

Roof-top extension of an existing 6 level concrete framed social housing building using light steel framing that provide 2 new floors of apartments and was achieved without having to relocate the occupants during the construction process.

HIGH QUALITY ROOF-TOP EXTENSION IN BOULOGNE



A group of four residential blocks in a social housing district built in the 30's have been refurbished in Boulogne suburb of Paris. All the blocks have been roof top extended creating 2 new levels of apartment structure on the existing building. This operation has been conducted without relocating the occupants during the construction process. It has created nearly 500 new apartments. The main challenge was to build comfortable premises on the existing structure without proceeding to intensive work within the existing building made of concrete frame and brick blocks. This was possible by using light steel framing and envelope that not over-load the existing concrete structure. The new structure is connected to the original concrete frame on a perimetrical and transverse steel beam podium. Nevertheless the original structure was not strong enough to support the new live loads and long vertical columns have been added along facades in some location. Due to its lightness, steel can provide efficient way for refurbishing including high thermal

insulation in the new levels. The steel construction industry provides efficient material including, rolled steel elements in small or large sections and light steel framing for the frame, profiled steel sheeting's for the envelope and many others. Combined with other material as mineral wool, plaster boards, glass and terracotta this can offer affordable appearances and quality. In this operation the skin envelope is made from light grey metallic shine steel sheeting. 15 years after completion the building looks still perfect as expected in the original project. No trace of steel contamination between the two facades is present.

Cost construction was around 750€ per m² (1990). This operation has demonstrated that new apartments can be constructed in heavy congested urban area without any need of new land thus saving on green land and net area. It shows the efficiency of the steel construction industry for refurbishing in renovation projects.

Sustainability Benefits:

- Two new floors of apartments (+30% new apartments) without new land use.
- Rapid, simple and land efficient construction system with minimum occupancy of ground on congested area
- Lightweight steel frame system does not over-load the existing building
- Dry construction does not need heavy material. Crane positioned in internal courts
- Occupants are not relocated during the construction work



Detail of structural column at ground

Project Team:

Client: Office Public
Départementale d'HLM des
Hauts de Seine, Boulogne

Architects:

Project Manager:

Contractor: Various

Steel framing:



H steel section columns are running along facades

Construction Details:

A set of new steel beams are placed at roof of the existing building to create a podium that will support the new structure. Void between the two structures are used for service and systems placement. The new steel structure is composed of small rolled section (150 to 180 mm depth), light steel sections (C and Omega). Partitioning is made from plasterboard panels fixed on a steel sub-frame (Pregymetal). Adequate acoustic insulation material is set between apartment separations. The envelope is made from double skin ventilated envelope fitted with high efficiency thermal insulation. The skin is made from profiled and lacquered steel sheeting. All the new structure is dry constructed and does not need any heavy material for. A local crane is needed for lifting material.

Due to the less resistance of the existing concrete building (concrete from the 30's) some extra foundation supports are needed and columns are running along facades at some location. They connect directly the new structure to extra ground foundation. Sections

are rolled ??? and are fixed to the building at intermediate points to avoid buckling.

Maintaining internal circulation system as set will not permits to comply with regulation. New lifts are created along facades to gain access to the new apartments but also to existing one's that were not lift served in the existing building. Lift frame is partially supported by the vertical columns that also support the new apartments as previously described.

A few extra apartments have been gained by creating bridge structures between the building blocks. On the new apartments small balconies are created to gain attractive opportunities for the in occupants.

The OPHLM is presently conducting a refurbishing operation on the original building. Due to the correct behaviour of the steel roof top extension it has not been considered to refurbish this. This is a proof that steel is an efficient construction material.