

Subsea Wellhead Integrity Monitoring

Digital twin for improved decision support and reduced cost



Subsea Wellhead Integrity Monitoring (SWIM™) measures accumulated load and other critical parameters on the wellhead during drilling operations, providing KPIs and prediction analysis as a digital service. No extra personnel are required on the rig.

4Subsea offers drilling and well intervention services to optimise drilling operations and extend the life of producing wells. We help operators perform offshore drilling, completion, and intervention operations safely and efficiently. The Well Intervention and Drilling range contains **Subsea Wellhead Integrity Monitoring (SWIM™)**, **WellTrack™**, **Conductor Analysis**, and **Subsea Control Systems**, in addition to advanced **Engineering Services**.

KEY BENEFITS

- Monitors stability, load, fatigue, and structural integrity of the wellhead system
- Helps avoid unnecessary downtime
- Provides decision support to drilling teams during drilling operations, telling them when to disconnect when operating in bad weather
- Helps enable operations on wells with wellhead integrity concerns
- Presents status and results on a web application for rig crew and onshore organisation
- Can be configured to provide live readings at any depth without the need for an ROV
- Ensures functionality of wellhead after drilling operation is completed
- Can be used for exploration, greenfield, and brownfield wells



Proven Concept for Wellhead Integrity Monitoring

SWIM™ is a well documented and tested solution for monitoring the main barrier while drilling. The system can be extended to provide live monitoring of drilling risers and conductors. SWIM™ uses machine learning to predict into the future and artificial intelligence to detect and manage shallow gas/shallow water, structural failures in the wellhead, and conductor instability issues.

With SWIM™ operators can reuse critical wells and maximise lifetime of wellheads by scheduling drilling operations based on well criticality, historically accumulated load on wellhead, and predictive models assessing expected load on wellhead from next drilling operation based on weather forecast.

Watch demo video [here](#).

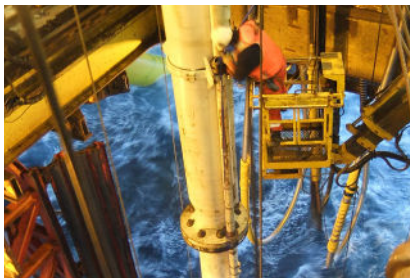
Integrated Operations

- Results are presented live on a web application accessible to the rig crew and the land organisation
- Onshore wellhead specialists can support decision making during the drilling campaign as requested
- Measured data are stored and can be re-used for model calibration
- The system can be attached to the rig pod umbilical



Installation and Data Transfer

- 3 high quality motion sensors installed on the BOP
- Sensors are installed and retrieved by ROV or while BOP is on deck
- High speed data transfer to wireless ROV modem
- Compressed and full data series can be transferred during monitoring campaign
- Acoustic data transfer and alarms as required
- Live monitoring with cable to surface if required



Sensor Specifications

- 3-axis accelerometer and 3-axis rotational rates
- Logging frequency 10Hz
- Large capacity for data processing in sensor
- Battery data storage capacity for more than 9 months of continuous logging
- Height: 393mm - Diameter: 114mm - Weight: 9kg
- Water depth rating: 3000m
- Up to 4 communication ports for connection to other sensors or transmitters



4Subsea is a leading provider of technology and services that help operators optimise energy production from subsea oil & gas fields and offshore wind farms. We combine domain expertise with data analytics and digital services to maximise lifetime of assets, reduce operational cost and optimise future projects through data-driven design.

The company was established in 2007 and clients include the major energy operators as well as the large suppliers of subsea equipment. 4Subsea is headquartered in Asker, Norway with additional offices in Bergen, Kristiansand, Stavanger, Rio de Janeiro, and Aberdeen. 4Subsea is a company in the Subsea 7 Group. More info at www.4subsea.com.

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