
BMT
Safer Ports,
Smarter Operations
BMT provides integrated solutions that
enhance port safety, optimize operations
and drive sustainable growth.

Reducing Risk in Marine Operations

Provision of port risk and safety management, including safe navigation, traffic modelling, marine surveying, incident investigation, and cyber security and assurance.

Improving Operational Efficiency

From strategic level asset management and digital transformation, through to improving operating windows through coastal hydraulics and adaptive dredging, whilst planning for current and future regulatory and legislative change.

Extreme Weather and Resilience

Working to ensure reduced environmental risk and impact of maritime operations, understanding investment and planning for future fuels, and the development of port resilience plans.

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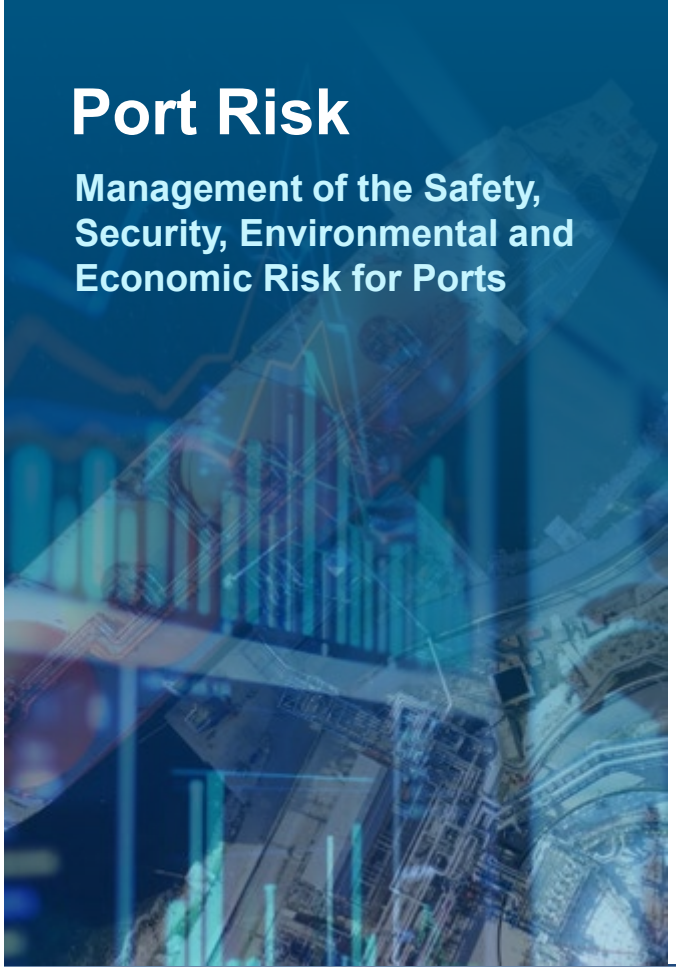
Port Risk

Management of the Safety, Security, Environmental and Economic Risk for Ports



Safe port management is critical to ensuring the safety of all those operating in ports and at sea, as well as the ecology of the maritime environment. Without safe port management the risks to safe navigation, ecological and economic fallout are substantial, including multi-billion-dollar costs associated with claims following major incidents.

BMT combines expert knowledge of the maritime environment from navigation, traffic simulation, digital and cyber assurance, as well as risk management and environmental expertise to ensure that ports can manage personal, vessel, ecological and economic risks. Our focus is on informed CAPEX and OPEX expenditure, reducing operational risk and improving environmental credentials and resilience.

Port and Maritime Infrastructure Risk

Vessels, safe navigation, regulatory compliance, and security all form part of risk management. BMT employs specialist expertise and in-house products to maritime infrastructure stakeholders to manage maritime operations risk:

- Safe Navigation and Traffic Simulation Modelling
- Surveying, Inspections and Incident Investigation
- Vessel Design and Operations
- Riverine, Estuarine and Coastal Hydraulics
- Environmental Management
- Cyber Assurance and Digital Transformation
- Strategic Asset Management Advisory Services

Services

By combining our specialist services with state-of-the-art maritime modelling tools, we provide the following:

- Port Risk Management Assessment
- Associated Investment Appraisals
- Strategic Investment Advisory Services
- Maritime Incident Investigation Assessments
- Environmental Management Planning

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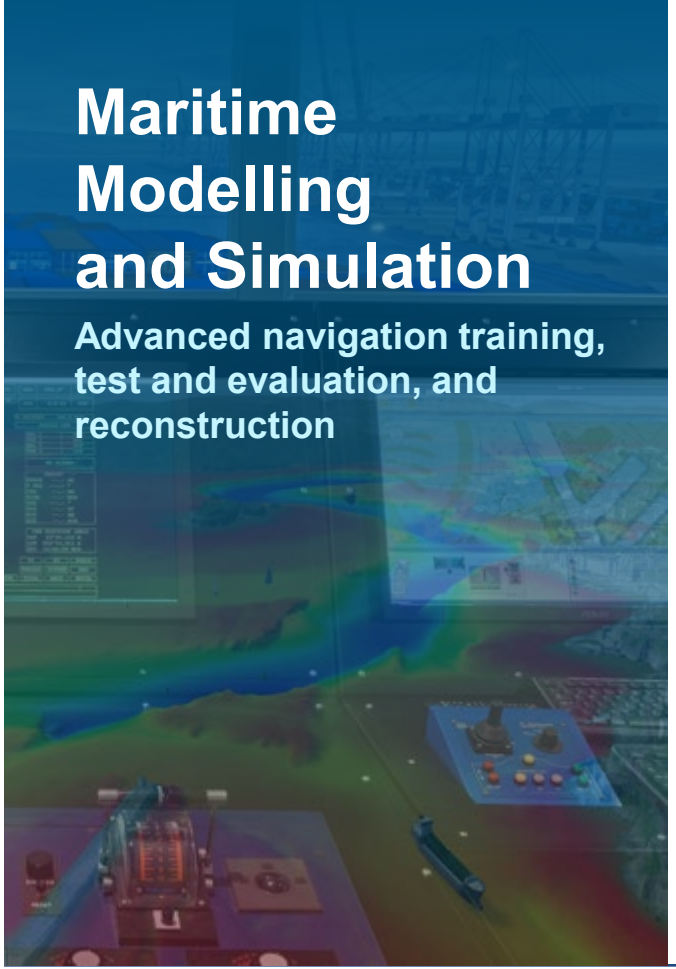
Maritime Modelling and Simulation

Advanced navigation training, test and evaluation, and reconstruction



Our real-time ship-handling and manoeuvring simulation system, BMT REMBRANDT, is used by national maritime authorities, ports, pilots, ship operators, and naval architects to analyse vessel handling, enable advanced training, provide accurate operations rehearsal, evaluate port feasibility, and in incident investigation.

BMT REMBRANDT ensures that your specific characteristics, class of ships, and reference points (such as anchors, mooring lines, navigation aids) form part of the simulation. BMT REMBRANDT is used world-wide to provide training, safe navigation assessments and to understand incidents and investigations following maritime accidents.

Simulation, Analysis and Training

Certified by DNV GL & BAW, BMT REMBRANDT is used for:

- Full mission bridge simulation
- Pilot and officer training
- Complex multi-vessel tug and towage simulation
- Forensic incident investigations / root cause analysis
- Maritime autonomy test and evaluation
- Navigation of restricted and inland waterways
- Onboard installs for STCW/OOW training at sea
- Mooring analysis
- Marine consultancy for safe port operations

Outcomes and Benefits

- **A realistic and accurate synthetic environment** giving incredible utility to mariners to prove and train manoeuvring and berthing operations, especially complex multi-vessel scenarios, including S100 capability.
- **Generating assured insight and evidence** for vessel operators to minimise risk and financial impacts of collisions and groundings, and to demonstrate safe operations, including new or changed port layouts.
- **Detailed representation of incidents** to provide safety board or insurance bodies with robust information to derive and validate recommendations for future safe and efficient operations.

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Marine Surveying

Surveys, Inspections and Incident Investigation

Marine investigation and surveying forms a critical part of maritime operations, applying global regulation, monitoring how attitudes and behaviours shift over time, and how organisations respond to a range of maritime incidents, inclusive of managing risk. Ports rely on expert surveyors to ensure cargo, vessels and marine incidents are managed appropriately.

BMT provides services inclusive of expert witness and litigation services. With over 45 dedicated marine surveyors and a further 300+ affiliate surveyors worldwide, BMT is involved in audits, technical inspections, forensic investigation, claims and casualty investigation, cargo handling and marine incident and emergency management

Who we work with

Our marine surveying and incident investigation services are provided to a range of stakeholders in the maritime industry including:

- Protection and Indemnity Clubs
- Insurance Organisations
- Port Authorities
- Ship Owner Operators
- Maritime Organisations
- Offshore Energy Organisations
- Litigation Specialists

Handbooks and Training

In addition to our marine surveying services, we also provide access to the following:

- **Cargo Handbook:** The Cargo Handbook is the world's largest database of transportation of cargoes in the marine industry. The platform is openly available to share best knowledge on cargo transportation, raising awareness and prevention of loss.
- **Training:** From Port & Ship Familiarisation Courses, through to Tanker, Terminal and Liquid Cargo, LNG & LPG, our team of experts, based in Rotterdam, provide courses to support a wider understanding of ports, ships, tankers and terminals.

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Cyber Assurance

Protecting Critical Infrastructure and Maritime Assets

The port of the future is smart, connected, and digital—but as global supply chains innovate and adapt, new threats and risks emerge. Understanding what is relevant to ensure cyber security and resilience in critical infrastructure, to protect maritime assets and to maintain uninterrupted port operations is a complex challenge that BMT is well equipped to help you navigate.

BMT's cyber security team provide a range of services to ensure that organisations with critical assets are equipped to make cyber security decisions today with a view to reducing risk for tomorrow.

Services

- Cyber Strategy, Risk Reviews and Compliance
- Security Documentation and Governance
- Data Protection and Security Implementation
- Resilient Smart Port Security
- Threat Intelligence and Monitoring
- Cloud Security and Governance

Risk-informed Approach

- **Integration**: Combines industry best practices with tailored security strategies.
- **Alignment**: Fits business model and organizational needs
- **Proactive Defense**: Utilizes a risk-informed defense approach.
- **Threat Navigation**: Assists in mitigating evolving threats.
- **Supply Chain Security**: Understands supply chain security challenges.
- **Secure Operations**: Ensures secure operations.
- **Cost Reduction:** Lowers risk and cost for the future.

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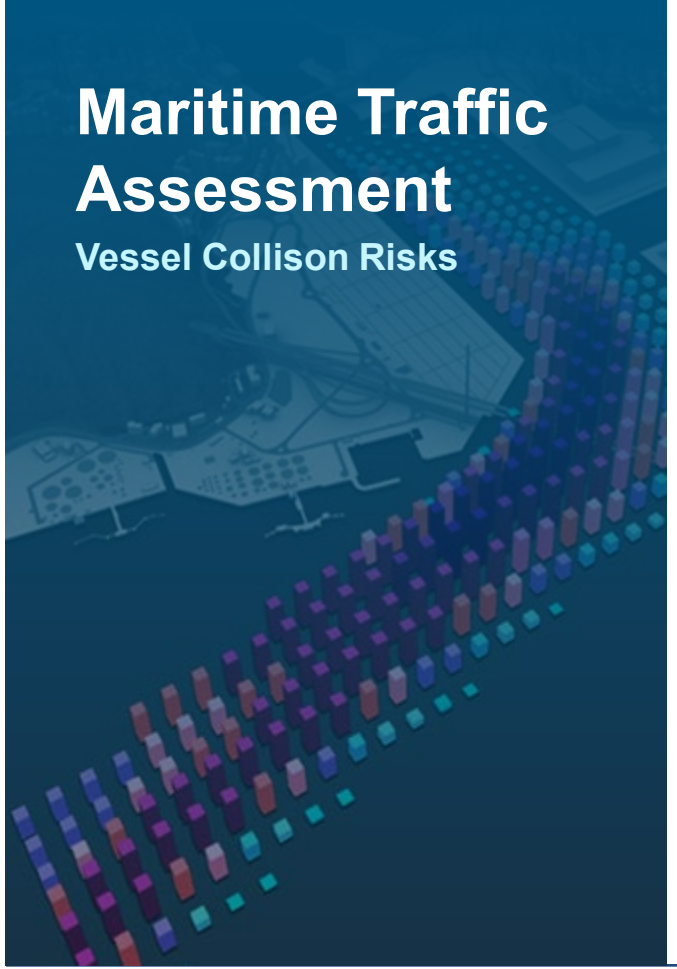
Maritime Traffic Assessment

Vessel Collison Risks



Managing vessel collision risk in congested waters is an intrinsic part of safe vessel and port management. By better understanding collision risk and planning, improvements to safety and incident response planning can be made early to reduce human, environmental and economic costs downstream.

BMT's proprietary Dynamic Marine Traffic Simulation Model meets the collision risk challenges in dense marine traffic streams by reproducing realistic navigation and collision avoidance behaviour.

Dynamic Marine Traffic Simulation

BMT's dynamic vessel collision simulation and modelling enables the following:

- Understanding of **navigational risks** and scenarios, including traffic 'bunching' and knock-on effects of real-life behaviours.
- **Risk mitigation** for vessel encounters and collisions to be modelled in a variety of traffic situations including variable vessel speeds and density.
- Planning ahead through baseline modelling, alternative traffic control measures and **testing of scenarios** relating to marine risk, including stakeholder analysis.

Outcomes and Benefits

- Optimised traffic management and reduced environmental impact from loitering
- Reduced impact of reclamations, bridges and other infrastructure on traffic flow
- Optimisation of fairway arrangements
- Reduced risk from new traffic movements
- Safe operation and integration of construction and other temporary traffic
- Impacts of offshore energy site developments.

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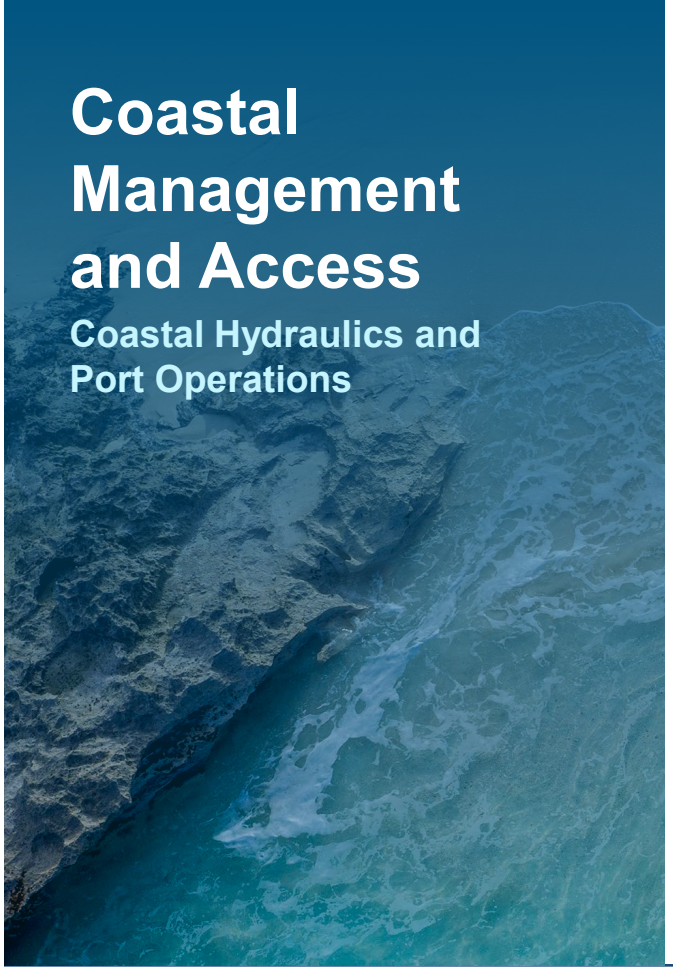

Coastal Management and Access

Coastal Hydraulics and Port Operations

Coastal modelling is key to understanding the interactions between marine infrastructure and its surrounding environment. With accurate, predictive modelling, port stakeholders can make timely and informed decisions on the most effective and efficient infrastructure designs, employment of port management resources, and port operation models.

BMT combines environmental expertise with proprietary tools for coastal modelling and analysis (TUFLOW) to ensure that the economic, technical and environmental feasibility of port management and maritime operations are understood and are managed in accordance with maritime regulations.

Services

- **TUFLOW** | is a suite of advanced 1D/2D/3D computer simulation software for flooding, fluvial modelling, coastal hydraulics, sediment transport and morphology, particle tracking, water quality and aquatic ecology processes.
- **World Leading** | With over 30 years of continuous development, TUFLOW is internationally recognised as the industry leader for hydraulic modelling accuracy, speed and workflow efficiency.
- **Integrated** | Ability to integrate TUFLOW with wider modelling systems (e.g. waves).
- **Adaptive Dredging** | Integrating modelling and monitoring capability to enable efficient employment of dredging assets.

Outcomes and Benefits

- **Cost Efficiencies** | Infrastructure and operation cost-reduction through precise predictive employment of assets, and enhanced information for risk mitigation.
- **Coastal Management** | Estuarine and coastal modelling for the complex interaction of tides, inflows and ocean currents to address sedimentary & environmental challenges.
- **Maritime Infrastructure** | Providing a link between oceanography and coastal engineering advanced modelling supports marine infrastructure assessments for ports and offshore energy developments.
- **Marine Conservation** | Modelling to identify locations for marine restoration and conservation including seagrass and kelp forest initiatives.

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Future Fuels and Clean Maritime

Ship to Shore Infrastructure

The International Transport Forum projects that global freight demand is expected to triple by 2050 with 75% of goods movements taking place on ships. With maritime shipping accounting for ~4% of global emissions, a shift towards the adoption of alternative fuels is inevitable. Decisions on future fuels are required today to ensure tomorrow's ship to shore infrastructure.

With a heritage in vessel design and operations, combined with expert knowledge on alternative fuels and energy efficiency, BMT provides advisory services relating to energy saving options and alternative fuels, including advice on supply, storage, safety and environmental impacts on ship to shore infrastructure.

Services

BMT employs specialist knowledge of the maritime environment, with teams of marine engineers, naval architects and specialists in alternative fuels and energy saving technologies. This is supplemented by BMT's comprehensive approaches in:

- BMT Horizon Scanning
- BMT Technology Road-mapping
- Techno-Economic Assessments
- Clean Maritime Expertise
- Environmental Management Services

Outcomes and Benefits

BMT supports major stakeholders in ship to shore infrastructure for decisions relating to future fuels from port owners, operators and authorities through to ship owner operators. Assessing options for alternative fuels and ship to shore connectivity includes:

- Vessel and Fleet Design and Technology Advice
- Energy Saving Strategies and Planning
- Design & Integration Services
- Alternative Fuel Options and Advice
- Advice on Supply, Storage and Safety
- Techno-Economic Services

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Extreme Weather Events

Resilience for Ports and Marine Infrastructure

In the context of extreme weather events, the management of risk, adaptation and resilience are integral in port management strategies. Reducing risk, maintaining safety levels and viability of operations is critical. It is important to look beyond acute physical risks associated with extreme weather events, and to engage with port stakeholders, investors and insurers to develop practical solutions in policy, adaptation plans and associated guidelines to address chronic risk.

Working with key stakeholders to understand the complexities of their own operating environment, BMT applies environmental, safety, techno-economic and strategic asset management expertise to understand the scale, likelihood and impact of severe weather events on safety, operational resilience, risk and economics.

Services

The impacts of extreme weather events on ports and marine infrastructure may come in many forms ranging from:

- Acute Environmental Events (Storms, Hurricanes)
- Rising Sea Levels, Extreme Precipitation
- Marine and Land-Based Heatwaves
- Damage to Estuaries and Access Routes
- Ecological Impacts (Marine Conservation)
- Impacts to Vessel Operations (Sea States)
- Coastal and Riverine Flooding
- Fires from Surrounding Areas

Outcomes and Benefits

BMT supports the ability to plan and adapt to extreme weather risks inclusive of how these affect the physical, human, operational and systems of ports and marine infrastructure, providing:

- Tailored Port Impact Frameworks
- Tailored Risk and Mitigation Plans
- Environmental Impact Assessments
- Safety and Regulatory Compliance Advice
- Coastal and Flood Modelling and Advice
- Marine Access and Safe Navigation Simulation
- Strategic Asset Management Services

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