



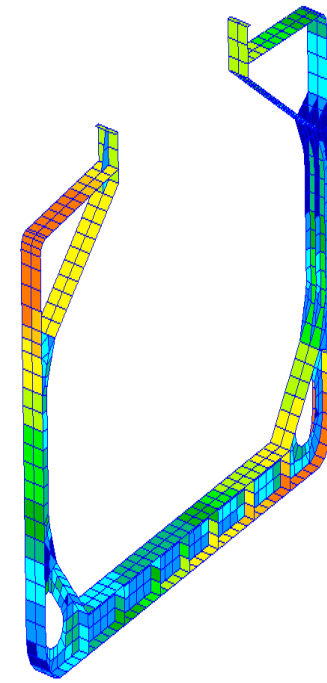
Common Structural Rules

PUBLISHED BY INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES

Common Structural Rules are applicable for Bulk Carriers & Double Hull Oil Tankers which are self propelled with unrestricted navigation. Ships contracted for construction on or after 1st January, 2015 must comply with Common Structural Rules.

Structural Response of the Ship to Yield, Fatigue & Buckling Loads is analyzed by Prescriptive & Finite Element Analysis.

The objectives of the Rules are to establish the minimum requirements to mitigate the risks of major hull structural failure in order to help improve the safety of life, environment and property & to contribute to the durability of the hull structure for the ship's design life. Structural Requirements are specified in such a way so that the ship's structural strength & watertight integrity are adequate for the intended service.



CSR COMPLIANCE VERIFICATION TOOL
by INDIAN REGISTER OF SHIPPING (IRCLASS)

FEATURING

- 2D MODELLER
- GLOBAL STRENGTH ANALYSIS
- PANEL LEVEL ANALYSIS
- LOCAL SCANTLING ANALYSIS
- SHEAR FLOW CALCULATOR
- TRANSVERSE MEMBERS
- FINITE ELEMENT MODELLER
- DIRECT STRENGTH ANALYSIS

PRESCRIPTIVE ASSESSMENT

Prescriptive Assessment is carried out for individual sections based on Panel Approach. Static & Dynamic Loads based on formulae provided in the Rule Text are used for Analysis. Prescriptive Assessment includes Yield, Buckling & Fatigue Checks. Provisions for CAD modeling of 2D Ship Sections are provided in the software. Following are the main features:

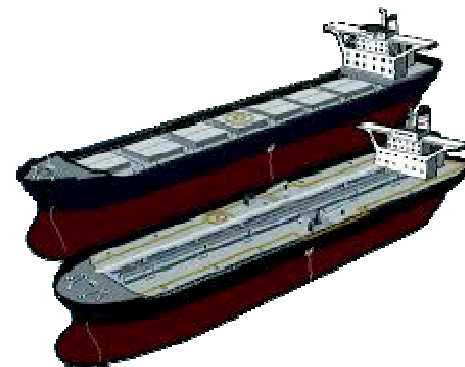
- Section Modeling
- Compartment Attachment
- Section Modulus Calculations
- Global Strength Assessment
- Local Scantlings Verification

PRIMARY SUPPORT MEMBERS

Primary Support Members are assessed independently using a standalone tool. Currently structures like Girders, Stringers, Cross Ties, Floors, Side & Deck Transverses and Web Frames can be analyzed. Yield Check is performed for Primary Support Members.

DIRECT STRENGTH ANALYSIS

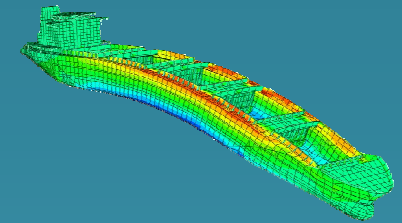
Direct Strength Analysis is to be carried out using Finite Element Method. 3 holds of the Vessel are analyzed at a time.



FE Checks are available for Yield, Buckling & Fatigue. Pre-processing is done using a customized version of MSC Patran & MSC Nastran is used as the solver.

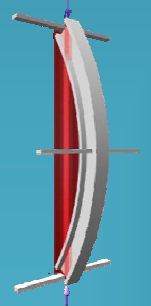
The features below have been automated for the convenience of the user:

- Generation of Parallel Middle Body
- Load Calculation & Application
- Boundary Conditions Assignment
- Compartment Detection
- Stress & Deformation Plots
- Very Fine Mesh
- Detection of FE Buckling Panels



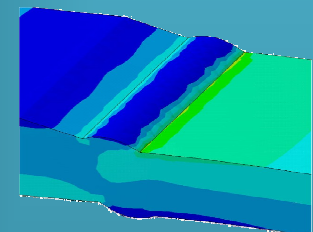
YIELD

Yield Check is done through both Prescriptive Assessment & Direct Strength Analysis. Pressures are calculated based on internal loads from compartments & external loads. In prescriptive check,



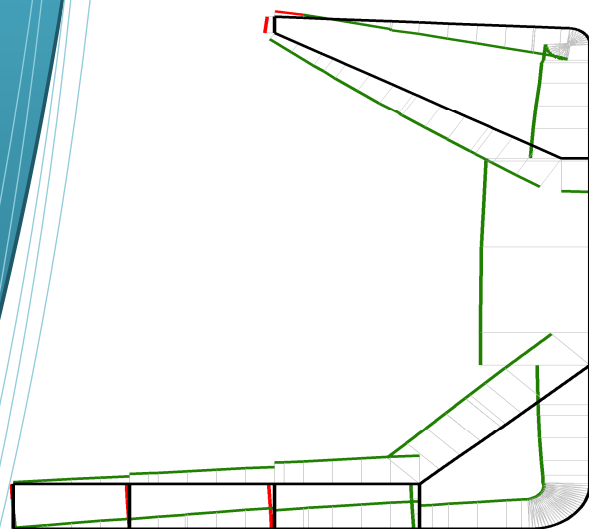
BUCKLING

Buckling capacity in H-CSR gives a lower bound estimate of the maximum load the panel can carry without suffering major permanent set. The assessment also utilizes the positive post-buckling assessment for plates.



FATIGUE

Fatigue Assessment is performed for structures in order to prevent fatigue cracks initiating from toe of welds or from free edge of non welded details. North Atlantic wave environment data is used to determine Fatigue Design Load.



 **DOWNLOAD** at <http://www.irclass.org>

 For **HELP AND SUPPORT** email to ircsr@irclass.org