

Brash ice channel project continues

There are currently no clear guidelines in the Finnish-Swedish ice class rules on how to prepare a brash ice channel for model tests. Aker Arctic and Aalto University therefore started a joint project last year, with the target of defining the channel properties and production methods.

The project began with gathering information from the main facilities worldwide, and defining the parameters for two different ice channels.

“The guidelines define the thickness and width of a rule channel, but we know that many other parameters affect the channels resistance as well,” says Topi Leiviskä. “We have now conducted tests in our facilities with different variations in parental ice strength, porosity and cohesion.”

“In order to demonstrate a situation where there is no cohesion in the ice, we ordered six m³ of 50 mm sized ice cubes,

and poured them into the testing basin,” adds Research Engineer, Riikka Matala. “Visually this worked well as you can see from the pictures below.”

This situation was then compared to tests where the brash ice was prepared from traditional model ice, which represents another level of ice strength and cohesion.

These tests show that different ways of preparing the ice give different results in channel resistance, and more studies are required to find the right composition.

“Due to variations in test results, more full-scale channel test results are required to find the best solution,” Matala says. “The best option would be to perform both model tests and full-scale tests with the same vessel in an ice channel with carefully measured parameters.”

An additional finding was that a consecutive test in the same channel gave different results in channels, which were made from an FGX model ice (F=fine, G=grained, X=containing fresh water layers). Existing rules or guidelines do not regulate how many times a test can be performed and the model basins

have varying practices in this respect. The results obtained so far are now being analysed and additional verification tests will be performed. The plan is to have the project ready by the end of 2017.

FGX model ice

Aker Arctic uses granular model ice, so called FGX –model ice (F=fine, G=grained, X=containing fresh water layers), which is produced using a spraying method. The NaCl-doped water is taken from the test basin, and sprayed using a carriage that moves back and forth above the basin. In spraying, the water droplets freeze and the model ice layers are formed from small, granular ice crystals. The spraying circuit is repeated as many times as needed to reach the required model ice thickness.

After spraying, the ice strength is adjusted with an adequate freezing period. The length of the freezing period needed depends on the model ice thickness and the target value of flexural strength.



Brash ice channels in real life.

Ice cubes represent a situation where there is no cohesion in the ice. Six m³ of ice cubes were used for this test.

The same test performed in model ice with more cohesion.

