

PRECASTER

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■ An inspired reinterpretation of the traditional church

The Anglican Parish of Dapto was looking to create a building that would complement the existing church hall, welcome visitors and re-connect with the public. By cleverly re-organizing the site, the architect has created an open and welcoming face to the public with a commercial café and forecourt, which on first impressions does not reveal that the building is a church.

Silvester Fuller's bold, civic design links the old church hall on one side and the existing pre-school on the other. The central hub is in the form of a foyer and 500 seat auditorium. Used not only for Sunday worship, the auditorium now accommodates a broad range of events seven days a week, catering to the wider community and blurring the line between religious and community space.

The tight budget required a simple and cost-effective construction. The solution was to use load bearing precast concrete panels supporting steel trusses and a single pitch roof. The use of precast was also the perfect solution for an economical and efficient method of achieving the impressive, large spaces that were integral to the church's functionality.

The faceted precast entry points funnel users into the building, and the striking black and white colour scheme highlights the differences between these entry points and the remaining external mass. A bright, white, smooth finish was used for the entry areas, while in contrast the bulk of the building features an earthy, black rough-textured finish.

Award winner

The project has won a Commendation in the 2012 RIA National Architecture awards and the Blakett Prize and Public Architecture award in the 2012 AIA NSW awards.

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Photographer : Martin van der Wal

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The architect and client team visited Austral Precast's Wetherill Park plant in NSW to help find a solution to achieve the texture and finishes desired. They accidentally stumbled upon some 'unfinished' panels that had been discarded prior to the final smoothing process. The resultant rough, lumpy, irregular exposed aggregate surface was exactly what they were looking for. It took some convincing of the manufacturer that the architect would be happy with 'unfinished' panels, and that they would not be rejected on site. The fact that custom form liners were not required was an added bonus to an already restricted budget.

The builder, Premier Building Group finished the project on time and to budget. Frank Tropea from Premier comments *"The restricted site and necessity to keep the adjacent buildings fully operational made this a challenging project. The use of precast meant the structure could go up quickly and efficiently in the restricted area. The loadbearing precast panels were the first to go up as they were essential to support the roof structure and critical to the time frame."*

Location: Dapto, Wollongong, NSW

Client: Anglican Parish of Dapto & Anglican Church Property Trust

Architect: Silvester Fuller

Builder: Premier Building Group

Precast manufacturer: Austral Precast



Photographer : Martin van der Wal



Photographer : Martin van der Wal

■ New Standard and Code on the way

Over the last 2 years National Precast members have been active in a detailed review of AS3850-2013 Prefabricated Concrete Elements and the National Code of Practice for Tilt-up and Precast Concrete in Building Construction. The reviews were crucial for our members as the documents will govern all aspects of the manufacture and safe erection of precast concrete and will provide clear direction to everyone in the building industry.

The draft of the new AS3850 will be released for public comment first and will be in 2 parts. It will cover all precast concrete elements in building construction, expanding on the current Standard which mainly covers single storey industrial buildings and which is now often not relevant to many of the precast buildings

being constructed today.

The review of the National Code of Practice brings the 2008 issue of the Code in line with the national harmonisation of WHS laws. Its release for public comment will follow the release of the Standard.

National Precast congratulates Safe Work Australia and Standards Australia for their joint decision to co-ordinate both the review and release of both documents. With the precast industry continuing to grow its share of building construction around Australia, it is important that this unique opportunity for public comment is widely considered as an enhancement of the safe incorporation of precast concrete elements in building construction. an enhancement of the safe incorporation of precast concrete elements in building construction.

■ The art of noise

Shell Cove is a large residential mixed-use project being jointly developed by Australand and Shellharbour City Council. Located on the coast 20 kilometres south of Wollongong, it is the largest coastal tourist/residential development ever initiated by a local government authority in Australia. When completed, the \$1.5 billion development will create around 3,000 prime residential lots, a 300 berth marina constructed within an in-shore boat harbour, an 18-hole championship-standard golf course, community parks and playgrounds, cycleways, and a range of quality commercial, retail, tourist, community and recreational facilities.

As the development grew towards the existing Bass Point Quarry - that provides crushed basalt for concrete production to the Sydney construction market - the need to address road noise became paramount. The main access road to the quarry required a noise wall to be constructed, in stages, over its 2.5 km length to create the necessary quiet locale for the nearby residences. The most recent stage was supplied by Hanson Precast.

From the RTA Noise Wall Design Guideline, the concept of adding 'art' to the practical design considerations for a noise wall is encouraged. Local communities benefit from the visually pleasing designs that can be incorporated into noise walls - adding to their obvious acoustic functionality. This can be done by introducing texture and colour to the precast panel.

In this case, a Reckli mould liner was selected for the noise walls, using an Andalucia profile - the first time the design had been used in Australia. The random block pattern of the liner has a variable profile of 30mm. Normally, liners are made in 1.2m widths so the decision was taken by Reckli to create a master mould that would 'join' five liners as one to eliminate all vertical joints. This made the setup of the liner for casting the panels an easier task for Hanson and resulted in an improved quality of finish for all panels.

All panels with the texture facing have been positioned towards the



housing, either as the rear fence of a dwelling or as a side boundary to a residential access road.

The latest stage of the Shell Cove noise wall comprised 1569m² in area and had two different heights of 6.5m and 4.5m, as specified by an acoustic engineer. 94 panels were supplied to the project with 6 different panel sizes. The typical larger panels, 6m long by 3.5m high, weighed 8.9 tonne with the smallest panel weighing 1.2 tonne.

A black pigment was added to the concrete mix, 4% of cement weight, to provide an integral and low maintenance colour to the panels. The pigment was selected from an aesthetic perspective to provide reference to the local basaltic rock, which is also used extensively throughout the project in feature stone walls in landscape areas.

According to Keith McComasky from builder Trade West "We recognised the benefits of using precast concrete panels over smaller lightweight panels early on.

"Precast panels offer fast installation and we were able to lift fewer panels as opposed to many. They are durable in the long term, as well as being less susceptible to damage during transport and installation. And they are supplied as the finished product. In terms of finishing, the coloured panels don't require any messy finishing trades after installation".

Client: Australand Corporation (NSW)

Builder: Trade West

Engineer: MYD Consulting Engineers

Precast manufacturer: Hanson Precast



■ Dress circle living

Sophisticated urban living has arrived in the heart of Adelaide's CBD with this landmark apartment block.

The \$51 million, 15-storey Rowland Apartments complex consists of 87 apartments in South Australia's first 8.1 star Nationwide House Energy Rating Scheme (NatHERS) building.

Situated close to Adelaide's historic Her Majesty's Theatre in the popular Central Market precinct, the project provides local students, professionals and others who crave an urban lifestyle with the latest in high rise living – and also sits at ease with its historic, lower-rise neighbours.

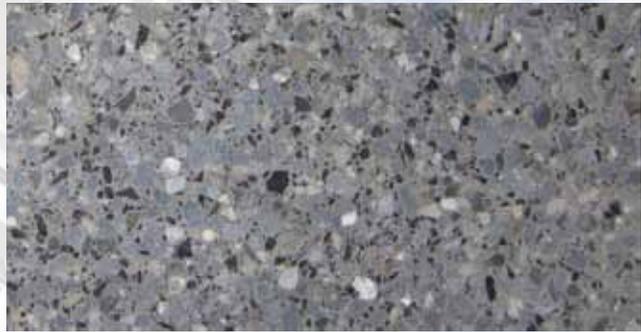
As well as environmental performance – enhanced by features such as solar-powered hot water systems, water retention tanks and double glazing – the project is characterised by attention to finishes and details designed to appeal to discerning residents.

These include fully tiled balconies and generous 920mm-wide solid timber apartment entry doors with natural wood finishes, while that bugbear of apartment living, excessive noise, is eliminated by double corridor and party walls with a 55mm air gap: totalling a privacy-assured 160mm thickness.

Similar standards applied when it came to the exterior finish, with precast the first and only choice. It offered the winning combination of aesthetics, durability, speed and ease of construction, value and safety that the developers desired.

The 2,510 square metres of precast panels that make up the building's façade were supplied by the SA Precast team, which worked closely with the designer and builder prior to the project's commencement. Involvement at this early stage enabled a level of planning and preparation that helped streamline construction, despite a number of challenges.

"The original plan called for off-form colour panels with polished panels at the ground and fifth level. However, the designer then requested a trial of an acid washed panel for a different look. The ultimate decision was to finish the majority of panels in a paler acid wash with a darker, contrasting acid washed panel, along with some polished panels," explains Claude Pincin, from SA Precast.



Once the decision to use the acid washed panels was made, another challenge arose: ensuring that the majority of paler panels were constructed to the required two-storey height while remaining under the maximum engineering weight requirements. At close to 22 square metres per panel, this meant thin – therefore relatively fragile – panels. Combined with the acid washing requirement, this called for extra care in the treatment and handling process so as not to damage the panels. To address the issue, hydraulic tilt-up frames were used for casting and washing.

The decision to increase the building height from 14 to 15 storeys mid-build posed another challenge. This required the swift design and supply of an additional 20 subtly-different panels that retained the building's design integrity, without hampering the tight construction program.

Happily, construction proceeded smoothly, aided by another precast advantage: the panels were delivered on walkway frames, eliminating the risk, time and cost associated with the alternative: ladders and boom lifts.

The final result is a structure that's ideal for 21st century living, enabling residents to enjoy both the heritage and history that Adelaide has to offer as well as its growing range of thoroughly modern delights.

Client: MANDALA Developments Pty Ltd

Builder: Brookfield Multiplex

Designer: D'Andrea & Associates

Structural engineer: Lelio Bibbo

Precast manufacturer: SA Precast



■ Estate planning

Extensive additions to an existing Melbourne housing estate have changed the game when it comes to public housing.

This \$43.4 million project comprises a seven-storey, 152-unit block built on the site of a former carpark - an upgrade to the existing Atherton Gardens housing estate in Fitzroy, Victoria. In addition to its accommodation, the new facility includes a community space, kindergarten, office and parking facilities.

A key requirement was to avoid a grim, monolithic example of early public housing and instead create a space on a more intimate scale. Cost was an issue: with a tight budget and an ambitious plan, some creative thinking was required.

With much of the suburb's architectural history associated with local brickworks and brickform warehousing and factories, a masonry building was a clear first choice, however the cost and time required to construct this were prohibitive.

That's where the precast solution came in. Use of precast panels specially cast with a brick inlay facing delivered the best of both worlds: a highly durable and cost effective construction material that also met the aesthetic requirements of the job. Accordingly, a complex and highly distinctive brickwork basketweave design, interspersed with bands of bright colour, was developed for the project.

When a brick is cast into concrete, the bond of the brick and the concrete is permanent and structurally superior to masonry alone and offers a number of advantages in addition to its structural and aesthetic value. These include many of the distinct advantages of precast in general, including reduced construction time, simplified engineering, no requirement for flashing, lintels or weep cavities and no need for concern about efflorescence or having sand, mortars or mixers on site.

Westkon Precast, which has experience working with brick inlay panels, was selected to supply the precast, which required numerous highly specialised reusable moulds to create the brick pattern and ensure that it repeated accurately, panel after panel.

The brickwork on the panels was created in conjunction with a specialist company that makes fully-fired brick facings some 10 to 15mm thick. These were positioned face down in a mould and the concrete poured to create the panel – a method that allows for dimensionally stable placement of the bricks. The brick face panels equated to 2,200 square metres of conventional brickwork.

The largest challenge on this project was the coordination of the brick pattern in the façade panels. Because the shape of the building did not allow for a modular panel system, every panel had to be detailed individually to ensure the pattern was maintained. In addition, bands of highlight bricks ran across multiple panels. Great care had to be taken with the shop drawings and manufacture to make sure these bricks, in particular, were in the correct position.

Assisting construction speed and safety was the fact that the façade work took place offsite and was craned into position with no need for the added risk and cost of scaffolding, hoists and so on.

The final result more than fits the brief: an accessible and human scale structure with a warm and welcoming façade that's in keeping with the history of its surroundings.

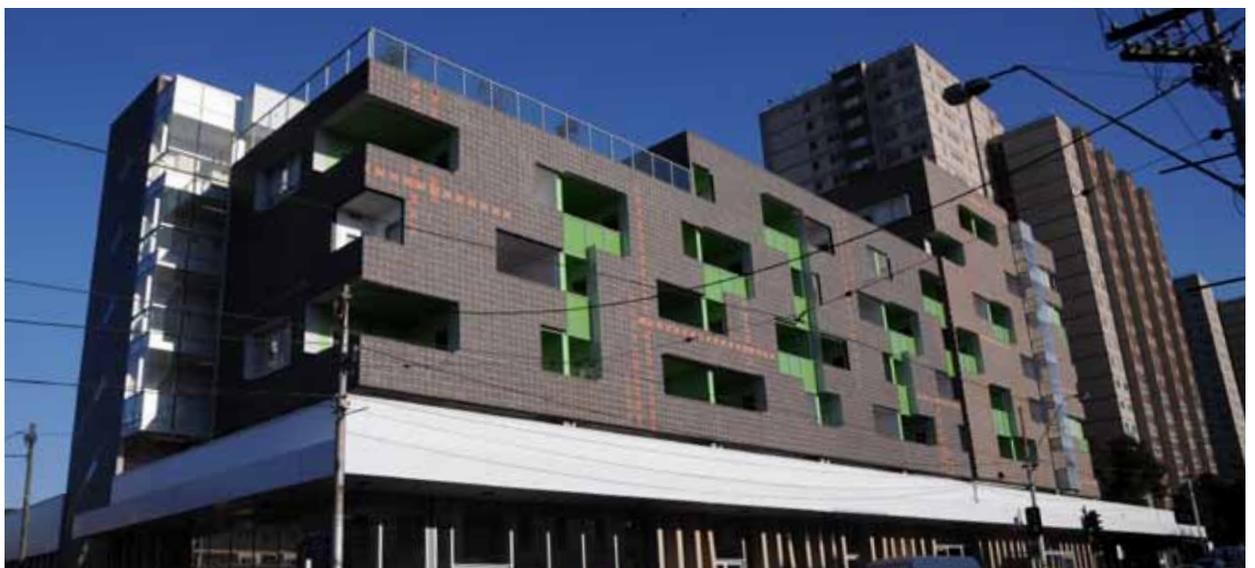
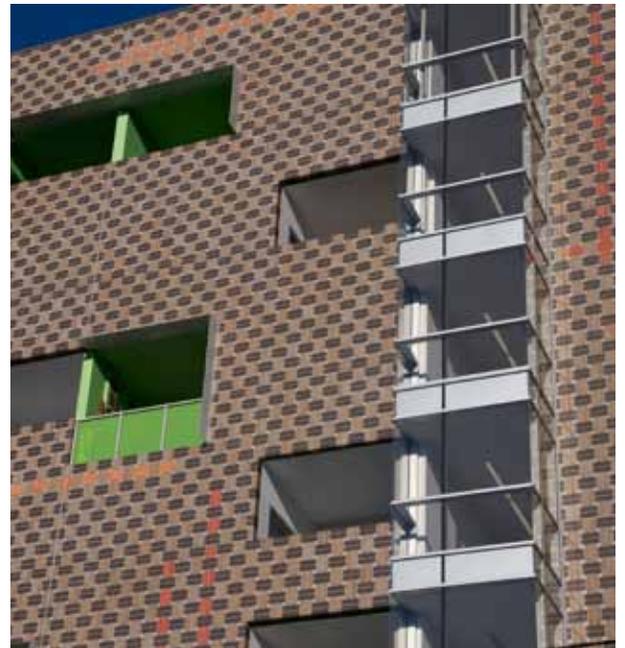
Client: Victorian Government

Architects: Bird de la Coeur/McCabe Architects

Builder: ABI Group

Engineer: Robert Bird Group

Precast manufacturer: Westkon Precast



Admixtures in precast concrete

Concrete additives have been used since Roman and Egyptian times, when it was discovered that adding volcanic ash allowed concrete to set underwater. The Romans knew that adding horse hair reduced cracking, whilst blood made concrete more frost-resistant.

Modern admixtures can improve the durability, strength and workability of concrete whilst accelerating the production of precast components and speed of on-site construction. Today's admixtures can also be used to improve frost resistance and thermal properties, minimize shrinkage cracks, improve stability during placement and transport, reduce corrosion in steel reinforcement, or inhibit the surface mortar to expose the aggregate.

Admixtures can assist the precast manufacturer to increase productivity, reduce power, and use resources more efficiently. Polymer chemical admixtures accelerate the curing process without the need for external heat, thus reducing energy consumption. During manufacture, other admixtures reduce the energy to run concrete mixers and vibrators, improve the flowability of concrete to allow more slender forms, and enable moulds to be removed quickly for fast turnaround and reduced cycle times.

Many admixtures are highly active chemicals and if two or more are being used in a mix design, they should be checked for compatibility. They should not be used without the approval of the design engineer nor should they be regarded as a substitute for good concreting practice. Admixtures should conform with AS 1478.1-2000 and should be sampled and tested in accordance with AS 1478.2-2005.

Exposed aggregates in precast concrete

Aggregates are comprised of coarse gravel or crushed rocks such as limestone or granite, together with fine aggregates such as sand. The size, shape and proportions of the aggregates in the mix will affect the workability, placement, cohesiveness, strength and durability of the finished precast concrete product.

The aggregates remain hidden by a thin layer of cement paste; they can be exposed by the use of retarders, or by grinding, water washing, sand (grit) blasting, acid etching or bush hammering.

If the mix isn't coloured with pigments, the fine aggregates, namely sand, will determine the final colour. On the other hand if coarse, exposed aggregates are used proud of the surface, they will dominate the colour and appearance of the final product. Sharper, more angular exposed aggregates will produce more shadow and trap dirt, whereas rounded, smoother shapes will give a softer appearance and be easier to clean. Aggregates can also be honed or polished to achieve a more prestigious look that reflects light, and the use of decorative or different coloured stones can add interest to the final product.

The best way of getting a good result is to meet with the engineer and precast manufacturer, order some trial samples before deciding on one you like (with the engineer's approval) that the precast can produce and finish for the price. The precast can then record the details of the mix design which means avoiding the need to specify aggregate sizes and proportions.

The architectural market is spoiled for choice when it comes to the selection of aggregate that can be used in precast. According to Steve Falland from Barossa Quarries, over 20 unique colours of marble or granite are available and only sound, clean stone is selected before being crushed and screened to exact sizes as specified. The crushing plants are carefully cleaned to ensure cross-contamination is avoided between different colours of stone.

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