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WORLD MARITIME UNIVERSITY

Dalian, China

**A Study on Cooperation Mechanism of Maritime Search
and Rescue among Guangdong, Hong Kong and Macau**

By

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China

A research paper submitted to the World Maritime University in partial
Fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

(MARITIME SAFETY AND ENVIRONMENTAL MANAGEMENT)

2014

DECLARATION

I certify that all the material in this research paper that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this research paper reflect my own personal views, and are not necessarily endorsed by the University.

Signature: Chen Qidong

Date: July 12, 2014

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Dalian Maritime University

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ABSTRACT

Title of Research Paper: **A Study on Cooperation Mechanism of Maritime Search and Rescue among Guangdong, Hong Kong and Macau**

Degree: **MSc**

The research paper is a study of maritime search and rescue cooperation among Guangdong, Hong Kong and Macau, providing some recommendations for solving the existing problems on the basis of the analysis to the present situation of maritime search and rescue cooperation among Guangdong, Hong Kong and Macau.

A brief look is taken at the related concepts and theoretical basis of maritime search and rescue cooperation at first. Related international conventions are discussed to illustrate the importance of carrying out maritime search and rescue cooperation among Guangdong, Hong Kong and Macau.

The necessity and significance of maritime search and rescue cooperation among Guangdong, Hong Kong and Macau are discussed from the trend of the times, the feature of maritime search and rescue, the number of ships and the implementation of international conventions. The main achievements of maritime search and rescue cooperation in recent years are also described in the paper.

Based on the analysis to the existing problems in the maritime search and rescue cooperation among Guangdong, Hong Kong and Macau, some recommendations are

made for further improving maritime emergency rescue capability and reducing the loss of life and property at sea.

KEYWORDS: regional cooperation, maritime casualty, maritime search and rescue, search and rescue region

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LIST OF ABBREVIATIONS

AIS	Automatic Identification System
CNMRCC	China Maritime Rescue Coordination Centre
DSC	Digital Selective Calling
EEZ	Exclusive Economic Zone
EPIRB	Emergency Position-Indicating Radio Beacon
GDMRCC	Guangdong Maritime Rescue Coordination Centre
GMDSS	Global Maritime Distress and Safety System
HKMRCC	Hong Kong Maritime Rescue Coordination Centre
IAMSAR Manual	International Aeronautical and Maritime Search and Rescue Manual
ICAO	International Civil Aviation Organization
ICOMSAR	International Convention on Maritime Search and Rescue, 1979
IMO	International Maritime Organization
MSA	Maritime Safety Administration
RSC	Rescue Sub-Centre
SAR	Search and Rescue
SOLAS	International Convention for the Safety of Life at Sea
SRR	Search and Rescue Region
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very-High Frequency
VTs	Vessel Traffic Service

Chapter I Introduction

1.1 Research Background

In recent years, with the rapid development of society and economy, regional cooperation has become more and more important in the world. Regional cooperation not only can improve the local economy and people's living standards, but also can strengthen the effective communication between the states. Generally speaking, regional cooperation often occurs in the neighbouring states such as China, Russian Federation, the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan and the Republic of Uzbekistan which consist of a regional organization called the Shanghai Cooperation Organization. Usually, the regional cooperation mainly concentrates on the economic fields at first. However, with the further deepened development of society and economy, the cooperation needs to be expanded into more widespread fields such as politics, culture, education and society. This paper mainly focuses on maritime search and rescue cooperation among Guangdong, Hong Kong and Macau.

Guangdong, a province located in the southern of China, has developed quickly and ranks first on the list of Gross Domestic Product in China. In particular, since the reform and opening-up policies implemented in China, Guangdong has drawn lessons from Hong Kong and Macau where implemented the free capitalism economic system at that time. Due to the above reasons, Guangdong Province is regarded as a pioneer of China's reform and opening-up policies. Meanwhile, the

cooperation among Guangdong, Hong Kong and Macau has a centuries-old historical basis. In history, Hong Kong and Macau are part of Guangdong province. Apart from the geographic advantage, they also have the identical culture and common ancestors. Therefore, the cooperation among Guangdong, Hong Kong and Macau is usually easier to be fulfilled. However, there are still some difficulties in the cooperation mechanism. For example, Hong Kong and Macau are the only two special administrative regions in China. They have a high degree of autonomy, which means they enjoy executive, legislative and independent judicial power, including that of final adjudication. We often describe this policy as “One Country, Two Systems”. In contrast, Guangdong does not have a high degree of autonomy, which is rigidly controlled by the Central People’s Government such as more policies need to be approved firstly. Over the past few years the cooperation among Guangdong, Hong Kong and Macau brings about the economic growth and improvement of living standards. When entered in the 21st century, great changes have taken place, more deepen and widespread cooperation needs to be implemented among them.

Nowadays, there are more frequent incidents which occurred at sea due to the sea-related activities increase and abnormal climate changes. For example, Da Shun, a roll-on roll-off vessel, collapsed in the Bohai Sea when she voyaged from Yantai to Dalian on November 24, 1999. This accident caused more than 280 people died because of the badly seaborne and meteorological conditions, poor search and rescue facilities as well as not equipped with the professional search and rescue planes. Another case is Egyptian ferry “Al Salam Boccaccio 98” which sunk in the Red Sea and caused more than one thousand people died owing to lack of

rapid response system and scientific decision-making mechanism. After the accident, the Egyptian government hesitated to start the search and rescue operation so as to miss the best time for rescuing the persons in distress. Some victims had drifted in the sea for several hours when they were rescued finally (Wu, 2010, p.22). Recently, as is well known, the typical case is Malaysia Airlines System Berhad passenger plane “MH370”. The aircraft lost contact with Air Traffic Control when it flew from Kuala Lumpur to Beijing on March 8, 2014. There are 227 passengers and 12 crews on the plane, the missing people are not found up to now. When this accident happened, all related countries have taken part in the search and rescue operation such as Vietnam, Singapore, Thailand, United States, Australia, Britain, New Zealand and China (Wikipedia, 2014). There are so many countries join in the search and rescue process, effectively coordinate with the search and rescue units is undoubtedly important. Therefore, cooperation is necessary for maritime search and rescue between the neighbouring states or regions. Take Guangdong, Hong Kong and Macau for example, their geographical locations are adjacent, and their waters overlap to some extent. At the same time, the search and rescue service is responsible for the coastal state government, better search and rescue service can improve the international image for the government and implement the international conventions. According to what has been mentioned above, a study on cooperation mechanism of maritime search and rescue is a practical and guiding problem.

1.2 Research Review

The maritime search and rescue cooperation among Guangdong, Hong Kong and Macau originated in the regional cooperation. There are some more in-depth studies

relating to the regional cooperation. As is well known, the regional cooperation is the mainstream of current world economic development. For example, Tokyo, London, New York and the Great lakes have become the engine of world economic development (Lin, 2009, p.2). Essentially, the root of regional cooperation is the economic benefits. As for Guangdong, Hong Kong and Macau, the current main challenge is not regional competition but regional cooperation.

At present, domestic research on maritime search and rescue has some achievements, whereas relevant research mainly reflects the interpretation of international search and rescue treaties, introduction of foreign search and rescue mechanism, defects and improvements of domestic search and rescue mechanism. Few studies have been carried out on regional cooperation of maritime search and rescue, and the relevant research is lack of theoretical depth of the problem. Therefore, the cooperation mechanism of maritime search and rescue among Guangdong, Hong Kong and Macau has a strong theoretical and practical significance.

1.3 Methodology

In order to analyse the cooperation mechanism of maritime search and rescue more accurately, two methods are adopted to carry out this study.

(1) Literature research. By reading a variety of magazines, periodicals, papers and books, the author collected a lot of data and used them to analyze maritime search and rescue conditions of Guangdong, Hong Kong and Macau.

(2) Case study method. This paper focuses on the maritime search and rescue cooperation among Guangdong, Hong Kong and Macau, analyzes the maritime

search and rescue cooperation situation in recent years to find out the existing problems, and proposes some specific recommendations for doing a better job of search and rescue at sea.

1.4 Text Organization

A brief outline of the content discussed and the organizational structure of this thesis is presented as follows:

Chapter I Introduction: This chapter provides an introduction of maritime search and rescue cooperation among Guangdong, Hong Kong and Macau. Research background, review and methodology are discussed in this chapter as well.

Chapter II Related Concepts and Theoretical Basis: In this chapter, basic concepts of maritime search and rescue are presented, and related international conventions are discussed to illustrate the importance of carrying out search and rescue cooperation for neighbouring states or regions.

Chapter III Present Situation of Maritime Search and Rescue: This chapter first sorts out maritime search and rescue of Guangdong, Hong Kong and Macau, then analyses the necessity and significance of maritime search and rescue cooperation, and describes the main achievements of maritime search and rescue cooperation in recent years.

Chapter IV Existing problems and Recommendations: On the basis of analysing maritime search and rescue cooperation among Guangdong, Hong Kong and Macau in the previous chapter, combining with the practical working conditions at the same time, the author puts forward some corresponding recommendations.

Chapter V Conclusions: Conclusions derived from this study are presented.

Chapter II Related Concepts and Theoretical Basis

2.1 Definition of Related Concepts

2.1.1 Maritime Casualty

According to article 221(2) of the United Nations Convention on the Law of the Sea (UNCLOS), maritime casualty means “a collision of vessels, stranding or other incident of navigation, or other occurrence on board a vessel or external to it resulting in material damage or imminent threat of material damage to a vessel or cargo”(UNCLOS,1982). In other words, maritime casualty refers to a ship in distress suffered from natural disasters or other fortuitous accidents at sea, which can cause great damage to life and property. In general, ship in distress which means the ship suffered a grave and imminent danger when it is at sea, at anchor or doing jobs is discussed in this paper. In this definition, “grave and imminent danger” indicates the urgency and severity of danger which will happen and affect the ship, property and life safety.

As is well known, maritime casualty is also described as “marine casualty” or “marine incident” in different documents. For example, marine casualty is often used in the code for the investigation of marine casualties and incidents. Maritime casualty can be divided into several types such as grounding, contact, collision, missing, foundering, fire and explosion, heavy weather and ice damage, and hull and machinery damage in the light of reports on investigations into serious casualties (IMO, 1986). However, maritime casualty is differently classified in the code for

the investigation of marine casualties and incidents, which is categorized as very serious casualties, serious casualties, less serious casualties and marine incidents (IMO, 1997). In addition, according to the regulations of the People's Republic of China on the investigation and handling of maritime traffic accidents, maritime traffic accidents contain collision, strike or damage by waves, hitting hidden rocks and running aground, fire or explosion, sinking, damage or loss of machinery parts or important tools during a voyage which affects the vessel's seaworthiness, and other maritime traffic accidents which cause losses in property and human lives (Ministry of Transport of the People's Republic of China, 1990). From the types of maritime casualty, it can be found that different countries have different categories, and one country may have different standards in the different periods as well.

There are some factors for maritime casualty such as weather conditions, technical conditions, crew's skill and dedication of workforce, port facilities and their management skills and so on. According to IMO, causes of maritime casualty can be divided into three categories which are human factors, ship machinery or equipment factors and other factors unrelated to the ship. Human factors contain failure to comply with the regulations, negligence, improper operation and poor maintenance etc. Ship machinery or equipment factors generally refer to the main engine or auxiliary engine faults, navigation and communication equipment failure etc. Other factors unrelated to the ship contain the impact of wind, current and waves, the third-party liability and the failure to navigational aids etc. Although some reasons are sudden and non-human control, human factors still are main reasons for maritime casualty. It is estimated that almost eighty percent of maritime casualties are caused by human factors, particularly in the negligence of seafarers. It

should be noted that the machinery or equipment may be damaged when the ship is at sea, undoubtedly, the damaged machine or equipment will result in a certain impact on the ship's safety. If the damaged machine or equipment does not directly affect the ship's safety, which can be remedied by temporary repairs or other emergency measures. The above situation is not defined as the ship in distress or maritime casualty. If the above-mentioned defects cannot be eliminated, even if the ship has not an imminent danger, but with the deterioration of the surrounding environment, the ship is actually still in danger, this situation should be regarded as the ship in danger. The statistical standards of maritime casualty are different in different countries or different sectors. For example, arrest vessel, thieves and unlawful acts are also considered as maritime casualty in the marine insurance business.

2.1.2 Maritime Search and Rescue

Maritime search and rescue refers to any rescue unit except for the ship in distress which conducts the expeditious search and rescue operations when it receives marine distress message. Maritime search and rescue contains maritime search and maritime rescue. Maritime search refers to locate persons in distress by certain rescue coordination centre or rescue sub-centre through existing staff and rescue facilities. Maritime rescue refers to adopt any rescue unit to rescue persons in distress, providing initial medical and other required services, and transfer them to a safety place (Fu &Zhu, 2001, p.123). Due to the continuity of maritime search and maritime rescue on the working hours and job content, these two work together often

refer to as maritime search and rescue or search and rescue at sea. It can be explained by figure 2.1 as follows:

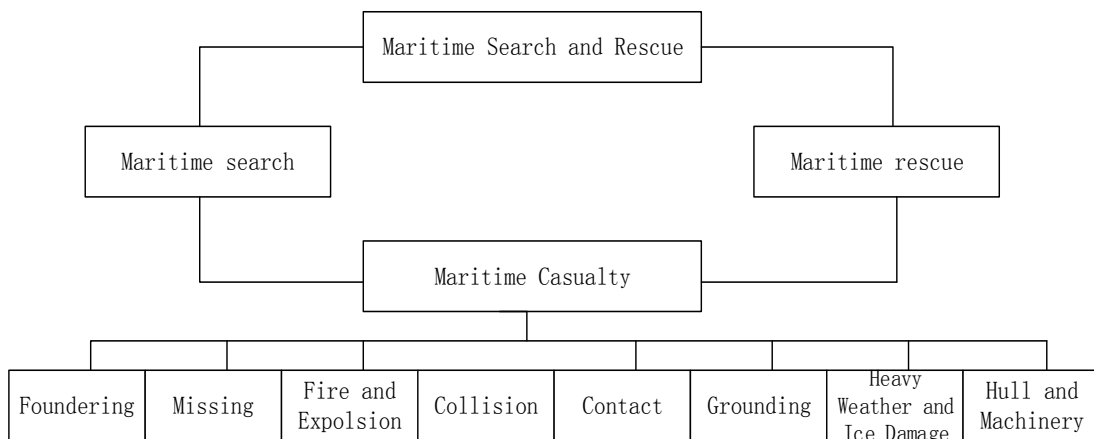


Figure 2.1 Maritime Search and Rescue and Forms of Ships in distress

The ship in distress may cause the following consequences: the hull and machinery damage, casualties, man overboard, floating in the lifeboat (liferaft), capsizing and out of control etc. when the maritime casualty happened, the ship in distress should immediately take emergency measures to try to rescue itself. If the condition is critical and rescue is invalid, and it is certainly possible to endanger human life or to sink, it is time to send a distress signal for help, let off the lifeboat quickly, abandon the ship and wait for being rescued. Compared to the property, the persons in distress should be taken into consideration at first in the maritime casualty. As for the ship and cargo, it is necessary to reach an agreement in the light of salvage contract at first, and then rescue in accordance with its requirements. There are about 400 ships in distress in the world every year. The international community attaches importance to the significance and moral responsibility of search and rescue operations and formulates a large number of conventions and regulations. In the

year 1979, the inter-governmental maritime consultative organization passed “international convention on maritime search and rescue, 1979” (ICOMSAR) in the Hamburg meeting. ICOMSAR is the code of conduct abided by rescue ships and agencies, and it is also a specific procedure for search and rescue operations. According to ICOMSAR, China has established a lot of rescue coordination centres and rescue sub-centres in recent years (Chen, 2008, p.10-11).

When a ship sends distress signals, the vessels and coast stations in the vicinity should notify the appropriate rescue coordination centre or rescue sub-centre in accordance with ICOMSAR. The vessels in the vicinity should rapidly approach to the ship in distress as the action is within its capability. Rescue units should select the appropriate rescue actions. There are some rescue actions in practice such as drainage, plugging, towing, transporting parts, refloating, unloading, ice-breaking, sending doctors on board, evacuating the wounded and rescue persons in water etc. If the ship in distress has no emergency position indicating radio beacons (EPIRB), rescue units should first get to the distress position, and then determine search base point according to the wind, current and other circumstances. Ten nautical miles square around the base point is regarded as the initial search and rescue region. Search pattern can be a single ship square and fan-shaped expansion search, multi-ships parallel search, and maritime and aeronautical collaborative search depending on rescue units and their equipment.

2.1.3 Search and Rescue Region (SRR)

An SRR is an area of defined dimensions associated with an RCC within which search and rescue services are provided. Usually, maritime SRRs are published in the IMO SAR Plan, which could be similar or different to aeronautical SRRs. The purpose of having an SRR is to clearly define who has primary responsibility for coordinating responses to distress situations in every area of the world and to enable rapid distribution of distress alerts to the proper RCC (IMO & ICAO, 1998). Generally speaking, some factors need to be taken into consideration when determining the SRR Size and Shape such as shipping traffic density and pattern, reliability of the communications network, and distribution, readiness, availability and mobility of SAR resources etc. However, it should be noted that the delimitation of SRRs is not related to any boundary between states. Its aim is to ensure who has the primary responsibility for coordinating SAR services in the certain geographic area (IMO & ICAO, 1998). Therefore, rescue persons in distress should not be hindered from SRR limits. In this respect, cooperation between states and regions should be as close as possible.

2.1.4 Regional Cooperation

Regional cooperation originates in the interest-driving of regional economic development, which is a kind of behavior to pursue the maximization of regional economic interests. According to the nature of sovereignty, regional cooperation can be divided into international cooperation between sovereign states and regional cooperation within a sovereign state. Some scholars believe that the cross-border cooperation between the contiguous areas of neighbouring states and regions is viewed as sub-regional cooperation. Regional cooperation is different from

regional integration, to be specific, regional cooperation is the basis of regional integration, whereas regional integration is the advanced stage of regional cooperation. The development of regional cooperation is bound to promote the development of regional integration. Regional cooperation exists in the entire development of regional integration (Jin, 2010, p.8). Take Guangdong, Hong Kong and Macau for example, Hong Kong and Macau are the only two special administration regions in China, where have a high degree of autonomy. However, Guangdong is a province of China without a high degree of autonomy, under such circumstance many policies need to be approved by the Central People's Government before implementing. Therefore, although the cooperation among Guangdong, Hong Kong and Macau belongs to the cooperation within a sovereign state, the cooperation among them is similar to cross-border cooperation to a certain extent because of different political systems.

2.2 Theoretical Basis for Maritime Search and Rescue Cooperation

In order to ensure the safety of life and ship at sea, the international community has formulated a number of provisions relating to maritime search and rescue in the international conventions which clearly define that the Parties shall cooperate in the establishment of individual maritime search and rescue coordination centre, foundation of appropriate facilities, development of operating procedures and conducting maritime search and rescue cooperation so as to provide timely and appropriate search and rescue services for offshore ships and persons in distress.

2.2.1 International Convention on Maritime Search and Rescue, 1979 (ICOMSAR)

The International maritime search and rescue conference held in Hamburg, Germany by IMO finally adopted the international convention on maritime search and rescue on April 27, 1979. The convention entered into force on June 22, 1985. The purpose of ICOMSAR is to establish an international maritime search and rescue plan for the rescue of persons in distress at sea and the desire to develop and promote search and rescue activities by that plan. The convention emphasizes humanitarian spirit, which stipulates “a Party should authorize, subject to applicable national laws, rules and regulations, immediate entry into or over its territorial sea or territory of rescue units of other Parties solely for the purpose of searching for the position of maritime casualties and rescuing the survivors of such casualties” (ICOMSAR, 1979). Its annex stipulates the organization, cooperation, preparatory measures, operating procedures and ship reporting systems. China has acceded to the ICOMSAR as a Party in 1985. The convention requires each Party can make rapid and effective response for maritime casualties occurred in their search and rescue regions. Meanwhile, the convention stipulates that Parties shall establish a national machinery for the overall coordination of search and rescue services (ICOMSAR, 1979).

Based on the requirements of humanitarian spirit, ICOMSAR stipulates that every coastal state shall comply with the relevant provisions of international conventions, strengthen maritime search and rescue capability and cooperation with neighbouring states, and the desire to develop and promote these activities by establishing an international maritime search and rescue plan for the rescue of persons in distress at sea (ICOMSAR, 1979). The convention requires that Parties shall make some

necessary training for persons who engage in the maritime search and rescue operations so that they could provide the adequate and effective rescue of persons in distress at sea. For example, chapter 2 of the ICOMSAR's annex entitled "organization" stipulates that a Party receives information that a person is in distress at sea in its search and rescue region, the responsible authorities of that Party shall take urgent steps to provide the most appropriate assistance available(ICOMSAR, 1979).

ICOMSAR is an important and special convention for maritime search and rescue, and its amendment has been approved by the 69th maritime safety committee in 1998 which is also called 1998 amendment. On the one hand, the 1998 amendment explains the responsibility of each Party and emphasizes the cooperation and coordination between maritime and aeronautical search and rescue regions. On the other hand, the responsibility is more clearly defined in chapter 2 of its annex. In chapter 2, each Party is required to establish the elements of search and rescue services in cooperation with other nations, what's more, plans of arrange search and rescue services and development of the country's energy is concerned in this chapter. Meanwhile, there is a separate chapter to describe the international cooperation of maritime search and rescue and to define the coordination on maritime search and rescue of each Party, which is to provide an important reference for establishing the cooperation mechanism of maritime search and rescue among Guangdong, Hong Kong and Macau.

2.2.2 United Nations Convention on the Law of the Sea (UNCLOS)

UNCLOS, also called the Law of the Sea Convention, is the international agreement that resulted from the third United Nations Conference on the Law of the Sea. The Law of the Sea Convention clearly defines several important concepts such as internal waters, territorial sea, contiguous zone, continental shelf, exclusive economic zone (EEZ) and high seas. It has an important guiding role in the settlement of disputes on the territorial sea, the management of marine natural resources and the protection of marine environment etc. In particular, article 98(2) of UNCLOS, entitled “Duty to render assistance”, indicates: “every coastal state shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service regarding safety on and over the sea and, where circumstances so require, by way of mutual regional arrangements cooperate with neighbouring states for this purpose”(UNCLOS, 1982). Similarly, article 146 of UNCLOS stipulates “with respect to activities in the area, necessary measures shall be taken to ensure effective protection of human life” (UNCLOS, 1982). Although the international cooperation of maritime search and rescue is not clearly mentioned in these two articles, there are relevant statements such as “adequate and effective search and rescue service” and “necessary measures” used in the articles. The above statements should be broadly understood, all search and rescue actions should be considered to comply with the requirements of those articles as long as they are able to effectively protect human life (Li, 2012, p.11). Since the maritime search and rescue capabilities of Guangdong, Hong Kong and Macau are relatively low, sometimes it is difficult to ensure the effectiveness of search and rescue solely depending on search and rescue operations in an area. We can understand the “necessary measures” which should include search and rescue cooperation between the relevant regions as long as it can be able to adequately guarantee the safety of

human life. Therefore, maritime search and rescue cooperation is in accordance with the requirements of UNCLOS.

2.2.3 International Convention for the Safety of Life at Sea (SOLAS)

SOLAS is an international maritime safety treaty. It ensures that ships flagged by signatory states comply with minimum standards in construction, equipment and operation. The SOLAS Convention is generally regarded as the most important of all international treaties concerning the safety of merchant ships. The first version of the treaty was passed in 1914 in response to RMS Titanic. It prescribed numbers of lifeboats and other emergency equipment, safety procedures and continuous radio watches. After that, there are some newer versions adopted in 1929, 1948, 1960, 1974 and 1988. Different versions prescribe different contents. For example, the 1960 version puts forward a number of suggestions about updating commercial shipping regulations and staying up-to-date with new technology and procedures in the industry. The 1974 version introduces the “tacit acceptance” procedure and simplifies the process for amending the treaty. The 1988 version uses the Global Maritime Distress Safety System (GMDSS) to replace Morse code. As of June 2014, the most recent amendment dates from May 2012 (Wikipedia, 2014).

SOLAS, as a special treaty for the safety of life at sea, stipulates the relevant rules and regulations for the protection of life at sea. China has acceded to the Convention in 1982. Therefore, the Convention is also applicable to Guangdong, Hong Kong and Macau. Article I of SOLAS indicates the contracting governments have an obligation to promulgate all necessary laws, decrees, orders, and regulations

and to take all other necessary measures to ensure the safety of life at sea (SOLAS, 1974). The purpose of maritime search and rescue cooperation is to improve the success rate by cooperation among countries or regions. Therefore, “all necessary measures” should be considered as all measures which can protect the safety of life at sea, of course, including international and regional cooperation of maritime search and rescue. Maritime search and rescue cooperation among Guangdong, Hong Kong and Macau is in accordance with the regulations of SOLAS.

2.2.4 International Aeronautical and Maritime Search and Rescue Manual (IAMSAR Manual)

In order to ensure the full implementation of GMDSS and amendments to international convention on maritime search and rescue, International Civil Aviation Organization (ICAO) and IMO jointly developed IAMSAR Manual in October 1996. The primary purpose of IAMSAR Manual is to assist States in meeting their own search and rescue needs and to fulfill their obligations under the ICOMSAR, the SOLAS and the Convention on International Civil Aviation. We can find some relevant regulations of maritime search and rescue cooperation in the IAMSAR Manual. For example, chapter 1 of the Organization and Management volume describes that this Manual is to foster cooperation between ICAO and IMO, between neighbouring States, and between aeronautical and maritime authorities. Its goal is to assist State authorities to establish effective search and rescue services and to ensure that persons in distress will be assisted without regard to their locations, nationality, or circumstances (IMO & ICAO, 1998). As for the cooperation between neighbouring States, it can be extended to the cooperation between neighbouring regions. Therefore, the maritime search and rescue cooperation

among Guangdong, Hong Kong and Macau is also in line with the regulations of IAMSAR Manual.

Chapter III Present Situation of Maritime Search and Rescue

3.1 Present Situation of Guangdong Maritime Search and Rescue

Guangdong province lies in the southern of China while facing the South China Sea and has 4114 kilometre coastline and 419 thousand square kilometre maritime space area. There are more than 100 thousand various types of vessels, big seaborne trade volume, developed marine fishery and aquaculture industry and many offshore oil exploration platforms. Moreover, Guangdong is the most frequently affected by the typhoon in China and the typhoon season usually lasts for a long time. Hence, there are many ships in distress at sea every year, under such circumstance maritime search and rescue task is very onerous.

Guangdong Maritime Rescue Coordination Centre (GDMRCC), as a command structure of Guangdong Maritime Search and Rescue operations, is jointly headed by Guangdong province government and Guangzhou military region, and subject to the professional guidance of China Maritime Rescue Coordination Centre (CNMRCC). GDMRCC is mainly responsible for organizing and coordinating the prevention of tropical cyclone of ships and facilities, prevention of pollution from ships and maritime search and rescue operations in its search and rescue region. Director of GDMRCC is vice governor of Guangdong province, executive deputy director is superintendent of Guangdong Maritime Safety Administration (MSA), deputy director contains relevant persons in charge of Guangdong MSA and Guangzhou military region. Now GDMRCC has 31 government departments, enterprises and institutions as members which contain the provincial party committee propaganda department, the provincial economic and information commission, the provincial

public security department, the provincial department of civil affairs, the provincial department of finance, the provincial department of transport, the provincial health and family planning commission, the provincial department of foreign affairs office, the provincial administration of ocean and fisheries, the provincial administration of work safety, the provincial administration of Hong Kong and Macau affairs office, the provincial administration of Taiwan affairs office, Guangdong sub-administration of China customs, civil aviation administration of China (CAAC) central and southern regional administration, the provincial communication authority, the provincial meteorological authority, Guangdong maritime safety administration, south China sea branch of state oceanic administration, Guangzhou salvage bureau of the ministry of transport, south China sea rescue bureau of the ministry of transport, south China sea fleet, Air force of the Guangzhou military region, the provincial military region, the provincial armed police forces, the provincial railway construction investment group, Guangzhou railway group, Guangzhou ocean shipping Co., Ltd, Guangzhou dredging Co., Ltd, China shipping bulk carrier Co., Ltd, Shenzhen branch and Zhanjiang branch of China national offshore oil corporation. There are 8 rescue sub-centres (RSC) in Guangdong province which are Shantou RSC, Huizhou RSC, Shenzhen RSC, Zhuhai RSC, Zhongshan RSC, Jiangmen RSC, Zhanjiang RSC and Yunfu RSC respectively. Every RSC is headed by the local municipal government and also subject to the professional guidance of GDMRCC (Chen, 2014, p.13). It can be clearly described by organization chart figure 3.1 as follows:

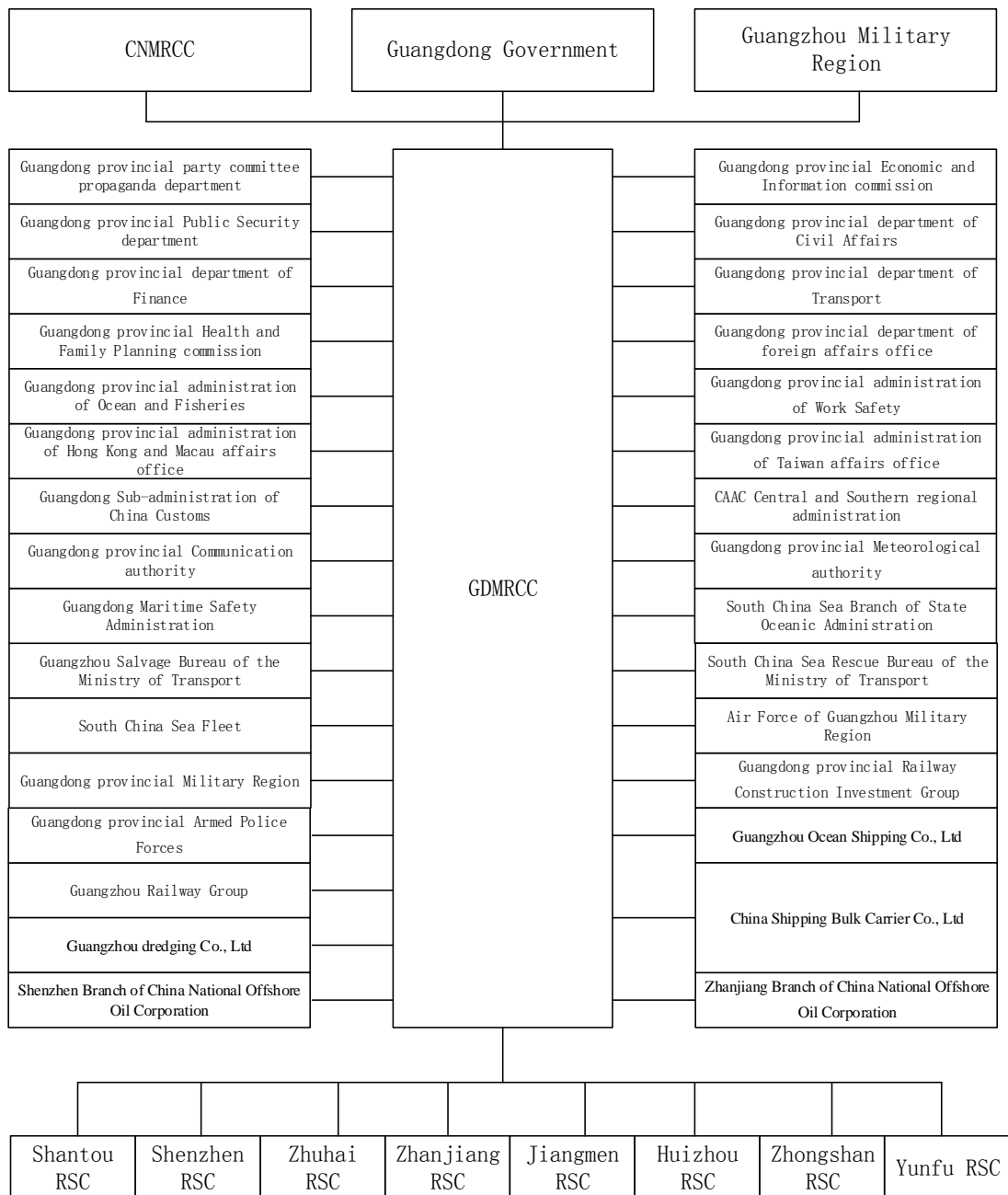


Figure 3.1 GDMRCC Organization Chart (Source: GDMRCC Office)

Guangdong Maritime Rescue Coordination Centre Office is in charge of the daily affairs of GDMRCC. It has been attached to the provincial bus office, the provincial economic commission, the provincial economic and trade commission and

the provincial administration of work safety. From January 2012, it belongs to Guangdong Maritime Safety Administration due to the institutional reform. The office has a duty room which equips with a number of persons on watch who are familiar with the laws and regulations of maritime search and rescue, have rich experience at sea, and are able to deal with maritime casualty separately. In order to cope with the possible maritime casualty at any moment, the duty room maintains on duty for 24 hours. The duty room has a relatively complete aeronautical and maritime communication and command system, opens up the private telephones with Guangdong troops, civil aviation authority and transport agency, establishes communication liaison system with public security, border department, maritime safety administration, fishery administration and all rescue sub-centres. It also equips with Automatic Identification System (AIS), Closed-Circuit Television monitoring system (CCTV) and fishing vessel communication and command system. Therefore, the duty room can ensure the real-time monitoring of navigable condition of merchant ships and fishing boats in the Guangdong sea area and the conduct of search and rescue operations at sea (Chen, 2008, p.28).

Generally speaking, maritime search and rescue operations can only be conducted by ships or aircrafts. Maritime search and rescue force contains professional rescue force and non-professional rescue force. In China, professional rescue force usually refers to rescue and salvage teams under the jurisdiction of the Ministry of Transport. However, non-professional rescue force includes official government forces, the army, armed police forces and other social forces. Although GDMRCC is an organization for coordinating the conduct of search and rescue operations, it does not have its own rescue forces, all rescue forces are from other sea-related units. At

present, the main rescue forces in Guangdong are: ships and aircrafts of south China sea rescue bureau of the ministry of transport, official ships and aircrafts of maritime, ocean and fisheries, public security, customs and oceanic administrations, ships and aircrafts of Guangdong troops, aircrafts of Hong Kong government flying service, and merchant ships or fishing vessels navigating in the Guangdong sea area.

The South China Sea rescue bureau of the ministry of transport is the professional rescue force, which has excellent equipment, superior performance, and good anti-wind grade of professional rescue ships and aircrafts. Its rescue forces are an indispensable part of search and rescue forces in Guangdong province. It is mainly responsible for the rescue of human life of ships, facilities, aircrafts and other aspects in South China Sea, including the rescue of firefighting at sea and property for the purpose of human life. Currently, it has emergency response rescue team, rescue fleet, rescue logistics department and 8 rescue bases which are distributed in Guangzhou, Shenzhen, Shantou, Zhanjiang, Yangjiang, Haikou, Sanya and Beihai respectively. It also has 33 various types of rescue vessels which are deployed in the Qiongzhou Strait, the Pearl River estuary, the Xisha islands and other important sea areas. Meanwhile, there are three dolphin rescue helicopters and an EC225 rescue helicopter which are deployed in Zhuhai, Zhanjiang and Sanya respectively. The aeronautical and maritime search and rescue system is initially established in Guangdong province.

The official ships and aircrafts of maritime, ocean and fisheries, public security, customs and oceanic administrations, ships and aircrafts of Guangdong troops, aircrafts of Hong Kong government flying service, and merchant ships or fishing

vessels navigating in the Guangdong sea area are important search and rescue forces in Guangdong province, they usually play an important role in protecting the safety of life at sea.

3.2 Present Situation of Hong Kong Maritime Search and Rescue

Hong Kong Maritime Rescue Coordination Centre (HKMRCC) was established in 1989. It is responsible for coordinating all maritime search and rescue in territorial sea of Hong Kong and international waters of South China Sea, bounded by Latitude 10 °North and Longitude 120 °East, which includes some other countries and regions SRRs to some extent such as mainland China, Vietnam, the Philippines and Taiwan. HKMRCC is only a coordination centre and neither possesses nor has direct command over SAR resources. The role of HKMRCC is to coordinate all available SAR resources to conduct maritime search and rescue operations. For example, if maritime casualty happened in Hong Kong waters, HKMRCC will coordinate Marine Police, Government Flying Service (GFS) and Fire Services Department (FSD) to conduct search and rescue operations. If maritime casualty occurred in international waters, HKMRCC will mainly rely on the assistance of GFS and fishing vessels and merchant ships in the vicinity of the incident. Sometimes, HKMRCC applies to mainland China, Vietnam, and the Philippines for assistance according to prevailing situation. HKMRCC operates 24 hours a day and has three persons on watch on duty all the time. All the persons on watch are qualified Master Mariners, and they have undergone intensive training SAR techniques. HKMRCC is equipped with the most advanced communication equipment which includes a search and rescue satellite system (COSPAS-SARSAT), Digital Selective Calling (DSC)

system, marine VHF, high-powered radio transceiver, Inmarsat telephone and facsimile. HKMRCC has a number of hotlines to connect with GFS, FSD and Marine Police, and also keeps close contact with GDMRCC and Macau Maritime Rescue Coordination Centre (Wikipedia, 2014).

3.3 Present Situation of Macau Maritime Search and Rescue

Marine and Water Bureau is responsible for coordinating maritime search and rescue operations in Macau waters. In particular, there is a search and rescue coordination centre (CC) under the Vessel Traffic Control Centre of Macau (Macau VTS). Macau search and rescue coordination centre is different from HKMRCC and GDMRCC. CC does not operate in normal times, in other words, its operation is activated when the need arises. The Macau VTS is responsible for ensuring the safety of vessels sailing in Macau waters at ordinary times. When it receives a distress signal, the Macau will immediately notify all the relevant search and rescue authorities and coordinators and keep in touch with them until rescue units arrive.

3.4 The necessity and significance of maritime search and rescue cooperation among Guangdong, Hong Kong and Macau

According to the relevant international conventions, national laws, regulations and agreements, maritime search and rescue cooperation refers to an action that rescue units and facilities which can effectively conduct search and rescue operations take part in the process of rescue ships, property and persons in distress at sea under the coordination and command of maritime safety administration (Fu &Zhu, 2001,

p.142). The cooperative action may be search and rescue operations or the service provided for search and rescue operations by some means. Since maritime search and rescue is an urgent, large-scale and dangerous job, especially for the distress incident under the harsh climatic condition and serious casualties, it is rather difficult for one single rescue unit to operate a completely search and rescue operation alone in a short time. That is to say, the above procedure often needs support and collaboration from other rescue units.

In general, the forms of maritime search and rescue cooperation contain cooperation between various national authorities, between states or regions, and between aeronautical and maritime authorities. Here, we are talking about maritime search and rescue cooperation among Guangdong, Hong Kong and Macau which refers to national or regional cooperation. In order to further improve the success rate of search and rescue at sea, it is necessary to develop maritime search and rescue cooperation among Guangdong, Hong Kong and Macau.

Firstly, the international cooperation on maritime search and rescue to cope with emergency incidents in the region has become the trend of the times. For example, the Arctic Council member states have signed a search and rescue cooperation agreement in 2011, the Black Sea coastal states have signed an Ankara Agreement, the Baltic States have signed bilateral or multilateral search and rescue cooperation agreement. The above agreements can all effectively improve the maritime search and rescue capabilities within the regions.

Secondly, there is a need to fulfill their obligations under the international conventions. China acceded to the ICOMSAR Convention as a party in 1985. The primary purpose of the ICOMSAR Convention is to promote cooperation among search and rescue organizations around the world and among those who participate in search and rescue operations at sea. The ICOMSAR Convention aims to encourage all Parties to sign search and rescue agreement with neighbouring states, establish search and rescue regions, make rational use of search and rescue resources, develop common search and rescue procedures, and carry out training and reciprocal visits so as to provide timely and efficient search and rescue services to vessels or persons in distress at sea (Wei, 2010, p.77-78).

Thirdly, the most significant feature of maritime search and rescue is without borders. Although IMO has regulated a number of search and rescue regions in the IMO SAR Plan, the primary purpose of SRRs is solely to ensure search and rescue services provided in that geographic area. SRR limits should not be viewed as barriers to assisting persons in distress (IMO & ICAO, 1998). Therefore, search and rescue persons in distress at sea should not take any boundary between states or regions into consideration. Maritime search and rescue should establish cooperation mechanism between neighbouring states in order to provide the timely and effective search and rescue operations (Tang, 2006, p.77). This is why the maritime search and rescue cooperation should be established among Guangdong, Hong Kong and Macau.

Last but not least, there are a number of high-speeded passenger ships navigated in the Pearl River estuary every day, so that the traffic volume is big. Especially in recent years, with the further development of economic cooperation among

Guangdong, Hong Kong and Macau, the number of merchant ships to and from the Pearl River estuary is increasing. Many merchant ships, tankers, and fishing vessels gather in the Pearl River estuary, on this occasion it is prone to give rise to maritime casualty. Therefore, to strengthen maritime search and rescue cooperation among Guangdong, Hong Kong and Macau for the purpose of ensuring the safety of shipping and the prevention of marine pollution is an urgent need for their economic development.

Maritime search and rescue cooperation among Guangdong, Hong Kong and Macau which is in accordance with the common interests of the people of Guangdong, Hong Kong and Macau is not only necessary, but also has great significance. Firstly, it is not only conducive to ensuring navigation safety in the waters of Guangdong, Hong Kong and Macau, but also more conducive to improving the success rate of search and rescue in that waters. Meanwhile, it is directly related to the safety of human life and property, the protection of marine environment and social harmony and stability, and also helps to ensure the safety development of economic surrounding countries and regions in the South China Sea. Secondly, it embodies Guangdong, Hong Kong and Macau governments to faithfully fulfill the important mission of international convention and international humanitarian spirit, which can help to build the image of responsible governments and promote profound friendship between the people of Guangdong, Hong Kong and Macau.

3.5 The Main Achievements of Maritime Search and Rescue cooperation among Guangdong, Hong Kong and Macau

In recent years, Guangdong, Hong Kong and Macau governments devote themselves to actively promote regional cooperation on maritime search and rescue, to continually coordinate and communicate with each other, and to carry out various forms of regional cooperation on maritime search and rescue activities. Maritime search and rescue cooperation among Guangdong, Hong Kong and Macau plays an important role in ensuring navigation safety in the waters of Guangdong, Hong Kong and Macau.

(1) Held relevant meetings and signed agreements. As early as the 1970s, Guangdong, Hong Kong and Macau governments have begun to coordinate in maritime search and rescue cooperation and have reached appropriate agreements for maritime distress happened in the adjacent waters to provide the timely and effective search and rescue operations. For example, in August 1984, Guangdong and Hong Kong being as the two delegations participated in Guangzhou meeting to discuss “lifesaving issues of crews on the waterway between Guangdong and Macau” and reached six agreements. After that, Guangdong and Hong Kong signed “South China Sea Maritime Search and Rescue Issues Memorandum” in April 1987. Maritime search and rescue cooperation among Guangdong, Hong Kong and Macau has been further improved since the 21st century, in particular the scale and effectiveness of cooperation during the period of “Eleventh Five-Year” has been significantly improved. For instance, Guangdong and Hong Kong have held a thematic working group meeting in Guangzhou to jointly cope with regional emergencies in September 2009. Subsequently, in October, Guangdong and Macau held a thematic working group meeting in Macau to jointly cope with regional

emergencies. All of these are to further enhance collaboration among Guangdong, Hong Kong and Macau to jointly cope with regional emergencies.

(2) Explored the establishment of maritime search and rescue cooperation mechanism. With the development of Guangdong, Hong Kong and Macau maritime trade, more and more ships go in and out of ports. Guangdong, Hong Kong and Macau governments have begun to actively explore the establishment of maritime search and rescue cooperation mechanism. For example, GDMRCC and Capitanía dos Portos have signed “Guangdong and Macau Maritime Search and Rescue Cooperative Arrangements” in May 2010. Subsequently, in September, GDMRCC and Hong Kong Marine Department signed “Guangdong and Hong Kong Maritime Search and Rescue Cooperative Arrangements” in Guangzhou, so that maritime search and rescue cooperation among Guangdong, Hong Kong and Macau will be more standardized and routinized in the future, under such circumstance the cooperation has great significance for reducing maritime casualties and property losses and the protection of marine environment.

(3) Carried out search and rescue personnel exchange and reciprocal visits. By observing maritime search and rescue exercises and personnel exchanges, the cooperative relations and search and rescue capability have been further improved. For example, GDMRCC has invited Hong Kong GFS, Marine Department, Civil Aviation Department to observe “Guangdong Province 2006 Qiongzhou Strait Maritime Search and Rescue and Pollution Prevention Exercise” in September 2006. Subsequently, in October, GDMRCC took part in “2006 Hong Kong Air Disaster Search and Rescue Exercise” organized by Hong Kong Civil Aviation Department.

In July 2007, GDMRCC coordinated a ship and an aircraft to take part in “Guangdong, Hong Kong and Macau Joint Search and Rescue Exercise” in Pearl River estuary. In May 2012, the executive deputy director of GDMRCC named Liang Jian-wei led the delegation to go to Hong Kong to carry out the exchanges of maritime search and rescue, to discuss maritime search and rescue cooperation between Guangdong and Hong Kong, and to visit HKMRCC, Hong Kong GFS and Hong Kong Marine Department respectively.

(4) Organize maritime search and rescue joint exercises. In recent years, in order to further improve the organization and command capability of maritime search and rescue and ship oil spill emergency response, and to exercise maritime search and rescue teams, Guangdong, Hong Kong and Macau often organize various forms of maritime search and rescue joint exercises. For example, Guangdong, Hong Kong and Macau have held maritime search and rescue joint exercises in the Hong Kong waters in July 2007 and in the waters near the Macau international airport in June 2010 respectively. Maritime search and rescue joint exercises are to strengthen the collaboration and cooperation in search and rescue operations at sea between search and rescue authorities and between professional rescue forces and non-professional rescue forces in the Guangdong, Hong Kong and Macau waters.

(5) Successfully rescued domestic and foreign ships and persons in distress at sea. Guangdong, Hong Kong and Macau maritime search and rescue authorities have successfully rescued persons in distress at sea and completed the information exchange and mutual forwarding tasks many times. They have better fulfilled their responsibilities and obligations under the international conventions. According to

statistics, from 2006 to 2010, GDMRCC has carried out maritime search and rescue cooperation with Hong Kong 392 times and with Macau 11 times, and coordinated 58 Hong Kong ships, 8 Macau ships, Hong Kong helicopter 74 sorties and Hong Kong fixed-wing aircraft 60 sorties.

Chapter IV Existing problems and Recommendations

4.1 The problems existing in the maritime search and rescue cooperation among Guangdong, Hong Kong and Macau

In recent years, maritime search and rescue cooperation among Guangdong, Hong Kong and Macau has been greatly developed, but due to various factors, especially different political systems and economic development, there are still some existing problems, which mainly reflect in the following aspects:

(1) The communication of maritime search and rescue information is not unimpeded. Maritime search and rescue requires to use the most efficient speed for obtaining the most accurate information and intelligence, if the information and intelligence is not timely enough, will likely lead to miss the best opportunity to salvage, which would seriously affect the effectiveness of search and rescue and squander search and rescue resources. Nowadays, there are some issues in the maritime search and rescue operations such that alert information is not enough timely notified, especially while handling some of the ship's DSC alert information, and sometimes one has been confirmed as a false alert, because the information is not enough timely notified, the other search and rescue authority may still dispatch rescue forces to the alert location for the conduct of search and rescue operations.

(2) Maritime search and rescue joint command system is not perfect and efficient. In general, maritime search and rescue authorities can be able to quickly and effectively conduct search and rescue operations unilaterally, and to appoint on-scene command ship or aircraft for the unified command of a variety of rescue forces.

However, as for a joint search and rescue situation, the Parties are responsible for directing their own search and rescue forces, it is difficult to designate on-scene command ship or aircraft. Due to lack of a unified on-scene command organization, sometimes part of the search area will have duplicate search, resulting in a waste of search and rescue resources to some extent.

(3) Hong Kong rescue aircrafts temporary transit stops and refueling problem has not been effectively solved. Hong Kong rescue aircrafts are often widely used in search and rescue operations at sea because of their excellent flight performance and good rescue techniques, especially suitable for maritime casualties happened at night or in bad weather conditions. But for the Guangdong west waters, due to their long distances away from Hong Kong, rescue aircrafts usually cannot conduct search and rescue operations for a long time, thereby affecting the effectiveness of search and rescue to some extent. At this point, if Hong Kong rescue aircrafts temporary transit stops and refueling problem can be solved, which is bound to increase maritime search and rescue time and improve the success rate of search and rescue operations at sea.

(4) Joint search and rescue assessment system after serious casualties has not been established. Since 2011, Guangdong maritime search and rescue authorities have begun to establish the investigation and assessment system for maritime casualties to summarize successful experiences and to propose recommendations for improvement. The principle of maritime casualty investigation is based on the grade of maritime casualties. Generally speaking, rescue sub-centers are responsible for investigating marine incidents and less serious casualties, the provincial maritime search and rescue authorities are responsible for investigating serious casualties, CNMRCC is

responsible for investigating very serious casualties in China. Therefore, establishing a joint maritime search and rescue assessment system after serious casualties can be conducive to find the problems existing in the emergency process and to enhance regional maritime search and rescue cooperation.

(5) Many fishing vessels which their resistance to adverse weather and sea condition is poor caused maritime casualties frequently. Every year casualties caused by fishing vessels accidents occurred in the Guangdong waters approximately account for 70% of total casualties. The cooperation of search and rescue fishermen in distress at sea is always the main task of Guangdong, Hong Kong and Macau maritime search and rescue authorities, but there are a lot of factors to limit the cooperation, which are mainly reflected in communication and alert aspects. Firstly, on the one hand a number of fishing vessels lack of communication facilities, which result in poor contact with rescue units during the search and rescue operations. Maritime search and rescue authorities are also difficult to determine their distress position, causing a serious impact on the timely rescue. On the other hand, compared with merchant ships, the transmitting power of communication equipment used by the majority of fishing vessels is smaller, and the communication frequency is also different from maritime search and rescue authorities and merchant ships, resulting in difficulty to contact with each other. Secondly, when fishermen are in distress at sea, often difficult to promptly send a distress message to the nearest maritime search and rescue authority, usually the distress message is sent back home first, and then maritime search and rescue authority obtains the distress message from the local alert channels, which delayed the best opportunity to rescue fishermen in distress (Shi &Li, 2013, p.28-29).

4.2 Recommendations for further strengthening maritime search and rescue cooperation among Guangdong, Hong Kong and Macau

As regards the problems existing in the maritime search and rescue cooperation, Guangdong, Hong Kong and Macau need to work together to solve them. According to “Guangdong and Hong Kong Maritime Search and Rescue Cooperative Arrangements” and “Guangdong and Macau Maritime Search and Rescue Cooperative Arrangements”, Guangdong, Hong Kong and Macau governments should clearly define their own responsibilities and rights, and jointly establish a long-term cooperation mechanism in the maritime search and rescue operations.

On the one hand, it is necessary to further strengthen the routine search and rescue cooperation among Guangdong, Hong Kong and Macau. Firstly, there is a need to enrich the contents of maritime search and rescue cooperation such as mutual learning search and rescue management system, regularly convening search and rescue meetings, search and rescue information and work experience exchanges, search and rescue services learning and seminars, exchanges and cooperation in maritime search and rescue techniques, search and rescue training and exercises etc. Secondly, there is a need to define the contents of communication contact approaches and information exchange. From communication contact approaches point of view, GDMRCC should directly contact with HKMRCC and Macau Maritime Rescue Coordination Center by using the main duty telephone and try to reduce immediate links to ensure the smooth flow of distress reporting channels; from the contents of search and rescue information exchanges point of view, the contents of search and rescue information exchanges should include the distribution of search and rescue

forces, available search and rescue support, search and rescue training and learning programs and contents, search and rescue techniques, and human resources coordination costs (Li, 2009, p.18-19). Thirdly, there is a need to further integrate search and rescue resources with each other. Based on the existing search and rescue resources, Guangdong, Hong Kong and Macau should optimize the allocation of search and rescue resources and rational deployment of search and rescue vessels and aircrafts, update search and rescue information, and establish search and rescue resources internet in order to timely understand and grasp search and rescue resources each other. Fourthly, there is a need to further deepen the contents of maritime search and rescue cooperation and to regularly carry out search and rescue joint exercises. Guangdong, Hong Kong and Macau maritime search and rescue authorities should regularly conduct the exchanges of search and rescue operation and carry out maritime search and rescue joint exercises to enhance mutual understanding, to share search and rescue experiences and to improve search and rescue capabilities.

On the other hand, it is necessary to further strengthen the emergency search and rescue cooperation among Guangdong, Hong Kong and Macau. Firstly, there is a need to promptly notify maritime casualties. When maritime casualties happened in the Guangdong, Hong Kong and Macau waters, if a third party is involved, the responsible party should immediately notify the relevant party so that the relevant party has fully prepared so that to provide necessary support information during search and rescue operations such as meteorological and hydrological information and procedures of ships and aircrafts arriving at the scene of accident. Secondly, there is a need to further strengthen the unified command of maritime search and

rescue operations. The composition of joint search and rescue forces is complex, so the coordination is difficult. In this case, in order to avoid double or multiple command to shorten the information flow, it is necessary to establish temporary on-scene coordination working group, specifically responsible for organizing and directing the joint search and rescue operations (Shi &Li, 2013, p.30).

In a word, with the further development of regional economic cooperation, Guangdong, Hong Kong and Macau should actively carry out the maritime search and rescue cooperation to constantly improve the capability and efficiency of search and rescue at sea, to ensure the safety of vessels sailing in the Guangdong, Hong Kong and Macau waters, and to minimize the loss of life and property.

Chapter V Conclusions

With the emphasis on human rights in the international community, all countries and regions began to further strengthen the protection of life and property at sea. In order to more effectively protect the safety of life and property at sea, all countries and regions constantly strengthen international cooperation in the field of maritime search and rescue to compensate for the limitations of national or regional search and rescue forces, the regional cooperation has become the development trend of search and rescue at sea. In this paper, Guangdong, Hong Kong and Macau actively explore the cooperation mechanism on maritime search and rescue, organize maritime search and rescue joint exercises, and carry out search and rescue personnel exchange and reciprocal visits etc. All of these measures are to improve maritime emergency rescue capability and reduce the loss of life and property at sea.

In this paper, through the study of Guangdong, Hong Kong and Macau maritime search and rescue cooperation mechanisms, the author laid out the understanding of composition of maritime search and rescue authorities, the present situation of maritime search and rescue cooperation and the existing problems and made some recommendations for solving the problems. The main conclusions are as follows:

Firstly, the establishment of cooperation mechanism of maritime search and rescue is a long gradual process. The effective cooperation mechanism can improve the success rate of maritime search and rescue operation and reduce the loss of life and property at sea.

Secondly, maritime search and rescue cooperation among Guangdong, Hong Kong and Macau still has a lot of specific deficiencies such as dealing with false alerts, designating on-scene command ships and aircrafts, Hong Kong rescue aircrafts temporary transit stops and refueling problem and the status of fishing vessels etc. All of these problems need to be solved in the future maritime search and rescue cooperation.

Last but not least, maritime search and rescue cooperation among Guangdong, Hong Kong and Macau needs to cope with the regional maritime emergencies jointly, which can be improved by the routine and emergency search and rescue cooperation.

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