

Saudi Arabia

# The world's longest undersea HDD recovery operation

In 2007/8 a pioneering HDD project was started using Trenchless Technology on the Berri Causeway and Abu Ali Island on the Persian Gulf coast of Saudi Arabia. Two parallel 3,050 metre long steel pipelines were to be installed under the bay. The smaller one to be used as an oil trunk line (24") and the larger one with a total steel pipe weight of more than 1,500 tonnes will serve as a water injection line (30"). Previously published press releases claimed these as the 'world's longest undersea HDD crossings ever undertaken.

Horizontal directional drilling



In November 2008 TT-UK were contacted by the Middle East specialist HDD Contractor Digital Connection Co Ltd of Al-Khobar, Kingdom of Saudi Arabia (KSA). They sought technical advice and assistance in the recovery of a 42" hole-opener that had become stuck along with the 3 km drill string beneath the seabed during a pre-ream pass on the second of two under sea pipeline crossings.

The 'Berri Causeway' pipeline project in the Middle East (with high profile exposure to the Trenchless technology industry) was always seen as a big challenge, for example the length of the crossings but also the dimensions of the pipeline which would weigh more than 1,525 tonnes.

Whilst the first 24" oil pipeline had previously been successfully installed, unforeseen delays between the drilling process over a 12 week (non working) period had caused the drill string and the 42" hole-opener to become stuck on the second (30") pipeline crossing/installation.

TT-UK renowned for their expertise in the supply and service of their high quality manufactured Trenchless Technology Equipment had little time to provide a solution to releasing the 3km stuck drill string and 42" hole-opener.

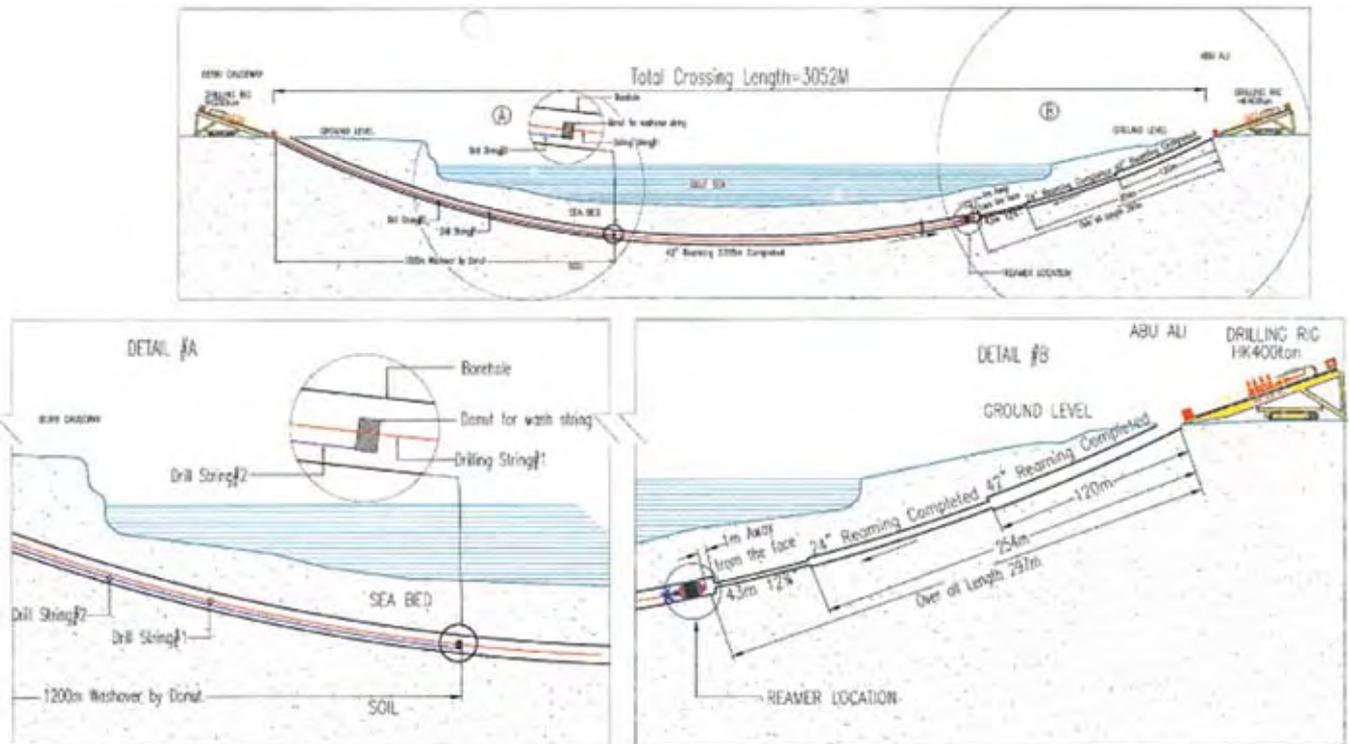
However, emergency discussions between TT-UK, the main contractor and the local drilling contractor quickly led TT-UK to respond to the challenge and recommend utilising their 'powerful' Grundoram Taurus impacting hammer combined with steel pipe adaptations which were designed and formulated to transfer dynamic impact performance energies through special steel fabrications adapted to the drill string via the Grundoram dynamic impacting hammer.

Sharing the project information with other TT Group offices in the USA and Germany, TT-



42" hole-opener successfully retrieved in 10 days





HDD cross sectional view of bore problem



Grundoram Taurus Ramming

UK quickly drew up a strategic plan together with a technical proposal on how they believed the drill string could be freed up using 'Dynamic Impact Vibration Energy'.

Whilst similar successful undertakings have previously been carried out world wide, few have been attempted for releasing stuck drill rods over this exceptionally long distance with each drill rod weighing 480kgs. Dynamic impact vibration energies have normally been placed on the end of product pipes for assistance in completing HDD (Ram Assist), or for product pipe retrieval where the product pipe has become stuck using HDD techniques, few had previously tried with stuck drill rods due to the enormous 'impact power' which has to be contained onto a relatively small size drill rod (6/58th) from a large impacting hammer in a usable and controllable process.

The project owner is Saudi Aramco. The main pipeline contractor is Al Robaya and the HDD subcontractors are DCL and TATCO.

The combined efforts from all companies and the personal attendance on site of Roger Atherton of TT-UK proved invaluable to the success and final retrieval of this problematic drill bore taking TT's Grundoram and 'Pipe Ramming' technologies to a 'new' level of HDD ram assist, pipe/drill stem rescue method. Following bore-hole salvage this 30" x 3km water injection pipe-line was finally and

successfully installed on January 13th 2009!

This rescue saved significant financial implications such as the total cost of a lost drilled bore. Any contractual penalties. Any ongoing cost delays in commissioning the final pipelines All associated costs involved in planning a new bore and the actual costs of duplicating all the undertakings of a new bore/ installation, etc.



250T HDD Machine



Taurus (600 mm) Grundoram Hammer with 2,000 Nm Impact Energy