

Close to the Opera, this existing building is a witness of the Parisian urbanism which underwent a heavy rehabilitation including the creation of a supplementary level. Intended to accept new commercial places, the construction site had to allow constructing without stopping activity at the ground floor.

Commercial activity for an office building 54, Boulevard Haussmann in Paris (F)



The original structure of the building was typical of the 19th century. Thus slabs were made of plaster and IAO girders, as joists, supported either by main beams or by stone facades. The existing building contained 6 levels in superstructure and 2 basements: a total surface of 14 600 m².

The main objective of the project was to create a new floor and to extend the car park in new deep levels of basement. The great difficulty was the preservation of the activity for the shop at the ground floor. Because the main occupant is also the commercial brand in the building on the other side of the street, another constraint was to create an aerial footbridge. Unfortunately, the heights were different from a building in the other one

Rather than to correct these distances, it seemed necessary to demolish floors while keeping facades on street, registered in historical monuments.

For the project, the structure had to remain independent from existing facades and also to propose of long spans which free the commercial spaces to be fitted out. The weight must be optimized to reduce the impact on the levels of basements and facilitate the lifting during the work. The choice of architects and engineers was to use a steel construction.

The realized work represents 16 400 m² of gross area, distributed on ten levels: 3 in basement and 7 in elevation. The metal structure concerns the eight superior levels.

To erect the 950 tons of the definitive structure, the difficulties were numerous:

- delicate operations of crane,
- storage zones reduced and only in the working zone,
- no waste tolerated in an environment of frequented shops.

The project was delivered only 11 months after demolition.

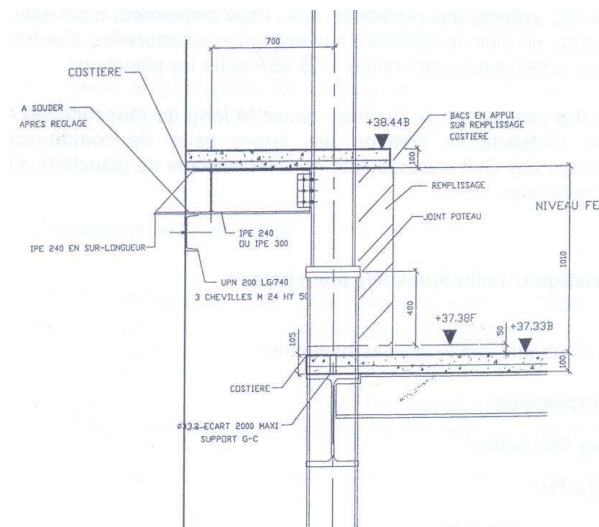
Case Study: Refurbishment for commercial building in Paris

Sustainability Benefits:

- Rapid construction system with minimum disruption on site
- The ease of assembly of the metal structure compensates for the absence of storage area on the site
- To succeed in preserving a registered building
- Flexibility of the spaces thanks to long spans and fewer columns.
- Optimization of land use by creation of new floor

Project Team:

Client:	HAMMERSON France
Architect:	J-J ORY Architectures
Project Manager:	J-P DUVERT
Engineer :	TERRELL International
Contractor:	Bouygues ouvrages fonctionnels
Contractor:	BARBOT



Detail of the connection between both buildings



Global view of temporary structure (outside)

Construction Details:

The main beams form a grid of 11 x 7 m approximately at all the levels. They are constituted by welded plate girder to optimize the depth and the inertia of beams. Some have openings for the passage of girdles and services. Spacing of joists (IPE 240 or 300) varies from 1.5 to 2 m.

10 cm in thickness, the composite slab is made with concrete on steel deck. To answer its deformation, the majority of beams and joists are composite and precambered between 15 and 20 mm. A bed of mortar (5 cm) was also added to reach the acoustic insulation requirement. The slabs of superstructure were built without strut: 150 m² realized a day !

The speed of construction was also improved by using columns two-storeyed height. HEM sections were used (260 and 300). All the new columns are on isolated foundations. Some are arranged close to the preserved facades in order

to connect them to the structure and then assure the bracing.

A system 'in bayonet' (see on figure) was designed to connect new floors with the facade for the transmission of wind loads. The live loads were ranging from 250 daN/m² for the offices to 1000 daN/m² for the delivery area.

The requirement for fire resistance was REI 90 and was obtained with an additional reinforcement in concrete slab.

At last; one of the main stakes in the project was the preservation of existing facades. The solution was to set up a temporary metal structure outside of the building to maintain facades. Lattice beams were vertically placed around the building and also inside to keep the visible part of the roof from the street.