Our Lady of Mercy College

SAFETY-FIRST APPROACH SEES STRUCTURAL STEEL CHOSEN FOR THE LATEST ADDITION TO THIS GROWING COLLEGE

ONESTEEL'S 300PLUS® RANGE OF HOT ROLLED STRUCTURAL SECTIONS WERE USED IN THIS TWO-STOREY ADDITION TO OUR LADY OF MERCY COLLEGE.

The ground level of the extension consists of a 200 seat auditorium with a stage, a band room adjacent to the stage, a foyer and kitchen servery, toilets and a small storage room.

The upper level consists of general classrooms and a common area, overall accommodating up to 108 students and staff.

Egress from the upper floor is via one set of stairs from the common area and a bridge across a void to the existing three-storey part of the building and then to stairs. The void effectively separates this part of the building from the remainder of the building. A smoke detection system is incorporated within the lower level of the building and will result in shut down of air supply to the auditorium.

In the event of activation of the detection system, an alarm will be sounded at both levels.

Since the two-storey extension is connected to a three-storey existing building, the Deemed-to-Satisfy (DTS) provisions of the BCA would require the two-storey extension to be treated as Type A construction. Structural steel beams and columns require a Fire-Resistance Level (FRL) of 120 minutes with the floor between the levels having an FRL of 120/120/120.

The **300PLUS®** structural steel columns and beams are unprotected and the slab between the levels has been designed to have an FRL of 30/30/30.

A composite slab can achieve the latter performance without taking into account the influence of reinforcement other than the steel decking.

The fire-engineering solution demonstrated that the risk associated with the proposed extension incorporating bare steel beams and columns and a floor having a reduced FRL was not less than that associated with the building should it have been designed to the DTS provisions. This was able to be demonstrated on the basis of the following arguments:

(a) evacuation time for the upper floor is short and occupants will become aware of the fire due to detection at the lowest level and from the other cues associated with a fire at ground level. The DTS provisions do not require the detection and alarm system.

(b) it is not possible for a significant fire to take hold in the auditorium due to the lack of air supply. A door would have to be left open to get sustained burning but even then the resulting fire would not be of sufficient intensity to seriously affect the columns and beams within the auditorium. Other parts of the ground floor also have insufficient fire load or ventilation to result in a fire capable of significantly affecting the structural steel members.

OUR LADY OF MERCY COLLEGE – FIRE RESISTANCE REQUIREMENTS SUMMARY

BUILDING ELEMENT	ELEMENT REQUIREMENT	
	DTS#	**Alternative Solution**
columns	120/-/-	ESA/M ≤ 26m²/tonne
beams	120/-/-	ESA/M ≤ 30m²/tonne
floor slabs	120/120/120	30/30/30
local detection	no	yes

Type of Construction: A # Classification of building: 9b

OWNER
Our Lady of Mercy College, Melbourne. The college is incorporated as the Mercy Secondary Education Inc.

ARCHITECT
Williams Ross Architects

CONSTRUCTION MANAGER
Burns Bridge Australia Pty Ltd

STRUCTURAL & CIVIL ENGINEER
Burns Hamilton & Partners Pty Ltd

SERVICES ENGINEER
Sanderson Consultants Pty Ltd

BUILDING SURVEYOR
PLP Building Surveyors & Consultants Pty Ltd

FIRE SAFETY ENGINEERING
Cesare (VUT)

PHOTOGRAPHY
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