8-24-2014

The impact of the implementation of Tokyo MOU new inspection regiem on Port State Control in Yantian of Shenzhen and countermeasures

Fangming Xiao

WORLD MARITIME UNIVERSITY
Dalian, China

THE IMPACT OF THE IMPLEMENTATION OF TOKYO MOU NEW INSPECTION REGIME ON PORT STATE CONTROL IN YANTIIAN OF SHENZHEN AND COUNTERMEASURES

By

XIAO FANGMING
China

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

MASTER OF SCIENCE

(MARITIME SAFETY AND ENVIRONMENTAL MANAGEMENT)

2014

DECLARATION

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

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

(Signature): .....Xiao Fangming.....

(Date): ..... 10th July 2014.....

Supervised by: Wang Fengwu

Professor

Dalian Maritime University

ACKNOWLEDGEMENTS

This thesis, being used to apply for master degree offered by World Maritime University, would not be successful without generous supports from various people and organizations and I am grateful to them deeply.

First of all, I am profoundly grateful to all teachers of MSEM, 2104 for their professional teaching and enthusiastic assistance and to my classmates for their selfless care and rich work experience which make me have a comprehensive and solid study. Moreover, I am extremely grateful to staff members of MSEM program such as Ms Wang and Dr. Bao from DMU for their never-ending support and diligent work.

Secondly, words cannot express how grateful I am to Dr. Wang Fengwu for his guidance to my research paper. He has made painstaking efforts to help me in topic selection, scheme design and data analysis. I benefited greatly from his profound knowledge and active thinking so that I can smoothly complete my thesis after overcoming a series of difficulties. He is a respectable man because of his rigorous scientific attitude and upright and selfless character. In addition, I am profoundly grateful to my friend, Xu xin, a PSC officer, working at Shenzhen Maritime Safety Administration, who gave me a lot of good advice on this paper. I wish to acknowledge the assistance of Yantian Maritime Safety Administration in providing the data used in this paper.

Last but not least, family support plays a significant important role in my study. My beloved wife, Guo Xiaoyan, takes care of my family and always encourages me to study hard. Many thanks are given to her.

Title of Research paper: **The Impact of the Implementation of Tokyo MOU New Inspection Regime on Port State Control in Yantian of Shenzhen and Countermeasures**

Degree: **MSc**

ABSTRACT

With the rapid development of shipping, the lag nature of former inspection regime on port state control of Tokyo MOU arises. Through unremitting efforts in the past decades, the Tokyo MOU finally implemented new inspection regime on PSC on January 1st, 2014. At present, the impact of the new inspection regime and its effective implementation become the focus issues of maritime authorities.

The research paper is a study of the impact of the implementation of Tokyo Memorandum of Understanding new inspection regime on port state control in Yantian of Shenzhen and countermeasures. For this purpose, this paper expatiates on Tokyo MOU NIR including formation process, content, a comparison with former inspection regime and status quo of implementation. Then, it collects and analyzes the data of foreign ships called at Yantian Port from January 1 to March 31, 2014, with the use of statistic figures and tables to mirror the distribution of ships risk and inspection window. The results show that the number of ships which are suitable to be inspected in Yantian Port will decrease and PSC inspection is the greatest influence factor for risk grade assessment of ships which call at Yantian Port. It will cause increase of appeal and review and it requires PSC officers in Yantian Port to improve their own quality. According to the data analysis results, a number of recommendations for PSC inspection in Yantian Port are presented to the different aspects, namely flexible working hours, to modify evaluation indicators of PSC and to strengthen training on Tokyo MOU NIR.

Results of this paper can offer some guidance and reference value for Yantian Maritime Safety Administration and for further investigation in the subject.

KEYWORDS: Tokyo MOU NIR, Port State Control, Impact, Yantian Port, Ship Inspection, Countermeasures

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

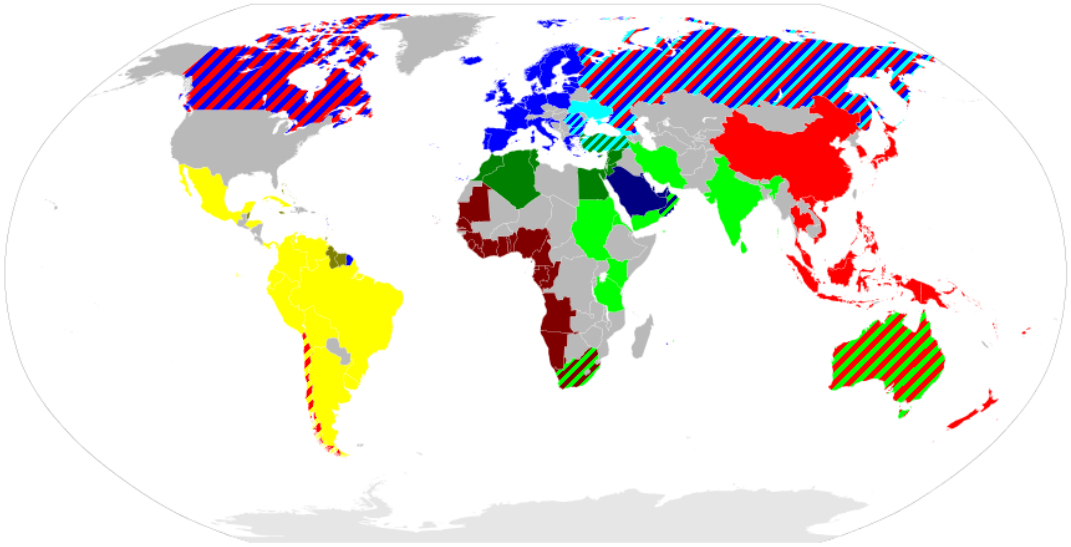
ABS	American Bureau of Shipping
APCIS	Asia Pacific Computerized Information System
BV	Bureau Veritas
CCS	China Classification Society
CCIS	China Port State Control Computerized Information System
DNV	Det Norske Veritas
EU	European Union
FSA	Formal Safety Assessment
GL	Germanischer Lloyd
HRS	High Risk Ships
IACS	International Association of Classification Societies
IMO	International Maritime Organization
ISM	International Safety Management
KR	Korean Register of Shipping
LRS	Low Risk Ships
LR	Lloyds Register of Shipping
MOU	Memoranda of Understanding
MSA	Maritime Safety Administration
NK	Nippon Kaiji Kyokai
NIR	New Inspection Regime
PSC	Port State Control
PSSC	Port State Control Committee
RINA	Registo Italiano Navade
RO	Recognized Organization
RS	Russian Maritime Register of Shipping
SRS	Standard Risk Ships
USCG	United States Coast Guard
VR	Vietnam Register
VIMSAS	Voluntary IMO Member State Audit Scheme

CHAPTER 1 INTRODUCTION

1.1 The background of Tokyo MOU new inspection regime

> Port State Control (PSC) is the inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations (e.g. SOLAS, MARPOL, STCW, etc.) and that the ship is manned and operated in compliance with these rules.
>
> (IMO, n.d.)

PSC is called the last line of defence of maritime safety. In the 1991, International Maritime Organization (IMO) passed the resolution - A. 682 (17), which encouraged countries and regions all over the world to establish Memoranda of Understanding (MOU) or MOUs following the example of the Paris Memoranda of Understanding. At present, there are nine PSC MOUs for different regions around the world, including the Paris Memoranda of Understanding (mainly for Europe and North Atlantic region), the Tokyo MOU (mainly for Asia-Pacific region.), Acuerdo Latino or Acuerdo de Viña del Mar (mainly for South and Central America region), the Caribbean MOU (mainly for Caribbean Region), the Mediterranean MOU (mainly for Mediterranean Sea region), the Indian Ocean MOU (mainly for Indian Ocean region), the Abuja MOU (mainly for West and Central Atlantic Africa region), the Black Sea MOU (mainly for Black Sea region), and the Riyadh MOU (mainly for Persian Gulf region). Figure 1 shows the world with nations participating in PSC. (IMO, n.d.). It is noteworthy that the United States does not sign any PSC MOU. The United States Coast Guard (USCG) undertakes the task of inspection of foreign ships when they enter the United States waters, ensuring the ships to comply with international conventions substantially and to apply laws, regulations and treaties of United States.



Note:

Signatories to the Paris MOU (blue), Tokyo MOU (red), Indian Ocean MOU (green), Mediterranean MOU (dark green), Acuerdo Latino (yellow), Caribbean MOU (olive), Abuja MOU (dark red), Black Sea MOU (cyan) and Riyadh MOU (navy).

Figure 1 - The world with nations participating in Port State Control

Source: http://en.wikipedia.org/wiki/Port_State_Control#mediaviewer/File:Portstatecontrol.svg

As one of the most active MOUs, the Tokyo MOU, which was concluded in December 1993 at its final preparatory meeting in Tokyo and began to operate on April 1, 1994, an inter-governmental co-operative organization on port state control (PSC) in the Asia-Pacific region, consists of 18 member authorities such as China, Australia and Canada, 2 co-operating member authorities, 4 observer authorities and 6 observer organizations. In order to accomplish its objective which is to eliminate sub-standard shipping so as to promote maritime safety, to protect the marine environment and to safeguard working and living conditions on board ships, the Tokyo MOU has introduced the new inspection regime (NIR) on January 1, 2014, replacing former inspection regime - ship target factor system, which has two major drawbacks resulted in the lagging of development. (Tokyo MOU, n.d.).

First of all, the former inspection regime of Tokyo MOU determines priority of PSC inspections based on ship target factor system. (Li & Zeng, 2103, p.37). According to

selection scheme of ships and priority of inspections of the former inspection regime, time windows of inspections is set to 6 months for all ships except for the underperforming ships recorded in Annex 3 of Tokyo MOU, the ships which need to do priority inspection stipulated in clause 3.3.2, high risk ships and very high risk ships under the former inspection regime. It means that those ships will not be inspected in a period of 6 months. This mechanism is difficult to reflect the requirements of inspection frequency for different risk levels ships. To some extent, it has caused a waste of inspections resources in port states. In addition, it also increases burden to the ships which have advanced management and good technical condition when they receive the port state control inspections. (Chen & Zeng, 2006, p.80).

Secondly, compared with audit of companies, port state control is more direct on supervision of ships. But under the former inspection regime, the authority of PSC officers is only confined to raise a request of additional audit to ships even that a ship is detained because of a number of serious defects. It is not conducive to promote the company safety management level. (Fei & Bao, 2006, p.19). Furthermore, supervisory measures for ships and their companies such as survey, inspection and audit, are not better than active management of companies for their ships because active management is direct and continuous. The fundamental guarantee to keep ships' technical condition good is that their companies should keep good performance. But the former inspection regime did not consider company performance, which decrease company's self-consciousness of improving fleet safety management level. The difference between companies with good safety performance and those with bad safety performance does not reflect under the former inspection regime. In other words, fairness and impartiality cannot be reflected in the former inspection regime. (Chen, 2014, p.19).

Therefore, reform of former inspection regime is very necessary and the introduction of NIR is an inevitable way for the further development of PSC. It is undeniable that, as an important organization which has a great impact on PSC inspections and shipping industry, Tokyo MOU did an action of milestones - introducing NIR, which will bring revolutionary change to shipping industry and Asian-Pacific region PSC inspection, certainly including the Yantian PSC inspection in China.

1.2 A brief introduction to the Yantian Port

As illustrated in Figure 2, the Yantian Port is located in the east of Shenzhen in Guangdong Province of China. More specifically, it lies in the west of Mirs Bay northern shore. The west of the port is adjacent to Sha Tau Kok, a small town adjacent to Hong Kong. And on its south, Crooked Island of Hong Kong is separated by the sea. Geographical position of the Yantian Port is considerable superior because it is backed by the Pearl River Delta which is the biggest export processing base in china. In recent years, the Yantian Port, a favourable natural deep-water pier for super-large container ships, has developed into a single container terminal with the largest container throughput and the largest density of ocean-going container liner in China. The port is a pivotal gateway on import and export trade of China. It includes 16 large container deepwater berths with a yard of about 373 hectares. It has been working in close collaboration with nearly 40 large shipping companies around the world such as Maersk line, Evergreen Marine, Orient Overseas Container Line and Hanjin Shipping. In addition, the port can provide about 100 routes per week including domestic routes to reach the global major ports. It is impressive that the number of port calls served by Yantian Port slightly fluctuates at 30,000 during 2013, for the seventh year running. (YICT, n.d.).

Figure 2 - Geographic location of Yantian Port

Source:http://sz.msa.gov.cn:8083/Applications/ArticleContent/ArticleContent.aspx?ArticleContent=62aff5fb-b181-458c-865e-37af483946bb&MenuCode=SUBA_YT_GXQY

As to PSC in Yantian Port, approximately 1000 different foreign-flag ships per year calling at Yantian Port are in the scope of supervision of Yantian Maritime Safety Administration (MSA), a sub-branch of Shenzhen MSA in China. Figure 3 shows the number of ships which received PSC inspections in Yantian Port from 2009 to 2013. Workload of the Yantian MSA is very huge because there are only six PSC officers in this institution. The figure will reduce to four because of position changes. Although the number of port state inspection in Yantian Port is not leading in China, quality and efficiency of PSC of Yantian MSA are on the top. The PSC officers in the Yantian MSA have inspected ships according to Tokyo MOU NIR since January 1, 2014. (Yantian Maritime Safety Administration (Yantian MSA), 2014).

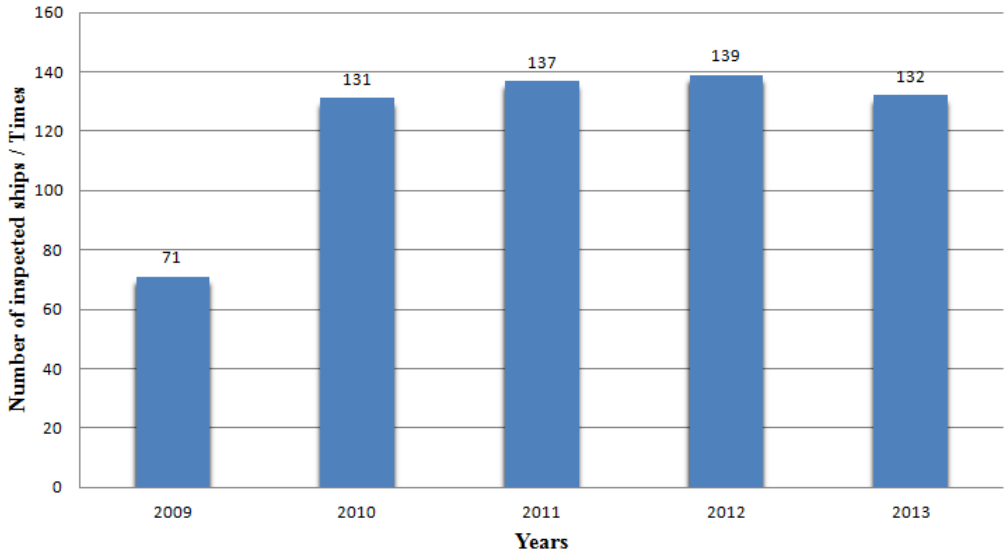


Figure 3 - Number of ships which received PSC inspections in Yantian Port from 2009 to 2013

Soucre: Yantian Maritime Safety Administration (January, 2014) *The Yantian Maritime Safety annual report 2013*.Shenzhen: Author.

1.3 The main task in this paper

This paper will be developed from the following scopes:

First of all, the paper will have an overview of the Tokyo MOU NIR. The progress of the formation of Tokyo MOU NIR, main contents of Tokyo MOU NIR such as ship risk

profile, Selection Scheme and company performance, the comparison between Tokyo MOU NIR and the former inspection regime, as well as its implementation status quo would be presented in this paper. And this section mainly bases on the publications from Tokyo MOU and some authoritative documents related to the Tokyo MOU NIR from China MSA and some opinions of Chinese maritime experts who do PSC research for a long time.

Then, the paper will focus on the analysis of impact of the implementation of Tokyo MOU NIR on Yantian Port. To this end, it is very necessary to analyze the data about foreign ships call at Yantian Port. It would find out the impact on Yantian Port brought by Tokyo MOU NIR through data analysis which is a simple and clear analysis method. Some tables and figures made by the author, which base on original data given by Yantian MSA, would be shown in the chapter 3. In addition, the author's opinion will be presented and some simple analysis on the tables and figures will be made in the following paragraphs.

At last, some general recommendations and conclusions would be given in this paper. Some advices and suggestion for PSC officers in Yantian MSA would be presented.

CHAPTER 2 AN OVERVIEW OF TOKYO MOU NEW INSPECTION REGIME

2.1 The brief process of the formation of Tokyo MOU NIR

In November 2004, the second joint ministerial conference of Tokyo MOU and Paris memorandum of understanding (Paris MOU), which are the most active organizations of all the MOU on the PSC inspections with effective working was held. In the conference, it determined to harmonize two MOU as much as possible in order to facilitate consistent development of inspection procedures. (Shu, 2004, p.59).

Reflection on the "Prestige" maritime accidents, European Union (EU) realized that the original PSC inspection regime cannot completely prevent low- standard ships from going into their water area. Thereupon, for the purpose of reducing the number of low- standard ships in their water area, on March 11, 2009, EU passed the third maritime safety measure, "Directive 2009/16/EC of the European Parliament and of the Council of 23 April 2009 on port State control". According to requirements of the directive, the 42nd session of Paris MOU committee approved Paris MOU NIR which introduced assessment of company performance and new selection scheme and inspection principle for ships - different inspection frequency for ships with different risk. The Paris MOU NIR, formally being implement on January 1, 2011, fully absorb research production of International Maritime Organization (IMO) Formal Safety Assessment (FSA) on risk assessment. It uses flexible and sustainable management to high risk ships and assesses ships risk based on the performance of their flag states, certification bodies and their companies. Since then, shipping safety management has introduced the FSA with risk analysis technology as the core.

After the 19th meeting of the Port State Control Committee (PSSC) of Tokyo MOU, it set

up a working group led by Canada, consisting of China, Hong Kong, Japan, South Korea, Malaysia, Russia, Singapore and representatives of Paris MOU secretariat. And it launched compilation working of Tokyo MOU NIR, referring to research achievements of the Paris MOU NIR. Then Tokyo MOU NIR was discussed and modified in the 20th, 21st and 22nd meeting of PSSC and was finally deliberated and approved in the 23rd meeting with a decision to put it into implementation on January 1, 2014. In October of 2013, the 24th meeting decided to incorporate the final draft of the Tokyo MOU NIR into Annex 2 of Tokyo MOU. (Li, 2006, p.54).

2.2 The main content of Tokyo MOU NIR

In brief, the main content of Tokyo MOU NIR includes ship risk profile, selection scheme and company performance.

2.2.1 Ship risk profile

Each ship recorded in the Asia Pacific Computerized Information System (APCIS), an information system for Tokyo MOU, has a ship risk profile. According to the differences of seven parameters - type of ship, age of ship, flag, recognized organization (RO), company performance, deficiencies and detentions, ships are identified under three categories: High Risk Ships (HRS), Standard Risk Ships (SRS), and Low Risk Ships (LRS). Table 1 shows the criteria and weighting points of each parameter for three risk grades. If the sum of weighting points of a ship is greater than or equal to 4, it belongs to HRS. For the ships whose sum of weighting points is less than 4, if a ship meets the criteria of 7 parameters of LRS, the ship belongs to LRS, and if not, it belongs to SRS.

Table 1 - Ship risk profile under Tokyo MOU NIR

Parameters	**Profile**		
	High Risk Ships (HRS) (When sum of weighting points >=4)	Standard Risk Ships (SRS)	Low Risk Ships (LRS)

		Criteria	Weighting points	Criteria	Criteria
Type of Ship		Chemical tanker, Gas Carrier, Oil tanker, Bulk carrier, Passenger ship	2	Neither LRS nor HRS	-
Age of Ship		All types > 12 y	1		-
Flag	BGW[1]- list	Black	1		White
	VIMSAS[2]	-	-		Yes
Recognized Organization (RO)	RO of Tokyo MOU[3]	-	-		Yes
	Performance[4]	Low Very Low	1		High
Company performance[5]		Low Very Low	2		High
Deficiencies	Number of deficiencies recorded in each inspection within previous 36 months	How many inspections were there which recorded over 5 deficiencies?	Number of inspections which recorded over 5 deficiencies		All inspections have 5 or less deficiencies (at least one inspection within previous 36 months)
Detentions	Number of detention within previous 36 months	3 or more detentions	1		No detention

1) The Black, Grey and White list for flag State performance is established annually taking account of the inspection and detention history over the preceding three calendar years and is adopted by the Tokyo MOU Committee to publish in the Annual Report.

2) The status on completion of Voluntary IMO Member State Audit Scheme (VIMSAS) will be based on updated information obtained by the Tokyo MOU Secretariat.

3) Recognized Organizations of Tokyo MOU are those recognized by at least one member Authority of the Tokyo MOU, a list of which is provided on the web-site.

4) The performance of all Recognized Organizations is established annually taking account of the inspection and detention history over the preceding three calendar years and is adopted by the Tokyo MOU Committee to publish in the Annual Report.
5) Company performance takes account of the detention and deficiency history of all ships in a company's fleet while that company was the International Safety Management (ISM) company for the ship. Companies are ranked with a "very low, low, medium or high" performance. The calculation is made daily on the basis of a running 36-month period. There is no lower limit for the number of inspections needed to qualify except a company with no inspections in the last 36 months will be given a "medium performance".
Source: http://www.tokyo-mou.org/doc/NIR-information%20sheet.pdf

2.2.2 Selection scheme

The selection scheme determines the scope, frequency and priority of inspections according to ship risk profile mentioned in 2.2.1 of this paper, which determines time interval of implementing of periodic inspections. Based on time window since previous inspection, it determines priority of inspections and makes two criteria - Priority I (ships must be inspected because the time window has closed) and Priority II (ships may be inspected because they are within the time window of inspection). It establishes respective criterion for LRS, SRS and HRS (see in the Table 2 and Figure 3). The priority and selection level are shown for each ship in the APCIS.

Table 2 - Time Windows of Selection Scheme under Tokyo NIR

Ship Risk Profile	Time Window since previous inspection
Low Risk Ships	9 to 18 months
Standard Risk Ships	5 to 8 months
High Risk Ships	2 to 4 months

Source:http://seafarers.msa.gov.cn/Applications/Information/NewsView.aspx?infoid=b3dfed40-0e99-4ef3-99eb-39cfb4e1cba4&MenuCode=201311007#

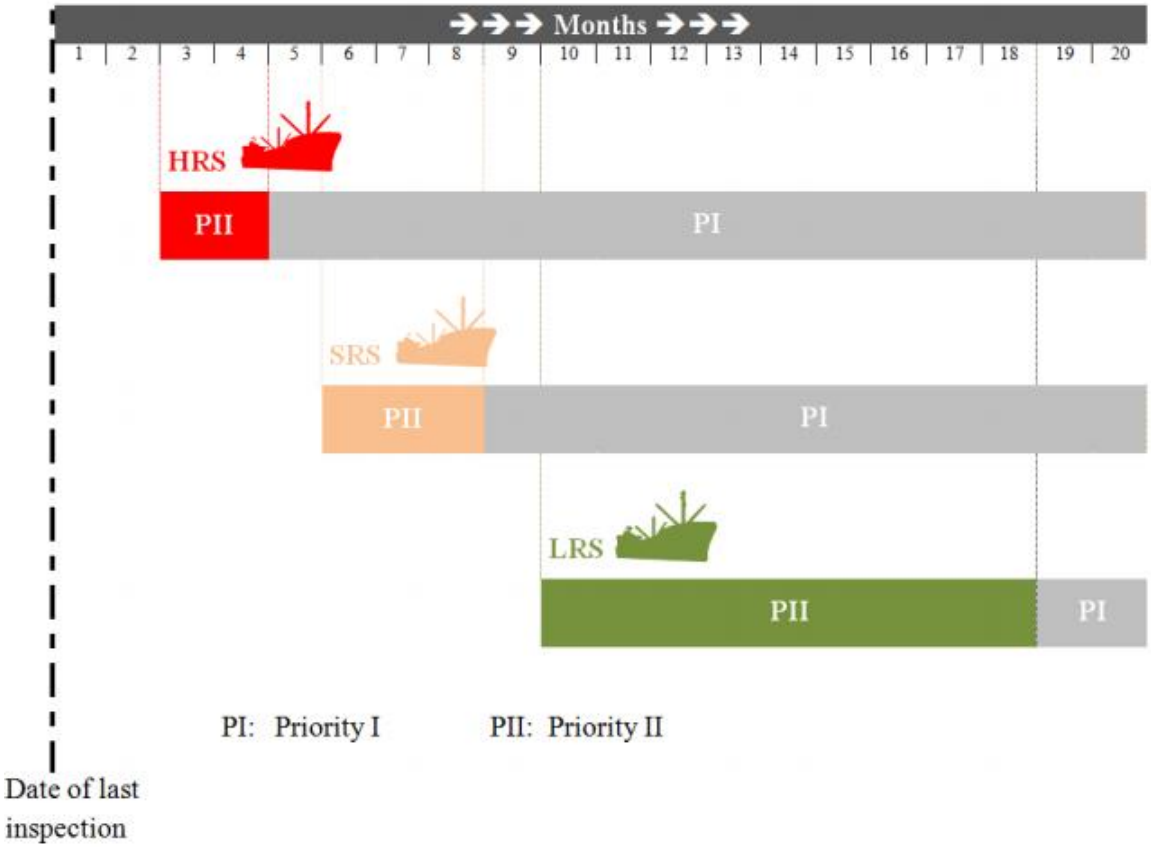


Figure 4 - Inspection window of HRS, SRS, LRS under Tokyo MOU NIR

Source: http://www.tokyo-mou.org/doc/NIR-information%20sheet.pdf

2.2.3 Company performance

The company, being responsible for safety and pollution prevention, refers to the ISM company for the ships. Company performance, which is classified into four grades- very low, low, medium and high performance, is based on the detention and deficiency history of all ships in a company's fleet. The calculation is updated daily on the basis of a running 36-month period. It do not set lower limit for the number of inspections. If all ships of a company did not receive any inspections in the last 36 months, the company will be given a medium performance. Company performance is determined based on the deficiency index and the detention index.

(1) Deficiency index

The deficiency ratio, average deficiencies' weighting points of each inspection, is the ratio of the total points of all deficiencies of all ships in a company's fleet to the number of inspections of all ships in the company's fleet within the last 36 months. The formula of deficiency ratio of one company's fleet is shown as follows:

$$\text{Deficiency ratio} = \frac{\text{No. of ISM deficiencies} \times 5 + \text{No. of non-ISM deficiencies} \times 1}{\text{No. of inspections}} \quad \cdots\cdots\cdots \text{(a)}$$

From the formula (a), it is clear to express that each ISM related deficiency is weighted at five points, five times as high as non-ISM deficiencies' weighting points. Then this ratio is compared with the average for all ships inspected in the Tokyo MOU over the last three calendar years to determine whether the index is average, above average or below average. (See Table 3).

Table 3 - Deficiency index

Deficiency index	**Deficiency points per inspection**
Above average	> 1 above Tokyo MOU average
Average	Tokyo MOU average +/- 1
Below average	> 1 below Tokyo MOU average

Source: http://www.tokyo-mou.org/doc/NIR-information%20sheet.pdf

For example, deficiency ratio of "X" company's fleet within the last 36 months is 5.03, and Tokyo MOU average deficiency ratio from 2011 to 2013 is 4.01 posted on the website of Tokyo MOU. (Tokyo MOU, 2014a). Comparison with Table 3, it can know that deficiency index of "X" company belongs to "above average"

(2) Detention index

Detention ratio, average deficiencies' number of each inspection, is the ratio of the number of detentions all ships in a company's fleet to the number of inspections of all the ships in the company's fleet within the last 36 months. The formula of detention index of one company's fleet is shown as follows:

$$\text{Detention ratio} = \frac{\text{No. of detentions}}{\text{No. of inspections}} \quad \cdots\cdots\cdots\cdots \text{(b)}$$

Then the ratio should be compared with the average for all ships inspected in the Tokyo MOU over the last three calendar years to determine whether the index is average, above average or below average as shown in the Table 4.

Table 4 - Detention index

Detention index	**Detention rate**
Above average	> 1% above Tokyo MOU average
Average	Tokyo MOU average +/- 1%
Below average	> 1% below Tokyo MOU average

Source: http://www.tokyo-mou.org/doc/NIR-information%20sheet.pdf

For example, if detention ratio of "X" company' fleet within the last 36 months is 4.12%, and Tokyo MOU average detention ratio from 2011 to 2013 is 5.16% posted on the website of Tokyo MOU. (Tokyo MOU, 2014a). Hence, comparison with Table 4, the detention index of "X" company is given "below average".

The combination of deficiency index and the detention index can determine the company performance level by using company performance matrix illustrated in the Table 5. Referring to the company performance matrix, it is easy to determine that the company performance of "X" company belongs to "low".

Table 5 - Company Performance Matrix

Detention Index	**Deficiency Index**	**Company Performance**
Above average	Above average	Very Low
Above average	Average	Low
Above average	Below average	
Average	Above average	
Below average	Above average	
Average	Average	Medium
Average	Below average	
Below average	Average	
Below average	Below average	High

Source: http://www.tokyo-mou.org/doc/NIR-information%20sheet.pdf

2.3 Comparison between Tokyo MOU NIR and former inspection regime

2.3.1 Classification of risk grades of ships

Both Tokyo MOU NIR and former inspection regime use quantitative analysis which quantify all parameters and accumulate value of each quantified parameter (weighting points) to determine ships' risk. Under the NIR, ships are identified under three categories (see in the table 1): High Risk Ships (HRS), Standard Risk Ships (SRS), and Low Risk Ships (LRS). However, the former inspection regime has four categories: LRS, SRS, HRS and Very High Risk Ships. The sum of weighting points may be greater than 100 because of different quantitative criteria of parameters. The corresponding total value of different risk grades are as follows: LRS (0~10), SRS (11~40), HRS (41~100) and Very High Risk Ships (greater than 100). (Zhong, 2013, P.38).

2.3.2 Calculating method of ship risk profile

There are 7 parameters to calculate ship risk profile under both Tokyo MOU NIR and the former inspection regime. Compared with the former inspection, Tokyo MOU NIR on ship

Table 6 - Comparison of Tokyo MOU NIR and the former inspection regime on ship risk profile.

Parameters	**Former inspection regime**		**NIR**	
	Criteria	**Weighting points**	**Criteria**	**Weighting points**
Type of Ship	Oil tanker, Chemical tanker, Bulk carrier, Multi-purpose ship, Refrigerator ship, Ro-ro ship, Passenger ship, whose age ≥ 15y	4	Chemical tanker, Gas Carrier, Oil tanker, Bulk carrier, Passenger ship	2
	Other ships	0		
Age of Ship	0~5y	0	All types > 12 y	1
	6~10y	5		
	11~15y	10		
	16~20y	10 and add extra 1 point each year		

	> 20y	15 and add extra 2 points each year		
Flag	Above average detention percentage	Add 1 point with the growth of every 1%	Tokyo MOU blacklists	1
Recognized Organization (RO)	Not a member of IACS*	10	Low Very low	1
Company performance	-	-	Low Very low	2
Deficiencies	New deficiencies in recently 4 inspections or repeated inspection	0.6×Number of deficiencies	How many inspections were there which recorded over 5 deficiencies?	Number of inspections which recorded over 5 deficiencies
	Left deficiencies of last Inspection	2×number of left deficiencies	-	-
Time window since previous inspection	6~12 months	3	-	-
	12~24 months	6		
	>24 months or not receive inspection	50		
Detentions	1 detentions in recently 4 inspections or repeated inspection	15	3 or more detentions within previous 36 months	1
	2 detentions in recently 4 inspections or repeated inspection	30		
	3 detentions in recently 4 inspections or repeated inspection	60		
	4 detentions in recently 4 inspections or repeated inspection	100		

* International Association of Classification Societies

Source: Gan, Z. (2014). Compare the new inspection regime of Tokyo MOU with the existing inspection regime of Paris MOU and Tokyo MOU. *China Maritime Safety*, (1), 21 - 23.

risk profile which adds one new parameter - company performance, as well as cancelling

one parameter - time window since previous inspection, greatly simplifies in respects of parameters' classification and calculating method. Ship risk profile under Tokyo MOU NIR and the former inspection regime are as shown in Table 6.

From Table 6, it can see that the introduction of company performance is the biggest difference between Tokyo MOU NIR and former inspection regime. It assesses company performance on ship safety management by the comparison of ships' average deficiencies and detention percentage within previous three calendar years and average level in Tokyo MOU. At the same time, it increases weight proportion of International Safety Management (ISM) deficiencies (One ISM deficiencies is equal to five deficiencies) in the calculation which will promote the effectiveness of operation of ship safety management to become an important factor for assessing company performance. It means that company safety management and ships will connect effectively. In this way, the ship management company will focus more on the operation of ISM and every inspection of each ship in order to avoid the poor ship to become short plank of company performance. (Wang, 2011, p.77). Compared with the former inspection regime, Tokyo NIR also has some differences about specific contents settings of parameters as follows.

(1) The former inspection regime only focuses on the specific ship types such as oil tanker, chemical tanker, bulk carrier, multi-purpose ship, refrigerator ship, ro-ro ship and passenger ship whose age are greater than 15 years as well as low weighting points (only 10 % of criteria of HRS). However, under NIR, it does not consider the age factor of specific ships and the weight proportion reaches to 50%.

(2) NIR greatly simplifies the criteria of flag and age of ship which will cause a convenient calculation.

(3) Assess of RO performance does not rely on whether the RO is a member of IACS or not. Classification society with good performance who is not a member of IACS such as Vietnam Register (VR) does not suffer from discrimination. Its ships also have a chance to become LRS. (Wei, Zeng, & Li, 2011, pp.8 -10).

(4) Under NIR, it pays high attention to deficiencies' number of every inspection, increasing the impact of deficiencies on ship risk profile, which will promote seafarers to do good maintenance for ships so as to reduce the number of deficiencies in each inspection (or eliminate it). It weakens the weighting points of detention, greatly reducing

the effect of detention on ship risk profile, which will to some extent contains influence of subjective factors of PSC officers on ships risk assessment. (Gan, 2014, pp. 21-23).

2.3.3 Selection scheme

Under the Tokyo MOU NIR, the selection scheme can determine the PSC inspections' scope, frequency and priority. More specifically, priority, including two criteria - Priority I and Priority II, can be determined according the time window since previous inspection. There are respective criteria for LRS, SRS and HRS (See in the Table 3 and Figure 3). The new selection scheme is scientific and reasonable because it cancelled inspection period of 6 months stipulated in the former regime and accomplished an aim of rewarding excellence and punishing inferior. Under this selection scheme, it can reduce times of inspections for LRS and accordingly enable port states to allocate inspection resources properly and to inspect HRS more frequently. (Ning, 2011, pp.28 - 29).

All in all, the former inspection regime of Tokyo MOU - ship target factor system, just takes account of ships' basic parameters and inspection history and does not fully consider the factors about ships' company and seafarers. And its selection scheme is a simple linear additivity model which would cause a common phenomenon in practice of PSC - one ship with no deficiency in one inspection would be detained in the next PSC inspection because of multiple deficiencies.

Compared with former inspection regime of Tokyo MOU, Tokyo MOU NIR is more scientific and reasonable. And it can be seen that ship risk profile, company performance and selection scheme form a relationship of mutual effect, interpenetrating and inter-constraint. The change of inspection regime inevitably brings new challenge to PSC inspection.

2.4 The implementation status quo of Tokyo MOU NIR

According to data from the APCIS, website of Tokyo MOU and China PSC Computerized

Information System (CCIS), the member states of Tokyo MOU have inspected 7242 ships per time since January 1 to March 31, 2014. The results of inspections are shown in table 7, compared with the port states inspections information from January 1 to March 31, 2013.

Table 7 - Port states inspections information of Tokyo MOU

Time	January 1 ~ March 31,2014	January 1 ~ March 31,2013
NO. of inspection	7242	7456
NO. of deficiency	23628	24536
Average NO. of deficiency per inspection	3.26	3.29
NO. of detention	344	409
Detention ratio	4.75%	5.49%

Source: Sun, Y. J., & Pan, Z. B. (2014). Countermeasures of Tokyo Memorandum of Understanding New Inspection Regime. *China Ship Survey,* (4), 74 - 76.

Of the countries who have inspected more than 300 ships from January 1 to March 31, 2014, the number of port states inspections of China, Indonesia, Republic of Korea, the Philippines and Vietnam declined to some different extent, compared with that from January 1 to March 31, 2013. The number of port states inspections of China declined slightly, and that of Indonesia went down 24.7% which is the biggest fall of all. The inspection number of Australia, Singapore (the largest increase is 97.5%) and Japan went up to some different extent. As a whole, the detention ratio presents a downward trend. The detention ratio of all member states of Tokyo MOU except Hong Kong, New Zealand and Russia went down. However, overall, all the inspection data from January 1 to March 31, 2014 year-on-year roughly flat. Compared with January 1 to March 31, 2013, it increased the number of deficiency about maritime labour from January 1 to March 31, 2014. As in the last year, most frequent deficiencies are the deficiencies about fire safety and life saving appliances. Although value of ISM related deficiency is 5 times as great as that of non-ISM related deficiency, the number of ISM related deficiency year-on-year roughly flat, as well as the percentage of all deficiencies. Distribution of ISM related deficiency is irregular because Tokyo MOU NIR was implemented for short time. In addition, the data from January 1 to March 31, 2014 by type, flag, recognized organization

year-on-year roughly flat. Stable inspection date reflects that Tokyo NIR achieved a smooth transition from the former regime in Asian-Pacific region as a whole. (Sun & Pan, 2014, p.75). It is an undeniable fact that it is would not get an accurate evaluation of implementation effect of Tokyo MOU NIR in a short period time. Supervision area of Tokyo MOU is extensive. Cultural values, the level of science and technology and comprehensive strength have significant difference among member states of Tokyo MOU. The unbalanced development causes more difficulties on policy coordination.

CHAPTER 3 ANALYSIS OF FOREIGN SHIPS CALLED AT YANTIAN PORT UNDER TOKYO MOU NIR

In order to know the effect of implementation of the Tokyo MOU NIR in Yantian Port of Shenzhen of China, referring to APCIS and annual report 2013 of Tokyo MOU, the analysis of data of non-China flag ships called at Yantian Port from January 1 to March 31, 2014 provided by Yantian MSA is given. The data with full representativeness includes 654 non-China flag ships which call at the port 1043 times in total (1043 port calls), accounting for about 65% of annual foreign ships arrival at Yantian Port. Trend of the foreign flag ships in the first quarter can basically reflect year-round situation of all foreign ships. Non-China flag ships which call at Yantian Port are objects of PSC inspections of Yantian MSA. In other words, the impact of implementation of the Tokyo MOU NIR on Non-China flag ships called at Yantian Port can really reflect the impact of implementation of the Tokyo MOU NIR on PSC in Yantian Port.

3.1 Route of ships

The 654 ships cover year-round 84 international routes in Yantian Port, including 30 US routes, 30 Europe routes, 4 South American routes, 4 Middle East routes, 10 Asia routes, 3 Africa routes, 2 Australia routes and 1 Central American route. The details of vessel schedule refer to Appendix 1. Averagely, seven ports per route including Yantian Port are in the scope of supervision of Tokyo MOU member states. Yantian Port stands a latter position among the seven ports with connected ports such as Hong Kong, Shanghai and Singapore in most routes. 90% of routes call at terminals in Hong Kong before arriving at Yantian Port because of Hong Kong’s geographic position and its important role of international shipping centre.

3.2 Ships risk profile

PSC officers of Yantian MSA select foreign ships for port states inspections based on selection scheme, which is ultimately based on ships risk profile. In other words, ships risk profile would change through the change of risk parameters so as to influence the PSC inspections.

3.2.1 Type of ships

From Figure 5, non-China flag ships called at Yantian Port from January to March, 2014 consists of 650 container ships, making up amazing 99.4% of all, and only 4 ships of other types. Hence, Yantian Port can be interpreted as a container terminal which services single type ships - container ships. Referring to Table 6, container ships do not add the weighting points when it assesses ships' risk grades under both the former inspection regime of Tokyo MOU and NIR. Hence, this parameter - type of ships does not influence the assessment of ships' risk grades after the implementation of the Tokyo MOU NIR.

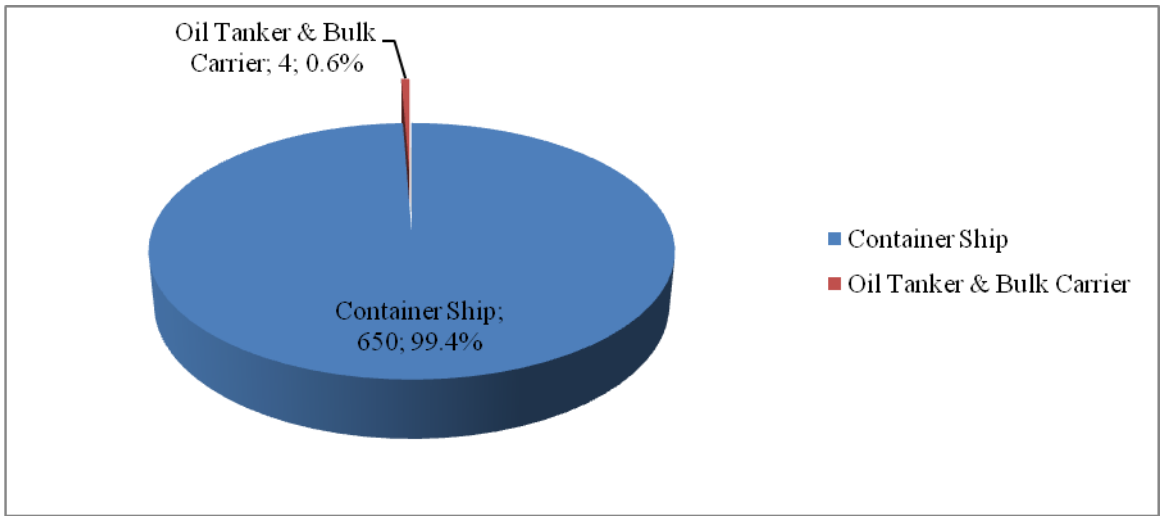


Figure 5 - Type of non-China flag ships called at Yantian Port from January to March, 2014

Source: Compiled by author.

3.2.2 Age of ships

According to Tokyo MOU NIR, critical point of ships' age is 12 years. Figure 6 shows that the number of ships whose age is less than 12 years is 547, making up 83.6% of all non-China flag ships. And the ships whose age is great than 12 years, account for a small share, only 16.4% (107). Of all ships who hang non-China flag, container ships whose age does not exceed 12 years are the main force in Yantian Port. Hence, age of ships does not become main factors to influence the assessment of ships' risk grades under Tokyo MOU NIR.

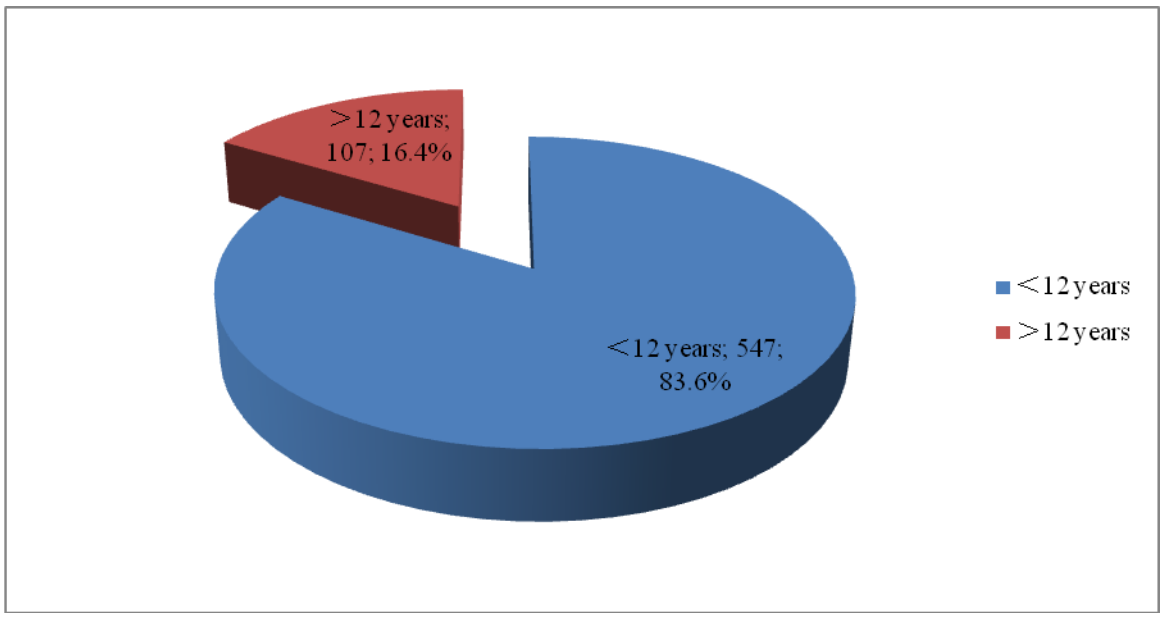


Figure 6 - Age of non-China flag ships called at Yantian Port from January to March, 2014

Source: Compiled by author.

3.2.3 Flag of ships

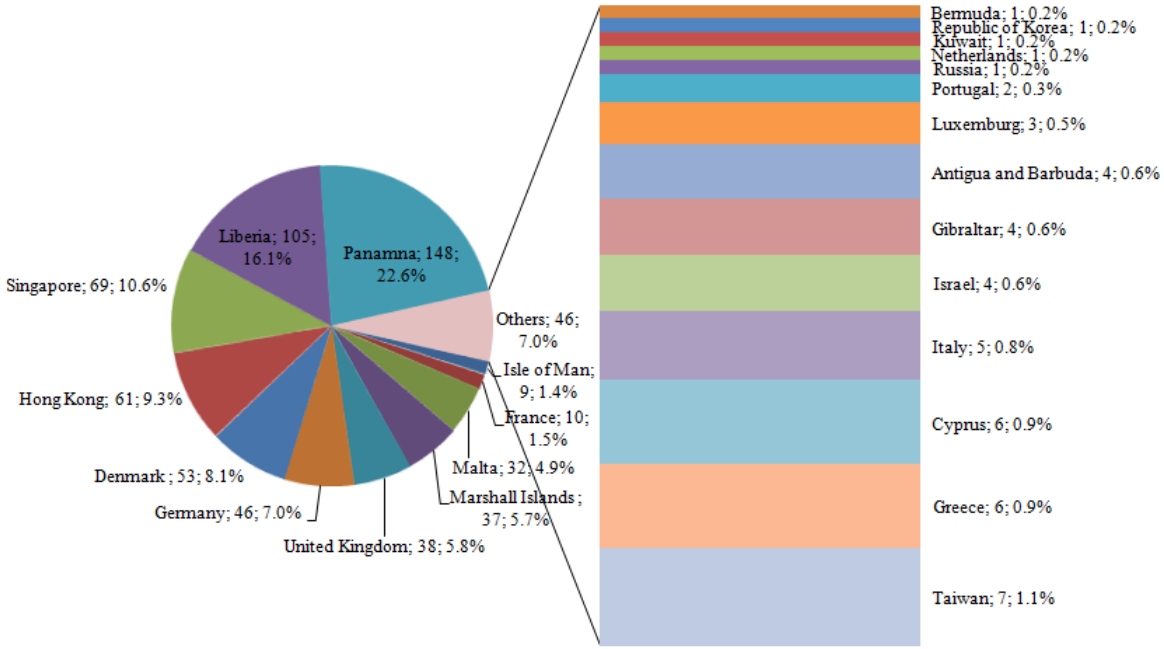


Figure 7 - Flag of non-China flag ships called at Yantian Port from January to March, 2014

Source: Compiled by author.

In the figure 7, the flags of non-China flag ships are widely distributed in 25 countries. The number of Panama flag is largest, accounting for 22.6% of all, following by Liberia flag, 16.1%. Bermuda, Republic of Korea, Kuwait, Netherlands and Russia are tied at the bottom with 0.2%. According to annual report 2013 of Tokyo MOU, there is no flag in black list of Tokyo MOU. 4 flags are recorded in grey list and 21flags are in scope of white list. Flag performance of non-China flag ships called at Yantian Port is high. Flag of ships is the fixed parameter which does not influence ships risk profile of foreign ships in Yantian Port.

3.2.4 Recognized organization of ships

There are ten recognized organizations for the 654 ships shown in the figure 8. Referring to the annual report 2013 of Tokyo MOU, performance level of these ten recognized organizations of non-China flag ships called at Yantian Port is given “high”. This is also a fixed parameter for the assessment of ship’s risk grades.

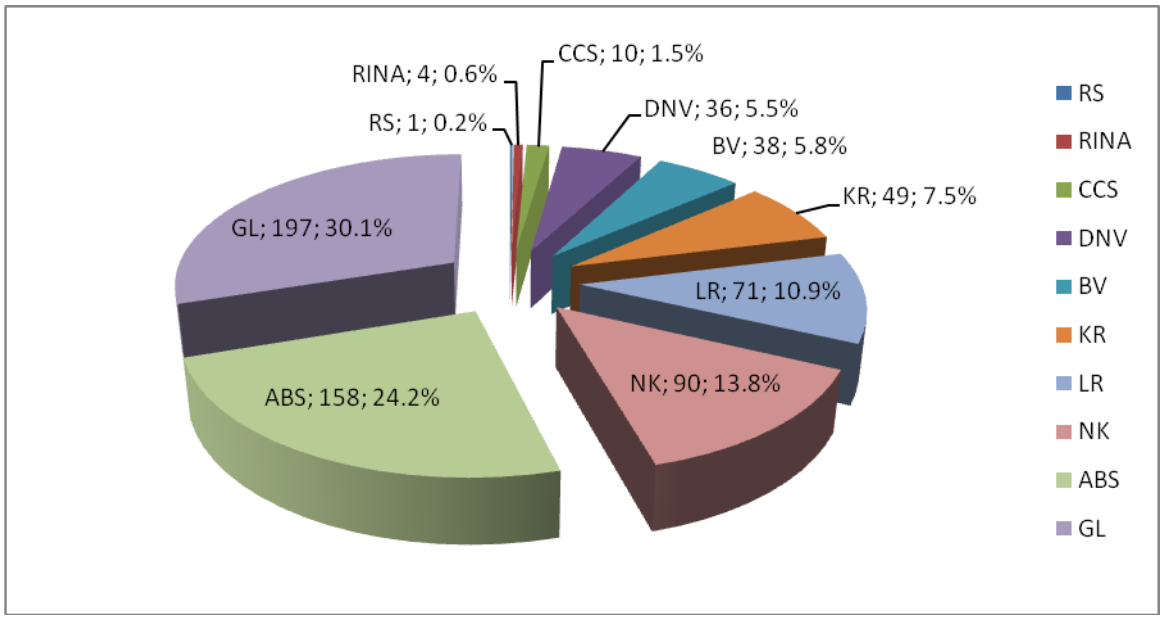


Figure 8 - Recognized organizations of non-China flag ships called at Yantian Port from January to March, 2014

Recognized Organizations (RO):

RS: Russian Maritime Register of Shipping

RINA: Registo Italiano Navade

CCS: China Classification Society

DNV: Det Norske Veritas

BV: Bureau Veritas

KR: Korean Register of Shipping

LR: Lloyds Register of Shipping

NK: Nippon Kaiji Kyokai

ABS: American Bureau of Shipping

GL: Germanischer Lloyd

Source: Compiled by author.

3.2.5 Company performance of ships

There are 88 ISM companies such as A.P. Moller - Maersk A/S, Evergreen Marine Corp, COSCO Maritime Ltd, CMA- CGM and Danaos Shipping Co Ltd for the 654 ships while only 6 ISM companies' performance is low or very low(see Figure 9). High and medium ISM company performance is conducive to make the ships become LRS.

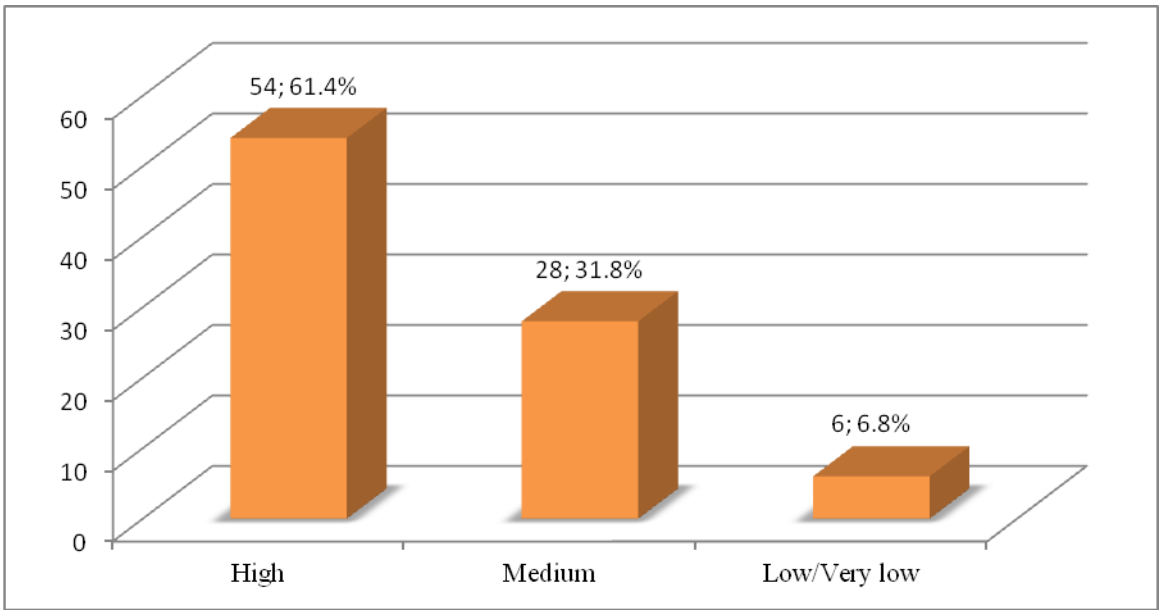


Figure 9 - Performance of non-China flag ships' ISM companies

Source: Compiled by author.

3.2.6 Risk grade of ships

Figure 10 provides a clear risk grade distribution that 61.0% of foreign ships entering the port from January to March, 2014 belong to LRS, nearly twice as many as SRS, 37.6%. However, HRS held only 1.4% of all. Shipping liner is the main service object of Yantian Port. Yantian MSA shall supervise each port call of all ships. Of all 1043 port calls, there are 614 LRS, 417 SRS, and 12 HRS (see Figure 11), respectively accounting for 58.9%, 40.0% and 1.2%.

Based on the analysis of the above, the non - China flag ships called at Yantian Port have a few characteristics as follows. In Yantian Port, container ships with young age, high flag performance, high recognized organization performance and high company performance are the mainstream ships which cause a phenomenon that the number of

LRS called at Yantian Port are much more than that of SRS and HRS. And the ships' type, age, flag and recognized organization almost can be seen as fixed parameters among seven parameters of ships risk profile. The main influencing factors of risk grade are company performance and historical inspections. And assessment of company performance is based on the detention and deficiency history of its all ships. Hence, the risk grade of foreign ships called at Yantian Port mainly depends on their historical PSC inspections.

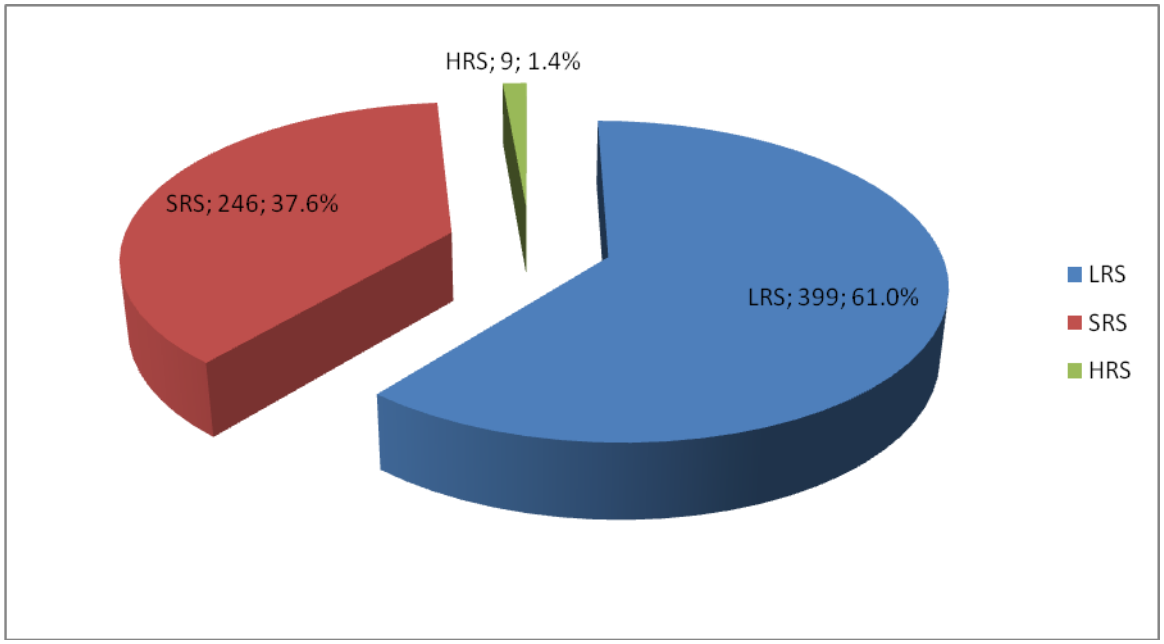


Figure 10 - Risk grade of non-China flag ships called at Yantian Port from January to March, 2014

Source: Compiled by author.

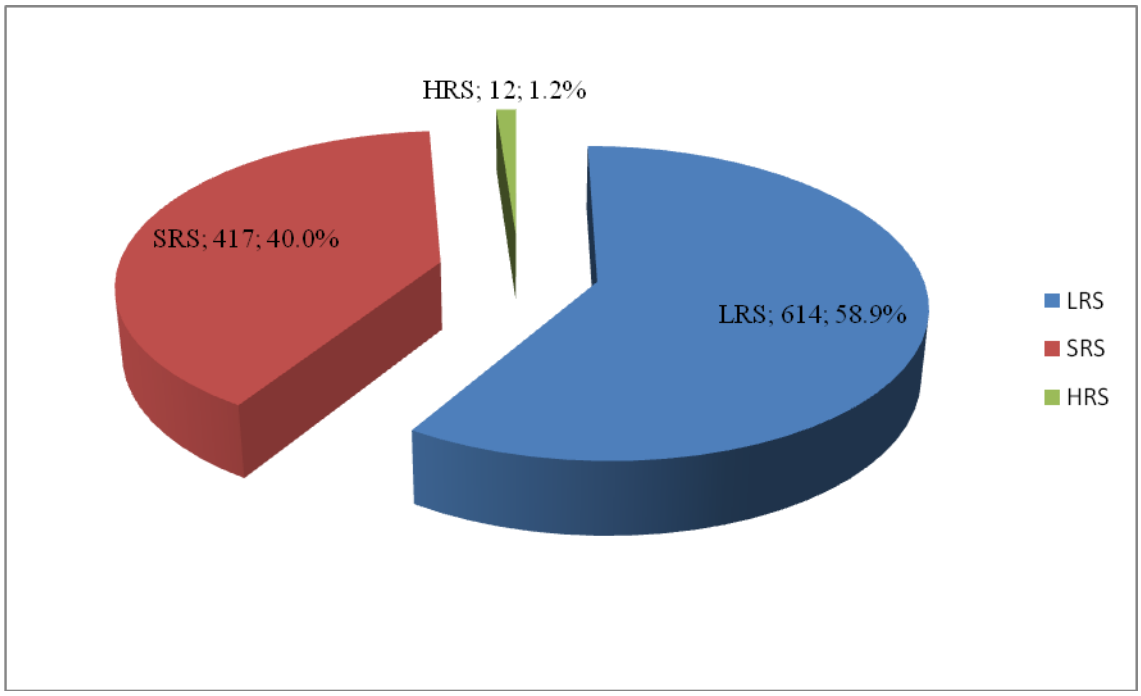


Figure 11- Risk grade of ships per time

Source: Compiled by author.

Of 1043 port calls, risk grade of 67 ships per time changed after the implementing of Tokyo MOU NIR. Thereinto, risk grade of 17 ships per time went up.15 ships per time changed from LRS to SRS and 2 ships per time changed from SRS and HRS. Risk grade of 50 ships per time went down. 7 ships per time changed from HRS to SRS and 43 ships per time changed from SRS to LRS. It is not hard to see that general tendency of risk grade of ships called at Yantian Port is descending.

3.3 Inspection window of ships

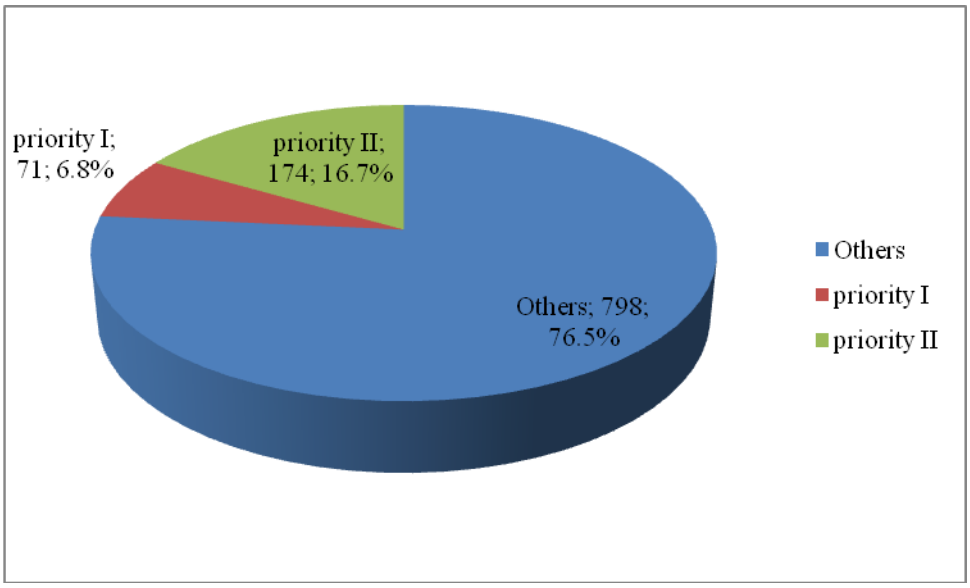


Figure 12 - Inspection priority of non-China flag ships called at Yantian Port from January to March, 2014

Source: Compiled by author.

From January to March, 2014, the ships which are in the scope of priority II in inspection window call at Yantian Port 174 times, accounting for 16.7% of all port calls, and the ships which are in the the scope of priority I arrive at the port 71 times, accounting for 6.8%. It is striking that 76.5% of port calls are not in the scope of priority I and priority II. The distribution diagram of inspection window of ships called at Yantian Port is compatible with the distribution of risk grades of ships.

Because of the implementing of Tokyo MOU NIR, inspection window for different risk grade ships has changed. Of 1043 port calls, there are 91 port calls which changed from priority II to non-priority I and non-priority II, namely ships which are suitable to be inspected. There are 12 port calls which changed from non-priority I and non-priority II to priority II and 5 port calls which changed from priority II to priority I. Hence, after

the implementing of Tokyo MOU NIR, general tendency is that more foreign ships called at Yantian Port are not in the scope of priority I and priority II.

CHAPTER 4 IMPACT OF THE IMPLEMENTATION OF TOKYO MOU NIR ON PSC IN YANTIAN

4.1 Decrease of ships which are suitable to be inspected

After the implementation of Tokyo MOU NIR, it is possible that the number of inspected ships keeps stable in Asian-Pacific region and even in China, but for the ports which service single type ships such as Yantian Port, the number of ships which are suitable to be inspected will decrease. Based on the data analysis in the Chapter 3, there are some reasons as follows.

(1) In terms of sequence of port call in the routes of ships, it is unfavourable for Yantian PSC inspection because Yantian Port stands a latter position of Asian-Pacific region in most routes. The ships generally call at several ports which are in the scope of supervision of Tokyo MOU member states before arrival at Yantian Port. Especially in Hong Kong, China, its PSC inspection is high-quality and high-efficiency and most foreign ships would receive PSC inspection before enter into Yantian Port, a neighbouring and closely spaced port. It means that the ships are extremely likely to receive PSC inspections in other ports in the Asian-Pacific region. And it is also a reason to cause that most ships called at Yantian Port are not in the scope of priority I and priority II (see Figure 12).

(2) Of all ships called at Yantian Port, the number of LRS and SRS is far greater than that of HRS. Container ships called at Yantian Port have a great superiority in aspects of

type, age, flag, RO and company performance when it assesses the ships' risk grade. After the implementation of Tokyo MOU NIR, it makes the inspection period much longer for LRS and SRS than that stipulated in the former regime. Hence, under the Tokyo MOU NIR, more ships which call at Yantian Port are not in the scope of priority I and priority II in the time window. In other words, the ships which are suitable to be inspected in Yantian Port will decrease.

4.2 Increase of appeal and review

According to the evaluation rule of ship risk profile, if the number of one ship's deficiencies in a PSC inspection is greater than five, it will add one weighting point in the evaluation of HRS. But it just adds one weighting point when the ship meets three or more detentions within previous 36 months. This calculation method causes the fact that the weight of ships' deficiencies in PSC report is much greater than that of ships' detention. Chapter 3 points out that the ships called at Yantian Port have a great superiority in aspects of type, age, flag, RO and company performance to become LRS. Hence, five deficiencies, as a critical point in the process of evaluating HRS, is a very important influence factor to ship risk profile. For example, with good company performance and historical PSC inspection records, a container ship whose age is greater than 12 years, belongs to LRS. But in one inspection, it is found more than five deficiencies and then the ship becomes to HRS from LRS. It is difficult for the ship and its company to accept the result. Consequently, dispute between PSC officers and seafarers would be happened. If they do not reach a consensus at that time, the company would appeal to Tokyo MOU for review. Hence, after the implementation of Tokyo MOU NIR, it would face with a focal problem - increase of appeal and review on ships' deficiencies. (Yu, 2009, p. 113).

4.3 To require PSC officers in Yantian Port to improve quality

In the calculating formula of deficiency index of company performance, value of ISM related deficiency is five times as great as that of non-ISM related deficiency. Hence, the significantly increase of ISM related deficiency weighting promotes PSC officers to be familiar with knowledge about system-audit in order to properly judge the difference between non-conformity of safety management system and deficiencies found during the PSC inspections, and accurately describe deficiencies before a appropriate treatment. (Zhai, 2014). In addition, increase of appeal and review from ships and their companies brings the new challenge to PSC officers. It not only requires them fair use of their professional judgement with the help of conventions, their professional knowledge and experience, but also requires them more precise when they exercise inspections and determine deficiencies. Tokyo MOU NIR brings a new challenge for PSC officers' behaviour- normative, objective and reasonable behaviour.

CHAPTER 5 COUNTERMEASURES AND RECOMMENDATIONS

5.1 Flexible working hours

Flexible work is to meet different hierarchies, different levels and different types demand for human resources by adjusting some factors such as working hours, site, content and number of staff in the human resources management (Zhang, 2007, p.56). The number of foreign ships calls at Yantian Port suitable to be inspected will decrease. Fixed working hours (working from 9:00 am to 5:00 pm) do not suit PSC officers in Yantian MSA. Many foreign ships which are in the scope of priority I often arrive at Yantian Port at night or on weekends. Therefore, working hours should be arranged according to the time windows of selection scheme under Tokyo NIR and the liner schedule in order to effectively avoid missing any inspection of foreign ships called at Yantian Port in the scope of priority I. If the PSC officers still inspect ships according to present regular working hours, it would accomplish PSC inspection targets and even not meet the requirements of Tokyo MOU.

5.2 To modify evaluation indicators of PSC for Yantian MSA

In recent years, China MSA assigns evaluation indicators of PSC (even to the detail of number of deficiencies per ship) to directly-managed MSA substation per year in order to effectively implement relevant regulations of PSC. It requires that Yantian MSA shall inspect more than 11% of foreign ships calling at Yantian Port per year. However, after the implementation of Tokyo MOU NIR, the number of foreign ships calls at Yantian

Port which are suitable to be inspected will decrease. It means that Yantian MSA is not able to complete the task when the number of foreign ships in the scope of priority I is not up to the demand. For performing tasks, PSC officers of Yantian MSA would inspect more foreign ships which do not need to inspect and even record more deficiencies out of thin air. Hence, it suggests China MSA to reset evaluation indicators of PSC for Yantian MSA according to the actual conditions of Yantian Port.

5.3 To strengthen training on Tokyo MOU NIR

Yantian MSA should pay high attention to the implementation of Tokyo MOU NIR. Taking the opportunity of implementation of Tokyo MOU NIR, it should change law enforcement philosophy and strengthen law enforcement procedure as well as service consciousness in order to raise the competence and ability of administration by law and to improve performance on PSC inspection. In order to effectively implement Tokyo MOU NIR, Yantian MSA should make comprehensive arrangements such as information construction and quality assessment of PSC inspection. In addition, Yantian MSA should organize its PSC officers to learn Tokyo MOU NIR. Through thematic training, all PSC officers should be familiar with contents of Tokyo MOU NIR and its characteristic – ship risk profile, company performance and selection scheme form a relationship of mutual effect, interpenetrating and inter-constraint. Even assessing officers in the port and joint inspection officers should receive some training on Tokyo MOU NIR. After the implementation of Tokyo MOU NIR, the number of deficiencies in one inspection brings great influence on company performance. (Yu, 2013, p. 24). Hence, Yantian MSA should strengthen quality management based on PSC procedure instead of that based on inspections' number.

(1) If PSC officers expand the scope of the inspection in the case of improper selection of ships or no obvious basis, MSA may lose a lawsuit when ships' company lodges

appeal and review even that PSC officers judge deficiencies correctly according to conventions. Hence, PSC officers should not exceed their powers and select ships strictly before their inspections. It should firstly select the overriding priority and poor performance ships determined by Tokyo MOU. Then it selects ships based on time windows stipulated in Tokyo MOU NIR. It should not select ships which are not in the scope of priority I and priority II. (Sun, 2013, p. 24). PSC officers must inspect the priority I ships according to PSC inspection procedure, especially listening to captain's reasonable excuse about deficiencies in order to avoid appeal and review.

(2) PSC officers should pay attention to collection and preservation of deficiencies, especially the collection and preservation of deficiencies related to ISM, detention and controversial deficiencies. It should collect photos of deficiencies from different angles. For example, it can put the boarding card with a ship' name beside the deficiencies and take photos together as evidence. (Hu, 2014, p.26).

(3) For the occasional deficiencies which are easy to correct and brings little influence to navigation safety and pollution prevention, it is suggested verbal warnings after that ships or their companies timely take reasonable corrective action. It records important deficiencies according to the principle of "retain the large, release the small". (Sun & Xia, 2014, p.62).To ensure accurate positioning and description of ISM related deficiencies, the ISM related deficiencies should be inspected by PSC officers who have ISM auditor certificate.

(4) English is not the mother language for PSC officers in Yantian MSA. But the report of PSC inspections needs to be described in English. In the past, the PSC officers in Yantian MSA often used the vague expressions in PSC inspection report such as "not to be in compliance with the requirements of the relevant convention", "damage" and "not found". Vague expressions of deficiencies will become a negative factor when ships and

their companies institute an appeal. Vague expressions of deficiencies could not help ships and their companies to take specific corrective actions. Accurate and fluent expressions of deficiencies in English will become the basic requirements of PSC officers. (Wang & Sun, 2014. P.31).

CHAPTER 6 CONCLUSION

Establishing an unified and coordinated port states inspection regime and limiting operation of substandard ships so as to stabilize the order of ocean, to safeguard safety of lives and property and to protect marine environment, has been the principle of Tokyo MOU since its establishment. The implementation of PSC inspection regime provides a strong guarantee for navigation safety and marine environmental protection. However, the former inspection regime of Tokyo MOU has some obvious shortcomings with the development of shipping industry. Thereupon, Tokyo MOU introduced the NIR on January 1, 2014. The Tokyo MOU NIR based on differentiated management pays more attention to protect high standard ships and to limit substandard ships so as to promote the improvement of regional security, which has a significant impact on PSC in Asian-Pacific region including Yantian Port, and the global shipping market.

Theoretical basis for the analysis of the implementation of Tokyo MOU NIR on PSC in Yantian Port is given in this paper. First of all, it introduces the background of Tokyo MOU NIR, including the reasons of introducing NIR, and general situation of Yantian Port. Then, it reviews the process of formation of Tokyo MOU NIR as well as its main content followed by the comparison between Tokyo MOU NIR and the former regime and the analysis of implementation status quo of NIR. Data analysis mainly focuses on the parameters of ship risk profile. It obtains the following conclusions through data analysis. (1) The number of ships which are suitable to be inspected in Yantian Port will decrease. (2) PSC inspection is the greatest influence factor for risk grade assessment of ships which call at Yantian Port. It will cause increase of appeal and review and it

requires PSC officers in Yantian Port to improve their own quality.

Based on the analysis results, the author puts forward some countermeasures and recommendations on PSC inspection in Yantian Port, including flexible working hours, to modify evaluation indicators of PSC and to strengthen training on Tokyo MOU NIR.

In thesis writing, the author hopes to make a comprehensive and in-depth exposition on the implementation of Tokyo MOU NIR on PSC in Yantian Port and to make some reflection and opinion on PSC inspection in Yantian Port. However, this paper is still purely theoretical because of the insufficiency of the author' academic vision, learning competence and research materials as well as the complexity of PSC inspection in Yantian Port. The analysis of some problems in this paper is not very thorough. Some views and opinions have yet to be verified and discussed. In the future, the author will continue to do further research on Tokyo MOU NIR so as to put forward more opinions and countermeasures. Maritime authorities of port states authority and shipping community should concern and discuss the research on inspection regime for the developing direction of PSC regime so as to make it be constantly advancing with the times.

References

Chen, X. S. (2014). Tokyo MOU NIR will enter into force on 1 January 2014. *China Maritime Safety*, (1), 18 - 20.

Chen, C., & Zeng, X. M. (2006). Existing problems in PSC and its development tendency. *Navigation of China*, (6), 78 - 81.

Fei, Z. Q., & Bao, J. Z. (2006). Present issues of international implementation of port state control. *World Shipping, 29* (5), 19 - 21.

Gan, Z. (2014). Compare the new inspection regime of Tokyo MOU with the existing inspection regime of Paris MOU and Tokyo MOU. *China Maritime Safety*, (1), 21 - 23.

Hu, R. H. (2014). Ship management industry-respond to the new challenge to Tokyo MOU NIR. *China Maritime Safety*, (1), 26 - 28.

International Maritime Organization (IMO). (n.d.). *Port State Control.* Retrieved May 26, 2014 from the World Wide Web: http://www.imo.org/OurWork/Safety/Implementation/Pages/PortStateControl.aspx

Li, C. (2006). Discussion on some issues related to port state control. *China Maritime Safety*, (3), 53 - 55.

Li, P. F., & Zeng, Q. S. (2013). Study on the current situation and trends of port state control. *China Maritime Safety*, (1), 35 - 38.

LI, W. F. (2013). *Analyses on the issues and countermeasures of port State control on foreign Ships.* Unpublished master thesis, Xiamen University, Xiamen, China.

Ning, B. (2011). Rationality for the application of NIR ship targeting system in the Asia-Pacifi c Region. *China Maritime Safety*, (6), 28 - 29.

Shu, H. (2004). New policy on port state control of Tokyo MOU. *China Ship Survey*, (12), 59.

Sun, Y. J., & Pan, Z. B. (2014). Countermeasures of Tokyo Memorandum of UnderstandingNew Inspection Regime . *China Ship Survey*, (4), 74 - 76.

Sun, Y. J., & Xia, D. R. (2014). The impact of the implementation of Tokyo Memorandum of Understanding new inspection regime on port state control. *Marine Technology*, (1), 60 – 63.

Sun, Y. J. (2013). The impact of the implementation of Tokyo Memorandum of Understanding new inspection regime on port state control and countermeasures. *World Shipping, 36* (10), 22 - 26.

Tokyo Memorandum of Understanding (Tokyo MOU). (2014). *Annual Report on Port State Control in the Asia-Pacific Region 2013.* Tokyo: Author.

Tokyo Memorandum of Understanding (Tokyo MOU). (2014a). *New Inspection Regime (NIR)*. Retrieved May 25, 2014 from the World Wide Web: http://www.tokyo-mou.org/inspections_detentions/NIR.php

Tokyo Memorandum of Understanding (Tokyo MOU). (n.d.). *Organizational Structure*. Retrieved May 25, 2014 from the World Wide Web: http://www.tokyo-mou.org/organization/organizational_structure.php

Wang, X. S., & Sun, W. (2014). Analysis on the performance of the Chinese flagged vessels under the new Tokyo MOU NIR. *China Maritime Safety*, (1), 29 - 32.

Wei, D., Zeng, Q. S., & Li, W. F. (2011). The comparison between NIR and the ship risk assessment system of Tokyo MOU and the enlightenment thereof. *China Maritime Safety*, (6), 8 -10

Wang, J. (2011). Policy tendence on port state inspection of USCG and Tokyo MOU. *China Ship Survey*, (2), 66 - 68.

Yantian Maritime Department of Shenzhen Maritime Safety Administration of People's Republic of China. Jurisdictional area of Yantian MSA. Retrieved May 1, 2014 from the World Wide Web: http://sz.msa.gov.cn:8083/Applications/ArticleContent/ArticleContent.aspx?ArticleContent=62aff5fb-b181-458c-865e-37af483946bb&MenuCode=SUBA_YT_GXQY

Yantian Maritime Safety Administration (Yantian MSA). (January, 2014). *Annual Report 2013 of Yantian Maritime Safety Administration.* Shenzhen: Author.

Yantian International Container Terminals (YICT). (n.d.). *Company Profile*. Retrieved April 13, 2014 from the World Wide Web: http://www.yict.com.cn/about.html?locale=en_US

Yu, Q. W. (2013). Port state control: respond to the new requirements of Tokyo MOU NIR. *China Maritime Safety*, (1), 24 - 25.

Yu, L. (2009). Differentiation inspection regime on port state control. *China Ship Survey*,(6), 112 -114.

Zhang, S. J. (2007). Development tendency of port state control and *countermeasures*. Unpublished master thesis, Shanghai Maritime University, Shanghai, China.

Zhai, J. G. (2014, January 14). The comment on Tokyo Memorandum of Understanding New Inspection Regime. China Communication News, p. 3.

Zhong, G. Q. (2012). Discussion on learning from the advanced experience of Europe and America in Port State Control inspection. *China Maritime Safety*, (2), 38 - 42.

Appendix 1: Vessel Schedule of Yantian Port from January 1 to March 31, 2014

Lane	Route
US (30)	Kaohsiung , Hongkong , Yantian , Shanghai , Busan , Tokyo , Tacoma , Seattle , Vancouver
	Los Angeles , Oakland , Seattle , Vancouver , Tokyo , Yantian , Hongkong , Laem Chabang , Cai Mep , Hongkong
	Vietnam (Vung Tau) , Hongkong , Shekou , Yantian , Singapore , Suez Canal , New York , Savannah , Charleston , Norfolk , Port Said , Jeddah , Singapore , Vietnam (Vung Tau)
	Chiwan , Hongkong , Ningbo , Shanghai , Chiwan , Yantian , Singapore , Salalah , New York , Norfolk , Baltimore , Freeport(Bahamas) , Charleston , Norfolk , Jeddah , Colombo , Singapore
	Nansha , Hongkong , Yantian , Xiamen , Long Beach
	Taipei , Hongkong , Yantian , Kaohsiung , Panama Canal , Colon , Savannah , New York , Baltimore
	Laem Chabang , Cai Mep , Hongkong , Yantian , Los Angeles , Oakland , Seattle , Vancouver , Tokyo
	Shanghai , Ningbo , Hongkong , Yantian , Tanjung Pelepas , Suez Canal , Newark , Norfolk , Savannah , Suez Canal , Tanjung Pelepas , Hongkong
	Tanjung Pelepas , Hongkong , Yantian , Shanghai , Busan , Seattle , Vancouver , Yokohama , Shanghai
	Xiamen , Chiwan , Hongkong , Yantian , Long Beach , Oakland
	Tanjung Pelepas , Kaohsiung , Hongkong , Yantian , Shanghai , Ningbo , Tacoma , Vancouver
	Jebel Ali , Dammam , Port Klang , Singapore , Laem Chabang , Yantian , Los Angeles , Oakland , Busan , Shanghai , Ningbo
	Hongkong , Yantian , Ningbo , Shanghai , Prince Rupert , Vancouver , Seattle , Hongkong
	Nansha , Hongkong , Yantian , Ningbo , Shanghai , Busan , Seattle , Vancouver
	Xiamen , Long Beach , Prince Rupert , Yantian , Nansha , Hongkong
	Pusan , Xiamen , Yantian , Ningbo , Shanghai , Pusan , Panama Canal , Savannah , New York , Wilmington , Charleston , Panama Canal , Pusan
	Taipei , Xiamen , Hongkong , Yantian , Los Angeles , Oakland
	Busan , Shanghai , Ningbo , Xiamen , Yantian , Panama , Colon , Houston , Panama , Busan
	Naples , Livorno , La Spezia , Port Said , Suez Cana , Singapore , Vietnam (Vung Tau) , Hongkong ,Yantian , Ningbo , Long Beach , Oakland , Pusan , Shanghai , Ningbo , Hongkong
	Kaohsiung , Yantian , Hongkong , Kaohsiung , Taipei , Los Angeles , Oakland , Tacoma
	Suez Canal , Salalah , Tanjung Pelepas , Vietnam (Vung Tau) , Nansha , Yantian , Hongkong , Los Angeles
	Xiamen , Hongkong , Yantian , Shanghai , Panama , New York , Norfolk , Savannah
	Singpapore , Ho Chi Minh , Shekou , Hongkong , Yantian , Singapore , New York , Norfolk , Jacksonville , Savannah , Singapore
	Xiamen , Hongkong , Yantian , Shanghai , Nagoya , Tokyo , Tacoma , Vancouver , Tokyo , Nagoya , Kobe , Kaohsiung
	Keelung , Kaohsiung , Hongkong , Yantian , Kaohsiung , Keelung , Los Angeles , Oakland
	Xiamen , Hongkong , Yantian , Shekou , Hongkong , Kaohsiung , Long Beach , Kaohsiung
	Miami , Panama Canal , Balboa , Los Angeles , Yokohama , Osaka , Kaohsiung , Hongkong , Nansha , Yantian , Shanghai , Busan , Balboa , Panama Canal, Miami , Savannah , Charleston
	Singapore , Yantian , Chiwan , Xiamen , San Pedro , Kaohsiung , Chiwan
	Cai Mep , Hongkong , YICT , Singapore , Suez Canal , Algeciras , Norfolk , Savannah , Jacksonville , Charleston , Algeciras , Suez Canal , Colombo , Singapore , Cai Mep
	Xiamen , Kaohsiung , Hongkong , Yantian , Shanghai , Pusan , Panama Canal ,Manzanillo(Panama), Kingston , Savannah , Charleston , New York , Norfolk , Jacksonville , Kingston , Manzanillo(Panama) , Panama Canal , Balboa , Pusan ,Xiamen
	Shanghai , Ningbo , Shekou , Hongkong , Yantian , Port Klang , Jeddah , Suez Canal , Le Havre , Rotterdam , Hamburg , Zeebrugge , Suez Canal , Port Klang
	Ningbo , Shanghai , Yantian , Tanjung Pelepas , Suez Canal , Le Havre , Rotterdam , Bremen , Hamburg , Antwerp , Felixstowe , Suez Canal , Singapore , Busan , Hakata , Dalian , Tianjin Xingang , Qingdao
	Qingdao , Shanghai , Hongkong , Yantian , Singapore , Salalah , Suez Canal , Rotterdam , Hamburg , Southampton , Tangier , Suez Canal , Singapore
	Singapore , Dalian , Tianjin Xingang , Busan , Qingdao , Shanghai , Yantian , Singapore , Port Klang , Suez Canal , Le Havre , Hamburg , Bremen , Zeebrugge , Rotterdam , Southampton , Beirut , Suez Canal , Jeddah , Port Klang , Singapore
	Shanghai , Ningbo , Yantian , Suez Canal , Felixstowe , Hamburg , Rotterdam
	Shanghai , Ningbo , Yantian , Suez Canal , Felixstowe , Hamburg , Rotterdam

Europe (30)	Singapore , Chiwan , Hongkong , Dalian , Tianjin Xingang , Busan , Qingdao , Ningbo , Shanghai , Yantian , Hongkong , Chiwan , Singapore , Gioia Tauro , Naples , Taranto , Valencia , La Spezia , Fos , Barcelona , Jeddah , Gioia Tauro , Salalah , Jebel Ali
	Ningbo , Shanghai , Xiamen , Yantian , Tanjung Pelepas , Suez Canal , Algeciras , Bremen , Hamburg , Felixstowe , Le Havre
	Xiamen , Shanghai , Ningbo , Yantian , Nansha , Tanjung Pelepas , Port Klang , Suez Canal , Beirut , Malta , Valencia , Malaga , Algeciras , Port Said , Suez Canal , Port Klang , Singapore , Xiamen
	Singapore , Suez Canal , Southampton , Hamburg , Rotterdam , Suez Canal , Singapore , Yantian , Ningbo
	Ningbo , Shanghai , Yantian , Tanjung Pelepas , Suez Canal , Rotterdam , Bremen , Gdansk , Aarhus , Gothenburg , Bremen , Rotterdam , Algeciras , Suez Canal
	Suez Canal , Zeebrugge , Felixstowe , Rotterdam , Bremen , Suez Canal , Colombo , Singapore , Yantian , Kobe , Nagoya , Yokohama , Ningbo
	Ningbo , Shanghai , Xiamen , Kaohsiung , Hongkong , Yantian , Singapore , Suez Canal , Port Said , Ashdod , Genoa , Barcelona , Fos , Port Said , Suez Canal , Singapore , Hongkong , Ningbo
	Algeciras , Suez Canal , Yantian , Hongkong , Gwangyang , Ningbo , Shanghai
	Ningbo , Shanghai , Yantian , Singapore , Suez Canal , Southampton , Hamburg , Rotterdam , Suez Canal , Singapore
	Singapore , Salalah , Suez Canal , Rotterdam , Hamburg , Southampton , Tangier , Suez Canal , Singapore , Yantian , Qingdao , Shanghai , Hongkong
	Chiwan , Xiamen , Ningbo , Shanghai , Xiamen , Yantian , Chiwan , Sines , Le Havre , Rotterdam , St. Petersburg , Antwerp , Dunkerque , Felixstowe , Valencia , Port Klang
	Shanghai , Xiamen , Kaohsiung , Yantian , Singapore , Rotterdam , Hamburg , Felixstowe , Antwerp , Singapore , Shekou , Hongkong , Shanghai
	Ningbo , Shanghai , Xiamen , Hongkong , Chiwan , Yantian , Port Klang , Suez Canal , Tangier , Southampton , Hamburg , Rotterdam , Zeebrugge , Le Havre , Malta , Suez Canal , Khor Al Fakkan , Jebel Ali , Ningbo
	Ningbo , Shanghai , Xiamen , Yantian , Tanjung Pelepas , Suez Canal , Algeciras , Felixstowe , Bremen , Rotterdam , Algeciras , Suez Canal , Salalah , Jebel Ali
	Tokyo , Osaka , Qingdao , Shanghai , Ningbo , Kaohsiung , Hongkong , Shekou , Yantian , Tanjung Pelepas , Colombo , Suez Canal , Ashdod , Alexandria , Taranto , Genoa , Barcelona , Valencia , Taranto , Suez Canal , Jeddah , Colombo , Singapore , Tanjung Pelepas , Kaohsiung , Hongkong
	Port Klang , Singapore , Yantian , Chiwan , Hongkong , Xiamen , Ningbo , Shanghai , Xiamen
	Qingdao , Busan , Shanghai , Ningbo , Nansha , Yantian , Chiwan , Tanjung Pelepas , Port Klang , Suez Canal , Malta , Valencia , Barcelona , Fos , Genoa , Malta , Port Said , Suez Canal , Khor Al Fakkan , Port Klang , Singapore
	Ningbo , Shanghai , Nansha , Hongkong , Singapore , Suez Canal , Hamburg , Rotterdam , Felixstowe , Antwerp ,Suez Canal , Singapore , Nansha , Yantian , Kaohsiung , Ningbo
	Dalian , Tianjin Xingang , Busan , Shanghai , Ningbo , Taipei , Chiwan , Yantian , Tanjung Pelepas , Port Klang , Suez Canal , Canakkale , Izmit , Avcilar , Bosperus , Constanta , Ilyichevsk , Odessa , Bosperus , Canakkale , Damietta , Port Said , Suez Canal , Port Klang , Singapore
	Singapore , Suez Canal , Algeciras , Hamburg , Rotterdam , Le Havre , Algeciras , Suez Canal , Singapore , Yantian , Hongkong , Tianjin Xingang , Gwangyang , Busan , Shanghai
	Ningbo , Shanghai , Hongkong , Yantian , Tanjung Pelepas , Suez Canal , Felixstowe , Zeebrugge , Rotterdam , Bremen , Suez Canal , Colombo , Singapore
	Tianjin Xingang , Gwangyang , Busan , Shanghai , Yantian , Singapore , Suez Canal , Algeciras , Hamburg , Rotterdam , Le Havre , Algeciras , Suez Canal , Singapore , Hongkong , Tianjin Xingang
	Gwangyang , Busan , Shanghai , Shekou , Yantian , Singapore , Suez Canal , Rotterdam , Hamburg , Thamesport , Suez Canal , Salalah , Singapore , Gwangyang
	Xiamen , Nansha , Hongkong ,Yantian , Singapore , Suez Canal , Hamburg , Rotterdam , Felixstowe , Antwerp,Suez Canal , Xiamen
Middle East (4)	Shanghai , Ningbo , Xiamen , Kaohsiung , Shekou , Tanjung Pelepas , Singapore , Jeddah , Aqaba , Suez Canal , Jeddah , Singapore , Yantian , Shanghai
	Gwangyang , Busan , Ningbo , Keelung , Yantian , Hongkong , Singapore , Port Klang , Dubai , Bandar Abbas , Karachi , Singapore , Hongkong , Gwangyang
	Singapore , Hongkong , YICT , Kwangyang , Pusan , Ningbo , Kaohsiung
	Los Angeles , Oakland , Busan , Shanghai , Ningbo , Yantian , Singapore , Jebel Ali , Dammam , Port Klang , Singapore , Laem Chabang

Asia (10)	Haiphong , Yantian , Hongkong , Haiphong
	Shanghai , Busan , Osaka , Kobe , Tokyo , Yokohama , Hongkong , Yantian , Manila , Cagayan De Oro , Davao , Shanghai
	Kaohsiung , Taichung , Shantou , Huizhou , Yantian , Shekou , Shantou , Kaohsiung
	Kaohsiung , Yantian , Hongkong , Ho Chi Minh , Sihanoukville , Laem Chabang , Tanjung Pelepas , Singapore , Batangas , Manila
	Haiphong , YICT , Hongkong , Haiphong
	Busan , Ulsan , Shanghai , Xiamen , Yantian , Singapore , Port Klang , Chennai
	Hongkong , Tianjin Xingang , Dalian , Qingdao , Ningbo , Xiamen , Shantou , Hongkong , Yantian , Chiwan , Hongkong , Manila South Harbour , Manila North Harbour , Hongkong
	Pusan , Kwangyang , Shanghai , Keelung , Xiamen , Hongkong , Tanjung Pelepas , Singapore , Jakarta , Tanjung Pelepas , Singapore , Hongkong , YICT , Kaohsiung , Keelung , Ningbo , Shanghai , Pusan , Vostochniy
	Ho Chi Minh , YICT , Shekou , Ho Chi Minh
	Hakata , Gwangyang , Xiamen , Yantian , Hongkong , Singapore , Tanjung Pelepas , Jakarta , Surabaya , Davao , Shanghai , Busan , Vladivostok
Africa (3)	Shanghai , Ningbo , Fuzhou , Yantian , Tanjung Pelepas , Port Louis , Durban , Port Elizabeth , Port Louis , Singapore , Nansha , Shanghai
	Shanghai , Ningbo , Kaohsiung , Yantian , Hongkong , Tanjung Pelepas , Singapore , Durban , Cape Town , Singapore , Kaohsiung , Shanghai
	Tanjung Pelepas , YICT , Nansha , Tanjung Pelepas , Port Kelang , Apapa , Tincan , Cotonou , Apapa , Tanjung Pelepas
Australia (2)	Tokyo , Kobe , Busan , Shanghai , Yantian , Hongkong , Brisbane , Auckland , New Plymouth , Nelson , Wellington , Lyttelton , Napier , Tauranga , Tokyo
	Kaohsiung , Hongkong , Yantian , Melbourne , Sydney , Brisbane
Central America (1)	Singapore , Kaohsiung , Nansha , Hongkong , Yantian , Kwangyang , Yokohama , Manzanillo , Lazaro Cardenas , Balboa , Buenaventura , Callao , San Antonio , San Vicente
South America (4)	Shanghai , Ningbo , Yantian , Hongkong , Singapore , Santos , Montevideo , Buenos Aires , Santos , Singapore , Hongkong , Shanghai
	Pusan , Shanghai, Ningbo , YICT , Hongkong , Tanjung Pelepas , Singapore , Santos , Itaguai , Itapoa , Itajai , Paranagua , Santos , Itaguai , Coega , Singapore , Hongkong , Pusan
	Busan , Shanghai , Ningbo , Yantian , Hongkong , Busan , Manzanillo , Balboa , Buenaventura , Guayaquil , Puerto Angamos , Valparaiso , San Vicente , Manzanillo , Busan
	Kaohsiung , Yantian , Hongkong , Ningbo , Shanghai , Manzanillo , Buenaventura , Callao , Iquique , San Antonio , Callao , Buenaventura , Kaohsiung