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2. Flower Market at Pescia (Italy)

Owner:	*Tuscan organization for agriculture and forest development*
Architects:	*Savioli, Santi, Corradetti, Dallai, Marcaccini, Marcelli*
Engineers:	*C. Pesenti, L. Nusiner*
Main contractor:	*Simoncini S.p.A.*
Steelwork Sub-contractor:	*Pradelli SACM — Ubersetto di Fiorano*
Duration of work:	*3 years*
Service date:	*1980*

The flower trade has developed rapidly in the past 30 years in Italy and in Europe. Pescia, a town near Pistoia, is where the flower trade has developed the most, both for the spread flowers growing and for her central position. Pescia thus became the leading Italian market for flowers and now one of the most important in Europe. The original building for the flower market, built in the fifties, very soon became too small and lacked sufficient facilities; moreover it was not located in the best position. Therefore it became necessary to build a new market, to meet the new European commercial dimensions.

The project carried out was one that won a National Competition, sponsored by the Tuscan organization for agriculture and forest development. Basically the building is composed of:

- the market hall, dimensions 100 x 100 m, without any internal columns
- the parking area, below the hall and having the same dimensions
- the lateral buildings, protruding like fingers (5 on the east side and 5 on the west) for the delivery of goods
- the facilities typical for a building of this kind (offices, management, social facilities,...).

The columns and the roof structure are made of hollow steel sections.

The roof of the main hall (100 x 100 m) is composed of 5 equal independent elements, each made up as follows:

- The space truss beams (60 m span, 18 m wide, 3 m high) are supported at 4 points by 4 steel ropes 64 mm diameter anchored in the top section of the columns. The nodes of the structure, spaced 6 x 6 x 3 m, are made up of circular steel plates perpendicular to each other and orientated according to the directions of the members (chords and diagonals). Each member is bolted at both ends to one of these nodes, the diameter of which varies from 600 to 1000 mm. The structure is supported by ropes at the 4 nodes located at the apex of the 2 head space beams, 6 m high, which are an integral part the space structure.

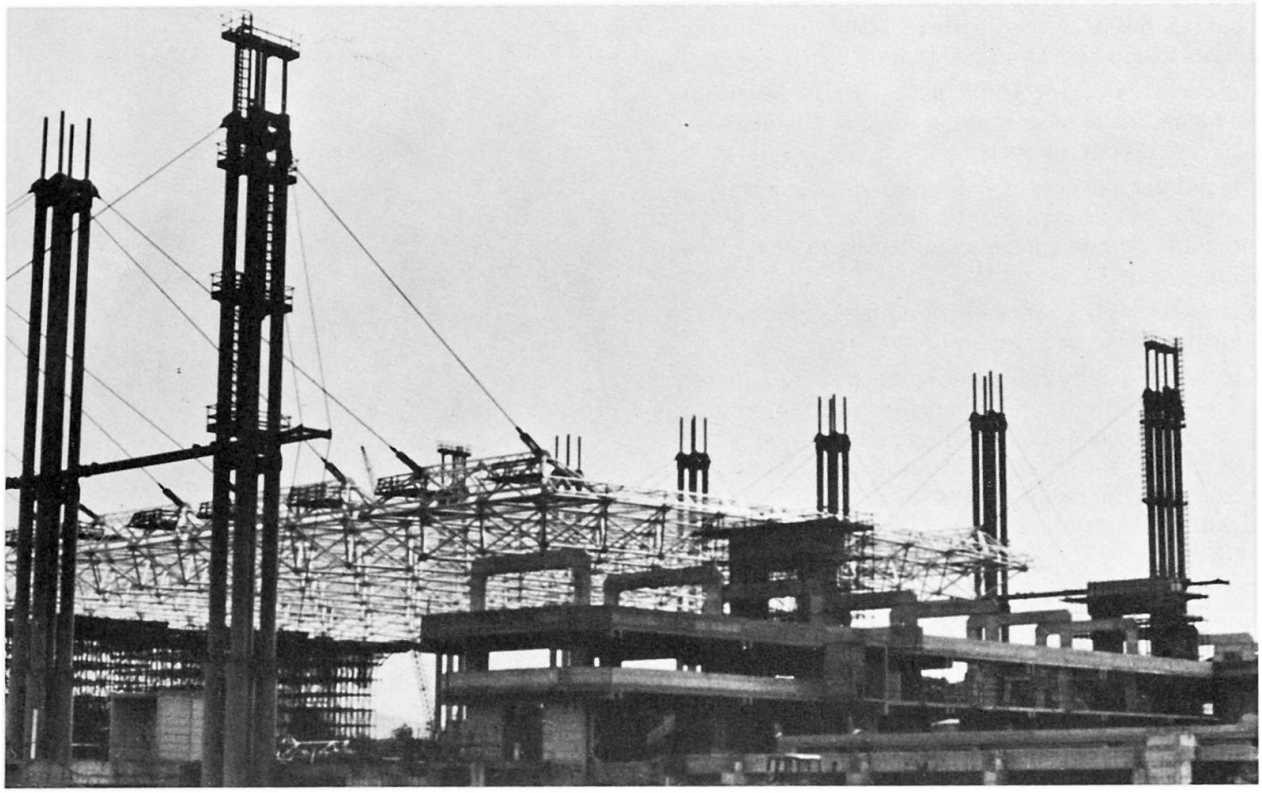

Fig. 1 Space structure

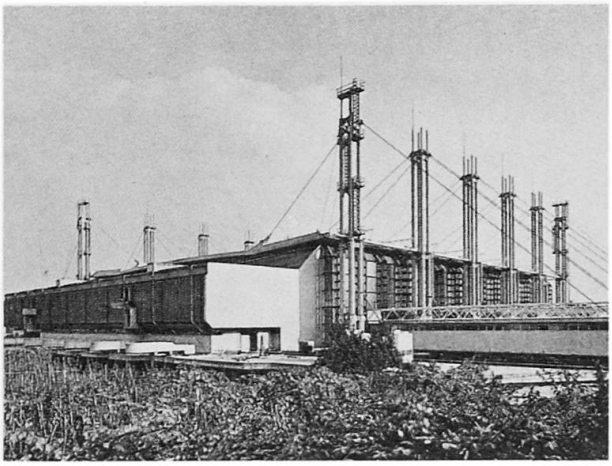

Fig. 2 View from northwest

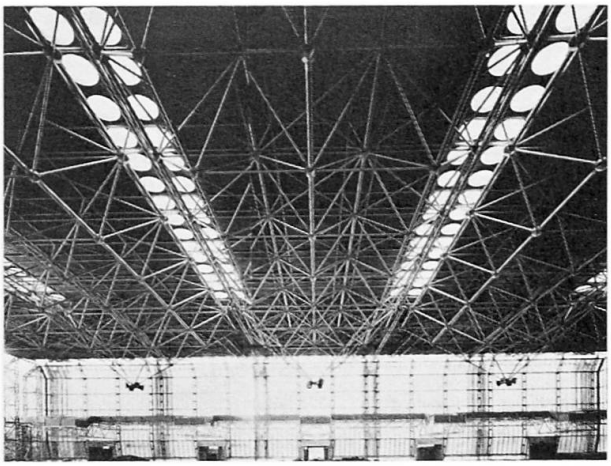

Fig. 4 Internal view

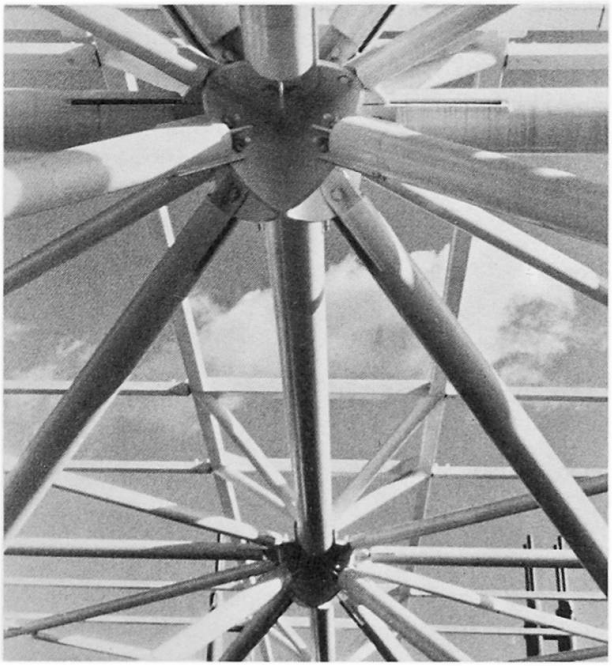

Fig. 3 Node detail

The roof covering, a corrugated insulated steel sheeting, is supported by a secondary hollow rectangular section structure formed by the square bases of pyramids, suitably connected to each other. The apex of the pyramid is turned downwards and is supported by the nodes described above. The secondary structure makes the space truss beam exactly 20 m wide.

- Two lateral truss spans of equal 25 m lengths supported by the space structure on one side and on the other, by a hollow circular member 600 mm diameter located between the columns. The two main beams, in each span, have a triangular shape and are an integral part of the space structure. They bear the wind loads but act independently (Gerber type connections) for the vertical loads. Transverse truss beams and hollow rectangular section purlins complete this structure.

  The weight of the roof is 0.55 kN/m² ; the dead and live load is 1.50 kN/m².

- Hollow circular section columns, 41 m high from the foundations, support the ropes from which the roof is hung. The column diameter varies from 1221 mm at the bottom to 706 mm at the top section. The distance between the two rows of columns is equal to 110 m, so that they remain outside the building. Because of the magnitude of the loads and the stresses acting in the columns, it was found necessary to anchor the top of the columns to foundation plints by means of steel ropes located 45 m far from the columns. To allow the length of the ropes to be adjusted, special anchors were designed, so that it was possible to tension the ropes and to check the rope stresses during the various stages of erection.
- East and west side wall structure. Hinged columns, trussed Vierendeel type and triangular shaped, are made of hollow circular sections. The axis of the columns is a broken line. The top sections of the columns are connected to the roof, the bottom sections to the reinforced concrete slab. The purlins are hollow circular sections.
- South side wall structure. The trussed rectangular shaped columns are fixed at the bottom and act as cantilevers.
- North side structure. At the north side, the facilities building, in reinforced concrete, closes the market hall : the roof structure is made of hollow steel sections ; one portion is horizontal, the other slopes at 45° and is covered with glass. The weight of the north side steel roof structure is 285 t.

The roof structure of the 10 lateral buildings is made up of truss beams, rectangular in shape and 42.35 m span with two cantilevers of 9.6 and 12.5 m length. The 12.5 m cantilever is located inside the building and supports a panoramic walkway 7 m above the hall ground level. The walkway structure is made of hollow sections, the beam shape being trapezoidal. The corrugated steel sheet roof is hung for the truss beams. The weight of this structure, including the walkway, is 215 t.

Stormwater pipes, self-supporting, have a considerable architectural effect due to their space running.

(C. Pesenti, L. Nusiner)