OCEANEERING®

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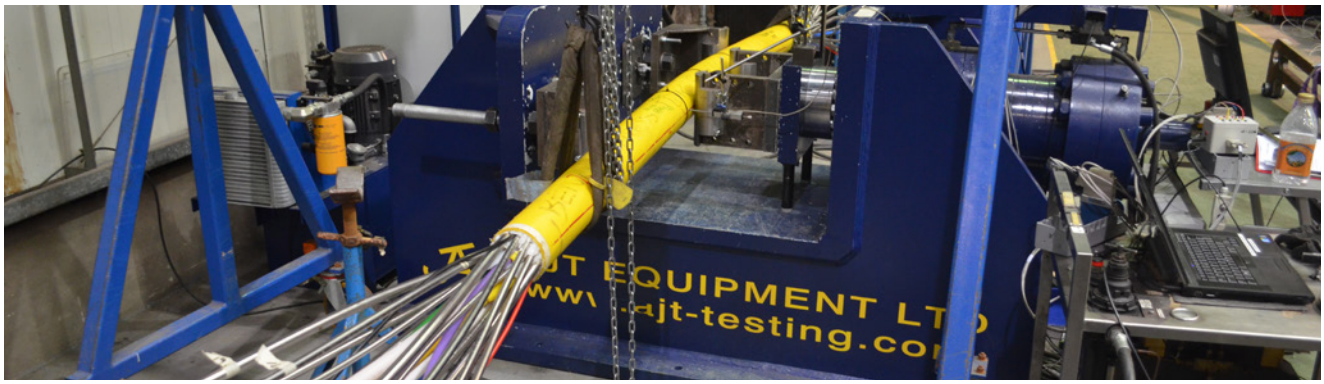
Bend Stiffness Qualification Test

Verifying the bending characteristics of subsea umbilicals



Oceaneering conducts bend stiffness tests to confirm the bending behavior of subsea umbilicals. During testing, the umbilical is bent under a controlled load and the curvature is measured until it reaches its minimum bending radius (MBR). The results of the test are used to verify the predicted values used for design and installation.

Due to the complex composite structure of an umbilical and the variations in temperature, bend stiffness is a non-linear property. This makes verification testing the most accurate means of obtaining actual bend stiffness values.

FEATURES

- **Proven track record**
- **Maximum umbilical diameter 320 mm**
- **Validates bend stiffness over a range of curvatures**

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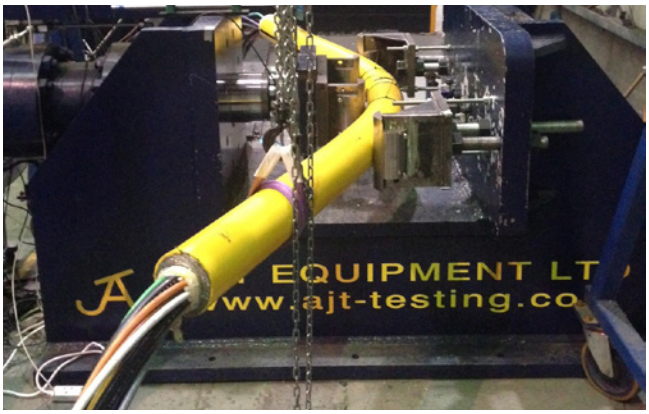

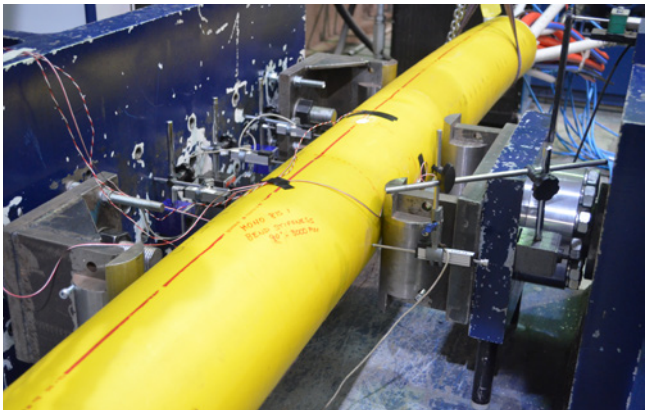

Post-Test Acceptance

During and after testing, thermoplastic hoses and steel tubes within the umbilical are monitored to ensure no leakage, bursts, or unexplained pressure drop has occurred. The bend stiffness vs curvature is then reported to the client and is used to verify the predicted values.

Advantages of Testing

- Verifies predicted bend stiffness generated by theoretical or analytical models
- Provides enhanced understanding of product behavior under bending conditions
- Verifies of compliance with industry standards
- Gives an actual/accurate bend stiffness value over a range of curvatures to the MBR

Technical Data

	Rosyth, Scotland	Niterói, Brazil
Maximum umbilical outside diameter	12.6 in / 320 mm	12.6 in / 320 mm
Test sample length	16.4 ft / 5 m	39 ft / 12 m (Maximum sample length. Shorter samples can be evaluated.)
Umbilical orientation	Horizontal	Horizontal
Umbilical test pressure	Installation pressure or working pressure	Installation pressure or working pressure
Bending method	Four-point bending	Two-point bending
Maximum load	500 kN	9.8 kN
Recorded parameters	Load, curvature, and temperature	Load, curvature, and temperature
Safety controls	Job-specific JSEA	Job-specific JSEA
Calibration	UKAS accredited calibration	Accredited calibration
Results	Electronic test report	Electronic test report
Industry standards	ISO 13628-5 (10.2.1 c), bespoke tests/ procedures to client requirements	ISO 13628-5 (10.2.1 c), bespoke tests/ procedures to client requirements