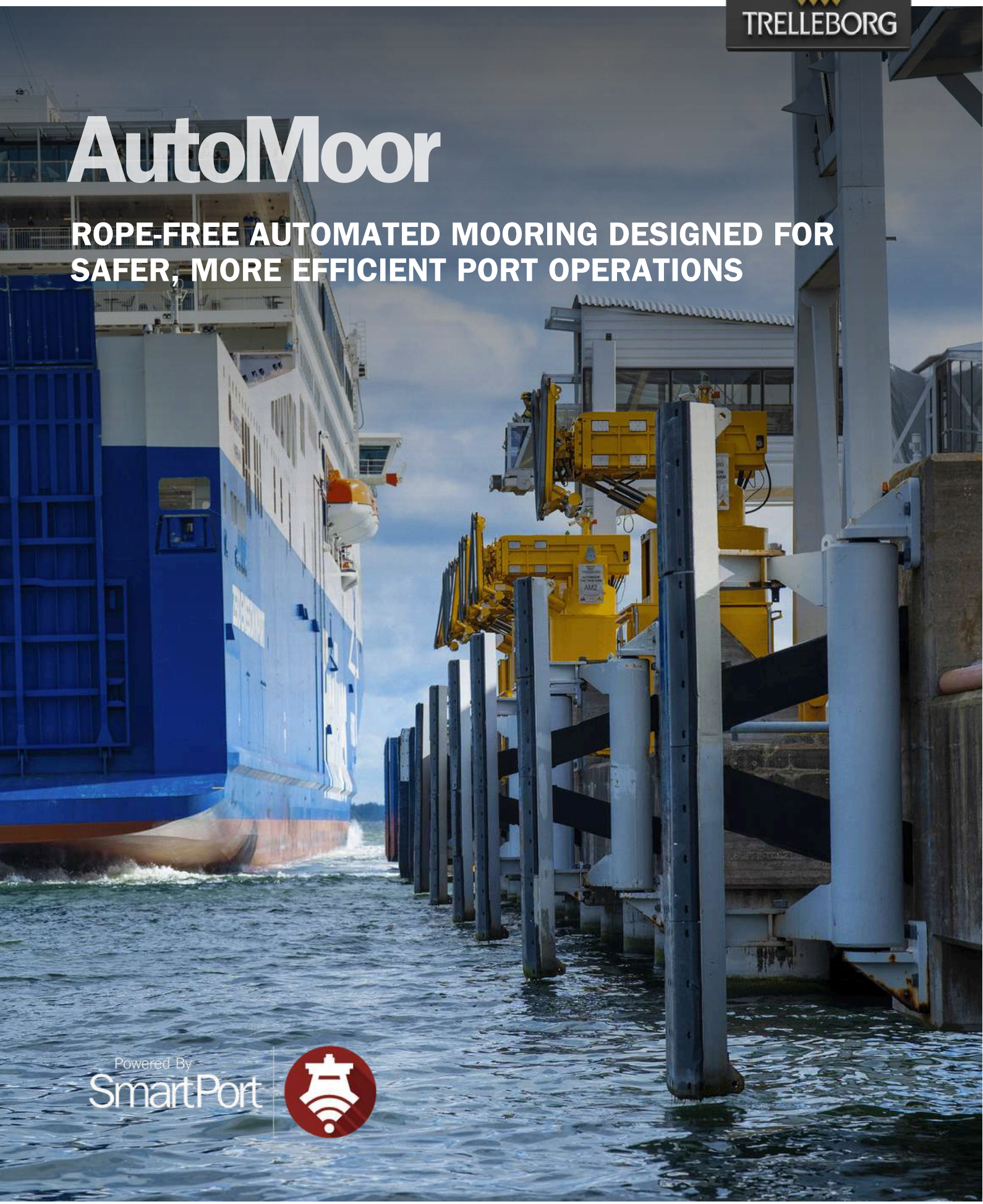
AutoMoor

ROPE-FREE AUTOMATED MOORING DESIGNED FOR SAFER, MORE EFFICIENT PORT OPERATIONS



Powered By SmartPort

With Trelleborg’s rope-free AutoMoor you can now moor your vessel in under 30 seconds! That's safe, swift, and sustainable operations at its peak! Embrace the future of mooring with Trelleborg's AutoMoor – because your time is valuable, your operations are crucial, and your peace of mind matters.

SCAN FOR MORE INFO

Transforming port operations with smart and sustainable solutions

Trelleborg Marine and Infrastructure is a leading manufacturer of premium solutions for critical marine, port and built infrastructure applications. We understand firsthand the importance of efficiency in port operations, which is why we have a comprehensive range of solutions that cover every aspect of the process. Whether it's our state-of-the-art marine fenders, advanced docking and mooring systems, or cutting-edge vessel technology and navigation and piloting systems, we provide premium solutions that are specifically designed to maximize overall safety and efficiency.

Our extensive global network, premium product design capabilities, and R&D and technical expertise enable us to be the trusted partner you can confidently turn to for projects of any size or complexity.

Driven by our commitment to catering to the specific needs of our customers, our team of experts will always be on hand from the beginning to the end of a project, ensuring a collaborative effort that yields tangible results.

Trelleborg's industry-leading docking and mooring equipment has been instrumental in helping port owners and operators worldwide achieve greater operational efficiency and productivity while enhancing port safety. Our range of high-quality and innovative products combine engineering expertise with advanced technology, optimizing mooring systems and improving efficiency, safety, and sustainability across berthing management procedures.

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Automated mooring solution redefining mooring efficiency with the latest technology

The marine industry is experiencing significant transformation. Constant adaptation and innovation are essential to ensure safe, efficient and sustainable port operations. At Trelleborg, our automated mooring solution, transforms berthing strategies and play a key role in optimizing port operations.

It enhances port safety by reducing traditional mooring hazards, increases throughput by accommodating larger vessels or expanding berthing windows, and minimizes environmental impact by lowering port emissions.

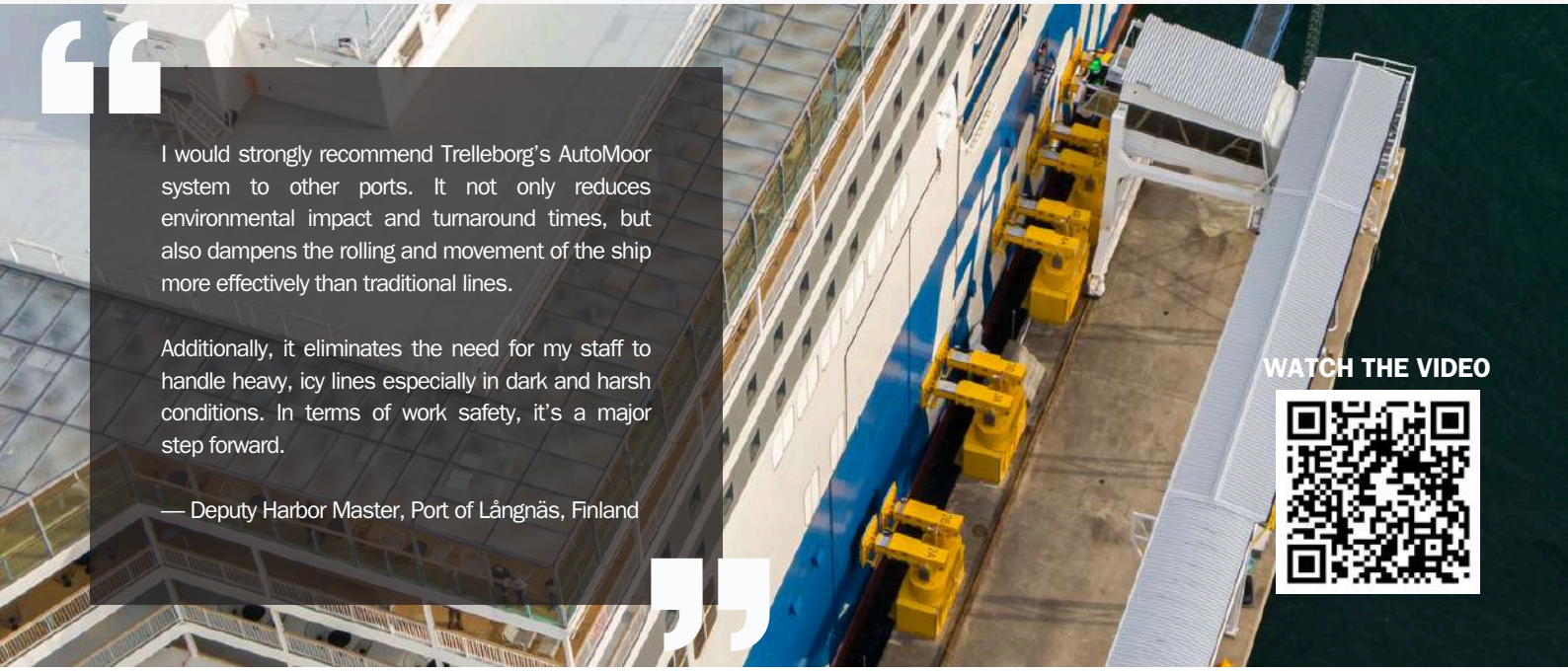
Additionally, combining our automated solutions with real-time process monitoring enables data analysis for better day-to-day decision-making and efficient operational performance.

In port operations where time is critical, Trelleborg's automated vacuum mooring solution, AutoMoor swiftly secures vessels in various berthing conditions, improving turnaround times for faster departures.

This rope-free automated mooring system utilizes advanced vacuum pad and damping technologies to enhance both port safety and efficiency.

KEY BENEFITS INCLUDE:

- **Enhanced Port and Terminal Throughput:** Quick mooring and release operations, reduce vessel turnaround times, expand operational windows, and improve transfer efficiency for smoother operations.
- **Reduced Capital Investment and Operational Costs:** Enables ports to accommodate larger vessels without the need for costly infrastructure upgrades, while also minimizing tug usage.
- **Optimal Resource Allocation:** Reduced reliance on mooring crews, allowing personnel to focus on safer, high-value tasks onboard and at the port.
- **Improved Safety Standards:** Effectively dampens vessel motions and eliminates risks associated with traditional mooring lines, ensuring safer operations for personnel and assets.
- **Contributes to Sustainable Operations:** Reduces fuel consumption by eliminating the need for line boats, minimizing tugboat reliance, and promoting sustainability through optimized mooring procedures and accelerated mooring times.



> I would strongly recommend Trelleborg's AutoMoor system to other ports. It not only reduces environmental impact and turnaround times, but also dampens the rolling and movement of the ship more effectively than traditional lines.
>
> Additionally, it eliminates the need for my staff to handle heavy, icy lines especially in dark and harsh conditions. In terms of work safety, it's a major step forward.
>
> — Deputy Harbor Master, Port of Långnäs, Finland

WATCH THE VIDEO

AutoMoor

Trelleborg's rope-free Automated Mooring Solution, AutoMoor, is expertly designed to elevate berthing operations. By utilizing advanced vacuum pads and damping technologies, AutoMoor helps streamline operations in ports and terminals, allowing vessels to be secured and released quickly and reliably. This optimization enhances berth utilization and overall vessel throughput. It contributes to faster turnaround times, addressing the urgent need to improve port efficiency and reduce arrival delays.

AutoMoor eliminates the use of traditional mooring lines, reducing the reliance on tugboats during berthing. It also addresses the critical safety issue of mooring line snapback, significantly reducing danger to human life, ensuring a safer working environment and improved overall operational safety. Less tug assistance during docking and mooring procedures means lower operational costs and decreased emissions, contributing to sustainability.

AutoMoor uses SmartPort technology to connect assets and to continuously monitor all mooring loads acting on the vessel at berth, it also provides live data to the operator to optimize day-to-day port and terminal operations.

INSTALLATION

To ensure optimal installation, the number and positions of AutoMoor units is determined relative to the vessel, berth, and environmental conditions. This is achieved through several technical reviews, including upon request basic mooring analysis, a vessel hull surface study, and a berth mounting review.

At Trelleborg, we also provide complete site-service offerings including installation and commissioning support such as site audits, operator training and scheduled maintenance, ensuring the system is fully prepared for optimal operation.

To find out more, contact your Trelleborg representative.

Automated mooring systems are not a new mooring solution. Backed by a technology with a proven track record spanning 25 years in the industry, Trelleborg's vacuum mooring units have successfully completed over **30,000 rope-free moorings globally,** making them a trusted choice for modern maritime operations.

OPERATIONAL FUNCTIONALITY

When the vessel is nearing the berth for mooring, AutoMoor offers the use of AIS with geo-fencing to identify the vessel once it is near the berth. The operator or the master then confirms the identity of the vessel to be berthed.

Once confirmed, AutoMoor loads the vessel's profile, positioning the pads correctly according to the vessel's plan, accounting for openings, scuppers, and hull protrusions.

The AutoMoor system then informs the master that it is ready to moor. The master selects the mooring function on their control device, and the pads reach out to attach to the vessel. Once the pads are attached, AutoMoor initiates a pretension cycle, pulling the vessel against the fenders.

When the vessel is stationary, AutoMoor restrains the vessel using its low power damping technology (Always Active Mechanical Damping Technology (AAMD)), allowing the vacuum pump and HPU to go into standby mode. AutoMoor's control system continuously monitors the loads via load cells equipped in each unit, balances, and adjusts the tension, and tops up the vacuum as required.

In the event of a mooring system overload or if motion limits are exceeded, the driveline motor activates to adjust the arm and pad position, either paying in or out as needed to manage the load. This process helps to break the vessel's natural frequency of motion, regain the assigned pre-tension load, and remain within the normal operating force window.

When the vessel is ready to sail, the master can release the AutoMoor units from the bridge or instruct onshore operators to do so as per a normal 'let go' operation.

AutoMoor is managed by a single operator, either the mooring master or shoreside personnel, who can operate the entire berth of AutoMoor units, controlling the moor/de-moor operations and monitoring. The mooring control is accessible via the AutoMoor tablet or the control panel at the mooring unit, with an option for control from a workstation device in a port control room.

APPLICATIONS

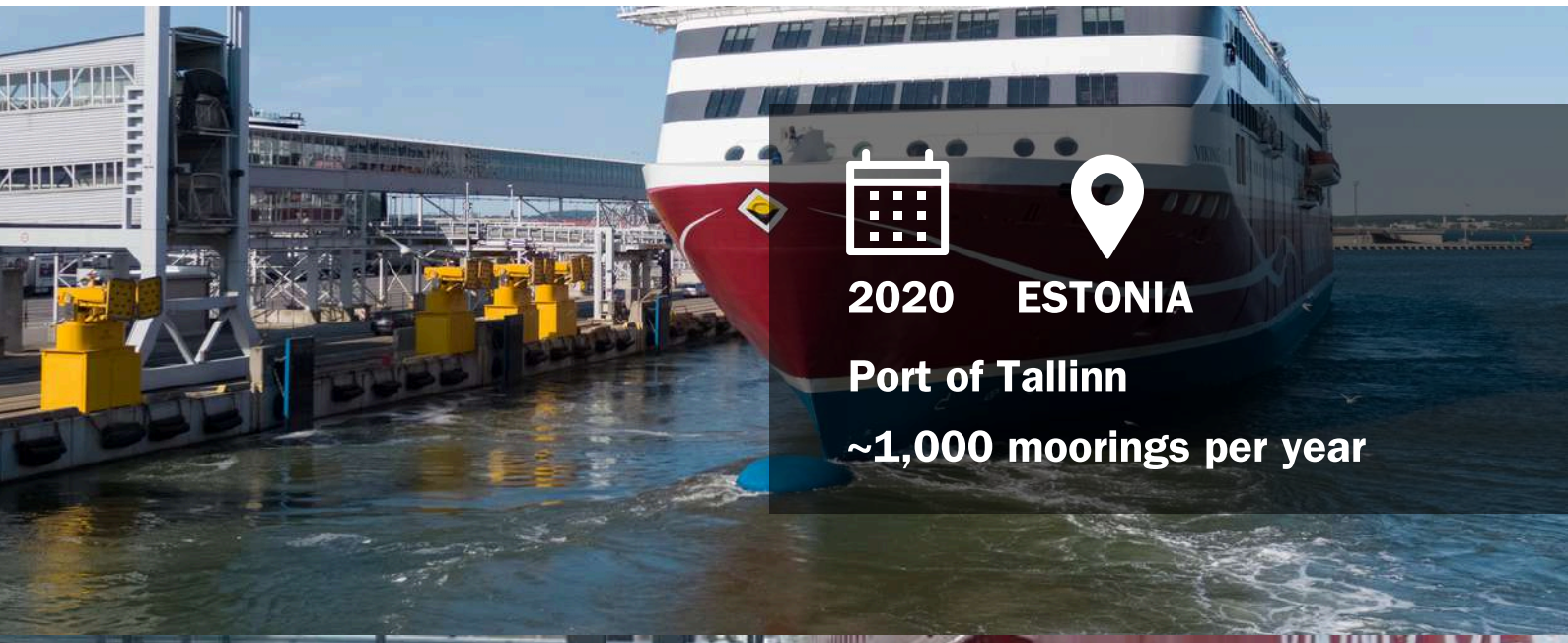
AutoMoor's adaptable system can meet various docking needs, making it an ideal choice for multipurpose ports seeking a flexible mooring solution.

- Dry Bulk
- Oil & Gas
- Container
- Cruise
- Ferry

Trelleborg's AutoMoor system is equipped with multiple standard and optional redundancy features to ensure safe operation during a power outage. These include the ability to connect to port backup power or an optional AutoMoor UPS. In the event of a power failure, the vacuum holding capacity will continue to safely moor the vessel, and can be manually released via a dump valve on each mooring unit upon vessel departure, ensuring uninterrupted safety and functionality.

AutoMoor can be switched from fully-automatic to limited-manual operation to allow basic operation of the mooring unit in case of emergency.

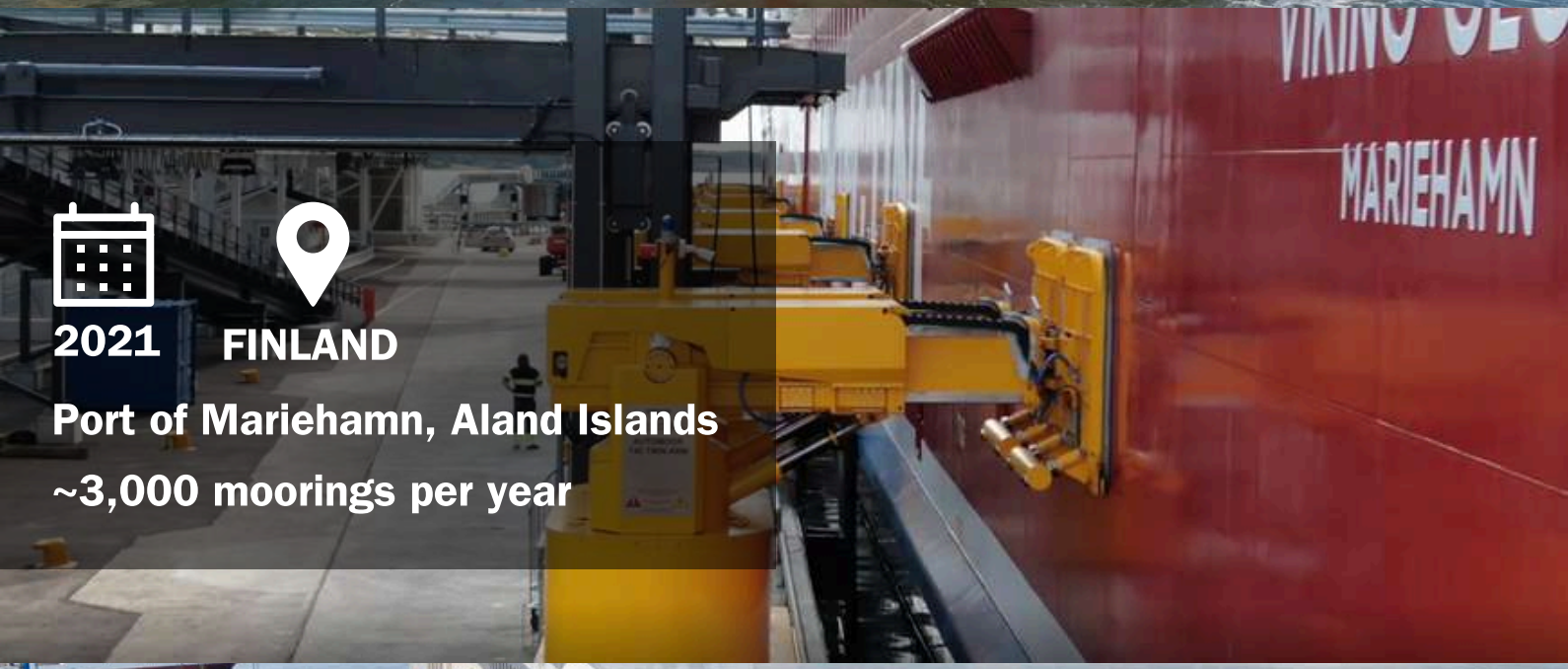
Note: Fenders are essential at berths equipped with Trelleborg's AutoMoor. They absorb the initial berthing energy when a vessel approaches the berth. Once the vessel is stable alongside the fenders, AutoMoor securely moors the vessel by holding it against the fenders.



2020 ESTONIA

Port of Tallinn

~1,000 moorings per year



2021 FINLAND

Port of Mariehamn, Aland Islands

~3,000 moorings per year

2023 FINLAND

Port of Långnäs - International

~2,700 moorings per year

FEATURES AND BENEFITS

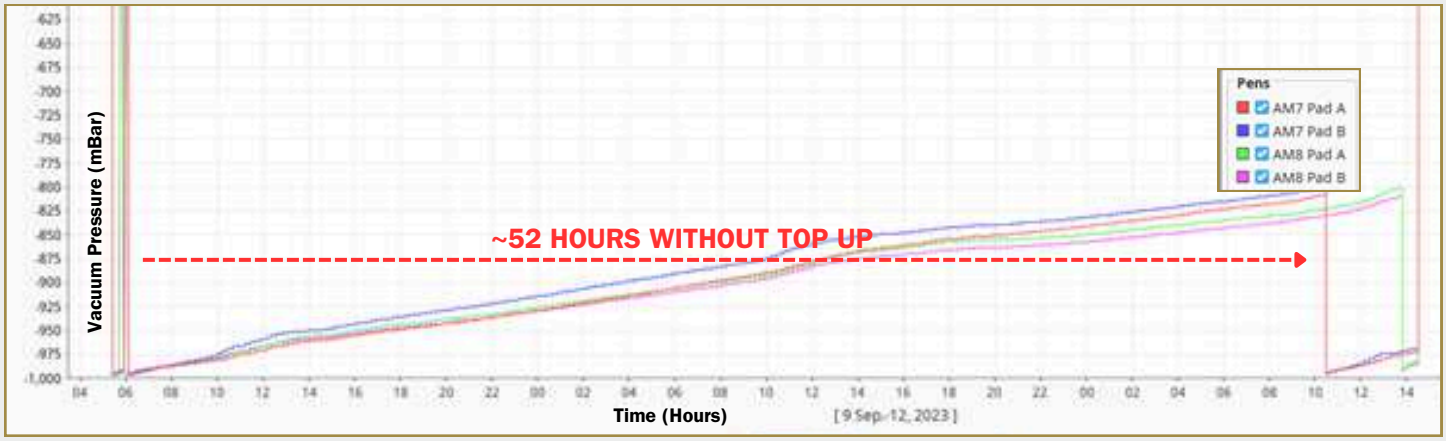
- AutoMoor utilizes rope-free vacuum mooring technology, enhancing safety and eliminating the need for manual handling of ropes—reducing the risk of serious or fatal injury from snap back.
- AutoMoor's advanced damping technology reduces vessel motion, enabling safer transfers and expanding operational windows.
- Optimizes vessel turnaround time and boosts vessel throughput by swiftly and securely mooring vessels within approximately 30 seconds upon arrival and releasing them in under 15 seconds during departure.
- Enables ports to accept larger vessels into smaller existing berths by efficiently concentrating mooring forces towards the flat hull section of the vessel, which can reduce the need for wharf extensions or mooring dolphins.
- Leverages advanced control system technologies with Always Active Mechanical Damping Technology (AAMD) to minimize power usage and extend the life of the electrical and hydraulic components in the AutoMoor unit.
- Intelligent position monitoring, sensing vessel position and adjusting before a problem develops, reduces the risk of collision or equipment damage, enabling more flexible mooring patterns.
- AutoMoor Gen2 is a self-contained compact design with a small footprint on the wharf and no additional equipment housings
- Ensures operational continuity in high winds and cold climates, preventing downtime and maintaining consistent throughput even in extreme weather conditions.

FOR MORE TECHNICAL DETAILS DOWNLOAD THE AUTOMOOR DATASHEET

VACUUM TECHNOLOGY

Trelleborg's AutoMoor has a proven track record of holding mooring vacuum for substantial periods of time. In fact, it is common to see as little as 15% vacuum loss over a 52-hour period. This is achieved by Trelleborg's multi-lip vacuum seal and proprietary UV-stabilised, non-marking rubber compound seal material.

The chart below shows live data from the performance of four AutoMoor vacuum pads mooring a vessel in Finland. Over a 52-hour period, the vacuum pads required only one top-up, showcasing their superior performance and efficiency.



Designed for increased operational efficiency

Trelleborg's rope-free Automated Mooring System, AutoMoor is engineered not only to enhance port efficiency, but also to promote sustainable operations through its low-power electromechanical damping system. The design features an innovative sway motion control mechanism that remains unaffected by power failures, ensuring secure mooring even in unforeseen circumstances by providing Always Active Mechanical Damping (AAMD). The vacuum pad nodes are designed to optimize vacuum seal compression, preventing hull plate buckling and improving overall mooring performance. Additionally, the multi-lip vacuum seals minimize the risk of mooring failure during critical operations and can maintain a vacuum without needing a top-up for up to approximately 50 hours.

The system is specially engineered to effectively manage tidal and draft changes using its innovative 'vertical height adjustment' function. This function allows the vacuum pads and extension arms to release and reposition on the vessel's hull, enabling the system to 'walk' up and down the hull as it changes draft. Each pad or mooring unit performs this action one at a time, ensuring seamless and efficient adaptation to varying conditions.

A rolling service tray and quick-release access panels have been introduced to allow fast access to serviceable items, ensuring reduced downtime during maintenance.

Innovative sway motion control system with minimal energy consumption, unaffected by power failures whilst vessel is moored

Vacuum Pad Nodes optimize vacuum seal compression, preventing hull plate buckling and enhancing mooring performance.

Lightweight shrouds for ease-of-access

Low-Power Electromechanical Damping System for sustainable operations

Multi-Lip Vacuum Seals enhances performance by minimizing the risk of mooring failure during critical mooring operations. The seal can maintain vacuum without top-up for extended periods ~50 hours

Pull-out services tray for easy access enabling quicker maintenance

Mooring control is accessible via the AutoMoor tablet or the control panel at the mooring unit, with the option for control on a workstation device in a port control room

2022 NORWAY

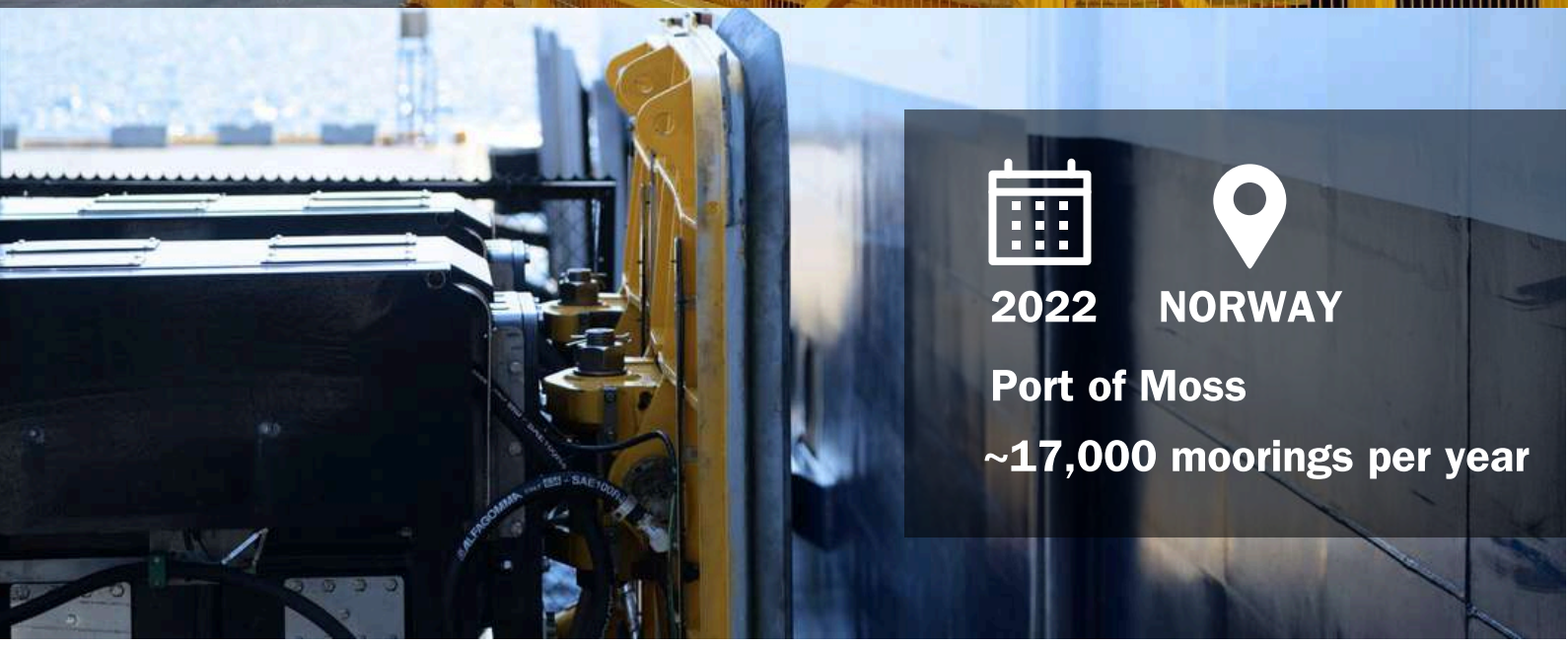
Port of Horten

~17,000 moorings per year

2021 FINLAND

Port of Langnas - Domestic

~250 moorings per year



2022 NORWAY

Port of Moss

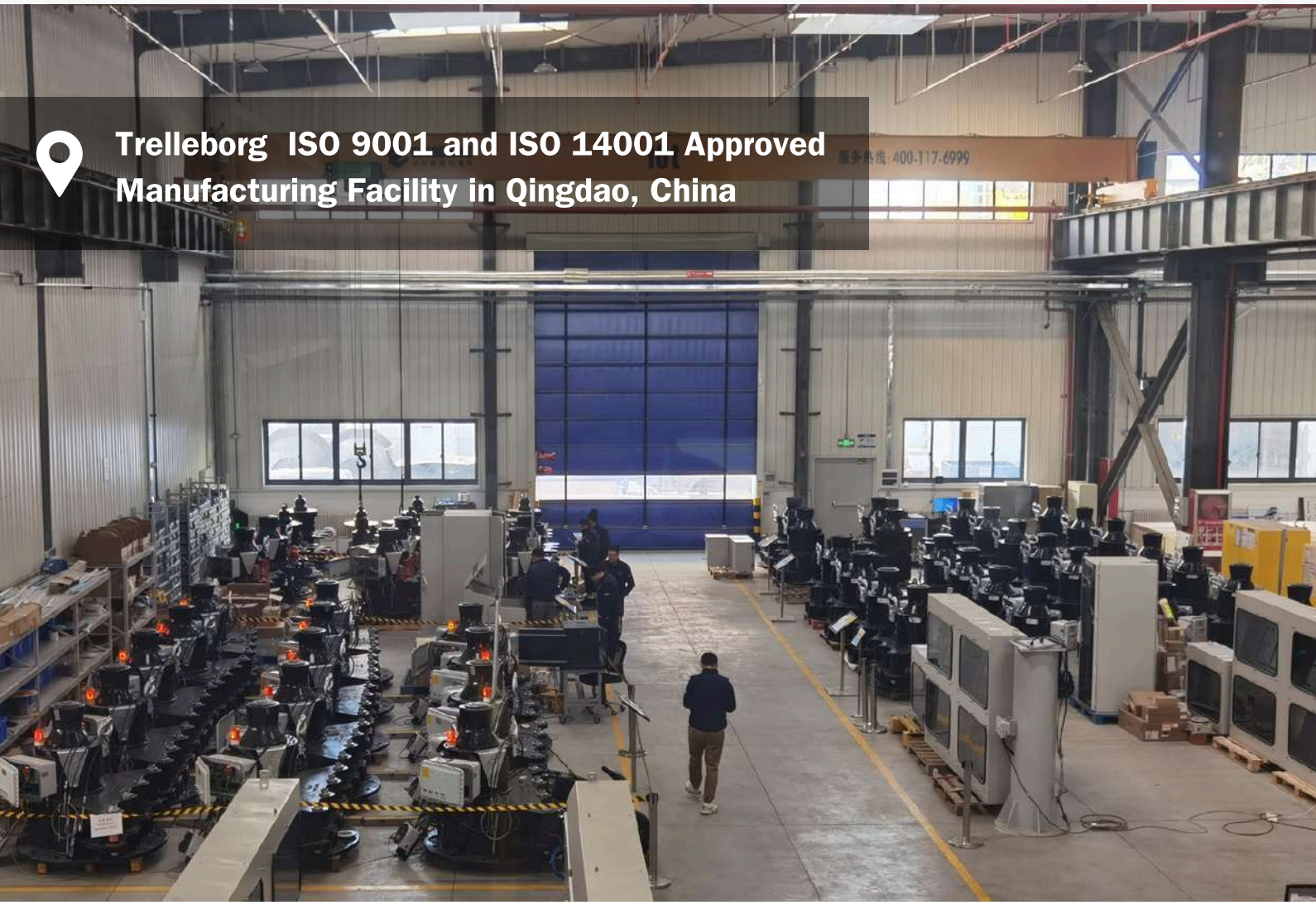
~17,000 moorings per year

Precision manufacturing and testing

Trelleborg's vacuum mooring solution, AutoMoor, is manufactured at our in-house facilities, allowing us to maintain stringent control over the entire production process. Our factories and product processes are accredited to ISO 9001 and ISO 14001 standards, ensuring the highest levels of quality and industry standards. We use high-quality components supplied from reputed international brands and subject them to rigorous testing to guarantee exceptional performance and reliability. Our Engineering Centre of Excellence in Melbourne, Australia is staffed with skilled professionals who engineer and design each component with utmost precision, adhering to various international standards, including BS 6349, AS 4997 and AS 1554.

Before our dedicated team completes the final assembly, we conduct factory acceptance testing of the key sub-systems. This is followed by comprehensive functional testing of each mooring unit using specially designed test rigs that simulate various vessel motion behaviors to verify damping performance. To ensure quality, we also provide detailed customer testing documentation and offer witness testing upon request.

Once installed onsite, the AutoMoor systems are commissioned to verify factory testing results and ensure they meet system and berth performance requirements, guaranteeing reliable and efficient operation in real-world conditions.



Installation and inspection

Trelleborg offers an all-encompassing asset management solution for docking and mooring equipment. To ensure safe operations, optimize operational efficiency, reduce the risk of downtime, and maintain continuous equipment functionality and longevity, we offer a range of Master Service Agreement packages for our Automated Mooring Systems. This service helps extend equipment lifespan, ensures consistent performance and reliability, and reduces maintenance and replacement costs. Additionally, it enhances port safety, boosts operational efficiency, and prevents unplanned downtime. We provide comprehensive support, including installation and commissioning, inspection, operator training, on-site functionality testing, service, maintenance, repair, and component exchange when required.

INSTALLATION AND COMMISSIONING SUPPORT

Trelleborg offers a suite of site services that can be conveniently packaged with installation and commissioning support services such as site audits, operator training and scheduled maintenance.

INSPECTION

A proactive inspection and maintenance schedule is crucial for the timely identification and rectification of potential problems within the docking and mooring equipment.
It facilitates the detection of hazards, and the assessment of component functionality and repair requirements, which in turn helps prevent system failures and guarantees sustained operational integrity.

Trelleborg provides world-class inspection services to port and terminal operators worldwide. The inspection service includes:

1 - INSPECTIONS
Visual and operational inspection of all the components of the equipment are obtained and recorded on site by our experts, ensuring they meet international standards.

2 - DATA EVALUATION
In line with international standards, the components are evaluated for wear and tear.

3 - GRADING EVALUATION
A maintenance rating scale is used to classify the components based on its damage condition and potential impact to operation.

4 - ANALYTICAL REPORT
The findings are presented, and recommendations are made regarding the necessity for further monitoring, repair, or replacement.

By providing such detailed information, port operators can effectively budget their resources and plan for future maintenance.

ON-SITE FUNCTIONALITY TESTING

During commissioning, inspection services, and any service or repair interventions, on-site functionality testing is conducted to confirm the system's operational integrity. This includes verifying the equipment's physical range of movement and executing software diagnostics tests.

OPERATOR TRAINING

Knowing how to operate and maintain your docking and mooring equipment is essential for safe and efficient berthing operations. Our experienced trainers can help you invest in your most important asset: your people. Training can be customized to meet your specific needs, whether conducted at our factory or on-site.

SERVICE, MAINTENANCE AND REPAIR

Trelleborg provides 3 levels of service agreements and also provides custom solutions if required.

Bronze level includes on-site evaluations by our skilled & knowledgeable service engineers, who will ensure your Trelleborg equipment is accessed for optimum performance.

Silver level offers annual replacement of consumable parts, priority technical support, load cell exchange and assistance.

Gold level offers a complete maintenance solution for Trelleborg docking and mooring equipment installed on your jetty.

BENEFITS

- Reduce unplanned service activities
- Reduce equipment downtime
- Maximize equipment lifespan
- Improve safety through best practice maintenance
- Reduce total cost of ownership

COMPONENTS EXCHANGE

The Trelleborg Components Exchange Program offers a straightforward solution for load cell calibration. It enables terminal operators to easily comply with the SIGTTO/OCIMF Jetty Maintenance and Inspection Guide's recommendation for annual calibration. The program ensures minimal downtime and guarantees reliable performance, making maintenance efficient and hassle-free.

SERVICE	BRONZE	SILVER	GOLD
Equipment inspection and condition report	✓	✓	✓
Spare parts audit	✓	✓	✓
Remote Diagnostics Support	✓	✓	✓
Onsite Technical Support	◯	✓	✓
Load cell exchange	◯	✓	✓
Load cell exchange assistance	◯	✓	✓
Yearly consumable parts replacement		✓	✓
Programmed maintenance - quarterly intervals			✓
Capital parts replacement - 5 year interval			✓
Computer hardware / software upgrade			✓
Breakdown cover			◯
Total labor coverage*			✓

*Not available in all regions ◯ = Optional

Common Misconceptions of Automated Mooring Systems

Opinions vary widely across the industry regarding the benefits and drawbacks of port automation and automated mooring systems (AMS). In the following section, we clarify some of the most frequently asked questions to provide greater understanding and insight.

AUTOMATED MOORING SYSTEMS (AMS) ARE EXPENSIVE

While automated mooring systems (AMS) might appear to be more expensive upfront than simple bollards or quick release hooks, their true value lies in productivity benefits. AMS can assist ports to achieve considerable operational efficiency gains by saving time that can be allocated for other port operations, e.g. more product transfers, additional vessel calls to the berth, requiring less mooring crew, thus, improving safety and reducing operational costs. They also improve the efficiency of the berth by minimizing the effect of adverse mooring conditions more than a typical bollard or hook would do, thereby reducing the likelihood of accidents. The costs associated with such accidents—both direct and indirect—can be substantial. By mitigating these risks, AMS provides a compelling return on investment over time, making it a smarter alternative with sustained benefits.

Ask your local Trelleborg representative to conduct an Operational Benefit Analysis specific to your port application to see how AMS can work for you.

AMS PRODUCTS ARE UNRELIABLE

Incorrect. Trelleborg has a proven track record of supplying safe, reliable berthing and mooring solutions for well over 50 years. Our AMS products have a design life of 20 years and have completed over 30,000 moorings to date since 2020. Whilst automated mooring systems are more complex, a comprehensive maintenance and service program from Trelleborg ensures that your AutoMoor system will work as required to keep your port operations functioning efficiently.

VACUUM PUMPS NEED TO RUN CONTINUOUSLY

With its advanced multi-lip vacuum seal, AutoMoor's vacuum pump doesn’t need to run continuously. The seal efficiently maintains the vacuum level for extended periods with only intermittent operation to top-up the vacuum, thus, minimizing wear and significantly reducing energy consumption. Compared to traditional mooring systems which carry significant risks such as mooring line snap backs and potential injuries to personnel, AutoMoor is a safer and more efficient alternative.

AMS TAKES JOBS FROM HUMANS

Many aspects of port and vessel operations have been automated over the years, from cranes, straddle carriers and electronic gates to ticketing services, AIS and navigation systems. All of these solutions have an overall common objective to improve port efficiencies and raise the bar on safety. Automated mooring systems are no different in that regard. Their objective is to make safer, the task of mooring a vessel securely at a berth so product transfer operations can occur safely whilst putting humans out of harms way where mooring line snapback can be a considerable an often underestimated hazard. By automating the mooring process, crew members can be reassigned to other critical operations onboard and at the port, that require greater human input. AutoMoor enables the workforce to work smarter and safer, contributing to a more productive and modern maritime industry.

ROPE-FREE AUTOMATED MOORING SYSTEMS USE A LOT OF POWER

Trelleborg's AutoMoor operates in two modes to reduce power usage throughout the mooring cycle. Active mode is required during the initial mooring phase where the vacuum pad is driven out to the vessel's hull, then makes contact with the hull to create a holding vacuum. This takes less than a minute at peak power. Once the vessel is securely moored, AutoMoor switches to Passive mode where the entire mooring unit uses less than 1kW.

AUTOMATED MOORING SYSTEMS LEAK OIL

AutoMoor has been designed with minimal use of hydraulic systems to reduce the risk and impact of oil spillage onto the berth, with no hydraulic equipment located over water. Furthermore, extensive factory testing also ensures the hydraulics are working as intended, and although not required, biodegradable oils and drip trays can also be specified.

AUTOMATED MOORING SYSTEMS ARE EXPENSIVE TO MAINTAIN

Compared to a bollard, yes, but a bollard doesn't offer the overall port efficiency benefits that an AMS solution does to ultimately improve a port's profitability and safety – the value of which more than offsets the maintenance costs. Other than functional checks on a 3-monthly schedule, there is hydraulic oil replacement every 3 years with vacuum pump oil being replaced every 500 hours of use which could amount to once every 5 years. Speak to Trelleborg for information on master service agreement packages for AMS solutions.

AMS CANNOT OPERATE IN HAZARDOUS AREAS OR BE CLASS-CERTIFIED

AutoMoor solutions are optionally available with Hazardous Area Capability to Zone 1, also covering Gas Group IIB and Temperature Zone T3. Trelleborg has extensive experience designing and supplying HAZ compliant products to the docking & mooring industry, as well as experience of certification with bodies such as DNV-GL.

THE PASSIVE SYSTEM IN AUTOMOOR IS NOT AS EFFECTIVE AS A FULLY-HYDRAULIC ROPE-FREE MOORING SYSTEM

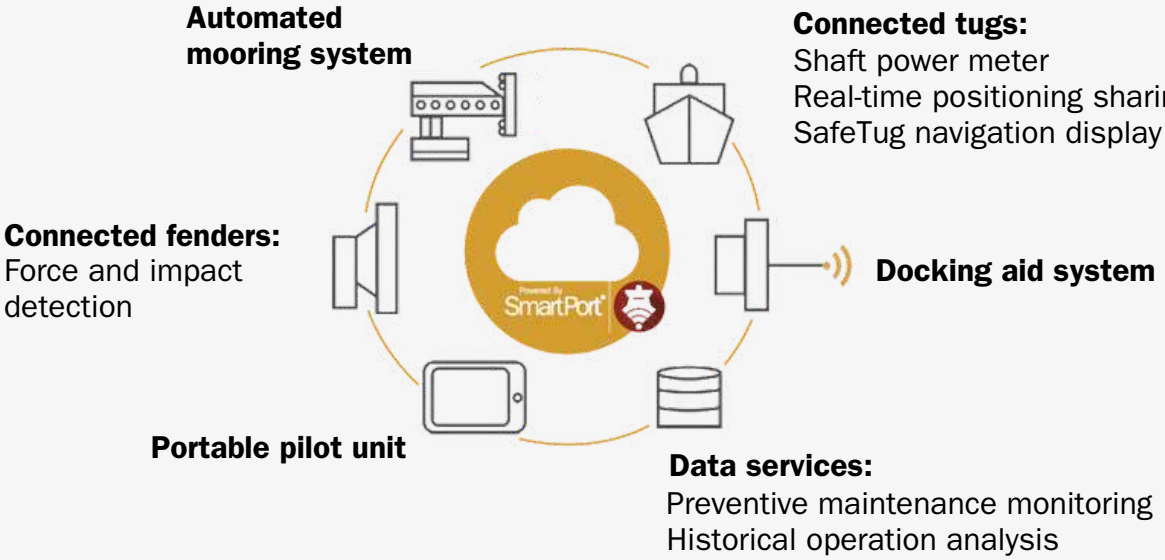
Having listened to existing automated mooring system customers, Trelleborg specifically designed AutoMoor with low power usage in mind. AutoMoor uses a combination of mechanical, electrical and hydraulic technology to attach and moor a vessel and uses a fraction of the power required by fully-hydraulic mooring systems whilst the vessel is moored. The AutoMoor Gen2 mooring system is significantly simpler to maintain whilst providing reliable operation.

Smart technologies powered by SmartPort

SmartPort is Trelleborg's answer to the need for a standardized way to collect and store data from different sources. It is a technology platform that connects port operations, allowing users to analyze asset performance effectively and apply data insights to improve day-to-day decision-making and long-term operational improvements.

SmartPort connectivity

Performance data from mooring equipment such as AutoMoor can be connected via the SmartPort cloud to information systems such as environmental monitoring systems (EMS) and vessel automatic identification systems (AIS), enabling full transparency and information sharing to safety systems such as emergency shut-down (ESD) and landside passenger and vehicle ramps. Access to all relevant information is with a touch of a finger at the right time to the right staff in real time, ensuring situational awareness and improving safety.



Why choose SmartPort?

- SmartPort uses the latest smart technology to manage intelligent data collection, transfer and storage to optimize assets across the port environment.
- SmartPort enables multiple port operational systems to work with each other, optimizing the effectiveness of their data – interlocking systems where necessary.
- SmartPort products collect and transmit data in real time, distributing it to the right people at the right time – on board the vessel, in the control room or on the jetty – to improve day-to-day operations.
- SmartPort allows the performance of assets to be analyzed quickly and effectively to identify incremental efficiency gains over the short and longer-term.
- SmartPort is built on an open API structure to enable collaboration with third-party systems and third-party assets.

LEARN MORE ABOUT SMARTPORT

Trelleborg supporting you at every stage

Trelleborg Marine and Infrastructure offers exceptional service and support across its entire product range. Our industry-leading mooring solutions are supported by best practice aftersales services including operational training, comprehensive product warranties and simple, cost effective, predictive maintenance packages, giving you peace of mind. Our mooring solutions can be customized to meet your needs and reduce the Total Cost of Operation (TCO), they include:

- Global support, local presence
- Rapid response emergency hotline
- In-house technical staff with knowledge of hardware and software
- Local spare parts holding
- Cost effective remote diagnostics and support
- Scheduled or tailored maintenance and ongoing support packages
- In-built system diagnostics
- Run-time monitoring to optimize predictive maintenance requirements
- Comprehensive product warranties
- Remote and on-site training classes, workshops and factory acceptance testing
- On-site commissioning

Get in touch to see how we can customize a program to meet your needs.

Trelleborg provides dedicated support throughout the full length of a project, from concept to commissioning and beyond. Our support combines commercial and technical knowledge, which are both put into practice through site services and maintenance, helping you to reduce downtime, improve productivity and reduce costs over a lifetime.

USEFUL INFORMATION FOR THE APPLICATION OF AUTOMATED MOORING SYSTEMS

The port and marine industry has many useful standards, guidelines and articles on the topic of automated mooring systems. Here are some of the main resources:

PIANC WG212 – Criteria for acceptable movement of ships at berths

PIANC WG184 – Design Principles For Dry Bulk Terminals – Section 8.4 Special Mooring Systems

PIANC WG153B – Design Marine Oil And Marine Terminals – Section 5.9 Alternative Mooring Systems

OCIMF Mooring Equipment Guidelines 4th edition (MEG4) – Section 11 Alternative Mooring Technology

British Standards BS6349-4:2020 – Maritime Works Part 4: Code of practice for design of fendering and mooring systems – Section 10.6 Vacuum Mooring Systems

PEMA – Information Paper IP23 Automated Mooring for Ships

ASCE – Mooring of Ships to Piers and Wharves – Section 3.6 Mechanical and Automated Mooring Systems

The following mooring analysis software programs have Trelleborg automated mooring solutions integrated into their simulation environments to allow users to independently model our solutions:

- MIKE21MA (DHI),
- Optimoor (Tension Technology International)

BC-AMS-V1.1-EN,2025

At Trelleborg, sustainability is at the core of everything we do. We are helping to decarbonize the maritime industry by providing smart and technologically advanced solutions like AutoMoor, which result in reduced emissions and increased efficiencies, further benefiting our customers. Our sustainability initiatives are not just an afterthought, but the very foundation on which we build our success.

SCAN FOR MORE INFO

TRELLEBORG

Trelleborg is a world leader in engineered polymer solutions that seal, damp, and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Marine and Infrastructure is a leading provider of premium solutions for critical marine, port, and built infrastructure applications. Its innovative polymer and smart technology solutions enhance operational efficiency, safety, and sustainability.

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