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9. Car Exhibition Hall, Augsburg (Fed. Rep. of Germany)

Owner:	<i>OPEL Sigg OHG, Augsburg, Fed. Rep. of Germany</i>
Architect:	<i>Hans Schrammel, Augsburg</i>
Structural Engineer:	<i>Josef Postulka, Bratislava, CSSR</i>
Contractor:	<i>Pozemné Stavby, Nitra, CSSR</i>
Total Floor Area:	<i>3318 m²</i>
Number of Floors:	<i>one floor on two levels</i>
Maximum Height:	<i>5.5 m</i>
Number of cars:	<i>200</i>
Total Weight of Cable Steel in Roof:	<i>12000 kg</i>
Construction Period:	<i>9 months</i>
Service Date:	<i>1982</i>

The owner needed a large exhibition hall for new and used car sales. Thanks to the good reputation of Czechoslovak creations in the field of hanging roofs (there are more than 100 CSSR-made hanging roofs all over the world), we were asked to build this hall.

Figures 1, 2, 3 and 4 illustrate the circular hall with 65 metres diameter in its finished state. Precast RC edge beams with a 800 × 800 mm cross section and a length of 5100 mm lie on 40 steel tube columns (Fig. 5). The roof cable network without any inner tension ring forms a middle opening of 3770 mm diameter as an atrium.



Fig. 2 Inside view of the hall

80 wire cables of 21.2 mm diameter and 66 m length were used. They were pre-stressed on the floor before being mounted into the roof with a 120 kN force in order to reduce the permanent deformation of the cable network. The mounting deflection of the roof was 200 mm. Before mounting, the cables were painted as a protective measure against fire (F30).

The composition of the roofing coat can be seen in Fig. 5.



Fig. 1 Outside view of the hall

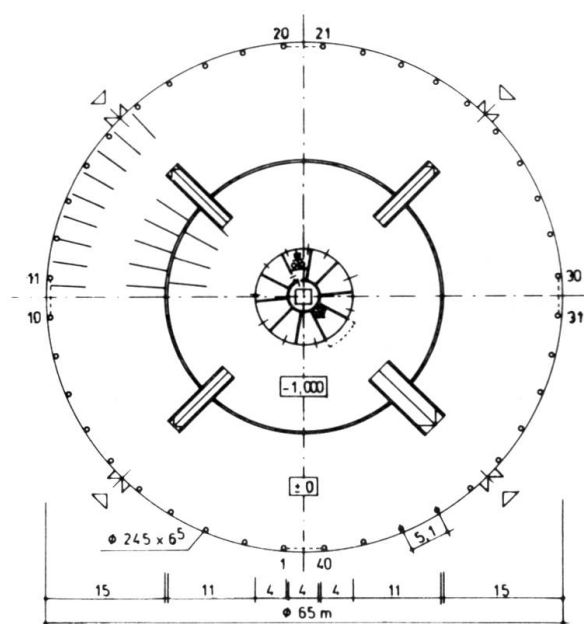


Fig. 3 Ground plan of the circular hall

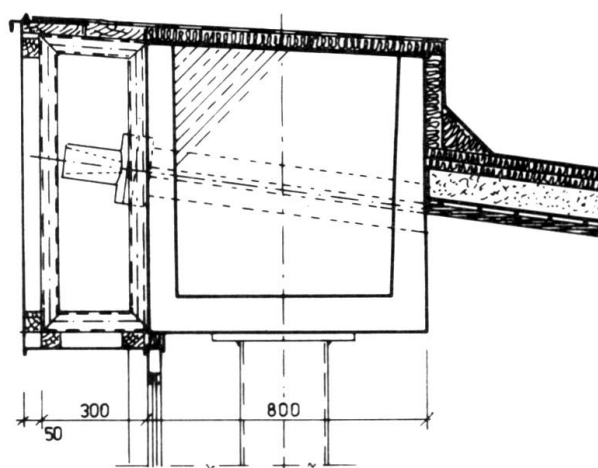


Fig. 5 Detail of the edge beam:

Roofing-coat composition: Cable netting + F30 fire protection, welded wire-netting, glass texture, thermal insulation with glass-wool 100 mm, wood cement plates: 2 x 25 mm, water insulation with rubber foil, reflex paint.

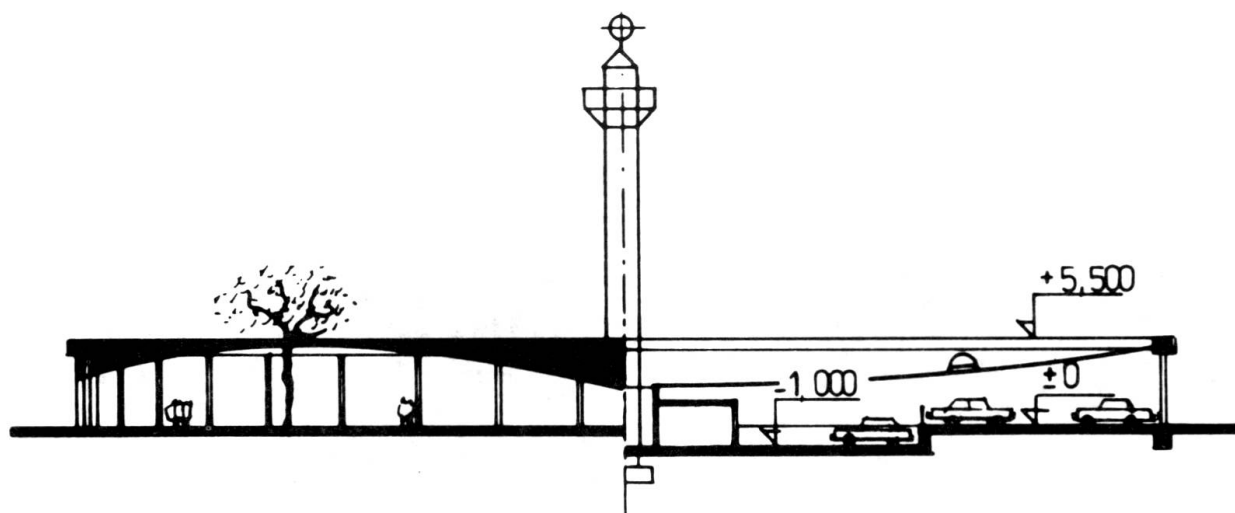


Fig. 4 Cross-section of the hall

As the maximum deflection of the hanging roof in the middle area of the hall is 2500 mm, the middle floor is at a 1 metre deeper level than the outside area, thereby allowing for a sufficient height (clearance) of 3500 mm. The outside ring of the hall with a width of 15 m can hold two stands of cars with a through lane. The inner circle of 35 m diameter has an outside ring with one car stand, a traffic lane, a shopping centre and lounges in a «house within a house» approx. 13 m diameter and 2.5 m in height.

The atrium serves as an air conditioning outlet for this inner building. It is not covered and additionally serves as an exit to the roof and to be the top of the steel tube lattice tower in the middle of the atrium. The tower has no connection with the roof and serves for advertising purposes of the owner only. The drain-pipe going from the roof pass through the atrium as well.

The cable roof cannot lie on the atrium wall because the maximum elastic deflection of the hanging roof comes to approx. 300 mm. The connecting space between the roof and the atrium wall is made of an elastic spacer of Polyurethan (PUR) with a 250 x 600 mm cross-section covered on both sides with a rubber-foil screen.

The floor structure is very important. The ceramic floor covering has to support daily temperature changes ranging from 16° to 60°C as the sunshine penetrates through the windows. The expansion joints in the floor form a network of 3 x 3 m. The owner made a very good experience with this solution.

The costs of this hall were approx. 1/3 lower than the costs of a traditional structure. The car sales in this exhibition hall had very positive results.

(Josef Postulka)