



## Strong enough for elephants

The male Elephant Enclosure at Taronga Zoo is part of the new \$40M elephant exhibit which has been built to house an additional five elephants imported from Thailand.

The attractive but supremely strong precast concrete enclosure is the home to one male 'Bull' elephant and rotating visits for breeding purposes from the herd of 'Cow' elephants. The panels have to be able to withstand huge point of impact loads from potentially aggressive and dangerous elephants. Precast concrete is the obvious choice for this task.

The enclosure is formed from 47 large precast panels made from neutral coloured concrete. A total of 60 precast units are incorporated, comprising wall panels, gate panels and a planter box.

The biggest panels are nine metres high, three metres wide and weighing a significant 17 tonnes. With only four base moulds used, the design has cleverly created a pattern where every panel seems unique. The main feature of the precast façade is the unique pattern cast into the external face of the panels. The purpose of the pattern is to transform a building which is essentially a large concrete box into a structure that will be viewed as a background

### **Project Owner**

Taronga Conservation Society Australia

### **Architect and Project Superintendent**

Jackson Teece

### **Service Engineer**

Hughes Trueman

### **Builders**

ADCO

### **Precast Manufacturer**

Precast Concrete Products

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building strong in its own right with detail references to natural shapes and forms, while contrasting with the Heritage Elephant Temple and its golden dome. Importantly there was a dialogue between the design requirement to limit any repetition around the building and the precaster's desire

to maintain mould efficiency by limiting the number of moulds required – the end result cleverly achieves both aims.

The solution is a mix of aesthetic treatments that were conceptualised by the designers and developed by the precaster's in house design team throughout the shop drawing process. Close collaboration between the client, the architects Jackson Teece, the builder ADCO, and Precast Concrete Products, was the key to the success of the finished façade.

The façade solution includes the following aspects:

- The panels are inclined at five degrees from the vertical to soften the shape of the overall building.
- Panel to panel joints are inclined at five degrees from the vertical to help the joints blend into the pattern and help hide the regularity of the panel sizes.
- The top edge of the panels are staggered to further break any appearance of regularity.
- The fine pattern which represents foliage is randomly distributed around the façade. A series of mould liner shapes were created at the precaster's in-house mould workshop for this purpose.
- The deeper pattern comprises varying width grooves that add another layer of complexity to the overall appearance and allow a more unique look to each individual elevation. Great care was taken to ensure that these deeper grooves were seamless across panel joints.
- Panels are integrally coloured with oxides after an extensive sample and approval process.



The precast panels are nominally 300mm thick and tapered to almost 400mm at the base of the panels to stiffen the connection to the base structure. The panels are heavily reinforced and fixings stiffened to resist the forces that could be applied by the inhabitants throughout the life of the building.

The result is a building that, when viewed from the Harbour or up close, blends in with the surrounding vegetation and pays respect to the Heritage Elephant Temple.

#### A manufacturing challenge

These features presented the precaster with a unique series of challenges throughout manufacture. Due to the slope of the panels and the joints, the mould geometry was complicated as no corners were square and no mould sides were normal to the casting beds. Each panel was unique so the mould pattern had to be modified for every cast. The large doorways required for the elephants to access the building resulted in a number of awkward panel shapes with narrow legs down the sides of the doorways. Due to the incline of the panels, they had to be installed with face lifters that were cleverly camouflaged within the pattern. Panels were turned in the factory and delivered face up on the delivery trucks to the site so that the face lifters could be utilized.