Project Overview

Client: iAP G3
Status: Final Fit Out
Date: November 2010

H39 – Conference Centre, NATO BASE KANDAHAR

The building is a two storey light gauge steel structure located in NATO BASE KANDAHAR in Afghanistan. The building is twelve metres square on plan with clear spanning floor trusses at first floor level. The floor trusses were spaced to allow for HVAC ducting runs parallel with the floor trusses to reduce the overall floor depth and reduce the overall height of the building to comply with local requirements. As the area is seismic and has a requirement for a 45m/s (100mph) wind speed the design was carried out to Eurocodes – EN 1990, 1991 and 1993, specifically EN 1993-1-3 for the LGS and EN 1991-8 for the seismic elements.

Light steel framing uses galvanized cold form steel sections which were used as the main structural component. Wall panels, floor cassettes and roof trusses were prefabricated in a factory and later combined on site. Single skin cladding was used as the external skin, though light gauge steel can be designed to carry any light weight skin, with the internal face lined with fibre cement board.

MMCEngineer Ltd.
The innovation Centre @ Hornbeam House, Hornbeam Business Park Harrogate, North Yorkshire, HG2 8QT.
Company registration number 9857752. Email – steve@mmcengineer.com Tel. 01423 855939 Mob 07901594342

Floor cassettes were designed to span between external load bearing wall panels on z hangers to enable ease of levelling of the finished building. Floors were constructed using twenty two millimetre floor boards due to ease of supply in theatre – alternatives could have included concrete screed on “Lewis Deck” to produce a shallower floor construction overall. Design allowed for composite action between the timber deck and the top chord of the light gauge steel trusses. Deflection, and design checks, in accordance with SCI P301.

The duo pitched roof consists of trusses assembled from C-section members. Trusses were spaced to suit the locally sourced plasterboard dimensions to aid speed of erection and fit out.

The panels are connected to each other on site using conventional techniques, i.e. self-drilling screws. Wall panels are fixed onto previously installed concrete floor using a combination of bolts and screws to meet holding down and shear requirements. Due to the seismic requirement and the relatively high wind load of 45 m/s (100mph) there was a need to check the racking and overturning resistance of the building under both load cases. Diagonal ‘K’ bracing was employed for the purposes of erection and assembly only in panel corners. The final structural design relied on the work by SCI and Trada in ED002 to negate the need for additional steel in the form of multiple braced bays – the design checks require every bay to be ‘braced’ which would otherwise have greatly increased the steel content.

The individual framing components are fully tied together to form inter-connecting panels, which together with the sheathing resistance of the lining boards, ensures the whole framed structure acts as a single mass. This also applied to the progressive collapse requirements and checks – EN 1991-1-7.

The structural system is designed and erected in accordance with the guidance of Steel Construction Institute for light gauge steel framing in residential construction, P301. A design life of over 200 years can be achieved in a ‘warm frame’ construction. This design highlights that Light steel framing extends the range of steel framed options into commercial construction, which has traditionally been in hot rolled steel and masonry. Overall the project benefited from adopting light steel framing solution which combines the benefits of a reliable quality controlled product with speed of construction on site and the ability to create existing structural solution.

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