Docking & Mooring Systems
When installing or upgrading Docking & Mooring Systems, you need to ensure you choose the right partner.

Ensure your provider can deliver the solution for you, on time and on budget, wherever you are in the world.

Ensure your solution is designed around the needs of you and your customers, with a dedicated team with the experience to understand them.

Ensure your Docking & Mooring Systems feature technically superior products, to maximise durability and reliability whilst minimising downtime and whole life costs.

Ensure your partner can offer you the maintenance and after sales service you need.
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We have over 30 years experience in providing the very best docking and mooring systems all over the world, from oil terminals operating in sub-zero temperatures, to LNG terminals in the tropics and everything in between. Here’s how we do it.

**The Benchmark in Design**
Trelleborg designs and supplies over 60% of LNG terminal mooring and monitoring systems. Quick Release Hooks with integral load monitoring and remote release are matched with docking systems and environmental monitoring to provide the benchmark in integrated marine berthing packages. Trelleborg can assist in the development of specifications to ensure equipment requirements are clearly defined according to your operational needs.

**Product Innovation**
Trelleborg is a major supplier of mooring systems to the bulk export industry. For example, iron ore load out jetties which are in Western Australia are world class with regards to operational efficiency and safety. Trelleborg helps them achieve this by designing mooring equipment to suit their specific needs: in addition to our standard Quick Release Hooks, capstans and instrumentation, new features are being incorporated such as locking mechanisms, tugger winches and control architecture to improve marine operations.
Development and Upgrades
Investment in marine facilities is a long term venture. However, vessel types and sizes do change over time making the terminal less efficient or competitive. Trelleborg can conduct a site audit of your mooring system to understand your challenges and upgrade the mooring equipment to suit. Examples include replacement of old equipment, upgrading bollards to Quick Release Hooks, and the addition of docking systems to manage berthing speeds and impact on the jetty structure.

Technology Implementation
Trelleborg have a solid track record in implementing technology in marine environments. Whenever possible, our design approach is grounded in field proven equipment and processes to offer the highest reliability possible. The latest ship-to-ship and FSRU operators rely on Trelleborg’s experience to safely manage their mooring operations with our monitoring software and data presentation.
Our consultative project management process takes the pressure off you because our dedicated in-house team are experienced from the conceptual design stage right the way through to aftersales care.

Trelleborg have the largest and most experienced team of Docking and Mooring specialised engineers in the world, with twice the number of our nearest competitor.

When you partner with Trelleborg we allocate a team to your project and they stay on the project until completion.

The concept, design, manufacturing and testing for your project is all done by Trelleborg.

Your Trelleborg project manager is your dedicated point of contact and will work with you as your project is developed, built, delivered and commissioned.

Trelleborg Marine Systems was awarded the design and supply of the mooring equipment upgrade for Portland Pipeline Corporation’s jetty, which was originally built in the 1960s and is located on the east coast of the USA.

The jetty upgrade was required to accommodate the berthing of vessels of up to 170,000 dead weight tons. Taking into account environmental factors such as tide constraints that lead to the busy berth having an unloading cycle time of 1.5 days, Trelleborg upgraded the existing bollards with Quick Release Hooks with the added benefits of load monitoring and remote release.

Trelleborg have continued to support Portland Pipeline Corporation with aftersales service, training and additional upgrades over the last 10 years.
Trelleborg Marine Systems mooring equipment was chosen for the completion of the 175 million cu.m. (6,000 million scf) per day Escobar LNG terminal in Argentina to ensure ship and terminal safety during critical gas discharge operations. The terminal operators and vessel masters are able to ensure rapid responses to potentially hazardous conditions through the use of Trelleborg Quick Release hooks with Remote Release and Smarthook® Load Monitoring Systems.

The new Escobar LNG terminal is Argentina’s second facility, and is located 43 miles up the river Parana del las Palmas, and 25 miles north of Buenos Aires.

Trelleborg Marine Systems was contracted to supply new Quick Release Hooks (76 units with 136 hooks), control and monitoring systems to Saldanha Bay, the largest deep water port in South Africa. As part of a major upgrade to the port, a new system architecture design was developed to meet the operators requirements on the jetty.

To provide a fully integrated, full service solution, Trelleborg also supplied laser Docking Aid Systems and an environmental monitoring package. The terminal, which has exported more than 600 million tons of iron ore since its first iron ore consignment in September 1976, now loads between 16 and 20 vessels per month, at an average consignment size of 150,000 tons per vessel, and can accommodate Panamax and Cape size vessels with a deadweight of approximately 300,000 tons.

This FSRU LNG terminal required Trelleborg Marine Systems’ equipment for both the jetty and the FSRU. Trelleborg worked with the Dubai Supply Authority to supply double, triple and quadruple Quick Release Hooks with load monitoring for the jetty mooring system, as well as working with Golar on the design and supply of the double 150T Quick Release Hooks, load monitoring, remote release and central computer system.

The integration and alignment of the two systems was critical as the hooks on the outer dolphins, which moor the LNG carrier, are released from the FSRU.
Quality management is at the core of everything we do in Docking & Mooring. Our Melbourne facility holds ISO9000 accreditation, which is integral to our processes and procedures and controls the way we approach each engineering challenge. Our business systems are constantly evaluated to drive innovation and value delivery to our customers, reflecting relevant national, regional and environmental standards.

An Eye for Documentation
Documentation is an essential part of today’s project deliverable. Your Trelleborg project team will fully manage all documentation, CAD design and QA to ensure full compliance with specifications and to provide complete peace of mind to the end-user. We work with a full suite of engineering and design tools and our qualified designers are experienced in all relevant industry standards.
I am passionate about Quality Management. To me it’s the life blood that drives our commitment to give our customers the quality they need and more!

Gabriel Ting
Quality Manager
Experienced engineering and rigorous testing.

Not only are we able to design and engineer bespoke solutions for all your docking and mooring specifications, we can also test our tailored systems with full scale in-house testing capabilities.

The right solution
We take pride in tailoring project proposals and solutions to meet your needs, however exacting they are. And when the project calls for an innovative, bespoke design, our engineers will present the right solution, not simply pages from a catalogue.

A consultative approach
Your dedicated team of docking and mooring specialists will always be on hand to answer any of your questions.
Turning a specification into a real project, developing close working relationships throughout the supply chain and delivering to specification, budget and deadlines gives me a true sense of fulfillment.

Travis de Fluiter
Project Manager
Research and Development

For over 30 years, we’ve been a world leader in innovation to meet the needs of ports and harbours all over the world. We’ve remained true to the principle of innovation, with a substantial staff of experts in research and development, ensuring we consistently provide new ways to meet increasingly demanding specifications.

Innovation
Sometimes a more innovative approach is needed. We will assess the requirements of your project holistically and ensure that the solution we supply is the best possible fit for your needs.

Customized solutions
Unfamiliar situations are familiar to us. Our in house research and development facilities mean that we can truly tailor a solution that fits your needs.
**Versatility**
Our understanding of the intricacies of docking and mooring helps us to provide versatile, future proof solutions to meet and exceed the specifications of your project and maximise the efficiencies of your operations.

**Compatibility**
We can work with you to integrate new solutions into existing projects – our products can be used with those of other providers and integrated seamlessly to provide full-service, bespoke solutions.
Trelleborg Marine Systems designs, manufactures and installs unique mooring hardware and monitoring software that is specifically configured and matched to your requirements. Our solutions, which are built around the latest field-proven technologies, will be tailored to the needs of your project by our multi-disciplined team of engineers.

**Quick Release Hooks and Capstans**

Quick Release Hooks are the basis of any advanced integrated mooring system and ensure the vessel is secured fast to the jetty by providing solid, reliable anchor points for mooring lines.

Our Quick Release Hooks are available with several options such as an integral capstan, remote hook release and mooring line monitoring. They can also be adapted to ensure the best solution is delivered for most docking situations.

Our electric capstan can also be integrated into the system to remove the need for mooring crews to haul the lines in manually.

**Mooring Instrumentation**

We design and engineer turnkey systems with integrated monitoring and remote release modules, which removes the need for jetty personnel to be close to the hook when a loaded mooring line is released – greatly reducing the risk of injury.

Our SmartHook® load monitoring software provides real-time readings of the load on mooring lines, enabling mooring crew and jetty operators to access essential data from the moment the mooring lines are attached to each hook.

**Docking Aid Systems**

Our SmartDock® family of docking aid systems (DAS) monitor the approach and docking of vessels during berthing operations using lasers, differential GPS or Real Time Kinematic (RTK) GPS technologies.

Various standard and customised designs are available to meet the widest range of berthing situations, including fender impact management.

**Environmental and MetOcean**

According to your needs, we can supply standalone or integrated environmental monitoring systems for both marine and offshore applications.

Systems are designed to allow multi-user access to environmental and MetOcean data, which can be made available to portable devices on the vessel during approach and whilst moored at the berth.

**Integrated Control and Monitoring**

Our specialised systems display vessel-to-jetty interface data through a single marine monitoring system to improve operations, management and control. As all key data is displayed in real time, operators are able to make more informed decisions.

SmartHook® load monitoring, remote release, SmartDock® DAS and environmental modules are integrated into a single user interface at the Jetty Control Room and the data can be networked or sent over wireless communications to other locations as required.

**Mooring Equipment Upgrades**

Trelleborg’s docking and mooring group provides a full service to help customers decide on the most cost effective and operationally efficient mooring equipment upgrades.

Our tailored packages can be adapted to fit existing foundations, and we can work with you to determine how best to integrate load monitoring or speed of approach technology into existing systems, including those from other suppliers.

**Spares and Service**

To gain the most benefit from sophisticated mooring systems, it is important that equipment is correctly maintained and that system operators are adequately trained in all aspects.

We have developed four levels of maintenance program, designed to help our clients get the best performance, safety, reliability and longevity from their mooring systems.

Our unrivalled aftersales care means global support with local reach and knowledge. With staffed offices across the world, working to local time zones and languages, you’ll never struggle to get in touch with us, wherever and whenever you need us.
FAQs

Q1. Standard technical questions such as:
What is the maximum horizontal and vertical angle of movement of each hook?
What is the operating height of the capstan?
What is the IP rating of the equipment?
A. Are typically covered by the product datasheet. Contact Trelleborg Docking & Mooring or download from our website.

Q2. What capacity capstan is required?
A. The capacity of a capstan is usually specified by its line pull. This is sized according to the weight of mooring line expected to be hauled in from the vessel to the mooring point. This will be greater for mooring dolphins than berthing dolphins; however, capstans are specified by maximum line pull to provide standardised equipment across the berth.

Q3. Is the capstan supplied with a Mains Isolator Switch?
A. This can be supplied as an optional extra.

Q4. How many mooring lines can the hook accommodate?
A. Each hook can accommodate two mooring lines up to a diameter noted in the datasheet. However, most modern berths utilise load monitoring, and for this to be effective as a management data tool, each hook should be dedicated to a single mooring line.

Q5. What access area is required around the QRH Unit?
A. Safe access around a QRH unit requires that the operator can safely move around the footprint of the hook unit without hindrance from structures, the jetty edge or other equipment. Typically it is recommended to allow a minimum of at least one metre in front of the hooks and two metres at the rear of the support structure.

Q6. What sizes of hooks are required for my project?
A. Proper sizing for mooring equipment should follow a dynamic mooring analysis performed by a marine consultant. Also note that under OCIMF Meg3 guidelines, the SWL of each hook is recommended to be greater than the MBL of the ship’s mooring lines.
As an example, for a LNG carrier using 140T MBL lines, Quick Release Hooks with a capacity of 150T SWL are typically specified.

Q7. Why integrate monitoring systems?
A. An integrated, single supplier marine monitoring system incorporating both mechanical hooks and instrumentation provides a complete package for both the end-user and contractor alike. This means a single responsibility, one set of training and easy access to maintenance. Most modern specifications recognise the benefits this offers to design, documentation and project management.

Q8. What is the design life for these systems?
A. Trelleborg Quick Release Hook units and associated electronics are robust, field proven designs with a service life expected beyond 25 years where manufacturers maintenance recommendations are observed. Computer systems, software and instrumentation are often upgraded, according to end-user requirement, in order to maintain best operating practices.

Q9. What kind of maintenance of equipment is required?
A. Hooks require regular greasing and basic inspection, not unlike similar mechanical equipment. Instrumentation requires more specialist inspection. Trelleborg can provide either bespoke training development to the end-user, or offer a range of onsite maintenance services in line with OCIMF/SIGTTO guidelines for jetty topsides. As an example per SIGTTO, load cells should be calibrated annually; Trelleborg can provide a full service or simply hire of the calibration unit.
Trelleborg Marine Systems designs, manufactures and installs bespoke fender systems, docking and mooring equipment, oil and gas transfer technology and vessel efficiency technology for marine environments all over the world. Our polymer engineering expertise also extends to our range of general marine products, including navigation aids and buoys.

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