ProfilARBED Office Building in Esch-sur-Alzette, Luxembourg

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1 GENERAL INFORMATION

Client:
ProfilARBED

Architect:
Architekturbüro Böhm

Planning of structural framework:
Schroeder & Associés
Arne Hill A.S.

Executive company:
ARBED Building Concepts
ACOME SA/CDC

Processing time:
1992 – 1993

Kind of building:
Office building with 8 floors

Total surface:
15,000 m³

2 INTRODUCTION

In 1992 ProfilARBED built a new office complex. The existing entrance tower (part of an old castle) and the building of ARBED Recherche were renovated. A new 8 storey office building was built and connected to the entrance tower by a new corridor.

The required conditions for the office building were:

- open architecture
- modern and functional building
- building referring to the industry
- building incorporating innovative concepts
- references for a “steel” building

Figure 1. Office complex of ProfilARBED

Figure 2. 8 storey office building

3 STRUCTURE

The building is divided into two wings including an office unit each per floor. One office unit consists of 24 cells and a public zone. Four atria provide natural illumination for the public zones.

The steel structure is built without concrete bracing. The horizontal loads are carried off by a truss construction which is integrated in the atria. The columns are made of HE-Profiles and an IFB (Integrated Floor Beam) system is used for the slabs.

Figure 3. Steel structure of the building

3.1 *Columns*

The columns are arranged in a grid of 6.0m to 7.2m. The flange and web are getting thicker with the increase of the load, so the outer dimensions could stay constant.

3.2 *Slabs*

The slabs are made of "Integrated Floor Beams" with a hollow core slab lying on the lower flange. The beams are IPEa 500 cut into halves. The lower flange consists of a plate with 10mm thickness. By using this system, the slab could be accomplished without any binding girder and can be erected quickly.

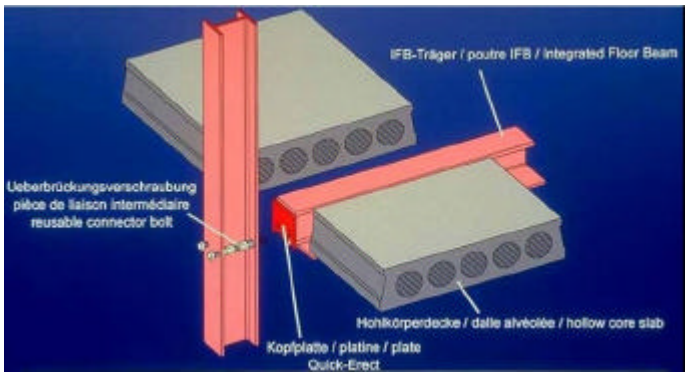

Figure 4. Typical detail of an IFB-slimfloor

Figure 5. Fire reinforcements in slab

Figure 6. Smoke exhausts in the roof

4 FIRE SAFETY CONCEPT

The result of the active and passive measures of the fire safety concept was the execution of the steel construction without any use of fire protection material. Short ways to the staircases which are separated from the main structure, optimal ventilation by heat and smoke exhausts which opens automatically and a sprinkler system maintain low temperatures in the steel structure.

The structural behaviour of the supporting structure was simulated under consideration of the localised natural fire model. The result was a bracing of the connections between column and beam. The fire resistance could be achieved with the slab built as a composite beam. The outer columns are integrated into the facade so they are thermally isolated.

REFERENCES

Bauen mit Stahl 2000. Brandsicher bauen mit Stahl. In *Bauen mit Stahl* documentation 608

A.O.B. (English), Power Point Presentation of ProfilARBED