

NATIONAL PRECASTER

NATIONAL PRECAST CONCRETE ASSOCIATION AUSTRALIA

PRESIDENT'S COLUMN

DOUBLE STANDARDS

The QA gurus have given the industry a whole new culture which is having quite dramatic effect throughout precast factories. Whilst for some, the need is to improve our basic quality and procedures, for others it amounts to little more than documenting existing procedures. There is no doubt, however, that clients are assured of good quality levels from mainstream precasters.

It is therefore both disappointing and frustrating to see that many clients will deal with fringe precasters with no pretensions to any quality assurance programme. Many clients cannot resist the lure of a lower price.

Recessions bring to the fore the out-of-work formwork and tilt-up operators who see their salvation in a stint of precasting. Having no long-term commitment to the industry, they will set up on site or in a rented factory and will often be long gone by the end of the maintenance period. They offer little or nothing in the way of quality programmes, pollution control or investment in equipment and worker training; they do of course have a cost advantage.

Clients who take advantage of the lower, up-front costs, invariably pay later in lower capital appreciation of their structure and higher maintenance costs. That is their right but the NPCAA believes they are confusing the down-payment with the total cost.

Meanwhile, the established precasters who are members of NPCAA will continue to promote and manufacture quality precast concrete products, recognising that such an attitude demands investment in worker skills, plant and equipment. **JOHN BURKE**

REFURB GOES PRECAST

The ever-present need for building owners to present for lease a structure which is both functional and visually pleasing promotes an ongoing market for the refurbishment industry.

The availability of polished, architectural precast concrete has increased the armoury of the architect when specifying cladding refurbishment.

This product offers great flexibility to the designer; apart from its good looks –

a function of colour of both aggregates and matrix and texture – it is capable of being cast in a variety of panel shapes and sizes, having moulded profiles compatible with building style and streetscape.

The use of precast cladding allows for a rapid closure of the refurbishment facade, providing security and resistance to inclement weather.

For the building owner, a prestigious finish with lifelong durability is a worthwhile consequence. □

NORTHPOINT CENTRE – RE-CLADDING OF STREET AND MEZZANINE LEVEL FACADES USING POLISHING PRECAST PANELS. WORK STILL IN PROGRESS BUT NOTE THE PLEASING STYLE AND EXCELLENT USE OF JOINTS AND DUMMY JOINTS.



TURNING BACK THE TIDE

Precast concrete has long been a choice of designers as a material highly suited to resist the in-service ravages of water, be it the turbulent ocean or the more sedate tidal, or non-tidal harbours, rivers and lakes.

In the former instance the use of precast elements such as Dolos, Tribar or Tetrapod units among others, placed on a prepared sloping embankment to a pattern or randomly placed depending on unit type, have all performed well.

The so-called 'sea-wall' also lends itself to precasting as evidenced by recent applications in Sydney Harbour. At a most prestigious development at Pulpit Point, precast concrete sea-wall units were designed, incorporating a ledge which acted as a bearing surface for a sandstone veneer. This sandstone facing occurs at and above the level of the adjacent broadwalk. Thus, the high visual quality of the sandstone is apparent above the broadwalk, with the durable, precast surface exposed below to counter wave action and resist the aggressive characteristics of the seawater.

The choice of sandstone facing stemmed from the developer's wish to mirror the widespread use of the stone in the surrounding heritage-conscious Hunters Hill. Alternatively, the visual

impact of such units can be enhanced by the use of 'form liners' as seen in the flood-protection walling.

At nearby Birchgrove a different requirement and design solution utilised some ninety 7-tonne units.

After placement, the void behind the parapet will be backfilled.

This project occurred in a residential area having a very strong and influential residents' organisation. The ability for all concrete work to be completed off-site with consequent noise reduction and markedly reduced clean-up were all a bonus for the contractor.

The major advantage apparent in the use of precast units is the ability to place units largely independent of tidal conditions with the added capacity to place a finished wall unit and thus avoid the logistical problems of formwork, concrete placement and stripping.

The durability of precast marine elements is provided by the use of a generous cement content, using either Type A or a slag-blend cement and a low water-cement ratio, typically 0.35-0.4. Additionally, providing adequate cover to reinforcement (generally galvanised) together with good compaction and curing will provide a durable product. □



DOLOS UNITS BEING CAST, PORT BOTANY. SEAWALL, BEYOND LINE OF BROADWALK. USE OF FORMLINERS TO CREATE VISUAL INTEREST AT FACE OF PANEL - FLOOD-PROTECTION WALLING.



PRECAST UNIT DELIVERED ADJACENT TO FINAL PLACEMENT POSITION.

UNIT IN PLACE.

BIGGER AND BETTER

The first use of the Swiss designed 'Bebo' arch in Australia was in 1985, a modest 9-m span bridge in Byron Shire, NSW. Since then, some 40 projects around Australia have used this system, utilising the 9-m and 12-m standard spans.

A natural progression was the development of multiple cell arches such as the triple span bridges recently completed at the Solander Shores and Bond University projects in Queensland.

This enables the crossing of large watercourses, providing a degree of elegance with the good durability characteristics of a factory-made precast product.

Significant savings in construction time are made possible by the ability to manufacture the arch units simultaneously with site preparation. The absence of falsework and forms and the virtual elimination of lost time due to inclement weather all contribute to the engineering and economic success of this arch system.

Interest in the application has led CSR Humes to develop arch spans of 15, 18 and 21 metres having approximately 7 metres headroom. This now allows for its use in such projects as underpass and overpass applications for roads and railways.

The University of Sydney was commissioned to carry out load testing of different joint arrangements together with field load-testing of a completed arch.

As a consideration of craneage requirements, the arch has been designed so that each arch comprises two half-span sections.

Each half unit has a joint detail which allows initial interlocking of the halves during erection with a final continuous moment connection provided by a part width insitu concrete joint.

Compared with traditional bridge structures the 'Bebo' arch and the newly developed Classic™ arch eliminates scaffolding, minimises abutments and thereby offers greatly reduced construction time. Additionally, the system generally avoids the need to divert a watercourse, a frequent necessity in more-traditional construction.

The design uses a soil/structure computer analysis to determine critical loads within the structural elements. The benefits of this approach provide a structure of reduced weight, in turn offering greater ease of transporting and erecting. □



MULTIPLE-SPAN APPLICATION. NOTE THE ARCH CURVE IS PROVIDED WITH A CAST-IN CONTINUOUS NIB TO SUPPORT MASONRY VENEER IF REQUIRED.

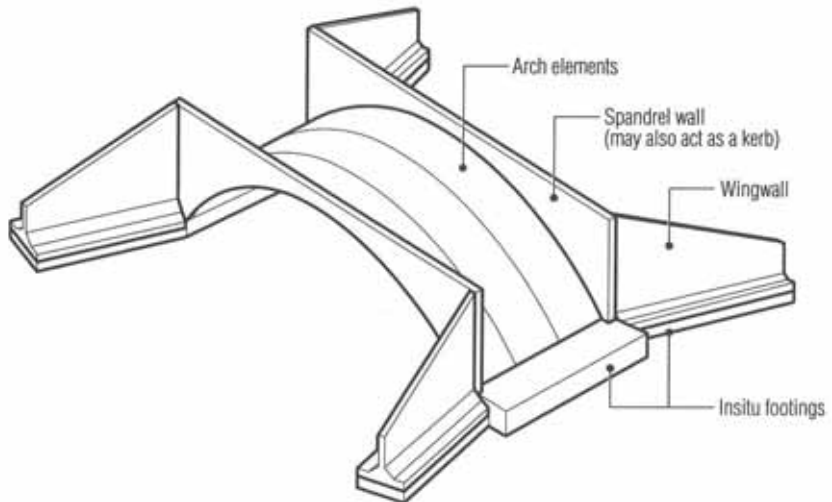


FIGURE 1 GENERAL ARRANGEMENT OF 9- AND 12-m-SPAN ARCHES WITH SPANDREL UNIT.

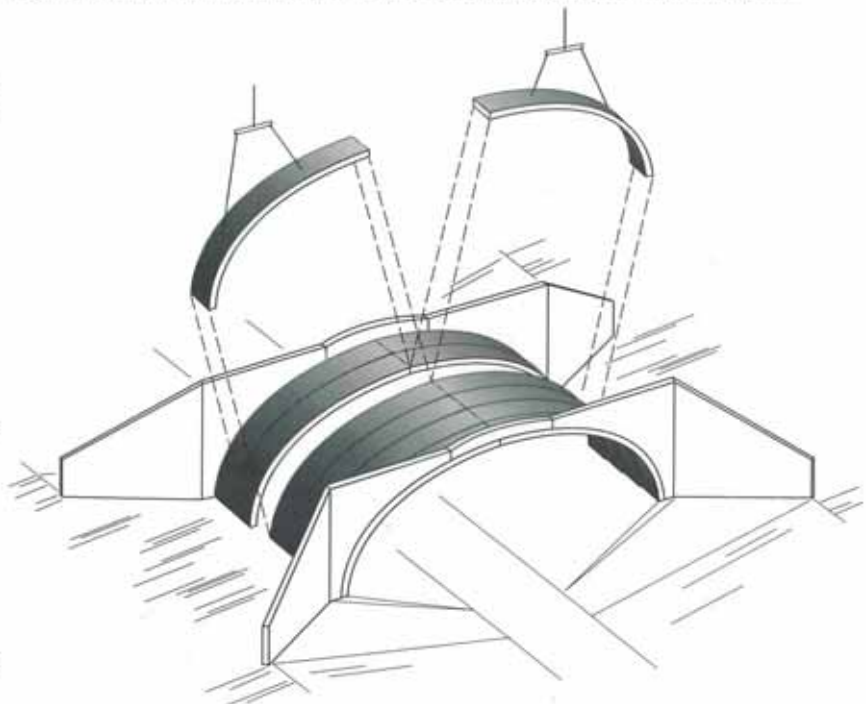


FIGURE 2 DESIGN CONCEPT FOR A 21-m-SPAN CLASSIC™ ARCH.

The speed of erection and ultimate construction is emphasised by the rate of placement at the F4 Western Tollway project by Statewide Roads. Here the arches are supported on a beam footing carried on piers. The tender provided for a seven-week manufacturing period and a two-week erection programme. All the arches, wingwalls and spandrel walls were manufactured and erected within that time frame. An average erection rate was some seven arches (14 half units) per day.

A recent tender awarded to CSR Humes involves the use of the 9-m span 'Bebo' arch in a series of continuous spans to give all-weather access across ground subject to periodic flooding. The project at

Eastern Parkway, Canberra for the ACT Public Works Department, requires two roadway structures, one of eleven continuous spans, the other of eight spans. Each span will comprise some seven precast arch elements, (see Figure 1) the arches being supported on piled footings.

The Bebo arch system has justified the faith of CSR Humes in its initial marketing and subsequent development.

TEST ERECTION OF PROTOTYPE CLASSIC™.

LIFTING A BEBO SPANDEL UNIT. FOR EASE OF ERECTION THE CLASSIC™ ARCH SPANDEL WAS MANUFACTURED IN FIVE SEGMENTS.

- Summarised, its advantages include:
 - A range of spans giving design freedom for a multiplicity of applications.
 - System limits the size and mass of components to provide for ease of transportation and erection.
 - Off-site manufacturing allows for a controlled parallel operation with siteworks, reducing the often disastrous effects of inclement weather.
 - Elimination of traditional formwork, erection and stripping.
 - A high level of durability provided by a precast operation using a 50-MPa concrete with a cement content of 300 kg/m³ and water-cement ratio of 0.35.



READER ENQUIRY

Should you wish for further information on material in this issue, or have other precast interests, then complete this enquiry form and mail it to:

**NATIONAL PRECAST CONCRETE ASSOCIATION
AUSTRALIA
PO BOX 1889 NORTH SYDNEY NSW 2059**

I WOULD LIKE TO OBTAIN FURTHER INFORMATION ON

- ARCHITECTURAL PRECAST
- POLISHED PRECAST
- STRUCTURAL PRECAST
- PERMANENT FORMWORK (FLOORS)
- HOLLOW CORE FLOORING
- HOLLOW CORE WALLING
- DRAINAGE UNITS
- OTHER PRECAST (PLEASE SPECIFY)

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**EVERYTHING YOU EVER
WANTED TO KNOW ABOUT
HOLLOW CORE FLOORS –**

**BUT DIDN'T KNOW WHERE
TO ASK**

SURE...

YOU'VE HEARD ABOUT HOLLOW CORE FLOORS,
THEIR QUALITY OFF-SITE MANUFACTURE AND
SPEED OF CONSTRUCTION

BUT...

YOU'VE NEVER DESIGNED IN HOLLOW CORE...
YOU'VE NEVER BUILT IN HOLLOW CORE

AND...

YOU AREN'T SURE WHERE TO START?
THEN START RIGHT HERE! WITH THE MANUAL



AND THE MANUFACTURERS

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BELOW OR COMPLETE THE COUPON OVERLEAF**

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DELTA CORPORATION LTD

PRECAST INVOLVEMENT

A significant content of precast concrete is being used in the new *John Morony Correctional Centre*, South Windsor, presently under construction by Jennings Construction Services for the NSW Department of Corrective Services.

Cell walls are manufactured using a battery mould to cast eight wall panels at a time.



**BATTERY MOULD FOR THE SIMULTANEOUS
CASTING OF EIGHT WALL PANELS.**

Battery casting offers considerable economic advantage where a high level of repetition is required. Applications can be found in a multitude of building types including medium- and high-density dwellings, motels, hotels and the like.

The two-storey cell blocks use a precast floor system which provides the floor soffit panel, reinforcement trusses and insulation, the panels eventually being 'topped' with an insitu concrete. The floor units are supported on the precast walling units, dowelled and grouted.

Perimeter fencing used an extruded,



CELL WALLS LOCATED AND PROPPED,

THE EXPERT ERECTORS

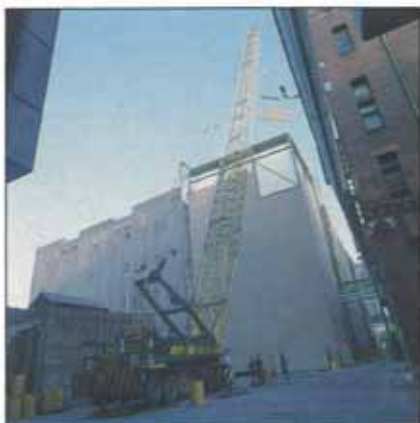
Associate Members of NPCAA comprise suppliers of goods and services to the precast manufacturing industry.

Numbered among our Associates are three very specialised and immensely experienced erection contractors, experienced to the point that the principal of each of these companies can claim some thirty or more years of direct experience. Accompanying their engineering understanding and experience is a certain flair, often responsible for resolving what, at first glance, may appear a complicated erection problem. Importantly, that solution must offer all the required levels of safety.

To the precast manufacturer the quality of erection is critical; it is a most visible part of the precast construction and, even though the quality of the precast components delivered to site may be excellent, the success of the finished project is very much in the hands of the erector. A good erection job can only enhance the performance and appearance of the project.

Ease of erection is partly determined at the design stage of the project and developed during the manufacturing operation.

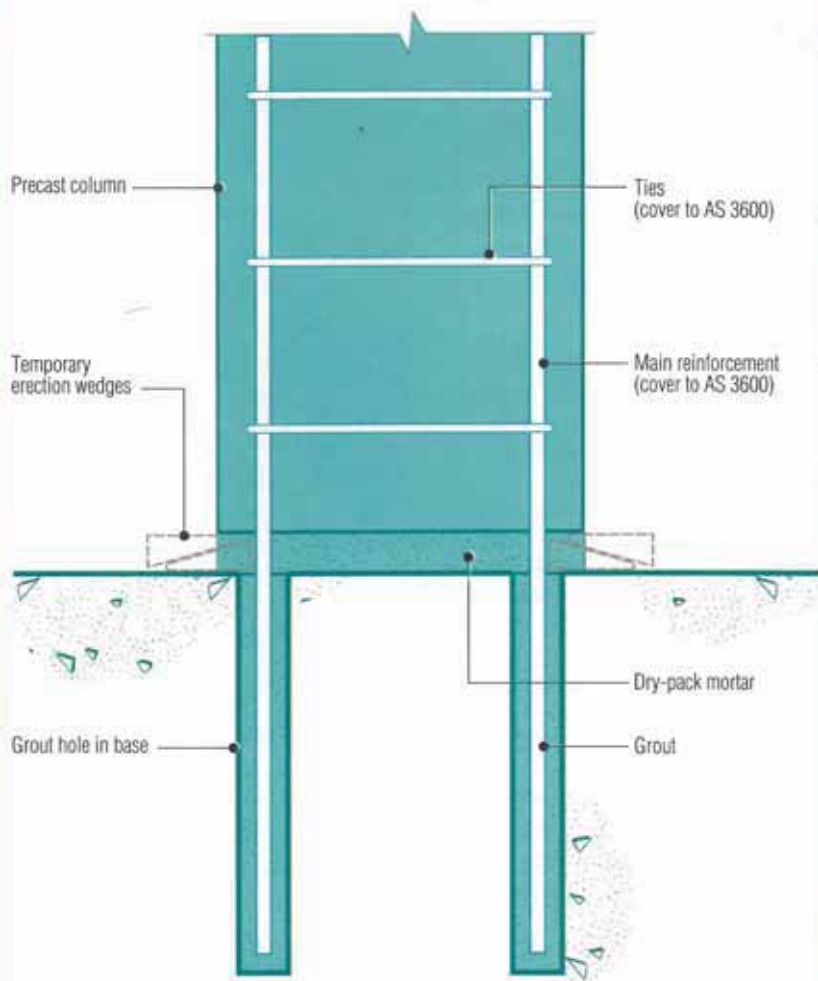
The obvious message to designers and contractors is: *involve the precaster and specialist erection contractor at the earliest possible time. There is far more to efficient, ease of erection, than 'have crane will lift'.*



ERECTION OF WALL CLADDING PANELS BY BARADOM.

L W CONTRACTING PLACING THE INNER AND OUTER WALL AND INNER ROOF ELEMENTS, ABC REHEARSAL STUDIO. PANEL MASS VARIED FROM 30-40 TONNES EACH.

TYPICAL DETAIL THIS ISSUE: COLUMN TO FOOTING



DOWELLED CONNECTION - COLUMN TO BASE

- Given adequate embedment length, high moment resistance is provided at the column base
- Good horizontal shear resistance
- Excellent fire-resistance levels



ERECTION OF 12-m-HIGH, WATER-WASHED, EXPOSED-AGGREGATE HOLLOW CORE PANELS BY THREE WAY CONSTRUCTION.