
Research & Development

Research and Development is the backbone of all activities at IRS. It is carried out to achieve the following:

- Acquire in-depth knowledge on relevant issues
- Participate actively in the global efforts to improve quality & safety in marine industry & protection of marine environment
- Provide professional service at par with the world leaders

The major areas of Research and development among other activity at IRS are:

- Hydrodynamics
- Ship Structures
- Vibration and Noise
- Corrosion
- Fatigue
- Analysis of data from Ships in Service
- Formal Safety Assessment / Risk Assessment
- Rule Development & Rule Calibration
- Development of New Engineering Methods and/or Software
- Use of Information technology onboard

Some Examples of RRD work:

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Work examples 

IRWAVE: This software has a pre-processor which generates Hull data / Grid data for different solvers such as SWAN, IRSTRIP (IRS own solver), and SOFORCE from the given offset table. The post-processor helps to view the forces, motions, and pressures in standard format.

SLOSHING EFFECTS IN TANKS:

This Computational Fluid Dynamics model has been used to estimate the sloshing loads on tank boundaries and on structural members in the tank.

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SLOSHING EFFECTS IN TANKS 

HULL GIRDER STRENGTH: Various models for hull girder strength and Ultimate strength analysis. A computer code was developed for Ultimate strength analysis by Smith's method and a methodology for finite element based prediction of ultimate strength.

ANALYSIS OF LOCAL STRUCTURES: Analysis of a hopper knuckle structure has been carried out by using fine mesh to find out the local stress concentration effects.

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ANALYSIS OF LOCAL STRUCTURES 

Free vibration analysis is carried out on ship hull structure models to determine the natural frequencies of various mode shapes of vibration

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Free vibration analysis 

This shows the deformation of a patrol vessel subjected to air blast loading from a nearby explosion.

deformation of a patrol vessel

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http://www.irclass.org/./././files/deformation_of_a_patrol_vessel.jpg

Risk analysis of Ports and Harbors

IRS has developed capability for Qualitative and Quantitative Risk analysis of ports and harbors including other related analysis for the following aspects:

- Gas Dispersion, Fire & Explosion analysis for IMDG class 2 & 3 hazardous chemicals at Container Terminals
- Preparation of Onsite Emergency Action Plan for ports and terminals
- Preparation of Oil Spill Contingency Plan for ports and harbors
- Failure mode effect analysis (FMEA) of loading and unloading systems for oil tankers

Fire Simulations

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http://www.irclass.org/./././files/fire_simulations.jpg

Fire Simulations:

IRS is taking part in the EU FIREPROOF project aimed at developing a probabilistic frame work for fire safety
