

A case study on the use of vacuum consolidation for improving soft clay for coastal development

KENNY YEE

**Menard Geosystems Sdn. Bhd.
Malaysia**

A 350 MW combined cycle power plant is to be constructed on soft clay situated close to the Gulf of Thailand. Include in the construction, an access road is to be built over very soft Bangkok clay. Ground improvement using Menara Vacuum Consolidation technique was introduced in this project for the first time in Thailand. The vacuum consolidation technique was employed to provide the required stability and consolidation.

The site is located in Samut Prakam province of Thailand, south of Bangkok. The geological formation belongs to the Chao Phraya River plain with the upper 20–25 m of soft clay deposited under marine conditions. The water content varied from 90–135% with undrained shear strength of less than 10 kN/m² in the upper 10 m. Fill of up to 4.3 m was placed in order to build a 1.33 m embankment above ground elevation.

The design criteria include residual settlement not exceeding 40 cm over 25 years; differential settlement not exceeding 1:750 and a factor of safety not less than 1.3 against shear failure. Vacuum pumping was kept for 7 months. The average degree of consolidation achieved ranged from 87–93% and an average increase of 22 kN/m² in the undrained shear strength. The main concern was to maintain stability of the 4.3 m fill during construction.

The ground improvement work was carried out based on a turnkey design-and-built contract including a performance guarantee. The philosophy behind the selection of the vacuum consolidation treatment and the results after treatment are presented in this paper.
