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ANALYSIS OF SEA ACCIDENTS (2002–2015)

ABSTRACT

In the paper the issue of maritime safety is presented. Most of the modern world trade is carried by sea, where maritime safety plays a key role. The article also presents the analysis of marine casualties at the beginning of the 21st century, covering the years 2002–2015. Apparent systematic steady decline in accidents and total losses of vessels is the result of improved maritime safety.

Keywords:

maritime safety, sea accident, total losses of vessels.

INTRODUCTION

The safety of vessels is critical to the global shipping and economy. International shipping transports approximately 80% of global trade by volume and over 70% of global trade by value. Shipping is an important highly complex, global industry that provides trade networks across the world contributing to economic progress. Nowadays a steady increase in the improvement of maritime safety is observed in the global shipping as indicated by reduction in the number of maritime accidents, which results in the total loss of vessels. Safety at sea depends on a number of factors. This analysis will be based on a review of maritime accidents between 2002 and 2015.

SAFETY AT SEA

The term ‘maritime safety’ is defined in many ways and used in documents and publications, legal, technical, organizational and operational documentations

for imaging conditions safe operations at sea, both for ships and men, as well as the marine environment. The equivalent term to the concept of ‘maritime safety’ is the term ‘safety at sea’. According to the work of J. Urbański, Z. Kopacz and W. Morgaś, accounting for only sea approach to the issue, the term ‘maritime safety’ is to be understood as correct and appropriate conditions for human activities at sea, which does not threaten the lives and property and are not harmful to the marine environment. The term ‘maritime safety’ is illustrated in Figure 1 at two levels of detail. The first level is the safety of life and property at sea and prevention of marine pollution by ships. While the second level of security assigned areas of human activity on the sea appropriate for the two levels [Kopacz, Morgaś, Urbański, 2005].

The definition of ‘maritime safety’ by the Ministry of Maritime and Inland Waterways says that ‘maritime safety’ is the safety of life, health and property from environmental hazards and exploitation which entails shipping [<https://www.mgm.gov.pl/gospodarka-morska/26-bezpieczenstwo-morskie>].

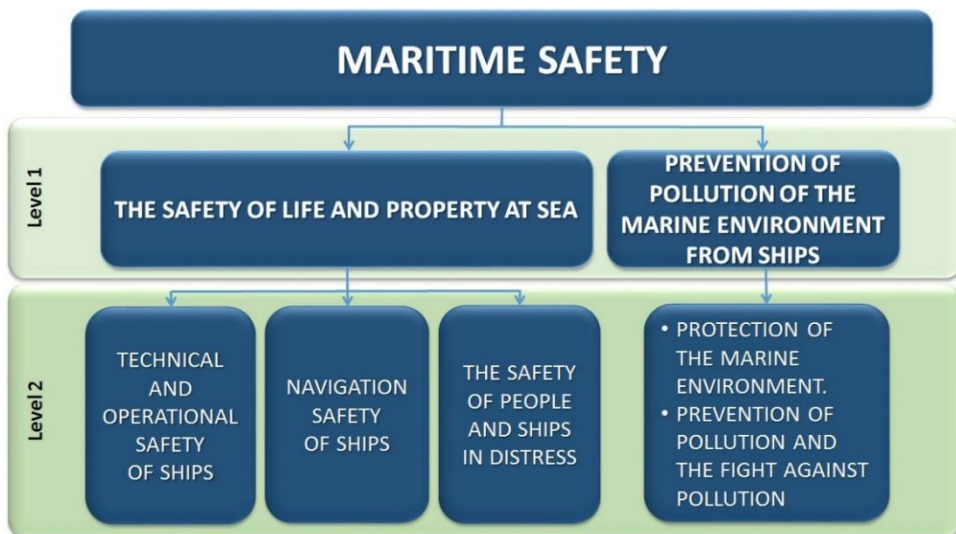


Fig. 1. The concept of ‘maritime safety’ shown on two levels of detail [Kopacz, Morgaś, Urbański, 2005]

Maritime safety is achieved through the adoption and implementation of a series of actions to ensure legal, technical, operational and other conditions for use of the seas, navigational and communicational equipment and devices, the appropriate

level of training of crews of vessels and enforcement. This task is the responsibility of the State Controls, education and training institutions and the wider maritime administration.

SEA ACCIDENTS REVIEW (2002–2015)

The number of accidents, with total loss of the vessels, has been systematically decreasing since the beginning of the 21st century, from approximately 200 vessels to 85 in 2015. The total losses of vessels (over 100 gross tons) between 2002 and 2015 is presented in Figure 2. Depicted by the descending trend of the phenomenon, it demonstrates the increase in factors affecting maritime safety.

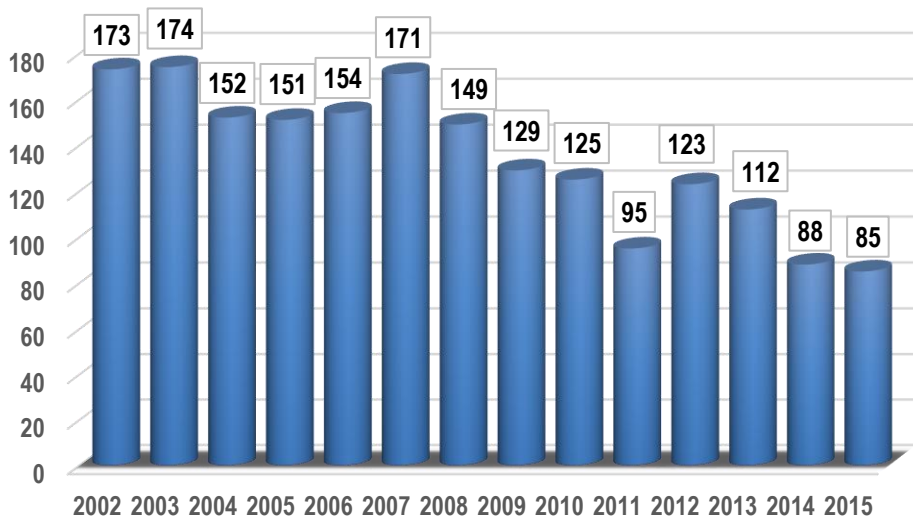


Fig. 2. Total losses of vessels in years 2002–2015 [‘Safety and Shipping Review’, 2014], [‘Safety and Shipping Review’, 2016]

The total losses by type of vessels in years 2002–2015 is presented in Table 1. Looking at 1881 total losses recorded between 2002 and 2015, cargo vessels (763) and fishery vessels (353) have accounted almost 60% of them.

Tab. 1. Total losses by type of vessels in years 2002–2015 [‘Safety and Shipping Review’, 2014], [‘Safety and Shipping Review’, 2016]

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Cargo	63	75	58	61	61	70	58	51	60	37	61	41	31	36	763
Fishery	40	32	33	35	23	34	36	29	21	14	12	13	15	16	353
Bulk	7	10	8	6	8	12	8	10	11	14	9	15	4	6	128
Passenger	13	14	9	12	12	8	4	5	3	7	7	8	10	4	116
Tug	7	9	9	5	7	11	7	5	7	2	6	7	7	7	96
Chemical/product	7	8	10	6	11	6	7	9	5	2	8	10	2	2	93
Ro-ro	6	7	8	7	10	5	8	6	1	3	4	2	5	4	76
Other	16	6	4	3	3	7	5	5	3	5	3	6	4	2	72
Container	2	1	–	2	4	3	2	4	5	3	6	4	4	5	45
Burge	4	3	2	6	6	6	3	–	1	–	–	3	1	–	35
Supply/offshore	1	–	3	3	3	5	1	3	2	2	3	2	3	2	33
Dredger	3	1	4	4	3	2	5	–	2	2	2	–	1	1	30
Tanker	2	5	2	–	2	1	3	2	3	3	1	–	1	–	25
LPG/LPN	2	–	1	1	–	–	1	–	1	1	1	–	–	–	8
Unknown	–	3	1	–	1	1	1	–	–	–	–	1	–	–	8
Total	173	174	152	151	154	171	149	129	125	95	123	112	88	85	1881

For every year in 2002–2015 foundering (sinking, submerging) was the most common cause of loss of large ships. In years 2002–2015 it was the cause of almost 46,5% of total losses (857 accidents), often caused by bad weather. It is the highest proportion of all losses. There were significant reductions in the number of wrecks/strandings and fires/explosions year by year, with total losses of 30,3% in years 2002–2015 (570 accidents). The machinery and hull damages caused the total losses of 11,3% (213 accidents) and we can see significant reduction in these causes. The causes of total losses in years 2002–2016 are presented in Table 2.

Tab. 2. Total losses by type of vessels in years 2002–2015 [‘Safety and Shipping Review’, 2014], [‘Safety and Shipping Review’, 2016]

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Foundered (sunk, submerged)	48	63	75	57	64	69	73	61	64	45	55	70	50	63	857
Wrecked/stranded (grounded)	22	35	25	24	29	35	34	23	23	28	26	21	18	12	355
Fire/explosion	35	21	20	16	19	18	16	14	11	8	13	15	6	3	215
Collision (involving vessels)	19	20	12	26	23	17	12	13	10	3	5	2	2	3	167
Machinery damage/failure	16	13	9	8	11	14	8	7	4	6	15	2	5	2	120
Hull damage(holed, cracks, etc.)	22	12	5	8	4	11	4	7	4	3	6	1	4	2	93
Miscellaneous	9	8	1	3	1	3	1	2	6	1	1	1	2	–	39
Contact (e.g. harbor wall)	2	2	3	5	2	2	1	1	–	–	2	–	1	–	21
Piracy	–	–	1	1	–	1	–	1	2	1	–	–	–	–	7
Missing/overdue	–	–	1	3	1	1	–	–	1	–	–	–	–	–	7
Total	173	174	152	151	154	171	149	129	125	95	123	112	88	85	1881

According to the study, foundering (857) and wrecking/stranding (355) are the most popular causes of loss between 2002 and 2015, and represent 64,43% of all losses.

The percentages of total losses by geographical areas are shown in Figure 3 and Table 3 and cover only a 14-year period from 2002 to 2015. According to the study, geographical areas that are most prevalent (in order) are the North Pacific Ocean with the South China Sea, the Indonesian Archipelago, the Philippines and the North Atlantic Ocean with the North Sea, the Mediterranean Sea and the Indian Ocean.

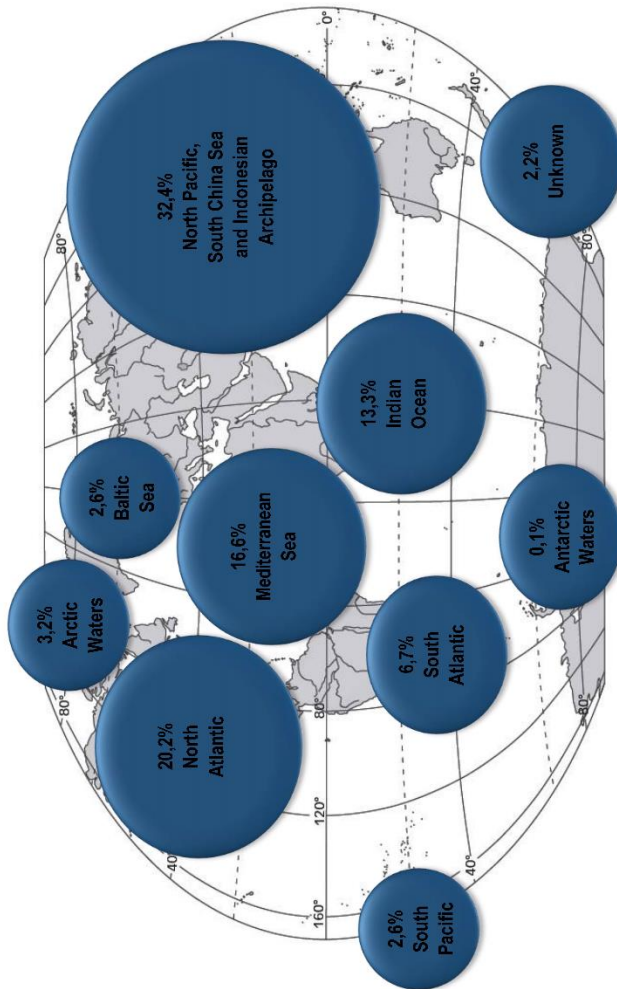


Fig. 3. Percentages of total losses by geographical areas in years 2002–2015 [‘Safety and Shipping Review’, 2014], [‘Safety and Shipping Review’, 2016]

Tab. 3. Percentages of total losses by geographical areas in years 2002–2015 [‘Safety and Shipping Review’, 2014], [‘Safety and Shipping Review’, 2016]

	Sea regions	Total losses	Percentage of total losses by sea regions [%]
1	2	3	4
1	North Pacific Ocean, South China Sea, Indonesian Archipelago, Philippines	609	32,4
2	North Atlantic Ocean	380	20,2
3	Mediterranean Sea	314	16,7
4	Indian Ocean	251	13,3
5	South Atlantic Ocean	126	6,7
6	Arctic Waters	61	3,2
7	South Pacific Ocean	49	2,6
8	Baltic Sea	48	2,6
9	Antarctic Waters	1	0,1
10	Unknown location	42	2,2
		1881	100

The maritime industry observed the number of total losses remain stable during 2015, declining slightly to **85**; the lowest total number in a decade, and the second year in a row the annual losses fell below 100. The losses declined by 3% compared to 2014 (88). The 2015 accident year represents a significant improvement of the 10-year loss average (**123**). The large shipping losses have declined by **45%** over the past decade, driven by an increasingly robust safety environment and self-regulation. However, regional disparities remain [‘Safety and Shipping Review’, 2014]. The number of total losses by geographical areas in 2015 are shown in Table 4.

Tab. 4. Total losses by regions in 2015 [‘Safety and Shipping Review’, 2016]

	Sea regions	Number of losses
1	2	3
1	North Pacific Ocean, South China Sea, Indonesian Archipelago, Philippines	30
2	North Atlantic Ocean	6
3	Mediterranean Sea	11
4	Indian Ocean	11
5	South Atlantic Ocean	3
6	Arctic Waters	0
7	South Pacific Ocean	0
8	Baltic Sea	0
9	Antarctic Waters	0
10	Unknown location	24
	Total losses in 2015	85

CONCLUSIONS

The number of maritime accidents in the years 2002–2015 with total losses of vessels is very high and reached 1881 events at sea. The analysis shows that the trend of these events is decreasing, which is optimistic for the future. The presented studies indicate that maintaining this trend is dependent on the appropriate level of maritime safety at every level of its organization.

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Received September 2016

Reviewed December 2016

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STRESZCZENIE

W artykule została przedstawiona problematyka bezpieczeństwa morskiego. Współczesna światowa wymiana handlowa odbywa się w znaczącym procencie drogą morską, gdzie bezpieczeństwo morskie ma kluczowe znaczenie. W pracy dokonana została analiza wypadków morskich początku XXI wieku obejmująca lata 2002–2015. Przyjmuje się, że widoczny systematyczny spadek liczby wypadków morskich oraz całkowitych strat jednostek pływających to wpływ poprawy warunków bezpieczeństwa morskiego.