

# • NATIONAL • PRECASTER

NATIONAL PRECAST CONCRETE ASSOCIATION AUSTRALIA

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Accommodation building in new Student Village, University of Sydney.

Photo courtesy of Eric Sierens.

## PRECAST Duo Perform in Student Housing Project

### PROJECT

Sydney University Village, Newtown

### CONTRACTOR

Multiplex Constructions (NSW) Pty Ltd

### ARCHITECT

Allen Jack & Cottier

### STRUCTURAL ENGINEER

Bruechle Gilchrist & Evans Pty Ltd

### PRECAST CONCRETE WALLS

Rescrete Industries Pty Ltd

### PRECAST FLOORS

Ultrafloor Pty Ltd

The newly completed Sydney University Village situated between Carillion Avenue and Missenden Road in Newtown comprises ten buildings of different heights and architectural appearance set on a 1.48 hectare site. Construction is a mixture of three-storey timber-framed brick veneer, loadbearing brickwork and loadbearing, honed finished precast concrete. With 650 bedrooms, it is designed mainly for student accommodation, but there are some commercial areas including a bar and eating facilities. Additionally, the two blocks of motel-style apartments can be used for trading as a summer hotel. Initially the cluster of structures was to be of fairly conventional insitu concrete construction with facades of painted masonry. However, as the planning evolved, different methods of building were incorporated allowing the architects, Allen Jack & Cottier, to create the different façade finishes that can now be seen on the completed site.

When Multiplex Constructions took on the design and construction of the project, including a lengthy maintenance contract, the durability of the building elements and the ease of maintenance became of prime importance. "The team's selection of the most appropriate materials, construction detailing and methodologies were key issues, with whole-of-life costs being an ever-present consideration throughout the design and construction process", said Multiplex's Project Manager, Sean Nyssen. Consultation by the project management and the structural engineers, Bruechle Gilchrist & Evans, with the precast industry at that stage led to the changing of the facades and internal loadbearing walls to precast concrete in the two tallest buildings, namely Blocks 1 and 2. The internal and external precast walls were supplied by our NPCAA Member and provided an additional aesthetic feature to the complex.



Precast deck forming floor of Village building prior to mesh placement



Honed reconstructed stone finished panels with staggered window layout  
Photo courtesy of Eric Sierens.

The flooring system between the precast walls is provided by a NPCAA Member. Further, the conventional reinforced concrete floors that were to be used in four of the other buildings were changed to the speedily erected precast flooring system in order to make gains in the construction program. In this way only four of the ten buildings on site were constructed without using precast concrete. Multiplex did, however, incorporate timber framing into these – again using off-site manufacture.

#### Precast Flooring System

Generally the 130C beams were used to provide a 190mm deep slab. The deck is formed by pouring a concrete topping over a grid of precast beams along with any additionally required reinforcement. The precast beams are spaced some distance apart with the spaces filled by sturdy fibre-cement formboards. The floor beams may be supported on conventional RC beams, walling or steelwork, but maximum benefit is gained when used in

conjunction with their band beam system. These precast shells further reduce propping and formwork. The flooring precaster had previous experience of combining its floor system with precast walls and hence was in a good position to ensure a fruitful liaison with the walling precaster. In total, some 9,400 square metres of precast flooring was installed.

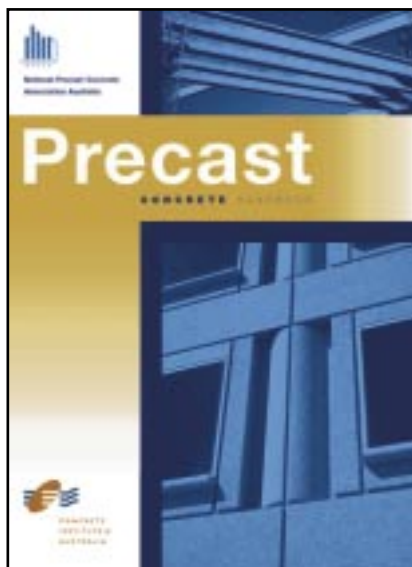
#### Precast Walling System

The walling precaster worked with Multiplex and its consultants to develop an efficient and durable walling solution that satisfied the architectural brief. Internal loadbearing walls are 150mm thick and generally in a module size of 8 metres, alternating with non-loadbearing walls to provide 3m wide rooms. External walls at the stairwells and lift shaft are 200mm thick and painted. The main external walls are 200mm thick and have a honed exposed aggregate finish. Exterior painted

surfaces were reduced to a minimum and the honed finished precast walls installed offer a visually pleasing architectural finish, long-term durability, and a self-cleaning, low-maintenance façade. They give a natural stone appearance that could be detailed to provide staggered windows and the attachment of lightweight sunshades. During the construction phase, these panels provided an immediate safety barrier such that it was not necessary to erect temporary handrails. In all, the walling precaster supplied 5,500 square metres of walling in a total of 400 panels, all of which were erected by NPCAA Associate Member LW Contracting Pty Ltd.

The simultaneous use of these precast components in Blocks 1 and 2 required close cooperation between the precasters in terms of structural design, planning, shop drawings and on-site activities. Coordination of the connection details between the floors and wall panels was the key issue. The beams were seated directly onto the heads of the internal precast walls and onto nibs cast into the external walls. Reinforcing (splice) bars were lapped between the walls and floor elements before being concreted together during the topping of the floors.

The major building works were commenced in December 2001 and completed on 20 December 2002. "Students began moving in from day one of 2003 – this could only be achieved through careful planning, the choice of varied construction techniques and the use of off-site manufacturing to reduce the overall reliance on labour-intensive trades on site. The combination of the precast systems and the coordination between their suppliers has been a job well done", added Mr Nysse of Multiplex. ■



## Precast

CONCRETE HANDBOOK

CIA Z48—2002 *Precast Concrete Handbook* can be purchased from  
**STANDARDS AUSTRALIA's**  
**Customer Service Centre:**

**tel:** 1300 65 46 46  
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## NEW NPCAA President

At its recent AGM the National Precast Concrete Association Australia elected MATT PERRELLA(right) , General Manager of Delta Corporation to succeed CLAUDE PINCIN(left) as National President.

Matt's career in the precast industry commenced in Perth in 1968, when he joined the family business (Delta Concrete) founded by his late father just a few years earlier. During the early years, Matt gained valuable hands-on experience in all aspects of the precasting business, in particular architectural precast. Later his role involved marketing and negotiating supply contracts for many high profile WA projects.

In 1980 the small family business was acquired by the publicly listed company now known as Schaffer Corporation Ltd. In 1987, Matt was appointed General Manager of the company and under his leadership it has developed into one of Australia's leading precasters. The company has been a Corporate Member of the NPCAA since its inception in 1990.

Matt expressed the Association's appreciation of Claude's contribution to the industry over the last 2 years, and particularly for his achievement in bringing the publication of *The Precast Concrete Handbook* to fruition.

Matt, in looking ahead at new challenges, says "We now have reached the point that we need to focus on promoting the Association as a strong voice for our industry. This will make the construction industry aware of the value in doing business with our Members whose services and expertise can be offered in providing real solutions to their many and varied construction problems."

## WA's largest precast residential APARTMENT COMPLEX

Perth's latest luxury apartment complex featuring panoramic views across the city and Swan River is the largest total precast structure ever built in Western Australia.

The \$18million 18-storey Panorama development in Terrace Road includes 114 luxury apartments on 17 levels with a leisure centre for residents on the 18th floor incorporating health and fitness facilities, swimming pool and private dining area.

A city showpiece, Panorama also has a Garden Court area with another 24 apartments and the developers, Mirvac Fini (WA) Pty Ltd, plan to build an identical apartment tower on the other side of the Garden Court in Terrace Road.

Architects for the development, Spowers, and engineers, Airey, Ryan & Hill, have incorporated precast concrete for the 18-storey tower in conjunction with the in situ central core.

Leading WA precast concrete specialist Delta Corporation Ltd were awarded the contract to manufacture and supply 2,000 hollowcore floor panels, 970 external and internal walls, and 184 balcony panels for the project.

The floor panels totalling 16,200 square metres and the wall panels total 9,700 square metres, were produced and delivered to site as required.

The structure consists of an insitu slip-formed central core surrounded by load bearing external and internal precast concrete wall panels, purpose made curved balustrades and hollowcore floor panels.

The construction cycle comprised dividing the floor plan into two equal areas of 500 square metres each constructed in a staggered mode all the way up the building.

Whilst installation of the precast elements occurring on one half of the floor the reinforcement and insitu topping being placed on the other.

The wall panels were erected and propped, 150 and 200mm thick floor panels placed directly onto the walls or

shelf angle at the insitu core and the pre assembled balustrade component fixed on and to the walls.

Connection of wall to wall is by dowel pin and grout tube filled with structural grout and reinforcing starter bars tied into the floor by the insitu concrete.

The added benefit of this total precast concrete solution is the absence of any scaffolding or back propping which allows following trades to move in immediately.

In fact on this project the lightweight blocks for the non-loadbearing walls were hoisted onto each level prior to the next lot of precast being erected.

In line with global trends, precast has arguably grown to become the favoured construction method on multi-storey developments in WA. Its use on Panorama enabled structural contractor Multiplex to maintain floor cycle times of six days.

General manager, Matt Perella, of Delta Corporation, said precast concrete was now an accepted advantage on major construction sites in Western Australia. ■



Perth's 18-storey Panorama Apartment complex - the largest totally precast structure in WA

# ACROSS THE TASMAN – Auckland's Precast Buddhist Temple

Located a half-hours drive south of Auckland is the largest Buddhist Temple in New Zealand. Stresscrete, New Zealand's largest precast concrete manufacturer, was chosen as the supplier of over 300 precast panels, spandrel panel/beams, shell beams, hollowcore and prestressed solid slab flooring for this unique project.

The temple is layed out in accordance to the scale and proportions set out in Ying Tso Fa Shih written in 1103. All the building dimensions are sized and proportioned from the brackets that support the roof structure off the building columns.

Architectural design was initiated by Murray Cockburn Partnership and completed by Hames Sharley International Ltd. The main contractor was Robert Cunningham Construction Ltd.

The temple complex comprises of four main structures and two towers. The main entry building has adjoining side halls and is flanked by two towers. On either side of the inner courtyard there is the two-storey accommodation building and the two-storey function building. The main chapel and largest building of the complex is towards the rear of the courtyard.

Technically, the precast works were straight forward with the exception of fourteen large wall panels ranging from 8 to 11m height forming the main entranceway walls. The tops of the panels have a curved edge to match the tile roof profile.

The architectural specification required an off-form finish for the exterior concrete panels with cast-in rebates to provide



*Installation of precast wall panels in main temple building and side halls*

visual relief to the panel surface. Factory precasting of the panels under controlled conditions was the natural choice to meet the specification.

Part way through the construction, the contractor changed the spandrel panels and beams on the Main Chapel from insitu concrete to precast concrete. This avoided the high cost of formwork and greatly reduced the risk of possible injury to workers operating at a height of 10 to 12 metres.

Speed of installation and the ability to provide long clear spans made hollowcore the ideal suspended flooring product for the 1st floor of the accommodation and function buildings. This, coupled with shell beams, completed the flooring system.

To achieve floor diaphragm action for seismic resistance, a 65mm concrete topping was cast over the 200mm hollowcore and prestressed 75mm solid slab units.

The roof system consists of clay tiles on timber battens, fixed to a 100mm thick lightweight concrete topping (1650 kg/m<sup>3</sup>) on light steel formwork supported by prefabricated steel roof trusses.

Specialised contractors from Shanghai, volunteer labour from Taiwan and donated materials were used to complete a major portion of the finishing works including the complex tile roofs.

The temple has such a striking visual impact, it is intended to be used as an approach marker by the local aeroclub. ■



*Drawing showing elevation of Temple*

# SUNSHINE PLAZA – Rhythm and Strength of Precast

This \$30mill recently completed shopping and cinema complex at Maroochydore on Queensland's Sunshine Coast is an excellent example of the ability of precast concrete to cohesively combine aesthetics and structural requirements in a project.

The project which commenced in October 2001 and completed in December 2002 comprised three main segments:

- Six new cinemas, associated foyer and refurbishment of existing retail outlets on the southern side of Cornmeal Creek,
- An extension of the complex in an easterly direction along the northern side of the creek (the Riverwalk), and the linking of these with a new bridge
- A new Woolworths Supermarket and associated specialty stores.

## Woolworths Segment

In planning the Woolworths section of the project, Bovis Lend Lease were aware of the environmental sensitivity of the site and needed to meet the Council's requirements of avoiding blank walls not in harmony with the surrounding tidal flats. Thus, an artist was engaged for the project and both artist and precaster worked together to create the rhythmic Tidal Wall.

The eastern "Tidal Wall" comprises 34 architectural cladding panels, 6m tall x 2.4m wide and 175mm thick. The intention of the design is to replicate the rippling

sand that is seen on the riverbanks at low tide. This effect works well as the wall blends the overall building with the adjoining landscape of Cornmeal Creek.

The wall serves to not only provide a maintenance free cladding system with a high level of security protection, but also provides a wall in harmony with the surrounding environment.

In the artists' words, Tidal Wall is 'A depiction of nature's influences on our coastal environment, WATER, WIND & TIDAL RHYTHMS'.

These panels were manufactured from a hand sculptured concrete mould to provide an artistic representation of a beach theme. Panels were manufactured in off white concrete with a low dose rate of yellow oxide. The bottom section of the panels received a light texture finish, achieved by acid washing, to represent sand. The middle section contained a series of cast in grooves in a wave pattern representing the edge of the beach. This section also received a light texture finish using an acid wash technique. The top section contained the hand sculptured wave pattern, highlighting the design flexibility of the precast concrete medium. This pattern changed in texture over the height of the wall from a very light acid wash finish at the bottom to a heavy depth sandblast finish at the top.

After erection, the artist placed boulders against the base of the panels and mechanically roughened a border around the edges of the boulders. This added an increased feeling of depth to the wall, whilst continuing to develop the beach theme.

## Riverwalk Segment

The northern Riverwalk area extends about 130 metres along the creek and comprises



*850mm depth inverted T-beam and infill panels forming the deck of the Riverwalk*

outdoor space, shops, restaurants and a two storey tavern. Approximately 15 metres of the structure is built over the creek and there were strict requirements as to encroachment of the permanent structure on known flood level and for avoidance of contamination of the creek during construction.

The original design was to construct a cast in situ reinforced concrete deck, similar to the deck on the existing Riverwalk. However, with the project facing budget and construction timetable problems, the consulting engineer proposed the construction of a precast concrete structure, with timber decking externally and Ultrafloor decking internally. This resulted in significant cost savings and a reduction of many months in the construction time of the deck, such that the viability of that section of the project was retained.

The structure comprised a series of 850 mm depth prestressed inverted T beams at 7.2 metre centres, projecting from the creek bank, supported on two rows of driven piles. In the outdoor areas, transverse precast concrete bearers spanned between these main girders at approximately 4 metre centres. Internally, precast planks spanned between the girders. The upper 260 mm section of the girders in this section was poured insitu, tying the structure together, protecting the ends of the precast planks and providing design continuity in the slabs.



*Tidal Wall formed by precast coloured acid-washed 6m high panels and sculptured boulders*

## PROJECT TEAM

### DEVELOPER

Lend Lease Retail

### BUILDER

Bovis Lend Lease Pty Ltd

### PRECAST SUPPLY AND ERECTION

Precast Concrete Pty Ltd

### ENGINEER

Hughes Trueman Pty Ltd

### ARCHITECT

Woolworths – Brewster Hjorth  
Cinemas, Boardwalk – Ken Down Architects

### ARTIST

Hew Chee Fong and LM Noonan



Capulec Centre in Rockhampton featuring 10m precast column shells

## MEMBER Profile

**ROCLA BUILDING PRODUCTS** is the newest business unit of Rocla Pty Limited, utilising the combined experience and resources of the Rocla group of companies.

First established in Melbourne in 1922, the company established a reputation for manufacturing technologically advanced products using in-house product design and process engineering capabilities. It is a national supplier to markets in Australia of products used by civil engineers, governments and commercial contractors and has licensed its technology to over 30 countries in past years.

The origins of Rocla Building Products can be traced back to 1990 when it won the contract to supply precast concrete columns for the Capulec Centre in Rockhampton. As a regional architectural showpiece the project presented an interesting challenge as the featured external precast columns served more than just an engineering function. An innovative approach was taken to construct the external freestanding columns by using prefabricated hollow spun precast concrete column shells in 10m lengths. These shells which were 810mm in external diameter and cast with a minimum wall thickness of 90mm acted as permanent formwork to the reinforced insitu columns. The use of these prefabricated shells overcame the need for an expensive system of falsework whilst achieving an excellent off-form finish. The KongKrete™ precast concrete building columns available today, are direct descendants of this project.

Working closely with clients has enabled

innovative and cost effective solutions to be developed. Recent projects, which have provided their own unique set of challenges, include a private residential development at Hastings on the Mornington Peninsula. Based on little more than a photograph of a Georgian residence in southern USA, the client working with the precaster, was able to capture the essence of the design for his two storey home which features 7.3m long, 740mm to 630mm tapered precast columns. The scale and proportion of the columns provide a striking aesthetic effect. As a result of using precast columns, considerable savings were made. It took less than 2 days to erect the 24 structural columns.

The KongKrete™ structural precast concrete columns have proven themselves as a practical and cost effective solution for modern commercial developments like the Dick Smith Building at Preston in Melbourne. A system of 400mm diameter structural parallel columns used to support the mezzanine office area was again shown to facilitate rapid construction and ease of installation.

Meeting the challenge of the construction industry and exceeding client expectation have always been an important ingredient in the company's commitment to developing new products and innovative solutions. It's quality system accreditation ensures benchmarking in product services.

Rocla Building Products plans to expand its product range with additional innovative and high quality products across its business segments to assist customers with their building and construction products needs. ■

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- Redland Precast Concrete Products ■ 852-25900328

### NEW MEMBER

The President, Directors and Members welcome the following new Members to the Association:

- Redland Precast Concrete Products – Leading Hong Kong manufacturer of precast and prestressed concrete products
- Readymade Precast Erectors – specialist installers of precast concrete wall and floor panels.



### FOR FURTHER INFORMATION

about the New Zealand precast industry including Member details, list of publications, visit Precast NZ Inc at:

[www.precastnz.org.nz](http://www.precastnz.org.nz)