Allianz Global Corporate & Specialty

Safety and Shipping **Review 2017**

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

Allianz

The **Modern Express** was one of the largest total losses recorded during 2016.
Photo: iStock

The **Ocean Dream** cruise ship had been abandoned by its owner for over a year before it sank.
Photo: ShipSpotting.com.

CAN S 1 was one of the total losses in the East Mediterranean in 2016 – the top incident hotspot.
Photo: ShipSpotting.com

Executive Summary

International shipping transports approximately **90%** of world trade[i], so the safety of vessels is critical to the global economy. The maritime industry saw the number of total shipping losses decline during 2016 to **85**. The number of shipping incidents (casualties) also declined year-on-year.

Shipping losses declined by 16% compared with a year earlier **(101)**. The preliminary figures for the accident year show a significant improvement on the 10-year loss average **(119)** – down 29%. Large shipping losses have also declined by 50% over the past decade, driven by improved regulation and the development of a more robust safety culture. However, disparities by region and vessel type remain. The recent downturn in the shipping economy could also be a factor in benign loss activity.

More than a quarter of losses in 2016 **(23)** occurred in the South China, Indochina, Indonesia and Philippines maritime region, which has been the top loss hotspot for a decade. While losses in this region remain stable year-on-year, the total is still almost double that of the next highest loss region – East Mediterranean and Black Sea **(12)**. Losses are up year-on-year in the following maritime regions: Japan, Korea and North China; East African Coast; South Atlantic and East Coast South America; and the Canadian Arctic and Alaska.

Cargo vessels **(30)** account for more than a third of 2016's losses. Passenger ferry losses are up year-on-year **(8)**, driven by activity in South East Asia and the Mediterranean. Foundered (sunk/submerged) is the most common cause of all vessel losses, accounting for over half, often driven by bad weather. The number of losses resulting from fire/explosion **(8)** is up slightly year-on-year.

There were **2,611** reported shipping casualties during 2016, down **4%**. Machinery damage/engine failure is the main cause and was also responsible for driving a **16%** increase in the top hotspot – the East Mediterranean & Black Sea region.

Growing complexity and interconnectivity of shipping risk: While the decline in the number of total losses and casualties is encouraging, there is no room for complacency, especially at a time of inherent economic challenges. Environmental scrutiny is increasing with record fines being issued for pollution. New ballast water management rules aimed at stopping the spread of harmful aquatic organisms are welcomed, but will also add a significant cost and potentially bring new risks to shippers. Political risk is rising with Yemen and the South China Sea posing increasing threats.

The collapse of **Hanjin Shipping** exposed the perilous state of some parts of the shipping industry, as trade growth has slowed at a time of record capacity. Bankruptcies are on the rise and economic strains have led to cost-cutting. **Crew negligence and inadequate vessel maintenance** are two increasing areas of risk. An increase in maintenance-related claims has already been observed. According to AGCS negligence/poor maintenance is one of the top causes of liability loss in the shipping sector[ii], so rigorous inspection and maintenance regimes are crucial.

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, 2016**. It follows the **Safety and Shipping Review 2016** by Allianz Global Corporate & Specialty (AGCS) available at **www.agcs.allianz.com**

85
losses

in 2016

28
years

Average age of vessels lost in 2016

Friday is the most frequent day for shipping losses with **Saturday** being the safest day.

Economic pressure in the shipping industry could accelerate the trend towards larger, more efficient ships. Such **'mega ships'** may promise greater efficiencies but they also bring new risk challenges, such as salvage operations and the availability of suitable ports of refuge in the event of an incident. Exposures are increasing exponentially. The loss of a large container vessel or passenger ship in environmentally-sensitive waters could cost billions of dollars, potentially even resulting in a **$4bn** loss, if two large vessels are involved.

Concerns over the **structural integrity** of some larger vessels – particularly conversions – also remains an issue in the wake of a number of incidents and losses resulting from breaches in recent years. Industry stakeholders need to come together to address this issue.

Passenger ship and ferry losses continue to trouble as fire, storm and stability issues remain problematic. Despite decades of casualties, passenger ferry safety is still a major issue in some parts of Asia, driven by bad weather, poor maintenance, weak enforcement of regulations and passenger overcrowding. Elsewhere, fires on-board ferries are also a growing concern, with the failure of electrical equipment and undeclared or misdeclared cargo responsible for incidents.

There have also been a number of **fires on container ships at sea** recently, leading to concerns that safety systems have not kept pace with vessel sizes. More containers can mean locating and containing a fire is more challenging. However, first, there is a need for more accurate cargo manifests. It is estimated that more than a third of boxes containing dangerous goods are marked incorrectly, while approximately one-in-five have some other defect[iii]. If inaccurately documented cargo catches fire, crews may not know the best way to extinguish it.

Arctic casualties decrease but challenges remain: There were **55** reported shipping incidents in Arctic Circle waters during 2016, down by more than **20%**. However, more transits are expected. Shipping brings a number of risks such as a lack of hydrographic study, extreme conditions and the ability for salvagers to respond in the event of an incident. The introduction of this year's Polar Code should raise the bar for shipping, however it will need to be regularly updated to include any changes in risk conditions.

Piracy threat evolving as crew kidnappings rise: Piracy incidents may have hit an 18-year-low at the end of 2016 but an increase in kidnappings in parts of Asia and West Africa – and the return of activity in Somalia – shows the risks should not be underestimated. The **Sulu-Celebes Sea** has seen activity escalate.

Technology is driving safety improvements but over-reliance is a concern: Safety-enhancing technology is already finding its way into shipping. This could bring huge benefits, as it is estimated that **75% to 96%** of marine accidents can be attributed to human error[iv]. Information from voyage data recorders is already used in accident investigation but important safety lessons could also be learned by analyzing information from everyday operations. Conversely, a number of incidents have occurred where crews have relied too much on technology, particularly involving electronic navigation tools.

The cyber threat at sea grows: The risk of attack is significant. Ship-owners are often reluctant to share information for fear of being identified but the number of incidents that have resulted in loss of critical data, financial loss or IT problems is increasing. As much as **80%** of offshore security breaches could be the result of human error. To date, most attacks have been aimed at breaching corporate security, rather than taking control of the vessel but there are concerns that a major cyber-attack of this nature could occur in future. Cyber security should not be neglected at a time when crew, training and maintenance budgets are already under pressure. Standard practices, such as crew education and identifying measures to back up and restore systems, should be implemented to reduce cyber risk.

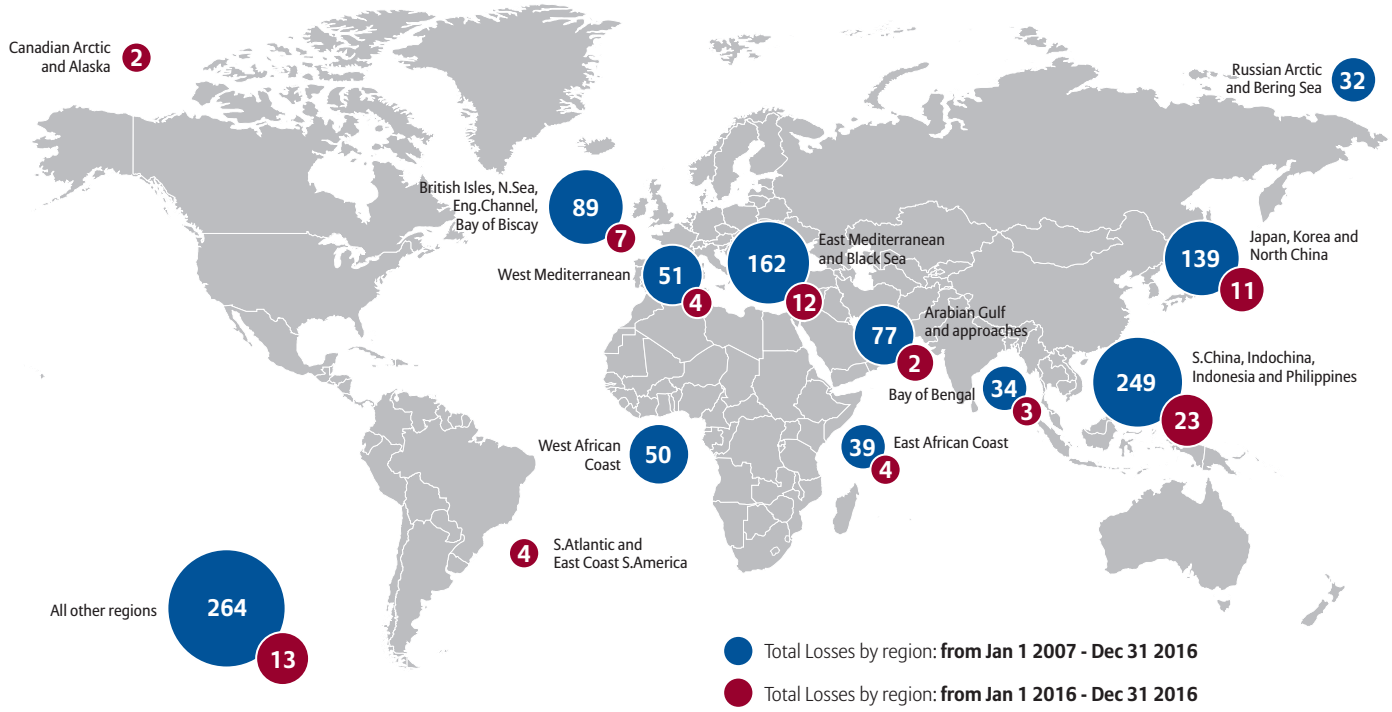
The development of autonomous shipping: AGCS analysis shows that human error accounts for approximately 75% of the value of almost 15,000 marine liability insurance claims analyzed over five years[v], equivalent to over $1.6bn. Autonomous vessels could improve maritime safety and revolutionize movement of cargo on a scale not seen since containerization. It is forecast that a remotely-operated local vessel could be in operation by 2020[vi]. Safety considerations will be crucial to the development of autonomous shipping with concern about the potential for collision between manned and unmanned vessels and challenges around regulation and liability issues. A critical element will be whether there will be sufficient backup if things go wrong.

i International Chamber of Shipping
ii Global Claims Review: Liability In Focus, Allianz Global Corporate & Specialty
iii International Cargo Handling Coordination Association
iv Safety & Shipping 1912-2012 From Titanic to Costa Concordia, Allianz Global Corporate & Specialty
v Global Claims Review: Liability In Focus, Allianz Global Corporate & Specialty
vi Rolls-Royce

2016: Losses in Focus

The analysis over the following pages covers both total losses and casualties/incidents.
See page 42 for further details.

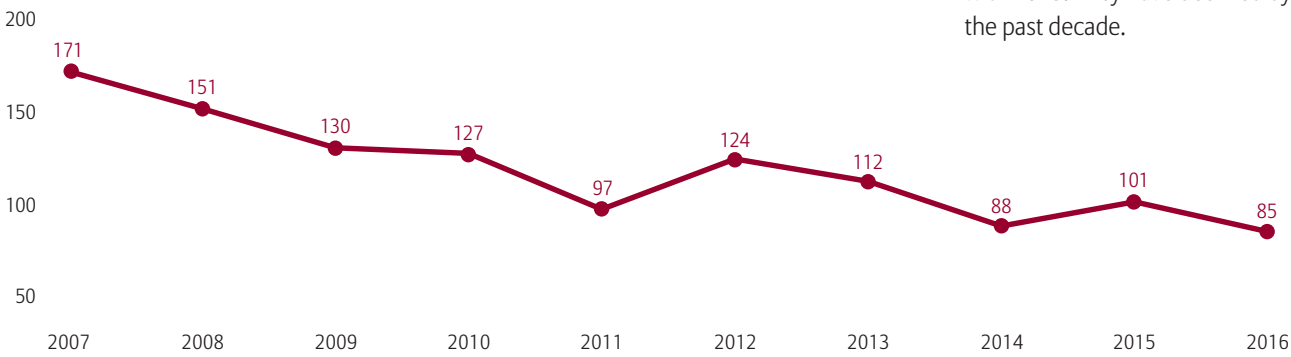
Total Losses by Top 10 Regions: 2007-2016 and 2016



Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

Total Losses by Year a declining trend

Shipping losses declined by 16% compared with 2015. They have declined by 50% over the past decade.



Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

Total Losses by Top 10 regions:
from January 1, 2016 to December 31, 2016

2016 REVIEW

2016: More than a quarter of losses occurred in the South China, Indochina, Indonesia and Philippines region (23). Over half of these incidents involved cargo vessels. Foundered was the top cause, accounting for 87% of losses in this region.

85 losses

in 2016.

10

shipping regions contain 85% of all losses.

Region	Loss Total	Year-on-year Change
S. China, Indochina, Indonesia and Philippines	23	
East Mediterranean and Black Sea	12	↓ 3
Japan, Korea and North China	11	↑ 1
British Isles, N. Sea, Eng. Channel, Bay of Biscay	7	↑ 2
East African Coast	4	↑ 1
S.Atlantic and East Coast S.America	4	↑ 2
West Mediterranean	4	
Bay of Bengal	3	↓ 1
Arabian Gulf and approaches	2	↓ 2
Canadian Arctic and Alaska	2	↑ 1
Other	13	↓ 13
Total Losses	**85**	**↓ 16**

Source: Lloyd's List Intelligence Casualty Statistics
Data Analysis & Graphic: Allianz Global Corporate & Specialty

Total Losses by Top 10 regions:
from January 1, 2007 to December 31, 2016

2007 - 2016 REVIEW

2007 - 2016: The 2016 accident year (85) represents a significant improvement on the rolling 10-year loss average (119) - down 29%. South China, Indochina, Indonesia and Philippines (249) has been the top loss hotspot for a decade.

1,186 losses

between 2007 and 2016.

3 shipping regions account for almost half (46%) of all losses over the past 10 years.

Region	Loss Total
S. China, Indochina, Indonesia and Philippines	249
East Mediterranean and Black Sea	162
Japan, Korea and North China	139
British Isles, N. Sea, Eng. Channel, Bay of Biscay	89
Arabian Gulf and approaches	77
West Mediterranean	51
West African Coast	50
East African Coast	39
Bay of Bengal	34
Russian Arctic and Bering Sea	32
Other	264
Total Losses	**1,186**

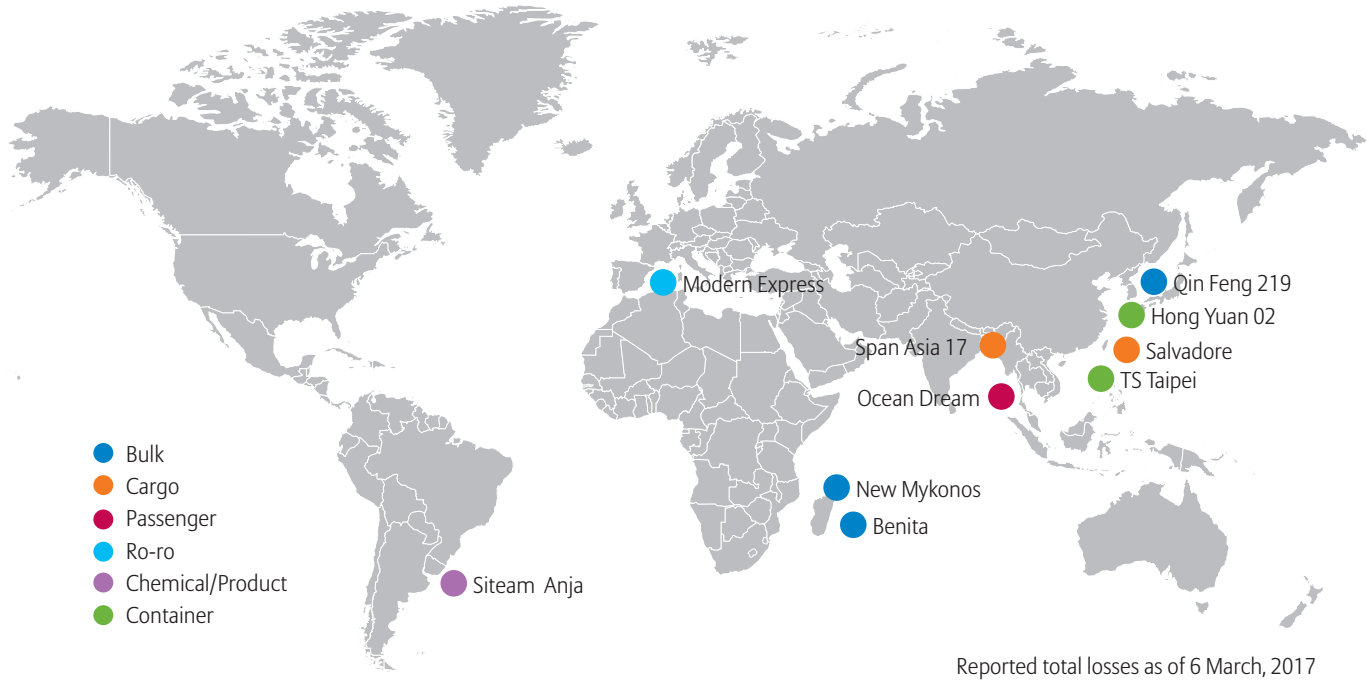
All figures are based on reported losses as of **6 March, 2017**. 2016 total losses may increase slightly, as based on previous years' experience; developments in losses lead to a number of total losses being confirmed after year-end. The average variance over the past nine years has been an increase of fewer than three total losses, but in some years this varies, with up to 16 additional losses being notified for one year.

Source: Lloyd's List Intelligence Casualty Statistics
Data Analysis & Graphic: Allianz Global Corporate & Specialty

Major Losses: 2016

Largest ships lost

10 largest vessels lost from January 1, 2016 to December 31, 2016
(showing approximate location of loss and type of vessel)



Reported total losses as of 6 March, 2017

Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

Largest vessels

New Mykonos
28 February 2016. Ran aground off Talagnaro, Madagascar. Finally sank 13 May. **81,152 GT**

Modern Express
26 January 2016. Listing 45 degrees after cargo shifted. Crew evacuated. Taken to Bilbao, Spain. Sent for break-up. **33,831 GT**

Siteam Anja
17 May 2016. Grounded off Punta del Este after engine room flooding. Towed to Rio Janeiro, Brazil. Sent for break-up. **28,027 GT**

Benita
17 June 2016. Grounded on reefs/rocks off Mahebourg, Mauritius. Sank 30 July. **24,953 GT**

Hong Yuan 02
16 December 2016. Ran aground on a reef west of Small Huanglong Island, north of Zhousan, China. Water ingress. Submerged. **23,734 GT**

Qin Feng 219
7 July 2016. Deliberately grounded by ballasting south of Taizhou, Luqiao District, China. Hull breach, water ingress. **22,257 GT**

Ocean Dream
27 February 2016. Capsized and sank off Laem Chabang breakwater. **17,042 GT**

TS Taipei
10 March 2016. Hull bottom breached, water ingress in bad weather off New Taipei City. Crew rescued. Broken in two, 25 March. **15,487 GT**

Span Asia 17
21 May 2016. Drifted ashore at Sitakunda, Chittagong, during Cyclone Roanu. **9,754 GT**

Salvadore
24 February 2016. Ran aground and partially sank, Jibei Island, Taiwan. Crew rescued. **8,575 GT**

Fewer losses: Improving safety or economic slowdown?

Maritime safety has been improving in recent years, driven by continually evolving regulation and the development of a more robust safety culture. Many ship-owners are now much more proactive around safety than they were in the past.

The decline in the number of total losses and incidents (casualties) *[see page 13]* year-on-year, combined with the reduction in mid-sized claims seen in recent years, is likely to be a reflection of this improving safety culture and this bodes well for the shipping industry. However, it should not be complacent.

The recent downturn in shipping is also likely to be a contributing factor to more benign loss activity, as this has led to fewer voyages, slow steaming and an increasing number of vessels in lay-up, particularly in the offshore sector.

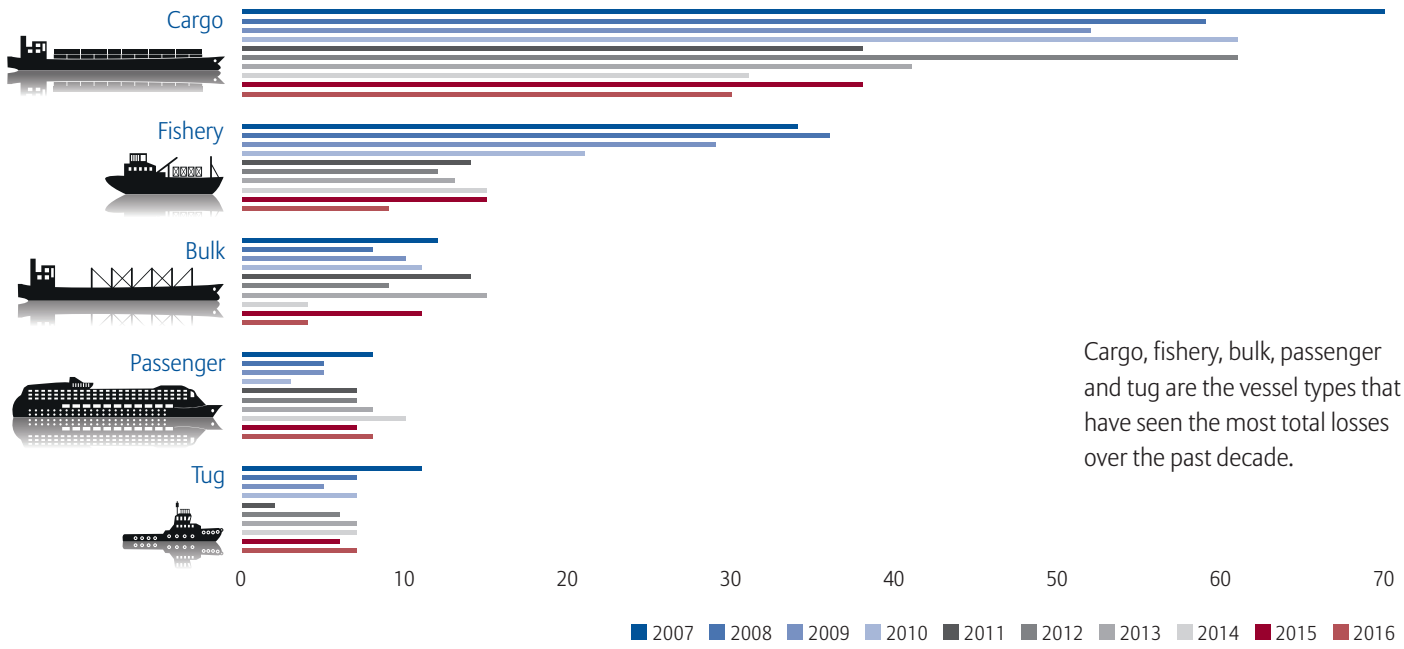
Conversely, economic strains have led to cost-cutting in the sector, which could potentially have negative implications for maintenance, training, qualified personnel and, ultimately, loss activity in future.

The **Modern Express** during its scrapping at Aliağa.
Photo: Wikimedia Commons

Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

Total losses by type of vessel 2007-2016

Top 5 vessel types lost



Cargo, fishery, bulk, passenger and tug are the vessel types that have seen the most total losses over the past decade.

All vessel types lost

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Cargo	70	59	52	61	38	61	41	31	38	30	**481**
Fishery	34	36	29	21	14	12	13	15	15	9	**198**
Bulk	12	8	10	11	14	9	15	4	11	4	**98**
Passenger	8	5	5	3	7	7	8	10	7	8	**68**
Tug	11	7	5	7	2	6	7	7	6	7	**65**
Chemical/Product	6	7	9	6	2	8	10	2	3	6	**59**
Ro-ro	5	8	6	1	3	5	2	5	6	8	**49**
Other	7	5	5	3	5	3	6	4	4	3	**45**
Container	3	2	4	5	3	6	4	4	5	3	**39**
Supply/Offshore	5	1	3	2	2	3	2	3	3	2	**26**
Barge	6	3		1			3	1		2	**16**
Dredger	2	5		2	2	2		1	1	1	**16**
Tanker	1	3	2	3	4	1		1			**15**
Unknown	1	1					1		2	1	**6**
LPG		1		1	1	1				1	**5**
Total	**171**	**151**	**130**	**127**	**97**	**124**	**112**	**88**	**101**	**85**	**1,186**

Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

Cargo vessels (41%) and fishing vessels (17%) account for almost 60% of the 1,186 losses over the past decade.

The tanker industry has made great strides in safety in recent years, enjoying an extended period of benign loss activity. It has been excellent at pursuing self-regulation and maintaining high standards. Coastal passenger, cargo and fishing vessels could learn from its safety culture, benefiting from a more proactive approach to investment in safety management systems, training and spare parts.

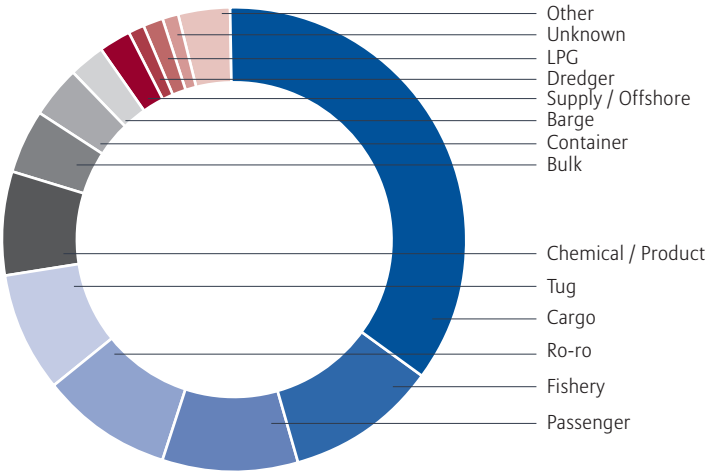
The tanker sector has seen just 15 total losses over the past decade, according to the analysis.

Photo: iStock

Total Losses by type of vessel

January 1, 2016 - December 31, 2016

2016 REVIEW



Source: Lloyd's List Intelligence Casualty Statistics
Data Analysis & Graphic: Allianz Global Corporate & Specialty

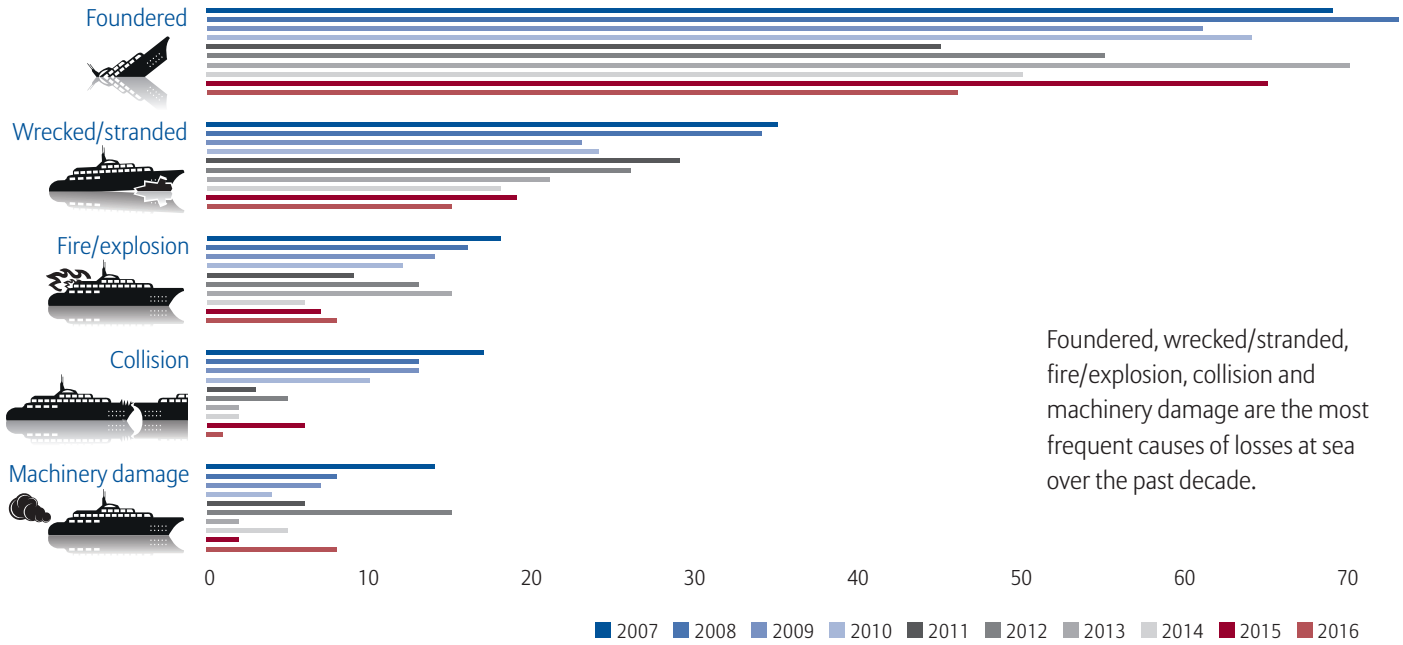
Cargo	30
Fishery	9
Passenger	8
Ro-ro	8
Tug	7
Chemical / Product	6
Bulk	4
Container	3
Barge	2
Supply / Offshore	2
Dredger	1
LPG	1
Unknown	1
Other	3
Total	**85**

Cargo vessels accounted for over a third of vessels lost during 2016, although activity was down year-on-year. Passenger ferry losses were up year-on-year (8), driven by activity in South East Asia and the Mediterranean.

An unusual loss was the **17,042 GT Ocean Dream**. The cruise ship had been anchored and abandoned by its Chinese owner for over a year before it capsized off the coast of Thailand.

Causes of Total Losses 2007-2016

Top 5 causes of loss



Foundered, wrecked/stranded, fire/explosion, collision and machinery damage are the most frequent causes of losses at sea over the past decade.

All causes of loss

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Grand Total
Foundered (sunk, submerged)	69	73	61	64	45	55	70	50	65	46	**598**
Wrecked/stranded (grounded)	35	34	23	24	29	26	21	18	19	15	**244**
Fire/explosion	18	16	14	12	9	13	15	6	7	8	**118**
Collision (involving vessels)	17	13	13	10	3	5	2	2	6	1	**72**
Machinery damage/failure	14	8	7	4	6	15	2	5	2	8	**71**
Hull damage (holed, cracks, etc.)	11	4	8	4	3	7	1	4	2	4	**48**
Miscellaneous	3	1	2	6	1	1	1	2		1	**18**
Contact (e.g harbor wall)	2	1	1			2		1			**7**
Missing/overdue	1	1		1						2	**5**
Piracy	1		1	2	1						**5**
Grand Total	**171**	**151**	**130**	**127**	**97**	**124**	**112**	**88**	**101**	**85**	**1,186**

Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

Causes of Total Losses

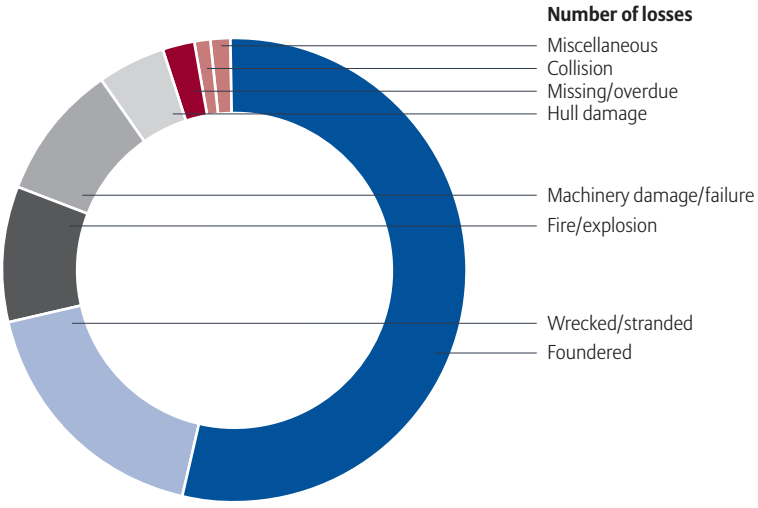
January 1, 2016 - December 31, 2016

2016 REVIEW

Foundered (sunk, submerged) has been the cause of over half of all total losses over the past decade and accounted for a similar share of all losses through 2016. Bad weather is often a factor.

The number of total losses resulting from fire/explosions increased slightly year-on-year (8) and included one case of suspected arson.

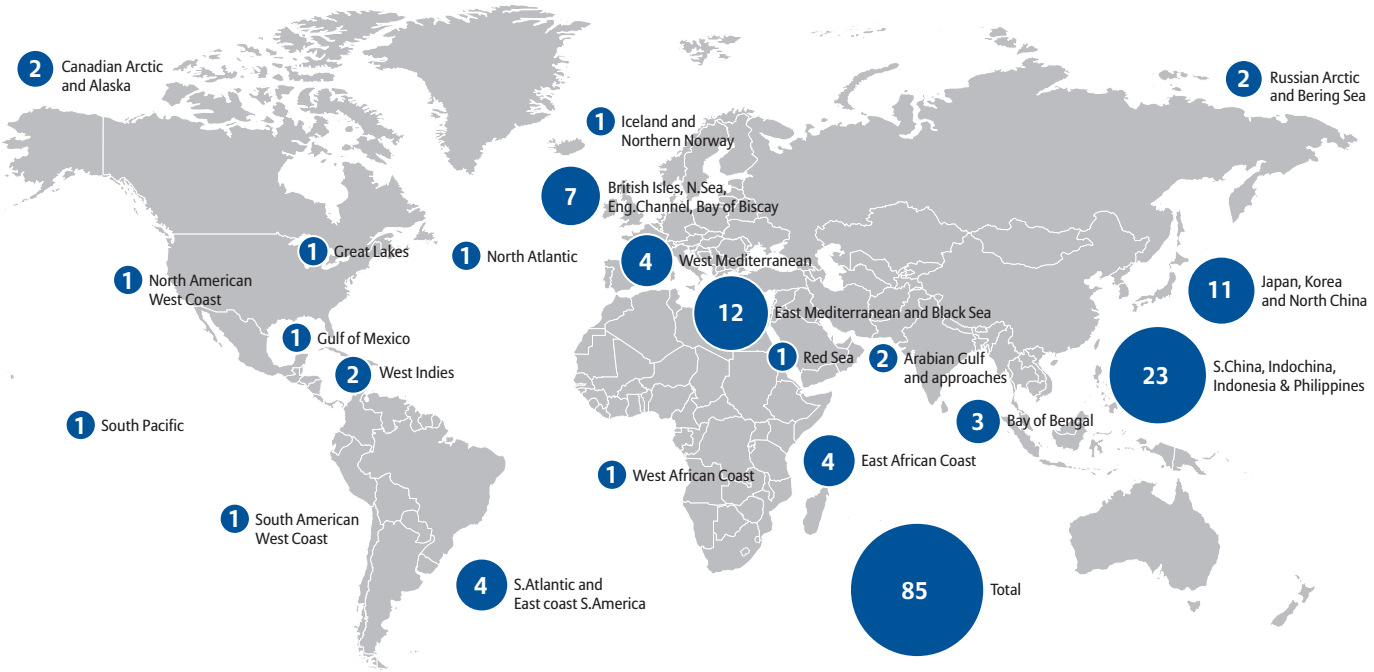
Foundered	46
Wrecked/stranded	15
Fire/explosion	8
Machinery damage/failure	8
Hull damage	4
Missing/overdue	2
Collision	1
Miscellaneous	1
Total	**85**



Source: Lloyd's List Intelligence Casualty Statistics
Data Analysis & Graphic: Allianz Global Corporate & Specialty

2016 Total Losses in all regions

This map shows the approximate locations of all 85 reported total losses during 2016.



Regional loss rankings		Losses	% share
1	South China, Indochina, Indonesia & Philippines	23	(27%)
2	East Mediterranean & Black Sea	12	(14%)
3	Japan, Korea and North China	11	(13%)
4	British Isles, North Sea, English Channel & Bay of Biscay	7	(8%)
5	East African Coast	4	(5%)
5	South Atlantic and East Coast South America	4	(5%)
5	West Mediterranean	4	(5%)
8	Bay of Bengal	3	(4%)
9	Arabian Gulf and approaches	2	(2%)
9	Canadian Arctic and Alaska	2	(2%)
9	Russian Arctic and Bering Sea	2	(2%)
9	West Indies	2	(2%)
13	Great Lakes	1	(1%)
13	Gulf of Mexico	1	(1%)
13	Iceland and Northern Norway	1	(1%)
13	North American West Coast	1	(1%)
13	North Atlantic	1	(1%)
13	Red Sea	1	(1%)
13	South American West Coast	1	(1%)
13	South Pacific	1	(1%)
13	West African Coast	1	(1%)

Reported data as of 6 March, 2017

Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

All Casualties including Total Losses

- Top 10 regions: **2016**

2016: The East Mediterranean and Black Sea region has been the location of the most shipping incidents (casualties) for the past five years. 2016 saw a significant uptick in activity in this region, up 16% year-on-year. This was driven by machinery damage/engine failure, which caused over half (54%) of these incidents.

2,611 casualties in 2016

Down **4%** year-on-year

37% of casualties

Caused by machinery damage in 2016 (969)

Region	Casualty Total	Year-on-year Change
East Mediterranean and Black Sea	563	↑ 78
British Isles, N. Sea, Eng. Channel, Bay of Biscay	370	↑ 30
S. China, Indochina, Indonesia and Philippines	241	↓ 48
North American West Coast	143	↑ 22
Baltic	140	↓ 32
Japan, Korea and North China	125	↓ 46
Great Lakes	115	↓ 1
West Mediterranean	109	↑ 32
West African Coast	85	↑ 30
Iceland and Northern Norway	82	↓ 51
Other	638	N/A
Total Casualties	**2,611**	↓ 95

Source: Lloyd's List Intelligence Casualty Statistics.
Data Analysis & Graphic: Allianz Global Corporate & Specialty

2016 REVIEW

These figures include total losses of 85 during this period.

All Casualties including Total Losses - Top 10 regions: **2007 to 2016**

2007-2016: The recent uptick in casualty activity means that the East Mediterranean and Black Sea region replaces the British Isles, N.Sea, Eng. Channel, Bay of Biscay as the location with the most shipping incidents over the past decade. Machinery damage is the top cause of shipping incidents globally (32%). Collision ranks second (15%) with wrecked/stranded third (15%).

25,898 casualties

Over the past decade

17% of incidents in the East Mediterranean and Black Sea

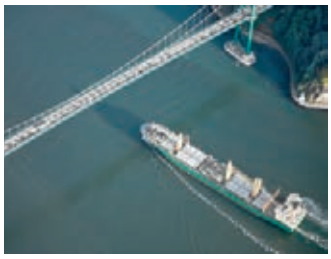
East Mediterranean and Black Sea	4,401
British Isles, N. Sea, Eng. Channel, Bay of Biscay	4,198
S. China, Indochina, Indonesia and Philippines	2,162
Japan, Korea and North China	1,753
Baltic	1,678
Great Lakes	1,289
Iceland and Northern Norway	1,031
West Mediterranean	935
North American West Coast	884
Gulf of Mexico	752
Other	6,815
Total Casualties by Region	**25,898**

Source: Lloyd's List Intelligence Casualty Statistics.
Data Analysis & Graphic: Allianz Global Corporate & Specialty

2007 - 2016 REVIEW

These figures include total losses of 1,186 during this period.

Recent developments in Review:



Some 170 million containers are loaded onto ships each year. Misdeclared cargo poses a threat to ship stability.

Photo: iStock

Safety responses round-up

The United Nations' global shipping regulator, the International Maritime Organization (IMO) has continued its commitment to safety and environmental improvements over the past year with a number of initiatives

Over 50 countries have now ratified the BWM Convention.

Photo: iStock

- These included the launch of a four-year project establishing **Maritime Technology Cooperation Centers (MTCCs)** in five regions – Africa, Asia, the Caribbean, Latin America and the Pacific – to address energy efficiency and shipping emissions in an effort to curb climate change[i].

- Similarly, the IMO's Marine Environment Protection Committee (MEPC) has also adopted **mandatory requirements for ships to record and report fuel consumption**. Under the system, ships of 5,000 GT and above will be required to collect data for each type of fuel they use. The data collection requirements are expected to enter into force in 2018. These ships account for approximately 85% of CO2 emissions from international shipping[ii].

- 1 January, 2020, has been set as the implementation date for a **significant reduction in the sulphur content of the fuel oil used by ships**. The decision to implement a global sulphur limit of 0.50% m/m (mass/mass) compared with 3.5% m/m today - was taken by the IMO during its MEPC 70th session meeting in London and demonstrates a clear commitment to ensuring shipping meets its environmental obligations[iii].

- The process to verify global tonnage figures in order to assess entry into force criteria for the **International Convention for the Control and Management of Ships' Ballast Water and Sediments (the BWM Convention)**, which aims to protect the marine environment from the transfer of harmful aquatic organisms in ballast water carried by ships, has now been completed. Over 50 countries have now ratified the convention, more than the 30 required. However, IMO Secretary-General Kitack Lim has urged countries that have not already done so to ratify the convention as soon as possible[iv]. The BWM Convention will enter into force on 8 September 2017 *(see page 28)*.

- Some 170 million containers are loaded onto ships each year. A new regulation requiring the **gross mass of a container to be verified before it is loaded onto a ship** entered into force on 1 July 2016. The aim of the amendments to **SOLAS regulation VI/2** is to ensure containers carried on ships each year are optimally stowed, thereby helping to prevent collapses, containers being lost overboard, and injury and loss of life[v].

i http://www.imo.org/en/MediaCentre/PressBriefings/Pages/01-2016-MTCC-.aspx
ii www.imo.org/en/MediaCentre/PressBriefings/Pages/28-MEPC-data-collection--.aspx
iii http://www.imo.org/en/MediaCentre/PressBriefings/Pages/MEPC-70-2020sulphur.aspx
iv http://www.imo.org/en/MediaCentre/PressBriefings/Pages/06-BWM-.aspx
v http://www.imo.org/en/MediaCentre/PressBriefings/Pages/New-ship-safety-rule-to-prevent-loss-of-containers-enters-into-force.aspx

- At its 96th session meeting, the IMO's Maritime Safety Committee (MSC) adopted amendments to **SOLAS regulations III/3 and III/20** to make mandatory the requirements for maintenance, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear. This package of provisions, with an expected entry into force date of 1 January 2020, aims to prevent accidents with survival craft and addresses longstanding issues such as the need for uniform, safe and documented servicing standards[i].

- The MSC also approved interim guidelines on maritime cyber risk management, aimed at enabling stakeholders to take the necessary steps to safeguard shipping from current and emerging threats and vulnerabilities related to digitization. The guidelines include background information, functional elements and best practices for effective cyber risk management[i].

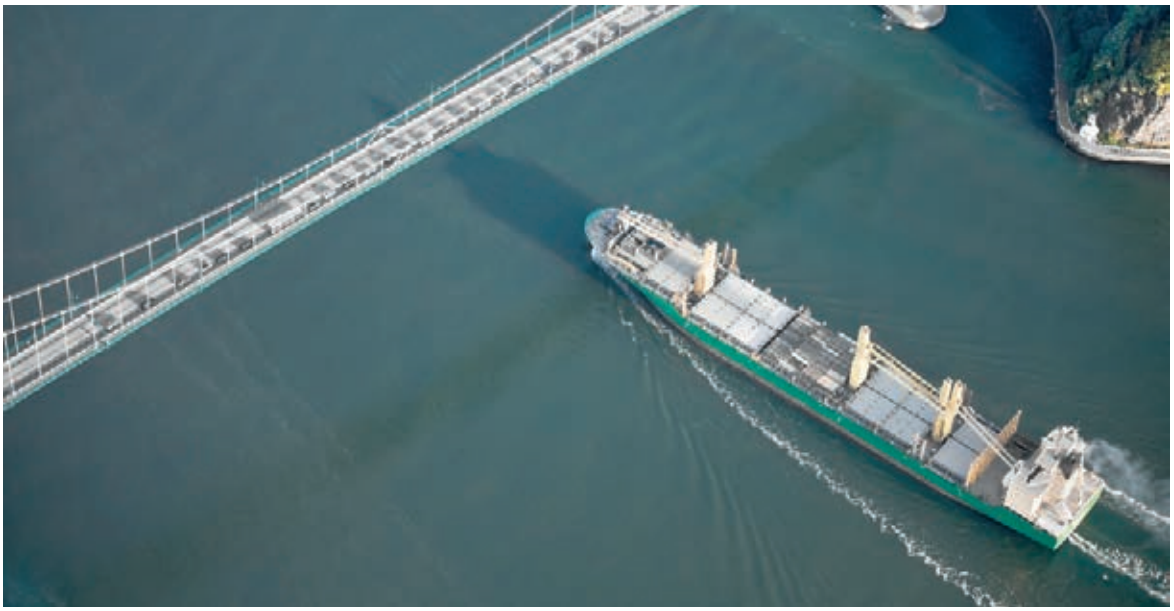
- At its 97th session meeting, the MSC adopted interim recommendations for carriage of liquefied hydrogen in bulk, which have been developed as the **International Gas Carrier (IGC) Code** does not specify requirements. The interim recommendations include: the provision of portable hydrogen detectors for each crew member working in the cargo area; a selection of fire detectors for detecting hydrogen fire; and appropriate safety measures to prevent formation of an explosive mixture in the case of a leakage of hydrogen[ii].

- The MSC also approved draft amendments to paragraphs 4.5.1 and 4.5.2 of the **International Maritime Solid Bulk Cargoes Code (IMSBC Code)** to emphasize the responsibility of the shipper for ensuring that a test to determine the transportable moisture limit (TML) of a solid bulk cargo, as well as sampling and testing for moisture content, are conducted. Cargo liquefaction remains a concern for the industry. The draft amendments will be put forward for subsequent adoption by **MSC 98** together with the next set of draft amendments to the IMSBC Code, set to be adopted in 2017 with entry into force in 2020[ii].

- At its 97th meeting, the MSC also adopted amendments on a recommendation to governments to take into account safety of navigation when multiple structures at sea, such as wind turbines, are being planned. The amendment would add a new paragraph in the **General Provisions on Ships' Routeing (resolution A.572(14), as amended)**. It recommends that sufficient maneuvering space extending beyond the side borders of traffic separation schemes should be provided to allow evasive maneuvers and contingency planning by ships making use of routing measures in the vicinity of multiple structure areas.

- **Record penalty for deliberate vessel pollution**
  The shipping industry is facing increasing environmental scrutiny. In April 2017, a US federal judge imposed a record **$40m** fine on Princess Cruise Lines after it pleaded guilty to the illegal dumping of oil-contaminated waste off the south coast of England from the **Caribbean Princess** cruise ship. The US Department of Justice also announced it would be placed on probation for five years[iii].

i www.imo.org/en/MediaCentre/MeetingSummaries/MSC/Pages/MSC-96th-session.aspx
ii www.imo.org/en/MediaCentre/MeetingSummaries/MSC/Pages/MSC-97th-session.aspx
iii www.justice.gov/opa/pr/princess-cruise-lines-pay-largest-ever-criminal-penalty-deliberate-vessel-pollution



The maritime sector is entering a period of considerable change and unrest from economic pressures, technology and narrowing margins.

Photo: iStock

Outlook: Growing complexity and interconnectivity of marine risk

The shipping industry forms a critical link in the global supply chain. But the maritime industry is being buffeted by a number of interconnected risks at a time of inherent economic challenges

"We continue to see improvements in maritime safety, but the price of safe navigation is constant vigilance. Maritime trade may appear a constant but it is not. There are new risks and change driven by internal and external forces," explains **Captain Andrew Kinsey, Senior Marine Risk Consultant at AGCS**.

Environmental regulations are increasing, with new rules for ballast water management *(see page 28)* and the Polar Code *(see page 25)* coming into force in 2017.

"The shipping industry is moving in the right direction in addressing its environmental responsibilities. But this comes at a huge cost, as shipping is already reeling from severe economic pressures," says **Captain Rahul Khanna, Head of Marine Risk Consulting at AGCS**. "However, there can be no turning back from environmentally-sustainable shipping."

Political risks are also shifting, with changes in piracy risk, increasing tensions in the South China Sea and conflict in Yemen. Technology is another area of change for shipping as the industry tests the waters with increased automation and growing reliance on e-navigation.

"These are all additional challenges and pressures hitting the maritime industry at a time of economic stress – when the industry is least able to cope and absorb additional risk," says Kinsey.

"The maritime sector is entering a period of considerable change and unrest from economic pressures, technology and political factors. There is a perfect storm of increasing regulation and narrowing margins."

Although these risks and challenges seem unrelated, they are in fact interconnected, and could amount to fundamental changes in maritime risks in the future. For example, political risks in the Middle East or Asia could influence major shipping routes, with a shift in favor of the Panama Canal or, long-term, into Arctic waters.

Economic pressures and environmental concerns could also impact shipping routes, while at the same time encouraging ship owners to seek efficiencies in technology and larger vessels.

For insurers, this will mean changes to the way underwriters assess risks in the maritime industry, explains Kinsey.

"Insurers base their underwriting on historical data. But we are increasingly having to evaluate risk for new types of vessels and technology, transiting new routes and using new forms of cargo movements. There will be new risks and new practices," says Kinsey.

It is estimated that some 500,000 teu, worth $12bn, was on more than 100 ships around the world when Hanjin filed for bankruptcy protection.
Photo: Shutterstock

After Hanjin - economic pressures continue to bite

Crew negligence and inadequate vessel maintenance are increasing areas of risk in the current tough shipping environment

The collapse of South Korea's **Hanjin Shipping** in 2016 exposed the perilous state of some parts of the shipping industry. It is estimated that some **500,000 teu**, worth an estimated **$12bn**, was on more than 100 ships around the world[i] when Hanjin filed for bankruptcy protection, throwing ports and retailers around the world into confusion. Previously one of the world's top 10 shipping companies, the firm was declared bankrupt by a South Korean court in February 2017.

"Hanjin will not be an exception," says **Nicolas Thoreau, Regional Head of Marine Hull, Asia, AGCS**. "We have recently seen more bankruptcies, ranging from small to larger carriers. Mergers, acquisitions and alliances are more and more the new norm to building a sustainable future."

For example, Thoreau notes that in Japan, the country's big three container shipping companies - K Line, MOL and NYK Line - recently announced a joint venture (Ocean Network Express). "The move will allow Ocean Network Express to better meet customers' needs by providing high-quality competitive services through the consolidaton and enhancement of the three companies' global networks and service structures," K Line said[ii].

"Market developments" remains the biggest risk in the shipping sector, according to those questioned for the Allianz Risk Barometer 2017.

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 carry 19,224 standard containers or, if it was so inclined, **2.4 million microwaves**.

Top risks in Marine & Shipping 2017: Allianz Risk Barometer

			2016 rank	Trend
1	Market developments (volatility, intensified competition/new entrants, M&A, market stagnation, market fluctuation)	**35%**	1 (46%)	-
2	Business interruption (incl. supply chain disruption, and vulnerability)	**28%**	3 (31%)	↑
2	Theft, fraud, corruption	**28%**	2 (33%)	-
4	Natural catastrophes (e.g. storm, flood, earthquake)	**23%**	4 (30%)	-
5	Human error	**22%**	NEW	↑

82 responses

Source: Allianz Risk Barometer 2017. Figures represent the number of responses as a percentage of all responses. More than one risk selected.

i www.bdpinternational.com/news-advisories-events/trend-watch/hundreds-shippers-still-waiting-cargo-hanjin-boxes-held-hostage-pocket-ports/
ii worldmaritimenews.com/archives/221423/japan-trios-jv-to-be-named-ocean-network-express/

Growth in trade has slowed at a time of record capacity in the shipping industry. According to shipping analyst Clarksons,[iii] the global commercial shipping fleet currently totals 1,861.9m dwt, over 50% larger than at the start of 2009. In contrast, growth in global trade in 2016[iv] was at its lowest level since 2009, according to the World Trade Organization.

"When debt levels are high and earnings are low, many ship-owners will look to make cost savings, with implications for maintenance budgets, training and crew," says **Chris Turberville, Head of Marine Hull & Liabilities, UK, AGCS**. This raises concerns about how such measures could impact safety and claims activity further down the line.

"When companies are stretched so thin, crew costs are an easy target and it is tempting to reduce manning levels or seek cheaper contracts," says Kinsey. "Having spent 25 years at sea, including 13 years as a master, I know that the safety of crew and cargo is paramount. But safety decisions should not be made on the basis of cost."

"Crew negligence and inadequate vessel maintenance are potentially increasing areas of risk in the current tough economic shipping environment, particularly if ship-owners opt to recruit crew with less experience and fewer qualifications in order to save money, or choose to stretch maintenance work to the longest possible intervals," adds **Duncan Southcott, Global Head of Marine Claims at AGCS**.

And efficiency measures may already be filtering through to claims, according to Thoreau. "While we see fewer large claims, we do see more attritional claims. These are smaller claims that should not really happen – a large percentage are purely maintenance-related and should not fall into the scope of insurers."

Negligence/poor maintenance is already one of the top causes of liability loss in the shipping sector *(see page 32)*, so rigorous inspection and maintenance regimes are crucial, adds **Adrian Laflin, Senior Claims Expert, Marine at AGCS**. "Obtaining buy-in from all levels of the workforce is important in creating a transparent and effective mechanism for reporting accidents and other areas of concern, learning lessons and, ultimately, implementing preventative measures as a result. As we all know, prevention is the best cure."

Stretching maintenance intervals increases risk. Photo: iStock

CBM and reactivation – storing up problems for the future

Any cost-cutting is likely to extend to choices of maintenance of vessels, both in service and in lay-up.

Ship-owners have shown a growing interest in **condition-based maintenance (CBM)**, where maintenance is done on an as-needed basis, rather than sticking to manufacturers' recommendations, as it offers significant cost savings. However, this may be storing up problems for the future, says Turberville. CBM runs the risk of a potential fault going undetected until it results in a major breakdown, while stretched maintenance intervals also increases risk. Employing CBM can also place undue pressure on already stretched crews and can be akin "to allowing the crew to put band aids on the ship," Kinsey warned in the **Safety & Shipping Review 2016 edition.**

Meanwhile, as freight rates increase, ship-owners will bring laid-up vessels back into service. But the cost of reactivation can be significant and ship-owners may be tempted to get their reactivated vessels trading and earning for a period before dry-docking and reactivation. And this could create heightened exposures.

"The underwriting community should take the risks of reactivation seriously and place certain requirements on insureds, such as around maintenance and surveys," Turberville advises.

iii https://clarksonsresearch.wordpress.com/tag/demolition/

iv https://www.wto.org/english/news_e/pres16_e/pr779_e.htm

Scrapping is on the rise, including among younger vessels.

Photo: iStock

Consolidation and scrapping – a younger fleet and larger vessels

Economic pressures in the shipping industry could accelerate the trend towards larger, more efficient ships

Encouraged by low interest rates, container ship ordering spiked in 2010 and 2013 to 2014, as ship-owners invested in larger and more efficient vessels. But with an estimated 5% to 6% of the global fleet idle, overcapacity has seen the value of vessels plummet and led to record scrapping levels in 2016[i].

According to Braemar ACM, over 200 container ships were scrapped in 2016, taking around **700,000 teu** capacity out of the market, compared with **185,000 teu** capacity scrapped in 2015. 2016 also saw **6,000+ teu** boxships scrapped for the first time[ii].

The expansion of the Panama Canal, which can now handle even larger New-Panamax vessels has also boosted scrapping – according to Clarksons the pace of demolition of '**old Panamaxes**' has been running at more than twice the five-year average[iii].

The rise in ship demolition has also seen relatively young ships sent for recycling. At the start of 2017, the seven year-old container ship **Hammonia Grenada** was sold for scrap for an estimated $5.5m. When it was launched in 2010 it was valued at $60m[iv].

According to Clarksons, the average scrapping age for bulk carriers has fallen from 33 years in 2007 to 24 years.

Economic pressures are also pushing the shipping industry to consolidate, with a number of major container ship operators in China, South Korea and Japan announcing mergers and acquisitions.

"Trading conditions in the container market are likely to result in consolidation. This will no doubt further the trend for larger and more efficient vessels in the LNG and container industries in particular," says Thoreau.

Larger operators will continue to seek efficiencies, which will drive them to switch to ever-larger vessels. "Despite overcapacity, we continue to see deliveries of vessels of 20,000 teu or more," Thoreau adds.

"Using the latest technology, new vessels are usually larger, more efficient and safer. However, larger vessels also pose challenges, such as around salvage operations and the availability of suitable ports of refuge," says Thoreau. "All sectors are concerned – from cruise, container, LNG to bulk and car carriers."

i http://www.telegraph.co.uk/business/2016/10/08/up-for-a-scrap-shipbreaking-enters-hits-record-level/

ii http://www.telegraph.co.uk/business/2016/10/08/up-for-a-scrap-shipbreaking-enters-hits-record-level/
http://splash247.com/boxship-owners-send-record-700000-slots-scrap-2016/

iii https://clarksonsresearch.wordpress.com/tag/demolition/

iv www.bbc.co.uk/news/business-38653546

Large losses expected to cost more in the future

Larger vessels may promise greater efficiencies but concurrently there remains an inherent danger from increasing exposures, which have quadrupled over the last decade, according to Khanna. Exposures are increasing exponentially with higher values, the increasing size of vessels, the rising cost of wreck removal, environmental sensitivities, and greater levels of liability and regulation.

"When all these factors come together they can produce a major casualty. The loss of a large container vessel or a tanker in an environmentally-sensitive area could cost many billions of dollars. A major casualty costing **$2bn to $4bn** is not unrealistic."

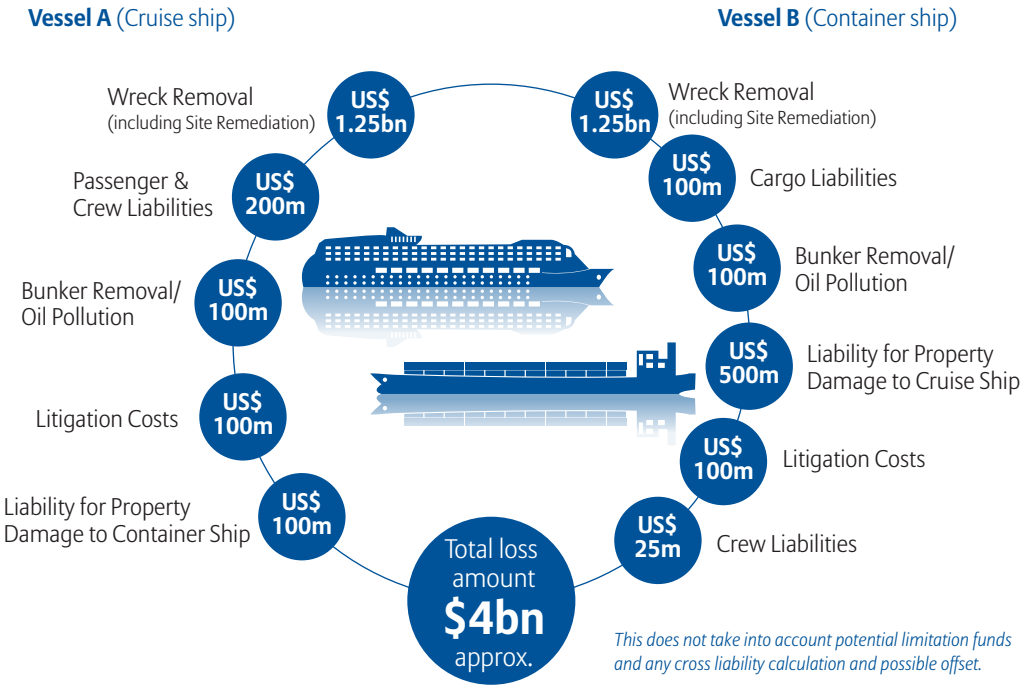
Structural integrity issues

Concerns over the structural integrity of some larger vessels – particularly ones that have been converted – remains an issue in the wake of a number of incidents and losses resulting from breaches in recent years. Shipping stakeholders need to come together to address this issue. In 2017, there have been reports of cracks being discovered on a number of converted very large ore carriers (VLOCs). Meanwhile on 31 March, 2017 the converted VLOC, the **Stellar Daisy**, sank off the coast of Uruguay with the loss of 22 crew. The cause of that incident had yet to be determined at time of writing.[i]

How a **$4bn loss** scenario could occur

The increasing size of vessels has raised fears about the potential for higher losses if a major casualty does occur, particularly one involving two large vessels, such as a cruise ship and a container ship, for example. There are many factors to consider when evaluating the potential costs from such an incident.

Below, we consider a worst case scenario casualty involving a collision, followed by grounding of both vessels and pollution, in an environmentally-sensitive location. In this scenario both vessels are then deemed constructive total losses. The potential exposure could be:



Source: Allianz Global Corporate & Specialty

i http://www.maritime-executive.com/article/imo-calls-for-inquiry-into-the-loss-of-stellar-daisy

Concerns persist for **passenger and ferry casualties**

Passenger and car ferry losses continue to trouble the sector, as fire, storm and stability issues remain problematic for insurers

MV Sewol capsized en route from Incheon to Jeju in South Korea.

Photo: Wikimedia Commons

While passenger ferry safety in Europe has improved significantly in the 30 years since the Zeebrugge disaster *(see page 23)* safety concerns persist, says Turberville.

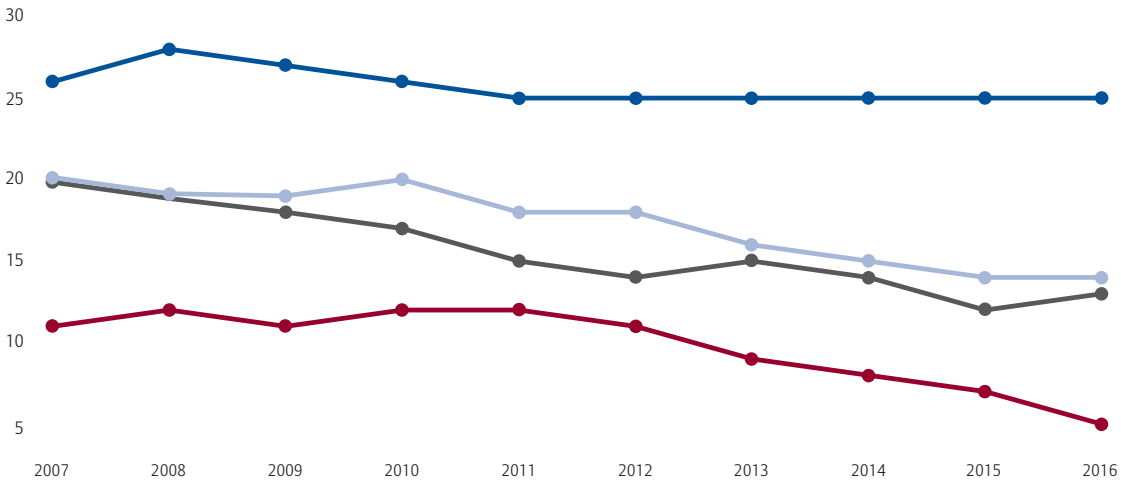
"Standards of safety are not as high in some parts of Asia as they are elsewhere in the world, while we have also seen fires on board vessels in the Baltic."

Despite decades of casualties, passenger ferry safety is still a major issue in some parts of Asia. In 2015 there were a string of fatal accidents in China and Myanmar, while some 300 people died in 2014 when the **MV Sewol** capsized en route from Incheon to Jeju in South Korea.

Passenger ferries in Asia are particularly exposed to typhoons. Meanwhile, in the Philippines and Indonesia, safety is a persistent problem, driven by poor maintenance, weak enforcement of regulations and passenger overcrowding.

Fires on-board ferries are also of growing concern. The International Union of Marine Insurance (IUMI) recently warned of an alarming over-representation of fires on-board ro-ro ferries[i]. The failure of electrical equipment in cars and trucks on board, as well as undeclared or misdeclared cargo, are believed to be the major causes of such incidents.

Total Losses: Five year moving loss average by top regions 2007-2016 (All vessels)



The number of total losses has remained stable in South East Asia over the past decade.

The East Mediterranean and Black Sea; Japan, Korea and North China; and the British Isles, North Sea, English Channel and Bay of Biscay maritime regions have all seen their five year rolling loss average totals improve considerably over the past decade. Conversely, the South China, Indochina, Indonesia and Philippines average has seen little change.

How it works

Between 2003 and the end of 2007, the Japan, Korea and North China region saw 101 total losses, so the five-loss average for 2007 is 20.

Source: Lloyd's List Intelligence Casualty Statistics. Data Analysis & Graphic: Allianz Global Corporate & Specialty

i https://iumi.com/news/iumi-eye-newsletter-march-2017/turning-up-the-heat-on-ro-ro-fires

The IMO is to review international regulation with a view to minimize the incidence and consequences of fires on ro-ros. An important factor in dealing with such incidents is a rapid response, particularly if a fire occurs on semi-open decks where oxygen can fuel flames.

Fires are also a risk for car carriers, purpose-built vessels used to transport new and used cars between ports. "There is an inherent risk of fire for car carriers and this is a concern given the size of some vessels, which can carry some 5,000 to 6,000 vehicles at one time," says Turberville.

The nature of car ferries and transporters also means they are vulnerable to stability issues. This was shown by the **Hoegh Osaka**, a large car carrier that run aground in January 2015 having listed soon after leaving port in Southampton, UK.

"Car carriers and ferries are under immense pressure for port turnaround, but unless the crew carries out stability modelling and checks, there is a risk of instability," says Turberville.

"Overall, fire, stability and lack of loss prevention are the main factors of concern for ferry vessels," adds Thoreau. "This is reflected in the majority of claims occuring in Asia, together with natural catastrophe exposure."

Fire is also a risk on car carriers.
Photo: iStock

The Herald of Free Enterprise being towed into harbor after salvage.
Photo: Wikimedia Commons

The Zeebrugge disaster – **30 years on**

On 6 March, 1987 the **Herald of Free Enterprise** car passenger ferry turned over on its side outside the port of **Zeebrugge**, Belgium, killing 193 of the 459 passengers, and half of the crew of 80. It was the deadliest maritime disaster involving a British ship in peacetime since the sinking of the **Iolaire** in 1919.

The vessel capsized after water ingress into the car deck, which, in the absence of bulk heads, destabilized the vessel. Human error was also a factor, as the crew member responsible for securing the doors was reportedly asleep in his cabin.

In the 30 years since the tragedy there has been a large amount of regulatory change requiring more segregation of compartments on car ferries and on the operation of bow doors, explains Turberville. The disaster, and subsequent enquiry, also led to the formation of the **Marine Accident Investigation Branch (MAIB)** in 1989.

"Since Zeebrugge, there has been a significant improvement in passenger vessel safety, in areas like design, training, evacuation and accident investigation. This work continues to this day and we continue to learn from incidents like the **Costa Concordia** disaster in 2012," says Khanna. "The Zeebrugge and Costa Concordia tragedies provide a reminder of the importance of training and the need to reduce the element of human error, especially as the consequences can be so great. We really need to find new ways of addressing this problem and concepts like behavioural safety might be the way forward.

"Costa Concordia, in particular, showed that the margins of error are much smaller and the potential consequences are much greater with large vessels. If the crew makes one small mistake it can have huge and disastrous consequences."

Fires also fuel **fears for large container ship safety**

A number of major fires on-board large container vessels have sparked growing concern among insurers for the safety of this type of vessel

$3.5bn

estimated insurance industry losses from the Port of Tianjin explosions in China in 2015

Vessel size and fire regulation is a major concern.
Photo: iStock

Major fires on container vessels are among the worst hazards in global shipping[i]. During 2016 alone, there were three major fires that required external firefighting assistance: the **Maersk Karachi** in May, and the **CCNI Arauco** and the **Wan Hai 307** in September. In April 2017, the, 13,800 teu **MSC Daniela** was on fire for more than a week, 120 nautical miles off the coast of Sri Lanka.

Safety and support systems on board container ships have not kept pace with the increasing size of vessels and numbers of containers, according to Khanna. As a result there are now serious concerns for the ability of crew to put out a fire on a container vessel where firefighting equipment proves insufficient.

With many more layers of containers on deck, it is far harder to contain a fire once ignited. The nature of the cargo also makes the use of CO2 ineffective, while containers contain oxygen which can make fire-fighting even more challenging.

"We need to figure out how to fight fires on board large container ships more effectively, and this could see requirements for new firefighting systems," says Kinsey.

"But first and foremost, there needs to be accurate cargo manifests. If inaccurately documented cargo catches fire, crews do not know the best way to extinguish them."

According to data from the recent **International Cargo Handling Coordination Association's (ICHCA)**, Dangerous Goods seminar, over a third (39%) of boxes containing dangerous goods are marked incorrectly, while approximately 21% have some other defect[ii]. To illustrate the deadly consequences when dangerous goods are not handled, shipped and stored correctly, we only have to look at the Tianjin explosions, which occurred in China in August, 2015, Kinsey adds. The official investigation found that an overheated container of nitrocellulose was the cause of the initial explosion that led to a much larger explosion.

"Vessel size and fire regulation is a big concern," adds Turberville. "Safety regulation is driven by the **International Convention for the Safety of Life at Sea (SOLAS)**, but this is concerned with the safety of the crew and not the vessel. Safety of life is paramount, but we would also like to see safety systems developed to take more account of the preservation of the vessel itself."

i https://iumi.com/news/iumi-eye-newsletter-december-2016/iumis-growing-concern-over-containership-fires
ii http://ichca.com/ichca-calls-awareness-better-enforcement-less-complexity-improve-safety-containerised-dangerous-goods

The number of shipping incidents in Arctic Circle waters is down year-on-year but risks remain.

Photo: iStock

Polar Code will need to keep pace with changing risks

Shipping in Polar waters poses a number of risks, which means the new code will need to be regularly reviewed and updated

What is the Polar Code?
It will initially apply to vessels greater than 500 tons and requires shipowners to have in place contingency plans for all aspects of marine operations, including safety of navigation, pollution incidents, ship structure requirements and search-and-rescue plans.

The **International Code for Ships Operating in Polar Waters (the Polar Code)** was adopted by the International Maritime Organization (IMO) in 2014 and entered into force on 1 January, 2017.

The Polar Code, which amends a number of existing conventions, including the **International Convention for the Safety of Life at Sea (SOLAS)** and the **International Convention for the Prevention of Pollution from Ships (MARPOL)**, is a far-reaching set of

Arctic Circle Waters

Causes of All Casualties (shipping incidents) including Total Losses 2007-2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Machinery damage/failure	5	13	14	16	12	13	20	27	46	32	**198**
Wrecked/stranded	10	11	14	9	9	8	10	14	6	11	**102**
Miscellaneous	5	1	4	4	2	6	5	5	6	4	**42**
Collision		1	4	10	4	4	2		3	2	**30**
Fire/explosion	3	1	2	6	6	1	4	2	4	1	**30**
Contact (e.g. harbor wall)	1	1	1	3	1	3	6	4	5	1	**26**
Hull damage	3	1	6	2	2	1	2	1	1	2	**21**
Foundered	1	1	2		3	1	1	2		1	**12**
Labor dispute										1	**1**
Total	**28**	**30**	**47**	**50**	**39**	**37**	**50**	**55**	**71**	**55**	**462**

including **18** total losses

Source: Lloyd's List Intelligence Casualty Statistics

Data Analysis & Graphic: Allianz Global Corporate & Specialty

55

Number of shipping casualties (incidents) in Arctic Circle waters in 2016, including 1 total loss

rules, covering the design and operation of vessels operating in Arctic and Antarctic waters, as well as crewing and environmental protection. Shipping in such waters poses a number of risks, such as a lack of hydrographic study, the year-round ice factor and the ability for salvagers to respond in the event of an incident.

Shipping on the **Northern Sea Route** across the top of Russia was up by more than a third last year, according to the Northern Sea Route Information Office. Total traffic exceeded seven million tons, a figure that is expected to grow ten-fold to 75 million tons by 2025[i].

Meanwhile, the Northwest Passage, north of Canada, has also seen pioneering transits in recent years. Last year the **Crystal Serenity** became the first large luxury liner to transverse the Northwest Passage. But traffic remains limited due to ice conditions.

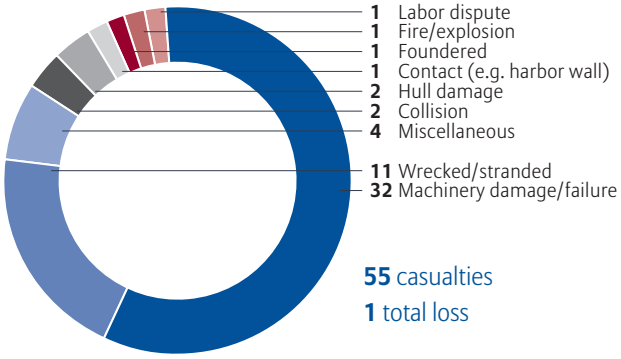
The Polar Code should raise the bar for ships operating in the extreme Arctic environment and help mitigate the risks. However, it will need regular updates to adapt to changes in risk and ice conditions.

"Given the fragility of the Polar environment, the code will need to be regularly reviewed and updated. In the past it has taken too long to update safety and environmental regulations, and this needs to be streamlined," says Kinsey.

"When operating in a harsh environment like the Arctic we need to review the lessons learned much quicker than has been the case in the past."

Arctic Circle Waters

Causes of Casualties (shipping incidents) 2016



Source: Lloyd's List Intelligence Casualty Statistics.
Data Analysis & Graphic: Allianz Global Corporate & Specialty

The analysis shows there were 55 reported shipping incidents in Arctic Circle waters during 2016, down over 20% year-on-year. Machinery damage/failure was the cause of almost 60% of incidents, driven by the harsh operating environment. Over a third of incidents involved fishing vessels.

Arctic shipping risk management best practice

- One key element of the Polar Code is a requirement for ships to have a **Polar Waters Operational Manual**, which outlines the ship's procedures to follow in normal operations, in the event of incidents, when conditions are encountered that exceeds the ship's capabilities, and when icebreaker assistance is needed. It should also include voyage planning, and procedures for search and rescue (SAR) and spill response. It is crucial this is regularly updated
- Ensure that ice-training for bridge-watch standers includes the most up-to-date information available
- Improve harsh weather survivability of ship's systems
- Ensure crew preparedness for emergency, including dangers posed by exposure
- Ensure vessel includes special tools for ice removal, and fire extinguishers operable in cold temperatures.

Various sources

i www.globaltrademag.com/global-logistics/mixed-signals-future-arctic-shipping

Looking ahead: In the pipeline

Ballast water management rules add cost to shipping ► 28

Piracy falling but crew kidnapping on the rise ► 29

Countering geopolitical instability ► 30

Technology to improve safety but overreliance a concern ► 32

Can shipping safety benefit from VDR? ► 33

The cyber threat at sea – and how shipping needs to respond ► 34

Autonomous vessels pose risk challenges ► 36

Full steam ahead for the Asia cruise sector ► 38

IMO's ballast water convention requires vessels to exchange ballast water at sea, which can result in high stress on the hull, especially if procedures are not correctly followed.

Photo: iStock

Ballast water management rules add cost to shipping

New environmental legislation will also apply further economic pressure to stressed shippers and could be a catalyst for further scrapping

New ballast water management rules are aimed at stopping the spread of harmful aquatic organisms in ballast water which pose a significant threat to ecosystems and the economies of the affected areas. It is estimated about one-third of all documented invasive plants and animals are able to travel in the ballast water tanks of ships. However, the introduction of the new rules will also add a significant cost to shipping.

The International Convention for the Control and Management of Ships' Ballast Water and Sediments (the BWM Convention) takes effect in September, 2017. It requires ships trading in international waters to fit an approved Ballast Water Management System (BWMS) by their first International Oil Pollution Prevention (IOPP) Renewal Survey after this date.

The ballast water management convention is one of the key issues for the maritime industry in 2017, believes Khanna.

"The convention will affect shipping in a big way. Unless the technology becomes more affordable the extra expense will add yet more pressure to ship-owners and could act as a catalyst for an increase in scrapping."

Some estimates suggest the cost to the industry of fitting BWMS could run to as much as **$75bn**[i]. Some 40,000 vessels will be affected, at a cost per vessel of between $0.5m to $5m.

Although the US has not acceded to the convention, it adopted its own ballast[ii] water management regulations in 2012. Vessels entering US waters will therefore also need to meet these more stringent ballast water management standards.

As of March 2017, only three BWMS had been approved under the convention and by the US Coast Guard[iii].

"Environmental legislation like the new ballast tank rules impact on already stretched shippers. Increased regulation comes at a time of great economic stress," says Kinsey.

"New regulations can also give rise to new risks," says **Captain Nitin Chopra, a Senior Marine Risk Consultant at AGCS**, based in Singapore. "The BWM Convention requires vessels to exchange ballast water at sea, which can result in high stress being placed on the hull, especially if procedures are not correctly followed."

i http://www.insidemarine.com/index.php/news/equipment/212-shipping-on-the-right-course-for-the-ballast-water-management-convention

ii http://www.gc.noaa.gov/gcil_ballast_federal.html

iii http://www.hellenicshippingnews.com/shipping-on-the-right-course-for-the-ballast-water-management-convention/

Piracy threat evolves with crew kidnapping on the rise

Incidents of piracy may have hit an 18-year-low at the end of 2016, but an increase in kidnappings in parts of Asia and West Africa, and the return of activity in Somalia, shows the risks should not be underestimated

Piracy in 2017
Pirates attacked 43 ships and captured 58 crew members during Q1 2017, slightly up year-on-year. Over 60% of kidnappings were in the Gulf of Guinea, with Nigeria a hotspot. Nine ships were attacked in the Southern Philippines, compared with just two a year earlier.[ii]

2017 has seen the return of piracy activity off the Somalian coast. Photo: Wikimedia Commons

According to the **International Maritime Bureau (IMB)**, incidents of piracy in 2016 continued their downward trend. It recorded **191** incidences of piracy in 2016, down 22% on 2015 (246) and the lowest total recorded since 1998[i].

The reduction reflects the success of measures to contain the threat of Somali pirates in the Gulf of Aden and Indian Ocean, including the introduction of armed guards on-board vessels and the presence of a multinational naval task force. There were just two recorded incidents off Somalia in 2016, compared with 160 in 2011.

Despite this positive trend, the threat of Somali pirates has not gone away. In March 2017 pirates captured the oil tanker, **Aris 13**, off the coast of Somalia and demanded a ransom – the first such seizure of a large commercial vessel since 2012. At the time of writing, there had been four further attempted or successful incidents, raising concerns from some that activity could resurface more widely in the region.

Meanwhile, piracy has been increasing in other areas. In particular, 2016 saw a worrying trend in the escalation of crew kidnapping, showing a threefold increase on 2015, according to the IMB. Pirates kidnapped 62 people for ransom in 15 separate incidents during the year. Just over half were captured off West Africa, while 28 were kidnapped from around Malaysia and Indonesia.

"Piracy has been declining in the Gulf of Aden, but it remains prevalent in West Africa and the Far East. However, this is a very different type of piracy with more of a focus on armed robbery and kidnapping, rather than ransom" says Turberville.

While Somali pirates target ships, those in Asia have focused on kidnapping and robbery, mostly from tugs, barges and fishing boats. However, last year saw an escalation with the kidnapping of crew from ocean-going merchant vessels in the Sulu-Celebes Sea, between Malaysia and the Philippines. During the last quarter of 2016, 12 crew were kidnapped from two cargo vessels, while a South-Korean-flagged heavy load carrier was attacked in southern Philippines waters in October 2016, says Thoreau. In response to the recent surge in activity, the Philippines, Malaysia and Indonesia are launching joint patrols, Thoreau adds.

"Violence is seen as an income stream for pirates operating in the Sulu Sea and West Africa," says Kinsey.

i https://icc-ccs.org/index.php/news/1218-imb-report-sea-kidnappings-rise-in-2016-despite-plummeting-global-piracy
ii www.icc-ccs.org/index.php/news/1229-maritime-piracy-report-sees-first-somali-hijackings-after-five-year-lull

Countering geopolitical instability

The Yemen conflict and territorial disputes in the South China Sea means a watching brief for shippers on their potential impact on vessel routes

Yemen coast poses significant risk for merchant vessels

Conflict in Yemen is threatening trade along the Bab al-Mandab strait, a major shipping lane for vessels transiting through the Red Sea. During 2016, Houthi militants, who control most of the Yemen's Red Sea coastline and ports, launched a number of attacks against merchant and naval vessels off the Bab al-Mandab strait. Almost five million barrels of oil pass daily through the strait, which links the Gulf of Aden to the Red Sea.

The US Navy transits the Bab al-Mandeb strait. Recent attacks off the coast of Yemen show there is a significant risk to merchant vessels.
Photo: Wikimedia Commons

"While the incidence of Somali piracy has reduced that does not mean that trade through the Red Sea is any more secure. The attacks off the coast of Yemen show that there is still a significant risk to merchant vessels," says Kinsey.

In October, 2016, militants successfully attacked a United Arab Emirates vessel with an anti-ship cruise missile, later firing on US naval ships off Yemen's coast. Merchant vessels have also been attacked. The Spanish registered LNG tanker **Galacia Spirit** was attacked in October 2016 by a small craft carrying explosives. Fortunately the militants' vessel exploded before hitting the tanker, which suffered only minor damage.

In the same week, militants fired a rocket propelled grenade at another vessel, the 32,100 dwt oil tanker **Melati Satu**[i], which was sailing through Bab al-Mandab strait to the Indian port of Chennai.

"We have not seen this type of active attacks since the Tamil Tigers attacked merchant shipping in Sri Lanka during the 2000s," says Kinsey.

The attacks have continued into 2017. In January, Houthi militants in suicide boats attacked a Saudi frigate, killing two crew[ii]. In response, the US sent a warship to patrol the area and maintain freedom of navigation in the Red Sea and through the strait[iii].

Militants have also laid mines in the Bab al-Mandab strait – two Yemen sailors reportedly died and eight were wounded after their vessel struck a mine in the strait in March.[iv]

The US Office of Naval Intelligence had previously warned that Houthi mines were a threat to commercial ships traveling near Mokha port and the Bab al-Mandab Strait.

i http://worldmaritimenews.com/archives/205139/report-second-attack-on-merchant-ship-off-yemen/
ii http://uk.businessinsider.com/iran-houthi-militants-yemen-missile-saudi-ship-2017-1?r=US&IR=T
iii http://www.foxnews.com/world/2017/02/03/uss-cole-patrolling-off-yemen-after-iran-backed-rebels-attack-saudi-ship.html
iv http://www.thetower.org/4705-iran-backed-yemeni-rebels-said-to-plant-mine-in-major-strait-threatening-global-shipping/

Disputes over territories are increasing in the South China Sea region.
Photo: Wikimedia Commons

Tensions simmer in the South China Sea

A potential escalation in a number of territorial disputes in the South China Sea could force ship owners to consider more costly alternative routes. Tensions have been steadily rising between China, the US, Japan and a number of South East Asian countries over territorial claims to a number of island groups in the South China Sea.

China is looking to exert more commercial control over the South China Sea region, which is rich in oil and fishing resources, as well as being one of the world's most important shipping routes.

"The South China Sea is the maritime equivalent of the Silk Road," says Kinsey. "China has been increasing investment in its navy and building airstrips and infrastructure on the Spratly Islands and also has plans to make the islands a destination for Chinese cruise ships," *(see page 38 for more on the cruise sector in Asia)*.

China's actions have caused tensions with Vietnam, the Philippines, Taiwan, Malaysia and Brunei, which all have competing claims to the Spratly Islands, as well as the Paracel Islands.

And the dispute is not the only one in the region. In the East China Sea, tensions between China and Japan remain over a group of islands known in Japan as the Senkaku and in China as the Diaoyu.

These political tensions in Asia could become a threat to shipping in the region, says Thoreau.

"With one third of all global trade passing through the South China Sea there are understandably concerns that an escalation in the dispute between China and Vietnam, Japan and China, South Korea and Japan or China and the Philippines could disrupt the operation of shipping." Any deterioration could result in vessels having to change routes, impacting operational costs, warns Thoreau.

Technology to drive safety improvements but overreliance causes concerns

Technology is playing an increasingly important role in improving safety and performance but understanding its limitations is crucial

Technology is also being used to improve crew welfare. For example, offshore health problems can be difficult to address. Insurers, such as Allianz, are now able to offer crew 24/7 access to medical advice through "**telemedicine**" assistance services, which utilize tablet technology and on-board equipment. Such services could reduce the need to make costly route deviations to seek help.

Safety-enhancing technology is already finding its way into shipping, from crew monitoring and electronic navigation, through to shore-based monitoring of machinery.

"Technology could bring huge advantages for the maritime sector, catching issues early, before they escalate into a major casualty," says Turberville. "**Human error** remains the biggest problem for shipping casualties *(see chart)*, but technology offers the potential to reduce human error, as well as reduce machinery breakdown," he says.

Vessel telematics are one way in which human error could be reduced. By analyzing **Voyage Data Recorder** information, it is possible to study near misses and feed lessons learned to crew training and procedures *(see page 33)*. Improved communication is another area where developments could help improve safety. Vessels at sea are traditionally very isolated, but technology could revolutionize ship-to shore communication and support.

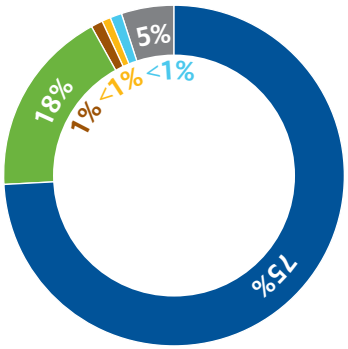
"With improving communications, we could see more decision-making moved onshore. It could also give ship's crew access to more onshore expertise and technical support. This is something that should be developed further," says Khanna.

Virtual reality technology is becoming more effective and could be used to improve safety beyond its current use in navigational training.

"Virtual reality is the next best thing to hands-on training. It is already used in bridge and cargo simulators but it could be expanded to train engineers, for example on a particular engineering routine," says Khanna.

Top causes of liability loss: Marine (by value of claims)

The **Costa Concordia** and **MV Rena** groundings are two well-documented, and costly, incidents caused by human error.



Human error	**75%**
Accidental nature/damage	**18%**
Natural hazards	**1%**
Negligence/poor maintenance	**<1%**
Failure to provide service	**<1%**
Other	**5%**

Human error has long been regarded as contributing to the majority of incidents in the shipping sector. It is estimated that **75% to 96%** of marine accidents can be attributed to human error[i]. In addition AGCS analysis of almost 15,000 marine liability insurance claims between 2011 and 2016 shows that human error is behind 75% of the value of all claims analyzed, equivalent to over **$1.6bn**.

14,828 liability insurance claims analyzed between 2011 and 2016 (September 13)

Source: Global Claims Review: Liability In Focus, Allianz Global Corporate & Specialty

i Safety & Shipping 1912-2012 From Titanic to Costa Concordia, Allianz Global Corporate & Specialty

More integrated and sophisticated navigational systems and digital charts are another area of development seen in recent years. However, while positive, these advancements have also raised questions about how humans interact with new technology.

"The issue of overreliance on technology is ongoing and we are still seeing a number of incidents where officers and crew have relied too much on technology. Sometimes replacing common sense decisions with digital inferences is not such a good idea," says Khanna.

"Crew and officers have an increased responsibility to understand the shortcomings and limitations of technology. The human interface with technology will be an important consideration in future safety," he says.

VDR analytics – the telematics of the seas

Black boxes – or telematics – are already successfully deployed in the automotive sector to improve driver behavior. Could the shipping sector also benefit?

AGCS is in the early stages of working with ship owners to use **Voyage Data Recorder (VDR)** analysis to improve safety. By analyzing VDR output it is possible to identify and influence the behaviors that drive risks such as human error, the key cause of casualties. Information from VDRs is already being used in accident investigation, but important lessons can also be learned by analyzing every day operations, explains Khanna.

"We can now analyze crew behavior and feed the insights back into training and safety. By analyzing VDR information we can learn lessons from near-misses and identify the actions and behaviors that can lead to crew and officers making the wrong decisions," he says.

AGCS is talking with a number of shipping sector companies about trialling VDR analytic technology. Eventually, VDR analysis should become standard practice, believes Khanna. "The results of VDR analysis can be used to compare the actions of the crew against industry best practices and to identify gaps, and advise our clients on where they can make improvements," says Khanna. It is view shared by the **Oil Companies International Marine Forum**: "The proactive analysis of VDR data on a regular basis could provide an important tool for use in accident prevention and the reinforcement of a positive operational safety culture," it has noted[i].

VDR analysis can be used to inform risk management decisions, and could potentially be reflected in insurance premiums. As is already the case in motor insurance, a form of maritime telematics could be developed to improve safety and better reflect risk in premiums.

"Ultimately such information could be used in underwriting. We could see each ship-owner's risk management better reflected in their insurance. The better the result of the analytics, the better the risk score," says Khanna.

VDR information could also help crew to learn from near-misses as well as accidents.

Photo: Wikimedia Commons

The future of marine telematics

This could not only include VDR data but also a combination of other information like vessel location and manoeuvring data (AIS), container tracking information and data from machinery sensors. The ship of the near future would be in a connected ecosystem where such big data would be accumulated ashore for analytics and could be vital in making accurate risk assessments.

Real-time tracking of ships and individual containers has already helped companies to see the big picture around their supply chains and improve efficiencies. For cargo insurers container tracking and monitoring is already highly beneficial. Many of AGCS' clients are actively using the technology. In event of theft, the tracking technology improves recovery prospects.

i Recommendations on the Proactive Use of Voyage Data Recorder Information, OCIMF

The cyber threat at sea – and how shipping needs to respond

The digital era is opening up new possibilities for the maritime industry, from remote monitoring of engines and systems to the development of autonomous ships. But it is also making it increasingly vulnerable to cyber-attacks

Cyber risk and human error

The risk of a cyber-attack continues to be significant. Ship-owners are often reluctant to share information for fear of being identified but, to date, most attacks have been aimed at breaching corporate security rather than taking control of a vessel, resulting in loss of critical data, financial loss or IT problems. It is thought that as many as **80%** of offshore security breaches could be the result of **human error**. It is vital that investment in cyber risk education and security is not neglected at a time when budgets are under pressure.

Modern vessels are increasingly dependent on computer and software. Bridge systems, such as Electronic Chart Display and Information System (**ECDIS**), Automatic Identification System (**AIS**) and Global Positioning Systems (**GPS**), are now important features of a ship's ability to navigate safely. Elsewhere on a vessel are cargo handling and management systems, propulsion and machinery management systems and power control and communications systems, all of which can be controlled in real-time through wireless networks. This is leading to increasing concern about the disruption that could be caused by a technical failure or even the ability of such systems to be compromised by criminals, potentially resulting in a serious maritime event such as a collision, property damage or even personal injury.

"The shipping sector doesn't have a particularly heightened risk awareness when it comes to cyber risk," says Khanna. "As no major incident has occurred to date, the majority of the industry is complacent about the risks."

"A changing geopolitical scenario can transpose cyber risk into a real threat," adds Chopra. "The threat perception towards this intangible must change."

For many, cyber-attacks are largely regarded as onshore affairs. And compared with the retail, healthcare and banking sectors there have been relatively few public examples of shipping incidents to date, although their number has been increasing in recent years *(see page 35)*.

In 2013, researchers at the University of Texas showed how easy it can be to take charge of vessels cruising near coastal regions: they seized the IT system of a large yacht and managed to take it off course. If such risks are not appropriately addressed, it is only a matter of time before the maritime sector suffers a major cyber-attack of this nature, believes Khanna.

"We can't put IT security on the backburner. Just imagine if hackers were able to take control of a large container ship on a strategically-important route. They could block transits for a long period of time, causing significant economic damage."

The increasing reliance on technology and automation will significantly alter the risk profile of the maritime sector, adds Turberville. Yet there is concern about the current pace of development of IT and cyber security standards in the maritime industry.

Five steps to cyber risk management onboard

- **Identify:** Define personnel roles and responsibilities for cyber risk management and identify the systems, assets, and data that, when disrupted, pose risks to ship operations
- **Protect:** Implement risk control processes and measures, and contingency planning to protect against a cyber event and ensure continuity of shipping operations
- **Detect:** Develop and implement activities necessary to detect a cyber event in a timely manner
- **Respond:** Develop and implement activities and plans to provide resilience and to restore systems necessary for operations or services impaired due to a cyber event
- **Recover:** Identify measures to back-up and restore cyber systems necessary for operations impacted by a cyber event.

Source: Draft IMO Guidelines Cyber Risk Management

i http://ww2.eagle.org/en/news/press-room/2017/ABS-Issues-Industrys-First-Cyber-Safety-Notation.html

ii http://fairplay.ihs.com/safety-regulation/article/4258406/iacs-adopts-cyber-safety-as-%E2%80%98third-pillar%E2%80%99

In 2016 Baltic and International Maritime Council (BIMCO) launched its cyber security advice for ship owners: **The Guidelines on Cyber Security onboard Ships**. Supported by other shipping organizations, the guidelines help ship-owners assess and manage cyber risks, as well as develop response and recovery plans.

Also last year, the IMO approved its interim guidelines on maritime cyber risk management, which provide high level recommendations on cyber security for the maritime industry *(see page 34)*.

Class societies are also developing cyber security solutions – US class society ABS issued its first cyber security notation in 2016[i]. The International Association of Classification Societies (IACS) has extended its remit to include cyber security[ii] .

"In the maritime industry there is no one regulation or standard for IT systems and cyber security that ship-owners and operators have to comply with. There needs to be industry codes and best practices developed, as well as minimum regulatory standards," says Turberville.

With increasing use of technology and connected devices, the maritime sector will need to speed up the development of cyber security standards.

Multimillion dollar "**superyachts**" are said to be susceptible to cyber-hijacking, due to less-secured Wi-Fi networks, which can be accessed from some distance. At a recent superyacht conference in London, cybercrime experts demonstrated that they could take control of a vessel's Wi-Fi in less than half an hour.

Photo: Shutterstock

Cyber log – Incidents to date

Up until now, the global maritime community has, largely, managed to stay out of the hacker's cross hairs. However, there have been a number of incidents over the past five years which have caused alarm:

- Iran Shipping Lines was the victim of an attack that crashed its system and resulted in the loss of data tracking its carriers. This led to significant disruption in operations, financial losses, and lost cargo
- Criminal syndicate penetrates cargo systems operated by Australian Customs and Border Protection
- Danish Maritime Authorities discovered that they had been subjected to a successful attack
- World Fuel Services falls victim to an online bunkering scam costing around $18m
- Port of Long Beach reported several large scale distributed denial of service (DDoS) attacks
- Drug traffickers recruited hackers to breach IT systems at the port of Antwerp in Belgium that controlled the movement and location of containers
- Malware dubbed "**Zombie Zero**" was preinstalled and hidden within Chinese-made scanner hardware used by shipping and logistic firms. The malware compromised at least eight companies
- Hackers stole hundreds of thousands of dollars from a Limassol-based shipping company through a phishing attack.
- US Coast Guard officials say GPS interference disrupted operations at an undisclosed port for several hours
- South Korea reported that hundreds of its vessels had to return to the port, as their GPS signals were jammed due to a cyber-attack initiated by North Korea
- Criminals download bills of lading from a container company's servers. Pirates then board a number of vessels and target these specific high-value containers.

Various news sources

Rolls Royce has previously predicted we may see an autonomous unmanned ocean-going ship by 2035.

Photo: Rolls Royce

Safety considerations and regulation key to progress of autonomous vessels

With human error accounting for 75% of marine liability losses[i] there are hopes that autonomous vessels can improve maritime safety. However, developing the technology is not the greatest challenge

Autonomous cars are already being tested on the streets and it looks like crewless ships will follow in the water. But the jury is still out on whether safety concerns and regulations will clear the way for ocean-going autonomous vessels in the near future.

The technology behind autonomous vessels is developing rapidly, including technology that could allow ships to be controlled remotely or allowed to operate autonomously.

Rolls-Royce, which is working on autonomous technology in the maritime sector, envisages a remotely-operated local vessel being in operation by 2020 and a remotely-operated autonomous vessel in international waters by 2025. Fully autonomous unmanned ocean-going ships could be around by 2035, it predicts[ii].

Advancements in technology should enable ships to monitor their own health and monitor the environment around them, potentially making decisions based on that information. The potential uses of automation also go well beyond the vessels themselves, and stretch the entire length of the cargo movement chain.

"Autonomous technology has the potential to revolutionize the movement of cargo on a scale not seen since containerization was introduced some 50 years ago," says Kinsey.

However, autonomous shipping is likely to be phased in over time. There are many legal and regulatory issues that need to be resolved. For example, maritime law and conventions were not drafted with crewless ships in mind and currently require vessels to have crew and a master on board.

"Despite unknowns and regulatory issues, autonomous shipping will happen. It's just a question of when and how. And it is possible that economic pressures on the shipping industry and the need to find efficiencies,

i Global Claims Review: Liability In Focus, Allianz Global Corporate & Specialty

ii http://www.rolls-royce.com/~/media/Files/R/Rolls-Royce/documents/customers/marine/ship-intel/rr-ship-intel-aawa-8pg.pdf

will support and speed up developments in maritime automation," says Kinsey. However, he believes that overall, technology will largely support rather than completely replace ships crews.

Safety considerations will be crucial to the development of autonomous shipping. For example, only large vessels routinely have tracking devices today, raising questions about the potential for collisions between an automated ship and smaller vessels.

"Fully automated shipping may be possible from a technical perspective, but on a global scale it may not happen given the navigational challenges of entering ports and congested routes, as well as the challenges of operating in storm conditions. It is hard to see how vessels can operate without crews to deal with emergency situations," says Turberville.

It could be that automated, or ships controlled from the shore, will operate on local coastal routes. But for more complex transits, the journey towards automation is likely to follow the model of the aviation industry, Turberville believes.

Aircraft have gradually adopted automation, but pilots still play an important role on-board, taking control during an emergency or at certain points, such as take-off and landing.

"It has yet to be seen whether the decision-making ability of computers matches that of humans. And I am not yet convinced that the technology is there to navigate difficult conditions, like the Suez Canal or the English Channel," adds Khanna.

"Autonomous technology has the potential to improve safety but a critical element will be whether there will be sufficient backup when things go wrong.

"There is talk of autonomous shipping within the next five years, but it will probably take longer for the regulatory framework to catch-up. And while autonomous ships could soon operate on simplistic and fixed regional routes, autonomous shipping on a larger scale will take time."

Autonomous shipping **Q&A**

When:

Remotely operated local vessel **2020**
Remote controlled unmanned coastal vessel **2025**
Remote controlled unmanned ocean-going ship **2030**
Autonomous unmanned ocean-going ship **2035**[i]

Potential Benefits:

- Increase productivity, make logistics easier and enhance safety – given human error is a leading cause of maritime incidents, it is anticipated unmanned vessels could be safer
- Increase efficiencies – savings on crew and fuel costs. Free up space to store additional cargo
- Better accessibility of remote, potentially dangerous areas
- Automated shipping lanes could increase reliability of cargo transport
- Decline in piracy incidents as crew cannot be used as ransom leverage

Challenges and Risks:

- Regulatory framework could prove more challenging than developing the technology
  Significant international cooperation needed
- Safety considerations – potential issues around collisions between manned and unmanned vessels
- Human intervention also averts a significant number of incidents. Emergencies could pose tests
- Cargo maintenance and care challenges without crew support
- Increase in product liability issues
- Cyber security.

i Rolls Royce

Full steam ahead for the Asia cruise sector

While many sectors of the shipping industry are under pressure, the cruise sector continues to grow, particularly in Asia, where it is comparatively young, but has considerable potential. However, such 'mega ships' bring new risk challenges

"There are now more than 50 cruise ships operating in Asia, which has seen passenger growth of around 25% year on year," says Thoreau. "Over the next few years all eyes will be on China."

China is predicted to become the world's second largest cruise market after the US by 2030. It is expected to expand to 4.5 million passengers by 2020 from one million in 2015[i] and is investing heavily, taking delivery of new vessels and building new port facilities.

More recently, China announced plans to begin constructing cruise liners in the country for the first time. China State Shipbuilding Corporation, Italian shipbuilder Fincantieri and cruise line Carnival have signed a $1.5bn deal to construct two cruise ships, with an option for another four[ii].

"This is a new step for the Asian cruise market. These are mega cruise ships made for the Chinese market," says Thoreau.

i http://usa.chinadaily.com.cn/opinion/2017-03/02/content_28414943.htm
ii http://www.reuters.com/article/us-fincantieri-carnival-china-idUSKBN16119B

There are now more than 50 cruise ships operating in Asia, which has seen passenger growth of around 25% year on year.
Photo: Shutterstock

Cruise vessels are far from conventional and their construction is highly specialized. To date, their construction has been mostly limited to a small number of specialist shipyards in Europe.

Mitsubishi's plan to build large cruise ships in Japan was overshadowed by delays. The construction of its first two vessels was marred by technical problems and fires, a major issue with construction[iii].

"China's ambitious plans will be under the spotlight over the next few years. Issues relating to reputational risk, safety, training, cyber threats and new terminal facilities will have to be monitored accordingly, " says Thoreau.

iii http://worldmaritimenews.com/archives/189858/mhi-in-financial-woes-due-to-aida-cruises-ships/
https://www.ft.com/content/d4f8f138-34aa-11e6-bda0-04585c31b153

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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 6 March, 2017). 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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