

This issue of *Generations* is dedicated to safety and availability. In the *Business Insight* section, we present customer cases and articles introducing key concepts, market trends and business strategy. This is followed by *Technology Insight*, where ABB engineers, as well as external stakeholders, share research findings, details of new solutions and the thinking behind them.

Our goal has not been to make the complex simple, but to make it comprehensible.



Switch to mega-ships raises stakes at ports

Terminal operators have good reason for taking the leap to the next level of automation. Providing an efficient service for the new breed of mega-ships is vital if they are to stay ahead of the game.



Tauro Rickmers is trading as Maersk Evora and was delivered by Hyundai Heavy Industries to Rickmers Group, a German ship operator with eight 13,100 TEU container ships in its fleet.

Today container shipping is about cost and efficiency. Shipping lines have been in a sprint for growth for years, ordering bigger ships to leverage economies of scale, and these mega-ships come with a hefty price tag.

Even in today's oversupplied market, the new 13–18,000 TEU capacity container ships are being ordered. At the present fuel price, it is not viable to continue operating smaller or older ships that consume over 50% more fuel than the newer boxships.

The large ports on the Asia-Europe trade routes are preparing for the arrival of the first 18,000 TEU Triple E-class container ships later this year. With an estimated quayside exchange of 7,000-10,000 TEU per visit, terminal operators are looking for solutions to a central dilemma: how to discharge more containers within the same handling time as that of ships half the size.

Uno Bryfors and Fred Hoonard, respectively Vice President and Senior Vice President of ABB's Crane and Harbor, stress that highly efficient container



handling is going to be crucial for terminal operators. "In an over-supplied market, terminal operators have to switch to innovative solutions to handle fast increasing volumes efficiently and safely," says Hoonard.

With fewer but bigger ships going to fewer ports, the competition for these mammoth loads is heating up. "The number of ships arriving in Northern Europe from Asia has gone from 35 per week in 2007 to 23 today and may soon be below 20", says Bryfors. Under the terms of their contracts with port authorities, many terminal operators are obligated to bring in volumes. "It comes down to how fast they can handle the boxes and for how many dollars per TEU," he adds.

"Containers must be loaded and unloaded as efficiently and quickly as possible so that the ship can leave. Ships don't make money at the quayside and shippers expect the shortest possible total transit time, says Hoonard. When the last boxes are being unloaded, the first ones must already be out of the gate. Otherwise, the operation becomes impossible due to the incredible volume," he explains.

Terminal operators' response

Terminals are scaling up their facilities, ordering more and bigger cranes and introducing more automation to cope with the challenge.

A prime example is APM Terminals (APMT) in Rotterdam. It is leading the way at its new Maasvlakte II terminal by investing in the latest generation automatic stacking cranes (ASCs) as well as automated, remote controlled ship-to-shore (STS) cranes with ABB's state-of-the-art automation solution.

TEU: twenty-foot equivalent units, length x width x depth below water in meters

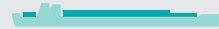
Early container ship (1956-)

500 – 800 TEU, 137x17x9m



Fully Cellular (1970-)

1,000 – 2,500 TEU, 215x20x10m



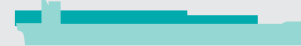
Panamax (1980-)

3,000 – 3,400 TEU, 250x32x12.5m



Panamax Max (1985-)

3,400 – 4,500 TEU, 250x32x12.5m



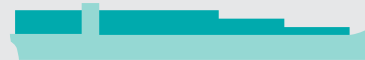
Post Panamax (1988-)

4,000 – 5,000 TEU, 285x40x13m



Post Panamax Plus (2000-)

6,000 – 8,000 TEU, 300x43x14.5m



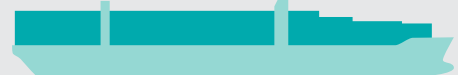
New Panamax (2014-)

12,500 TEU, 366x49x15.2m



Triple E (2013-)

18,000 TEU, 400x59x15.5m



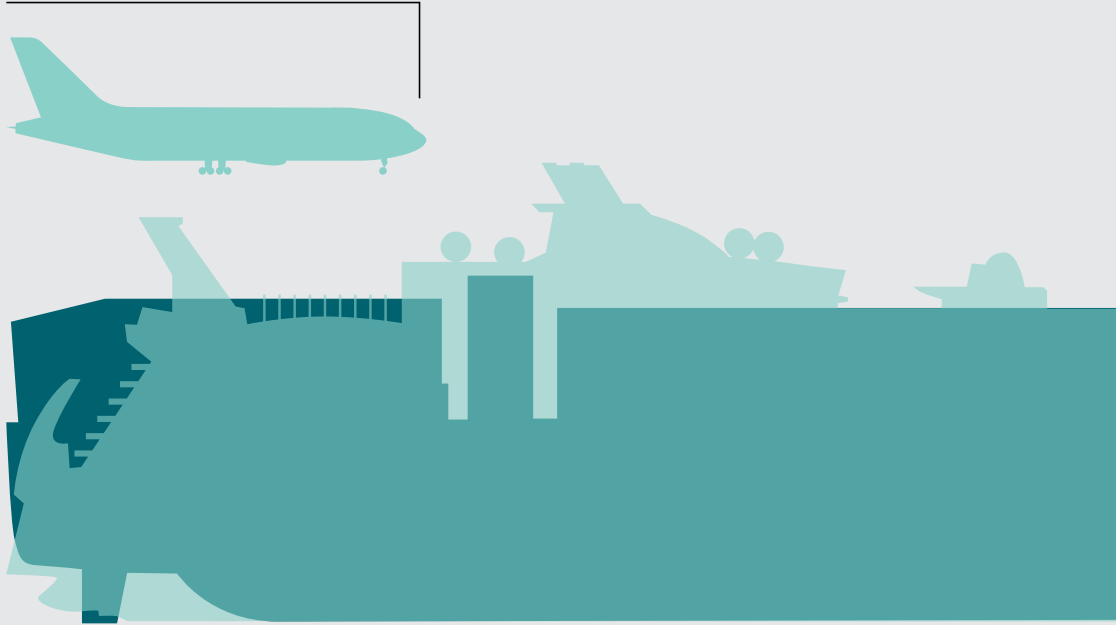
Adapted with permission from Jean-Paul Rodrigue



Marco Polo (396m)

Oasis of The Seas (362m)

Airbus 380 (73m)



Remotely controlled STS cranes will also be installed in the nearby Rotterdam World Gateway terminal. In the next few years 10000+ TEU ships will rapidly be introduced in all major trade lanes. This means that the need for efficient terminals is spreading far beyond Northern Europe. Long Beach Container Terminal in the USA and Jebel Ali Terminal 3 in Dubai are examples of terminal operators who have made large ongoing investments in new terminals with intelligent automation.

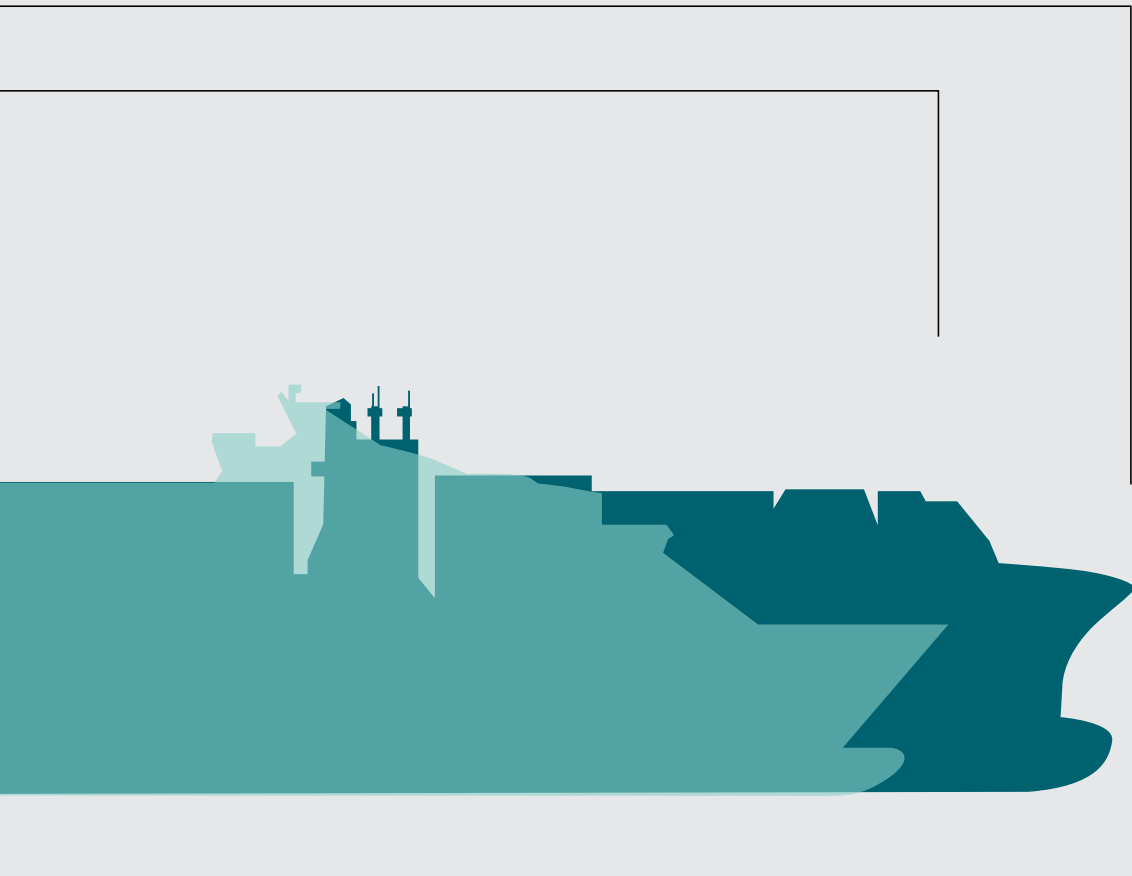
Benefits of Intelligent Automation

New ship-to-shore cranes now have a lifting height of more than 50 meters, which would place crane drivers' cabins about 60 meters above the quay. Taking drivers off the moving machines, from which they have

limited vision, and putting them into a control room for remote operation is a far more efficient option.

"The crane can run faster and there is less ramp time. There are also no interruptions in shifts. One person just moves away from a chair and someone else takes over, instead of having to travel kilometers to the crane, go up and come down," says Hoonard.

Bryfors adds that ABB's remotely controlled STS cranes are only part of a total intelligent automation solution the company offers. Fleets of coordinated automatic stacking cranes (ASCs) handle the increasing volumes, optimizing productivity as well as the use of storage area and energy consumption. The ASCs stack containers five or six high, enabling



them to be stored in the smallest possible area and close to the quay saving the cost of paying for land.

With intelligent automation, the ASCs are able to respond to varying sea-side as well as land-side volumes and ensure timely delivery of containers for quay and rail terminal processes. The optimum scheduling of ASCs is crucial for overall terminal efficiency.

With more than 400 ASCs equipped with ABB automatic solutions to date and the remote control of STSs soon to go into large scale operation, Bryfors and Hoonard feel that terminal automation is really taking off.

They stress that this does not only mean automated remote controlled cranes. Intelligent automation

is about the whole organization and operation of container terminals. Crane operators go from the hands-on operation of cranes to supervising the process and handling exceptions. They move to a centralized control room that is a vastly improved working environment, allowing team work and collaboration for instance with operations and maintenance staff.

Intelligent automation means using real-time process data to optimize crane operation and the entire terminal operation and enabling collaboration between people in different teams and functions, say Hoonard and Bryfors.

Text: Helen Karlsen