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DIGITAL SOLUTIONS

NAUTICUS™ MACHINERY
Shaft Fatigue

Lifecycle calculations of shaft based on basic or simplified methods

Nauticus Machinery – Shaft Fatigue can calculate the load carrying capacity based on the methods described in DNV GL Class Guidelines 0038 (Calculation of shafts in marine applications) and 0041 (Ice strengthening of propulsion machinery). The calculation method is mainly based on the DIN 743 Part 1-3: 2000-04 and VDEH 1983, but it is adapted to marine applications. The tool is applicable for marine propulsion and auxiliary shafts onboard ships and marine applications.

Nauticus Machinery – Shaft Fatigue calculates the main class strength capacity and ice class strength capacity. The purpose of main class strength is to calculate allowable torsional vibratory stress levels based on low cycle, high cycle and transient fatigue. The results can be obtained either by using simplified methods (less input) or detailed methods (more input).

The program includes empirical formulas for calculation of stress concentration factors for all common "stress raisers" in marine shafts.

Applications
- Direct coupled propulsion systems
- Geared propulsion systems
- Generator set
- Shafts with ice-class inclusive IACS Polar/Baltic rules

Benefits
- Efficient determination of load carrying capacity for shaft
- Calculate several critical sections of the shaft in one batch
- Easy input of notch geometry by extensive use of relevant figures
- Get acceptance criteria for torsional vibration response calculations
- Easy to do parameter studies for stress concentration factors
- Support for IACS Unified Requirements M68 criteria
- Supports Finnish-Swedish ice class and IACS Polar ice class calculation
- Estimation of maximum torque loads due to ice impacts
- Calculation of blade failure load bending stress from ice impacts
- Calculation of maximum static torsional stress due to ice impacts
- Accumulated fatigue analysis due to ice impacts