

# Earthquake risk dictates grandstand piling

The first stage of the construction of the new eastern grandstand at EnergyAustralia Stadium should be nearing completion as this issue is published.

Around 5000 concourse seats were due to be ready for the Newcastle Knights' first home game of the 2004 NRL season on the weekend of April 16-18.

The construction of the new eastern grandstand is being carried out in two stages. Following the completion of the concourse seating, the superstructure will be built during the remainder of the year and is due for completion by the end of 2004.

Haslin Construction Pty Ltd is responsible for the grandstand's civil contract. By April 2004 Haslin will have completed earthworks for the tiered seating and grandstand concourse as well as the seating structure and installation of seats.

Subsurface conditions within the vicinity of the new grandstand area generally comprised 7m of fill which included slag boulders forming the existing hill. The fill was underlain by dense sands generally up to 4m thick, which in turn was underlain by very stiff clay, with bedrock varying in depth from 25 to 28m.

The main grandstand structure will be supported primarily on 900mm diameter contiguous flight concrete piles constructed by Frankipile Australia, with the heavier working loads to 3,350kN maximum socketed nominally within the bedrock.

Piles have been designed for vertical, horizontal and moment loading, together with the requirement that piles be free

standing from RL14 (underside of grandstand footings, approx. top of hill) to RL8 (level of playing field) due to the limited lateral soil restraint provided by the hill formation.

Piles were also designed for the possibility of an earthquake event in response to the 1989 Newcastle earthquake and code requirements. Consequently, pile size (diameter) and reinforcement were dictated by column design (freestanding section of pile) and earthquake loading conditions.

Sheet piles were also installed under Frankipile Australia's contract, with the sheets providing support for ramps and proposed excavations associated with the grandstand construction.

Frankipile drove the LX16 sheet pile supplied by Steelcom Pty Ltd ex stock, in lengths varying from 8 to 12m. Interestingly some of the sheet pile will be shotcreted and remain permanently exposed. The undulating profile of the sheet pile will be used to create an attractive feature of the wall.

Steel sheet pile is an established solution in temporary applications. This is an example of sheet being increasingly used in permanent works.

Once completed, the grandstand upper deck, corporate level and concourse will cater for around 12,500 patrons with more than half seated undercover.

In addition to construction of a new grandstand, permanent bucket seating has been installed on the northern and southern concourses, while remedial work will be undertaken on the Western Grandstand.

## Leighton go ahead on Hong Kong reclamation

A judicial review has given Leighton Contractors (Asia) Limited, the go ahead to proceed with the reclamation of a portion of Hong Kong Harbour, to form approximately 18ha of land.

Additional works include the construction of more than one kilometre of seawalls, a rail overrun tunnel for the Airport Railway, a one kilometre dual three-lane road tunnel, a heliport, numerous ferry piers, including the famous Star Ferry pier, various roadworks, drainage and pedestrian access and cooling water pumping stations and pipelines.

The \$HK3.8bn (\$A650m) project for the government, Leighton's largest project yet in Hong Kong, had been the subject of a judicial review following a legal challenge from a local environmental group, the Society for the Protection of the Harbour. The Society was seeking an order that the Executive Council send the plans for the project back to the Town Planning Board for further consideration. The Society has yet to decide whether it will appeal the decision.

In September the government ordered the suspension of the marine portion of the project while the judicial review took place.

Following the decision, Leighton has been instructed to re-mobilise equipment for the project, and expects to be fully operational by mid April.

Leighton, in joint venture with China State Construction Engineering (Hong Kong) Limited and Van Oord ACZ, was awarded the project in February last year. It is expected to be completed in 2008.

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