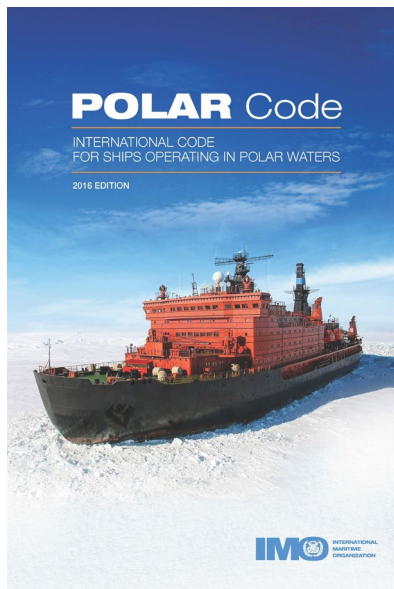


## ●北極航路研究の出口戦略としての国際基準、国際標準への貢献



THE STRUCTURAL DESIGN AND ENGINE OUTPUT REQUIRED OF SHIPS FOR NAVIGATION IN ICE

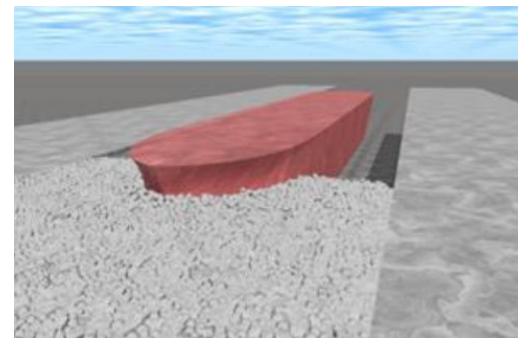
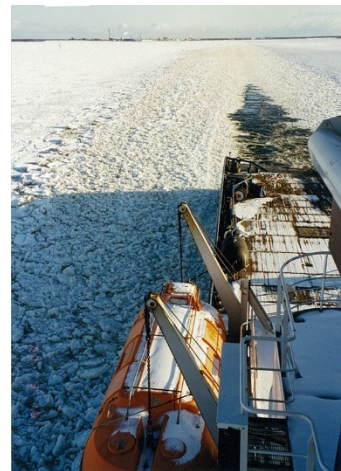
"FINNISH-SWEDISH ICE CLASS RULES"

TABLE OF CONTENTS

1 GENERAL	3
1.1 Ice classes	3
2 ICE CLASS DRAUGHT	3
2.1 Maximum draught amidships	3
2.2 Maximum and minimum draught fore and aft	3
3 ENGINE OUTPUT	4
3.1 Definition of engine output	4
3.2 Required engine output for ice classes IA Super, IA, IB and IC	4
3.2.1 Definitions	5
3.2.2 New ships	6
3.2.3 Existing ships of ice class IB and IC	7
3.2.4 Existing ships of ice class IA Super or IA	7
3.2.5 Other methods of determining $K_e$ or $R_{e1}$	8
4 HULL STRUCTURAL DESIGN	9
4.1 General	9
4.1.1 Regions	9
4.2 Ice load	10
4.2.1 Height of load area	10
4.2.2 Ice pressure	10
4.3 Shell plating	12
4.3.1 Vertical extension of ice strengthening (ice belt)	12
4.3.2 Plate thickness in the ice belt	12
4.4 Frames	13
4.4.1 Vertical extension of ice strengthening	13
4.4.2 Transverse frames	14
4.4.2.1 Section modulus	14
4.4.2.2 Upper end of transverse framing	15
4.4.2.3 Lower end of transverse framing	15
4.4.3 Longitudinal frames	15
4.4.4 General on framing	16
4.5 Ice stringers	17
4.5.1 Stringers within the ice belt	17
4.5.2 Stringers outside the ice belt	17
4.5.3 Deck stringers	18

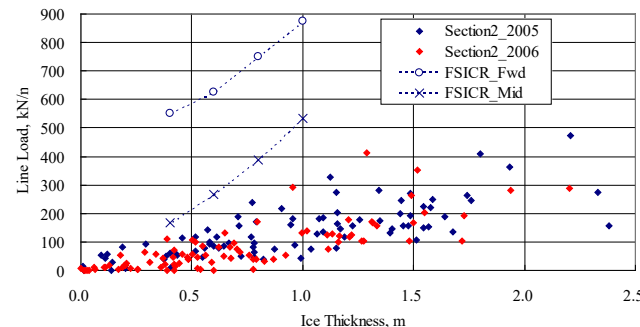
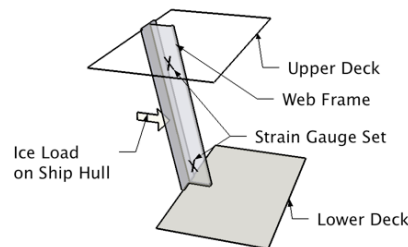
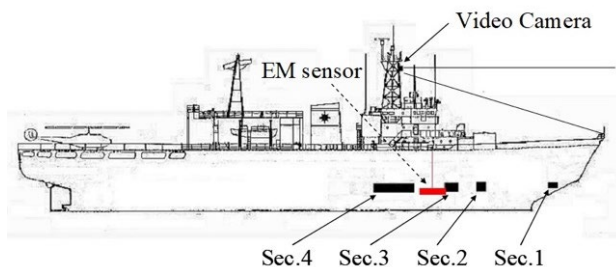
page - 1 -

- 耐氷船規則の国際スタンダードであるFinnish-Swedish Ice Class Rulesでは主機出力要件としてブラッシュアイスチャネルを船速5knotで単独航行可能であることを定めている。
- 規則に記載された主機出力推定式を用いて推定できるが、規定では**精度の高いシミュレーション**および水槽試験結果を用いた推定も認められる。
- この分野で世界最先端の研究を行う国内の研究に期待。



## ● IACS URI2 氷海船 構造設計基準への貢献

- ✓ みらいII船上での長期にわたる構造応答計測及び局所氷荷重推定
- ✓ IACS構造設計基準の検証に提供



Matsuzawa and others., Full-scale Experiments of JCG Patrol Vessel SOYA from 1991 to 2013  
In the Southern Sea of Okhotsk, Okhotsk Sea and Polar Oceans Research 6 (2022)