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China maritime safety administration in the new millenium : challenges and strategies

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WORLD MARITIME UNIVERSITY
Malmö, Sweden

**CHINA MARITIME SAFETY ADMINISTRATION
IN THE NEW MILLENNIUM**

Challenges and Strategies

By

XIAO MING

The People's Republic of China

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the reward of the degree of

MASTER OF SCIENCE

in

MARITIME ADMINISTRATION AND ENVIRONMENTAL PROTECTION

2000

DECLARATION

I certify that all the material in this dissertation 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 dissertation reflect my own personal views, and are not necessarily endorsed by the University.

..... (Signature)

..... (Date)

Supervised by:

Name: Dick Hodgson

Office: Associate professor

World Maritime University

Assessor:

Name: Jan-Åke Jönsson

Office: Associate professor

Institution/organization: World Maritime University

Co-assessor:

Name: Haakon Storhaug

Office: Principal Surveyor

Institution/organization: Norwegian Maritime Administration

ABSTRACT

Title of Dissertation: **China Maritime Safety Administration in the
New Millennium: Challenges and Strategies**

Degree: **Msc**

The dissertation is a study of the challenges and strategies facing the China Maritime Safety Administration in the new millennium.

An examination is made of the internal environment of the China Maritime Safety Administration, which includes its mission, values, mandate, functions and structure. The differences between the new and former China Maritime Safety Administration are also reviewed. Based on the internal environmental scanning, the strengths and weaknesses of the China Maritime Safety Administration are analyzed in detail, including the current structure, staff, technologies, controllability, procedure, legislation, information system, funding and law enforcement capacity with respect to both maritime safety and environmental protection.

An assessment is made of the external environment of the China Maritime Safety Administration from the perspective of international, economic, social, political, legislative and technical aspects. From an international perspective, organizations like IMO, ILO, PSC MOUs, IACS and some maritime safety administrations in other countries are assessed, while in relation to economics, international shipping, national shipping and other maritime economics are reviewed. Safety culture, views of people and media are assessed from a social aspect, while government reform is assessed from a political perspective. Some new maritime laws are assessed, while technologies in the

maritime sector, information technology and formal safety assessment are reviewed. The external environment of the China Maritime Safety Administration is analyzed and opportunities for, and threats to, the China Maritime Safety Administration are identified.

Based on an identification of the strengths and weaknesses, opportunities and threats in relation to the China Maritime Safety Administration, challenges facing the China Maritime Safety Administration in the new millennium are identified through the combination of the above factors.

To meet these challenges, strategies need to be addressed. To develop these strategies, certain principles are set out and a vision for the China Maritime Safety Administration is proposed. These specific strategies are proposed in an integrated way for the China Maritime Safety Administration so as to meet those challenges effectively.

The dissertation closes with conclusions and recommendations drawn from the study. The conclusions summarize the strengths and weaknesses, opportunities and threats in relation to the China Maritime Safety Administration drawn, from the analysis of the internal and external environment; and the challenges facing the China Maritime Safety Administration in the new millennium. The recommendations comprise the proposed integrated strategies for the China Maritime Safety Administration to meet those challenges.

KEYWORDS: Challenges, Strategies, New Millennium, China Maritime Safety Administration

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LIST OF ABBREVIATIONS

APCIS	Asia-Pacific Computerized Information System
ARPA	Automatic Radar Plotting Aids
ATN	Aids To Navigation
BIMCO	Baltic and International Maritime Council
CCG	Canadian Coast Guard
CCS	China Classification Society
CMSA	China Maritime Safety Administration
COSCO	China Ocean Shipping Company
CSRS	Chinese Ship Reporting System
ECDIS	Electronic Chart Display and Information System
EU	European Union
FOC	Flag Of Convenience
FSA	Formal Safety Assessment
FSI	Flag State Implementation
GDP	Gross Domestic Production
GMDSS	Global Maritime Distress and Safety System
IACS	International Association of Classification Societies
IBS	Integrated Bridge Systems
ICS	International Chamber of Shipping
ILO	International Labor Organization
IMDG	International Dangerous Goods Code
IMO	International Maritime Organization
INF	Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on board ships
ISF	International Shipping Federation

ISM	International Safety Management Code
IT	Information Technology
JMSA	Japanese Maritime Safety Administration
LL	International Convention on Load Lines, 1966
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978
MCA	Maritime and Coast Guard Agency
MEPC	Marine Environmental Protection Committee
MOT	Ministry of Communications
MOU	Memorandum of Understanding on Port State Control
MSA	Maritime Safety Administration
MSC	Maritime Safety Committee
NM	Nautical Mile
NPC	National People's Congress
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990
DGPS	Differential Global Position System
PSC	Port State Control
PSCO	Port State Control Officer
SAR	Search and Rescue
SMS	Safety Management System
SOLAS	International Convention for Safety of Life at Sea, 1974, and its Protocol of 1978
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995
SWOT	Strength, weakness, opportunity and threat
UK	the United Kingdom
USA	the United States of America

USCG	the United States Coast Guard
VDR	Voyage Data Recording
VHF	Very High Frequency
VTMIS	Vessel Traffic Management Information Systems
VTS	Vessel Traffic Service
WMU	World Maritime University
WTO	World Trade Organization

1. Introduction

This chapter introduces the background to the China Maritime Safety Administration (CMSA), the objective of the dissertation, as well as the methodology to be used. In addition, the limitations and omissions in this dissertation are noted.

1.1 Background

As part of the reform of the port system in China in 1986, the China Maritime Safety Administration was separated from the port system. Since then, the CMSA has developed quite fast and both the means and capacity of law enforcement have been greatly improved. In 1998, the Chinese government carried out further reform and the Registry of China was separated from the China Classification Society and merged with the Harbor Superintendency Administration of the People's Republic of China (P.R.C.), creating a new China Maritime Safety Administration.

This reform gives the CMSA a more prominent position in the government, and provides new circumstances and a broader space and stronger base for its development. The new CMSA is different from the former one regarding the administrative mechanisms, structure and responsibilities. As the new CMSA enters the new millennium, it is facing quite a lot of challenges. How to deal with these challenges seems urgent and important to the CMSA. It will determine whether the CMSA can have a sustainable development in the first decade of the new millennium so as to sustain the Chinese economic development, protect Chinese maritime interests, and fulfill

international obligations. Therefore the strategies must be studied carefully, formulated correctly and implemented effectively so as to meet these challenges adequately.

1.2 Methodology

The author has researched the relevant literature in the library at World Maritime University (WMU) and on the Internet, and analyzed the information gathered. A further study of the CMSA system was conducted with respect to its mandates, values, structure, programs, funds, equipment and facilities, and staff.

Some contacts were made through e-mail, and ordinary mail to collect first hand information. All the information and data collected has been studied, analyzed, and discussed. The working experience of the author in the Guangzhou Maritime Safety Administration has helped him in the study.

The methodology of the SWOT analysis is used to identify the Strengths and Weaknesses of the CMSA, and the Opportunities for and Threats to the CMSA. The methodology of strategic management is used in this study to address the strategies for improving the CMSA system. Figure 1.1 shows the model used in this dissertation.

It should be mentioned here that priority has been given to the identification of the CMSA's weaknesses rather than its strengths. Because the dissertation aims at the development of the CMSA, the author considers that identifying the weaknesses of the CMSA will be more valuable than identifying its strengths while considering the strategies for the CMSA's development.

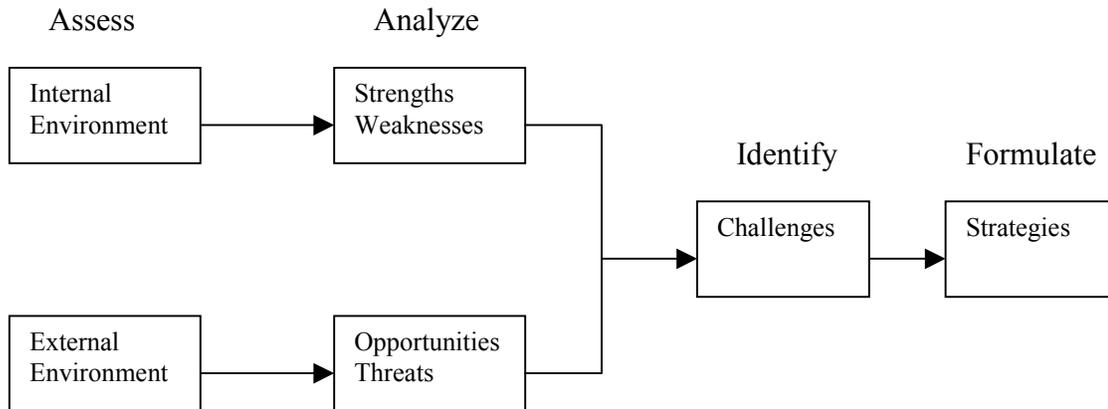


Figure 1.1 Strategic management model

1.3 Limitations and omissions

Strategic management techniques have been widely and successfully used in the private sector, but only rarely used in public administrations due to certain difficulties (Cole, 1997). Although a study of the strategies of the CMSA is difficult, the author thinks that meeting this challenge will benefit himself and the CMSA to some extent if it is willing.

This dissertation combines knowledge learned from WMU, with experiences of working in the CMSA, along with the systematic thinking of the CMSA. Some views are only the author's personal views and not that of the CMSA.

This dissertation is not intended to describe the CMSA system to its full extent. The present status of the CMSA is briefly discussed, focusing on the aspects of structure. Since the CMSA is carrying out its reform, the internal environment of the CMSA is changing quickly. There must be some differences between the description of the CMSA in the dissertation and the real situation in the CMSA.

Since the external environment of the CMSA presents a very broad and complex picture, it is impossible to address all the external factors in this dissertation. Therefore, only the key elements which seem to have an important effect on the CMSA are addressed.

2. The CMSA's internal environment

As an organization, the CMSA has its internal environment which consists of quite a lot of elements. This chapter will review the internal environment of the CMSA, with particular respect to the mission, values, mandate, functions and structure. By doing this, the author is trying to identify the strengths and weaknesses of the CMSA.

2.1 Mission and values

2.1.1 Mission

The mission of the CMSA is to protect lives and property at sea and to preserve the ocean environment so as to sustain future development.

2.1.2 Values

The CMSA has the values of "Pioneer, initiative, reality, efficiency, united, contribution, honest, fair" (Year Book House of China Transportation & Communications, 1999).

- Pioneer means the staff is encouraged to do something that has not been done before, for example by developing or using new methods or techniques.
- Initiative means the staff is encouraged to be active in solving a problem.
- Efficiency means the staff is encouraged to do a task successfully without wasting time, money or energy.
- United means the staff is encouraged to join together and act as a team.
- Contribution means the staff is encouraged to do the best to make the CMSA successful.

- Honest means the staff is encouraged to tell the complete truth or give their sincere opinion, even if this is not very pleasant.
- Fair means the staff is encouraged to deal with affairs in a reasonable, right and just way.

2.2 Mandate and functions

2.2.1 Mandate

Public organizations have a mandate specified in the legislation, that defines the scope of their activity (Gortner, 1987). Since mandates are of fundamental importance in deciding on the strategies, it is often a useful lesson for public agencies to re-examine what they are meant to do under the legislation which set them up.

The mandate of the CMSA depends on the international conventions joined by China and the relevant domestic laws. The mandate is stated in a general sense in the articles of particular conventions and domestic laws.

In national legislation, its mandate can be found in the following laws:

- Maritime Traffic Safety Law of the People's Republic of China
- Maritime Environment Protection Law of the People's Republic of China
- Territory Sea and Adjacent Area Law of the People's Republic of China
- Maritime Law of the People's Republic of China

In international legislation, its mandate can be found in the conventions ratified by China. Until now, China has ratified 34 IMO conventions (Year Book House of China Transportation & Communications, 1999).

The CMSA is responsible for effectively enforcing the national and international maritime safety and pollution prevention standards on Chinese ships no matter where they are, on foreign ships voluntarily coming into Chinese ports, and providing essential navigation services. Also, it needs to exercise adequate control over the agents who have been authorized to carry out tasks on behalf of the CMSA according to the conventions.

2.2.2 Functions

The main functions of the CMSA include (Maritime Safety Administration of the People's Republic of China, 1998):

- i) Formulating and implementing relevant laws and regulations, policies, technical standards and specifications on safety administration, prevention of pollution from ships, inspection, survey of ships and offshore units as well as navigation services for safe operation of maritime industry.
- ii) Administering shipping safety and prevention of pollution from ships; Supervising the implementation of safety management systems and safe operation of shipping companies; investigating marine traffic and pollution accidents, and dealing with violations thereof.
- iii) Being responsible for the administration of ship's and offshore unit's surveying services, statutory survey and certification of ships and offshore units. Being in charge of the examination and approval of qualifications of ship surveying organizations and ship surveyors as well as the branch offices of foreign ship surveying organizations. Being responsible for the registration and control of Chinese ships, control of Chinese and foreign ships entering and leaving Chinese waters, and the safety of ships carrying dangerous goods and other cargoes.
- iv) Being in charge of the administration of registration, training, examination and certification of seafarers and pilots; examination and control of qualification and

quality assurance systems of seafarer and pilot training institutes and control of issuing seaman's passport.

- v) Being responsible for marine traffic control, designation and control of traffic-prohibited zones, navigational channels (routes), traffic control zones, out-port anchorage and safety operation zones etc., examination and approval of safe berthing conditions, the use of coastline and maritime engineering operations relating to the safety of navigation, removal of wrecks and other navigational obstacles. Being responsible for broadcasting/issuing navigational warnings and notices, conducting the routine work of the China Maritime Transport Facilitation Committee.
- vi) Being in charge of the administration of aids to navigation, hydrographic surveying and mapping for seaports and fairways as well as nautical publications. Organizing, coordinating and conducting maritime search and rescue operations.
- vii) Being in charge of the implementation of relevant international maritime conventions and exercising Flag/Port State Control thereof. Being responsible for the co-operations and exchanges on maritime affairs with relevant international organizations and maritime authorities.
- viii) Being responsible for the organization and preparation of medium/long term development plans as well as for the management of port and light dues collection.
- ix) Carrying out other instructions from the Ministry of Communications.

2.2.3 Functions delegated to the China Classification Society (CCS)

According to SOLAS, Administrations are responsible for taking the necessary measures to ensure that ships flying their State's flags comply with the provisions of relevant Conventions, including surveys and certification. Meanwhile, Administrations may

delegate the surveys and certifications to one or more organizations, but the responsibility still remains within the Administrations.

Before the establishment of the new CMSA, the China Register of Shipping had already delegated all the statutory surveys and certifications to the China Classification Society (Shen, 1999).

2.3 Structure of the Chinese Maritime Safety Administration

2.3.1 Framework of the CMSA

In general, there are four levels in the framework of the CMSA. The first level is the headquarters. The second level is the direct-controlled bureau under the headquarters. The third level is the sub-bureau under the direct-controlled bureau. The fourth level is the station under the direct-control bureau or sub-bureau. Figure 2.1 shows the framework of the CMSA.

The first level mainly exercises the function of regulatory policy, the second level mainly exercises the synthetically or multiple function of administration, the third level mainly exercises the specific functions of administration, and the fourth level mainly exercises the functions of the on-scene administration.

2.3.2 Headquarters of the CMSA

Figure 2.2 shows the structure of the Headquarters of the CMSA. There is one Director General, one Executive Director General and three other Deputy Directors at the headquarters. A Vice-Minister of the Ministry of Communications chairs the Director General. There are twelve divisions in the headquarters.

The headquarters mainly plays a policy-forming role in the CMSA system.

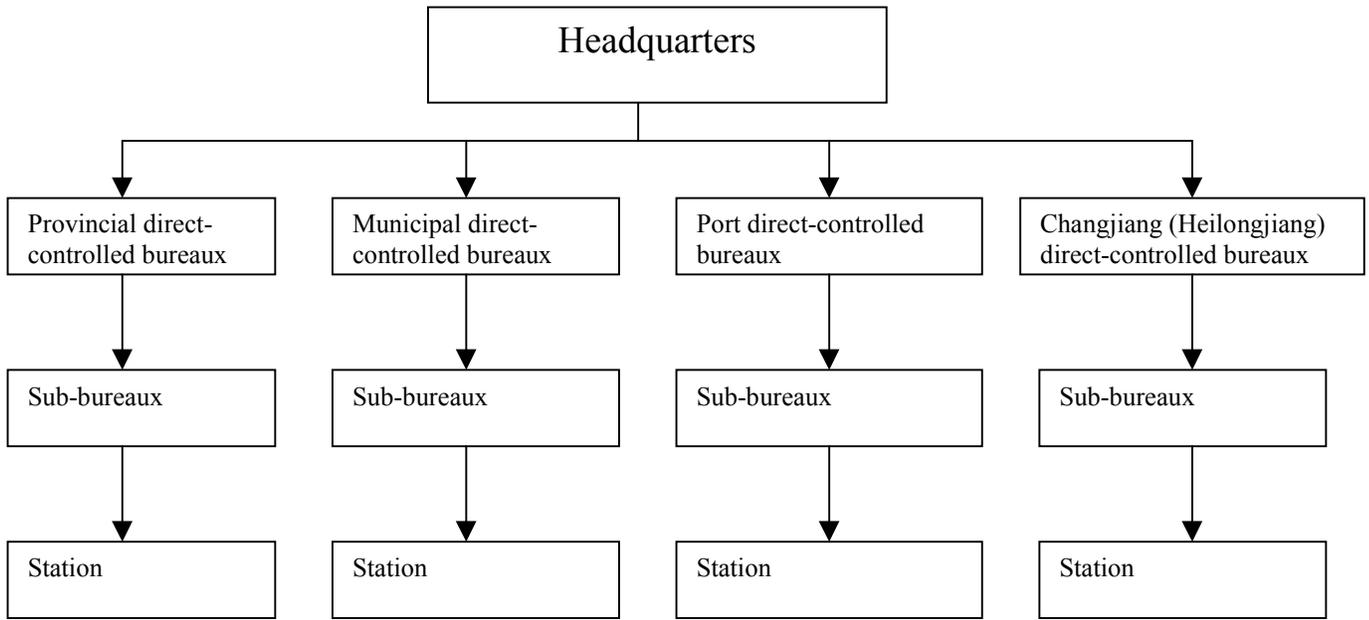


Figure 2.1 Framework of the CMSA

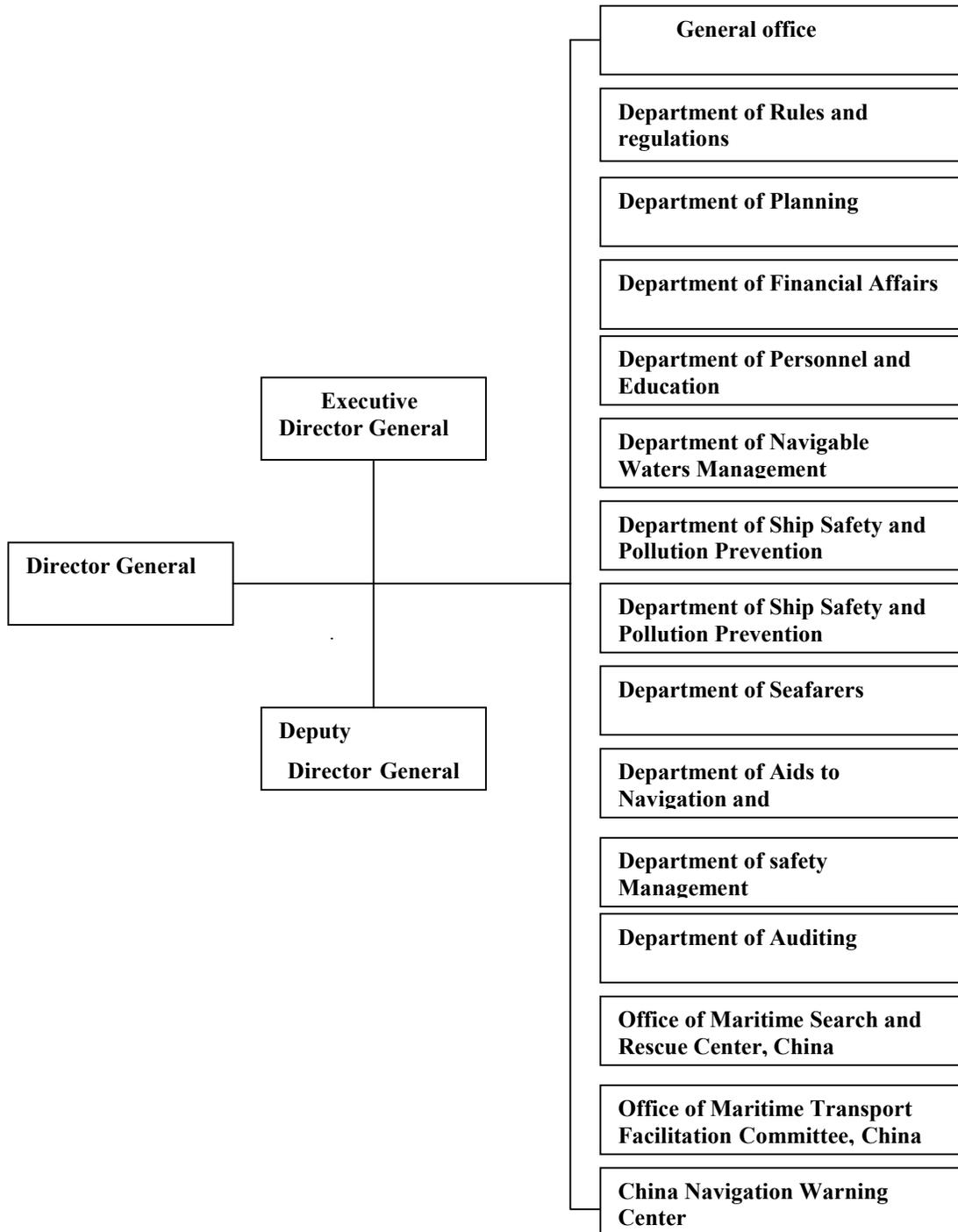


Figure 2.2 Structure of the headquarters of the CMSA

2.3.3 Direct-controlled bureaux

There are twenty direct-controlled bureaux located in different parts of China. They can be categorized into four kinds. The first are provincial direct-controlled bureaux, the second are direct-controlled municipal direct-controlled bureaux, the third are port direct-controlled bureaux and the fourth are river direct-controlled bureaux. The first kind has nine bureaux which are in Liaoning, Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong, Guangxi, and Hainan. The second kind has two bureaux which are Shanghai and Tianjin. The third kind has seven bureaux which are Shenzhen, Yingkou, Yantai, Lianyungang, Xiamen, Shangtou and Zhanjiang. The fourth kind has two bureaux which are Changjiang and Heilongjiang.

A direct-controlled bureau mainly plays the role of coordination and support.

2.3.4 Sub-bureaux

Sub-bureaux are directly controlled by the direct-control bureaux. Each direct-controlled bureau may have one or more sub-bureaux according to the actual need.

A Sub-bureau is mainly a unit located in a port and in charge of maritime safety and pollution prevention affairs in its respective area.

2.3.5 Stations

Stations are directly controlled by direct-controlled bureau or sub-bureau. Both direct-controlled bureau and sub-bureau can have one or more stations in some locations if needed. A station only has certain specific functions of on-scene enforcement of law.

2.4 Differences between the new and former CMSA

After the reorganization of the Ministry in 1998, the Maritime Safety Administration became a relatively independent governmental body, although it is still under the leadership of the Ministry. It is a non-profit making organization, and has its own budget and income. It has a united supervising system from the central government to local with a united policy and regulations, united development plan and united supervision administration. Compared with the original structure of the Ministry, the current Maritime Safety Administration, while keeping the same name as before, is a governmental body merging itself with the Register of Shipping in China. The new Administration maintains all the functions of the original. As far as ship survey is concerned, it has the sole function of policy-making and setting up the rules and regulations of a general nature. To enhance the position of the new Administration, one Deputy Minister is appointed to be the Director of this Administration.

2.5 Analysis of the CMSA's internal environment

2.5.1 Strengths of the CMSA

The CMSA can currently meet the needs of, and support, Chinese shipping, port construction and marine resource exploration to some extent. It has certain strengths as follows:

- i) The functional elements of the CMSA are quite complete, and the whole system is becoming unified.

As mentioned above, there are twelve functional divisions in the headquarters of the CMSA, which cover the full functions of a maritime administration. There are four

levels of management in the structure of the CMSA system. These four levels are interrelated to each other. Compared with the former CMSA, the new arrangement has a more unified and rational structure.

ii) Many of the staff in the CMSA are well experienced.

They have graduated from Dalian Maritime University, Shanghai Maritime University, etc. and have worked on board ships for quite some years before joining the CMSA. Some have been pilots in the ports.

The CMSA has a good source of recruitment of trained shipboard personnel. Trained shipboard personnel are traditionally a significant source of recruitment for a whole range of shipping services and provide expertise for transport management, marine insurance, finance institutions, classification societies as well as maritime administrations. China has a large merchant fleet, which includes the China Ocean Shipping Company (COSCO), one of the major shipping companies in the world. These circumstances provide a sound base for recruitment for the CMSA.

As a result of government reform, staff working in the government has been reduced and salaries have been improved. The posts in the government are becoming more and more attractive to most people. This gives a chance for the CMSA to select good persons to join it. The quality of the whole staff is being improved.

iii) Modern technologies are now being increasingly used in the CMSA which have greatly improved the control and service level.

For instance, advanced positioning system-Differential Global Position System (DGPS) is relatively well established in China. There are now 13 DGPS stations forming a DGPS

net covering 300-nm in width of coastal waters along the Chinese coast, and providing a new high accuracy positioning means (Year Book House of China Transportation & Communications,1999).

iv) The controllability in port areas is relatively strong.

In the past, China was mainly concentrating on supervising the port areas and internal waters. The name of the Harbor Superintendency Administration of the P.R.C. reflected this sense. Since focusing on maritime safety and environmental protection within the port areas, most CMSA branches are familiar with the situation in the ports, and have quite a lot of experience, and most infrastructures have been built to strengthen the controllability in the port areas, e.g. Vessel Traffic Services (VTS). In 1998, there were 18 VTS which included 45 radar stations, and 16 VTS centers (Year Book House of China Transportation & Communications, 1999). The VTS in some ports significantly strengthens the controllability of the CMSA and provides good traffic services to the ships. Even in the case of an emergency, e.g. when a passenger ship collided with a cargo ship in the Nanjing section of the Changjiang River in heavy fog last year, the VTS successfully helped the damaged passenger ship to a safe place (Wang, 2000).

v) Some procedures regarding maritime safety and pollution prevention have been established and have proved to be practical, valuable and effective.

The CMSA has worked hard and made a great contribution to the improvement of maritime safety and the prevention of marine pollution from ships since its establishment in the 1950s. After so many years of development, it has gained much valuable experience and has made great progress. For instance, the procedure of accident investigation has many advantages, such as the separation of cause-finding investigation and penalty investigation, the mediation, non-sanction administrative measures and the

use of top experts from the country in a "very serious accident" investigation. (Song, 1999).

2.5.2 Weaknesses of the CMSA

The CMSA is a Maritime Safety Administration (MSA) in a developing country. It has some common weaknesses of developing countries. It also has its own particular weaknesses. These weaknesses mainly are:

- i) Some weaknesses exist in the current structure of the CMSA.

First there are too many directly-controlled bureaux under the headquarters of the CMSA. This will not only weaken the policy function of headquarters due to more ordinary work e.g. coordination, but also weaken the development of the directly-controlled bureaux. The workload for each bureau may not be enough. The budget is allocated to too many places. The portion of the staff working directly for maritime safety and marine pollution prevention is lower due to the logistic function divisions in more bureaux. The interfaces between the bureaux are more thus. The infrastructure construction may be easily duplicated.

Second, the port-based bureaux are still in the new CMSA. There are some port directly-controlled bureaux as well as some provincial directly-controlled bureaux. The major problem is that in some provinces, there exist both provincial directly-controlled bureaux and port directly-controlled bureaux. It is impossible to divide the jurisdictional areas rationally for each bureau. Therefore, cross-management problems are easily created. This will reduce the effectiveness of the administration. This is even more confused for aspects outside the CMSA. For instance, when a ship is sailing in an area of a province, how should it report if needed, to the provincial bureau or the port bureau?

- ii) Legislation regarding maritime safety and pollution prevention from ships does not respond to the changing situation adequately.

In recent years, the work of following up the international situation, studying and assessing the applicability and effectiveness of the international conventions, laws, and policies, is far from sufficient. The quality of legislation is not high or systematic. The construction of the Chinese maritime safety and marine protection law system is weak. The standards of safety and prevention of the national flag ships have not been improved enough. This also creates difficulties concerning ununification of the enforcement. The effectiveness of law enforcement is not good enough.

As a body with a role in law enforcement, a sound Chinese maritime safety and marine protection law system is essential. The law not only defines the obligations but also gives the authority to enforce the law. This system is composed of two parts. One is the international part; the other is the national part.

The international part includes related international conventions ratified by China. The national part includes the laws issued by the National People's Congress (NPC) and its Standing Committee, regulations issued by the State Council, Ministry of Communications, and the CMSA.

To implement the conventions, they must first be incorporated into domestic law. Some conventions need national laws to compliment or support in order to be enforced. However, the problem is that some requirements of the existing laws and regulations are not suitable to the new situation, and need to be updated in order to cope with the new situation. This is because the reform of the government leads to the changing of functions, obligations, and authorities of some governmental bodies; the situation at the

time when the law or regulations were made is considerably different from the present due to the development of technology, conventions or laws. Some new issues have appeared, but have not been addressed or adequately dealt with by the existing laws and regulations; some conflicts exist in the current laws and regulations.

Due to some historical reasons, the construction of the Chinese maritime safety and marine protection law system is inadequate. The construction of the law system was not stressed in the past. There was no special law division in the former CMSA headquarters responsible for the construction of the law system. The whole quality of the construction of the law system could not be guaranteed.

The speed of making new laws is very slow due to the many conflicts in the process of drafting and the heavy coordination work. The procedure of drafting regulations is not good enough. Some important laws like the law applying to ships and seafarers still cannot be formulated due to a number of difficulties.

When a convention or national law is amended, certain related national regulations need to be amended accordingly. For instance, the law of marine pollution prevention of the P.R.C. was amended in 1999 and entered into force on 1 April 2000 (Yao, 1999). Accordingly the related regulations, such as the regulation of pollution prevention from ships need to be updated, but until now, this work has not been done.

When a new law is made, there is a need to formulate some supporting regulations and rules to cope with the new law. Since the law usually addresses the issues in general, it is not operational and will produce some difficulties when implemented. Also the standardization of its implementation will also need the supporting regulations which address the issues in detail.

Due to the old concept of safety, the cost/benefit of a regulation was not carefully assessed. It was considered that the regulation was costly, China was a developing country and it was reasonable to make safety standards lower than the international standards so as to protect the existing fleet. So nowadays, domestic safety standards are generally lower than the international standards. This permits ships to operate below acceptable safety standards within a common traffic system. Many of the benefits of the international safety standards regime may thus be negated.

The authority of the CMSA from the national legislation is weak in comparison to some foreign maritime safety administrations. Since ships are mobile on the water, it is difficult to control them unless the crew operating the ships can be controlled. This means that the administrators should have the legal right to limit the freedom of the crew. Therefore, the policing right is much in need in order to enforce maritime safety and pollution prevention laws effectively. Most foreign maritime safety administrations such as the United States Coast Guard (USCG), Canadian Coast Guard (CCG), Swedish Coast Guard, and Japanese Coast Guard all have policing right according to their national law, but the CMSA does not have the right to police.

According to the Maritime Traffic Safety Law of the People's Republic of China, fishing boats are registered and controlled by the Fishery Administration which is under the Ministry of Agriculture (Maritime Traffic Law of the People's Republic of China, 1983). The movement of fishing boats produces a threat to safe navigation in coastal areas. However, the CMSA cannot know the situation of the fishing boats. Therefore its preventive capacity is weakened. In recent years, more and more accidents in coastal areas have been related to fishing boats.

Due to the inadequacy of these rights, some ships do not obey the orders of the CMSA. The CMSA can not arrest the offenders; the ships sail without listening to the CMSA

and the patrol ships do not have the rights to take further action to stop them. It may ask the navy to assist, but coordination is complex. Even if the navy agrees to help, it takes time for the naval ship to come. When it arrives, everything has finished. The violating ship has fled. When this kind of incident happens, not only is the national interest damaged, but also the authority of CMSA. This will lead to a vicious cycle. The situations of sand dredging and fishing in some important navigational waters are the examples.

iii) The distribution of the staff is not so rational.

The total number of staff in the CMSA is about 30, 000 (Maritime Safety Administration of the People's Republic of China,1998). This is a big number, but the portion of the staff working directly for the maritime safety and pollution prevention is small. There is quite a big proportion of staff working on logistic aspects such as dining supply, office management, etc. Also there are quite a lot of staff working in the offices of the direct-controlled bureaux and sub-bureaux. The quantity of the on-scene staff in some stations is not enough to fulfill the workload of the on-scene administrative activities.

iv) Maritime information system construction is weak.

The weaknesses can be seen from some aspects. First, the information network has not been established in the whole of the CMSA system, which impedes the improvement of the management level. There is also no ship control system, seafarer management system, accident statistics and analysis system, etc. The development of some system software is low-speed, low-level and unstandardized, which obstructs the connection between the system with international systems. Second, the application of computers in some units is quite poor. Some basic units do not have a computer, some others have but they are not connected to the offices of the higher level units and other units at the same

level. The software for the work is lacking. Some staff have not been trained in the computer operations and simply do not know how to use a computer.

- v) The funding for the CMSA from the central governmental coffers is limited and the capacity to recover the cost of the CMSA is weak.

The funding of the CMSA comes from the central finance agent. CMSA's budget of the coming year is determined mainly based on the fees collected by the CMSA in the current year. These fees include lighthouse tax, ship's port tax and some other fees such as certification fees and registration fees, etc. Among these fees, lighthouse and ship's port taxes account for the major part. Both are calculated on the basis of ship's tonnage. Due to the low rate of taxes and some other reasons, the total fees collected by the CMSA are limited. Therefore, the budget is limited. Although it is not clear how large is the budget, some data published implies it. In 1998, the total infrastructure construction invested by the central government in the CMSA was RMB250 million. (Year Book of China Transportation & Communications, 1999). In 1999, the first 1,000 tonnage patrol ship of the CMSA started building and it cost about RMB 100 million (Li, 2000). Comparing these two figures, it is obvious that the funding of the CMSA is limited. Also, some phenomena happened in the CMSA were due to the limit funding. For example, some units in the CMSA cut or reduced some administrative activities such as patrolling so as to reduce expenditure of fuel oil. The limit funding creates a danger of encouraging the CMSA units to focus on the collecting of a fee while safety standards may be ignored. This of course affects the law enforcement of the CMSA. Furthermore, the limited funding affects the development of the CMSA because there is no adequate investment in the construction of infrastructure for the CMSA.

There are quite a number of wrecks along the coastal waters which constitute a threat to safe navigation. Most of these wrecks have been abandoned by the shipowners and have

no insurance. Sometimes the shipowners were broken after the accident happened. Therefore, there is no security to remove these wrecks. Also there is no special fund for the CMSA to remove the wrecks along the coast. Sometimes the CMSA units have to remove wrecks due to the great danger arising from them, but the cost of the removal by the CMSA units cannot be fully and quickly recovered. This thus influences their ordinary work.

vi) Capacity regarding some maritime safety and pollution prevention programs has some weaknesses.

a) Ships' survey control

First, the ships' survey control structure is not well established. Before merging with the China Register of Ships, the former CMSA had no function to monitor the survey of Chinese ships. The China Register of Ships was in charge of the mandatory surveys. Since the China Register of Ships and the China Classification Society were different names for the same organization with the same staff, there was no unit really monitoring the mandatory surveys conducted by the CCS. After the reform, the CMSA now has the function of monitoring the mandatory surveys conducted by the CCS. But the CMSA has only one department for this job in the headquarters. There is no support unit in the direct-controlled bureaux. The ships' survey control structure is not well established.

Second, the expertise in the CMSA regarding ships' survey is lacking. There are few personnel with the background of surveyors. As ships' survey is a technical job, the person who monitors this kind of job also needs special knowledge regarding the ships' survey, otherwise, the monitoring of the ships' survey will not be effective.

Third, the equipment needed for reviewing, auditing, surveying and managing ship's survey is lacking and cannot fulfill the requirements of the work. As the technology is developing very fast, the complexity of the ships' survey is increasing. More and more new and complex equipment is used to conduct the ships' survey and it is obvious that some equipment is needed to monitor it.

b) Navigation control in coastal waters

The CMSA lacks quick, effective and efficient solid administrative means to conduct effective navigation control in coastal waters. Solid administrative means should include means of communications, transportation, and surveying. This includes aircraft, helicopters, ships, and communication facilities. But the CMSA has no helicopters or other aircraft. Ships are the main controlling means of the CMSA. Most existing ships of the CMSA have the weakness of single function, old-age and low speed. Particularly the CMSA lacks large tonnage, good anti-wind capacity coastal patrol ships. Nowadays there are mainly two series of ships in the CMSA. One is for Aids to Navigation (ATN) and Hydrographic surveying, the other is for patrolling. There are 14 meter long, 17 meter long, 20, 26, 30, 45, and 50 meter long patrol ships in use (Year Book of China Transportation & Communications, 1999). All the patrol ships are below 1,000 gross tonnage. Until now, only one 1,000 tonnage patrol ship is being built. Most of the patrol ships are limited to the port area and their speed is slow. There is a lack of large multifunctional patrol ships which can operate in coastal waters.

The capacity of the communication is measured by the Global Maritime Distress and Safety System (GMDSS), national coast radio stations, and Very High Frequency (VHF) facilities. Without this, the CMSA is "blind". Until now most of the coastal radio stations and all satellite communication facilities have been under the control of the China Communications Center which is directly under the MOT. The CMSA only have

VHF facilities and a few coastal radio stations. In some ports and coastal areas, VHF communication is often disturbed by other civil communications. Some seagoing ships of the CMSA have not been equipped with GMDSS due to financial problems.

c) Port State Control (PSC)

First, the expertise in the CMSA regarding Port State Control is weak because of the separation of the work of the flag State survey (delegated to the CCS) and port State control (remaining in the CMSA). As required by IMO Resolution A 787(19), the Port State control officers (PCSO) should be "qualified as Flag State surveyors". Flag State inspection is referred to as a comprehensive and systematic inspection, while Port State inspection is a random check. Therefore, it is desirable that a qualified Port State control officer has a Flag State surveyor background. But due to historical reasons, most Port State control officers do not have the experience of Flag State surveyor. Some of them have just graduated from a maritime university and lack sea experience. Some of them may also have problems in speaking English which is becoming more and more important as operational inspections are required.

Second, difficulties of information exchange are a problem (Huang, 1999). Since the ship is moving from one port to another, it is important for the next port to know what has been done to the ship at the last port of call. Accurate, timely information is helpful for the PSCOs in the next port to target the ship to ensure that the deficiencies are remedied and to avoid unnecessary boarding of the ship. This is a very important factor to improve the efficiency of the PSC. As the Internet is becoming popular in China, this could be achieved through the Internet. In this way, the so-called "last safety net" can really be achieved to eliminate substandard ships. China has established a national wide port State inspection information computer net, based in Beijing headquarters, and is

connected to the Asia-Pacific Computerized Information System (APCIS). However, due to financial and technical problems, its effectiveness has been badly affected.

d) Aids to navigation (ATN)

First, the structure of ATN management is not so rational. Before reform of the CMSA, the ATN management was as follows: the headquarters of the CMSA was in charge of the whole national ATN management. Three ATN district units within Tianjin, Shanghai, and Guangzhou direct-controlled bureaux were responsible for providing technical guidance to the ATN work in the Northern, Eastern and Southern sea areas respectively. The ATN stations in every former direct-controlled bureau were responsible for the maintenance and management of the aids to navigation in the respective area. But now, the structure of the CMSA has been changed, while the former ATN management still remains. There is an inconsistency between the structure of the CMSA and the structure of the ATN management.

Second, certain ATN facilities have problems. Some existing navigational aids are in poor conditions particularly in the Taiwan Strait. Some imported equipment of the ATN and hydrographic survey are outdated.

Third, construction of superintendent substations and ATN stations cannot catch up with port developments. Due to the limited funding, some existing stations are relatively poor. The office buildings, docks and maintenance fields of aids to navigation cannot fulfill the needs of work development.

e) Search and Rescue (SAR)

First, the SAR structure is not rational. The national SAR coordination center is in the headquarters of the CMSA, but some sub SAR coordination centers are in the provincial governments. Others are in some direct-controlled bureaux of the CMSA. This often creates confusion when an accident occurs and it also reduces the harmonization of the SAR activities.

Second, the command system is weak. When an accident occurs, so many governmental bodies are involved. Some of them claim that they are in charge of the search and rescue operation. It takes some time to set up a provisional command system. Even when the command system has eventually been established, it may not operate well because the relationship among the different governmental agencies is so complex that it cannot easily be dealt with. The local government officers who become commanders may not have enough experience, or the special knowledge needed. This will influence the use of resources. The effectiveness of the SAR operation is thus much reduced.

Third, the SAR forces are not sufficient. According to the Maritime Traffic Safety Law, the CMSA is responsible for organizing the SAR activities. However, it has not enough forces to conduct SAR, particularly when an accident happens in coast waters a little way from the coastline. Most CMSA branches can mainly search for ships and rescue persons within the port area due to the limitation of ships and capacity of their crews. The search and rescue forces mainly depend on the Bureau of Salvage which has some branches located in Yantai, Shanghai, and Guangzhou. As reform of the government progresses, this bureau is becoming more and more commercialized. The budget from the government to the bureau is insufficient. In 1999, the bureau needed a budget of RMB200 million (about USD23.5 million) but only received a budget of RMB9.5 million (about USD1.1 million) from the government (Chen, 2000). This of course weakens the existing SAR force.

Fourth, SAR means are falling behind. To conduct a SAR operation well, there is a need not only for a well functioning command system, and well coordinating net, but also some necessary means. These may include helicopters, ships, and communication equipment, etc. One effective means of SAR is the helicopter, especially when the accident happens in an area no too far away from the shore and the weather is not too bad. But the CMSA has no helicopter. This can be illustrated by many accidents. A recent example is the comparison of the Dashun accident in China on 24 November 1999 and the Sleipner accident in Norway on 26 November 1999. No helicopter was used in the former accident and only 22 out of 312 persons on board were rescued by ships (Chen, 2000). Helicopters were used in the later and 69 out of 85 persons on board were saved (Fast Ferry International, 1999).

f) Accident investigation

First, the qualification of the investigators is the key element in investigation. However, the CMSA does not have specific requirements on the qualifications of the investigators. Although the investigators in the CMSA do have various professional backgrounds and different working experience in the maritime safety field, there is a lack of sea service experience.

Second, the reports of investigations are not published. Even related parties cannot get the full text of the reports. Since an investigation is related to the public interest, the facts concerning an accident should be made public. Public awareness can be improved and some analysis can be further made by some interest groups. Publishing the reports of an investigation may put pressure on the investigators. Under this pressure, the quality of the investigation can be improved quickly. This will be better so as to achieve the aims of the investigation and fulfill the requirements of transparency.

Third, the CMSA does not have a comprehensive handbook for investigators. It would be valuable to issue this kind of book so as to give help to the investigators and this will standardize investigation procedures in the different areas (Song, 1999)

g) Pollution prevention

First, there is no database of coastal information, which is necessary for responding to pollution accident because China has a coastline of over 18,000 km, and over 5,000 islands along the coast (Xinhua Pub. House, 1985). The circumstances in different areas are very complex and much different.

Second, there is no national strike team, which has advanced knowledge and techniques on marine pollution prevention although China has quite a lot of experts regarding marine pollution prevention.

Third, the command system regarding marine pollution accident has not been established. When an accident happens, the establishment of a command system often takes quite a lot of time due to the complex relationship among different interested governmental bodies.

Fourth, the surveillance capacity of marine pollution in coastal waters is weak. There is no aircraft in the CMSA to conduct aerial surveillance. The surveillance in coastal waters only depends on patrol ships. However, the patrol ships are not large enough to conduct effective ground-level surveillance.

Fifth, although a national contingency plan for oil spills from ships has been established recently, it needs to be further developed.

3. The CMSA's external environment

The CMSA is not an isolated unit. It is a specialized agency in the government, which deals with the issues of maritime safety and pollution prevention. These issues not only have national characteristics but also international characteristics. Therefore, the CMSA's external environment is quite broad in scope. In this Chapter, the author undertakes an assessment of the CMSA's external environment considering international, economic, political, legislative, social, and technical aspects from both the international and national points of view. Figure 3.1 illustrates the situation. By doing this, the author is endeavoring to identify the opportunities for and threats to, the CMSA.

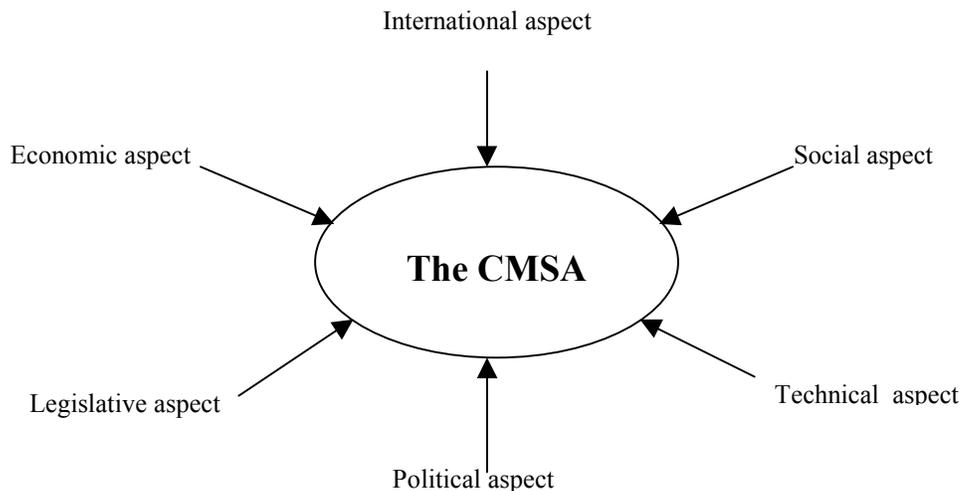


Figure 3.1 External environment of the CMSA

3.1 International aspect

The maritime sector has never been restricted to national boundaries, and it is more internationalized nowadays. Safety and environmental problems are those that can be better solved at the global level (Ma, 1999). The role of international organizations, especially IMO, but also ILO, MOUs and IACS, is constantly expanding.

Regarding maritime safety and environmental protection affairs, IMO, ILO and Flag State governments have different but related roles. IMO and ILO have the responsibility to develop technical safety and pollution prevention global standards. Flag State governments have the duty to implement and enforce these standards.

3.1.1 International Maritime Organization (IMO)

IMO is responsible for the creation of a body of conventions, codes and recommendations. Since coming into being, IMO has made great progress in formulating conventions. Most IMO conventions have been widely accepted by the world. For example, China has ratified 34 IMO conventions including SOLAS74, MARPOL 73/78, STCW 78/95, LL 66, TONNAGE 69, etc. By ratification, these conventions have been incorporated into Chinese legislation.

Conventions are not stationary but are continuously in a process of development due to the development of technology and occurrence of accidents. The current and future development of conventions includes:

- **SAR Convention:** A revised annex to the International Convention on Maritime Search and Rescue (SAR Convention) entered into force on the 1 January 2000 (IMO News, No.1, 2000). The revised SAR Convention clarifies the

responsibilities of Governments and puts greater emphasis on the regional approach and co-ordination between maritime and aero-nautical SAR operations. The technical requirements of the SAR Convention are contained in an Annex, the revised version of which includes five chapters.

- **MARPOL 73/78:** The NOx Technical Code was adopted as a new Annex VI, Prevention of Air Pollution from ships, which was added to MARPOL 73/78 in September 1997. It will enter into force 12 months after the date on which not less than 15 States, the combined tonnage of which shall be not less than 50% of the gross tonnage of the world shipping fleet, have become parties to the Protocol to MARPOL which contains Annex VI. To date, only Norway and Sweden are the Parties to it (IMO News, No.1, 2000).
- **IMDG Code:** The Sub-Committee agreed to make the International Dangerous Goods (IMDG) Code, or certain parts of it, mandatory. It is expected that the IMDG Code could become mandatory by 1 January 2002 (IMO News, No.2, 1999).
- **INF Code:** The Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on board ships (INF Code) is targeted to become mandatory by 1 January 2001(IMO News, No.2, 1999).
- **LL:** The 1998 Protocol to the 1966 Load Lines Convention entered into force on 3 February 2000. It introduces the tacit procedure into this convention. The amendment will be of benefit in the future (IMO news, No.2, 1999).
- **SOLAS:** The May 1998 Amendments to SOLAS are due to enter into force on 1 July 2002, under the tacit acceptance procedure. These amendments include Chapter II-1-Construction-subdivision and stability, machinery and electronic installations, IV-Radiocommunications, Chapter VI-Carriage of cargoes, Chapter VII-Carriage of dangerous cargoes (IMO News, No.1, 2000).
- A harmonized system of ship survey and certification entered into force from 3 February 2000 (IMO NEWS, No. 1, 2000). The system covers survey and

certification requirements of SOLAS 1974, the International Convention on Load Lines, 1966, and MARPOL 73/78, as well as the IBC Code, BCH Code and IGC Code. The system will alleviate the problems caused by survey dates and intervals between surveys which do not coincide, so that a ship should no longer have to go into a port or yard for a survey required by one convention shortly after doing the same thing in connection with another instrument.

IMO could never have “teeth” nor act as a regulatory body unless member States were to agree. In 1993, IMO created the Subcommittee for Flag State Implementation (FSI) to control the implementation of conventions (Boisson, 1999). IMO Assembly resolutions A.847 (20), Guidelines to assist flag States in the implementation of IMO instruments, and Resolution A.881 (21), Self-assessment of flag State performance have been passed after the creation of the FSI. Resolution A.881 (21) includes a flag State performance self-assessment form, which is intended to be used by flag States on a voluntary basis to obtain a clear picture of how well their maritime Administrations are functioning and to make their own assessment of their performance as flag States.

Recently new provisions have given IMO a more active role in the effective implementation of international regulations. For example, the new STCW Convention on the training and qualification of seafarers breaks new ground by giving the IMO the authority to scrutinize the performance of an administration in meeting its commitments under the convention.

Parties to the Convention will have to submit information to IMO concerning administrative measures taken to ensure compliance, education and training courses, certification procedures and other relevant matters. The Maritime Safety Committee (MSC) will use this information to identify those Parties that are able to demonstrate that they have given full and complete effect to the provisions of the Convention.

Currently IMO is pursuing:

- A proactive policy, so that trends which might adversely affect maritime safety, may be identified at an early stage and action taken to prevent them from being developed;
- A policy to bridge, to the extent possible, the gap between new and existing ship's safety standards;
- A policy to emphasize the role of the human element in maritime casualties;
- A shifting of emphasis from the development of new, to the implementation of existing, standards; and the development of a safety culture in all maritime activities.

In the future, IMO will be most active in the area of implementation. Most of these activities will concentrate on the human factor (IMO, 2000).

3.1.2 International Labor Organization (ILO)

The International Labor Organization was set up just after the First World War and now has more than 170 member States (Boisson, 1999). It plays a leading part in regulating the working conditions of seafarers, and improving their living conditions. The most important ILO Convention regarding the maritime sector is ILO Convention No. 147, which prescribes a set of minimum standards related to safety, social security, and shipboard conditions of employment and living standards regarding merchant shipping. It has been included in the Paris MOU, Tokyo MOU, etc. as a relevant instrument to combat substandard ships.

Apart from its standard-setting activities, the ILO collaborates actively with other international institutions on all issues of concern to seafarers. It participates with IMO on the Joint IMO/ILO Committee on the health of seafarers. It has also set up several

cooperative structures with IMO: a joint group of experts on fatigue, a joint committee on training, and a special joint working group to investigate human factors involved in accidents at sea.

As part of its program of technical assistance to developing countries, the ILO organizes regular regional and national seminars on maritime labor standards. These are focused on the training of ship inspectors, to check whether they comply with the relevant standards of the Organization, particularly Convention 147 on minimum standards.

3.1.3 Memorandum of Understanding on Port State Control (MOU)

Port State Control has been developed into regional cooperation. At present there are seven regional PSC agreements in operation: Paris MOU, Latin-America Agreement, Tokyo MOU, Caribbean MOU, Mediterranean MOU, Indian Ocean MOU and Abuja MOU. Two further regional agreements are currently under development, one for the Persian Gulf region and the other for the Black Sea area (IMO NEWS No.1, 2000).

The Tokyo MOU now has 18 members: Australia, Canada, China, Fiji, Hong Kong, Indonesia, Japan, Republic of Korea, Malaysia, New Zealand, Papua New Guinea, Philippines, Russian Federation, Singapore, Solomon Islands, Thailand, Vanuatu and Vietnam.

The Tokyo MOU has established a unique regional target inspection rate, that is 50 % of the total number of ships operating in the region by the year of 2000 (Tokyo MOU, 1999). It has also established the Asia-Pacific Computerized Information System (APCIS) for PSC information exchange. A new regional database system, using the latest Internet technology has become fully operable from 1 January 2000. In the near

future, the number of inspections conducted by the member countries is to be increased substantially to 60% of the ships calling in their ports (Tokyo MOU, 2000).

The establishment of a worldwide regional PSC is only in its infancy. The prospect of a global PSC, with exchange of information and harmonization of procedures and training, has even more exciting implications (Hoppe, 2000). As more and more statistics and data are gathered and exchanged by the different PSC secretariats, this will result in a huge increase in knowledge about sub-standard shipping. This knowledge is not only useful in itself, it will also provide the maritime community with the opportunity to better analyze the causes of incidents and casualties and to ascertain, more accurately than ever before, how they can be prevented from occurring again.

3.1.4 International Association of Classification Societies (IACS)

IACS currently has 10 members and 2 associate members. It classes 95% of the world shipping in tonnage and 50 % in number of ships. It undertakes more than half a million surveys a year in about 1,200 offices throughout the world, with more than 6,000 front-line surveyors. (Boisson, 1999)

Classification societies have a fundamental role to play in preventing accidents at sea, through their dual role in the classification and certification of ships (Abe, 2000):

Classification, as a completely private service performed by these societies, consists of issuing rules for the safety of ships, and performing surveys and inspections to ensure that these rules are being applied. The technical skills possessed by classification societies, and their international networks of surveyors, have led them to assume another, public service role. Under powers delegated by governments, they enforce the regulations contained in international conventions on safety at sea and protection of the

environment. In this case, they carry out the necessary surveys and inspections, and deliver official certificates of conformity to such regulations.

Nowadays, classification societies are facing certain challenges (Abe, 2000):

- Increasing competition in all major trade sectors means commercial pressures on ship operations--typically to shorten in-port times for bulk carriers and to drive big containerhips harder to stay on schedule for surveying.
- New technology and new concepts can lead to great risk; for example, the prospect of faster, much bigger containerhips, high-speed ferries and possibly cargo vessels, and the fire and evacuation scenarios for the latest so-called 'mega' cruiseships with thousands of passengers and crew.
- Ever-increasing accountability to the international community for achieving and maintaining safer ships and clean seas. Accountability means clear demonstration of achievement of effective self-regulation, which is certain to place ever-increasing emphasis on productive working partnerships across the spectrum of those who influence maritime safety.

3.1.5 Development of maritime safety administration in some other countries

Maritime safety administrations in some other countries are being strengthened, and integrated. This may be seen from the following aspects:

First, the position of MSAs in governments is being improved. The functions of the MSAs are being strengthened. For example, neighboring countries like South Korea, Japan, and Vietnam have developed their MSAs into Coast Guards which have more regulatory power to administer maritime safety and environmental affairs.

Second, the capacity of the MSAs is being improved quickly. MSAs are developing into the model of solid maritime safety administration so as to enlarge the controlling area, enhance controllability, and improve the capacity of emergency response. This solid administration is based on modern equipment including large multi-functional patrol ships, aircraft, and VTS. The cooperation among these resources establishes a solid monitor net. ATN is developed with more systematization. Different kinds of aids are used in different areas (port, sea) according to the characteristics of each kind of aids so as to make full use of its advantages. The distribution of different kinds of aids is considered in a systematic way so as to optimize the functioning of the whole ATN system and improve its reliability, and accuracy. Information systems are being emphasized. For instance, the U.K. Maritime and Coast Guard Agency (MCA) has made a large investment in improving its information system (Lloyd's List, 2000).

3.2 Economic aspect

3.2.1 International shipping

The globalization of the world economy is developing fast and has reinforced the inherent and unique internationalism and fluidity of the shipping industry. Flag, capital, accounting, crew, management and operation, marketing, etc. are all being fragmented, and piece-by-piece being globalized to an ever-greater extent, while over the same period the industry has become vastly more productive, with very much larger, faster ships and new techniques such as containerization.

The decline of the fleets of the traditional maritime countries and the rapid growth of flags of convenience is still continuing. In 1997, the share of the world tonnage registered under the convenient flags was about 45% (Ma, 1999). The reason why this has happened may be attributed as follows: First, cost, including lower crewing

cost/manning requirements, unrestricted choice of crew in the international market and not being subject to onerous national wage scales; lower operating cost generated by "lighter" maintenance; and the probable avoidance of tax. Second, accessibility to the register and less demanding standards enforced by the State of register, mainly reflected in less regulatory control and less stringent enforcement of safety and labor standards.

The growth of the developing and newly industrialized economy has increased eastern nations' share of world shipping. Changing patterns of world seaborne trade have shifted the geographical focus of growth towards different trading routes, in particular those to, from and within the Far East (Department of the Environment, Transport and the Regions, 1998).

According to BIMCO BULLETIN (BIMCO BULLETIN, Volume 94. No.5. 99), China is set to be the biggest single influence in the shipping industry over the next decade. China is on course to create substantial increases in shipping demand from its own trading needs and to become a major force in shipbuilding and shiprepair.

The global shipping industry is facing shortages of officers. The shortfall is estimated to be about 16,000 at present; this could widen to about 46,000 by the end of the decade in the new millennium (The Sea, issue 146 July/Aug 2000).

A Quality shipping campaign is being developed in the world. Quality Shipping means "all sectors of the maritime industry (including shipowner, classification societies, insurers, cargo owners, charterers, brokers, ports, pilots etc.) are encouraged to promote practices aiming at higher quality and safety standards by codes of best practice and other self-regulatory instruments. (Coleman, 2000)" Effective and uniform implementation and enforcement of existing rules, regulations and standards is the cornerstone of the philosophy and approach underlying the Quality Shipping Campaign.

The Shipping industry is becoming more and more transparent. According to IMO NEWS (IMO NEWS, Nov.1, 2000), the **Equasis database** has been set up to collect safety-related information on the world's merchant fleet from both public and private sources and make it easily accessible on the Internet. Its launch was in May 2000.

At the end of the last millennium, the Malta-registered tanker "Erika" broke into two, and spilled thousands of tons of its heavy fuel oil into the sea, causing serious damage to the French coast. This disaster has astonished the world. It is almost certain that some actions will be taken by some organizations, i.e. IMO, IACS, MOUs, and EU.

For instance, the Sub-Committee on Safety of Navigation - 46th session: 10-14 July, 2000, has approved a new mandatory ship-reporting system which would be applicable to the central English Channel, making it easier to track and communicate with ships in the area. The system would supplement the existing mandatory ship-reporting systems already established at Ouessant and in the Pas de Calais.

The system will be put forward to the Maritime Safety Committee (MSC) at its 73rd session in November-December 2000 for adoption and would enter into force at 0000 hours UTC, six months after its adoption by the Committee.

3.2.2 National shipping

China has a large national shipping industry. According to China shipping development annual report, 1998 (Department of water transport ministry of the communications of the P.R.C. 1999), by the end of 1998, there were more than 1,300 shipping companies engaged in domestic coastal transport and over 5,600 shipping companies engaged in domestic inland waterway transport. There were 6,820 vessels employed in coastal

service with a total deadweight of 9.11 million tons. There were altogether 190,174 vessels in the inland shipping fleet with a total deadweight of 18,438 million tons. Table 3.1 shows the details.

According to China shipping development annual report, 1998 (Department of water transport ministry of the communications of the P.R.C. 1999), by the end of 1998, there were more than 310 companies approved by the Ministry of Communication for international shipping service. The number of vessels registered in China and with Chinese nationality was 1,880 with a total deadweight tonnage of 16 million. Table 3.2 shows the details. This capacity ranked 9th in the world. The number of overseas registered vessels under flags of convenience was 550 with a total deadweight tonnage of 20.15 million. If such vessels flying flags of convenience were taken into account, the ocean shipping capacity in China would rank 5th in the world.

From the perspective of the age of the vessels, for those flying the Chinese flag the age is higher than those flying flags of convenience. According to China shipping development annual report, 1998 (Department of water transport ministry of the communications of the P.R.C. 1999), by the end of 1998, the average age of the ocean shipping fleet flying the Chinese flag was 18.5 years. The age for passenger/container ships, crude oil tankers, chemical vessels, reefer vessels, container vessels (excluding full container ships) and liquefied gas carriers was lower, between 10 to 20 years on average. They composed 10% of the total deadweight tonnage of the ocean shipping fleet. However, the ages for passenger/cargo vessels, liquefied petroleum gas vessels and liquefied natural gas vessels were more than 20 years, which comprised 17.6% of the total deadweight tonnage of the ocean shipping fleet.

Table 3.1 Domestic coastal and inland waterway fleet and their composition in 1998

(Department of Water Transport Ministry of Communications of the P.R.C. 1999).

Type of Vessel	Number of Vessels in Coastal Shipping	Tonnage for Coastal Shipping Vessels (Thousand tons)	Number of Vessels in Inland Shipping	Tonnage of Vessels in Inland Shipping (Thousand tons)
General Cargo Vessel	4594	2906	78455	4758
Bulk Carrier	877	3906	55455	3357
Oil-Tanker	552	1747	2053	685.9
Reefer Vessel	54	25.9	12	1.3
Container Ship	142	13.2	375	11.8
Chemical Vessel & Liquefied Gas Carrier	56	75.2	584	67.3
Lighter and Push(tug) Ship	545	451.1	53240	9569
Total	6820	9111.20	190174	18438.5

Table 3.2 Composition of international ocean shipping fleet in China
(Department of Water Transport Ministry of Communications of the P.R.C. 1999).

	Number	DWT	Average Age in (year)	Percentage by Chinese Vessels(%)
Bulk Carrier	494	20,876,521	13.98	36.6
Oil Tanker	199	5,437,851	12.1	38.9
Container Ship	257	4,305,305	12.34	46.3
Multi-purpose Vessel	244	2,200,051	13.8	63.8
General Cargo Ship	401	2,686,928	21.9	93.4
Liquefied Gas Carrier	17	82,123	20.1	100
Passenger Ship	19	64,371	16.8	78.1

According to China shipping development annual report, 1998 (Department of water transport ministry of the communications of the P.R.C. 1999), the average age for vessels flying flags of convenience under the control of a Chinese shipowner was 14.8 years. The average ages of passenger/container vessels were 2.9 years. The average age for passenger/vehicle Ro-Ro vessels, chemical vessels, tankers, multi-purpose vessels, and fully containerized vessels were from 9.2 to 13.6 years. The average ages for general cargo ships, chemical carriers and Ro-Ro vessels were more than 20 years.

According to China shipping development annual report, 1998 (Department of water transport ministry of the communications of the P.R.C. 1999), by the end of 1998, there were more than 2000 ports with an individual annual throughput of over 10 thousand tons, among which, 130 were open ports accommodating over 36 thousand vessels from

more than 100 countries and regions every year. The port throughput of containers has had maintained a growth rate of more than 20% for 12 consecutive years. At present, the international container throughput of the Mainland ports of Shanghai, Qingdao, Shenzhen, Tianjin and Guangzhou has made these ports among the 50 top container terminals in the world.

With the development of reforms in the socialist market economy and changes in the role of government, the competent authorities have gradually retreated from direct control of transport operations.

China has a large number of seafarers and is becoming a main seafarer exporting country. In recent years, there have been 200,000 persons taking part in the seafarer's examination annually, and the number is increasing by 20% annually (Yang, 1999). As the Labor Law being implemented, more free-flow seafarers in the market will appear. That means many seafarers will not have a strong link with shipping companies as before.

China expects its Gross Domestic Production (GDP) to double between 2000 and 2010. This has major implications for ports as increasing numbers of lines are making direct calls at mainland ports (BIMCO BULLETIN, Volume 94. No.5. 99).

It is predicted that the number of ship accidents causing pollution in China Coastal Waters is forecast to about 252 in 2005 and about 270 in 2015. Pollution accidents caused by traffic accidents are forecast to 18 in 2005 and 23 in 2015 (Liu, 1999).

In recent years, there have been increasing calls for direct shipping across the Taiwan Strait. It seems that this route may become a reality in coming years. As a result, there

will be a cross between the flow of ships from north to south and the flow of ships from east to west. Ship density in the Taiwan Strait will increase dramatically.

After the unification with China in 1997, Hong Kong became a special administration area in China, as did Macao later. Today Hong Kong still remains one of the world's major shipping centers. It has the largest container port in the world in terms of the number of the containers handled. Hong Kong's Maritime Department is an efficient maritime administration. It has a strong capacity for the implementation of the international conventions because of its highly-qualified staff, sound facilities, and sound maritime legislation.

On the 24th of December, 1999, the "Dashun" Ro-Ro passenger ferry carrying 312 persons and over 60 cars on board sank in Buohai Bay due to the bad weather while she was sailing to Dalian port from Yantai port. Only 22 persons on board were saved. This is one of the most serious maritime accidents in China. It caused serious concerns for both the highest politicians and the Chinese people. 32 national congressmen questioned the Minister of the MOT during the session of the congress meeting in March 2000 (Chen, 2000).

Human error and poor weather were responsible for this tragedy, according to the investigation of the accident carried out by the joint-investigating team directly under the State Council (Lloyd List, 2000). It should be mentioned that the shipping company of "Dashun" had a similar accident less than two months before the "Dashun" disaster.

After the accident, MOT authorized CCS to conduct statutory surveys of all Ro-Ro passenger ships.

3.2.3 Other Maritime Economics

- Oceanic touring

It is expected that oceanic touring will undergo dramatically development in the coming decade as the Chinese economy is developing fast, especially in the coastal areas of China. There are over 5,000 islands along the coast, which are valuable for tourism (Xinhua Pub. House, 1985). In 1999, the Chinese government decided to enhance the development of tourism in the future so as to enlarge the civil expenditure of the Chinese people. Therefore, oceanic touring will be a key item in the Chinese economy.

- Recreational boating

With the rapid development of the economy, maritime leisure activities such as recreational boating is increasing dramatically. Some yacht clubs have been established in coastal cities like Dalian, Qingdao, Shanghai, Guangzhou and Haikou.

- Oceanic oil and gas production

China's oceanic oil and gas production will increase at the rate of 20% annually between 2001 and 2005. By 2005, oceanic oil and gas production will reach 40,000,000 tons. The main production areas are the Buohai, Nanhai, and Donghai seas (Jiang, 2000).

3.3 Social aspect

3.3.1 Safety Culture

The concept of a safety culture is not especially new to shipping, as reflected in the ICS/ISF Code of Good Management Practice which was published as long ago as 1981 (ISF, 2000). However, in recent years, its importance in improving maritime safety has

been recognized by the shipping industry, IMO and many maritime safety administrations. One of the main features of a safety culture is that there has to be a deep understanding, from top management down to the ratings on board ship, that all accidents are ultimately preventable.

The promotion of a safety culture within the shipping industry has been identified by IMO as one of the key priorities for the new century. Two important ways to achieve this goal are: proper implementation of the ISM Code which requires companies to embrace a safety culture through a commitment to continuous improvement of their safety records; and effective implementation of the new STCW Convention which aims at achieving competent seafarers who are far more likely to think more about safety.

3.3.2 Views of the people

The citizenry, the public we serve, is the central focus of everything that government does, or it ought to be. Views of the people about government are important to government. Today, the public does not want government to be a drag on prosperity and progress. It wants the government to be modern and modernized (Balanoff, 1998).

The weight of public opinion in determining the level of safety should not be underestimated, although it is very difficult to evaluate. There is general agreement that absolute safety is not possible, that risk is an integral part of transportation, and that an act of God and human error can outflank technical advances and preventive measures. However, no one is ready to accept that a damaged tanker should discharge its cargo of oil on to the coast, or that a passenger ship should go down with nearly a thousand people on board. Public opinion refuses to accept these modern-day cataclysms. It may drive politicians to take actions after the accident happened.

3.3.3 Media

The media arouses the public conscience and often stimulates the standard-setting enthusiasm of the maritime community, in favor of better protection of men at sea and their environment. This is so true that one may wonder whether, without the dreadful images of oil-covered birds after the Exxon Valdez disaster, the Oil Pollution Act would have been brought on to the statute book in the United States, only eighteen months after the accident.

Today, the growth of the communications industry has distorted the collective perception of the dangers of navigation. The audiovisual media, because of satellite broadcasting reports of accidents, can show pictures of the event e.g. Erika disaster in real time on a global scale. The information for the needs of the general public offered an unflattering view of shipping and safety.

3.4 Political aspect

The CMSA is a specialized agency in the Chinese government. The Chinese government is the most important factor to the CMSA in the political aspect. In recent years, the most important event happening in the Chinese government is reform.

This reform started in 1997 and included reform of both central and local governments. Before the reform, there were demands for a "Big Transpiration" department which included the existing Ministries of Communications, Railway and the Bureau of Aviation. This had been discussed for quite some time, but due to several complex factors, this had not been achieved. However, in the maritime administration sector, the former China Oceanic Administration, under the direct-control of the State Council, was incorporated into the Ministry of Land and Resources in this reform, while the CMSA

was separated from the Ministry of Communications. As government reform is still continuing, there is an expectation in the State Council that it will need to establish a more integrated regulatory body so as to administer Chinese maritime affairs more effectively.

The role of government has changed from "large" to "small". The next change could be in the attitude to change government from small to competent management. Government should be efficient, facilitative and appropriate to its circumstances rather than merely small. This change in attitude has led funding agencies to change their perspective on the role of government (Hughes, 1998).

Administrative bureaucracy is the most powerful institutional actor in China. However, as the emphasis on administration of the country is by using the law, the national and local congresses are becoming stronger and stronger.

As China is becoming more and more open, public and media have more freedom to speak. Under pressure from public opinion, stirred up by the media, the government is being forced to act quickly.

As China will enter WTO, the Chinese government will face pressures to become more transparent and open because the "Service Trading General Rules" of the WTO, Reg.29 contains many requirements for increased transparent conduct and openness of information (Zhang, 1999).

The priority in developing the maritime economy in the coastal areas has been set by local governments of the coastal provinces, such as Liaoning, Shandong, Zhejiang, Fujian, Guangdong, and Hainan etc.

3.5 Legislative aspect

Legislation provides a legal base of law enforcement of the CMSA. In recent years, some new laws and regulations have been passed and entered into force. For example, the Marine Environment Protection Law of the P.R.C had been amended and entered into force on April 1, 2000. The regulation of safety superintendence for construction over on and under waters was passed last year and entered into force this year. The maritime procedure law was enacted in July, which is a special supplement to the civil procedure law. The enacting of this law will better improve the legal system of China's maritime law and help China follow international practices in the future.

3.6 Technology and methodology aspect

The rapid development of technology has been seen in many global aspects as the world has entered into the new millennium. From a maritime aspect, the new technology developments include radar, automatic radar plotting aides (ARPA), the global positioning system (GPS) and differential GPS (DGPS), voyage data recording (VDR), adaptive auto pilots (AAP), track control systems, integrated bridge systems (IBS), vessel traffic services (VTS), vessel traffic management information systems (VTMIS), automatic identification system (AIS), and the use of computers in navigation.

Satellite navigation systems will replace radio navigation systems progressively. New energy sources, light sources, materials, remote survey and remote control technology will be more and more widely used.

It is said that we are in the information and Internet age as we enter the new millennium. Information technology is playing a more and more important role in every aspect of the

world. On the one hand, information is explosively increasing; on the other, information can be quickly and easily transferred from one place to another place far away from each other. The world is becoming smaller and smaller due to the Internet.

The application of IT in maritime safety administration is increasing and will dramatically improve the efficiency and effectiveness of the administration. For instance, Britain's Maritime and Coast Guard Agency has invested heavily in technology to integrate and develop information technology into providing a far more efficient system. The Agency aims to make 50% of its dealings capable of delivery electronically by 2005 and 100% by 2008. The annual running costs will be 20% higher than the existing system, but this integrated system will extend area data coverage by 80% and capacity by 100% (Lloyd List, 2000).

Maritime safety and marine protection conventions and laws are regarded as learning from accidents. Although they have made a great contribution to improving the conventions and laws, the constraints seem more obvious. With the development of deregulation, one scientific method is being introduced in the legislation regarding Maritime safety and marine protection aspects. This is Formal Safety Assessment (FSA).

Formal Safety Assessment is becoming an increasingly helpful tool in the proactive assessment of risk levels and the identification of cost-effective measures to improve the effectiveness of the regulatory regime pertaining to ship safety and vessel-source pollution control (Bievre, 2000). FSA has been used in the U.K, Denmark etc. The Maritime Safety Committee (MSC) and the Marine Environment Protection Committee (MEPC) of IMO approved guidelines for the application of FSA in 1997.

3.7 Analysis of the CMSA's external environment

The external environment of the CMSA is changing. Some elements are changing slowly, and smoothly, others are changing fast and dramatically. This will have an impact on the CMSA. These impacts may have some implications, which are here classified into opportunities and threats.

One event may produce opportunities while another may produce threats. But opportunities and threats are not always independent. They are linked to each other sometimes. One event may produce opportunities while at the same time; it may also create some threats.

3.7.1 Opportunities

i) While globalization is continuing, it will stimulate international shipping and the maritime industry and increase international cooperation on maritime affairs. This will provide important opportunities for the development of the CMSA because a strong maritime economy needs a strong maritime safety administration to sustain it.

The entry of China to the WTO will greatly encourage trade between China and foreign countries. Both international and domestic shipping will benefit. This will speed up application of new technology and lead to adjustments in the structure of the Chinese Flag fleet.

The Dashun disaster provoked serious concern among both the public and national leaders. Maritime safety is being emphasized more, and both the politicians and the public are recognizing the importance of the CMSA. Some long-existing weaknesses

and problems regarding maritime safety have been exposed e.g. the problem of the SAR system. These may now have a chance to be solved quickly.

ii) With respect to national policy, transportation will still be a key priority for the Chinese economy in the 21st century and will develop quickly. So the CMSA as part of the support system to transportation will be given developmental priority by the State Council. More funds and resources may be given to the CMSA from the central fund.

Government reform is still continuing. There is an expectation in the State Council that it will need to establish a more integrated regulatory body so as to administer Chinese maritime affairs effectively. The CMSA may now have an opportunity to be strengthened.

The former China Oceanic Administration, under the direct-control of the State Council, has been incorporated into the Ministry of Land and Resources. Its declining interest in maritime affairs gives more space for the CMSA to develop.

There are demands for a “Big Transportation Department” which includes the existing Ministries of Communications, Railway and the Bureau of Aviation. This has been discussed for quite a long time. The next new government may carry it out and the CMSA may be given more power as a relatively independent agency.

Neighboring countries like South Korea, Japan, and Vietnam have already set up their Coast Guard in recent years so as to protect their maritime interests better. As maritime economics become more and more important to the whole of the Chinese economy, the government may consider the need to establish a strong, effective enforcement body like the Coast Guard to protect Chinese maritime interests. As the new CMSA is receiving

attention the both politicians and the public, the support is wide and clear. This will provide a chance to develop the CMSA quickly.

More and more focus on environmental problems, including marine environmental pollution by the international and national public, will encourage politicians to consider strengthening the CMSA.

The priority in developing the maritime economy in the coastal areas set by the local governments will stimulate the Chinese maritime economy. As this development can never be separated from maritime safety and environment protection, they know that the CMSA is becoming more and more important to them. This will give a chance for the CMSA to strengthen its relationship with local governments and get more support from them so as to develop the CMSA more quickly. Some specific problems in the local areas, which are not addressed by the national legislation, may be solved through local legislation.

iii) Modern technology is developing very rapidly. The application of new technology to the maritime sector will improve the safety of ships and reduce pollution from them. The application of the new technology to maritime safety administration will also improve the capacity and efficiency of the CMSA.

3.7.2 Threats

i) IMO is being strengthened. As it is concentrating on Flag State implementation and establishing the assessment standards for Flag States, the CMSA will be more and more affected by the IMO. Unilateral action such as the European Union's (EU) action after the Erika may be easily avoided, but if the IMO has decided on some issues regarding safety and environmental protection, member States may need to act

effectively. Some States may try to achieve their goals through the IMO; e.g. EU is putting pressure on the IMO after Erika. As a result, some technical standards may be enhanced and this will put significant pressure on developing countries, including China.

Tacit procedure increases the speed at which regulations change. Very little account is taken of the costs involved. Implementation may make it difficult for developing countries, including China, to keep up with the changes.

Because of the rapid development of PSC into more broad geographic areas, higher inspection rates and detailed inspections, PSC will monitor the effectiveness of the international standards on board ships more effectively. On one hand, the result of the inspection will show this link because the ship is always linked to its Flag State. This has already been seen when each MOU publishes its detention list. If the detention rate of a flag State is higher than the average detention rate, this flag State will be put on the "Black List" which means the ships of this flag will be inspected more frequently and in detail. This may lead to more ships of this Flag State being detained, and thus put the competent authority of that Flag State into serious trouble. On the other hand, the task of PSC of the CMSA is increasing. Higher inspection rates and more detailed inspections mean a more difficult and complex inspection, resulting in more and higher qualified PSCOs being required.

Increasing the liability of the Classification Society may increase the danger to the administration which has delegated the mandatory surveys and certifications to the Classification Society. In order to avoid this danger, some States' authorities have already established certain terms on the liability arising from the improper surveys and certification between the authority and its delegated Classification Societies. The CMSA has delegated most surveys and certification to the CCS but there is no clear agreement

on this delegation, let alone the terms governing liability arising from the improper surveys and certifications. This will create a real threat of liability on the CMSA itself.

ii) The disconnection of the government from enterprises has now been finished, and market competition is becoming more serious. On the one hand, the control of, or intervention into, enterprises by the government is much reduced. On the other hand, enterprises may seek economic efficiency i.e. maximum profit, while ignoring safety.

Before this change, enterprises were controlled tightly by the government. Governmental instructions were easily implemented in the enterprise. Since safety is not free of charge, safety and economic profit seem always to be in conflict in the short term. To achieve safety standards, certain expertise, equipment, money and technology are needed. This of course will affect the profit of an enterprise in the short term, but will benefit it in the long term.

The disconnection of the government from enterprises has freed them in respect of planning, market, etc. and also with respect to safety. The enterprises have the possibility to make their own decisions without observing government instructions as before. It is easy for the enterprise managers to focus on the economic aspects while neglecting the safety aspects because they are driven to achieve economic success. The attitude towards safety will change. With increasing competition in the market, it is easier for enterprises to cut out some seemingly unimportant costs including the cost of safety construction.

As the market is being established, the mechanism of the market is not satisfactory. Unfair competition is widely prevalent due to the operation of substandard ships. Therefore, the situation becomes more serious and complex.

The entry of China into the WTO will greatly encourage foreign trade between China and other countries. The number of ships entering and leaving Chinese ports and waters will increase dramatically. The traffic density in Chinese waters will thus increase greatly. The task of monitoring these ships will become much greater. Thus the possibility of shipping accidents occurring will increase. As imported crude oil and natural gas by shipping will increase dramatically, the threat posed by the ships on the ports, territorial waters and potential exclusive economic zones (EEZ) will also be greater.

China's entry into the WTO means China is more open to the world. Foreign shipping companies and foreign classification societies may easily enter China's markets. These will increase the task facing the CMSA with regard to maritime safety and environmental protection. Meanwhile, WTO rules require its member governments to conduct themselves in a more transparent and open way. The CMSA will also face this requirement.

The shipping market will benefit from China entering the WTO. As the market turns up, most shipping companies will take the chance to enlarge their fleets so as to get a larger portion of the market. Ships will be highly valued, no matter whether they are new or old. As the building of new ships will take some time, the existing old ships will become increasingly attractive for shipping companies to enlarge their fleets quickly. Therefore, more old ships will join the fleets. This will increase the risk of maritime safety and marine pollution.

The administrative task is a function of a range of variables. These include import and export cargo types and tonnage, port state control of foreign ships and flag state control of the national fleet (Crone, 1987). Small ships often represent a proportionally greater administrative task than larger ships operated as part of a sophisticated fleet

management operation. For instance, accidents at sea on board recreational boats will occur with greater frequency, as a result of the increasing popularity of marine leisure activities.

Present maritime administrative regimes do rely significantly on operator responsibility. The legal obligation on owners and masters to maintain a seaworthy ship and to operate it safely are the most noteworthy.

In previous years, many new shipping companies have appeared, and some of them did not have enough personnel, technology, expertise and money. They bought many old ships, most of them being small ships, and in this way they took part in serious competition. Single ship companies and small shipping companies are numerous. Most of these companies do not have any long-term goals. They just want to earn money quickly and pay it back to the banks. This explains their short-term actions. Their ships often have lower safety standards, because they do not want to invest in safety. Therefore, so many shipping companies may pose serious threats and are difficult for the CMSA to control.

The quality shipping campaign will put additional pressure on the Flag State. One important criteria of quality shipping is the implementation of the international standards on board ship. Since the Flag State is basically responsible for implementing international standards on its ships, the CMSA which is the competent authority to implement these standards on Chinese flag ships will be open to criticism if Chinese flag ships cannot show reasonable quality.

The development of flag of convenience may increase the threats to maritime safety and environment protection. Flag of convenience has a loose interpretation of the link between a ship and the State whose flag it flies and which, accordingly, holds itself

"open" to the ships from any country. Standards of safety and environmental protection vary and are often subject to less rigorous control than traditional national registers. Flag of convenience ships are more likely to cause accidents and pollution due to the poor physical condition of the ship, inadequate manning, multinational crews, or the lack of proper training. This can be seen from the detention rate in MOUs and from some of the major accidents that occurred in history.

iii) Since the reform results in an adjustment of the interests, there must be some potential conflicts. Where a reform is carried out deeply, these potential conflicts may develop and new problems may arise.

Reform is influenced by many factors. These can be generally divided into two aspects, positive and negative. The reform may go ahead quickly and smoothly if the positive factors are stronger than the negative factors. The reform may go ahead more slowly and with more difficulties if the positive factors just exceed the negative factors. It may stop altogether if the positive factors balance the negative factors. It may even turn back if the positive factors are weaker than the negative factors. This can be drawn from lessons in history.

Reform is never an easy thing but an adventure. It may never end. As government reform is still continuing in China, there is a danger that the temporary achievement of the reform may change. One of the important factors, which will affect the reform, is the current performance of the new organization that is a result of the reform. The reform is to achieve a planned objective. This could be tested by the performance of the new organization. If the performance of the new organization is better than the former, it will sustain the reform. But if the performance of the new organization is not better than the former, or even worse than the former, it will put negative affects on the reform. Those opposing it will say the reform is wrong and it is essential to revert to the former or go in

another direction. Therefore, the newly produced body is really under threat to survive. The CMSA, as a result of the reform, may face the same danger.

iv) The overlap of responsibilities among some governmental agencies in respect of maritime affairs is still a problem. This leads to competition among them for resources. For example, the amendments to the Law of Marine Environmental Pollution Prevention of the P.R.C. was adopted by the NPC standing committee and entered into force on the 1st April 2000. Although the amendment made progress, some new problems arose. For instance, unclear divisions of authority among the different governmental bodies caused overlaps in law enforcement in some areas. As the other agencies are enhancing their role of the administration of maritime affairs, there is a danger for the new CMSA if it cannot fulfill its obligation rightly and efficiently. It may lose the support from the State Council and could lose the resources it needs to develop itself.

v) The rapid development in the Chinese economy provides so many opportunities to make a fortune. So many people want to make a fortune quickly; this leads to risk-taking by many people. This has a negative impact on establishing a safety culture in the Chinese shipping industry. This is also one cause for the disaster of the “Dashun”. According to the investigation report, human error is the main cause of the disaster. The captain and the managers of the company were blamed for the risky operation of the ship in bad weather without seriously considering the safety of the ship and the passengers on board. There is now greater public intolerance of accidents and of pollution and the threat to human lives. The result is that political considerations seem to be becoming the driving force for introducing new regulations. This places much more pressure on the CMSA.

The media's quick reporting on maritime accident will push the work of the CMSA more into the public eye and make it transparent. The CMSA will be easily criticized by the public if it responds to an accident improperly.

vi) Technology will also create some new problems. First, there are often risks with the initial use of new technologies because sometimes the technology was applied without a full assessment of its risk. Second, technology changes the nature of these risks. Ships turn around more quickly, causing traffic congestion in certain maritime zones; as ships have become increasingly reliable, upstream expertise has declined correspondingly. This has led to an under-evaluation of real transport risks, itself resulting in lightweight packaging, negligence in handling operations, and a lack of care in company logistics. Third, bigger and faster ships will cause more serious damage once the accident happens. Fourth, ships are becoming more sophisticated. This will increase the difficulty of the ship's survey. Ships will also need better-qualified crew to operate them. Some accidents at sea in the past have been attributed to technological changes. Fifth, the new technology is also a main reason that leads to IMO conventions amended quickly. This has been proved by the history of the IMO. As the conventions have been amended, the technical standards for ships have been improved. This means more investment is needed because the implementation of the standards is costly. This puts more pressure on flag States, particularly developing countries including China.

4. Challenges facing the CMSA

After assessing the strengths and weaknesses of the CMSA in chapter 2 and the opportunities and threats outside the CMSA in chapter 3, the author intends to identify the major challenges facing the CMSA in this chapter.

4.1 Definition

Challenge is something new and difficult, which requires greater efforts and determination. The challenges facing the CMSA in the new millennium relate to its internal strengths and weaknesses, and the opportunities and threats external to the organization. The combination of the above factors will create the challenges for the CMSA.

4.2 Challenges

Challenge 1 Flag State implementation of the conventions is being highlighted throughout the world. IMO is being strengthened. It now has a little but very important power to monitor the Flag State implementation of the IMO conventions. It does, and will continue to focus on Flag State implementation. As the CMSA has some weakness regarding ship's survey control, etc. how should the CMSA enhance the implementation of international standards so as to set an example as a quality flag?

Challenge 2 The present strong focus on the human element by IMO, PSC, etc. regarding maritime safety and pollution will continue in the future. There is a lot to do to institutionalize the 'safety culture', as it has been called, beyond the first round of

implementation. At issue, for the CMSA, is how to effectively and completely implement the ISM and STCW 95 so as to ensure that the human element and safety management system programs become institutionalized.

Challenge 3 As the PSC is developing into more geographic areas, higher inspection rate and detailed inspection, the task of PSC of the CMSA is becoming greater. As the FOC is still developing, the safety situation of the world fleet is serious. The task of the Port State to eliminate substandard ships has increased. In the meantime, the CMSA has some weaknesses regarding PSC. How can the CMSA cope with increasing requirements and fulfill its role as a responsible member of the Tokyo MOU?

Challenge 4 As China will enter the WTO in 2000, the Chinese government, including the CMSA, will have to conduct itself according to the rules of WTO. How should CMSA deal with ship survey, safety superintendence, ATN, SAR, pollution prevention etc. in line with the international expectations e.g. openness and freedom of information while the CMSA has some weaknesses in information aspect?

Challenge 5 As the speed of updating some regulations is slow, there is a potential danger that conflicts between the outdated regulations and the amended laws or conventions may arise. This danger may be serious when the officers are still enforcing the amended laws by using the outdated regulations because they do not know of the changes. For example, if a ship is detained according to the outdated regulations, while the ship is in accordance with the new requirement of the amended laws or conventions, then the ship is unduly detained. The CMSA is responsible for the undue detention and may be sued in the Court by the plaintiff for compensation. When this happens, not only does the CMSA have to pay for the damage, but also the image of the CMSA will be seriously hurt. As awareness among the public is increasing, and Chinese society is opening up, this danger is becoming more urgent for the CMSA to consider. How can the CMSA avoid this kind of potential danger?

Challenge 6 As the amended Law of Marine Pollution Protection of the P.R.C. entered into force on the April 1, 2000, allied enforcement at sea of the related governmental agencies will need to be quickly started. The situation where some governmental bodies are enforcing the same law at sea will still remain for some time. In the meantime, the CMSA has some weaknesses regarding on-scene force and controlling means. How can the CMSA play an active role in the associate enforcement activities in the future?

Challenge 7 With the increasing import of crude oil from the Middle East and the increasing exploration and production of marine oil and gas fields in Chinese waters, so the marine transportation of crude oil will increase. The threats of oil spills in Chinese waters as a result are increasing dramatically. Central and local governments are increasingly emphasizing the maritime economy. More and more local coastal economies are relying on the maritime economy, e.g. tourism. The damage of pollution in the future will be much more serious than now. In the meantime, the CMSA has some weaknesses regarding pollution prevention. How can the CMSA prevent, control, combat and mitigate oil spills effectively especially large-scale oil spill?

Challenge 8 The “Dashun” disaster exposed some weaknesses in maritime safety. This should serve as a warning to the CMSA. What should the CMSA learn from it? What actions should be taken so as to prevent accidents like this occurring in the future?

Challenge 9 Seafarers used to be attached to state-owned shipping companies, where employment stability and training, examination, and certification could be easily done with the help of these companies. But now, with the Labor Law implementation, the outflow of seafarers is becoming a trend in the market economy. In the mean time, quite a lot of new seafarer agents appear. As China is becoming a main crew-supply country in the world, the many free and frequent flows of seafarers will increase the amount of

work, and the difficulties of the work. In the meantime, the new STCW places more stringent requirements on seafarer training and certification. How can the CMSA audit the qualifications of so many seafarer agents and monitor the quality of seafarer education and training institutes effectively?

Challenge 10 As the Chinese government reform is still in progress, how can the CMSA perform better so as to support the reform and survive in the competition with other governmental agencies? As the reform within the CMSA progresses, the structure and institutions will be changed dramatically. This means the reallocation of people, interests, etc. How can the CMSA keep its staff stable, and maintain daily work standards while significant change is occurring?

Challenge 11 The CMSA is also facing an ethical challenge. As China is becoming more open and developing fast, the Chinese society is becoming more complex. Growing social complexity implies ethical dilemmas for the public servant (Straussman, 1985). As a public servant, a CMSA officer will have some discretion in his or her daily organizational life. Discretion implies choices, and choices usually contain within them ethical challenges. How does a CMSA officer choose among, obligation to country, obligation to self, obligation to profession, and obligation to law when the Chinese society is becoming so complex?

Challenge 12 More ships and more sophisticated ships are increasing the work of the ship survey. Advanced facilities for reviewing and auditing the ship survey and higher qualified staff are required. The amount and difficulty of controlling, reviewing, and auditing of the ship survey are increasing. In the meantime, the risk of liability of the classification society is also increasing. There is no formal agreement on delegation between the CMSA and CCS to clearly define the responsibilities of each party. Also, the CMSA has some weaknesses regarding ship's survey control. How can the CMSA

monitor the CCS effectively so as to maintain the Chinese flag as a quality flag and avoid the risk of liability in the future?

Challenge 13 As technology is developing quickly, the application of new technology in the CMSA is very important to improve its capacity for law enforcement. However the application of new technology needs large investments and highly qualified personnel to operate new equipment. How can new technology be applied in the CMSA so as to build up its capacity for law enforcement quickly? How can the CMSA acquire adequate funding and human resources to apply the new technology in the CMSA so as to strengthen its capacity?

Challenge 14 As ships become faster, larger, more sophisticated and turn around quickly, the nature of some risks are being changed as well as some new risks arising. In the meantime, the new technology applied in the CMSA is not adequate. How should the CMSA change from a traditional management style into a new management style, particularly regarding the management of ships entering and leaving port, dangerous cargo transport, ship safety inspection and seafarer training and certification?

4.3 Summary of the challenges

In summary, the CMSA may face many challenges in the new millennium. Although these challenges are different from each other, there are some interrelationships among them. For example, one challenge is due to more than one weakness. One weakness may contribute to more than one challenge. Therefore, these challenges can only be effectively dealt with in an integrated way. The following Chapter will address the strategies needed so as to meet with these challenges in an integrated way.

5. Strategies proposed for the CMSA

This chapter will address the strategies that the CMSA needs to adopt to meet the challenges identified in the former chapter. 'Strategy' means defining long-term goals and providing the means for achieving them. (Cole, 1997).

Strategies for the CMSA to meet the above challenges can be proposed in a general or specific way. To propose strategies in a specific way will be more difficult than in a general way. Also, specific strategies may lead them to be extensive to some extent. However, specific strategies may be more valuable for the CMSA than general ones while considering the implementation of them. Furthermore, if specific strategies can be proposed in an integrated way, they will be more like a whole package and the effectiveness of specific strategies will be better. Therefore, specific strategies will be formulated in an integrated way.

5.1 Principles for developing strategies

When developing strategies, the following principles should be considered:

First, it is the principle of long-term view. This means the development of the world maritime industry, Chinese economy and particularly the Chinese maritime economy should be considered from a long term prospective.

Second, it is the principle of coordination. This means that all the various parameters, including financial, personnel, circumstance factors, and both hardware and software, should be considered as a coordinated package.

Third, it is the principle of emphasizing key points. This means that the key issues which are crucial to the development of the CMSA should be given priority to address. If these ignored, there would be a serious negative impact on the CMSA. As the CMSA is a MSA in a developing country, it has many issues to deal with while it has only limited resources. It is realistic and effective for the CMSA to give the priority to certain important and urgent issues.

5.2 Proposed vision of the CMSA

Before formulating the strategies, a vision of the CMSA needs to be proposed because a vision of the CMSA is the perception of its future. It is very important in the development of the CMSA because it implies its long-term goals. Considering the mission, mandate and the internal and external environment in the above chapters, the proposed vision of the CMSA is:

To be a world leading maritime safety administration which can effectively and completely fulfill both national and international obligations with respect to maritime safety and environmental protection so as to sustain future development.

5.3 Strategies proposed for the CMSA to meet the challenges

Strategy 1 Build up a solid administrative capacity so as to effectively enforce the laws and provide high quality services

A solid administrative capacity contains all the aspects regarding the different maritime safety and environmental protection programs. Therefore, the means to build up a solid administrative capacity will be provided for each specific program.

i) Ship survey and certification

Ship survey and certification is one of the most important elements regarding ship's safety and pollution prevention in SOLAS, MARPOL and LL etc. It is through survey and certification that the technical standards are firstly imposed on board ships. Since the survey and certification of ships was delegated to the China Classification Society by the former China Register of Ships before the merging with the former China Maritime Safety Administration, therefore the CMSA should:

- Negotiate a comprehensive agreement on delegation of survey and certification with the CCS, clearly defining the rights and responsibilities of each party. Considering the IMO conventions and guidelines on delegation to recognized organizations, the agreement should include the terms of the audit of the classification society, limitation of liability etc. This will provide a sound base for the CMSA to effectively monitor the statutory survey and certification carried out by the CCS on behalf of the CMSA.
- Enhance monitoring of the statutory survey and certification carried out by the CCS on behalf of the CMSA. First, develop specific requirements on the conduct of delegated statutory functions including active and objective audit practices to classification societies by the CMSA. Second, design effective audit processes for the societies. The process must be cost-effective and timely, and based on objective criteria for determining nonstandard occurrences, together with agreed corrective

processes. Third, establish ship surveyor's accountability mechanisms. Fourth, establish the database of statutory certificates issued by the CCS to the Chinese ships and timely monitoring the situation of such certificates. Fifth, issue and implement regulations on the administration of ship survey, rules of certification and qualification of surveyors.

- Enhance the specialized unit tasked with monitoring the work of ship survey conducted by the classification society, through training and developing an expert team in the CMSA regarding ship's survey. First, develop special training programs for the staff in the unit and intensify the training in collaboration with the CCS. These programs should include the IMO conventions and the procedures for surveying. Second, employ some retired experienced surveyors to give advice on some technical issues.

ii) Registry of shipping

- Enhance ship registry; amend the regulations governing ship registry.
- Establish a database of Chinese registered ships.
- Develop the CMSA into an efficient and service-oriented organization which will actively attract ships to the China register.
- Work with industry to maintain the reputation of the China register as a quality flag and to improve the service provided to Chinese shipping.

iii) Ship's safety inspection

- Enhance the safety inspection of Chinese flag ships before leaving Chinese ports so as to lower the detention rate of Chinese flag ships in MOUs. The ships leaving for PARIS MOU countries, the U.S.A, Canada and Australia should be given priority for inspection. The deficiencies found should be fully rectified before leaving.

- Intensify the training of the PSCOs. First, regularly hold concentrating training programs, including IMO conventions and English. Second, send those PSCOs who lack sea experience to practice on board ships. Third, invite some experienced surveyors to give lectures on ship's survey and send the PSCOs to work with these ship's surveyors while the survey is being conducted.
- Continue to enhance the safety inspection of passenger Ro-Ro ships, chemical tankers, LPG, LNG in Buohai Bay, Changjiang river, Qiongzhou Strait and Zhoushan archipelago waters. Also, enhance the safety inspections of the inland water ships according to the different situations prevailing in different rivers.
- Establish a database of ship inspection. As soon as an inspection is finished, a report should be sent to the database; inspectors in other ports can then get instant results from the inspection of the ship in the last port. Follow-up actions can be taken and unnecessary boarding can be avoided.

iv) Management of seafarers standards

- Effectively implement STCW 95 through monitoring the quality of training institutions, establishing a national network of seafarer management, using computers and simulators for training and assessing seafarer's skills, and establishing a quality system for seafarers' examinations, assessments and certification.
- Establish a database of seafarers and certificates.
- Establish a database of questions for examining seafarers and for standard computerized examinations, and establish several computerized examination centers in a few major cities which have large amounts of seafarers taking part in the examinations.

v) Navigation control

A sound traffic order in Chinese waters is important for maritime safety. According to some statistics, most accidents happen within 50 NM coastal waters and collision is the highest among all kinds of accidents. Therefore, the CMSA should:

Give priority to some important or congested waters including port areas, Buohai Bay, Qiongzhou Strait, Taiwan Strait, waters of the mouths of the Changjiang River, Pearl River, Waters of Chenshantou, and tanker routes.

Use various means that are integrated to achieve the greatest effectiveness, including a Chinese Ship Reporting System (CSRS), VTS, video monitoring systems and patrol ships and aircraft. The CSRS will gather information on the movement of both foreign and Chinese ships by receiving reports from ships. VTS and the video monitoring systems will provide service to ships and monitoring of the movement of the ships in certain areas. Patrol ships will actually monitor the real situation of ship's movement and maintain traffic order. Aircraft will quickly and effectively monitor ship's movements. By using these means, effective control should extend to 100 NM away from the coastline within 5 years and 200 NM within 10 years.

Consider establishing separate traffic schemes in some congested waters e.g. the waters of Chenshantou. This would improve vessel traffic order in these waters. To establish separate traffic schemes, the CMSA should first draft the documents of the scheme. To do this, certain expertise is needed and some data on ship's movement in these areas needs to be collected and processed. After drafting, the document should be submitted to the MSC of the IMO for adoption. Once adopted by the MSC, a public notice should be made before implementation of the scheme.

Cooperate closely with local governments to solve certain issues including sand dredging, fishing and breeding in some navigational waters, particularly congested waters. These problems can only be effectively solved in collaboration with local governments because they are related to the local economy.

vi) Search and Rescue (SAR)

Improve communication relating to maritime distress. First, make the national SAR special call number "12395" which has been launched on April 1, 2000 well known to the public. Second, use Coastal Radio Stations and other such facilities to maintain a continuous watch on distress frequencies twenty-four hours a day. Third, implement and maintain the Global Maritime Distress and Safety System (GMDSS) including the Cospas-Sarsat and the Inmarsat systems. Fourth, collect distress information through maritime cellular phones.

Establish a Chinese Ship Reporting System (CSRS). The ship reporting system will allow rapid and precise search and rescue activities by managing information such as the navigation plans submitted by participating ships and the positioning of ships using computers to observe the status of each ship. The CMSA would handle messages from participating ships at coastal stations throughout China. In cases where it would take a long time for patrol vessels/craft and other such support to arrive at a distress site, CSRS has the merit of making it possible to assist in rescue, as well as to conduct efficient searches by specifying the estimated distress position.

Improve SAR coordination. First, all the sub-coordination centers in local government should be reorganized under the direct-controlled bureaux of the CMSA. The heads of the direct-controlled bureaux should chair the heads of the sub-coordination centers. Second, the coordination procedures should be further standardized. Regular exercises

should be held to help involved persons to be familiar with the procedures. The procedures should be regularly reviewed and adjusted if needed.

Improve SAR resources. First, helicopters should be considered as a major requirement due to their quickness and effectiveness comparing with ships. Certain SAR helicopter centers should be set up in a few strategic places such as Dalian, Shanghai and Guangzhou. Second, large coastal patrol ships should be also considered as primary resources. Third, the establishment of private rescue organizations and the establishment of a rescue system related to marine leisure activities should be considered as a supplementary means and be actively promoted.

Promote SAR cooperation. First, cooperate with Hong Kong and Macao. Cooperating procedures need to be further standardized. Joint exercises involving Guangdong, Hong Kong and Macao should be held annually. Second, cooperate with neighboring countries. These cooperations should be based on the international laws, particularly the International Convention on Maritime Search and Rescue, 1979 (SAR Convention) as updated.

vii) Aids to navigation and hydrographic survey

Aids to navigation are grouped into visual, audio, and radio aids. Different aids have different functions and are suitable for different environments. The choice of aid depends not only on the functions of the aids, but also on the natural conditions, the characteristics of vessel traffic, changing maritime traffic patterns as a result of the development of new ports and new traffic routes, the size and speed of vessels, and interdependent relationships with other aids to navigation. Therefore, the CMSA should systematically take into consideration these factors.

To establish and improve aids to navigation, the CMSA should: first, enhance the maintenance of navigational aids facilities and adjust some ATN at important locations, such as the entrances of ports. Second, explore the application of the new energy, light sources and materials. Third, establish an ATN information system to improve the information service for safety of navigation through the publishing and provision to mariners of hydrographic charts and publications, i.e. nautical charts, tide tables, nautical almanacs, and other publications that contain information required to ensure safety of navigation. Fourth, create a new system of radio aids to navigation by constructing DGPS stations to provide DGPS services for all Chinese coastal waters except for some of the isolated islands.

To develop a hydrographic survey into an efficient, reliable service equipped to improve the accuracy of charts and reduce the time of production of charts. the CMSA should: first, construct a telemetry system; second, establish an electronic chart center.

viii) Accident investigation

Improve the quality of investigators. First, set up standards for investigators. Second, intensify the training of the investigators, including on board training to obtain sea experience. Third, send investigators to take part in the activities of the International Marine Accident Investigators Forum.

Ensure objective investigation. First, maintain a separation between the interested parties and the investigators so as to reduce factors that might influence the investigation. Second, establish an internal audit process to ensure objective investigation. Third, use the unified checklist on the human element according to the guidance provided by IMO, develop ship-reporting forms, and standardize the investigation formats. Fourth, establish a national marine accident investigation experts committee and draw upon their

expertise. Fifth, publish the reports of investigations and encourage critical comments on the CMSA in the investigation.

Enhance investigations into near misses to assemble more information on the causes of emergencies. Near misses should be emphasized in order to promote a safety culture. A near miss analysis is valuable for analyzing human error. Near misses should be reported, collected, investigated, and analyzed so as to promote preventive measures.

ix) Shipping company management

Maritime safety is related not only to the ship itself but also to the shore based office of the ship. Therefore, shipping company management should be improved. The CMSA should promote a safety culture in the Chinese shipping industry through effectively implementing the ISM code and the new STCW. First, enhance initial audits of SMSs of companies included in the second phase according to the ISM Code. Second, extend the ISM mechanism to domestic passenger Ro-Ro ships, oil tankers, chemical tankers, liquid gas vessels, bulk carriers and their companies and strictly audit these shipping companies. Third, emphasize the human element in implementing the International Safety Management (ISM) Code and the International Convention for Standards of Training, Certification and Watchkeeping (STCW) 1995 amendments.

Different policies should be used for different groups of shipping companies. According to Jonsson (1999), shipping companies can be classified into four kinds in terms of “will” and “can”. The first group is the companies that will and can rectify the deficiencies on board their ships so as to improve their safety. The second group is the companies that will not but can rectify the deficiencies on board their ships so as to improve their safety. The third group is the companies that will but cannot rectify the deficiencies on board their ships so as to improve their safety due to certain problems.

The fourth group is the companies that will not and cannot rectify the deficiencies on board their ships so as to improve their safety. The first group should be encouraged by the CMSA; the second group should be pressured; the third group should be helped and the last group should be cracked down upon.

x) Pollution prevention

Build up capacity to prevent, control, combat, and mitigate large-scale oil spills because they will cause serious damage to environment and lead to serious public concern. First, build up and maintain a database of coastal information, which is necessary for responding to oil spills. Second, establish a national strike team which has advanced knowledge and techniques on maritime disaster prevention and which carries out comprehensive exercises regularly. Third, establish the Incident Command System, which includes solid, consistent, but flexible standard organizational methods for all types of marine pollution incidents nationwide, and a standard communication repertory. These will achieve a reduction in the chaos at large incidents, thereby effecting a smooth transition from an emergency mentality to that of a planned event (Sampson, 2000). Fourth, increase aerial and ground level surveillance capability. Strive to obtain downlink capabilities with aircraft and command posts to provide real-time surveillance data to decision-makers. Fifth, develop and implement a national contingency plan for oil spills from ships, and conduct joint exercises with Hong Kong and Macao in the mouth of the Pearl River. Finally, enhance cooperation between the governmental and private sectors. Form partnerships with industry and use them for developing dynamic open dialogue and quality-based processes to reach mutually agreed improvements in response and planning.

Enhance dangerous goods control and pollution prevention through information enhancement of the work. The information regarding dangerous goods and the ships

carrying them should be instantly input into a database which is accessible by all interested parties.

Strategy 2 Establish sound legislation regarding maritime safety and pollution prevention, which can provide a strong base for law enforcement;

i) Enhance the study and assessment of the law instruments regarding maritime safety and pollution prevention, which form the basis of the work of the CMSA.

First, Follow up on changes to these instruments. The establishment of the information system and its utilization mechanisms is important to draw upon and utilize the latest information. Second, study the instruments. The study should include the operating mechanisms of international organizations and the domestic legislation procedure, the content, background, and impact of these instruments. Third, make a scientific assessment. Assessment should be completed rationally so as to measure the needs of the situation and the opinions of those being administered.

ii) Put in order the conventions, laws, and regulations according to the following steps:

- Check whether some related international conventions are fully implemented.
- Check whether existing national laws and regulations are in compliance with the conventions.
- Check that the regulations and procedures issued by the CMSA are in compliance with existing national laws and regulations.
- Check that the local legislation regarding maritime safety is in compliance with national legislation.
- Clarify the levels and category of these law instruments in preparation for establishing the CMSA legal system.

- iii) Intensify the work of developing maritime safety and pollution prevention legislation.
- a) In the development of maritime safety and pollution prevention regulations, FSA should be considered as a valuable tool to improve the quality of the work. The following steps should be adopted:
- A clear and compelling need must exist prior to consideration of any new regulations.
 - National safety, pollution prevention and crew health requirements should be consistent with those international instruments to which the Government is a party.
 - Regulatory development should involve broad participation by affected parties.
 - Acceptable national standards should be used where applicable in preference to developing separate maritime industry standards.
 - Existing regulations should be regularly reviewed for adequacy, relevance and clarity.
- b) After assessing the situation, the CMSA should:
- Draft the Law of Ship, Law of Seafarer, and Regulations for SAR management.
 - Amend the Regulations for ship registry, seamen's passport administration, ATN management and marine pollution prevention from ships.
 - Formulate rules for the administration of dangerous goods carried by ships, administration of bulk liquid cargoes carried by ships, ship survey, examination, and qualification of ship survey, administration of dredging of sunken ships and wrecks, safety loading and unloading of bulk carriers.
 - Establish enforcement and superintendence mechanisms.

- Suggest and promote the ratification of the ILO 147.
- c) Consider adopting the highest practicable national and international standards in matters concerning maritime safety and pollution prevention. Since regulation is often seen to be costly and inefficient, a cost-benefit analysis needs to be applied so as to ensure that the cost of the regulation does not exceed the benefits (Straussman, 1985).

Strategy 3 Construct a comprehensive maritime safety and pollution prevention information system which can fulfill the needs of management.

In maritime safety administration, the user's demands are often very urgent. The CMSA frequently has to take decisions in a hurry in order to deal with situations calling for action that cannot be postponed. In such cases, information must be provided at once.

The use of information to improve the bases for decision-making is to reduce the risk of error. In order to be used efficiently, the information must be processed. It must be recorded, analyzed, and transferred into data that are useful for the decision-maker. But for the information to be useful, it must be communicated to those who need it. Finally, information, effectively communicated, becomes part of a decision process.

More rational decision-making processes cannot be introduced without first organizing the collection, processing, and employment of information. (Grolier, 1979). Information must be clear, timely, reliable, valid, adequate and wide-ranging. Therefore, the CMSA should:

Construct a China maritime information system. This system should cover all the units and major work of the CMSA. This is a large information project. Its construction should be in accordance with the principles of unified leadership, standards, division and

cooperation, and implemented step by step. It will push forward the work of information management in the CMSA. Some urgent issues should be given priority and completed quickly.

The information system should gather relevant information (i.e. information likely to answer the questions raised by those who use it). This must be selected and then indexed, classified and analyzed—and possibly even translated—so that abstracts and syntheses can be produced.

The information system should have a large variety of links with other information services in the country such as information services organized for the general public, university information services, information services of non-university research centers, other governmental bodies, particularly the maritime industry. It should also link with some international or regional organizations, including IMO, TOKYO MOU, IACS, etc.

Strategy 4 Establish optimized internal structures through continuous reform.

i) Continue to complete the merging and transfer of the maritime safety organizations. Until now there is no agreement between the CMSA and the local governments of the Jiangxi, Anhui, Hubei, Chongqing, Zhejiang, Changjiang, Heilongjiang, no transfer from Liaoning, Shangdon, Hebei, Guangxi, Jiangshu, Zhejiang, Changjiang, Heilongjiang, and no change of name of the maritime organizations in Jiangshu, Zhejiang, Changjiang, Heilongjiang.

ii) Place emphasis in reorganizing internal relationships within the CMSA and establish unified, efficient, management mechanisms. As the reform progresses, the following three changes should be made:

First, the reform should shift focus from external to internal. Second, the reform should shift focus from structure to system or institution. Third, the reform should shift focus from general reform operated by top management to specific reform operated by the lower level units. These three changes are crucial to the achievement of an effective and efficient, unified CMSA.

a) As to internal reform:

First, clearly define the functions and responsibilities of each unit at different levels. As soon as the direct-controlled bureaux are established, set up the plan for the structure of the sub-bureaux and stations and implement the plan.

Second, during the process of establishing the new structure of the CMSA, the internal and external relationships must be balanced. The relationship between the headquarters and the direct-controlled bureaux is the relationship between the leader and those being led. The relationship among the direct-controlled bureaux is equal. The overlap of responsibilities among them, particularly among provincial and port direct-controlled bureaux within the same province must be avoided. Although they have their own functions, responsibilities and administrative areas, they must cooperate and coordinate with each other. In the near future, some adjustments should be made to remove the situation where more than one provincial and port direct-controlled bureau exists in the same province.

The external relationship includes the relationship between the CMSA and local governments, and the CMSA with other governmental bodies, e.g. customs, immigration authorities, and the public security bureau.

Third, each direct control bureau must comply with the plan and rationally define the positions, control the quantity of the staff, reduce the staff in offices and strengthen the on-scene force.

Fourth, when determining the elements and positions in the bureau, the main function of the maritime safety administration must be stressed. According to the actual situation, rational clarified management should be used.

b) As to system or institution reform:

When conducting system or institution reform, the new requirements of the new structure and mechanism must be complied with. In order to establish a unified order, harmonized operation and scientifically efficient mechanisms, a unified and standardized internal management system is the base. Every unit at all levels should comply with its authorized functions and responsibilities. The procedures and regulations to strengthen the internal and external management should be set up. The procedures and the regulations should clarify the responsibility area, working standard and procedure for each job. The relationship between different jobs should be adjusted if needed.

Before the establishment of a new system, both local and former direct control units had their own management systems. The new system must connect well with the former systems. The advantages and the shortcomings should be clarified. The advantages of the former systems should be considered for retention in the new system, while the shortcomings should be removed. To introduce the new system effectively, training must be stressed.

c) As to implementing reform in the units at the lower level:

The implementation of reform in the units at the lower level should be incorporated into the daily work. The most important task is to connect the various jobs effectively. People, resources and facilities should be transferred and incorporated as soon as possible so as to form an integrated body. During this procedure in the reform of the basic units, any overlap and vacuum in maritime safety management must be avoided. A smooth transition should be established so as to smooth the connection between the new and former units.

Strategy 5 Train and develop the staff to high quality levels and with an optimized distribution.

- Improve the management of the personnel resources through developing mechanisms for appointment and removal according to the performance of the staff, a competition mechanism for the staffing process, a post exchanging mechanism and an accountability mechanism.
- Develop suitable training programs to update the knowledge of the staff and consider cyber-training through the Internet.
- Cooperate with some shipping companies and send some young staff on board ship so as to improve their seagoing experience.
- Cooperate with Dalian Maritime University and establish a CMSA college within it so as to provide personnel who are destined to become CMSA executive officers with the necessary education and training. This should include general education and training related to the advanced knowledge and sophisticated skills required of future CMSA executive officers, such as jurisprudence, public administration, navigational science, marine engineering and telecommunications engineering.

- Cooperate with World Maritime University (WMU) closely and send more staff to study in it. WMU was established by IMO in 1983 so as to assist the developing countries in implementing IMO conventions and has made a great achievement in this aspect. The CMSA will benefit quite a lot from this cooperation especially in implementing IMO conventions.
- Increase the portion of the staff working in the basic units of the CMSA through giving priority to recruitment to the basic units.

Strategy 6 Establish efficient internal integrated management.

The internal integrated management includes management of personnel, money, equipment, technology and document. Since any administrative activities of an organization will involve using some or all of the above resources, effectiveness of activities cannot be achieved without its efficient internal integrated management. Since the CMSA is a large system, its internal integrated management is complex and important to its effective administration. Therefore, the CMSA should:

- Place emphasis on the application of modern management theory and modern technology in the CMSA so as to improve the management level through, for example, quality management theory and internal computer network.
- Establish a department to manage the equipment and technology as the inventory of equipment increases.
- Improve the quality of documentation by establishing and implementing a standard, unified, effective system of document processing.
- Establish effective coordination and communication mechanisms among and within each unit of the CMSA.

Strategy 7 Develop a sound organizational culture.

Organizational culture is important to the achievement of objectives of an organization. According to one theory, culture is something which cannot be switched on and off at will. Culture arises over a long period of time. Culture is related to attitude, expectation, behavior and results. To achieve results we need behavior. Every type of behavior will achieve a result. The result will have an impact on both the expectations and attitudes of people. Both of them will shift due to the impact of the result of the behavior as time goes on. They will influence the behavior of the people. This is a continuous cycle. As this cycle runs, the culture of an organization changes (Liu, 1997).

Therefore, to develop culture in the CMSA, it should:

- Elicit attitudinal and cultural variables and see whether they are congruent with today's situation.
- Elicit these and other culture variables, bring them out into the open and make staff realize that some of their taken-for-granted assumptions about their organization are valid and some are distinctly invalid.
- Make progress on an educational front, get the arguments across to staff.
- Make staff understand current behavior and results.
- Help staff to change their behavior and results in a way which is congruent with what the CMSA is striving for on the educational front.
- Change the units of the CMSA into results-based organizations in which leaders are accountable for achieving targets and results.

To strengthen the development of the culture, the CMSA should:

- Establish a CMSA culture and a public relation committee to enhance the leadership.

- Study and make a plan for constructing the culture of CMSA, detail the measures and implement them.
- Develop guidelines on culture construction and dissemination.
- Set up models.
- Establish a CMSA news, publicity and reporting net to publish the CMSA periodicals and maritime safety information.
- Enhance the positive publicity of the CMSA through strengthening the relationship with the press and other media.
- Encourage the staff union to play an active role in culture construction.
- Encourage ethical behavior by specifying what is, and is not, acceptable. This can be developed into professional codes, which can help foster sound ethical standards, foster confidence between the staff and public, and help staff make decisions when they are involved in ethically uncertain situations.
- Encourage ethical behavior by ensuring that citizens can observe them in action or obtain information concerning what they have done. Visible administration is accountable administration.

Strategy 8 Build up strong relationships with clients and the public.

Maritime safety and pollution prevention is the common goal of government, industry and the public. Different bodies have different but mutual roles. To achieve this goal effectively, cooperation among them is very important. Therefore, the CMSA should:

- Assign the function of dealing with the relationship with clients and the public to a specified division in the CMSA.

- Establish partnerships with the shipowners, port agents, seafarers agents, yacht clubs etc. and cooperate on some programs on maritime safety and environmental protection, e.g. study preventing human error in accidents.
- Enhance communications with the clients and public. Communications is the best way to strengthen relationships. First, the CMSA should provide information to clients and the public. All direct-controlled bureaux should provide maritime safety information, especially to local communities and for the convenience of the local residents. Second, the CMSA should respond to requests for advice or for consultation with clients and the public. The time limit for response should be set, e.g. 3 working days. If the request is urgent, it should be responded to as soon as possible.

Strategy 9 Play an active role in international maritime affairs regarding maritime safety and pollution prevention.

- Select and send more experts to take part in IMO activities. These activities should include IMO meetings, programs, working groups etc.
- Establish some specific committees to study the IMO and ILO conventions and their future development trends. These committees should include experts from various interested organizations.
- Develop international cooperation with adjacent countries. Many matters can only be handled effectively through international cooperation among countries. The international framework of maritime safety response has been constructed through the SAR Convention (International Convention on Maritime Search and Rescue, 1979), the OPRC Convention (International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990) and other Conventions to cope with various problems such as search and rescue in open sea areas, and protection of the maritime environment. Regional cooperation mechanisms on PSC have been

established through MOUs. China is a party to these international conventions and regional agreements.

- Work with neighboring countries to organize a high level meeting and implement joint drills related to search and rescue and other maritime safety activities.
- Exchange information on maritime safety and pollution prevention.
- Exchange training officers so as to understand and become familiar with each other.
- Take part in various international forums, seminars, and meetings relating to maritime safety and environmental protection.
- Establish relationships with some famous international non-governmental organizations such as BIMCO, ITF, CMI, etc.

Strategy 10 Establish a stable and adequate level of funding for the CMSA.

A stable and adequate level of funding for the CMSA is very crucial to the success of the above strategies. Without this, all the above strategies can never be implemented effectively or completely. Therefore, the CMSA should:

First, increase the funding from the central governmental coffers. Since the funding of the CMSA is mainly from the central governmental coffers. According to funding mechanism, the amount of the fee collected by the CMSA is the basis of determining the budget of the CMSA. To increase the funding, the CMSA should increase the amount of collected fees. This can be achieved by improving the fee rate, adding new kinds of fee and strengthening collection of the fee. The first two options must firstly be approved by MOT and other responsible government bodies. The CMSA needs to convince them that more financial resource is indeed needed to sustain the development of the CMSA. A good performance of the CMSA regarding maritime safety and pollution prevention is the key factor which will influence them. The third option mainly depends on the CMSA

itself. The CMSA should improve collection of the fee through rational financial management, improve measures used in collection and reducing ship's evading fee.

Second, consider introducing some other kinds of funding to supplement the funding from the central governmental coffers. These may include:

- Establish a rational emergency fund for oil spill and other pollution accidents like the USA, Canada, etc.
- Establish a fund for the clearing of wrecks in Chinese territorial waters.

5.4 Summary of the proposed strategies

Reviewing the above strategies, certain characteristics can be summarized as follows:

- The above strategies have been proposed in an integrated way.
- These strategies comply with the national policy.
- The development of hardware and software has been balanced and priority has been given to new technology and methodology.

Some key points have been emphasized in specific strategies.

6. Conclusions and recommendations

From the above chapters it is now possible to draw some conclusions.

First, as an organization, the CMSA has its own mission, values, mandates, functions and structure, which compose its internal environment. As an organization, it also has some strengths and weaknesses. Since China is a developing country, the CMSA has more weaknesses than strengths. After the objective scanning of its internal environment, the strengths and weaknesses have been identified.

The strengths are:

- i) The functional elements of the CMSA are quite complete; the whole system is becoming unified.
- ii) Many of the staff in the CMSA are well experienced.
- iii) Modern technologies are now being increasingly used in the CMSA, which have greatly improved the control and service level.
- iv) The controllability in port areas is relatively strong.
- v) Some procedures regarding maritime safety and pollution prevention have been established and have proved to be practical, valuable and effective.

The weaknesses are:

- i) Some weaknesses exist in the current structure of the CMSA.
- ii) Legislation regarding maritime safety and pollution prevention from ships does not respond to the changing situation adequately.
- iii) The distribution of the staff is not so rational.

- iv) Maritime information system construction is weak.
- v) The funding for the CMSA from the central governmental coffers is limited and the capacity to recover the cost of the CMSA is weak.
- vi) Capacity regarding some maritime safety and pollution prevention programs has some weaknesses.

Second, the CMSA is not an isolated organization in the world. It is a special Chinese governmental body tasked with administering maritime safety and marine environmental protection matters. It has its specific external environment which directly or indirectly influences it. This specific external environment is generally grouped into political, social, economical, and technical aspects. As the world enters the new millennium, the external environment of the CMSA is changing rapidly. This is having a significant impact on the CMSA, which can be positive or negative. This implies some opportunities for, and threats to, the CMSA. After objectively scanning of the external environment, the opportunities and threats have been identified.

The opportunities are:

- i) A strong maritime economy needs a strong maritime safety administration to sustain it. Both the politicians and the public are recognizing the importance of the CMSA.
- ii) National policy will give priority to transportation in the new century and the CMSA as a supporting system to the transportation will also be given priority to develop.
- iii) The application of new technology to maritime safety administration will also improve the capacity and efficiency of the CMSA.

The threats are:

- i) As a flag State, the CMSA is facing more and more pressure from the IMO, PSC, and classification societies regarding implementation of international standards on board Chinese flag ships.
- ii) The changing economy is imposing a greater workload on the CMSA to administer maritime safety and pollution prevention.
- iii) The continuing reform in the government is imposing certain pressures on the CMSA.
- iv) The overlap of responsibilities among some governmental agencies in respect of maritime affairs leads to competition among them for resources.
- v) The more active role of the public and media in society is imposing strong pressures on the CMSA.
- vi) Technology is also creating some new problems regarding maritime safety and environmental protection.

Third, as the CMSA enters the new millennium, it faces a number of challenges which arise as a result of the combination of the internal and external environments. Based on the identification of the weaknesses and strengths inside the CMSA, and the threats and opportunities outside the CMSA, challenges have been identified.

The challenges are:

- i) How should the CMSA enhance the implementation of international standards so as to set an example as a quality flag?
- ii) How should the CMSA effectively and completely implement the ISM and STCW 95 so as to ensure that the human element and safety management system programs become institutionalized?
- iii) How can the CMSA cope with increasing requirements, and fulfill its role as a responsible member of the Tokyo MOU?

- iv) How should CMSA deal with ship survey, safety superintendence, ATN, SAR, pollution prevention etc. in line with international expectations e.g. openness and freedom of information while the CMSA has some weaknesses in information aspect?
- v) How can the CMSA avoid the potential danger to be liable for improper administration due to outdated regulations?
- vi) How can the CMSA play an active role in the associated enforcement activities in the future?
- vii) How can the CMSA prevent, control, combat and mitigate oil spills effectively?
- viii) What actions should be taken so as to prevent accidents like the Dashun accident occurring in the future?
- ix) How can the CMSA audit the qualifications of so many seafarer agents and monitor the quality of seafarer education and training institutes effectively, especially large scale oil spill?
- x) How can the CMSA keep its staff stable, and maintain daily work standards while significant change is occurring?
- xi) How should a CMSA officer choose among, obligation to country, obligation to self, obligation to profession, and obligation to the law when Chinese society is becoming so complex?
- xii) How can the CMSA monitor the CCS effectively so as to maintain the Chinese flag as a quality flag and avoid the risk of liability in the future?
- xiii) How can new technology be applied in the CMSA so as to build up its capacity for law enforcement quickly? How can the CMSA acquire adequate funding and human resources to apply the new technology in the CMSA so as to strengthen its capacity?
- xiv) How should the CMSA change from a traditional management style into a new management style, particularly regarding the management of ships entering and

leaving port, dangerous cargo transport, ship safety inspection and seafarer training and certification?

The dissertation also has drawn certain recommendations. To meet these challenges, the CMSA has to adopt some strategies which have to be adopted in an integrated way. The following strategies have been proposed to meet thus requirement. These strategies constitute the recommendations of this dissertation.

The strategies are:

- i) Build up a solid administrative capacity so as to effectively enforce the laws and provide high quality services;
- ii) Establish sound legislation regarding maritime safety and pollution prevention, which can provide a strong base for law enforcement;
- iii) Construct a comprehensive maritime safety and pollution prevention information system which can fulfill the needs of management;
- iv) Establish optimized internal structures through continuous reform;
- v) Train and develop the staff to a high quality and with an optimized distribution;
- vi) Establish an efficient internal integrated management;
- vii) Develop a sound organizational culture;
- viii) Build up strong relationships with clients and the public;
- ix) Play an active role in international maritime affairs regarding maritime safety and pollution prevention;
- x) Establish a stable and adequate level of funding for the CMSA.

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