



MARINE SIMULATOR

MODULAR
ELSTEEL
ENCLOSURES

ELSTEEL MARINE SIMULATOR Articulation of Ship Vibrations

Travelling the waters of the world today requires that you can rely on your equipment and their functionality at all times. Elsteel's panel boards have been designed and developed to protect your equipment in the best possible way.

Panel boards in ships have to endure a lot of stress from a variety of weather conditions, which exert a combination of forces up on the ship and its equipment. The constant vibrations from mechanical equipment will challenge your equipment further.

Elsteel offers you the best solutions for panel boards in the maritime field. Our unique combination of design and material guarantees, that your panels are operational and serviceable during storms and high temperatures, stemming from a combination of engines and turbulent weather conditions.



You're holding a top of the line quality product in your hands. Made with love and excellence! I hope you will enjoy assembling and using Elsteel products as much as I enjoy manufacturing it for you.

A handwritten signature in white ink, appearing to be 'Fang Logstrup'.

Fang Logstrup
Managing Director

Our panel boards have been thoroughly tested in our Marine Simulator. The Marine Simulator is designed by Elsteel and is able to generate not only the various vibrations from main engines, generators, compressors, thrusters etc., but is also able to replicate a ships movements at sea, which create an accurate test environment for the test object. Elsteel panel boards have also been type tested by IPH at 50°C ambient, there by ensuring the suitability in an engine room environment.

When you choose an Elsteel panel board, you can be confident that our product will live up to your expectations and requirements, because you have chosen one of the absolute best and most tested panels in the world!



STANDARDS & RESULTS OBTAINED



Elsteel products are certified for marine applications by



Stay up to date with the latest tests and certifications at www.elsteel.com

STANDARDS

- Vibration in all directions is to be less than 10mm/sec. (rms velocity value)
- Frequency should lie between 0-1000Hz.
- Usual practice with high-speed ships is, that flare angles of the bow side shell and bulwarks are not to exceed angles of 40 to 45 degrees relative to the vertical. (Normal value at rough weather, $2\beta \approx$ degrees.)

RESULTS

- Panels are stable for 0-30mm/sec. velocities.
- Panels can withstand frequencies in XYZ directions from 0-5000Hz.
- Panels are stable for 0-30m/s² accelerations.

Tilting Angles

- At slow speeds $2\beta = 25$ degrees
- At high speeds $2\beta \approx 40$ degrees

SIMULATOR FUNCTIONS

- Wave Motion = Tilting of a Ship
- Main Engine = Main Driving Engine of a ship
- Vibrators = Other Machineries such as Compressors and Generators



SOME DEFINITIONS

FREE VIBRATION

Free vibration takes place when a system oscillates under the action of forces inherent in the system itself, and when external impressed forces are absent.



NATURAL FREQUENCY

Natural frequency is the frequency of free vibrations in Hz and is a property of the dynamic system established by its mass and stiffness distribution.

FORCED VIBRATIONS

Vibration that takes place under the excitation of external forces is called forced vibration.

RESONANCE

If the frequency of excitation coincides with the natural frequency of the system, a condition of RESONANCE is encountered, and dangerously large oscillations may result. The failures of major structures occur due to this theory.

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