

# ENGINEERS



ENGINEERS  
AUSTRALIA

## AUSTRALIA

CIVIL EDITION

# FIBRE TO THE HOME

**The  
engineering  
behind the  
government's  
broadband plan**

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insitu formwork system is done in one continuous pour," he said.

"The concrete structure of a standard residence (single storey) with a concrete roof slab meets Australian concrete construction code requirements without variations or upgrades. Two storey structures are easily accommodated with minor upgrades.

"Concrete and reinforcing steel are much less complicated structural building materials for housing than combinations of steel, timber, bricks and roof trusses. Yet foundations, floor slab designs, fit-out products and fit-out materials are the same for concrete homes as most other homes built on a concrete slab."

A standard 25MPa concrete mix with 7mm to 10mm aggregate is used for the walls, beams and columns. These elements are all cast in one continuous concrete pour.

A super plasticising additive is placed in the concrete mix on site to bring the liquid concrete to an easy flowing self-levelling mix of about 260mm slump without affecting the finished strength of the concrete.

Standard 20MPa concrete is used for the foundations, and 32MPa for the roof. For more information and licensing inquiries go to [www.formworksystems.com.au](http://www.formworksystems.com.au). ■

## High performance expansion joint for car park



This high performance expansion joint was recently installed on a carpark at Waterfront City development in Melbourne's Docklands.



## Precast concrete tunnels for coal mine

Precast TechSpan arches were used to construct this tunnel for Rio Tinto's Kestrel coal mine in Queensland's Bowen Basin. The tunnel was one of two tunnels designed, manufactured, supplied by the Reinforced Earth Company (RECO). The lengths of the two tunnels are 130m and 180m.

The scope of RECO's involvement included the design and supply of precast TechSpan arches and associated precast concrete footing slabs. The precast footing slabs were designed to accommodate the variable foundations over the length of the declining tunnels. At the lowest depths, where fill height above the arch was 20m, the footings were required to be particularly robust. At this depth, footing widths needed to be limited to 1.1m and the weight to 25t to allow practical transport from the precasting facility at Rockhampton. As the height of fill reduces, nearing the tunnel entrance, the base slab design changed until a minimum fill height of 2.75m was reached.

A key element of the new \$40 million Waterfront City development in Melbourne's Docklands is the north east car park, completed early this year. The car park is seven storeys high, covers an area of 63,000m<sup>2</sup> and provides for 2200 car spaces. It took 18 months to complete.

Architect The Cox Group and builder Hansen Yuncken chose to use an expansion joint system available through Construction Specialties (CS), known as CS Zip Block, in the construction of the car park.

Bernhard Wendt of Construction Specialties said the CS Zip Block allows for maximum surface contact area, minimising the possibility of water ingress across the expansion joint.

"It has an integral nosing of high strength ethylene propylene diene M-class rubber (EPDM), which ensures the side forces on the concrete edges are absorbed," he said.

"By incorporating an integral nosing into the design, Zip Block seals protect the concrete edges from constant side forces and deterioration by vehicle wheels. They also form an integral nosing on either side of the compression seal, increasing the bond line, further preventing water ingress," he said. ■

# Precast for crane runway

**B**ianco Precast recently constructed a 270m long precast concrete portal frame structure at its Gepps Cross (Adelaide) manufacturing facility to support three overhead cranes used for precast panel storage and loading.

The 20t capacity cranes are suspended 11m above ground and span 25m between steel rails supported on precast concrete runway girders.

Bianco engineer Gordon Wilson said the concrete girders are simply supported by corbels on concrete columns at 9m intervals. The columns are 13m high and the prestressed precast concrete I-section portal rafters are 27m long. The rafters are based on road/rail bridge beams.

“We used the relevant sections of AS5100 Bridge Design, covering fatigue strength of concrete beams and other essential design considerations, in conjunction with AS1418 and AS3600, to carry out the design of the structure. There may be a need for AS1418 to be amended to cover concrete runway girders and monorails, and for a limit states design guide for concrete crane runway girders to be published,” he said.

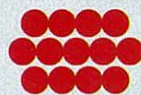


Adelaide precaster Bianco Precast built this 270m long portal frame building at its Gepps Cross manufacturing facility. The structure supports three 20t cranes.

The company pointed out that in Australia crane runway girders and portal frames of this size are usually fabricated from structural steel. This is reflected in Australian standards, with AS1418.18 Crane Runways and Monorails covering steel runway girders and monorails only. It said larger size steel beams can be hard

to source, have fluctuating prices and steel beams need careful consideration of web stiffness in crane beam applications.

“Precast concrete girders are already well entrenched in the road and rail bridge market and precast concrete offers an ideal combination of stiffness and strength in this application,” Wilson said. ■



**Reinforced Earth**

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**Supplier of TechSpan®  
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to Kestrel Coal Mine**

Reinforced Earth Pty Ltd  
Trading as The Reinforced Earth Company  
ABN 53 001 215 327  
Level 2, 20 George Street,  
Hornsby NSW 2077 Australia

Phone: (61) 2 9910 9910

Fax: (61) 2 9910 9999

Email: [recoaustralia@reco.com.au](mailto:recoaustralia@reco.com.au)

Website: [www.reco.com.au](http://www.reco.com.au)

1. TechSpan® precast concrete arch segment.
2. Base slab unit.
3. Site preparation.
4. TechSpan® arch, backfill in progress.
5. TechSpan® arch, construction nears completion.

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