

# INTEGRISTICK™ Dynamic Curvature Sensor



INTEGRISTICK™ strain sensor

The Pulse **INTEGRISTICK™** is a unique patented dynamic strain sensor specifically suited for riser fatigue monitoring where response is dynamic bending dominated. Typical applications include fatigue monitoring in the touch down section of an SCR and the taper joint of a top tensioned riser.

The stick sensor is 19 mm outer diameter and 0.5 meter in length and it is attached to the outside surface of a riser. It changes in sympathy with the riser pipe and measures the change in riser curvature in 2 planes allowing local dynamic bending stress to be determined and hence the fatigue damage rate to be calculated.

The sensor has a typical 2 micro-strain resolution. This makes the sensor sensitive enough to capture lowest sea states. This capability is essential for measuring response under day to day current profiles and waves that contribute significantly to damage accumulation.

Uniquely the **INTEGRISTICK™** is sealed, oil-filled and pressure balanced allowing application at depths up to 3000m. It is manufactured from corrosion resistant materials. The strain measurement system is compact, ultra lightweight and can be fitted to the riser in a matter of minutes. When fitted with a compact GRP fairing the arrangement provides a highly reliable and robust method for measuring riser bending stresses.



INTEGRISTICK™ strapped to a riser

## SYSTEM CONFIGURATION

The sensor has ultra low power consumption and designed to interface directly to an **INTEGRIPOD™** <sup>(1)</sup> for battery-powered (standalone) or online data logging. The connection between the **INTEGRISTICK™** and **INTEGRIPOD™** is a dry-mate connector. The connection type will depend on the project specification.

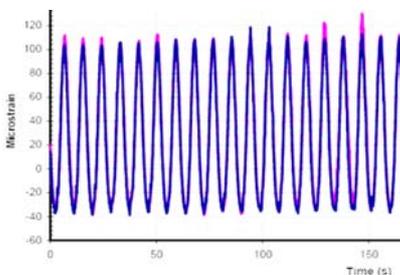
## MOUNTING METHODS

The **INTEGRISTICK™** is mounted on the outside diameter of the riser or over the outside diameter of the coating of the riser via four mounting blocks. The blocks are made from Titanium material. The blocks are strapped to the riser pipe using smart band straps. The installation can be carried above water only.

The logger pod is mounted on the outside diameter of the riser using various proven mounting methods.

## SPECIFICATIONS

- Stick size 19 mm OD and 506 mm length. Hose length varies
- Strain Resolution 2  $\mu$ strain RMS (for Pipes between 6" to 12")
- Strain Accuracy 6% of riser strain on the surface (for Pipes between 6" to 12")
- Temperature range -5°C to 80°C (storage) 0°C to 65°C (operation)
- Stick Weight 1 kg approx. in air
- Design pressure 3000 meters water depth



INTEGRISTICK™ dynamic strain measurement  
– example of signal output from the stick

Note (1): **INTEGRIPOD™** is the generic name for Pulse subsea logger assembly to acquire data from sensors, to store data into memories and to transmit data in different communication schemes

