

# Container Ship Reliability and Impact on Scale of Claims

**Bigger Ships = Bigger Risks**



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# Why the Fuss?

- Vessel Total and Serious Loss Events (by number, tonnage and percentage of the world fleet) trending down since 2010. (Lloyd's List)
- Containers Lost at Sea average 1,679 per year from 2008-2013 including the M/V Rena and M/V MOL Comfort. In 2013 a total of 5,578 or .000046 of the total number of containers shipped. (World Shipping Council).

# Here's Why

- More and larger containerships coming online
- Worldwide fleet age steady
- Scant scantlings
- Officer shortfall
- STWC Compliance Concentrated Inspection Campaign
- Unpredictability
- MOL Comfort

# Container Size Through the Years

- 1956: Ideal X- 58 TEUs (?)
- 1968: Encounter Bay- 1,530 TEUs
- 1972: Hamburg Express- 2,950 TEUs
- 1980: Neptune Garnet- 4,100 TEUs
- 1984: American New York- 4,600 TEUs
- 1996: Regina Maersk- 6,400 TEUs
- 1997: Susan Maersk- 8,600 TEUs
- 2002: Charlotte Maersk- 8,890 TEUs
- 2003: Anna Maersk- 9,310 TEUs
- 2005: Gjertrud Maersk- 10,500 TEUs
- 2006: Emma Maersk- 11,000 TEUs
- 2012: Marco Polo (CMA CGM)- 16,000 TEUs
- 2013: Maersk Mc Kinney Moller- 18,270 TEUs
- 2014 : CSCL Globe- 19,000 TUEs
- 2015-: ??????????????

## **The current 6<sup>th</sup> Generation in Container ships represent a 1600% increase in TEU carrying capacity.**

The greater the number of containers being carried the lower the costs per TEU. The process became a viscous circle with ever increasing volumes yielding lower unit costs. The Panamax standard achieved in 1985 was about 4,000 TEUs. Post Panamax vessels translate into new configurations of networks, new handling equipment as well as draft limitations at ports and requisite storage and inland transport infrastructures.

# New Panamax and Beyond

New Panamax (NPX). Refers to ships designed to exactly fit the locks of the expanded Panama Canal, expected to open in 2015, and have a nominal capacity of about 12,500 TEU. Like its Panamax counterparts, New Panamax ships will compose a specific ship class able to effectively service the Americas and the Caribbean, either from Europe or from Asia.

# Post New Panamax

By 2006, a new generation of container ships came online when Maersk introduced a ship class having a capacity in the range of 11,000 to 14,500 TEUs, the so-called E Class. Then they built the Triple E vessels or "Post New Panamax" since these ships are bigger than the expanded Panama Canal specifications and can handle up to about 18,000 TEU (Triple E Class). There are larger ship designs on the drawing boards, such as the "Malacca Max" class that could carry about 27,000-30,000 TEU, but they are not expected to be constructed within a decade.

# Larger Ships – same size Suez



- The 324-meter container vessel Colombo Express collided with the 332-metre container vessel Maersk Tanjong in the Suez Canal off Port Said. The accident occurred 9/29/14 at 5:33 UTC.
- The Maersk vessel was clearing the Suez Canal Container terminal to join the second convoy, while the Colombo Express was proceeding through the convoy. The collision resulted in a 20-meter dent to the left side of Colombo Express and three containers lost overboard with one recovered.
- The second southbound convoy has been interrupted. The container ships will be moored at the canal lakes until the investigation and the repairs are completed.
- <https://www.youtube.com/watch?v=2ktwo-k-onk>



# AIS can also tell the story

- Colombo Express (IMO number 9295244 and MMSI 211433000) was built in 2005 and is registered in Germany. The container ship has a deadweight of 103,800 DWT and a capacity of 8750 TEU.
- Maersk Tanjong (IMO number 9332511 and MMSI 565510000) was built in 2007 and is registered in Singapore. The vessel has a deadweight of 107,266 DWT and a capacity of 6670 TEU.
- [http://www.youtube.com/watch?feature=player\\_embedded&v=HMV7W0QCikA](http://www.youtube.com/watch?feature=player_embedded&v=HMV7W0QCikA)

# Containership Fleet- 5,088 Vessels

- 1990- 1.5 million TEU
- 2000- 4.3 million TEU
- 2008- 10.6 million TEU
- 2012- 16.3 million TEU
- 2013- 17.3 million TEU
- 2014p - 19.0 million TEU (17.8 as of 8/15)
- 2015- 20.7 million TEU
- 2016- 21.0 million TEU

# Potential of \$400M to 1.9B+ exposure on loss of a single large containership

- Vessel operations are limited to small number of deep water ports – increased concentration of risk.
- Average value per container (\$35,000 to \$210,000)
- Former Panamax vessels will be shifted onto what had been traditional feeder vessel runs. This will result in a trickle down impact on Port Operations and Loss Exposures.

# World's Leading Containership Operators

- Maersk (582)
- MSC (495)
- CMA CGM (430)
- Evergreen (191)
- PIL (164)
- COSCO (162)
- Hapag-Lloyd (154)
- CSCL (136)
- MOL (111)
- NYK (109)
- Hamburg-Sud (108)
- APL (106)
- Hanjin (98)
- OOCL (92)
- Yang Ming (89)
- Zim (83)
- Wan Hai (81)

# Ports of Refuge

MSC Monterey which suffered hull cracking on 29 December 2013 while on a voyage from Le Havre to Newark, NJ. The vessel had to anchor off Trepassey Harbor, Newfoundland and was subsequently escorted into port in St Mary's Bay, on 30 December, where a hull inspection and temporary repairs were able to be conducted. If the weather had not cooperated, had the cracking been worse or the vessel had not be allowed into port to complete repairs then a greater delay could have led to loss of perishable cargoes onboard and the declaration of GA.

# Places of Refuge from a Ports' Perspective

- International Association of Ports and Harbors (IAPH).
- Major environmental, economic and financial interests are connected with the operation of giving shelter to a ship in distress.
- A place of refuge has been defined as “a place where a ship in need of assistance can take action to stabilize its condition, reduce the hazard to navigation, protect human life and the environment”

# Incompatible Positions

Since 1999, there have been three major incidents involving ships laden with crude oil and other hazardous cargoes requesting and being refused access to places of refuge. In two of these cases – the *Erika* (1999) and the *Prestige* (2002) – the ships subsequently sank and caused severe pollution damage. In the third – the *Castor* (2001)– a disaster was narrowly averted.

# Tankers now; Containerships tomorrow?

28 March 2014 - The chemical tanker Maritime Maisie is to be offered a port of refuge in Ulsan, South Korea, where it will unload its cargo after a controversial three months under tow and in danger of breaking up in the Sea of Japan. The agreement came just in time to save the 44,404-dwt Maritime Maisie (built 2003) with its classification society, Lloyd's Register (LR), recently reporting that the tanker's maximum bending moment exceeded its damage strength limits, putting it in danger of sinking.



# What is Wrong with This Picture?



# ClassNK probes slow steaming role in MOL Comfort loss

- Tradewinds 04 July 2014: Japanese class society turns its gaze to how trading at reduced speeds may have contributed to the largest boxship total loss on record
- ClassNK has turned its attention to the role slow steaming played in the total loss of the 8,110-teu containership MOL Comfort (built 2008) as it prepares to deliver its report into the casualty in September.
- The investigation — part of a government and Japanese shipping industry-led review of large-boxship safety — is taking place against the background of a \$130m legal claim in the Tokyo courts brought by owner Mitsui OSK Lines (MOL) and cargo claimants against shipbuilder Mitsubishi Heavy Industries (MHI).

# SHIFTING OF CARGO



# Actual Container Weights?



# 19,000 TEU's – But what do they weigh?

- The IMO's Maritime Safety Committee (MSC) at its 93rd sessions (May 2014) approved changes to the Safety of Life at Sea (SOLAS) convention regarding a mandatory container weight verification requirement on shippers.
- History of the IMO Effort to Improve Container Safety; World Shipping Council - May 2014 ([www.worldshipping.org](http://www.worldshipping.org)). The earliest effective date would according to the SOLAS provisions be July 1, 2016.

# Meeting the 2030 challenge in a sustainable way - A sustainable marine industry means ships with...

- Minimal safety risk

**essential safety functions**

dependability of essential safety systems

machinery, equipment, components

- Minimal environmental impact

**essential environmental functions**

dependability of essential environmental systems

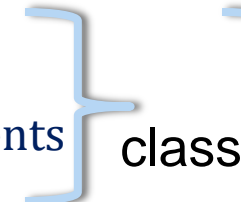
machinery, equipment, components

- Maximum commercial benefit

**essential commercial functions**

dependability of essential commercial systems

machinery, equipment, components



future  
Class  
Society  
services

# Casualties 2013-2014

- General Cargo- 154
- **Containerships- 79**
- Tankers- 69
- Barges- 47 (self-propelled)
- Bulk Carriers- 48
- Specialty- 24 (heavy lift, livestock, reefer, etc.)
- Ro-Ro- 21
- Unknown- 4

# Containership Casualties

- Trending
  - Time of year
  - Cause
  - Vessel Age
  - Where built
  - Registry
  - Location



# Time of Year

- **January-** 10\*\*
- **February-** 16\*\*\*
- **March-** 6
- **April-** 10
- **May-** 9
- **June-** 3\*
- **July-** 6\*
- **August-** 5
- **September-** 3\*
- **October-** 2\*
- **November-** 6\*
- **December-** 6\*\*
- **\*Structural Damage or Lost Container Events**

# Cause

• Collision-	23
• Fire/Explosion-	15
• Allision-	11
• Disabled-	8
• Containers Lost Overboard-	8 (7 heavy weather )
• Ran Aground-	7
• Structural Damage-	4
• MSC Monterey, Emma Maersk, Anna Maersk, MOL Comfort	
• Pirate Attack-	3
• Sinking-	1
• Other-	2

# Vessel Age

- 0-5 years- 16
- 6-10 years- 25
- 11-15 years- 15
- 16-20 years- 14
- >20 years- 7
- Unknown- 5

# Construction

- South Korea- 26
- Germany- 14
- Japan- 12
- China- 10
- Denmark- 8
- Others (Poland, Romania, Taiwan, Turkey...)

# Notable Shipyards

- **Hyundai Heavy Industries- Ulsan SK (10)**
- **Odense Steel Shipyard- Odense, Denmark (6)**
- **Hyundai Heavy Industries- Sambo SK (4)**
- **Nordic Yards- Rostock, Germany (4)**
- **Daewoo, Geoje, SK (3)**
- **Samsung Shipbuilding- Geoje, SK (3)**
- **Siag Nordseewerke- Emden, Germany (3)**
- **Daewoo, Mangala- Romania (2)**
- **Hanjin Heavy Industries, Pusan, SK (2)**
- **Imabari Shipbuilding- Japan (2)**
- **Jiangdong Shipyard, Wuhu, China (2)**
- **MHI Nagasaki- Japan (2\*)**
- **Mitsui Ichihara- Japan (2)**
- **New Szczecin- Poland (2)**
- **Shin Kochi Jyuko- Japan (2)**
- **Zhoushan Shipyard- China (2)**

# Registry

<b>Liberia-</b>	<b>20</b>
<b>Panama-</b>	<b>9</b>
<b>Antigua-Barbuda-</b>	<b>7</b>
<b>Denmark-</b>	<b>7</b>
<b>Germany-</b>	<b>5</b>
<b>Hong Kong-</b>	<b>4</b>
<b>China-</b>	<b>3</b>
<b>Netherlands-</b>	<b>3</b>
<b>Taiwan-</b>	<b>3</b>
<b>Marshall Islands-</b>	<b>2</b>
<b>Singapore-</b>	<b>2</b>
<b>Turkey-</b>	<b>2</b>
<b>UK-</b>	<b>2</b>
<b>Other (Bahamas, Bermuda, Cyprus, France, Greece, Indonesia, Italy, Malaysia, South Korea, Vietnam)-</b>	<b>1</b>
<b>Unknown-</b>	<b>3</b>

# Location

- **Germany**
- **North Atlantic (Bay of Biscay, English Channel)**
- **Suez Canal**
- **Indian Ocean (Maldives, South Africa)**
- **North Pacific (Japan)**
- **Singapore**
- **South China Sea (Vietnam)**
- **Antwerp, Belgium**
- **East China Sea**
- **Gulf of Aden (Yemen and Somalia)**
- **Hong Kong**
- **Netherlands**
- **South Atlantic (Spain and Canary Islands)**

# Predictive Analytics- “SWAG”





# Or This

- Connecting the Dots

$$\text{cov}(X, Y) = \sum_{i=1}^N \frac{(x_i - \bar{x})(y_i - \bar{y})}{N}.$$

# Containerships

- Bigger, smarter and more complex
  - Cyber threat?
- Manning
  - Crew size, experience, training & communication
- Firefighting capability/capacity
- Salvage potential
  - Escalating Wreck Removal costs
  - Safe refuge
  - Available repair facilities
- Pollution

# Related Studies

- BV
- CINSNET
- Drewry
- IACS
- IMO

# What Can Be Done?

- Shippers
  - Make Proper Declarations
    - Cargo
    - Weight
  - Follow CTU Packing Guidelines
  - Incorporate Seasonal Weather Patterns in Logistics Planning
  - Practice Basic Risk Management
- Carriers
  - Work closely with Class on Design and Construction
  - Provide Proper Manning
  - Comply with STCW Standards
- Insurers
  - Advise assureds on vessel casualty trends and other timely intelligence
  - Ensure Cargo & Hull Underwriters collaborate
  - Lobby USCG to support relevant issues at IMO

# Worth Binge Watching

- [http://www.youtube.com/watch?v=VTV\\_2Rp4o8A](http://www.youtube.com/watch?v=VTV_2Rp4o8A)- 47 minute documentary on the OOCL Atlanta – one of the first post-Panamax megaships at slightly over 8,000 teu capacity
- [http://www.youtube.com/watch?v=NE\\_ri8PkihE](http://www.youtube.com/watch?v=NE_ri8PkihE) – clip of containership in heavy weather
- <http://gcaptain.com/wp-content/uploads/2014/01/40-Degree-Roll.png>- 40 degree roll on OOCL Belgium
- [http://www.liveleak.com/view?i=f3d\\_1396810842](http://www.liveleak.com/view?i=f3d_1396810842)- Hansa Constitution “docking” in Hong Kong

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