



CELEBRATING
OUR CENTENARY

Professional Engineers Registration Bill

Submission to the NSW Legislative Assembly
Committee on Environment and Planning

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Annex: case studies

These case studies illustrate the need for a statutory registration scheme for professional engineers working in all industries.

Case study 1

Case study of an engineering failure in a building that is not a Class 2 apartment⁸

Tilt up panels are a standard form of construction for many factories and commercial properties. It involves lifting pre-cast concrete panels into place for a building. Temporary bracing is used during construction to support unfinished structures against wind and other construction loads. Failure of temporary bracing is not uncommon and prompted NSW Workcover to issue guidelines after the collapse of a 40-tonne panel:

- Temporary bracing needs to be designed by an engineer taking into account wind loading, site access, installation and dismantling
- The engineer must review and approve any modifications to the bracings' design before any changes can be made
- An experienced engineer should design the temporary bracing before starting construction works
- Installation must be according to the engineer's specification
- An engineer must review any proposed changes to the installation of the bracing
- Structural integrity of the bracing needs regular inspection.

Bracing for tilt-up panels needs the input of engineers to ensure it is fit for the purpose and will perform safely without collapse and subsequent injury and damage. Without a compulsory registration scheme for engineers that applies beyond Class 2 structures, vital areas of engineering will remain at risk.

Case study 2

Case study of an engineering failure in a Class 2 apartment, but related to something not usually considered when thinking of what goes into erecting a building⁹

Formwork is an integral element in construction and is applicable to many construction activities including high rise apartments. Formwork is a temporary (sometimes permanent) mould into which concrete is poured. It is often made of strong plywood but can be other materials. Failure of formwork can have horrific results. A multi-story formwork collapse in May 2019 in NSW saw three workers escape injury by grabbing onto and climbing up the reinforcement mesh and debris. Formwork for high rise apartments and other high-rise buildings needs to:

- Be designed by a competent person, such as an engineer, taking into account various factors including static and dynamic loads, how the formwork is to be braced, rigidity, movement of people and environmental factors such as wind and rain
- Have variations to design checked by an engineer
- Have various components from different formwork systems authorised by an engineer
- Have an engineer inspect and certify completed formwork and its supporting structures to ensure it meets the design specifications and is structurally sound



⁸ OHS News, *NSW: WorkCover Issues Guidelines on Tilt Up Panels*, 29 January 2010. Available at: <http://content.safetyculture.com.au/news/index.php/01/nsw-workcover-issues-guidelines-on-tilt-up-panels/#.XaQ84egzaUI>. Accessed 14 October 2019. Additional details about the incident involving the 40-tonne panel may be available from SafeWork NSW.

⁹ SafeWork NSW, *Formwork collapse during concrete pour*, 25 May 2019. Available at: <https://www.safework.nsw.gov.au/compliance-and-prosecutions/incident-information-releases/2019-iiir-accordions/formwork-collapse-during-concrete-pour-25-may-2019>. Accessed 14 October, 2019. Additional details about this incident may be available from SafeWork NSW.

Formwork in complex construction should be designed by engineers with appropriate training and experience. Without a comprehensive compulsory registration scheme for engineers vital areas of engineering will remain at risk.

Case study 3

Case Study of engineering failure in civil construction (bridge)

In 2010, the eastern duplication bridge of the Gungahlin Drive Extension (GDE), over the Barton Highway in the ACT, partially collapsed sending debris crashing onto the highway. The new bridge was under construction when it collapsed. One man was trapped under the rubble and nine taken to hospital for treatment. All those affected were working on the new span of the bridge.

An engineer's report on the collapse of the bridge found the project's formwork was not properly braced to stop the girders moving sideways when the concrete was poured, creating excessive stress.

The engineer responsible has also been accused of breaching building standards on eight projects in the ACT including the Barton Highway bridge, Empire Apartments in Forrest and Pulse Apartments in Gungahlin.



Case study 4

Case Study of engineering failures in the agriculture sector

A number of silo collapses have taken place in regional Australia, some of which have resulted in fatalities. Recent examples of silo collapses include:

- In May 2010, a man was crushed to death by a metal grain silo near Kyabram in northern Victoria;
- In October 2014, a farm worker near Ouyen in western Victoria died when a grain silo collapsed on him;
- In June 2015, a 3000-tonne silo, which was about three-quarters full of cement dust, collapsed in the Adelaide suburb of Osborne, despite the silo being brand new, although thankfully, no-one was injured.
- In January 2017, a 3500-tonne grain silo on poultry company, Ingham's property in Cardiff, near Newcastle in NSW, collapsed without warning, with witnesses saying it was lucky that no-one was hurt; and
- In June 2018, a full grain silo collapsed near Mallala, to the north of Adelaide, and although workers were in the vicinity at the time, no-one was injured;

Compulsory registration of engineers would make it much less likely for similar design flaws and silo collapses to happen in the future, significantly enhancing community safety and consumer protection.