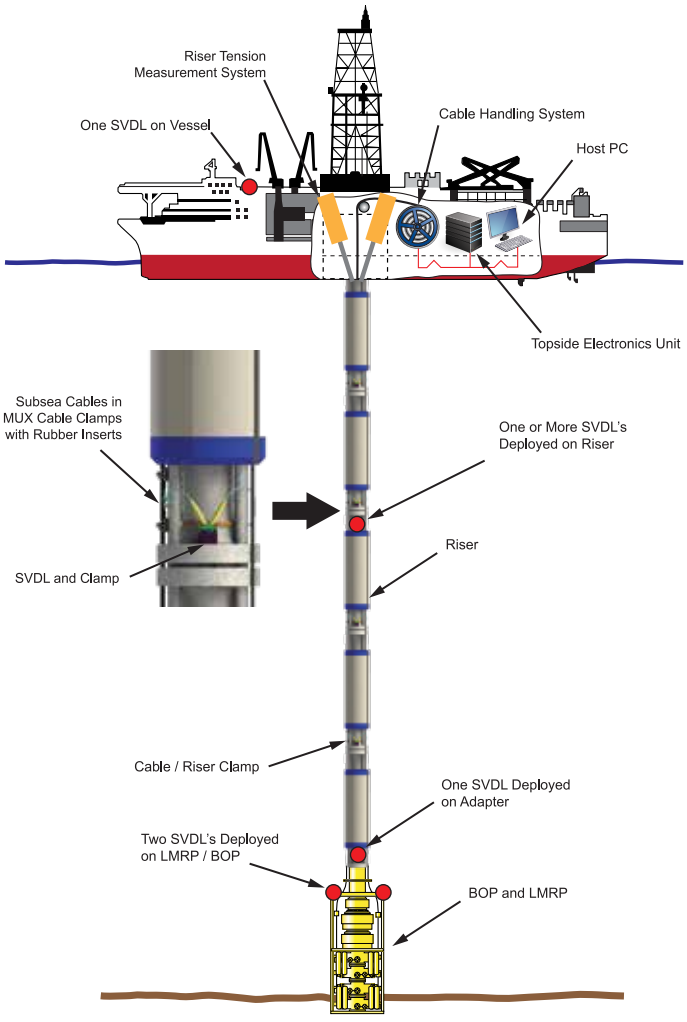
# Realtime Fatigue Monitoring System (RFMS®)

Stress Engineering Services developed the Realtime Fatigue Monitoring System (RFMS®) as a method of providing field measurements of stress and fatigue on drilling risers, wellheads and other subsea systems in near real time.

The RFMS® significantly advances riser integrity management by;

- Using measured data at a fewer locations
- Using advanced algorithms to reconstruct stress and fatigue damage along the entire riser
- Integrating this approach into a fully automated, real-time environment

The RFMS® provides a basis for understanding all the fatigue loads on a wellhead system. The wellhead is the last pressure barrier between the well and the environment. Understanding the loads and managing the loads on the system ensures that the integrity of the system is not compromised, and protects the environment from any potential discharge of hydrocarbons. As a result, drilling engineers are empowered with a tool that provides real-time data on the integrity of the drilling riser, enabling informed decisions to be made in adverse environments that increase safety and efficiency of drilling operations.




Spotlight on new TECHNOLOGY 2017 Winner

**Realtime Fatigue Monitoring System**

2017 Oil & Gas Engineering Product of the Year Silver Award

The RFMS® can also significantly reduce downtime with commensurate cost savings. The real-time stress and fatigue information provided by the RFMS® will prove increasingly useful as riser design boundaries are extended, and as structural integrity management becomes a preeminent concern in deepwater drilling and production operations. Ultimately, a sufficient amount of quality field data are expected to lead to improved model validation and simulation accuracy, and a more focused inspection and integrity management program. Additionally, the accumulated fatigue damage estimates may be tracked on a per-joint basis as the riser joints are rotated among different well sites, thereby aiding decisions regarding the frequency of joint inspection intervals.

## How it Works

The RFMS® calculates stress and fatigue at any location in a riser system/wellhead/conductor casing via measurements from 5-10 accelerometers and angular rate sensors placed at strategic locations along the riser, along with analytical riser mode shape information. Since the only required online inputs are the dynamic riser response, top tension, and mud weight, fatigue estimates may be calculated without knowledge of the impinging currents or other forcing events. Vibration sensors and data acquisition electronics are housed in Subsea Vibration Data Logger (SVDL). The SVDL units are connected via fiber optic subsea cabling to a central data acquisition system, located topside. Data from each SVDL is displayed as it is acquired, and processed with a sophisticated online computer algorithm to synthesize stress estimates along the entire riser length using a database of riser dynamic modes. The estimates are then processed chronologically via rainflow counting, recording fatigue damage accumulated during the deployment. The fatigue estimates are updated at 15-minute intervals, thereby providing actionable information to the drilling crew in real-time.

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