

# **ANNEX 3-B**

## **Case study**

### **RE-BUILDING OF LONDON'S PATERNOSTER SQUARE**

A variety of innovative construction techniques was used in this prestige commercial building project in the City of London. Long span beams with off-site fire protection were used for the office space, and *Slimdek* in the basement floors to reduce below ground costs.

## RE-BUILDING OF LONDON'S PATERNOSTER SQUARE



Long span composite construction has become the vogue for commercial buildings. Stanhope's 36,000 m<sup>2</sup> King Edward Court on the Paternoster Square project adjacent to St Paul's Cathedral met the twin challenges of flexibility in space provision, and a fast construction programme by a variety of innovative construction techniques.

The 4500 tonnes of steelwork in this 8 storey building were erected in only 20 weeks out of a 78 week construction programme for this 'shell and core' project. Fabricated steel beams were designed with large rectangular openings for later 'fit-out'. The steel beams were fire protected in the fabricator's factory which greatly benefited the speed of construction process. Negotiation with the City of London Corporation over a range of fire safety measures led to the specification of 60 minutes fire resistance, which the single layer of off-site applied intumescent coating could easily achieve.

Below ground level, *Slimdek* was used in order to provide the minimum slab depth to reduce

the basement and excavation costs. This deep composite slab also acted as a temporary loading bay at street level and the load capacity of the composite slab was easily increased by provision of additional reinforcement.

Importantly for this city centre project, deliveries were timed 'just in time' to meet the construction programme and local traffic conditions. Large Portland stone cladding panels attached to the framework gave the impression of a traditional Georgian façade'. At street level, colonnades in stoneclad steelwork provide for circulation space between the buildings and create a lively atmosphere in the public areas.

This same long span technology has been used in other phases of the Paternoster Square project, which has led to a new publicly accessible street-scape in this important heritage site in central London.

**Application Benefits:**

- Long column-free spans
- Off-site fire protection saved time on site
- Stiff floor to reduce vibration sensitivity
- Rectangular openings in beams for later servicing
- *Slimdek* used for minimum depth in the basement
- Ground floor in *Slimdek* acted as temporary loading bay

**Project Team:**

- Client:** Mitsubishi Estates/Stanhope Properties  
**Project Manager:** Bovis Lend Lease Ltd
- Architect:** Eric Perry Architects and Sheppard Robson  
**Structural Engineer:** Waterman Partnership
- Fabricator:** Severfield Reeve/Fabsec  
**Decking:** Richard Lees Ltd



*Long span beams with various opening sizes*

**Construction Details**

The 12 and 15 m span fabricated beams were generally 635 mm deep and were provided with 375 mm rectangular openings for services as part of the client fit-out. To achieve a target floor-floor zone of 3.85 m, the overall structural and services depth was only 1100 mm and comprised a 150 mm deep lightweight composite slab selected for stiffness and acoustic purposes. The floor construction is designed to achieve a minimum of 5 Hz natural frequency for this prestige office building.

The steel beams were protected by a 0.6 to 1.0 mm thick intumescent coating applied as a single coat in the fabricator's factory, saving in on-site fire protection costs, and in potential disruption to later cladding and finishing trades. Tubular columns were also protected using a similar coating and some were later encased by mouldings for visual effect.

The fabricator's *Strucad* detailed drawings were linked into the architect's *Autocad* package in order to develop an integrated

computer model of the whole building. The building process could also be followed using the model to further optimise the I.T. infrastructure by the construction team.

The ground floor of this important building provides for retail outlets in an urban street-scape. The first floor provides for a 'dealer floor', and the remaining floors are used as offices. At sixth floor level, the columns are set back and are supported by heavy fabricated beams whilst maintaining the strict floor zone. Two triangular-shaped atria provide for internal natural lighting and housed the tower cores for this project.

Cladding was pre-fabricated as large storey-high panels in Portland stone, which further improved the speed of installation.