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Research on Communication Technology for Ocean Fishing Vessels in Distress

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Abstract: Nowadays, fishing boats are the most vulnerable to danger in the sea. The success rate of rescue after the accident is also lower than the average success rate of national maritime search and rescue. According to incomplete statistics, the direct economic loss of 290,000 marine motor fishing vessels per year is nearly 1 billion yuan. Every year about 600 fishermen die or disappear and more than 1,000 ships sink. According to the statistics of the total number of Chinese Fishing Vessel Owners Mutual Insurance Association in recent 10 years, the Chinese Fishing Vessel Owners Mutual Insurance Association has insured 1.77 million fishing crew members in recent 10 years, with a mortality rate of 2.110 per 100,000 people. Considering other factors, the mortality rate of Chinese marine fishermen can be set at 162 per 100,000 people per year. It is estimated that China has 2 million seafarers and the annual death toll should reach 3235. Fishing vessels in distress at sea are often unable to save themselves. The only way to survive is to call a nearby ship and equip it with communication equipment. However, coastal fishing vessels mainly rely on short-wave or ultra-short-wave intercom equipment for communication. Channels are divided by frequency, and they interfere with each other at the same frequency. Analog technology can only communicate with similar products, but can not connect to public communication networks (such as wired networks, mobile networks). It is imminent to study the communication support technology of ocean fishing vessel in distress.

1. Introduction

According to incomplete statistics, the direct economic losses caused by accidents of 290,000 marine motor fishing vessels per year are nearly 1 billion Yuan. Every year about 600 fishermen die or disappear and more than 1,000 ships sink. According to the statistics of China Mutual Insurance Association of Fishing Vessel Owners in recent 10 years, China Mutual Insurance Association of Fishing Vessel Owners has insured 1.77 million fishing crew members in recent 10 years, with a mortality rate of 210 per 100,000 persons per year. Considering other factors, the mortality rate of Chinese marine fishermen can be set at 62 per 100,000 people per year. It is estimated that China has 2 million seafarers and the annual death toll has reached 3235. The world believes that fisheries have the highest risk and mortality rates, especially marine fisheries, which are more vulnerable to natural disasters and accidents than other industries on land. According to the data provided by the 22nd IMO Assembly in 2001, more than 24,000 fishermen die or disappear each year for various reasons. In China, due to the low horsepower of fishing vessels and the low knowledge level of fishermen, the production risk is relatively high. Fishing vessels in distress at sea are often unable to save themselves. The only way to survive is to equip communications equipment and call a nearby ship. However, coastal fishing vessels mainly rely on short-wave or ultra-short-wave intercom equipment for communication. Channels are divided by frequency, and they interfere with each other at the same frequency. Analog technology can only communicate with similar products, but can not connect to public communication networks (such as wired networks, mobile networks). Only voice communication, basically no weather forecast, information dissemination and distress alarm function. Because of shortcomings of shortwave communication, such as lack of continuous coverage and available frequency band, fishermen almost lost contact with the outside world after leaving the

coastline for production. When a fishing boat is in distress, it is difficult to contact the search and Rescue Department and the nearby fishing boats, so it is impossible to cooperate with the rescue. Considering other factors, the mortality rate of seafarers in China's marine fisheries can be basically determined as 162 out of 100,000 people a year. As a result, it is estimated that there are about 2 million seafarers on China's offshore fishing vessels, with an annual death toll of about 3,235.

2. Development and Current Situation of Communication Support Technology for Ocean Fishing Vessels in Distress

China is located in the southeastern part of the Asian continent, with the sea to the East and the Bohai Sea, Yellow Sea, East China Sea and South China Sea to the east. It has a vast coastline of more than 18,000 square kilometers, dense ports and numerous islands. Due to the lack of effective maritime communication and teaching assistance, ships can not be rescued in time in case of danger. At the same time, due to the relatively backward quality and management level of fishing vessels, a series of fishery production safety problems have become a major problem plaguing fishermen and government departments at all levels. In order to ensure the safety of fishermen's lives and property and gradually improve the ability of fishery safety production, the Ministry of Agriculture has put forward the idea of building a "safe fishery" to manage fishing vessels and Fisheries in specific areas through a ban on fishing. In recent years, China has actively carried out fishery production safety assurance work and established a national marine fishery safety communication network. In order to better safeguard national maritime sovereignty and effectively protect fishery resources, the Ministry of Agriculture proposes to establish a monitoring system in the ocean, which uses satellite communication technology and navigation technology to manage fishing vessels 50 nautical miles away from China. At present, the national marine fishery safety communication network has formed a satellite, shortwave, ultra short wave, mobile phone "four networks in one" fishery emergency communication network. National marine fishing vessels with more than 60 horsepower should be equipped with satellite navigation instruments, unilateral radio and radar. Marine fishing vessels under 60 horsepower shall be equipped with CDMA mobile communication equipment and walkie-talkies. The national marine fishery safety communication network can meet the communication needs of offshore fishing vessels and ocean-going fishing vessels, and plays an important role in the construction of "safe fisheries". It has become an important part of the national emergency response system and early warning platform. According to statistics, in 2008, the National Marine Fisheries Safety Communication Network issued more than 25,000 meteorological and navigational warnings, received more than 1,000 warning signals, participated in more than 210 maritime distress, rescued more than 130 fishing vessels and rescued nearly 700 fishermen. The state has invested nearly 40 million yuan to establish a nationwide unified communication network for marine fishery safety, which includes short-wave safety of marine fishery, ultra-short-wave (offshore) fishery safety rescue, location monitoring of fishing vessels and public mobile communication network for marine fishery (referred to as "four nets in one"), and calls on students majoring in fishery safety. Production and fishery management communication, fishermen production and fishermen life communication is a unified national marine fishery safety communication network. At the same time, local governments at all levels take the construction of "safe fishery" as an opportunity to build a safe communication network, which is an important measure to improve fishermen's ability to resist and mitigate disasters. Actively seek financial support, establish a national marine fishery safety communication network, provide subsidies for fishing vessels, equip them with communication equipment, and ensure the smooth development of the safety communication network. With the continuous improvement of marine fishery safety communication facilities in China, the communication equipment of fishing vessels has been continuously improved, and advanced communication equipment has been gradually popularized and applied. According to statistics, since 2005, governments at all levels have invested nearly 350 million yuan in the construction of marine fishery safety communication infrastructure and subsidy of fishing vessel

communication equipment. The provincial marine fishery safety communication network has built 14 coastal monitoring stations, 78 base stations, 70 coastal monitoring stations and 15 fishery vessel location monitoring centers. Five fishing vessel safety information systems (under construction) provide subsidies for nearly 20,000 fishing vessels equipped with various communication equipment.

3. Areas in Urgent Need of Development of Communication Support Technology for Maritime Fishing Vessels in Distress

There are more than 1000 shortwave fishing grounds in China, more than 60,000 fishing vessels have installed a large number of shortwave radio stations, and 170,000 fishing vessels have installed ultrashort wave coastal radio stations. Many fishing boats are equipped with ultrashort wave radio and extensive radio navigation and positioning equipment. In the past, fishery communications developed from a single short-wave Morse telegram. AM wireless telephone has developed to short-wave single sideband call and FM telephone, satellite communication, CDMA communication, etc., from the past maritime communication to ocean communication, even global communication; from the past production command and robbery cases, distress communication has expanded to include distress warning, marine meteorology, ship location monitoring and fishing. Industry management, market quotation, logistics supply, medical services and other communication services. However, with the rapid development of communication technology, China's marine fishery communication is still far behind. To meet the needs of modern fishery production management and safety assistance. The main manifestations are: the lack of a unified national development plan for fishery communication construction, the decentralization of fishery communication service areas, poor sharing, and the failure to effectively play the overall function. The communication equipment is backward, the equipment is aging, the performance is poor, the side frequency of short wave communication is low, the communication quality is low, the communication management and interference of the system are difficult, and the scope and reliability of distress alarm are not high, so it can only be within a certain range. International seafarers of the International Maritime Organization (IMO) are different from those working on fishing vessels. In 1995, the training, certification and duty system of international fishing vessels was formally issued. The standard convention (95stcw-f Convention for short) makes a detailed and in-depth study of the image on the basis of determining the whole communication system, communication functions and operation pairs. Communication equipment and other contents of ship distress and safety system. However, due to the lack of funds for Chinese fishing vessels, the crew's cultural quality is low and it is difficult to get on board. In addition, China's marine industrial structure is facing unprecedented adjustment, and some fishing vessels with poor productivity and seaworthiness will be eliminated or reformed. These factors all affect the fishery communication system. The stability and development of information network. Based on the above factors, the full implementation of FGMDSS system on fishing vessels is unrealistic. Among the imported GMDSS, the most feasible method is to provide low communication rate and low equipment cost. Security information and alarm function are part of the system's extended security communication function. Establish a fishing vessel safety system based on GMDSS.

4. Countermeasures and Suggestions

4.1. Enhancing the Construction of Fishery Safety Communication Network Infrastructure

Efforts should be made to build communication network infrastructure, improve the communication capacity of basic ocean-going vessels and ensure their safety at sea.

4.2. Strengthen the Equipment and Management of Communication Equipment for Fishing Vessels

To strengthen the equipment of communication and navigation equipment for fishing vessels, the government provides appropriate subsidies and carries out standardized management.

4.3. Enhancing the Maintenance of Communication Equipment for Fishing Vessels

Strengthening the Maintenance of Communication and Navigation Equipment for Fishing Vessels.

4.4. Solve the Problem that the Communication Equipment between Merchant Ships and Fishing Vessels can not Communicate with Each Other

Unify technical specifications for inspection and installation of communication equipment between merchant ships and fishing vessels so that communication equipment between merchant ships and fishing vessels can be communicated.

5. Development Expectations and Future Trends of Port Automation

Although the communication guarantee technology in distress of fishing vessels can not fully guarantee the safety after distress, it undoubtedly adds a layer of protection risk to the platform of professional safety communication system, strengthens the maritime communication ability, and ensures that all the safety of fishing vessels at sea can be better protected. In addition, with the development of information technology and fisheries, and the improvement of people's comprehensive quality, the establishment of a new type of maritime safety communication system for fishing vessels based on information support of maritime distress and safety system will surely better guarantee the safety of fishing vessels in maritime operations.

6. Conclusion

At present, with the rapid development of communication technology, more and more users choose communication equipment. The cost of communication equipment and funds should be taken into account in the preparation and manner of communication. Because of the effectiveness of communication, especially in maritime traffic accidents, people pay more and more attention to the reliability of communication. With the development of science and technology and the reduction of equipment cost, some fishing boats with weak economic strength have been built. This provides a good opportunity to improve the ability of secure communication. The integration of information network and the development and application of information technology have laid a solid technical foundation for the construction of fishery communication informatization in China and improved the level of fishery safety. Support communication skills. Communication facilities should also be established on fishing vessels. Only by strengthening the training of operators can we make better use of technology and equipment. Prepare and improve the safety communication ability of fishing vessels operating at sea.

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