



Erection design engineering: Lifting

When something goes wrong involving the installation of prefabricated concrete elements, the spotlight tends to shine on lifting systems and QA procedures. Two past incidents in particular - one in Western Australia and the other in Victoria - occurred when lifting inserts broke away from precast panels, causing the panels to fall.

Initial reports indicated that both incidents were attributed to the incorrect installation of the anchoring systems and poor rigging practices. In the two instances, both of the anchoring systems required tension bars to achieve their rated capacities. In one of the incidents a straight bar was used rather than the specified 'V-shaped' tension bar and in the other, the tension bar wasn't installed at all.

The incidents raised questions about lifting systems generally and the quality control on their installation during manufacture.

They have also emphasised the requirement for an Erection Designer to be engaged for all building projects - as required by AS 3850:2015 Prefabricated Concrete Elements. Depending on the circumstances, the

Erection Designer may be responsible to the builder or the precaster, and contract conditions should clearly state to whom the Erection Designer reports. The Erection Designer may also be the In-service Designer.

The importance of the Erection Designer is often overlooked, or alternatively, the erection design role is undertaken by a number of different people. This fragmented engineering approach can be confusing and often some important tasks are overlooked or forgotten during the construction process.

Whilst the Erection Designer is responsible for the erection design of a structure, the Erection Designer has a role to play in the manufacture, handling, transport and erection of prefabricated concrete elements, and must be engaged before any element is manufactured. With an understanding of all the construction loads, it is the role of the Erection Designer to ensure the structural integrity of each element during manufacture and erection and also to ensure the stability of the prefabricated elements within the building during construction.

With an understanding of all the construction loads, the Erection Designer approves the selected engineered lifting system with the published technical data from the manufacturer, and approves shop drawings in which the system is installed. Alternatively, reputable engineered lifting system suppliers will provide certified lifting designs, on which the Erection Designer can sign-off for a project. If the specified engineered lifting system is unable to be installed in accordance with the certified lifting point design, then the Erection Designer must approve and record any proposed changes.

The next step is to communicate the various rigging designs (which will include the manufacture and erection drawings, showing any special rigging diagrams) to everyone who will handle the concrete elements. The erection documentation must be given to the erection crew on site

before any erection work is undertaken. If, for whatever reason, the specified rigging details cannot be achieved, the Erection Designer must be contacted so that the proposed changes can be verified and approved in light of the selected engineered lifting system.

Indeed, the role of the Erection Designer is integral to the whole process, however it is also crucial to use a reputable precast manufacturer who has a documented QA system in place. This will minimise any likelihood of incorrect lifting systems being used or of systems not being installed correctly.

Note - for more information about the role of the Erection Designer, refer to AS 3850:2015 Prefabricated Concrete Elements. Refer in particular to Part 2 - AS 3850.2 Building Construction.

Critical to safe lifting and erection of panels is that:

- An Erection Designer undertakes the 'erection design' (refer to Part 1 of AS 3850.1:2015 for definition of 'erection designer')
- All chosen lifting systems must be engineered (and approved by the Erection Designer as part of the erection design)
- Lifting systems must be correctly installed by a reputable precaster who has a documented QA system (such as a National Precast Member)
- All rigging diagrams ('erection documentation') must be included in the erection design and communicated to the erection crew
- All rigging practice must be in accordance with the erection design and appropriate Australian Standards
- Any changes to any of the above must be approved by the Erection Designer.

Adopting these practices will minimise any potential for accidents.

Please note: The National Code of Practice for Precast, Tilt-up and Concrete Elements in Building Construction 2008 has become outdated and its content conflicts with requirements of the revised AS 3850.1 and 2:2015. National Precast does not support this Code, which is pending review and updating by Safe Work Australia.