Project Overview

Client: Newcom Mining Company
Status: Final Fit Out
Date: September 2012

Workshop Building – Gobi Desert, Mongolia

The building is a two storey light gauge steel structure that will be used as a Workshop, located in the Gobi desert in Mongolia. The building is 64.3m x 24.15m on plan. There are two distinct parts to the building, the Office area and the Garage area; they are measured 18.15m x 24.15m and 46.15m x 18.15m respectively. All light gauge steel and sections were designed and calculated in compliance with EuroCodes EN1993-1-3, of which imposed loads were also accordingly calculated but based on loads provided by Newcom.

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Wind loads were advised as 0.7 kN/m², with the Roof loads as 0.66 kN/m² Dead (Permanent) and 0.6 kN/m² Live (Variable).

Both areas of the building primarily consisted of portal trusses with lattice purlins, infill wall panels, lattice floor trusses and gable wind posts, all of which were prefabricated using galvanized cold form steel sections as their main structural component. The structure was then finished with a single skin layer of external cladding, with the internal skin a single layer of plasterboard.

The wall panels are connected to each other on site using conventional techniques, i.e. 5mm self-drilling screws with a shear capacity greater than 5kN. Wall panels are fixed onto previously installed concrete floor using a combination of bolts and screws to meet holding down and shear requirements. Diagonal "K" bracing was employed for the purposes of erection and assembly only in panel corners and in instances that would keep the panel as simple as possible to ease in fabrication.

Floor lattice trusses cassettes were designed to span between both external and internal load bearing wall panels, sitting on a combination of z hangers and l hangers to enable ease of leveling of the finished building. Floors were constructed using eighteen millimeter floor boards due to this being the standard board size in Mongolia. 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 roof has two separate gable pitched roofs, each at a different height, thus snow loads had to be considered in the calculations. Each roof consists of portal trusses assembled from C-section members with lattice purlins between them to provide structural stability, with gable wind posts at intervals at each gable end due to the spans involved. Trusses were spaced to suit the design of the building which required several large openings for the entry of heavy duty trucks and machinery.

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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. 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 in Mongolia.

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