Roof array readies regional hub for more upgrades

Newcastle Airport Terminal expansion (Stage One)

A well targeted lightweight steelwork package has capped off the partial redevelopment of a busy airport terminal located at the regional centre servicing the Hunter in NSW, ready to be extended further when required.

The work was completed on schedule on 24 February and comprises a 2600sqm extension to the existing terminal building creating a new arrivals hall and a dedicated area for permanent customs, immigration and quarantine facilities for potential international services.

The trick was to provide temporary structures supporting the initial extension to be readily expanded later on whilst providing the level of building aesthetics and amenity expected of a premier high-use public facility.

For this project, Australian steelwork was primarily chosen for the lightweight roofing and awning structure over the terminal's extended footprint and for new covered walkways on the 'airside' and 'landside'.

Essentially, the 2000sqm lightweight steel roof covers a concrete slab atop the terminal extension that is expected at some point to support an additional level to be supported by a more permanent structure of steel columns and roof overhead to provide significant additional floor space to the airport in the future as required.

Jonathan Russell, the Project Manager with the project's builder, Hansen Yuncken said that incorporating a lightweight approach to the roofing was critical as anything heavy would have required additional structural increases to support the load that was not fit for purpose for a temporary structure.

"The lightweight roof is an excellent option for this installation that allows for future proofing of the current structure whilst providing the waterproofing capability and aesthetic detail required prior to the commencement of the later stages," he said.

He said that water drainage management needed to be coordinated with the current and future structure and building layout.

The project also had to contend with some of the wettest weather conditions experienced in the region for decades with constant downpours delaying construction during August and September.

"Using steelwork meant that work could commence immediately after the record rain events bucketing the region so there was no need to wait for the concrete floor to be fully dried out," he said.

"Also, because of the open site location, wind-driven debris is a serious safety concern and the use of steelwork for the awning and the temporary roof ensured that debris was minimised onsite."

He added that prefabrication of steelwork aided in developing the covered walkways as the work was adjacent to a live aircraft apron and prefabricating the steel columns ensured minimum work durations which could be scheduled around flights.

Associate with project architect Schreiber Hamilton Architecture, **Joel de Carle** said there were several factors which affected the design of the temporary roof.

"Initially, the decision was made that the drainage system for the future first floor roof should be utilised in the initial stage to drain the temporary roof," he said.

"Also that it have only minimal fall so that the ridge of the roof sat below the sill of a series of existing office windows overlooking the roof area to ensure that no window was obscured and that natural light and views were maintained where possible."

The result is a low pitched roof which has a central ridge, halving the overall fall to two large box gutters and a series of sumps positioned over the main structural columns below.

"With the downpipes serving these sumps cast into the building's main structural columns below, the temporary roof successfully drains the majority of the future first floor space in the first stage of works," he said.

"When the future first floor is constructed, the temporary roof can be quickly removed and the new roof can be connected into the existing downpipe drainage outlets without major disruption to the everyday terminal operations happening on the ground floor below."

He said it was also important to both the design team and the client that the temporary roof should be able to be recycled where possible.

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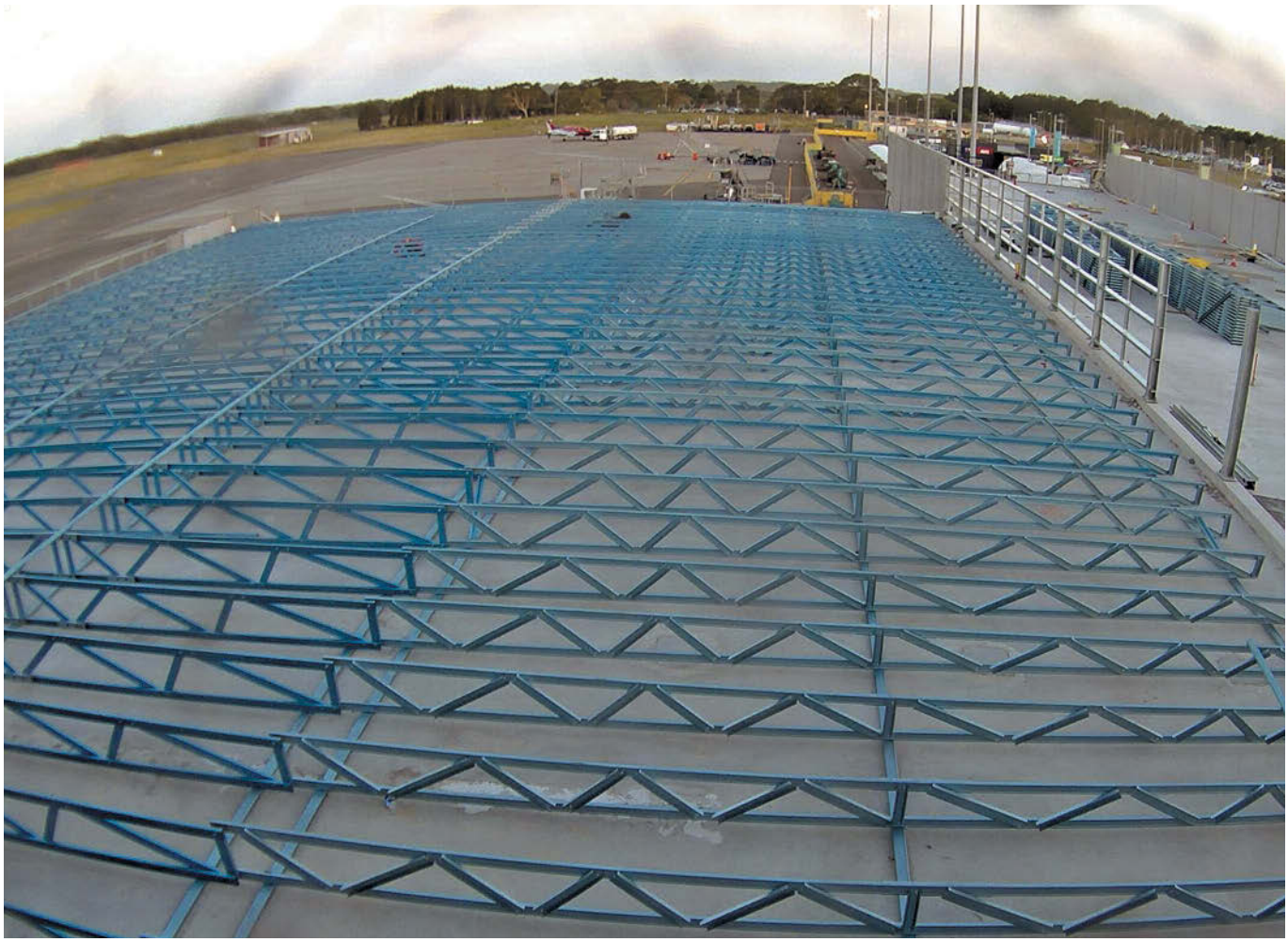
"Consideration was given initially to the temporary roof being constructed in such a manner which allowed it to be simply raised up in sections to form the future first floor roof in due course, " he said.

"However this was seen as unfeasible and impractical for this particular project and the decision was made to proceed with a lightweight steel framing system which could instead be recycled for use on other projects."

Project engineer, MPC's requirement for the performance of the 'temporary roof structure' was for it to satisfy all code requirements for the environment with regard to corrosion protection and design tie down fixings, and for full design strength of all light gauge steel elements.

"Whilst the roof structure was seen as potentially temporary, it was imperative that the elements were designed for long-term



'permanent' requirements as there was no guarantee when any future extension could occur," said MPC Consulting Engineers Senior Structural Engineer and Director, **Derek Prentice**.

"Furthermore, with the Airport being considered a post-disaster facility, the design requirements for the roof framing had to satisfy these long-term wind load requirements.

"As such, the structure was considered as permanent from a structural strength perspective and to be effectively sealed (as for internal steelwork) from a corrosion perspective."

Scott Robertson at the project's steelwork contractor, Newcastle Steel Frames & Trusses said they predominantly used Trucore® zinc/aluminium alloy coated steel for the roof framing and coated steel flat product from BlueScope.

He said that due to the large roof areas the trusses had to be separated into transportable lengths and then joined together onsite.

The trusses are supported on bearing plates fixed to the post tension slab with screw bolts at 1200ctr spacing which was challenging to ensure the fixings didn't penetrate the post tension ducts (cables in the concrete).

PROJECT TEAM

Architecture: Schreiber Hamilton Architecture

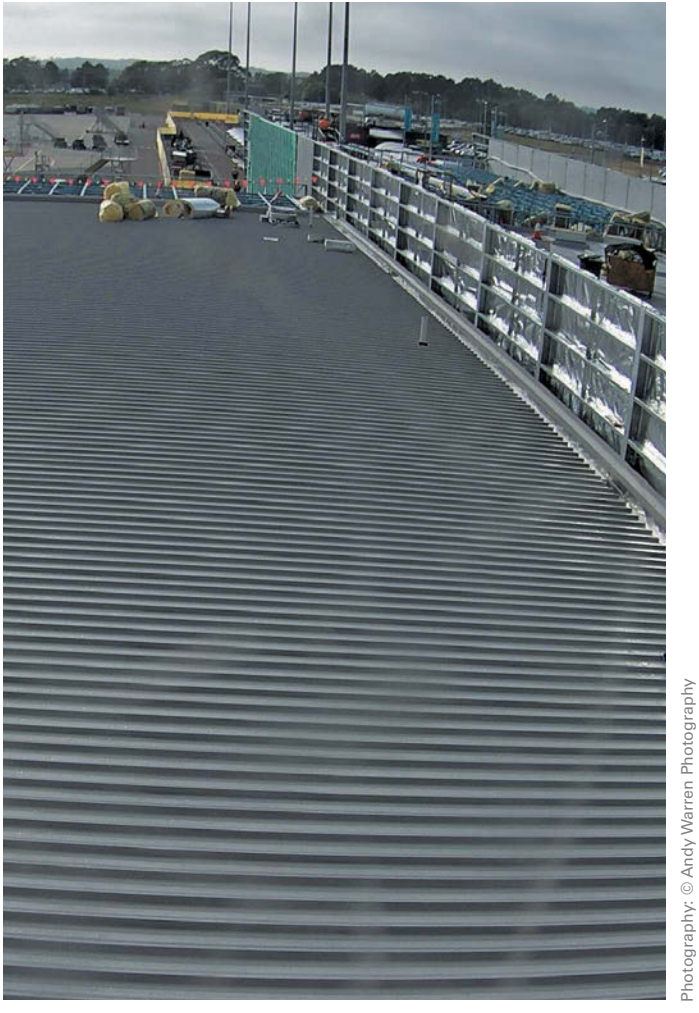
Builder: Hansen Yuncken

Structural Engineering: MPC Consulting Engineers

Steel Fabrication: Newcastle Steel Frames & Trusses

ASI Steel Distributor: BlueScope Distribution

ASI Steel Manufacturer: BlueScope



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