**ΑΚΑΔΗΜΙΑ ΕΜΠΟΡΙΚΟΥ ΝΑΥΤΙΚΟΥ**

# ΠΤΥΧΙΑΚΗ ΕΡΓΑΣΙΑ

**ΕΠΙΒΛΕΠΩΝ ΚΑΘΗΓΗΤΗΣ :**

**ΠΑΡΑΣΚΕΥΗ ΠΑΠΑΛΕΩΝΙΔΑ**

## ΘΕΜΑ

***MARINE CASUALTIES AND INCIDENTS 2011-2015. INVESTIGATION AND ANALYSIS***

**ΤΩΝ ΣΠΟΥΔΑΣΤΩΝ: ΚΟΠΑΡΑΝΗ ΠΑΣΧΑΛΗ**

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| **1** | **ΤΣΟΥΛΗΣ.Ν** | | | |
| **2** | **ΠΑΠΑΛΕΩΝΙΔΑ.Π** | | | |
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| ***ΤΕΛΙΚΗ ΑΞΙΟΛΟΓΗΣΗ*** | | | | |

***Ο ΔΙΕΥΘΥΝΤΗΣ ΤΗΣ ΣΧΟΛΗΣ: ΤΣΟΥΛΗΣ ΝΙΚΟΛΑΟΣ***

# Abstract

This dissertation aims to research and perform the consecutive analysis on the marine incidents and accidents, throughout the five-year period from 2011 to 2015. By using data from the three overseeing agencies on a global, European and Greek level, the incidents will be examined based on their severity, the type of ship involved, and on whether damage to the natural environment or to people was caused. Finally, the relative conclusions will be extracted. In the final chapter there is a presentation and detailed analysis of the most important marine casualties in the years 2011-1015.

***Key words:*** *Casualties, Incidents, Investigation, Marine, Naval, Ship*

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# Introduction

To be able to analyze and investigate marine casualties that occurred between 2011 and 2015, we should first mention a few key principles that have been put in place to categorize them and study them, as well as organizations that have the oversight of maritime rules both in a global, European as well as Greek environment.

The International Maritime Organization (IMO) is a transnational body for overseeing proper and safe maritime communication between the member countries of the United Nations. It is founded in Geneva in 1948 as IMCO (International Maritime Cooperation Organization), it took its present name in 1982, when it moved its headquarters to London.

The European Maritime Safety Agency (EMSA) is the main provider of technical expertise and operational assistance in the areas of maritime safety, maritime pollution response and maritime safety in general. In particular, it has a preventive and supervisory role, assessing the Member States of the European Union as regards their effectiveness in the implementation of maritime rules, but it can also take actions of a repressive nature, such as assistance to oil refueling companies and the treatment of petroleum spills. Finally, it may update the satellite-based system for eventualities by Member States in real time.

Finally, the Hellenic Marine Accident and Event Investigation Service (HBMCI) was established only in 2011 and is the incorporation by the Greek state of a European Community Directive of 2009. It is the competent, impartial state mechanism capable of conducting safety investigations for maritime accidents and incidents occurring in Greek ships or ships of any flag in Greek territorial waters or in the area of search and rescue of Greece if assistance is provided by coastal services of the Greek State as

well as any accident or incident considered to be of substantial interest to the Greek State.

The following categories have been decided and voted by the IMO for the classification of maritime accidents and incidents (IMO, 2017):

- Marine casualty is considered to be any incident or sequence of events that has resulted in any of the following occurring in direct connection with the ship's operations:
    - Death or serious injury to a person
    - Loss of the person from the ship
    - Loss presumed loss, or abandonment of a ship
    - Material damage on board
    - Infestation or inability (naval) ship to sail or engage a ship in conflict
    - Material damage to the naval external infrastructure of the ship, which could seriously jeopardize the safety of the ship, other ship or person
    - Serious damage to the environment or the possibility of causing severe damage to the environment caused by damage to a ship or several
    - The term marine casualty does not include deliberate action or omission to cause damage to the safety of the ship, person or the environment.

- Serious Casualty: According to the recently updated definitions of Circular 3 of 18 December 2008 of the 37th IMO Maritime Safety Committee and Marine Environment Protection Committee. It is the accident on board that is not classified as very serious and involves fire, explosion, collision, landing, contact, serious damage due to severe weather conditions, ice damage, cracks in the hull, or possible defect in the ship's outer shell (hull):

    - Immobilization of main engines, extensive damage to accommodation spaces, severe construction damage such as inflow from reefs etc., rendering the ship unsuitable to continue due to its condition, which is not in line with international conventions, showing Risk to the ship, the occupants, the threat of damage to the marine environment

    - Pollution irrespective of quantity

    - Mechanical damage that requires towing or shore-based assistance.

- Very Serious Casualty: Marine accident resulting in total shipwreck or death of a person or very serious damage to the environment. As a result of the most serious environmental damage, the pollution which, as estimated by the affected coastal State or States or the Administration of the Flag State, will, as the case may be, cause a major or detrimental effect on the environment or would cause it without the preventive action.

- Marine Incident: Any incident or sequence of events not covered by the maritime accident category of the first case that occurred directly in relation to the ship's operations and which threatened or was not corrected would jeopardize the safety of a ship, its occupants, or any other person or the environment. However, a naval event does not involve deliberate action or omission with the intent to damage the safety of a ship, a person, or the environment.

For this work, we have addressed both HBMCI, which has been registering marine incidents and accidents since 2013, and EMSA covering the entire period we are studying, as it has been active for decades. However, to make a clear comparison, we will initially highlight the three years for which analytical results are available annually, and then we will see some of the data for the years 2011-2015.

# Chapter 1 - Categorization per year

Beginning, we will present the total events taking place each year, both in the area of interest of EMSA and the area of interest of HBMCI, using the two charts below (EMSA, 2014, 2015, 2016, 2017).

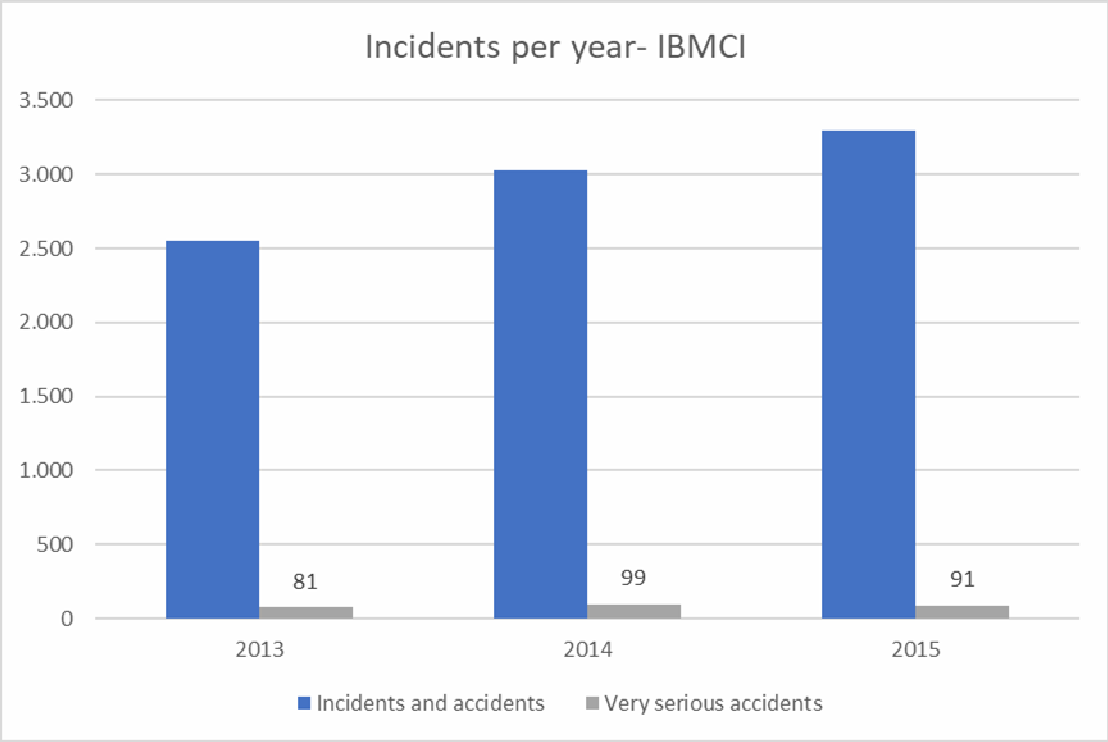



**Table 1. Incidents per year**

(Source: HBMCI, 2015)

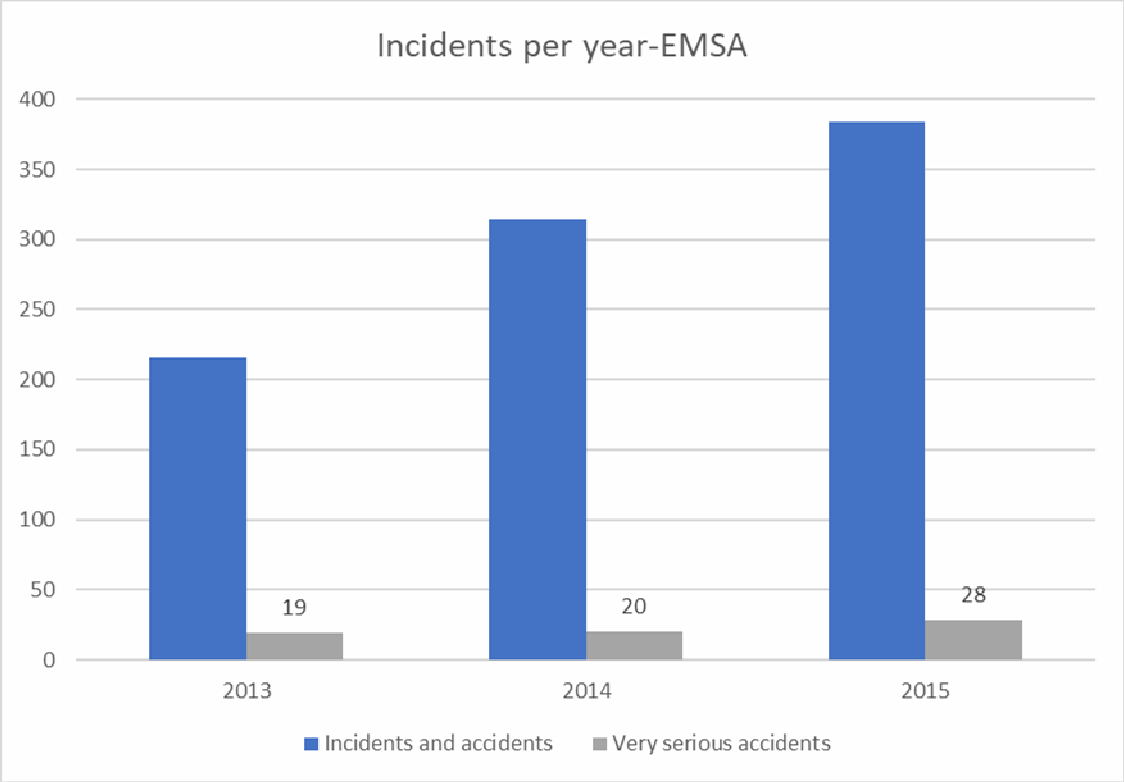



**Table 2.Incidents per year**

(Source: EMSA, 2015)

As we can see, the total events in both areas of interest are increasing, but based on the official position of EMSA, this still cannot lead to a safe conclusion as the data collection and recording process is in the development stage and cases of data substitution are often observed.

Another interesting point is that the relationship between very serious accidents to all other types of recordings in the EMSA region remains relatively stable at 3.17% in 2013, 3.27% in 2014 and 2.76% in 2015, while for the same time periods in HBMCI 's area of interest they are the same, with slightly higher rates, ie 8.8%, 6.37% and 7.29% respectively, while in 2014 there appears to have been a reduction in very serious accidents in the areas of interest of HBMCI against an increase in EMSA (HBMCI, 2013).

In the next section, based on the statistics of the two agencies, we will study the categorization of major accidents in the two areas of interest. Since each sample only contains the reported incidents in each area, some categories are naturally not displayed due to non-event logging.

# Chapter 2 - Analysis of major maritime accidents

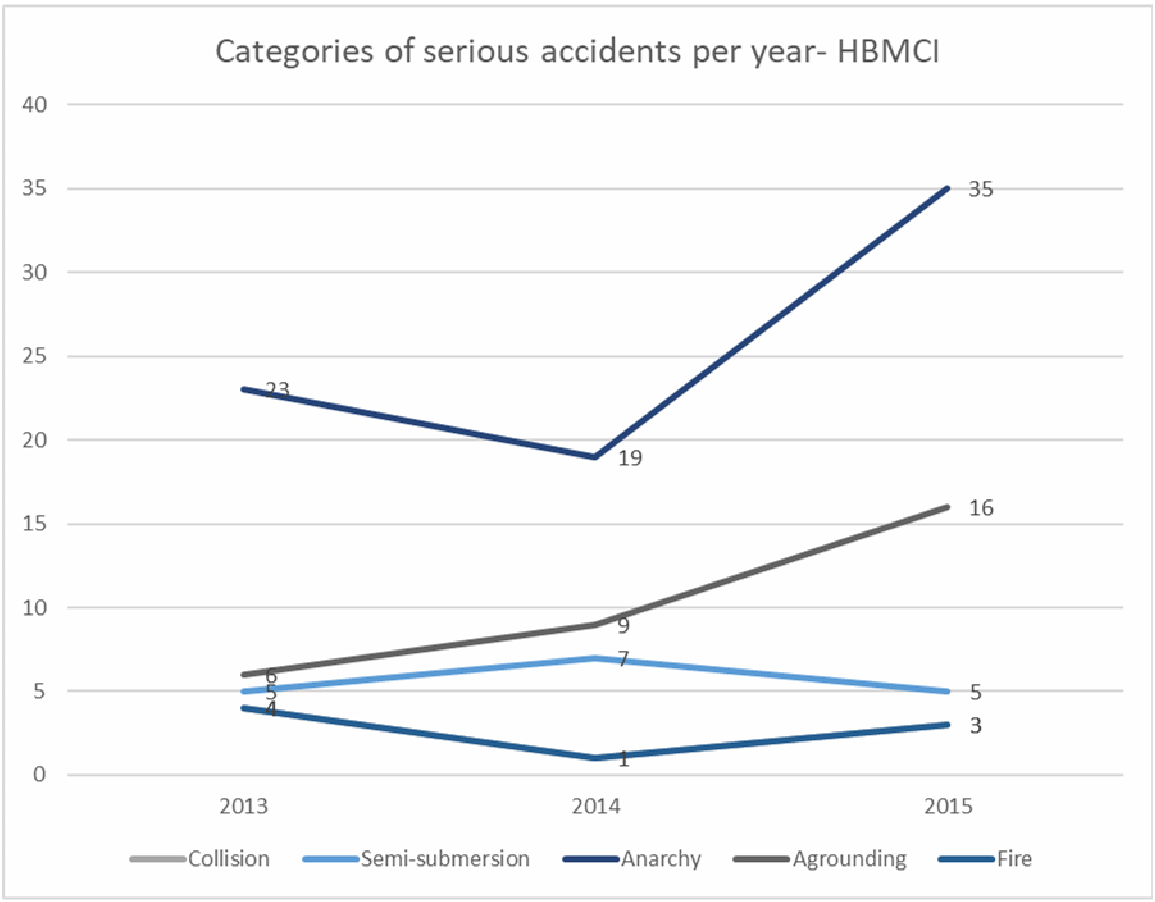



**Table 3. Categories of serious accidents per year**

(Source: HBMCI, n.d.)

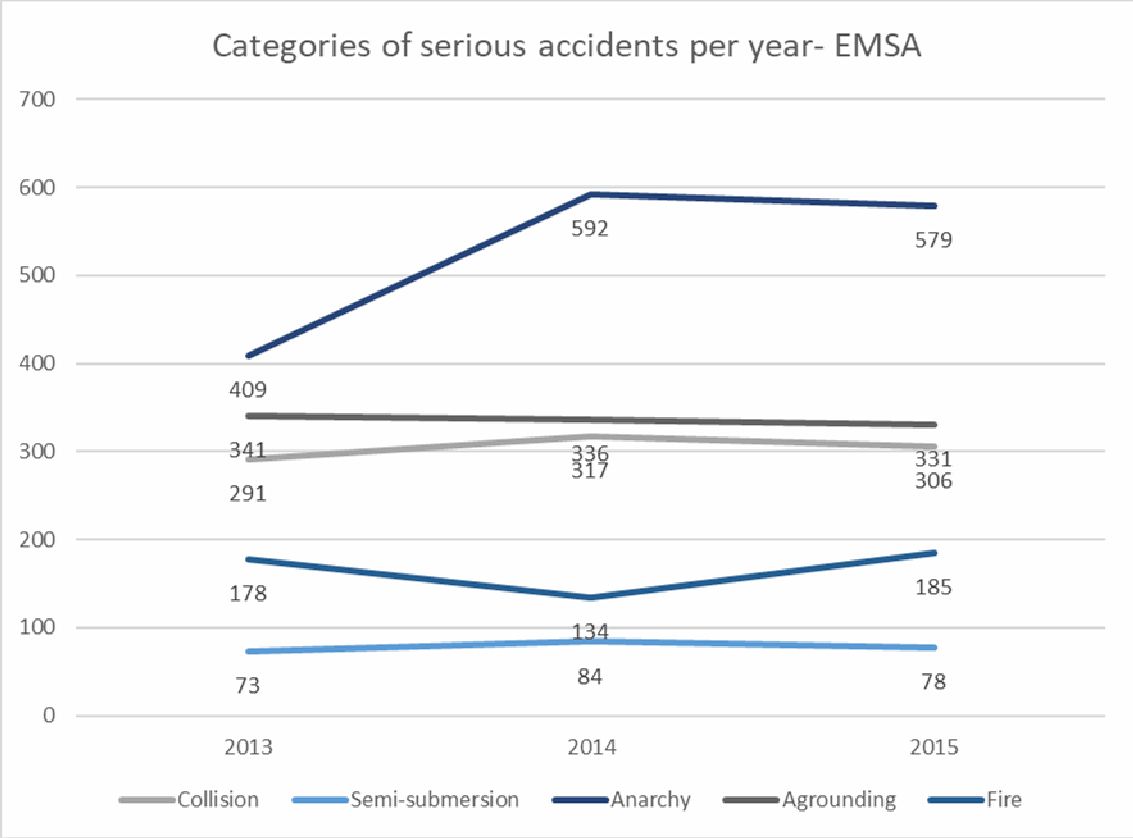



**Table 4. Categories of serious accidents per year**

(Source: EMSA, 2014, 2015, 2017)

It is evident from the analysis of the two graphs that the main cause of major accidents in both areas with the fire / explosion being is the human factor. In both samples, similar behaviors are presented in recorded incidents, which is likely to rule out any wrong practice or guilty misuse by the Greek state, either as a sovereign or offshore flag or as a flag state (HBMCI, n.d.).

# Chapter 3: Marine Accident Analysis

Based on the figures of the two regulators, we can look at maritime accidents and draw key conclusions.

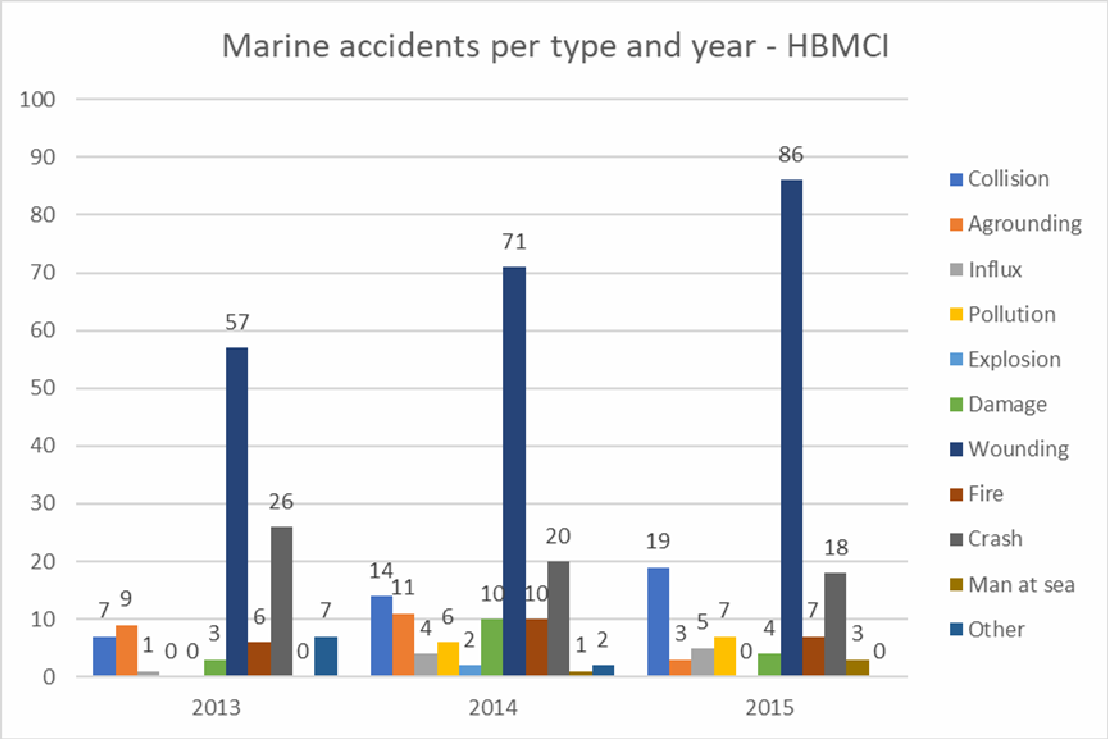



**Table 5. Marine accidents per type and year**

(Source: HBMCI, n.d.)

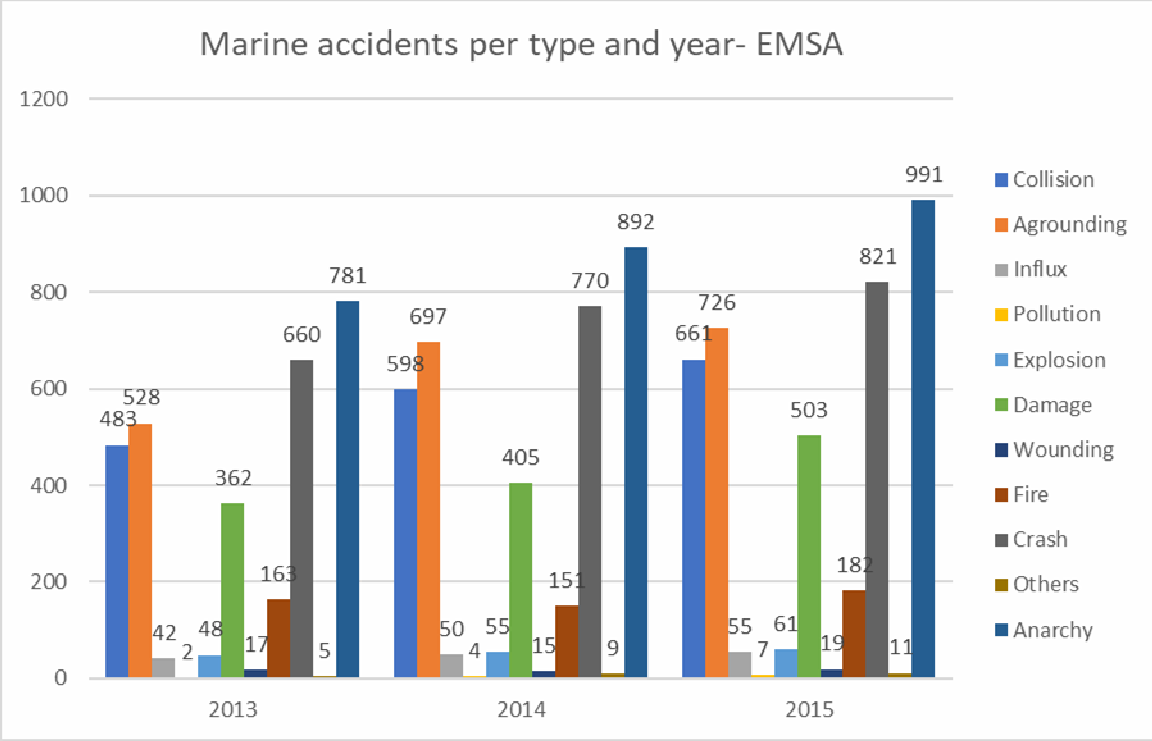



**Table 6.Marine accidents per type and year**

(Source: EMSA, 2017)

From here, we can initially see that about the same priorities are observed each year as to what is causing maritime accidents, both at a Greek and a pan-European level. What however is quite alarming in this case is that based on the data of HBMCI, no incident ungovernability recorded as marine casualty, but the pan-European data, is the main reason that causes (HBMCI, 2015).

Thus, one can safely say that in this area it has deviated from European standards, as even such an incident should be recorded. Of course, the non-existence of identical data, ie that the Greek record of an incident is assigned to the corresponding EU figures, leaves room for doubt.

An equally important conclusion is that each year gradually, the reported incidents are increasing, which is in full consistency with the fact that gradually the investigation and registration of marine casualties and incidents institutionalized in more and more EU countries under EU Directive in the projected period.

Furthermore, one can observe that in Greek territory, in the manner defined by the IMO, the injury is the primary recording event of marine accidents, a second predominant factor inflow however, although the input is indeed among the top players in the European area, the injury is found to be quite low on the list.

Finally, it is encouraging that the pollution records are poor, so the permanent damage to the environment, whether at sea - coastal life, either at the level of disruption of natural beauty is particularly limited. Next, it is worthwhile to study what recordings have been made for the last category, that of maritime events.

# Chapter 4: Analysis of Marine Casualties

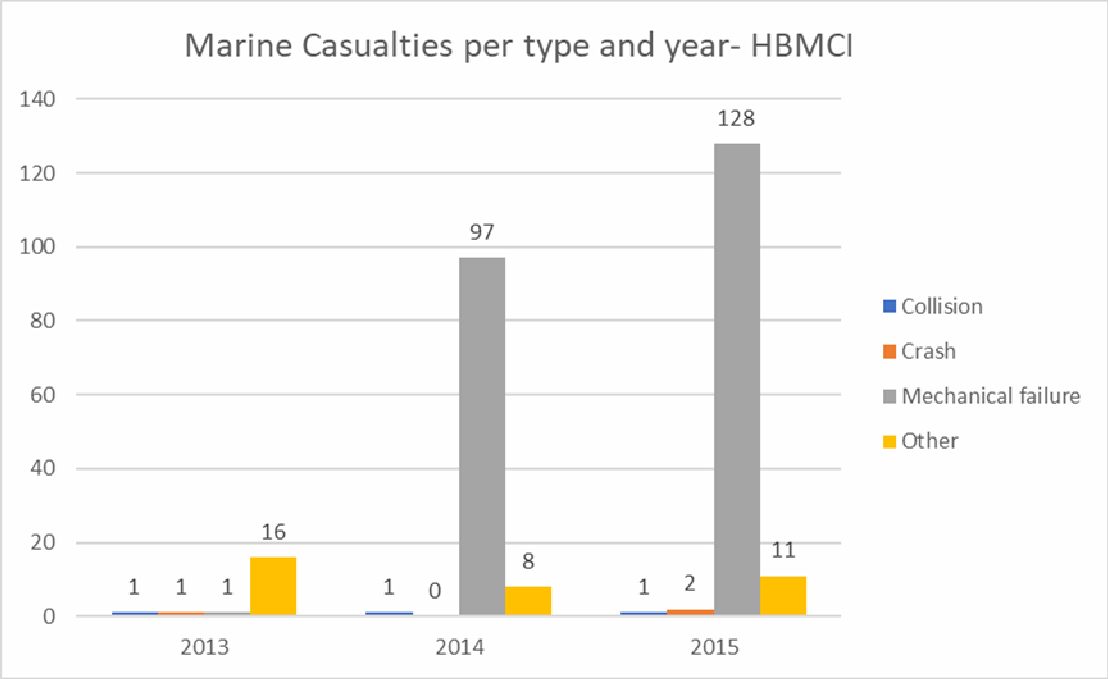



**Table 7. Marine casualties per year and type**

(Source: HBMCI, n.d.)

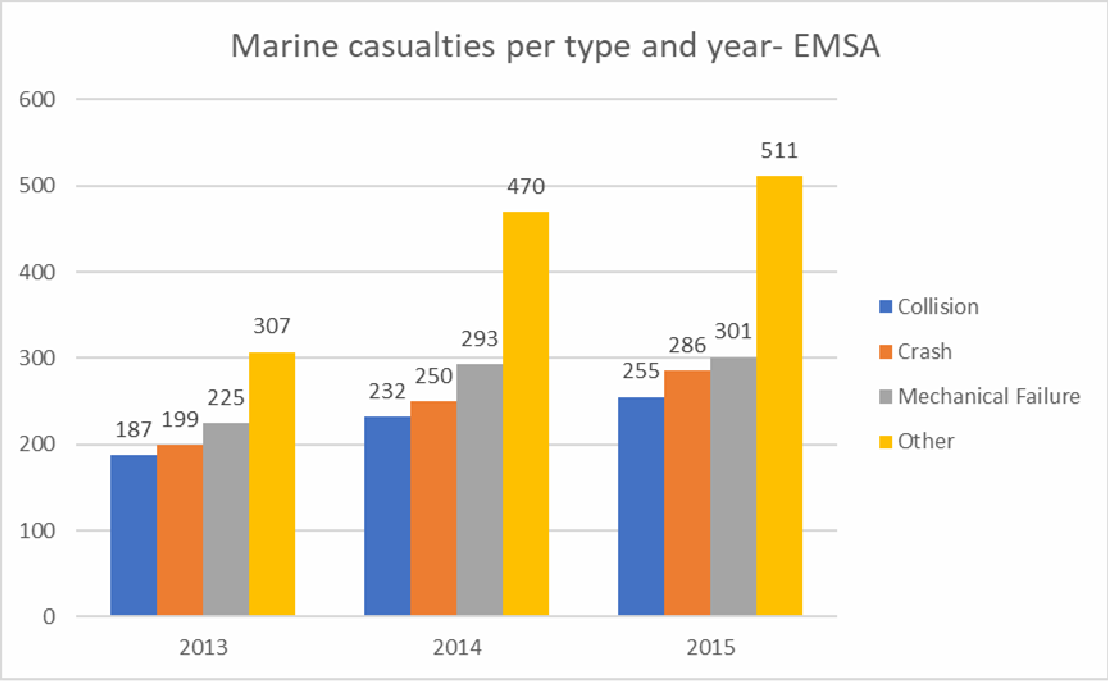



**Table 8. Marine casualties per type and year**

(Source: EMSA, 2017)

Once again, it is self-evident that each year the results increase as the incidence of incidents increases. In 2015, the recordings between the two operators show the same priorities as to what is the main reason for the naval incidents, but in both cases the other causes are the leading factor. We could mention the factors that are categorized as EMSA elements, but the small number of HBMCI 's records would not help us draw any conclusions.

# Chapter 5: Analysis by ship type

In addition to the general accident recordings, both in importance, year by year and by category, EMSA data provide a more complete picture, giving more evidence of incidents. So, let's look at them in detail.

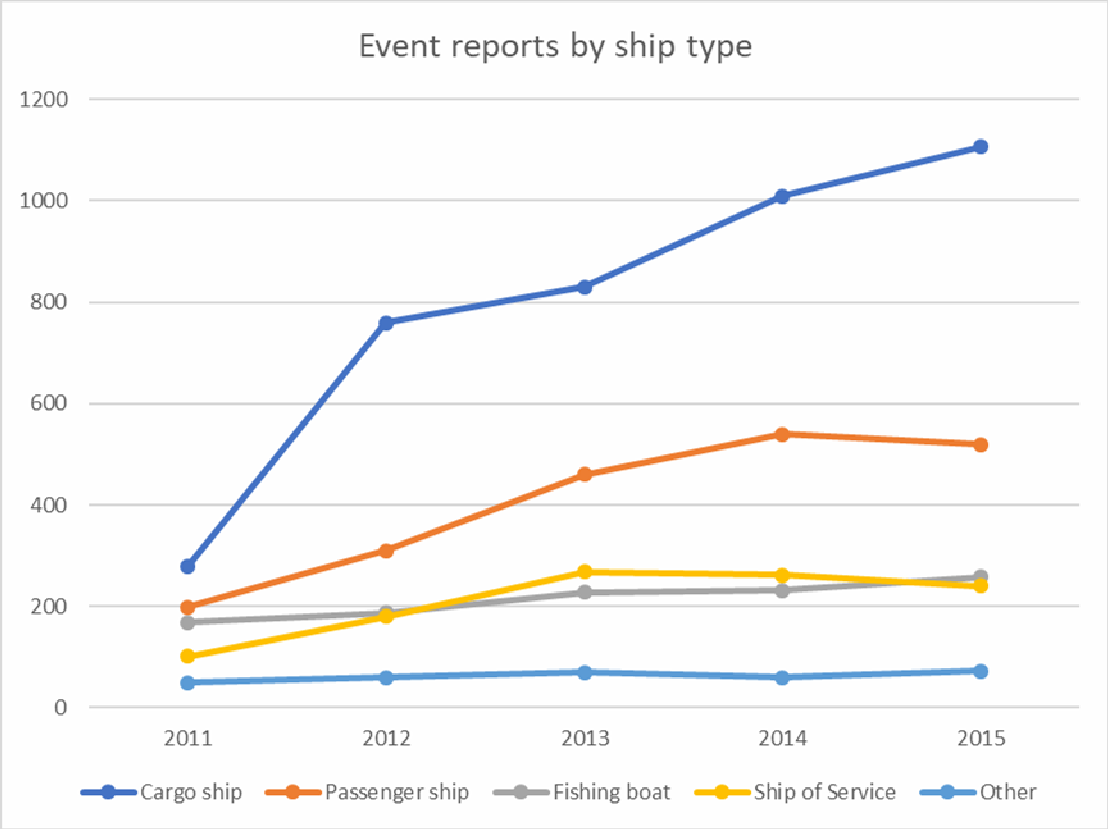



**Table 9. Event reports by ship type**

(Source: EMSA, 2017)

Although one would expect most accidents to happen from passenger ships, we should not forget that these are usually made known through the news media. However, reality is quite different. Not only most accidents are happening by cargo ships, but considering the range of goods being shipped, ie fuel, containers, tanks that include a solid load such as, for example, sand, it is logical to have many more cargo ships in circulation against passenger and therefore cause more accidents.

However, we should bear in mind that, although all the categories tend to stabilize, as the years go by, freight accidents continue to increase, which may be due to many factors, due to the specificity of their journeys, which are in their overwhelming majority overseas and many times in different parts of the world at a time.

It is then worth considering the naval accidents and incidents from the point of view of the human factor. In the following graph, we will see each year how the reported accidents relate to the people who participated in them.

# Chapter 6: Analysis of human involvement

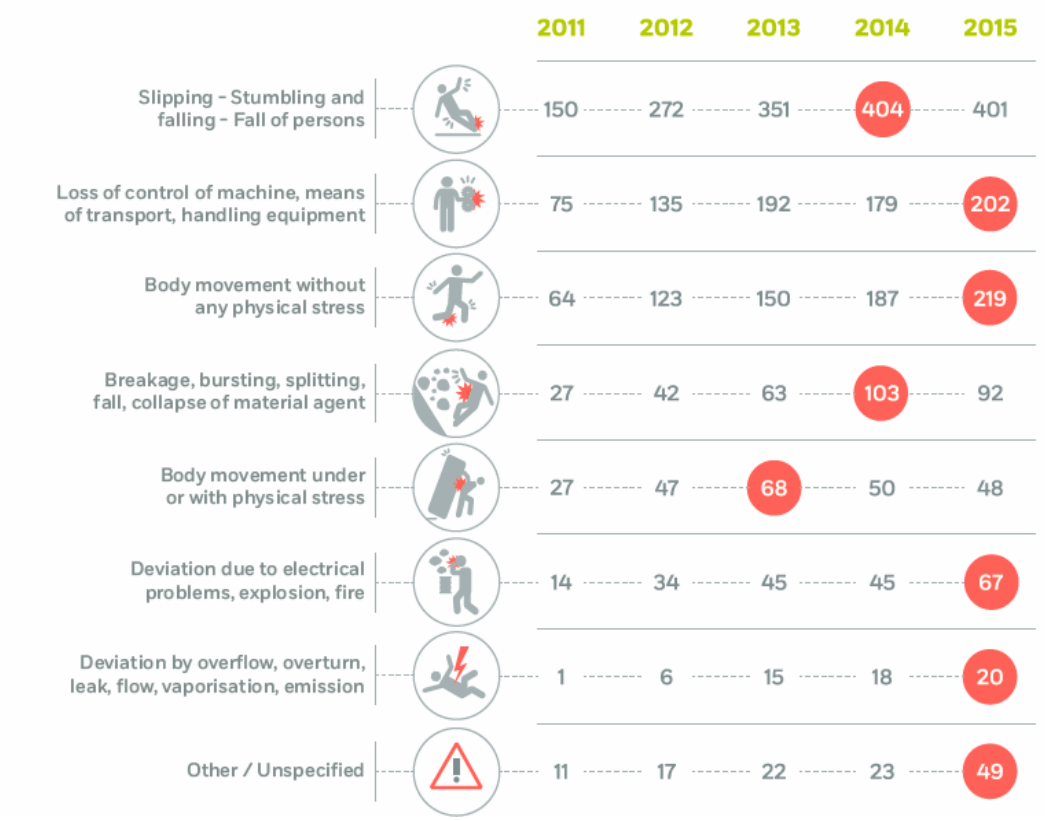



**Figure 1. Accidents related to people**

(Source: EMSA, 2015)

As it turns out, the main cause with a difference is the drop of an individual, having twice the records of the next, which is the loss of control. The fact that peak records in all categories are presented from 2013 onwards is again affected by the overall increase in recorded incidents by EMSA. All these records, however, can have two consequences for those who have been involved. These are the loss of life and the injury. The graphic below is presented per year, separated by whether the person was a crew, passenger or other (e.g. land).

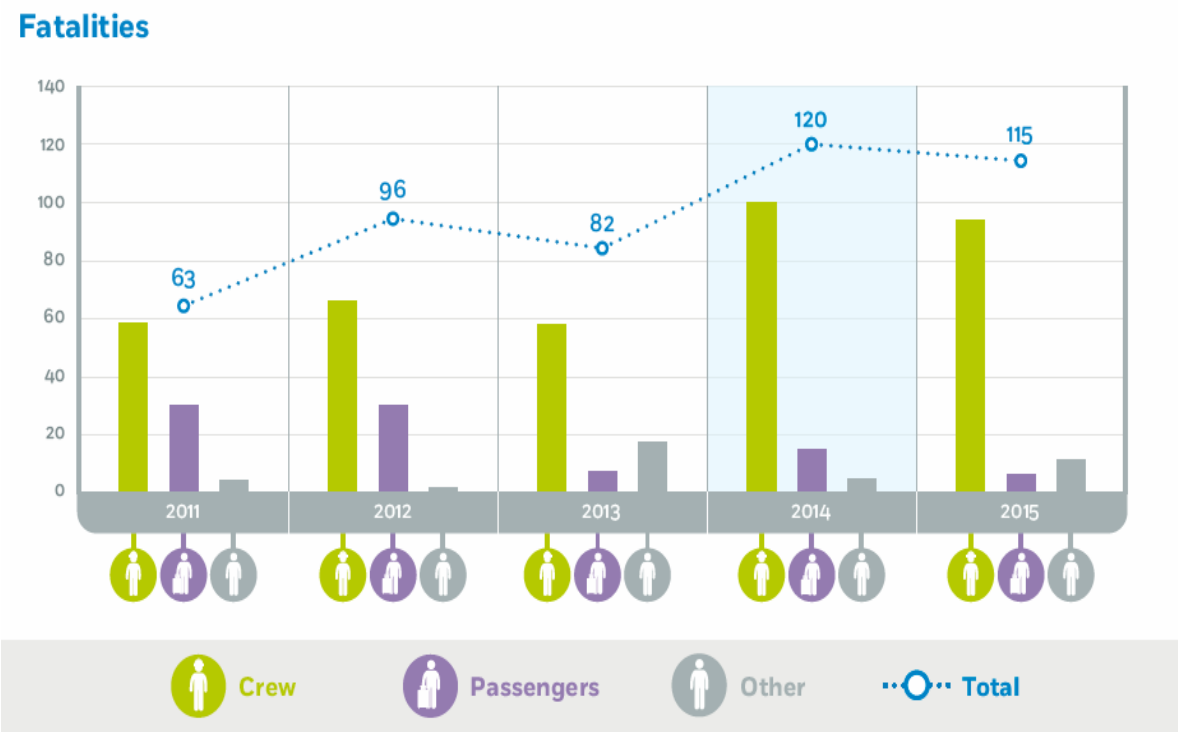



**Figure 2. Fatalities**

(Source: EMSA, 2015 )

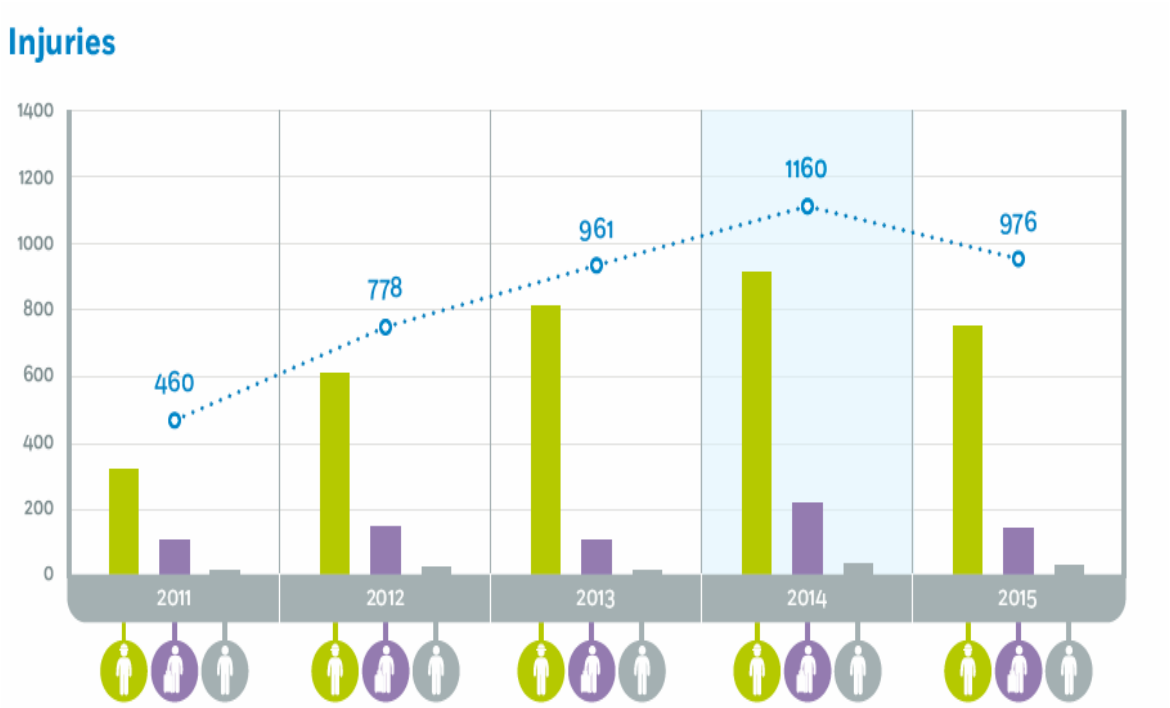



**Figure 3. Injuries**

(Source: EMSA, 2015)

As it is unfortunately expected, both in the case of life-threatening and injuries, the crew members come first with great difference. This is the case for three factors. Firstly, because cargo ships do not carry passengers, secondly, because maritime regulations require passengers to be first evacuated in the case of passengers and the crew then leave the crew, and thirdly, the nature of the accident itself often occurs only in places which the crew has access to, such as an industrial accident in the engine room (EMSA, 2016).

# Chapter 7: Ship loss analysis - case recording

EMSA provides interesting information on how the overall loss of ships is broken down by category.

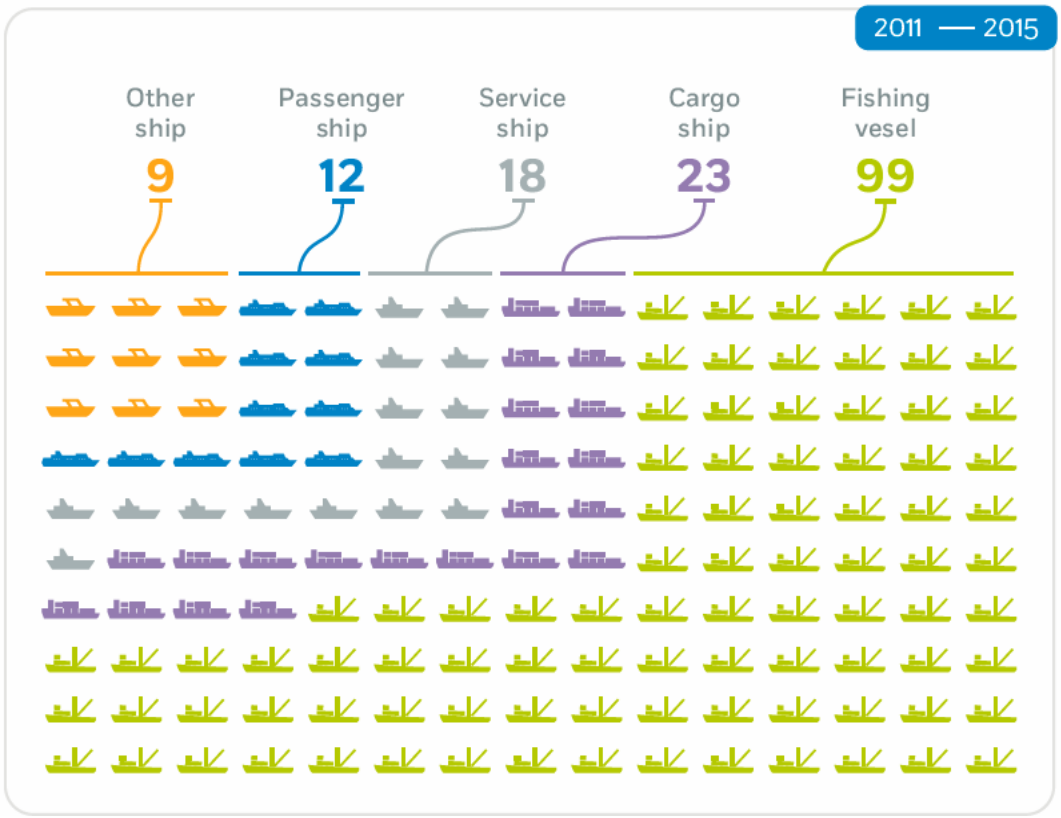



**Figure 4. Loss of ships by category**

(Source: EMSA, 2015)

As one can easily see, with about 100 losses, the fishing vessels come first to the losses, covering 62%. Although it seems paradoxical, the fishing vessels vary in sizes from small trawlers to large ocean-going vessels. Due to the nature of the work they perform, they are often faced with extreme weather conditions for which they are not ready in terms of construction. So, many times, there are heavy list, mechanical failure, and water ingress. Finally, there are quite a few collision incidents, but these do not lead to total loss.

A large percentage of total loss is reported on service ships. Service ships based on EMSA records do not include warships and fleet of the country's navy, but only tugs, special purpose vessels and excavators are defined.

From all records in the five-year period, there is a reduction in service shipwrecked accidents and therefore a reduction in overall total loss occurrences, but this excludes tugs, the accidents of which increase every year from 2011, which could partly be justified by the increased lack on incidents, which they are called upon to hurry for help.

Particularly positive is the fact that in the five years there have been only 12 incidents of total loss of passenger ships as it is the only type of ship that in case of total loss can have a terrifying impact on human lives.

These 12 cases of total loss of passenger ships are as follows:

1. July 10, 2011: The Russian river boat Bulgaria (built in 1955, Komarno, Czechoslovakia) made regular services on the channels of the Volga and Don rivers. On July 10 it sank at Kuybyshev in Volga with 201 passengers and crew. The destruction led to 122 confirmed deaths. It has been Russia's worst accident since 1986 when SS Admiral Nakhimov collided with a cargo ship and killed 423 people.

**Figure 5. The Russian river boat Bulgaria**

(Source: Wikimedia Commons, 2017)

2. July 25, 2011: Turkish Ishan Alyanak passenger ship collides with the pier in Smyrna, Turkey and sinks to the same spot.

3. September 10, 2011: The Dutch RiverZZ is completely destroyed by fire in the city of Rotterdam in southern Holland.

4. September 15, 2011: The Nordlys Norwegian cruise ship (built in 1994, Stralsund, Germany) fired at the engine room shortly after leaving Ålesund in Norway. Two of the 55 crew members are killed instantly, while all 207 passengers and crew are rescued, except for some members who stayed to help extinguish the fire.

5. January 13, 2012: The Costa Concordia cruise ship (built in 2005) is located at the bottom of the Isola del Giglio, Tuscany, Italy. There were 32 deaths among a total of 522 persons. A rock falling on the ship caused great list and filled it with water. This affected the engine room, the ship lost its power so gradually it ended up sinking 500m away from the village of Giglio Porto, in shallow water.

6. With the help of tugboats, that ship was, straightened and traveled to dismantle last month.

7. January 29, 2012: The Russian-flagged passenger ship, Anna Akhmatova, is seriously damaged by fire and sinks in Moscow.

8. February 16, 2012: French flagged Yogi, sinks during a storm in Skyros. The eight-member crew is rescued by a helicopter. After sinking, a lot of information connects him with financial scandals in France, talking about a strange sinking.

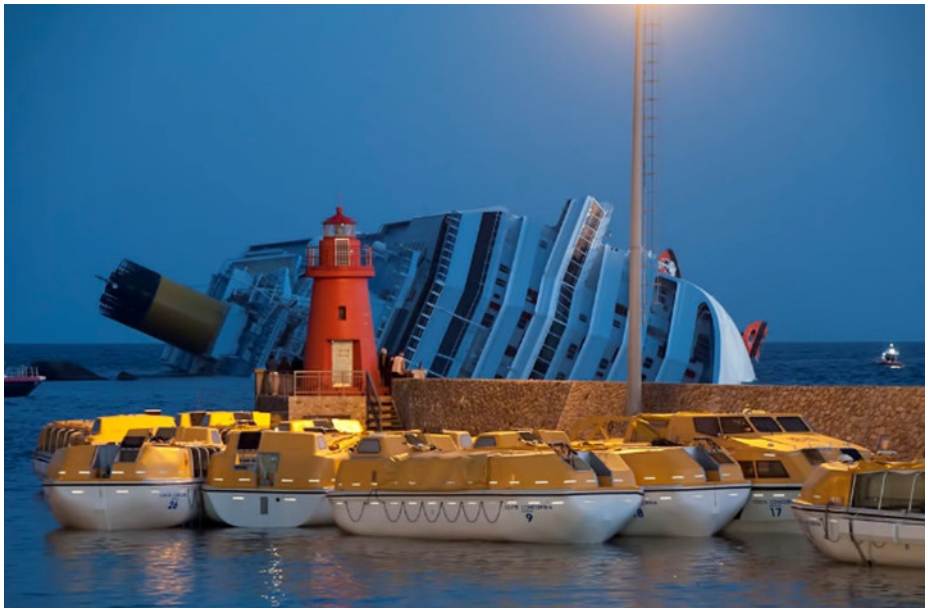


***Figure 6. Costa Concordi*** (Source: gCaptain, 2013)

**Figure 7. Yogi**

(Source: Pike, 2013)

9. May 3, 2012: The Urd passenger ship, flagged in Denmark, collides with the German flaged Nils Holgersson, in Travemunde, Germany, and sinks.

10. April 2, 2013: The Turkish ship Sabret flies to the Marmara Sea in Istanbul. Passengers and crew are transported to the Caddebostan but there are many injuries.

11. 30 November 2013: The Ocean Countess, a Portuguese flaged passenger ship, was completely destroyed by fire in Chalkida, where it remained anchored in order to return to service a few months later. The 5-member crew was rescued, and the ship was sold for scrapping.

**Figure 8. Ocean Countess in Helsinki**

(Source: Wikimedia Commons, 2017)

12. December 28, 2014: The Norman Atlantic passenger ferry, under Italian flag, was used by ANEK Lines for trips to the Adriatic. On that day, there was fire, from which 9 bodies are collected, while 19 others are ignored in the logbook, but references refer to 499 passengers. After the accident, the ship was towed to the port of Bari for investigations.

**Figure 9. Norman Atlantic**

(Source: Alan, 2015)

13. April 28, 2015: Italian passenger ferry, Sorrento, caught fire during a trip from Palma del Mallorca to Valencia, Spain. 27 nautical miles away from Majorca, all the passengers survived, with four crew members injured. The ship, however, was cracked, and was unable to be repaired, so it was towed to the Sagunto area awaiting its dismantling.

14. Finally, we should mention that there are unfortunately not official records of merchant ships carrying migrants due to the refugee crisis that has already begun in 2015, and due to the non-observance of maritime regulations, the existence of surplus passengers, and poor weather conditions, often sink, resulting in very serious or serious marine incidents.

# Chapter 8: Environmental Impact

EMSA provides data per year on pollution. Most of environmental pollution cases were caused by the discharge of products from ships' tanks and other polluting agents such as lubricants and cargo residues. In 2015 there was a decrease in similar accidents. Pollution-control services usually start a business after grounding or collision between ships.

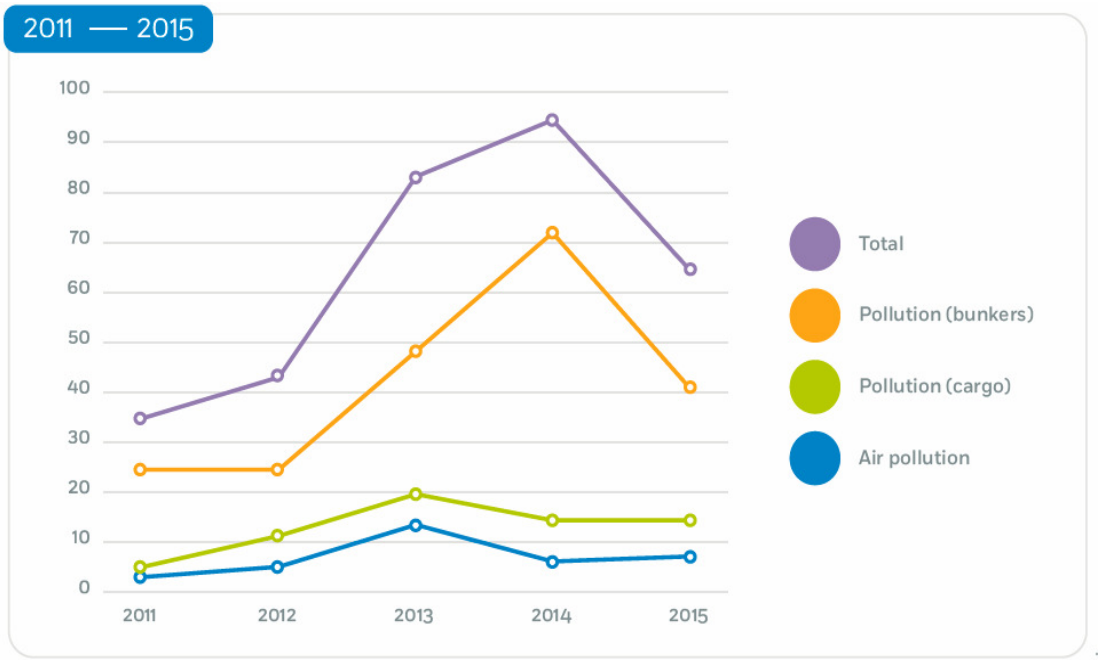



**Figure 10. Pollution in 2011-2015**

(Source: EMSA, 2015 )

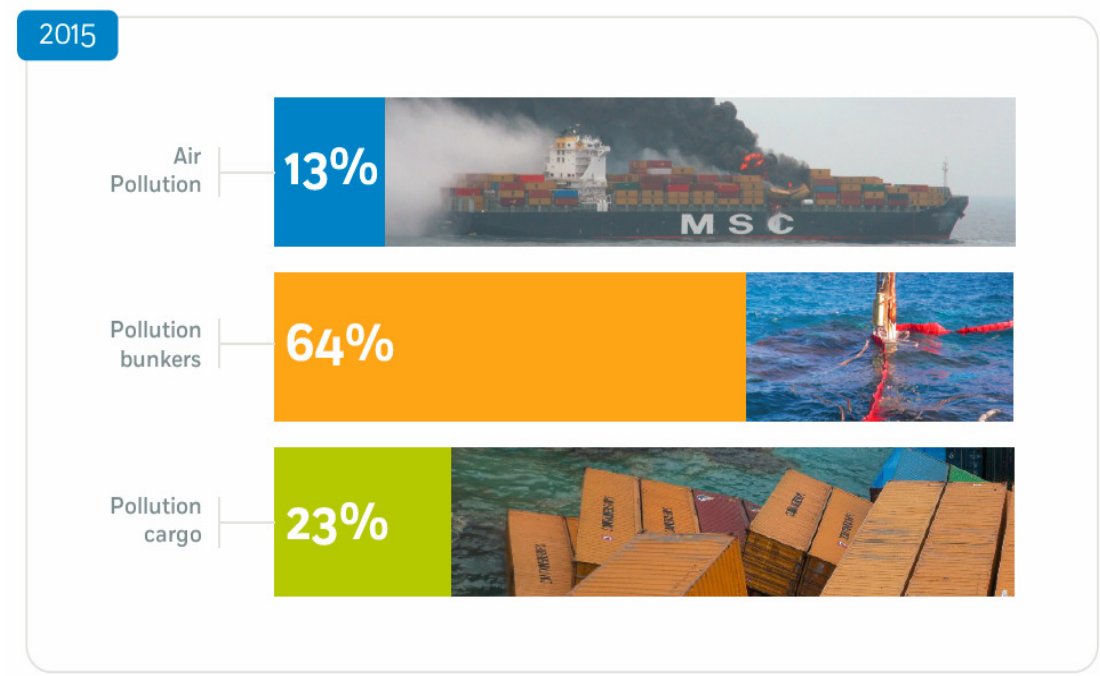



**Figure 11. Pollution in 2015**

(Source: EMSA, 2015)

The data for 2015 is showing that the proportion of tanks (fuel) is just over 50% of the total pollution, with ¼ coming from pollution caused by cargo, and a little over 10% by air pollution, which unfortunately cannot be prevented or restricted in any way.

# Chapter 9: Overall case analysis

To summarize, therefore, between 2011 and 2015, the incidents recorded regardless of their severity are ¼ incidents involving mechanical damage, 1/5 contact incidents, such as with a port, with a 16% of total records occupied by cases of collision, and impact, while material damage is 8%. The above cases cover more than 80% of total records.

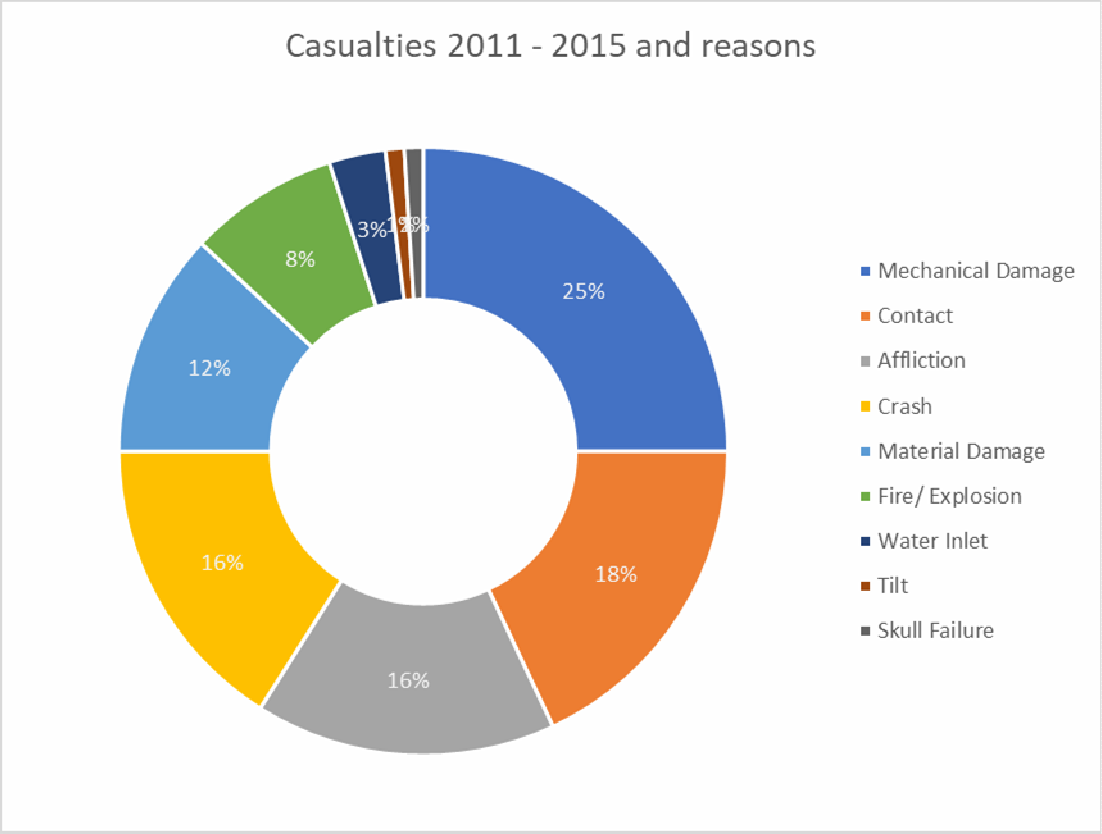



**Table 10. Reasons of casualties in 2011-2015**

(Source: EMSA, 2015)

In order to understand the following figures, it is worth mentioning how the total records are moving per year for the time we are studying. In 2011 there were about

1250 records, in 2012 about 2200, in 2013 there were 2800 in 2014 about 3100, and finally in 2015 there were about 3250 recorded incidents.

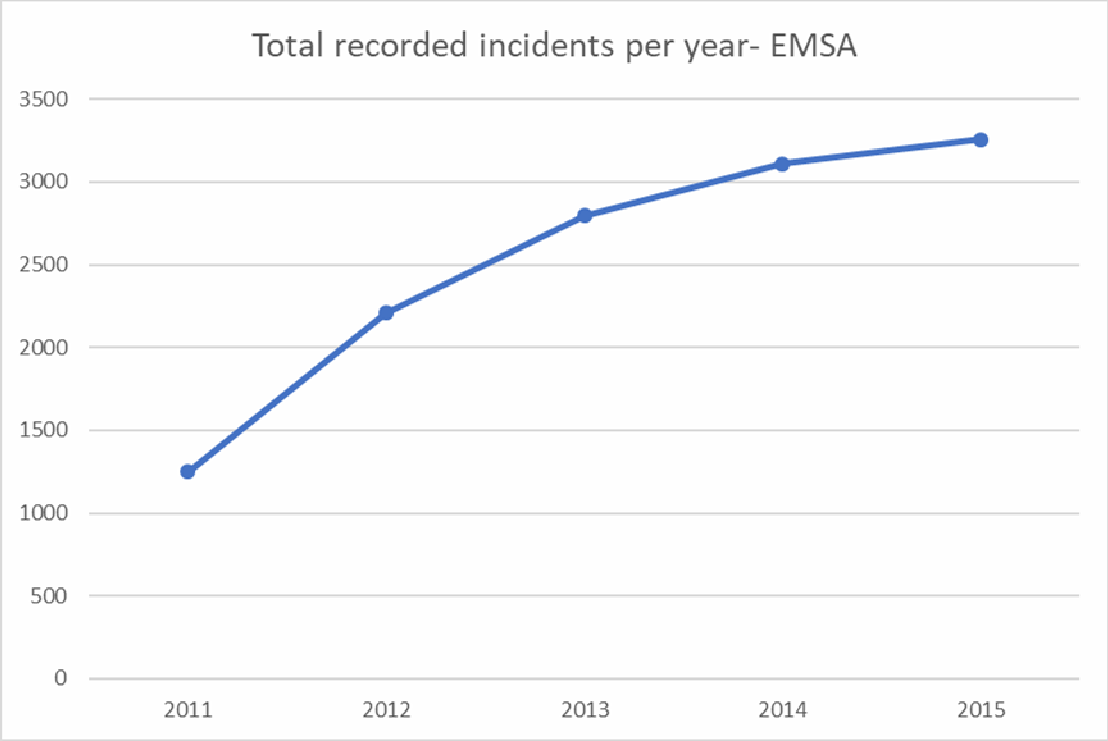



**Table 11. Total recorded incidents per year**

(Source: EMSA, 2017)

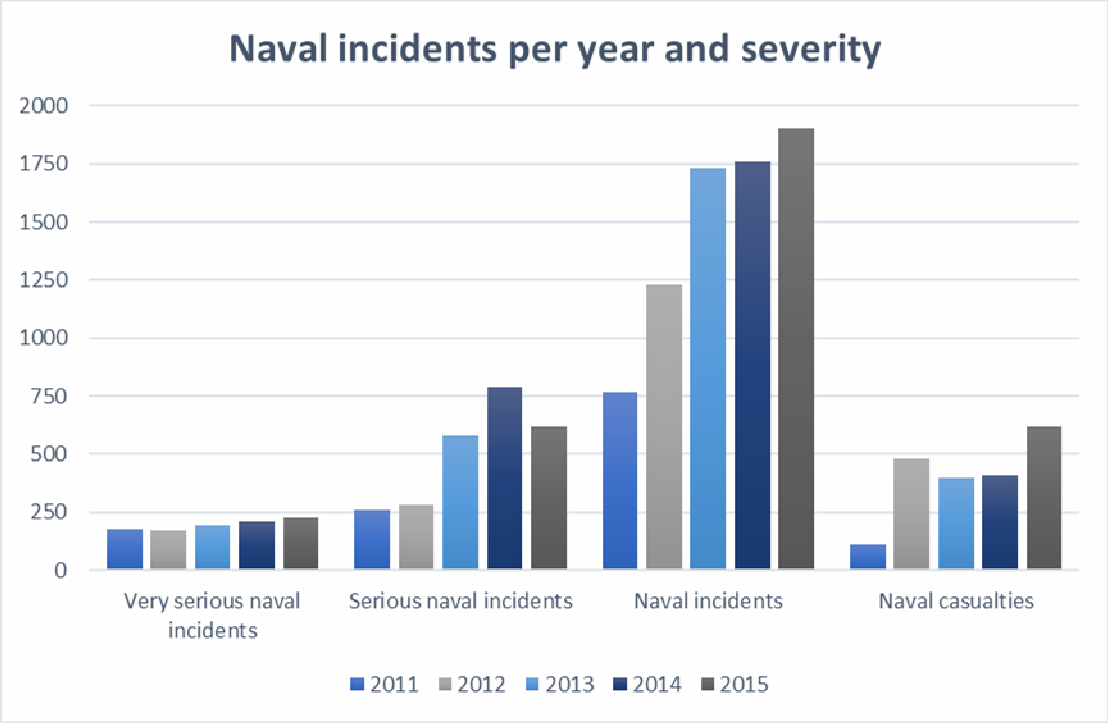



**Table 12. Naval incidents per year and severity**

(Source: EMSA, 2015)

Based on EMSA data over the projected five-year period, we can easily see that very serious marine casualties are almost constant, despite the increase in the total recorded events, which is extremely encouraging, since we count the measured records, we will see that there is a fall in them. That is, accidents with permanent environmental damage, death of a crew member, passenger or third party involved, or total loss of the ship, have decreased.

We also notice that maritime accidents, which are mostly recordings, are steadily rising, while a fluctuating course records serious maritime accidents and marine incidents, but without the variation exceeding 500 records in the five years.

However, having analyzed both incidents in severity and impact on the environment and humans, it would be good to see how the recording mechanism works and whether it produces results.

During the five years 2011-2015, a total of 749 investigations were ordered, 49% of which involved very serious accidents and 42% of major accidents. Of these, 8 surveys directly related to the interests of the European Union were conducted by 6 non-Member States.

It is also worth noting that the only year in which the very serious marine casualties reported are more than the ordered and / or carried out investigations is in 2011, as the Community Directive requiring the recording and investigation of all very serious marine casualties entered into force after 17 June 2011. The Directive is 2009/18 / EC.

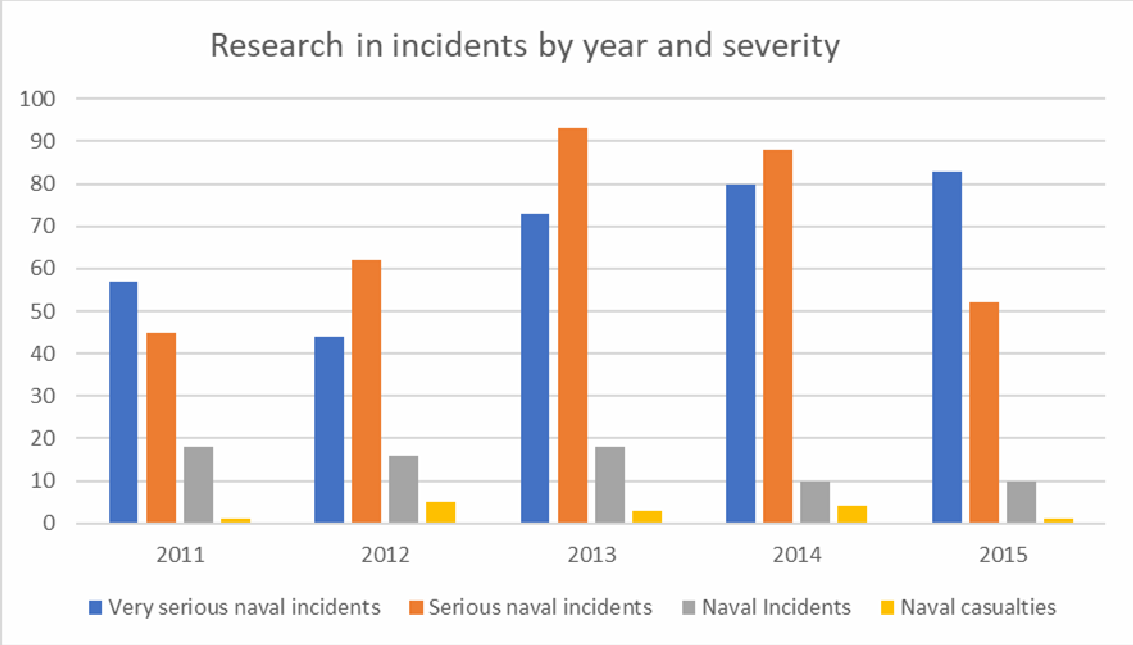



**Table 13. Research in marine incidents by year and severity**

(Source: EMSA, 2015)

Here it is worth noting that due to the overall increase in occurrence records, there seems to be a steady increase in the number of investigations, and due to the mandatory procedure under the EU Directive, the number of very serious accidents after 2011 is identical to that of the year in this category.

Another interesting piece of information provided by EMSA for the past five years is the distribution of maritime incidents (incidents and accidents at all levels of gravity) geographically, both within Europe and globally.

As can be easily seen from the following map, the largest number of records is found in the English Channel, in the narrow passage south of England and north of France. This is because there is short distance particularly in a large volume of ships mainly used for freight transport. On the other hand, this is the busiest sea corridor with more than 500 ships a day, while soil geomorphology is an obstacle to the aid of shipping from land, such as using terrestrial radar.

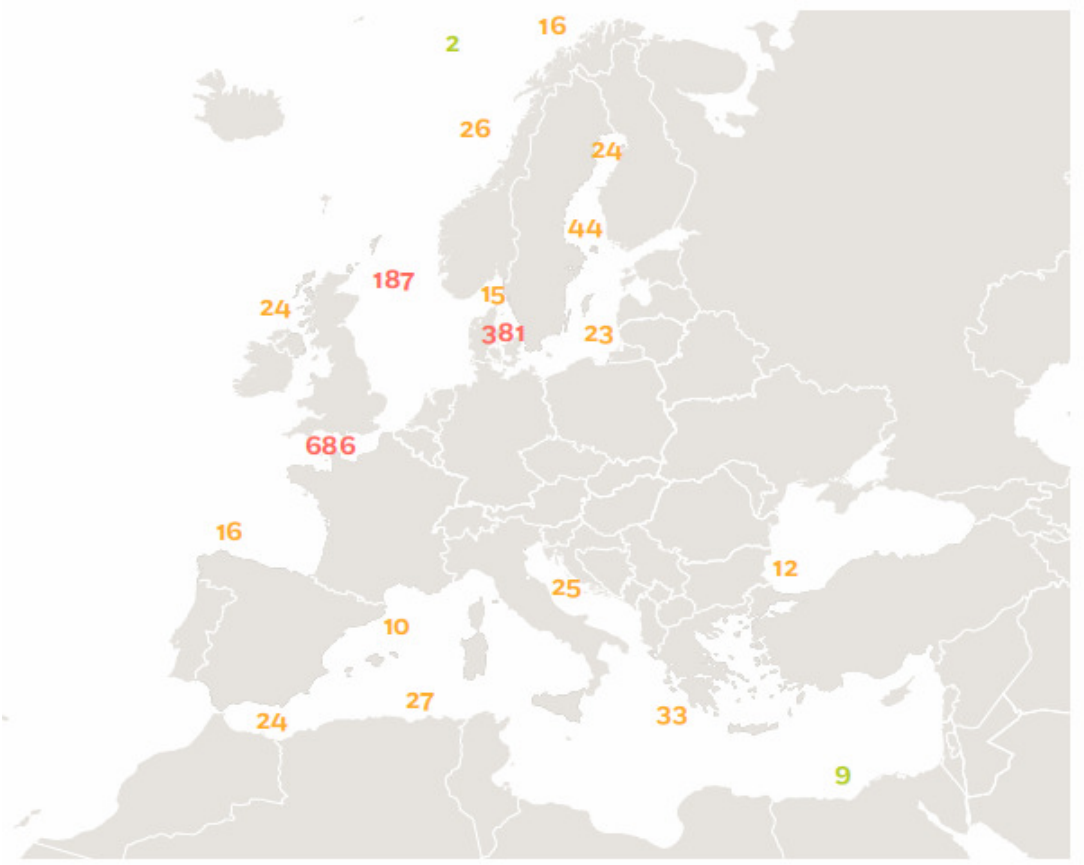



**Figure 12. Marine incidents in Europe**

(Source: EMSA, 2015)

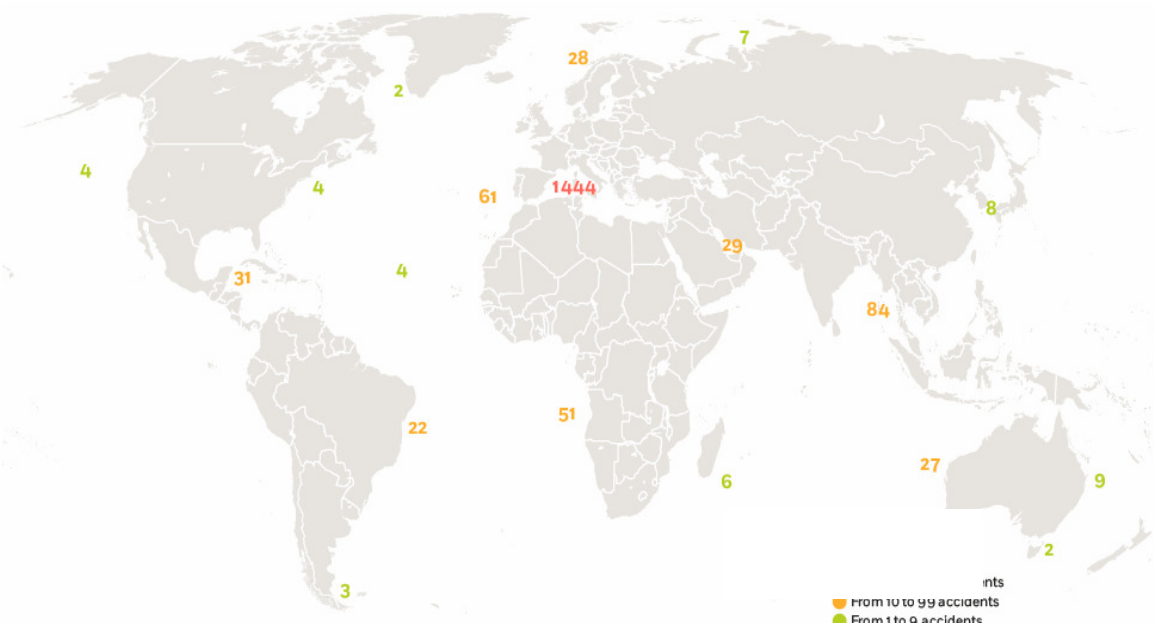



**Figure 13. Marine incidents all over the world**

(Source: EMSA, 2015)

At global level, as we can see, incidents are limited to areas of major commercial interest, such as the Persian Gulf, the Indian Archipelago, the Ivory Coast, Western Australia and Brazil, but at five-year levels, incidents are negligible against records in the European section.

The most recent classification based on data collected by EMSA is the place of the naval event.

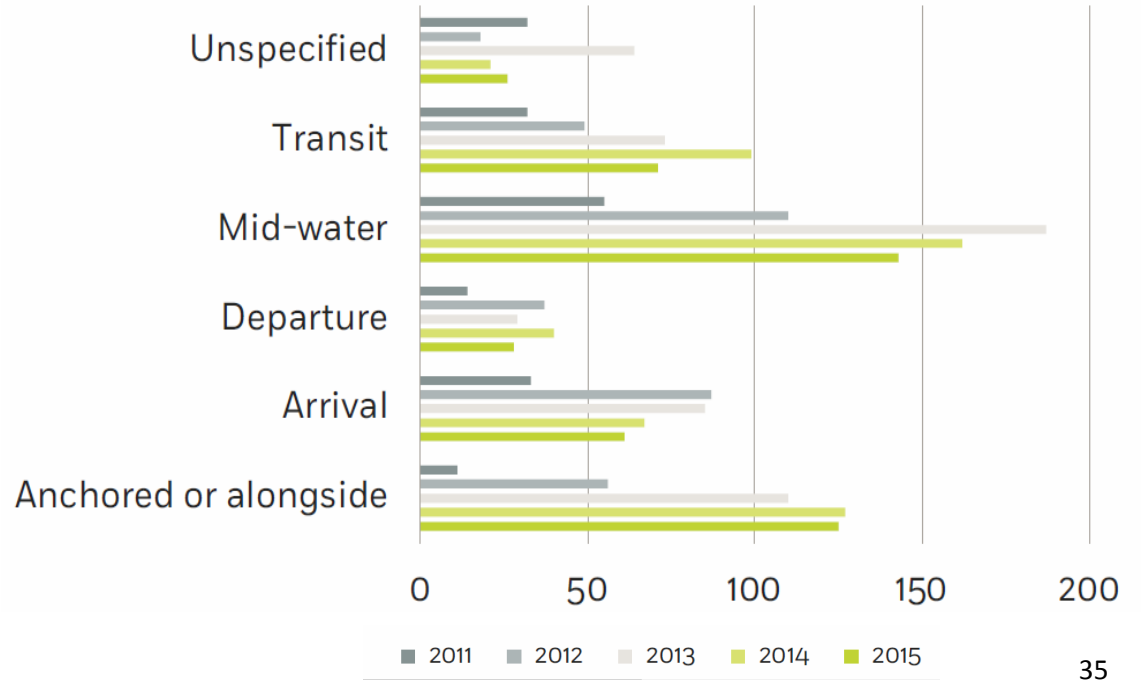


**Figure 14. Places of marine casualties**

(Source: EMSA, 2015)

It is easy to see that most of the incidents are made in the middle, while the second point with no significant difference in the recordings for the last few years is when a ship is anchored.

At this point, it is worth noting that EMSA considers as anchorage incidents cases of active towing, when an accident has occurred, a tug intended to carry the ship involved, and becomes a new one, a conflict between those two is born.

Finally, EMSA data categorizes the sample based on the type of ship involved in the marine incident record. This procedure is followed for both passenger ships and service ships.

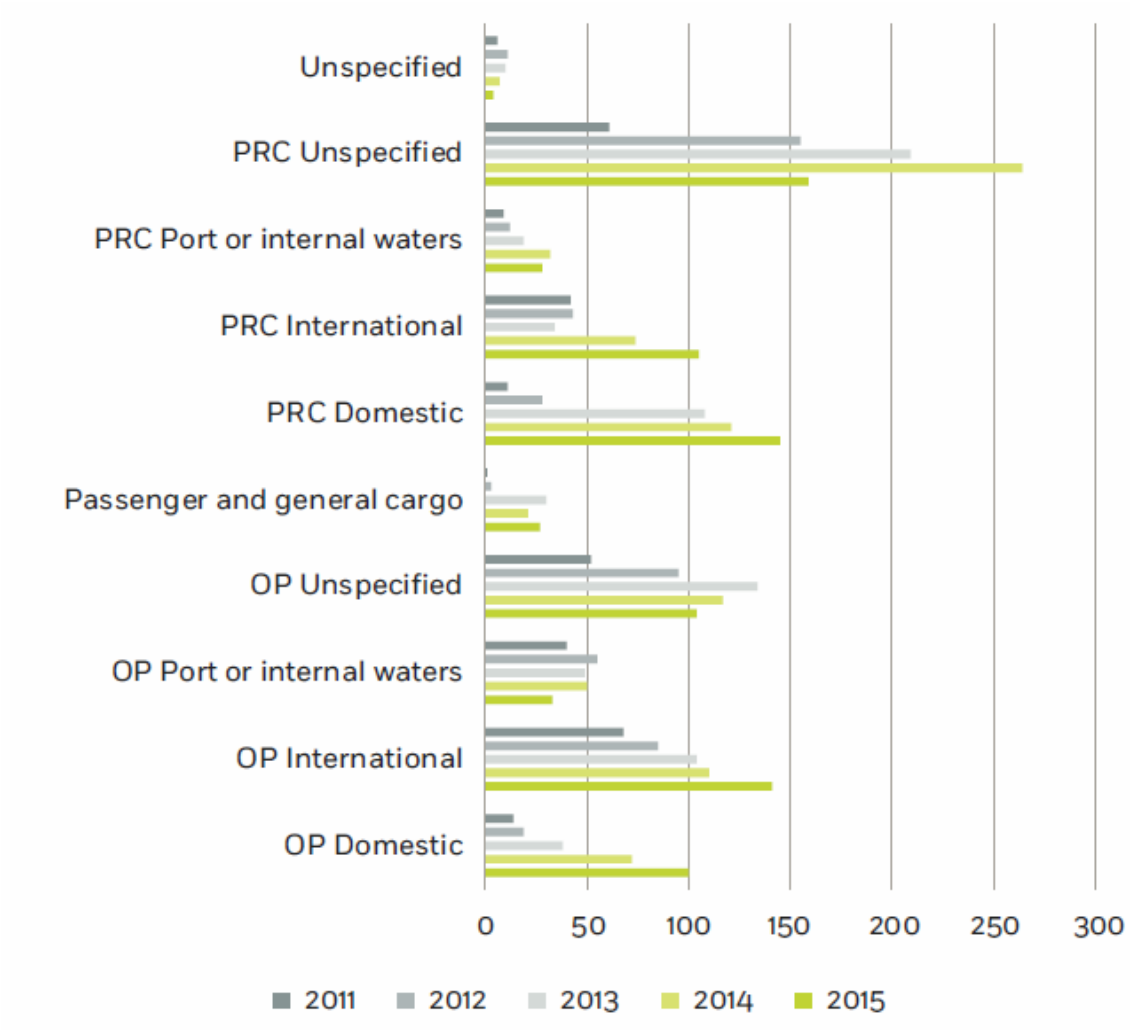



**Figure 15. Passenger ships involved in the marine incident record**

(Source: EMSA, 2015)

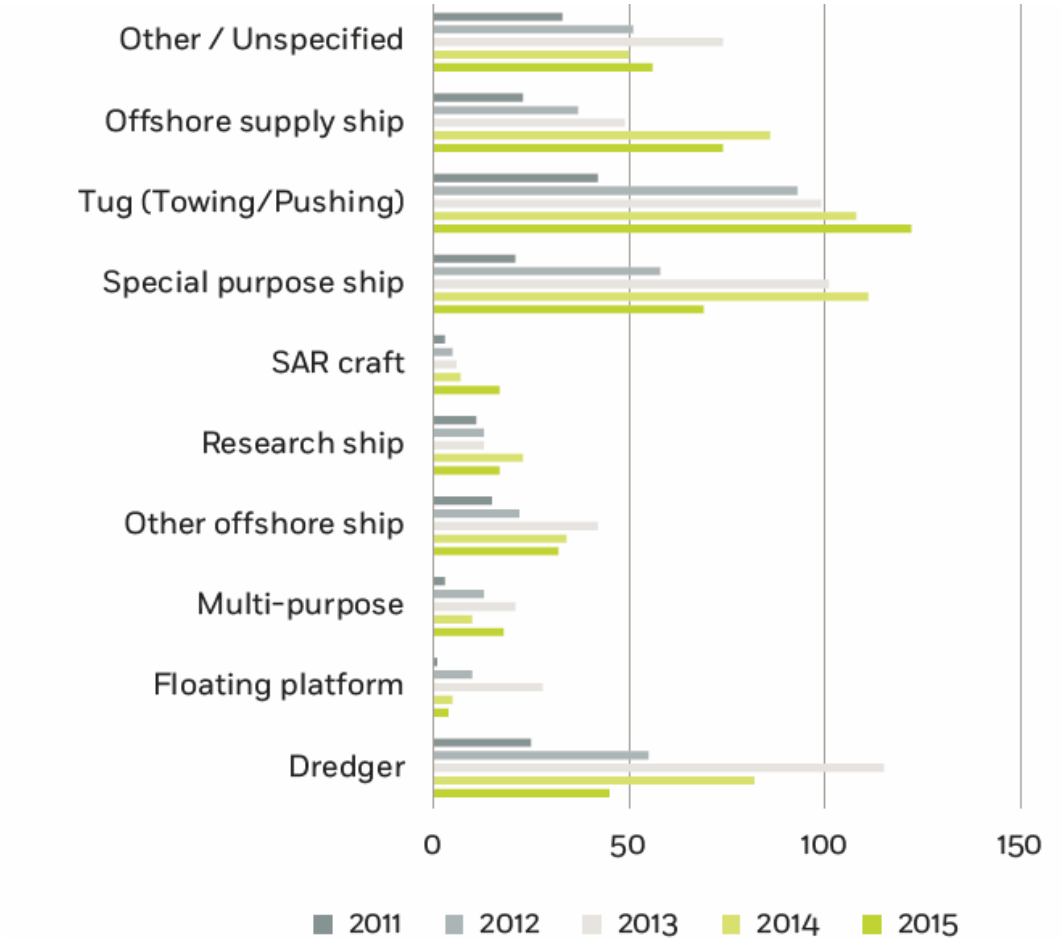



**Figure 16. Service ships involved in the marine incident record**

(Source: EMSA, 2015)

In conclusion, we can see that for passenger ships, the main category of events is reported to be Passenger - Cargo, without any identifiers.

In the case of service boats, the tugs served their purpose, mainly because of their difficult work, as the trailer has no or only limited control of the direction and the possibility of maneuvering, and it is also very close to the trailer.

The same procedure is followed for cargo ships and other vessels, but the data available is aggregated and does not lead to any conclusion.

# Chapter 10: Important marine casualties

## September 10, 2011: MV Spice Islander I

History of the Vessel:

The MV Spice Islander I, was originally built in 1967 as Marianna for an unknown owner, she was later sold to Theologos P. Naftiliaki of Piraeus, Greece.

In 1988, Marianna was sold to Apostolos Shipping and renamed Apostolos P. She was later sold to Saronikos Ferries and placed in service on the Piraeus.

In 2005, Apostolos P was registered to Hellenic Seaways.

In 2007, she was sold to Makame Hasnuu of Zanzibar, Tanzania, and renamed Spice Islander

I.

On 25 September 2007, Spice Islander I was off the coast of Somalia when she experienced engine problems due to contaminated fuel. After the alarm had been raised via Kenya, USS Stout from Combined Task Force 150 was sent to her aid. The ship was on a voyage from Oman to Tanzania and was not carrying any passengers. USS James E. Williams also responded. Stout provided the ship with 7,800 US gallons (30,000 l; 6,500 imp gal) of fuel and supplied the ten crew with food and water. After her engines were restarted, she resumed her voyage to Tanzania.

Investigation of the Accident:

On 10 September 2011, the MV Spice Islander I, a passenger ferry carrying over 2,000 passengers, sank off the coast of Zanzibar. The ferry was travelling between Unguja and Pemba, two islands off the coast of mainland Tanzania, when it capsized. Early estimates put the death toll at around 200, but a report published by the Tanzanian government in January 2012 claimed that over 1,500 people had been killed.

At 21:00 local time (19:00 UTC), the MV Spice Islander I, sailed from Unguja, the main island of the Zanzibar archipelago, for Pemba Island to the north. The ship's official capacity was 45 crew and 645 passengers, but it was reported to be heavily overloaded.

Around four hours after departure, Spice Islander I, sank between Zanzibar and Pemba. The ship is thought to have capsized after losing engine power. Of those on board, around 620 were rescued, with at least 40 of them suffering serious injuries. Early news reports claimed that the ferry was carrying an estimated 800 people at the time of her sinking, and by 12 September, it was reported that over 240 bodies had been recovered. However, on 14 October, the Tanzanian government confirmed that the vessel had in fact been carrying around 3,586 passengers, of whom 2,764 were unaccounted for. In an investigative report published on 19 January 2012, these figures were revised downward, with 2,470 passengers, 203 confirmed dead, and 1,370 missing.

**February 2, 2012: MV Rabaul Queen**


History of the Vessel:

MV Rabaul Queen was a passenger ferry owned by the Papua New Guinea company Rabaul Shipping. The ship was built in Japan in 1983, operated on short runs in that country, before being brought to Papua New Guinea in 1998 and plying a regular weekly route between Kimbe, the capital of West New Britain, and Lae, the capital of the mainland province of Morobe.

Investigation of the Accident:

In the early hours of 2 February 2012, the ferry capsized and later sank in rough conditions. With the official Commission of Inquiry estimating the dead at 146 to 165. The final death toll is unknown because the exact number of passengers is unknown. Early in the morning of 2 February 2012, the ship capsized due to rough conditions in the Solomon Sea. The ship was hit by three large waves. About four hours later, at approximately 6:00 am local time (8:00 pm on 1 February UTC), she sank 9 nautical miles (16 km) from Finschhafen. She was near the end of her 20-hour journey from Kimbe to Lae. 12 crew and an estimated 350 passengers were aboard at the time, though it is possible there may have been more than 500 passengers on the ferry.

A joint rescue effort by Papua New Guinea and Australia was formed shortly after the sinking. Many survivors were rescued by six merchant vessels alerted by the Australian Maritime Safety Authority (AMSA), which was alerted by Rabaul Shipping that the ferry had disappeared from a satellite tracking system. Seven fixed wing aircraft, including a P-3 Orion maritime patrol aircraft from the Royal Australian Air Force, three helicopters and seven boats were involved in locating survivors.

Heavy seas and high winds complicated the search and rescue operations. 246 survivors were rescued by nightfall on 2 February. As of 5 February 2012, the bodies of six victims had been recovered, and no further survivors were rescued. Over 100 remained missing. It was reported that 27 survivors were on an uninhabited island. One survivor contacted a family member with a cell phone, although Papua New Guinea's Maritime Safety Authority claimed on 5 February that any survivors would already have been located.

On 10 February 2012, Radio New Zealand reported that the number of people rescued had been re-calculated as 237, and that the number of people missing (based on new information from relatives of those onboard) was 321. This would indicate that some 558 people were aboard the vessel, although it was only permitted to carry 310. Seven of the survivors were admitted to Angau Memorial Hospital in Lael, three of whom had serious injuries.

Attempts were made to determine the names of all victims, including "a public appeal for family and friends to come forward. However, an exact list was deemed impossible because of incomplete manifests, poor record-keeping, lack of identification upon boarding, and the local tradition of using multiple names.

The final report showed that Rabaul Queen had passed her annual survey and "been deemed to be seaworthy for normal operations". However, the crew were found to be uncertified and unqualified, including the ship's navigational and engineering officers, and inadequate background checks had been performed before hiring. The captain's understanding of ship stability was "incorrect" and not sufficient for command of a ship. In addition, the crew did not wear uniforms, which impeded the passengers' ability to appeal for help in an emergency.

Rabaul Queen was also found to be overloaded. According to its certification, the ship was fit to carry 310 persons with a maximum of 295 passengers. However, the managing director of Rabaul Shipping, Peter Sharp, had directed his captains to carry 350 passengers and the ship "routinely" took aboard passengers in excess of 295. The Commission set the number of people on board at the time of the accident at between 392 and 411, of whom 369 to 384 were ticketed passengers, about 11 were unticketed infants, and 16 were crew. With 246 people surviving, the Commission determined that 4 dead were recovered plus between 142 and 161 people were "considered to be missing and presumed dead", or a total death of 146 to 165. The actual number is unknown, because a shipping manifest was not completed. he Report criticized Rabaul Shipping's policies and Papua New Guinea's oversight of maritime operation.

Despite recommendations from the IMO regarding safety of life at sea, PNG regulations did not require a safety management plan. Rabaul Shipping had no emergency response plan, and their thin Floating Staff Handbook contained "nothing that provides guidance to the crews of Rabaul Shipping ships in relation to passenger welfare on board the ships" and was "deficient in almost every aspect". Information that was in the Handbook, such as life jacket drills demonstrations after leaving every port, were ignored by crew according to testifying survivors.

Survivors also testified that "life jackets were padlocked in a wire cage" or were stored in locked cabinets. The "appalling and inhumane conditions" of the passengers aboard was blamed on Captain Sharp. The Papua New Guinea National Maritime Safety Authority showed "very poor corporate governance", "a high level of incompetence", and a history of "ineffectiveness". In all, the Commission's report provided 34 proposals that would "promote maritime safety", including new safety regulations, better staffing and equipment for a coordinated rescue center, and improved weather reliability and reporting for shipping.

**June 17, 2013: MV MOL Comfort**

History of the Vessel:

One of twelve ships of similar design, MOL Comfort was laid down at Mitsubishi Heavy Industries Nagasaki shipyard in Japan on 23 August 2007 and launched on 8 March 2008 as APL Russia for charter to APL. She was completed on 14 July 2008. On 1 June 2012, APL Russia was transferred to Mitsui O.S.K. Lines' Europe-Asia route and renamed MOL Comfort.

Investigation of the Accident:

The loss of the MOL Comfort in June and July 2013 is by far the most spectacular loss on our list by nearly every measure. In fact, there were no life casualties but the loss of the MOL Comfort ranks as the single worst container shipping disaster in modern history. All crew members on board abandoned ship safely, but both halves of the vessel of the stayed afloat as rescuers watched on.

On 17 June 2013, MOL Comfort suffered a crack amidships in bad weather about 200 nautical miles off the coast of Yemen and eventually broke into two after a bad loading that caused extreme pressure by hogging. The vessel was underway from Singapore to Jeddah, Saudi Arabia, with a cargo of 4,382 containers equivalent to 7,041 TEU. The crew of 26 abandoned the ship and were rescued from two life rafts and a lifeboat by the German Flagged container ship Yantian Express, one of three vessels diverted to the site of incident by ICG Mumbai.

After the structural failure, both sections remained afloat with the majority of the cargo intact and began drifting in an east-northeast direction. Smit Salvage Singapore was contracted to tow the sections to safety.

On 24 June, four oceangoing tugboats arrived at the scene and began towing the bow section to safety. However, before any salvage operations of the stern section could commence, water ingress was reported on 26 June. On the following day, the stern sank at a depth of 4,000 meters (13,000 ft). Some of the approximately 1,700 containers on board were later confirmed floating near the site. While no major oil leak was reported, the stern section was said to contain about 1,500 tons of fuel.

On 2 July, the tow of the bow section broke free in bad weather but the towing line was reattached the next day. On 6 July a fire broke out in the rear part of the bow section. Unable to get the blaze under control in bad weather the salvage vessels asked for help from an Indian Coast Guard patrol boat with external firefighting equipment. By 10 July most of the 2,400 containers on board had been destroyed by fire. The damaged bow section sank the next night at a depth of 3,000 meters (9,800 ft) with what remained of the cargo and 1,600 metric tons of fuel oil in the tanks. No spill apart from a thin oil film on the surface has been reported, but some containers were spotted floating around the sinking site.

The cause of the fire remains unknown. The exact cause of the accident is not known. On 4 July, Mitsui O.S.K. Lines appointed Lloyd's Register to support investigations into the cause of the incident. As a precaution, the sister ships of MOL Comfort were withdrawn from the same route and their hull structures will be upgraded to increase the longitudinal strength. In addition, operational changes will be carried out to reduce the stresses on the vessels' hulls.


The sinking of MOL Comfort cost the insurers between 300 and 400 million dollars in claims. The hull and machinery of the vessel were insured for $66 million. By December 2014, the insurers were among 100 companies, including Mitsui O.S.K. Lines Ltd., who had launched lawsuits against MHI, reportedly on the grounds that the accident and consequent loss of ship and cargo was caused by a design flaw in the freighter.

**April 16, 2014: MV Sewol**

History of the Vessel:

At the time of her purchase by Chonghaejin Marine 2012, the ship that would come to be known as the Motor Vessel Sewol was 18 years old and dilapidated. She was originally named Ferry Naminoue and was operated from 1994 to 2012 as a transport ship for cargo and passengers by the Japanese company A-Line Ferry. According to A-Line Ferry, she did not experience any problems while being operated by the company in Japan. After she was purchased on 8 October 2012, she was registered by Chonghaejin on 22 October 2012 and underwent modifications from 12 October 2012 to 12 February 2013. The modifications were later found to have been based on an illegal redesign of the ship.

After the modifications, which included the addition of two floors of passenger space and the expansion of the cargo space, Sewol had her gross tonnage increase by 239 tons to 6,825 tons and her persons capacity increase by 116 people for a total of 956 people including the crew. The modifications also resulted in her center of gravity being moved upward by 0.51 m as well as a left-right imbalance.

After the modifications were completed, she underwent investigations by the Korean Register of Shipping including an inclining test and received the ship inspection certification and the certification for the prevention of sea pollution on 12 February 2013. During the process of approving the modifications, the Register reduced the maximum amount of cargo that could be carried by 1,450 tons to 987 tons and increased the amount of ballast needed by 1,333 tons, to 1,703 tons.


Investigation of the Accident:

As Sewol began sinking, the ferry's intercom system started ordering the passengers to stay put, alleging that moving was dangerous. The announcements were made by a communication officer, Kang Hae-seong, who had not consulted the manual before the broadcast. The announcements began broadcasting by at least 8:52 a.m. and continued even when water began flooding passenger compartments. Other crew members corroborated this order, instructing passengers to stay put. Captain Lee also instructed passengers to stay put and did not change the order even as he was leaving the ship.

The first emergency call was made by Choi Duk-ha, a Danwon high school student aboard the ferry. At 8:52 a.m., he called the national emergency service number and reported to the Jeollanam fire station that Sewol was capsizing.

Choi was connected to the Mokpo Coast Guard at 8:54 a.m. and was asked to give the latitude and longitude of the ship's location three minutes later, the Mokpo Coast Guard station situation room ordered patrol vessel No. 123 to be dispatched to the scene; the vessel was launched at 8:58 a.m. Following the Coast Guard search and rescue manual, the boat was to be in charge of surveying the area and "swiftly" rescuing passengers. Choi did not survive the capsizing and was later found dead.

At 8:55 a.m., Sewol's crew made their first distress call to the Jeju vessel traffic service and asked the Jeju VTS to notify the Coast Guard, as the ferry was rolling and in danger. At 8:56 a.m., the Jeju VTS called the Jeju Coast Guard. Three minutes later, the Jeju Coast Guard called the Mokpo Coast Guard and discovered that a patrol boat had already been dispatched. At 9:01 a.m., a crew member on Sewol called the Incheon branch of Chonghaejin Marine to report the situation, and the Chonghaejin

Marine headquarters located in Jeju then called Captain Lee at 9:03 a.m. for a report of the situation. The Incheon branch then talked with the first mate in five telephone calls over the next 35 minutes.

At 9:06 a.m., the Jindo VTS were informed of the capsizing incident by the Mokpo Coast Guard. Around this time, the crew began communicating with the Jindo VTS, which was closer to their location. For the next two minutes, Jindo VTS alerted two other ships that *Sewol* was sinking, with one confirming that it had visual contact with the ship. At 9:07 a.m., *Sewol*'s crew confirmed that the ferry was capsizing and requested the help of the Coast Guard. At 9:14 a.m., the crew stated that the ship's angle of heel made evacuation impossible. Around this time, the captain of Patrol Vessel 123 was appointed the commander of the scene. Four minutes afterwards, the crew of *Sewol* reported to the VTS that the ferry had heeled more than 50 degrees to port.

At 9:23 a.m., the VTS ordered the crew to inform the passengers to wear personal floatation device When the crew replied that the broadcasting equipment was out of order, the VTS told them to personally order the passengers to wear life jackets and more clothing. At 9:25 a.m., the VTS asked the captain to decide quickly whether to evacuate the ship, stating that they did not have enough information to make the decision. When the captain inquired about the rescue, the VTS replied that patrol boats were due to arrive in 10 minutes and a helicopter in one minute. The captain then replied that there were too many passengers for the helicopter.

During this time, the captain told passengers to stay in their rooms. The communications officer, using the ship's intercom repeatedly ordered passengers not to move. Around 9:30 a.m., the captain gave orders to evacuate the ship, though the order may not have been relayed to all the passengers. At 9:33 a.m., after confirming that nearby ships had volunteered to help in the rescue operations, the VTS told all ships to drop lifeboats or the passengers. At 9:38 a.m., all communications were cut off between the VTS and the ferry. About three minutes after all communications were cut, about 150 to 160 passengers and crew jumped overboard.

Sewol took two and a half hours to sink. By around 11:18 a.m., the bow of the ship was submerged, with a section of the hull about 2 metres (6 ft 7 in) high and 20 to 30 metres (66 to 98 ft) long showing above the water. At 12:00 noon on 16 April, only 50 centimetres (20 in) of the bulbous bow was above water. As of 1:03 p.m., the ship was completely submerged.

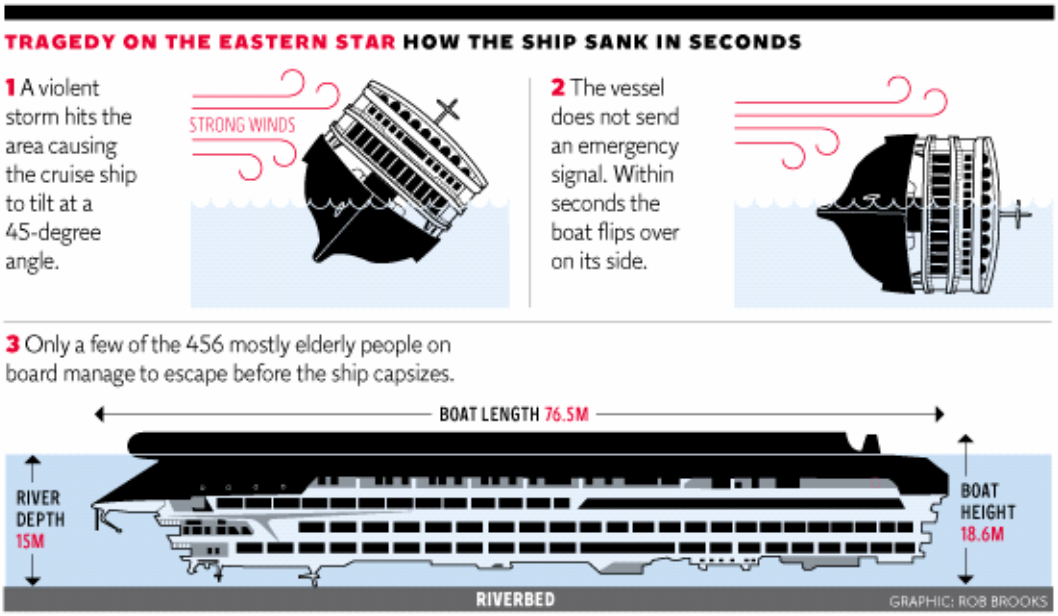
During the capsizing, some members of the crew drank beer. The crew also communicated by telephone with staff from Chonghaejin Marine at seven different times. As passengers stayed in their cabins as instructed, the captain and crew members abandoned the ship. The captain, the chief engineer, and the chief and

second mates were the first people to be rescued. he captain was rescued around 9:46 a.m.

## June 1, 2015: MV Dongfang zhi Xing

### History of the Vessel:

MV Dongfang zhi Xing was constructed in February 1994. In 1997 the ship's length was extended by 11 meters. It underwent another retrofit in 2008 that cut its capacity from 584 to 534 people. As of 2015, the ship was 76 metres (250 ft) long with a beam of 14 meters (45 ft). It was owned by the Chomgqing Eastern Shipping Corporation and operated by Xiehe Travel, where it made cruises within the three gorgeous area of inland China.




### Investigation of the Accident:

Severe weather reports were issued for the area, which should have subsequently been sent to all vessels on the river in the area for them to take necessary precautions. There is no confirmation that Dongfang zhi Xing had been properly notified, though at least one other vessel travelling nearby was shown to have taken precautions due to

the weather warning. The ship's captain and chief engineer, two of the rescued persons, have been taken into custody for questioning.

The Chinese government censored news and discussion about this accident, while tightly controlling media coverage. Chinese journalists have been told to focus on the "positive part" of the story only. The Politburo Standing Committee has attempted to control public opinion about the disaster response, by issuing an order to both "understand the sorrow of the families" and "concretely preserve social stability". Some foreign journalists have also been blocked from the rescue site in Hubei province where a police cordon has been set up with checkpoints.

On 30 December 2015, the Chinese government issued the investigation report of the incident. The report said that heavy storms caused the Dongfang zhi Xing to capsize it also found that the shipping company and local authorities had flaws in their daily management and suggested that 43 people be punished accordingly.

# Conclusion

In conclusion, based on these figures, we can draw a clear conclusion on the following:

- Incidents at sea are categorized into very serious, serious, simple marine accidents and marine incidents.

- The bodies responsible for recording and investigating their causes are the state bodies, for Greece HBMCI, the collective bodies, for the European Union, EMSA and the global player, IMO.

- Most cases are caused by cargo ships, as they are the largest population at sea, at all levels considered.

- In addition to partial or total damage to the ship, damage to the environment in the form of pollution and to people in the form of injury or death may occur.

- The main cause of the events under consideration is the fire challenge, however, depending on the circumstances, there may be another parallel cause. However, crew actions often determine the severity of the situation.

- Competent bodies after research draw conclusions that aim to improve safety regulations and avoid the same accident in the future.

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