

MACAU, THE VENETIAN

JET GROUTING MASS GRAVITY RETENTION WALL ON PARCEL 7&8



Client: Venetian Macau
Consultant: ARUP

Principle Contractor: Top Builder

THE PROJECT

The Venetian Casino project in Macau is located within the large hotel and resort Cotai Strip development created by the Sheldon Adelson Casino operator. Parcels 7 & 8 of The Venetian Macau within this Cotai Strip development as part of the overall \$12b investment with the intent to build over 20,000 hotel rooms by 2010.

The site developed has located imported sandy fills over thicknesses ranging from 8 to 10m. These fills overlaid approximately 15m of very soft to soft dredged marine deposits which had previously been treated using wick drains. Further, in excess of 40 metres of firm natural alluvial clay was present below the dredged and imported materials.

To provide watertightness within the site and retain the 5 to 8 metres excavation across parcels 7 & 8 the tender design specified an 8m large by 30m deep Soil Mixing retention wall over 635lm long. This technique had been previously performed on other parcels of the project and presented a number of quality issues as being relatively costly and slow to implement. Menard Bachy submitted in January 2008 an alternative Design and Construct proposal to perform the perimeter retention wall.

MENARD BACHY'S ROLE

The alternate proposal submitted by Menard Bachy relied on the use of large overlapping 1.2m jet grouted columns forming a cantilevered wall. The wall was constructed using interlocking jet grouted

columns forming a continuous soil-crete mass at the face of the excavation and stepping down away from the excavation face utilising the weight of soil above for stability.

An initial contradictory investigation campaign performed by Menard Bachy followed by value engineering of the structure involving the use of finite element modelisation lead to an optimised design of the retention structure. This allowed significant reduction of the size of the retaining wall with final thicknesses of 5 to 8m and depths of 15 to 20m providing a reduction by a factor 4 of the overall volume of treatment. Overall in excess of 4,000 columns of varying depths and lengths as well as 28,000m³ of jet grouting was required to perform the 635lm long retention wall.

Target program was tight and it was anticipated to use two jet grouting drilling rigs with one batching plant to perform the works in less than 12 weeks on a double shifts roster.

Upon reaching 65% completion of the retention structure works in July 2008, and due to the global financial crisis impacting adversely on the gambling and tourism activity, the Macau Venetian Group decided to temporarily halt the works.