

Streatham Regeneration, London

The site of the former Streatham Ice Rink has been re-developed to create a new supermarket with a 6 storey residential building on top using light steel framing.



Light steel framing is the preferred solution where weight saving and speed of construction are fundamental to the success of the project. The re-development of the former Streatham Ice Rink site was made economically feasible by building a 3 to 6 storey residential building over a major new Tesco supermarket, and by relocating the new ice rink and bus station to either side. The £80 million project provides 250 apartments arranged in a courtyard form.

Metek UK was chosen by the main contractor, Vinci Construction UK, for this project because of their joint experience on similar projects. Vinci are a keen advocate of light steel framing on projects all across the UK.

The residential building is supported by long span composite beams at the podium level. The building is in 5 distinct parts, of which three are for private housing, and two are for a mixture of

shared ownership social rented and key workers. The split of apartment sizes is: 166 two bedroom apartments of approximately 85 m² floor area, 90 single bedroom apartments of 55 m² floor area and 6 three bedroom apartments of 115 m² floor area.

The construction of Metek's light steel framing started in October 2012 and finished in April 2013. Importantly, deliveries to the site on the busy Streatham High Street were kept to the minimum and one lorry could provide sufficient wall panels for 2 days work. Highly accurate installation and absence of waste and site noise were other benefits of light steel framing.

The light steel structure supports a composite floor slab of 170 mm depth that spanned up to 5 m between the cross-walls. A composite slab was chosen for its excellent acoustic and stiffness properties. Despite the weight of the concrete, the total weight of the construction system was

only 60% of that of a concrete flat slab. The total floor area of the residential building was close to 19,000 m², and its estimated total cost was £30 million of which the light steel framing part was only 12%. Light steel framing was also used for the penthouses at roof level, and the roof was supported by C-section purlins. The cladding was insulated render attached to cement particle board that was directly screw fixed to the light steel external walls. A U-value of 0.2 W/m²K was achieved.

The apartments also included 3 m wide and 1.5 m deep steel balconies that were attached to steel posts through thermal 'breaks'. Metek designed and installed the hot-rolled steel balconies and also installed the decking, reinforcement, external boarding and the pre-cast concrete stairs as part of their 'package' with the main contractor Vinci.



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Application Benefits

- Fast construction for complex site
- Mixed use building
- Composite floor slab supported on light steel wall panels
- Balconies in light steel package
- Excellent acoustic insulation
- Light weight for support by podium

Advantages of the system



Cost



Quality



Speed



Sustainability



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Construction Details

Metek's light steel load-bearing wall panels uses 100 mm x 50 mm C-sections in thicknesses of 2 mm for the lower floors and 1.4 mm for the upper floors. The C-sections were placed in pairs at 600 mm centres where loads are high, which meant that their use was optimised with respect to the applied loads. The 170 mm deep composite floor slab used 80 mm deep decking and bar reinforcement was placed in the ribs and mesh reinforcement in the topping. The floor slab was supported directly by the light steel walls and spans were typically 3 to 4 m, which did not require temporary propping. For spans of 4 to 5 m, the decking was propped.

Where longer spans were required, slim floor beams in the form of 150 mm x 100 mm Rectangular Hollow Sections (RHS) with a welded 10 mm thick bottom flange were designed on which the single span decking sat. Continuity was provided by bar reinforcement passing through pre-punched holes in the sides of the RHS.

A fire resistance of 90 minutes was specified. The composite slab provided this fire resistance with a single layer of plasterboard ceiling. The floor depth was only 500 mm including the battened floor, service zone and suspended ceiling. The single leaf load-bearing light steel walls had two layers of 15 mm fire resisting plasterboard on each face that were attached via horizontal resilient bars. This form of construction is predicted to achieve a 60 dB sound reduction index.

The important factors influencing the choice of the light steel framing system were the site logistics and the relatively low self-weight of the construction system. Light steel wall panels were delivered 'just in time', and installed at a rate of 20 panels per day. The concreting of the floors was carried out every 9 or 10 days on a decking area of approximately 900 m².

Metek also installed the pre-cast concrete stairs, and the stairs were supported on 200 mm deep steel PFC sections spanning up to 2.8 m and Square Hollow Section posts. Stability was provided by X-bracing of the light steel wall panels rather than through the stair cores. The balconies used 180 mm deep PFC sections that were connected to RHS posts though bolted end plates with thermal breaks. The posts were detailed within the light steel walls.

The penthouse roof consisted of long spanning 250 mm deep light steel C-section purlins and the set-back walls were supported on the composite slab below. A service zone was also provided at podium level using 150 mm deep light steel joists.

Metek provided all the structural steel in the residential levels as part of the light steel framing package, and Atlas Ward provided the steelwork for the podium structure and the Ice rink.

BIM

The whole project was 3D modelled by sequencing the installation of each light steel element, each composite concrete floor, each hot-rolled steel and each concrete stairway. Metek's design process is BIM level 2 without COBie and based around BS1192: 2007 with the AEC (UK) BIM protocol v2 for Revit incorporated.



Mixed use of Structural Hollow Sections, light steel framing and composite floor slab as part of Metek's package.



Light steel framing wall panels delivered just-in-time and built on composite concrete slab.



Internal view of X-braced cross walls beneath profiled steel decking.



Profiled steel decking prior to installation of rebar/reinforcement and in-situ concrete. Hot rolled steel 'goal posts' designed, manufactured and installed by Metek.



Light steel frame walk-ways showing balcony parapets, window openings, cement particle board sheathing and roof joist over-hang.



Light steel frame elevation showing scaffolding and cement particle board sheathing.

Project Team

Client: Spenhill Regeneration

Architect: Michael Aukett and partners

Consulting Engineer: Peter Brett Associates

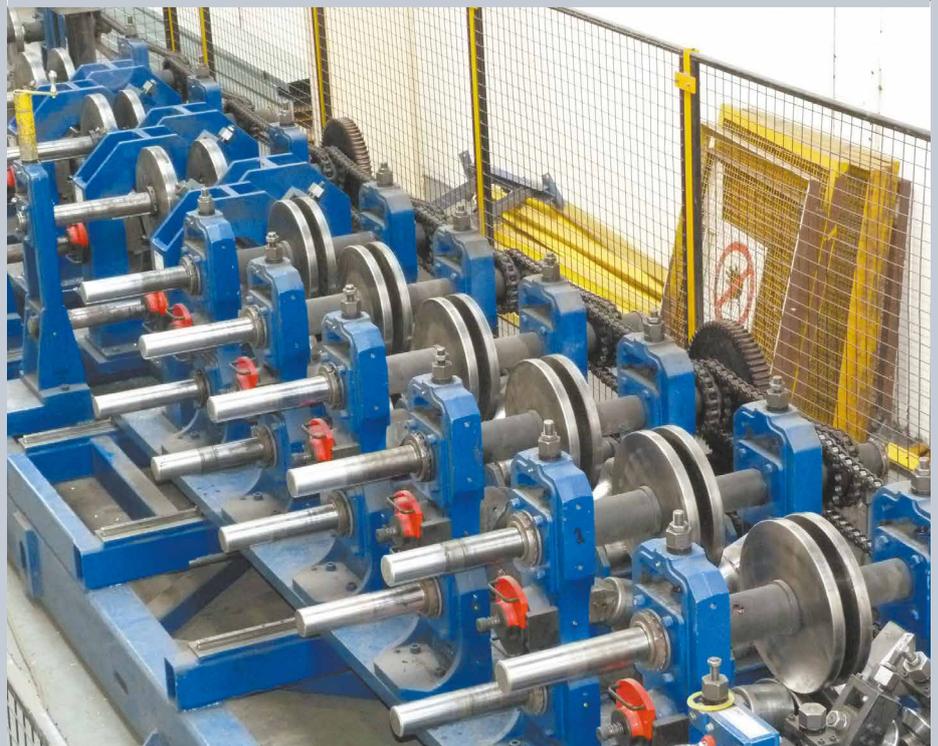
Contractor: Vinci Construction UK

Light steel framing: Metek UK Ltd

Structural steel: Metek UK Ltd for residential levels, Atlas Ward for podium



Internal view of X-braced cross walls beneath profiled steel decking.



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