ISSN 1339-3642

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ARCHITECTURE PAPERS
OF THE FACULTY OF ARCHITECTURE AND DESIGN STU

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1/2024

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ISSN 2729-7640

ALFA ARCHITECTURE PAPERS
OF THE FACULTY OF ARCHITECTURE AND DESIGN STU
www.alfa.stuba.sk

1/2024 (Vol. 29)
DOI: 10.2478/alfa-2024-0001

Editorial

Jan Jehlík

Baroque vault and refurbishment, current use of the Moorish style, small-scale architecture, temporary forms of performative space – these are the themes of the actual issue. How different, how common, how architectural. To understand the architecture as a holistic discipline we can (or we have to) search the arch of separate items every time and project them on a screen of some 'matrix' of complexity. On the one hand, it requires us to immerse in a concrete theme and its attributes, on the other to incorporate it into a wider context.

However, it is not as easy as it sounds. What is to be projected and what is the screen? Because projecting is not about neighbouring, but about an assessment of values and relations. And the screen is ever changing: it depends on an intention, a standpoint and a scope. When searching for tools to link these themes there are crucial architectural categories, an interwoven framework helping us to interconnect seemingly remote themes on a common level. It is useful to start on the very abstract level and then delve into details. The goal is not to lose the main field, the array of specific findings. And to understand the ways of setting phenomena and attributes within the 'matrix'. To grasp that network of a specific research it is necessary to set the aim, the structure of terms and categories, adjacent fields, and a position within the explored domain.

Then it is crucial to learn and to fix relations. Because it is always a matter of relationships, the relationship between elements (scale), the relationship of the elements to the whole (proportion) and the relationships that form the whole (relations). The scale of an element corresponds to its position within the whole. However, it is not only the issue of its external dimensions, but also of its significance, its value for the complex. We communicate what is important for the situation in question. We create an image of reality, or rather its subjective reinterpretation. Scales of meaning thus meet physical scales – in the image, the more distinct communication corresponds to the more significant piece of information. Proportions determine the mutual connections between parts and the whole. The awareness of mutuality de facto stabilises the whole. The whole is derived from its parts, the parts are derived from the whole. It is also possible to make a loose reference to the relations of derivation and integration. It is the relations that determine the way of integrating parts into a whole. Emphasis is usually placed on the limits that influence the investigation of the object from the standpoint of external circumstances. Many times, significantly less energy is dedicated to the extent and form of the contribution to the benefit of the environment, community, or urban entirety. But in fact, this relation is mutual, even symbiotic. Long-term success of an item is unthinkable without the quality of the whole, as a whole cannot be built without the assistance of each item.

We can apply these phenomena to the topics released in this issue: to be able to understand the value and the position baroque vaults within the contemporary constructions and architecture; to discover the code of the Moorish style to (re)interpret it; to apply dynamics of temporary objects and living performances revitalising the environment; and to be aware of the real value of small-scale or small-size architectural objects within the urban tissue.

ISSN 2729-7640

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DOI: 10.2478/alfa-2024-0002

Survey and preliminary assessment of a baroque vault for refurbishment planning

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Article information
Sent: Oct 10, 2023
Accepted: Feb 29, 2024

Abstract: Designing the modification of buildings for a new use is a costly and time-consuming process, before which it is often necessary to conduct a preliminary assessment of the feasibility of the intended project. The article discusses the procedure for such a preliminary cost-effective assessment using the example of a historic building with vaulted ceilings. For older historical buildings, archival documents specifying their geometry, construction details and material characteristics are typically not available. For the preliminary design, it is possible to obtain information about the dimensions of the load-bearing elements non-destructively. However, the knowledge of the exact material properties of the masonry exceeds the possibilities of an inexpensive assessment, which must take advantage of the data available in the literature for similar structures. This article presents a methodology and an example of the measurement and assessment of the mechanical response of the Baroque vault to static loading. It shows the process of obtaining data on the geometric shape of the structure by means of geodetic surveying and geometric radar measurements of the thickness of vaults whose upper faces are not accessible. Two models are used to calculate the internal forces in the structure. The first planar model considers a simplified barrel vault strip according to the focused geometry with respect to geometric nonlinearity and without tension, the second model is a linear spatial model of the entire vault. The calculation was performed in ANSYS 17.2, the input parameters of the material are taken from the literature. The calculated stresses in the vault are compared with the values of the design strength of brick masonry, taking into account the characteristic compressive strength of the masonry based on published known data obtained during tests of similar historical materials. The results are then used to decide on the feasibility of the intention to adapt the building for a new use.

Keywords: baroque vault, non-destructive survey, mechanical response, load carrying capacity estimate

INTRODUCTION

Care for the long-term sustainable preservation of a quality environment is increasingly rising interest in extending the functionality of existing buildings and new uses. The designer must thus meet the requirements for design renovation, conversion, alteration, rehabilitation, adaptation, retrofitting, improvement or modernisation of the buildings. These modifications can generally be included under the umbrella term refurbishment. Refurbishing and repurposing buildings is nothing new in history, as in many cases these were the best solutions for buildings that had lost their function or become obsolete. They are activities that, together with maintenance, have accounted for almost fifty percent of construction production in the last twenty years in Europe. This trend is likely to grow, as it is estimated that by the middle of our millennium, eighty percent of the buildings occupied will be buildings standing today. Refurbishment has a number of advantages over new construction or the demolition and rebuilding of structures. In addition to the economic benefits of reducing costs and shortening construction time, environmental benefits are also obtained, especially the re-use of brownfields and substantial reduction of waste production.

Simplifying the preparation and permissions for the construction and, last but not least, the preservation of cultural heritage and its use for the creation of a high-quality life also seem important. More recently, refurbishment planning has included carbon footprint assessment and energy performance solutions (Konstantinoua, Knaack, 2011; Tejedor et al., 2022). There are also potential disadvantages associated with refurbishment, which primarily entail requirements for design interventions that make buildings structurally safe and robust (UKEssays, 2018). Here, the designer often encounters a lack of information about geometry, materials and construction details, which affects not only the design process, but also brings uncertainties in assessing reliability and often problems when carrying out construction work (Lorenzoni et al., 2016). It is therefore necessary to devote sufficient time and financial resources to comprehensive surveys using modern means of non-destructive or gently destructive testing.

A comprehensive and detailed survey, including reliable monitoring of the condition of a historic structure, is a costly and time-consuming task for which investors usually do not have the resources when deciding whether and how to use an existing building. They need to know indicative data on the suitability of the

building for the intended new use. Estimating the functional potential of a building in terms of its construction quality is essential information for deciding on the feasibility of the project, the necessary scope of interventions and the resulting costs. Therefore, it is useful to perform a preliminary assessment of the response of the structure to the applied load in the first step, using an appropriate low-cost approach. The aim of the preliminary assessment is not a detailed analysis of the condition of the structure in question and its behaviour under load, which would normally require a costly comprehensive survey with sampling of building materials and the most accurate determination of their properties. In order to decide on the implementation of a new use project, a less costly preliminary assessment of the load-bearing structures with respect to the load is sufficient in the initial phase, which will reveal their quality and the need for possible reinforcement if the load-bearing capacity is not adequate. An example of such an affordable procedure is presented in the following paragraphs.

ASSESSMENT CONDITIONS AND METHODOLOGY

The intention to change the use in selected areas of the former Jesuit College in Telč on Zachariáše z Hradce Square No. 2 in the Czech Republic required a preliminary assessment of the behaviour of the vaults therein subjected to the intended live load of 5 kNm-2. The contracting authorities provided copies of the construction drawings of the premises in question for analysis. However, the construction documentation did not contain detailed data on the geometry of the vaults, which would have allowed the creation of a computational model. Furthermore, documentation on the thickness of the vaults was unavailable, as was the height of the embankments and the dimensions and composition of the floor layers above the vaults. The material properties of the building materials used for the construction of vaults were also unknown.

Consequently, the analysis was preceded by local investigations, the aim of which was to survey the geometric shape and to non-destructively examine –by using georadar– the composition of inaccessible parts between the lower surface of the vaults and the upper surface of the ceiling. The geometry of the extrados and intrados of the vaulted ceiling was precisely determined by geodetic surveying. The internal composition was estimated according to the response of passing electromagnetic waves. Material properties were estimated based on the experience of the authors with similar historical buildings and a literature search. The data so obtained were used for the analysis. The calculated stresses were tentatively compared with the estimated computational strength of masonry. Therefore, the present analysis does not replace the design static calculation of vaults and must be understood as a highly qualified expert estimate of the behaviour of the structure on acting and considered loads. The results are naturally usable as input data in the processing of a detailed static calculation by a future designer.

GEOMETRY OF THE VAULTS

The geometry of the lower surfaces of the vaults was measured by an authorized surveyor and the measured vaults are shown in Fig. 1. Figure 2 shows the measured values of the vertical coordinates of the shape of the edges of the passage of individual vaults from rooms 1.17 and 1.18 and their ground plan. During the local investigation for radar measurements, it was revealed that the thicknesses of the perimeter walls on individual floors are not the same; the division of rooms by transverse walls is not identical either. For the calculation, the vaults were spatially modelled according to their undivided shape on the floor below the vaults.

Fig. 1. Barrel vaults with lunettes under room 1.11 (top), cross vaults under room 1.11 and room 1.12 (middle), barrel and cross vaults under rooms 1.17 and 1.18 (bottom). (Photo: Válek, 2021)

Georadar, ground radar, or GPR (short for Ground Penetrating Radar) is an instrument that uses a radar signal to survey and then display the internal structure under the surface being examined. It is a geophysical method that can be used for a wide range of non-destructive exploration tasks such as those involved in laying down the foundation of buildings, archaeology, or the detailed exploration of the subsurface defects of buildings. The basic principle of measurement is the pulsed emission of electromagnetic waves (< 1 ns), which passes through the given environment (the material under study). In engineering and construction applications, frequencies ranging from 300 MHz to 2.5 GHz are used. Reflected waves are received back by the antenna and displayed according to the time of arrival and in relation to the position of the antenna. Reflection or alteration of the signal occurs when it passes through an environment with different permittivity (e.g. rock-air interface) and conductivity (e.g. presence of iron fasteners).

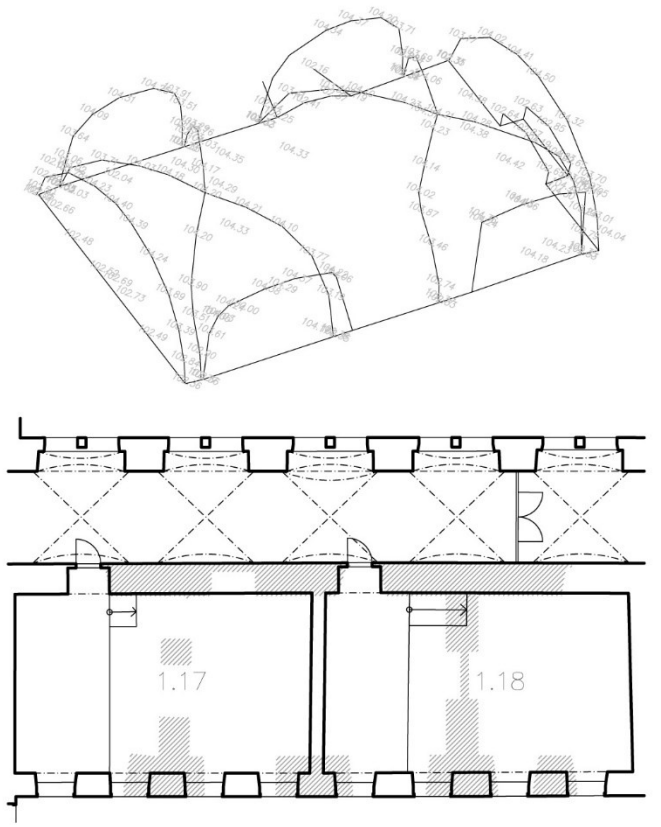

Fig. 2. The shape of the vault edges under rooms 1.17 and 1.18 (top), floor plans of the rooms concerned, with the indication of the supporting walls on the floor below. (Source: Zadražil, Buzek, 2021)

The parameter measured is time. If the speed of wave propagation in a given material or materials is known, then the depth where the signal changes or reflections occur can be determined. When measuring, the method most commonly used is the movement of the antenna in a straight line in the plane that relates to the surveyed object. If there is a different object or cavity in the material environment being examined, the so-called non-homogeneity, from which the sent waves are reflected, then when approaching the antenna, the distance determining its depth is shortened and when it is zoomed out, this distance is subsequently extended. In radargrams, these reflections create hyperbolas. For subsequent interpretation and localization of findings, it is necessary to know the position of the antenna during measurement. The antenna displacement is most often recorded by a measuring wheel, which measures the linear distance from the starting point.

For the radar measurements the space of room 1.18 was divided into 6 longitudinal and 4 transversal mutually perpendicular straight line profiles, which formed a rectangular grid. The longitudinal profile guidance was adapted to the position of the windows in the room (Fig. 3). The starting point was located in the northeast corner of the room at a distance of 300 mm from the walls. The IDS type ground radar was used for the task. With regard to the resolution and the expected depth range, a 900 MHz and a 2 GHz antenna was used. The linear distance when the antenna was moved along the profile was measured by a wheel. After initial authentication, the following system settings were selected: A depth resolution of 1,024 samples/scan was chosen for radar scans, the time limit was 60 ns for the 900 MHz antenna and 20 ns for the 2GHz antenna, the signal velocity was estimated at 140 mm/ns and the signal was read by 10 mm in the direction of the antenna movement.

Fig. 3. Room 1.18 (yellow) and measurement area (orange). The red dots show the initial positions of the longitudinal (L) profiles, which were positioned according to the central axis of the windows. (top) Orientation marking of the square network of longitudinal (L) and transverse profiles (T) in room 1.18. (Author: Válek, 2021)

Slice software was used for evaluation. To visualize the reflections, the signal was linearly amplified with depth, an interval of displayed frequencies was selected and the distance between the antenna and the top was subtracted. To better visualize non-homogeneities and eliminate noises, the signal was "smoothed out" by averaging over 3x3 boxes. From the course of hyperbolic reflections, the speed of signal propagation was retrospectively refined. These were 120 mm/ns (2 GHz) and 110 mm/ns (900 MHz) in room 1.11, and 130 mm/ns (2 GHz) and 120 mm/ns (900 MHz) in room 1.18 and were considered average for these two environments. In general, the depth determination of the signal reflection given in radargrams based on the average is only indicative, as it depends on the actual velocity of signal passage through the material, which can be inhomogeneous in depth and along the profile. However, the degree of simplification is normally suitable for the required resolution. The selected radargrams are presented in Figs. 4 and 5.

A vault is visible on all longitudinal profiles (L10005–10). Its top is at a depth of about 40 cm in the northern part of the room and about 50 cm in the southern part of the room (room 1.18 is above two rooms on the ground floor, which have different vaults). The profiles captured the main vault (L10005, L10007, L10010) and the vault with lunettes (L10006, L10008). On the L10007 profile it is possible to document the structure section. Parallel reflection with the floor at a depth of about 8-10 cm can be associated with a modern structure, which includes a concrete slab with reinforcing bars spaced at 15 cm. The thickness of the vault structure is about 25 cm at the top. It is quite homogeneous without significant reflections: it might consist, for example, of brick masonry.

The L10010 profile shows the ceiling structure above the next room. The interface of the new floor structure is at a depth of approximately 22 cm. The vault structures are of a similar character. Radargrams showed vault structures in all the rooms studied. The density of the selected network allows them to be described sufficiently. In all rooms a concrete slab is probably present with reinforcement in both directions. The tops of the vaults are at a depth of 40–50 cm under the floors of rooms 1.11 and 1.18. This interpretation is a qualified guess based on measured data. For display, the depth signal amplification was used as the average over the entire length of the profile, as well as the average signal pass rate. This setting corresponded to a simplified model that was suitable for the situation. However, when interpreting depth data or comparing signal intensity, it was necessary to take into account the fact that the environment examined was not ideally homogeneous.

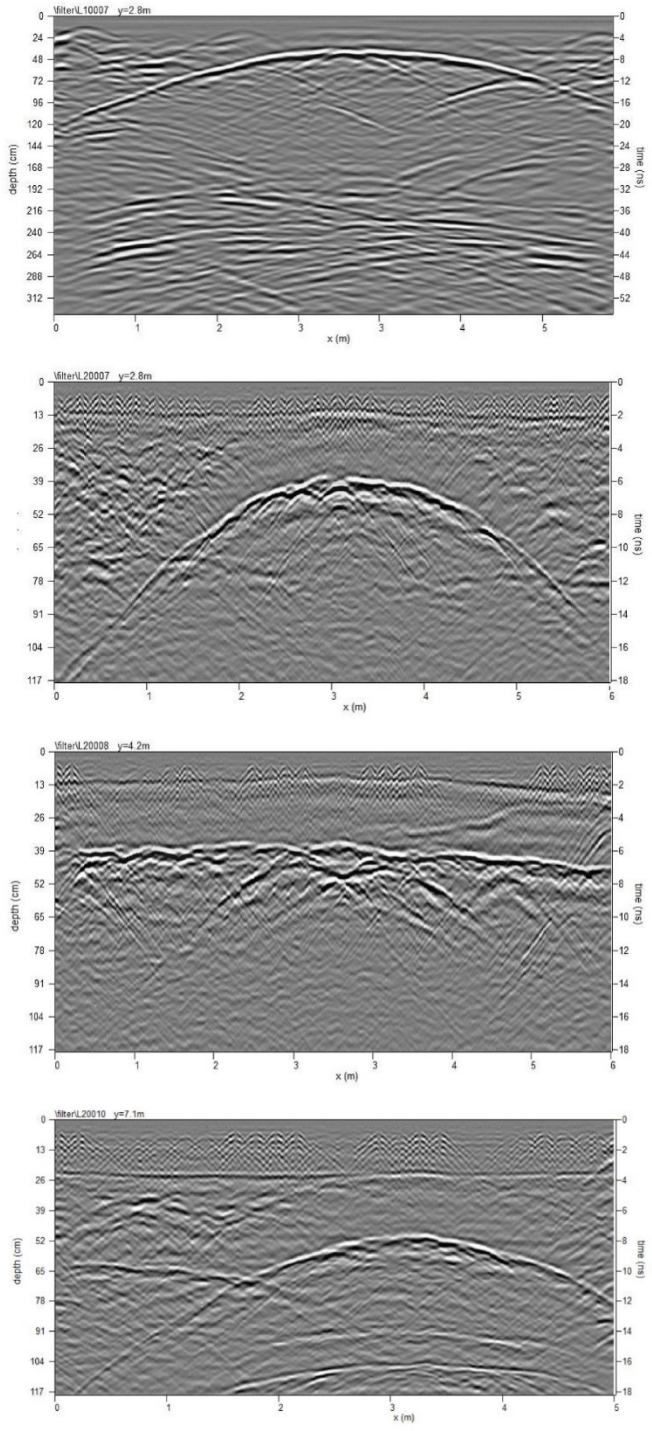

Fig. 4 (left). Radargrams in room 1.18 – profiles along the long direction. The upper two records (profiles L1/L20007 show the barrel vault in perpendicular section measured with different frequencies; the higher-frequency antenna allows to distinguish masonry from the infill material and the floor texture. Profile L20008 runs across the top of the side lunettes of the vault. Profile L200010 is a section through the vault in the adjacent room. (Author: Válek, 2021)

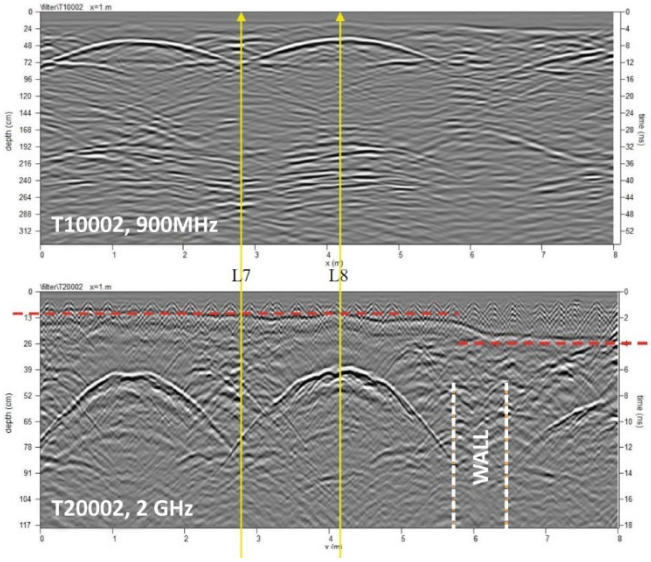

Fig. 5. A vault is visible on all transversal profiles. (Author: Válek, 2021)

STRESS ANALYSIS

For the stress calculation in the vaults under room 1.17/1.18, both the above-mentioned estimated dimension of the vault thickness of 25 cm and the more likely dimension of 30 cm were used. In addition, radar-estimated thicknesses of embankments and floor layers were used. As for the vaults, these have relatively complicated material properties with a rugged spatial geometry in which imperfections can have a significant impact on the stress distribution in the structure and the calculation should therefore ideally consider material and geometric nonlinearity. The demands on such a calculation are disproportionately high in comparison with the importance of the construction being considered, and therefore the calculation using two simplified models was chosen. The first planar model considers a strip of barrel vault with a width of 1 m without taking into account the load from the transverse vault and is made according to the focused geometry taking into account geometric nonlinearity and excluding tension. The second model was a linear spatial model of the entire vault according to the geodetic survey (see Fig. 2) in room 0.22A. The resulting stresses to be compared to standard limits were chosen from both models such as to be on the safe side according to engineering judgement. The calculation was performed with ANSYS 17.2 using SHELL181 and MASS21 finite elements. Input parameters of the calculation are the following:

Room floor 22: ±0.12 m

Room floor above room 22: + 5.0 m

Vault thickness: 0.25 m (0.3m), ρ_c = 1,900*1.1 = 2,100 kg/m^3

Thickness of backfill: 0.7 – 3.0m ρ_z = 1,800*1.1 = 1,980 kg/m^3

Thickness of floor above room: 0.12 m ρ_b = 2,400*1.1 = 2,640 kg/m^3

Live load: p = 5.0 * 1.1 = 5.5 kN/m^2

Modulus of brick elasticity: E_c = 5.0 GPa

The input data adopted and the ANSYS software generate results which correspond with the measurements acquired during full scale tests of masonry vaults (Khorkov et al., 2023). The new live load represents approximately 25% of the weight of the vault structure loaded under its own weight, including backfill and floor. For the planar model, the cross-section geometry was taken from the geodetic measurements for points 310–320. A strip of barrel vault with a width of 1 m was considered. The barrel vault in the longitudinal direction is relieved by an oblique vault in the transverse direction leading to the windows and doors. In a planar model, it is therefore necessary to estimate an increase of the load of the main barrel vault from the transverse vault. The barrel vault is by the walls on about 35.5% of the length of the room on one side and 34.3% on the other side. The resulting stress values obtained by calculation for a running meter of barrel vault must therefore be multiplied approximately by the coefficient 1/0.35 = 2.86 to obtain an estimate of the actual stress on the barrel vault (Fig. 6). According to this simplified type of analysis, the tensile stresses will not occur while the maximum compressive stress reaches 1.8 MPa approximately.

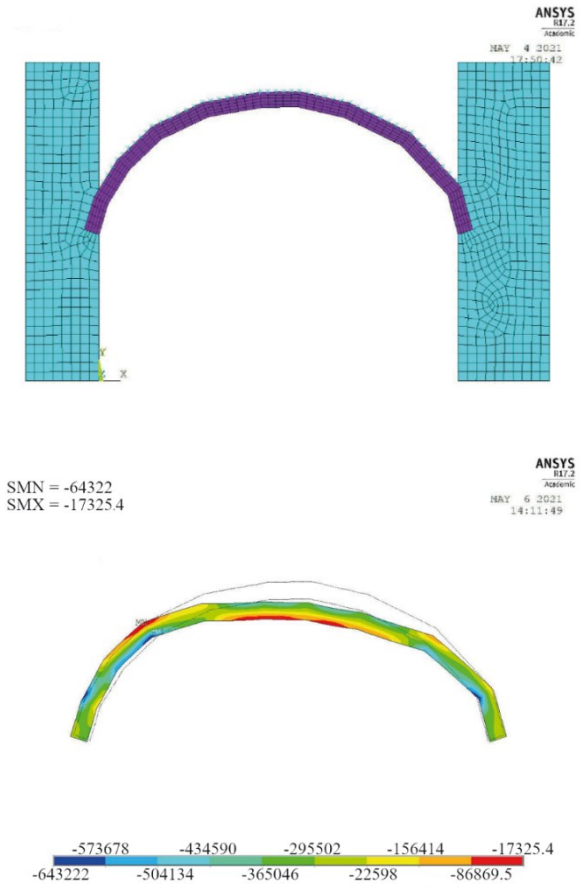

Fig. 6. Planar computational model (top), the course of the main stresses for calculation with live load and vault thickness of 25 cm. (Author: Bayer, 2021)

The maximum compressive stress on the model, taking into account the 25 cm thickness of the vault, is approximately 5.2 MPa (see Fig. 8) and the most stressed point is the contact edge between the longitudinal and transverse vaults at the lower surface. In the middle of the barrel vault belt above the place of fixing, maximum tensions of up to 1.8 MPa occur at the upper surface, which in fact cannot be completely transmitted through the masonry and will lead to a redistribution of stress, which will increase at this point the theoretically calculated compressive stresses at the lower surface. With the lower surface in the same place, the compressive stress in one direction is approximately 0.867 MPa (see Fig. 9) and in the other direction the compressive stress is approximately 0.322 MPa (see Fig. 9). On the other hand, it should be noted that in this place, due to stress, theoretically the vault belt should buckle towards the backfill, which in fact would be effectively prevented by the backfill, and it is therefore possible that the actual level of pressure stresses may be lower than the calculation shows. The spatial computational model was constructed in such a way that the surveyed geodetic points were connected by straight lines and planar surfaces (Fig. 7). Unrealistic stress concentrations can occur at the edges between the edges of the planes of the spatial model, because in reality the vault surface is rounded.

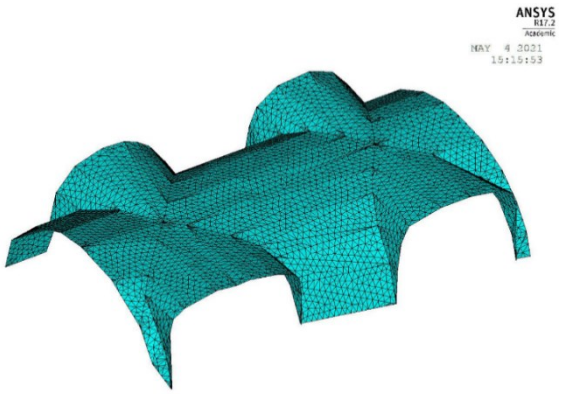

Fig. 7. Spatial computational model. (Author: Bayer, 2021)

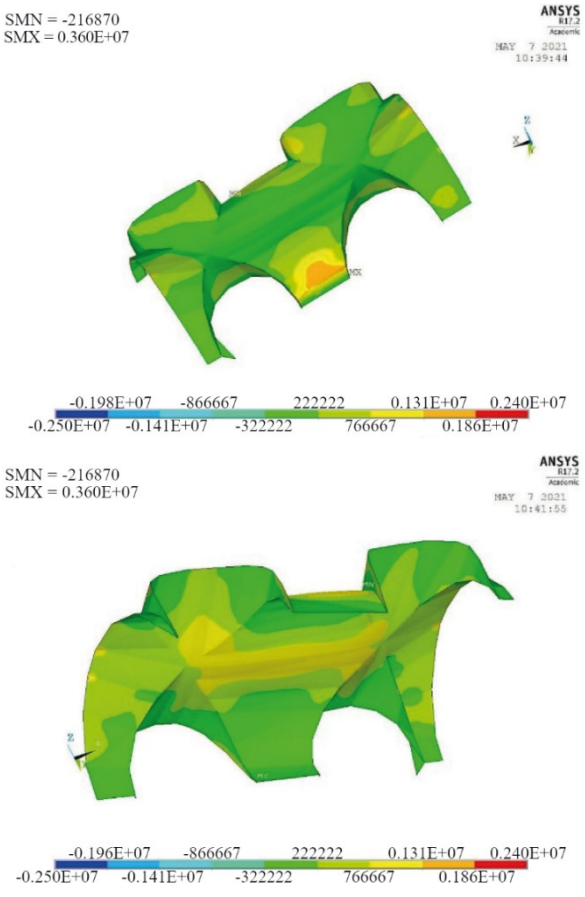

Fig. 8. The first main stress on the upper surface, (top), and the lower surface (bottom). Vault thickness 25 cm, + 5.5 KN/m² live load. (Author: Bayer, 2021)

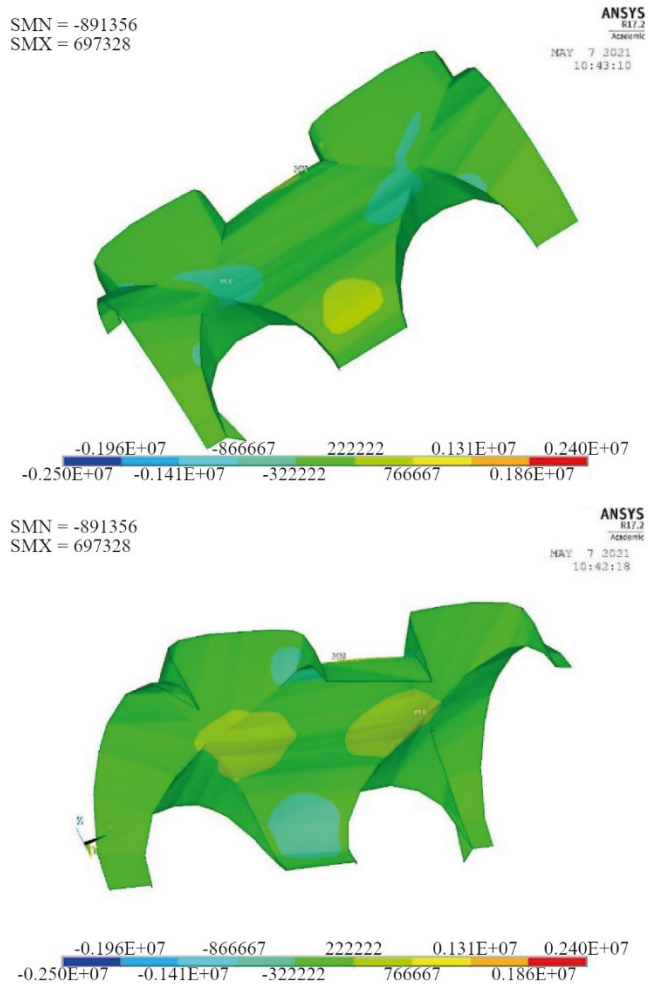

Fig. 9. The second main stress on the upper surface, and the lower surface. Vault thickness 25 cm, + 5.5 KN/m² live load. (Author: Bayer, 2021)

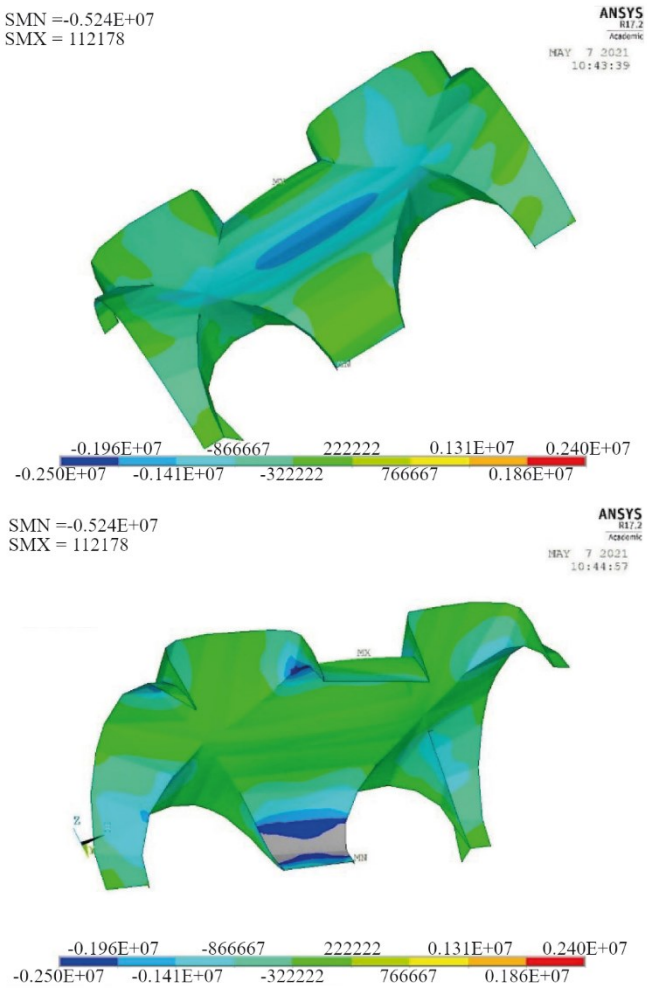

Fig. 10. The third main stress on the upper surface, and the lower surface. Vault thickness 25 cm, + 5.5 KN/m² live load. (Author: Bayer, 2021)

At the top of the vault there are compressive stresses around 2 MPa (see Fig. 10, top) compared to tensile stresses on the lower face of about 1 MPa (see Fig. 10, bottom). This corresponds closely to the simplified planar analysis above with 0.643*2.86 = 1.840 MPa in compression.

LOAD CARRYING CAPACITY ESTIMATION

The stresses calculated in the vault can be compared with the values of the design strength of the brick masonry. The actual strength of the bricks and the strength of the mortar is unknown. If we assume that the bricks used have an average strength comparable to today's bricks, i.e. 50 MPa and a normalized masonry strength at compression f_b = 50 * 0.77 = 38.5 MPa and the mortar had an assumed strength of at least 1 MPa, the characteristic compressive strength f_K of the masonry would then be in keeping the Eurocode 6 (European Commission, 2005), eq.3.2 at K = 0.5

$$f_K = K \cdot f_b^{0.7} \cdot f_m^{0.3} = 6{,}438 \text{ kPa}$$

But bricks may have less strength. According to tests conducted by the Brno University of Technology (Anton et al., 2016) the strength of old bricks from the last quarter of the 19th century was found to be in the range of 8.3–12.3 MPa at natural humidity. The characteristic strength when applying an average unit strength (brick) of 10.3 MPa and 1 MPa for mortar would then be only

$$f_K = K \cdot f_b^{0.7} \cdot f_m^{0.3} = 2{,}558 \text{ kPa}$$

Sýkora et al. (2018) gives an example of tests of brick strength from the monastery on Republic Square in Prague (dating from 1638) with an average value of 13.65 MPa. Further from the palace in Na Kampě Street in Prague 1 (dating from 1652), average values of various batches of bricks were 15.4 MPa and 25.3 MPa. This gives the characteristic strength for the bricks from 1638: 3,116 kPa and bricks from 1652: 3,390 kPa or 4,799 kPa. Sýkora and Holický (2014) tested the materials of the 17th century church and found the strength of bricks and the mortar to be 23.9 MPa and 1.44 MPa, respectively. The characteristic strength when applying the average strength would then be

$$f_K = K \cdot f_b^{0.7} \cdot f_m^{0.3} = 5{,}145 \text{ kPa}$$

For comparison of the calculated stresses with the expected strength of the masonry, this last value is probably the best description of the strength of the masonry of the vaults of the former Jesuit college, because, according to the authors' experience, the usual strength of high-quality structures mortar from the 17th century is somewhat higher than 1.5 MPa and the use of high-quality bricks in the vault can be assumed. According to the results of the above-mentioned studies, it can be estimated that the characteristic strength of masonry from the 17th century ranges from 3,116 kPa to 4,799 kPa. The design values of the masonry strength can then be considered to be at the sub-coefficient γ_m = 2 in the range from 1,558 kPa to 2,400 kPa. Stress calculations were made for vault thicknesses of 25 cm according to georadar data and 30 cm, which was the usual size of historical bricks, in Moravia standardized only by the decree of the Moravian-Silesian Governorate from 1810, with the size of the “zdice”

being 111/2 × 53/4 × 23/4 inches (Lower Austrian inch – 302 × 151 × 72 mm). However, in previous times, the dimensions of the bricks could vary greatly.

With the presumed vault thickness of 25 cm and 30 cm respectively and the application of a constant and useful load of 5 kN/m², the following stress values were obtained. A linear calculation of the barrel vault belt aggravated by the supported parts of the cross vault revealed a maximum compressive stress in the vault of 1,722 kPa for a vault thickness of 25 cm and 1,840 kPa. These are values that lie within the limits of the design values of the strength of the masonry. The spatial model considers the vault as a shell, transmitting even bending stresses, which were calculated in large areas of the vault. These stresses are considerable even when unloaded, and the model does not adequately reflect the actual behaviour of the vault, because there are no defects on it today. It is therefore very conservative.

In conclusion, it can be stated that the stresses calculated in the vault from the effect of the considered live load of 5 kN/m² represent an increase in stress of approximately 25% compared to the stress from the dead load of the vaulted ceiling structure. The calculated stresses on the simplified model are around the design values of the masonry strength and it is not guaranteed that the structure will meet the calculation of the standard design of the vault. However, it must be said that with better knowledge of the material characteristics of the structure and, ideally, with verification by a load test, the load of 5 kN/m² could be considered. The design values reduce the estimated strength of the masonry by half. A more accurate determination of the strength values of historic masonry requires extensive experiments to be carried out on test specimens prepared from historical bricks and replicated mortar (Xia et al., 2022). Of course, the results of such tests can also be used to improve stress analyses based on more accurate inputs of material characteristics. But this is beyond the scope of preliminary assessment.

CONCLUSION

By reconstructing and modernizing historic buildings, it is possible to achieve their adaptation for new uses, meeting new requirements also in terms of expected and safe behaviour under load. Many unused buildings are becoming the subject of investor interest in using them for new functions, which, however, may not always be in line with the technical capabilities of the building. Early assessment of the potential for refurbishment thus significantly saves investors' time and money and helps them in their decision-making. A significant proportion of the existing building stock is made up of historic buildings, estimated at 30% in Europe. A typical construction type seen in older historical buildings incorporated brick vaults with unknown bearing capacity. This paper presents an example of a procedure for fast non-destructive survey and assessing the load-bearing capacity of a brick vault with unknown technical parameters.

Current technological tools for exploring the geometry of vaults are shown, which provide information about their shape and thickness of masonry even in situations where access is not possible. The obtained data allow the creation of numerical models for the calculation of internal forces and for preliminary estimation of the load-bearing capacity of the vault. A simplified planar model of the barrel vault section as well as the linear spatial model of the entire vault according to the geodetic survey analysed with the ANSYS 17.2 provided reasonable results for further computations. For the first estimates of the load carrying capacity of a vault, it is possible to use the values of mechanical properties of vault masonry built in the corresponding time period and style, published in the literature. Similar approach has been successfully applied for advanced non-linear and limit analysis procedure (Milani et al., 2014).

A preliminary assessment is not a substitute for a detailed analysis of an existing building. However, it provides the investor with a reliable and low-cost estimate of the structure's response to loads, thus opening or closing the way to the implementation of any plan for the new use of historic buildings with vaults. In this example, the result obtained did not give one hundred percent certainty of the possibility of using the building without the need to strengthen the vaulted ceilings for the intended project of a multi-purpose cultural facility where a large number of people might gather. The potential investor then withdrew its plan on the basis of this preliminary assessment.

Acknowledgements

This paper is based on the results of research supported by institutional project RVO 68378297 and by the Strategy AV21 programme.

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ISSN 2729-7640

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www.alfa.stuba.sk

1/2024 (Vol. 29)
DOI: 10.2478/alfa-2024-0003

New Moorish architectural identity in Tlemcen, Algeria

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Article information
Sent: Dec 31, 2023
Accepted: Mar 5, 2024

Abstract: In Algeria, the city of Tlemcen is home to 60% of the country's Arab-Islamic architectural heritage, also known as Moorish. During the French colonization, the rich Moorish historical and architectural heritage was largely diminished. The architecture of Tlemcen's historic old town was gradually replaced by classical architecture in the early days of colonization, and then by modern architecture from 1940 onwards. After the independence in 1962, the city has carried out huge programs of facilities and new housing, based on modern architectural principles. In 2011, Tlemcen was designated a "Capital of Islamic Culture" and, in preparation for this international cultural event, new cultural facilities and hotels have been built, inspired by Moorish heritage. Given the heterogeneity of references and in particular the identity crisis ensuing in architecture in Tlemcen, this event was the key moment for validating a stylistic choice, which directly recounts the history of the city. The question is: what authenticity is expressed by the current use of the Moorish referent? Is it technical and material authenticity, or merely symbolic and cultural genuineness? This study delves into the question of identity in architecture. It analyses the new Moorish-style buildings in Tlemcen and highlights their contribution to the quest for a local identity and the ambition to produce local architecture. The article supports the hypothesis that architecture is an effective means of expressing identity and that it has always had, and continues to have, a close relationship with memory. The methodology is based on a combination of several investigative tools: surveys, photographs and archive consultation. These tools helped develop a building analysis grid, which serves as a repertory for describing the buildings, according to two levels of reading of the architectural work. We have chosen three Moorish and four contemporary buildings to which the different criteria of the analysis grid are applied. The results of the analysis of the new buildings show that, in a way, they enabled to establish continuity and dialogue with the Moorish heritage.

Keywords: Moorish-style, revival, authenticity, identity, contemporaneity

INTRODUCTION

According to Marçais (1950): "*Tlemcen has long symbolized the Muslim city through the quality of its monuments*". Indeed, Tlemcen has witnessed the passage of several Arab-Muslim dynasties (Almoravid, Almohad, Zianid and Merinid), all of which have left their mark on the town, testifying to its history. Tlemcen alone comprises 60% of the country's Arab-Islamic architectural heritage (Cote, 2014). This makes it one of the region's richest heritage sites, with many fine monuments, such as the great mosque dating from the 11th century, the governors' palace "El Mechouar" and the Sidi Hassen mosque built in the 12th century, as well as the remains of the ancient Almohad ramparts and the Mansourah archaeological site. This heritage is also referred to as Moorish, in reference to its Moorish architecture, which owes its name to the 10th-century Almoravids, masters of Marrakech and the Maghreb (Zerrouki, 2021).

During the French colonization, Tlemcen's rich Moorish historical and architectural heritage suffered extensive erasure and destruction. The city was partially remodeled according to the French ideology that justified colonialism as a civilizing project aimed at modernizing and transforming colonial territories. From 1842 to 1903, a series of radical transformations changed its spatial and morphological structure (Kari et al., 2021). The advent of colonialism marked a break with its traditional architecture, but also upheavals and changes in architectural production. As a result, the architecture of the historic old town was gradually replaced by classical architecture in the early days of colonization, and then by modern architecture from 1940 onwards.

After 1962 – the year of the country's independence – the pressure of demographic growth and population movements led Tlemcen to produce a large number of housing units and facilities, whose design was modelled on the modern, standardized architectural model derived from the Athens Charter, in which the bar and tower had prevailed. The emergency situation had taken its toll on the question of finding a compromise between "tradition" and "modernism". It was only when the city of Tlemcen was designated a "Capital of Islamic Culture" by the Islamic Educational, Scientific and Cultural Organization (ISESCO) for 2011 that the architectural and urban value of the city's old quarters was recognized. In addition, a number of new cultural buildings were erected to coincide with this international cultural event, such as the Andalusian Studies Center, the Mo-

hamed Farah Exhibition Pavilion, the Imama Islamic Institute, the Imama Mohamed Dib Library and the Mansourah Cultural Palace, which had all displayed an architectural identity bearing the Moorish symbolic referent.

The watchword guiding all these new cultural achievements was dialogue with the Moorish referent. These new buildings expressed the desire to perpetuate the city's ancient architectural traditions. We hypothesize that, faced with a situation of identity crisis in architecture, the international Islamic cultural event was the key moment for validating this stylistic choice, which directly tells the story of the city. The Moorish heritage corresponds to what Alois Riegl called "desired monuments", with the difference that their memorial value is conferred both by their creator and by posterity (Popescu, 2004). Today, you cannot walk around Tlemcen without noticing that: alongside the monuments and historic sites that bear witness to its prosperous Arab-Islamic past, many new buildings are emerging, displaying a language with Islamic heritage references, at least at first glance. This observation has obviously been reinforced in the wake of its designation as the "Capital of Islamic Culture 2011".

A question arises: What authenticity is expressed by the current use of the Moorish referent? Is it technical and material authenticity, or just symbolic and cultural genuineness? This article delves into the question of identity in architecture. It analyses the new Moorish-style buildings in Tlemcen and highlights their contribution to the quest for a local identity and the ambition to produce local architecture. This article supports the hypothesis that architecture is an effective means of expressing identity, and that it has always had, and continues to have, a close relationship with memory.

LITERATURE REVIEW: AUTHENTICITY AND IDENTITY IN ARCHITECTURE

The notion of authenticity originated with the Venice Charter (1964), which requires that the restoration of historic monuments and sites should always be preceded and accompanied by a study of the archives, and which prohibits any alterations whatsoever except where applicable (Hsieh, 2015). Conceived in the spirit of the Venice Charter and as an extension to it, the NARA Declaration (1994), in particular the provisions of Article 10, stipulates: *"Authenticity [....] Its role is crucial in any scientific study, conservation or restoration work, as well as in the procedure for inclusion on the World Heritage List or in any other cultural heritage inventory"* (ICOMOS, 1994). The question of authenticity is inevitable when we talk about heritage conservation. Understanding the history and significance of a site over time is crucial to identifying its authenticity (ICOMOS, 1996). Architecture also represents a form of human expression that is established over time.

However, it remains fragile, malleable, even unstable, to the point of being maintained, restored, transformed, and sometimes even destroyed (Verdier, 2014). The authenticity of a building arises at the time of its transformation or renewal, which is in fact limited by the notion of authenticity, which implies technical, material, symbolic and cultural values. Authenticity raises questions when it comes to modifying or rebuilding a building. According to Thierry Verdier (2001), all architecture is resistance. Through its materiality, as through its presence, architecture is what remains. Architecture has always had an obvious link with time. Through the built that remains, and through the memory that is rebuilt, the architect is captured by temporality. *"Every architectural gesture, every project, every realization, every attitude, intends to be a posture of the present, but we know very well that every work of art is a rewriting of the past"* (Verdier, 2001).

The question of authenticity in architecture is its existence, which goes beyond the question of truth to reach a kind of excellence of the true (Verdier, 2014). Schnell and German (2014) have focused on concepts related to the notion of authenticity in architecture. In their view, the right balance needs to be struck between "truth and falsehood, accuracy and deception, the original, the copy, the fake". Moreover, Edwar Al Kharrat (2004), like the provisions of the Cracow International Charter (ICOMOS, 2000), specifies that from an axiomatic point of view, it is an illusion to think that a ready-made projection of a historical age could be transposed into the present; the past cannot be copied or repeated. The relevance of architecture often lies in its ability to render perceptible the abstraction of an idea, which is in essence linked to the past, on what we perceive as the tip of our dome of the future. Memory then becomes the selection of our experiences (Verdier, 2001).

On another note, and according to the San Antonio Declaration, we speak of identity "if the local population identifies with the site and what identity the site reflects" (ICOMOS, 1996). Identities are social constructs, which actors appropriate in various ways (Eckmann, 2004). The concept of identity has evolved in its own way in the face of globalization and has broadened as its links with place have become increasingly complex (Jones, Pappas, 2023). According to Jan Assmann (1992), an identity can be constructed, deconstructed, and reconstructed: *"identity is therefore changeable, understood as an ongoing process, and does not revolve around what we were or could have been, but refers to what we have become through our collective history and our personal trajectories"*.

Memory is in fact a central aspect of identity. Architecture has always had a close relationship with memory. According to Thierry Verdier (2001): *"Architecture is often no more than a summons to memory"*. But are there any constants that underpin identity? Yes, in fact, according to Jean-Paul Cassulo (2016), permanence, recognition of the same, difference within the same cultural corpus and belonging to a whole identifiable by its components, are the four constants that found identity. As to the question of 'how to put architecture – and therefore architects – back at the service of a strong identity?' Jean-Paul Cassulo explains that the first thing to do is to identify and understand the territories in which it is established, and then to draw on the materials (stone, earth, light, plants) that occupy these territories to create architecture with them.

The Amsterdam Declaration of 1975 emphasized essential considerations, including that today's architecture is tomorrow's heritage: *"We must do everything we can to ensure that our contemporary architecture is of the highest quality".* In this sense, Carmen Popescu (2004) points out that the expression of identity through architecture is inescapable: *"When we begin to wonder about how to express identity in the 21st century, architecture proves to be an effective instrument: a public art par excellence [....], welcoming foreign visitors and offering them the quintessence of the country that produced it. Influenced by the climate and built with the materials of the soil in which it is erected, architecture also reflects the level of culture of its builders. In this way, the image of a nation is built at the same time as its architecture"*.

However, we must not lose sight of the fact that identity and authenticity are linked, as stated in the Cracow Charter (ICOMOS, 2000): *"Identity is [....] the common reference both to the present values emanating from a community and to the values of the past identified in authenticity"*. More radically, Edwar Al-Kharrat (2004) finds that the two notions of authenticity and identity have a mutual relationship of intersection, interpenetration, and interdependence. Nevertheless, in his view, authenticity, like identity, can be challenged by the emergence of a certain degree of 'globalization' in the sense of standardization and levelling, thus erasing distinctive characteristics.

METHODOLOGY

A field survey was carried out in the old town of Tlemcen, based on a qualitative sample of buildings constructed in two periods: Moorish buildings inherited from the medieval period, and buildings constructed on the eve of Tlemcen's designation as the "Capital of Islamic Culture in 2011". The aim of this approach is to verify the degree of authenticity achieved by the buildings of the 2011 cultural event, compared with Moorish heritage buildings. This study is based on a combination of several investigative tools: surveys, photographs, and archive consultation. Based on these tools, a building analysis grid was developed, which serves as a directory of building descriptions. For our study, we have chosen three Moorish and four contemporary buildings, to which the various criteria of the analysis grid are applied. Our analysis is based on two levels of reading of the architectural work (Mahbub, 2020; Martin, 1947):

1. The basic principles of Moorish architecture:
- Geometry;
- Light;
- Architectural elements;
- Unity inside, expressiveness outside;
- Introversion.

2. Decorative elements of Moorish architecture:
- Building materials;
- Colour;
- Calligraphy;
- Vegetal elements and arabesques.

Table 1 presents the principles of Moorish architecture. It shows that Moorish architecture is based on basic principles, as well as decorative elements. Decorations were among the most important unifying aspects of Moorish architecture (Mahbub, 2020). Moorish buildings offer a perfect blend of architecture and ornament: "*Ornamentation is added to architecture like a rich fabric covering the interior walls of the building and, more rarely, its exterior as well*" (Martin, 1947). As for the forms of these buildings, they are simple: "*Stripped of this cladding, architecture is most often reduced to simple, static forms like the cube and the hemisphere of a dome*" (Martin, 1947). Moorish architecture is distinguished by: "decoration and polychromy" (Benyoucef, 2010). Relative preference is given to interior decoration over exterior expression. Moreover, light is an important material (Bonnéric, 2013).

CASE STUDIES

Table 1 shows the combination of criteria on which Moorish architecture is based, allowing us to deduce whether the new buildings erected for the 2011 international event meet these criteria. This comparative study of Moorish and contemporary buildings should enable us to determine the type of authenticity between old and new buildings.

Tab. 1. Principles of Moorish architecture. (Source: Authors, 2023)

Moorish architectural principles								
Basic principles					**Decorative elements**			
Geometry	Light	Architectural elements	Unity inside, expressiveness outside	Introversion	Building materials	Colour	Calligraphy	Vegetal elements and arabesques

Moorish buildings in Tlemcen (analysis of examples)

During the French colonial period, notably in 1872, Edmond Duthoit, architect engaged with the French department of historic monuments, was sent to Algeria as the first chief architect of historic monuments. His aim was to identify and survey buildings representative of Moorish architecture. Edmond Duthoit had worked on several monuments in Tlemcen. We focus on three monuments:

1. The Great Mosque of Tlemcen, built in 1136 by the founder of the Almoravid dynasty, Yousef Ibn Tachfine;
2. The Sidi Belhacen mosque, built in 1297 by the ruler of the Zianid dynasty, said Othman ibn Yahyâ Yaghmurâsan;
3. Sidi Boumediene mosque, built in 1339 by the Merinid sultan Abou l'Hassan Ali.

The three historic monuments are classified as national heritage. They are located in the old town of Tlemcen, known as the medina. Its compact urban fabric is structured by streets and alleyways serving the dwellings (Fig. 1). Table 2 presents the three Moorish buildings in Tlemcen. It specifies the basic principles and decorative elements of Moorish architecture applied to these buildings.

Figure 2 concerns the Great Mosque of Tlemcen and shows its floor plan, roof, exterior envelope, and interior decorative elements. Figure 3 shows the plan, main façade and interior decorative elements of the Sidi Belhacen mosque. Figure 4 shows the plan, exterior envelope and interior decorative elements of the Sidi Boumédiene mosque. Figure 5 shows details of the mosques.

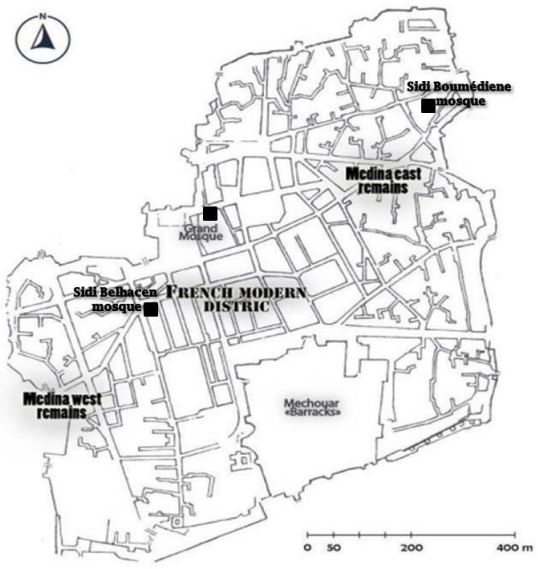

Fig. 1. Location of the three Moorish buildings in the Medina of Tlemcen. (Source: Kari et al., 2021, adapted by the authors)

Tab. 2. Principles of Moorish architecture applied to old buildings in Tlemcen. (Source: Authors, 2023)

Moorish architectural principles		**Great Mosque of Tlemcen** (1136)	**Sidi Belhacen mosque** (1297)	**Sidi Boumediene mosque** (1339)
Basic principles	Geometry	The building measures 60 * 50 m and is preceded by a square courtyard measuring 20 m on each side.	The building is small. The minaret is 14.5 m high.	The building measures 28.45 * 18.90 m. The inner courtyard measures 13.5 * 12 m.
	Light	The courtyard is the mosque's main source of light. The presence of windows framing the mihrab (architectural niche cut into the wall of a mosque to indicate the direction of Mecca, in which the imam says the prayer) to the south and on the east façade contributes to the mosque's illumination.	Windows on the east, west and north facades help illuminate the mosque.	The courtyard helps diffuse light. The spaces furthest from the courtyard receive the least light.
	Architectural elements	Dome with stalactites; Inner courtyard lined with galleries; Doors with horseshoe and poly-lobed arches; Roof tiled with sloping sides.	Ribbed dome; Stalactite dome; Onyx columns; Doors with broken horseshoe arches; Cedar roof.	Cupola with stalactites; Courtyard lined with galleries of cruciform pillars bearing semicircular horseshoe arches; 7-m-high arched entrance porch.
	Unity inside, expressiveness outside	The exterior is sober with simple forms, while the interior is a space of great decorative richness.	A simple building with no courtyard or pool. The interior is richly decorated.	The exterior is sober, while the interior is richly decorated.
	Introversion	The patio is the main source of light.	No patio	The patio is the main source of light.
Decorative elements	Building materials	Stone, brick, marble, plaster, ceramics, and wood.	Stone, brick, marble, plaster, ceramics, and wood.	Stone, brick, marble, plaster, ceramics, bronze, and wood.
	Colour	Polychromy of windowpanes and ceramic motifs.	Ceramic decoration in three shades (green, brown, and white).	Four-tone zelliges (a style of mosaic tile-work): white, brown, green, and yellow.
	Calligraphy	Rich calligraphic inscriptions	Rich calligraphic inscriptions	Rich calligraphic inscriptions
	Vegetal elements and arabesques	Floral decoration on sculpted plaster and on the glasswork of the openings.	Walls decorated with false arcades and arabesques with smooth, wide leaves; Mouldings decorated with floral and epigraphic motifs+ Capitals decorated with palm leaves.	Walls carved with arabesques; Walls decorated with sculpted plant elements.

Fig. 2 (left). Grand mosque of Tlemcen. A) Exterior view of the Great Mosque of Tlemcen; B) View of the sloping tile roof; C) Plan view; D) The dome; E) The entrance to the mosque. (Photos: Discover Islamic Art (MWNF), source: Lafer, 2024).

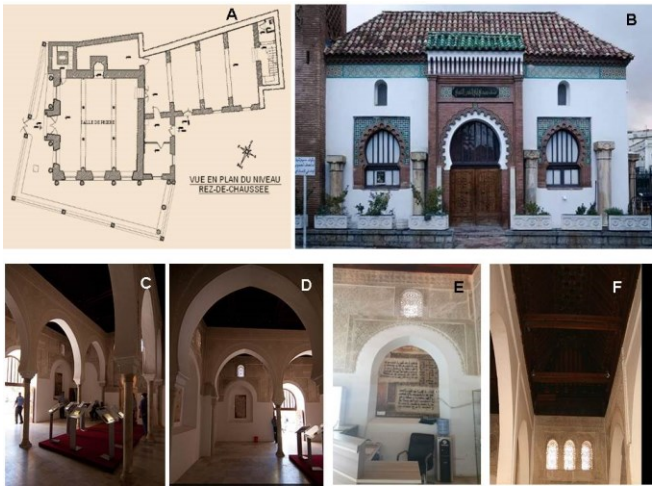

Fig. 3. Sidi Belhacen mosque. A) Plan view of the Sidi Belhacen mosque; B) Main facade of the mosque; C) Onyx columns; D) Broken horseshoe arch; E) Wall decoration; F) Cedar roof of the mosque. (Photos: Authors, 2023)

Fig. 4. Sidi Boumédiene Mosque. A) View of the exterior of the Sidi Boumédiene mosque; B) Plan view of the mosque; C) The entrance porch; D) Detail of the decoration on the entrance porch of the mosque, watercolor by Edmond Duthoit, 1872; E) Detail of the spandrel on the reverse of the large interior arch of the porch of the Sidi Boumédiene mosque, watercolour by Edmond Duthoit, 1872. (Photos: Authors, 2023; Koumas, Nafa, 2003)

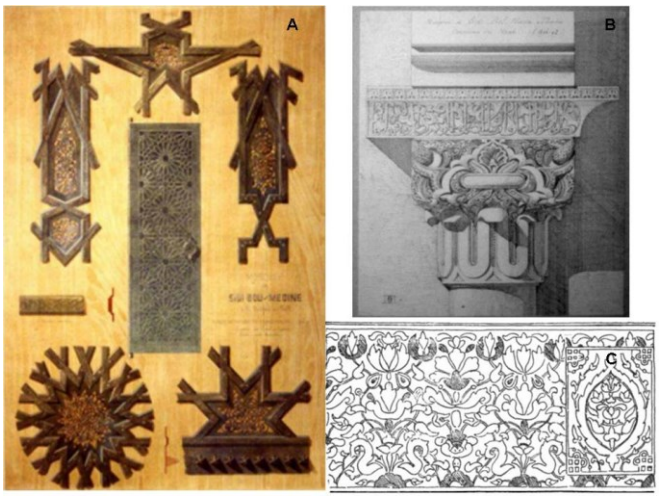

Fig. 5. Details of mosques. A) Details of the interior door of the large porch of the Sidi Boumédiene mosque, drawn by Edmond Duthoit in 1872; B) Detail of the capital of the Sidi Belhacen mosque, drawn by Edmond Duthoit in 1872; C) Specimens of painted decor. (Source: Oulebsir, Mercedes, 2009)

The results show that the exterior appearance of Moorish buildings in the city of Tlemcen is sober. The buildings are geometrically shaped and feature quite different light structures. In the case of the Great Mosque of Tlemcen and the Sidi Boumediene Mosque, the inner courtyard is the main source of light, and openings are mainly oriented towards the inner courtyard. Whereas in the case of the Belhacen mosque, it is the openings that are the main source of light. In addition, these buildings have pitched tile roofs and incorporate a variety of architectural elements such as domes, columns, monumental doorways, arches, and galleries. These buildings have richly decorated interiors, with abundant calligraphic inscriptions, and their walls are chiseled with arabesques and decorated with carved plant elements.

Contemporary architecture inspired by the Moorish style in Tlemcen (analysis of examples)

Since the country's independence in 1962, the undeniable desire for affirmation (Niemeyer, 1974), but also the desire to revamp the image of cities, led the State to call on renowned modern architects such as Oscar Niemeyer (who designed several universities in Algiers and Constantine) and Kenzo Tanger (who designed the University of Oran), and other European architects to build large-scale structures. Nevertheless, as part of the 2011 cultural event, this time, the State has entrusted the construction of cultural facilities to architects trained at local universities who have chosen to work with the Moorish style. In our paper, we present three cultural facilities (the Andalusian Studies Centre, the Abdelkrim Dali Palace of Culture and the Mohamed Dib regional library) and the Renaissance hotel of the Marriott hotel chain.

The Andalusian Studies Centre is located in the Imama district, to the west of the city of Tlemcen. It covers an area of 10,000 m^2. The Abdelkrim Dali Palace of Culture is close to the Centre for Andalusian Studies. It covers a total area of 15,000 m^2. The palace was named after Abdelkrim Dali (1914–1978), a symbolic figure in the field of Andalusian music in Tlemcen. The Mohamed Dib library is also located in the Imama district, close to the first two buildings. The library is named after Mohamed Dib (1920–2003), a writer born in Tlemcen. As for the Marriott hotel (Renaissance), it is located on the Lalla Setti plateau, to the south of the town. It covers an area of 91,000 m2. The Lalla Setti plateau overlooks the entire city of Tlemcen and offers a breathtaking panorama (Fig. 6).

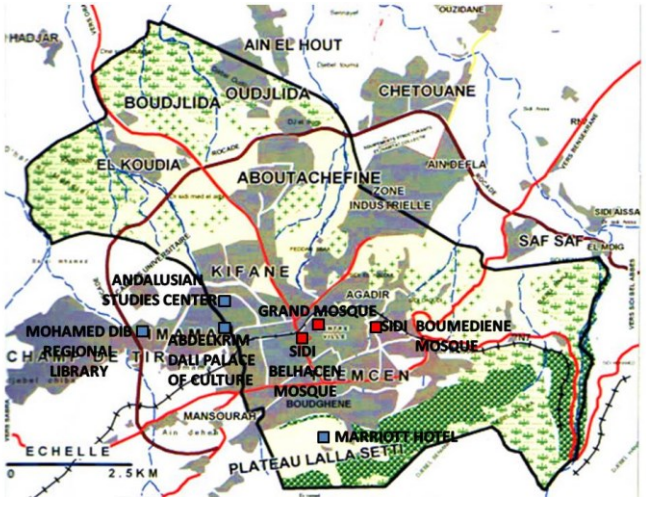

Fig. 6. Location of the Moorish and contemporary in Tlemcen. The principles of Moorish architecture have also been applied to contemporary buildings in the city of Tlemcen, built to mark its designation as the Capital of Islamic Culture in 2011. (Source: Municipality of Tlemcen, 2019, adapted by the authors)

Tab. 3. Moorish architectural principles applied to contemporary buildings of 2011, in the city of Tlemcen. (Source: Authors, 2023)

Moorish architectural principles		**Andalusian Studies Centre** (2011)	**Abdelkrim Dali Palace of Culture** (2011)	**Mohammed DIB Regional Library** (2011)	**Marriott Hotel (Renaissance)** (2011)
Basic principles	Geometry	The building was inspired by the Alhambra palaces in Granada, Andalusia. It is composed of multiple rectangular spaces, arranged around small patios connected to a large Patio of the Gazelles.	The building measures 100 * 100 m. The interior courtyards each have a surface area of 350 m2.	The building is misshapen and lacks an interior courtyard.	The building is misshapen and lacks an interior courtyard.
	Light	The presence of several patios and large bay windows on the four façades contribute to the building's brightness.	The presence of two interior courtyards and large bay windows on the four façades contribute to the illuminating of the building.	The large bay windows on the four façades help illuminate the building.	The multiplicity of types of opening contribute to the building's brightness.
	Architectural elements	Cupola; Inner courtyard lined with galleries; Horseshoe-arched doors and windows; Pitched tile roof. The treatment of the building envelope on the patio is completely in modern-style glass, while the galleries are Moorish-inspired.	Cupola; Bare-capital columns; Horseshoe-arched doors and windows; Gemini window; Roof tile cornice.	The building's envelope is rounded off by merlons and a tile cornice set on wooden brackets. Bare-capital column Poly-lobed arch with arabesque frame; Claustra not clad with glass.	Cupola; Masonry moucharabiehs, furnished with series of horseshoe arches, separated horizontally by earthenware panels; Column with bare capital; Poly-lobed arch with arabesque frame; Horseshoe-arched.
	Unity inside, expressiveness outside	The exterior is sober, while the interior is richly decorated.	The exterior of the building is monumental, while the interior is richly decorated.	The exterior of the building is hybrid, while the interior is richly decorated.	The exterior of the building is sober, while the interior is richly decorated.
	Introversion	In the middle of the courtyard is the Fountain of the Gazelles, modelled on the Lion fountain. The building communicates with the garden and the water.	Extroverted building but also features 2 courtyards.	Extroverted building with no interior courtyard.	Extroverted building with no interior courtyard.
Decorative elements	Building materials	Reinforced concrete, brick, marble, stone, plaster, and wood.	Reinforced concrete, brick, earthenware, marble, stone, plaster, and wood.	Reinforced concrete, brick, earthenware, marble, stone, plaster, and wood.	Reinforced concrete, brick, earthenware, marble, stone, plaster, wood, Stucco.
	Colour	Monochrome	Green earthenware; white marble.	White and yellow marble; Polychrome earthenware motif.	Coloured Marble; Polychrome earthenware motif; alternating colours.
	Calligraphy	Presence of calligraphic inscriptions.	Presence of calligraphic inscriptions.	No calligraphic inscriptions.	No calligraphic inscriptions.
	Vegetal elements and arabesques	Walls carved with arabesques; Walls decorated with sculpted plant elements.	Framed in interlaced stucco; Horizontal register with diamond pattern; Wooden cladding with openwork star motif; Geometric frieze.	Horseshoe-shaped arcatures encircled by arabesques; Plaster frame with floral motif.	Horseshoe-shaped arc;atures encircled by arabesques; Plaster frame with floral motif.

On the face of it, the design of the four contemporary buildings is based on the principles of Moorish architecture. Semi-directive interviews with the architects who designed these buildings reveal that they were indeed inspired by Tlemcen's Moorish heritage buildings. The decorative registers used on the exterior of the buildings are sober and faithfully reproduce the Moorish tradition, while the interior incorporates a variety of architectural elements such as columns, monumental doors, arches, and floral and geometric decorations. However, with the exception of the Andalusian Studies Centre, the other new buildings are extraverted, their roofs not sloping, but rather flat. New techniques and materials were used, such as reinforced concrete and special insulating glass. The interiors are bright with light. The presence of interior courtyards and large bay windows on all four façades contribute to the brightness of these buildings. At a glance, the four contemporary buildings blend well and merge into a homogeneous whole.

Table 3 presents the four contemporary buildings of 2011, in Tlemcen. It specifies the basic principles and decorative elements of Moorish architecture applied to these buildings. Table 4 presents the results of the application of Moorish architectural principles to contemporary buildings in Tlemcen. It shows the similarities and differences in the design of contemporary buildings compared to Moorish architecture. Figure 7 shows the similarities between the patios of the Lions of the Alhambra Palace in Andalusia (Spain) and the patio of Gazelles of the Andalusian Studies Centre in Tlemcen. Figure 8 shows the exterior envelope, interior and fountain of the Gazelles of the Andalusian Studies Centre in Tlemcen. Figure 9 shows the ground plan, external envelope, and interior decorative elements of Abdelkrim Dali Palace of Culture. Figure 10 shows the exterior envelope and interior decorative elements of Mohamed Dib Library. Figures 11 and 12 show the exterior envelope and interior decorative elements of The Marriott hotel.

Fig. 7 (left). Similarities between patios in Tlemcen and Alhambra. A) The patio of the Andalusian Studies Centre in Tlemcen; B) The Patio of the Lions of the Alhambra Palace in in Andalusia (Spain). (Photos: Authors, WikiArquitectura, 2022).

Fig. 8. The Andalusian Studies Centre. A) View of the exterior of the Andalusian Studies Centre; B) View of the walls in the Patio of the Gazelles; C) View of the Fountain of the Gazelles. (Photos: Authors, 2022)

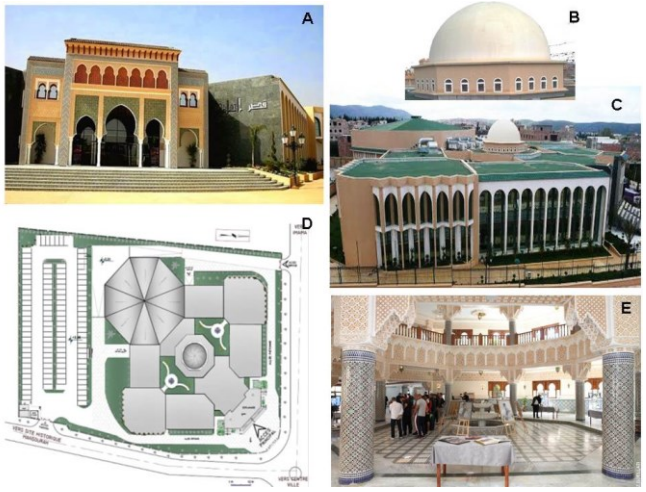

Fig. 9. Abdelkrim Dali Palace of Culture. A) View of the main entrance to the Palace of Culture; B) The dome; C) View of the side façade of the palace; D) Plan view; E) Main hall of the palace. (Source: Authors, 2022)

Fig. 10. Mohamed Dib Library. A) View of the main entrance to the library; B) A poly-lobed arch with an arabesque frame; C) View of the library exterior; D) Entrance hall of the library. (Photos: Authors, 2022)

Fig. 11. The Marriott hotel façade. A) The main façade of the Marriott hotel; B) View of a moucharabieh supported by three brackets.; C) Details of an arched balcony; D) A poly-lobed arch with an arabesque frame. (Photos: Boulbene, 2012)

Fig. 12. The Marriott hotel interior. (Photo: Authors, 2022)

Tab. 4. Results of the application of Moorish architectural principles to contemporary buildings in Tlemcen. (Source: Authors, 2023)

Moorish architectural principles applied to contemporary buildings		**Andalusian Studies Centre** (2011)	**Abdelkrim Dali Palace of Culture** (2011)	**Mohammed Dib Regional Library** (2011)	**Marriott Hotel (Renaissance)** (2011)
Basic principles	Geometry	X	X		X
	Light	X	X		X
	Architectural elements	X	X	X	X
	Unity inside, expressiveness outside	X	X		X
	Introversion	X			
Decorative elements	Building materials	X	X	X	X
	Colour		X	X	X
	Calligraphy	X	X		
	Vegetal elements and arabesques	X	X	X	X

RESULTS

The design of contemporary buildings is controversial. There are similarities and differences observed in the design of contemporary buildings compared to Moorish architecture (Tab. 4). In the first case, the Andalusian Studies Centre responds to a greater or lesser degree to the principles of Moorish architecture. Except that the center is multicultural. It is the confluence between two cultures: Moorish and modern. The envelope of the buildings overlooking the Patio of the Gazelles is a good illustration of this fusion: it is partly made of glass, in a modern, yet Moorish-inspired style. The architecture of the other three buildings is extraverted, which goes against the logic of the introverted Moorish buildings of old Tlemcen.

What is more, the three contemporary cultural buildings are public facilities for study, reading and meeting. These functions require a high level of visual comfort: hence the need for a high level of illumination, enhanced by the presence of large, glazed openings. The buildings maintain high level of brightness in keeping with their functions (Bonnéric, 2013). The decorative registers used on the exterior of the buildings are sober and faithful to Moorish tradition. All the decorative richness was introduced inside the buildings. Nevertheless, calligraphic inscriptions are virtually absent in the Mohamed Dib library, and new materials and construction techniques have been used in their architectural expressions. The three contemporary buildings only partially reflect the principles of Moorish architecture. Their authenticity is not technical and material. The results of the analysis of the new buildings inspired by the Moorish style show that, in a way, they have made it possible to establish continuity and dialogue with the Moorish heritage.

DISCUSSION

The twentieth century saw architectural thinking evolve in directions that were as diverse as they were contradictory. The two main periods identified are those of 'modernity' and reactionary 'postmodernity' (Bohli Nouri, 2015). Postmodernism has the merit of having given importance to history in contemporary creation (Pomerleau, 2009). According to the postmodernists, in order to define the contemporary identity of an architectural intervention, it was absolutely necessary to have recourse to history, to which heritage belongs by definition. With Tlemcen having been invaded for decades by modern architecture that supports the rejection of ornament and symbolism, the 2011 international cultural event provided the opportunity to

reconnect with different architectural traditions and turn its back on the universalism championed by the moderns.

Against this backdrop, Tlemcen's Moorish heritage has come to the fore for its symbolic, cultural and, in particular, historical value, as a way of addressing the issue of identity in architecture and the city. In a way, the new, Moorish style-inspired buildings have enabled, above all, to forge an orientation for architectural practice in Tlemcen, until then variable and very open to all kinds of foreign influences. Through these contemporary buildings, the architects have adopted an architectural style that rehabilitates the Moorish tradition. The architects have expressed their desire to break with colonial and post-independence traditions, which reproduced imported occidental models, and to reclaim a prestigious past dislocated by the colonial enterprise (Zerrouki, 2021).

CONCLUSION

The city of Tlemcen boasts a priceless Moorish heritage, indicative of its glorious past. As part of the international cultural event "Tlemcen, the Capital of Islamic Culture" in 2011, contemporary buildings were erected and the Moorish heritage has fully played its "identity role", as explained by McLean (2006): *"Heritage transforms the material into an 'identity past' that is preserved because of its significance"*. In fact, the architectural style of contemporary buildings is a free reinterpretation of the old Moorish style. On the surface, Tlemcen's contemporary buildings are not far from the authenticity they claim to express. Contemporary architecture in Tlemcen is evolving towards this new paradigm. Nevertheless, this style has other assets: it responds to an international event, marks its era and breaks with the identity crisis in architecture that persisted in the city. It is culturally and symbolically authentic.

Today, visitors to the city can see that, alongside its beautiful Moorish monuments, new buildings have been erected that have a hybrid appearance, both modern and Moorish. Clearly, architecture "is" (this is what exists in the present) (Verdier, 2014). But it is also true, as confirmed by the words of writer Victor Hugo: *"Architecture writes history"* (Chemetov, Marrey, 1984). Nowadays, contemporary buildings in Tlemcen bear witness to the city's identity and development. Moreover, the international Islamic event allowed the Moorish style to rise from the ashes. It was a kind of reconciliation between the city and its Moorish heritage, but above all it stands for an orientation of architectural practice in Tlemcen, which until then had been variable and very open to all kinds of foreign influences.

Nevertheless, in order to guide the architectural design of buildings in Tlemcen in the future, measures need to be taken. Among other things, a corpus of Moorish architecture is to be drawn up, targeting all the reference elements to be used. This corpus will serve as a dictionary of local architecture. Secondly, this corpus of local architecture must be integrated into the architects' training programs. The ultimate aim would be to achieve equally satisfactory results as in neighboring Tunisia, which has fully embraced its Moorish architectural identity. Leila Ammar (2006) explains that this state of affairs has been made possible by the introduction of a well-defined vocabulary: *"This phenomenon of asserting Tunisian cultural identity by selecting elements from the vocabulary of reinterpreted traditional architecture is so deeply rooted in people's minds, particularly at institutional level, that it has come to constitute a new 'norm', and it is hard to imagine today's domestic architecture without its share of glazed tiles, geometric decoration in openwork figures and arcades on the façade"*.

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ISSN 2729-7640

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OF THE FACULTY OF ARCHITECTURE AND DESIGN STU
www.alfa.stuba.sk

1/2024 (Vol. 29)
DOI: 10.2478/alfa-2024-0004

Appraisal of the historical impact of neglected, modernised small-scale architectural objects by Rudolf Frič

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Article information
Sent: Feb 2, 2024
Accepted: Mar 12, 2024

Abstract: The context of interwar period Czechoslovakia lacks a formal on both the personality and built artefacts on the often overlooked Bratislava builder, Rudolf Frič. Small-scale architecture tends to be undervalued because of its size, utility, multiplicity, or related momentariness, and because of the automatic consideration of its banality. This paper aims to analyse their architectural qualities presented in concrete typologies and realisations. Tram shelters, gas stations, mausoleums, and small detached houses are thus researched. Their architectural values, both in construction and in form, are identified and clarified. On the other hand, it is noted that the scale and ephemerality conditioned by the utility character are the crucial reasons for their undervaluation. This is especially the case of traffic buildings, where the same dynamic that initiated their origin also resulted in their end, as they become obsolete rather soon. Some of these projects by Frič such as: Rybáček House, Polák Tram stop, the Zikmund Brothers' gas station, as well as the Frič family tomb, are confronted with other relevant realisations, prove that small-scale architectural objects and peripheral typologies have the architectural qualities for which they would deserve the public and professional interest. Moreover, these objects reflect their variety, being situated in diverse urban situations, from the architecturally and historically intact city centre, through to newly urbanised dwelling area, urban periphery up to a provincial town. Additionally, they illustrate the asymmetric position of the Slovak situation compared to the Czech one, particularly in transport architecture. The presented works characterise the style of Frič based on the high-quality craftsmanship details rather than explicit architectural forms. This transfer of new typologies and structural forms with partial urban impacts, underscores the neglected and crucial contribution to architecture by Frič.

Keywords: Frič, interwar Czechoslovakia, gas station, tram shelter, tomb, mausoleum, small-scale architecture

INTRODUCTION

Small-scale architecture tends to be undervalued due to its size, utility, multiplicity, related momentariness, and automatic consideration of its banality. On the contrary, these are the great masterpieces which usually receive both the public and the scientistic interest. However, several small projects have already proven that their significance may be equally valuable, sometimes even greater. There are historical examples such as the Art Nouveau Paris metro entrances (1900s) by Hector Guimard (1867–1942) (des Cars, 2006, pp. 432–437) or the Texaco gas station in Skovshoved (1937) by Arne Jacobsen (1902–1971) (Larsen, Staunsager, 2020), to name a few. Moreover, this proof is evident among various architectural typologies implemented in different urban contexts.

In the context of the Czechoslovak interwar architecture and the great complex changes, some of those typologies were traditional while some others were revolutionary modern. The architecture comprising gas stations, public traffic shelters, tombs and even detached family houses and represents a significant and diverse architectural set additionally varied in structure and materiality. In addition, concrete typologies, such as gas stations and partially public transport shelters, contributed unprecedentedly to the modernisation of towns and cities, and mobility. The new transport architectures used to occur at urban radials, along which the cities spread significantly. That was precisely the case of Bratislava, which began to spread exactly in this way in the interwar period. (Moravčíková et al., 2020, pp. 95–105) The rapid construction of the traffic architecture reflecting the same rapid modernising process was embodied in dynamizing architectural forms and in innovative structures which enabled it. That was, for instance, exemplified by the constructionist and functionalist designs by Josef Gočár. (Lukeš et al., 2010)

However, the same dynamic which initiated that architecture unfortunately resulted in their end, as they soon obsoleted. On the contrary, tombs considered fundamental ancient architecture obsoleted as typology, but the concrete realisations, most in conversative design, have been physically preserved. Finally, houses, in our context often referred to as 'family houses', as essential forms of individual living, varied the most, reflecting the demands and the position in urbanisation processes. In

these processes, prestigious villa complexes were confronted with workers colonies, urbanistically segregated. (Moravčíková et al., 2020, pp. 581–611) That was happening both in the city centres and in the then slightly urbanised peripheries. A contribution to this field would be attributed to the construction entrepreneur Rudolf Frič (1887–1975).

Although Slovak historiography exclusively presents him as a builder of civil engineering structures, such as the water power station in Ladce (1932–1935) designed by Jindřich Merganc and Václav Houdek, the Bratislava fortifications (1934–1938) and self-designed Kopráš viaduct (1942–), or structures for the construction of the Lanfranconi school dormitories (1928–1933) designed by Klement Šilinger and heavy industry factories in Brno, Podbrezová, Ladce, and elsewhere, Frič is author of a wide variety of architectural designs, including small-scale designs in the aforementioned typologies. Their architectural value is being examined in confrontation with the work of the same typology and approximate architectural and structural characteristics authored by other architects within the Czechoslovak interwar context.

Rudolf Frič was born on 21 March 1887 in Nová Ves pod Pleší, a small village on the outskirts of modern-day Prague. He graduated from the Czech Technical University in Prague, back then called 'C. k. Česká vysoká škola technická v Prahe'. He completed the early internships in Moravia, Hungary, Slavonia and Galicia, in construction companies specialised in water engineering structures, such as Velflík and Kunz companies. During the Great War, Frič joined the newly formed Czechoslovak legions: and it was from this formation where many of his future clients would come from later. Shortly after the arrival to interwar Czechoslovakia, he moved to Bratislava, where he cooperated in the establishment of the country branch of the Bank of Czechoslovak legions, which helped consolidate the economic situation in Slovakia.

As the director of the technical and construction department, Frič was responsible for the initiation and construction of social and developer projects financed by the bank. (Khýn, 1947, pp. 16–18) Soon after in 1921 Frič set up his independent technical, design and construction company, residing on Dunajská, Špitálska, and since 1928 on Štefánikova Street, in the Kittler and Gratzl villa (1897). (Kiaček, 2022) Frič's work counting more than 100 projects is found beyond the Slovak borders, both in Czechia and in the Subcarpathian region. Until the era of the Nazi-allied Slovak State, Frič was the chairman of the Slovak Builders Association, and from that position he initiated the first Slovak magazine reviewing architecture, called 'Slovenský staviteľ – revue architektúry a stavebného umenia' (Slovak Builder – Magazine of architecture and construction art). (Harman, 1947, pp. 13–15)

He was a member of the Bratislava City Council and a long-serving member of the City regulation committee, which defined the city urbanisation and construction process. For his participation in the Slovak National Uprising where he built ephemeral military structures, he was arrested by gestapo. In consequence of the Czechoslovak coup d'état in 1948, Frič's company and plants were nationalised and incorporated into the Czechoslovak construction works, national corporation. (National Council of the Republic of Czechoslovakia, 1948) Frič's corporate archive is currently part of unsystematised and inaccessible resources in the archival fond titled 'Československé stavebné závody, n. p.' (Czechoslovak Construction Works, national enterprise) in the Slovak National Archive.

In fact, the fond consists of the archives of all nationalised construction companies. If it were inventoried and accessible, it might have enriched the research notably. Included in 'Action B' in 1952, Frič was resettled in the village of Rimavská Baňa in south-east Slovakia. (Oravcová, 2020, p. 178) In the late 1950s he was allowed to return to Bratislava, where he worked in elementary positions until his late 80s. The personal possession confirms that he made a living from designing small wooden detached houses inspired by imported Swedish catalogues. He died in the Evangelic hospital on 4 October 1975.

MATERIALS AND METHODS

The starting point of the study is a company publication by Ján Slabihoud (Slabihoud, 1947) that contains a list of Frič's works with a selected graphical addendum. The debt of the Czech and Slovak historiography owed to Czech and Moravian architects of Slovak interwar architecture, also involving Frič, is partially reduced by a collective publication Zapomenutá generace. (Dulla et al., 2019) The book is inspirational for its message and structure. In a holistic historiographical work, Matúš Dulla and Henrieta Moravčíková (Dulla, Moravčíková, 2002) provide an analytical overview of the greatest of Frič's building projects with added contextual and background explanations. However, his contribution is not directly mentioned, nor evaluated, and the book just mentions one of the buildings from among those being researched in our paper.

The paper takes a qualitative architectural-historical approach to the research and a continuously verifies the results. The main research method of the study was a comparative method mostly based on archival research carried out in the Bratislava City Archives. The comparison with relevant architectural workpieces in the Czechoslovak interwar context was crucial to identify and review the architectural value of the Frič's examined works. The confrontation examples were chosen appropriately for the precise typology and approximate architectural and structural characteristics. Study of period magazines, specifically 'Slovenský staviteľ" (Slovak Builder), elucidated Frič's work through the then propaganda.

Complementary photographs and accompanying field research notes were applied in those cases where no archival materials or period magazines were accessible or preserved. They are most appropriate to demonstrate the quality of craftsmanship details and building materials: as that is being examined to characterise the designs by Frič. The Frič family tomb is the best example to apply the method and to prove the claimed qualities. Therefore, it was included in the paper, despite of being typologically ancient compared to the rest of new typologies, which the paper focuses on. Contemporary publications subsequently mentioned in the paper's body were most applied in the comparable examples research. The paper preparation work consisted in the initial identification of the buildings, which was performed by combining archival research and a comparison of Slabihoud's list with holistic historiographical publications. (Dulla, Moravčíková, 2002) This allowed for Frič's architectural projects to be distinguished and his direct contribution to be evaluated.

THE DETACHED HOUSE FOR A FRIEND

Even though Frič is better known as a builder of predominantly civil engineering structures, he both designed and constructed several detached houses of different scale and in various urban situations. Among them is the house of the civil engineer

Rybáček on Kubániho Street in Bratislava (1933–1934). The detached house is situated in an upper corner of a gently sloping plot in the then newly urbanised north-west city hills – the Westende. The location in the neighbourhood of Horský park, sparsely built by garden cottages, had potential for a villa district, similar to the modern Baba Colony in Prague from 1930s. (Ulrich et al., 2013) However, even though the concentration of social elites and financial capital in Bratislava after 1918 intensified, the local environment did not provide monetary resources and cultural self-confidence that could generate the creation of such a colony of puristic and functionalistic villas. (Moravčíková, 2014, p. 137) Actually, Rybáček's house was the pioneer and only house based on modern puristic aesthetic built in the area, described as the most absorbent there. (Dulla, Moravčíková, 2002, p. 378)

The local identity of the former vineyards is transferred to the vine that crawls the façades. The design is based on an architectural composition of prisms in puristically austere style with some nautical allusions. Such allusions are the horizontal tubular railing, the terraces on both levels as decks, the semicircular terrace end resembling a nautical bridge, and the winter garden as a pilothouse. The nautical allusions reflected a steamship as the contemporary symbol of modernity. (Dulla, 2010, p. 85) The structure of the narrow winter garden with the plain wall behind is based on the Trombe wall concept, heating the neighbouring interior. (Fig. 1) Had it been designed intentionally, it would have been a rare application of the Trombe wall in then Czechoslovak architecture.

Fig. 1. Rudolf Frič, House of the civil engineer Rybáček, Kubániho Street, Bratislava, now Slovakia, 1933–1934. (Photo: Slovak Academy of Sciences, 2024)

Rybáček's house shares similarities with Villa Tománek (1929) by Friedrich Weinwurm (1885–1942), as both were placed in slightly urbanised locations. Designed on puristic aesthetic, both contrasted with the neighbouring architecture. Both Frič and Weinwurm preferred to connect the interior and exterior by large terraces rather than glazed walls, keeping modest ordinariness compared to European functionalism. (Moravčíková, 2014, pp. 136–138) The Tománek Villa was thus appreciated by Moravčíková and in the period Dutch magazine on European and American architecture. (Wattjes, 1930, pp. 158–160) On the other hand, the asymmetric composition of prisms and horizontal elements that Frič applied make it differ from Weinwurm's moderate style.

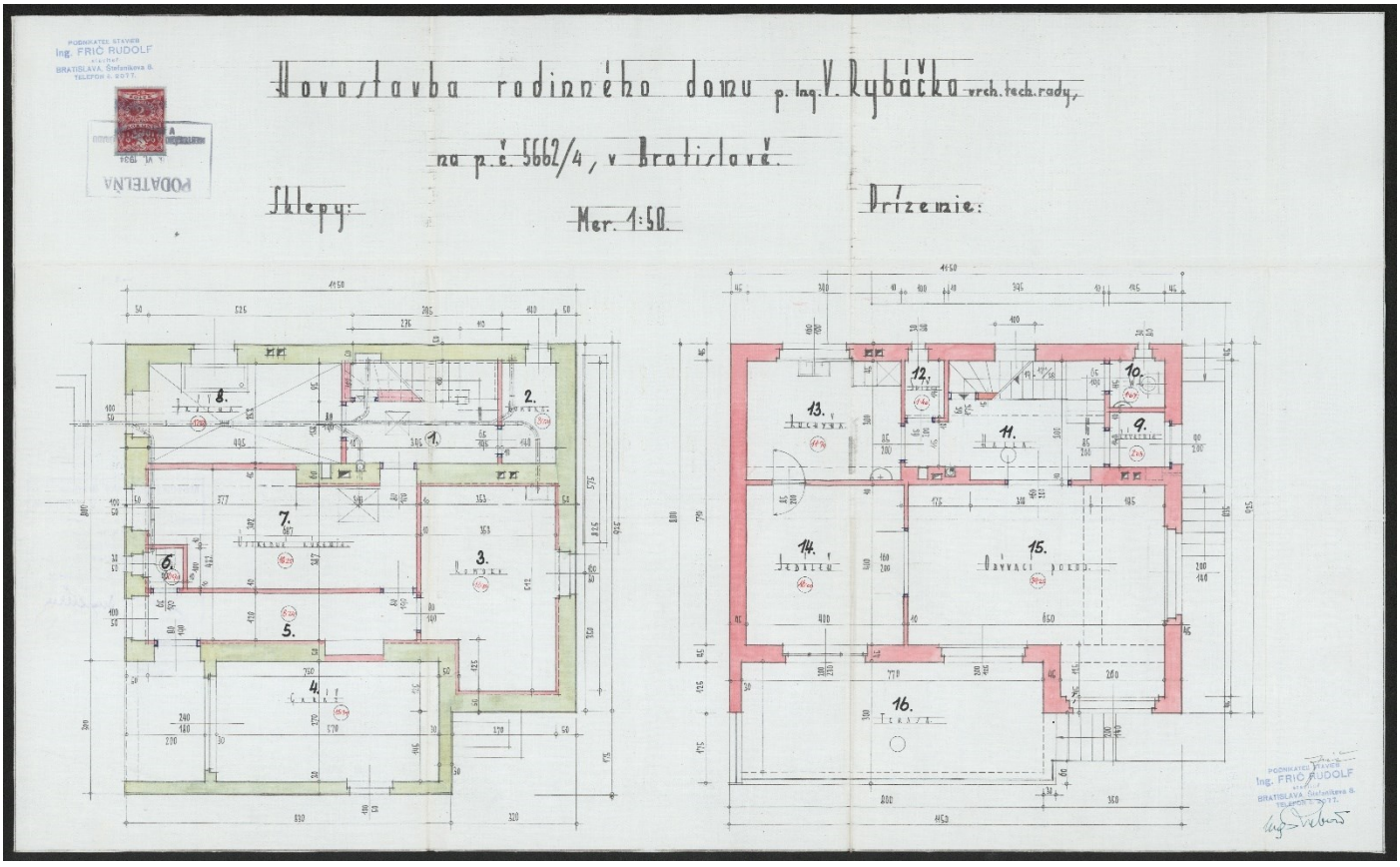

Fig. 2. Rudolf Frič, House of the civil engineer Rybáček, Kubániho Street, Bratislava, 1933–1934. Basement and ground floor. (Source: Bratislava City Archives, 1934)

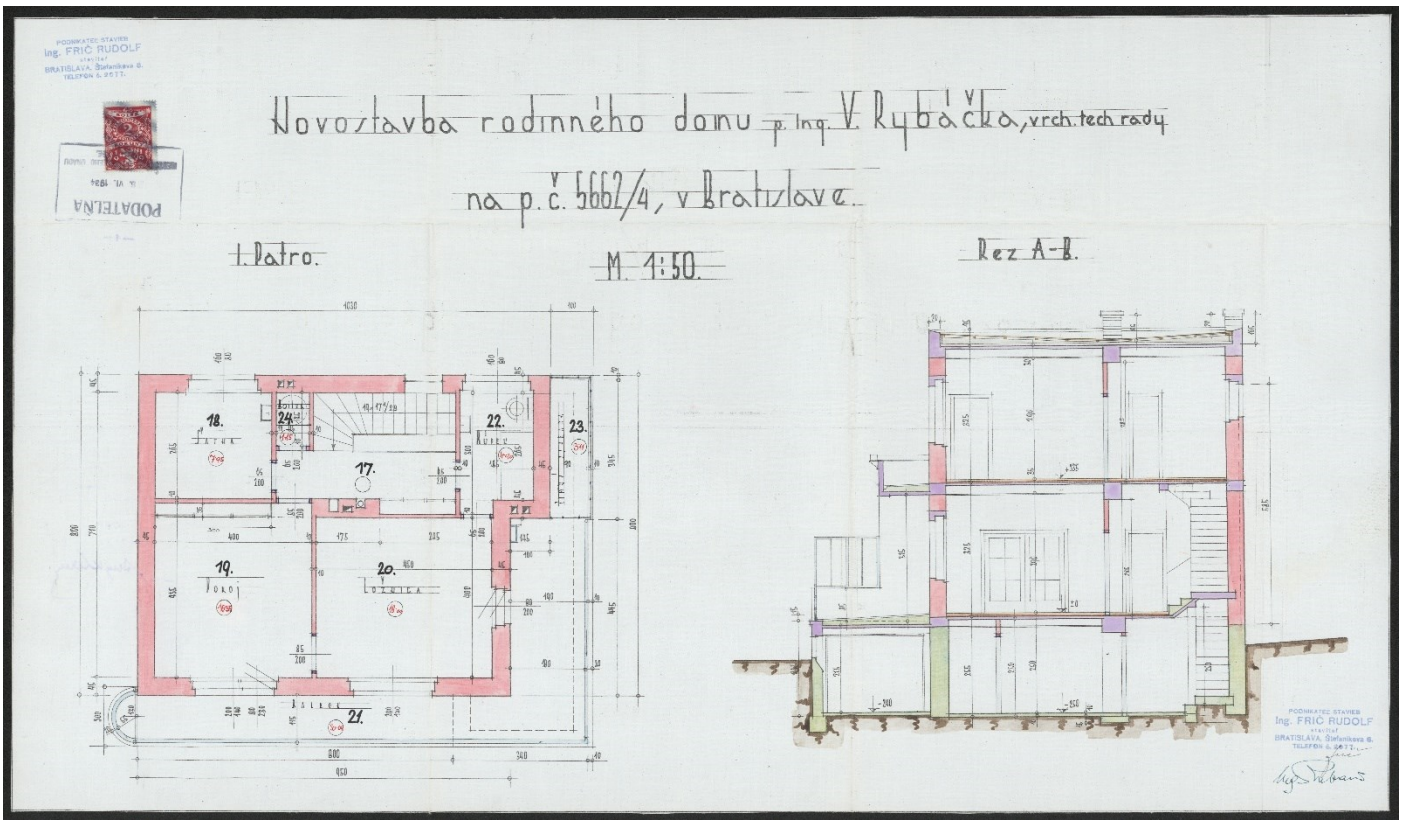

Fig. 3. Rudolf Frič, House of the civil engineer Rybáček, Kubániho Street, Bratislava, 1933 – 1934. First floor and cross section. (Source: Bratislava City Archives, 1934)

A modern concept of a house that turns its back on the street, but opens up to the private garden, was applied. The façade facing Kubániho Street is the most functional one with utilitarian spaces behind. It is dominated by a large glass block wall which lightens up the interior staircase. The most significant element is the winter garden on the corner of the street. The façade facing the garden is the most articulated and perforated, with prism volumes receding by terraces. All windows are all shaded with Eslinger wooden roller blinds. The façade was originally plastered in pure white combined with high-quality artificial stone plinth, entrance framing, and terraces. The main spaces are orientated to the garden and partially to Čerešňová Street, while the utilitarian rooms are oriented to Kubániho Street. The largest space in the ground floor is the living room with a deep niche in the ejected corner prism. The adjacent dining room leads to the partially sheltered terrace. (Fig. 2) The upstairs rooms have both access to the upper terrace, however, the dominant winter garden is accessed only from outside. (Fig. 3)

Houses in a provincial town

In Myjava, on a hill above the town steam baths, Frič designed a detached house the evangelic priest Valášek, called 'The house of Sun' (1933). (Anon, 1933a, pp. 37–38) Contrary to the prevailing historicizing architecture, both the baths and the priest's house were rare representations of the interwar purism in the town. The provincial identity is partially reflected in the design, in the replacement of a terrace by a traditional glazed porch, separate entrances, and in personal heating. (Fig. 4) In comparison to the Rybáček's vila in Bratislava, the architectural composition is limited to a trivial addition of prisms. (Fig. 5) The façade is plastered in pure white combined with artificial stone details and fire clay tiles. The name 'The house of Sun' can be interpreted in two ways – as the house of God and the belief embodied in the priest's personality, or as the house of modernity. As a consequence of the urbanisation after the war, the house has not been preserved.

Fig. 4. Rudolf Frič, House of the evangelic priest Valášek, 'The house of Sun', Myjava, 1933. (Photo: Frič's personal possession, author's personal archive)

Frič's design proposal for an anonymised Doctor's B detached house with a surgery, in the same town of Myjava (1933) got published subsequently. (Anon, 1933c, p. 34) (Fig. 6) The two-storey building is shaped as a composition of two prisms, one rounded at the corner, and an ejected semicircular volume of the inner staircase. The corners are articulated in several positions, those are the rounded corner, the corner windows, the cut surgery entrance on the left, and the ejected house entrance on the right. The larger left side of the ground floor is dedicated to the surgery. Compared to the size of the town, the surgery is relatively large, containing two separate waiting rooms, a general surgery and a dentist surgery, which may indicate the suc-

cess of the doctor. The surgery is connected to the private resting part by a great hall with a staircase and a glazed porch accessing an ejected terrace oriented to the back garden. Next to the porch, there is a kitchen to serve summer gatherings. Upstairs there is a spacious flat with an enfilade of representative rooms on the staircase axis. The bearing structure is partially made of reinforced concrete skeleton.

Despite its attractive design and innovative layout, the house was not a rare hybrid typology, as that was also applied in Doctor Polony's terraced house with surgery (1937–1938) in Senica, designed by Czech functionalist architect Jan Gillar (1904–1967). On the contrary, Gillar's design is more radical, with continuous fenestration bands to the entire width of the façade. (Dulla, Moravčíková, 2002, p. 396) The aforementioned examples present the minor human-scale part of Frič's portfolio and prove his design abilities. The fact the design proposal by Frič was published in the period magazine proves its architectural significance and acknowledgment of that time.

THE SMALL PUBLIC TRANSPORT ARCHITECTURE

In Hviezdoslavovo Square in Bratislava, in front of the monumental representative architecture of the Carlton Savoy hotel, then the largest in central Europe, Frič designed the very opposite – a utilitarian kiosk and tram shelter (1928). (Anon, 1933b) (Fig. 7) It was built on the edge of the alley in a place where in the early 1920s other construction was forbidden, claiming: *'Here located orchards are appreciated in the image of the city, which must be preserved. In the future, the intention to build a new bridge that ends in Rybné Square will make this place a traffic centre. For these urbanistic goals, existing unbuilt areas must remain free.'* (Bratislava City Archives, 1921) The kiosk replaced a wooden shelter at the traffic nod of the city's most prominent promenade space, enclosed by historicizing architecture of the 18th and 19th century. In such a position, the kiosk was architecturally banal and infrastructurally crucial.

The architectural composition combines vertical volumes with horizontal lines, and rectangular, circular, and polygonal geometry. The two vertical elements, the hexagonal pillar, and the elevated prism, are horizontally joined with the semicircular shaped roof above the waiting space. The composition is finished with an elevated cornice at the volume of the kiosk prism. The wide plinth is organically shaped and serves as a bench. (Fig. 8) Although the space was sheltered, there was no sufficient wind and cold protection, which was criticised for by public. It was the municipality, in cooperation with the Monument Protection Authority, who ordered to shrink the shelter and to construct one instead of the originally intentioned two ones.

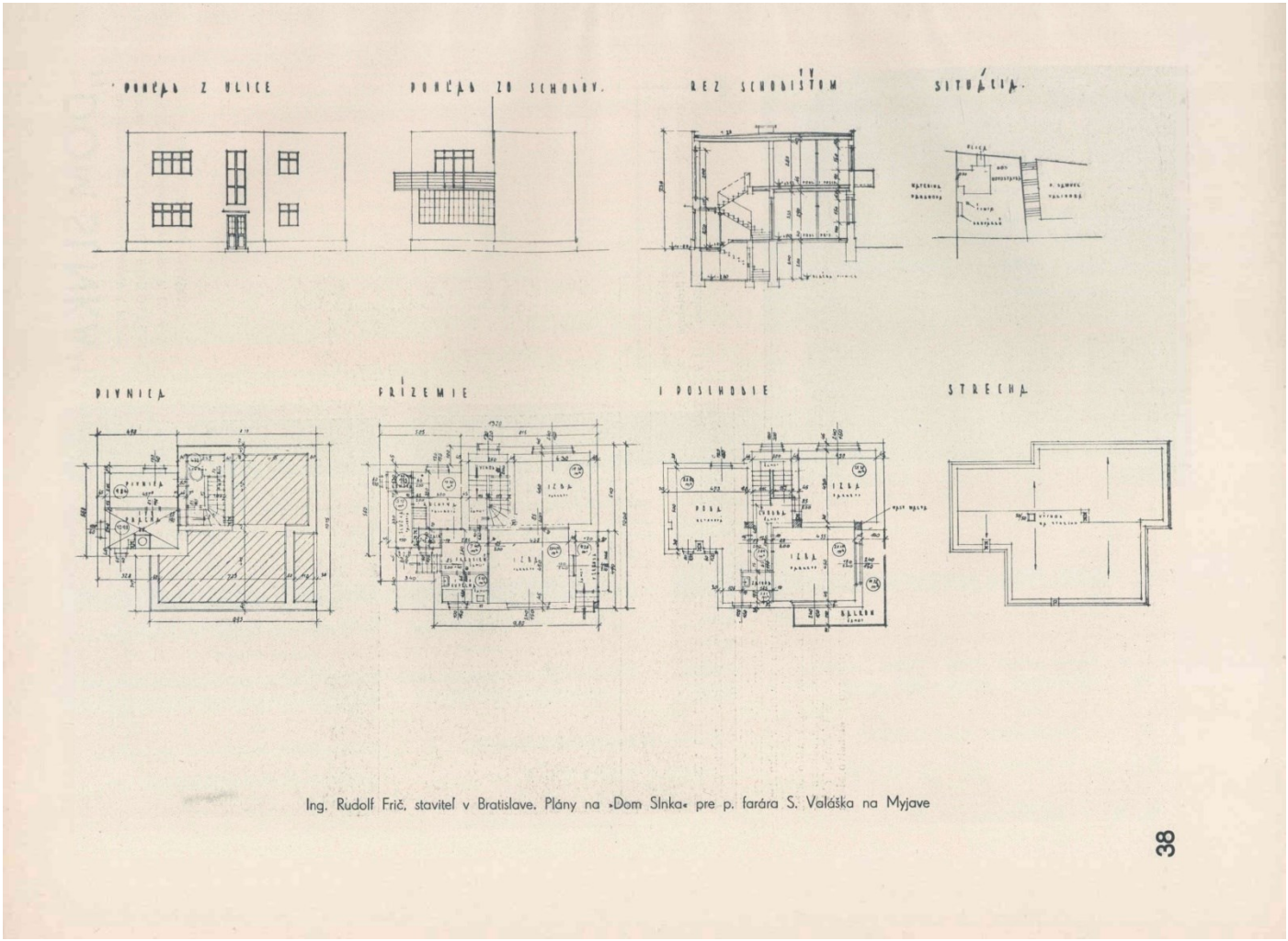

Fig. 5. Rudolf Frič, House of the evangelic priest Valášek, 'The house of Sun', Myjava, 1933. (Source: Anon, 1933a)

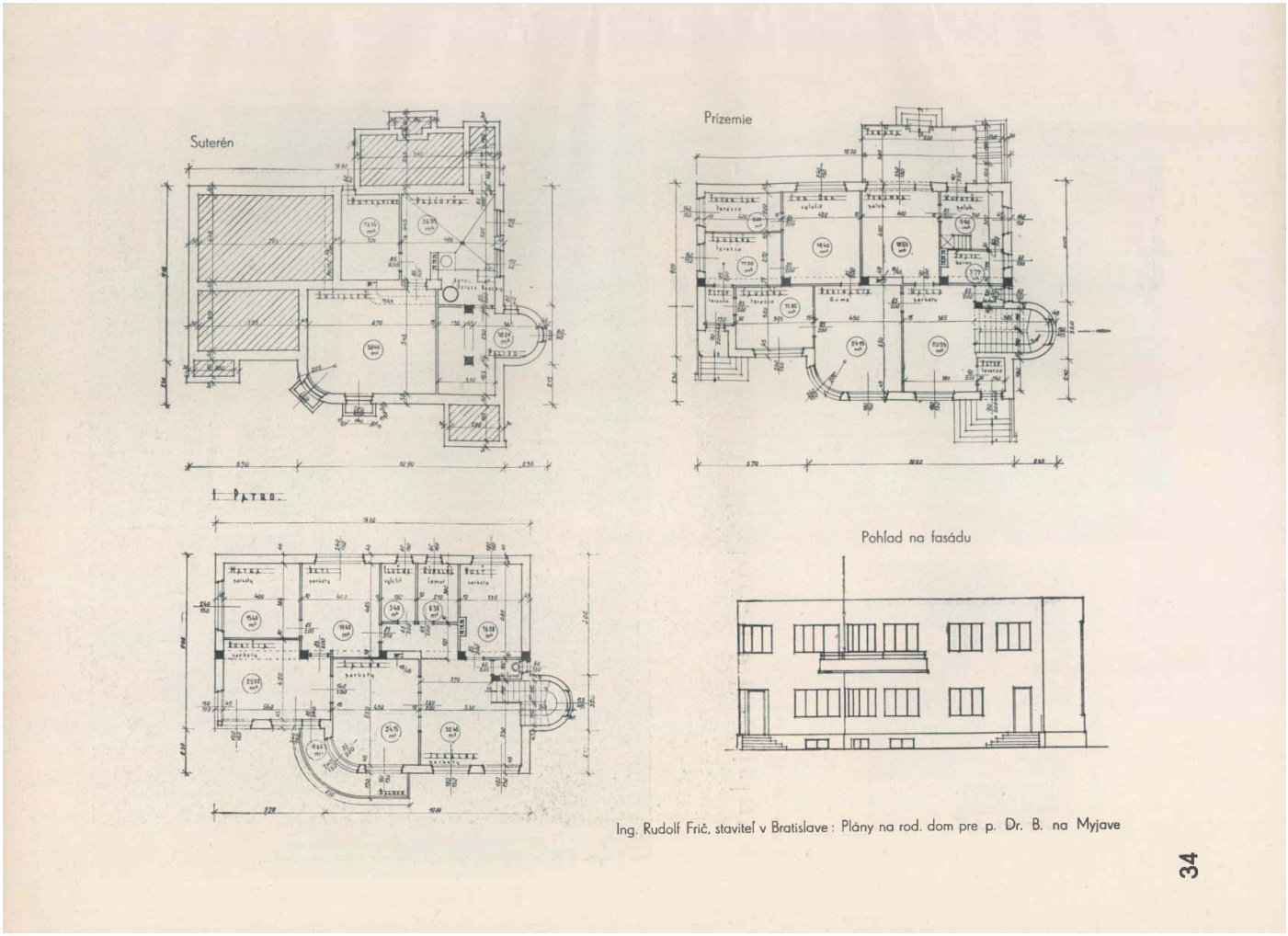

Fig. 6. Rudolf Frič, Doctor's B house with surgery, Myjava, 1933. (Source: Anon, 1933c)

Fig. 7. Rudolf Frič, Tram shelter with kiosk of Kazimír Polák, Hviezdoslavovo Square, Bratislava, 1928. (Photo: Frič's personal possession, author's personal archive)

Moreover, it ordered to raise the volume of the kiosk to split the attic. (Bratislava City Archives, 1921) The interior of the kiosk was just for the staff, offering services through the window. Due to its urban position and transit point to the Bratislava – Vienna intercity tramline, the kiosk provided traffic and tourist information about both cities bilingually. The entire structure is made of reinforced concrete covered with artificial stone with high-quality details which was required by the municipality. (Bratislava City Archives, 1921) The fact that the Slovenský staviteľ (Slovak Builder) magazine published an article about the kiosk ten years later recognises its architectural value and it may be assumed that there was no such a structure even so much later.

In the Czechoslovak interwar context, an appropriate comparable contemporary selection of works is a series of tram shelters and waiting rooms by Oskar Pořízka (1897–1982) in Brno. (Vrabelová et al., 2016, p. 290) From 1924 until 1937, Pořízka worked as an architect in the Brno Municipality Building Office and was commissioned to design four shelters with adjoining facilities, such as public toilets, a kiosk, and a traffic office (1925–1932). The four shelters are characteristic of the purely presented structure and gentle curves, typical for Pořízka design. (Pelčák, Wahla, 2011) In materiality, they combine plastered concrete with artificial stone, ceramic tiles, glass blocks, and fillings, all resistant to exposed public use. (Anon, 1929) The curves are applied in circular or semicircular floorplan, similar to Frič design, or in cross section. Although considering the multiplicity, scale, and additional facilities involved, the Brno tram shelters substantiate that the specific typology was evolving more in the Czech than in the Slovak environment. Furthermore, while in Brno it was the municipality to commission and finance the design of the shelters, in Bratislava, both the developer Kazimír Polák and the builder Rudolf Frič were private entrepreneurs. Gas stations were a similar case; they embody the motorising and modernising process in cities.

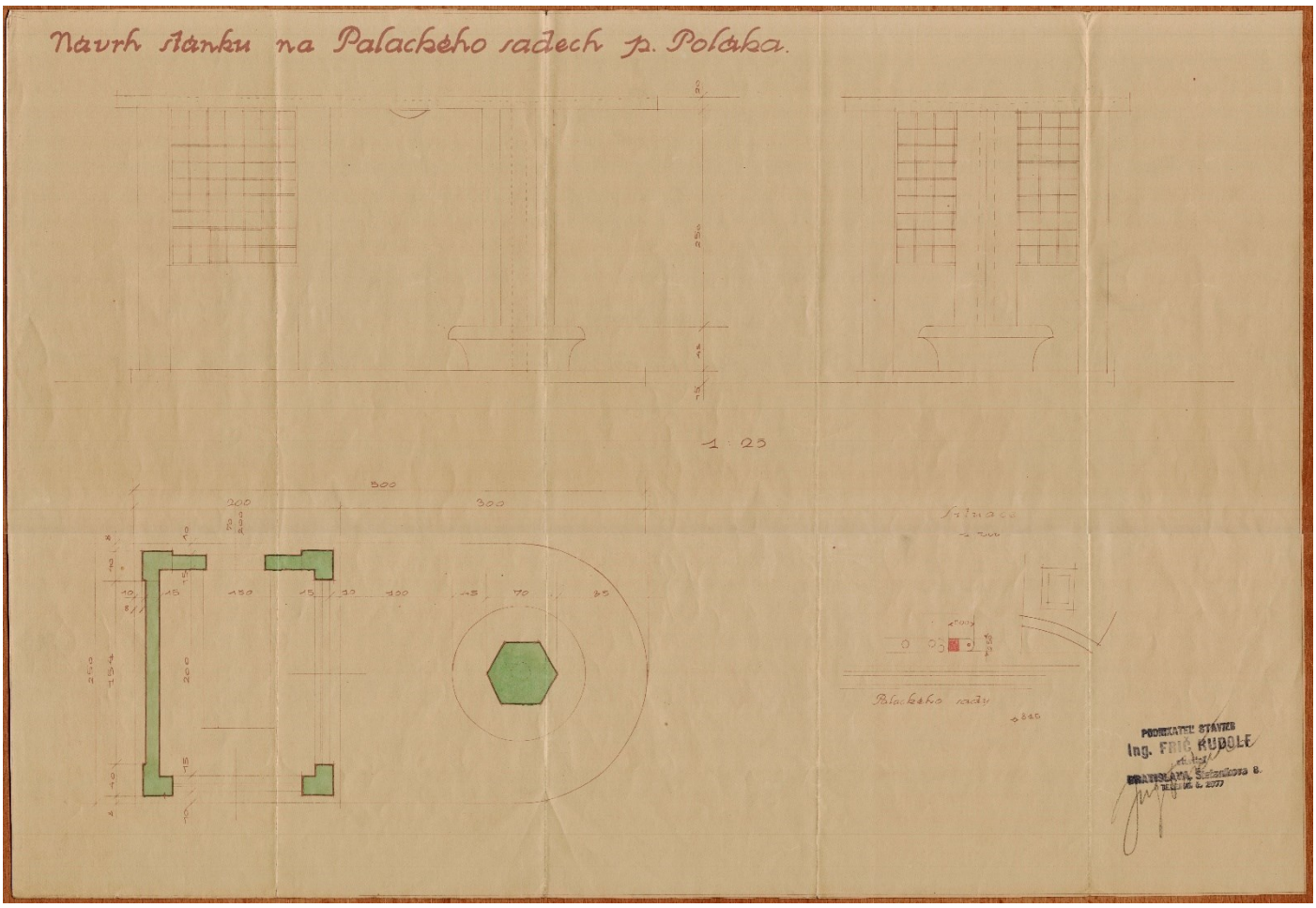

Fig. 8. Rudolf Frič, Tram shelter with kiosk of Kazimír Polák, Hviezdoslavovo Square, Bratislava, 1928. (Source: Bratislava City Archives, 1921)

Fig. 9. Oskar Poříska, Tram shelter, Obilní trh, Brno, 1926. (Photo: Archiweb, 2024)

The prevalence of larger-scale architecture, the exposed urban position and public use, and the architectural decay in this specific typology caused that, except for the one in Obilní trh (1926, renovated 2017 by Tomáš Rusín and Ivan Wahla from RAW studio), (Fig. 9) none of Frič's and Poříska's tram shelters have been preserved. However, the recognition of both designs in period magazines on architecture, 'Slovenský stavitel" and 'Stavba' (Construction), confirm their appreciable contribution to architectural discourse in that unique typology. Still, architecture of other means of transport, such as ferry wharfs (1930) by Emil Belluš (1899–1979) were of a wider and more adequate public and professional interest especially for their higher architectural value, acclaimed author, and appealing story, to which we may attribute their preservation. (Dulla, 2010, p. 86)

THE FIRST GAS STATION IN THE CITY

Despite growing urbanisation and motorisation of the city, till 1940s there was no gas station in Bratislava. Although there were gas pumping facilities, they missed one crucial architectural element, the roof. The first one to be built in Bratislava was the Zikmund Brothers' gas station on Račianska Street (1940), at that time located on the city periphery. It was designed by the Czech architect Jan Slavíček and built by Rudolf Frič who was assumed to be the author at the beginning of the research. Being the first gas station in the city automatically makes it unique and progressive. The design cooperated in establishing a new typology and its architectural forms and principles. The incline-kinked trapezoid roof fluently continuing to two bearing pillars dynamises the architectural composition and materialises the idea of a vibrant motorising city. (Fig. 10) Its steel structure of beams is on the other side supported by reinforced skeleton of the adjacent kiosk. (Fig. 11) The kiosk is shaped as a lowered perpendicular mass with semicircular glassed end. In the glassed space there is cash desk, in the back there is staff space. (Fig. 12)

A different concept with a perforated slab supported by four corner columns and a round kiosk built around one of them was applied by Slavík in a gas station built on Koutníkova Street in

Hradec Králové (1939), now Czech Republic. (Valchářová, 2012, pp. 36–37) In addition to Zikmund Brothers, there were other four largest oil companies in the interwar Czechoslovakia. Among them, the Fanto oil company was most aware of the importance of promotion through the high-quality architecture of gas stations. Therefore, its design was commissioned from the prominent Czech architect Josef Gočár (1880–1945). (Lukeš et al., 2010) The gas station on Klárova Street in Praha – Malá Strana (1930s) has a structurally comparable design to the one of the Zikmund Brothers in Bratislava. (Fig. 13) In comparison, there the roof is more prominently and smoothly curved, constructed as a console with no support. The kiosk, similarly semicircular at the ends, is arranged in parallel, not perpendicular to the road. In the 20 years of interwar Czechoslovakia, the gas station architectural designs established a new typology and its principles, reflecting the utility demands and representation of the then motorising and modernising cities.

Fig. 10. Jan Slavíček, The Zikmund Brothers' gas station, Račianska Street, Bratislava, 1940. (Source: Frič's personal possession, author's personal archive)

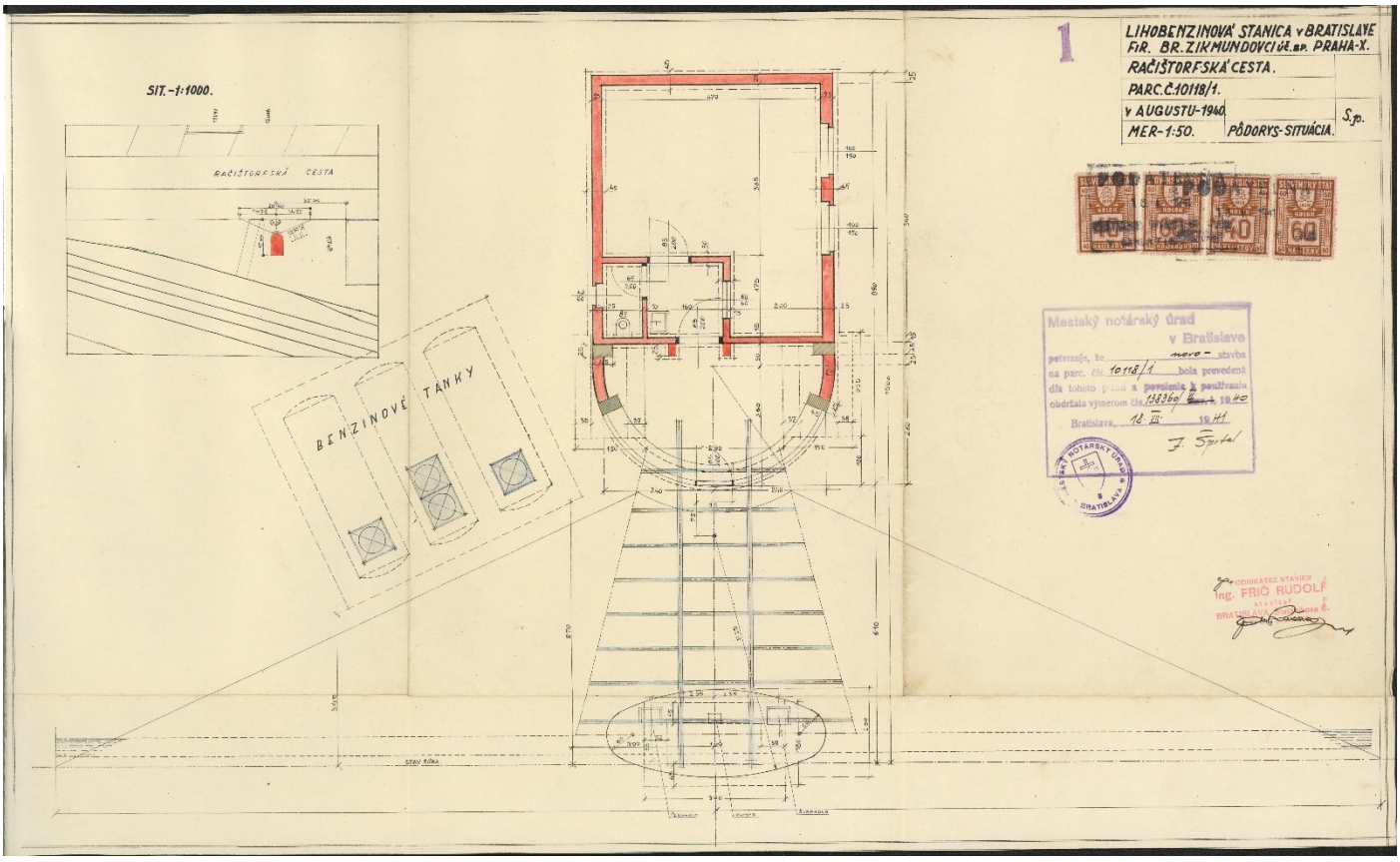

Fig. 11. Jan Slavíček, The Zikmund Brothers' gas station, Račianska Street, Bratislava, 1940. Ground floor and site plan. (Source: Bratislava City Archives, 1940)

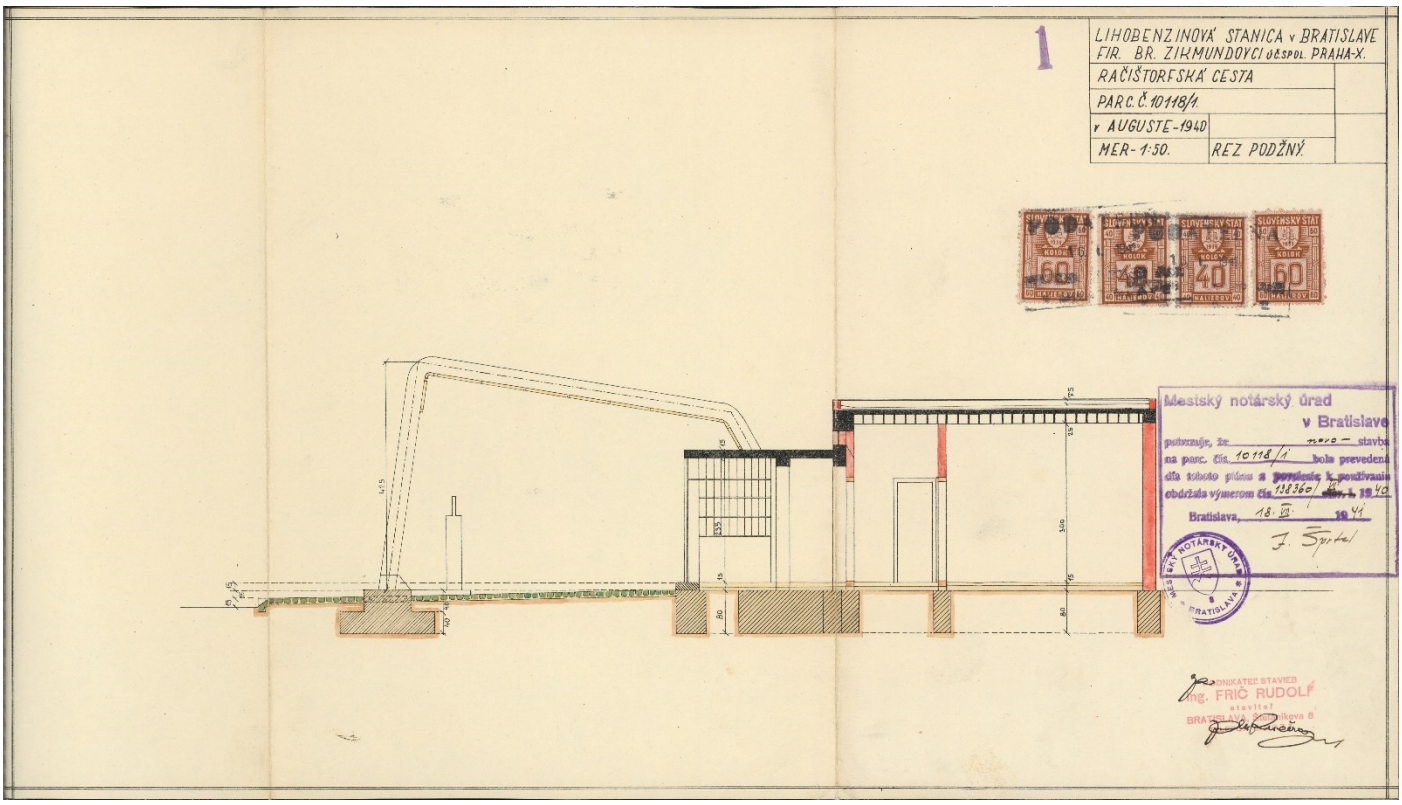

Fig. 12. Jan Slavíček, The Zikmund Brothers' gas station, Račianska Street, Bratislava, 1940. Cross section. (Source: Bratislava City Archives, 1940)

Fig. 13. Josef Gočár, Fanto gas station, Klárova Street, Praha – Malá Strana, 1930s. (Photo: Vyšehradskej jezdec, 2020)

THE SMALL SEPULCHRAL ARCHITECTURE IN DOBŘÍŠ NEAR PRAGUE

The only sepulchral architecture in Frič's portfolio is the family mausoleum in Dobříš (1937) near Prague (now Czech Republic), where the family moved in early 1890s. There Frič spent his childhood and, as a young man, left for studies in Prague. Since the 17th century, all generations of the Catholic family were teachers; unlike Frič. The mausoleum design is based on a square geometry and symbolism, significantly repeating the square arrangement. Square has traditionally been symbol of rationalism, stability, and order; in religion the symbol of divinity; and in design and architecture the symbol of equality. The square also represents the physical essence of a human being, and inserted in a circle it symbolizes the physical and mental complexity of the being.

However, Frič was also a freemason; therefore, the square might have been intentioned as a symbol of the growth, production, honesty and truth, as it is for the freemasonry. The square then represents a person who is in control of their thoughts, actions, and emotions, thriving complexly. The mausoleum is shaped as a simple cube of three metres in size, flat roofed, with a below-ground crypt and an above-ground chamber in the main volume. The façades are divided by a simple rhythm of vertical ribs made from artificial-stone and filling stripes of yellowish plaster stripes arranged in a square bond. (Fig. 14) The same pattern is repeated in the bronze cassettes of the entrance double wing door. (Fig. 15)

At the lateral axis, the spaces between the ribs are filled with stained glass in the same pattern. The rhythmically repeated square pattern unifies all four façades making the tomb's volume facing all the four world corners equally. The widened plinth rounded at corners is secondarily designed as a flower pot for ivy and white rose, symbolising the rebirth. The chamber floor is tiled with mosaic arranged in a square pattern in a traditional colour range of prevailing blue and white with black and yellow borders and crosses. The walls are plastered in white. At the sides of a simple wooden altar there are bronze urns, while the coffins are in the crypt below. Frič's profession as a builder is reflected in high-quality materials and craftsmanship details.

The mausoleum may be compared with the Nedelco and Klimko family mausoleum (1937) at Saint Rosalia Cemetery in Košice (now Slovakia), designed by Ľudovít Oeschläger (1896–1984), a renowned representative of regional modernism and functionalism. (Priatková, 2012, p. 16) Oeschläger received traditional architectural education from the Budapest Polytechnic, where the students were focused on structural design rather than innovative architectural forms, keeping the historicizing forms. (Priatková, 2012, p. 12) The knowledge of structural design and

the high-quality craftsmanship details then characterised Oeschläger's highly rated pre-functionalist and functionalist interwar architecture. *'He was typical for a deep sense of detail. He was among the architects who could design the modern building with a stamp of a truly completed building. Interwar modernism was economical and efficient, but it lacked the 'spice' that had been the detail throughout the history of architecture.'* (Šlachta, 1988, p. 41)

Fig. 14. Rudolf Frič, The Frič's family tomb, Dobříš near Prague, 1937. (Photo: Kiaček, 2024)

The emphasis on craftsmanship detail is typical for both Oeschläger's and Frič's work, including the sepulchral designs. In comparison to Frič, the Nedelco and Klimko family mausoleum has a less diluted functionalist aesthetic. (Priatková, 2012, p. 16) The simple concrete cube cladded with stone has the entrance façade inserted deeply into the volume with a three-step staircase to the façade width. (Fig. 16) It works as a modernised allusion to the ancient Greek in-antis temple. At the sides of the iron glazed double-wing door leading to the chamber there are black granite gravestones. The concept with a central axis and a dominant façade is the opposite of the Frič's design. In the Saint Rosalia cemetery, which is protected for its unique historicizing, secessionist, modernist and functionalist tombs, there is also a conservative cube-shaped Krčméry family mausoleum (1937) by Emil Gottesmann (1900–1944). (Kapišinská, 2015) On a smaller scale the concept of a cube volume based on square geometry and symbolism is applied to the architect Maximilián Scheer's (1902–2000) gravestone in the Nitra cemetery. (Dulla, Moravčíková, 2002, p. 475)

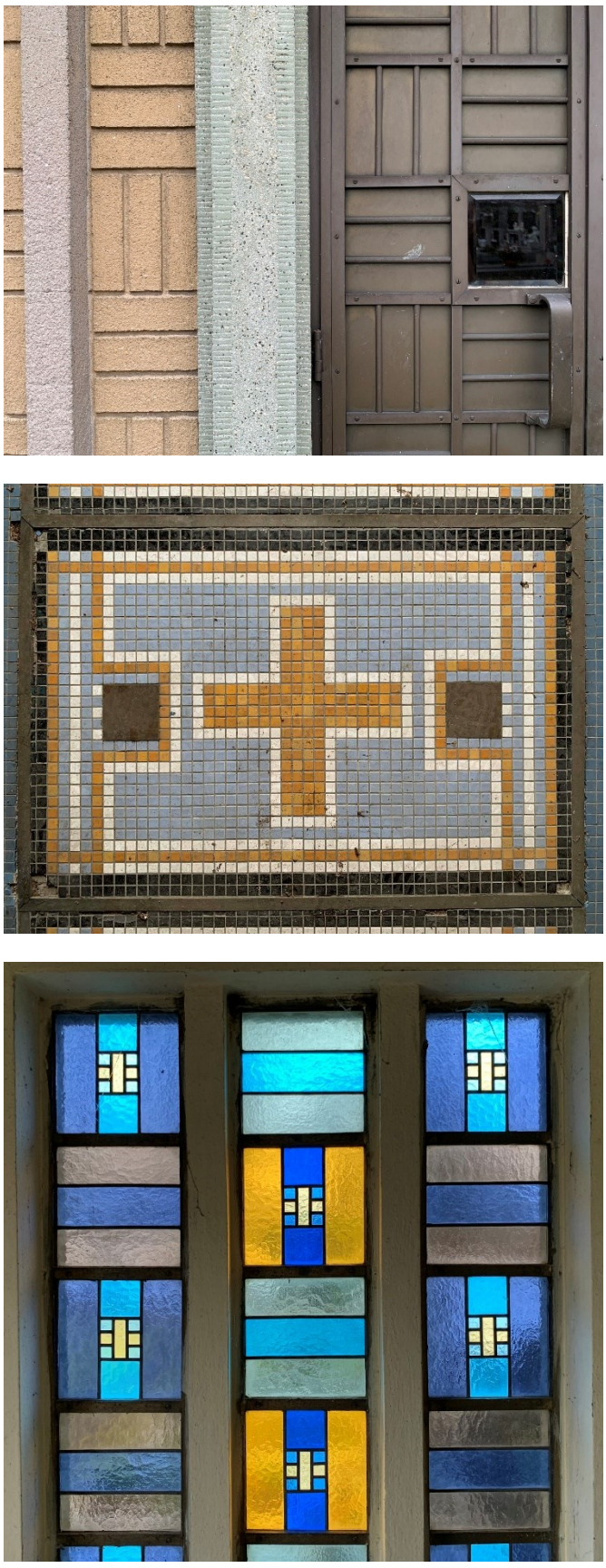

Fig. 15. Rudolf Frič, The Frič's family tomb, Dobříš near Prague, 1937. Details. (Photo: Kiaček, 2024)

Fig. 16. Ľudovít Oeschläger, the Nedelco and Klimko family mausoleum, Saint Rosalia Cemetery, Košice, 1937. (Photo: Luppa, 2018)

The last confrontation is with Adolf Loos's design proposal for a mausoleum of the Austrian Czech art historian Max Dvořák. The mausoleum has a simple chamber built in a cube volume made of blocks of Swedish black granite, with a ziggurat-shaped roof. (Fig. 17) The interior was to be decorated with frescoes by the expressionist artist Oskar Kokoschka. (Foster, 2004) Loos himself claimed that 'Only a very small part of architecture belongs to the realm of art: The tomb and the monument'. (Loos, 1910, p. 334) In the end, all the aforementioned tombs endorse the architectural and aesthetic value of even the smallest architectural work piece.

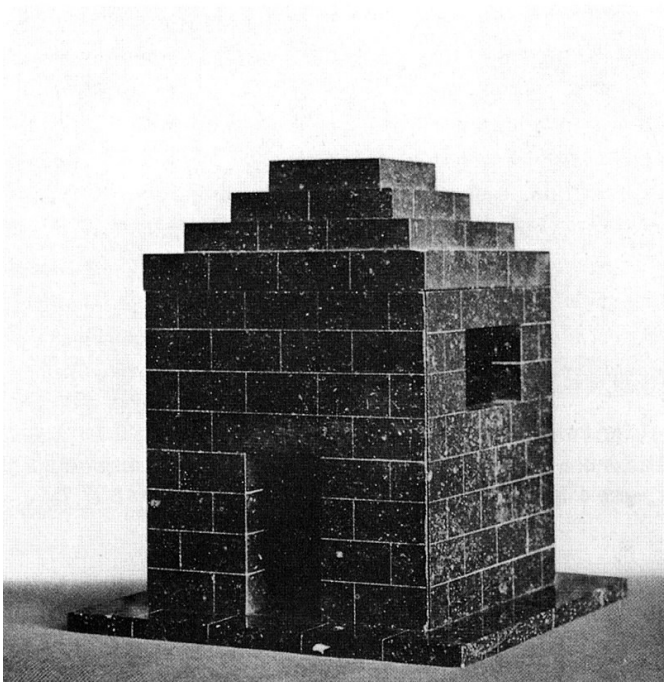

Fig. 17. Adolf Loos, Max Dvořák's mausoleum, unrealised design proposal, 1920s. (Source: EMAP, 2015)

CONCLUSION

In conclusion, the architectural value of small-scale typologies in the Czechoslovak interwar context, both in construction and form, has been identified and clarified. On the other hand, the scale and the ephemerality conditioned by the utility character are the crucial reasons behind their undervaluation. Especially in the case of traffic buildings such as gas stations and tram shelters, the same dynamic which initiated those architectures indeed resulted in their end, as they soon became obsolete, left in a dilapidated state, or demolished, these objects became lost to the collective urban memory. However, the aforementioned architectural works have proven that small-scale architecture and peripheral typologies have the architectural qualities for which they deserve both public and professional interest. Moreover, they reflect an inherent variety, being situated in very different urban contexts: from an architecturally and historically completed city centre through a newly urbanised dwelling area, an urban periphery up to a provincial town. Additionally, they illustrate the asymmetric position of the Slovak situation compared to the Czech one, particularly in transport architecture.

The detached houses built in urbanised cities, such as Rybáček's house in Bratislava, differed from those built in provincial towns, such as Valášek's house in Myjava, which was reflected in their variances in design ingenuity, typological features, and urban position. Being the only one to be mentioned and evaluated in architectural historiography, Rybáček's house surpasses the other designs by Frič. Its positively evaluated architectural form proves Frič's ingenious adoption of puristic aesthetic while its pioneer position in the then urbanising city periphery makes it urbanistically valuable. The period publication of the design proposal for Doctor B's house declares its position in the period discourse, but in confrontation with Jan Gillar's terraced house for doctor Polony it shows that it was not a rare hybrid typology. Furthermore, the comparison indicates that Frič was more conservative in architectural design compared to Gillar.

However, considering the more extravagant design of Rybáček's house, it may be concluded that Frič did adapt to the concrete environments; or that he did not create a recognizable specific style that would characterise his work. In the typology of traffic shelters, considering the multiplicity, scale, and additional facilities involved, the comparison of the Frič's shelter in Bratislava and the Brno tram shelters by Pořízka substantiates that the specific typology was evolving more in the Czech than in the Slovak environment. Nevertheless, both adopted dynamising curves reflecting their function. Gas stations that embody the motorising and modernising process in cities, followed a similar path.

The Zikmund Brothers' gas station, as the first in Bratislava, was unique and progressive. Thus a new typology and its architectural forms and principles were established in the Slovak context, based on dynamics determined by steel curved structures. The transport architectures in general accompanied urban modernisations based on higher mobility. Finally, the Frič family tomb represents a fading ancient typology, built in a conservative and symbolical design. More than the previous workpieces, it characterises Frič's specific style based on high-quality craftsmanship details rather than explicit architectural forms. Except the tomb, all aforementioned workpieces contrasted in form with the environment and determined the change of its peripheral image.

Finally, a contribution of Rudolf Frič to the small-scale typologies in the context of the Czechoslovak interwar architecture has been identified and discussed. It has also been proved that although the Slovak historiography exclusively presented him as a builder of civil engineering structures, his portfolio was more complex and architecturally valuable. In addition, the disparate architectural qualities of Frič's aforementioned works prove his unstable even absent architectural style or signature, which may indicate that the projects were not designed by him personally, but in his company's name. This finally shows that Frič was a

fervent construction entrepreneur whose contribution to architecture was organisational rather than direct architectural.

This conclusion is supported by his early career in the Bank of Czechoslovak legions where he directly initiated construction and development activities of the bank, by the complex technical, designing, and construction services of his later independent company, his own developing businesses, the memberships in construction associations and in the regulation committee of the City of Bratislava, and last but not least the direct initiation of the first Slovak revue on architecture and construction. The paper rediscovers and declares Frič's significant contribution to architecture as a highly productive, organised, and complex creator. It has been proved nevertheless that his architectural and construction portfolio is hard to be unequivocally characterised and valuated.

Acknowledgements

This paper was published within Project VEGA no. 1/0286/21 "Innovations in architecture of the 20th century in Slovakia" at the Faculty of Architecture and Design STU and at the Institute of History of the Slovak Academy of Sciences (Bratislava, Slovakia). Great acknowledgement to the Bratislava City Archives for providing scans of the original projects.

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ISSN 2729-7640

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ALFA ARCHITECTURE PAPERS
OF THE FACULTY OF ARCHITECTURE AND DESIGN STU
www.alfa.stuba.sk

1/2024 (Vol. 29)
DOI: 10.2478/alfa-2024-0005

Temporary forms of performative space: Impact of temporary architecture on audience diversification

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Article information
Sent: Jan 30, 2024
Accepted: Mar 12, 2024

Abstract: The term *temporary forms of performative space* was coined out of the need to define the group of objects under study that use temporality and the architectural input into a non-theatrical space, and serve as boundaries for performative content. One such space was designed and built in the previous part of the research. By analysing the space during its functioning, supported by examples from abroad, we offer an example of one of the possible solutions to the problem of theatre attendance. In the conducted study, we aim to support by a practical experiment the premise that temporary architectural forms intended for performance art can diversify and broaden the audience, thus making the theatre more inclusive. The method at hand involves the analysis of two performances. In the Jera show, we analyse the impact of an object located in a public space on the composition of the audience. The object adopts characteristics taken from examples from abroad. The Elektra performance serves as a reference example, where the object is present but not necessary for the relevance of the data obtained. The gathering of information – monitoring the influence of the architectural form on the composition of the audience – takes the form of questionnaires distributed before the performance. The individual questionnaires were processed into a spreadsheet from which research questions with follow-up responses were abstracted. Due to the insufficient number of comparable performances delivered, we can currently confirm the premise of the functioning of the temporary architecture as an attractor of the wider theatre audience only on the basis of the number of spectators who learned about the performance from the QR code, posted in a public space a week before the performance together with the installation of the object itself. This group of visitors surpassed 17%, which we consider a positive result that encourages us to create more testing events in various environments.

Keywords: architecture, performance, space, temporary, statistics

INTRODUCTION

Before exploring the topic, it is necessary to clarify the basic terminology used. In the *book Occupying spaces: experimental theatre in central Europe: 1950-2010*, Tatjana Lazorčáková presents two poles of the spaces in which theatre takes place – i. the so-called *theatre architecture*, which includes stone theatres with a traditional stage and auditorium layout, and auditoriums with theatrical equipment, and ii. *non-theatrical spaces*, which include spaces not originally intended for theatre: bars, restaurants, streets, abandoned industrial halls, squares... The author speaks of *"...a disturbance of conventional theatrical attributes, a rejection of the aesthetics of dominant production and instead, leaning toward theatre as a meeting, as dialogue, as a co-experience, as co-existence."* (Lazorčáková, 2010)

Attention is paid to the second group of non-theatre spaces mentioned above. The temporary architectural input into these space leads to the origin of the category under research – the term *temporary forms of performative space*. In this part of the research, the architectural input – the *form* – represents an object designed and realized by us. By implementing the object in two different types of non-theatre spaces, we create our own *per-formative space*. In addition to the object created for the needs of the research, we also mention examples from domestic and foreign environments that complete the idea of similar types of projects. The fundamental question becomes how such interventions affect the show attendance; we focus on documenting the visitor profile, the ratio of viewers, ranging from new, casual viewers to viewers who regularly seek theatre as a type of culture. We investigate the direct impact of temporary architecture on theatre attendance and audience diversification.

THEATRE IN NON-THEATRICAL SPACE

As Maja Hriešnik points out, the current trend of retreating from existing theatre buildings has already characterised several periods in the second half of the 20th century of the Czechoslovak history, when artists sought more hidden, often slightly unsuitable conditions or environments for their work, in order to express their ideas with greater freedom. (Hriešnik, 2010) The non-theatre interior spaces used for theatrical performances are represented, for example, by *Bytové Divadlo Vlasty Chramostovej (Vlasta Chramostová's flat theatre)* in the 1970s, or a more contemporary example from the early 1990s, the *Divadlo Stoka (Stoka Theatre)*.

At the turn of the millennium, the motivation to leave traditional theatre spaces changed. Among other things, there was a need to find new means of artistic expression, as well as new audience to replace the old one that had lost interest in theatre. Nowadays, artists also seek spaces or buildings that initially seem unsuitable and unusable. Often these are industrial buildings, various factories, buildings of transport or energy infrastructure that are no longer used. Some of these spaces are architecturally transformed – adapted, others are used only temporarily, without permanent interventions.

The term non-theatre space also entails outdoor spaces. Squares, streets, parks, together with interior non-theatre spaces, began to be used as early as the 1960s. (Lazorčáková, 2010) Urban interventions, such as various happenings or street theatre, bring spontaneity to the urban experience. These ephemeral events challenge the conventional use of space and encourage citizens to redefine their relationship to the city. Audiences, which are often transient and diverse, reflect the demographic diversity of urban life, promoting inclusivity and accessibility in the arts. The theory mentioned above is confirmed by several realisations. Out of these, we select two examples of temporary performative spaces from abroad, which used a distinct architectural form, temporary occupation of public space and less traditional production, to expand their audience base.

Bouda III, the summer stage of the National Theatre in Prague, Czech Republic designed by architect Luboš Svoboda, was operated during the year 2006, for almost four weeks. The shape of the building reflected the internal function minimized to the stage and auditorium. At the same time, the architectonized form of the initials ND was an unmissable part of the space of the National Theatre piazza. By expanding the productions to include experimental projects or projects by young creators, but also by its distinctive form and the media attention that resulted from the uniqueness of this project, Bouda III had the opportunity to reach a wider audience. (Krausová, 2006)

Using The Shed, by Haworth Tompkins, as an example, we demonstrate a scenario where a temporary object functions as an extension of the stone theatre, an additional auditorium, during the refurbishment of the London National Theatre. Its original planned duration for one year was extended and, The Shed remained in use for four years. The bright red, almost sculptural form, without windows or doors, formed a contrast to the concrete volume of the National Theatre. As the previous project, not only did it substitute for the space of the reconstructed auditorium, but it also offered an extended production of experimental performances, not suited for the National Theatre building. In the words of the studio, from the opening show in 2013 to the dismantling of the building in 2017, The Shed attracted a more diverse audience to the National Theatre and helped to bring energy to the whole surrounding area. (Haworth Tompkins, 2013)

Inspired by these projects, we abstract their characteristic features. Distinctive form, installation in public space and unconventional production are the characteristics that we intentionally use at, for us, realizable smaller scale. Similarly, to the analysed examples from abroad, our object's aim is primarily making theatre accessible to a wider audience. By abandoning the traditional position of theatre as a cultural institution, these projects become more inclusive, more accessible. Inclusivity and accessibility in theatre are highly demanded today, as evidenced by The Dresden Declaration, a document highlighting the key challenges, which the theatre sector is facing. It cites diversity, inclusion, and access as one of these challenges. Theatre and performing arts should aim to represent the whole society and strive to be accessible to all citizens regardless of their social or geographical origin, age, race, gender, religion, physical ability, or other factors. (ETF, 2020)

MATERIALS, DATA AND METHODS

In the previous phase of the research – research by design – we created an object, currently serving as a test space, filled with performative content, and gradually embedded it in various types of spaces. Two performances were delivered in the space it offers so far. Jera, a dance performance taking place at the square (outdoors), and Elektra, which took place in the former boiler room of the Faculty of Architecture and Design, Slovak University of Technology in Bratislava, Slovakia, indoors. In the current phase, the selected research method is information gathering and statistical evaluation.

The observation of the impact of the architectural form on the composition of the audience is performed by means of questionnaires distributed before each performance. (Fig. 1) The design of the questionnaires and the method of marking the selected answers is the result of the search for the easiest format to choose the answer without using a pen. This need arose naturally because of the different types of environments in which questionnaires cannot be completed. We evaluated a tear-off questionnaire, in which the audience tears off the selected answer, as the most ideal method of completion.

Fig. 1. Tear-off questionnaires. (Author: Kristína Boháčová, 2023)

The paper questionnaires were administered by the main author, meeting the respondents to whom the questionnaire was distributed. The return rate was 93%, out of a total of 45 questionnaires distributed, 42 were returned, of which one questionnaire could not be evaluated due to incorrect completion. A pilot testing of the questionnaire was performed simultaneously with the on-site survey. Owing to multiple performances where the identified deficiencies in the questionnaires will be corrected, we did not have the need for a separate pilot testing. The questions examined belonged to the category of factual questions, which respondents answer mostly accurately, (Gavora et al., 2010) and therefore we assess the responses as valid and highly reliable.

The questions asked were inspired by various sources dealing with statistics in the field of theatre. The primary sources of inspiration include the book *Slovenské divadlo v číslach* by Martina Čierna and 2018 output of the *Národné osvetové centrum* entitled *Vzťah slovenskej populácie k divadlu*. (Čierna, 2017; Národné osvetové centrum, 2020). The questions were grouped into i. factual and ii. opinion questions. The factual questions comprised age, education, source of information about the per-

formance, relationship with the organisers of the performance, and theatre attendance frequency. The opinion questions investigated the motivation to attend a particular event, preference of a particular theatre type and what discourages theatre goers from attending theatre events more often. In this part of the research, we focused on questions related to the audience's relationship with the event organisers and the source where the attendees heard about the event. The individual questionnaires were processed into a spreadsheet from which the researched questions with follow-up responses were abstracted. The generated sub-graphs are shown in the results.

EXPERIMENT

By performing an experiment, we aim to confirm that temporary architecture forms intended for performative art can diversify and expand the audience, and thus make theatre more inclusive. The method we have chosen involves the analysis of two performances. In the Jera show, we analyse the impact of an object situated in a public space on the composition of visitors. The object takes on characteristics adopted from examples from abroad. The Elektra performance is used as a reference example, where the object is present, but it is not necessary for the relevance of the data obtained.

Fig. 2. Elektra (is not coming). (Photo: Barbora Podola, 2023)

Elektra (is not coming) was a project developed under the interdisciplinary civic association *Objektorárium*, which brings together young professionals from the field of art and architecture. The production was hosted in the Ad: creative centre, located in the former boiler room at the Faculty of Architecture and Design, Slovak University of Technology in Bratislava, Slovakia. The original text by director Matej Trnovec and playwrights Veronika Briestenská and Martina Havierová, Elektra (is not coming), was based on the motives of Euripides' Elektra and other ancient myths. In the production Elektra (is not coming) the object is part of the stage, the play takes place inside and also outside the object, the audience sits in an improvised auditorium. Since the performance takes place in the interior, the object was not intended to function as an attractor. The role of this performance in relation to the research is primarily comparative. We do analyse the data obtained from the questionnaires and use them as a control sample in relation to Jera.

Jera – a dance movement performance for one performer – was delivered at the end of October in an exterior environment on the Námestie slobody in Bratislava. The choreographer was Nela Rusková, a final-year student at the VŠMU, who was invited to join the – at that time emerging – interdisciplinary project *Objektorárium.*

Fig. 3. Jera. (Photo: Barbora Podola, 2023)

The theme of the performance was a Nordic ritual, which often works with circular movements, overall, with the motives of the circle and runes. The chosen concept was inspired by the very shape of the object in which the performance took place. The object also acted as an eye-catcher, as it was already installed in its location, along with a QR code referring to the performance, posted a week before the performance. We were inspired by the aforementioned *The Shed*, or *Bouda III*. In both shows, the objects appealed to potential visitors not only through traditional communication channels, but also by their distinctive form or by appearing in a space that was previously empty. The site for the performance was chosen strategically, on the pedestrian route connecting the main railway station with the city centre as an important transit route. The building provoked curiosity and the information reached people who are not regular theatregoers, which was already evident from the interviews with the audience before (after) the performance and was confirmed later by the answers collected in the questionnaires.

RESULTS

During both performances, audience data was gathered by way of questionnaires. The research questions reflected the need to identify where the audience heard about the performance, or what their motivation was to attend a particular performance. We also investigated the audience's relationship with the performance organisers in order to be able to separate those audience members whose motivation to come to the performance was personal (relationship with the organizing team or the cast). These data are confronted in the interior vs exterior relationship, in order to compare the number of casual (new) spectators that an object placed in the square was able to attract.

The Elektra sample had 20 viewers during the premiere and the rerun. The questionnaires collected during the opening night and the rerun differ from each other mainly in two categories, namely in relation to the organisers and the source of information about the performance. These two categories are closely connected, based on their mutual relationship with a specific viewer, we can learn whether the viewer is new (random), or a viewer who came to the show because of someone from the cast, or event organisers.

For the opening night, up to 95% of the audience had some relationship with the event organisers, and the same percentage of the audience had heard about the performance from friends. This is based on the very nature of the low-capacity premiere, to which audiences were mainly invited from family and friends. The audience changed during the rerun. The statistics show that 40% of the audience were not related to the event organisers. However, if we look at the data which shows the source of in-

formation about the performance, we can see that more than a third of this group learned about the performance directly from a friend. We consider a genuinely new visitor to be a spectator who is not in a relationship with the organisers and has received the information about the performance indirectly, i.e. through social media. Based on these criteria we conclude that only 25% of the audience are truly casual (new) spectators. Figure 4 shows the questions asked and the answers collected from individual viewers during the premiere and reruns of the performance Elektra.

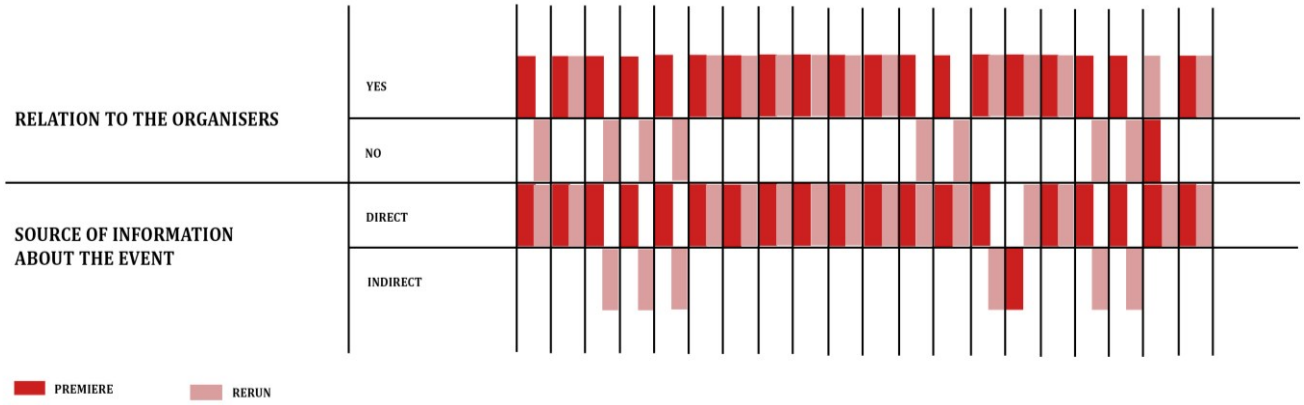

Fig. 4. Graph Elektra. (Author: Kristína Boháčová, 2024)

The questionnaires gathered during Jera are identical to the ones used for Elektra, with the addition of answers regarding the motivation to attend a particular event, as well as the source from which the audience learned about the event. However, we are still able, as with the previous chart, to divide the source of information about the performance into indirect and direct source – from an acquaintance. The indirect source includes responses from social networks, from the QR code, and also the 'any other form' option. When examining the question regarding motivation to attend a performance, in relation to the source of information about the performance, it was found that visitors who chose the answer 'any other from', walked past and stopped to see the performance. Their source of information about the performance was not anyone from the organiser team; therefore, we classify them as an indirect source.

The sample was composed of 41 respondents. The number of evaluated questionnaires was not corrected in any way; the aim was to collect as many questionnaires as possible. They were distributed to all the participants, of which 41 spectators handed in a correctly completed questionnaire. We found that more than a third of the spectators were not related to the theatre organisers in any way. The other two-thirds reported that they were acquainted with the organisers in some form. We are interested in the 'unrelated' group, where 78.58% of the visitors found out about the performance indirectly. Finally, only 26.83% of the original 34.15% of unrelated visitors are actually new (random) according to our criteria. We emphasize that to be classified as new, a visitor needs to be unrelated to the organisers and to have accessed information about the performance indirectly. Figure 5 shows selected questions and answers of individual viewers during the premiere of the performance Jera.

Comparing these two events, we can observe similar results indicating new (random) viewers, but we have to remember that in the case of Jera, the premiere distorts the sample and thus a comparison is not entirely possible. Despite this imbalance, we can assume, based on the previous data, that in the case of the Jera rerun, the data concerning the percentage of casual (new) viewers will be higher and will confirm the hypothesis. Currently a clear indication of the influence of architectural form on theatre attendance is the figure of visitors who learned about the performance from the QR code, embedded in the object during its one-week implementation in the square, which culminated into the performance. Such visitors surpassed 17% of all spectators.

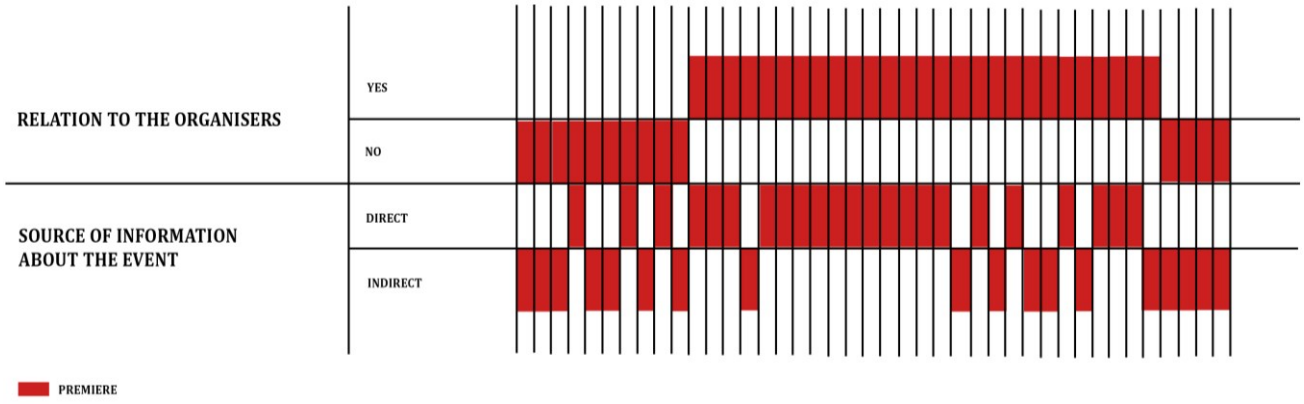

Fig. 5. Graph Jera. (Author: Kristína Boháčová, 2024)

DISCUSSION AND CONCLUSION

We considered comparing the results of the experiment with similar research from abroad, but so far, due to the originality of the research, we have not been able to find relevant data that could be compared. Perhaps the closest to the subject of the research is the attendance figure for the National Theatre in London, United Kingdom, which reported more than 45% increase of paying spectators during the 2012/2013 season, compared to data gathered four years earlier. (Healy, 2013) We could discuss whether this phenomenon was caused by the installation of The Shed back in 2013, and which brought a dramaturgy that appealed to a wider audience, or whether its installation was part of a new approach to the marketing of the National Theatre and contributes only minimally to the increase in attendance. If we accept that the increase in visitors is due to the installation of the object, we still cannot determine exactly whether they were attracted by the more varied dramaturgy, the object itself, or partly by both. Therefore, in the experimental phase, we asked the audience about their motivation to visit a specific performance and how they learned about the performance, so that similar speculations cannot occur.

For the clearest comparison of indoor and outdoor performances, it would be appropriate to rerun the Jera, as was done with Elektra. At this point, the results are insufficiently comparable, given that the premiere of Elektra consisted primarily of viewers directly invited, mostly family and friends. The opening night of Jera had a wider audience, which was ensured by the outdoor setting and the possibility to attend the performance based on a form of invitation other than by direct invitation from a member of the organiser team. Nevertheless, the nature of a premiere with many invited guests from among the family and friends is preserved. Consequently, comparing the two performances is disputable, which is indicative of the main limits of this study. The effort to combine the requirements for performances resulting from scientific work with the reality of organizing events in the field of independent culture does not always result in favour of scientific work. Therefore, some performances cannot be included in the study, which is not ideal in terms of their long-lasting preparations.

At the moment, we can confirm the hypothesis of the functioning of temporary forms of performative spaces as an attractor, based on the percentage of viewers who learned about the performance from a QR code. This group of visitors surpassed the rate of 17%. This is a positive outcome that encourages us to create more testing events in various environments. We are already able to confirm the installation of the object in the vicinity of the Chancellor's Office at the University of Performing Arts located in Bratislava old town (Slovakia) and rerun the Jera show. On this occasion, we will obtain additional data regarding the expansion of the audience base. The results not only encourage us to pursue further research, but we think they could also encourage theatre institutions to create their own temporary performance spaces and thus not only expand their theatre audiences, promote, and highlight the institution but also enrich the cultural scene in the city. We further think the experience could be transferable to other art forms – not only theatre, but also fine arts, literature, and philosophy – and could use the phenomenon of temporary architecture to approach people more closely.

Acknowledgements

The object was created thanks to the *Program na podporu mladých výskumníkov Slovenskej Technickej Univerzity* (Program to support young researchers of the Slovak Technical University) and the project *PUN: Podpora univerzálneho navrhovania* (Universal design support), project code 312041APA3. The project was implemented with the support of the European Social Fund and the European Regional Development Fund within the Human Resources Operational Programme. The productions were realized with the support of foundations *Nadácia Tatra banky, Nadácia Centra pre filantropiu* and *Nadácia Tipsport.*

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1/2024 (Vol. 29)

Summaries

SURVEY AND PRELIMINARY ASSESSMENT OF A BAROQUE VAULT FOR REFURBISHMENT PLANNING

Jan Bayer, Miloš Drdácký, Jan Válek

Keywords: baroque vault, non-destructive survey, mechanical response, load carrying capacity estimate

Care for the long-term sustainable preservation of a quality environment is increasingly arising interest in extending the functionality of existing buildings and their new use. Refurbishment and repurposing of buildings, together with maintenance, have accounted for almost fifty percent of construction production in the last twenty years in Europe. This trend is likely to grow, as it is estimated that by the middle of our millennium, eighty percent of the buildings occupied will be buildings standing today. Refurbishment has a number of advantages over new construction or demolition and rebuilding of structures. There are also potential disadvantages associated with refurbishment, which primarily represent requirements for design interventions that create a work structurally safe and robust. Here, the designer often encounters a lack of information about geometry, materials and construction details. It is therefore necessary to devote sufficient time and financial resources to comprehensive surveys using modern means of non-destructive or gently destructive testing which is very costly and time consuming. Hence, it is often useful to perform a preliminary cost-effective assessment of the feasibility of the intended project. This article presents a methodology and an example of such a preliminary survey and assessment of the mechanical response of a brick masonry Baroque vault of a former Jesuit College to the static load, initiated by an intention to change its use in selected areas and the indicative allowable load of the floor had to be estimated. The construction documents did not contain detailed data on the geometry of the vaults, there was no documentation of the thickness of the vaults or the height of the embankments and the dimensions and composition of the floor layers above the vaults. The material properties of the building materials used for the construction of vaults were also unknown. The analysis was preceded by local investigations, the aim of which was to survey the geometric shape and to non-destructively examine by using georadar the composition of inaccessible parts between the lower surface of the vaults and the upper surface of the ceiling. The geometry of the extrados and intrados of the vaulted ceiling is precisely determined by geodetic surveying. The internal composition is estimated according to the response of passing electromagnetic waves. The IDS type ground radar was used for the task and the slice software was used for evaluation. To visualize the reflections, the signal was linearly amplified with depth, an interval of displayed frequencies was selected and the distance between the antenna and the top was subtracted. To better visualize non-homogeneities and eliminate noises, the signal was "smoothed" by averaging over 3x3 boxes. From the course of hyperbolic reflections, the speed of signal propagation was retrospectively refined. Radargrams showed vault structures in all studied rooms. The density of the selected network allows them to be sufficiently described. In all rooms a concrete slab with reinforcement in both directions is probably

present. Material properties are estimated according to the experience of the authors with similar historical buildings and a literature search. The data obtained were used for the analysis. For the stress calculation in the vaults the radar estimated dimension of the vault thickness of 25 cm and the more likely dimension of 30 cm were used. In addition, radar-estimated thicknesses of embankments and floor layers were applied. For vaults, these have relatively complicated material properties with a rugged spatial geometry in which imperfections can have a significant impact on the stress distribution in the structure and the calculation should therefore ideally consider material and geometric nonlinearity. The demands on such a calculation are disproportionately high in comparison with the importance of the considered construction, for which reason the calculation using two simplified models was chosen. The first planar model considers a strip of barrel vault with a width of 1 m without taking into account the load from the transverse vault and is made according to the focused geometry taking into account geometric nonlinearity and excluding tension. The second model is a linear spatial model of the entire vault according to the geodetic survey. The calculation was performed with ANSYS 17.2 using SHELL181 and MASS21 finite elements. The spatial model considers the vault as a shell, transmitting even bending stresses, which were calculated in large areas of the vault. These stresses are considerable even when unloaded, and the model does not adequately reflect the actual behaviour of the vault, because there are no defects in it today. It is therefore very conservative. The calculated stresses in the vault from the effect of the considered live load of 5 kN/m2 represented an increase in stress of approximately 25% compared to the stress from the dead load of the vaulted ceiling structure. The presented analysis does not replace a static calculation of vaults and must be understood as a highly qualified expert estimate of the behaviour of the structure on the acting and considered loads. Nevertheless, it helped to decide on the feasibility of the intention to adapt the building for a new use.

NEW MOORISH ARCHITECTURAL IDENTITY IN TLEMCEN, ALGERIA

Fatima Mazouz, Manar Triqui

Keywords: Moorish-style, revival, authenticity, identity, contemporaneity

In Algeria, the city of Tlemcen is home to 60% of the country's Arab-Islamic architectural heritage. This heritage is also known as Moorish. During the French colonization, the rich Moorish historical and architectural heritage was largely erased and destroyed. The architecture of Tlemcen's historic old town was gradually replaced by classical architecture in the early days of colonization, and then by modern architecture from 1940 onwards. After 1962, the year of the country's independence, the city was faced with a succession of emergencies and has carried out huge programs of building facilities and new housing, based on the principles of modern architecture. In 2011, Tlemcen was designated a Capital of Islamic Culture and, in preparation for this international cultural event, new cultural facilities and hotels have been built, inspired by Moorish heritage. Given the heterogeneity of references and in particular the identity crisis ensuing in architecture in Tlemcen, the international Islamic cultural event was the key moment for validating a stylistic choice, which directly recounts the history of the city. The question is: what authenticity is expressed by the current use of the Moorish referent? Is it technical and material authenticity, or merely symbolic and cultural genuineness? This article looks at the question of identity in architecture. It analyses the new Moorish-style buildings in Tlemcen and highlights their contribution to the quest for a local identity and the ambition to produce local architecture. This article supports the hypothesis that architecture is an effective means of expressing identity, and that it has always had, and continues to have, a close relationship with memory. The methodology adopted for this study is based on a combination of several investigative tools: surveys, photographs and archive consultation. These tools helped develop a building analysis grid, which serves as a repertory for describing the buildings, according to two levels of reading of the architectural work: firstly, the basic principles of Moorish architecture which are geometry, light, architectural elements, unity on the inside versus expressiveness on the outside and, finally, introversion. Secondly, the decorative elements of Moorish architecture which are the building materials, the use of colour, the calligraphy, and the plant and arabesque elements. For our study, we have chosen three Moorish buildings (The Great mosque of Tlemcen, Sidi Belhacen

mosque and Sidi Boumediene mosque) and four contemporary buildings (the Andalusian Studies Center, the Abdelkrim Dali Palace of Culture, the Mohamed Dib regional library and the Marriott hotel), to which the different criteria of the analysis grid are applied. The results of the analysis of the new buildings inspired by the Moorish style show that there are both similarities and differences observed between the design of contemporary buildings and the Moorish architecture. The decorative registers used on the exterior of the buildings are sober and faithful to Moorish tradition. All the decorative richness was introduced inside the buildings. Nevertheless, calligraphic inscriptions are virtually absent in the Mohamed Dib library, and new materials and construction techniques have been used in their architectural expressions. The architecture of three of the four buildings studied is extraverted, which goes against the logic of the introverted Moorish buildings of old Tlemcen. What is more, the three contemporary cultural buildings are public facilities for study, reading and meeting. These functions require a high level of visual comfort: hence the need for a high level of illumination, enhanced from the presence of large glazed openings. The buildings maintain a high level of brightness in keeping with their functions. The results of analysing the new Moorish style-inspired buildings show that, in a way, they have enabled to establish continuity and dialogue with the Moorish heritage, and above all to forge an orientation for architectural practice in Tlemcen, until then variable and very open to all kinds of foreign influences. Through these contemporary buildings, the architects have adopted an architectural style that rehabilitates the Moorish tradition. The architects have expressed their desire to break with colonial and post-independence traditions, which reproduced imported occidental models, and to reclaim a prestigious past dislocated by the colonial enterprise. Tlemcen must be able to fully embrace its new Moorish architectural identity. To achieve this, a number of measures need to be taken. Among other things, a corpus of Moorish architecture needs to be drawn up, identifying all the reference elements to be used. This corpus will serve as a dictionary of local architecture. It will have to be integrated into architects' training programs. To answer the initial question, we believe that the authenticity expressed by the current use of the Moorish referent in contemporary buildings in Tlemcen is not a technical and material authenticity –the use of new construction techniques and materials–, but only a symbolic and cultural one. These contemporary creations are a rewriting of Tlemcen's prosperous Moorish past. Their architectural identity has been drawn from Moorish heritage.

APPRAISAL OF THE HISTORICAL IMPACT OF NEGLECTED, MODERNISED SMALL-SCALE ARCHITECTURAL OBJECTS BY RUDOLF FRIČ

Matúš Kiaček

Keywords: Frič, interwar Czechoslovakia, gas station, tram shelter, tomb, mausoleum, small-scale architecture

The paper observes the small-scale architecture of the Bratislava builder Rudolf Frič (1887–1975) in the context of the Czechoslovak interwar architecture. It also shows that his portfolio is more complex than the Slovak historiography presents. The problem of small-scale architecture is its undervaluation due to size, utility, multiplicity, or related momentariness, and automatic consideration of its banality. Therefore, the architectural value of the Frič's small designs, tram shelters, gas stations, mausoleums, and small detached houses, is being examined in confrontation with the work of other architects of the same typology and approximate architectural and structural characteristics within the Czechoslovak interwar context. On the other hand, we notice that it is the scale and ephemerality conditioned by the utility character, which are the crucial reasons behind their undervaluation. This is especially crucial in transport architecture, whose origin and demise were both conditioned by a dynamic process. The asymmetric position of the Slovak situation compared to the Czech is observed, particularly in transport architecture. The presented works characterise Frič's style based on high-quality craftsmanship details rather than explicit architectural forms. Finally, we examine in what Frič's crucial contribution to architecture lies, as he was a more complex entrepreneur.

Frič designed several detached houses of different scale and in various urban situations. Among them is the house of the civil engineer Rybáček on Kubániho Street in

Bratislava (1933–1934), now Slovakia. The structure of a narrow winter garden with a plain wall behind is based on the Trombe wall concept, rare in the then Czechoslovak architecture. The house represents a modern concept of a smaller urban villa that is introvert to the street and opened to the garden. It differs from Frič's house designs for small towns such as Myjava, where he designed the evangelic priest Valášek's detached house, called 'The house of Sun' (1933). Although compared to the Rybáček's vila in Bratislava, the architectural composition was limited to a trivial addition of prisms, it was a rare example of purist architecture in the town. Frič subsequently published a design proposal for an anonymised Doctor B's detached house with a surgery (1933). Despite its attractive design and ingenious layout, it was not a rare hybrid typology, as it was applied in Jan Gillar's (1904–1967) design for Doctor Polony (1937–1938).

In the context of motorisation and modernisation processes in interwar cities, new public traffic shelters were being built. Frič built one in Hviezdoslavovo Square in Bratislava (1928), in front of the monumental representative architecture of the Carlton Savoy hotel, rebuilt by Michal Milan Harminc. In such a contrary position, the kiosk was architecturally banal but infrastructurally crucial. The architectural form based on vertical volumes combined with horizontal lines, and rectangular, circular, and polygonal geometry, together with its position were criticised at first. In the research, it is confronted with a series of tram shelters and waiting rooms by Oskar Poříska (1897–1982) in Brno (1925–1932), now Czech Republic. Considering the multiplicity, scale, and additional facilities involved, the Brno tram shelters substantiate that the specific typology was evolving more intensively in the Czech than in the Slovak environment. The recognition of both designs in period magazines on architecture, 'Slovenský stavitel" and 'Stavba', confirms their appreciable contribution to architectural discourse in that unique typology.

The motorisation and modernisation processes in cities led to the construction of a new typology of gas stations. They would be embodied in dynamic architectural forms. Although in Czechia such architectures were being built since early 1930s, both in city centres and on peripheries, in Bratislava there was no gas station until 1940. The first was the Zikmund Brothers' gas station on Račianska Street (1940), located on what was the city periphery at that time. It was designed by the Czech architect Jan Slavíček and built by Rudolf Frič. Due to its structure and dynamic form, it is being compared to Gočár's designs.

The fourth and last typology to deal with is a mausoleum, or generally a tomb. As an ancient sepulchral architecture, it used to have traditional architectural forms. From this point of view, it may be considered the opposite of transport architecture, which was modern in cause and form. However, in the interwar Czechoslovakia this typology was fading away, and was scarcely used from the post-war time onwards. The paper studies the only example of sepulchral architecture in Frič's portfolio which is his family mausoleum in Dobříš (1937) near Prague, now Czech Republic. The mausoleum design is based on a square geometry and symbolism, significantly repeating the square arrangement. It is confronted with the Nedelco and Klimko family mausoleum (1937) at Saint Rosalia Cemetery in Košice (Slovakia), designed by Ľudovít Oeschläger (1896–1984). The Krčméry family mausoleum (1937) by Emil Gottesmann (1900–1944) also follows a conservative cube-shaped concept. The last confrontation is made with Adolf Loos's design proposal for the Austrian Czech art historian Max Dvořák's mausoleum.

TEMPORARY FORMS OF PERFORMATIVE SPACE: IMPACT OF TEMPORARY ARCHITECTURE ON AUDIENCE DIVERSIFICATION

Kristína Boháčová, Alexander Schleicher

Keywords: architecture, performance, space, temporary, statistics, event

We are publishing this paper as a partial output of a larger body of research. It serves to analyse the data collected during the implementation of the object, which was created during the research by design phase. Along with the theoretical background, a

part of the dissertation thesis is devoted to this issue. The fundamental question becomes how such interventions affect the show attendance; we focus on documenting the visitor profile, the ratio of viewers, ranging from new, casual viewers to viewers who regularly seek theatre as a type of culture. We investigate the direct impact of temporary architecture on theatre attendance and audience diversification.

In the introduction, we clarify the basic terminology used. In the book Occupying spaces: experimental theatre in central Europe: 1950-2010, Tatjana Lazorčáková presents two poles of the spaces in which theatre takes place: i. so-called theatre architecture, which includes stone theatres with a traditional stage and auditorium layout, and auditoriums with theatrical equipment, and ii. non-theatrical spaces, which include spaces not originally intended for theatre. Attention is paid to the second group of non-theatre spaces. The temporary architectural input into these spaces leads to the origin of the category under research – the term temporary forms of performative space. In this part of the research, the architectural input – the form – represents an object designed and realized by us. By implementing the object in two different types of non-theatre spaces, we create our own per-formative space. In addition to the object developed for the needs of the research, we also mention examples from domestic and foreign environments that complete the idea of similar types of projects.

Inspired by these projects, we abstract their characteristic features. Distinctive form, installation in public space and unconventional production are the characteristics that we intentionally use in our experiment. Similarly to the analysed examples from abroad, our object's aim is primarily making theatre accessible to a wider audience. In the experiment performed, we aim to confirm that temporary architecture forms intended for performative art can diversify, and expand the audience, and thus make the theatre more inclusive. The method we have chosen involves the analysis of two performances. In the Jera show, we analyse the impact of an object situated in a public space on the composition of visitors. The object takes on characteristics adopted from examples from abroad. The Elektra performance is used as a reference example, where the object is present, but it is not necessary for the relevance of the data obtained.

Elektra (is not coming) was a project developed under the interdisciplinary civic association Objektorárium, which brings together young professionals from the field of art and architecture. The production was hosted in the Ad: creative centre, located in the former boiler room at the Faculty of Architecture and Design, Slovak University of Technology, in Bratislava, Slovakia. The original text by director Matej Trnovec and playwrights Veronika Briestenská and Martina Havierová, Elektra (is not coming), was based on the motives of Euripides' Elektra and other ancient myths. In the Elektra (is not coming) production, the object is a part of the stage, the play is performed inside and outside the object, the audience is seated in an improvised auditorium. Since the performance is hosted indoors, the object was not intended to function as an attractor. The role of this performance in relation to the research is primarily comparative. We do analyse the data obtained from the questionnaires and use them as a control sample in relation to Jera.

Jera – a dance movement performance for one performer – was delivered at the end of October in an exterior environment on the Námestie slobody (Freedom Square) in Bratislava, Slovakia. The choreographer was Nela Rusková, a final-year student at the Academy of Performing Arts in Bratislava, Slovakia, who was invited to join the – at that time emerging – interdisciplinary project Objektorárium. The object acted as an eye-catcher, as it was already installed in its location, along with a QR code referring to the performance, posted a week before the performance. We were inspired by projects from abroad where the objects appealed to potential visitors not only through traditional communication channels, but also by their distinctive form or by appearing in a space that was previously empty. The building provoked curiosity and the information reached people who are not regular theatregoers, which was already evident from the interviews with the audience before (after) the performance and was confirmed later by the answers collected in the questionnaires.

During both performances, audience data was collected by way of questionnaires. The research questions reflected the need to identify how the audience learned about the show, or what their motivation was to attend a particular performance. We also inves-

tigated the audience's relationship with the performance organisers to be able to separate those audience members whose motivation to come to the performance was personal (relationship with the organiser team or the cast). These data are confronted in the interior vs exterior relationship, to compare the number of casual (new) spectators that an object placed in the square was able to attract.

ISSN 2729-7640

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ALFA ARCHITECTURE PAPERS
OF THE FACULTY OF ARCHITECTURE AND DESIGN STU
www.alfa.stuba.sk

1/2024 (Vol. 29)

ARCHITECTURE PAPERS
OF THE FACULTY OF ARCHITECTURE AND DESIGN STU

volume 29
year 2024
issue 1

PUBLISHED BY
Faculty of Architecture and Design STU
Námestie slobody 19, 812 45 Bratislava, Slovakia
www.fad.stuba.sk
tel.: +421 257 276 178
+421 949 015 316
e-mail: alfa@fa.stuba.sk
IČO: 00397687

and

Sciendo; De Gruyter Poland Sp. z o.o.
Ul. Bogumila Zuga 32A, 01-811 Warsaw, Poland
https://www.sciendo.com/
tel.: +48 227 015 015
KRS: 0000055478
NIP: PL 9521878738

March 2024

PUBLISHED ONLINE QUARTERLY
ISSN 2729-7640

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