InfraBuild

Foodland Associated Warehouse Melbourne

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This case study was written at the time when InfraBuild (formerly Liberty OneSteel) was part of BHP. In that context, in some instances within this case study reference may be made to BHP.

The big lift

An unconventional technique enabled the steelwork for Foodland Associated Ltd's (FAL) massive new distribution warehouse in Perth to be completed ahead of schedule.

The entire roof structure of the 54,000 square metre, steel framed building was pre-erected in sections on the ground and then hoisted into place by cranes.

This unusual method was judged the safest and best solution to laying roof trusses across spans of up to 40m between column centres in the 350m long by 150m wide structure.

And it enabled the project's steel fabricators and erectors, Fremantle Steel Fabrication Co. (1979), to complete the steelwork substantially quicker than by conventional methods.

Fremantle Steel decided on a" spaceframe" type construction technique for the 14m high roof after consultation with builder Multiplex and carrying out its own eight-week feasibility study. The method also required the approval of safety inspectors from the Western Australian Department of Occupational Health, Safety and Welfare.

The roof, consisting of primary and secondary trusses, was first assembled on site in sections of up to 60m by 40m in size on special stands designed and built by Fremantle Steel. The truss design, which made the roof frame lighter and more rigid than conventional construction, enabled such large sections to be handled.

Two 40 tonne and two 20 tonne cranes were used to point-lift the 60 individual roof sections into place on their structural steel columns. Each was then bolted off using cherrypickers.

Fremantle Steel's managing director, Vince D' Amato, said: "It was an unusual method of erecting the roof frame and I like to think no one else would have thought of it."

"We have used it before - but not with this type of design. "

Clive Bradshaw, a director of the project's consulting engineers Van der Meer, said the column grid of around 40m by 20m meant it would have been difficult to erect the steelwork by conventional means because of lack of support.

"It was really the sheer size of the building, together with the large column centres, that made it better to lift it from the ground. It was also a lot safer because the roof is quite high and there's not a lot of steelwork up there."

"A normal roof has purlins at about 1.7m centres, whereas this one has them at 4m centres, so it was a long way between supports, where someone could walk around."

Another advantage of the pre-erect and lift technique was that most of the services inside roof, including sprinkler pipes and electrical cables, could be installed on the ground.

A total of 950 tonnes of structural steel, supplied by BHP Steel (now OneSteel), was used in the construction of the warehouse in the outer Perth suburb of Canning Vale. About another 250 tonnes of steel was used in the purlins.

Austral Insulation supplied and installed the cladding of 75mm thick insulated roof panels and 100mm and 150mm thick insulated wall panels with a COLORBOND® steel skin on both sides.

The design, by architects John McKenzie & Associates, ruled out the use of internal bracing in the building. The high rigidity of the insulated panels, however, enabled the purlins and wall-girts to be spaced at up to 4m centres.

The warehouse's ground slab required 8,500 cubic metres of concrete, placed with vibrating screeds and finished with compacting discs and special trowelling machines. The concrete floor was poured under controlled conditions, after the wall and roof panels were installed, to achieve the high standard of finish required by the client.

Above: A completed section of the warehouse roof frame

Top: Cranes lift a roof section of the FAL warehouse into position