Investigation and Analysis of the Maritime Casualties occurred in the Pacific side of the Central American Region between 1980 and 2004

Oscar Porras Rojas*, Hayama Imazu**and Takahiko Fujisaka**

Abstract

The nonexistence of information about the high number of maritime casualties that there are been occurring in the Pacific side of the Central American Region, in which annually many people died, disappeared and suffer serious injured, and the negative social and economic impact that this situation is generating inside the society, are the reasons for which this subject of research was chosen. The information was compiled by the researcher from personal communication way, from the origin source due to nonexistence of writing reports. In this work the information collected about the maritime casualties occurred between 1980 and 2004, in the Pacific side of the Central American Region, was analyzed and the results obtained are presented. The objective of this research is to compile and analyze, the maritime casualties that have occurred from 1980, in the Pacific side of the Central American Region, in order to know the reasons by which they happened. Based on the information compiled, was calculated the mortality rate by 100,000 persons. And then, was compared the mortality rate obtained, with the Japanese mortality rate calculated. Also, was compared the relationship existence between the amount of dead and disappear persons, occurred as result of the maritime casualties happened in Japan and the Central American Region. Therefore, all information generated by the present research theme, will be used as support for increase the concept of safety navigation and by this way to give one more integral labor protection to the maritime sector.

Keywords: Casualties, Central American Region, Maritime Security, Maritime Accident, Maritime Traffic

1. Introduction

The Pacific side of the Central American Region is integrated by the Republics of Guatemala, El Salvador, Nicaragua, Costa Rica and Panama. Geographically this Region is located between latitudes 07°30'N and 14°40'N and longitudes 078°12'W and 092°00'W. Have one coast line length of 3,824 Km (1). Over 70% of the Central American population (33.7 million of people at July, 2005) live on the Pacific side (2). One important fishery activity is develop in the Pacific side of this Region, which has one economic and social impact in this Region. The maritime traffic volume in 2004, reached the amount of 29,495,000 tons (3). In spite of this high volume, any of the countries have their own mercantile fleet, except Panama and Honduras that only offers to the word, the flag state services. To satisfy the necessities of the international trade, this region has a fluid maritime traffic over 4400 ships (3) and is integrated to the International Maritime Organization (IMO) and the International Labor Organization (ILO).

The theme of the maritime casualties within the frame of the maritime security in the world is being regulated by international agreements such as the articles 2 and 94 of UNCLOS; the regulation 1/21 of SOLAS, 1974; the articles 8 and 12 of MARPOL 73/78; the article 23 of the International Convention on Load Lines, 1966; in the sense of, to conduct casualty investigations that occurs in their waters and flag ships.

And recently IMO, MSC/Circ. 539/Add 2 and FSI 6/61. In the same sense, with respect to the rights of the maritime workers, there are several international conventions elaborated by ILO, such as the Conventions No.8, 9, 16, 22, 23, 55, 56, 69, 71, 73, 74,92, 108, 112, 113, 114, 125, 126, 134, 137 and 147.

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2. Information Compilation

Each one of the countries located in the Pacific side of the Central American Region, was visited by the researcher in order to proceed with the Data Compilation Process. In each country, all the possible information sources were visited and consulted: Coastguard Service, Government Naval Forces, main Newspapers, Harbor Master Office, COCATRAM office (Maritime Transportation Central American Commission), Fishermen Cooperatives, Government and Regional Fishery Departments, ILO Regional Office, IMO Governments Delegates. But, due to the nonexistence of the information required, in none of the countries visited, the researcher personally, had to visit the proper information source in each country, in order to compile the same one.

The information was compiled by personal communication means way, from the origin source, such as, maritime workers associations and cooperatives, Fishermen Cooperatives members (El Salvador, Guatemala and Nicaragua), fishermen independents, ship-owners. Furthermore were read and transcribed all the neglected daily hand workbooks beginning since 1980 of the Coast Guard Service of Costa Rica, abandon without any care. The information was compiled personally, by hand process way, firstly as textual form and then was to digitize in the computer as data base. About each one of the casualties occurred, was compiled information such as, casualty's date and type, ship's position, build material and length, ship's type involved in the casualty, persons affected by the casualty, cause and consequences of the casualty. During the investigation, were compiled 2479 data and then analyzed. Furthermore from National Oceanographic Atmospheric Administration were analyzed, weekly sea surface temperature satellite images and information about hurricanes and tropical torments, corresponding to the selected period of time. Based on the compiled information was calculated the Central American Region mortality rate. And then, was compared with the Japanese mortality rate calculated, which was base on the information provide by the Kainan statistics of the Japan Ministry of Land, Infrastructure and Transport.

3. Results and Discussion

3.1 Maritime casualties occurred in the Pacific side of the Central American Region

From the compiled and analyzed information, the amounts of maritime casualties occurred in the Pacific side of the Central American Region, is shown in Fig. 1. From Fig.1, it can be seen that during the analyzed period of time, there are one gradual increment of the casualties cases.

![Fig. 1 Maritime Casualties occurred](image)

3.2 Ship’s types involved in the maritime casualties occurred

The ship’s types involved in the maritime casualties occurred between 1980 and 2004, in the Pacific side of the Central American Region, are shown in Fig. 2. From Fig. 2, it can be seen that during the analyzed period of time, the 95% of all maritime casualties happened onboard on fishing boats.

![Fig. 2 Ship’s type involved in the maritime casualties occurred](image)

3.3 Building materials used in the ships involved in the maritime casualties

The respective building materials used in the ships involved in the maritime casualties, occurred between 1980 and 2004, in the Pacific side of the Central American Region, are shown in Fig. 3. From Fig. 3, it can be seen that during the analyzed period of time, the
65% of all material used was glass fiber, whereas the wood reached 28% and iron 7%. The increasing of the glass fiber's use given since 1984, have concordance with the introduction of this kind of synthetic material into the Central America Region (5).

3.4 Composition of the fleet involved in the maritime casualties occurred
Analyzing the information compiled during the research, made along the Pacific side of the Central American Region and considering the characteristics of the ships, on which occurred the maritime casualties, was elaborated the Figure 4. From Fig.4, it can be seen that, casualties occurred in the Pacific side of the Central American Region between 1980 and 2004, can be separated in two groups (undeck ships and deck ships).

characterized as undecked vessels (shown in photo 1), which length usually is lower than 8 meters, propelled by one or two out board motors, hand working power and usually constructed by glass fiber materials. This type of ships is actually used along the Pacific side of the Central American Region. Onboard undecked type of ships have happened the 63% of all the maritime casualties occurred in the mentioned Region.

Photo 1 Undeck type of ship used in this Region

By other hand, in the other group, are included all those ships characterized as decked ships (shown in Photo 2), which length usually is bigger than 8 meters, propelled by internal motors, often mechanical working power and usually building by wooden materials. This type of ships are actually used along the Pacific side of the Central American Region. Onboard decked type of ships have happened the 37% of all the maritime casualties occurred in the mentioned Region.

Photo 2 Decked ship type used in this Region

3.5 Maritime Casualties types occurred in the Pacific side of the Central American Region

Within the first group, are included all those ships
Based on the compiled information, the amount of maritime casualty's types occurred between 1980 and 2004, are shown in Fig. 5. From Fig. 5, it can be seen that two types of maritime casualties have happened mainly in this Region, Capsize (41%) and Machinery Failure (36%). The other types of maritime casualties occurred in their respective descending order of occurrence are Ships Missing (7%); Sinking (6%); Flooding (4%), Grounding (3%) and Fire (3%).

3.5.1 Casualties types happened onboard undecked and decked ships occurred in Central America
The maritime casualty's types occurred between 1980 and 2004 are shown in Table 1.

<table>
<thead>
<tr>
<th>Casualty types</th>
<th>Undecked ships</th>
<th>Decked ships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capsized</td>
<td>65%</td>
<td>--</td>
</tr>
<tr>
<td>Machinery failure</td>
<td>21%</td>
<td>60%</td>
</tr>
<tr>
<td>Ships missing</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>Grounding</td>
<td>--</td>
<td>9%</td>
</tr>
<tr>
<td>Flooding</td>
<td>--</td>
<td>9%</td>
</tr>
<tr>
<td>Sinking</td>
<td>4%</td>
<td>7%</td>
</tr>
<tr>
<td>Collision</td>
<td>--</td>
<td>6%</td>
</tr>
<tr>
<td>Fire</td>
<td>--</td>
<td>8%</td>
</tr>
<tr>
<td>Thunderbolt</td>
<td>1%</td>
<td>4%</td>
</tr>
</tbody>
</table>

From Table 1, it can be seen that, in the case of undecked ship group two, types of maritime casualties have happened mainly, Capsize (65%) and Machinery Failure (21%). The other types of maritime casualties occurred are Ships missing (9%), Sinking (4%) and Thunderbolt (1%). By other hand, in the case of decked ship group, the main type of maritime casualty happened was Machinery Failure (60%), and then Grounding (9%), Flooding (9%), Sinking (7%), Collision (6%), Fire (6%) and Ships missing (3%).

3.6 Persons affected by the maritime casualties occurred in the Central American Region
Based on the information compiled during the conducted investigation, was possible know the amounts of people affected by the maritime casualties, occurred in the Pacific side of the Central American Region, which is shown in Fig. 6. From Fig. 6, it is can be seen, the existence of one continuous annual increment, in the amount of injured, disease and disappear persons.

<table>
<thead>
<tr>
<th>Casualty types</th>
<th>Undecked ships</th>
<th>Decked ships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>867 persons (42%)</td>
<td>121 persons (6%)</td>
</tr>
<tr>
<td>Disappear</td>
<td>862 persons (41%)</td>
<td>174 persons (21%)</td>
</tr>
<tr>
<td>Injured</td>
<td>359 persons (17%)</td>
<td>524 persons (64%)</td>
</tr>
</tbody>
</table>

From Table 2, it can be seen that, the amount of persons death and disappear between 1980 and 2004,
onboard undocked ships is near 6 times more higher than the occurred onboard decked ships. But, onboard deck ships the amount of people injured was lower than the occurred onboard undocked ships. The possible reason is the large and tired working periods and the use of mechanical systems without any safety measures.

3.7 Causes associated with the occurrence of the maritime casualties happened between 1980 and 2004 in the Pacific side of the Central American Region

Based on the analysis of the information compiled by the research, with respect to casualty’s type, casualty’s occurrence date, and ship’s type involved into the casualty, it is possible to affirm that the arrive to this Region of Atmospheric phenomenon such as Hurricanes, Tropical Torments, El Nino and La Nina, are one of the main causes that gave rise the amount of maritime casualties along the selected period of time. Other possible cause of the maritime casualties occurred is the not planned increase of the fleet.

3.7.1 Atmospheric conditions

Based on the analysis of the information contained in the NOAA\(^4\) weekly sea surface temperature satellite images archive, was possible elaborate Table 3. From Table 3, it can be seen, the atmospheric phenomenon occurred between 1980 and 2004, in the Pacific side of the Central American Region.

Table 3 Atmospheric phenomenon occurred in the Pacific side of the Central American Region between 1980 and 2004.

![Fig. 7](image)

Fig. 7 Influence of the Atmospheric phenomenon occurred in the Pacific side of Central American Region

Fig. 7 shows the existence of an annual increase in the amount of maritime casualty’s cases occurred until 1999. The influence of atmospheric phenomenon occurred from 1982, is indicated by the use of arrows placed throughout the maritime casualties graphic.

The arrive of the last one atmospheric phenomenon at this Region happened in 1999. Although, based on the analysis of the weekly sea surface temperature satellite images archive, provide from NOAA, even after 1999, this Region has continued being affected by abnormal heating of the sea water temperature, which influence had been very similar to El Niño phenomenon.

Based on the above information, it is therefore possible to affirm that, one of the main cause of the annual increment of the maritime casualties, can be associated with the arrive at this Region of atmospheric phenomenon such as hurricanes, tropical storms, El Niño and La Niña.

Due to the influence of El Niño and La Niña phenomenon, the sea temperature change and the fish shoal must swim tow other places where, the ocean conditions tend to be normal. In these cases, the fishermen must face the situation and sail away the coast, in order to search other fish ground.

This is the case of thousands of fishermen, which onboard his undocked ships, must sail distances over 100 nautical miles away the coast, without any safety measures and without any type of communication. The same situation is too face by thousands of fishermen, which onboard his old decked ships, whose lengths are within 12 and 20 meters, must sail distances between 800 and 2,000 nautical miles away the coast, The
described situations frequently provokes maritime casualties.

3.7.2 Fleet evolution occurred in the Pacific side of the Central American Region

Based on the information compiled from the origin and the information contained in the Central American Census of the Fisheries Sector (6), published in 2000, was possible make one reconstruction of the evolution of the Central American Region fleet, occurred between 1980 and 2004. Such evolution is shown in Fig. 8.

Fig. 8 Fleet evolution occurred in the Central American Region

Based in the fleet evolution reconstruction, was elaborated the undocked ships and decked ships fleet evolution. Such evolution is shown in Fig. 9. From Fig. 9, it can be seen that during the analyzed period of time, the undocked ships fleet had an increase of 11 times whereas that the increase of the decked ships fleet was 1.7 times.

Fig. 9 Undocked ship and Deck ship's Fleet Evolution

3.7.3 Safety measures situation

The Central American Region fleet is characterized by have short range navigation. But, in spite of this condition, the fishermen sail long distance out the coast, carried out additional fuel, without any safety measure and poor stowage. In general, the use of safety measures is unknown. in the same way, the electronics aids to navigation is not a common practice. The atmospheric information access is not available.

3.8 Central American Region and Japan Relationship between amount of died and disappear persons and their respective fatality rate by 100,000 persons

Based on the data collected during the investigation, fatality rates (fatality per 100,000 persons) due to maritime casualties on the Pacific side of the Central American Region were calculated for the time period of between 1980 and 2004. Fig. 10 was generated based on the information compiled during the research for the Central American Region and from Kainan Statistics of the Japan Ministry of Land Infrastructure and Transport. The right vertical axis of the Fig. 10 represents the fatality rate by 100,000 persons and the left vertical axis represents the number deaths and missing persons due to maritime casualties. The Japanese mortality rate are shown in triangles and the Central American Region values are represented by circles. The black vertical columns represent the number of dead and missing Japanese persons during maritime casualties occurred and the grey column represents those in the Central American Region.

Fig. 10 Dead and disappear persons and Fatality rate occurred by maritime casualties in Japan and Central American Region

At world-wide level the fatality rate for the maritime sector is almost unknown due to the scarce statistics information compiled by the respective governments. According to ILO, fatality rate over 100
Conclusions

(1) The Central American Region, it has not compiled until now, any type of information, about the maritime casualties occurred in the Pacific side.

(2) The 95% of the casualties analyzed, occurred onboard on fishing ships.

(3) Two types of maritime casualties had occurred mainly in this Region. Capsized (41%), which has affected mainly to undocked ships and Machinery Failure (36%), which has affected mainly to docked ships.

(4) One of the main cause of the annual increment of maritime casualties, can be associated with the arrive at this Region of atmospheric phenomenon such as hurricanes, tropical storms, El Niño and La Niña.

(5) The fatality rate obtained for the Central American Region from this research is very high in comparison with the Japanese fatality rate obtained

References


(4) http://www.osdpd.noaa.gov/PSB/PS/SST/data/equipsac.gif. 2005


Questions and Answers

Kurokawa Hisayuki (Tokyo University of Marine Science and Technology) You showed the fatality rate values in Japan and Central American Region, what are the reasons why the Central American Region value is so higher?

Oscar Porras

Thank you by your question. The reasons are the following: unknown about safety measure, inadequate maritime education.