# Safety & Environment: From SOLAS to MARPOL & ISPS

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# Your speaker

- M.Sc. in Shipping, University Of Piraeus
- B.Sc. in Business Administration.
- 20 years working experience in shipping industry including on board & office experience in various positions.
- Lecturing Experience, over 3.000 hours, at Public & Private Institutes, seminars & in house training
- Certified CSO & Internal Auditor from BV & DNV - GL
- Certified adult trainer from The Institute Of Continues Adult Education
- Visited over 200 cities around the world for business or leisure purposes.

# Why we need shipping regulations?



# Shipping industry characteristics

- Capital Intensive
- Labor Intensive
- Flags of conveniences
- Incorporation/ Off shore companies
- International trade
- Adventure of the sea & Maritime pollution
- International Law & Law of the sea

# Capital Intensive

- Banks/ Investors
- Underwriters & Class societies
- Charterers
- Owners

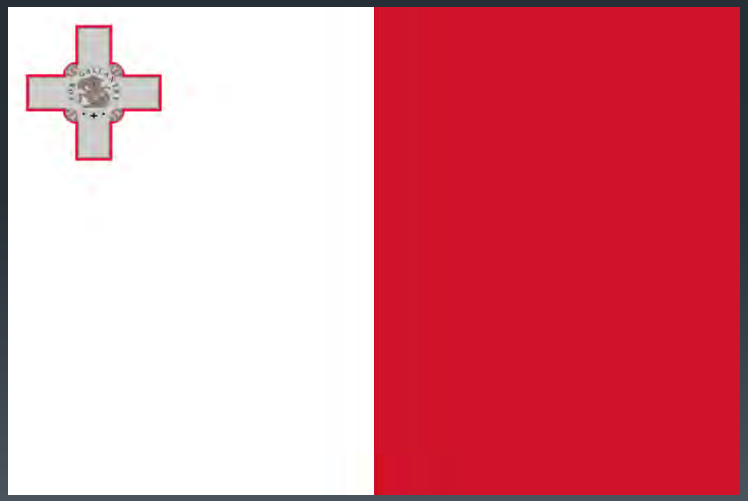
- Different nationalities / Different law

# Labor intensive

- Different nationalities

# Administrations



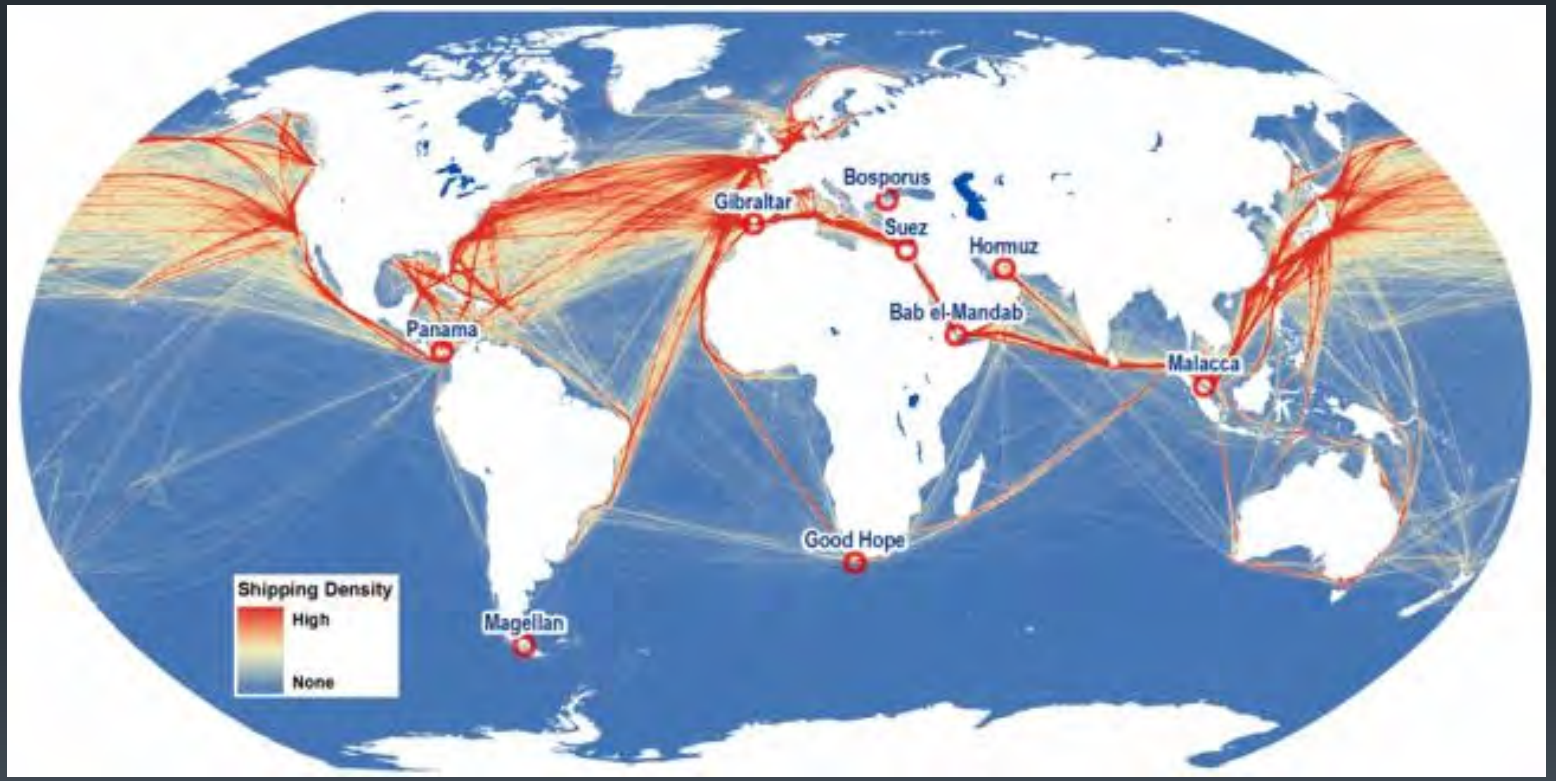


# Off shore companies



# International Trade

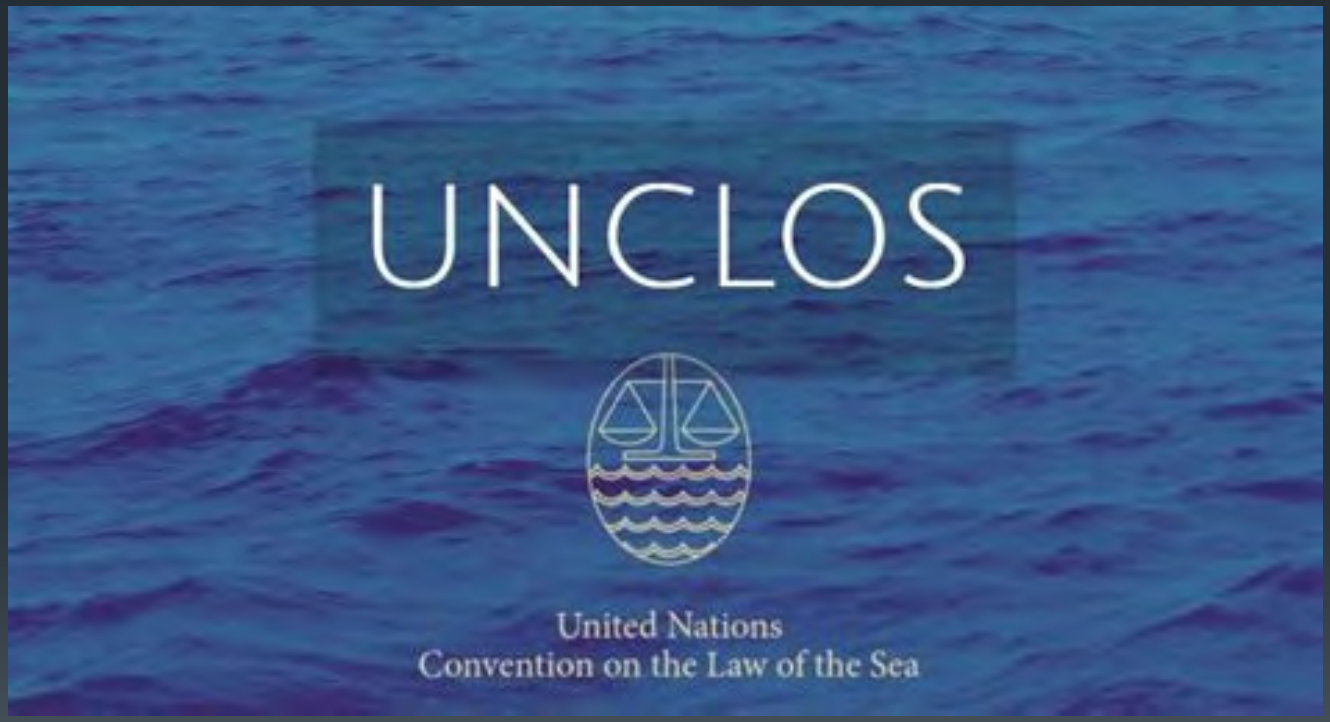




# Adventure of the sea & Maritime pollution

# International Law & Law of the sea





# Shipping an international industry



**Extremely difficult to follow common regulations**

# Until when?



10 April 1912

14 April

11:40 p.m. ship's time

2:20 a.m.

SOLAS

# Changes in safety practices after the sinking of the RMS Titanic



- Lifeboats
- 24-hour radio watch and distress rockets
- International Ice Patrol
- Ship design changes

# IMO

- It has always been recognized that the best way of improving safety at sea is by developing international regulations that are followed by all shipping nations and from the mid-19th century onwards a number of such treaties were adopted.
- Several countries proposed that a permanent international body should be established to promote maritime safety more effectively, but it was not until the establishment of the United Nations itself that these hopes were realized.
- In 1948 an international conference in Geneva adopted a convention formally establishing IMO (the original name was the Inter-Governmental Maritime Consultative Organization, or IMCO, but the name was changed in 1982 to IMO).
- The IMO Convention entered into force in 1958 and the new Organization met for the first time the following year.

# Purpose



The purposes of the Organization, as summarized by Article 1(a) of the Convention, are

"to provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships".

# IMO's mission statement



"The mission of the International Maritime Organization (IMO) as a United Nations specialized agency is to promote safe, secure, environmentally sound, efficient and sustainable shipping through cooperation. This will be accomplished by adopting the highest practicable standards of maritime safety and security, efficiency of navigation and prevention and control of pollution from ships, as well as through consideration of the related legal matters and effective implementation of IMO's instruments with a view to their universal and uniform application."

# IMO regulations



- IMO's first task was to adopt a new version of the International Convention for the Safety of Life at Sea (SOLAS), the most important of all treaties dealing with maritime safety. This was achieved in 1960.

- Then turned its attention to such matters as
  - the facilitation of international maritime traffic,
  - load lines and the carriage of dangerous goods, while the system of measuring the tonnage of ships was revised

# Torrey Canyon & Marpol



- Torrey Canyon disaster of 1967, in which 120,000 tonnes of oil was spilled, demonstrated the scale of the problem.

# Global Maritime Distress and Safety System (GMDSS)

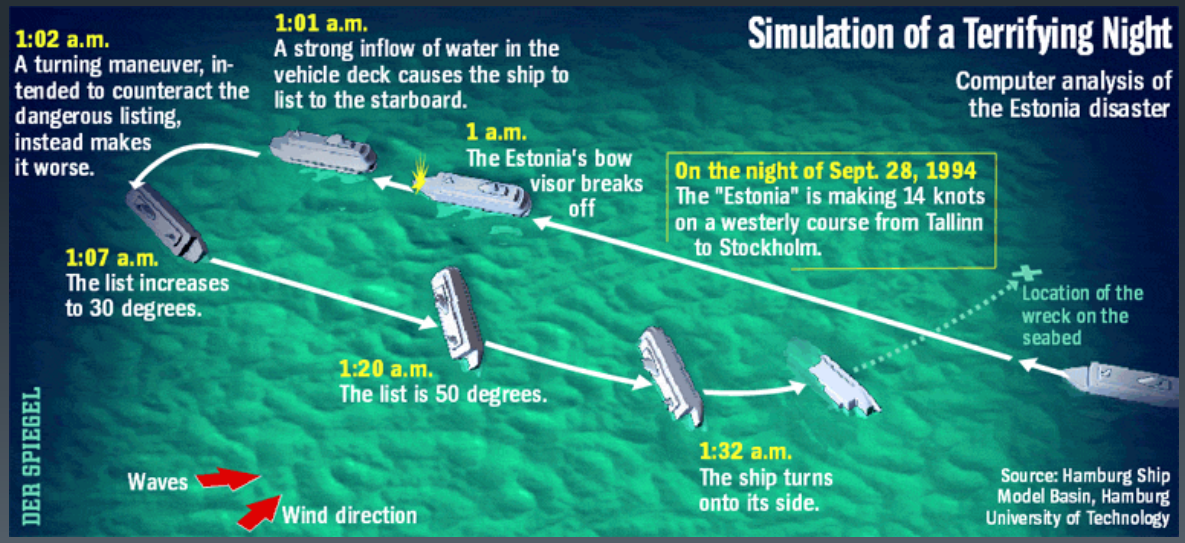


- The Global Maritime Distress and Safety System (GMDSS) was adopted in 1988 and began to be phased in from 1992. In February 1999, the GMDSS became fully operational, so that now a ship that is in distress anywhere in the world can be virtually guaranteed assistance, even if the ship's crew do not have time to radio for help, as the message will be transmitted automatically.

# International Safety Management Code (ISM)



- On 1 July 1998 the International Safety Management Code entered into force and became applicable to passenger ships, oil and chemical tankers, bulk carriers, gas carriers and cargo high speed craft of 500 gross tonnage and above. It became applicable to other cargo ships and mobile offshore drilling units of 500 gross tonnage and above from 1 July 2002.



# STCW

- On 1 February 1997, the 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 entered into force. They greatly improve seafarer standards and, for the first time, give IMO itself powers to check Government actions with Parties required to submit information to IMO regarding their compliance with the Convention. A major revision of the STCW Convention and Code was completed in 2010 with the adoption of the "Manila amendments to the STCW Convention and Code".

# AFS 2001, BWM 2004, Recycling Convention 2009



- Conventions relating to the marine environment were adopted in the 2000s, including one on anti-fouling sytems (AFS 2001), another on ballast water management to prevent the invasion of alien species (BWM 2004) and another on ship recycling (Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009).

# ISPS code



- The 2000s also saw a focus on maritime security, with the entry into force in July 2004 of a new, comprehensive security regime for international shipping, including the International Ship and Port Facility Security (ISPS) Code, made mandatory under amendments to SOLAS adopted in 2002.

# Timeline: Key milestones in maritime safety since 1912

**1914**
International Convention for the Safety of Life at Sea (SOLAS) established – setting standards for maritime safety provisions.

**1914**
International Ice Patrol starts aerial monitoring of icebergs.

**1922**
Echo sounding applied on board to monitor depth of water.

**1930**
International Convention on Load Lines addresses issues on loading and stability.

**1940s**
Welding starts to replace riveting, later followed by prefabrication, increasing quality of ship construction.

**1940s**
LORAN (LOng RAnge Navigation) radio navigation system allows accurate offshore position finding to 900 miles.

Image: Wikimedia Commons/Stahlkocher

**1944**
DECCA position fixing allows accurate position finding up to 400 miles offshore.

**1948**
International Maritime Organization (IMO) established, and entered into force in 1958.

**1960s**
Computer-aided ship design revolutionizes ship design.

**1960s**
Widespread use of Very High Frequency radio improves ship-to-ship and ship-to-shore communication.

**1965**
RADAR made mandatory under 1960 SOLAS convention.

**1967**
"Transit" Sat Nav system: the first satellite-based positioning system for merchant ships, giving regular position fixes on 'transit' of a satellite.

**1969**
Automatic Radar Plotting Aid (ARPA) introduced (mandatory 1989), replacing manual plotting of movements.

**1972**
International Regulations for Preventing Collisions at Sea (COLREGS) establishes 'rules of the road' for shipping.

**1973**
International Convention for the Prevention of Pollution From Ships (MARPOL) addresses maritime pollution risk.

**1978**
International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) establishes basic training and certification requirements.

**1993**
International Safety Management (ISM code) adopted by IMO, establishing standards for safe management and operation of ships.

**1994**
Global Positioning System (GPS) fully operational, allowing accurate satellite-based position finding.

**1999**
Global Maritime Distress and Safety System (GMDSS) establishes protocols for ships in distress and rescue scenarios and introduces mandatory distress communication equipment on board vessels.

Photo: Hervé Cozanet from the marine-marchande.net Website

**2000**
IMO adopts amendments to SOLAS making "Voyage Data Recorders" (VDR) or the 'Black Box' of navigational bridge mandatory on new ships.

**2004**
Automatic Identification System (AIS) for vessel identification and tracking, reduces collision risk.

**2004**
International Ship and Port Facility Security (ISPS) Code enhances security in ports.

**2012**
Electronic Chart Display and Information System (ECDIS) navigation system to become mandatory, providing continuous position and navigational information.

1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Source: Allianz Global Corporate & Specialty

BUILDING A SOLID FUTURE

## Ship's bridge equipment

Modern ships' bridges are a far cry from those of the first half of the 20th century – and are extensively equipped with safety and navigational aids.

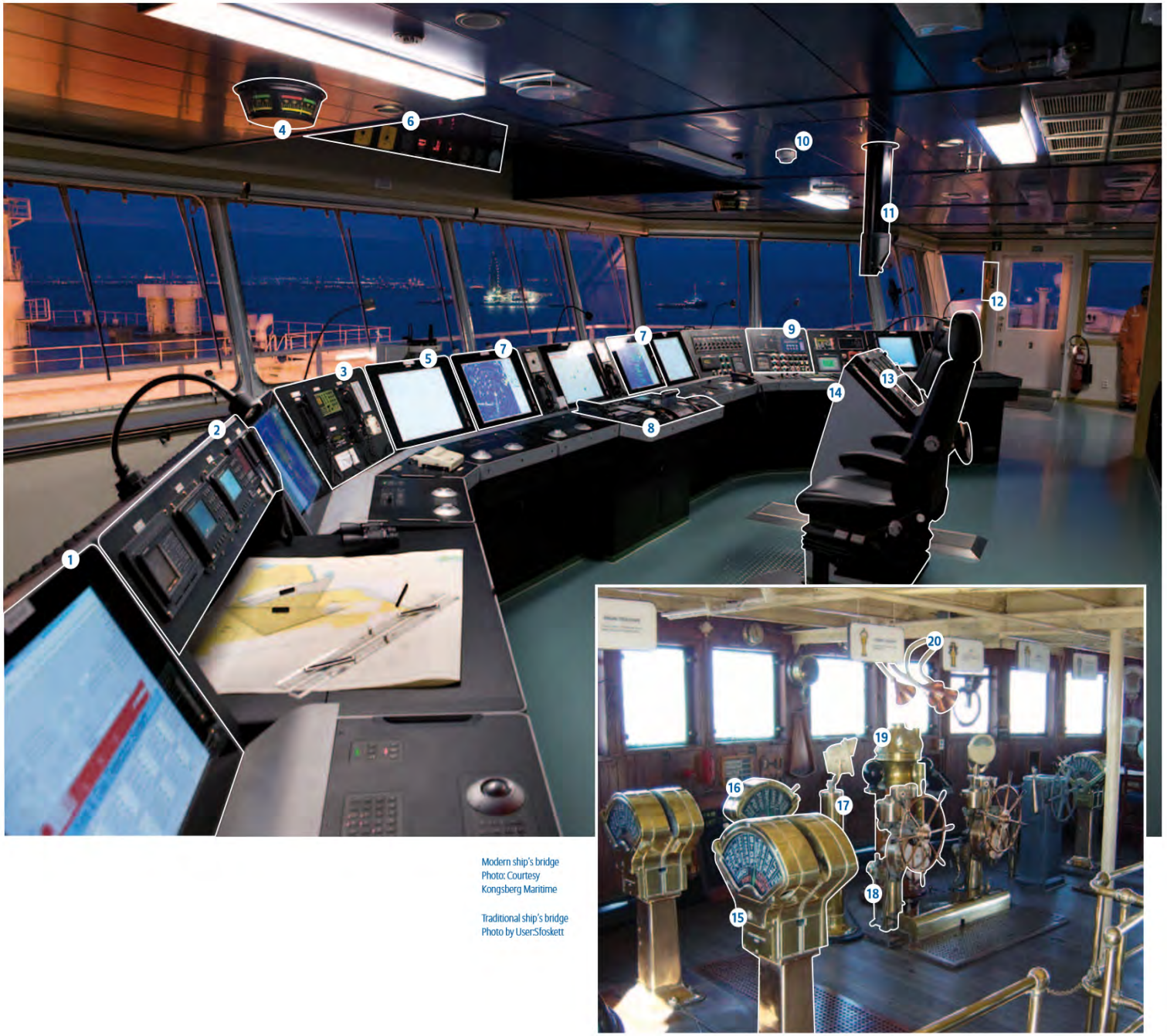
### Modern day bridge

1. Fire Detection Panel
2. GPS, AIS and Speed Log Display
3. VHF radio
4. Rudder angle indicator
5. Electronic Charts Display & Information System (ECDIS)
6. Clinometer, Anemometer, Tachometer, Echo sounder
7. Radars (10cm and 3cm)
8. Engine controls
9. Switch panel (lighting etc)
10. Smoke alarm
11. Magnetic compass display
12. Search and Rescue transponder
13. Gyro compass
14. Steering stand

### Traditional bridge

(*RMS Queen Mary* launched 1934)

15. Telegraph for port engines
16. Steering telegraph
17. Compass repeater
18. Steering stand for port rudder
19. Magnetic compass
20. Voicepipes





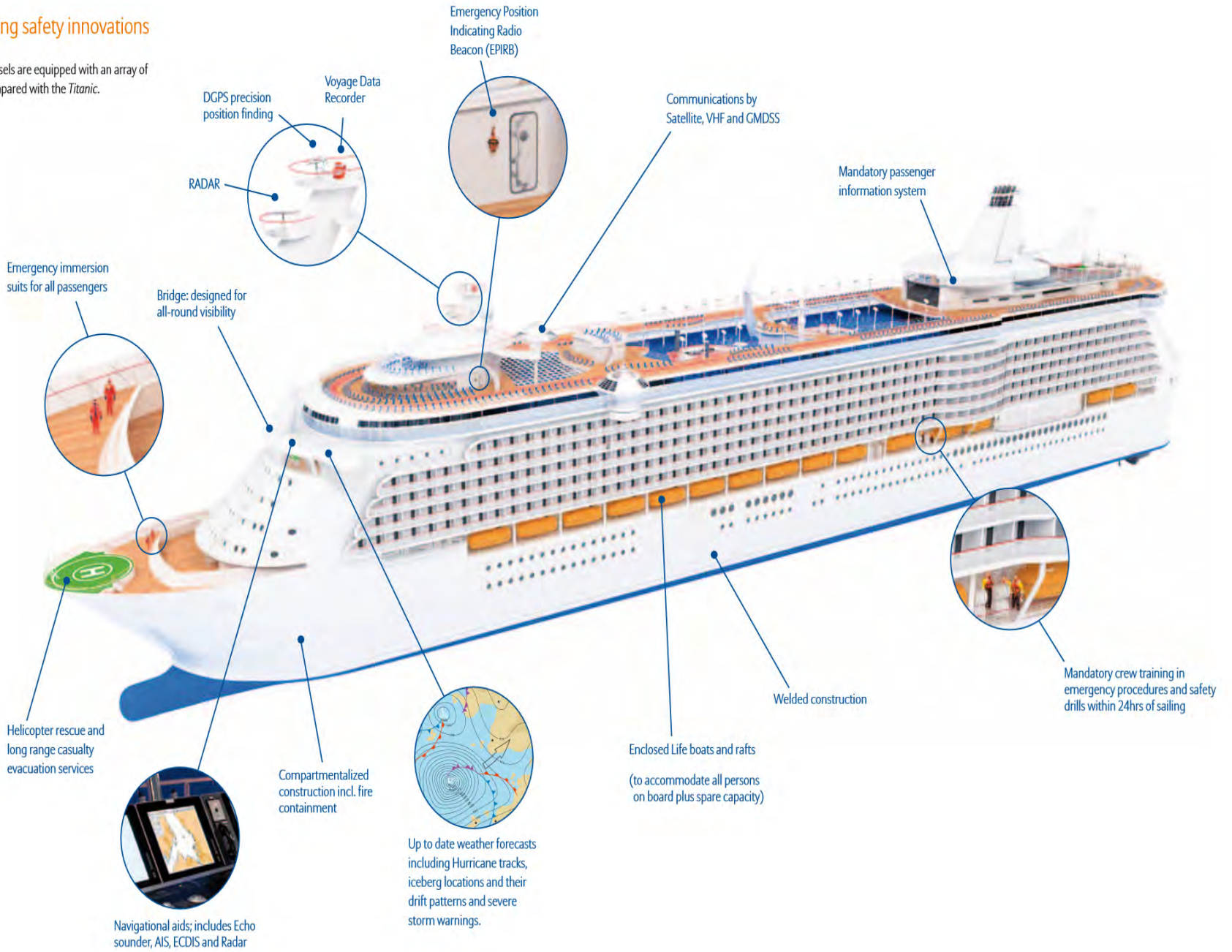


Modern ship's bridge
Photo: Courtesy Kongsberg Maritime

Traditional ship's bridge
Photo by User:Sfoskett

## Modern shipping safety innovations

Modern passenger vessels are equipped with an array of safety innovations compared with the *Titanic*.




Source: Allianz Global Corporate & Specialty

# SOLAS

# Solas



- The first version was adopted in 1914, in response to the Titanic disaster,
- the second in 1929,
- the third in 1948, and
- the fourth in 1960.
- The 1974 version includes the tacit acceptance procedure - which provides that an amendment shall enter into force on a specified date unless, before that date, objections to the amendment are received from an agreed number of Parties.

- As a result the 1974 Convention has been updated and amended on numerous occasions.
- The Convention in force today is sometimes referred to as SOLAS, 1974, as amended.

# Technical provisions



- The main objective of the SOLAS Convention is to specify minimum standards for the construction, equipment and operation of ships, compatible with their safety.
- Flag States are responsible for ensuring that ships under their flag comply with its requirements, and a number of certificates are prescribed in the Convention as proof that this has been done.
- Control provisions also allow Contracting Governments to inspect ships of other Contracting States if there are clear grounds for believing that the ship and its equipment do not substantially comply with the requirements of the Convention - this procedure is known as port State control.
- The current SOLAS Convention includes Articles setting out general obligations, amendment procedure and so on, followed by an Annex divided into 14 Chapters.

# Structure

- Chapter I - General Provisions
- Chapter II-1 - Construction - Subdivision and stability, machinery and electrical installations
- Chapter II-2 - Fire protection, fire detection and fire extinction
- Chapter III - Life-saving appliances and arrangements
- Chapter IV – Radiocommunications
- Chapter V - Safety of navigation
- Chapter VI - Carriage of Cargoes
- Chapter VII - Carriage of dangerous goods
- Chapter VIII - Nuclear ships
- Chapter IX - Management for the Safe Operation of Ships
- Chapter X - Safety measures for high-speed craft
- Chapter XI-1 - Special measures to enhance maritime safety
- Chapter XI-2 - Special measures to enhance maritime security
- Chapter XII - Additional safety measures for bulk carriers
- Chapter XIII - Verification of compliance

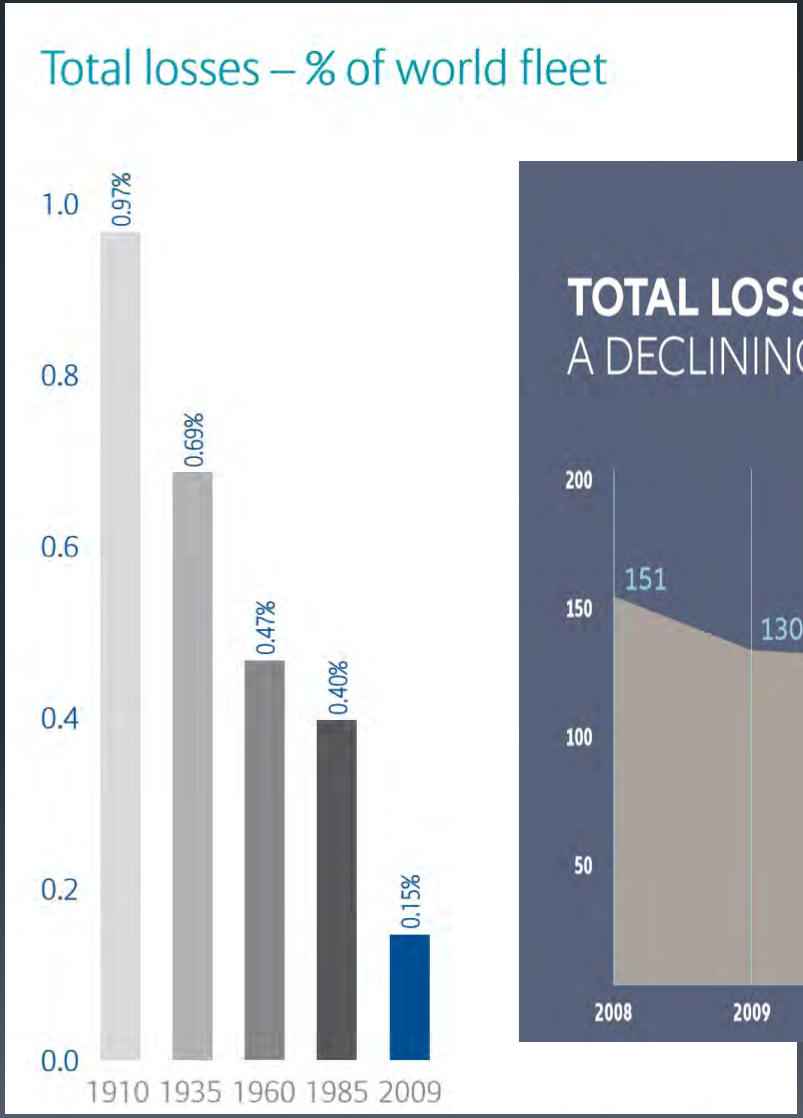
Makes mandatory from 1 January 2016 the IMO Member State Audit Scheme.

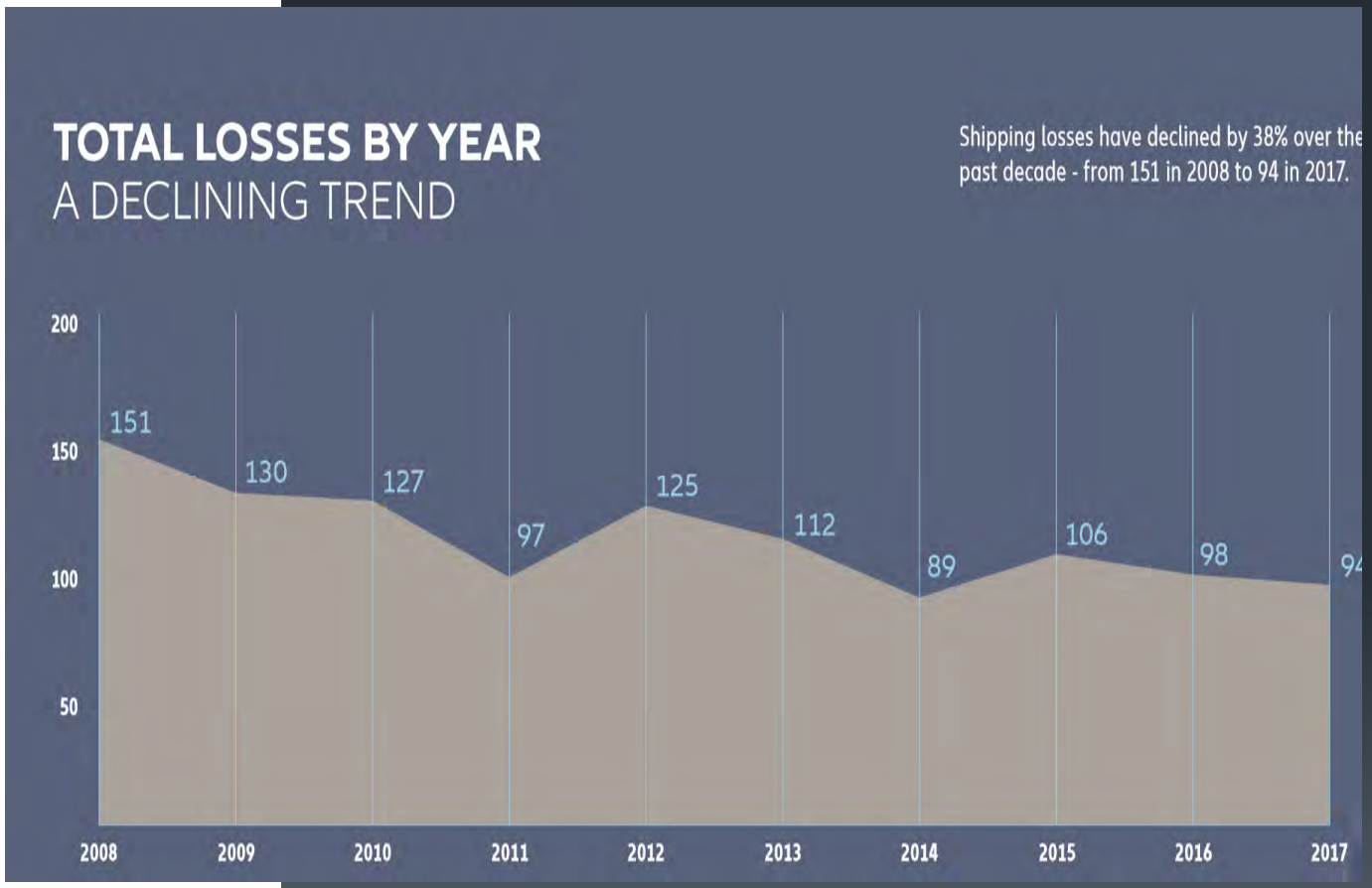
- Chapter XIV - Safety measures for ships operating in polar waters

The chapter makes mandatory, from 1 January 2017, the Introduction and part I-A of the International Code for Ships Operating in Polar Waters (the Polar Code)

# SOLAS & Shipping Regulations Effectiveness



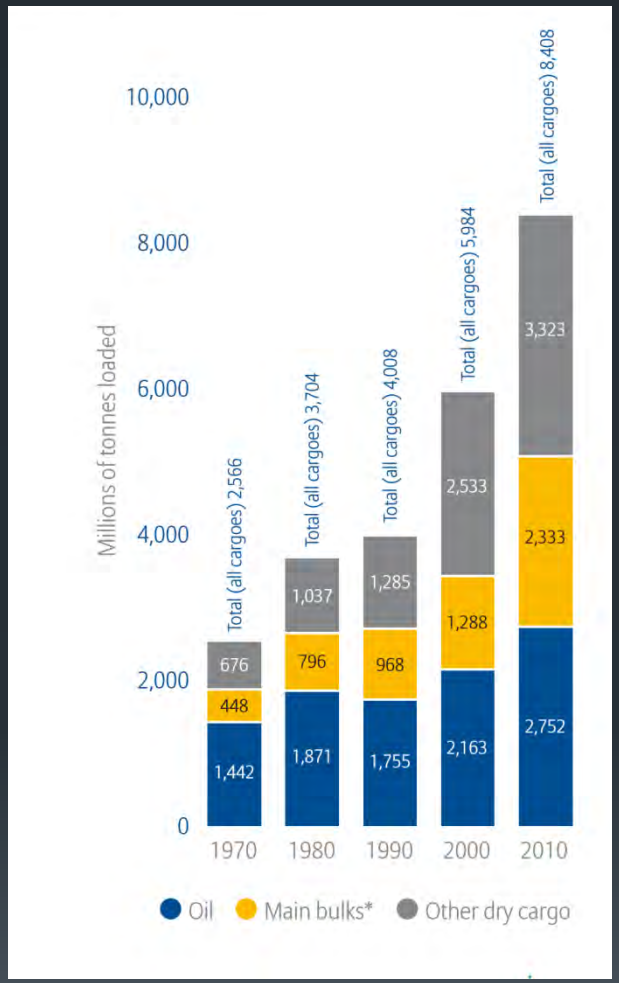



Source: Allianz Global Corporate & Specialty

# Development of International Seaborne Trade & Fleet





Source: Allianz Global Corporate & Specialty & European Transport Safety Council 2003


SAFETY & SHIPPING REVIEW 2018 IN NUMBERS
90% of global trade transported by shipping
1,129 total losses over past 10 years
94 total losses in 2017. Second lowest total in a decade.
Bad weather a factor in 21 losses
30 losses in South China, Indochina, Indonesia and Philippines - the main hotspot
Major risks
Busy seas
Typhoons
Piracy
Safety standards
Political risk
180 piracy attacks in 2017¹. Down year-on-year. Lowest total for 22 years
3 regions account for almost half of all losses
53 losses - cargo ship most frequent vessel lost globally in 2017
Up year-on-year
61 losses caused by foundering in 2017.
Up year-on-year
6 vessels lost to fire in 2017.
Down year-on-year

# The polar code



- The Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two poles.
- The Polar Code includes mandatory measures covering safety part (part I-A) and pollution prevention (part II-A) and recommendatory provisions for both (parts I-B and II-B).

# WHAT DOES THE POLAR CODE MEAN FOR SHIP SAFETY?

## EQUIPMENT

**WINDOWS ON BRIDGE**
Means to clear melted ice, freezing rain, snow, mist, spray and condensation

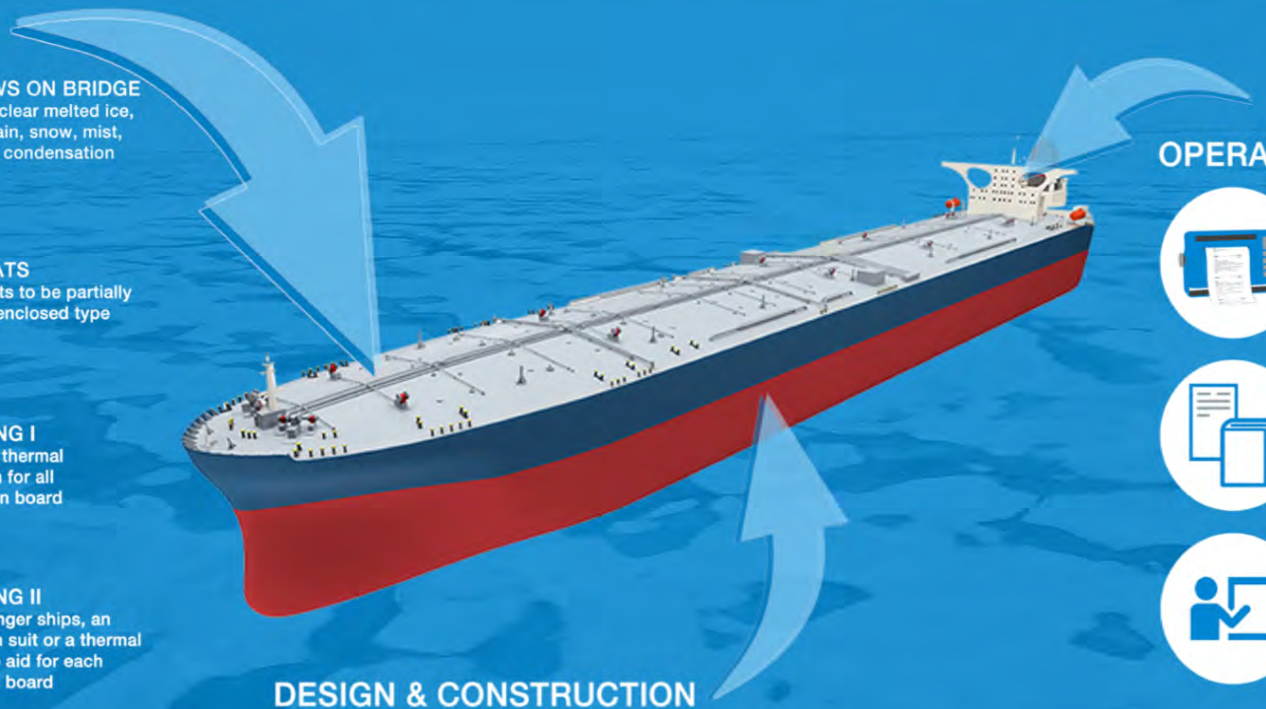
**LIFEBOATS**
All lifeboats to be partially or totally enclosed type

**CLOTHING I**
Adequate thermal protection for all persons on board

**CLOTHING II**
On passenger ships, an immersion suit or a thermal protective aid for each person on board

**ICE REMOVAL**
Special equipment for ice removal: such as electrical and pneumatic devices, special tools such as axes or wooden clubs

**FIRE SAFETY**
Extinguishing equipment operable in cold temperatures; protect from ice; suitable for persons wearing bulky and cumbersome cold weather gear



## OPERATIONS & MANNING

**NAVIGATION**
Receive information about ice conditions

**CERTIFICATE & MANUAL**
Required to have on board a Polar Ship Certificate and the ship's Polar Water Operational Manual

**TRAINING**
Masters, chief mates and officers in charge of a navigational watch must have completed appropriate basic training (for open-water operations), and advanced training for other waters, including ice

## DESIGN & CONSTRUCTION

**SHIP CATEGORIES**
Three categories of ship which may operate in Polar Waters, based on:
A) medium first-year ice
B) thin first-year ice
C) open waters/ice conditions less severe than A and B

**INTACT STABILITY**
Sufficient stability in intact condition when subject to ice accretion and the stability calculations must take into account the icing allowance

**MATERIALS**
Ships intended to operate in low air temperature must be constructed with materials suitable for operation at the ships polar service temperature

**STRUCTURE**
In ice strengthened ships, the structure of the ship must be able to resist both global and local structural loads

## BACKGROUND INFO

- THE INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS WAS ADOPTED NOVEMBER 2014 BY THE IMO MARITIME SAFETY COMMITTEE
- IT APPLIES TO SHIPS OPERATING IN ARCTIC AND ANTARCTIC WATERS
- THE AIM IS TO PROVIDE FOR SAFE SHIP OPERATION AND THE PROTECTION OF THE POLAR ENVIRONMENT BY ADDRESSING RISKS PRESENT IN POLAR WATERS AND NOT ADEQUATELY MITIGATED BY OTHER INSTRUMENTS

IMO INTERNATIONAL MARITIME ORGANIZATION

# HOW THE **POLAR** CODE PROTECTS THE ENVIRONMENT

## OIL

**DISCHARGES**
Discharge into the sea of oil or oily mixtures from any ship is prohibited

**STRUCTURE**
Double hull and double bottom required for all oil tankers, including those less than 5,000dwt (A/B ships constructed on or after 1 January 2017)

**HEAVY FUEL OIL**
Heavy fuel oil is banned in the Antarctic (under MARPOL). Ships are encouraged not to use or carry heavy fuel oil in the Arctic

**LUBRICANTS**
Consider using non-toxic biodegradable lubricants or water-based systems in lubricated components outside the underwater hull with direct seawater interfaces

## INVASIVE SPECIES

**INVASIVE AQUATIC SPECIES**
Measures to be taken to minimize the risk of invasive aquatic species through ships' ballast water and biofouling

## SEWAGE

**DISCHARGES I**
No discharge of sewage in polar waters allowed (except under specific circumstances)

**TREATMENT PLANTS**
Discharge is permitted if ship has an approved sewage treatment plant, and discharges treated sewage as far as practicable from the nearest land, any fast ice, ice shelf, or areas of specified ice concentration

**DISCHARGES II**
- Sewage not comminuted or disinfected can be discharged at a distance of more than 12nm from any ice shelf or fast ice
- Comminuted and disinfected sewage can be discharged more than 3nm from any ice shelf or fast ice

## GARBAGE

**PLASTICS**
All disposal of plastics prohibited (under MARPOL)

**FOOD WASTES I**
Discharge of food wastes onto the ice is prohibited

**FOOD WASTES II**
Food wastes which have been comminuted or ground (no greater than 25mm) can be discharged only when ship is not less than 12nm from the nearest land, nearest ice shelf, or nearest fast ice

**ANIMAL CARCASSES**
Discharge of animal carcasses is prohibited

**CARGO RESIDUES**
Cargo residues, cleaning agents or additives in hold washing water may only be discharged if they are not harmful to the marine environment; both departure and destination ports are within Arctic waters; and there are no adequate reception facilities at those ports. The same requirements apply to Antarctic area under MARPOL

## CHEMICALS

**DISCHARGES**
Discharge of noxious liquid substances (NLS) or mixtures containing NLS is prohibited in polar waters

## BACKGROUND INFO

- THE INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS WILL ENTER INTO FORCE ON 1 JANUARY 2017
- IT APPLIES TO SHIPS OPERATING IN ARCTIC AND ANTARCTIC WATERS; ADDITIONAL TO EXISTING MARPOL REQUIREMENTS
- IT PROVIDES FOR SAFE SHIP OPERATION AND PROTECTS THE ENVIRONMENT BY ADDRESSING THE UNIQUE RISKS PRESENT IN POLAR WATERS BUT NOT COVERED BY OTHER INSTRUMENTS

## DEFINITIONS


**SHIP CATEGORIES**
Three categories of ship designed to operate in polar waters (to:
A) at least medium first-year ice;
B) at least thin first-year ice;
C) open water(s) or ice conditions less severe than A and B

**FAST ICE:** Sea ice which forms and remains fast along the coast, where it is attached to the shore, to an ice wall, to an ice front, between shoals or grounded icebergs

**ICE SHELF:** A floating ice sheet of considerable thickness showing 2 surfaces above sea level, attached to the coast

IMO

# Thank you for your attention