International Standard

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Ships and marine technology — Model tests for ships and offshore structures in snow-covered ice

Navires et technologie maritime — Essais sur modèles pour les navires et les structures offshore dans les situations de glace recouverte de neige

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Foreword

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This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Ship design*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Snow cover is usually the concomitant circumstance for natural ice, particularly in polar regions. Due to its different physical and mechanical properties compared with fine-grained level ice, snow cover usually leads the ice-structure interacting processes to different modes. Therefore, the presence of snow cover should not be neglected during the investigations on ice-structure interactions. A large number of field observations have indicated that snow covers have significant effects on both the ice-resistance of ships and the ice loads on offshore structures. Snow cover changes the friction property of ice sheets and also affects the mode of crack propagation in ice, consequentially altering the breaking length of ice and the accumulation process of broken ice fragments.

In order to meet the requirements of the Polar Code established by the International Maritime Organization (IMO),[1] information on the influence of snow cover must be included in the Polar Water Operational Manual. In the experimental prediction of the ship performance in ice, ship owners often request the inclusion of test data under snow-covered ice conditions, especially for ships with a higher ice class. In the design of Arctic offshore structures, actions and influences on operations by ice rubble accumulations are one of the major concerns, and snow cover is considered to accelerate the rubble building process. Standard procedures for the modelling of snow cover in scaled model tests are lacking, making it difficult to judge the accuracy and rationale of the experimental prediction. This document therefore provides a standardized model test method for ships and offshore structures in snow-covered ice, to ensure that all groups can assess the accuracy of their predicting methods on the same basis.

Ships and marine technology — Model tests for ships and offshore structures in snow-covered ice

1 Scope

This document specifies the model tests for ships and offshore structures in snow-covered ice. It covers the physical modelling techniques, test methods, analysis methods of results, and requirements of the facilities and data documentation used in these tests.

This document applies to the model test methods used for estimating the ice resistance of ships and ice loads on offshore structures in snow-covered ice.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 19906, *Petroleum and natural gas industries — Arctic offshore structures*

ISO 35106:2017, *Petroleum and natural gas industries — Arctic operations — Metocean, ice, and seabed data*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 19906, ISO 35106 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
depth hoar
ice crystals (usually cup-shaped, faceted crystals) of low strength formed by sublimation within dry snow beneath the snow surface

3.2
ice breaking
process where external forces induce fracture and fragmentation in ice, overcoming its structural integrity to create pathways (usually for ships and offshore structures) through ice-covered waters

3.3
ice clearing
process of removing fragmented ice or ice blocks from a targeted area (usually ship bottom or structure surface) to maintain ice-free conditions

3.4
ice resistance
time average of the ice-related forces acting parallel to the axis of motion of a ship in such a way as to resist its motion