

O-TUBE

UWA Research Leads to Significant Cost Savings | May 2012

Pipeline stabilisation is expensive. Woodside is working with UWA to understand how we can reduce cost.

Pipelines can move in heavy weather.

Woodside operates the STABLEpipe Phase 2 joint industry project (JIP) which studies this movement.

The JIP helped fund the University of WA O-Tube facility. The O-Tube is a large scale model that allows us to circulate water to simulate tropical cyclone wave and current conditions. It's like a wind tunnel – with water!

The O-Tube circulates 60 tonnes of water to simulate underwater conditions during tropical cyclones.

We are aiming to test and improve on traditional design rules.

The O-Tube Facility

The interactions between the water, soil and pipeline are very complex. The best way to understand the interactions is to perform scale modelling.

The O-Tube is a large scale model. It is a recirculating flume, the first of its scale. No other facility can simulate the same storm intensity.

The UWA facility is cutting edge. It includes advanced control, measurement, and interlocks to safely and accurately manage and monitor the testing.

The facility gives Woodside access to a world class research capability. It is supported by highly capable researchers and technicians under the leadership of Professor Liang Cheng and Professor

David White. It helps train our next generation of engineers.

The STABLEpipe JIP will improve pipeline reliability and reduce stabilisation costs for subsea pipeline owners. It validates performance in areas prone to tropical cyclones, typhoons and hurricanes.

The Modelling is Complex

We take real world data from the O-Tube and feed it into our complex models. We also use computational fluid dynamics to investigate the wave and current forces.

Woodside's models allow us to incorporate other information like wave direction, frequency and current.

By validating our models we can test the reliability of design rules that are being applied across the world.

Collaboration

Woodside is operating phase 2 of the joint industry program through a collaboration including Chevron, University of WA and the Australia Research Council.

The work engages industry specialists from J P Kenny, Det Norske Veritas, Danish Hydraulics Institute and the National University of Singapore to provide input, to challenge and to validate the findings.

The research has already yielded technical outcomes with a benefit-to-cost ratio greater than 10:1.

QUICK FACTS

- Woodside-led STABLEpipe JIP commenced in 2010.
- Pipe-Soil-Fluid interaction testing is performed in the O-Tube research facility, a very large recirculating flume.
- The O-Tube rapidly circulates 60 tonnes of water to simulate underwater conditions during tropical cyclones.
- The O-Tube facility is a worldwide first. No other facility can simulate the same storm intensity.
- The hydrodynamic studies investigate the wave and current forces on pipelines to test the reliability of traditional rules with the aim of improving design criteria selection.
- The research has already yielded a benefit-to-cost ratio greater than 10:1.