City stadium in Split (Yugoslavia)

Autor(en): **Ordulj, B. / Peranic, S. / Pintaric, N.**

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6. City Stadium in Split (Yugoslavia)

Owner: Municipal Assembly of Split
Architect Designer: Gradjevno Projektni Zavod, Rijeka
Engineering: Ivan Lucic Lavcevic Co., Split
Hidroelektra Co., Zagreb
Industrijsko Projektni Zavod, Zagreb
Contractor: Hidroelektra Co., Zagreb and its Subcontractors
Completion: 1979

Introduction

In Split, a few main sports venues were constructed for the VIIIth Mediterranean Games held in September 1979.

One of the biggest and most beautiful structures is the City Stadium in Poljud. This "Beauty of Poljud" so named because of its superb architectural concept, is able to hold 50,000 spectators-fans of football and athletics.

The Scope of Construction

The City Stadium is oval shaped in plan-view, having outside diameters of 225 and 210 m, thus resembling a pair of open seashells.

The framework of the stadium consists of 74 radial frames partially composed of prefabricated concrete elements which are connected to the circular ring.

Having been previously prefabricated on the ground, i.e. put in their final position in structure, the frame beams were then lifted up to the top end, rotating around their interior end. They were assembled with two concrete columns. This manner of execution enabled the construction of overhanging cantilevers without scaffolding. For instance, some of these radial frames have a length of up to 40 m and the cantilever of up to 18 m (Fig. 1 and 2).

The top edge of the cantilevering concrete structure is held together upon the circular ring and stressed with annular force of 15,000 kN. Three BBRV tendons, each of 5,000 kN, with 108 wires dia 7 mm pass along the circumference of approx. 700 m, with the radial girders acting as deviation points. The tendons are anchored in four buttresses and coupled in between, requiring in total 24 tendons of approx. 95 and 100 m length respectively Six couplings with WIGA force-measuring sleeves enable the checking of the tendon force during the actual prestressing and later on too.

The special Stahlton-Flex ducts had been installed between each of two frames in the open space, with the metal corrugated ducts being installed in the top edge of the frames and in the buttresses. After con-

Fig. 1 View to the City Stadium

creting these and the ring diaphragms, the tendons were pulled through the ducts, coupled and fixed in the buttresses. In the buttresses every tendon of 5,000 kN is divided into two tendons each one of 2,500 kN. The tendons were simultaneously prestressed by 8 jacks of 250 Mp in 4 stages, and protected by cement grouting.

The prestressing works have been wholly performed by Geotehnika Co., Zagreb in consultation with Stahlton A.G., Zurich (Fig. 3 and 4).

3,000 prefabricated concrete steps for the stands were placed onto the frame girders.

The eastern and western stands of the stadium are completely covered with a 205×47 m roof structure constructed by the Mero system. These are two steel lattice spherical structures, being woven by 12,384 steel sticks, 3,525 ball-knots and 56 bearings. The max. span of this spherical structure is 210 m. For the roof covering Plexiglass Lexan was used.

The quantities of materials used in this structure are:

– Concrete	65,000 m³
– Reinforcement	6,000 t
– High tensile steel wire dia 7 mm	76 t
– Steel arch Mero	686 t
– Roof covering Plexiglass Lexan	17,000 m²

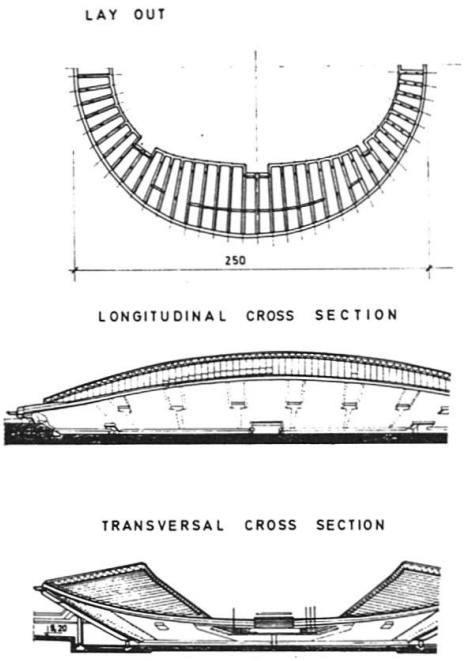

Fig. 2 Sketch of the Stadium

Remarkable aspects

- The major part of the structure is composed of the prefabricated components. The weight of the heaviest element reached 200 t.
- The special usage of BBRV tendons for the ring prestressing.
- One of the largest arch spans ever achieved in the Mero system.
- A record erection time has been achieved in spite of some difficulties encountered on the building site.

(B. Ordulj, S. Peranic, N. Pintaric, V. Rimac)

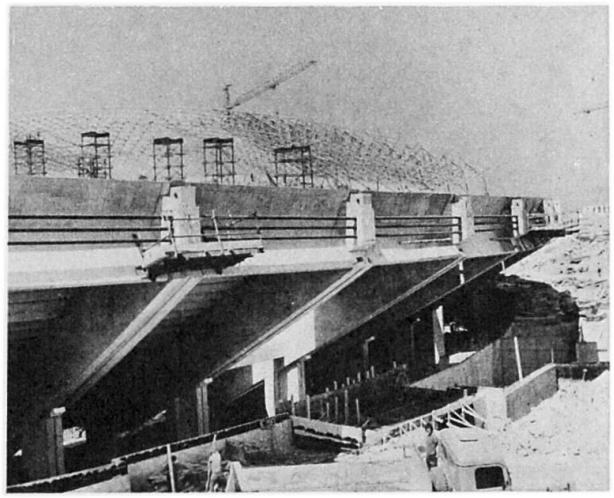

Fig. 4 Details of the Frame and Ring Structure

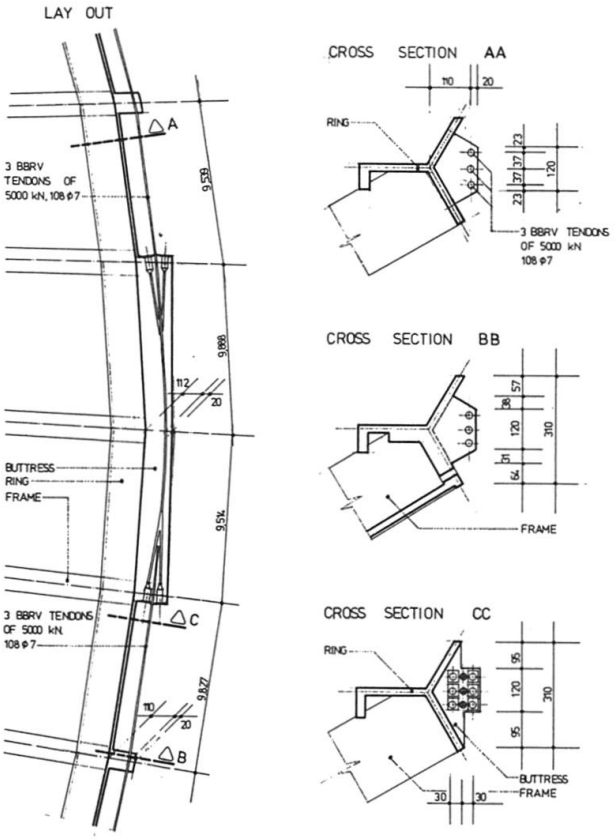

Fig. 3 Details of the Ring