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# Indonesian Sea Accident Analysis (Case Study From 2003 – 2013)

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**Abstract.** There are so many accidents in sea transportation in Indonesia. Most of the accidents happen because of low concern aspects of the safety and security of the crew. In sailing, a man as transport users to interact with the ship and the surrounding environment (including other ships, cruise lines, ports, and the situation of local conditions). These interactions are sometimes very complex and related to various aspects of. Aware of the multiplicity of aspects related to the third of these factors, seeking the safety of cruise through a reduction in the number of accidents and the risk of death and serious injuries due to accidents and goods transported is certainly not enough attempted through mono-sector approach, but rather takes a multi-sector approach to the efforts. In this paper, we described the Indonesian Sea Transportation accident analysis for eleven years divided into four items: total of ship accident type, ship accident factor, total of casualties, region of ship accidents. All data founded from Marine Court (*Mahkamah Pelayaran*). From that 4 items we can find Indonesia Sea Accident Analysis from 2003-2013.

## 1. Introduction

Majority (80 to 85%) of all recorded maritime accidents are generally attributed to human error or associated with human error. Contribution of human error to maritime accidents has increased over a ten-year period 1991 to 2001 [2]. Most of the accidents are the result of senseless and avoidable human errors. The concern about human factors is growing as human error is significantly implicated in so many marine accidents. Many of the failures are actually the result of errors (i.e. latent failures) that have been designed and constructed into highly complex systems especially system integration and interfacing. Indonesia as an archipelago country consisting of thousands of Islands and has a vast sea area so indispensable transportation mode is ocean freight as a means of mobility and driving force of economic development nationwide [15]. Even in parts of Indonesia, the ship is one of the means of transport used to get in touch with the outside world. A great potential this is very useful when coupled with the assurance of the safety and security of the marine mode of transportation.

Sea transport holds a very important role in maritime countries, such as in Indonesia whose territory is an archipelago. Associated with sea transport, there are three aspects that are interlinked with each other, i.e. traffic and sea transportation, port and also safety and security covering their cruise [1].

Ship accident that occurred recently in the Indonesian waters can occur at anytime and anywhere. Due to unforeseen circumstances, the various parties associated with industry transportation create a



variety of sea conditions are very strict with regard to the safety and security of the ship in accordance with the condition of the waters of Indonesia. International institutions specializing in the maritime areas of the IMO (International Maritime Organization) to make the International Convention SOLAS (Safety of Live at Sea) as well as various derivatives of its implementation in the form of codes such as the ISM (International Safety Management) Code, ISPS (International Port Facilities Security) Code, the IMDG (International Maritime Dangerous Goods) Code [7]. SOLAS is a fixed rule that is mandatory for all countries to implement it, it is no exception that come into Indonesia ratified it. Therefore, the Government of Indonesia implement it by making the ACT No. 17 of 2008, who then makes a wide range of Government Regulation (PP) as a technical guide its implementation, as the consummation of legislation and other regulations.

## 2. Literature Review

The maritime transportation affects most of goods and passenger's movement among islands in an archipelago country, Indonesia. As the result, the reliability of maritime transportation to link among islands will impact to the development of country especially in the frame of economic sector. The maritime transportation could be divided into two categories which are sea transportation and crossing transportation. The crossing transportation bridges between places as the continuation of road or railway by crossing the straits. The ship operation system contains complex interrelation among technical factor, environment factor as well as human factor that control the ship handling process. One important idea for careful consideration is ship handling. Ship handling is defined as the practice of guiding a ship which controls ship movement through ship controllability means, visual monitoring means and instrumental monitoring. Therefore, ship navigation operation and ship manoeuvring are the integrated part of the ship handling. The successful of ship handling will reduce accident from happening. In other word, if there is a problem with ship handling process such as the difficulty of controlling ship behaviour, it might lead to accident. It could be generalized that ship handling difficulty is potentially directed toward move ship accident [8].

Accidents occurring in sea, rivers, lakes, and crossing that reached Marine Court in 2005-2010 was mostly due to human error (65%), and only a few accidents in the waters caused by natural factors [4]. Given the reasons mentioned above, all accidents can be minimized if prevention efforts are seriously performed by all parties so as not to stumble on the same stone. Water transport accidents occur mainly due to overcrowding and navigation system, which is characterized by a large number of passengers and goods compared to the draft Commission. For passengers who do not have the expertise and skills in emergency situations, it is important to note that users of the waterway in the category of vulnerable population groups. Efforts to ensure the safety of passengers and crew must be considered as a serious issue, including this trivial security equipment such as buoys. Current conditions, many ships that do not have safety equipment should be able to buoy passengers and crew when the vessel having accident. Most of the accidents occur due to the low awareness on the aspects of security and safety of the crew. The figures differ from the manifest of passengers and number of passengers on the ground become common place. Transportation is the lifeblood of society and the economy in Indonesia. Transportation development activities in Indonesia are out of various dimensions (marine transport and others) and increasing. This is an impacts of economic activity and socio-cultural activities and community. In addition, the process of regulatory reform in the field of national transportation deregulation has also triggered an increase in transport activity. To understand fully that human consciousness towards the preservation of the environment are increasingly high, so that sea transportation accidents which can cause damage to the environment (pollution) should be a significant consideration. In order to further integrate transport infrastructure and facilities that meet the requirements of security and safety of transport, it is necessary to make a standardization of regulation system and procedures, as well as human resource professionals to realize the service organization of the transport and works in order to hold everything intact. Then it is necessary to have a system of good governance, where Governments have function in the transportation services which include coaching in the aspects of setting up, monitoring and controlling the system [14].

### 3. Problem Identification

#### 3.1 *Characteristic of Sea Transportation Accident*

The ship is major means of sea transport, where many people rely on it for sustenance. Each time the safety of human life at sea is threatened, both the sailors and the people on board are attached. From the facts and the data obtained, the sea had swallowed many accident victims and property which is not small in size. Ship accidents can happen anywhere, anytime and to anyone. For that reason, the crew and passengers need to know about ways to escape if there is an accident happening including on board, first aid and fire safety responsibilities. There is urgent need for training of the crew, especially in the areas of safety for the crew members, as well as rescue techniques, as required by the Convention of the IMO (International Maritime Organization) and the State Governments concerned. Many of the accidents victim at sea are caused by a lack of basic security knowledge and protection of the environment, according to the IMO, its numerous deaths which occurred in the sea caused by the human factor.

Characteristics of accidents in general are:

- a. an accident as a rare occurrence;
- b. as an event that accidents do not know when to expect;
- c. accidents as those events Multiple Factors.

#### 3.2 Regulation and Law about Ship Accident

Principles of safety transport is bought to the Government attention for long time, such as the policy, established in 1999 Presidential Decree number 105 in year of 1999 on the establishment of the Komite Nasional Keselamatan Transportasi (KNKT) or National Transportation Safety Committee/NTSC [9].

Government Regulation No. 1 year of 1998 concerning the examination of the ship accident split into five examination categories, namely:

- a. Sinking ship;
- b. Ship fired;
- c. Ship collision;
- d. Ship accidents which cause the soul of man and wildlife losses of property and
- e. Ship was run ground or crashed out.

Examination of the ship accident consisted of a preliminary examination by Syahbandar (Harbor Master) and advanced examination by The Marine Court (Mahkamah Pelayaran). Whereas the Legislation of the Republic of Indonesia number 17 year of 2008 about the shipping/ cruise Article 245 states that: Accidents aboard the events experienced by the vessel that may threaten the safety of the ship and/or the human spirit in the form of: sinking ship, ship fired, ship collision, and ship was run aground or crashed out.

Later, in the Article 256 about the investigation of the ship accident stated that:

- (1) The Accident Investigation Board conducted by the National Transportation Safety Committee to search for facts in order to prevent the occurrence of the ship accident with the same causes;
- (2) Investigation as referred to subsection (1) made against each ship accident;
- (3) Investigations conducted by the National Transportation Safety Committee referred to subsection (1) is not to determine which errors or omissions on the occurrence of the ship accident.

To minimize the occurrence of sea accidents, top priority is to rescue the soul in order to satisfy all the rules by the standards and even more to ensure the safety at sea, which requires a support from around the world. There are three organizations that govern the safety of the ship. The IMO (International Maritime Organization), ILO (International Labor Organization) and ITU (International Telecommunication Union), Indonesia is one of the three members of the organization and has ratified the convention. To ensure safety at sea, it is required for a standard (the rules) which applies nationally and internationally, which are:

## a. National Standard includes:

1. The Legislation of the Republic of Indonesia Act No. 17 year of 2008 about a shipping/ cruise that spelled out in the regulation of the Government and the Minister's decision and the regulation;
2. The Legislation of the Republic of Indonesia Act No. 3 year of 1988 replacement Act No. 5 year of 1964 about the Telecommunications that comes with PP No. 10 of 1974 on Public Telecommunications;
3. Government Regulation No. 7 year of 2000 about seamanship that arrange regulates about competence, expertise and skills qualifications for crew and the captain/Master on all ships except sailing ship, sail boat with motor, motor boat with a size less than GT 35, private yacht that was used to trade and specialized ships.

## b. International Standard includes:

1. SOLAS (Safety of Life at Sea) 1974 and the amendment [16];
2. MARPOL (Marine Pollution) 73/78 and the protocols [11];
3. Load Line Convention 1966 [10];
4. COLLREG (Collision Regulations) 1972 [3];
5. Tonnage Measurement 1966;
6. STCW (Standards of Training Certificate and Watch keeping) 1978 Amendment 1995;
7. ILO No. 147 Year of 1976 about the Minimum Working Standards for Crew Commerce [6];
8. ILO Convention No. 185 year of 2008 about SID (Seafarers Identification Document) which has been ratified by The Legislation of the Republic of Indonesia law No. 1 year of 2009 [6];
9. SAR (Search & Rescue) Convention [16];
10. GMDSS (Global Maritime Distress Safety System) [5];
11. ISM (International Safety Management) Code [12];
12. ISPS (International Ship and Ports Security) Code [13].

In addition to the conventions mentioned above there is one rule that could not be released from the safety of the voyage which set about Radio Communication close relation to the Radio Regulations (RR), Telegraph and Telephone Regulation under the Convention on the International Telecommunication Union (ITU).

## 4. Result and Discussion

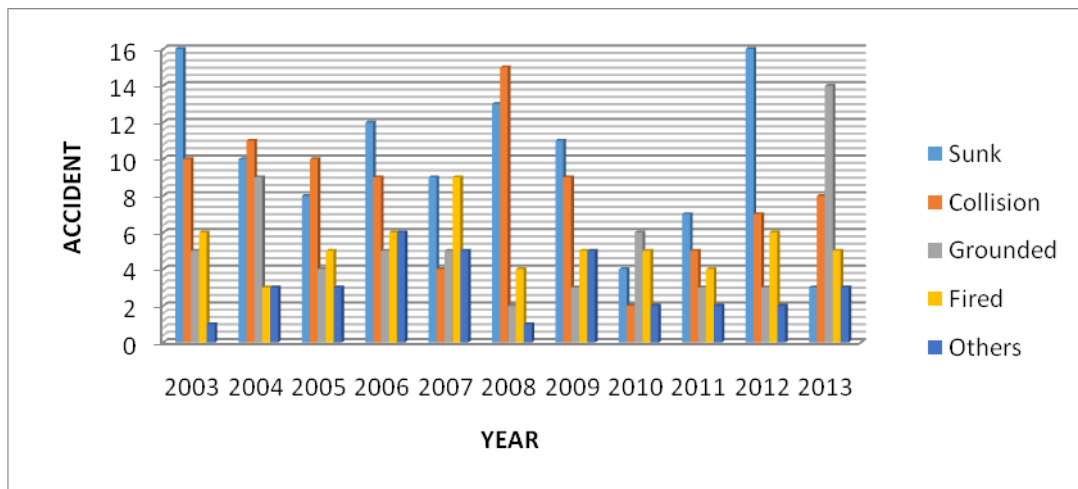
### 4.1. Indonesian Ship Accident Data

The accident happened on a river, Lake, and river crossings that are up to the Marine Court over voyage caused by human error, and just a little accident in the waters caused by natural factors. Tracing the reason mentioned above should all the events of the accident can be minimized while there are preventive efforts from all parties so as not to stumble on the same stone. The Ship Accidents Data shown on Table and Figure 1 – 4.

**Table 1.** Total of Ship Accident According to Marine Court Decision 2003-2013

No	Type of Ship Accident	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	Sunk	16	10	8	12	9	13	11	4	7	16	3
2	Collision	10	11	10	9	4	15	9	2	5	7	8
3	Grounded	5	9	4	5	5	2	3	6	3	3	14
4	Fired	6	3	5	6	9	4	5	5	4	6	5
5	Others	1	3	3	6	5	1	5	2	2	2	3
	Total	38	36	30	38	32	35	33	19	21	34	33

Source: Mahkamah Pelayaran, Setjen, Kemenhub

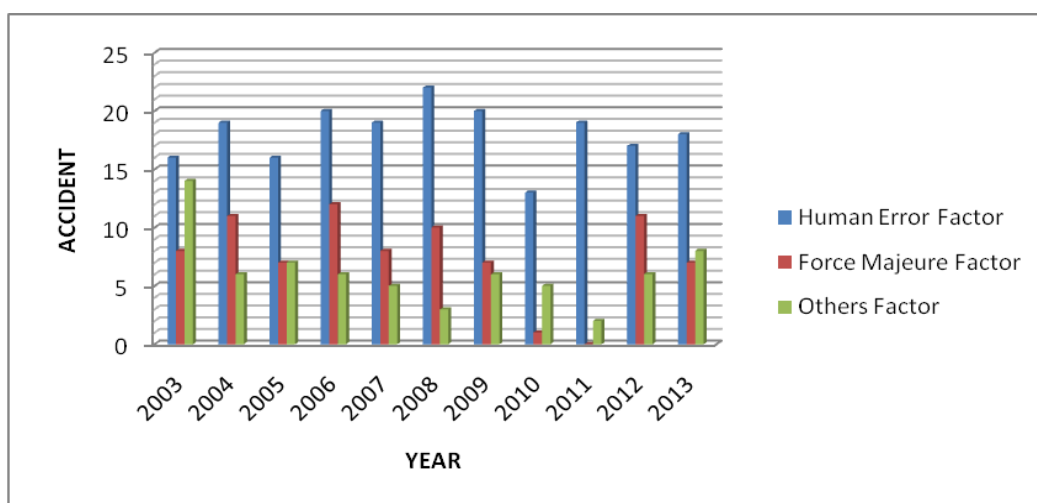


**Figure 1.** Total of Ship Accident Types According to Marine Court Decision 2003-2013

**Table 2.** Total of Marine Court Decision by Factor Ship’s Accident 2003-2013

No	Ship’s Accident Factor	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	Human Error Factor	16	19	16	20	19	22	20	13	19	17	18
2	Force Majeure Factor	8	11	7	12	8	10	7	1	0	11	7
3	Others Factor	14	6	7	6	5	3	6	5	2	6	8
	Total	38	36	30	38	32	35	33	19	21	34	33

Source: Mahkamah Pelayaran, Setjen, Kemenhub

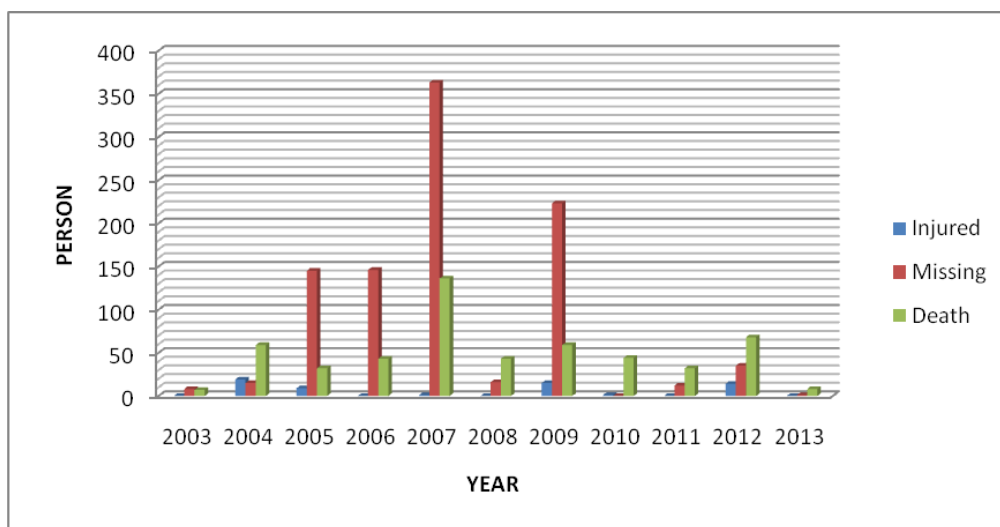


**Figure 2.** Total of Marine Court Decision by Factor Ship’s Accident 2003-2013

**Table 3.**Total of Victims According to Marine Court Decision 2003-2013

No	Ship's Accident Victims	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	Injured	0	19	9	0	1	0	15	1	0	14	0
2	Missing	8	15	145	146	363	16	223	0	12	35	1
3	Death	7	59	32	43	136	43	59	44	32	68	8
	Total	15	93	186	189	500	59	297	45	44	117	9

Source: Mahkamah Pelayaran, Setjen, Kemenhub

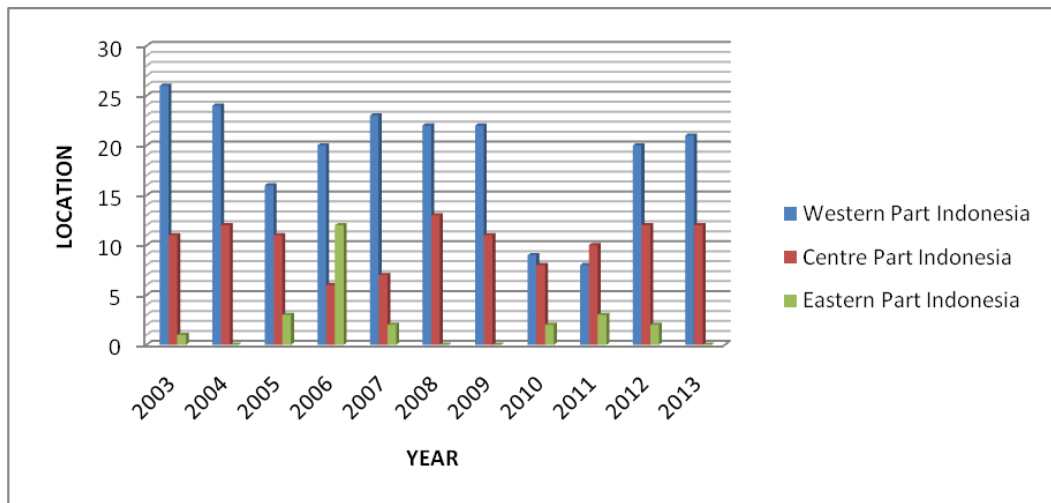


**Figure 3.**Total of Victims According to Marine Court Decision 2003-2013

**Table 4.**Total of Marine Court Decision by Ship Area of Accident 2003-2013

No	Ship Area of Accident	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Western Part												
1	Indonesia	26	24	16	20	23	22	22	9	8	20	21
Centre Part												
2	Indonesia	11	12	11	6	7	13	11	8	10	12	12
Easter Part												
3	Indonesia	1	0	3	12	2	0	0	2	3	2	0
	Total	38	36	30	38	32	35	33	19	21	34	33

Source: Mahkamah Pelayaran, Setjen, Kemenhub



**Figure 4.** Total of Marine Court Decision by Ship Area of Accident 2003-2013

#### 4.2 Problem Solving

According to research before [4], if it is restricted to the scope of the company (in terms of the micro), it appears that the occurrence of accidents owing to the discrepancy between the three major elements of production (sub human systems, environment and management physic) resulting in the occurrence of an action and the circumstances are not safe.

But directly of the accident can be grouped into two outlinescauses, namely:

- Unsafe actions of humans (Unsafe Acts) for example:work without any authorize-failed to give a warning,working with the wrong speed and so on.
- A state of insecurity (Unsafe Condition) for example: thesafety equipment on board which are damaged or are not usable, environmental and weather on the waters is not goodformaliciousitemsthatcanshipexploding/burning.

#### 5. Conclusion

- From the Marine Court Decision from 2003-2013, after processing the data, by percentage:
  - Total of Ship Accident: sunk 31%, collision 26%, grounded 17%, fired 17% and others 9%.
  - Total of Factor Ship's Accident: human error 57%, force majeure 24%, others 19%.
  - Total of Victims: missing 62%, death 34%, injured 4%.
  - Total of Ship Area of Accident: western part Indonesia 61%, centre part Indonesia 32%, eastern part Indonesia 7%.
- The safety of the ship is affected by the ship's supplies, ships, load functions charge and driver skills. In order for the safety of passengers and crew aboard stay awake, then supplies the ship had to be adapted to the standard of safety, the use of the ship as its main function, the burden of the charge does not exceed the limit load required, the driver of a ship actually sailed the ship accomplished and master cruise lines took place.
- The high number of accidents sea in Indonesia shouldbe paid attention all sides, not only government, but also the owner of a ship related institutions and the citizens who must be more active in providing information. Of the results of observations, the main cause of the accident the sea isbecause the excess of the capacity of transport set, whether itis transportation of goods and people. Do not even rarelyusers shipping services exert oneself aboard a ship thoughthe ship was filled with determination can be placed on board.



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