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Construction of a Highway Toll Plaza on Dynamic Replacement Stone Columns

PROJECT BRIEFS

Client:
KESTURI

Engineer:
Zaidun Leeng

Main Contractor:
MRCB Construction

Specialist Contractor:
Menard Geosystems

MENARD

Sustainable Technology

The project is located near Jalan Kuching, Kuala Lumpur, Malaysia. It involved the construction of a Highway Toll Plaza. The Toll Plaza was founded on soft silty clay deposit. The Standard Penetration Test (SPT) N values varied from 1 to 4 down to a depth of 6m. The maximum height of the embankment fill varies from 2m to 11m. The ground improvement scheme adopted was stone columns constructed by Dynamic Replacement (DR) technique.

"DR Stone Columns were constructed to depth of 5m with 2,500mm diameter."

Menard Geosystems
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"Compaction energy up to 300 ton.m per blow was used to form the columns."

DR Stone Columns are spaced at 4.5m and 5.5m constructed to depths of 5m. Total treatment area is about 40,000m^2.

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Field calibration was carried out on trial columns to determine optimum operation parameters such as weight of pounder, drop height, number of blows and number of phases of compaction.

"Treatment area up to 10,000m^2 was carried out using 1 DR rig per month."

Environmental monitoring was carried out to measure sound noise level (in decibels) and surface vibration (in peak particle velocity) during DR works.

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"Stones (aggregates) used for DR columns ranges from 3 in. to 9 in. sizes."

Menard Pressuremeter tests were carried out at the DR column locations and in-between the columns to determine the mechanical properties after treatment.

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