

Safety and health alert

18/05 Concrete panel retaining wall failure

Incident

A 20-tonne concrete tilt-up panel recently collapsed, resulting in significant damage to a work vehicle. The concrete panel was part of a retaining wall consisting of individual concrete panels. The retaining wall had been in situ and had been backfilled with soil for approximately 9 months prior to the incident. At the time of the incident, the concrete panel failed to withstand the forces applied by the backfill soil, falling outwards into an adjacent car park and onto a work vehicle.

The concrete panel had been poured on site and lifted into position (tilt-up), with a footing being poured after the panel was in place (post pour footing), in accordance with the design engineer's requirements. Each concrete panel of the retaining wall was free-standing. They were held into position by reinforcing steel through the base of each panel into a postpoured footing. No ground anchors were part of the design.

An investigation following the incident revealed a section of the footing was unable to withstand the forces applied to the footing. The front (toe) section of the footing failed, allowing the concrete panel to fall over. Advice to WorkSafe indicates that the incident was a result of a design fault that would not be obvious to most structural engineers.

Factors

- The retaining wall consisted of concrete panels that were not anchored into the backfill or tied together.
- The concrete panel was being held in position by way of reinforcing steel through the base of the panel into the post-poured concrete footing.
- The design of the retaining wall did not adequately address the forces that were to be applied to the footing.

Recommendations

1. Persons who have control of workplaces where freestanding concrete panels are in use as retaining walls should confirm that the wall is structurally sound.
2. Section 23(3a) of the *Occupational Safety and Health Act 1984* requires persons who design and construct any building or structure for use at a workplace to, as far as is practicable, ensure that the design and construction is such that persons who properly use the building or structure are not exposed to hazards. Designers of retaining walls need to consider the adequacy of their designs in terms of all the forces likely to be imposed on the retaining walls and their footings.

Further information

Further information can be obtained from the WorkSafe internet site www.worksafe.wa.gov.au, or by contacting customer service on 1300 307 877 or email: safety@docep.wa.gov.au.

