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Collapse of precast concrete elements stored in fabricated racking

What happened?

Eleven precast concrete elements (panels) weighing approximately 100 tonnes and stored in a steel rack on a local construction site collapsed on 9 March 2009. Fortunately there were no people in the vicinity of the rack at the time of the collapse but the elements and the rack struck and damaged a mobile crane on site.

The rack was not designed or tested to determine its safe load capacity and the large number of elements being stored arose from stockpiling as a result of the sequencing of erection.

Key issues

The steel storage rack was not fabricated in accordance with any engineering calculations or certification of its safety for the purpose it was to be used. The large number of elements being stored in the rack was clearly beyond its safe capacity, resulting in collapse. Workers are routinely in the area of the rack as part of their work and could have been crushed and killed or seriously injured.

There is a National Code of Practice for Precast, Tilt-up and Concrete Elements in Building Construction (the Code) which was released in February 2008 by the Australian Safety and Compensation Commission (ASCC) that provides valuable safety guidance for those working with or handling concrete elements. A concrete element means a concrete panel or other precast concrete element, made in either an on-site or off-site casting yard that is cast and then lifted into position to form part of a building.

Section 6.2 of the Code provides the following information in relation to the storage of concrete elements:

- the concrete elements should only be stored in a position **approved by an engineer**
- racking systems, frames and supports should be **designed by an engineer** for the shape, size and weight of the concrete element
- approval and written instructions should be obtained from the engineer before a concrete element is stored horizontally
- approval and written instructions should be obtained from the engineer before a concrete element is stored on a suspended floor slab or beams. This is particularly important in a situation where it becomes necessary to put a concrete element into unplanned temporary storage. For example, where the erection of a concrete element to the temporary braced

- condition cannot be finalised. If approval by an engineer cannot be obtained, the concrete element must be returned to ground level
- during storage, care should be taken to minimise the likelihood of impact between the concrete elements. Where concrete elements are stored in areas of vehicular movement, protection by way of bollards or other physical barriers and appropriate warning signs should be provided, and
- prefabricated concrete elements should only be stored in a designated area and in such a manner as to minimise multiple handling

Recommendation

It is recommended that those in control of construction sites where concrete elements are used and stored or panel yards take steps to ensure that they arrangements they have in place are safe. The National Code of Practice for Precast, Tilt-up and Concrete Elements in Building Construction should be referred to for guidance.

In particular, sites storing concrete elements in racks or otherwise should examine the racks or other stillages they use for this purpose and if necessary seek the advice of an Engineer to ensure they are safe and appropriate for the purpose.

A copy of the National Code of Practice for Precast, Tilt-up and Concrete Elements in Building Construction is available from the Australian Safety and Compensation Council web site - ascc.gov.au - Index of National Standards Codes of Practice and related Guidance Notes

Legislative requirements

Workplace Health and Safety Act:

Section 55

Employer's general statutory duty of care

Workplace Health and Safety Regulations:

38 Hazard identification and risk assessment

39 Risk management

National Standard for Construction Work [NOHSC:1016(2005)]

National Code of Practice for Precast, Tilt-up and Concrete Elements in Building Construction

Further information

Additional information on this issue or other safety matters is available at NT WorkSafe:

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