

Alexander Arnfinn Olsen

Finite Element Method Analysis for Ice Class Vessels



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*He that will not sail till all dangers are over must
never put to sea.*

Dr. Thomas Fuller, 1654–1734

*He who lets the sea lull him into a sense of security
is in very grave danger.*

Hammond Ines, 1913–1998

Preface

The purpose of this text is to provide ship designers with clear guidance on alternative design procedures for hull side structures, on alternative methods for the determination of power requirements, and procedures for propeller strength assessment based on the Finite Element Method (FEM) for Baltic Ice Class Vessels.

The text is divided into five chapters, with each focusing on a particular aspect of ship design for vessels intended to operate in ice conditions. Accordingly:

- Chapter 1 provides a procedure on ice strengthening designs using direct calculation approaches
- Chapter 2 provides a procedure for the calculation of power requirement for ice class vessels
- Chapter 3 provides a procedure for the strength analysis of propellers for ice class vessels
- Chapter 4 provides a procedure for calculating the power requirement for ice class vessels; and
- Chapter 5 provides procedures for assessing propeller strength for use in ice conditions.

Whilst every effort has been taken to ensure the information provided herein is accurate and current, readers are strongly advised to contact the specific Classification Society (Class) with responsibility for the design and operation of the vessel in question.

Southampton, UK
2024

Alexander Arnfinn Olsen

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