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## Research on China maritime safety supervision of large cruise ships

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**WORLD MARITIME UNIVERSITY**

Dalian, China

**Research on China Maritime Safety Supervision of  
Large Cruise Ships**

By

**CHEN QIANG**

**The People's Republic of 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)**

2015

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## **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 Qiang

(Date): July,2 2015

**Supervised by:**

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Assessor:

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## ABSTRACT

Title of the research paper: **Research on China Maritime Safety Supervision of Large Cruise Ships**

Degree: **MSC**

This research is on maritime safety supervision of large cruise ship, the analysis of navigation environment, risk resources and safety measures are main content. First, development of large cruise ship tourism and transportation at home and abroad is respectively introduced and the perspective of large cruises is foreseen under the macro scope of China's development strategy. Secondly, in order to demonstrate the importance of the safety of large cruise ships, the main historical cruise ship accidents are reviewed as well as their impacts on the regulations and rules. Then, the main measures of practice taken by the maritime safety administration authorities are introduced and existing problems are listed. Finally, the author proposes suggestions to improve the maritime safety of large cruises in China.

**Key Words:** maritime safety, large cruise ships, supervision, suggestion.

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## **LIST OF ABBREVIATIONS**

ALARP	As Low As Reasonable Practicable
ASEAN	Association of Southeast Asian Nations
CLIA	Cruise Lines International Association
ECC	European cruise council
ECDIS	Electronic Chart Display And Information System
FSA	Formal Safety Assessment
IMO	International Maritime Organization
ISM Code	International Safety Management code
ISO	International Standardization Organization
ISPS Code	International Ship and Port Facility Security Code
MOU	Memorandum of Understanding
MSA	Maritime Safety Administration
NDRC	National Development and Reform Commission
NTA	National Tourism Administration
PSC	Port State Control
SOLAS	Convention on the Safety of Life at Sea

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## **Chapter 1 Introduction**

### **1.1 The general situation of global large cruise tourism industry**

After its first appearance in the 19th century, cruise has grown into a comparatively mature industry since the 1960s and has been increasingly prosperous from the 1980s, known as the gold industry floating in the water channel ( Pang, 2014 ). According to statistics issued by the CLIA, in recent 30 years, the international cruise tourism industry has been growing at an average annual rate of 8.6%, far higher than the development speed of the overall international tourism annual growth rate at 4% ( China Cruise & Yacht Industry Association, 2012 ). In terms of the number of cruises, in the 1980s, about 40 new cruise ships were built globally, in the 1990s nearly 80 were built, from 2000 to 2009 more than 100 new cruise ships were built, in 2010, 12 new cruises were launched, and the order in 2014 reached 26, making a total of 51000 beds in the world( Liu, 2014 ). In 2013, cruise economy created more than \$100 billion output value, 33 billion wages, 75000 jobs for the world, and attracted \$7.4 billion investment ( Ma, Du, & Wu, 2014 ). With the section growing fastest in contemporary international tourism, international luxury cruise tourism is coming to the general masses from the elite minority. 21.3 million visitors travelled by cruise globally in 2013, and it is expected that this number will rise to 25 million and 30 million in 2015 and 2020 respectively, and the growth speed is quite astonishing ( Pang, 2014 ). The large global cruise companies have been operated actively, with a total of 269 luxury cruise ships being operated in 2013, offering 436 thousand beds to visitors. In terms of the expansion of the cruise fleets, European shipyards play an important role. From 2011 to 2014, the shipyards constructed 23 new cruise ships, with a total investment of nearly 11 billion euros ( Wu & Cao, 2014).

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## 1.2 The development of large cruise tourism industry in China

In the late 20th century, the trend that the world cruise tourism market gradually shifted to the asia-pacific region was apparently intensified ( Ni, 2014 ). In the 1980s, an international cruise called at Chinese port for the first time, and in recent decades, the number of international cruise ships visiting Chinese ports has been increasing continually ( Su, 2014 ). Cruise tourism in China shows an explosive growth, with only 10 thousand people taking a cruise in 2005 while 1.4 million in 2013. The cruise industry developed rapidly at the annual average growth rate of 34% during the 8 years, with the market size rising to more than 300 billion yuan ( Huang, 2015 ). According to The China Cruise Development Report 2010-2011, the reception of international cruise ships in mainland China was 262 in 2011, with year-on-year growth of 17.5 percent ( Ni, 2014 ). In 2013, the national cruise market continued to be hot, and the attraction of cruise tourism significantly increased, with 393 cruise ships, up 51 percent from a year earlier, calling ports and 1.1661 million passengers, up 100 percent from a year earlier ( Peng, X., 2014 ). In 2014, the national cruise tourism market continued to boom, with berthing business growing and routes enriching, supplying sufficient energy for the maturity of domestic cruise market, leading to the strong growth momentum of cruise industry ( Zhang & Wu, 2015 ).

Table 1. National Cruise home Port Calling Operations in 2014 ( Zhang, & Wu, 2015 )

Name of Port	Passing people (ten thousand )	Year-on-year growth	Number of calling	Year-on-year growth
Shanghai	121.5	60.6	269	35.2

Tianjin	22.4	-10	55	-21
Sanya	15.6	15	71	-37
Xiamen	5.6	127	21	62
Total	169.0	44.9	436	10.1

The Guidance to Promot Sustainable and Healthy Development of Cruise Transportation Industry in China, released by the Ministry of Transportation of China, proposed that the number of cruise passengers in China would reach 4.5 million in 2020, making China the most dynamic and the largest cruise market in the asia-pacific region ( Huang, 2015 ). Due to the rapid development of Chinese cruise economy, many domestic coastal port cities have grasped this rare opportunity which would probably lead to faster local economic development. Some port cities,such as Shanghai, Tianjin, Xiamen, and Sanya, have established specialized cruise home ports, while cruise terminals are also under construction in Hong Kong, Dalian, Qingdao and Yantai and in the planning in Zhoushan, Ningbo, Guangzhou, Shenzhen, Zhuhai, Haikou, and Qinhuangdao. The coastal port cities in China will be soon on the verge of cruise economy era. At present, the pattern of Chinese cruise ports has been basically formed; the pattern of three pillars have gradually emerged, namely northeast Asia cruise port group with Shanghai and Tianjin as the core, the cruise port group across the Taiwan straits with Xiamen as the core, and the cruise port group of southeast Asia with Sanya as the core ( Liu, 2014 ).

Table 2. The Cruise Terminals Existing, under Construction and in Planning in China ( Wu, & Zhu, 2014 )

City	Cruise Port	Completion time	The berth	T (ten	Clearance Capacity
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	Terminal		number	thousand tons)	(ten thousand people)
Tianjin	Tianjin International Cruise Home Port	2010.5	2	22	50
Dalian	Dalian international cruise center		4		
Qingdao	Olympic sailing center cruise terminal	2010.5	1	22	50
Shanghai	Shanghai international passenger transportation center	2008.8	3	8	
	Shanghai wusong port international cruise terminal	2010.4	1 1	10 20	60
Xiamen	Xiamen international cruise center	2005	1	14	150
Hongkong	Shipping building cruise terminal	1966	2	5	

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	Kai Tak Cruise Terminal	2013.6	2	22	
Shenzhen	Taizi bay cruise home port				
Guangzhou	Nansha cruise home port				
Sanya	Phoenix island cruise terminal	2006	1	8	60

The world's three largest giants in cruise industry have launched a fierce competition in China, since July 2004 when Star Cruises began to provide cruise travel services to Chinese consumers. The cruise market of China was completely under control of foreign cruise companies. At present, the domestic native cruise companies are in the stage of trial operation, still remaining in the exploratory stage in the respects of customer management, ticket sales, cooperation agency, the ship management and shore service and so on. They have fully shown the enthusiasm of competing for cruise market as native operators ( Sun, 2015 ). Henna of Hna cruise Co., LTD , the first domestic cruise in China, started its operations on the route from Tianjin to South Korea in May 2013, marking that the Chinese national brand formally entered the cruise tourism market. On August 31, 2014, Chinese Taishan cruise, completely operated and managed by Bohai Cruise Management Company departed from Yantai port and bounded for South Korea. In early September 2014, Ctrip, a leading online travel service company in China, bought a royal Caribbean's large cruise ship called Celebrity Century from Royal Caribbean Cruises Ltd. In addition, Xiamen Universal Cruise Co., LTD has struck a deal with Xiamen Shipbuilding Industry Co., LTD, and spent 3.1 billion yuan to build luxury cruise ship. Shanghai International Port Co.,

Ltd will also form a cruise lines, etc. It is expected that in 2020, the contribution of cruise market to Chinese economy will reach 51 billion yuan, making it a new growth point of shipping industry and the tourism industry ( Li, 2014 ).

Table 3. Present National Domestic Cruise

Name	Gross Tonnage (ten thousand ton)	Maximum Capacity (person)	First Time Operated in China
Henna	4.7	1965	May, 2013
Chinese Taishan	2.45	927	August, 2014
Celebrity Century	7.1	1814	September, 2015

In 2014, with the support of the relevant ministries and commissions of the state, the cruise tourism policy environment was further optimized. On January 23, the Shanghai municipal government issued “Several Opinions on Shanghai City’s Accelerating the Construction of the Experimental Area of Chinese Cruise Tourism Development”, making a clear division of tasks and responsibilities of the construction of the experimental area. The Ministry of Transport released Guidance on Promoting the Sustainable and Healthy Development of China’s Cruise Shipping Industry on March 7, clarifying the development direction, recent tasks and policy making of China’s cruise transportation industry. On August 9, “Several Opinions on Promoting the Development and Reform of China’s Tourism Industry” promulgated by the State Council clearly stated a bunch of policies which brought good for cruise industry reform and development, including optimizing cruise travel policy, continuing to support national manufacturing of tourism equipment like cruise and

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yacht, planning and guiding the coastal public tourism wharf construction and increasing the international and domestic cruise lines. Furthermore, the State Council promulgated “Several Opinions to Promote the Healthy Development of Maritime Industry” on August 15, specifically stating the government’s tasks of developing cruise economy orderly and cultivating regional cruise transportation brand. Soon, the Ministry of Transport stated that the pilot practice of the innovation cruise transportation system would be carried out in Tianjin city, Shanghai city, Fujian province and Hainan province to speed up the exploration and execution of related policies ( Zhang & Wu, 2015 ).

### **1.3 The significance of large cruise industry in China’s strategic plan**

At present, in order to promote the long-term cooperation between China and the ASEAN, the Chinese government proposes the strategic concept called the 21st Century Maritime Silk Road Construction, in the hope of promoting regional prosperity and the development of the global economy through the all-round cooperation with countries along the maritime silk road in port navigation, ocean energy, economy and trade, scientific and technological innovation, the ecological environment, cultural exchanges and other fields. As the cruise tourism industry can not only fit infrastructure interconnectivity opportunities, but also play an important role in promoting cultural exchange. It is a useful and powerful instrument for greatly improving China’s competitiveness in regional economy with the help of the maritime silk road construction. Thus, cruise tourism, under the background of the 21st Century Maritime Silk Road Construction, is one project requiring scientific planning and also is an important part of national Marine economy competitiveness. Cruise tourism is the mainstream of the 21st century leisure tourism projects, showing the huge development potential in the international tourism market. In the

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implementation of the strategic layout of the 21st Century Maritime Silk Road, the full integration of cruise travel into the execution process of the layout of infrastructure interconnectivity can maximize the use of resources. Cruise tourism, in short, is the world's fastest-growing industry which is not only the important way to upgrade coastal tourism industry level and competitiveness, but also the important growth point to boom national economy in the future. Therefore, it is of irreplaceable significance to promote the effective implementation of the Construction of the 21st Century Maritime Silk Road ( Peng, M. L., 2014 ).

#### **1.4 The purpose and the significance of the research**

With the rapid development of cruise economy, the issues on China maritime safety supervision of large cruise need to be paid more and more attention to. Modern luxury cruise ships complies with strict international standards and management system in the hardware requirements for accurate navigation, collision prevention at sea, maritime rescue and relief of seasickness. Although the security performance of the cruise is improved continually, the maritime accidents of cruise ships still can't be completely avoided. Large cruise ships have complex structures and can accommodate lots of guests and personnel. Once an accident occurs, it would cause a large number of casualties. In order to ensure the safety of large cruise ships, the safety of persons on board and the protection of marine environment when sailing and berthing, it is of great necessity to regulate and supervise the safety of large cruise ships. With the frequent occurrence of large cruise accidents in recent years, people pay more and more attention to the safety of large cruise ships. The regulation and supervision of large cruise safety has become a hot issue. There are a few relevant papers on cruise ship safety regulation and supervision issues, some of which are about how to guarantee the rights of the passengers on the cruise and some

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of which are in view of the summary of the review of the development and trends of passenger ship safety guarantee measures. Yet, none of them has specifically conducted a comprehensive study on maritime safety problems of large cruise ships. The objective of this paper is to analyse the present situation and measures and mechanisms of China's maritime administrative regulation and supervision of maritime safety of large cruise ships and explore some viable suggestions to improve the maritime safety of China's large cruise ships.

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## **Chapter 2 The world's major cruise maritime accidents and their effects on maritime safety rules**

### **2.1 Titanic and its impact**

The cruises have experienced multiple major accidents since the cruise industry appeared, among which, the catastrophe failures of Titanic and Costa Concordia, are typical and significant and have important influence on the passenger ship safety rules. There are no special provisions for the cruise in international conventions which mainly improve the safety of the large cruise ships by improving the overall level of safety requirements of passenger ships. In 1912, the Titanic cruise ship sank and more than 1,500 passengers and crew members died in the accident which aroused the public doubt on the standard for the safety of human life at sea. Therefore, the British government proposed an international conference to make international rules. Representatives of 13 countries attended the meeting and made SOLAS convention on January 20, 1914, which set new international requirements in terms of safe navigation for all the merchant ships, e.g., passenger cabin wall shall be watertight and refractory, passenger ship shall be provided with rescue equipment and fire prevention and fire extinguishing equipment. SOLAS has been revised for many times thereafter. One of the motivations to revise is the occurrence of major disaster accidents and each revision is to respond to the voice of strengthening the safety of life at sea. SOLAS convention prescribes international standards for the construction, equipment and operation of ships, which contains the special design and stability requirements of the cruise in order to reflect the particularity of the cruise. In addition, it provides standards and requires the of availability for life saving equipment. It adopts a mandatory rules of ISM Code, providing an international standards for ship safety management, operation as well as the pollution

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prevention. SOLAS convention also adopted the ISPS Code, which provides legal basis and guidance for ships against terrorist attacks and pirates and specifies the strict standards of ship safety and port security, including access control, security personnel's nomination, and the ship security plan. In terms of safety prevention, SOLAS convention requires the captain to arrange and perform periodic fire fighting and rescue drills, in order to give the crew some opportunity to contact the passengers and demonstrate them the measures of emergency, which should be taken once serious accidents or emergencies happen on board. All passengers are expected to participate in the drills by SOLAS convention. The drills are arranged according to the duration of sailing, if the voyage lasts for a week, the drill for the first time should be done immediately before setting out when all passengers have been aboard. If the voyage lasts for more than a week, the drill should be done every other week. If the shipping period is less than a week, the drill should be completed within 24 hours after leaving the home port. The 91st session Maritime Safety Committee of IMO, revised the original terms by change the statement that “the drill must be done within 24 hours after setting sail” into the statement “the drill should be done before setting sail and immediately after setting sail”. For a ship with voyage of less than a week, it can adopt a flexible way to inform passengers who board after the drill completed safety instruction. In terms of security, large cruise should evaluate potential risks in ship security according to the ship's design, operational practices and related policies and train the crew to be able to notice improper behavior among the crew, passengers and visitors to maintain a safe environment for tourists on board ( Wang, etc., 2013 ).

## **2.2 Costa Concordia and its impact**

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100 years after the major cruise disaster of Titanic, luxury cruise Costa Concordia experienced a tragedy of accident again on January 13, 2012, which prompted IMO to launch a comprehensive review of passenger ship safety measures. Although the industry policy published by the association of cruise industry, a non-government international organization with consulting status in IMO, is not legal binding, it can have great influence on the change of passenger ship safety standards set by IMO. The industry policy released by cruise industry association is binding to cruise operators who are members of the association, and the safety standards specified in the policy are usually stricter than standards required by international conventions. Thus, the large cruise ships of the member company of the association will comply with all safety inspection standards of the port state in the shipping routes. At the same time when the rollover accident of Costa Concordia cruise sparked widespread attention to the safety of cruise ship sailing, CLIA also announced to start comprehensive review of the operation of the cruise industry safety problems, including comprehensive assessment on human factors and operating factors of navigation safety. Based on the review, CLIA presented several measures to continually improve the cruise ship safety operation level as follows, which are adopted taken by IMO.

### **2.2.1 Safety protection**

In terms of cruise passengers' safety protection, CLIA proposed cruise passengers collection policy and passenger nationality registration policy. Passenger collection policy is supplementary to the cruise emergency plan and requires that cruise should conduct mandatory collection drill with all passengers who are already aboard. If there are new passengers aboard the cruise ship after the collection drill of emergency has finished, the cruise shall immediately arrange presentation about the

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safety of collection requirements for these passengers personally or in teams in conformity with the relevant provisions of the SOLAS convention. Cruise passengers nationality registration policy is the new safety policy announced by CLIA and ECC on behalf of the global cruise industry in response to the requirements proposed by government delegates in the 90th session of MSC of IMO, requesting that ships must ensure that the nationality of each passenger on a cruise ship has been recorded and is ready to be provided for the use of rescue workers when needed.

### **2.2.2 Navigation safety**

On April 24, 2012, CLIA and ECC announced three new safety policies with immediate effect. One of the new policies is cruise ship voyage plan. The new regulations take IMO requirements on the voyage plan as the minimum mandatory requirements for members, and more requirements are reference to best practices recognized in the bridge program guide compiled by ICS. The new rules also require a comprehensive overview of the completed voyage plan should be made to all the ship drivers before its implementation. The voyage plan must be completed by a designated officer, and requires the approval from the captain. Another new policy is the restrictions on the crew into the bridge. In order to reduce the unnecessary interference in bridge to the largest extent, CLIA stipulates that other personnel are not allowed to go into the bridge unless they are assigned a relevant task under the condition that ship maneuvering is limited or the alert level is raised. With respect to bridge navigation program, the new policy coordinates the bridge implementation procedure rule to achieve an accordance and consistency among the operation of private company ships, and the operation of shared or common ships in the fleet. This is to enhance the operation safety of the cruises which are members of CLIA and ECC. As the ship bridge workers often take turns to work on different ships, the

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application of the consistent bridge operation procedures will enhance the internal communication between the ship and each company, thus to enhance the operation safety.

### **2.2.3 Fire fighting and rescue**

Members of the cruise association should be clear about 12 common elements of collection and emergency, which are required convey to the passengers, including introduction to the key safety systems, explanation to the adoption of emergency routes, recognition of the emergency exit and so on. The members of CLIA and ECC are required to launch a lifeboat drill for the crew training purpose at least every six months. During the lifeboat drills, the number of crew in the lifeboat must achieve maximum capacity and the exercise must be done in the water in order to make the crew more skilled with the operation of the lifeboat. The policy requires that all the crew associated with lifeboat operation and release to take part in this drill. In terms of additional jackets, CLIA released a new policy on the equipment of jackets on April 24,2012. In addition to the life jackets legally required to be equipped for all of the boarding staff, the policy as well regulates that the cruise must be equipped with more adult life jackets than the number of staff on board, and the number of additional adult life jackets equipped should not be less than the number of cruise passengers numbers in main vertical area of fire prevention.

### **2.2.4 Sewage treatment**

Pollution from large cruise includes ship garbage, sewage, oily water and dust, exhaust gas and so on. Grey water and blackwater are two types of waste water produced by the cruise passengers or staff on board. The grey water is produced in the

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process of shower, in sink or pool and food preparation, while the black water refers to the sewage. On the cruise, these two types of water should be treated in compliance with the requirements of the industry association, which are usually even more strict and demanding than government regulations. Members of CLIA agree that the grey water could be discharged only when the cruise is on the voyage and the speed is not less than 6 knots, and it is forbidden to discharge the grey water in the port, within 4 nautical miles offshore or within the scope of other distance required by the local jurisdiction or local laws unless the cruise has an emergency, or is at where there is regional restriction. And the emission of grey water must be in compliance with all the current laws and regulations. All the black water must be treated by processing of Marine Sanitation Marine Sanitation Device MSD before discharge to be consistent with the international rules. And the black water could be emitted only when the cruise is over 4 miles offshore, and the sailing speed is not less than 6 knots ( Ma, 2014 ).

Learning from the Costa Concordia accident, ECC launched a passenger ship safety program, including three aspects as following:

### **2.2.5 Navigation plan**

During the voyage, captain Schettino of Costa Concordia detoured Giglio Island, making the cruise too close to shore and ran aground. Thus, ECC requires the cruises to plan shipping routes in advance, design routes in advance, and assess the risks of the routes, including the obstruction, hydrometeorological situation and situation of vessel traffic flow near the routes, etc. The cruises also should formulate relevant regulations for feasible routes evaluated, including normal noon position, fixed

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interval report mechanism with relevant departments ashore, to monitor the cruise to ensure that it is on the normal course.

### **2.2.6 The bridge**

The new rules ban irrelevant personnel who has nothing to do with the relevant operation into the cab. Relevant operators include duty officer, quartermaster, the captain, pilot and other personnel who can be considered to be associated with operating in the bridge.

### **2.2.7 Life jackets**

In accordance with requirements of the conventions, cruise liners must be equipped with a life jacket for every one on board. The new policy requires the cruise to be equipped with more adult life jackets and ensure that the number of ship life jacket is far greater than the number of actual persons on board. At the same time, it is recommended that the life buoys are placed on deck so that the ship personnel can find survival equipment in the shortest possible time when emergency occurs ( Wang, etc, 2013 ).

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## **Chapter 3 The factors affecting the safety of the cruises**

Human, ship, environment and management are four aspects which have direct and great influence on the safety of the cruises.

### **3.1 Human factor**

Human factor refers to psychological, physiological, behavioral ability of human. Professional personnel engaged in the work of the cruise on board are collectively referred to as the crew. The crew is the most active factor in the transportation system. If they are in bad condition in their work, they might form the wrong perception, misjudge the current situation of the cruise, and consequently make wrong decisions which might eventually cause harm to the crew and the safety of the cruise. Health and fatigue are the key to the physiological aspect. The crew must be clear that slower mind, slower reaction, inattention, irritability and so on indicate the poor performance of the physiological factor. A large number of sea accidents are supposed to be caused only because of the crew's unfamiliarity with and incomprehension of regulations for preventing collisions. Voyage experience is very important to bridge crew, who can be certificated only if he has served on board for the period of time required by the STCW convention and is competent. Factors that lead to the occurrence of marine accidents include the lack of bridge crew manning; the unreasonable organization of bridge crew; the absence of personnel on duty; the lack of the crew's work responsibility; the crew's overlook of safe navigation rules; the crew's lack of theoretical knowledge and practical experience; the crew's poverty of nautical knowledge; low technical ability; and the lack of sailing experience; the captain's failure to timely correcting the mistakes of pilot behavior, etc. Most of the

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marine accidents are related to crew factors. Statistics shows that 80% of maritime accidents are caused by human factor( Guo, 2014 ).

### **3.2 Ship factor**

Ship factor refers to the state of the ship during the operation period, which generally determines the probability of an accident and the success rate of self-salvation after the accident. In terms of this factor, the maintenance and good condition of the ship's key equipments are very important, because the technical failure of the propulsion system or power system or the weakening of the hull strength of the cruise may probably lead to navigation accidents. The failure of the steering or propeller remote control device may make the bridge lose control of rudder and engine, thereby increasing the probability of ship accident especially at a crucial time for the cruise safety. The failure of navigation equipments such as direction device, location device, distance calculation device and so on, may greatly affect the accuracy and reliability of routes; the failure of communication equipments can make it difficult for ship-to-ship and ship-to-shore to communicate with each other timely. The poor communication or interruption is likely to cause ship collision and make it hard to seek effective relief after the accident when the port is in restricted visibility, causing disastrous consequences. The conversion of ship without permission may lead to changes in ship's center of gravity and the rapid loss of stability at the time of the accident. Lots of passengers' gathering in the hull of the cruise may cause many hidden dangers and thus cause the internal risk of the ship.

### **3.3 Environment factor**

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Weather, sea conditions, and waters constitute the environment factor. Environment factor also contains the external navigation environment and the internal environment of the cruise ship itself. Although the sea is vast, the depth, width, bending angle and crossing situation of channels are relatively fixed, and directly affect shipping safety. In transport navigation environment, factors of channels and ports which are mainly divided into two aspects of natural and artificial factors are also very important. The natural aspect includes the influence of meteorological and ocean respectively or jointly on navigation of cruises. The artificial factor refers to the routes and channels set and arranged by human with the help of the natural environment and of navigation equipments, to provide reference for the location and navigation to ensure cruise safety. The leading indicators to measure the traffic environment of waters include the vessel traffic flow and navigation order. The waters where is most likely to have an accident is the sea area about 10 nautical miles offshore when the channel condition is limited, with shoals, reefs and wreck densely covered. At the same time, in such waters, the vessel traffic density is generally larger, making it more difficult to maneuver big cruise ships, thus, the probability of collision accidents increases. The internal environment of the cruise ship itself includes working conditions, living environment and safety management. In a safe and comfortable living environment, the unsafe behavior of people will reduce, and this will help to improve efficiency, reduce fatigue, so as to avoid an accident. After the ISM code came into effect, the implementation of the system management of ships mainly relies on the company's daily management and the atmosphere of ship safety management. However, the company can not conduct safety management and inspection on ships 24 hours a day uninterruptedly. Therefore, in order to maintain a rigorous safety management atmosphere on a regular basis for the ship, the role played by the competent maritime safety authority is also very important.

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### **3.4 Management factor**

The management of cruise companies, maritime safety supervision and administration authority and other related governmental departments are the main two aspects of management factor. The cruise companies control the personnel recruitment, training and deployment; the operation, repair and maintenance of the cruise ships; the choice of sailing routes; the policy which encourage to avoid the risk or adventure in response to the bad environment, etc. Thus, the company's safety management has direct impact on the three factors of human, ship and environment. The system of company safety management and the quality of ship and shore personnel directly affect the company's control of the accident. The management level, business level and safety quality of the shore personnel, are closely related with the safety of the cruise. To a large extent, an accident could be avoided if the management system is scientific. The safety supervision and management of Maritime and other functional departments has important influence on the cruise safety. Strict safety supervision can urge the company to carry out the safe production responsibility, improve the system of safety management, eliminate the hidden cruise ship accidents, constantly enhance the level of supervision and ensure the safety of the cruise in jurisdiction ( Guo, 2014 ).

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## **Chapter 4 The main administration measures on the cruise taken by Maritime Safety Administration authorities in China**

With the continual increase of the number of cruises visiting Chinese ports and the development of Chinese domestic cruise companies, the workload of supervision and administration on cruises for China's MSA authorities has been increasing gradually as well. At present, all the domestic MSA agencies with the jurisdiction of major cruise home ports have taken effective measures to ensure the safety of the cruises. Dongjiang Maritime Bureau affiliated to Tianjin MSA selects the excellent talents from each business to set up the Star Cruise Supervision Team, cultivating and developing cruise supervision culture with typical Dongjiang feature step by step, in order to comprehensively strengthen the safety administration of international cruises visiting Tianjin international cruise home port. They establish Dongjiang Cruise Supervision System, develop the Enforcement Norms of the Dongjiang Star Cruise Supervision Team Dongjiang MSA, drafts the Regulation Formalities for Port Entry and Exit of the International Cruises, and compile the Common Defects for Port State Supervision of International Cruises and other manuals. They also search and review the historical inspection data of cruises calling, and sets up Home Port Cruise Health Records. They Comprehensively track the PSC inspection of cruises which took ports under their jurisdiction as home ports conducted in ports required by Tokyo MOU and Paris MOU; they collate the defects of the PSC inspection of all the calling cruises within five years, make technical statistical analysis, and finally finds out weaknesses of each cruise in the previous inspection which affected the safety of ship each cruise ship so that they can focus on the designated project of the cruise during their inspection. They design and develop the Information System for the Management of International Cruise Safety in order to collect the basis of data of the calling cruise, cruise lines and related units to establish a basic information

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database for cruise safety supervision to establish a unified data platform for subsequent safety data analysis, quality assessment and ship classification. They strengthen the cooperation and interaction with cruise home port and the cruise lines, regularly visit ship management companies which run the international cruise ships which visited the ports under their jurisdictions to understand their demands. According to what they found in safety inspection, they hold seminars to report to the company timely, they also establishes the ship-shore emergency management system and emergency response plans to strengthen risk management. They regularly communicate with the government of the flag state of cruises calling ports under their jurisdiction, set up long-term management mechanism to conduct key inspection on they key cruises and eventurely form a new model of joint supervision together with the port state, the flag state government and the cruise owner ( Retrieved May, 23, 2015 from the World Wide Web:

<http://www.ccyia.com/news/xingyexinwen/2014/1112/1743.html> ).

Shanghai MSA puts forward the concept of All-The-Way Tracking Service for international Cruises, mainly including: the maintenance cruise navigation environment, the acquisition of sailing information of cruise timely, the guard during the whole course in port, entry and exit inspection, the PSC inspection of international cruises, pollution prevention management of international cruises, compiling a special maritime convenient service manual for cruises, setting up international cruise emergency response system, establishing international lines information platform and the international cruise maritime administration service center, etc. ( Retrieved May, 23, 2015 from the World Wide Web:

<http://www.shmsa.gov.cn/NewsContent.aspx?CatalogId=f04ecb41-8ea9-422f-8abf-f5ede769bf10&ContentId=0d38b959-c3d0-4d21-9ee7-3be505de0748> ).

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Xiamen MSA advocates the idea of Credit Management on Cruise Safety, they changed the previous raid mode to the calling cruises into the Open PSC Inspection Mechanism by which they will inform the captain in advance that they will conduct PSC embarkation inspection so that the cruise can arrange the time to call the port advantageously and reasonably and take the initiative measures to find defects and rectify in time to effectively improve the efficiency of inspection. They also open the Green Channel, implement the flexible office hours, and provide the calling cruise ships fast clearance and inspection service through electronic approval, online and credit management ( Retrieved May, 23, 2015 from the World Wide Web:

<http://www.xmsafety.gov.cn/View.Asp?ID=4893> ).

Sanya MSA, made the On-site Supervision and Inspection Instructions for Large Cruise to format the norms related to the cruises safety supervision ( Sanya MSA, 2012 ). Generally, the domestic MSA agencies mainly takes the following measures to supervise the safety of the cruises calling Chinese ports.

#### **4.1 Port management**

Many MSA agencies Implement the system of 24 office hours to accept the declaration from cruises to make sure that the maritime supervision work will not delay cruise sail plan because of rest time. They improve the methods of inspection on cruise entry and exit of the port, flexibly take embarkation or not embarkation or going through formalities of import and export at the same time (except not eligible) to conduct inspection of import and export formalities, trying to make it as convenient as possible for cruise ships' port entry and exit and increase the speed of clearance.

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## **4.2 Navigation management**

They make regulatory requirements and provide professional guidance to the wharf and the agency on information about cruise arrival declaration, pilot embarkation location, berth designation, cruise movement coordination, voyage plan making and the status of navigation environment of the port to help the related units to get prepared in advance to ensure the cruises' entry and exit safely and smoothly. When the cruises enter into the waters in effective coverage of the vessel traffic service system, they track the cruise motion by modern information means such as ship automatic identification system and radar, send safety tips information to the cruise ships timely, coordinate the dredging vessels in the waters of anchorage and other ships to keep clear to avoid collision as soon as possible, and prioritize the cruises into the waterway. They call relevant units to organize a cruise safely berthing meeting, put forward requirements, examine and verify the pilot program carefully and give opinions and suggestions to the pilot. Before the arrival of the cruise ships, they send a patrol boat to cruise the waters and clean up the waterway, to ensure that the port navigation aids work smoothly and the waterway is clear. JianDuTing In cruise ship in and out of port, they send a patrol boat to escort to ensure the berthing waters unobstructed.

## **4.3 Pollution prevention management**

They take special examination and acceptance for port antifouling and record for pollution contingency plans, formulate a complete set of technical regulations, guidelines and procedures, host maritime special review of the international cruise home port in accordance with the relevant requirements, examine the basic project situation, the company system, ship pollution prevention capacity, risk prevention

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capacity and the content, the operability, the cohesion with plans of each level of the terminal pollution emergency plan of the wharf, and put forward some opinions and suggestions on the improvement.

#### **4.4 Security**

The MSA agencies take the initiative to strengthen the communication and coordination with the port, the joint inspection units, the shipping agency and other departments to form powerful joint force of safety supervision. They are tougher with the examination and approval of the international cruise ships entry, and strictly require and audit security certificates and relevant security information. They supervise and urge the pier owner to intensify inspection of dangerous goods carried by passengers, strengthen the communication with customs and border control to investigate and intercept strictly passengers' embarkation carrying dangerous goods. Ports and cruises are required to strictly enforce the International Ship Security Rules of the People's Republic of China, implement various security measures, and the MSA agencies strengthen the on-site supervision and inspection of implementation. The command center of MSA agencies are required to be manned 24 hours a day to ensure smooth communication.

#### **4.5 Port state control**

The MSA agencies set up ship safety inspection station checkpoints as a professional team to concentrate expertise for the supervision of international cruises safety. They send prosecutors for exchange and training with foreign port state supervision organizations, and carry out technical exchanges and cooperation with several members of the international association of classification societies. They pick out the

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provisions in respect of the inspection of the liner in SOLAS convention and refine them into inspection key points in both Chinese and English, and point out their scope of application to further clarify the basis of international cruise inspection.

#### **4.6 Passenger steamer and search and rescue center corporate plan**

This plan is an important document of IMO related to the international passenger ship search and rescue , including the basic information of the passenger ship company, emergency contact, emergency action, emergency rescue force deployment of resources and rapid response, and the responsibilities of the parties during risk disposal and search and rescue operations, etc., of the maritime search and rescue center, passenger ship and ship company. In the search and rescue of a passenger ship in distress, the effective implementation of the plan can help the maritime search and rescue center, passenger ship and passenger ship company to establish emergency response basic links in a timely manner, form a quick reaction mechanism of trinity, and improve passenger safety last ring. At the same time, the plan is also the basic plan of periodic joint search-and-rescue drill for maritime search and rescue center, passenger ship and passenger ship company, which can help to improve mutual emergency coordination and eventually achieve the purpose of searching and rescuing the ship and personnel in distress more effectively. At present, associated with international passenger ships within its jurisdiction, Liaoning MSA, Shandong MSA and Xiamen MSA have established and implemented this plan.

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## **Chapter 5 Existing Problems of cruise maritime safety supervision in China**

From the above analysis, the MSA agencies of the cruise ports respectively provide navigation environment maintenance, safety inspections and maritime emergency search and rescue and other safety supervision measures, and conduct PSC inspections for the visiting large cruise ships. And related port state supervision and inspection are mainly based on the passenger ship inspection standards as well as additional requirements of hull, fire fighting and rescue equipment for ocean voyage in related conventions. At present, the large cruise maritime safety supervision in China still have some problems, mainly as follows:

### **5.1 Lack of unified regulations on large cruise safety**

Domestic legislation on large cruise safety regulation in China is mainly reflected in provisions in the Regulations of the People's Republic of China on International Ocean Shipping and Law of the People's Republic of China on Ports. These provisions have deficiency and the law force is relatively inferior. In contrast, The United States, the country with the largest cruise passengers and most developed cruise industry, inflicts the most strict regulation on the cruise industry and has relatively sound cruise safety legislation which could be used for reference to China. In 2010, the United States passed The Cruise Vessel Security and Safety Act of 2010, as a supplement to Title 46 Shipping of The United States Code. In addition to the provisions on cruises regulated by SOLAS convention and United States Code, this act sets some special requirements for the design, facilities, structure and transformation of the cruises. It also regulates the obligations of the cruise owner and require the owner to provide all the passengers with safety guidelines on the health and security information, the report scope of the the criminal cases, jurisdiction

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agency with their contacts and the legal procedures and other information in advance. The safety guidelines should be put in records in FBI and uploaded to the official website. The act is not only for cruise ship sailing safety regulation, but also for the solution to the public security problems generated from high-density gathering of passengers and crew on the cruise. Compared with the United States and European Union, China still is relatively backward on the shipping service soft environment construction, especially in legal system construction, and have not generated the innovative legal model. There are few related laws and regulations about the cruise. In 2008, the NDRC issued Guidance to promote the Development of Cruise Economy in China. In December 2009, the State Council issued the Opinions on Speeding up the Development of Tourism, in which the government proposed to support the development of conditional area to emerging cruise and yacht travel and encourage the cruise ship, yacht tourism equipment manufacturing industry for the first time. Despite these relevant policies and guidelines, the law system of cruise ships now is a blank. The MSA agencies conduct port supervision and management on large cruises according to the SOLAS convention, the ISM Code and ISPS Code and other international conventions. However, provisions of these conventions are general standards of ship safety and can't solve all the problems in large cruise supervision faced by China. Large cruises transport is the mode of transportation of integrating both transportation and tourism, and China is lack of corresponding legal regulations for passengers' leisure, catering, entertainment, etc, in large cruise tourism. The traditional law for carriage of passengers by sea can not adapt to the complexity of the cruise economy passenger transportation. Cruise lines have no clear industry norms and standards to respond to all kinds of tort crime, and the unexpected occurrence happened on the cruise in their business in China. The contract signed between Cruise lines and the passengers also have no format of standard terms, and there are no clear rules on cruise entry, port management and passenger

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clearance procedures, causing a lot of problems for passenger transport by cruise. The ambiguity of specification and the lack of industry standards often pose the hidden dangers ( Ma, 2014 ).

## **5.2 Lack of supportive policies for the development of the cruise industry**

At present, China has not put cruise industry into the overall planning, and has not made systematic standard specifically for development of the cruise industry. There is a lack of laws and regulations policy support for international cruise industry to invest in China. Governmental departments and related industry sectors of tourism, border, customs, quarantine, shipping and shipbuilding have not introduced special guidance and special planning for the development of cruise ( Ma, 2014 ).

## **5.3 Unable to monitor the safety management system of international cruise companies**

Most of the major international cruise lines run their business in China through the travel agency. Once the passengers on the cruise get into a legal dispute, rights issues are difficult to solve. Due to this type of operation, the domestic regulators can only monitor the travel agency, but can't regulate the cruise company's safety system ( Ma, 2014 ).

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## **Chapter 6 Suggestions on the improvement of China's maritime safety supervision of large cruises**

### **6.1 The unification of overall laws and regulations of large cruise safety**

China increasingly values the development of cruises, the policy environment of the development of cruise tourism is continuously improved. In June 2008, the NDRC issued "On the Guidance to Promote the Development of Cruise Economy in China" approved by the state council; in June 2010, the National Tourism Administration released "Asia the International Cruise Port Tourism Service Standard" which is considered to be the first cruise professional industry standards. In September 2012, the NTA formally approved Shanghai to be the first cruise tourism experimental area in China. In February, 2013, the State Council put forward to support cruise yacht wharf and other leisure tourism infrastructure construction clearly and actively develop related service products. The NTA lists cruise tourism into new emphasis cultivating project. All of these create the necessary and loose policy environment and contribute to the future development of Chinese cruise industry. However, these efforts are aimed at specific competent authorities without full consideration of the cohesion among different authorities. Therefore, it is of great necessity to make a law similar to the The Cruise Vessel Security and Safety Act of 2010 of the United States to join the function of these institutions together organically. Secondly, the design and construction of large cruises by domestic shipyards still have no classification standards issued by the classification societies. Thirdly, It is very important to strengthen the PSC inspection training. For the large cruise's safety supervision, the seaworthiness of the ship and the adaptability of captain and crew are the most fundamental. To ensure the seaworthiness of large cruises requires the to intensify the power of port state inspection, to analyse the difference between the ocean-going

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freighter and major cruise on structure and navigation condition on the basis of the experience of the inspection for ocean-going freighters, to formulate additional corresponding check projects, and to enhance the training for port state prosecutors to make them competent for their posts.

## **6.2 The establishment the cooperation mechanism strengthen the cooperation between the authorities**

Before the unified safety regulations are enacted, at present, China must strengthen the cooperation of the several regulatory authorities to avoid the overlap or regulatory gap in the regulatory process. In addition, sufficient attention should be paid to regulation efficiency, with large cruises as the core, giving full consideration to its interests when completing tasks of regulatory authorities. Cruise tourism involves multiple government functional departments. During the process of entry and exit, the international cruise ships needs transport, customs, tourism and other management units to set up effective coordination mechanism to gradually improve the supporting facilities to promote the healthy and rapid development of cruise tourism. In terms of port regulation, government departments need to form a complete set of international cruise entry and exit formalities and procedures of ship passengers clearance and create a unified and efficient regulatory system specification.

## **6.3 The full use of the role of industry associations to establish multidimensional management system of authorities,industry associations and the cruises as well as their companies**

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The administration can supervise the safety of large cruise ships through the reference of certification or membership management by independent industry associations. The associations can establish quality management system certified by ISO, set requirements which can even be more strict than the regulations or conventions so that they can ensure the safety quality of their members. If all of the cruise lines are members of the cruise industry association, the administration can supervise them through communication with the associations. The associations should develop the quality system certification scheme and embrace management systems related to safety work carried by its members. To the Administration, it would help a lot for effectively supervising the safety of the large cruise lines. At present, the inspection agencies and industry associations have the corresponding standards for large cruise ship safety regulations respectively. But to implement these standards, besides the check and supervision by agency officials and the supervisors of industry associations, the formulation and implementation of cruise lines' own safety management measures seem to be more important. The cruise companies are emerging industry in China and their internal systems and regulations are nearly blank. Therefore, the improvement of the internal system and management level is an important factor to reduce safety accidents of cruise liners. It is necessary to strengthen the regulation of cruise lines, and draw lessons from foreign mature supervision mechanism. To be in line with international standards and provide a good guarantee for healthy development of the cruise economy, one practical method is to form a set of domestic cruise service management rules as soon as possible. It is crucial to formulate unified standards in all kinds of safety measures, personnel training and staffing and security early warning facilities through the full market investigation ( Ma, 2014 ).

#### **6.4 The intensification of the supervision of the safety of the cruises**

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The government should provide support to the cruises company with advantageous policy, encourage them to buy or lease good large cruises and phase out old ships with new and good condition large cruises to improve the quality of the large cruises operated in China gradually. The authorities responsible for the maritime safety should develop, perfect and improve the standards of the cruises and strengthen the large cruise ships safety inspection and assessment continuously. At the same time, they should strengthen the regular inspection to the existing large cruises to ensure the seaworthiness of cruises, constantly improve large cruise ship navigation, communication and rescue fire fighting equipments configuration, strengthen the daily safety inspections, urge the crew to do daily maintenance work and ensure the key equipment and rescue fire fighting equipment on the cruises can be instantly available in emergency situations, and correct equipment defects on time to respond to emergencies at any time to improve the safety performance and self-salvation ability. The destination port should be informed of voyage route in advance, and the authorities, in view of the traffic situation near the port as well as the cruise's own situation, are obliged to provide guidance to the safety or voyage, and supervise the safe navigation in the port area. The competent authority shall strengthen pollution early warning system of the large cruises, plan pollution emission standards referring to the CLIA to protect marine environment of large cruises visiting port.

### **6.5 The further detailing of the FSA research risk and regulatory measures**

Denmark presided the FSA study over the roll-on ship and cruise, the research of which was submitted for consideration on MSC, 85, in 2008. In terms of cruise, the FSA study shows that the safety level of cruise is at ALARP range, and also points out that the main type of accidents are collision and grounding. Although the

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frequency of these accidents is low, the number of casualties is usually big. In addition, the barge operation is one of the high-risk cruise operations. The research also put forward several measures which could help effectively reduce the risk, such as improving bridge design, improving driver simulator training intensity according to the ECDIS, improving the damage stability and so on ( Wang, etc., 2013 ). The administrative authorities responsible for the ocean cruise supervision should require the ocean cruise operators to sort out and rate all potential risks according the accident frequency and damage degree combined with the actual situation of the ocean liner, and establish and improve corresponding prevention, process prost safety measures according to different risk levels.

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## **Chapter 7 Conclusion**

With the development of Chinese economy and the upgrading of life level of Chinese people, more and more large cruises call Chinese ports, more and more domestic large cruise will be constructed and operated. As large cruises safety accidents led to mass casualties in history, the safety issues of large cruise should be paid more attention. The administrative authorities have taken many effective measures to supervise and ensure the safety of large cruises. Yet, some problem still exists. It is suggested that they try to introduce overall laws and regulations on large cruise safety, cultivate the cruise industry association to help with the safety management control, strengthen the on-site supervision and inspection and further detailing the FSA research and application.

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