

## Ice Load Monitoring System



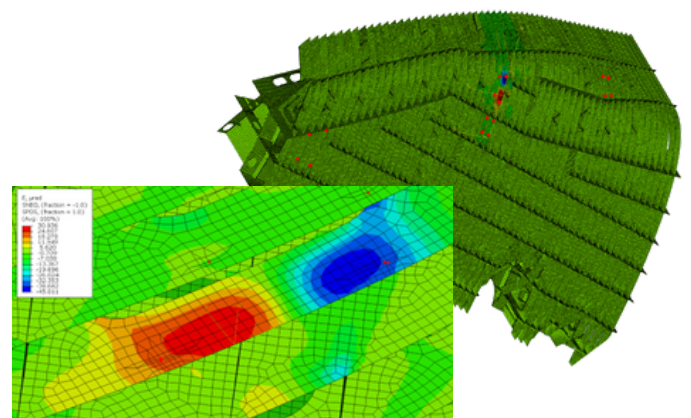
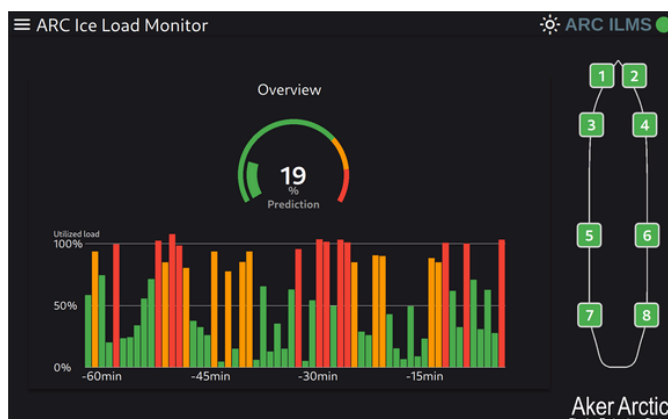
An essential tool for understanding ice navigation risks

**The ARC ILMS is Aker Arctic's Ice Load Monitoring system designed to support navigators in assessing the ice loads on their ship during operations in ice covered waters.**

Utilizing strain gauge data measured from sensors installed on the internal hull structure, the ARC ILMS shows real time ice loads as well forecasts upcoming ice loads using Aker Arctic's advanced calculation algorithms based on the statistical analysis of ice loads.

Ice load forecasting helps the navigator make safe operational decisions. It assesses the risk not only from the ice already encountered, but also from expected loads, considering the vessel's movement and the surrounding ice conditions.

Proper sensor positioning in an ice load monitoring system is essential for its reliability and data accuracy. Aker Arctic draws on our expert knowledge of ice strengthened structures and ship-ice loads to ensure the sensors are in the optimal place to record the most informative loads. By modelling the structure using the Finite Element Method, we achieve a clear understanding of how the expected loads will be measured and how the structure responds. All of this is essential for setting the right alarm limits.



As part of the ARC ILMS, Aker Arctic also offers a seasonal analysis of the measured data, taking the operator through key events that have been recorded by the system during the ice season and guiding the user in the effective use of the ship in ice.

**Aker Arctic develops a custom display for the ARC ILMS installation for each operator to ensure ease of use.**

Examples of parameters that can be displayed:

- Current % of maximum load
- Forecast trend % of maximum load
- Raw data with forecasted trend
- Last 10 peak values during the past hour
- Sensor condition monitoring

**ARC ILMS package includes:**

- Software platform with sophisticated forecasting algorithms
- Sensor location analysis
- Sensor and hardware delivery
- Installation and commissioning
- Seasonal analysis of measured data, support on ice trials

**ARC ILMS benefits:**

- Supports safe decision making on board
- Guides ice navigation training
- Bespoke set-up and display configuration
- Compatible with multiple sensor technologies
- On-line monitoring and notification  
(Depending on vessels communication facilities)

Ice load monitoring systems, such as the ARC ILMS, are especially useful for vessels that do not constantly operate in ice-covered areas or have a high crew turnover. In such cases, the crew may lack sufficient experience in navigating icy waters, which can increase operational risks.

The direct feedback provided by the system acts as a practical training platform, helping the crew quickly gain the necessary skills to operate more efficiently and safely in ice.

This added benefit makes the system not only a monitoring tool but also a valuable aid in improving ice navigation expertise.

## References

### Icebreaking Cruise Ship *Le Commandant Charcot*

In February 2024 Aker Arctic installed a version of its ARC ILMS on *Le Commandant Charcot*, Ponant's PC2 icebreaking cruise ship, while the ship was in Brest, France in time for the ship's historic trans-Arctic voyage from Nome to Longyearbyen.

The system is configured using a series of strain gauges mounted to the internal hull structure to measure the structure's response to ice loads, both when operating ahead and astern in "double acting" mode.

Seasonal ice load data, including the trans-Arctic voyage, has been analysed by Aker Arctic and presented to the operators – providing informative knowledge on the ship's capability when traversing extreme ice conditions.

