海上安全研究領域
Maritime Safety Department

海上において人と船の安全を確保するために、多方面から研究を行っています。

船の安全確保としては、波浪中での船体運動を研究し転覆現象等を明らかにすることで、船の耐航・復原性能の向上を図っています。また、航行シミュレータや確率論的手法を用いた安全評価法の研究は、船が安全に航行するための重要な役割を担っています。船体材料の健全性を保つため、腐食しにくい材料や船体の劣化を防ぐ技術の開発も行っています。火災時における煙流動および避難シミュレーションを用いた乗客避難特性の研究や、船上のバリアフリー化を進める研究を通じて、全ての乗客・乗員の安全確保に努めています。

海上輸送では天然ガス・原油などの燃料や放射性物質など取り扱いに注意が必要なものも多く取り扱われます。天然ガスハイドレート(NGH)輸送に関する技術開発や放射性物質輸送容器・輸送船の遮蔽検証など、危険物のより安全な輸送方法を目指した研究も実施しています。

以上のような研究は、国際海事機関(IMO)等における国際基準策定、海上事故対策にも役立てられています。

We are engaged in many research projects in various fields to improve the safety of lives and ships at sea.

Through research on ship dynamics in wind and waves, we are revealing detailed mechanism of capsizing phenomena, and presenting methods to retain stability and sea-keeping quality of various types of ships. The risks of collision or stranding are evaluated based on our navigation simulation system. We also assess risk during navigation by probabilistic analysis. Corrosion resistant materials and other techniques are developed for preventing hull deterioration and keeping it in good condition. To ensure the safety of all passengers including disabled persons on passenger ships, we are developing evacuation simulation technique including smoke movement simulation, and conducting the research on promoting barrier-free passenger ships. For safe carriage of dangerous goods, e.g., flammable gases and oils, including radioactive materials, we are seeking for better methods for handling and transporting dangerous goods through the researches on carriage of new materials such as natural gas hydrate and on the verification of the shielding performance of packages and vessels used for transport of radioactive materials.

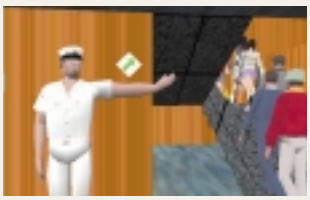
Through the above mentioned research projects, we have been functioning significant roles in development of and amendment to regulations and standards, including those established by the International Maritime Organization.

航行中の安全確保
Guaranteeing safety during navigation

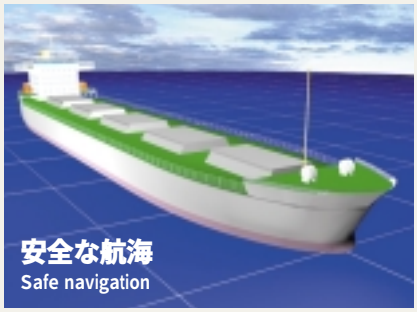
模型船による波浪中実験
Model experiment in the wave tank

油膜法を用いた船体周囲空気の流動観測
Measuring the flow of air around a hull by the oil film method

乗客・乗員の安全確保
Guaranteeing the safety of passengers and crew members



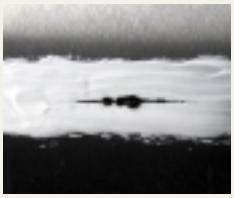
避難シミュレーション
Evacuation simulation



危険物・放射性物質の海上輸送における安全確保
Safer transport of dangerous goods including radioactive materials

放射性物質輸送に使われるキャスクの模型
Model of a cask used for transport of radioactive materials

船体の安全確保
Guaranteeing the safety of hulls



疲労亀裂を色で知らせ寿命を延ばすスマート材料
Smart materials that reveal fatigue cracks with colors and extend fatigue lives