



Pile Integrity Evaluations - Retaining wall structures

The integrity evaluation of piles within retaining wall structures is undertaken in an identical manner to piles which are in complete isolation. This requires that a downward travelling vibration is introduced into the pile at head level and, if reflecting interfaces are encountered by the wave, measurement of the resulting reflections at the pile top.

If, for instance, a wall pile is of uniform section, completely isolated from adjacent piles and the toe of the pile is within the depth penetration of the test, then it would be expected to see a single reflection corresponding to the pile base within the test data. If, as is often the case, a pile is attached to its adjacent pile(s), then this attachment would represent a change (increase) in the pile properties. This in turn would cause reflection of the downward travelling vibration wave back to the pile top. The magnitude of this reflection would be dependent on the magnitude of the attachment. For example, a 'small' attachment over a very short distance would result in a relatively small / partial reflection of the test wave. This allows propagation of the remainder of the test wave below the attachment which in turn allows assessment of the underlying pile shaft. As the attachment becomes greater / more rigid, then a greater proportion of the test wave is reflected back to the pile top. This allows less resolution of features at deeper depths. In a worst case, complete attachment of adjacent piles prevents any assessment of the piles below the level of the attachment.

Attachment of wall piles tends to occur within soils where overbreak occurs more readily i.e. granular / fill materials. These materials tend to be at their 'loosest' towards piling platform level and piling contractors will ensure that greater concrete oversupply occurs within these strata. It is thus not uncommon for piles on close centres to be connected close to the pile heads. This may restrict acoustic assessment of the piles to the uppermost 1m-2m of pile shaft only. In these circumstances, visual inspection of the wall after excavation may offer more integrity information than the tests themselves.

It is sometimes commented that it may be possible to undertake evaluations prior to installation of adjacent piles. It is, however, normal practice that neighbouring piles are installed typically 1-2 days apart. Integrity evaluations should not be scheduled until the piles have achieved reasonable maturity and are at least, say, 3 days old. This dictates that adjoining piles are often installed before integrity tests can be undertaken.