Otaniemi 15.10.2001

THE VISIT OF THE ARCTIC COUNCIL'S SAO-MEETING TO SHIP LABORATORY, HELSINKI UNIVERSITY OF TECHNOLOGY

Tuesday 6.11.2001 at 6 - 7:30 pm

The visit will contain three parts:

1) Description of facilities and the contents of Arctic Marine Technology.
2) Demonstration about seakeeping trials at the open water basin. The model is a fast ferry for the route between Finland and Germany.
3) Demonstration about turning in ice in the ice basin. The model is a standard Arctic supply ship developed by ILS Ltd.

The whole group is divided into three parts and each of the items is shown to each group.

THE CONTENTS OF ARCTIC MARINE TECHNOLOGY

The subject area of Arctic marine technology is structures operating in the Arctic waters, especially ships and structures for hydrocarbon exploration and production. Typical research questions addressed are:

- Safe design of structures to withstand the ice loading without any environmental risks
- The design of safe and efficient transport routes in the Arctic waters
- Formal Safety Analysis (FSA) related to operations in the ice covered waters

Below are two examples of Arctic Marine Technology, the Finnish lighthouse Kemi I in ice conditions and the Finnish multipurpose icebreaker Botnica, first of its kind in the world.

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The empirical research tools in the Arctic marine technology include scale model tests, measurements and observations on ships and offshore platforms in ice and expeditions to Arctic areas to investigate the ice conditions to serve as the design basis for structures. Overall the research field is wide and multi-disciplinary – much co-operation with other sciences is needed.

THE OPEN WATER BASIN

The open water basin is 130 m long model basin with a depth of x 5.5 and breath 11 m. The speed of measurement carriage is 8 m/s. The typical tests carried out here are resistance and propulsion tests to design the hull shape and determine the proper engine for a vessel. There is a possibility to create waves in the basin and investigate the seakeeping properties and stability of vessels.

A view from the open water basin

THE ICE BASIN

The area of the ice basin is 40 m x 40 m with a 2.8 m depth. The ice cover which can be grown here is about 70 mm thick in model scale corresponding to about 2 m thick ice in full scale. Apart from level ice conditions, ice ridges, old navigation channels and pack ice can be simulated. The typical tests are propulsion and resistance tests of ships, like in the open water basin, but also tests with different offshore structures can be carried out. The basin is unique in the world as it is wide. This makes it possible to make tests of very wide offshore structures (like an FPSU for the Bohai Bay in China) and also test ship turning, like in the demonstration.

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Creator:
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A sketch about the lay-out of the ice basin.

For more information you can visit our home page: www.hut.fi/Units/Ship/

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