

## FIRE OF ST. MARTIN'S CATHEDRAL TOWER IN BRATISLAVA IN 1833 AND ITS CONSEQUENCES

A probe into "the history of ordinary life" of the town of Prešporok/Pressburg

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**Keywords:** St Martin's Cathedral, tower, lightning, fire, renovation, lightning conductor

The study focuses on the great fire of the tower of St Martin's cathedral in Bratislava (formerly Pressburg, until 1919) caused by lightning on 12 June 1833 that completely destroyed the roof of the cathedral tower. In addition, the fire endangered not only other parts of the cathedral and buildings in its vicinity, but also the whole town of Pressburg. In the paper, we precisely follow the progress of the fire in detail and present new important facts found in unpublished archive materials.

Until 1833, the St Martin's Cathedral was adorned with a tall tower with a distinct roof covered with partly gilded copper sheet. At the top of the tower, there was a sizeable model of the so-called St. Stephen's crown, which was from 1765. The roof of the tower was constructed during a renovation of the cathedral's western facade and the tower in the 1760s based on the project of the chief architect of the Hungarian Royal Chamber, Franz Anton Hillebrandt.

The roof was destroyed by fire during the night from 12 to 13 June 1833. Several contemporary written testimonies about the fire offer the following information: lightning struck the tower on 12 June at around 10 p.m. and even though people at first thought that the tower was not damaged, after a few minutes they saw the flames that, at that stage, could no longer be extinguished. After the burning roof collapsed in front of the northern entrance to the cathedral on 13 June around 1 a.m., a huge fire emerged on the tower and people worried about its possible spreading. Fortunately, the fire was contained, and the big roof of the cathedral and the surrounding houses were saved. Furthermore, the walls of the tower, the tower clock and bells of the cathedral remained intact, which was considered to be a "true miracle".

In addition to the written testimonies, we have also one graphical representation of the fire at our disposal: the horrors of that night were captured by an unknown artist on a shooting target that is deposited in the collection of the Bratislava City Museum. The oil painting on wood is from 1834 and it depicts the moment of the collapse of the burning roof in front of the northern entrance to the cathedral.

The paper also covers some details of the fight against the fire and its context. Apart from the members of some guilds that in that period had the obligation to fight fires and protect our towns from possible spreading of fires, a huge role in the saving of the interior of the tower was played by the cathedral chaplain, Karol Scherz de Vaszója, later on known as a philanthropist. Bishop Alexej Jordánszky immediately after the fire donated 100 gulden of the so-called conventional currency for the restoration of the damaged roof.

The fact that the fire did not cause any major damage was an especially positive outcome for the whole town and that is why on 23 June 1833 a three-hour ceremony was served in thanks to God for the merciful diversion of the danger. During the celebration, priest János Hollósy, in an interesting homily, contemplated on the progress of the fire in the context of other Pressburg catastrophes.

A temporary roofing of the tower was built in the form of a rather low pyramid roof (works started after the fire and continued till the end of July and the beginning of August), which can be seen on several depictions of the cathedral and vedutas of Pressburg from the 1830s and 1840s.

From the perspective of "the history of ordinary life", the fate of the remains of the copper sheet from burnt roof is also interesting: immediately after the fire they were collected and officially weighed, and then auctioned in a public auction on 16 December 1833 – "the owner of a copper workshop Mr. Mayer" bought approximately 2,856.3 kilograms of non-gilded sheet and "a goldsmith Rapp from Győr" bought approximately 99.1 kilograms of gilded copper. Furthermore, the pieces of coal from burnt wood from the roof frame beams were bought by Vavrinec Libisch, a stringer of gold and silver wires and a member of the so-called extended town council.

People in charge of the cathedral certainly worried about another fire of the cathedral's tower and possible occurrence of a similar danger that could happen again, any time. That is probably the reason why multiple fire-fighting units were placed in the St Martin's Cathedral during the fire of Michalská Street in 1842. Installation of a lightning conductor on the top of the tower during the great renovation of the western facade and the tower in the 1840s was a very important step in a series of safety measures adopted in order to protect the cathedral against devastating effects of lightning. At that time, conductors were not a technological novelty anymore, but quite common equipment of important buildings, which is documented in several contemporary reports about installation and repairs of lightning conductors that were used in our region from the second half of the 18<sup>th</sup> century.

Based on our systematic research of unpublished materials from the Bratislava City Archive, we could uncover and explain the course of the fire of the tower of the Bratislava's cathedral in 1833 and other related information. The published facts offer evidence of precise administration of our ancestors and the importance of preserved memoir sources. Furthermore, they underline the great importance of archival written documents for interdisciplinary research of the history of architecture. In this respect, the primary contemporary materials constitute an irreplaceable source of relevant and complex information not just about the buildings themselves but also about the so-called personal background of their investors, planners, builders, craftsmen, artists and other people and any related events.

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## DESIGN OF A SUSTAINABLE HIGH-RISE BUILDING

HOHO / TWIN CITY TOWER

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**Keywords:** sustainability, innovation, high-rise building, building construction, cross laminated wood, wood construction, cross laminated timber, energy concept

Sustainability has become a trend for all areas of human life in recent years, so it is natural that this trend has been reflected in the

construction industry, where building construction standards have continuously been raised in order to correspond to the new requirements of sustainable development. Architects and construction companies constantly face new challenges concerning improvement of their building projects in order to satisfy the latest regulations and certifications. The more restrictions and regulations emerge in the field of buildings construction, the more challenges the professionals have to face, which pushes them to look for innovative ideas and techniques. The design of high-rise buildings is even more challenging and complicated in the context of construction methods in correlation with sustainability principles and taking into account the recent extreme weather fluctuations caused by global warming. Unlike the buildings of regular height, high-rises do not offer such a wide range of possible materials to be used in construction and are more limited to the standard monolithic reinforced concrete skeleton type of the load-bearing structure. It gives them less flexibility and limits the opportunities to achieve the necessary sustainability level. These kinds of challenges during the design process of a high-rise building require more creativity from the architects and stimulate research towards of innovations.

Therefore, the aim of this paper is to analyse and compare two newly constructed high-rises: Twin City Tower Bratislava and HoHo Vienna (Holz-Hochhaus – “Wooden High-rise” in German). Both of them comply with the latest building standards and share a range of common characteristics:

- climate zone (located 46 km away from each other),
- situated in dense urban environment in a capital city,
- urbanism is based on a concept of a sustainable city,
- the buildings are used for commercial purposes (multi-purpose),
- modern construction (Twin City Tower completed in 2018; HoHo completed in summer 2019),
- high-rises (Twin City Tower Bratislava: 23 floors, 89 meters high ; HoHo Vienna: 24 floors, 84 meters high ),
- floor area (Heated floor space 34,500 m<sup>2</sup> in Twin City Tower Bratislava; 25,000 m<sup>2</sup> in HoHo Vienna),

- both projects have received the green building certification (BREEAM Outstanding certificate for Twin City Tower Bratislava, which is also registered//has an application for WELL Core & Shell Certification; Gold Certificate by LEED for HoHo Vienna, Core & Shell Certification).

Despite many similar features, there are two major differences between the two structures, which are the use of materials and the construction methods. The structure of HoHo Vienna predominantly (about 75%) consists of local natural material – wood, while the Twin City Tower has a structure typical of high-rise buildings – a monolithic reinforced concrete skeleton with concrete ceiling slabs and a fully glazed facade. Twin City Tower uses proven building materials and procedures for its constructive solution, with the aim to improve and increase their useful life. In contrast, HoHo tower uses new experimental building solutions and combinations of materials. Nevertheless, both buildings comply with strict sustainability requirements as well as requirements for a healthy indoor environment. Therefore, the authors of this study compare these buildings, their constructional concepts, energy concepts and ecological solutions and analyse the differences and similarities, while keeping the focus on sustainability solutions.

*“Sustainable development is a term that everyone likes but no one is sure what it means.”*

#### PARAMETERS OF SUSTAINABILITY IN ARCHITECTURAL AND URBAN DESIGN

##### Need for monitoring of parameters of sustainability in studio works of students of architecture at FA STU in Bratislava

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**Keywords:** sustainability, parameters of sustainability, architectural design, urban design, studio works, student design

People these days are already fully aware of the need to move firmly on the path towards sustainability principles. Despite the fact that current scientific and technical progress already enables us to achieve sustainability in many areas, we tend to hesitate and still follow outdated principles. The field of architecture and urban design is not an exception in

this respect. Architecture and urban design are still often perceived as arts and crafts disciplines, slowly implementing scientific and technical knowledge. The change to this paradigm must be attempted early on, in the process of educating students - the emerging generation of architects.

Architectural and urban design studios are undoubtedly the most important courses at the Faculty of Architecture, and it is where students should be encouraged to observe not only visual and functional parameters but also the other parameters contributing to the sustainability of their designs. The study selected the most important parameters of sustainability that should be observed in the architectural and urban design projects of students, future professional architects. Following the logical order from a bigger whole to details, the sustainability parameters have been divided into urban and architectural. Urban design sustainability parameters focus on the whole design and in this respect take precedence over architectural parameters that concentrate on details. From this perspective, urban design parameters must be respected in both urban and architectural designs.

Urban design parameters of sustainability include:

location, connectivity, form of urban structure, density of build-up area, green infrastructure, presence of residents, functional structure, accessibility of basic amenities, environmental parameters and public space

Furthermore, the specific requirements for buildings and structures are expressed by the architectural parameters of sustainability:

aesthetics, functionality and adaptability, building life cycle, energy efficiency, use of renewable energy potential and selection of materials

Application of urban design and architectural parameters of sustainability was verified on a selected student design (VIZÁR, Martin. *Multi-purpose house*. Diploma thesis. Bratislava: Faculty of Architecture, STU in Bratislava, 2019.). The primary objective was not to assess the sustainability of the selected design itself, but to show the practical approach to the possible assessment of sustainability parameters in studio designs.

The analysis of the student design showed that the anticipated functional use of the area corresponds to the central location within the

city. The design relies on good connectivity of the area, although it does not attempt to improve it. The designed mass-spatial concept responds appropriately to the surrounding urban structure form and complements it with new, currently absent attributes. The density of build-up area in the design indicates a rather inefficient use of the land. However, the strengths of the design lie in the compositional consistency, human scale and emphasis on public space. The analysis of greenery confirmed the expected decrease in the share of greenery in favour of new buildings and structures, although, at the same time, it proved that by applying appropriate principles the student managed to maintain a high standard of ecological quality of greenery.

As regards population presence and functional structure, the design implies an increase in population density, with a slight decrease in the proportion of housing function. The increase in public amenities can be perceived positively; nevertheless, considering the possibilities offered by the location and connectivity, it could have been even higher. Good accessibility of basic public amenities creates conditions for efficient functioning of the site and justifies the planned increase in the number of residents. Even though the proposal builds on the already existing good accessibility of public amenities, it does not contribute to its further improvement. In contrast, environmental and public space parameters of sustainability are well taken into account and the design offers several positive ideas enriching the location also in a wider context. From architectural perspective, it can be stated that the student used traditional means of expression and achieved a cultivated and aesthetic, even if perhaps too conservative, expression. The positive aspects of the design are the concept of spatial adaptability, utilization of recycled and recyclable materials and use of solar energy both passively and actively and the collection and use of rainwater.

The retrospective assessment of the diploma thesis showed that the student quite comprehensively incorporated most of the selected parameters of sustainability. At the same time, however, certain shortcomings or potential areas for design improvement were identified that could have been covered at the creative stage of concept preparation. The aim

of this study was to summarize the key parameters of sustainability whose monitoring would allow for uncovering these potential areas of improvement at the analytical stage and for incorporating them into the final design. The monitoring of these parameters should also be reflected in the final evaluation of studio designs. Students' architectural and urban studio designs could be exposed to more constructive criticism, as it should motivate students to create more complex works of higher quality.

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## LIGHT AND LIGHTING FIXTURES

### Creative sources of interior design in the 21st century

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**Keywords:** light, lighting fixtures, light sources, artistic-compositional articulation of light, interior design, architectural design, environment

Light and lighting fixtures are an indispensable part of the architectural scene, interior environment of buildings not excepting. They are the basic prerequisite of generating all-around interactions of people with the world around them, a specific designer layer influencing both functional and aesthetical qualities of the interior. They co-create visual stories and images, both day and night time interpretations of space and objects. They can stimulate the mind and express ideas in a symbolic, abstract manner. However, conscious visual artistic modelling of interiors through artificial light as a unique phenomenon - means of expression - has not been commonplace in the course of history of architecture. For a long time, creation of scenic effects has been associated primarily with the effects of natural light corresponding to the tectonics of a building, "the story line" or intentionally set emotional atmosphere. Creators only later became fully aware of all the possibilities at their disposal and then they fully seized light as an artistic tool of the creative process in the work of an architect and light designer. Paradoxically, it was the era of industrialization that prepared ground for the stepping outside of the box of the earlier approach of creators that focused on practical value, as it brought about significantly higher interest

in the artistic aspects. Artificial light thus gradually won the exclusive position of an irreplaceable means of expression as an essential component of architectural affairs. It has become a flexible practical, artistic and, at the same time, marketing product capable of providing a dynamic visual experience.

In the context of the topic, the paper interprets several important milestones and circumstances that significantly affected the gradual modelling of interior light fixtures and light systems perceived as indispensable articles of artistic expression. The introductory sections interpret individual *semantic areas of both natural and artificial light* utilized to add creative architectural touches and to create a specific atmosphere of the interior environment. The attention is focused on current possibilities available in the advanced digital era, but also on alternative ways of its use in the distant past.

The sections of the article cover, one after another, the topic of *artistic-compositional articulation of light* that has one of the crucial roles in creating modern, scenically designed interiors. The focus is on basic quality characteristics involved in generating the final visual perception, the artistic modelling of space and interior furnishing elements.

The article contemplates two historically different principles of use of lighting media, i.e. conscious emphasis placed on the decorative nature of lighting fixtures on one hand and creation of aesthetical and optical effects by purposeful directing and spreading of the light flow. Furthermore, it covers prominent personalities and art movements that, with their theoretical work and their design work, contributed to further growth and subsequent purposeful development of this means of expression used in architecture and in art in general.

Since there is an inseparable connection between artificial light as a means of expression, light sources as technical means and lighting fixtures as composition elements of an interior, special attention is paid to every single one of them. The design of lighting fixtures, forming of lighting systems and creation of complex lighting concepts in the course of gradual historical development have been significantly affected by the discoveries and inventions in the field of light technology, including the development of light

sources. The generation of new optical situations and visual articulation based on specific qualities of a particular source are thus naturally perceived through the optics of the chronological technological development. The progress in the area of light sources was one of the main factors that considerably contributed to the creation of new perception of light architecture and creation of designer artefacts in the form of light fixtures. For this reason, the article documents quite in detail the major milestones related to their development, from the very first source mankind was able to control in the form of fire, through pre-industrial, industrial stages in the development, to the present-day sophisticated LED and digital technology.

Sections describing the historical milestones in the development of lighting fixtures also refer to the close connection between the visual and constructional design and the light sources. The most important milestones are presented, from the discovery of the oldest preserved pre-historic lamp, through ancient oil lamps, early lighting fixtures from later periods, such as petroleum lamps, up to the lighting of the industrial era that used town gas and electrical sources. Special attention is paid to the second half of the 20th century that was characteristic with rapid development of lighting design, start of various styles and growing effort to achieve alternative emotional levels in the interior designs. In this respect, the article mentions the formation of two main European movements practicing variant methods in the designing of lighting objects. Furthermore, it compares the rather limited sources that could be used in the past with what is possible now, even though the past limitations did not obstruct the creation of visually attractive, inspirational interiors abroad and also in the conditions of Czechoslovakia of that era. This section is accompanied with plentiful illustrations and photo-documentation.

Relentless technological progress, enormous expansion of digital, IC and other technology is naturally associated with contextual development in the area of lighting concepts and has an impact on the design of lighting objects. This fact gives rise to the need to adjust the educational process in both practical and theoretical area. One possible method of verification of the new trends is through

experimental solutions linked to practical work and solutions with an overlap to other scientific disciplines and this is also the base plate of the experimental section of the article. The research was conducted by future architects, interior designers, postgraduate students and employees of the Institute of Interior and Exhibition Design of the FA STU in Bratislava. The practical research was performed as testing of designs of prototypes on the scale 1 : 1 and 3D digital models and the theoretical part focused on identifying preference values from the perspective of both the designers and the users of home interiors. As the young generation represents a sample of future consumers, the research into their preferences constitutes an important part of the research activities. Observation of their approach and preferences not only in the theoretical area but also during the creative process itself helps to generate the relevant findings. The initial definition of the creative motivation bases and their acceptance or rejection by the respondents involved in the research – authors of the presented designs – opens a path to new knowledge and information and, what is more, introduces new ideas for research. The results then become a new addition to the field of creative design and also indicate potential future possibilities.

The basic objective of the paper is to emphasize the importance of cultivating comprehensive thought-processes of interior architects / interior designers, which inherently includes the ability to use light to shape architectural environment. The optimum use and selection of light sources and light fixtures and sets that meet the stipulated requirements are the basic pre-requisite of a functional, artistically coordinated and emotionally positive interior. Therefore, this topic should be explored in more detail in the future, both in the education process and in its practical application.

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