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Traffic stopper

The new headquarters of the Royal Automobile Club of Tasmania (RACT) is a modern, five storey building that combines strong functional elements with a style that calls for attention.

Built on the site of the Club's previous two storey headquarters on a hill overlooking the Hobart city centre and the Derwent, the new building certainly meets its brief.

Retaining a sense of its origins, the finished project also provides a cost effective and commercially practical base for the Club's operations – including its travel agency and insurance arms, some commercially leased office space, and a large basement car park that includes special bays for vehicle inspections and the fitting of child car restraints.

Certainly when it came to speed and efficiency, precast was the order of the day. Duggans Precast was contracted to supply some 420 precast elements, including retaining walls, columns and façade walls (with some incorporating inbuilt columns).

As well as meeting the practical requirements of the job, use of precast is the key to some of the more distinctive architectural features of the building.

One of these is the precast grand central staircase. This is a showcase piece that spans all floors of the building's signature full-height atrium.

Another is the innovative use of precast in window treatments to maximise light throughout the building – an aim of the design from the outset. Even traditionally 'dark' or enclosed areas of a building such as the lift lobbies and bathrooms have been opened up to the light.

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President's column

As incoming President of National Precast Association I am honoured to take over the reins from Peter Healy who has led us admirably for the last two years. Congratulations Peter on a job extremely well done and I look forward to your advice and guidance over my term.

The Board was re-elected with the addition of Richard Carr, General Manager Sales and Marketing with Humes. We look forward to a big contribution from Richard.

Over the next 12 months the following initiatives are planned:

- Review of the National Code of Practice for Precast, Tilt-up and Concrete Elements in Building Construction and AS3850, both very important documents to our industry;
- Publication of the Walling Detail Manual and the Sandwich Panel Recommended Practice;
- Reviewing our education content and its method of delivery;
- Participation in ICCX Oceania - being held in Melbourne in February 2011, with National Precast as the main supporting organisation;
- Joint meeting with Precast New Zealand in February 2011; and
- Hopefully representing our Association at ICCX Europe, in Italy in October 2011.

The Association provides a forum for participants (both Precasters and Suppliers) to promote their product and services and strive for excellence in the use of precast concrete.

Meetings are held quarterly in a different city in Australia and in 2011 will be held in Melbourne, Hobart, Sydney and Perth. Potential members wishing to join should contact our Executive Officer, Sarah Bachmann for more information.

Together with the Board, I look forward to serving our Members and growing the use of our Members' precast concrete.

Leo Valente
President

Precast arches deliver for Southern Gateway

The Southern Gateway Alliance, led by Leighton Contractors, was established in 2007 to deliver the New Perth Bunbury Highway in Western Australia, consisting of 70km of new road and 19 bridges. Five of the bridges involved a total of 5,000sqm of reinforced abutment walls with unique pattern recesses to each panel.

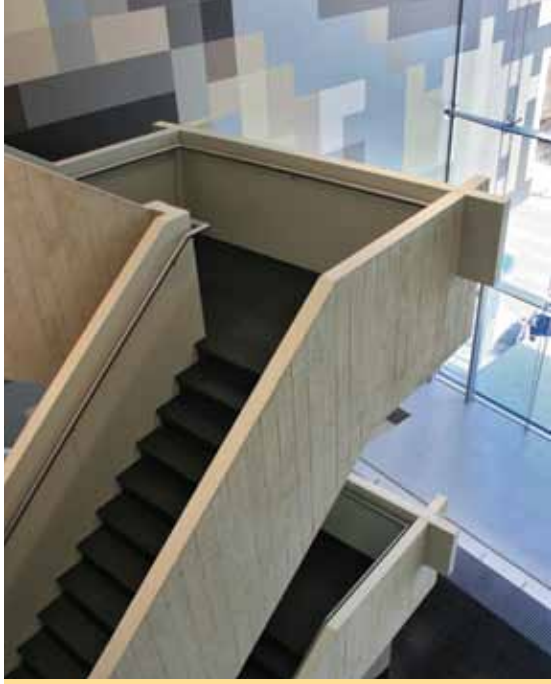
In early 2009 the alliance was additionally awarded the Mandurah Entrance Road project. The major elements of the Mandurah Entrance Road included 6.5km of four lane dual carriageway and two railway tunnels, one of which was an extension to an existing railway tunnel at Fremantle Road of some 170m length, and the other, a new 220m railway tunnel at Parklands.

In July 2009, Reinforced Earth tendered and was awarded the design and supply of the 220 lineal metres of TechSpan precast arch tunnel at Parklands. The arch tunnel was 17.5m span x 7.5m in height. Elements were 350mm thick, weighed 24 tonnes and were manufactured with 50MPa concrete. Humes was awarded the 170m extension to the existing Fremantle Road tunnel which they had previously supplied. The reason for awarding the tunnels to two separate suppliers related to the tight program for track possession and arch installation through January 2010. Awarding to two suppliers gave the Alliance partners some safety margin that the supply program could be met.

Reinforced Earth built four arch moulds to facilitate the arch supply program and engaged a local precaster to undertake the manufacturing. An electrical consultant was also engaged, as reinforcement to the arches was required to be electrically earthed.

Arch manufacture went smoothly once all four moulds were brought in to service and completion of arch manufacturing was achieved in just three months. Arch installation also went without any major problems, being completed in three of the four weekend track shut-downs which were provided by the client.

Client: Southern Gateway Alliance
Head contractor: Leighton Contractors
Engineer: GHD
Parklands precast arch tunnel manufacturer: Reinforced Earth
Fremantle Road precast arch manufacturer: Humes



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"We wanted light throughout the building, not just in the atrium," explains project architect, John Button. "So some precast panels on the lower floors that are overlooked by other buildings have round glass blocks incorporated into them, enabling modesty and privacy while still capturing and disseminating the light due to the shape and diameter of the glass insets.

"Side windows have been made with an Oregon-finished 'window box' and a precast 'hood' for both protection and aesthetics, so the large outer wall is punctuated with smaller windows surrounded by a sort of 'picture frame' that adds a sculptural quality," he says.

Each of these elements combine to give the building its airy open feel, while other inclusions ensure that it speaks with a voice all its own.

These include a rooftop indoor/outdoor cafeteria featuring a louvred, retractable glass wall – already a major hit among staff and a two storey high mural of a colourful humorous caricature of the RACT, by well-known local artist Tom Samek,

And, last but not least, in the building's foyer, the walls on either side of the atrium feature a massive four-storey-high rendition of an image of the previous headquarters. This has been achieved by commissioning huge 2,000mm x 600mm techlam tiles coloured to match a giant pixelated photograph of the old RACT building – a dramatic homage to this new building's heritage.

Head contractor: Fairbrother
Architect: Heffernan, Button, Voss
Engineer: Gandy & Roberts
Precast manufacturer: Duggans Precast

A total solution

A brand new 4.5 star hotel has set new standards and offered insights into the possibilities offered by a total application of precast.

The Mercure Sydney Hotel Liverpool, which shares the site of the Liverpool Catholic Club, has swiftly become a quality landmark.

The 104 room, six storey hotel shares the facilities of the Club, which include an ice rink, gym and sporting fields. In addition to its function and four separate dining facilities, the hotel has four pools, including lap, leisure and wading pools. Between them, the facilities on this site have helped enhance the identity of the wider community they serve.

Precast played a vital role in this construction from the earliest stage. It offered not only speed and ease of construction that enabled completion of the $20 million project in only 14 months – but has also become an exemplar of the new direction for precast construction, as Richard Lorenzin, from Sydney based precast manufacturer, Hanson Precast, explains.

"Total precast buildings represent a growing area, as more and more architects, engineers and builders recognise the ability of precast to meet a project's requirement at every stage".

"Whereas in the past you might have seen precast used for certain elements in a project - say, precast walling for its versatility and durability of finish or to meet site, speed, safety or environmental requirements - you can really see that this project is a classic example of the next logical step."

With total precast construction, the use of precast is anticipated and planned for right from the concept stage. This makes the most of all of its capabilities: structural qualities, versatility of finish, minimal maintenance, durability, sustainability and so on. The end result is a speedy, cost effective project that avoids double handling and open-ended insitu solutions.

"Sometimes, for example with architectural precast incorporating finishes such as polishing, insitu concrete construction is used for the structure, with precast as cladding only. It's a waste because with planning and foresight, you can use precast to offer both structural and impressive aesthetics, as we have done in this case," says Richard.

Once the first floor insitu suspended slab was poured, it was time for the precast.

Close to 3,000m2 of wall panels and 3,500m2 of precast flooring – supported by load-bearing precast walls – were installed using a 100 tonne mobile crane. This took place over five separate visits, in just 25 days – a feat which required delivery of some 155 loads.

The finish to some wall panels was acid etched, while other panels were polished. The concrete mix was based on an off-white cement, coloured aggregate and local sands.

A typical polished external panel was 8,500mm long x 3,450mm high and 200mm thick, with wall panels on the top level an expansive 4.28m high to allow for fixing of roof steel. Internal polished loadbearing wall panels were fixed with precast lintels ready to accept the hollowcore floor planks.

Architect: Wood + Day Partnership
Engineer: Robert Bird Group
Builder: James Clifford Construction
Precast manufacturer: Hanson Precast

Precast vs tilt-up clearing up the confusion

Over the last 30 years or so the precast industry has gone to great lengths to educate the market about the differences between precast and tilt-up… yet in some circles confusion still seems to reign. Although both products use concrete, they are very different breeds indeed.

What is precast?

Precast concrete is any concrete element which is manufactured in a controlled factory environment, transported to site and then craned into position.

Precast concrete elements are manufactured in state of the art facilities using advanced manufacturing techniques (extending to mixes, placement, vibration and curing), by highly skilled labour, in high quality moulds and with high quality equipment. The result is a high strength, high quality, highly durable and low maintenance product that can last over 100 years and which is available in a myriad of shapes, sizes, finishes and colours. Being manufactured in purpose-built factories brings with it all the benefits of off-site manufacture, such as minimised waste, quality control and incorporation of recycled content. There are benefits on site as well because exact elements are delivered to site (less waste), construction happens faster and sites are less cluttered, less noisy and safer. Usually locally supplied, precast ensures minimal transportation costs.

Precast concrete manufacturers such as the members of the National Precast Concrete Association usually have a huge investment in plant and equipment and are well funded. They are permanent businesses rather than ephemeral subbies.

What is tilt-up?

Tilt-up refers to the process whereby wall panels are poured adjacent to their final position on a construction site and then tilted into position with a mobile crane.

Tilt-up contractors are too often small operators without financial substance. It's a case of caveat emptor. Tilt-up is all too often made with unskilled labour and limited engineering supervision, and that poses a durability and general quality risk as well as an increased safety risk.

That being said, using a competent operator, tilt-up can be a perfectly good technique for low-rise work, especially where quality of finish is not a high priority and where appearance can be improved by applied external finishes such as painting, rendering or coating, and the use of landscaping.

Opera House built from precast not tilt-up

Any confusion that exists regarding the differences between precast and tilt-up is not helped by articles such as that published in a recent edition of Australian *Concrete Construction*, titled 'Tilt-Up Construction Moving Forward'.

The article has a huge error in claiming that the Sydney Opera House "was an on-site Tilt-up building".

The concrete prefabricated elements of the Opera House were entirely precast concrete without a piece of tilt-up. They were made in two sophisticated precast concrete factories. One was the EPM Concrete (NSW) Pty Ltd factory at Blacktown and the other a dedicated factory set up by Hornibrooks on site. EPM manufactured the entire pink Tarana granite wall, external paving and other panels that, along with the roofs, define the way the Opera House looks. These were sophisticated honed and acid etched units that were poured in two layers. The "semi-skilled labour" that the article refers to is an affront to the men working on the project. It was a job requiring very great skill indeed: skill in mix control, skill in pouring techniques, skill in curing, skill in honing and skill in etching.

The roof components and the other structural components were manufactured by the builder in a dedicated precast factory set up on site. These were sophisticated products - end matched and post tensioned in the case of the roof ribs and to very precise dimensions in the case of the tiled roof panels. Once again, these were manufactured by very skilled labour using sophisticated equipment. EPM bought the Whirler crane used in the precast site factory at the end of the project and installed it at Blacktown.

So nothing on the Opera House was tilted and nothing was made with unskilled labour.

Grand design for small house

An ultra-compact home tucked into a tiny laneway in Sydney's inner city offers a glimpse of an urban living future driven by practicality and design.

The aptly named 'Small House' boldly reconciles some of the challenges of inner city living – such as soaring property prices, lack of privacy and lack of space – with its many lifestyle benefits, including proximity to work, shops and restaurants.

In a tiny, garage-sized 7m x 6m site in Sydney's Surry Hills, surrounded by large commercial buildings, the 'Small House' is zoned vertically, rather than horizontally.

"We used a number of design devices to make micro spaces more liveable," explains owner and architect Domenic Alvaro, design principal of Sydney firm, Woods Bagot. "The design eliminates rooms, assigns multiple uses to single spaces, has no corridors or doors and diversifies the use of each floor. It also offers the flexibility of adding spaces in the future."

Vertical zones begin at the ground with utility/store/bicycle/parking, moving up to sleeping/bathing, followed with a living area, then an eating/food preparation/entertainment zone. The structure is topped with a working roof garden.

Zones are connected via a stair void which relays light throughout and acts as a thermal stack, drawing air out through each level via the roof-top glazing, maximising cross-ventilation. Large sliding windows flood the interior with daylight and frame city views. A services riser connecting each level enables the reticulation of all services and additional storage.

Critical to the success of the project was the collaboration between the architect and builder, Baseline Constructions, and the extensive use of precast concrete, which was supplied by Hanson Precast.

The precast option offered not only the solidity to ensure privacy in this built-out neighbourhood, but a high quality, exemplar finish that eliminated the need for paint and other decorative finishes. It also enabled the most challenging part of the project – its miniscule site – to be overcome.

"The builder brought an innovative approach to such a difficult site by thoroughly pre-planning all the necessary details for off-site production and minimising disturbance to the surrounding neighbourhood by delivering on a speedy timeline," says Domenic Alvaro.

The precast components comprised 318m^2 of 175mm thick load-bearing wall panels in Class 2 off-form and 138m^2 of 150 thick hollowcore floor planks, which were erected in just four days.

"The real issue with the construction was craneage," says Chris Parsons, Manager of Hanson Precast. "Essentially, until we could determine the logistics, there was no guarantee the job could go ahead. Not only did we have to accommodate the site size, narrow streets and existing buildings, there were real concerns that the position of a light pole on the street would block our only access."

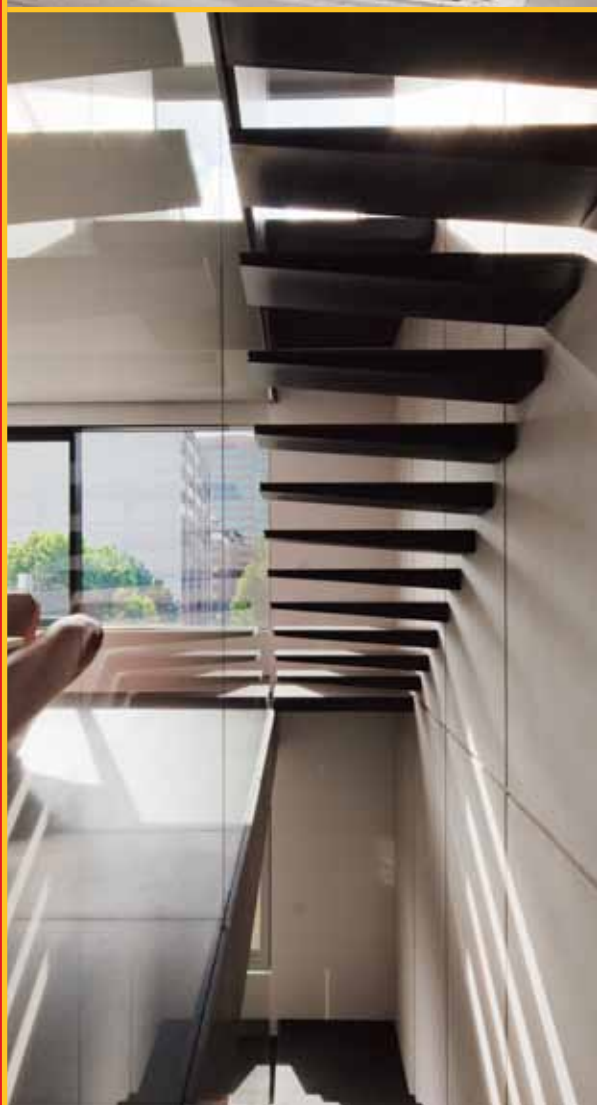
In the end, a 55 tonne, all terrain mobile crane was used, with the crane jib position and slew of the counterweight plotted to the millimetre to miss the neighbouring buildings.

"With most projects, a visual inspection and someone pacing out some dimensions is all that is required. But the decision in this case was made on the basis of an extraordinarily small 50mm tolerance: the ultimate tight site" explains Chris Parsons.

The access problem was ultimately resolved with a practical solution: placing one crane outrigger through the garage opening in the wall panel on the ground floor – a solution that enabled the swift and successful erection of the precast elements.

'Small House' and the story of its design and construction is featured in the Australian version of the popular architectural television series, 'Grand Designs'.

Architect: Domenic Alvaro
Builder: Baseline Constructions
Precast manufacturer: Hanson Precast



Precast protecting a delicate environment

The opening of the new, 360-metre long Red Bluff Shared Walkway spells win-win-win for residents, local government and the fragile ecosystem of the Lake Macquarie region.

The elevated boardwalk is suspended over the seagrass wetlands of Red Bluff on the New South Wales Central Coast. It enables residents, tourists, fishermen and others to traverse the area between the Lake and the nearby Eleebana boat ramp without damaging the vulnerable habitat of numerous native species.

The $2.2 million contract to build the walkway was awarded to Waeger Constructions following a lengthy and detailed concept submission and competitive tendering process, which addressed rigorous design, budget, environmental and social performance demands.

The project involved Waeger swinging both its precast and engineering divisions into action to work closely with the Lake Macquarie City Council to ensure the design and construction met with the brief.

This called for an open framed structure to allow maximum light through to the water below so wildlife, in particular the essential seagrass, would not be adversely affected.

Both super- and sub-structures had to meet critical loading requirements, such as storm surge, impact forces, uplift and crowding. Components used in construction had to be easily handled and transported without damaging the local environment. Potential shadowing issues had to be considered and, finally, the structure had to be maintenance-free, with a minimum design life of 50 years.

To address these requirements, there was significant use of precast in various applications, because it offered the flexibility of both design and application to meet the brief.

Use of prestressed precast concrete components also eliminated many of the potential environmental risks associated with over-water construction.

To address the shadowing issues, for example, specially designed, lightweight pile caps were cast to top the single, hollow, HDPE-sheathed steel tube piles.

They were tapered in all directions for minimal shadowing effect. These special precast caps also assisted with the stability of the very slender, 9m girders – also made from prestressed precast to carefully defined specifications to meet the special requirements of the job and minimise overshadowing.

The girders were designed as twin 400mm high x 230mm wide prestressed beams and spaced at 1m centres to enable securing of the cantilevered crossbeams. The cross beams themselves were also prestressed to reduce the overall weight and increase their load capacity.

At each abutment, textured precast concrete retaining wall panels were used, a finish specially selected to echo the flowing seagrasses of the lake.

To further minimise environmental and community disruption, all precast and other components were delivered to the site on a carefully planned 'as required' basis, positioned using a land-based maximum 80 tonne crane at 35m reach. Specially constructed trolleys were used to transport thousands of components along the length of the boardwalk.

Even more than its on-time, on-budget completion, perhaps the greatest testimony to the overall success of this project is the overwhelmingly positive community response it has received.

Meticulous planning, creative use of materials and a spirit of respect and teamwork for all parties involved meant that none of the potential perils and protests so often associated with development in environmentally sensitive areas happened – instead it was smiles all round.

Client: Lake Macquarie City Council
Architect: Lyn Patrick, Lake Macquarie City Council
Engineer: Waeger Engineering Services
Precast manufacturer: Waeger Precast

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