TEXT

On 1 December 1938, the Home of Fine Arts of King Peter the Great Liberator was consecrated and opened on the square of the same name in Zagreb. Not only because of the role this Home would henceforth assume in the artistic and general cultural life of Zagreb, but also as a significant architectural creation, it is necessary to present certain noteworthy technical details of this building to the professional public. The concept of the Home and its basic plan were conceived by Ivan Meštrović. The preparation of technical drawings, documentation, construction supervision, and cost accounting were entrusted to the City Authority, Department for Municipal New Constructions in Zagreb, where architect Harold Bilinić was particularly engaged in the elaboration of the architectural drawings. Construction began in 1936. The relatively long construction period was caused by a lack of financial resources. The building was financed through contributions from the Action for the Erection of the Monument to King Peter I, the Croatian Society of Arts, the Municipality of the City of Zagreb, and the Sava Banovina. The building is positioned at the centre of the square, thereby creating significant and attractive vistas from five streets. The new Home of Arts lies on the axis of three streets—Račkoga, Beogradska, and Zvonimirova—and outside the axis of Boškovićeva and Radišina, which could not be avoided because the street axes are not aligned with the symmetry lines of the square. Owing to the unequal dimensions of the square (ratio 138.0 : 150.0 m), traffic around the building could not be arranged as a circular roadway, since this would have produced unfavourable segments on the eastern side. Difficulties also arose in vertical positioning, as the square along the Račkoga–Beogradska axis descends from elevation 117.86 to 116.90, while the main municipal collector sewer passes through the centre of the square in the direction of Račkoga Street, with a crown elevation of 116.62 m. These circumstances determined the vertical placement of the Home, with the basement floor at elevation 116.82 and the ground floor at 120.17. Soil probing revealed weak upper strata; therefore, owing to the sensitivity of the structure, it was necessary to adopt foundations on gravel at a depth of approximately 5.0 m. Because of this depth of the load-bearing layer, foundation on piles or concrete wells was considered. Alternative tenders were requested for wells and for the Pieux Franki Liège system. The latter envisaged a system of 102 Franki piles concreted in situ; however, it proved more expensive, and the well solution was therefore adopted. The allowable stress of the gravel layer was taken as 4 kg/cm². The entire building was founded on 84 wells of varying diameters and heights. Owing to the main collector sewer passing beneath the centre of the building, special cases of load transfer arose. In two locations where symmetrical footings could not be developed, tie beams beneath the sewer were required. In certain columns of the lower external ground-floor wall positioned directly above the sewer, the load could not be supported by horizontal beams without interrupting basement circulation; therefore, the load was transferred beyond the sewer contour by means of concrete saddles. This foundation system proved technically flawless and economical. A total of

500 m³ of concrete (mix 1:10) was used for the wells. According to the design, the colonnade columns were to be entirely of stone. The external perimeter wall was likewise faced in stone, while the inner sides were constructed of brick, as was the hollow perimeter wall of the central hall. The principal spaces—the central hall and the ring hall—are covered by reinforced-concrete vaults. Structural harmony was achieved by placing all ceiling constructions on a system of concrete columns standing independently on the wells, while the remaining stone and brick masonry rests as self-supporting construction on concrete foundation vaults independent of the reinforced-concrete structural parts. To enable independent routing of installations along the walls, the concrete columns were recessed 5 cm from the wall face. The wall enclosing the central hall is hollow, with a 25 cm cavity accommodating central heating, ventilation, and other service ducts. The reinforced-concrete vaults above the central and ring halls incorporate glass prisms for illumination (product Jugosolfak). The span of the ring hall is 8.25 m. Above the mezzanine, the building is divided into two halves by a diametral expansion joint aligned with the sewer. Additional expansion joints divide the glass-concrete roof structure into four parts to accommodate thermal movement and eliminate secondary stresses. The elliptical dome above the central hall was executed in a single piece, 19.00 m in diameter with a rise of 4.90 m. The shell thickness equals the glass-prism thickness—5.7 cm. Static calculation followed Dischinger's method, considering self-weight, wind and snow pressure, and concrete shrinkage. To the best of our knowledge, this glass-reinforced-concrete dome represented the largest structure of its kind in Europe at the time. The vault over the ring hall is parabolic, with a clear span of 8.50 m and a rise of 2.35 m. Reinforced-concrete ring beams at the springing absorb thrusts and prevent the transmission of expansion effects. Structural calculations and construction supervision were carried out by Ing. Arch. N. Molnar (contractor) and Ing. Arch. Z. Kavurić (building authority). Waterproofing of the glass-concrete roofs was achieved using Flintkot asphalt emulsion with fabric reinforcement and protective glazing. Stone for the façades originates from Pučišća on the island of Brač; interior stone from Splitska, and stair and floor stone from Šareni Oklade. A total of 2,540 tons of stone were installed. Entering from the north-west (Račkoga Street), one first steps into a vestibule 7.70 m high, providing direct access to all spatial units. Opposite the entrance, doors lead to the central circular hall, cylindrical in form with a 19.0 m diameter and an elliptical dome. The hall height is 16.75 m, with a continuous balcony at 7.70 m. At ground level, a circular ambulatory 5.05 m wide surrounds the hall. The mezzanine contains a meeting room/reading room, office, caretaker's apartment, and sanitary facilities. On the first floor, a ring hall 8.25 m wide encircles the central hall, with three doors leading to a 3.75 m-wide balcony projecting into the space. The basement contains cloakrooms, sanitary rooms, plant rooms, boilers and fuel storage, a transformer station, and storage. Built-up areas: Basement: 990 m²; Ground floor: 770 m² (with colonnade 1,190 m²); Mezzanine (circulation): 283 m²; First floor ring hall with walls and balcony: 1,033 m²; Entire first floor including central void: 1,128 m². Heating is provided by low-pressure steam (0.1 atm) generated by sectional cast-iron boilers (Kotež system) using domestic brown coal (~3,800 Cal/kg). Four boilers, each with 25 m² heating surface, provide a capacity of 900,000 Cal/h under normal load. The system combines: radiator heating (offices, caretaker's flat, auxiliary rooms), warm-air heating (all exhibition spaces). Even at an external temperature of −20 °C and relative humidity of ≥50%, an internal temperature of +20 °C can be achieved. Total calorifier output is approximately 800,000 Cal/h, with required airflow of about 50,000 m³/h, supplied by two ventilation units. Air heating may operate with fresh air or recirculated air, the latter used at low external temperatures for reasons of economy.

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