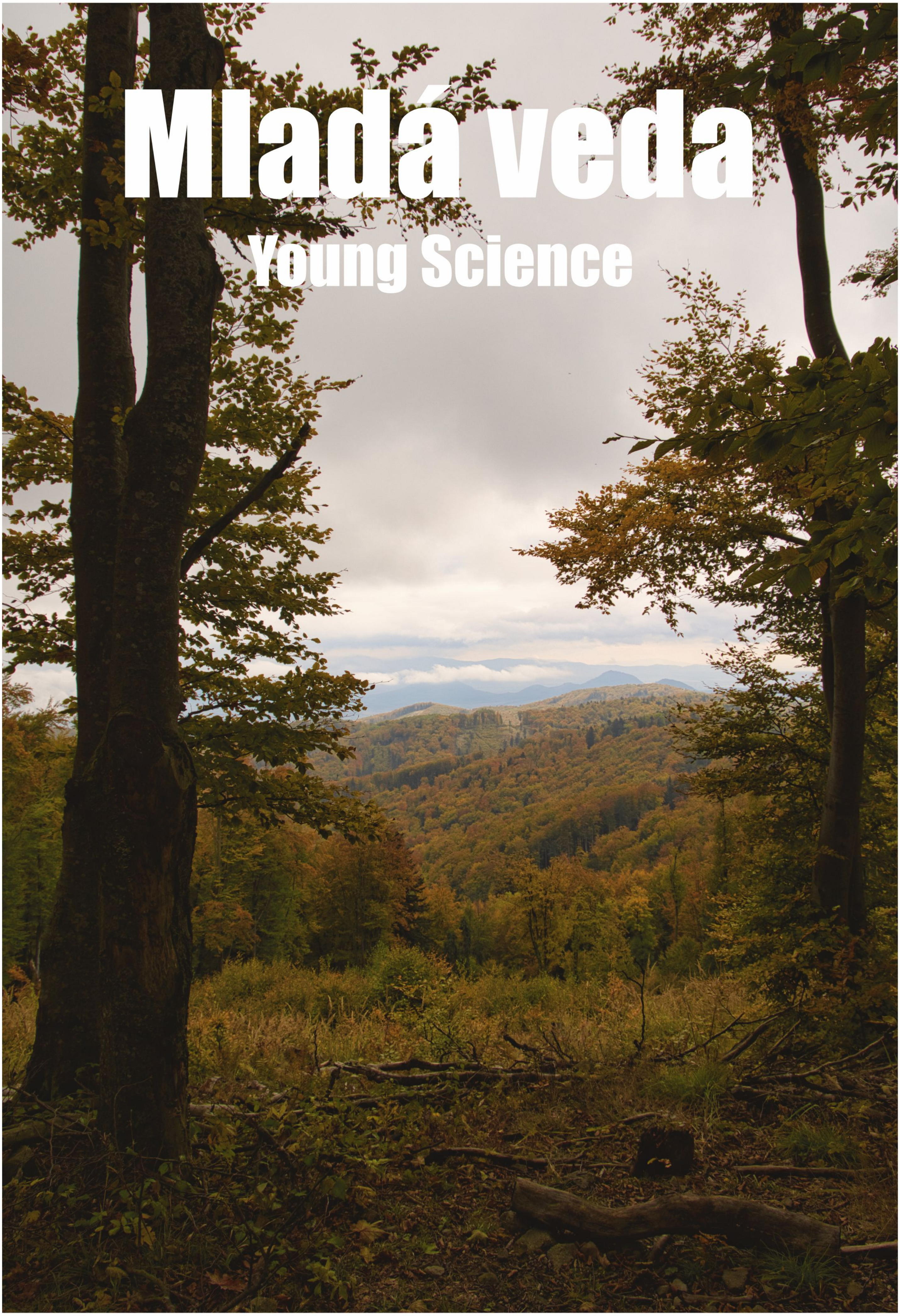
ISSN 1339-3189

5/2026

Mladá veda

Young Science



www.mladaveda.sk

Mladá veda
Young Science

MEDZINÁRODNÝ VEDECKÝ ČASOPIS MLADÁ VEDA / YOUNG SCIENCE
Číslo 5, ročník 14., vydané v septembri 2026
ISSN 1339-3189, EV 167/23/EPP
Kontakt: info@mladaveda.sk, tel.: +421 908 546 716, www.mladaveda.sk
Fotografia na obálke: Pohorie Čergov. © Branislav A. Švorc, foto.branisko.at

VYDAVATEĽ
Inštitút pre vedu, kultúru a spoločenský rozvoj
IČO: 57728038, Bajkalská 12B, 080 01 Prešov, Slovensko
v spolupráci s vydavateľstvom UNIVERSUM-EU, spol. s r. o.

Mladá veda
Young Science
ISSN 1339-3189

Vol. 14 (5), pp. 245-255

PREFABRICATED BALCONY STRUCTURES AS AN ALTERNATIVE TO MONOLITHIC SOLUTIONS - TECHNOLOGICAL AND ECONOMIC ANALYSIS

PREFABRIKOVANÉ BALKÓNOVÉ KONŠTRUKCIE AKO ALTERNATÍVA K MONOLITICKÉMU RIEŠENIU – TECHNOLOGICKO-EKONOMICKÁ ANALÝZA

Silvia Ďubek, Filip Ďuriš [1]

Silvia Ďubek works as an assistant professor at the Institute of Forensic Science of the Faculty of Civil Engineering at the Slovak University of Technology in Bratislava. In the field of research, she deals with the issue of calculating construction site equipment costs, the design of a construction site equipment cost evaluation model, but also business ethics in construction and pricing. Filip Ďuriš is a graduate of the Faculty of Civil Engineering at the Slovak University of Technology in Bratislava, where he studied the design of construction site equipment and cost optimization.

Silvia Ďubek pôsobí ako odborná asistentka na Ústave súdneho znalectva na Stavebnej fakulte na Slovenskej technickej univerzite v Bratislave. V oblasti výskumu sa venuje problematike kalkulovania nákladov zariadenia staveniska, návrhu modelu hodnotenia nákladov zariadenia staveniska, ale aj podnikateľskej etike v stavebníctve a cenotvorbe. Filip Ďuriš je absolvent inžinierskeho stupňa v odbore Technológia stavieb na Stavebnej fakulte na Slovenskej technickej univerzite v Bratislave. V rámci svojej diplomovej práce sa zaoberal návrhom zariadenia staveniska a optimalizáciou nákladov v realizácii.

Abstract
The paper deals with the technological and economic analysis of the implementation of monolithic and prefabricated balcony structures in residential construction conditions. The starting point of the evaluation is the design solution of the object with designed monolithic reinforced concrete balconies, which are confronted with an alternative solution using additionally assembled prefabricated balcony elements. The analysis reflects current development trends in the construction industry oriented towards the elimination of wet processes, shortening the construction time, increasing the quality of implementation and the

[1] Workplace address: Ing. Silvia Ďubek, PhD., Ing. Filip Ďuriš, Slovak University of Technology in Bratislava, Faculty of Civil Engineering, Radlinského 11, 910 05 Bratislava, Slovakia
E-mail: silvia.dubek@stuba.sk, xduris@stuba.sk

application of system elements to break thermal bridges. The comparison is made based on technological, economic and time criteria, while in addition to direct implementation costs, it also takes into account the impact of technological breaks, laboriousness, the required quality of exposed concrete surfaces, the risk of implementation deficiencies and the costs of possible remediation measures. The aim of the contribution is to comprehensively assess the effectiveness of both technological variants and identify the benefits of prefabricated balcony structures in terms of optimizing the construction process, the quality of the resulting work, and the overall economic efficiency of implementation.
Key words: prefabricated, balcony, construction

Abstrakt
Príspevok sa zaoberá technologicko-ekonomickou analýzou realizácie monolitických a prefabrikovaných balkónových konštrukcií v podmienkach bytovej výstavby. Východiskom hodnotenia je projektové riešenie objektu s navrhnutými monolitickými železobetónovými balkónmi, ktoré sú konfrontované s alternatívnym riešením využívajúcim dodatočne montované prefabrikované balkónové prvky. Analýza reflektuje aktuálne vývojové trendy v stavebníctve orientované na elimináciu mokrých procesov, skracovanie času výstavby, zvyšovanie kvality realizácie a aplikáciu systémových prvkov na prerušenie tepelných mostov. Komparácia je vykonaná na základe technologických, ekonomických a časových kritérií, pričom okrem priamych realizačných nákladov zohľadňuje aj vplyv technologických prestávok, prácnosti, požadovanej kvality pohľadových betónových povrchov, rizika vzniku realizačných nedostatkov a nákladov na prípadné sanačné opatrenia. Cieľom príspevku je komplexne posúdiť efektívnosť oboch technologických variantov a identifikovať prínosy prefabrikovaných balkónových konštrukcií z hľadiska optimalizácie procesu výstavby, kvality výsledného diela a celkovej ekonomickej efektívnosti realizácie.
Kľúčové slová: prefabrikát, balkón, konštrukcia

Introduction

Balconies are an important architectural and structural element of residential buildings, which increases the utility value of residential spaces and contributes to the quality of living. In addition to expanding the living space, they ensure contact between the interior and the exterior, improve the comfort of users and significantly influence the architectural expression of the building (NEUFERT, 2023).

From a structural point of view, balconies are among the most demanding parts of the building envelope. They are protruding load-bearing structures exposed to the effects of their own weight, payload, climatic influences and temperature changes. Their design must meet the requirements for mechanical resistance, usability, durability and thermal properties in accordance with the applicable European standards (STN EN 1992-1-1) (STN EN 1990) (STN 73 0540-2).

In current residential construction, monolithic reinforced concrete balconies are most often designed and implemented simultaneously with the ceiling structure of the building. Such a solution ensures continuous static action of the supporting structure, but is associated with high labor intensity, the need for formwork, concreting and compliance with technological breaks during the hardening of the concrete. An important aspect of the design is the elimination of the thermal bridge at the point of connection of the balcony to the ceiling slab, which is currently solved by using system elements with an interrupted thermal bridge (STN 73 0540-2) (STN EN 1990) (Schöck. Schöck Isokorb®).

In recent years, a growing trend in the application of prefabricated structural systems has been observed in the construction industry. Prefabrication allows the transfer of a significant part of the production processes to controlled production conditions, which increases the quality of the resulting elements, shortens the implementation time on the construction site and limits the scope of wet processes. From a technological and economic point of view, prefabricated balcony structures therefore represent a promising alternative to classic monolithic solutions, especially for multi-storey residential buildings (Fédération Internationale du Béton (fib), 2010) (PCI – Precast/Prestressed Concrete Institute) (The International Federation for Structural Concrete (fib).

The aim of the article is a technological and economic comparison of the implementation of monolithic and prefabricated balcony structures in terms of technological process, time requirements, economic efficiency and quality of the resulting structure.

Technical description of the structure

The subject of the analysis is the first stage of the construction of the Sýkorky Residential Complex, which consists of residential buildings SO201 and SO203. Each building is divided into two sections (A1 and A2) with a common first underground floor (1st PP), from which separate above-ground parts emerge. The above-ground part of each building consists of five above-ground floors, with the fifth above-ground floor designed as a recessed one. The balcony structures are designed as monolithic reinforced concrete slabs firmly connected to the supporting ceiling structure of the building. Since the area of individual balconies exceeds 5 m², their drainage is ensured through roof drains connected to the internal LORO piping system, in accordance with the requirements of the project documentation. The supporting part of the balcony is made of a monolithic reinforced concrete slab made of waterproof concrete of strength class C30/37, which is shaped with two height jumps and the necessary slope to ensure gravitational drainage. Height-adjustable targets carrying a wooden base grid with a cross-section of 70 × 45 mm are placed on the supporting structure. The final walkable layer is made of wooden terrace boards with a width of 140 mm. The lower surface of the balcony slab is designed as exposed concrete with a protective unifying coating. A separate waterproofing layer is not designed, while the waterproofing function is provided by the sloped reinforced concrete slab made of waterproof concrete itself. Five types of balcony structures are designed within the designed object. All balconies have a rectangular plan shape with a constant width of 1.55 m, while their length ranges from 3.50 m to 7.60 m depending on the layout of the housing units. The technological and economic analysis is prepared for the SO201 building. On one typical floor (2nd to 4th floor) there are a total of 20 balcony structures. The balconies on the fifth floor no longer serve as pedestrian exterior areas but form a roof over the balconies located on the lower floor. The total number of analyzed balcony structures on the SO201 building is 80 pieces.

Variant No. 1 Implementation of monolithic balcony structures

Variant No. 1 is based on the original design solution of the project documentation of the Sýkorky Residential Complex. Balcony structures are designed as monolithic reinforced concrete slabs implemented directly on the construction site using monolithic concrete technology. Their implementation takes place simultaneously with the concreting of the ceiling slab of the relevant floor, creating a monolithic connection of the balcony and ceiling structure.

Advantages of the monolithic solution:

• Monolithic technology provides a high degree of architectural and structural flexibility, while enabling the implementation of balconies of various floor shapes and dimensions without significant technological limitations.

• Simultaneous concreting of the balcony slab and ceiling structure creates a continuous reinforced concrete element that ensures the effective transfer of internal forces, especially bending moments, to the supporting system of the building.

• Implementation does not require handling of bulky prefabricated elements. The transport of formwork, concrete reinforcement and concrete mix can be ensured by standard tower cranes without increased demands on lifting equipment.

Disadvantages of the monolithic solution:

• The implementation of balcony structures is technologically demanding due to the need to accurately create the slope of the slab, height jumps and other shape details directly during the formwork.

• Since this is a wet construction process, the implementation process is significantly influenced by climatic conditions, especially low temperatures and precipitation, which can prolong or limit construction work.

• Technological breaks required for the hardening and maturation of concrete before stripping extend the construction period and at the same time limit the reuse of the formwork and support system.

• The implementation requires the coordination of several construction professions directly on the construction site, in particular the assembly of formwork, the binding of concrete reinforcement, the precise placement of elements to break the thermal bridge and the subsequent concreting. The increased scope of manual activities can have a negative impact on labor productivity and the quality of the resulting structure.

The implementation of monolithic balcony structures on the SO201 building requires the construction of formwork with a total area of 1,186.89 m². This area includes the formwork of the lower face of the balcony slabs, the front and side surfaces, as well as the formwork of height jumps and teeth resulting from the design of the balconies. The technological process also includes the construction of a support system ensuring the stability of the formwork during concreting and the concrete hardening process. When implementing balconies on the second floor above ground, the support posts are placed on the ceiling slab of the first underground floor. On the higher floors, the support system relies on the already implemented balcony structures of the lower floors, which must achieve the required concrete strength at

Mladá veda
Young Science
ISSN 1339-3189

Vol. 14 (5), pp. 245-255

the time of installation and at the same time remain partially supported. The total area of the balcony structures requiring support is 691.92 m². The load-bearing reinforcement is designed from B500B grade concrete steel. The reinforcement will be delivered to the construction site from the reinforcement shop in the form of prefabricated reinforcement kits according to the drawing documentation, while its delivery will be coordinated with the implementation process of individual work sections. Individual bundles will be marked with identification labels ensuring their unambiguous assignment to specific structural elements and installation positions. The total consumption of concrete steel for the balcony structures of the SO201 building is 22.27 t. (SCHOCK) The required coverage of the concrete reinforcement is ensured by using system spacers. The lower layer of reinforcement is covered by plastic spacer strips, point spacers are used around the perimeter of the structure, and the mutual position of the upper and lower reinforcement is stabilized by steel spatial spacers. To eliminate the linear thermal bridge at the point of connection of the balcony slab to the ceiling structure, system elements for breaking the thermal bridge of the type KL-M7-REI90-CV1-H160 are designed. Before concreting, anchor profiles made of stainless-steel Halfen HTA-CE 38/17 A4 will be attached to the concrete reinforcement, which create a system anchoring for the subsequent installation of the balcony railing. (HALFEN)

Waterproof concrete of strength class C30/37 is designed for concreting balcony structures. With a total area of 691.92 m² of balcony slabs and a variable thickness of the supporting slab in the range of 160 to 230 mm, the total concrete consumption is 148.48 m³. The elements of the final walking layers, the LORO drainage system and balcony railings were not included in the technological-economic assessment, since their technical solution and scope of implementation are identical in both compared variants and therefore do not affect the results of the comparative analysis.

Variant no. 2 Realization of prefabricated balcony structures

Prefabrication is a technological method of construction, in which building elements are produced in controlled conditions of the factory and then transported to the construction site, where they are installed in the designed position. The main goal of using prefabricated structures is to increase the efficiency of the construction process through the rationalization of production, shortening the time of implementation and reducing the dependence on climatic conditions. Production in a specialized production environment makes it possible to achieve higher dimensional accuracy, stable manufacturing quality and more efficient use of qualified labour. On the other hand, this method of implementation requires considering the higher procurement costs of prefabricated elements, ensuring their transport to the construction site and the use of lifting mechanisms with sufficient load capacity.

Advantages of a prefabricated solution:

• Installation of prefabricated balcony elements eliminates technological breaks associated with hardening and maturing of concrete, thus contributing to shortening the total construction time.

• There is no need for the implementation and subsequent dismantling of formwork and supporting structures, which reduces the labour and material requirements of construction works.
• Production in reusable steel forms makes it possible to achieve high quality visible concrete surfaces and minimize the need for additional repairs or remedial interventions after assembly.
• The transfer of a crucial part of production processes outside the construction site leads to a reduction in the production of construction waste and to limiting the negative effects of construction activity on the environment.
• Prefabrication reduces the need for work capacities on the construction site and at the same time reduces the demands on handling and storage areas intended for formwork systems, concrete reinforcement and other material needed in monolithic construction.
Disadvantages of a prefabricated solution:
• Handling of prefabricated balcony elements requires the use of tower or mobile cranes with sufficient load capacity and reach, which can increase the cost of mechanization.
• The transport of dimensionally and weight-demanding prefabs from the production plant to the construction site places increased demands on logistics, special transport technology and coordination of deliveries according to the construction schedule.
• The connection of prefabricated balcony elements to the monolithic supporting structure of the building requires the use of certified anchoring systems and elements to break the thermal bridge, while the accuracy of their installation is crucial to ensure the static function, durability and thermal technical parameters of the structure.

For the implementation of the prefabricated variant on the SO201 object, the delivery of 80 prefabricated reinforced concrete balcony slabs is proposed, which are divided into five type groups marked B1 to B5 according to their geometric dimensions. The balcony elements are designed from waterproof concrete of strength class C30/37, while the load-bearing reinforcement consists of concrete steel of class B500B. The total consumption of concrete steel for all prefabricated balcony slabs is 22.27 t, which corresponds to the amount of reinforcement used in the monolithic variant. Compared to monolithic implementation, the main difference lies in the integration of selected system elements already during the production of prefabs. At the factory, the roof drains of the LORO system, as well as the anchoring profiles Halfen HTA-CE 38/17 A4, are built into the balcony boards, which are used for the subsequent anchoring of the balcony railing. This procedure eliminates the need for additional assembly interventions on the construction site and increases the accuracy of fitting individual elements. The Halfen HIT-HP PI-B dry assembly system is designed to ensure the static interaction of the prefabricated balcony slab with the monolithic ceiling structure and simultaneously break the thermal bridge. (HALFEN) The construction system consists of two mutually cooperating parts. The first part SET-B (Balcony Side) is already built into the prefabricated balcony element during its production. The second part of the SET-F (Floor Slab Side) is installed in the formwork of the monolithic ceiling slab directly on the construction site, where it is tied to its concrete reinforcement. After the installation of the prefab, both parts of the system are mechanically connected, which ensures reliable load

Mladá veda
Young Science
ISSN 1339-3189

Vol. 14 (5), pp. 245-255

transfer between the balcony slab and the supporting structure of the building, while maintaining the required thermomechanical properties of the detail. SikaGrout®-212 cement grout is designed to fill the mounting pockets after the balcony elements have been installed. The total material requirement is 28 bags weighing 25 kg per package. (SIKA) The final compositions of the balcony floors, the drainage system, and the railings were not included in the technological-economic comparison, since their implementation and material solutions are identical in both considered variants. The analysis is therefore focused exclusively on the differences related to the realization of the load-bearing balcony structure.

Technical-economic evaluation

To prepare the economic evaluation, budgets are prepared for both variants. They are processed in the Cenkros 4 program in the current version for the given period. The unit prices and totals are stated without VAT. The price is the amount of money agreed upon when buying and selling goods. A price agreement is an agreement on the price or an agreement on the method by which the price is created, provided that this method sufficiently determines the price. When agreeing on the price, the definition of the goods by name, possibly also by the customs tariff code or by the code according to a special regulation, by the unit of quantity, by the qualitative and delivery conditions or by other conditions agreed upon by agreement of the parties is binding. (Act No. 18/1996 Coll. on prices)

A bill of quantities is a detailed description of a building object, including items of construction work, assembly work and supplies of building materials. This description includes units of measurement and a calculation of quantities, with the aim of providing a clear idea of the future construction work for both parties – the investor and the contractor. (Ellingerová, 2013)

No.	Type	Code	Description	Unit	Quantity	Unit price	Total (EUR)
			Total costs:				**210,606.11**
			HSV subtotal:				**209,977.67**
1	K	411321616	Concrete slabs and ribbed ceilings, reinforced C30/37	m3	148.48	160.86	23,884.49
2	K	411323823	Surcharge for exposed concrete ceilings and vaults SB 3	m2	1186.888	18.58	22,052.38
3	K	411351101	Formwork for slab ceilings – installation	m2	1186.888	17.62	20,912.97
4	K	411351102	Formwork for slab ceilings – removal	m2	1186.888	6.3	7,477.39
5	K	411354175	Support structure for ceilings up to 4 m (installation)	m2	691.924	15.34	10,614.11
6	K	411354176	Support structure for ceilings up to 4 m (removal)	m2	691.924	4.12	2,850.73
7	K	411361821	Reinforcement steel B500 for slabs and balconies	t	22.272	1879.68	41,864.23
8	K	411365004	Thermal break element KL-M7-REI90-CV1-H160	m	444	155.64	69,104.16
9	K	953943121	Embedding steel items before concreting (HTA anchors)	pcs	728	6.45	4,695.6
10	K	998012023	Transport of construction masses up to 24 m	t	378.503	17.23	6,521.61
			PSV subtotal				**628.44**
			Health installations – internal sewage				**628.44**
11		721230003	Roof drain installation DN 75	pcs	80	7.77	621.60
12		998721203	Transport of masses (PSV)	%	6.216	1.1	6.84

Fig. 1 – Budget for option no. 1
Source: authors

Mladá veda
Young Science
ISSN 1339-3189

Vol. 14 (5), pp. 245-255

No.	Type	Code	Description (EN)	Unit	Quantity	Unit price	Total price (EUR)
			Total cost:				**285177.58**
			HSV subtotal:				**276411.10**
1	K	01-CP prefa	Prefabricated balcony slab B1-3500, C30/37, including transport	pcs	32	1204.65	38584.69
2	K	01-CP prefa	Prefabricated balcony slab B2-7200, C30/37, including transport	pcs	4	2486.03	9944.12
3	K	01-CP prefa	Prefabricated balcony slab B3-7600, C30/37, including transport	pcs	8	2613.53	20908.23
4	K	01-CP prefa	Prefabricated balcony slab B4-6700, C30/37, including transport	pcs	20	2304.87	46097.41
5	K	01-CP prefa	Prefabricated balcony slab B5-7000, C30/37, including transport	pcs	16	2410.34	38565.44
6	K	01-CP prefa	Installation of prefabricated element – thermal bridge break (Halfen HIT-HP-PI)	pcs	208	10	2080.00
7	K	01-CP prefa	Installation of prefabricated element – HTA anchor	pcs	728	5	3640.00
8	K	01-CP prefa	Installation of prefabricated element – balcony drain LORO	pcs	80	5	400.00
9	M	02-Kat halfen	Halfen HIT-HP-PI thermal bridge break element	pcs	208	348.02	72388.16
10	M	02-Kat halfen	Halfen HIT-HP-FK element	m	382	84.57	32306.29
11	K	41121151	Installation of prefabricated reinforced concrete balcony slab using mobile crane	pcs	80	135.92	10873.20
12	K	27831121	Grout mortar SikaGrout-212 (25 kg)	pcs	28	22.27	623.56
			PSV subtotal:				**8766.48**
			Health installations - internal sewage				**8766.48**
13	K	953943123	Installation of small metal items into concrete (Halfen HIT-HP-PI)	pcs	208	11.29	2348.32
14	K	99801203	Material transport for buildings (reinforced concrete structures up to 24 m)	t	372.499	17.23	6418.16

Fig. 2 – Budget for option no. 2
Source: authors

A construction schedule, or also a construction timetable, is a schedule of individual activities that should take place within a planned time frame when building anything. For larger contracts, it is necessary to submit a schedule along with other documentation for assessment by the building authority. For smaller-scale construction, such as family houses, it is not necessary to have a plan, but it is always better to draw up at least a small schedule. It is not necessary to follow it to the letter, but a construction schedule can make work much more efficient and often cheaper. (HOBBYTEC.sk, 2025) When compiling the schedule, the standard hours listed in the Cenkros 4 program were used. In order for these schedules to be comparable, the same work shift time was chosen, as well as the number of workers. The sequence of activities was chosen with regard to the technological procedure that should be followed in the selected implementation processes.

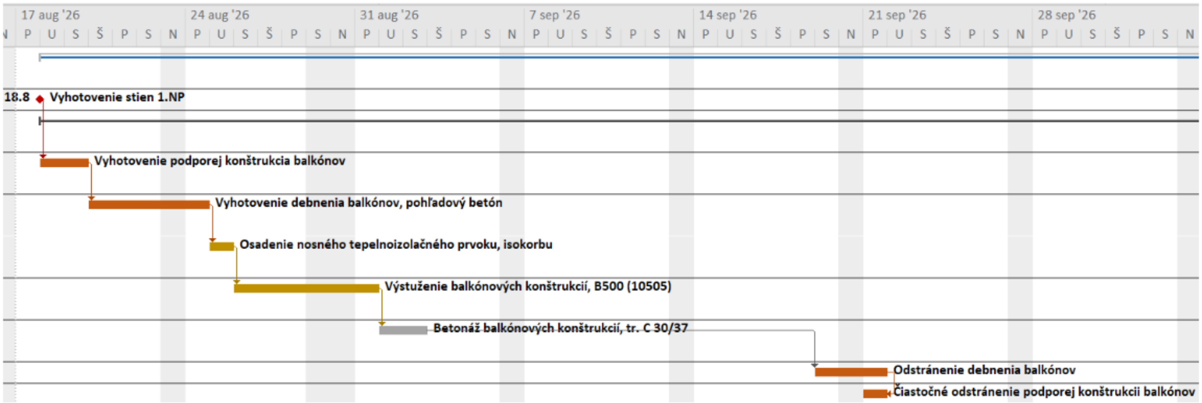


Fig. 3 – Timeline variant no. 1
Source: authors

Mladá veda
Young Science
ISSN 1339-3189

Vol. 14 (5), pp. 245-255

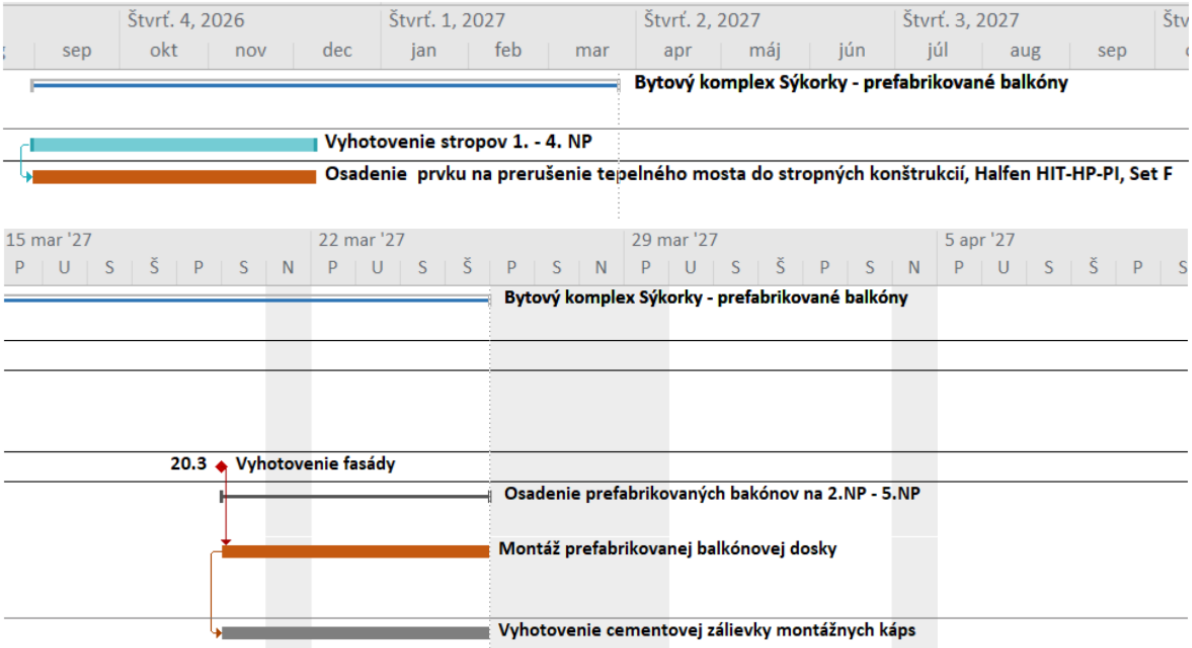


Fig. 4 – Timeline variant no. 2
Source: authors

Evaluation

Based on the economic analysis performed, it can be stated that the direct cost items are more favorable for the monolithic construction variant compared to the prefabricated solution. However, a certain degree of inaccuracy in this comparison results from the different methodology for pricing the individual variants, since variant no. 1 was priced based on the budget software CENKROS 4, while variant no. 2 is based on the indicative price offer of the manufacturer of prefabricated elements. The economic comparison did not include items of related construction production, such as protective coatings, tread layers or drainage systems, due to their identical implementation in both compared variants. Nevertheless, additional differences in total costs appear within the framework of additional items not included in the original valuation. Monolithic structures implemented directly on the construction site are characterized by a higher degree of dimensional deviations and construction inaccuracies compared to more precise prefabricated production. Despite the use of system anchoring elements of the Halfen HTA-CE type, the installation of the railings in the case of the monolithic variant usually requires additional precise alignment of the actual design after stripping. This fact leads to an extension of the delivery times of the railings and, if necessary, to an increase in the total implementation costs. On the contrary, prefabricated parts are characterized by high dimensional accuracy, thanks to which the production of the railings for variant no. 2 can be carried out in advance and in parallel with the production of precast elements and the construction of the shell, which contributes to the optimization of the construction schedule.

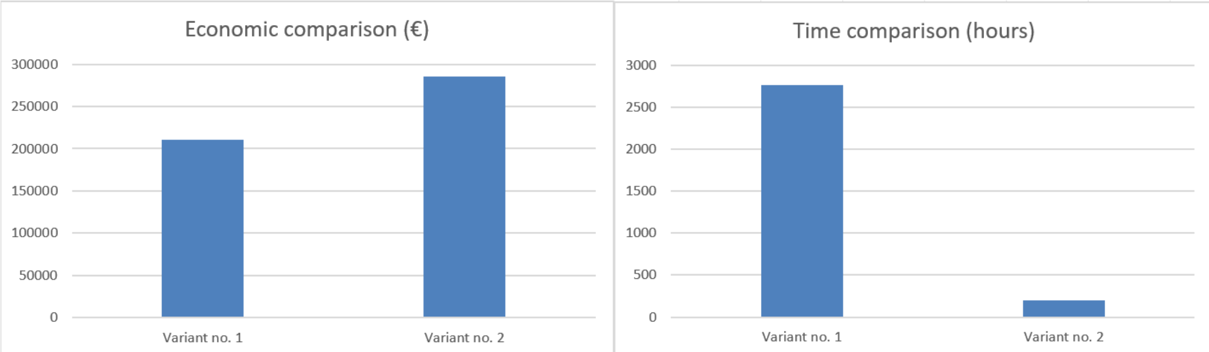


Fig. 5 – Economic and time comparison
Source: authors

For a comprehensive and objective assessment of the variants, a multi-criteria evaluation method was used, which allows taking into account technological, economic and qualitative criteria. Individual criteria were assigned weights according to their importance in the decision-making process. Within the framework of multi-criteria analysis, individual criteria were assigned weights based on their relative importance in relation to the decision-making objective, which is to optimize the selection of an option in terms of economic efficiency, time requirements and quality parameters. The total price criterion was determined as dominant due to its direct impact on the investment requirements and overall economic efficiency of the evaluated alternatives. In the context of the decision-making process, price represents the basic limiting factor that determines the feasibility of individual options within the available budget. For this reason, it was assigned the highest weight. The implementation time was determined as the second most important criterion, as it directly affects the time costs of the project, the speed of achieving the desired state and indirectly also the overall economic impacts (e.g. tying up resources, delaying benefits). From the perspective of project management, it is a critical parameter, but with a lower priority compared to price. The number of employees represents a secondary organizational and implementation criterion that reflects the demands on human resources and the level of personnel security. Its importance is lower, as it does not represent a directly decisive economic or output parameter, but rather indirectly affects the effectiveness of implementation. The qualitative criterion including quality, durability and aesthetic parameters was included as an additional criterion. Its importance lies mainly in the long-term sustainability and user value of the solution, but within the chosen decision-making model it has a complementary character to the economic and time criteria, therefore it was assigned a lower weight. The evaluation was carried out on a point scale from 1 to 5, with the value 5 representing the most advantageous solution in terms of the given criterion.

The results of the multi-criteria analysis, shown in Table No. 1, demonstrate that, given the selected criteria and specific implementation conditions, a prefabricated balcony structure (variant no. 2) is evaluated as the optimal variant.

Criteria	Weight (%)	Variant no. 1	Variant no. 2
Total price	45	4	2
Implementation time	35	2	5
Number of workers	10	2	4
Quality (durability, creditworthiness)	10	2	4
Total		**2.9**	**3.45**

Tab. 1 – Multi-criteria evaluation
Source: authors

Conclusion

The paper dealt with the technological and economic comparison of the implementation of monolithic and prefabricated balcony structures on a residential building. The results of the analysis showed that the monolithic variant is economically more advantageous in terms of direct implementation costs, with the total costs reaching €210,606 excluding VAT. The prefabricated variant required higher costs of €285,177 excluding VAT, which represents an increase of approximately 35.4%. On the contrary, from the point of view of time requirements, prefabrication proved to be a more efficient solution. The labor intensity of the implementation was reduced from 2,760 standard hours for the monolithic variant to 200 standard hours for the prefabricated variant, which represents a saving of approximately 92.8%. The results confirm that the selection of a suitable technological solution should not be based only on a comparison of direct costs, but on a comprehensive assessment of the economic, time and technological aspects of the implementation. Prefabricated balcony structures represent a promising alternative, especially for projects where the priority is to shorten construction time and increase the efficiency of construction processes.

This article was recommended for publication in the scientific journal Young Science:
Ing. Radovan Majer, PhD.

References

1. Ellingerová, H. 2013. Costs and prices in construction. 2013. ISBN: 978-80-263-0509-5.
2. Fédération Internationale du Béton (fib). 2010. fib Model Code for Concrete Structures. 2010.
3. HALFEN. HIT-HP-PI-B, element for retrofitting balconies.
4. HALFEN. HTA anchors.
5. HOBBYTEC.sk. 2025. Glossary. 2025.
6. NEUFERT, E. 2023. Architects' Data. s.l. : Wiley-Blackwell, 2023. ISBN 9781119873945.
7. PCI – Precast/Prestressed Concrete Institute. PCI Design Handbook: Precast and Prestressed Concrete.
8. SCHOCK. Isocorb.
9. Schöck. Schöck Isokorb®. Technical Information.
10. SIKA. Grouting mortar.
11. STN 73 0540-2. Thermal protection of buildings. Thermal properties of building structures and buildings.
12. STN EN 1990. Eurocode: Principles of structural design.
13. STN EN 1991-1-1. Eurocode 1: Actions on structures. Part 1-1: General actions.
14. STN EN 1992-1-1. Eurocode 2: Design of concrete structures. Part 1-1: General rules and rules for buildings.
15. The International Federation for Structural Concrete (fib). Precast Concrete Structures.
16. Law no. 18/1996 Coll. about prices.

Mladá veda
Young Science

ISSN 1339-3189