

Ice loads on piles

Background

In most marine areas there are many piles with a part of their length exposed to water. The piles act as structural elements for all kinds of marine structures. In the Nordic countries, with the risk of ice formation, piles in water are often subjected to ice loads during winter time. In many cases the ice load is significant, and the piles need to be designed to resist the upcoming forces.

Ice loads are not treated in the European building standard Eurocode. Instead national guidelines can be found in some European countries. The most well-known ice load guidelines in Sweden are from 1987 and developed for bridge piers and not piles. When applying the guidelines to piles, a lot of interpretation is given to the designer. Thus, the size of the load can vary greatly depending on who is the designer.

Goal and gains

The goal of the project is to develop guidelines for how ice loads should be applied on piles in marine environment. The expectation is that the guidelines will serve as an industry standard in Sweden. The guidelines will be based on a review and comparison of literature.

An industry standard for ice loads would have following gains:

- Avoidance of under-seized piles.
- Avoidance of over-seized piles.
- Create clarity for industry parties.
- Create clarity in the project.
- Clarify when further investigation of local conditions is needed.

Also, standardized methods of designing structures are necessary for a just competition between companies in the industry. Further on, standardized methods and just competition leads to constructions of good quality to best price. Harbors in Sweden are often managed by companies owned by the municipalities they are located in. Therefore, there is a public interest as well as benefits with cost efficient and long-lasting marine structures.

Participants

The work is a collaboration between COWI AB and Pålkommissionen (Swedish commission on pile research). The publications by Pålkommissionen are considered industry standard for geotechnical structures in Sweden. Some of the reports by Pålkommissionen are referred to in the requirements by The Swedish Transport Administration and therefore are included in the building regulations and per se must be followed by the designers. The project will start in August 2019.