Ising (sjøsprøyt) på fartøyer, MARICE prosjektet

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There is a clear trend of an increased activity among oil companies with respect to hydrocarbons exploration in the Arctic waters. Especially in areas that are ice free the whole year, for instance, the Norwegian Barents Sea or parts of the year, for instance, the U.S. parts of Chukchi Sea and the Russian Kara Sea.

Experience from activities in cold weather regions indicates that ice accretion on vessels and offshore structures must be taken into account in addition to loads from wind, waves and sea ice to provide safe and efficient operations. Effects of superstructure icing on smaller vessels have been reported to cause sinking, typically by capsizing. Conditions leading to heavy icing which jeopardizes the stability and integrity of the vessel are regarded as rare, but most operators have however experienced these conditions. The impact of icing on large ships and offshore structures is expected to differ from that for smaller structures when severe consequences due to marine icing are anticipated. However, hazardous situations due to e.g. slippery ladders and gangways, frozen and blocked escape and rescue routes and equipment as well as frozen process equipment and valves are expected to reduce operating efficiency or mission performance. Accidents may lead to injuries or even loss of lives, environmental damage and damage to assets. Icing of essential components jeopardizing the safety and operability of vessels are frequent event during operations in Arctic waters.

MarIce Joint Industry Project (multi-year collaboration between industry (DNV GL, Statoil), institutes (NFR) and academia (NTNU)) has undertaken multiple investigations to assess the risk of sea spray icing of existing vessels, including offshore service vessels. The overall objective was to provide predictive tools for sea spray icing for activities related to oil and gas production and transport. Within MarIce project, ice accretion in Arctic weather conditions were studied by means of scientific experiments and physically realistic simulations. The project made a big step forward with respect to experimental and data collection techniques for ice accretion measurements in small- and large-scales. MarIce has also delivered a mathematical model of the sea spray icing on vessel superstructures which in many aspects is the most advanced model nowadays. One of the most prominent features of the model is turbulent air flow and water droplet transport over the structure. This yields to a more realistic estimation of the interaction between sea spray and a vessel and, thus, more accurate ice accretion prediction. This mathematical model simulating an icing event supports observations. Such a combination provides means to investigate icing risks on a particular vessel in particular metocean conditions and, moreover, predicts icing risks in long term run.