

# CSL comes to Australia

Cross-hole sonic logging (CSL) is a non-destructive testing technique for evaluation of the integrity of bored piles.

CSL is widely used in Asia, Middle East, Europe and North America, but has been unknown in Australia until now.

The Kingsgrove to Revesby Quadruplication Project in Sydney is one of the first projects in Australia to specify the use of CSL.

Some of the risks in bored pile construction are borehole collapse before or during concreting, discontinuous concrete pours leaving voids or bony concrete, or contamination of the concrete from debris at the base.

Low strain (PIT) testing of bored piles is well known in Australia, and has the advantage of being quick and easy to apply. However, there are limitations to the accuracy of the PIT technique, and the depth to which the PIT signal will penetrate.

CSL is based on casting full-length 38mm diameter steel or plastic tubes into the pile as part of the reinforcing cage.

The number of tubes varies with pile diameter – typically



**Innovation:** Cross-hole sonic logging is a new technique being used in Australia.

one tube for every 0.3m of pile diameter. Tubes are equally spaced around the cage. The tubes must be sealed, and prior to concreting, they are filled with water which helps bonding to the concrete.

Between three and 14 days after casting, two probes (a transmitter and a receiver)

are lowered together down each pair of tubes.

If the concrete is sound, the receiving probe will record a strong energy wave, arriving at a consistent time after being sent from the transmitter. If there is any defect in the pile between the two tubes, the arriving wave will be

weaker and will be delayed.

By mapping the energy and the first arrival times (FATs), the condition of the pile can be assessed over its full length. If there is any region of concern, further detailed examination is possible, so that a 3D Tomographic image of the pile defect can be developed. ■