

ARCHITECTURE IN PERSPECTIVE

VYSOKÁ ŠKOLA BÁŇSKÁ - TECHNICKÁ UNIVERZITA OSTRAVA FAKULTA STAVEBNÍ KATEDRA ARCHITEKTURY



11

11th / 11.

Architecture in Perspective 2019 / Architektura v perspektivě 2019

VŠB - Technical University of Ostrava
Faculty of Civil Engineering, Department of Architecture

Vysoká škola báňská Technická univerzita Ostrava
Fakulta stavební, katedra architektury

Proceedings of the International Conference / Sborník příspěvků z mezinárodní konference

Editors / Editoři:

doc. Ing. Martina Peřínková, Ph.D.

Ing. arch. Sandra Jüttnerová

Ing. arch. Lucie Videcká

Graphic / Grafická úprava:

Ing. arch. Sandra Jüttnerová, Ing. arch. Lucie Videcká

Print / Tisk:

VŠB - Technická univerzita Ostrava

Publisher / Vydavatel:

VŠB - Technická univerzita Ostrava

ISBN 978-80-248-4331-5

"PANEL_LUCK", COMPLEX ALTERNATIVE SOLUTIONS FOR THE RENOVATION OF THE PANEL HOUSE ZTB-13B IN PETRŽALKA

Viktor Kasala - Martin Dubiny - Ema Ruhigová - Roman Ruhig

ABSTRACT: The Panel_LUCK project was organized in the form of a workshop in cooperation between the Faculty of Architecture, the Faculty of Civil Engineering and the Department of the Chief Architect of the City of Bratislava as part of the „Living Healthy!“ led by the Department of Chief Architect within the EU GUGLE project. The “Living healthy!“ Campaign was accompanied by the conclusion of the European project EU GUGLE, Green Urban Gate towards Leadership in Sustainable Energy, which aimed to exemplify the refurbishment of apartment buildings in European cities.

The theme was the renovation of the 13-storey point panel apartment building of the ZTB-13B construction system, which is widespread especially in the district of Ovsište in the city district of Petržalka. Alternative designs of systematic renovation of the block of flats respond to the overall urbanism of the housing estate, social aspects, cultural sustainability, spatial needs of apartment owners, the expression of the building itself after renovation and energy efficiency of individual solutions.

The Panel_LUCK workshop was one of the activities within the dissemination phase of the project, the task of which was to raise awareness of the need for responsible and systematic renovation of the housing stock. In addition to the lay and professional public, the aim of the renewal was to bring students closer to architecture and related fields.

KEYWORDS: panel house renovation; context; energy efficiency; revitalization of housing estate

INTRODUCTION: URBAN CONTEXT

According to the number of inhabitants, Petržalka is the biggest modernist neighbourhood in central Europe. its part Ovsište where workshop area is situated is on its north-eastern part of Petržalka. Geopolitically it is considered as part “Háje 3” with natural border on East - the Danube river and on South - forest of Ovsište (see Figure 1).



Fig. 1.: Unofficial map of Ovsište border, orthofoto map - detail Jankolova street no. 2 (Zdroj: mapy.cz, maps.google.sk)

Ovsište is one of the oldest parts of Petržalka (around 1977). It offers wide functional variety. Same as in the other parts of Petržalka, the number of cultural and event spaces decline. Former local cultural hub is no more considered to function. Today serve as interior recording studio for rent (TV shows, etc.). Also the number of bars and restaurants which serve alcohol in close area is increasing.

The standard of quality of public spaces in Petržalka is on low level which negatively affect also the feel of security. Public spaces are not well designed for pedestrians. With wide sidewalks often filled by parked cars we can consider that they are more car oriented or at least car friendly. Night illumination is also the problem which is often due to a wrong caretaking of high vegetation. Neighbourhood is also filled by death facades and low intensity of public functions in ground floors of the buildings. On the other hand some inhabitants are taking care of the front yards of the blocks of flats. These front yards, are often maintained on professional level. They humanize the public spaces and support the connection between space and people and support the community aspect in Petržalka.

Locality Ovsište is slowly growing in terms of sport function. New sport complex has been built in last 5 years as an extension of primary school campus. It consist of football playground for the local football team FC Petržalka and ice hockey and ice skating hall with public cross fit gym. On the south side in the forest is horse ride complex situated with program of horse riding competitions or the Saturday markets. In Ovsište is also operating one of the biggest football academies for young talents. In the past there was the of-

ficial track for off- road bikers. Today it used and also grow more on informal and community level. Last but not least raising interest of people into hockey ball results in building of the new hockey ball playground. Ovsište is very well connected to the main cycling axis of the district which is visible mostly during the summer period. Unfortunately proper bike lanes are missing so often dangerous situations happen (car - bike, bike - pedestrian).

From architecture point of view the main landmark of the area is a shopping and cultural centre designed by team of architects Stanislav Talaš and Ján Lenč built in 1983. Its volume of the building is based on both sides of the main road connected by the pedestrian interior crossing. Its form is very good reminder of the modernist architecture based on principles of strong linearity with vertical dominant of the tower with clock. The pedestrian bridge serves also as the roof of the public transport stop. High quality of contemporary architecture is supported by opened ground floor with public functions on both sides of the centre led pedestrians deeper in the residential zones and local park. Original Genius loci of the area is still presented by the wooden houses situated in the centre of the Ovsište. They remained there to express the previous character of the area. Before the development of the neighbourhood was Petržalka village and Ovsište only settlement.

CURRENT SITUATION

The topic of the workshop was the complex renovation of the panel housing block. As the object to solve we have chosen 13 storey panel housing construction type ZTB - 13B on Jankolova street. This exact construction type was used only in Ovsište, but its variations have been built all around the Petržalka. Students were asked to analyze and design the improvements of the connection of the building with the public spaces and urban context of the area. The structure consists of three houses with the same construction type which creates some kind of semi opened inner block public space.

This particular space is the crossing of important pedestrian transit ways of the area. One of them connecting the forest and the horse ride complex, the other one lead to shopping and cultural centre and sports complex, the other one connects the tree schools and continue to the church. In combinations with its open character in structure of the locality it is the important and frequent public space of local significance. On the other hand by its spatial and functional usage it really not support this character. Very basic problem in whole Petržalka and also in this particular space is increasing number cars which cause nega-

ING. ARCH. ING. EMA RUHIGOVÁ

Department of Architecture, Faculty of Civil Engineering, Slovak University of Technology in Bratislava Radlinského 2766/11, 810 05 Bratislava-Staré Mesto

ruhigova.ema@gmail.com

She graduated from the Faculty of Civil Engineering "Building Constructions and Architecture" and is currently a PhD student at the Department of Architecture. At the same time, she studied Architecture at the Faculty of Architecture and worked in the AŽ project at the Urban Studio. Today she is a member and founder of the ER Atelier studio. In her dissertation thesis she focuses on cultural sustainability and non-invasive interference with heritage-protected objects.

ING. ARCH. ING. ROMAN RUHIG

Department of Architecture, Faculty of Civil Engineering, Slovak University of Technology in Bratislava Radlinského 2766/11, 810 05 Bratislava-Staré Mesto

ruhigroman@gmail.com

The author graduated from the Faculty of Architecture and the Faculty of Civil Engineering of the Slovak University of Technology in Bratislava. He is currently a PhD student at the Department of Architecture at the Faculty of Civil Engineering. In his dissertation he is dedicated to the sustainable aspect in renewals, and more particularly the interspaces due to energy efficiency. In practice, he worked with several well-known architects. At the same time, he has successfully participated in various architectural competitions with his wife Ing. arch. Ing. Ema Ruhigová.

ING. ARCH. ING. MARTIN DUBINY

Institute of Structures in Architecture and Civil Engineering, Faculty of Architecture, Slovak University of Technology in Bratislava, Námestie slobody 19, 812 45 Bratislava-Staré Mesto

martin.dubiny@stuba.sk

The author graduated from the Faculty of Civil Engineering of STU in the field of Building Constructions and Architecture, later also from the Faculty of Architecture of the STU (FA STU) in the field of Architecture. At present, he works as a researcher at the Institute of Structures in Architecture and Civil Engineering and is also a PhD student at the Institute of History and Theory of Architecture and Restoration of Monuments at FA STU. In his dissertation he specializes in the field of industrial architecture, especially port infrastructure architecture in terms of urbanism, architecture and the preservation and restoration of monuments. During his research, he participated in field research, workshops and conferences not only at home but also abroad. He was a member of the research team within the international project Interreg DANUB focused on mapping and evaluation of cultural heritage in the field of industrial heritage.

ING. ARCH. VIKTOR KASALA

Institute of Structures in Architecture and Civil Engineering, Faculty of Architecture, Slovak University of Technology in Bratislava, Námestie slobody 19, 812 45 Bratislava-Staré Mesto

kasala.viktor@gmail.com

The author graduated from the Faculty of Architecture of the Slovak Technical University in Bratislava in the field of Urbanism and Spatial Planning. At the same time he works as a doctoral student under the leadership of prof. Ing. arch. Ľubica Vitkova, PhD. The dissertation thesis deals with the topic "Communities as a factor in urban planning". He actively cooperates with the main architect's department on participatory activities in the framework of Bratislava city projects. In the EU GUGLE project he was a member of the team responsible for dissemination activities. He is a co-founder of the civic association "Terrace beauty", which is dedicated to the revitalization of public spaces by active cooperation of the local community.

tive effects by parking them everywhere. Whole paved area is used as parking lot. The demands on the parking are still increasing. According to the rising number of cars there is a shortage of parking capacities which means that the other surfaces are starting to be used to park the car such as sidewalks or squares.

Big scale problem which is reflected also in the area is the lack of maintenance of the vegetation and greenery. Underpowered district officers are not able to take care of all parts of Petržalka. This can lead to degradation of greenery and endangering the lives or property of inhabitants. Such incident happened in 2018 by falling the tree on car. Fortunately no one went there and no major damage of the car happened.

The potential of this area is that diverse groups of users of different ages living or coming to this area daily (retiree, adults, university students, high school students, primary school kids and kindergarten kids too. Old benches situated on the main public spaces are being taken because cars are parking there and new ones are brought on the periphery of these spaces and transit corridors. They are no more destinations and places to meet, just quick sitting spots on the way. Former children's playground because of bad construction status was demolished without any replacement. Children's playground is now 500 meters away so the space during the day is totally empty.

Objekt itself was built in 1976. Each floor offers 4 flats (1 single room, 3 three room flats), totally 52 flats. Built surface is 323,92 m² and built volume 1049,82 m³. Single room flat with separate kitchen is south-east oriented. This is the only flat without balcony. Then there are two south-west oriented three room flats and last three room flat with north-west orientation. In total there are 13 single room and 39 three room flats (see Figure 2). Vertical communication core consists of staircase and two lifts. Entrance space situated on the north side is connecting the hall with lifts and staircase. Problem of the construction system ZTB-13B is with stick of the staircase to the rest of the building. It is problem which repeated on many built projects of this construction system. In this case it was solved in 2008 by installing the steel consoles to stick the panels together. All these facts determine the designs and solutions for urban and architectural renovation and revitalisation.

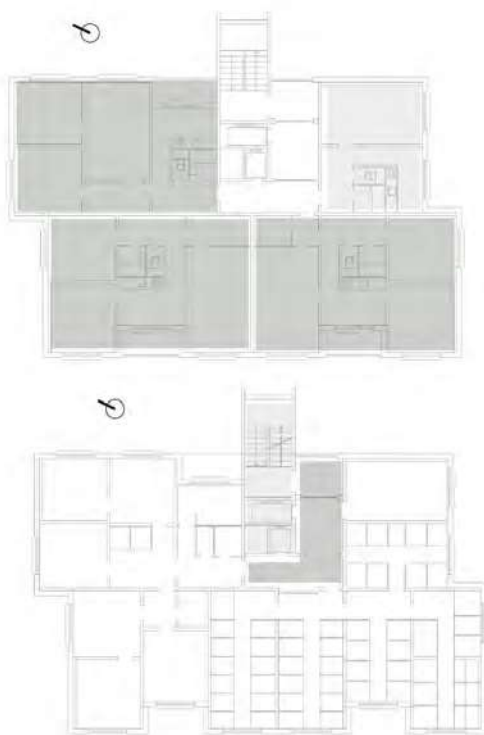


Fig. 2.: 13-storey point panel apartment building of the ZTB-13B construction system - floor plan 2. - 13. floor, ground floor plan (Zdroj: authors)

REVITALIZATION OF THE ENVIRONMENT AND ITS IMPACT ON LIFESTYLES

The current state (of the solved block or other block buildings of a panel character from the period of Petržalka construction) often does not have suitable parameters for meeting the current housing conditions.

Urban design of the courtyards located in Petržalka has a huge potential for the creation of quality community housing, but since the construction period (mostly on footpaths, paved areas, playgrounds) was not successful during construction, the courtyards started to deteriorate and many of them were "occupied" by socially non-attached members of the population.

This phenomenon deepened the asociality of these public spaces and contributed to the reluctance of ordinary people to use them for meetings and leisure activities. Originally designed with a meaningful zoning of space for pedestrians and cars in particular, housing estates have disappeared and have acquired the identity of "anonymous neighborhoods" where all social life and social interactions could be squeezed into a thirty-second "lift" meeting.

Around 2005-2010, there was a general generation change in the population of Petržalka housing estate, and more and more young families came to the housing blocks and naturally began to feel the need to form social bonds through their children. These efforts build on previously considered "the courtyard community" have become one of the main motives in dealing with public spaces in the workshop Panel_LUCK. The current view of architects and urban planners on the issue of renewal and revitalization of prefabricated housing estates goes far beyond the theme of facade renewal (making it more efficient from the thermo-technical point of view, or adding a new socially and culturally valuable layer and motifs). The focus is on bringing social life back into space in close contact with residential buildings, connecting people from different ages and social strata, and bringing more moments and impulses (in the form of furniture, park / landscaping, etc.) to naturally establish mutual relationships.

In one of the proposals, this moment is strongly supported by the removal of static traffic from the area of the imaginary inner block in the zone. In some respects, this is a bold (even extreme) intervention of adding a vertical parking lot to one of the blind facades of the house. It should be said that extreme situation, as in this case, the gradual transformation of formerly free public spaces at the existing parks sometimes requires just such a radical solution. The concept is particularly pleasing due to its variability, where residents will be able to decide what amount of added volume will be realized as a vertical garage (to remove cars from the courtyard) and how much can be realized for renting an office or flats. To begin with, extremely high entry costs will not be required as a gradual addition of leasable space (indicated by blue in the vertical parking area area in the enclosed image) is contemplated.

By cleaning and releasing the current parking lot between blocks of houses, a meeting center is created, which enables the revitalization and humanization of public space with the possibility of various uses. One of the possible options, such as a work spaces, is sketched in Figure 4. Together with the students, we decided to create variable pavilions made of recycled materials that will carry the "human scale" and life among the Petržalka prefabs. The space will thus naturally be divided into small micro-spaces with different functional contents.

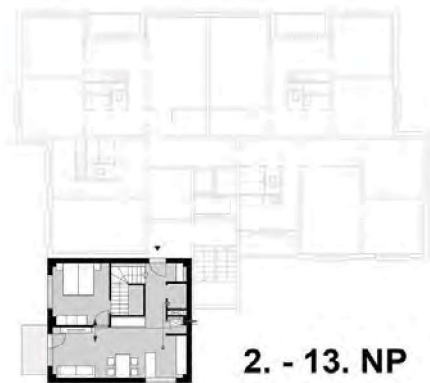
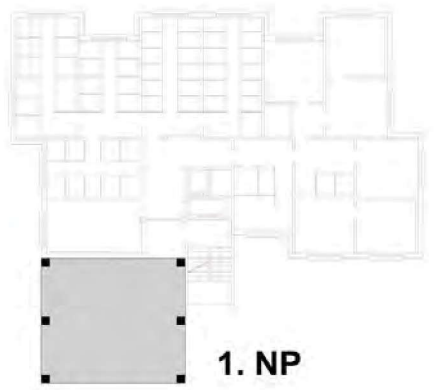


Fig. 3.: Extension of the modular system to the facade of an apartment building - an example of the location of the apartment (Zdroj: „TETRIS CITY“ design)

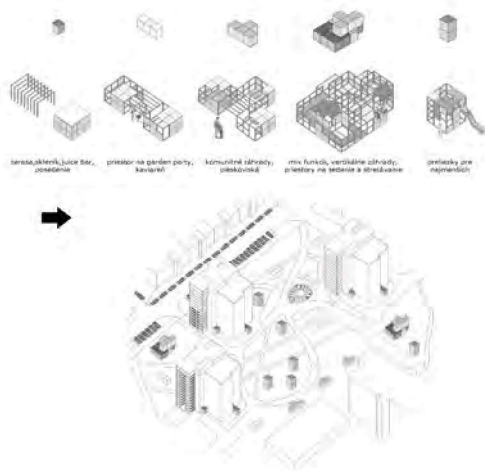


Fig. 4.: Solution of pavilions as a part of newly created public space for inhabitants (Zdroj: „TETRIS CITY“ design)

However, the public space can also be revived by reviving the building's parterre. This moment has become very strong in the next of concepts, which have been strengthened human contact and exterior - whether added loggias of prefabricated panels from the west, or by restoring a partial change and the function of the main floor. There

is a new living room, so-called "living room", workshop or summer kitchen. All are directed to the courtyard, which is also thanks to this space (especially in summer) filled with people. Therein it proposed new walking trails, playground, community gardens and small multifunctional building. However, if the speech about the complete restoration of the intentions of meeting the current requirements for housing, it is necessary to take into account the style of housing and living people today in the premises of the apartment. In exchange generation in Petrzalka naturally also resulted in partial changes in the disposition of claims and interior spaces, to which we responded in several layout and operational changes (see Figure 5).

Types of apartments on the floor are small adjustments changing of three two-bedroom and one one-room three two-room, one bedroom and one one-room. This change is mainly based on the current demand for flats for young people who are looking for housing in most precisely in two-room apartments. This fairly significant hit (thanks to which there is the floor of one apartment extra) is possible mainly resulting from an increase Sojourn space of individual apartments in the newly proposed structure loggia.

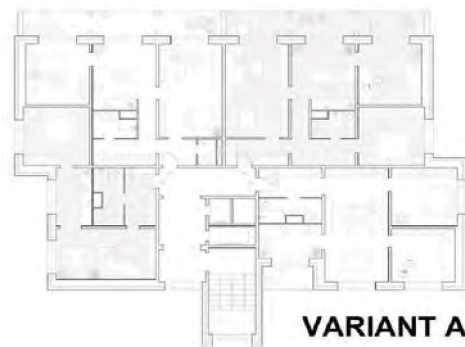


Fig. 5.: Interventions to disposition after the addition of a separate structure loggia, original condition and the proposed status (Zdroj: „DRUŽSTVO“ design)

A very similar approach to the problem was taken by the students with whom we worked on the "Späť do budúcnosti" proposal. However, our focus is not on the additive prefabricated construction on one of the facades of an apartment building (as in the case of the "DRUŽSTVO" design), but on the widening of the loggia width on all sides of the apartment building. The parterre that arises naturally overlapped area of the proposed cafeteria and on typical floors pleasant outdoor dining corners and ample space around them. The internal layout has not been significantly affect-

ed, but the increase in usable space by enlarged loggias brings a new quality of linking the interior with the exterior, which can slide through the perforated panels become completely private and intimate.

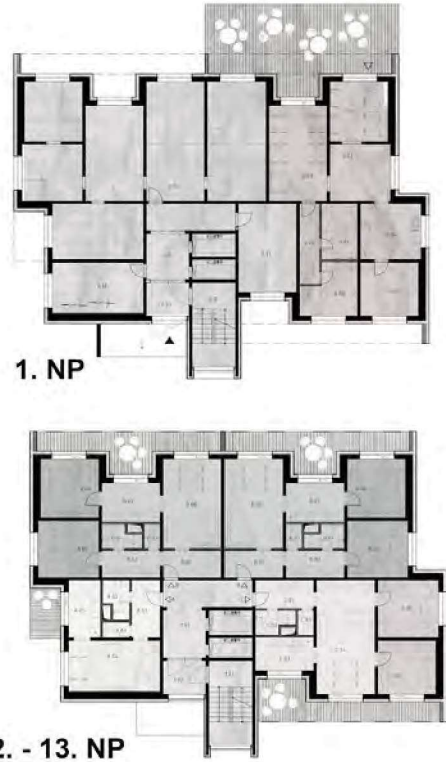


Fig. 6.: Interventions in the layout after enlargement of loggias, parterres and typical floors (Zdroj: „Back to the future“ design)

However, the question remains, what about our lifestyle and the style of the current “renewal” of prefabricated houses? Is it possible to consider prefabricating panels with cheap thermal insulation material and cheap plaster as a renovation? In addition to improving the thermal insulation properties of the house, is it not totally degrading and completely destroying its original identity? These are questions which, while in architectural circles fall day and the day was also addressed, but society as such it seems unprepared to face them. And this was one of our goals to Workshop Pan-

el_LUCK - try to outline and present to the public a number of ways to improve the energy efficiency of prefabricated buildings and also confound his fundamental means of expression.

CONCEPTUAL SOLUTIONS TO IMPROVE THE ENERGY EFFICIENCY OF AN APARTMENT BUILDING

We can improve the energy efficiency of an existing building in several ways, for example by improving the thermo-technical properties of fragments of a heat-exchange envelope, or by technology. First of all, we had to realize the volume characteristics of the original building substance. This analysis has shown the heated volume, area of heat-exchange cover and subsequent evaluation of the form factor of existing state of the object. As the impact factor of the form to calculate the specific heat demand for heating, it was necessary to evaluate the percentage of glazing on the facades, thermal transmittance of the existing outer walls, flat roofs, ceilings above unheated spaces, windows and doors. A specific feature on the facades of panel construction are balconies and loggias, which partially segment the facade of the building and thus contribute to reducing the monotony of the facade.

Nowadays, residents of housing units ungainly “arbitrarily” glazed the premises, thus contributing to the chaotic effect of the facade expression. The role of the architect is to introduce the possibility of regulating the facade, we have taken also aims. However, it should be remembered that design only becomes fully valued when its aesthetic aspect does not exceed its functional content [1]. That's why we decided loggia regulate not only in terms of aesthetics, but also design, which contributed to improving the energy efficiency of the whole building. We put the position of the existing state and various positions of glazing loggias against the heated volume and compared their results with each other. Based on the results of the comparison, students were able to choose which way they would choose in their design of the facade regulation.

A COMPARISON OF THE PROPOSALS IN TERMS OF ENERGY CERTIFICATION

The individual outputs of the Panel_LUCK 2019 workshop in terms of energy efficiency depend mainly on the work with mass (heated volume), on the extension, on the superstructure, on the proposed share of the areas of used glazing on the facade and their orientation towards cardinal points. Another important factor was the integration of loggia and staircase into the heated volume or as a buffer area (according to the baseline developed specifically for the Panel_LUCK 2019 workshop). Different combinations of these aspects differentiate the resulting values of individual proposals. The calculations were processed in ISOVER Project Evaluation 1.0 and ISOVER Fragment 5.0.

Fig. 7.: Comparison of specific heat demand calculations for heating individual designs (Zdroj: Roman Ruhig)



The worst in terms of energy efficiency was the “Spät do budúcnosti” design, which was not the only one in category A. The reason was the unfavorable 0.333 shape factor and 26.27% glazing, resulting in huge heat loss. The project “H: P: H design” with the value of 22,697 [kWh / (m2.a)] ended the best. The reason was the integration of loggia into the heated volume and optimization of the percentage of the glazing area on the facade.

CONCLUSION

In addition to the idea of bringing a new perspective on the renovation of prefabricated buildings in architectural terms, it was necessary to consider the revitalization of the surroundings of an apartment house, which brings with it the improvement of housing for apartment owners in the house and its surroundings. The search for technical solutions that would remove the structural technical failure brought with it a number of variant designs for the new access recovery facility. Integrating balcony to material objects, add new balcony, or layout changes within the floors and floors can bring a discussion of the overall reconstruction of prefabricated apartments with us.

All of the ideas presented approach to the renovation of a prefabricated apartment building from various aspects (architectural, urban, technical, social, or economic). Only such a complete overall renovation of a prefab block of flats can bring, on the one hand, an increase in the comfort of living in and around the house and, on the other hand, savings in money.

SOURCES

[1] Inspired by: „Good design is careful, bad design is careless“ Bjarke Ingels (BIG)

[2]https://bratislava.blob.core.windows.net/media/Default/Dokumenty/Stránky/brochure_Panel_LUCK.pdf