degree of design independence, while at the same time they are subordinate to the spatial-design integrity of the block (Fig. 5) [8]. On the northeast side of the block is a gallery type building, with storeys Po+P+4. In addition to allowing for good orientation of the apartments in the building, its disposition protects the area of the entire block against noise and the emission of gases. The gallery building with storeys Po+P+4, is built on the south-eastern part of the block. Its disposition protects against the noise and emissions of gases coming from the immediate vicinity of the city's traffic [9].

On the south-west and north-west side of the block are located buildings and urban villas, with storeys Po+P+3. Objects are positioned to maximize the benefits of the location in relation to its natural and created conditions [10]. Access to the block is enabled from all sides. Pedestrian areas and communications within the block are defined by different types of paving and partly divided by the accompanying mobile or greenery. In addition to pedestrian communications within the block, there are also green areas and space for rest.

3.2.7. 3D model

The final step in the design process is the production of 3D models. The architectural and design solution is based on the principles of contemporary design and is supported by the application of variously interpreted simple architectural forms and cubes in order to form a unique architectural complex. The architecture of the buildings is in one part calm and appropriate to the spatial context, while in the case of urban villas it is more playful and free. The basic idea is supported by adequate materialization – a combination of concrete, stone, wood and glass (Fig. 5).

4. Conclusion

The methodology of designing in architecture and urban planning starts from the analysis of types and models, the elaboration of the concept of organization, the definition of architectural and urban solutions, in order to finally enable the presentation of this solution to users.

The methodology of designing in architecture and urban planning shows that tendencies in modern design are focused on the application of different types of housing [11]. In this way, it is aimed at securing high standards and quality of life, a high degree of privacy, security and ecological comfort. Urban villas and gallery type of housing in an appropriate spatial context can meet these criteria.

Aspects that are also important to satisfy the principles of modern design in architecture are social and environmental [12]. Green construction is one of the ways of returning nature to cities and creating a better environment, and the socialization of the inhabitants of the housing block is one of the indicators of success in design.

Architecture suitable for a spatial context, supported by adequate materialization and simple forms, contributes to the creation of a unique urban-architectural structure. Such design principles in architecture and urban planning give high-quality results and thus point to the importance of the methodology in the design process [13].

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МЕТОДОЛОГИЯ ПРОЕКТИРОВАНИЯ В АРХИТЕКТУРЕ И УРБАНИЗМ: МНОГОКВАРТИРНОЕ ЖИЛЬЕ В Г. НИШ

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Аннотация: Темой исследовательской работы является анализ проблемы современного жилья и пути повышения качества жилой среды. Основная цель исследования – выявление возможных типов архитектурной организации, которые будут отвечать многочисленным функциональным требованиям современности и выполнять функцию устойчивого жилья. В статье представлен процесс проектирования, от аналитического подхода к проблеме до представления концептуального проекта. Проведен анализ архитектурно-градостроительного проекта жилого комплекса для многоквартирного жилья различных типов и форм на территории г. Ниш.

Ключевые слова: методология, процесс проектирования, модели, многоквартирное жилье.