DARLING ISLAND, SYDNEY

SECANT PILE WALL WITH FREYSSIMIX JET GROUTING

Client: Multiplex Limited
Consultant: Van der Meer Consulting

Specialist Contractor: Menard Bachy Pty Ltd

THE PROJECT

The Challenge
Darling Island is the spectacular setting for a new residential development in the heart of Sydney Harbour. The proposed structure required the construction of a water proof retaining wall connecting into bedrock to allow excavation of a combination of single and double storey underground basements for car parking. A Diaphragm Wall or Secant Pile Wall consisting of alternating interlocking un-reinforced ('soft') piles and reinforced ('hard') piles was identified as the likely solution. However, the underlying soil conditions consisting of loose back-filled rubble (including numerous timber piles and a ships hull!) overlying bedrock, varying between depths of 1m and 14m, presented extremely difficult conditions for maintaining pile verticality and hence an alternative system was required.

MENARD BACHY'S ROLE

Recognising that, in order to achieve the degree of water proofing required, the challenge was to ensure that adjacent piles maintained interlock even at their deepest point, Menard Bachy's successful proposal was based upon installing Freyssimix Jet Grouted soft piles after the hard piles had been constructed, vice versa to the normal sequence.

A local sub-contractor was engaged to install the primary 600mm diameter 'hard' piles (at 1.0m centre's) providing the walls structural support, whilst Menard Bachy 'filled in the gaps' with Jet Grouted "Freyssimix Columns" to ensure groundwater flow was cut-off. The columns were jetted using a highly durable grout mix specifically designed by Austress

In the deeper sections of basement a single row of temporary ground anchors were used as lateral support for structure, the shallower walls were installed as a cantilever after a sufficient key into the 5-10MPa Sandstone was demonstrated during installation.

The benefits of the Jet Grouting solution included the ability to adjust both size and position of columns, thereby allowing for modifications in the above structure to be incorporated, and the ability to work around obstructions using a range specially adapted coring bits fabricated to suit on-site.

Menard Bachy utilised both their Casagrande C6 and Klemm 802 (specifically modified for Jet Grouting for use on this project) drill rigs along with a small specialist site based team which completed the 300 linear metres of piled/jetted wall in 6½ weeks, some 2½ weeks ahead of program.

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