



Mines Safety Bulletin No. 140

Subject: Structural collapse of buildings and temporary structures during wind events

Date: 27 March 2017

Background

Several incidents involving the collapse of buildings and temporary structures (e.g. container structures) during severe thunderstorms and wind events have occurred in recent years. These incidents have resulted in damage to equipment and injuries to workers.

Inspectors have identified buildings with:

- damage (e.g. corrosion, impact)
- no design and construction records
- no final sign-off on the 'as-built' records by competent persons
- modifications not approved by competent persons.



Building and temporary structure damage following severe storm events. Left. Collapse of heavy mobile plant workshop roof. Right. Overturned container shelter.

Summary of hazard

Buildings (including temporary structures) can collapse when their strength is inadequate for the load applied (e.g. wind action). The strength of a building relies on adequate design, construction and continued maintenance. If parts of the building, its connections, bases or foundations are damaged or modified, its strength may be inadequate. For workers or those seeking shelter during a storm, the collapse of building has the potential to cause serious injuries from falling or moving debris associated with the structure, or parts thereof, collapsing.

Contributory factors

- Buildings not designed to withstand potential wind conditions as required by the Australian and New Zealand standard AS/NZS 1170.2 *Structural design actions – wind actions*.
- Construction of the building, including its bases and connections, not carried out in accordance

with the designer's requirements.

- Buildings not inspected adequately, during or after construction, or maintained thereafter to a suitable standard.

Actions required

Principal employers, mine managers, building designers and constructors are reminded of section 14(3) and their duty of care obligations under the *Mine Safety and Inspection Act 1994* and duties relating to construction under the *Mine Safety and Inspection Regulations 1995*.

- Building designers and suppliers to determine the correct site wind speeds for the building's design, as required by AS/NZS 1170.2 [wind regions, Figure 3.1(A) and Table 3.2] and communicate this (together with any other loading or construction requirement) to relevant parties.

Note: Each site's conditions and building locations are unique and need to be correctly assessed to ensure site-specific wind speed is recognised.

- Building constructors must meet all design specifications, including the installation of the required anchorage and tie-down practices for buildings and temporary structures.
- Buildings must be inspected during and after construction to confirm the quality of construction and that the ongoing conditions meet the design specifications.

Note: Records of this inspection should be kept for future verification.

- Where an existing building's wind resistance is undocumented, assess (using a competent person) the building for the wind loads specific to their location, as required by AS/NZS 1170.2.
- Implement a building maintenance system, including periodic inspections by competent persons, to ensure buildings are maintained in a safe condition.
- Implement suitable systems and procedures for the management of potential hazards associated with severe weather events on site.

Further information

- Standards Australia, www.standards.org.au

AS/NZS 1170 Structural design actions

AS ISO 13822 Basis for design structures – Assessment of existing structures

- Department of Mines and Petroleum, Codes of practice, www.dmp.wa.gov.au/Safety/Codes-of-practice-16145.aspx

Safe design of buildings and structures – code of practice

- Department of Mines and Petroleum, Mines safety alerts, www.dmp.wa.gov.au/Safety/Mines-safety-alerts-13194.aspx

Mines Safety Bulletin No. 124 *Structural safety of buildings, plant and other structures*

Significant Incident Report No. 182 *Whirlwind carries transportable ablution block 50 metres*

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