The construction of the post office in Basle

Autor(en): **Walther, R.**

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8. The Construction of the Post Office in Basle

Owner: Swiss Post Telegraph and Telephone
Architect: Suter & Suter AG
Structural Engineers: Gruner AG, Jauslin & Stebler AG,
Dr. R. Walther + H. Mory,
Emch & Berger AG
Contractor: E. Zublin AG, Stamm AG

Construction years: 1973 – 1977

The constant development of postal traffic in the station of Basel necessitated the construction of a new modern and functional building.

As the area of the old post office was insufficient and the new building had to be built near the railway station, it was decided to construct a large part of the building comprising an area of 100 x 100 m2 above the rails.

The Swiss Railway imposed the following restrictions:
- The railway traffic must be maintained at all times during construction
- Pedestrian platform and the rail traffic could only be closed for short periods, i.e. between one and five o'clock a.m.
- The principal structure must be chosen in a manner that the pillars can be displaced laterally in the future, when the railway station itself will be modified.

For that reason a combination of the beam launching method (Taktschiebeverfahren) and of prefabrication was developed and successfully applied.

This was done by first launching six prestressed box girders, weighing about 2000 t each, across the rail area, where solid steel columns had previously been erected on heavy flat slab foundations. A very high centric prestress was chosen for these main girders, in order to allow a later displacement of the columns. The box girder was cast in segments of 20 m length at intervals of one week. In front of each main girder a launching nose and a crane are fixed. The latter is used to place the heavy (36 t) columns directly from railway cars, since the pedestrian platforms were not accessible for movable cranes. The solid steel columns have a diameter of 50 to 60 cm.

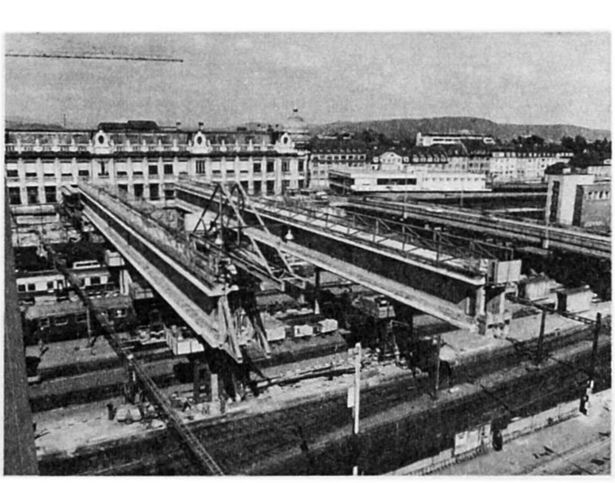

Fig. 1 Pushing of the main girders across the railway area

After having launched the main girders, the space in between was filled by about 350 prefabricated prestressed elements of 15 m length. The floor separated by these main girders serves as parking area for the PTT and the public. The upper part of the building, containing the installation of automatic mail distributing systems, coud then be constructed by conventional methods, on the existing platform composed of main and secondary girders.

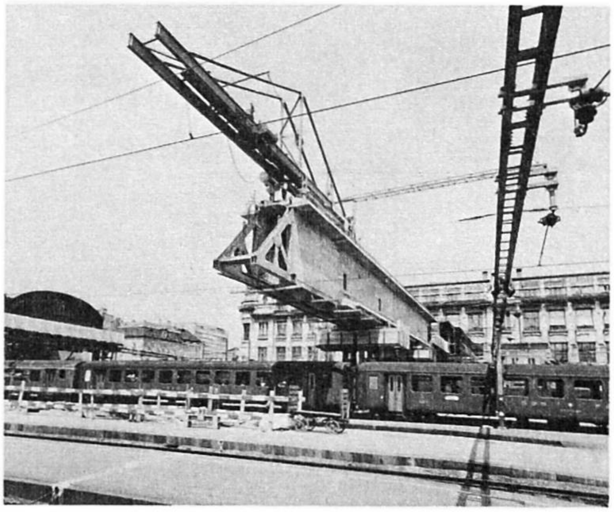

Fig. 2 Launching nose and crane of the main girders at launching stage

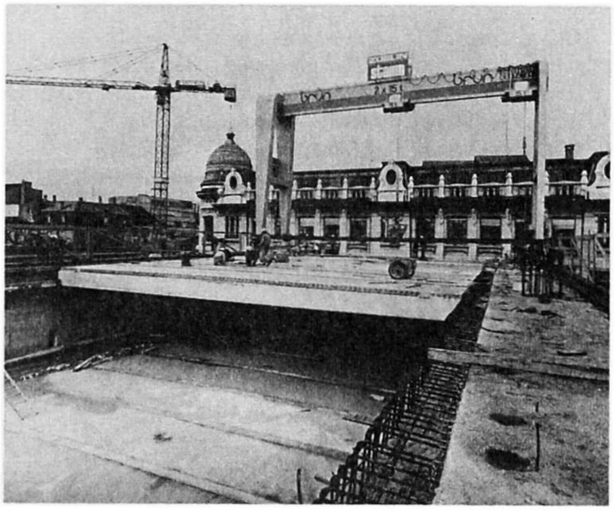

Fig. 3 Placing of the prefabricated prestressed elements between the main girders

To obtain a sufficient stability for a building of area 100 x 100 m2, weighing 70'000 tons and placed on thin pillars is difficult. Apart from these heavy loads, the structure has to withstand horizontal forces due to creep, shrinkage, temperature, an assumed engine shock of 200 tons, and last but not least seismic forces. The static structural stability was therefore verified by a plastic analysis of the whole system.

More difficult is the verification of the safety against seismic forces. The Swiss Codes specify that the effect of an earthquake be replaced by a static horizontal force representing, in our case, 35 MN. This force cannot be resisted by the pillars. Under these conditions the first idea would be to reinforce the escalator cages and to make the building more rigid. In the light of modern earthquake engineering, this would however be quite wrong, since rigid systems are very sensitive to seismic forces. In this case, it is preferable to leave the system flexible, i.e. without rigid connection to cages or the rigid part of the building outside the rail area. However, to limit relative displacements, a strong central earthquake column on a foundation floating on neoprene dampeners was constructed, and also the flexible and rigid parts of the building were joined by dampeners. A dynamic analysis has shown that such a flexible, dampened system greatly reduces the effects of earthquake.

(R. Walther)

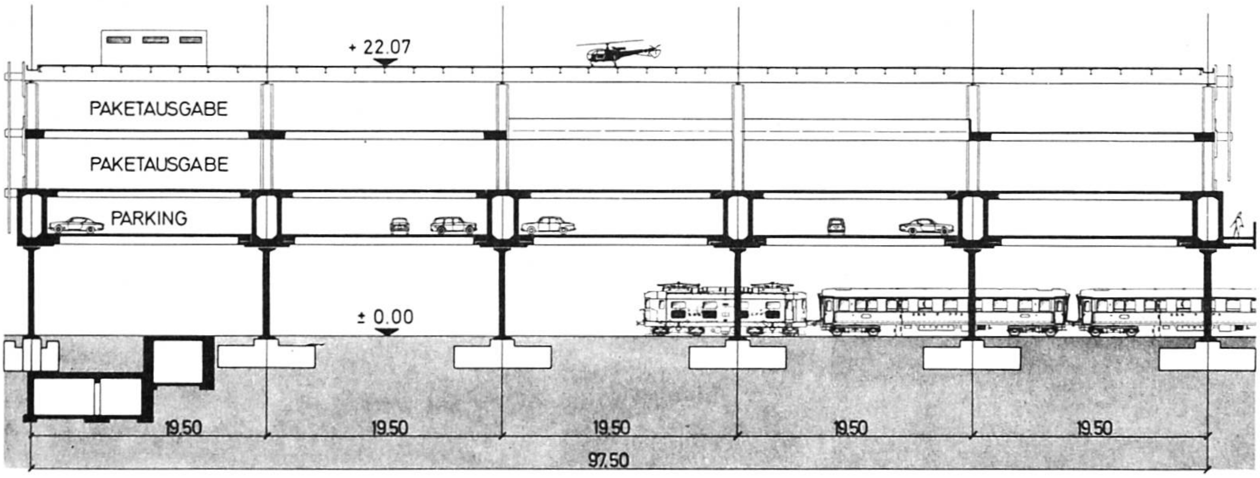

Fig. 4 Cross-section of the building

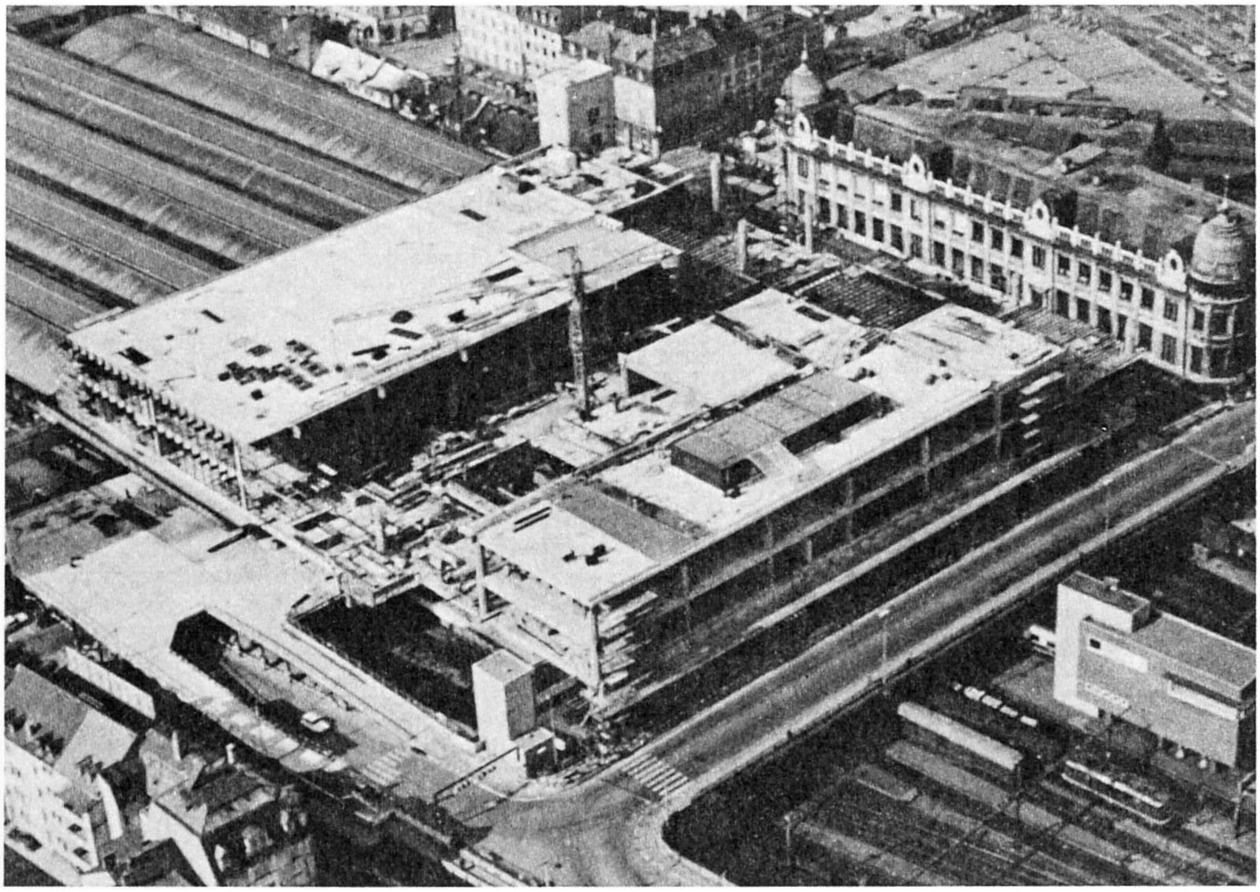

Fig. 5 New Postal Building on the railway station Basel is nearing completion. The old building in the rear will be demolished and replaced by an extension to the first new part of the building.