



Marine Terminal Berthing & Mooring Analysis



Our BC Ferries terminal work covers floating wing walls, dolphin and berthing loads, and storm tie-up mooring analysis.

Practical Engineering for Safe, Efficient Marine Terminals

Can your existing berth safely accommodate today's vessels and the larger vessels expected in the future? Are its wind, wave and current design assumptions realistic for the site, or do they overestimate or underestimate the loads?

DSA Ocean helps port owners, terminal operators and marine infrastructure designers assess vessel mooring, berth loads, vessel motions and operating limits. Our work supports new terminal design, infrastructure upgrades, changing vessel requirements and operational planning.

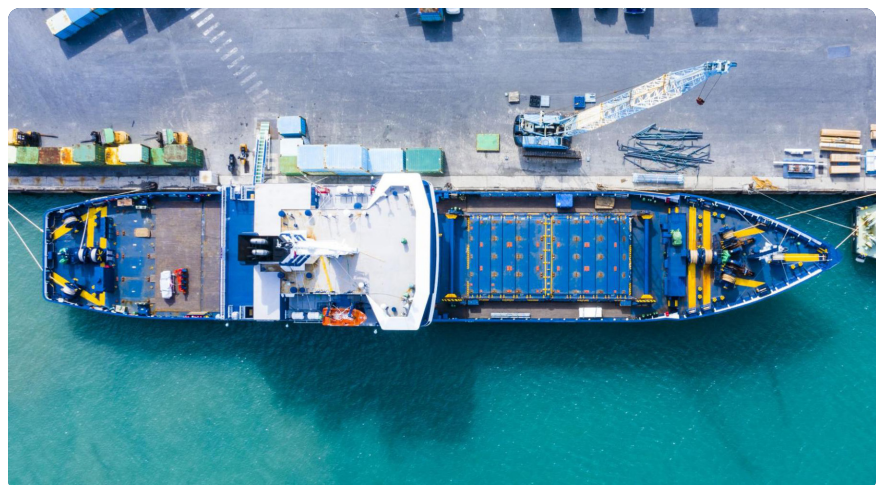
We assess how wind, waves, currents and water levels affect vessel motions, mooring-line tensions, fender reactions and loads transferred to bollards, dolphins, cribs and supporting structures.

As the developers of ProteusDS, we combine our own marine dynamic analysis technology with established engineering tools such as OptiMoor. We select the level of analysis appropriate to the project rather than applying the most complex model by default.

From Environmental Conditions to Practical Design

A reliable mooring assessment starts with realistic environmental conditions. DSA Ocean develops site-specific wind, wave, current and water-level conditions using available records, hindcast data, nearshore modelling and, where needed, field measurements conducted by our own team.

We consider realistic combinations and directions of environmental loading rather than simply combining independent extremes. This helps avoid unnecessary conservatism and infrastructure costs while supporting safe, practical designs and operating limits.



We combine metocean assessment with container vessel mooring analysis to quantify berth loads, refine mooring arrangements and establish operating limits.

Analysis That Leads to Practical Solutions

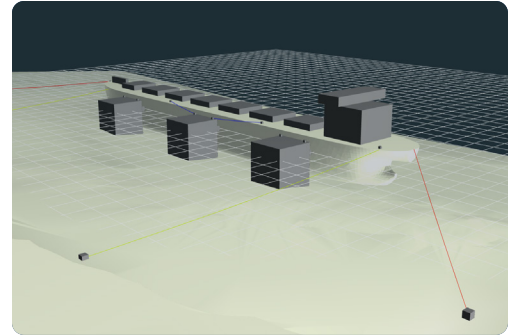
Our work goes beyond reporting loads. Depending on the project, DSA Ocean can develop practical mooring solutions and provide engineering information ready for use by terminal owners and design teams.

SERVICES

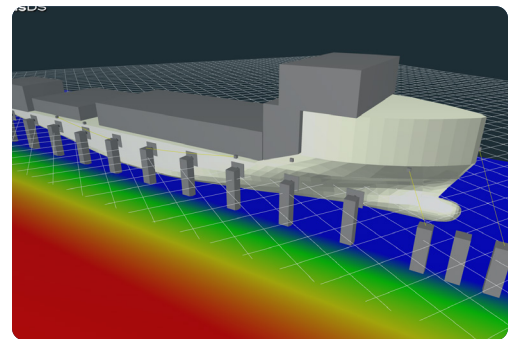
- Static and dynamic vessel mooring analysis
- Berthing and fender analysis
- Vessel motion and berth operability assessment
- Metocean assessment and nearshore wave modelling
- Wind, wave and current field measurements
- Evaluation of existing and proposed berth arrangements
- Assessment of operational and extreme environmental conditions
- Comparison of design and infrastructure alternatives

PRACTICAL ENGINEERING OUTPUTS

- Mooring-line, bollard, dolphin and fender loads
- Recommended mooring arrangements, line properties and pretension
- Mooring plans and engineering drawings
- Vessel motion and clearance envelopes
- Practical wind, wave and current operating limits
- Identification of overloaded lines or terminal components
- Engineering inputs for civil and structural design



ProteusDS dynamic analysis for Pennecon's Belleoram quarry berth assessed bulk-carrier motions and berth loads, following ISO 19901-7, OCIMF MEG4 and PIANC guidance.



ProteusDS dynamic analysis of subsea construction vessel motions and mooring loads at berth for a major US project, following ISO 19901-7, OCIMF MEG4 and PIANC guidance.



Steep mooring-line angles on larger vessels reduce horizontal restraint and increase bollard uplift. Berths designed for smaller vessels may need revised mooring arrangements.

Standards & Industry Guidance

We select standards and guidance to suit the vessel, terminal and project. Common references include **OCIMF MEG4**, **UFC 4-159-03**, **BS 6349-4**, **PIANC WG 186**, **WG 211** and **WG 212**, together with relevant ISO and DNV guidance for environmental loading.

Why DSA Ocean?

DSA Ocean combines marine engineering, metocean assessment and numerical modelling within one team. As the developers of ProteusDS, we understand the underlying analysis rather than simply relying on a black-box modelling tool. With our main office in Victoria, British Columbia, and staff in Nova Scotia and Quebec, we support marine terminal projects across Canada and internationally.

Discuss Your Terminal Project

Send us your berth layout, vessel particulars and a brief description of the design or operating question. We can help determine the appropriate level of analysis and the information required to get started.

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