NUMBER 18 • JULY 1998

NATIONAL PRECASTER

NATIONAL PRECAST CONCRETE ASSOCIATION AUSTRALIA

NPCAA

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BCP Precast Pty Ltd
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CHANGES at National Precast Concrete Association Australia are detailed on the back page of this issue of *National Precaster*.

SA PRECAST PLANT IN ADELAIDE

MEMBER PROFILE

SA PRECAST PTY LTD was incorporated in October 1991. The aim of the company is to service the top end of the architectural precast concrete market by supplying polished reconstructed granite, acid washed and sand blasted finished panels for architectural use. The company also maintains a capacity to undertake structural precast concrete including prestressed products.

The company operates from a yard at 72 Days Road, Croydon Park, Adelaide which has been set up with two portal cranes, two polishing machines, a curved polishing machine and an edge polisher. Other equipment includes a premix batching plant with four silos for different cement types, stressing beds and a Gregori saw.

The company has undertaken many medium to large sized architectural projects. Some of the larger projects have been undertaken as joint ventures with other precast companies, an example being the panels for the Hindmarsh Soccer Stadium in Adelaide.

SA Precast has been able to maintain a consistently high level of quality and meet tight delivery schedules. Most of the precast concrete manufactured in the Days Road plant in Adelaide is transported to either Sydney (1500 km away) or Melbourne (750 km away). When the distance has become a problem, a temporary plant has

NORTHLAND SHOPPING CENTRE, MELBOURNE

SA PRECAST PTY LTD
- Telephone: **[08] 8346 1771**
- Facsimile: **[08] 8340 1645**

ACN 051 987 181

ISSN 1037-9908

been established, such as in 1996 when a temporary yard was established in Port Hedland in Western Australia to manufacture precast concrete invert units for a tunnel. As part of the service to the client, SA Precast will also arrange and supervise the fixing and caulking of panels on site if required.

The Northland Shopping Centre in Melbourne is typical of the kind of work undertaken by the company. These panels are acid washed and made using local South Australian aggregates and were supplied and fixed by SA Precast.

Another example is the Paramount Apartments in Bourke Street in Melbourne. This complex project required the manufacture of two polished reconstructed granite arches which were bolted together on site and green natural granite strips fixed to the surface. In addition there were flat reconstructed granite window panels with polished stainless steel feature plaques bolted on to the panel face.

Current work in progress by the company includes the Chadstone Shopping Centre in Melbourne which requires 14 000 m^2 of white acid washed and white off-form precast panels (1200 panels) and valued at approximately $6 million.

Other work currently being undertaken is the precast for the Museum of Victoria valued at $3.5 million and has 1400 off-form panels coloured with oxides and the Merchant Hotel on top of the old Grace Bros building in Sydney which has 800 acid washed panels 10 000 m^2 and a supply and fix value of $3.5 million. ■

PARAMOUNT APARTMENTS, MELBOURNE

YANDINA BY-PASS CLASSIC ARCH PROJECT

THE CLASSIC ARCH

The Yandina By-Pass construction project on Queensland's Sunshine Coast featured the use of 21 m span precast concrete arches. The arch is precast as a twin-leaf structure, each half arch panel typically 1.8 m wide is identical and features an interlocking tongue and groove connection detail.

Placed two at a time, in rows, the panels are located at the foot in a U-shaped reinforced concrete strip footing. This controls movement at the panel base with the interlocking tongue and groove detail locating and fixing the opposing half panels at their apex.

A tie bolt system ties the panels together to form a temporary connection, prior to the joint between the two panels being poured insitu, to provide a permanent moment connection.

Once in position the panels are self-supporting requiring no propping or scaffolding. Each arch butts against the preceding arch unit to support concrete spandrel panels and wing walls, provided to support backfilling which, on this project, extended to 0.5 m above the crest of the arch.

Some 182 half arch panels, 28 wingwalls and 2 complete spandrel elements were placed in 10 days to complete the 164 m long arch tunnel.

The Yandina By-Pass (Northern Section) was awarded to the Concrete Construction Group by the Queensland Department of Transport on the basis of an alternative tender using the 'Classic Arch' system.

"Initially we considered the use of a conventional precast concrete 'I' beam bridge to span the main North South railway line. However, by opting for CSR Humes' new Classic Arch, construction time on site working alongside the operational rail line was reduced by half, saving twelve weeks construction time", said Robert Mowat, Construction Manager with The Concrete Construction Group.

'Classic Arch' is produced by NPCAA member CSR Humes and is specifically designed for major road and freeway projects. Span is variable, between 15 m and 21 m and can provide up to 7 m headroom.

In this project, the ability to construct the arch quickly and without disruption to the existing rail service, further enhanced the benefits of using the 'Classic Arch'. ■

PRECAST FLOORS

This is the third in a series of articles covering available precast concrete solutions for floors. Whilst this article looks at construction issues for hollowcore floors much of its content could be applied to other precast flooring methods.

HOLLOWCORE PLANKS are compatible with most structural building materials and methods. Economic advantages can be obtained by designing to accommodate the 1.2 or 2.4 m modular plank width. Typical construction details include:

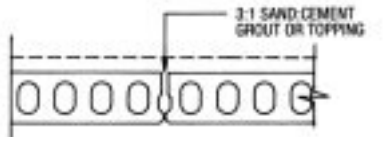


FIGURE 1 GROUTED SHEAR KEY

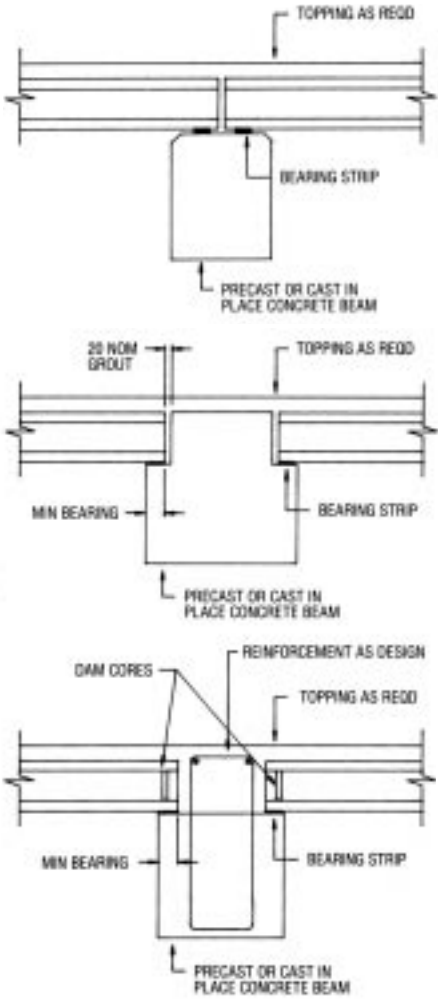


FIGURE 2 TYPICAL BEARING CONNECTIONS TO CONCRETE BEAMS

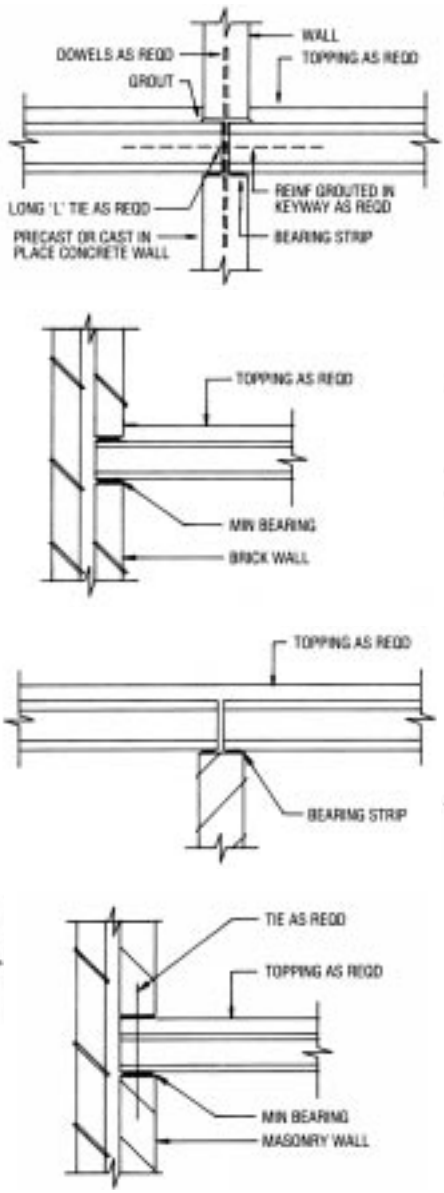


FIGURE 3 TYPICAL BEARING TO MASONRY WALLING

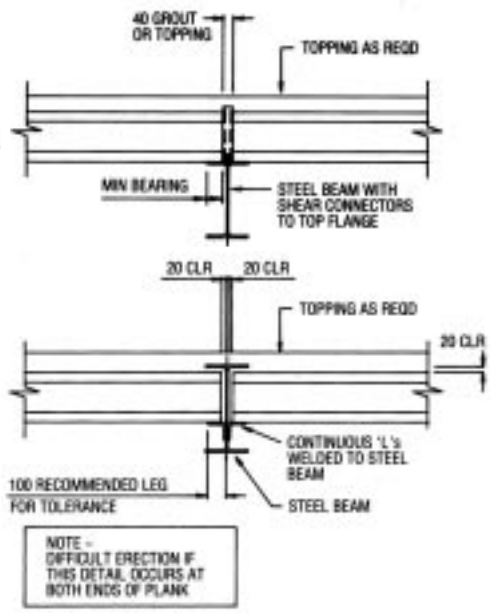


FIGURE 4 TYPICAL BEARING TO STEEL BEAMS

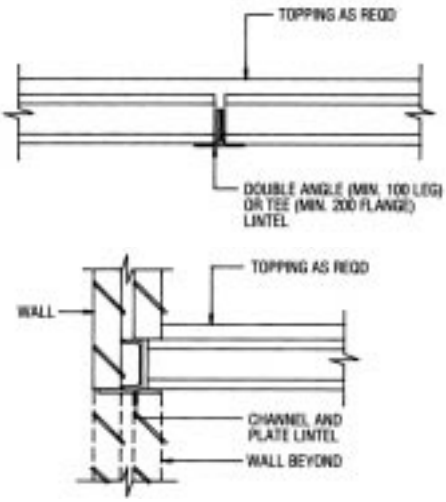


FIGURE 5 TYPICAL BEARING AT LINTELS

Table 1 Recommended Minimum Bearing (mm)

Plank Thickness	**Minimum Bearing** (mm) Concrete/masonry	Steel
150, 200	80	70
250, 300	120	100

Forces acting at an interface between hollowcore planks and the bearing material are specified by the design structural engineer. Detailing of the connection is generally performed by the manufacturer.

Connections should allow for the volume change movements that normally occur in precast elements. Cracking or spalling may result if such movement opportunity is not provided.

Detailing for minimum bearing widths, grout clearance etc should allow for realistic tolerances of construction.

Hollowcore plank tolerances are shown in Table 2 below.

Table 2

Length	+10 mm	–10 mm
Width	+3 mm	–6 mm
Thickness	+3 mm	–3 mm
Squareness at ends	+6 mm	–6 mm
Wind	10 mm per 3000 mm	
Location of strand	+3 mm	–3 mm
Differential camber between adjacent units	2 mm/m span but not greater than 15 mm	

Irregular bearing surfaces should be provided with a bearing strip, set back from the edge of the support.

Planks supported on masonry walls require a bearing strip or slip joints to separate the different materials and prevent cracking or spalling of the brickwork. Rendered walls and cornices should be detailed to permit some movement in accordance with good building practice.

Steel beam supports may be detailed for separate or composite action depending on the design requirements. If the overall depth of construction is critical, support angles may be welded to the web thus reducing the floor depth. Note that clearances are needed between the planks and beam for satisfactory erection and this arrangement should not be used at both ends of the planks. Bolted splices in steel beams should be detailed so that they do not interfere with the bearing of the planks.

Planks are often topped to increase the structural capacity of the floor. This also provides a convenient means of levelling the top surface, dealing with set downs for floor finishes and removing the effects of camber. Contraction joints should be provided at regular intervals and at the ends of planks to control shrinkage cracks.

Where untopped planks are used care is required in setting the level of supports and in selecting planks to reduce the effects of differential camber between units. Structural integrity ties may be required in both longitudinal and transverse directions. These may be bar or strand grouted into keyways or joints at the ends of planks, in which case care is needed in setting out the planks to ensure that the keyways line up.

Where concrete or masonry walls continue over the floor planks and a topping is provided there are two options for the construction sequence. The topping may be placed prior to erecting the wall over so that it is continuous throughout the floor or the topping may be placed after the wall is erected in which case it will be interrupted by the wall. The choice depends on both design and construction factors.

Where cantilevers are required care is needed in both design and construction to avoid overstressing and possibly cracking the planks at the support. Both the construction loads and final service loads should be considered. Some temporary propping may be required.

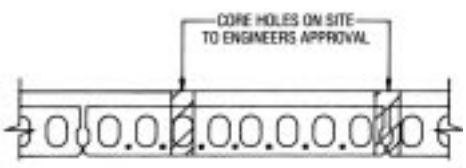


FIGURE 6 CORE HOLES LOCATIONS

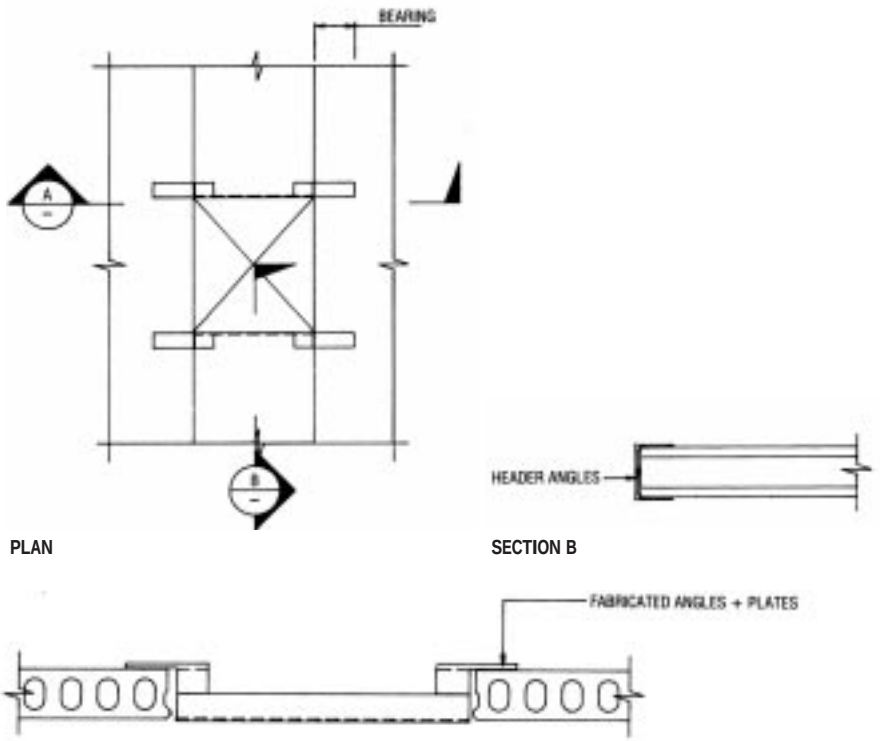


FIGURE 7 FRAMING LARGER OPENINGS

ERECTING 200 mm 8 m SPAN HOLLOWCORE PLANKS ON LOADBEARING BLOCKWORK AT A TOWNHOUSE DEVELOPMENT IN BRADDON, ACT

Penetrations and blockouts in planks should not cut through the strand unless this has been allowed for in the design. Any coring on site should be restricted to defined parts of members. Where large penetrations are required full width headers may be used to support the end of a plank and transfer the load to adjacent planks which are designed for the additional load.

Fixings and support hangers should be installed strictly in accordance with the manufacturer's directions. Where heavy loads require support, through bolts should be used to provide the necessary security.

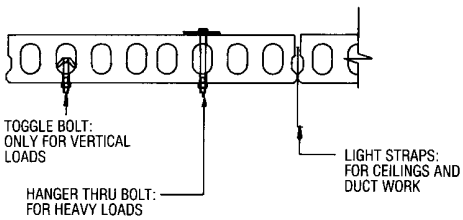


FIGURE 8 TYPICAL HANGER ARRANGEMENTS

Summary Given adequate design and documentation and with early dialogue between client and manufacturer, hollowcore planks can regularly be delivered to site within a week of a firm order.

Placement rates of 600–1000 m^2/day are attainable significantly reducing construction time. ■

30 000 SQUARE METRES OF SANDBLASTED OFF WHITE PRECAST CONCRETE WAS SUPPLIED TO CLAD THE DEPARTMENT OF FOREIGN AFFAIRS AND TRADE BUILDING IN CANBERRA

SHOWS BLASTING WITH PROFILED HEAD OF THE PANEL AND SURROUNDS TO WINDOW OPENINGS LEFT SMOOTH OFF-FORM

SURFACE FINISHES

This is the fourth article in a series dealing with treatments and finishes which can be provided to architectural and, in some instances, structural precast elements where those elements may have visual exposure.

SHOWS FINE TO MEDIUM DEGREES OF EXPOSURE

DEPICTS A COARSE BLAST EXPOSING SHAPE, DISTRIBUTION AND COLOUR

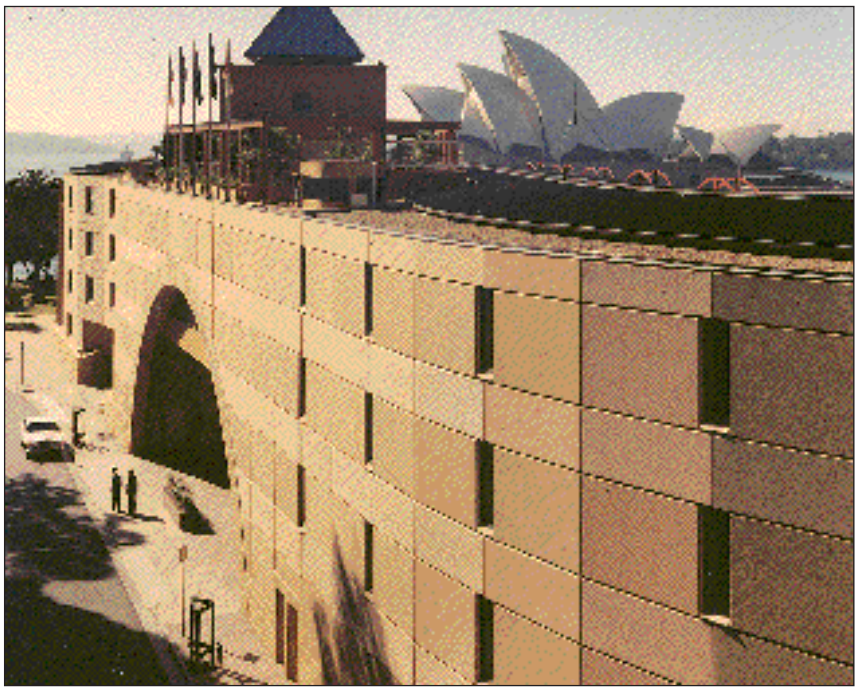
This issue deals with surface finishes achieved by sandblasting. While sandblasting is the common generic term there are a number of abrasive mediums used, not all of which are sand. The abrasive is carried by air or by air to which water has been added.

Sandblasting is a medium-cost way of achieving an excellent architectural finish. It is a technique requiring considerable skill in preparation of shop details, in mix design, in pouring technique and in the blasting operation itself.

The choice of abrasives depends on the type of architectural finish required and is also influenced by OH&S regulations and local availability. Experienced precasters will make these decisions – the specification should concentrate on achieving the required architectural effect.

Sandblasting is carried out on units poured face down and hence may be used on flat panels or on panels with ribs, grooves or other architectural features. This gives tremendous scope for crisp architectural detail.

While sandblasting is used on returns and other parts of panels not poured horizontally the finish on such surfaces will often not be a perfect match for the horizontal surfaces. This is usually not a problem but should be incorporated into the approval process.



THE PARK HYATT HOTEL'S FACADE FEATURES ALTERNATING BANDS OF SANDBLASTED AND HONED FINISH

Sandblasting is always followed by a light acid wash to provide an even clean finish.

Sandblasting may be combined with other finishes in the one panel. Off-form, polished and painted finishes are often used in conjunction with sandblasting. Some of Australia's most important and photogenic buildings have a sandblasted architectural facade. ■

CHANGES AT NPCAA

BRIAN MALLON is the new Executive Director of NPCAA following the retirement from full-time employment of Ivor Jones.

Brian, formerly a Senior Executive with CSR Construction Materials has been involved for the past quarter of a century in the precast concrete industry with Humes Ltd, CSR Humes and finally, CSR Construction Materials. Brian brings to the position a great depth of knowledge and understanding of the precast concrete industry.

The NPCAA has taken the opportunity to re-locate its offices to the Sydney region. It is now located at:

8–10 Palmer Street
North Parramatta NSW 2151

PHONE: [02] 9890 8853

FAX: [02] 9890 8854

EMAIL: **info@npcaa.com.au** OR
EMAIL: **brian@npcaa.com.au**

WEBSITE: **www.npcaa.com.au**

Ivor Jones will remain as a consultant to NPCAA until the end of 1998 and is contactable on phone/fax: [02] 4942 7210.

PRESIDENT:
R (Bob) Attwater
EXECUTIVE DIRECTOR:
Brian Mallon

N P C A A

WELCOME TO:

NPCAA are pleased to welcome the following members:

ASSOCIATE MEMBERS

- **Blue Circle Southern Cement Ltd**
- **Queensland Cement Ltd**
- **SIKA (Australia) Pty Ltd**

CORPORATE MEMBER

- **Unicrete Industries Pty Ltd**

The President, Directors and Members of NPCAA welcome the forthcoming support of these new members in further consolidating the status of the precast concrete industry.

UP, UP AND AWAY

NPCAA member **CONSTRESS**, an Adelaide-based precaster has recently developed an innovative construction technique producing a cell-like element consisting of a modular box having one face, the floor, open.

Any number of these modular elements may be linked together to provide a more complex structure.

The modules are produced in a complex, adjustable mould in a single pour. Variation of module size is available. To date, typical module dimensions have been 3.4 m wide x 6.5 m long and 2.8 m high.

Manufacture utilises high-strength, steel fibre reinforced, thin-section, concrete walls allowing the mass of each box element to be controlled to acceptable limits for transport. Typical mass is 12 tonnes, increasing to near 14 tonnes after fitting-out with wall linings, joinery, stairs etc. Such fitting out, together with internal and external decoration, plumbing and electrical services can all be completed prior to delivery.

PLACING A TYPICAL MODULE

The applications of such a module are widespread and include housing in the widest sense including detached, terraced, medium density, hospitals, prisons, hotel and motel structures. A future edition of *National Precaster* will examine a number of projects where this modular construction has been used. ■

COMPUTER PROGRAM AVAILABLE

PCP4

VERSION 7.11

This program for the design and selection of Hollow Core floor planks is back as Version 7.11, better than ever.

It facilitates:

- determination of exposure classification
- selection of concrete covers
- design for fire resistance
- analyses short/medium and ultimate shear forces and bending moments for simply supported spans with complex loading
- selects suitable sections from Australian manufacturers
- provides for more than 140 variables over which the user has full control.

Available from the program author on [02] **4862 1295**.

Published by **National Precast Concrete Association Australia** 8–10 Palmer Street North Parramatta NSW 2151 Australia • **Tel [02] 9890 8853**

DESIGNED AND PRODUCED BY HELEN CHRISTINA RIX