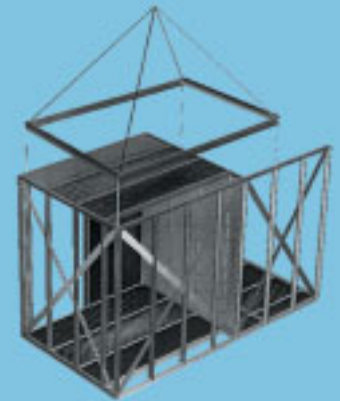


The Peabody Trust chose light steel framing for its social housing development in London, because of experience on other projects, and the requirements for quality and reliability, and speed of construction.

## Six-storey Housing using Light Steel Framing and Bathroom Modules

Modular and Light Steel



Pre-fabricated toilet module and its floor cassette

Mixed light steel framing and modular construction was selected for The Peabody Trust's housing project at Lillie Road, Fulham, because it satisfied the client's requirements for speed of construction, improved quality and reliability by off-site manufacture. Specialist constructor, Forge Llewellyn Ltd (now The Forge Company), and consulting engineer, Michael Barclay Partnership, conceived a mixed panel and modular structure, in which all the components were pre-fabricated using light steel C sections.

The project consists of 65 apartments, each of approximately 50 m<sup>2</sup>, constructed in three blocks, the largest of which is 6 storeys high. It is on the site of a former school, and for this inner city locality, reduced disruption due to the construction operation was an important client criterion in the choice of methods of construction.

The construction period was reduced to 68 weeks, a saving of 16 weeks on blockwork or concrete construction. Bathrooms were pre-fabricated as modules, which were fully fitted out before delivery to site. The blocks all have a semi-basement car park in *Slimflor* construction. Some exposed or expressed steel elements were used, but the majority of the structure was pre-fabricated using light steel wall and floor panels.

This high level of pre-fabrication allowed the building to be constructed rapidly, and safely, by using the floors as working platforms.

All partners in the project operated under the new PPC 2000 agreement, which encourages 'open book' and non-adversarial relationships. A high level of thermal and acoustic insulation was provided in the building fabric to meet Parts E and L of the revised Building Regulations (2002).

Architects, Feilden Clegg Bradley, also continued the theme of pre-fabrication by choosing a lightweight stack-bonded terracotta tiling system as a 'rain-screen' façade. Aluminium rain-screen cladding was used at higher levels. A sedum roof on the lower blocks reinforces the green landscape.



'Rain-screen' cladding during installation

The construction period was reduced to 68 weeks, a saving of 16 weeks on blockwork or concrete construction.



Front view from Lillie Road

# Six-storey Housing using Light Steel Framing and Bathroom Modules

## Technical details

### Application benefits

- Modular bathrooms are fully fitted out
- Entirely panel and modular construction speeds up construction
- Robustness for multi-storey application
- High level of thermal and acoustic insulation provided
- Less disruption to the urban locality
- Lightweight cladding

### Construction details

The 6-storey building is made from pre-fabricated light steel panels, floor cassettes, and bathroom modules, all using standard light steel C sections. The wall panels resist vertical and horizontal loads applied to the building, making this building the tallest in the UK using light steel framing as the load-bearing structure. Robustness issues are important for this height of structure, and the structural designer, Michael Barclay Partnership, used SCI's recommendations for tying action to achieve a robust efficient design. Various accidental loading scenarios were also examined, involving removal of whole panels, and the analysis showed that the structure was stable and robust to these extreme events.

Rectangular Hollow Section (RHS) members were introduced as 'expressed' steelwork on the end façades, and also in the balconies. They were installed along with the light steel framing panels.

The bathroom modules were also designed to be structural so that their walls and floors contribute to the resistance to loads. The floor elements used 200 mm deep C sections, and the wall elements used 100 mm deep C sections in 1.2 mm to 2.4 mm thickness, depending on the loads applied. Floors were pre-assembled as cassettes. Cross-walls were braced by cross-flats for stability.

The separating floors and walls achieve an airborne sound reduction of over 63 dB, by use of mineral wool and sound resistant plasterboard by Lafarge. Resilient bars support two layers of plasterboard ceiling. This construction satisfies the new Part E requirements of the Building Regulations.

Various energy efficiency measures were introduced in order to minimise the operation cost of the building, and dwellings will be individually metered. The external walls achieve a U value of 0.2 W/m<sup>2</sup>°C for excellent energy efficiency by placing mineral wool between the studs and also external to the wall. This U value is significantly less than in the new Part L requirements of the Building Regulations.

### Project data

**Client**  
The Peabody Trust

**Architect**  
Feilden Clegg Bradley

**Structural Engineer**  
Michael Barclay Partnership

**Constructor**  
Walter Llewellyn

**Light Steel Framing**  
Forge Llewellyn Ltd (now The Forge Company)  
Ayrshire Steel Framing

**Design of bathroom pods**  
MTech

## Modular and Light Steel



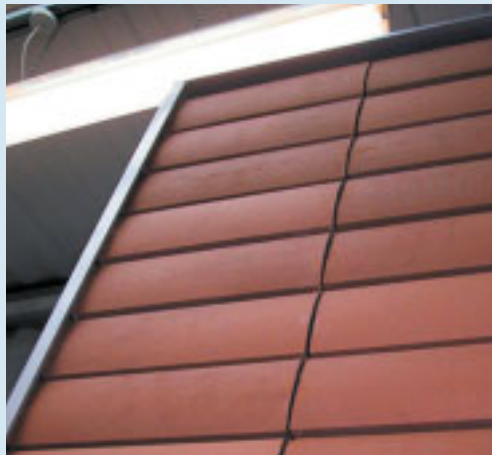
Braced wall



Staircase



Installation of light steel frames



'Rain-screen' façade using terracotta tiles

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