

Indonesian's Sea Transportation Accident Analysis

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Abstract---Indonesia is the world's largest archipelago, 2/3 of the country is covered by sea. But due to many factors a lot of ship accidents occurred every year, and claiming a large number of casualties. Efforts have been done to improve the safety of domestic sea transportation, as the result to be fully compliance to the SOLAS regulations, worsen by the varying sea and cargo characteristics, and low educated passengers, they are very vulnerable to accidents. . Most of the accidents occur due to the low awareness of 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 commonplace. There are four main issues in maritime transport, it is said, not the individual agencies or Government willing to hold responsibility for the security and safety, pricing policy, the quality of human resources, as well as the implementation and compliance with the rules are not clear.

Index Terms—sea transportation, accident, analysis.

Introduction

Majority (80 to 85%) of all recorded maritime accidents are generally attributed to human error or associated with human error. 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. Eighty percent or more of major marine accidents were caused by humans and organizations that influence the individual. Similarly, once an accident sequence has initiated, it is the organizational influences that allow the sequence to continue, resulting in an accident. The culture, incentives, and operating methods of organizations have important effects on the safety of marine systems.

Detailed analysis of the causes of accidents involving complex technological systems clearly indicates that a small percentage of the major catastrophic accidents are caused by failures of the structures or hardware components of the system (something less than 20%). This is the tribute of the technology. Rather, the accidents that are caused by unanticipated actions of people have undesirable outcomes (something more than 80%). A lot of ship accidents occurred every year on Indonesian waters, described in Figure 1, and the number of accidents in Figure 2.

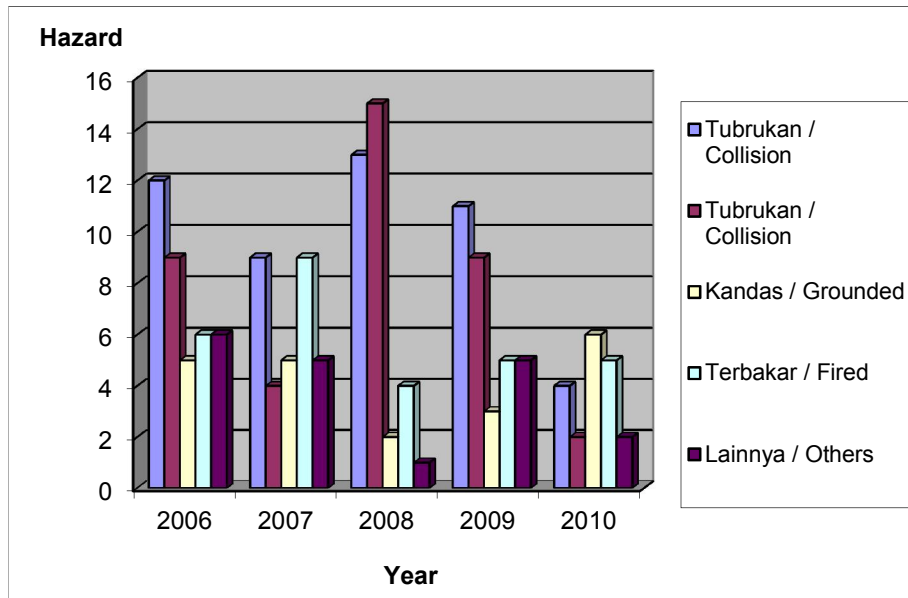


Figure 1. Number of Ship Accident according to Marine Court Decision

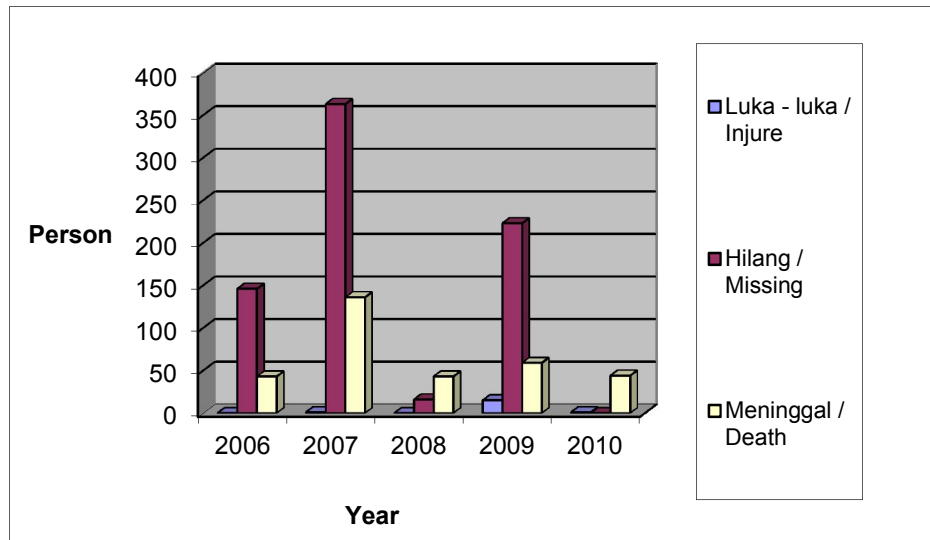


Figure2. Number of Victims according to Marine Court Decision

1. CHARACTERISTIC OF SEA TRANSPORTATION ACCIDENT

The ship as a means of sea transport, and where many people crave his life. Each time the safety of human life at sea is threatened, both the sailors and the people on board. From the facts and the data obtained that the sea had swallowed accident victims and property which is not small, so that accidents can happen anywhere, anytime and happen to anyone. For that, the crew and passengers need to know about ways to escape if there is an accident on board, first aid and fire safety responsibilities. So the need for training of the crew, especially in the areas of safety for the crew members are experts in 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. We could see in Table 1. that characteristic of sea transportation accident.

Table 1. Characteristic Sea Transportation Accident

	Accident Typical	Object
WHAT	Accident Type and Safety Indicator: Accident type: sink, collision, grounded, fired	Ship, Tug Boat, Tanker, Barge
WHY	Cause of Accident: - Human factor: <ul style="list-style-type: none"> • Carelessness in the conduct of the vessel; • Inability of the crew in mastering a variety of problems that may arise in the operation of ships' • Consciously loading ships in excess - Technical factor: <ul style="list-style-type: none"> o Less of carefully in ship design o Neglect of care resulting in damage to the ship or ship parts which caused the ship had an accident or the burning ship - Natural Factor: Bad weather factors; the storm, the waves height which is affected by the storm, the current season, resulting in the fog that limited visibility.	Captain, Crew, Port Inspection Officer, Passenger Ship Owner, Marine Inspector, Dockyard, Supplier Cruise Lines, Ports, BMKG Information
WHO	The Crash and crash victim: a. Ships involved accidents b. Gender (male, female) c. Age	Captain, Crew, Passenger
WHERE	Accident location	Cruise Lines, Ports, Harbor
WHEN	Accident Time: a. Hours of accident b. Date of accident	Ship, Captain, Passenger
HOW	Chronological Events: a. Ship movements	Ship

2. CAUSES OF THE SEA TRANSPORTATION ACCIDENT

From year to year ship accident on Indonesia never decreases. In fact, the cause of the sea accident like repeating the mistakes of the past, that is never far from the accident to bad weather, overloaded, or ships that do not meet the eligibility standards. At least, there are two important reasons of the sea accident in Indonesia. The first, condition of the fleet, the ships transport in general are made without the use of certain standards in safety. In addition, many ships in Indonesia purchased from other countries former fleets.. Treatment of these ships also substandard, aged of the former ship used in Indonesia are usually very old. So that, these ships unseaworthy. Even, maybe in his home country, not actually being used as one of the modes of transport. The second reason is the operational fleet, both aspects of the ship or of the charge. This problem occurs because a lack of standards supervision. Ship which eventually lead to safety problems or dangerous charge excess baggage is not reported. The reason of bad weather and natural conditions, is not the main reason. The Meteorology, Climatology and Geophysics Department (BMKG) always announce the following weather conditions forecast. This is where the role importance of the port to Syahbandar expressly choose, which permitted sailing ships and boats had to wait for the weather subsided, while that may be withheld by Syahbandar is specialized ships such as the High Speed Craft (HSC).

There are many causes of common sea accidents :

- a. Bad Weather;
- b. Fires including malicious payload;
- c. Ship stability including shifted the cargo;
- d. No reserve buoyancy due to excessive charge of cargo;
- e. Grounding (stranding);
- f. Collision;
- g. Imperfect Design and The structure;
- h. Human Negligence;
- i. Blow Out (Offshore Oil Platform).

The cause of the ship accident happened to:

1. Operator:
 - a. Ship safety:
 - Many ships created traditionally/ has no certificates;
 - Many shipbuilding does not follow the drawing direction of the ship's company which has already approved;
 - Certificate of many ships already expired;

- Less function of communications equipment/navigation vessel.
- b. Loading:
- Excessive loading especially on-deck placement;
 - Overboard loading passengers;
 - Passenger awareness still lacking.
2. Supervision authorities:
- Everybody can exit/enter the ship place where ever;
 - The number of supervisor is limited;
 - Not all ship stopover could be supervised;
 - Possible of careless inspection.
3. User/community:
- The lack of public awareness by the importance meaning of the ship safety;
 - The salvation will often impose regardless of voyage.

3. SHIP ACCIDENT ANALYSIS

Analysis of the accident:

The ship sank:

1. The root problem of the sunken ship accidents mainly because the ship had filling the water, the ship can take in to leak water through the gastric or by skin due to the ship at any given moment to inclined and making the ship broke. The ship's hull skin can split caused by the condition of the vessels are old or may be caused by the construction of the hull which is thin and not worth it to withstand pressure when the ship moves forward in an undulous sea.
2. Document Nautical: Leaks aboard when linked to the territorial waters of Western Indonesia and should be presumed that the waters of the region's many data coral -stone or other disorders such as skeleton buildings offshore or framework/not informed and wreck described and published in document Nautical as well as in the mark exactly with the SBNP (Sarana Bantu Navigasi Pelayaran).
3. Seafaring Powers Skills: good sailors (Seamanship) in navigation due to the ability of the captain and sailors in terms of keeping and controlling the ship to get know the various threats that could sink the amphibious insertions, are very necessary. Sciences related to the ship movement, ship building, ship stability and handling charge should be known. Ship maneuvers, related to the ways of maneuvering in waves, though-the motion in bad weather (tropical storm) is the science which applies at the time of executing the task.
4. Ship building in this regard is the knowledge relating to the Buoyancy-Meta centre ($BM = I/V$), the permeability of the vessels and ships at sea performance (Torsion and force). Stability include knowledge about the stability of the negative and the flood (floodable). The handling

of cargo (cargo handling) is devoted to the propagator knowledge to the boundary load (load line) and the condition of the ship's hogging and sagging.

Vessel crash out:

1. The data is related to the deep factor on the map and the tidal. The sea depth is associated with the survey results into the sea carried out by establishments that maintain a map of the sea, in Indonesia that have sea immense with 17 thousand islands more resounding depth map, the activity of the sea is very difficult and the cost that is large enough to do, therefore sounding is done only in certain places, so that the sea depths data for so long have been less well ahead on the beach who received land erosion high enough like beach in Northern Java, the East Coast of Sumatra, and also in South Kalimantan.
2. Officers of the ship's navigation ability factors:
Sometimes the theories are received in seamanship education cannot fully support jobs at sea, such as for the data about the deep of the sea, real close to the land caused the vessel crash out. Because the hiping like guessing in the dark and it's very dangerous to cause the crash out.
3. A navigational instrument that worked well like radar , echo sounder and so on will be well overcome some problems crash out when sailing in the dark especially when sailing on a river or coastal which have much shallow water.

Fired ship:

1. Mentality crew ship: generally crew ship of various degrees has given training control fires / a fireman (fire fighting) , and certified proficiency. The competence crew unquestioning but intrepidity and rapidity act exactly indispensable. The condition of being other than a few gen fires on ships to be uncontrolled because crew ship lose courage to act extinguishing fires . To another ship situation contrarily or confident high and intrepidity formed with a situation exists self trust crew the ship was closely relation with equipment available and unkempt well and intrepidity presented itself from crew it already possessed or may be beaten through education training long enough.
2. Tools and types of fires: fires that spread quickly and followed a great explosion is difficult to be controlled. Other situations, a fire that occurred in the generator engines and safety equipment to put out the fire was difficult because the water pumps for the engine power plant of the generator. Whereas the use of self-contained portable extinguishers for fire volume generators already become great effective. So the equipment and its type as well as the volume of fire was very concerned when the fire occurred on board the ship, therefore the fire became uncontrollable.

Collision of ship:

1. Though the narrow space motion, such as the Super tanker that limited the ability of sports motion, and have been doing for a passing in certain waters (e.g., the Strait of Malacca) and towing ship as the ship with the same conditions, a moving slowly should deviated other vessels in any condition. The ship can only move in the cruise line is hard to do the following deviations from the bow line plots, therefore something that thwarts and when collision will not be much damaged than the ship was run aground because the out flow then necessarily be inevitably blocking ships.
2. Negligent in doing keep the sea, as do other work while being/navigate (as do; administrative tasks at night, leaving the Ferryman, watches alone, asleep at the time), then the conditions/situations that had been approached (close quarter situation) collision is not inevitable.
3. Lacks understanding the application of regulations prevention at collision on the sea (Peraturan Pencegahan Tubrukan di Laut/ P2TL) 1972 by guard.

CONCLUSION

1. High sea transportation accidents in Indonesia at that time should be the concern of all parties, not only the ship owner but also Governments, relevant agencies and communities to be more active in providing information. From the observations, the main causes of marine accidents due to excess cargo from the set, whether the carriage of goods and people. Service users often do not even forced himself to climb aboard the cruise ship was full, despite the determination of origin may post on the Board.
2. Many accidents happened on the boat size < 500GT (Non-Convention) vessel, which was not governed by the agreement, both certification and security equipment. It should be reorganized the standard system includes the requirements of the ship was seaworthy, the procedures you must perform in predicting the risk of accidents at sea, as found on vessels more than 500 GT (SOLAS, MARPOL and STCW).
3. Indonesian waters are dominated by motor boats, motor yachts, sailing folk and traditional fishermen (fleet ants), so that vulnerability to the risk of accidents during this time many overwrite and often occur in bad weather seasons such as NE Monsoon and SW Monsoon (January and July), ocean currents and tides, the lack of shipping navigational aids (lighthouses, lighthouses buoys, traffic separation schemes, AIS, etc).

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