Zeitschrift: IABSE structures = Constructions AIPC = IVBH Bauwerke
Band: 7 (1983)
Heft: C-24: Structures in Italy

Artikel: New Department of Biology at the University of Padua (Italy)
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DOI: https://doi.org/10.5169/seals-18262

4. New Department of Biology at the University of Padua (Italy)

Owner:	*University of Padua*
Architect:	*Piacentini, Ometto, Grazioli, Ceccatelli, Sacchiero, Revisan*
Structural steel project:	*D. Danieli, G. Ferro, G. Mazzali*
Contractor:	*Costruzioni Metalliche Finsider S.p.A. Guasticce (Leghorn)*
Duration of work:	*10 months*
Service date:	*1981*
Volume of the building:	*100,500 m^3*
Weight of structural steel:	*2320 t.*

The preliminary project of the Department of Biology was awarded following national tenders called for by the University of Padua.

The building, with a T Plan, is essentially a mesh structure 11 m x 4.2 m consisting of 9 floors above ground to a height of approximately 30 m.

The building is serviced by five staircases in reinforced concrete, situated uniformly over the plan area of the building. In addition, vertical bracing is located on the external faces. The solution which was adopted gave all the structural elements used, whether steel or reinforced concrete, fundamental functions through the continuous connection of the various parts, resulting in a monolithic complex, with a distribution of the forces due to the rigidity.

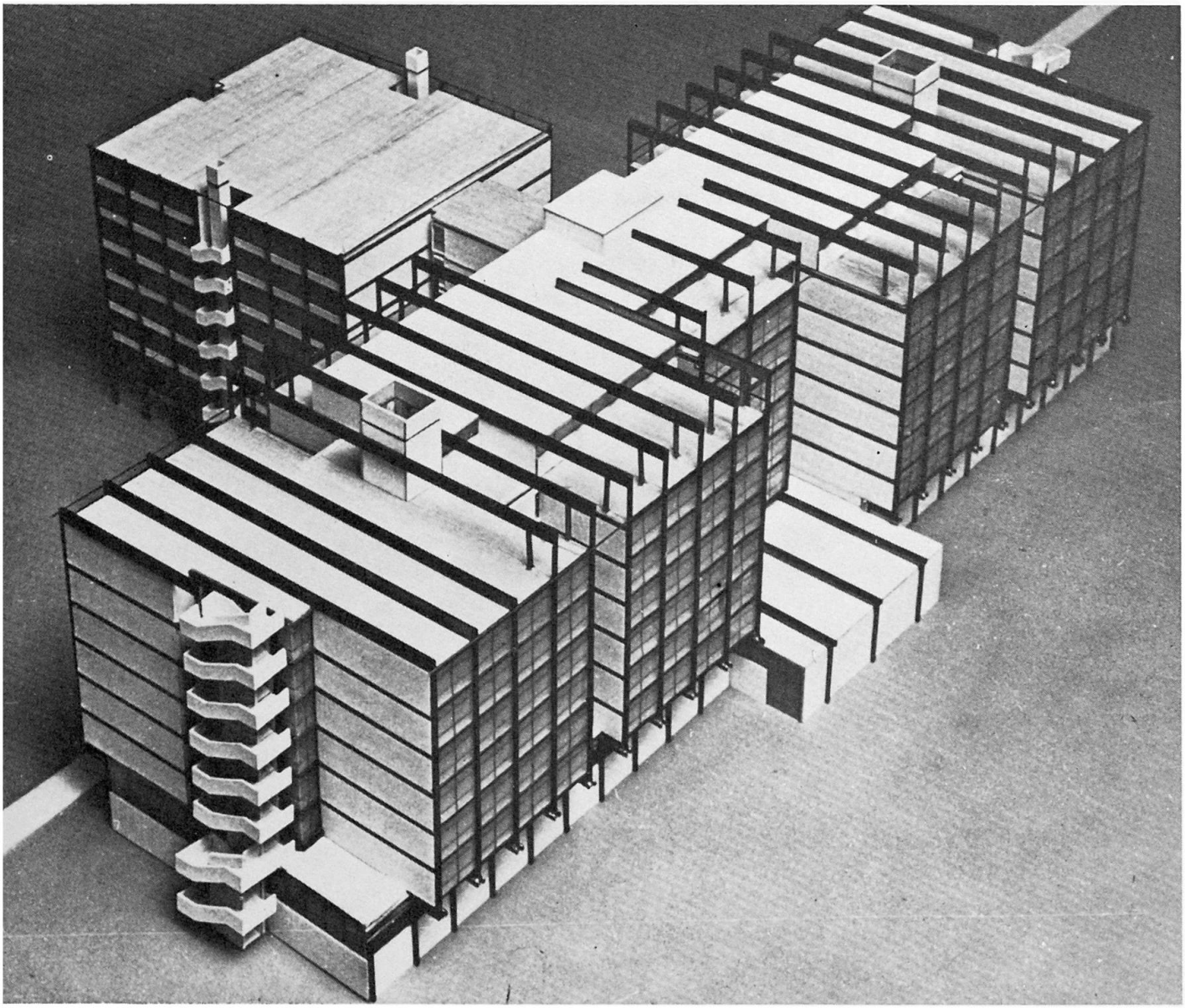

Fig. 1 The model of the building

In effect, the design adopted foresees a sectional behavior in which the various structural elements have the following basic functions:

- the steel columns and the beams bear the vertical forces;
- the slab, which is a rigid continuous body on each floor, transmits the horizontal forces to the reinforced concrete staircase structures and to the vertical steel supports;
- the staircase structures and the vertical steel supports carry the horizontal forces to the bottom of each floor, and act as brackets fixed at the base, thus forming the vertical backbone of the complex.

The real behavior of the structure was studied by assigning to each element, vertical or horizontal, the respective flexural and torsional rigidity, and by allowing for a thermal variation, as the building has no expansion joints. The columns are made of I section with wide flanges, either of type HE rolled sections, or welded compound rolled sections.

The main ceiling beams are made of I section either HE rolled section or compound welded rolled section. The main beams have a static lay-out with the beams being simply supported at the end.

The composite action of the reinforced concrete slab with a central section of the beam (equal to half its length) is ensured by Philips shear connectors welded to the top flange. The secondary ceiling beam are made of rolled section. They carry no vertical loads and have the function of transmitting the horizontal forces to the horizontal bracing.

In addition to the weight of the metal structure, the following loads have been taken into consideration:

- permanent: 6 kN m^{-2}
- additional: 3.5 – 6 kN m^{-2}

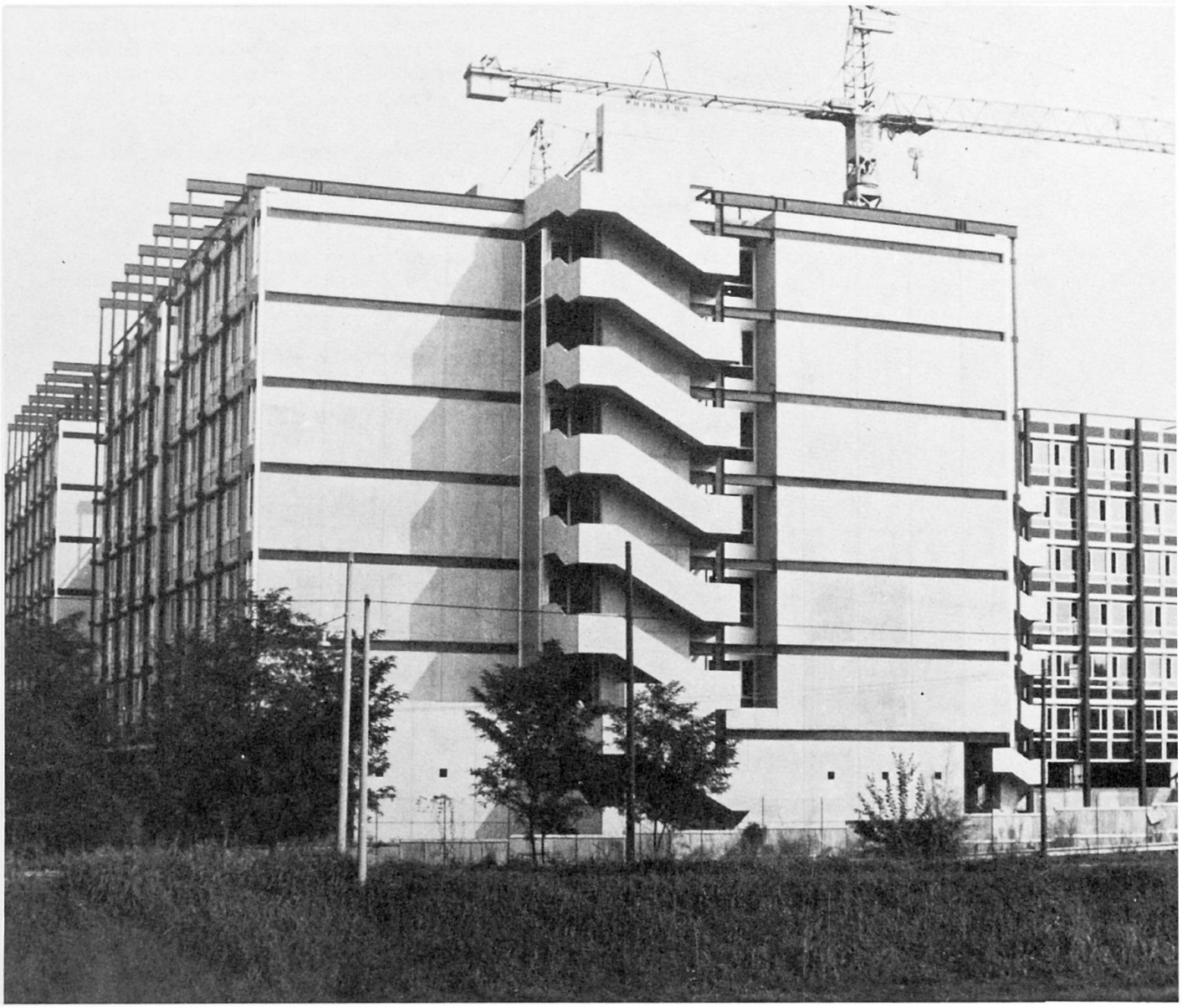

Fig. 2 The building in the final stages of construction