Automating Mooring for Increased Safety and Security

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INTRODUCTION

Mooring vessels using ropes or cables is one of the very few operations undertaken on a ship and in the port that has not significantly changed for centuries. While minor improvements have been made it remains a very dangerous operation that results in an unacceptable number injuries and fatalities every year. Furthermore, it also presents a significant risk to the vessels themselves as, while it has been studied and monitored, conventional mooring has no situational awareness to provide warnings should a hazardous situation arise. Automated mooring systems remove all risk to personnel and reduce the risk to the vessel to almost nothing by removing the personnel from the risky tasks and providing full situational awareness of mooring and environmental status.

TIME FOR CHANGE

Many aspects of port operations, have been improved by automation in recent years. These improvements have increased the throughput of port and visibility of operations. However, in most ports mooring continues to be a manual time consuming and dangerous task. Indeed mooring and the required line handling is one of the few tasks left in modern industry that regularly exposes staff to life threatening risks on a daily basis. Furthermore, conventional mooring provides no feedback to the port or vessel regarding mooring performance or integrity.

Automated mooring system that do not employ ropes are able to eradicate the risks associated with line handling for all staff on board and land side. There are no handling injuries and snap back risks making mooring significantly safer for personnel and reducing lost time due to injuries to nothing.

Furthermore these systems are able to monitor environmental conditions and mooring performance with a high level of precision and provide real time detailed feedback on mooring performance and integrity. Data stored over time can be used to compare to current conditions to predict potential upcoming events and provide advance warning to the port and vessel. Also stored data can be examined and stored in much the same way as Voyage Data Recording (VDR).

This paper and presentation will examine the pros and cons of automated mooring implementation and provide real world examples. Three ports and one canal system will be presented.

PORT HEDLAND, WA

Port Hedland has been able to secure cape size bulk carriers on a berth originally only intended, and long enough, for panamax vessels. This has enabled the port to realise a large increase in through put due to increased vessel size and speed of mooring while reducing risk to personnel. What was originally intended as a 6-7mtpa facility regularly exceeds 20mtpa.

Additionally, as the berth is very close to the busy port entrance the system has removed the effects of passing vessels at the berth and thus the removal of the risk to the moored vessel and personnel of parted lines.

During construction of the berth major savings were also realised as the mooring dolphins that are traditionally used in this location to allow for the large tidal variations were not required. However, the cost of the automated mooring system and its installation did add some cost, however, this was significantly less than the amount saved due to the elimination of the dolphins.

Cavotec MoorMaster™ MM200C[17] system installed in Port Hedland

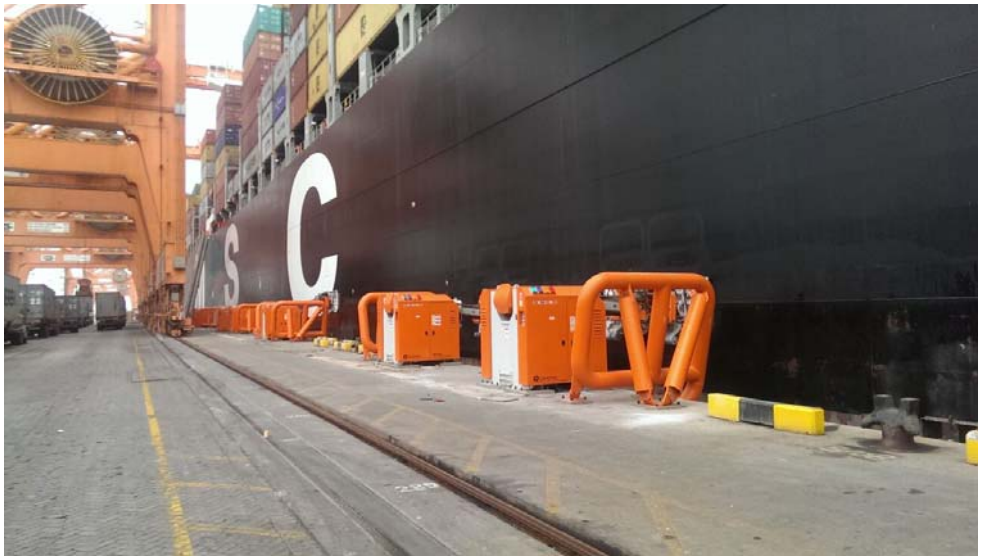
PORT OF SALALAH, OMAN

The port of Salalah experiences a long wave during the Khareef (monsoon) season that can cause the vessels to surge back and forth in the berth. The surge often times resulted in ceasing of cargo operations and parted lines and the associated risks to port staff and the vessel. The automated mooring system has reduced vessel surge to insignificant amounts removing all the risks associated with it.

Furthermore the port can be kept fully informed of the longwave condition and how the mooring system is coping with it. This situational awareness was also employed by the port to monitor the conditions and provide early warning of issues for the berth that still used traditional moorings in the port.

As with all installations of automated mooring the drawbacks are cost and space taken on the berth by the system itself.

The port has taken staff safety to a new level with the vessels now being moored by staff that are not on the berth at all. Mooring is now undertaken from the port control offices using cameras to provide vision on the berth.



Cavotec MoorMaster™ MM400E[15] system installed in the Port of Salalah

Automated mooring situational awareness

PORT OF NGQURA, SOUTH AFRICA

Similarly to the Port of Salalah the Port of Ngqura experiences vessel surge as a result of long wave. This combined with significant and steady winds resulted in significant risks to both staff and vessels while in the port. Again these effects have been completely removed through the implementation of automated mooring resulting is safe and secure vessels while along side and a safer work environment for the staff.

The ability of the system to monitor wave and wind activity also enables the port to forecast events that may present a danger to the vessel or personnel on the shore or ship.

Cavotec MoorMaster™ MM200C[17] system installed in the Port of Ngqura

ST LAWRENCE SEAWAY, CANADA

Finally we look at the St Lawrence Seaway, the river and lock system connecting the Atlantic Ocean with the Great Lakes of North America.

Mooring vessels in these locks exposed staff to significant risks from falling and parting ropes as a result of gear failure.

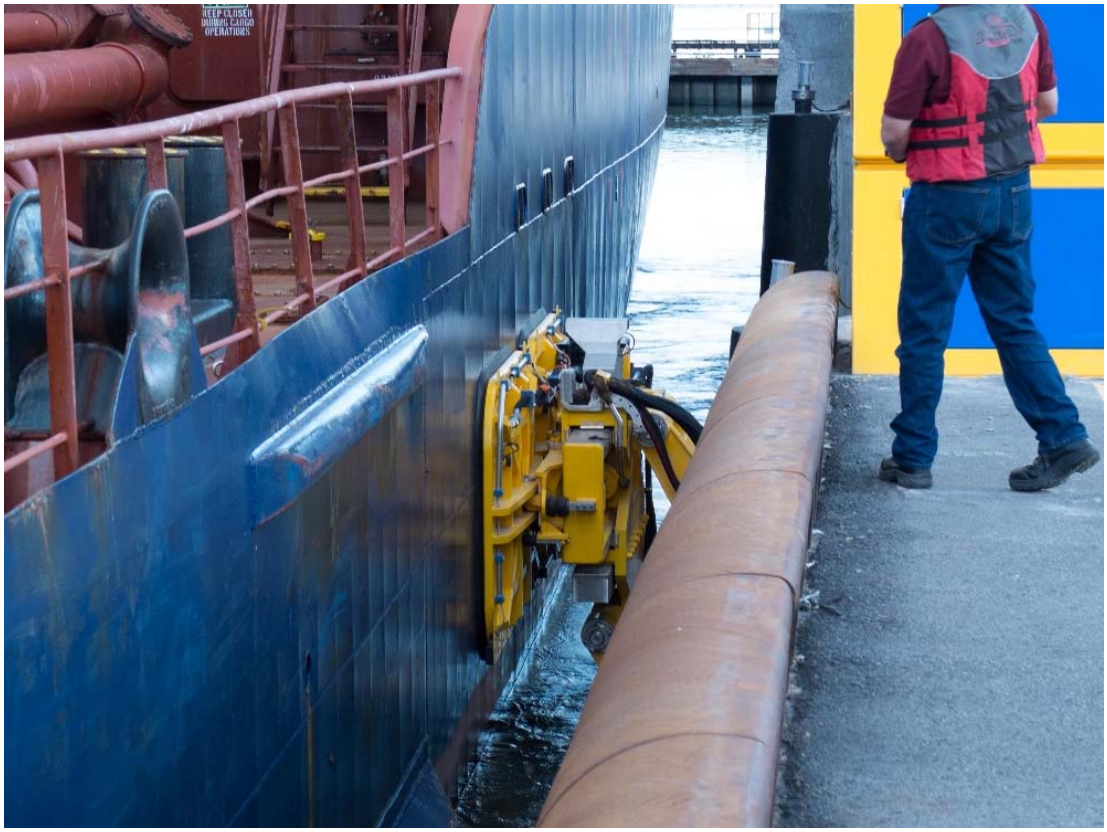
Additionally at low water level the mooring lines were extremely ineffective at preventing surge in the vessel and thus the risk to vessel or lock at this point of the lockage was very hazardous. Managing these risks was a major part of the operation of the locks. After the implementation of automated mooring not only are the risks to the vessel and staff reduced to almost nothing the locks can now be transited faster and the operation implemented remotely.

Furthermore the automated mooring system has been used to arrest the motion of a vessel with failed propulsion as it entered the locks. This prevent damage to the lock gates and the vessel and significant disruption to the operation of the seaway syste.

Mooring in the locks is now managed from remote control rooms in some cases many kilometres from the locks themselves.

Due to the restricted vessel space in the locks the costs of installation of the system were significant in this case. However disruption to canal operations was avoided by completing this work during the winter when the Seaway is closed due to ice.

Cavotec MoorMaster™ MM400L^{22} system installed in the St Lawrence Seaway, Canada



Lockside operation of the Cavotec MoorMaster™ MM400L^{22} system installed in the St Lawrence Seaway, Canada

CONCLUSION

It is an unavoidable fact that conventional mooring presents a danger to staff both on board the vessel and shore side. Furthermore it is unpredictable and performance is difficult to monitor accurately. Automated mooring removes all of the risks and presents a real opportunity for operators to improve their safety records.