



EUROPEAN MARITIME SAFETY REPORT: HIGHLIGHTS 2022

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Introduction

The first edition of the European Maritime Safety Report (EMSAFE), published by the European Maritime Safety Agency (EMSA), coincides with the 20th anniversary of the Agency. The report provides a comprehensive and factual overview of a wide range of maritime safety topics, as well as an in-depth analysis of specific technical areas. EMSAFE combines information from all the databases hosted by EMSA, e.g., EMCIP, SafeSeaNet, THETIS, STCW-IS, thus offering the possibility of cross-analysing data and obtaining detailed insights into the status of maritime safety in the EU.

EMSA would like to thank all the stakeholders that provided input and comments to this report making it more meaningful. In particular, EMSA appreciates the input provided by the European Commission (DG MOVE), Member States, IACS, ECSA, ETF, SeaEurope, CLIA, IUMI, MARIN, DIMECC/OneSea, INTERTANKO, Wartsila, Cyprus Shipping Chamber and the Royal Association of Netherlands Shipowners.

This document summarises the main issues dealt with in the first EMSAFE report.

Maritime transport and safety

Maritime transport is the oil in the engine of the global economy. Close to 80% of all world merchandise trade by volume is transported by sea. European ports are among the busiest in the world, handling 3.587 million tonnes of goods per year in 2019, 6% more than in 2016. In 2019, 37% of all trade volume corresponded to domestic and intra-EU transport. In addition, more than 418.8 million passengers embarked and disembarked passenger ships at EU ports in 2019, 13% more than in 2016.

But the most vital component of maritime transport, which underpins both its present functioning and its future progress, is safety. Our current maritime safety framework – both in the European Union and internationally – has evolved over many decades. Much of that framework's development has been triggered by individual catastrophic accidents, starting with the Titanic disaster over a century ago.

As shipping is inherently international, its safety is regulated in the first instance by International Conventions. The main safety Convention, SOLAS 74, has been ratified by 167 States and covers 98.89%

of the world merchant tonnage, a similar percentage of the fleet covered by two other essential safety conventions, COLREG and Load Lines. In terms of fishing vessels, an international instrument has been developed (the Cape Town Agreement on the Implementation of the provisions of the Torremolinos Protocol and Convention), although it is currently not in force.

Seafarers and safety

Qualified seafarers are essential for ensuring the safety of ship operations and are vital for the future of the maritime sector as a whole. By the end of 2019, 216,000 masters and officers held valid certificates of competency (CoC) issued by EU Member States, while another 120,590 masters and officers held original CoC issued by non-EU countries with endorsements issued by EU Member States attesting their recognition (EaR). Overall, 330,000 masters and officers are registered as potential crew to serve on board EU Member State-flagged ships. However, **the age profile of seafarers is increasing**, and recruitment and retention of those who work on board ships remains a challenge for the future.

Efforts to improve the working conditions of seafarers, like the Maritime Labour Convention (MLC), are steps in the right direction. However, figures from Port State Control inspections show that **around 25% of deficiencies found are related to the human element**, most of them within MLC Title 4, which deals with healthcare, safety protection and accident prevention of seafarers.

The training of seafarers is an important part of the safety process. EU Member State-flagged ships may have seafarers on board who have been educated, trained, and certified both inside and outside the EU. The assessment of compliance with the STCW Convention by non-EU countries is centralised with the European Commission, so that their CoC can be recognised by Member States and, accordingly, they can be allowed to work on board EU Member State-flagged ships. The European Commission, assisted by EMSA which carries out the necessary field inspections, assesses the educational systems implemented in non-EU countries on behalf of EU Member States and in line with the STCW Convention. To this end, **more than 70 inspections of maritime administrations, education, and training institutes have been carried out in third countries around the world** to assess their compliance with the

International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention). As a consequence of those inspections, 49 non-EU States have been recognised.

The COVID-19 pandemic – with seafarers unable to leave or join ships, and in some cases, with infected fellow crew members and passengers unable to disembark and receive proper healthcare – has demonstrated the vulnerability of life on board ships and added a new dimension to be addressed.

The increase of automation on ships may bring new challenges for seafarers; a new type of shipping will require new qualifications. It also remains to be seen whether any possible crew reduction brought about by increased automation might also augment fatigue. On the other hand, automation might bring new opportunities linked to the improvement of working conditions with the possibility to work onshore.

Compliance

The implementation of maritime safety legislation in the EU is the responsibility of Member States in their capacities as flag, port, and coastal States.

Flag State

In 2020, approximately 13 000 ships with an IMO number were flagged under EU Member States, excluding fishing vessels. This represents 14% of the world fleet in terms of the number of ships, and 18% based on size (measured in gross tonnage (GT), a measure of cargo-carrying capacity). Approximately 20% of the world fleet is owned by EU nationals or companies.

The ship types representing the largest proportion of the EU MS fleet (not including fishing vessels), are other work vessels (30%) followed by passenger ships (19%) and tankers (17%) of which, respectively, 45% are RoPax and 45% are chemical tankers.

The EU fleet is growing, but at a slower pace than that of the world fleet. Over the past five years, the share of ships flagged in EU Member States increased by 3.4%, while the world fleet increased by approximately 7%.

A ship's age is an important component in safety; it defines the safety standards that apply to it. The average age of the European Union Member States' (EU MS) fleet is comparable to that of the world fleet.

Passenger ships and RoPax vessels are the oldest type of ship in the EU fleet, with an average age of 28 and 27 years respectively, whereas the youngest are bulk carriers and gas tankers, with an average age of 10 years, followed by containerships with an average age of 11 and chemical tankers with an average age of 12.

The majority of EU Member State flags are within the Paris MoU white list, i.e., those with good safety records. Only two are within the grey list, i.e., those with some safety issues and none in the black list.

Flag States are delegating more and more competencies, particularly in the execution of statutory surveys, to recognised organisations. This means that part of the knowledge and experience of EU Flag States is effectively being outsourced, which reinforces the importance of retaining centralised EU expertise. Flag states are responsible for overseeing the activities of the organisations they have recognised, but the International Maritime Organization (IMO) audits of flag states (IMSAS) show that, **with respect to the delegation of authority to recognised organisations, the most recurrent findings are related to weaknesses in the administration's oversight programme.**

Globally, there are 95 organisations recognised by at least one flag, but **only 12 are recognised by the European Union and are regularly inspected by EMSA**. During the COVID-19 pandemic, remote surveys were carried out for the first time. Some flag states have advocated for a continuation of this practice as it can save significant costs. However, the lack of harmonisation of the procedures could bring safety risks. The EU took an initiative at IMO level to limit the use of remote surveys to exceptional circumstances and make them subject to a subsequent physical check to ensure no decrease in safety level will occur.

As there is no centralised database of flag state inspections, it is not possible to analyse the deficiencies found. However, **almost 40% of deficiencies found in the special regime for inspections of RoPax and high-speed craft (HSC) relate to fire safety.**

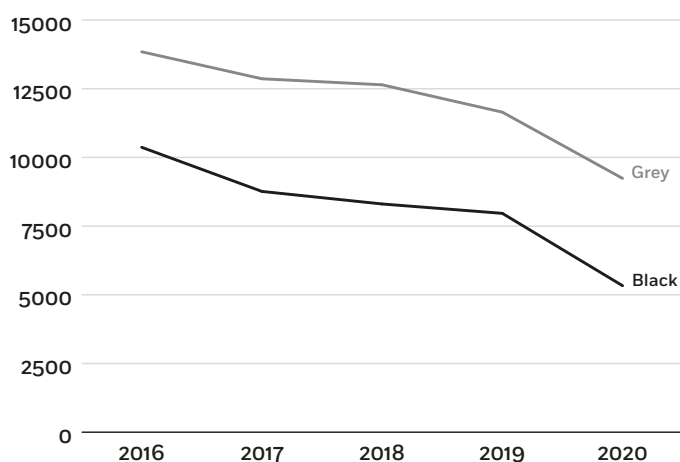
Port State

Port state control (PSC) works as a very effective second line of verification of implementation. Notable here is the work done by all PSC inspectors in the EU, with **more than 14 000 inspections carried out each**

year. At least one deficiency is found in one out of every two inspections, and more than 50% of all deficiencies recorded are safety-related (falling under the International Convention for the Safety of Life at Sea (SOLAS)). Deficiencies related to fire safety are most frequently reported, regardless of ship type.

The EU's waters are among the busiest in the world, which has a direct impact on maritime safety. In 2020 there were more than 680,000 ship calls to EU ports, with almost a quarter of ships visiting EU ports over the past five years flying flags from outside the EU, **almost all (92%) registered to countries under the Paris MoU white list.** In that time only 5% of non-EU Member State-flagged ships visiting ports here were registered to countries within the Paris MoU grey list and only 3% were registered to countries with more significant safety issues (the Paris MoU black list). The top 3 non-EU Member State-flagged ships visiting EU ports came from Panama, Antigua & Barbuda, and Liberia.

Port calls in the EU by ships with non-EU Member State-flagged grey and black flags



The misdeclaration of dangerous and polluting goods (hazmat) poses a severe risk to crew, cargo, and reception ports. **The percentage of missing hazmat declarations in 2020 (in the European vessel traffic monitoring system SafeSeaNet) was close to 9% for ships departing from EU ports and 12% for ships arriving from non-EU ports,** respectively.

The development of a fully realised European Maritime Single Window environment will lay the foundation for more accurate data exchanged between shipping actors, accompanied by a reduction of the

administrative burden currently associated with reporting obligations. This will make it possible to improve the quality, timeliness and availability of the information exchanged.

Coastal State

Coastal States have certain rights and obligations under various international instruments, one of the most critical being Search and Rescue (SAR). Globally and in the EU, search and rescue competence lies at national level and works through cooperation agreements in different EU regions. **Most cases of SAR activations in the EU (60%) related to accidents involving fishing vessels.**

Climate change is opening new routes in the Arctic, not just for the transport of goods, but also for the transport of passengers on board cruise ships (which increasingly travel to the Antarctic too). This has SAR implications in these isolated and hard-to-access regions.

Implementation of EU maritime legislation

EU maritime legislation is regularly verified through visits carried out by EMSA on behalf of the European Commission. More than **200 visits** have been carried out since EMSA was first set up in 2002, as well as more than **300 inspections** worldwide related to activities of EU recognised organisations. Visits to Member States are far more than mere 'control checks'. They provide maritime administrations with the opportunity of increasing efficiency by learning from best practices already in place in other Member States, thus contributing to improving safety performance. The horizontal analysis of a whole cycle of visits provides administrations with a safety benchmark against which they can compare their own operations, so contributing to greater harmonisation. It also provides EU legislators with first-hand feedback on practical issues encountered when implementing EU law.

Accidents

Over the past five years, **an average of 3 200 accidents occurred each year** on board ships falling under the scope of applicable EU legislation, which excludes, among others, fishing vessels of less than 15 metres in length. Occurrences with consequences

such as loss of life, loss of the whole ship or severe damage to equipment (very serious) represented 2.4% of all accidents reported. Accidents with consequences such as ships damaged to the point that they were unfit to proceed, serious injuries or non-severe damage to the environment (serious) represented a total of 24.9% of all accidents.

Approximately 90% of all those affected by marine casualties in the past five years were crew members; there were 490 fatalities between 2014 and 2020. The highest number of fatalities recorded occurred during accidents involving **cargo vessels**, which are the most common ships in the fleet, followed by **fishing vessels**, which are still the most vulnerable type of ship when it comes to accidents.

Places of Refuge – areas where a ship in need of assistance can go to stabilise its condition, and thus reduce hazards to human life and the environment – are vital when accidents happen at sea. The EU Operational Guidelines on places of refuge and associated regular tabletop exercises provide practical tools for authorities in these situations. However, **the COVID-19 pandemic** demonstrated that the Place of Refuge concept, as currently defined, does not accommodate a humanitarian health-related crisis of this nature and, therefore, a similar mechanism for such situations could be of added value.

New developments: ship safety and marine equipment

The cycle of proposing, discussing, approving and implementing new safety requirements is a complex and lengthy process. For example, the issue of fire on RoPax vessels was first highlighted in 2015 after the Norman Atlantic disaster in which 11 people lost their lives. However, **it is likely that the new standards developed to tackle the problem will only become mandatory in 2026.**

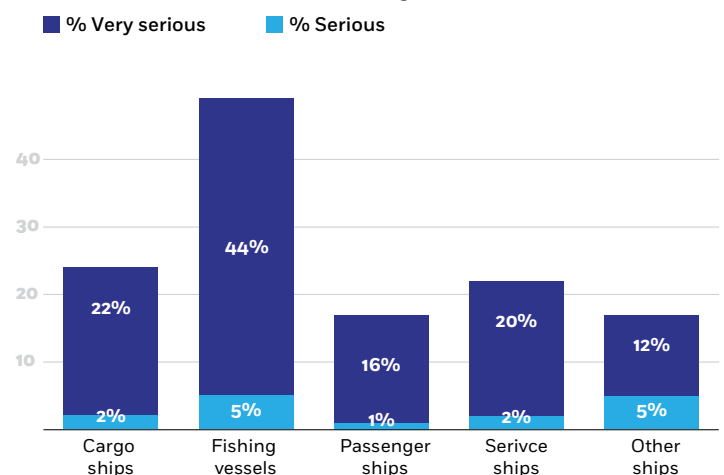
In most cases, the upgraded standards are **not applied retroactively due to their disproportionate economic and technical impact**, meaning that safety changes can take decades to have an impact on the overall fleet. A good example is the damage stability requirements for passenger ships. An analysis of the EU Member State-flagged fleet shows that 40% of the passenger ships currently in operation were built before 1990. Since then, the damage stability requirements have been significantly upgraded three times.

The most relevant topics on the current EU safety agenda include fire safety on RoPax; the carriage of alternative fuelled vehicles on ships; the interface between road and maritime transport; cargo fires on containerships and loss of containers; safety issues linked with emerging technologies (unmanned vessels) and the revision of three key European Union Directives on Accident Investigation, Port State Control and Flag State implementation.

With regard to the EU fishing fleet, there are close to 75,000 vessels registered in the EU-27. Only 3% of them are under the scope of the EU Directive dedicated to the safety of these vessels (above 24 metres in length).

In addition, even though fishing vessels represent 17% of the total number of ships involved in accidents reported, **the number of fishing vessels lost, represents more than 55% of the total number of lost vessels**, a trend observed in recent years. In addition, the rate of very serious casualties and serious casualties is **much higher for fishing vessels** compared to the overall fleet. Around 50% of all the accidents involving fishing vessels were reported as either very serious or serious, whereas the average for all ship categories was 27%.

Rate of very serious and serious occurrences per ship type



Regarding the safety of marine equipment, it is worth noting that the marine equipment Directive (MED) Portal developed by EMSA, with more than **190,000 monthly entries from 5,412 worldwide registered users**, has a new mobile version which allows e-tags to be scanned. This could be of use especially to market surveillance authorities and will help to reduce the

possibility of having non-compliant equipment on board, as it will facilitate the verification of compliance.

New developments: safety and sustainability

Efforts to reach emission targets as part of the European Green Deal should go together with efforts to keep ships safe, especially given that the use of new fuels (LNG, hydrogen, LPG, methanol, ammonia and biofuels) and power technologies (batteries and fuel cells) comes with associated safety risks.

Fuel cell powering systems for ships are being developed as an alternative to rechargeable cells and batteries. Fuel cells have the advantage of not needing to be charged if fuel continues to be provided, but have disadvantages in terms of their low power density and risks associated with hydrogen use.

Electrification should be seen from two different perspectives. From one side, ships calling at ports might have to connect to **a shore-side electrical network** while loading or unloading their cargo. This operation will bring associated risks to bear in the interface between the ship and the onshore charging station. At the request of the European Commission, EMSA is developing Shore-Side Electricity Guidance, mainly addressing the port side, whereas the IMO is developing guidelines focusing on the ship side. The second perspective deals with the **installation of batteries as primary energy source on ships**. In this respect, specific risks and safety measures must be considered. EMSA has been requested by the European Commission to begin work on this topic together with relevant stakeholders.

The shift to alternative fuels is not limited to maritime transport. Land transport will also pivot towards sustainability to reach emissions targets. In the EU, **alternatively fuelled vehicles have increased by 29%** between 2019 and 2021, meaning that both passenger and cargo ships need to prepare to mitigate safety risks of transporting this type of vehicles.

New developments: safety and digitalisation

The issuance of electronic certificates of ships (e-certificates) has the potential to pass on significant efficiency gains. In this case, inspectors would spend less time checking papers on board, thus allowing them to focus on the condition of the ship.

The increased use of systems on board ships that rely on digitalisation, integration, and automation has an associated cyber risk that may impact the safety of the ship and those on board. In general, cyber security addresses the protection of digital services from intentional attacks. However, there are threats to digital services on board ships from unintentional, benign actions, which can affect their overall safety. Examples of this could include a failure occurring during software maintenance and (lack of) patching. Even though it is now mandatory to include cyber risks within the Safety Management System of the ship, the implementation and audit of measures to address these risks onboard may prove challenging for industry and national administrations.

New developments: safety and autonomy

Automation is gaining ground in the maritime world, bringing with it different levels of ship autonomy. Autonomous ships not only offer new opportunities for industry, but also bring challenges (having decision systems to replace the critical decision-making of the crew in avoiding collisions, reacting to, and avoiding, bad weather conditions, addressing cyber security risks, etc.). The lack of an appropriate legislative framework (terminology, liability, standards, etc.) might for the time being hamper increasing automation onboard ships. Nevertheless, the process of automation is expected to be a gradual one; it is likely that, during the first years of operation, remotely controlled, highly autonomous ships will sail on the same routes and call at the same ports as traditionally manned ships. Difficult-to-predict challenges may arise in terms of surveys, manoeuvres at sea and in port, monitoring of hybrid traffic and the qualifications and skills of those on board and on shore, among others.

Conclusions

Overall, it can be concluded that the EU has developed a robust maritime safety system. Many challenges lie ahead of us, but one thing is certain – lessening our safety efforts cannot be an option. On the contrary, to avoid a return to the era of sub-standard shipping which manifested itself in accidents like that of the Erika, or the Prestige, the EU should continue investing in and reinforcing its maritime safety framework.

As a first layer of defence, the flag state plays a pivotal role. But most of the survey work has been delegated to recognised organisations and, therefore, it is essential to ensure a proper monitoring and oversight at EU level. The performance of the second layer, the PSC, is notable, and its results can be easily analysed through the THETIS information platform.

From an industry point of view, the EU Member States fleet continues to grow, although at a slower pace than the global one, and the EU marine equipment industry is a world leader. On the other hand, EU shipyards continue to lose market share (currently having only 3% of the worldwide gross tonnage) in relation to Asia.

In terms of age profile, the average age of the EU fleet is similar to that of the world fleet. The oldest category is the passenger fleet, with an average age of 28 years, whereas bulk carriers and gas carriers have only 10 years on average.

Qualified seafarers are essential to ensuring the safety of ship operations and are vital for the future of the maritime sector. However, the age profile of seafarers is increasing, and recruitment and retention of those who work on board ships remains a challenge for the future. At the same time, port state control (PSC) inspections show that around 25% of all deficiencies found are related to the human element.

With regard to ship safety, the number of accidents is showing a stable trend, with a significant decrease in 2020, most likely due to the impact of COVID-19 on maritime traffic. The vulnerability of fishing vessels, large passenger ships, and fires on ro-ro passenger ships and on containerships are some of the bigger challenges to continue to address.

Efforts to reach emission targets as part of the European Green Deal should go together with efforts to keep ships safe, especially given that the use of new fuels (LNG, hydrogen, LPG, methanol, ammonia, and biofuels) and power technologies (batteries and fuel cells) comes with associated safety risks.

Digitalisation has the potential to bring new efficiencies, with e-certificates for ships and e-tags for marine equipment two possible future benefits. Increased automation too is certain to bring benefits in terms of greater opportunities for the maritime industry. However, automation may also usher in a new set of safety challenges, as well as updated training needs and (crew) qualifications.

All in all, the coming years will see many developments which will affect EU maritime safety. EMSA will continue supporting the European Commission, Member States, industry, and other relevant stakeholders to strengthen safety in the coming decades as it has done in its first twenty years of existence.



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ABOUT THE EUROPEAN MARITIME SAFETY AGENCY

The European Maritime Safety Agency (EMSA) is one of the European Union's decentralised agencies. Based in Lisbon, Portugal, the Agency's mission is to ensure a high level of maritime safety, maritime security, prevention of and response to pollution from ships, as well as response to marine pollution from oil and gas installations. The overall purpose is to promote a safe, clean and economically viable maritime sector in the EU.

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