

Safety and Shipping Review 2015

An annual review of trends and developments in shipping losses and safety

Shipping Losses

By location, type of vessel
and cause

In Review

Trends and developments
affecting shipping safety

Future challenges

Important issues and
key risks



Passenger ship Norman
Atlantic on fire, with
rescue efforts underway
in December 2014.

Photo:
Wikimedia Commons,
Marina Militare



The MSC Oscar is now the world's largest container ship

Photo: Wikimedia Commons



More than 300 people died in the Sewol disaster

Photo: Wikimedia Commons



The Blue Sky M was abandoned by its crew while carrying almost 800 migrants

Photo: Wikimedia Commons

Executive Summary

- 75 large ships lost worldwide in 2014, down 32% year-on-year
- South China and South East Asian waters top loss hotspots
- East Mediterranean and British Isles top locations for incidents
- Cargo and fishing vessels account for over 50% of all losses
- Ship size growth raises risk management concerns. Industry should prepare for \$1bn+ loss
- Lessons not learned from overreliance on e-navigation. Cyber protection a major concern



This review focuses on key developments in maritime safety and analyzes shipping losses (of over 100 gross tons) during the 12 months prior to December 31, 2014. It follows the **Safety and Shipping Review 2014** by Allianz Global Corporate & Specialty (AGCS), available at www.agcs.allianz.com

Safety of international shipping vessels is critical to the global economy. More than **90%** of trade is estimated to be transported by sea. The maritime industry continued to improve its safety record in 2014 with **75 total losses** reported worldwide; the lowest in 10 years.

Losses declined by **32%** compared with 2013 (**110**). The 2014 accident year also represents a significant improvement on the 10-year loss average (**127**). Shipping losses have declined by **50%** since 2005, driven in part by a robust regulatory environment.

More than a third of 2014's total losses were in two maritime regions. As in 2013, South China, Indo China, Indonesia & Philippines had the most losses (**17**),

followed by Japan, Korea and North China (**12**). Losses in both regions declined year-on-year. Total losses in the British Isles and surrounding waters (**6**) doubled.

A third of vessels lost were **cargo ships (25)** followed by fishing vessels (14). Together, they accounted for over 50% of losses.

For the past decade **foundered** (sunk/submerged) has been the most common cause of loss, accounting for **65%** of losses in 2014 (**49**). Wrecked/stranded (grounded) was second (13). There was a significant reduction in fires/explosions resulting in total losses (4), down 73% year-on-year.

There were **2,773 casualties** (incidents) during 2014 with the East Mediterranean & Black Sea region the hotspot (**490**), up 5% year-on-year. The British Isles, N.Sea, Eng. Channel, Bay of Biscay ranked second (465), up 29%.

December is the worst month for losses in the **Northern Hemisphere (110)** over the past decade with a 64% increase compared with the quietest month (May). In the **Southern Hemisphere** it is **August (22)** with a 214% increase in losses compared with December. For every total loss in the Southern Hemisphere there are approximately 7 in the Northern Hemisphere.

The unluckiest ship? Analysis shows one vessel in the Great Lakes region of North America has been involved in 19 incidents in the past 8 years – including six in 2013. It has suffered a fire, engine failure, steering failure and even hit a submerged log.

While the long-term downward trend in shipping losses is encouraging, more work needs to be done to improve the overall safety of vessels. Recent casualties such as **Sewol** and **Norman Atlantic** have raised significant concerns over passenger ship safety.

Vessel construction is not always the only weak point. Levels of crew experience, training and emergency preparedness can also be inadequate. **Minimum manning levels** are reducing the ability to train people on-board, providing invaluable insight. But with crews being mandated to meet often unachievable hours of rest – and taking on secondary and tertiary duties – improved training alone is not the panacea.

Container ship safety is also under the spotlight in light of inconclusive findings from the investigation relating to the cause of 2013's largest loss – **MOL Comfort** – and ever-increasing ship sizes. 2015 sees the entry-into-service of ships as long as four football pitches, able to carry **19,000+ containers**. This raises concerns about whether risk management needs reviewing after an **80% capacity increase** in just a decade.

Larger ships could also mean larger losses. The industry should prepare for a **\$1bn+ loss** in future featuring a container vessel or even a specialized floating offshore facility. Maximum exposure will not necessarily be limited to vessel and cargo value but could also include environmental, social or business interruption backlash.

Overreliance on **electronic navigation** is also a rising safety concern. Lessons learned from accident reports

related to key technologies such as Electronic Chart Display and Information System are not always being filtered back into the training environment.

Dependence on e-navigation, the interconnectivity of the maritime sector, the current low levels of cyber security awareness and – longer term – the prospect of unmanned ships, means ships and ports could become enticing targets for hackers in future. A **cyber-attack** could result in a total loss, leading to substantial insurance claims for hull, cargo and protection & indemnity underwriters. It could even involve multiple vessels from the same company. Companies must simulate potential scenarios and identify appropriate mitigation strategies.

A pivotal moment for shipping in the high-risk Arctic waters was passed last year with the introduction of **the Polar Code**. However, questions remain around clean-up, training and vessel suitability. The code will need constant revision as industry develops. Problems encountered and best practices to employ should be regularly outlined. There were **55** shipping casualties in Arctic Circle waters in 2014. There were **just 3** a decade ago.

The recent outbreak of the **Ebola virus** has safety, as well as humanitarian, implications, for shipping following the decision last year by Mexico to refuse to allow the **Carnival Magic** passenger ship into port, amid fears a passenger had the disease. With reduced crews it is often the Chief Mate or Master that also acts as the ship's medical officer. Are ports going to rely on someone with basic medical training to make a diagnosis in the event of an infectious disease outbreak?

Vast improvements in tackling **piracy** in Somalia and the Gulf of Guinea have resulted in global attacks declining for a fourth successive year – **down 7%** in 2014. However, different piracy models continue to thrive elsewhere. Attacks in South East Asian waters are up year-on-year, as are incidents in the Indian sub-continent, with Bangladesh a new hotspot.

Other rising concerns include **Human trafficking and Search and Rescue issues**, particularly in the Mediterranean, which are stretching resources and rescue infrastructure; **War/upheaval risk** – the recent uptick in activity puts increasing pressure on the shipping supply chain. The risk fallen states present is an area which will increase; **Slow steaming engine challenges** – This practice has become a popular cost-saving strategy. However, it can impair engines on older ships and expose vessels to environmental and piracy threats for longer periods.

29
years

Average age of vessels lost in 2014

50%

Ship grounding is the top cause of loss by value - 50% of all marine insurance claims in excess of €1m*

*Source: AGCS' Global Claims Review

#1

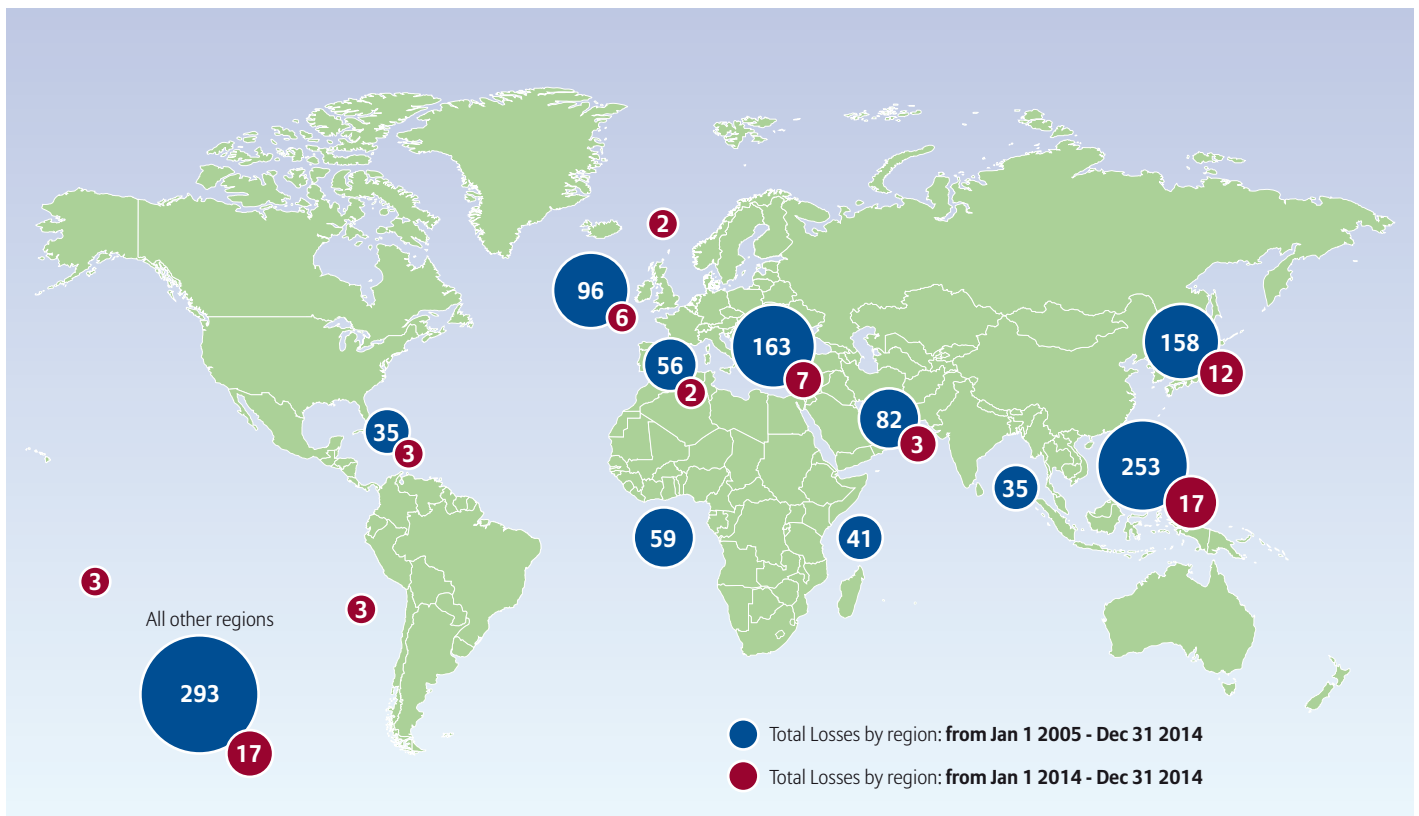
Impact of increasing competition is the top risk identified by the marine sector in 2015*

*Source: Allianz Risk Barometer

2014: Losses in Focus

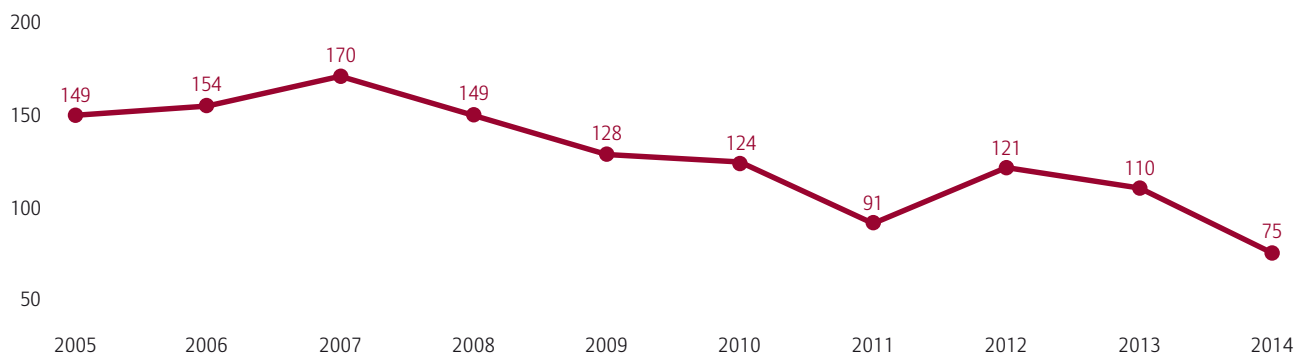
The analysis over the following pages covers both total losses and casualties/incidents.
See page 34 for further details.

Total Losses by Top 10 Regions: 2005-2014 and 2014



Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

Total Losses by Year a declining trend



Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

Total Losses by Top 10 regions: from January 1, 2014 to December 31, 2014

2014: More than a third of 2014's total losses were concentrated in two maritime regions. As in 2013 South China, Indo China, Indonesia & Philippines had the most losses (17), followed by Japan, Korea and North China (12). No other maritime region had double-digit losses for the year.



Meaning total losses have declined **32%** year-on-year (110)

S. China, Indo China, Indonesia & Philippines	17
Japan, Korea and North China	12
East Mediterranean & Black Sea	7
British Isles, N. Sea, Eng. Channel, Bay of Biscay	6
South American west coast	3
South Pacific	3
Arabian Gulf and approaches	3
West Indies	3
Iceland and Northern Norway	2
West Mediterranean	2
Others	17
Total Losses by Region	75

For year-on-year analysis see **page 12**

Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

Total Losses by Top 10 regions: from January 1, 2005 to December 31, 2014

2005 - 2014: We have identified 1,271 losses worldwide over this period. The 2014 accident year represents a significant improvement on the 10-year loss average (127). South China, Indo China, Indonesia & Philippines is the top hotspot (253). East Mediterranean & Black Sea (163) is ranked second. The top three maritime regions account for 45% of all losses.

10 key shipping regions contain **77%** of losses



S. China, Indo China, Indonesia & Philippines	253
East Mediterranean & Black Sea	163
Japan, Korea and North China	158
British Isles, N. Sea, Eng. Channel, Bay of Biscay	96
Arabian Gulf and approaches	82
West African coast	59
West Mediterranean	56
East African Coast	41
West Indies	35
Bay of Bengal	35
Others	293
Total Losses by Region	1,271

Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

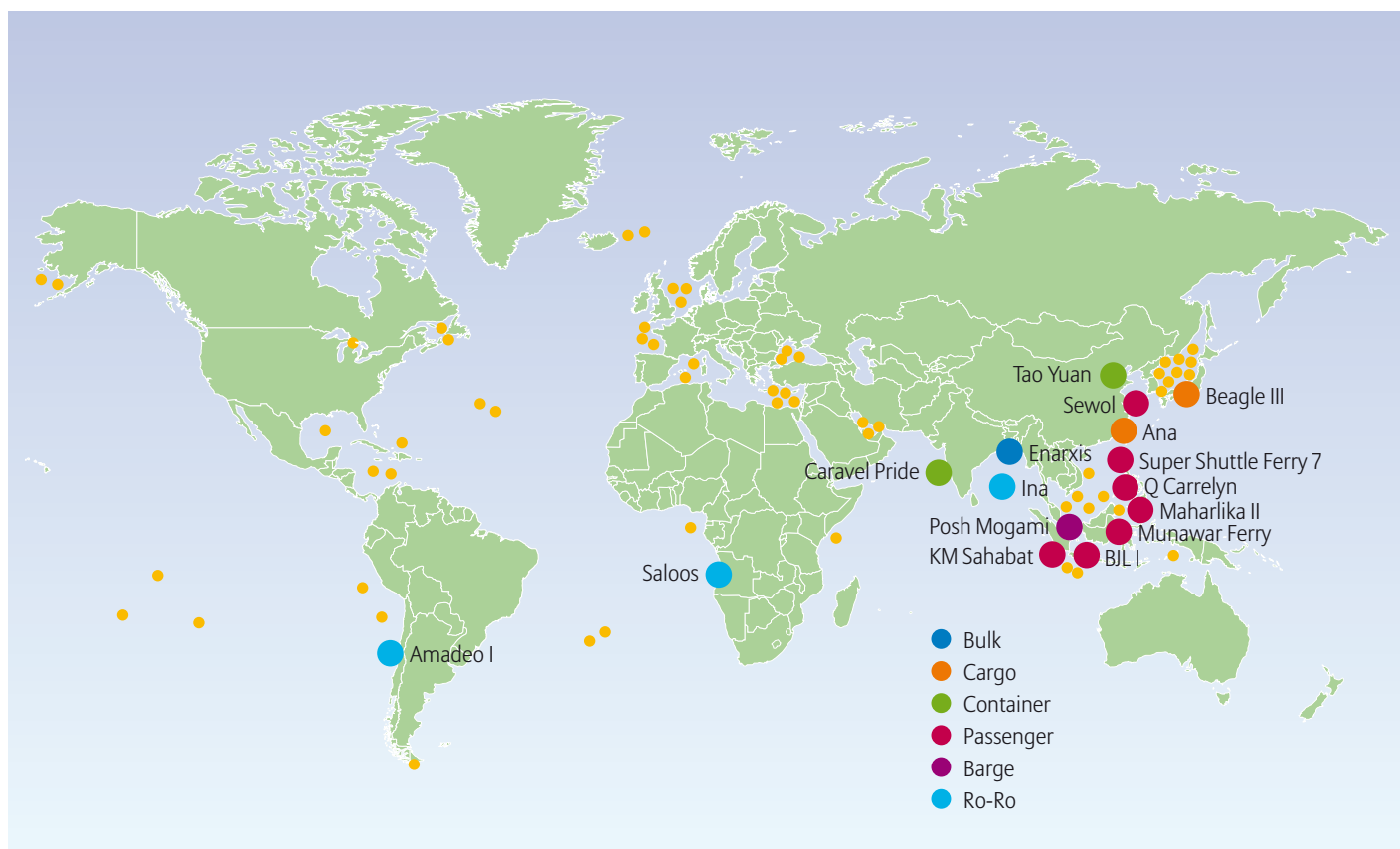
All figures based on reported losses as of January 26, 2015. We expect 2014 total losses to increase slightly as, based on previous years' experience, developments in losses lead to a number of total losses being confirmed after year-end. The average variance over the past 9 years has been an increase of three total losses, but in some years this varies considerably with up to 16 additional losses being notified for one year.

Major Losses: 2014

Largest ships lost and the major passenger vessel losses

Vessels lost from January 1, 2014 to December 31, 2014

(including largest 10 vessels and the major passenger vessel losses) – showing location of loss and type of vessel



Marks show the approximate locations of total losses reported between Jan 1, 2014 and Dec 31, 2014 with the largest 10 losses highlighted by ship type and major passenger losses.

Largest vessels

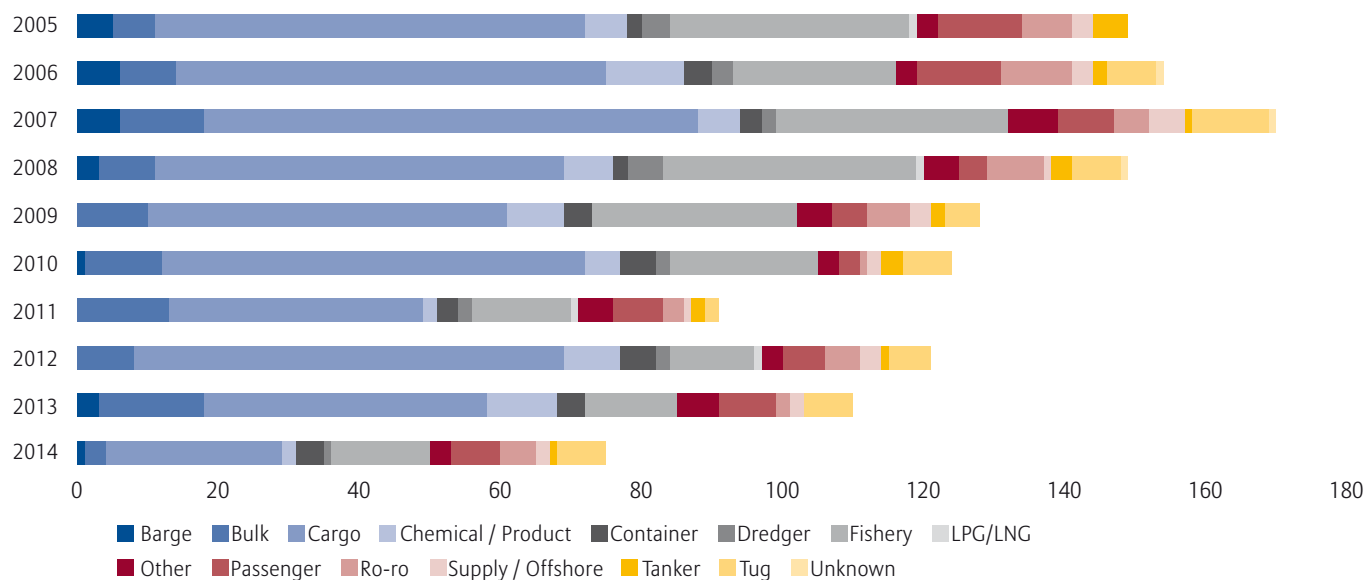
- | | |
|--|--|
| <p>● Posh Mogami
18 July 2014. Sank during failed submerging trials.
6 of the 9 crew rescued. 18,060 GT</p> | <p>● Amadeo I
18 August 2014. Ran aground and capsized.
No fatalities. 9,737 GT</p> |
| <p>● Enarxis
29 May 2014. Sustained water ingress in engine room. Cargo discharged. No fatalities. 18,003 GT</p> | <p>● Caravel Pride
16 July 2014. Grounded after engine problems.
Refloated by tugs. No fatalities 7,258 GT</p> |
| <p>● Beagle III
17 March 2014. In collision with Pegasus Prime.
Sank as a result. 12 of the 20 crew rescued.
12,630 GT</p> | <p>● Tao Yuan
25 August 2014. Sank following collision with Gang Tai Tai Zhou. No fatalities. 7,065 GT</p> |
| <p>● Ina
21 November 2014. Sustained blackout due to switchboard damage. Sent for scrapping. No fatalities.
10,931 GT</p> | <p>● Saloos
19 May 2014. Sank. Crew rescued. 6,950 GT</p> |
| <p>● Ana
23 July 2014. Drifted from anchoring position and ran aground in heavy seas caused by typhoon.
All 17 crew rescued. 10,208 GT</p> | <p>● Sewol
16 April 2014. Capsized and sank. Only 172 of the 476 passengers rescued. 6,825 GT</p> |

Passenger vessels

- | | |
|--|--|
| <p>● Sewol
16 April 2014. Capsized and sank. Only 172 of the 476 passengers rescued. 6,825 GT</p> | <p>● Super Shuttle Ferry 7
14 September 2014. Half-submerged on port side in bad weather. Crew rescued. 730 GT</p> |
| <p>● BJL I
14 January 2014. Sank after flooding caused the vessel to list. No reported fatalities. 2,555 GT</p> | <p>● Munawar Ferry
3 January 2014. Sank. Unconfirmed number of fatalities 522 GT</p> |
| <p>● Maharlika II
13 September 2014. Sank in rough waves caused by typhoon. Unconfirmed number of fatalities.
1,865 GT</p> | <p>● Q Carrelyn
29 November 2014. Capsized. Crew and passengers rescued by passing fishing vessel. 248 GT</p> |
| <p>● KM Sahabat
21 January 2014. Sank. Unconfirmed number of fatalities. 1,805 GT</p> | |

Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

Total Losses by type of vessel 2005-2014



Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

2014 is only the second year over the past decade when annual losses have dropped below 100. Together cargo (523) and fishing vessels (229) have accounted for almost 60% of the 1,271 losses since 2005. On average more than 50 cargo ships a year have been lost over the past decade, although this record has improved in recent years.

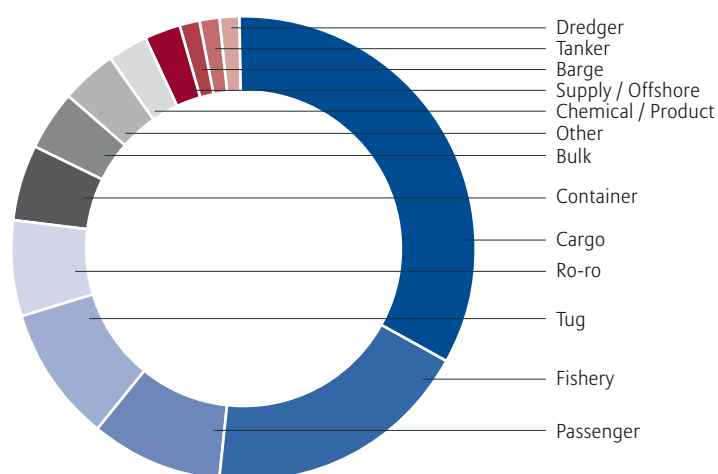


Container ships accounted for 5% of reported total losses in 2014

Photo: Shutterstock

Total Losses by type of vessel

January 1, 2014 - December 31, 2014

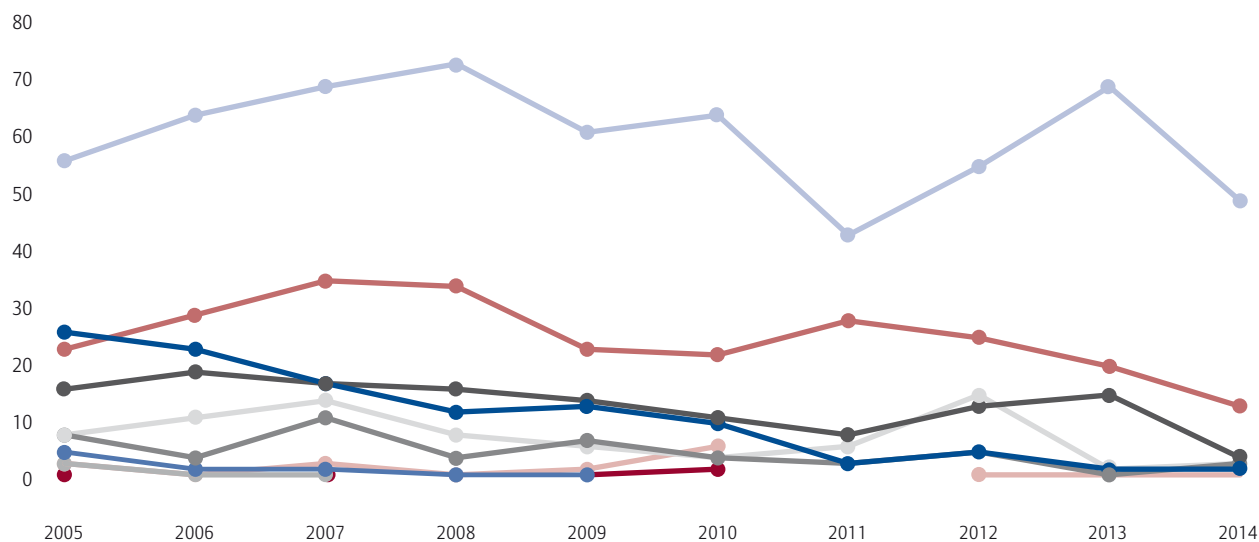


Cargo	25
Fishery	14
Passenger	7
Tug	7
Ro-ro	5
Container	4
Bulk	3
Other	3
Chemical / Product	2
Supply / Offshore	2
Barge	1
Dredger	1
Tanker	1
Total	75

Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

A third of the vessels that were losses were cargo ships (25) with fishery (14) the only other type of vessel to record double digit losses. Together, these two types of vessels accounted for over 50% of all losses in 2014.

Causes of Total Losses 2005-2014



Foundered (sunk or submerged) is the main cause of loss accounting for almost half (47%) of all losses over the past decade. Wrecked/stranded (aground) is the second major cause of total losses (20%). However, such incidents have declined year-on-year since 2011.

- Collision (involving vessels)
- Contact (e.g. harbour wall)
- Foundered (sunk, submerged)
- Fire/Explosion
- Hull damage (holed, cracks, etc.)
- Missing/overdue
- Machinery damage/failure
- Piracy
- Wrecked/stranded (aground)
- Miscellaneous

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Grand Total
Collision (involving vessels)	26	23	17	12	13	10	3	5	2	2	113
Contact (e.g. harbour wall)	5	2	2	1	1			2			13
Foundered (sunk, submerged)	56	64	69	73	61	64	43	55	69	49	603
Fire/explosion	16	19	17	16	14	11	8	13	15	4	133
Hull damage (holed, cracks, etc.)	8	4	11	4	7	4	3	5	1	3	50
Missing/overdue	3	1	1			1					6
Machinery damage/failure	8	11	14	8	6	4	6	15	2	3	77
Piracy	1		1		1	2					5
Wrecked/stranded (aground)	23	29	35	34	23	22	28	25	20	13	252
Miscellaneous	3	1	3	1	2	6		1	1	1	19
Grand Total	149	154	170	149	128	124	91	121	110	75	1,271

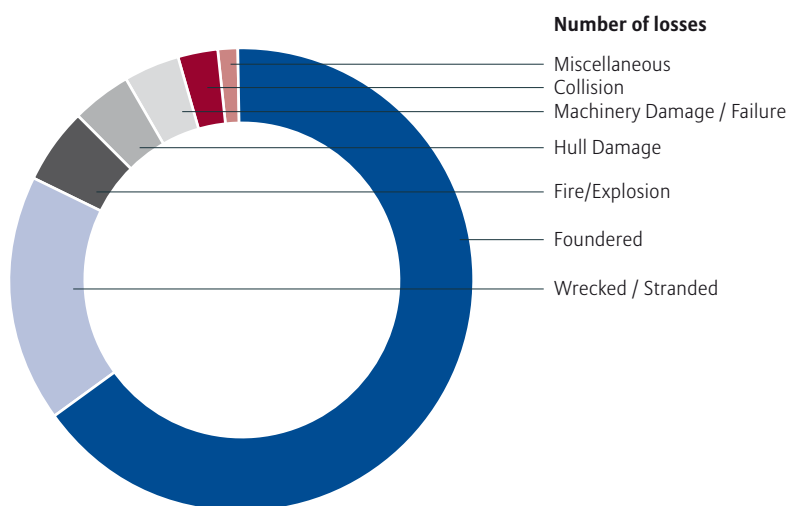
Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS.

Causes of Total Losses

January 1, 2014 - December 31, 2014

For every year over the past decade foundered (49) has been the most common cause of loss, accounting for 65% of all losses in 2014, although the number of such incidents was down almost 30% year-on-year. Wrecked/stranded was the second top cause of loss (13). There was a significant reduction in the number of fires/explosions (4), down 73% year-on-year.

Foundered	49
Wrecked / Stranded	13
Fire / Explosion	4
Hull Damage	3
Machinery Damage / Failure	3
Collision	2
Miscellaneous	1
Total	75



Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS.

2014 Total Losses in all regions

Total losses by regions: 2005-2014, 2013 and 2014

One-in-five losses over the past decade have occurred in the S.China, Indo China, Indonesia & Philippines region. However, in 2014 year-on-year losses declined in this region (by 11) and in the other major loss locations – Japan, Korea and N.China (by 6) and the East Mediterranean and Black Sea (by 5), driving the global trend.

	Total losses 2005-2014	Total losses 2014	Total losses 2013	Year-on-year Change
S. China, Indo China, Indonesia & Philippines	253	17	28	↓ 11
East Mediterranean & Black Sea	163	7	12	↓ 5
Japan, Korea and North China	158	12	18	↓ 6
British Isles, N. Sea, Eng. Channel, Bay of Biscay	96	6	3	↑ 3
Arabian Gulf and approaches	82	3	7	↓ 4
West African coast	59	2	8	↓ 6
West Mediterranean	56	2	3	↓ 1
East African Coast	41	1	4	↓ 3
Bay of Bengal	35	2	5	↓ 3
West Indies	35	3	2	↑ 1
Baltic	31		2	↓ 2
Russian Arctic and Bering Sea	31	2	1	↑ 1
S. Atlantic and East coast S. America	26	2	1	↑ 1
Iceland and Northern Norway	25	2	2	
Gulf of Mexico	24	1	2	↓ 1
North American west coast	17		1	↓ 1
South Pacific	17	3		↑ 3
North Atlantic	16	2	2	
Canadian Arctic and Alaska	14		3	↓ 3
United States eastern seaboard	14			
Newfoundland	13	2		↑ 2
South American west coast	12	3	1	↑ 2
Australasia	11		2	↓ 2
Red Sea	8			
Great Lakes	7	1	1	
North Pacific	5			
Suez Canal	5			
Cape Horn	4	1		↑ 1
Indian Ocean	4	1	1	
Not recorded (unknown location)	4			
Kiel Canal	2		1	↓ 1
Panama Canal	2			
South Pole	1			
Grand Total	1,271	75	110	↓ 35

Total losses in the British Isles and surrounding waters (6) doubled year-on-year during 2014. Conversely, the US eastern seaboard has not posted a total loss over the past two years.

Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

All Casualties including Total Losses - Top 10 regions: **2014**

2014: The East Mediterranean & Black Sea region was the location of the most shipping casualties (incidents) during 2014, accounting for 18% of all incidents. Of the 490 casualties just 7 were total losses, less than 2%.

2,773
total casualties
in 2014

2,084
75% of casualties
in top 10 regions

These figures include
total losses of **75** during
this period

East Mediterranean & Black Sea	490
British Isles, N. Sea, Eng. Channel, Bay of Biscay	465
S. China, Indo China, Indonesia & Philippines	285
Japan, Korea and North China	146
Baltic	141
Great Lakes	141
Iceland and Northern Norway	132
West Mediterranean	103
Gulf of Mexico	92
Newfoundland	89
Others	689
Total Casualties by Region	2,773

Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

All Casualties including Total Losses - Top 10 regions: **2005 to 2014**

2005-2014: The British Isles, N. Sea, Eng. Channel, Bay of Biscay has been the location of the most shipping casualties over the past decade with 18% of all incidents. There is a marked difference between the records of the East and West Mediterranean regions. East is four times more incident-prone than West.

24,545
total casualties
between 2005
and 2014

74%
18,050 casualties
from the top
10 regions

These figures include
total losses of **1,271**
during this period

British Isles, N. Sea, Eng. Channel, Bay of Biscay	4,381
East Mediterranean & Black Sea	3,754
S. China, Indo China, Indonesia & Philippines	1,932
Japan, Korea and North China	1,723
Baltic	1,579
Great Lakes	1,349
West Mediterranean	888
Iceland and Northern Norway	855
Gulf of Mexico	806
North American West Coast	783
Others	6,495
Total Casualties by Region	24,545

Source: Lloyd's List Intelligence Casualty Statistics. Analysis: AGCS

2014 in Review

- Safety responses implemented
- Cargo and passenger ship casualty implications
- Human trafficking search and rescue challenges
- War risks
- Overreliance on electronic navigation
- Crew cost-cutting concerns
- Container ship structural safety issues
- Slow steaming and engine challenges
- Liquefaction losses
- Piracy trends and developments



Photo: Wikimedia Commons

Passenger shipping was impacted by incidents such as a fire onboard the Norman Atlantic in Greek waters during 2014. Such casualties have raised concerns about levels of crew experience, training and emergency preparedness



The Sewol disaster was the result of a combination of factors including overloading and poor securing of cargo.

Safety concerns and responses

Cargo and passenger ship casualties during the final weeks of 2014 – and through the first weeks of 2015 – together with the release of some inconclusive findings from safety investigations of casualties from 2013 has ensured maritime safety has been firmly in the spotlight over the past 12 months.

As the committee with the prime responsibility for safety, the International Maritime Organization's (IMO) Maritime Safety Committee (MSC) met for its customary two sessions in 2014, during May and November. Extensive cross-industry cooperation on risk mitigation strategies for increased shipping in sensitive polar regions culminated in the adoption of the Introduction and part I-A of the International Code for Ships Operating in Polar Waters (**the Polar Code**) at the MSC's 94th session in November. This involved changes to the International Convention for the Safety of Life at Sea (SOLAS) chapter XIV "Safety measures for ships operating in polar waters", which made the Polar Code mandatory (see page 27).

With reference to the growing movements of **liquefied natural gas (LNG)** as a cargo – which has raised concerns about the impact of a collision or stranding given the nature of the product – a revised International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (**IGC Code**) was also adopted by the MSC in 2014. This will enter into force on January 1, 2016, with an implementation/application date of July 1. The rising interest in using LNG as a fuel was also covered by the MSC through the approval, in principle, of the draft International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (**IGF Code**), as well as draft SOLAS amendments to make the code mandatory. It plans to adopt both in 2015. The IGF Code will provide mandatory provisions for the arrangement, installation, control and monitoring of machinery, equipment and systems using low-flashpoint fuels, focusing initially on LNG, to minimize the risk to the ship, its crew and the environmentⁱ.

In 2014, the MSC also adopted a number of other amendments to SOLAS, including amendments to regulation II-1/29 on steering gear, to update the requirements relating to sea trials; amendments to regulations II-2/4, II-2/3, II-2/9.7 and II-2/16.3.3, to

introduce mandatory requirements for inert gas systems on board new oil and chemical tankers of 8,000 dwt and above, and for ventilation systems on board new ships; amendments to regulation II-2/10, concerning fire protection requirements for new ships designed to carry containers on or above the weather deck; and amendments to regulation II-2/13.4, mandating additional means of escape from machinery spaces. These are expected to enter into force on January 1, 2016. Additionally, the committee agreed a revised long-term action plan on passenger ship safety, specifically focusing on damage stability and survivability of passenger shipsⁱⁱ.

On the container front, mandatory weighing of containers will soon be a requirement after the MSC adopted amendments to SOLAS chapter VIⁱⁱⁱ. Misdeclared cargo and overweight containers – and their impact on safety – have long been a problem in the maritime industry. The expected entry into force date is July 1, 2016^{iv}. MSC has also approved an e-navigation Strategy Implementation Plan (SIP), which provides a framework and a road map of tasks that need to be implemented or conducted in the future to improve e-navigation solutions^v.

The IMO's Marine Environment Protection Committee (MEPC) has also been busy and some of its work from 2014 has a direct influence on safety. Safety-related measures agreed through the MEPC last year included amendments to the International Convention for the Prevention of Pollution from Ships (**MARPOL**) Annex I, the Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk (**BCH Code**) and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (**IBC Code**), on mandatory carriage requirements for a stability instrument for oil tankers and chemical tankers. These are expected to enter into force on January 1, 2016^{vi}.

"Vessel construction is not always the only weak point"



The Hoegh Osaka
Photo: Wikimedia Commons

Car carrier stability back in the spotlight

The stability of car carriers has been a focus of the IMO since the catastrophic capsizing of the passenger/car ferry **Herald of Free Enterprise** in March 1987. Movement of cargo on these types of ships can affect their stability and a large superstructure means that they are more susceptible to wind and bad weather. These worries surfaced again at the start of 2015 with an incident involving the 2000-built 51,770 gt pure car carrier **Hoegh Osaka**.

On the evening of January 3, 2015, the Hoegh Osaka developed a severe list shortly after departing from Southampton, UK, for Bremerhaven in Germany. The pilot onboard opted to deliberately beach the ship on the Bramble Bank in the Solent, off the Isle of Wight, UK, where the ship settled with a 52° list. All the crew and pilot were safely rescued and after a salvage operation to refloat the ship, it was towed to Southampton on January 22 with a 5° list. The cargo of 1,400 vehicles is reported to have included more than **£1m (\$1.54m)** of new BMW Minis and millions of pounds worth of JCB construction equipment. The UK's Marine Accident Investigation Branch has opened a report and the findings will be published later in the year.



Safety enforced

2014 saw the entry into force of a number of safety-related changes previously adopted. July saw four SOLAS amendments, covering on board noise protection; guidelines, plans and procedures for recovery of persons from the water; **fire-fighting communication, training and drills**; amendments to the Cargo Ship Safety Construction and Cargo Ship Safety Equipment certificates^{vii}; and changes to the International Convention for Safe Containers (CSC), 1972, relating to the container safety approval plate and approval of existing/new containers.

Passenger focus

Any industry responsible for lives must follow stringent safety measures and the passenger shipping sector is no exception. After the loss of the **Costa Concordia** in January 2012, last year was another watershed year for passenger shipping with the sinking of the 1994-built South Korean ferry, **Sewol** on April 16, 2014. More than 300 people died in the disaster, which was the result of a combination of factors including overloading, poor securing of cargo, and lower than recommended ballast. This incident led to wide public outcry and the prosecution and consequent conviction of many of the crew, as well as executives at the ferry's owner, Chonghaejin Marine.

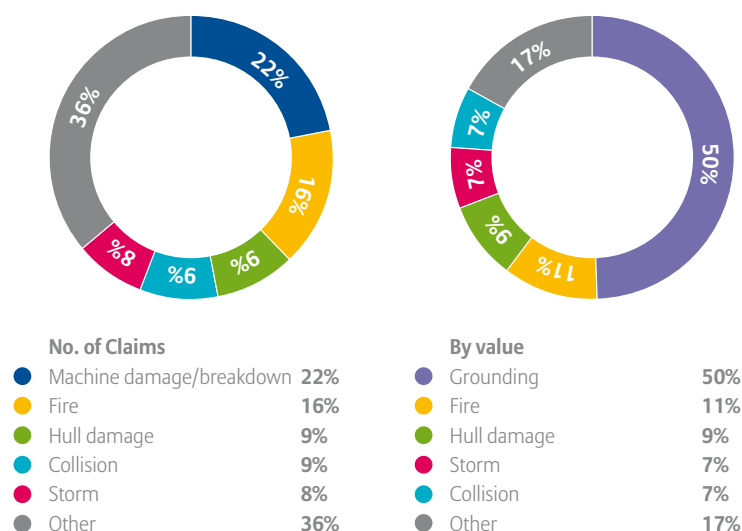
Passenger shipping was then hit by a second high-profile incident towards the end of the year with a fire onboard the 2009-built **Norman Atlantic** in Greek territorial waters on December 28. A total of 427 people were rescued^{viii}, but discrepancies in the ship's manifest meant that the current death toll of at least 10* could be higher. These two incidents underline a worrying gap in crew training when it comes to emergency operations on ro-ro/passenger ships.

"Sewol and Norman Atlantic underline the concerns we have as underwriters with respect of passenger/ro-ro ferries," says **Dr. Sven Gerhard, Global Product Leader Hull & Marine Liabilities, AGCS**. "What we have seen from the Sewol, and what we have so far heard from the Norman Atlantic, is that, in many cases, construction of the vessel is not always the only weak point. Levels of crew experience, training and emergency preparedness can also often be inadequate and this can be crucial, particularly on these types of vessels."

Also commenting on the Sewol, **Global Head of Marine Risk Consulting, AGCS, Captain Rahul Khanna** adds: "The swift rulings and stringent sentences passed on the crew, the manager, the owner, the state officials and the stevedores send a very strong message to substandard operators in that part of the world that when you are involved with passenger vessels, substandard operations will not be tolerated. Nobody should be spared for abdicating their responsibilities, especially when it comes to safety."

However, Khanna expresses concern that, in cases like this, the intense public pressure to deliver fast sentences may lead to some crew members being sentenced when they may have limited information or influence on operations.

Top Causes of Loss: Marine Claims (€1m+)



Source: Global Claims Review 2014, Allianz Global Corporate & Specialty

Rising claims inflation, the growing problem of crew negligence and the high cost of wreck removal have all contributed to a rise in the cost of marine insurance claims, according to AGCS analysis of five accident years (2009-2013).

Crew negligence is often a driver behind three of the top five causes of loss (grounding; hull damage; and collision). Collectively, these account for over 60% of the value of claims over **€1m (\$1.36m)**. In addition, in the UK alone it is estimated that **60%** of all hull and machinery claims are for machinery damage, with the majority of these attributed to crew negligence.

The Costa Concordia loss in 2012 drives grounding to the top cause of loss list by value. However, this cause of loss is relatively infrequent – **8%** by number of claims. Wreck removal is becoming more complex and expensive as environmental concerns and improved salvage technology place greater demands on ship operators and their insurers. As Costa Concordia demonstrated, wreck removal costs can easily be a multiple of hull value.

Human traffickers cause search and rescue issues

A changing tactic by human traffickers in the Mediterranean also proved to be a rising safety concern in 2014. This new ploy saw smugglers take migrants onboard, set the ship on a course towards Italy and then abandon it. More than **207,000 migrants** crossed the Mediterranean in 2014, almost three times the previous known high of about 70,000 in 2011 when the Libyan civil war took its toll*. This migration has been fuelled by those seeking asylum in Europe from the civil war in Syria. In the case of the 1976-built 2,560 dwt **Blue Sky M**, the ship was abandoned by its crew carrying 796 migrants in December 2014, while the 1966-built 2,329

dwt **Ezadeen** was left adrift off the Italian coast in October 2014 with 359 migrants onboard. Vessels used are often purchased when shipping companies are liquidated, and can even be bought online.

“The trade patterns of illegal immigration have moved to a new dimension,” says Gerhard. “They use dubious old vessels, owned by dubious owners.”

In other cases, commercial ships in the vicinity have either been requested by national coastguards to assist ships in distress, or have assisted as required by Article 98



The Salmis Filoxenia. At least 600 merchant ships were diverted from routes to rescue persons at sea in 2014
Photo: Wikimedia Commons

of the United Nations Convention on the Law of the Sea (UNCLOS). In November 2014, the **Liberty Grace** rendered assistance to over 230 Syrian refugees. In

another case, up to 350 migrants refused to leave the **Salmis Filoxenia** at the port of Limassol, requesting that they be taken to Italy. The 1975-built 15,402 gt cruise ship rescued the migrants off the coast of Cyprus.

The IMO estimates that at least **600 merchant ships** were diverted in 2014 from their routes to rescue persons at sea^{xi}. IMO secretary-general Koji Sekimizu described this figure as “detrimental to commercial shipping operations, with a knock-on effect on trade”. “It is abundantly clear that the situation we are seeing in the Mediterranean region today is stretching coast guard and navy resources and the rescue infrastructure as a whole to breaking point. We are also aware of the significant burden placed on ship owners when masters receive distress calls and are requested to deviate from their voyage plan in order to render urgent search and rescue assistance^{xii}.”

Mitigating the risks of conflicts

Conflicts in the Middle East, including the Syrian Civil War and unrest in Egypt, have a direct impact on the safety of the shipping industry. This impact is more pronounced when the increasing size of ships is taken into account as they are too big to utilize the Panama Canal and are restricted to the Suez Canal, which cuts directly through the heart of a number of volatile countries.

Captain Andrew Kinsey, Senior Marine Risk Consultant, Allianz Risk Consulting, AGCS believes that increasing reliance on this chokepoint could prove problematic: “Any time you take options away you are leaving yourself at risk. We have to look at this holistically as the supply chain hinges on the weakest link. The bottom line is that the cargo has to make it from the manufacturer to the buyer – any disruption in any portion of that supply chain will result in an unsatisfactory outcome. In the present economic world in which we live ‘just in time’ delivery is the norm.”

Dr. Sven Gerhard, Global Product Leader Hull & Marine Liabilities, AGCS also sees an extended risk to safety with the rise in the number of failed and fallen states, for example in Libya, where a Greek tanker was bombed off the coast on January 5, 2015 by the Libyan Army.

“The risk that **fallen states** present is an area which will increase. It needs to be monitored and needs more attention from underwriters in order to draw proper conclusions when it comes to risk-based underwriting,” he explains.

Effectively, it is about understanding the exposure and drawing proper conclusions as part of the underwriting process when it comes to, for example, setting warranties, making a loss-control assessment mandatory, ensuring full compliance with loss control recommendations or working on the insureds’ net retentions.



The Suez Canal cuts through a number of volatile countries
Photo: Shutterstock

17,000+

Ships passed through the
Suez Canal in 2014

Overreliance on electronic navigation



40% of the world's seafarers are Filipino*

However, training standards came under intense scrutiny over the past year with the EU at one stage threatening to cancel the accreditation for Filipino seamen to work in Europe should the Philippines fail to pass international standards. This has led to a planned phase-out of several Philippines-based marine higher education institutions in 2015.

*Source: Department of Transportation and Communications, Philippines

Meanwhile, the problem of overreliance on electronic navigation aids has not gone away and was the root cause of a number of incidents in 2014, with the **Rickmers Dubai** collision a case in point.

On January 11, 2014, the Liberia-registered multi-purpose cargo ship collided with **Walcon Wizard**, an unmanned crane barge which was being towed by the tug **Kingston** in the south-west traffic lane of the Dover Strait Traffic Separation Scheme.

The Walcon Wizard was badly damaged and Rickmers Dubai's hull was punctured above the waterline. A UK Marine Accident Investigation Branch investigation established that Rickmers Dubai's officer of the watch "had not kept a proper lookout...relied solely on AIS (Automatic Identification System) information displayed on the ECDIS (Electronic Chart Display and Information System) as an aid to collision avoidance... was alone on the bridge... did not monitor the radar and the bridge navigational watch alarm system was switched off"^{xiii}.

Senior Marine Risk Consultant, Allianz Risk

Consulting, AGCS, Captain Andrew Kinsey says:

"The Rickmers Dubai provides a perfect example of the perils of the overreliance on electronic navigation."

Inadequate training at grass roots level is a factor in this overdependence on e-navigation tools, according to Khanna. "Training standards are mixed when it comes to ECDIS. It should be relatively straightforward as the framework in Standards of Training, Certification and Watchkeeping (STCW) is already there, but the training in individual facilities in some parts of the world is not up to standard." Lessons learned from accident reports related to ECDIS are not always being filtered back into the training environment, he adds.

"The minimum standards have been met, but we need to go above and beyond them to give robust training to officers to ensure that they avoid misinterpretation of ECDIS and operating mistakes that lead to expensive disasters."

Kinsey believes there is a fundamental societal problem of overreliance on IT: "There's a generation of young graduates who have grown up looking at a screen and trusting everything they see on it. Reliance on automation can take precedence over looking out of the window, taking a visual bearing, or even picking up binoculars. However, manual navigation aids and skills are still crucial."



The Rickmers Dubai collision with an unmanned crane barge has raised issues around overreliance on electronic navigation

Photo: Wikimedia Commons

Crewing level concerns



Discover more about the risks associated with Green Ship Schedules at <http://www.agcs.allianz.com/insights/white-papers-and-case-studies/cargo-risks-with-green-schedules/>

In a related issue, amendments to the International Safety Management Code (**ISM Code**) which took effect on January 1, 2015 could shake up the perennial problem of minimum safe manning levels that are not fit for purpose. The amendment has shifted the onus of responsibility back on to the owner, requiring that the ship is manned in excess of its **Minimum Safe Manning Document** in order to comply with hours of rest rules and other requirements that may arise due to the operation of the ship^{xiv}. Owners will now be held liable if they have not made a proper assessment of the necessary minimum safe manning level, or for not reassessing a change in the circumstance of the vessel.

The minimum safe crewing levels should only be the default level for an emergency situation and not the normal day-to-day level for safe operations. "Good shipping companies will never keep the crew down at the safe minimum level; they will always have additional officers or cadets onboard," says **AGCS Senior Marine Risk Consultant and Master Mariner Jarek Klimczak**. "Vessels operating continuously at the minimum safety levels will often be on a cost-saving drive and this can also be reflected in the maintenance of the vessel."

Khanna points out that it is not just the quantity of crew onboard that is concerning; quality is also important.

"We suffer more from the lack of quality of the crew, than the quantity. This doesn't mean that fatigue and low manning levels are not a problem however." "Crews are constantly being asked to do more with less," adds Kinsey. "Smaller crews, higher tempo schedules, less time in port for repairs...The latest electronic navigation tool is of no use if crew are too fatigued to operate it." Minimum manning levels have reduced the ability to train people onboard he believes. "There's a lot to be said for learning on the deck."

Minimum safe manning levels also have an impact on whether crews are able to meet the mandatory hours of rest set by the Maritime Labor Convention, 2006 (**MLC**). "Port state control has been trying to deal with, and is cracking down on, falsifying hours of rest records, where manning levels have been at the bare minimum," says Khanna. "MLC has tried to address this but we have yet to see any impact. It's definitely something that is not going to go away soon and has a significant impact on safety."

Klimczak – who sailed on a six hours on/six hours off rotation at sea – understands the difficulties facing today's seafarers; especially those involved in short sea trades. "A six on/six off rotation can never provide the proper rest time," he says. "A solution could be to shorten contracts so that you are only on board for two to three weeks."



The sinking of the MOL Comfort in 2013 has raised concerns about container ship safety, particularly as ships grow bigger

Photo: gcaptain.com

MOL Comfort cause of loss concerns

With the review into the sudden sinking of the 2008-built 8,110 teu **MOL Comfort** in 2013 now complete, the industry is only fractionally closer to determining a definitive cause for the casualty. The investigation by the ship's classification society Class NK into the loss blamed "uncertainty factors" for the structural failure and could not definitively answer if design and construction or operational flaws had led to the disaster. The ship broke into two approximately 200 nautical miles off the coast of Yemen in June 2013. There were 11 sister ships of similar design which were all inspected for structural weaknesses shortly after the MOL Comfort incident and nothing of concern was found. Khanna describes the lack of a definitive cause as "quite concerning". "To say that an 8,000 teu, five-year old vessel broke in two in weather that is not exceptional without a clear defined cause does not comfort me, or anyone else in the industry. What it does is pose a lot of questions and raise a lot of concerns about the safety of container ships, particularly as they grow bigger."

Khanna calls on shipbuilders and classification societies to address the safety margins of scantlings (framing and structural supports) and hull girders at the construction stage. "It's extremely important to take a fresh look at shipbuilding, especially in light of the MOL Comfort investigation, as we really don't know what happened. The industry should not write this off as a freak accident; it is so dangerous to sit back and say we couldn't find anything out," Khanna adds.

Despite the lack of clear cause, the International Association of Classification Societies has responded to the casualty, introducing new container ship construction requirements for its members. The two new unified requirements (URs) for container ships are URS11A, which is a longitudinal strength standard for container ships, and URS34, dealing with functional requirements and load cases for direct analysis of container ships. Both are scheduled to be delivered in 2015 and are minimum technical requirements^{xv}.



What are cat fines?

Cat or catalyst fines are a by-product of refining made up of small particles of metal. These are deliberately added to marine fuels to "crack them". If they are not removed by purification they can cause serious damage and even engine failure, which could lead to a collision or grounding. Better training and monitoring, as well as sampling and testing fuel before use and regular cleaning of filters and settling and service tanks during dry dock can reduce the scale of the problem.

Slow steaming and engine challenges

Container ship operators were the initial proponents of **slow steaming**, but now it's a popular cost-saving strategy for ship owners of any type of vessel. The general acceptance of slow steaming as the norm rather than the exception has directly influenced ship design to incorporate engines and hulls specifically designed to operate at speeds of around **18 knots**. However, that design evolution for new builds does not benefit the existing ships that are slowing down to save money on fuel costs.

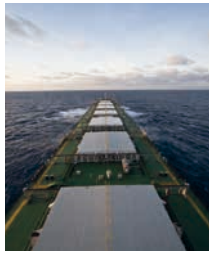
In Klimczak's view, this practice reduces the operating life of the engine on older ships. "Engines are designed to operate at an optimum power level," he explains. "If it is lower than this then emissions increase and there are issues with **cat fines** and **fuel residues**."

"The additional vibration caused by slow steaming may also have a structural implication for the hull and the cargo. While modern vessels may be designed for slow

steaming, older ships are not. Vessels not designed for slow steaming should not slow steam."

Of particular concern for underwriters is the inability to avoid potentially dangerous scenarios if restricted to slower speeds. "Slow steaming exposes the crew to threats both from the environment and piracy for longer periods of time," Kinsey adds. Slow steaming reduces the ability to maneuver away from bad weather and still stay on schedule.

Engines also have the added factor of low sulfur fuels to cope with in view of a reduction of the maximum sulfur content of fuel in the IMO's defined Emission Control Areas (ECAs). As of January 1, 2015, ships trading in designated ECAs had to use fuel oil on board with a sulfur content of no more than 0.10%, against the previous limit of 1.00%. These low sulfur fuels also introduce the risk of cat fines, which operators have been battling with since low sulfur fuels were first introduced.



What is liquefaction?

All bulk ore and concentrate cargoes are likely to have some moisture content. However, if the moisture content of the cargo reaches a specific level, known as the flow moisture point (FMP), the frictional force will be lost and the cargo will behave as if it were a liquid and flow freely. As a result of liquefaction, carrying vessels may suddenly lose stability and take on a list or even capsize.

Source:
www.martindale.com

Liquefaction losses

On the cargo front, the threat of **rapid liquefaction** of cargo with catastrophic results has continued after incidents in 2013. At least two recent total losses are suspected to be a result of liquefaction. At the start of 2015, the 2006-built 56,009 dwt **Bulk Jupiter** sank off the coast of Vung Tau, Vietnam, just a day before the 1984-built 2,327 dwt **Cemfjord** foundered off the coast of Scotland. The Bulk Jupiter was carrying bauxite, while the Cemfjord had a cargo of cement. As liquids, both cargoes are hazardous to ships. The accident investigations findings are not expected until later this year, but insurers have already raised concerns that rapid liquefaction may well have caused both incidents. For the Bulk Jupiter in particular, the IMO's categorization of bauxite cargoes has come into question.

"It's premature to say that it was liquefaction, but all the evidence so far suggests that it was," says Khanna. "The issue was that the Bulk Jupiter was carrying a cargo that is classified as a C-type cargo under the International Maritime Solid Bulk Cargoes Code (**IMSBC code**). This is the least dangerous category from a liquefaction point of view. However, there have been warnings from protection and indemnity (P&I) clubs that these could easily be placed in the dangerous category under certain conditions. This raises the issue of shippers being ignorant or careless and whether the list of cargoes in the A, B and C categories in the IMSBC code needs to be reassessed."

Piracy down in Africa but SE Asia waters concern

The number of pirate attacks on commercial shipping continued to decline overall around the globe in 2014, **dropping 7% year-on-year to 245** (compared with 264 in 2013), according to the International Chamber of Commerce's International Maritime Bureau (**IMB**) – the fourth successive year in which the number of attacks have decreased. This fall is the result of joint industry and cross-border cooperation to tackle the root causes of piracy on land, as well as using armed force at sea, to deter attacks.

In the **Gulf of Aden**, the highly successful EU Naval Force's Operation Atalanta – largely responsible for the **95% fall** in reported attacks by Somali pirates since the start of this decade from 219 in 2010 to 11 in 2014 – has been extended through to December 2016.

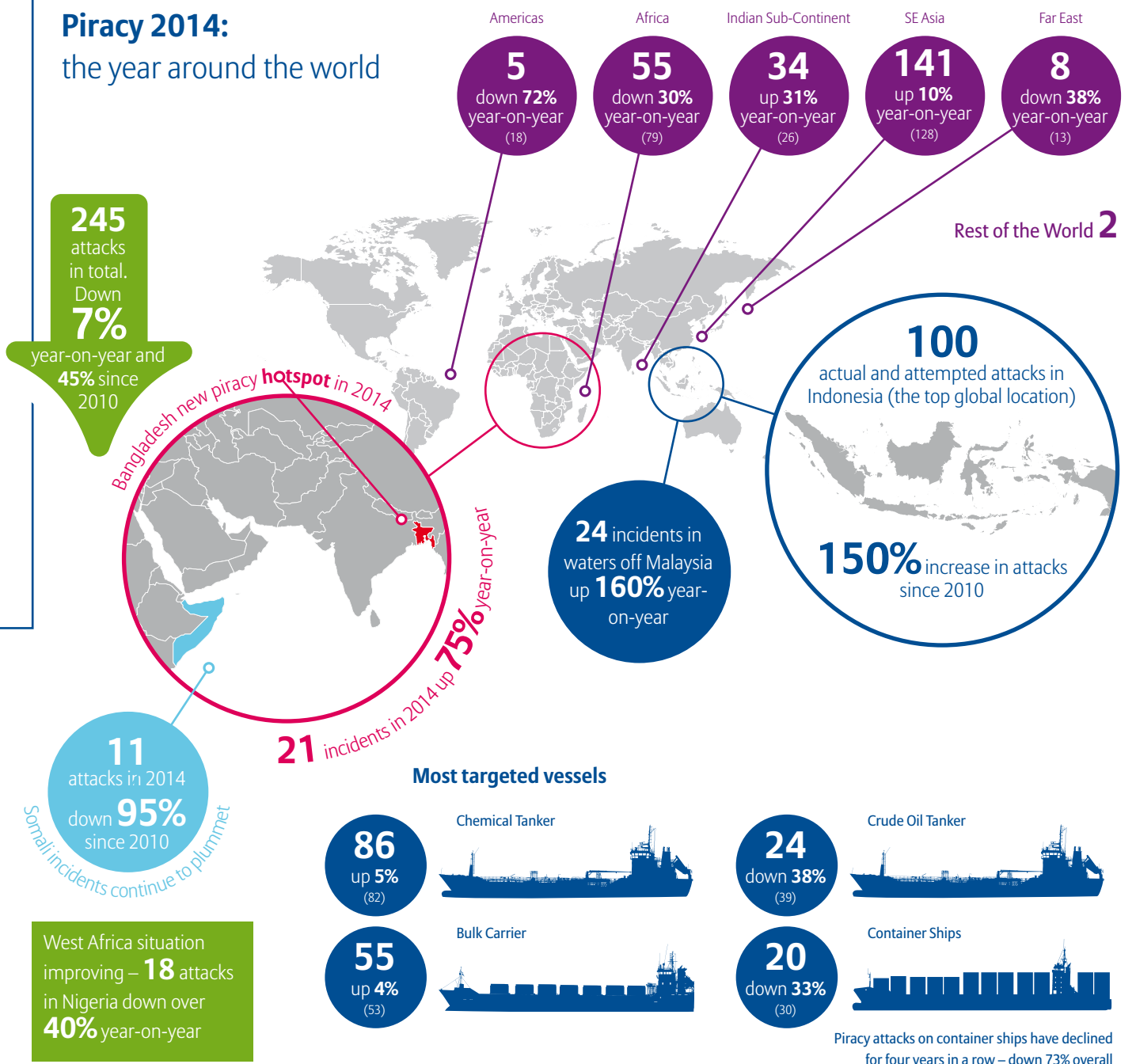
On the west coast of Africa, attempts to reduce piracy incidents have also proved successful with reported incidents off **Nigeria** alone **down over 40% year-on-year** from 31 to 18 in 2014. Ongoing programs include the European Union's Critical Maritime Routes Gulf of Guinea (**CRIMGO**) initiative, aimed at complementing and reinforcing regional or international initiatives against piracy and armed robbery at sea, and the implementation of an IMO

Code of Conduct, addressing the repression of piracy, armed robbery against ships, and illicit maritime activity in west and central Africa. However, a caveat for the not insignificant progress made over the past 12 months is that there is considerable under-reporting of piracy incidents in the Gulf of Guinea.

Unlike the Somali pirates, those in West Africa have been more inclined to hijack a vessel to steal the cargo rather than hold the crew or the ship. This trend has resulted in a drop in the value of such insurance claims, as the costs paid to release vessels and cargo are generally significantly higher than the thefts of oil. Often the West Africa thefts are to fulfil an order, so it is not unusual for only part of a cargo of oil to be stolen.

While African campaigns have proved effective, piracy attacks in **South East Asia** continue to rise. IMB figures reveal that there were **141 reported attacks** in South East Asian waters in 2014, **up 10% year-on-year** (128 in 2013). Treaties between Malaysia, Indonesia, Thailand and Singapore to prevent piracy in the Malacca Strait have kept incidents here down to an average of one to two annually since 2010. However, incidents in waters off **Malaysia** (24), **up 160%** over the past year, and off Indonesia (100), which is the top global hotspot, drive

Piracy 2014: the year around the world



last year's activity, although Indonesian incidents actually declined slightly year-on-year in 2014 (106 in 2013).

Attacks in South East Asian waters are also responsible for a **75% annual increase** in the number of vessels **hijacked** with 21 in 2014 compared to 12 in 2013. The IMB attributes this increase entirely to the rise in small coastal tanker hijackings in this region.

Bangladesh represented a new piracy hotspot during 2014, with the number of reported incidents increasing to 21 compared with 12 a year earlier (**up 75%**). The majority of incidents are low level thefts from vessels, although three crew were taken hostage and two

crew injured in two separate incidents, according to the IMB.

At the start of March 2015 the number of reported piracy incidents to the IMB during the year-to-date totaled 29. "Piracy is a problem which, unfortunately, is here to stay," says Captain Rahul Khanna, Global Head of Marine Risk Consulting, AGCS. "We have seen it rise and fall in the Gulf of Aden and to an extent in West Africa, only to rise again in the Far East. The modus operandi is different in each area but the bottom line is that merchant ships are easy targets. Seafarers around the world need to stay vigilant to guard against this threat, whichever quarter it may come from."

In the pipeline

- Larger ships – larger losses
- Arctic shipping developments and risks
- Ebola and medical misdiagnosis
- Places of refuge
- Increased competition concerns
- Cyber risks and loss scenarios
- Drone ships
- Other key risks



The world's largest container ships can now carry over 19,000 standard-size containers and are as long as four football fields

Photo: Wikimedia Commons

but there are many problems to overcome before we increase the size of container ships further," warns **Senior Marine Risk Consultant and Master Mariner, AGCS, Jarek Klimczak**.

"From a technical standpoint, it is always much easier to increase the breadth or width than the length, as a wider vessel has better stability. But on the flipside you then introduce

a problem with torsion. Other obstacles include the deeper draft needed, which ports are not ready for, and restrictions on cranes which do not currently have enough outreach."

How big is teu big?

Softening oil, and consequently bunker fuel, prices have put the quest for ever-more economical ships on the back burner for many operators. With bunker prices one of the top three operating expenses for owners, crude oil at a five-year low has reduced the pressure to cut overheads. With the breathing space afforded by falling oil prices, AGCS experts are recommending caution on making the leap to even larger container ships after a new holder of "the world's largest" title was crowned towards the end of 2014. At 1,312ft long, 192ft wide and 100ft deep, the **CSCL Globe** can carry over 19,000 standard-size 20ft containers (teu) and is as long as four football fields.

However, the vessel didn't hold this title for long. Inaugurated early in January 2015, **MSC Oscar**, Mediterranean Shipping Co's latest vessel has a nominal capacity of **19,224 teu** making it the largest container ship afloat at the time of writing. Yet ships as large as **22,000 teu** are now expected to be in service as early as 2018. "Then the next stage will be **24,000 teu** ships,

Senior Marine Risk Consultant at Allianz Risk Consulting, AGCS, Captain Andrew Kinsey adds that there are also issues with the wider logistics chain. "Yes, we can build 20,000+ teu vessels, but is it economically feasible for the supply chain to have those vessels? We have to look at the supply chain as an integrated system, which is only as strong as its weakest link." Another risk factor with ever-larger container ships is **the loss potential**. AGCS experts believe that the industry should prepare for a **\$1bn+ loss** in the future with an ultra large container ship. "For us, exposure is a concern, not just on the total loss, but also on a partial loss or general average claim," explains **Dr Sven Gerhard, Global Product Leader, Hull & Marine Liabilities, AGCS**. "A machinery claim or water ingress on such a large ship means that it will need to be unloaded, but where are the facilities to do it, how long will it take, and how much will it cost?"

What is General Average?

A legal principle of maritime law to which all parties, in a sea venture, proportionally share any losses resulting from a voluntary sacrifice of part of the ship cargo to save the whole in an emergency.

As Klimczak points out, operation of such vessels is limited to a small number of deep water ports – which means an increased concentration of risk. “There is also a world-wide shortage of qualified seaman to command these vessels,” adds Kinsey. It has been estimated that 80% of marine casualties are down to human error^{xvi}.

Therefore, the industry should think long and hard before making the leap to the next size up, adds **Captain Rahul Khanna, Global Head of Marine Risk Consulting, AGCS**. “As much as I support technological advances and development we need to be careful how we go about with this. If we are going to go bigger than 22,000 teu then risk management needs to go back to the drawing board, especially in the light of the MOL Comfort accident (see page 20).”

50 years of Container Ship Growth

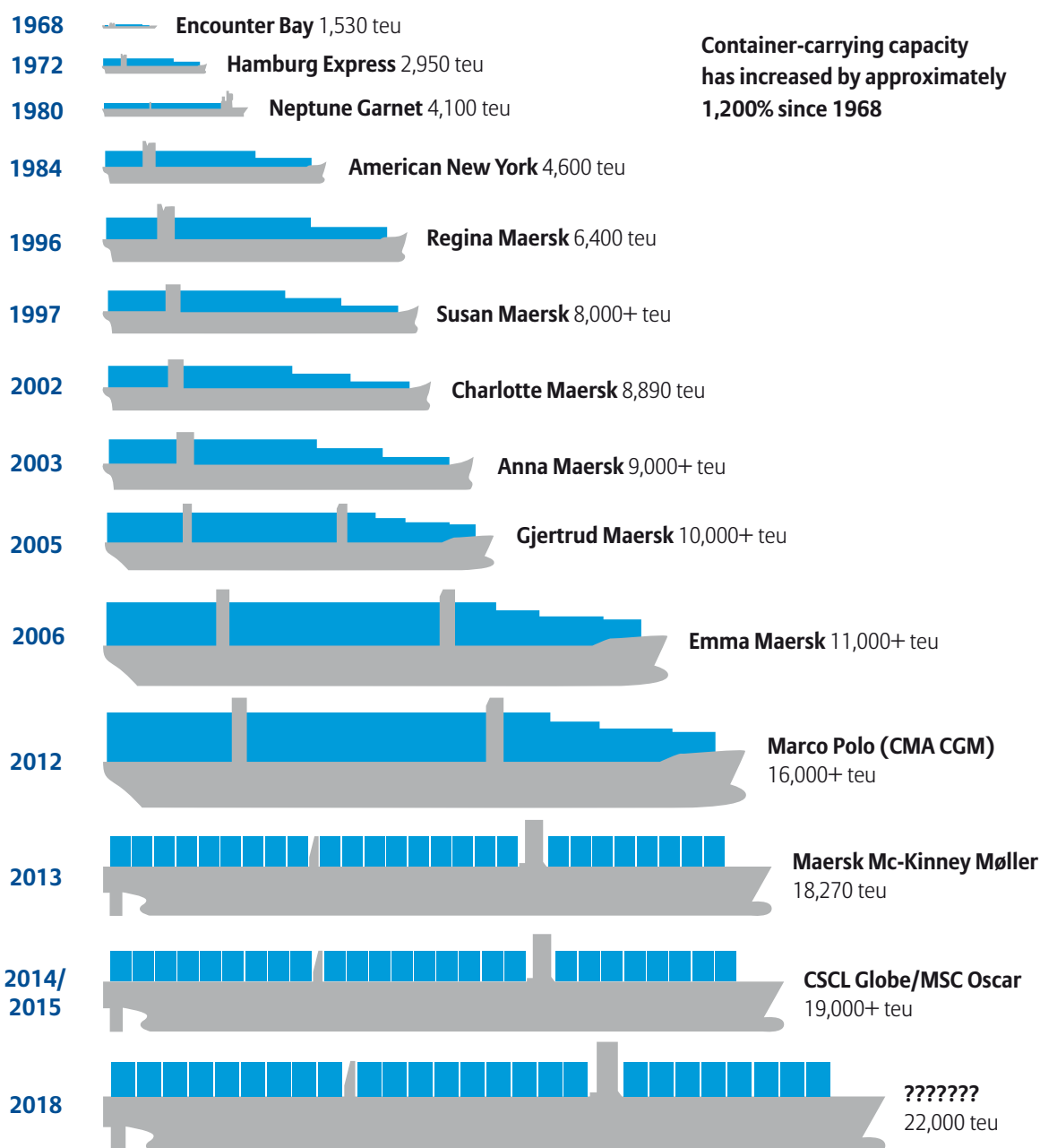


What's in a teu?

Container ship capacity is measured in 20-foot equivalent units (teu). Typical loads are a mix of 20-foot and 40-foot containers. The world's largest container ship – the 19,000+ teu MSC Oscar – has the capacity to hold **39,000 cars** or **117m pairs of shoes***.

*Source:
Süddeutsche Zeitung

**Container-carrying capacity
has increased by approximately
1,200% since 1968**



2 years

Salvage challenge

The time it could take to remove all of the containers from an **19,000+ teu** vessel in the event of an incident, assuming it was possible at all

Source: Allianz Global Corporate & Specialty
Approximate ship capacity data: Container-transportation.com

What happens if... Billion dollar shipping loss scenarios

What is a Lloyd's Open Form?

A standard legal document for a proposed marine salvage operation.

Last year's delivery and subsequent entry-into-service of **19,000+ teu** container ships – the largest ever built – demonstrates the remarkable growth in size of the industry. Cargo-carrying capacity has increased by approximately **1,200%** over the past 50 years (*see page 25*) and by over **80%** during the past decade alone.

However, the arrival of such “**mega ships**” is accompanied by concerns about increasing risk, safety issues, salvage difficulties and therefore the potential for higher losses if a casualty occurs. These ships test port and canal capacity, as well as the skills of their crews.

There are many variances and factors to consider when evaluating the cost of a potential loss scenario resulting from an incident involving such vessels. Most significantly, the average value of the contents of the containers and whether the vessel is completely laden or not, but also other influences such as shipping route/ location. In addition, if there is a salvage/removal of wreck situation, the major concern is that salvors do not have the equipment and resources to effectively deal with this. Such uncharted territory makes potential costs even more problematic to calculate, according to **Kevin Whelan, Marine Claims Specialist at AGCS.**

Bearing in mind such variances, a couple of possible scenarios are listed below:

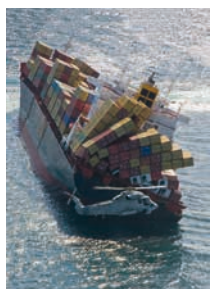
Scenario 1:

A new 19,000 container vessel (80% laden) capsizes/ sinks resulting in a total loss of the vessel and subsequent removal of wreck:

Costs involved:

- **Hull loss** – Insured value \$200m
- **Cargo loss** – 19,000 containers at \$35,000 per container x 80% – \$532m approx.
- **Removal of wreck and liabilities** \$300m approx (*Costs can vary here. For example, \$190m approx in the case of the MSC Napoli in 2007 and \$425m approx in the case of the Rena in 2011*)

Total \$1bn+ approx.



The Rena oil spill occurred off the coast of Tauranga in New Zealand in 2011. It has been described as New Zealand's worst maritime environmental disaster.



The MSC Napoli was a container ship broken up by salvors after running into difficulty in the English Channel in 2007

Photo: Wikimedia Commons

Scenario 2:

Two 19,000 container vessels (80% laden) collide and are towed to safety in difficult conditions; ie a complex salvage scenario.

Hull values - \$400m approx. (\$200m each) **Cargo values** - \$1bn approx. **Total venture value** \$1.4bn approx

- **Hull damage** - \$150m (approx 30% of insured values)
- **Cargo loss damage** - \$150m (approx. 15% of cargo)
- **General average claim** - \$250m under Lloyd's Open Form
- **Estimated general average expenditure** - \$250m

Total \$800m approx

However, the final losses from such scenarios could also significantly exceed the totals in these examples. Average value of containers onboard can vary widely, obviously depending on contents. If the average value of the containers onboard in the above scenarios totalled **\$50,000**, for example, it would make a considerable difference to the final loss total.

Is a **\$2bn** container ship loss scenario possible? “It is not entirely unrealistic,” says Khanna. “We have already seen a passenger ship case (**Costa Concordia**) where the final loss figure is around \$2bn. This is mainly due to the cost of wreck removal and if an equivalent wreck removal process is used in the case of two 19,000 teu vessels, then cost could exceed \$2bn. This is quite a rare scenario but \$2bn might be exceeded even if one 19,000 teu vessel and another smaller vessel is involved, if there is a wreck removal in a difficult location. It also depends on the response from the local authorities.”

According to Kinsey, the casualty incident would not have to be in a remote location in order to incur this level of loss. “Just the acreage required to stage all the containers in the event of a general average claim between two of these sized vessels would be staggering. And if you

combine that with a lack of adequate port infrastructure for fire-fighting, etc...”

Kinsey cites the recent case of a collision between two container ships in Malaysia’s Port Klang in late October 2014 as an example. The **San Felipe** (8,700 teu) struck the moored **Al Riffa** (13,500 teu) while approaching its berth. The collision resulted in fires in the forward container bays aboard both vessels. Luckily, in this case the fire was brought under control.

Klimczak says while a \$2bn loss scenario may appear highly unlikely it cannot be entirely discounted and considered impossible.

“It’s a fact that vessel dimensions are growing. Not just for container vessels but also for very large ore carriers and very large bulk carriers, as well as specialized large floating offshore facilities which don’t have any predecessors.

“It is human nature to explore and test the limits; and existing maritime infrastructure and insurance will have to follow. In future, maximum exposure will not necessarily be limited by the value of a vessel and carried cargo but also environmental, social or business interruption costs.

“The cost of claims may be very difficult to estimate and, looking at the history of the most expensive shipping accidents, may be significantly underestimated.”

Arctic progress but safety questions remain



Incidents such as the MS Explorer – which sank off Antarctica in 2007 after striking an iceberg – demonstrate severity claims can occur in remote waters

Photo: Wikimedia Commons

1

Number of shipping incidents (casualties) in the South Pole maritime region during 2014

A pivotal moment for shipping in the high-risk Arctic waters passed in 2014. **The Polar Code** was adopted by the IMO in November 2014, proving that the shipping industry can be proactive with regards to regulatory change: its adoption comes ahead of increasing use by shipping of the **Northern Sea Route** in recent years.

Just four ships navigated this route in 2010, increasing to 34 in 2011 and 46 in 2012. By 2013 the number had reached 71. Although 2014 saw relatively heavy ice cover in the Arctic, causing numbers to drop^{xvii} – with political implications and a slowdown in the Russian economy

also potential contributing factors in this decline – the long-term trend still indicates greatly expanded shipping.

Khanna welcomes the arrival of the Polar Code. “It has provided a framework that can be further developed and we now have a central code which everybody has to comply with when it comes into force in 2017.”

However, he adds it should be a dynamic document which will need to be expanded as the industry in these sensitive waters develops “as we cannot learn from our mistakes in the Arctic.”

36%

of shipping incidents (casualties) in Arctic Circle waters caused by machinery damage. (125 out of 347 incidents between 2005-2014)

55

Number of shipping incidents (casualties) in Arctic Circle waters in 2014. There were just 3 in 2005.

The Polar Code requires ships intending to operate in the defined waters of the Antarctic and Arctic to apply for a Polar Ship Certificate, which would classify the vessel as a Category A, B or C ship, dependent on the thickness of the ice that the ship will be allowed to operate in.

The code also requires ships operating in these waters to carry a **Polar Water Operational Manual**. The purpose of the manual is to provide the owner, operator, master and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process in Polar water operations. Gerhard points out this manual can only be as good as the flag state and the classification society approving it, which ultimately will make it a question of flag state and classification society quality.

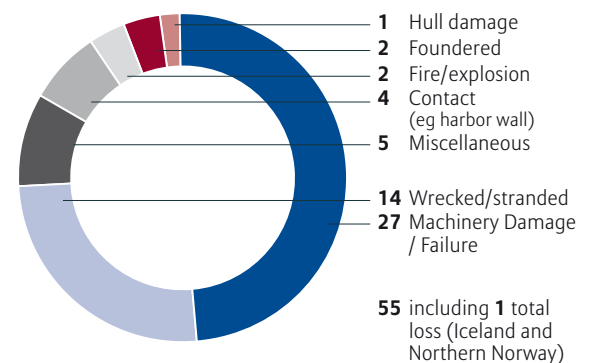
But while the Polar Code addresses many of the safety issues in these waters, unknowns remain. "There are still a great number of unanswered questions, particularly around crew training, suitability and potential clean-up," says Kinsey.

"The Polar Code will need constant revision because these are literally uncharted waters. Unfortunately the process of constant revision is outside the comfort zone of the IMO and of its ratification process. As this is a seasonal shipping route, at the very minimum, problems encountered and best practices to employ should be outlined at the end of each season."

Klimczak likens the disconnection on territorial ice regimes in the Arctic to "the Wild West", as, historically, bordering nations carved out their own rules and regulations for shipping in the region with limited reference to those of their neighbors. While Canada and Russia have ice regimes, other countries with access to the Arctic such as the US, Norway and Denmark lack such regimes and although Sweden and Finland have a great deal of experience of cold operations, that experience is not directly applicable to the extreme Arctic conditions. "These countries should look for a consistent approach to shipping within the Arctic," he advises.

Arctic Circle Waters

All Casualties including Total Losses 2014



Arctic Circle Waters –

All Casualties including Total Losses 2005 – 2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Machinery damage/failure	2	3	5	13	14	16	12	13	20	27	125
Wrecked/stranded	1	4	10	11	14	9	9	8	10	14	90
Miscellaneous			5	1	4	4	2	6	5	5	32
Fire/explosion			3	1	2	6	6	1	4	2	25
Collision				1	4	10	4	4	2		25
Contact (eg harbor wall)			1	1	1	3	1	3	6	4	20
Hull damage		1	3	1	6	2	2	1	2	1	19
Foundered			1	1	2		3	1	1	2	11
Total	3	8	28	30	47	50	39	37	50	55	347

347 including 19 total losses

Source: Lloyd's List Intelligence Casualty Statistics Analysis: AGCS



The Carnival Magic was refused entry by Mexico during 2014 over fears of transmission of Ebola

Photo: Wikimedia Commons

Ebola: places of refuge and medical misdiagnosis

One unresolved concern regarding Arctic shipping is the lack of adequate places of refuge in such an inhospitable area. However, this worry is not limited to the Far North. Indeed, insurers have raised numerous concerns over the lack of adequate places of refuge for the latest generation of container ships, wherever they trade. Breaking through the 20,000 teu capacity ship size ceiling will compound these anxieties.

A new twist on the places of refuge issue surfaced in 2014 as ships were refused refuge on concerns of spreading an infectious disease, namely the **Ebola virus**.

“Are ports going to rely on someone that has basic medical training to make a diagnosis?”

The 2011-built 128,048 gt **Carnival Magic** was refused entry by Mexico after it was confirmed that a passenger onboard had handled a lab specimen from an Ebola-infected man from Liberia who subsequently died of the disease. Belize allowed the ship to dock, but did not allow the passenger to leave the ship.

This latest outbreak of the Ebola virus has also raised concerns about onboard training. With reduced crews it is often the Chief Mate or the Master that also act as the ship’s medical officer. “In many cases seafarers are not being adequately trained in their primary duty,” says Kinsey. “Now, we are putting increased pressure on the secondary and sometimes tertiary duties of being a medical officer and diagnosing infectious diseases such as Ebola. Are ports going to rely on someone that has basic medical training to make a diagnosis?”

Competition an increasing concern

There are also commercial risks to shipping to consider going forward. **"Intensified competition"** topped the **Allianz Risk Barometer** as the number one risk for the marine and shipping sector in 2015. While healthy competition has driven research and development into increasing ship sizes, intensified competition is a double-edged sword.

"The other side of this intensified competition is that companies that cannot afford larger ships to take advantage of economies of scale have to find ways to make themselves economically viable," explains Senior Marine Risk Consultant at Allianz Risk Consulting, AGCS, Captain Andrew Kinsey.

"Factors may include cutting crew wages and reducing the size of the crew and this has a direct impact on the potential for severe losses. Intensified competition is not only driving the major players into major infrastructure investment, it's also putting tremendous pressure on the mid- and lower- tier players to find ways to stay economically viable."

Dr. Sven Gerhard, Global Product Leader Hull & Marine Liabilities, AGCS concludes that intensified competition increases the risk of default of a charterer or supplier, with the **OW Bunker** bankruptcy a case in point. OW Bunker collapsed under the weight of losses of more than \$125m at its Asian subsidiary in November 2014, leaving ship operators exposed to claims from third party suppliers.

Marine & Shipping Top Five Risks

			2014 Rank	Trend
1	Intensified competition	29%	NEW	▲
2	Market fluctuations (e.g. foreign exchange rates/interest rates)	27%	NEW	▲
3	Natural catastrophes	27%	38% (1)	▼
4	Theft, fraud, and corruption	27%	24% (2)	▼
5	Political/social upheaval, war	21%	NEW	▲

Respondents could select more than one risk

Source: Allianz Risk Barometer 2015

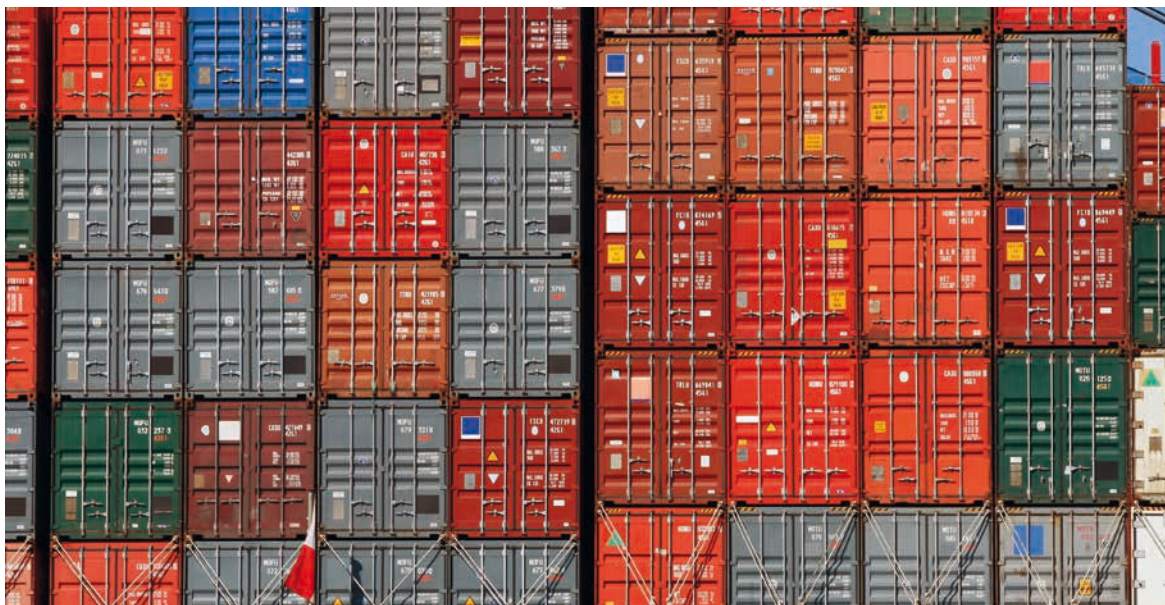
Major cyber attack on the horizon...

Inadequate cyber protection is a relatively new threat compared with traditional perils such as **ship grounding** – which was identified as the single top cause of loss for global businesses by value according to analysis of over **11,000** insurance claims over five years by AGCS in its **Global Claims Review 2014**. However, cyber risk is regarded by many as the major issue for the shipping industry going forward, particularly given that it is not inconceivable that an attack could ultimately result in a vessel grounding in future.

Three years ago a report by the European Network and Information Security Agency **Analysis of Cyber Security Aspects In The Maritime Sector**, noted that "The awareness on cyber security needs and challenges in the maritime sector is currently low to non-existent".

Improvement since then is hard to quantify. Today, a lack of robust cyber security is identified in the **Allianz Risk Barometer 2015** as a significant threat to future shipping safety by risk experts. The sector is regarded as being increasing vulnerable to a major attack. Crews becoming smaller (*see page 20*), ships becoming larger (*see page 24*), and a growing reliance on automation (*see page 19*) all significantly exacerbate the risks from hackers disrupting key systems.

A 2014 McAfee study **Estimating the Global Cost of Cybercrime** calculated cyber crime costs the global economy anywhere from **\$375bn** to **\$575bn** annually. Meanwhile, in its 2014 **Energy Market Review**, broker Willis said it is estimated that cyber attacks against oil



Hackers working with a drug smuggling gang have previously infiltrated the computerized cargo tracking system of a port in order to identify the shipping containers in which drugs were hidden^{xviii}

Photo: Shutterstock

and gas infrastructure will cost oil and gas companies **\$1.9bn** by 2018. The potential impact on the maritime sector is harder to determine. The number of known incidents is low, with many companies either unaware of the threat or reluctant to report them. However, considering more than **90% of global trade** is estimated to be carried by sea, much is at stake and at risk, with an increasing number of potential loss scenarios.

The interconnectivity of the maritime sector means a cyber attack in a key location, such as a major port, for example, could impact much of the shipping industry. Similarly, the ability to remotely interfere with the control of a ship, close terminals, access or interfere with containers or confidential data could result in significant business interruption costs, notwithstanding the costs associated with any resulting liability and reputational issues.

Of particular concern is the threat to navigation via key technologies such as the Electronic Chart Display and Information System (**ECDIS**), says Klimczak. **GPS** (Global Positioning System) and **AIS** (Automatic Identification System) have also been identified as being potentially vulnerable to attack.

“Many of these e-navigation systems may be updated via the internet and if a false update is downloaded you will end up with a casualty. The navigation system is just one element of an integrated, complex information process which can be accessed directly, as well as from outside. Whenever there are electronics and there is an advanced computer system there is always a threat that the system can be hacked. This threat is real and imminent and is very concerning,” Klimczak adds.

Kinsey adds that many firewalls onboard ships are often not able to provide an adequate level of cyber protection as to do so would stop “dialogue” between different systems. “We have a situation where there are so many different vendors supplying equipment onboard. Those systems need to communicate with each other, otherwise they would not be able to operate.” Such potential areas of weakness will increasingly make ships enticing targets for hackers.

“We should act proactively and prepare for this, simulating a scenario where this can happen and then identifying mitigation strategies,” Khanna adds. “Cyber risk may still be in its infancy in shipping but we need to take this threat very seriously going forward.”

Gerhard believes that a future claim related to a cyber attack could be “tremendous”, potentially resulting in a total loss of the vessel, leading to substantial insurance claims for hull, cargo and P&I underwriters. It could even involve multiple vessels from the same company.

“Is the shipping industry aware of this? Is it prepared and does it understand the full impact of cyber risks on its system?” Gerhard asks.

“What will concern us much more in future is the connection between computer technology on board and the risk of crime. If a virus intrudes into the IT-based steering of the machine or into navigation systems what will then happen? Such cyber risks will become a focus topic for us as a marine insurer.”

The IMO, through MSC, also has cyber protection on its radar. It is considering a proposal to develop voluntary guidelines on cyber security practices to protect and enhance the resiliency of cyber systems supporting the operations of ports, vessels and marine facilities^{xix}.

“A future claim related to a cyber attack could be ‘tremendous’, potentially resulting in a total loss of the vessel. It could even involve multiple vessels from the same company”

Drone ships

The idea of **unmanned ships** has been discussed in earnest for many years, however progress on making the concept a reality has been slow. But manufacturer Rolls Royce Holdings is keen to inject life into that process with the launch of its vision of so-called **drone ships**. It believes that the industry could see unmanned cargo ships brought into service before the end of the decade. Its prediction compliments the research of the EU-financed Maritime Unmanned Navigation through Intelligence (**MUNIN**) project, which aims to develop its own autonomous ship.

Gerhard believes unmanned ships could offer an alternative for short sea shipping, while Kinsey suggests a convoy formation with manned vessels escorting and tracking to “hold the leash” of the unmanned ships. However, AGCS experts believe it could be decades rather than years before the industry is ready for commercial use of drone ships. The susceptibility of unmanned ships to cyber attacks is another risk that needs to be considered.

Key risks to the future safety of shipping

Automation	Passenger ship safety
Big data	Piracy
Cat fines	Places of refuge
Competition	Quality of crew
Construction standards	Safe minimum crewing levels
Criminalization of seafarers	Search and rescue challenges
Cyber attacks	Slow steaming
Dangerous cargo classification	Substandard operators
Electronic navigation	Training standards
Emergency preparedness	Unmanned ships
Fallen states	War risks
Human trafficking	
Hours of rest regulations	
Ice shipping	
Increasing ship sizes	
Lifeboat drills	
Liquefaction	
LNG as a fuel	
Loss of power	
Misappropriation of cargoes	
Natural catastrophes	



Photo: Shutterstock

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Data & sources

The primary data source for total loss and casualty statistics is Lloyd's List Intelligence Casualty Statistics (data run January 26, 2015). Total losses are defined as actual total losses or constructive total losses recorded for vessels of 100 gross tons or over (excluding for example pleasure craft and smaller vessels) as at the time of the analysis.

Some losses may be unreported at this time, and as a result, losses (especially for the most recent period) can be expected to increase as late loss reports are made. As a result, this report does not provide a comprehensive analysis of all maritime accidents, due to the large number of minor incidents, which do not result in a "total loss" and to some casualties which may not be reported in this database.

This year's study analyzes reported shipping losses on a January 1 to December 31 basis.

All \$ US unless stated.

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