



Bigger Container Ships – port implications
 PIANC 11th June 2012
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Larger Container Vessel Sizes Update

- Since mid-2011 – slowdown in vessel ordering
- Major lines calculating responses to Maersk EEE 18,000TEU move
- Technical reviews focusing on 16,500TEU and scope to stretch the 18,000TEU design to 20kTEU (and possibly larger)
- New generation container feeder vessels – 1800-2000TEU (and larger) will be typical
- Cascade effect has accelerated (due to oversupply) – pushing up vessel sizes on secondary trades
- Lines that don't move up will see their competitive position undermined
- Panama Canal expansion was a key factor. This will accelerate penetration of larger vessels into the Atlantic

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■ Designs of Deepsea Containerships

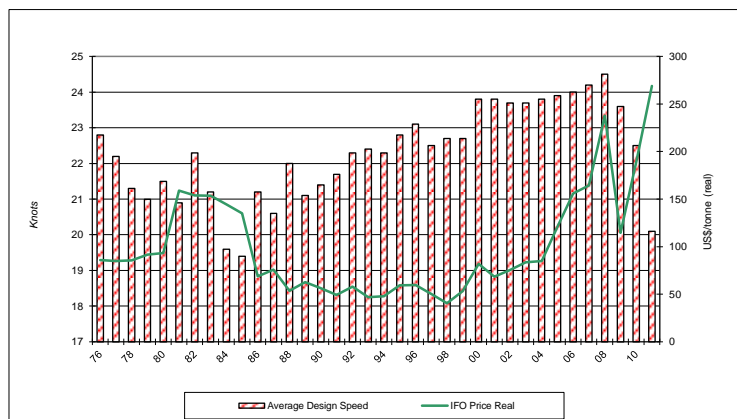
| | TEUs | Length overall (m) | Beam (m) | Maximum draught* (m) | Required berth depth (m)* |
|-------------------------------------|--------------|--------------------|----------|----------------------|---------------------------|
| First generation: 1968 | 1,100 | | | | |
| Second generation: 1970-80 | 2-3,000 | 213 | 27.4 | 10.8 | 12.0 |
| Panamax: 1980-90 | 3-4,500 | 294 | 32.0 | 12.2 | 12.6-13.0 |
| Post-panamax: 1988-95 | 4-5,000 | 280-305 | 41.1 | 12.7 | 13.5-14.0 |
| Fifth generation: 1996-2005 | 6,400-8,000 | 300-347 | 42.9 | 14.0-14.5 | 14.8-15.3 |
| Super post-panamax: 1997-> | 8,000-11,400 | 320-380 | 43-47 | 14.5-15.0 | 15.3-15.8 |
| Ultra large container ships: 2006-> | 14,500 | 380-400 | 56.4 | 15.5 | 16.3 |
| New-panamax: 2010 | 12,500 | 366 | 49.0 | 15.2 | 16.0 |
| Maersk EEE Class | 18,000 | 400 | 59.0 | 15.5 | 16.3 |

* Maximum draught is rarely realised, even when vessels are fully laden, so required berth depth is less in practice. Maximum draught refers to the depth of the vessel below water when at scantling draught, required depth refers to the water depth necessary to accommodate vessels at maximum draught.

Source: Ocean Shipping Consultants



■ Real Bunker Prices and Box Vessel Speed



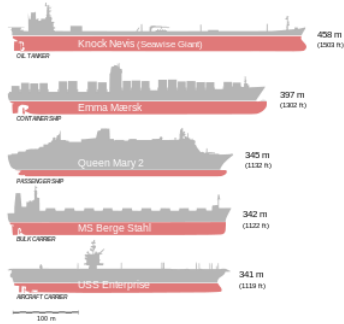
Largest vessels are slower and 'beamier'. Increased draught beyond current maximum unlikely to be an issue.



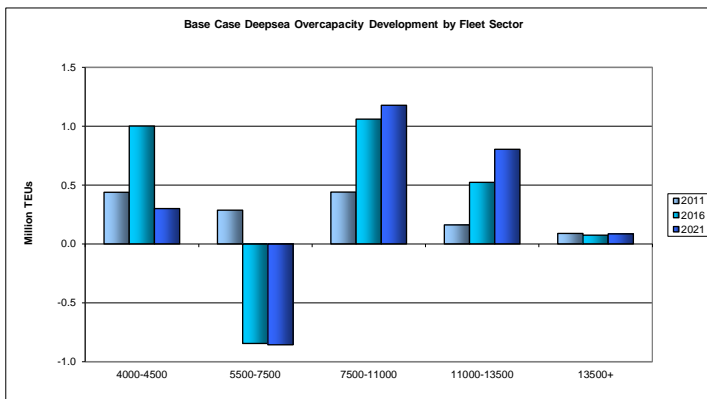
Container Vessel Sizes



← EEE Class – could be stretched to 20,000TEU. Will add another container bay – so LOA will be critical. Possible larger vessels under evaluation



Overcapacity and the 'Cascade' Effect



This will see much larger vessels deployed on north-south trades.



Current/Forecast Box Terminals to 2015

number of terminals

| | Controlling Depth (m) | | | | | |
|-----------------------|-----------------------|-----------|-----------|-----------|-------------|-----------|
| | <10.00 | 10-10.99 | 11-11.99 | 12-12.99 | 13.00-13.99 | 14.00+ |
| 2008 | | | | | | |
| Indian Sub Continent | 1 | 3 | 2 | 4 | 3 | 3 |
| N. America East Coast | | 2 | 3 | 6 | 2 | 2 |
| S. America Pacific | 2 | | 1 | 1 | | 2 |
| S. America Atlantic | 7 | 4 | 1 | 2 | 2 | 3 |
| Oceania | | 1 | 2 | 2 | 6 | 4 |
| East Africa | | 3 | 2 | 1 | | |
| West Africa | | | 1 | 2 | 1 | |
| Southern Africa | 1 | 1 | 1 | 1 | | |
| Total | 11 | 14 | 13 | 19 | 14 | 14 |
| 2011 | | | | | | |
| Indian Sub Continent | 1 | 3 | 2 | 4 | 4 | 3 |
| N. America East Coast | | 2 | 3 | 6 | 2 | 2 |
| S. America Pacific | 2 | | 1 | 1 | | 3 |
| S. America Atlantic | 7 | 4 | 1 | 2 | 2 | 4 |
| Oceania | | 1 | 2 | 2 | 6 | 4 |
| East Africa | | 3 | 2 | 1 | | |
| West Africa | | | 1 | 2 | 1 | |
| Southern Africa | 1 | 1 | 1 | 1 | 2 | 1 |
| Total | 11 | 14 | 12 | 19 | 17 | 17 |
| 2015 | | | | | | |
| Indian Sub Continent | 1 | 3 | 2 | 6 | 6 | 6 |
| N. America East Coast | | 2 | 3 | 4 | 3 | 3 |
| S. America Pacific | 2 | | 1 | 1 | | 2 |
| S. America Atlantic | 3 | 4 | | | 3 | 8 |
| Oceania | | 1 | 2 | | 8 | 4 |
| East Africa | | 3 | 2 | 1 | | |
| West Africa | | | 1 | 2 | 1 | 2 |
| Southern Africa | 1 | 1 | | | 2 | 1 |
| Total | 7 | 14 | 11 | 14 | 23 | 26 |

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Implications for Container Terminals

- Far-reaching changes are underway with regard to vessel size and mix (much bigger mainline and feeder tonnage)
- Correct terminal design must anticipated these trends
- Terminals in developing regions must also build for much larger vessels
- Larger consignment sizes – terminals are already under pressure, technical and market solutions must be found
- There is uncertainty from developers concerning what the market will require – guidance required
- It's getting more difficult to raise capital for common-user terminals
- Environmental issues no longer quite as pressing, but will return in force

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■ Key Impacts for Port Design - I

- Dredging:
 - Deeper & wider approach channels
 - Deeper berths & port basins



- ➔ *Larger quantities of dredging & material*
- ➔ *Large specialist equipment required*

- Clear planning needed for all terminal developments. Depth alongside is critical to 'future-proof' terminals. Channel and approach dredging can follow later

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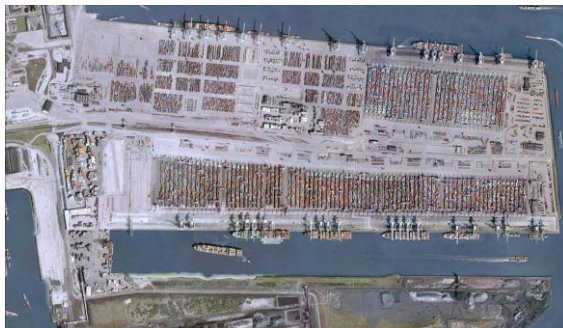


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■ Key Impacts for Port Design - II

- Longer vessels
- Much larger consignment sizes
- Higher transshipment volumes

- ➔ *Longer berths*
- ➔ *Larger terminal area*
- ➔ *Increased gate pressure*



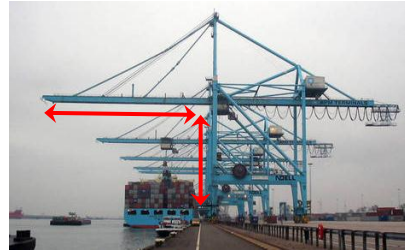
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■ Key Impacts for Port Design - III

- Larger Quay Cranes
 - Longer reach
 - Taller clearance
 - Twin lift / Tandem lift / Triple lift
- ➔ Increase in load on quay structures
- ➔ Increase in electrical loads & electrical infrastructure



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