

Project:

Liquefied Natural Gas, Shore Trunkline Microtunnel

Location:

Wheatstone Project, Onslow, Western Australia

Project completed:

2014

Applicator/Contractor:

*Subcon Technologies Pty Ltd
Dredging International Australia*

Market sector:

Energy

Products used & amounts:

*MasterFlow 871 – 871 tons
MasterFlow 700 – 70 tons*

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The Wheatstone Project is located in close proximity to an important whale shark breeding ground, meaning various environmental factors needed to be considered when developing Master Builders Solutions' grout delivery system.

The background

Chevron's Wheatstone Project is a multi-train Liquefied Natural Gas (LNG) and domestic gas plant located on the Pilbara Coast, Western Australia.

The Wheatstone Project involves processing gas from various fields located offshore and the installation of gas gathering, export and processing facilities in water and on land.

The gas is transported to the Wheatstone LNG plant from subsea wells through a trunkline, several kilometers offshore. The last kilometer of the trunkline is sent in from the shoreline through a protective microtunnel.

This project is located in an environmentally sensitive area, in close proximity to a whale shark breeding ground.

The challenge

During tide changes, a grout plug is required inside the tunnel annulus extending 70 meters inside the microtunnel to block water flow.

The challenge was to anchor the last 70 meters of the trunkline within the microtunnel to shore with a precision grout plug.

Since placement of the grout had to be done underwater with low visibility, the team had to develop a new design concept for grout movement, placement and mixing.

Considering the close proximity of the project to the shark breeding ground, environmental factors had to be taken into consideration to ensure zero environmental impact.

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Mock-up inflatable bags before filling with precision grout



Mock-up of the inflatable bags after filling with precision grout sealing the tunnel annulus

Our solution

A new grout delivery system was designed to overcome some of the challenges. This included a unique trolley system which carried the delivery line and inflatable grout bags down the 70 meter microtunnel underwater.

Master Builders Solutions' technical services team developed a new high strength non-shrink deep pour precision grout, MasterFlow 871. The grout and water temperature was reduced to 4 degrees Celsius for 48 hours before use, using several refrigerated containers. The design of the delivery trolley also assisted temperature control by enabling rapid product placement. Best practices were employed for working in environmentally sensitive areas that had zero tolerance for any spills.

The customer's benefit

- A difficult project was delivered on time and within budget.
- The on-site costs to the customer were reduced due to the speed of the pour (36 hours non-stop).
- The grout plug provided the trunkline with an anchor that was impermeable to tides and intermittent water and air ingress, improving the durability and life cycle of the structure.
- The solution reduced the possibility of future corrosion costs.

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Projects facts at a glance

- The project was in the design phase for almost two years, the actual placement of the grout was completed in 36 hours.
- Two mock-up trials were also conducted before the final application of the grout.
- The project now boasts the first ever microtunnel plug installed worldwide.

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