MAKING A
GLOBAL IMPACT

Project Report

EQUIPMENT	RIC 9000
LOCATION	Palm Island, Jebel Ali - Dubai
PURPOSE	Reclaiming and consolidating land for expansion of gas processing pant

The fill material forming the land reclamation of the Palm Island project was sand dredged from the Persian Gulf by Jan de Nul. Being highly calcareous it had unusual pre-compaction properties and had not been subject to RIC treatment before.

The sand laid below sea level remained loosely packed at loadings (qc) figures of 2-3 Mpa and densities (Dr) of around 40%. The sand laid above water became much harder forming a crust with qc up to 8-9 Mpa and Dr up to 100%.

The depth to the original sea-bed was at around 5-6m. The intention was to prove that the RIC9000 could successfully compact to this depth and penetrate the crust to improve the layers beneath up to the required qc of 5 Mpa and Dr over 60%.

The trial areas were prepared at two levels, one with the original surface at +2m CD and the second at +3m CD. Both levels achieved good compaction results beneath the crust down to depth up 6m.

The operational trials showed that compaction at the lower level was achieved with less blows - but the increased pore pressures tended to force water to the surface after the RIC unit had passed by. The upper level required more blows to penetrate the thicker crust , but the compaction site remained dry.

Initial CPT results were very favourable. Typically the lower level increased the 2m crust from 9 to 15 Mpa but more importantly the four meters beneath was also increased from 2 Mpa to between 5-6 Mpa to meet the design criteria. It was noted that when driving was completed the compactor was still penetrating at 15-20mm per blow; indicating that even more improvement could be achieved if another pass was conducted.

The upper level with 3m crust also showed significant increase. The crust was already at 15 Mpa and increased to 20-25 Mpa. Beneath this the next 4m showed an increase to the required 5 Mpa.

The CPT graphs also indicated some thin silt layers in places which were found to be less affected by the compaction. Sieve tests showed average silt content of 4-7%. Where these were concentrated into thin lens' the compaction was less effective.

The success of the trials lead to the RIC system being specified on projects using similar fill material elsewhere in the Middle East on typical port extension and land reclamation projects where sand dredged from the Gulf waters is used.

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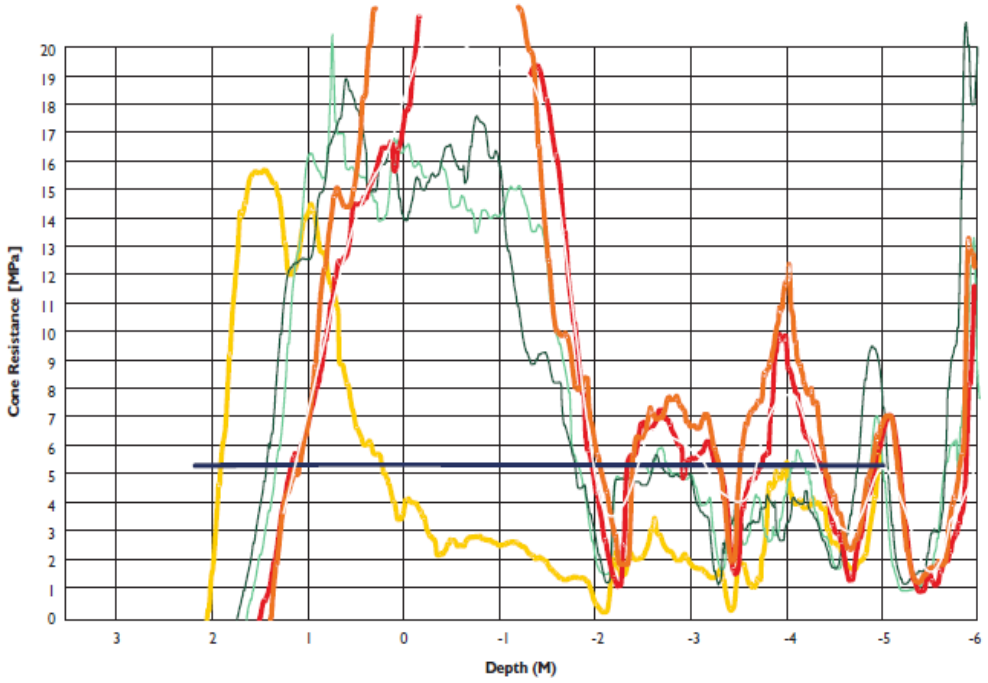
Conclusions

The purpose of the trial was to establish that the RIC 9000 was well able to compact this material to the depths and Mpa required. The results confirmed this and showed even more could be achieved with a secondary pass. Judgments should be made at design stage how high to lay the hydraulic fill in preparation for compaction. The thicker the crust the higher the duty on the machine and more blows per position required.



PALM ISLAND
JEBEL ALI AREA

Block 1-2
Pattern: 1
80 blows
(2 passes of 40 blows)
(with intermediate CPT's)

- PRE-1.02.xls
- INT-102a.xls
- INT-102b.xls
- POST-B1.02AGME.xls
- POST-B1.02BGME.xls

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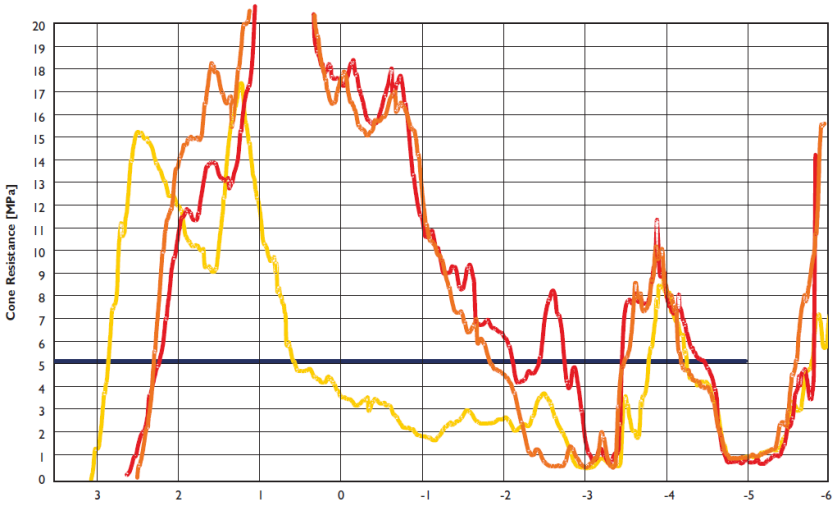

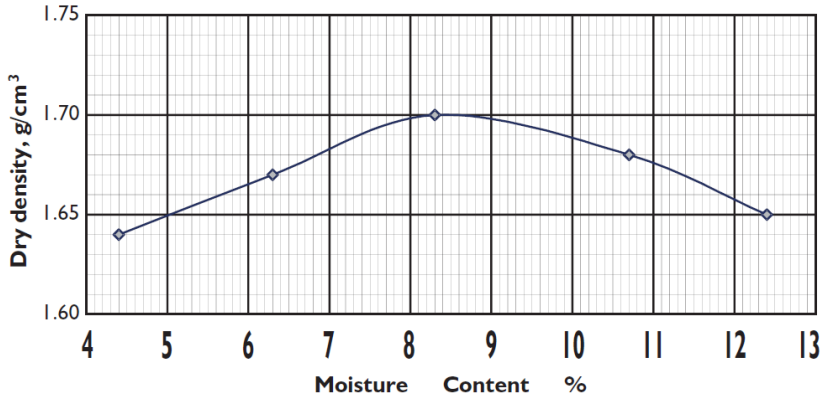

PALM ISLAND
JEBEL ALI AREA

Block 2-2
Pattern: 2
40 blows

PRE-2.02.xls

POST-B2.2a.xls

POST-B2.2b.xls

TEST SIEVE SIZE	CUMULATIVE
MM	% PASSING
25.0	100
19.0	98
12.5	96
9.5	94
4.75	89
2.36	82
2.0	80
1.18	69
0.600	50
0.425	41
0.300	33
0.150	18
0.075	6

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