Cost Reduction of Polar Class Vessels:
Structural Optimization that Includes Production Factors

by

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Abstract

The design of ship structures was normally optimized to reduce construction material and maintain adequate strength while adhering to a given classification society's rules. In the case of Polar Class vessels, where weight minimization was important, higher fabrication labor costs occurred due to the closely spaced frames and thicker material needed. There was a cost trade-off between minimizing material under the traditional design method and designing a ship that was easier to construct at the shipyard, i.e. designing for downstream processes.

Using the newly defined *Unified Requirements for Polar Ships* by the International Association of Classification Societies Inc., a numerical tool was developed to minimize construction cost of the icebreaker's hull form. This tool allowed the user to tailor the labor and material metrics to represent a specific shipyard. The tool then specified an optimum structural solution in terms of minimum weight and production cost.

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