



LIGHT STRUCTURES
Passion for Monitoring

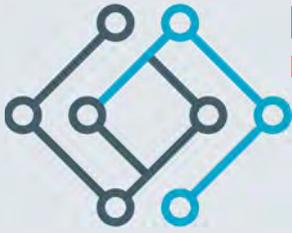


Commercial Shipping

SENSFIB HULL, SENFIB ICE and SENFIB GLOBAL FORCES

When Passion becomes Knowledge





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SENSFIB HULL

Safe and cost-effective operation of a vessel requires exact knowledge of the ship's design and awareness of the operational risks and their consequences.

One of the challenges involved has been the lack of information to the bridge about the actual loads on the hull. Historically this has been resolved relying on navigators' judgment and experience, but with Light Structures' solution, it is possible to get live data via the SENSFIB HULL Stress Monitoring solution.

By monitoring the stress responses in the hull structure during operations, the system will provide the navigators with online information about the load margins and provide support for the decision-making. The same data can be post-processed to give valuable input to maintenance planning and fleet utilization.

SENSFIB HULL will provide benefits for container ships, tankers, LNG carriers, bulk carriers, offshore structures, navy and advanced designs.

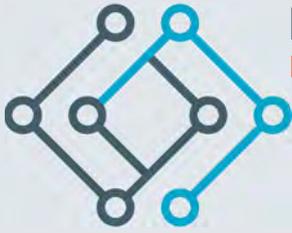
Fiber Bragg Grating (FBG) optical sensing technology gives SENSFIB a competitive edge compared to the conventional strain gauges, as the fiber optic technology gives more accurate monitoring, and is much more cost-effective over time, compared with conventional systems.



Hull and Structural Stress Monitoring Operational Control

- o Reduced maintenance cost
- o Dynamic operator guidance
- o Extended life-cycle
- o Fiber optic technology
- o No annual recalibration
- o Attractive ROI





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SENSFIB ICE

The challenges of operating in ice infested waters affects more and more vessels as Arctic shipping routes are opening, and offshore oil and gas related activities in the Arctic continue to increase.

Financially it is essential to be able to operate and utilize the vessels all year around. However, ice loads that exceed the design load, are a major risk for the hull structure.

SENSFIB ICE is the world's leading technology within ice load monitoring. Light Structures' advanced fiber optic technology is approved by all the major classification societies and is a vital tool for the increasing number of navigators without former arctic experience who will operate these vessels in the future.

SENSFIB ICE measures the actual real time load on the hull and sends data to the bridge helping the navigator in making correct decisions. Saved data provides valuable input for maintenance planning and contributes to a safer, cleaner and more effective usage of the vessel.

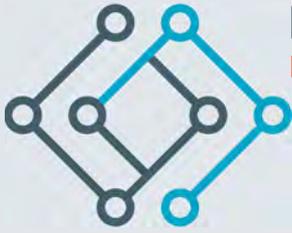
SENSFIB ICE can easily be retrofitted and the return on investment is attractive, as the vessel can be better utilized and at the same time keep the maintenance costs down.



Fiber optic monitoring

- Fibers not responsive to external disruptions
- High reliability and stability
- 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 that is at the core of the 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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