

NATIONAL PRECASTER

NATIONAL PRECAST CONCRETE ASSOCIATION AUSTRALIA

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Panels, stored awaiting contractor's directions

HOLLOWCORE Walling

Cost Saving and Speed of Construction

One of the precast concrete industry's most spectacular successes, has to be the introduction in the mid-1970's of the Hollowcore machine capable of forming voided panels, initially manufactured to the full length of the casting bed (100 m or more) and subsequently sawn into panels of the client's required length – limited only by the capacity to transport the panels to site.

It may be remembered that at the time of Hollowcore's introduction, masonry – due largely to the costs associated with laying brick and block – cost the proverbial arm and leg.

Significantly, the speed of construction of Hollowcore and the ability to enclose the structure quickly, were not lost upon the client. It is hardly surprising that an advertisement for Hollowcore by the Boral Group, similar to that shown here, was instantly understood by clients.

Hollowcore is now manufactured in Brisbane, Melbourne and Perth with a combined output of around 750 000 m² per year.

The major applications for Hollowcore are:

- walling, essentially quality industrial buildings, warehouses, workshops and commercial structures including shopping centres, laboratories, schools and car parks;
 - flooring (not discussed in this article).
- Resulting from its widespread use, intending clients can now form realistic expectations of the product including cost construction time, durability and weathering characteristics.

Manufacturers are constantly seeking to improve the product and create more visual appeal. The finishes presently available include:

- plain, as cast. Such panels are invariably treated with paint or applied coatings – ideal where a specific company identity can be created by paint colour and geometry;
- water-washed exposed aggregate. Where quality aggregates exist, this finish has proved very popular, weathering

extremely well. Selected coloured aggregates such as those of the granite family, water-washed to expose the stone, can be most attractive; ribbed or striated finishes. This is a recent development by manufacturers in their search to offer visually pleasing alternatives;

Visual expression can further be provided by the way in which panels are placed, either vertically or horizontally.

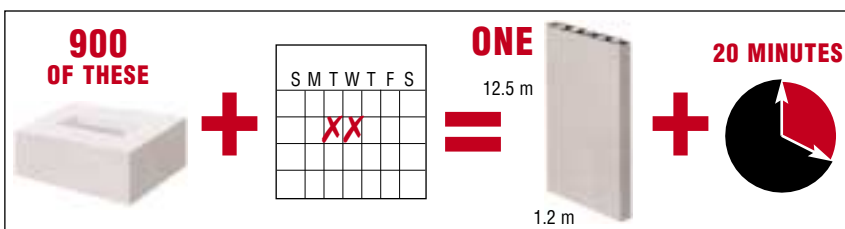
Note that the horizontal application is an effective procedure where poor ground conditions exist; footings for columns can be used to support the panel ends, the panels acting as deep beams between supports. A further significant advantage of Hollowcore is the ability to erect walls ahead of the floor thus permitting the concrete floor to be placed under cover. This gives it protection from inclement weather, including hot, windy conditions that could promote rapid evaporation and induce cracking of the insitu floor slab.

Like all precast concrete products, the merits of Hollowcore are well defined and include:

Speed of supply This obviously varies, being affected by the availability of designer's requirements, complexity of the job in relation to 'special' panels (ie half-width panels). Generally, two weeks should be allowed for the production of shop drawings and a further two weeks for manufacture and delivery, noting that delivery to site could commence soon after the first panels are produced.



Technical and warehouse facility. Horizontal, exposed-aggregate-finish panels. Note use of dark river gravel in bottom panel to suggest plinth.



Speed of construction Manufacture is off-site. It can be paralleled with site preparation, earthworks, drainage, service roads, footings and frame. Rate of erection (assuming a single crew generally comprising one crane operator plus three riggers) can be expected to be in excess of 300 m²/day. It is worth noting that the



Exposed aggregate



Ribbed finish



Vertical panel application



How close is close?



Suburban cinema



Wall placement – note proximity to boundary. Floor not yet placed.



Typical top fixing, two cleats per panel

longer the panels, the greater the rate of erection since crane time, locating, connection and grouting, etc is measurably the same, be the panels 8 or 12 m in length.

Massive reduction in project risk due to **inclement weather**. Apart from product manufacture and erection, the ability to place the floor after wall and roof construction eliminates many construction hazards posed by adverse weather conditions.

Reduction of on-site labour.

Ability to capitalise on restricted sites with units able to be placed adjacent to existing boundary structures.

Crack-free nature of prestressed units.

Good weathering and durability characteristics, promoted by the product's concrete strength, density and crack-free nature.

All these considerations add up to one large plus for Client and Contractor, namely the very significant reduction of risk.

Hollowcore panels are available in 1.2- and 2.4-m widths and are cut to the required length. Designers will benefit by using a planning grid to match these two modular widths. If necessary, part-width panels can be produced as can panels to accommodate openings for doors.



Panels being sawed to client's required length

Panel thicknesses vary from 150–300 mm, choice of panel thickness being determined by loading conditions, fire resistance level and cover to strand to meet durability requirements. Stressing strand (both number of strands per panel and strand diameter) can be varied to suit loading conditions.

To limit deflection in service, the ratio of span (between fixings) to total thickness is usually restricted to 50. For handling and erection considerations, the ratio of overall length to thickness should not exceed 60.

Connection details have become well established and practical. Bottoms of panels are dowelled and grouted, with top connections invariably provided by cast-in ferrules and fixing clamps.

Connection details are well documented in the NPCAA's *Hollow Core Walling Technical Manual* which is available from the National Precast Concrete Association Australia. A companion document *Hollow Core Flooring Technical Manual* is also available. ■