TRELLEBORG

Smarter Mooring Systems

OPTIMIZING MARINE MOORING SYSTEMS FOR BETTER EFFICIENCY, SAFETY AND SUSTAINABILITY

Powered By SmartPort

Introduction

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CHAPTERS

The marine industry is in a time of transition. As vessels get larger, the stakes grow higher.

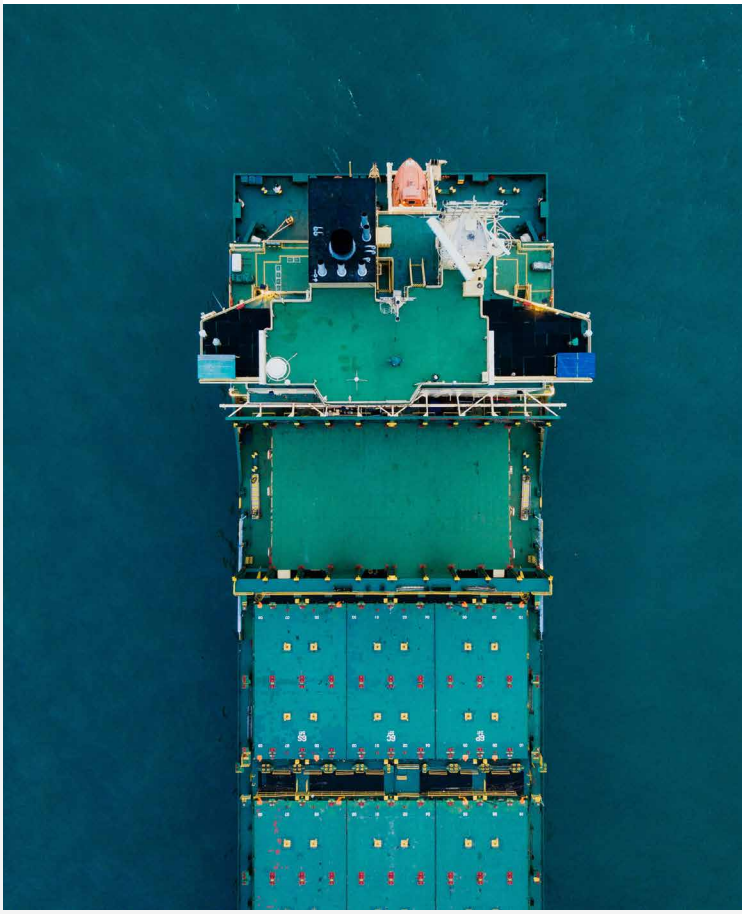
Since even a small error in docking and mooring can cause significant damage or even cost lives, greater standards must be met. A demanding environment requires that users of mooring systems adapt and innovate to ensure efficient, safe and eco-friendly solutions.

Docking and mooring has a critical role to play in optimizing the efficiency of both the berth and the overall port facility. Process refinement is key.

The lean mooring philosophy aims to transform berthing strategies and deliver superior operations. This approach enables greater control of the operational window, optimizes berth utilization, lowers resource and space requirements, and demands less time and infrastructure investment to increase berthing capacity.

Trelleborg combines best practice expertise gained through worldwide experience with a deep understanding of local requirements and regulations. Using industry-leading knowledge, Trelleborg provides truly end-to-end service, retaining vigilance and full control at every stage.

This paper explores how Trelleborg's industry leading docking and mooring equipment supports port owners and operators to achieve new levels of operational efficiency and productivity while creating a safer working port environment.



Efficiency

Docking and mooring is normally a process that requires both large amounts of people and a wide variety of accessories. It is a process that can benefit from being sped up and simplified.

Many ports and terminals are looking towards automated technologies to cope with increased demand and compete effectively in a global landscape. Compared to some other forms of transport, shipping has in some respects been left behind. 45% of container vessels are currently delayed by over eight hours upon arrival. For this reason, there is an immediate need to raise port efficiency for the businesses involved to stay competitive.

When using mooring lines, operators may need to interrupt operations, costing time and money in delayed transfer. Trelleborg's operating modes offer more efficient use of accessories while helping manage energy consumption and equipment fatigue.

Reducing human error is another significant benefit. Trelleborg Marine & Infrastructure offers a range of data-driven technologies that provide robust, accurate information that removes the element of 'best guessing' and replaces it with accurate, real-time decision making.

These include DynaMoor, which speeds up the berthing process and minimizes workload and manual line handling, improving overall efficiency. Meanwhile, AutoMoor securely moors vehicles in under a minute and releases them for departure in just 30 seconds. On top of that, Trelleborg's QRH (Quick Release Hooks), integrate with other Trelleborg systems for complete berth management.

Automated mooring technologies also minimize downtime by reducing the issue of passing ship movements. Using Trelleborg systems to dampen vessel motions and extend the range of conditions in which efficient transfer can take place can have huge implications for efficiency. In some cases, berths experience 15 – 20% downtime due to MetOcean conditions. If this can be reduced to 10%, there is a potential for a similarly significant increase in revenue. Not only is mooring time reduced, the window of operation at the berth is increased, meaning more vessel throughput, less time required to transfer the product and, ultimately, an optimized facility.

This type of technology also minimizes the need for costly infrastructure upgrades while increasing berth capacity by eliminating the necessity of wharf extensions or mooring dolphin investments for port terminal upgrades.

"The SmartPort technology platform is powering the marine industry to a new level of efficiency and asset optimization."

SmartPort products collect and transmit data, distributing it to the right people at the right time – whether they are on board the vessel, in the control room or on the jetty – to deliver improved operational efficiency.

Safety

Safety is one of the key principles that define port operations across the world, yet preventable accidents are all too frequent. For instance, an incident in 2017 saw a crew member in Hong Kong killed after being hit with a mooring rope. And in the US in 2018, there were two fatalities on a bulker after a mooring line snapped.

Implementing technological advances can enhance the safety of port procedures by minimizing personnel involvement during operations and eliminating snapback. The more human involvement there is in the docking process, the higher the likelihood of error. Allianz Global Corporate & Specialty (AGCS) estimates that between 75% to 96% of marine accidents can be attributed to human error.

Moreover, the greater the number of lines and fixtures such as bollards and pulleys, the greater the potential for accidents. With Trelleborg's new mooring technologies, where there is human involvement, it is aided by unprecedentedly accurate and timely data.

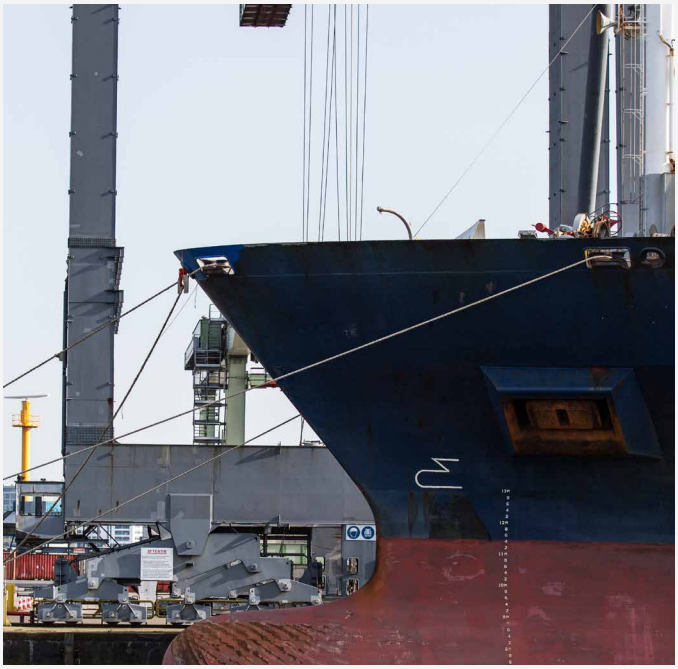
DynaMoor enhances safety by minimizing snapback zones, and also reduces the overall amount of wharf furniture, simplifying day-to-day operations. Its added safety interlocks prevent inadvertent or unauthorized release. It also has the ability to release mooring lines remotely in an emergency.

This engineered mooring solution adopts the latest computer-aided design and meets or exceeds numerous international engineering standards. On top of this, production is carried out by qualified technicians using components supplied by Trelleborg-owned factories or Trelleborg-approved supply chain partners.

Those involved in mooring can use Trelleborg products to make more educated decisions at key moments. SmartMoor delivers greater control by continuously showing mooring loads and unit operating conditions. It also clearly indicates the operational status of the mooring unit.

Trelleborg's QRHs maximize the safety limit under which docking and mooring can be carried out. With DynaMoor's constant tensioning system, this balances loads on the ship's mooring lines, leading to safer, more secure mooring.

Data-logging and reporting are available on multiple levels, and Trelleborg's products can be used in many different sectors within the port industry, helping improve safety with ferry berths, cruise terminals, bulk liquid berths, container terminals and dry bulk terminals.



Sustainable returns

Environments and operations are becoming more demanding. Climate change and greater commercial demands on ports necessitate that unloading and transfers take place in challenging conditions.

Reducing the time, personnel and equipment involved in docking and mooring will lower costs and emissions and thus increase sustainability. AutoMoor's passive damping technology means power consumption is a fraction of that of a fully active hydraulic system.

Trelleborg's run-time monitoring optimizes predictive maintenance requirements. This and other data that can be accrued by automated mooring allows the performance of assets to be analyzed quickly and effectively to identify optimization and efficiency gains. This ensures less waste, lowered emissions and reduced costs, helping partners and clients stay ahead of the field.

Using environmentally friendly technology is not just ethical, it is also smart. Docking and mooring equipment relies heavily on rubber, the production of which creates a lot of waste.

Moreover, a 2017 report by the Grantham Research Institute on Climate Change and the Environment, "Multiple benefits from climate change mitigation", provides evidence on the scale and range of ancillary benefits that derive from reducing emissions of carbon dioxide and other greenhouse gases. Figures from the World Health Organization Global Burden of Disease support the claim that reducing emissions of greenhouse gases are good for business, good for human health and good for the local economy.

Conclusion

In this paper, it has been explained that delays are still frequent during docking and mooring and that automated technology is helping to address some of these problems. Trelleborg has been raising port efficiency, which can help clients become more competitive.

By providing unprecedentedly timely and reliable data to operators, it also increases the safety of the whole process. Reducing the number of people and equipment involved has a similar effect.

All of this impacts positively on sustainability and return on investment for Trelleborg's clients. Lowered emissions, reduced waste and less turnaround time all end up affecting the bottom line.

For more than 30 years, Trelleborg has been providing cutting-edge docking and mooring systems to the marine industry. Trelleborg's range of high quality and innovative products combine engineering expertise and technology to optimize mooring systems and improve efficiency, safety and sustainability across berthing management procedures. With AutoMoor, Quick Release Hooks and DynaMoor, Trelleborg continues its advancements in this area, empowering customers to refine and enhance their processes now and in the future.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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.

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Trelleborg Marine and Infrastructure
Email: marine_infra@trelleborg.com