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World leaders in trenchless technology

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PHOTO REPORT

ON

INSTALLING OF Ø400mm STEEL PIPE USING GRUNDORAM, GIGANT, PIPE PUSHING METHOD

Client	:	Brunei Shell Petroleum (Zainal H.M. Daud Sdn Bhd)
Country	:	Brunei, Seria (F13 – G13)
Equipment Used	:	GRUNDORAM type Gigant Hammer Fitted with upsized Ram Cone
Ramming Distance	:	32m
Pipe installed	:	Ø400mm Steel Pipe
Ground Condition	:	Sandy with High Water Table
Ramming Commencement Date	:	16th February 2006
Ramming Completion Date	:	17th February 2006

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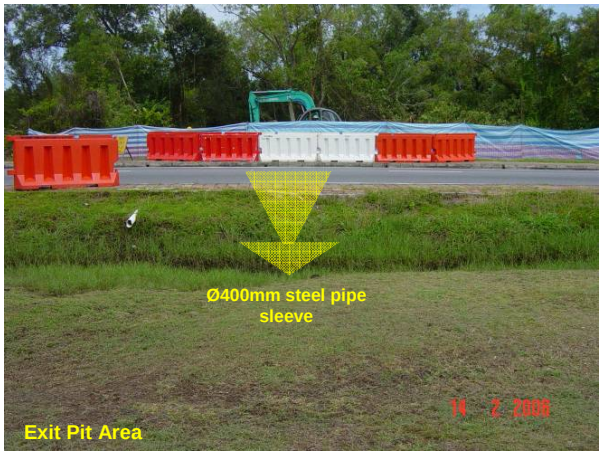

Photo 1 & 2: Installation of a Ø400mm steel pipe sleeve under a busy road (Jalan Tengah) in Brunei, Seria covering a distance of 32m.

Trenchless method was used as traffic is very busy because this is the only road connecting Seria to another town, Kuala Belait. In addition, BSP HQ is near the junction and traffic is very heavy during peak hours. There is also a fire station nearby and there is no alternative route for the fire station to use.

Photo 3: A view of the excavation being carried out.

The depth is 2.8m. Dewatering System had to be used as the soil condition in this is area is very sandy with high water table.

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Photo 4: A view of the shoring completed at the Entry Pit. Workers were aligning the improvised rail to the Exit Pit.

Photo 5: A view of the Exit Pit, just in front of the Fire Station.

Photo 6: Six steel pipes, each about 6m, were used to cover the ramming distance of 32m.

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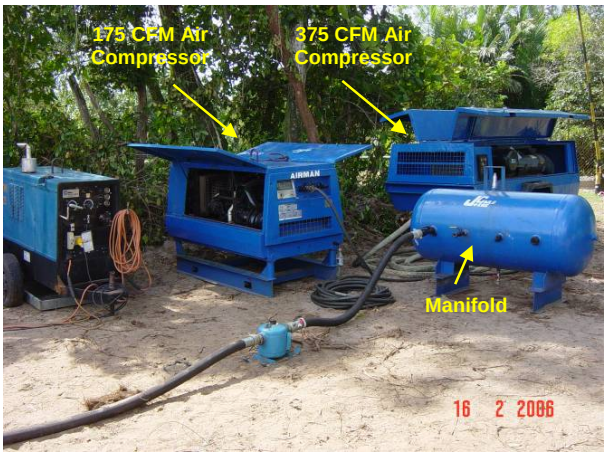

Photo 7: One 375CFM air compressor was combined with one 175CFM air compressor using a manifold to drive the Grundoram Gigant Hammer.

Photo 8: A view of the shoring at the Entry Pit with the Grundoram Gigant hammering in the Ø400mm steel pipe.

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Photo 9: Two holes were cut, one above and one below, to allow water to wash out the spoils within the steel pipe while ramming.

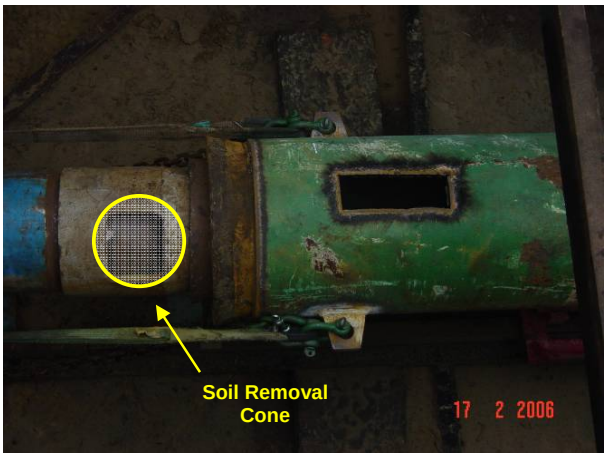

Photo 10: The hole in the soil removal cone is mostly blocked by the Grundoram Gigant. The spoils in the steel pipe cannot escape easily which caused the sand inside to be very compacted.

Photo 11: Water is inserted through the top hole on the steel pipe while ramming in the steel pipe.

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Photo 12: Water, together with sand in being washed out through the bottom hole on the steel pipe.

Photo 13: A view of the steel pipe emerging from the exit pit.

Photo 14: A view of the GRE pipe successfully inserted through the steel pipe.