



# THE CHALLENGES PRESENTED TO TERMINALS

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The bigger, the more economical – the conventional logic may not always apply to container ships in Asia-to-Europe traffic. Where seaports have invested in infrastructure and logistics systems, hinterland connections are beginning to reach their capacity limits. There are two possible solutions.

In recent years the volume of goods transported by the global container fleet has nearly doubled, reaching more than 200 million TEU per year. The Far East/Europe and East/West trade, while accounting for just 25% of the global trade volume, cover the longest distances and have had an impact on container ship sizes: Today's biggest vessels can carry in excess of 21,000 TEU, and 23,000 TEU vessels are on order.

## FEWER SHIPS, MORE CONTAINERS

For the terminals in the world's biggest port cities, adjusting to the mega boxers is a major challenge. At the Port of Hamburg,

container ship arrivals have been cut by more than half within a decade – with the overall tonnage remaining roughly the same. At DNV GL we note that terminals must be able to handle peak workloads, moving large numbers of containers within a short period of time. Afterwards the piers often remain empty until the next mega boxers arrives.

To increase its container handling capacity, Hamburg's terminal operator HHLA banks on automation. The Altenwerder container terminal enjoys a global reputation of being a leading-edge facility. Other sites are following suit. In 2018, HHLA, supported by DNV GL, upgraded its Burchardkai container terminal (CTB) by building a highly efficient block-type storage yard. Deploying three new, fully automated stacking cranes (ASCs) doubled the storage capacity at CTB. Modernizing the terminal also improved the Hamburg port operator's environmental footprint. "Thanks to the

electrically operated cranes, we save some two million kWh of energy – the power consumption of a village of 1,200 people," an HHLA spokesperson said.

But optimizing processes at the terminal alone does not ensure a smooth flow of containers. The hinterland connections are frequently a bottleneck. Quite a few ports are 'Porsches' at the front end but horse-drawn carriages at the back end. Outgoing road trucks often slow down the logistics flow at terminals. Traffic congestion around ports and on expressways, inadequate truck trip coordination, or customs clearance issues can cause a container waiting to be picked up to be delayed by hours or even days.

In many ports the area needed for container storage is growing constantly. Another good reason for HHLA to optimize its processing management. A coordinated slot booking system implemented recently now assigns specific time windows to trucking companies. This allows containers

to be distributed to road trucks faster and more efficiently during peak times.

Could using a larger number of smaller vessels help ports achieve a more continuous flow of containers at the pier and reduce traffic congestion in underdeveloped hinterland regions?

Unloading a 14,000 TEU ship is a much smoother process that reduces peak loads at the terminal and accelerates outbound transport to the hinterland by feeder vessel, train or road truck.

A shift in port calls - Arrivals of container vessels more than 330 m long and/or 45 m wide at the Port of Hamburg.

### ACCELERATING THE TRANSPORT

Bigger and more fuel-efficient ship designs were employed first in Far East/Europe service to maximize gains on that longdistance trade. Gantry cranes with longer outreach were installed in the ports along these routes to accommodate them, which led to a “cascading effect”: that smaller tonnage was pushed into the Pacific trade. The Panama Canal as well as the seaports on the US Pacific side fits to that tonnage. Additionally, the increased maximum beam of the Panama Canal to 51.25 metres will lead to a size of 14,000 TEU. Could this lead to a new around-the-world container ship design?

Smaller vessels would be more versatile and able to operate in more ports than huge, 20,000+ TEU vessels. Mega-vessels are only deployed in Asia-to-Europe trade. Before sailing to Europe, they often call at many Asian ports to collect cargo. While this trading pattern ensures high operational efficiency every port call delays the voyage by one day. Using two 14,000 TEU boxships instead of a single 20,000 TEU vessel could reduce the number of short-sea port calls per ship, thereby accelerating the transport.

But time is not the only important factor: A well-loaded 20,000+-TEU vessel has the lowest fuel consumption per TEU. Its smaller CO2 footprint contributes to IMO’s ambitious GHG reduction target. Using more, smaller ships to reduce the strain on inadequate hinterland infrastructure would increase greenhouse gas (GHG) emissions per nautical mile — not a convincing equation.

### ADDED CAPACITY

Block-type storage yards with automated stacking cranes allow containers to be stacked closely together, doubling storage capacity without requiring additional space.

Maersk Line and MSC’s 2M Alliance as well as the Ocean Alliance formed by COSCO, CMA CGM, OOCL and Evergreen rely on 20,000+ TEU mega-boxers,



whereas ONE (“Ocean Network Express”, the integration of NYK, MOL and “K” Line), Hapag Lloyd and Yang Ming, who have joined operations into The Alliance, favour 12,000 to 14,000 TEU ships. Jan Holst, Country Head Germany at ONE, explains: “Because our trading lines include many port calls within Asia where some ports lack the required capacity, mega-vessels would be of limited use. Therefore the cyclical deployment of 14,000 TEU container ships is the right choice for us.”

Maersk Line’s current focus is to explore new approaches to unlock efficiencies in port operations in cooperation with ports and terminals, says COO Søren Toft: “A lot of value from current sized ULCSs still remains to be extracted – not least in terms of improvements in terminal productivity when accommodating ULCSs.”

While shipowners view logistics from the ship’s perspective, other members of the value chain — retailers, exporters, importers, carriers, forwarding agents, railway operators etc. — have an interest in rapid, efficient door-to-door cargo transport. Meanwhile, new start-ups such as FreightHub and Flexport are currently mixing up the industry. Online agencies and freight forwarders are driving digitalization and promoting improved transparency. Their customers can track their goods along the entire delivery chain in real time.

Eventually, increasing transparency will put more pressure on liner companies to improve efficiency. This could become a key factor for the choice of ship sizes.

### ABOUT THE AUTHOR

Jan Olaf Probst graduated from Hamburg University with a degree in Naval Architecture. Currently he is an Executive Vice President and the Director of Business Development Hamburg at DNV GL - Maritime. In this role he is responsible for the strategic development of services, research, and global sales for container ships.

### ABOUT THE ORGANIZATION

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