

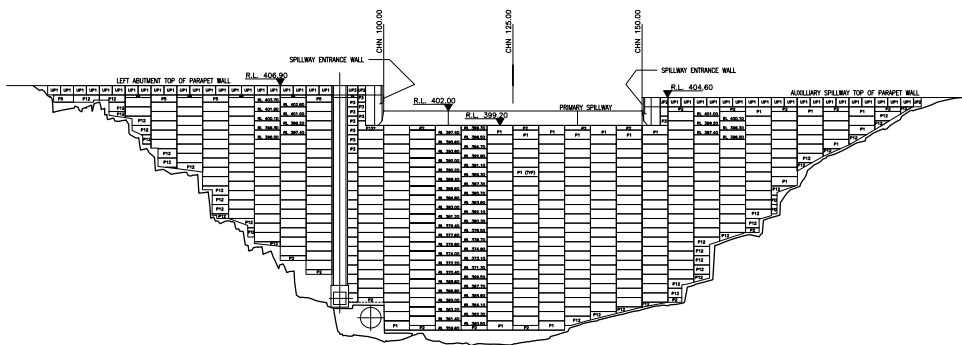
# PRECASTER

ACN 051 987 181 • ISSN 1037-9908

[www.nationalprecast.com.au](http://www.nationalprecast.com.au)



## MEANDER DAM relies on precast



### Upstream panels

Manufacturing for the upstream face included 484 precast concrete panels which form a smooth vertical surface. Each panel measured 5 metres by 1.8 metres by 100 mm and weighed 2.3 tonnes.

The 484 upstream panels were manufactured on four fabricated concrete mould beds. Moulds were set up for one type at a time on each table, then QA checked by Duggans' Project Leading Hand and QA Inspector and then by engineer McConnell Dowell, prior to major production.

Panels were generally poured before 2.00 pm, so they could be lifted before 7.30 am the following day. Prior to lifting, the moulds were released and eye bolts placed in ferrule holes.

Using a gantry crane, the panels were flat lifted off their mould beds into a vertical position, then moved to a temporary storage A-frame inside the factory. They remained in the inside temporary storage area for approximately three days, before being moved by loader to an external A-frame storage location. The panels were then covered and mist water cured for seven days.

The panels were transported into the dam construction area on the A-frames (generally 10 per load), then unloaded onto other A-frames at the dam face and lifted individually by the tower crane into place.

**Proposals to build a dam on the Meander River in Northern Tasmania go back to at least 1968. After more than thirty years of discussions, construction of the Meander Dam commenced in January 2007, using a high speed construction method of precast and roller compacted concrete (RCC).**

The basic construction method involved the placement of the upstream precast panels and downstream precast blocks, then layering RCC between, with compaction by vibratory rollers. Around 200,000 tonnes of RCC were in effect

sandwiched between the upstream and downstream precast faces. The final phase of construction involved the installation of a PVC "membrane" on the upstream face. The membrane was sealed against all sides of the dam, making the dam project virtually watertight.

The Meander Dam is 170 metres from abutment to abutment and 50 metres from upstream toe to downstream toe.

Over 4,000 precast concrete units were made by National Precast Member Duggans Pty Ltd. Whilst panels and blocks were made in the precaster's Launceston factory, the intake tower sections and crest units were made at their Cradoc factory.

# Joints in Precast Concrete Buildings

## Open-drained joints

The open-drained joint is recommended for high-rise construction. It consists of a rain barrier in the form of an expansion chamber with a loose-fitting baffle and an air-seal at the interior face of the panel (see diagram below).

The baffle prevents direct entry of the wind-driven rainwater. The pressure in the chamber between the baffle and the internal air seal is at external air pressure. There is, therefore, no pressure differential to drive rain past the baffle. The air-seal is the demarcation barrier between outside and internal air pressures.

Water that enters the joint in front of the baffle is drained downwards. At every intersection between the vertical and horizontal joints, a short length of flashing (300 mm) is used to ensure water is discharged to the outside.

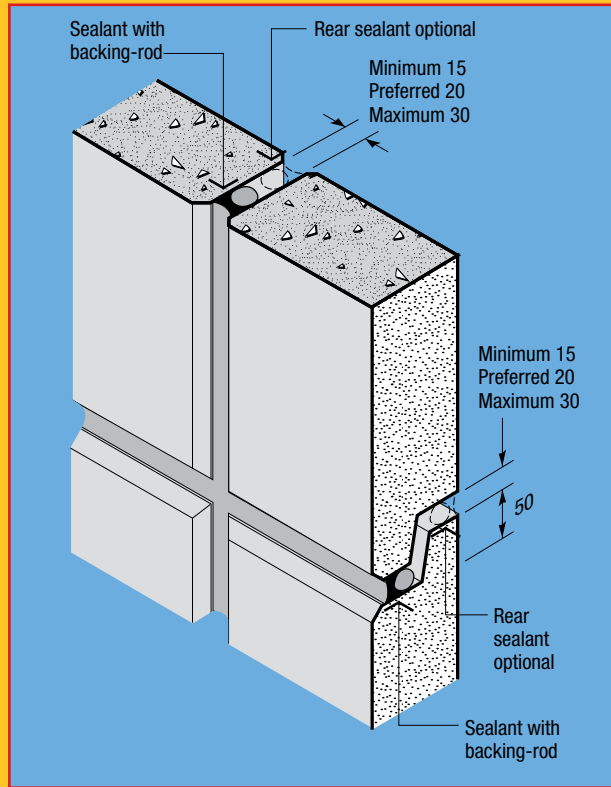
### Advantages

- Can tolerate relatively large movements.
- The rear sealant is protected from UV light and weather.
- Can be installed from inside the building (no scaffold required).
- Long maintenance-free life.
- Best for medium- and high-rise construction.

### Disadvantages

- Careful supervision is required during installation as it is difficult to remedy defects due to poor workmanship.
- Not suitable for tall vertical panels (> 9.0 m in height).
- Cannot accommodate joint gap tolerances > 5 mm.

## Face-sealed joints



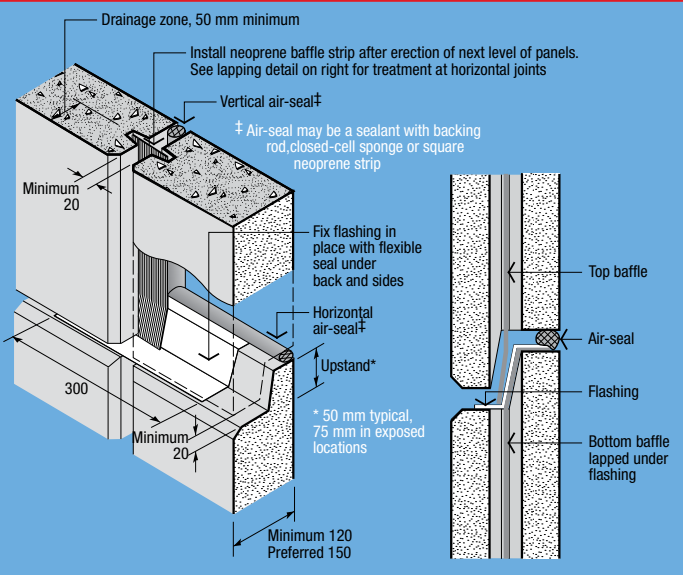
These joints are simple, economical and are most suited to low-rise construction (see diagram above). They are sealed by a single run of gun-applied sealant close to the exterior surface of the joint. A backing-rod forms the rear of the sealant. The external face seal should, where practical, be supplemented by a seal near the inside face of the panel.

### Advantages

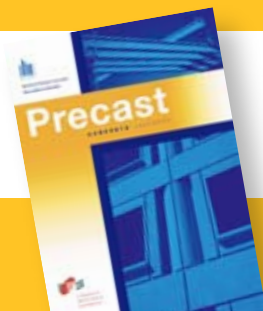
- Panel edges can have simple profiles, no grooves required.
- Can be used for complex panel shapes (angled or curved).
- Can have a rear seal as a second line of defence.
- Lowest first cost.
- Can be readily inspected, repaired or replaced.
- Best for low-rise construction.

### Disadvantages

- Must be applied from external scaffolding or other form of access.
- Sealant is exposed to UV light and weather – needs more maintenance.
- In a single-seal system even a small failure may allow water penetration due to capillary effects and pressure differentials.



For more information about joints in precast concrete buildings refer to the Precast Concrete Handbook, available for online purchase at <http://www.nationalprecast.com.au/services/publications>.



## Compression-seal joints

This type of joint utilises a compressible impregnated polyethylene or polyurethane foam strip. The strip is pre-compressed and inserted into the joint after the panels are erected or it is glued in position before placement of the second panel (see diagram below). It then expands to fill the joint.

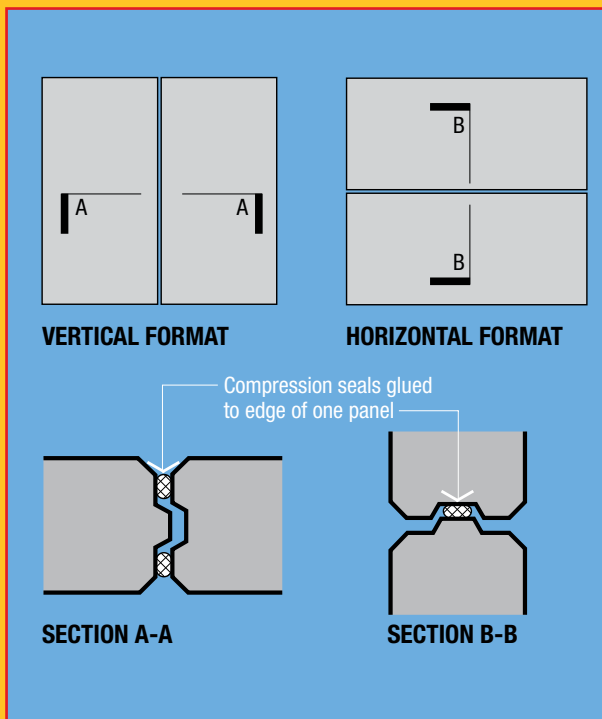
The use of this type of joint seal is usually limited to low-rise buildings such as factories and warehouses where wind pressures are low. It can be used where spandrel beams, downturns or columns restrict the access required for placement of gun-applied sealants.

### Advantages

- Simple and quick to install.
- Panel edges can be plain or simple profiles.
- Economical.

### Disadvantages

- Cannot be fully weatherproof, so limited to low-rise industrial buildings.
- Joint width is critical.
- Maintaining compression on seal at intersection of horizontal and vertical joints is difficult.
- Difficult to maintain and/or replace.
- Time-consuming while erecting.



... continued from page 1



## Downstream blocks

The downstream spillway's stepped incline was made up of 3,060 concrete blocks, each measuring 2.4 metres by 600 mm and weighing 1.2 tonnes.

These blocks were manufactured in 4 groups of 6 mould forms, allowing a maximum of 24 of the downstream blocks to be manufactured per day.

Because access to the construction area was very tight, the downstream blocks could not be stored at the dam face. Once made in the factory, the blocks were loaded into specially manufactured cradles which carried six blocks each. Three cradles (18 blocks) per semi-trailer were transported to site and then were tower craned onto the dam in these cradles.

The downstream blocks were doweled together, and were tied back into the RCC with tie bars, with the upstream panels' inter-locking edges locking into each other, and again with tie bars securing them into the RCC.

According to precast Project Foreman Dom Sandric, "Given the size and complexity of the job, and the huge number of individual components, it is amazing to think that only six to ten men at any one time were engaged in manufacturing the components. They did this over an eight month period."

For more information go to <http://www.meanderdam.net.au>.



## Four Commercial Terraces – A Completely Precast Solution

**National Precast Member Baseline Constructions Pty Ltd has developed a fine reputation in Sydney over more than a decade for providing a complete precast solution for a range of projects. In many ways they have pioneered the growing change to precast for projects in Sydney that a few years ago would have been considered in masonry.**

In 2004 Baseline engaged Hokin Design Group to provide the architectural services for four, four storey commercial terraces in Blackfriars Street, in the inner Sydney suburb of Chippendale. With a relationship going back to early 2000, the previous experience ensured that the design process was well understood and the solutions were tailored to efficient use of precast.

The configuration of the site, which is approximately 20 metres wide by 24 metres with four approximately equal width terrace lots, lent itself to a simple precast concrete vertical structure on boundary and party walls, large open balconies on the front towards the street, and precast hollowcore floor planks spanning the terraces and for the roof.

**Paul Bettar, General Manager of Baseline Constructions said: “With the approved height restriction, the 150mm deep precast hollowcore floor and roof planks allowed four levels to be squeezed in within the height, a solution that could not have been obtained with flooring systems that require beams.”**

The resultant architectural expression met the requirement for a design of very simple appearance with only the thickness of the floors and walls showing on the façade. While the general appearance was simple, there was a layering of interesting detail created by grooves in the panels. The large balcony openings facing north towards the street were screened with large blade adjustable louvres for privacy, solar and weather protection. As well, they provided a fine textural contrast.

The design lent itself to a very fast construction sequence where the structure could be erected quickly allowing finishing trades and services access to the building to work under cover and unhindered by formwork and back propping. The external end walls were 175mm thick ship-lapped painted precast panels, with the dividing internal walls between the terraces being a space-saving 150mm thick, while achieving fire and acoustic

... continued on page 5



## Precast for Structural Engineers



### ONE DAY SEMINARS

PRESENTED BY John Woodside together with local NPCAA precasters and engineers.

For recent structural engineering graduates, those who wish to freshen up on the latest precast trends around Australia and those who are new to precast construction.

These seminars will cover Materials & Tolerances, Precast Building Design, Manufacture, Transport & Erection, Design of Elements, Contractual Issues, Connections, Fixings & Joints. Opportunities to discuss your own precast challenge with industry representatives will be available at different times throughout the day. Handouts include The Precast Concrete Handbook on disk, worth \$180.

City	Date	Venue	Members	Non Members
Darwin	Monday 2 June	Engineers Australia	\$350*	\$425
Melbourne	Tuesday 17 June	Designbuild	\$400*	\$475
Canberra	Tuesday 8 July	Master Builders Association		
Perth	Friday 17 October	Designbuild		

For more information call Nicole at the Concrete Institute on (02) 9736 2955 or email [admin@concreteinstitute.com.au](mailto:admin@concreteinstitute.com.au)



\* Members prices apply to CIA and NPCAA members only.

... continued from page 4

separation. These panels were typically 9.5 metres long by 3 metres high, weighing 11.5 tonnes. A total of 210 hollowcore floor panels, generally 9.5 metres long by 1.2 metres wide comprised the floors and roof slabs. The 150mm deep hollowcore was given a 60mm in-situ concrete topping reinforced with a layer of SL62 to internal areas and SL82 to external areas.

**Jeff Hokin of Hokin Design Group said: "In summary, from an architectural perspective, the use of precast in building design should be used as a core part of a building's architectural expression and create a strong discipline for the structural layout. It works best where there is relevance for repetitive and regular layouts, and this should be clearly expressed through the design outcome."**

"The major challenge is to ensure that there is a good balance between solid and void, with as many large openings as possible," he said.

This design approach achieved a very buildable and attractive result at Blackfriars Street.

<b>Project Details:</b>	<b>Four Commercial Terraces</b> Address: 1 – 7 Blackfriars Street, Chippendale, Sydney
<b>Developer:</b>	Chiswick No.1 Pty Ltd
<b>Building Design:</b>	Hokin Design Group
<b>Engineer:</b>	Meinhardt
<b>Head Contractor:</b>	Baseline Constructions Pty Ltd
<b>Precast Supplier:</b>	Hanson Precast Pty Ltd



## Precast can handle 350km/hr winds at Bulk Liquids Berth Jetty



The new Bulk Liquids Berth at Dampier's Burrup Peninsula, in WA's north, handles the loading of liquid ammonia. It consists of a 490 metre long access trestle jetty and a berth incorporating four mooring dolphins, four berthing dolphins and a large loading platform. The berth has been designed to accommodate vessels ranging from 5,000 DWT to 65,000 DWT and has a design ultimate wind velocity of 350 km/hr.

The nearly 500 metre long jetty has 15 spans of 32 metres and a 20 metre access bridge.

The trestle jetty supports comprise twin 1,050mm diameter steel raker piles supporting precast pile caps and in-situ infill headstock. Precast prestressed concrete TeeRoff beams span between headstocks, acting compositely with the in-situ concrete deck. The 40 TeeRoffs supplied by National Precast Member Delta Corporation each weighed 56 tonnes and were 32 metres long by 2.5 metres wide, being 1.5 metres deep. They incorporated an up-stand kerb to one edge of the beam. Specification called for a 50MPa Silica Fume Concrete with a minimum of 35mm cover to the reinforcement. While manufactured in Perth, the beams were transported over 2000km to Dampier, using steerable jinkers.

... continued on back page

## Thinking precast? Use a National Precast Member.

**Committed to providing quality products and services to the construction industry. All members have:**

- \* A minimum of 3 years manufacturing experience
- \* Purpose-built manufacturing facilities
- \* QA procedures
- \* OH&S systems
- \* Technical & engineering competence
- \* Financial stability
- \* Environmental compliance

**For a list of Members go to:**  
[www.nationalprecast.com.au/members/corporate\\_members](http://www.nationalprecast.com.au/members/corporate_members)



The large 37 metre by 34 metre loading platform was constructed using precast concrete pile caps, beams and planks manufactured on site at Dampier. The concrete deck and four mooring and four berthing dolphins were constructed as open hollow precast boxes in-filled with in-situ concrete. The supply-only contract for the precast prestressed beams excluding transport amounted to \$1.4M. The entire project involved an extremely high degree of quality control to meet North West specifications.

An 850 metre long access road provides access to the wharf, with an adjacent services corridor for electrical and communications, hydraulics and fire protection systems.

<b>Project:</b>	<b>Bulk Liquids Berth Jetty,</b> Dampier, WA
<b>Client:</b>	Dampier Port Authority
<b>Engineer:</b>	Madsen Giersing
<b>Head Contractor:</b>	Laing O'Rourke
<b>Precast Supplier:</b>	Delta Corporation Ltd



#### CORPORATE MEMBERS

- Asurco Contracting** ■ [08] 8240 0999
- Bianco Precast** ■ [08] 8359 0666
- Delta Corporation** ■ [08] 9296 5000 (WA) or [08] 8363 4817 (SA)
- Duggans Concrete** ■ [03] 6266 3204
- Giroto Precast** ■ [03] 9794 5185 (VIC) or [02] 9608 5100 (NSW) [07] 3265 1999 (QLD)
- Hanson Precast** ■ [02] 9627 2666
- Hicrete Precast** ■ [08] 8260 1577
- Hollow Core Concrete** ■ [03] 9369 4944
- Humes Flooring** ■ 1300 361601
- Paragon Precast Industries** ■ [08] 9454 9300
- Precast Concrete Products** ■ [07] 3271 2766
- Precast Solutions** ■ [07] 3807 4511
- Precast WA** ■ [08] 9332 6310
- Reinforced Earth** ■ [02] 9910 9910
- Rocla Building Products** ■ [02] 9928 3552
- SA Precast** ■ [08] 8346 1771
- Sasso Precast Concrete** ■ [02] 9604 9444
- Structural Concrete Industries** ■ [02] 9411 7764
- The Precasters** ■ [03] 6267 9261
- Ultrafloor (Aust)** ■ [02] 4932 4433 or [03] 9614 1787
- Waeger Precast** ■ [02] 4932 4900
- Westkon Precast Concrete** ■ [03] 9312 3688

#### ASSOCIATE MEMBERS

- Actech International** ■ [03] 9357 3366
- Barossa Quarries** ■ [08] 8564 2227
- Baseline Constructions** ■ [02] 9080 2222
- BASF Construction Chemicals Australia** ■ [02] 8811 4200
- Blue Circle Southern Cement** ■ [02] 9033 4000
- Cement Australia** ■ [03] 9688 1943
- Composite Systems (Aust)** ■ [03] 9824 8211
- CSR Topcat Safety Rail** ■ [02] 9896 5250
- Fuchs Lubricants (Australasia)** ■ [03] 9300 6400
- Grace Construction Products** ■ [07] 3276 3809
- Hallweld Bennett** ■ [08] 8347 0800
- Hilti (Aust)** ■ 13 12 92
- Nawkaw Australia** ■ 1300 629 529
- OneSteel Reinforcing** ■ [02] 8424 9802
- Reckli Australia & New Zealand** ■ 0418 17 6044
- Reid Construction Systems** ■ 1300 780 250
- RJB Industries** ■ [03] 9794 0802
- Sanwa** ■ [02] 9362 4088
- Sika Aust** ■ [02] 9725 1145
- Sunstate Cement** ■ [07] 3895 1199
- Xypex Australia** ■ [02] 6040 2444

#### PROFESSIONAL ASSOCIATE MEMBERS

- BDO Kendall** ■ [02] 9286 5850
- Connell Wagner** ■ [02] 9465 5751
- Moray & Agnew** ■ [02] 4911 5400
- Robert Bird Group** ■ [02] 8246 3200
- Strine Design** ■ [02] 6282 4877

#### OVERSEAS MEMBERS

- Golik Precast Ltd (Hong Kong)** ■ 852-2634 1818
- Halfen GmbH** ■ [03] 9727 7700
- OCV Reinforcements** ■ [66 2] 745 6960

*The information provided in this publication is of a general nature and should not be regarded as specific advice. Readers are cautioned to seek appropriate professional advice pertinent to the specific nature of their interest.*

## Precast touches Form & Function

Visitors just couldn't resist the opportunity to touch the different finishes which were showcased on the National Precast stand at Sydney's Form & Function in April.

Ten National Precast Members joined forces to bring the Bianco Precast stand from Adelaide to Sydney for the exhibition. Precast Concrete Products, Giroto Precast, Sasso Precast, Hanson Precast, Reckli Formliners, Nawkaw, Barossa Quarries, Reid Construction Systems, OneSteel Reinforcing and Bianco Precast all supply the Sydney market and saw fit to represent the industry to potential specifiers and users.

The precast contribution was also complemented with three seminars run by National Precast, which were attended by over 80 people.

