

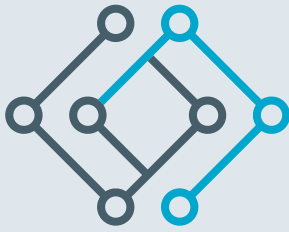
LIGHT STRUCTURES
Passion for Monitoring



FPSO and Offshore Structures

SENSFIB GLOBAL FORCES, SENFIB HULL and IMMS for SENFIB
Performance Confidence and Safety





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SENSFIB HULL for FPSO

Safe and cost-effective operation of hulls is a key in today's offshore oil and gas market. With SENSFIB HULL for FPSO the operator gains valuable knowledge on the hulls condition. This supports maintenance planning, life extension decisions and eases the inspection work load. SENSFIB HULL provides real-time data for operative decisions and the saving of life-time hull loads with environmental parameters for onshore post-processing.

SENSFIB HULL monitors the stress responses and accelerations during operation to provide online information about load margins and long-term information about fatigue accumulation. The scope and layout of the system can be adapted to fit any hull or geographical location. Fatigue hotspots such as midships side shell structures, hull-topsides interface and other details of interest will also be taken into consideration.

The Fiber Bragg Grating (FBG) optical sensing technology gives SENSFIB a competitive edge compared to conventional strain gauge technology as the fiber optic technology provides a higher level of accuracy, no annual/biannual recalibration costs and lower maintenance cost with less intervention.

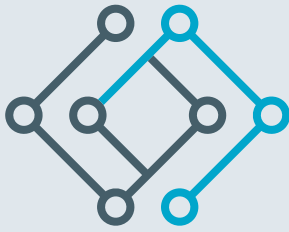
SENSFIB HULL for FPSO can also be extended with a Mooring Tension Monitoring viewer to track FPSO offsets and mooring line tension, including alarm function.



Hull and Structural Monitoring Operational Control

- Reduced maintenance cost
- Dynamic operator safety guidance
- Extended hull life-cycle
- Fiber optic technology
- Approved by leading classification societies
- Attractive ROI





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IMMS for SENSFIB

Integrated Marine Monitoring System for SENSFIB brings together the best of Hull Stress Monitoring with running comparisons to fatigue design calculations and hydrodynamic response models. Not only will the owner and operator gain detailed knowledge on the fatigue status of the hull, but the causes of fatigue development can be evaluated at a glance. IMMS for SENSFIB can perform real-time and post analysis related to deflection, fatigue, accelerations and strain.

In addition to all the benefits from a SENSFIB HULL system, the IMMS for SENSFIB solution provides online calculation of design fatigue using the original assumptions, as well as using the actual operating conditions. The results are valuable input to maintenance planning, life-extension, relocation decisions, and planning of new constructions. Interfaces to an Environment monitoring system and a Loading Computer ensures that all data that are commonly used in post-processing are available in one dataset with the same time stamping.

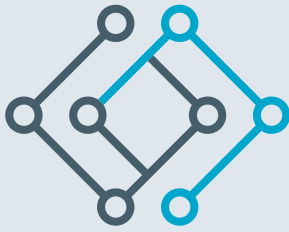
IMMS for SENSFIB can be extended to include low-cycle fatigue processing in addition to the standard high-cycle fatigue calculations. Interfacing to a centralized alarm system and to a database is available.



Fiber optic monitoring

- Inherent safety
- High reliability
- Excellent long-term accuracy
- No annual recalibration required
- Flexibility in positioning:
Small size, low weight and high IP grade





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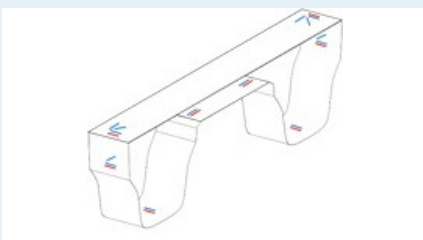
SENSFIB GLOBAL FORCES

For complex structures such as semi-submersibles and catamarans Light Structures offer the unique SENSFIB GLOBAL FORCES system. Based on the same high-performance fiber optic monitoring solution as SENSFIB HULL and SENSFIB IMMS, the SENSFIB GLOBAL FORCES package utilizes Finite Element analysis to move from localized strains and stresses to the global moments and forces acting on the hull.

With the powerful data processing SENSFIB GLOBAL FORCES system, owners and naval architects have the opportunity to understand the behavior of complex structures during interaction with wind and wave patterns, and compare actual loads on the structure directly with the limiting design loads.

Hard to grasp loads such as torsion and twisting are made available real-time to the user, and warning thresholds can be set. Virtual sensors can be configured to monitor the actual stress from real-life combinations of forces and moments that are not easily modelled.

SENSFIB GLOBAL FORCES can be combined with other SENSFIB systems such as SENSFIB HULL, IMMS for SENSFIB or SENSFIB COMFORT.



Global monitoring

- Vertical bending moment
- Horizontal bending moment
- Torsion moment
- Vertical shear forces
- Horizontal shear forces
- Normal compressive force

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