8-25-2013

Study on measures to optimize the training system for PSCOs in

Dong Xu

WORLD MARITIME UNIVERSITY

Dalian, China

STUDY ON MEASURES TO OPTIMIZE THE TRAINING SYSTEM FOR PSCOS IN CHINA

By

XU DONG

China

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

MASTER OF SCIENCE

MARITIME SAFETY AND ENVIRONMENTAL MANAGEMENT

2013

Declaration

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

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

Xu Dong

Date:

Supervised by:

Liu Zhengjiang,
Professor
Dalian Maritime University

Acknowledgements

This research paper was developed as part of my studies to apply for the master degree of Maritime Safety and Environmental Management at WMU and DMU.

First of all, I would like to dedicate special and sincere thanks to the officials from China MSA and Liaoning MSA for giving me good recommendations to accomplish this research. I wish to express my profound gratitude to Mr. Zhao Haijun, Mr. Bai Gang and other colleagues working in the Ship Control Division of Liaoning MSA, for their data, idea and resources supports.

My most considerable acknowledgment and sincere admiration to my dissertation supervisor, Liu Zhengjiang, professor of DMU, his indispensable guidance and share of professional experience and knowledge helped me to prepare this dissertation.

I also like to express my special thanks to all of the professors of this MSEM programme, whose professional knowledge and great effort was considerably helpful to my study in the MSEM 2013 and also greatly benefited this research paper.

Last but not least, I will express my deepest appreciation to my wife Mary and my lovely daughter Mia, for the encouragement and understanding they gave me from the beginning to the end.

Title of Research paper: **Study on Measures to Optimize the Training System for PSCOs in China**

Degree: **MSc**

Abstract

This research paper is a study to optimize the training system for Port State Control Officers (Hereinafter referred to as “PSCOs”) in China.

A brief review of qualifications of PSCOs in China is taken to express the specific requirements. Training is the only way to be a PSCO because the Port State Control (PSC) activity needs professional knowledge and skills related to maritime safety, security and environmental protection which may be acquired from the androgogy training.

The historical training system for PSCOs in China and its development and training systems for PSCOs in other port state authorities and regional organizations on port state control are reviewed and analyzed to find out the advantages and disadvantages in the training system for PSCOs in China. Then this study introduces several

theories or concepts in relation to training system to help analyze the current training system for PSCOs in China and study the measures to optimize it.

Based on analysis of the requirements of being a PSCO, the historical and current training systems for PSCOs in China, and theories upon training system, this study indicates the measures on optimizing training system from six aspects (Policy, Logistics, Types of training, Trainers, Trainees, Assessment) and gives suggestions correspondingly.

Key Words: Policy; Logistics Trainer; Trainee; E-learning; Training system; PSCO

TABLE OF CONTENTS

Declaration ii
Acknowledgements iii
Abstract iv
TABLE OF CONTENTS vi
LIST OF TABLES viii
LIST OF FIGURES viii
LIST OF ABBREVIATIONS ix
Chapter I: Introduction 11
1.1 Background of this study 11
1.2 Objectives of this study 12
1.3 Methodology of this study 12
Chapter II: Requirements of being a PSCO 13
2.1 The definition of PSC and PSCO 13
2.2 Qualifications for PSCO in IMO resolution 14
2.3 Requirements of being a PSCO in China 15
Chapter III: Training system for PSCOs in China and other port states or regional organizations 16
3.1 The current situation of PSCOs in China 16
3.2 Historical training system for PSCOs in China and its development 19
3.3 Contemporary training system for PSCOs in China 22
3.4 Review of training systems for PSCOs in other port state authorities or

regional organizations on port state control 23
3.4.1 Training system for PSCOs in the United States 24
3.4.2 Training system for PSCOs in Australia 25
3.4.2.1 Training for new entrant PSCOs in Australia 26
3.4.2.2 Training for existing PSCOs in Australia 27
3.4.3 Training system for PSCOs in Japan 28
3.4.4 Training system for PSCOs in Tokyo MOU region 30
3.4.4.1 Training 30
3.4.4.2 Harmonization of PSC procedures 31
3.4.4.3 Update of knowledge 31
3.4.5 Training system for PSCOs in Paris MOU region 32
3.5 The advantages and disadvantages of training system for PSCOs in China. 33
Chapter IV: Theories on training system 35
4.1 Open System and Closed System 35
4.2 Feedback and Feed-forward for a system behavior 36
4.3 Effect of Training 37
4.4 Training Design Basics 38
Chapter V: Measures to optimize of training system for PSCOs in China 40
5.1 Policy of training system for PSCOs in China 40
5.2 Logistics of training system for PSCOs in China 41
5.3 Types of training system for PSCOs in China 43
5.4 Trainers of training system for PSCOs in China 44
5.5 Trainees of training system for PSCOs in China 45
5.6 Assessment of training system 47
Chapter VI: Conclusion 49
Reference 51

LIST OF TABLES

Table 1: The current distribution of PSCOs in China 17
Table 2: The classification of apprentices..... 46

LIST OF FIGURES

Figure 1: The current distribution of PSC departments in China 19
Figure 2: Certificate for Completeness of the first training course for PSCOs in China 20
Figure 3: Course Arrangements of the first training course for PSCOs in China 21
Figure 4: Organization Structure for PSC in Japan 29
Figure 5: The model of open system 36
Figure 6: The impacts of feedback and feed-forward on system behavior..... 37
Figure 7: The effect of training..... 38

LIST OF ABBREVIATIONS

AMSA	Australian Maritime Safety Authority
CCIS	China Computerized Information System on Port State Control
CCS	China Classification Societies
China MSA	the Maritime Safety Administration of the People's Republic of China
CIC	the Concentrated Inspection Campaign
DMU	Dalian Maritime University
EM	the Expert Mission
EMSA	the European Maritime Safety Agency
FSCI	Flag State Control Inspection
GTC	the General Training Course
ICS	the International Chamber of Shipping
ILO	the International Labour Organization
IMO	the International Maritime Organization
MLIT	the Ministry of Land, Infrastructure, Transport and Tourism of Japan
NPC	National People's Congress of the People's Republic of China
Paris MOU	the Paris Memorandum of Understanding on Port State Control
PDS	the Professional Development Scheme
PEX	PSCO Exchange
PQSW	Performance Qualification Standards Workbooks
PSC	Port State Control
PSCB	Port State Control Billet
PSCE-PQS	Port State Control Examiner Performance Qualification Standard
PSCOs	Port State Control Officers

SME	the Subject Matter Expert
SOC	the Syllabus of Competence
STC	the Specialized Training Course
TCP	Technical Cooperation Programmes
Tokyo MOU	the Memorandum of Understanding on Port State Control in the Asia-Pacific Region
U.S.A	the United States of America
USCG	the United States Coast Guard

Chapter I: Introduction

1.1 Background of this study

Social structure has changed very much in the relation of Maritime Administration in China since the closure of the 12th National People's Congress (NPC) of the People's Republic of China in March 2013 – five of maritime administrations have been integrated into two governmental law enforcement organizations, i.e. China Coast Guard and Maritime Safety Administration of the People's Republic of China (Baidu, 2013). With the rapid development of society and shipping industry, Port State Control is facing more and more challenges as well as other law enforcement activities within the jurisdiction of the Maritime Safety Administration of the People's Republic of China (China MSA). To be more precise, a campaign "Creating and constructing the four-type Maritime Safety Administration" initiated in the year of 2009 is now in progress within the Maritime Safety Administrations in China (China MSA, 2012). In this context, much legislation related to new obligations and rights entrusted to the Maritime Safety Administration need to be developed or modified, as well as national regulations upon PSC thereof training for PSC Officers included. From my point of view, it is a good opportunity to optimize the training system for PSCOs in China which is necessary according to my work experiences as a coordinator on PSC affairs of Liaoning Maritime Safety Administration and as a manager of China Computerized Information System on Port State Control (CCIS) for about eight years.

1.2 Objectives of this study

The main aim of this study is to find out measures on optimizing specific training system. Correspondingly, objectives of this study mainly focus on appropriate theory used, background and current situation analyzed, policy designed, logistics arranged, types of training chosen, human resources managed and quality assessed in the mentioned training system for PSCOs in China in this day and age. This study will provide a frame of reference to leaders who are in charge of determining the training strategy for PSCOs in China in a circumstance where the system of Maritime Safety Administration is being reformed and as a consequence, some policies and resources of PSCO training are being changed at the present time.

1.3 Methodology of this study

In order to analyze the position of actual training system for PSCOs in China and to study the measures of optimizing it, some research methodologies were adopted in this dissertation. Firstly, literature review was extensively undertaken, for instance, relevant IMO instruments, national legislations, Internet sources, unpublished research reports done by my colleagues, etc. were reviewed to support the study. Secondly, data of PSCOs in China were analyzed in quantificational to dig the reasonable training resources needed for a specific training course. Thirdly, some theories or concepts such as open system and closed system, feed-forward and feedback for system behavior, effect of training and training design basics were introduced into the top-level design for the training system. Fourthly, in order to get the first-hand materials which were not found out in available documental records, some interviews were carried out to the parties.

In addition, in order to point out the advantages and disadvantages of existent training system for PSCOs in China, some practices of PSCO training in other port state authorities and regional organizations on port state control are indicated to make a comparison with those used in China for PSCOs.

Chapter II: Requirements of being a PSCO

2.1 The definition of PSC and PSCO

Concerning the origin of Port State Control, Wikipedia indicates that it can be traced back to the year of 1978, a number of European countries agreed in Hague on a memorandum that agreed to audit whether the labour conditions on board vessels were in accordance with the rules of the International Labour Organization (ILO) (Wikipedia, 2013), but it is widely accepted that contemporary PSC regime derived from the establishment of the Paris Memorandum of Understanding on Port State Control (Paris MOU) in 1982.

PSC regime has changed much in the development of last thirty years, but nevertheless, the definition of PSC as well as PSCO has not changed very much. International Maritime Organization (IMO) and its regulations have provided standard descriptions. IMO defines Port State Control on its public website as "*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 and that*

the ship is manned and operated in compliance with these rules" (International Maritime Organization, 2013). And regulation 1.7.7 of definitions in Resolution A.1052(27) delivered through the 27th assembly by IMO states that *Port State Control Officer is a person duly authorized by the competent authority of a Party to a relevant convention to carry out port State control inspections, and responsible exclusively to that Party* (International Maritime Organization, 2011, p.6).

2.2 Qualifications for PSCO in IMO resolution

As we know, Port State Control Officer is very powerful upon dealing with the deviations related to technical conditions of safety, security and marine environmental protection as well as the competency of crew onboard a ship from the relevant IMO and ILO regulatory instruments. For instance, a PSCO can refuse the entry of a foreign ship or detain a foreign ship if she is in the breach of relevant international conventions or national laws seriously. This kind of action will result in the monetary loss of the ship owner directly, i.e. the demurrage charges and the impact on reputation which is an important factor for the forwarders and the shippers when they choose service of a ship company.

So how can a person become such a powerful man – a PSCO? Even Port State Control Officer is authorized by a specific port state authority; IMO also gave a uniform regulation of qualifications for a PSCO. Procedures for Port State Control 2011 state relevant regulations in 1.8 and 1.9 of the indicated IMO resolution (International Maritime Organization, 2011, p. 7-8):

(1) The PSCOs should have no commercial interest, either in the port of

inspection, or in the ships inspected, nor should PSCOs be employed by, or undertake work on behalf of, recognized organizations.

(2) The PSCO should be able to communicate in English with the key crew.

(3) Training should be provided for PSCOs to give the necessary knowledge of the provisions of the applicable conventions which are relevant to the conduct of Port State Control, taking into account the latest IMO Model Courses for Port State Control.

(4) PSCOs carrying out inspections of operational requirements should be qualified as a master or chief engineer and have appropriate seagoing experience, or have qualifications from an institution recognized by the Administration in a maritime related field and have specialized training to ensure adequate competence and skill, or be a qualified officer of the Administration with an equivalent level of experience and training, for performing inspections of the relevant operational requirements.

2.3 Requirements for being a PSCO in China

Based on the uniform qualifications for a PSCO set by resolution of IMO, China

Maritime Safety Administration also has its precise requirements for being a PSCO through *The Regulations on PSCO and FSCO Management* (China Maritime Safety Administration, 2002). Firstly, the PSCOs should have at least completed his or her undergraduate course in relation to Maritime Management. Secondly, PSCOs shall pass the basic training course for PSCOs offered by China MSA. Thirdly, PSCOs shall have a good competence in listening, reading, writing and speaking of English. Fourthly, the PSCOs must have grasped the relevant international conventions, national laws and technical guides or criteria. Last but not least, the PSCOs must have experience of Flag State Control Inspection (FSCI) and have already inspected on board over 200 ships but if a PSCO has experience as Captain, Chief Officer, Chief Engineer or Second Engineer before being recruited by Maritime Safety Administration, the number of inspections could be reduced to about 40 ships.

Chapter III: Training system for PSCOs in China and other port states or regional organizations

3.1 The current situation of PSCOs in China

Port State Control started in China on July 1, 1990 with the permission of the Ministry of Transport of the People's Republic of China (Dalian Maritime Safety Administration, 1995, p. 40). In the year of 1990, there were only nine ports opened to foreign ships where nine PSC departments namely Dalian, Tianjin, Yantai, Qingdao, Lianyungang, Shanghai, Ningbo, Guangzhou and Zhanjiang were established. Of course, there were few PSCOs in that PSC department to carry out

PSC inspection. Nowadays, statistics show that there are 51 PSC departments with over 200 PSCOs working in 85 ports to conduct Port State Control on foreign ships. With the help of for Mr. Zhao Haijun who works in the headquarters of China MSA, was obtained the statistics as of December 31, 2012 in intestine report about PSC affairs. Based on the statistics, I make a statistical table (Table 1) to display current distribution of PSCOs in China. Besides, I also provide a figure (Figure 1) to make this kind of distribution more geographically vivid.

Table 1: The current distribution of PSCOs in China

Name of PSC department	Number of ports in its region	Number of PSCOs
Anqing	2	4
Beihai	2	5
Caofeidian	1	3
Changshu	1	6
Changzhou	1	4
Dalian	4	10
Dandong	2	3
Fangcheng	3	7
Fuzhou	1	16
Guangzhou	2	5
Haikou	5	10
Huanghua	1	2
Huizhou	1	3
Humen	1	6
Jiangyin	1	6
Jiaxing	1	5
Jinzhou	1	4
Lianyungang	2	5
Maoming	1	1
Nanjing	1	2
Nantong	2	3
Ningbo	1	8

Ningde	1	5
Putian	1	4
Qingdao	1	6
Qinhuangdao	1	6
Qinzhou	1	7
Quanzhou	1	7
Rizhao	1	8
Shanghai	1	17
Shantou	4	3
Shenzhen	6	12
Taicang	1	5
Taizhou Jiangsu	3	7
Taizhou Zhejiang	1	4
Tangshan	1	2
Tianjin	2	11
Weihai	1	4
Wenzhou	1	2
Wuhu	3	4
Xiamen	1	5
Yangzhou	1	8
Yantai	1	15
Yingkou	3	6
Yangjiang	1	3
Zhangjiagang	1	2
Zhanjiang	3	2
Zhenjiang	1	3
Zhoushan	1	5
Zhuhai	3	2
Zhangzhou	1	6
Total	**85**	**289**

(Note: Some of PSCOs in the statistics are non-dedicated; the number of dedicated PSCOs is only 156.)

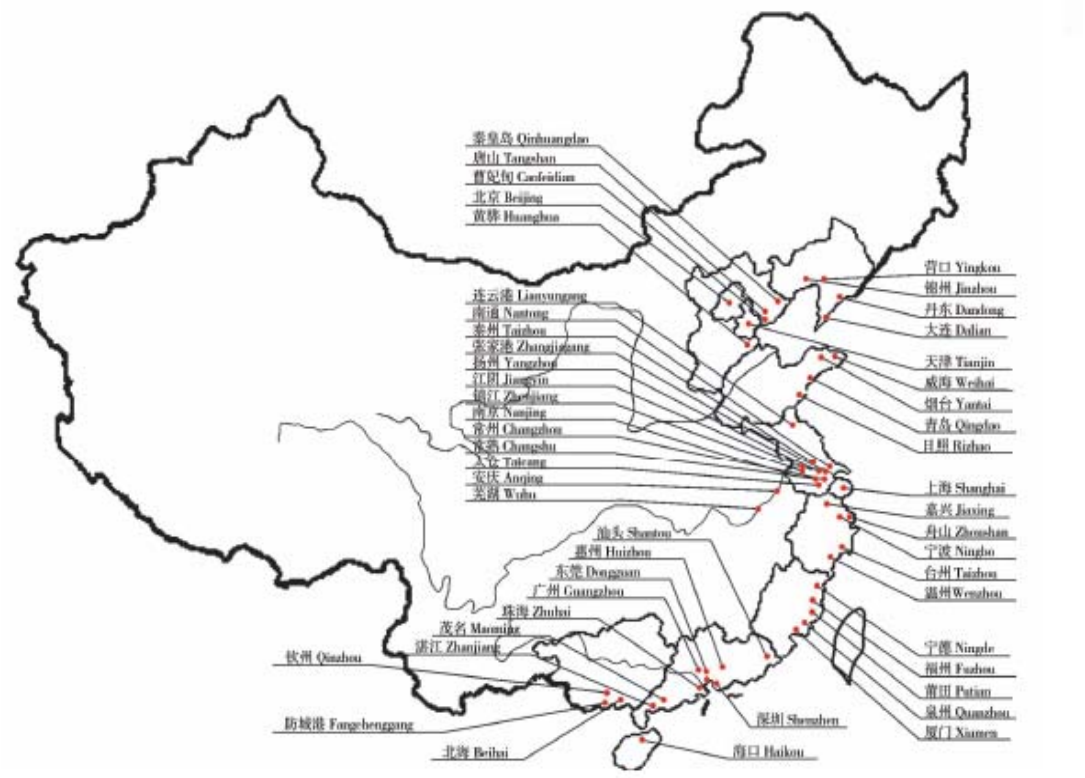


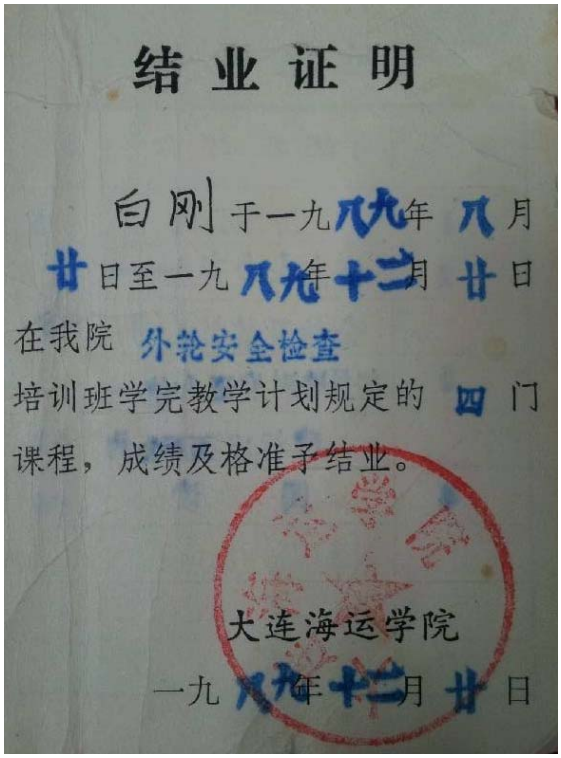
Figure 1: The current distribution of PSC departments in China

(Resource: The Subcommittee of PSC Committee of IMO in China)

3.2 Historical training system for PSCOs in China and its development

The first training course for PSCOs in China was held in 1989, according to Mr. Bai Gang, deputy director of the Ship Survey Management Division of the Liaoning Maritime Safety Administration. Mr. Bai Gang was the monitor of the first training class for PSCOs in China, and he was also one of the initiators of Port State Control regime in China, a pilot project since 1986 in Tianjin port, located in the north of China, facing the Bohai Ocean. Fortunately, Mr. Bai Gang provided a certificate for the first training course which he has personally kept for approximate 24 years. This certificate indicates the time and courses arrangement for the first training programme, with appreciation of permission authorized by Mr. Bai Gang, I attached

a copy of this certificate (Figure 2 and Figure 3) hereafter with English translation.



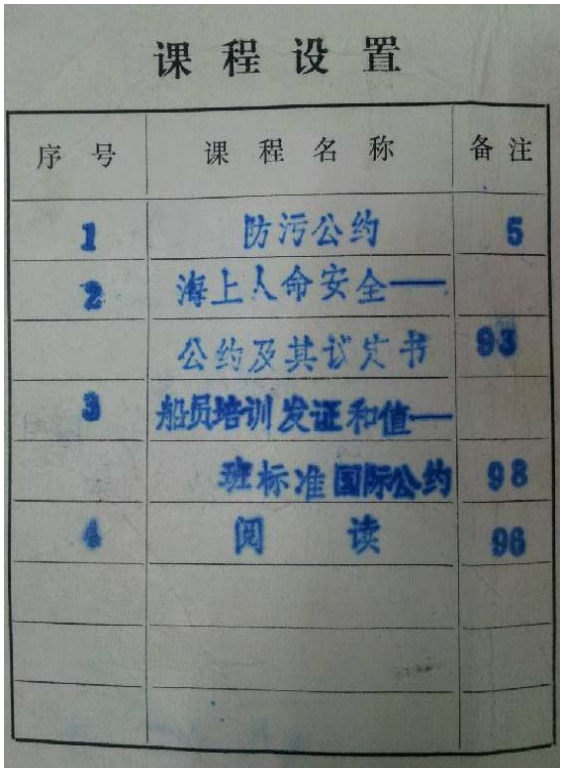
Certificate for Completeness

This is to certify that Mr. Bai Gang, has studied in Dalian Maritime University with a class of Port State Control from August 20, 1989 to December 20, 1989. Upon completing and passing all the required four courses, he is granted graduation.

Dalian Maritime University
(With Stamp)

December 20th, 1989

Figure 2: Certificate for Completeness of the first training course for PSCOs in China



Course Arrangements

Serial Number	Name of Course	Remarks
1	MARPOL Convention	5
2	SOLAS Convention	93
3	STCW Convention	98
4	English Reading	96

Figure 3: Course Arrangements of the first training course for PSCOs in China

Each of the first six training courses lasted for four months. However, from the seventh training course time of training was reduced to three months due to a regulation designed by China Maritime Safety Administration, stipulating that, the type of training should be changed from on-job to off-job if a training course last for over three months. As a consequence of that, participants would lose some allowance.

After the fourteenth training course, China Maritime Safety Administration withdrew the entrustment of PSCO training from Dalian Maritime University (DMU). It should be pointed out that, all the lecturers engaged in the PSC training programme were from Dalian Maritime University and they had professional knowledge in relation to the IMO instruments from the first to the fourteenth training course.

The fifteenth, sixteenth and seventeenth PSCO training courses were hosted by China Maritime Safety Administration but held in Qingdao, Xiamen and Shanghai respectively.

From the eighteenth training course to the twenty-fifth training course which was held last year, PSCO training courses were hosted by China Maritime Safety Administration in Dalian and those were held by the Liaoning Maritime Safety Administration, as a coordinator for those courses, PSCO training programme benefited me a lot.

In addition, the PSCO training courses mentioned above in 3.2 are all the basic training courses intended for the new entrant PSCOs. Besides those, China Maritime Safety Administration also held seminars and knowledge-updated training courses for existing PSCOs each year within China and sent PSCOs to participate in the PSCO exchange programme with other port states, such as Japan, Korea, Australia, New Zealand, Belgium, etc.

3.3 Contemporary training system for PSCOs in China

As mentioned in 3.2 of this chapter, training system for PSCOs in China can be divided into four types: Basic training, Knowledge-updated training, Seminar and PSCO exchange programme. According to *The Schedule for Training in 2013 of the China Maritime Safety Administration* (China Maritime Safety Administration, 2013), China MSA will host one training course for new entrant PSCOs in October and two training courses for existing PSCOs in June and July. Besides, China MSA will arrange the PSCOs exchange programme within PSC departments all over the

Maritime Safety Administrations in China from March to June of this year and will send PSCOs to Australia following the plan of PSCO exchange programme organized by secretariat of the Memorandum of Understanding on Port State Control in the Asia-Pacific Region (Tokyo MOU) and will nominate PSCOs attending the seminar held by Tokyo MOU.

According to the schedule mentioned above, PSCOs training system in 2013 coveres almost all the requirements raised in the last year by PSC departments in China. To be more specific, the Basic training course will last for 40 days, the Knowledge-updated training course will last for 10 days, and the PSCO exchange programme within China or with Australia will last for 2 weeks. All the lecturers attending the basic training course and the knowledge-updated training course are experienced PSCOs from the Maritime Safety Administrations or senior surveyors from China Classification Societies (CCS). Additionally, all the budgets or those training programmes are paid by China MSA.

The basic training course includes two parts: the first part will be the lectures in relation to IMO mandatory instruments, PSC inspection procedures, and experiences sharing by experienced PSCOs, this part will last for 35 days. The second part will be the empiric operational practice; this part will last for 5 days on aboard a training ship named M/V YU KUN of the Dalian Maritime University. The knowledge-updated training course mainly focuses on the new amendments of IMO instruments and the Concentrated Inspection Campaign (CIC) 2013 which is held by Tokyo MOU. The type of knowledge-updated training course will be lectures.

3.4 Review of training systems for PSCOs in other port state authorities or regional organizations on port state control

Training system is very essential for Port State Control Officers in whatever port state where the authority determines to carry out port state control upon foreign ships visiting their national ports. This study has reviewed the history and the current situations of PSCO training system in China in the previous chapters, in which some elements of training programmes were indicated. Next, this study will introduce some training systems for PSCOs in other port state authorities or regional organizations on port state control and it should be clarified at first that the reasons for choosing these designated authorities or organizations are mainly their impacts on PSC inspection from the perspective of the shipping industry, such as the International Chamber of Shipping (ICS).

3.4.1 Training system for PSCOs in the United States

Port State Control Officers in the United States of America (U.S.A) are subject to the United States Costat Guard (USCG) which is a branch of the United States Armed Forces and one of the seven United States uniformed services. In specific, USCG is a part of the Department of Homeland Security of the United States of America (Wikipedia, 2013).

There are three levels of PSCOs in the U.S.A: Ordinary PSCOs, Experienced PSCOs and Principal PSCOs. Training system for PSCOs in the U.S.A is one of the developed training systems for port state control officers all over the world. It has a character of modularization, hierarchicalization and menu-style structure in relation to training courses arrangement. For instance, the training course for new entrant PSCOs is composed of approximate 230 items which can be divided into three aspects: knowledge, skill and ability. The series of training materials have a name of

Port State Control Examiner Performance Qualification Standard (PSCE-PQS). Six steps should be followed if an employer wants to be a PSC Officer in the USCG. Firstly, candidates must be assigned to a Port State Control Billet (PSCB) and must be conducting PSC examinations as part of their primary duties. Officers, Civilians, Petty Officers in relation to PSC billet are eligible (USCG, 2013); Secondly, candidates must pass all of the training courses for PSC Officer which last for about 3 weeks in the facility of United States Coast Guard TRACEN Yorktown; Thirdly, candidates must grasp the precise requirements of Performance Qualification Standards Workbooks (PQSW) via 6 months on-job training; Fourthly, candidates must pass the operational examination; Fifthly, candidates must receive the qualification of spoken English onboard a ship and; Sixthly, candidates must get the port state control examiner or officer certificate signed by the commander.

PSC training system in the United States of America has three characteristics. The first one is that the USCG has a developed training regime which includes the training institutes, the syllabus and course arrangements, the standard training materials, the trainers, et cetera. The secondary characteristic is that the training course is taught using lectures, in-class and laboratory exercises, but emphasizes hands-on experience and procedures. The last one training is that course for PSCOs in U.S.A is in standardization, such as the PSCE-PQS for in-class training, the PQSW for on-job training, and the checklists for examining candidates.

3.4.2 Training system for PSCOs in Australia

Port state control is one of the strategies used to achieve the objectives of the protection of life and property at sea and the preservation of the marine environment; however, responsibility for the safety and operation of the vessels lies with

ship-owners and flag states (Australian Maritime Safety Authority, 2013). PSC inspection is carried out by surveyors in Australian Maritime Safety Authority (AMSA), but nevertheless, PSC inspection is only part of their job. In order to foster a high qualified surveyor team, AMSA has established an adequate training system, which can be divided into two types: the new entrant training and on-job training and the effectiveness of those training could be controlled through assessment, feedback and review (Gao, L. J., 2013, pp. 50-53). In order to explain the training system for PSCOs in Australia, hereafter this dissertation defines surveyor in AMSA in this chapter in narrow sense as PSC Officer.

3.4.2.1 Training for new entrant PSCOs in Australia

The training plan for new entrant PSC Officer in Australia is very specific. AMSA make a training plan based on the background of the majors of new entrant PSCO and the plan should reach an agreement between the new entrant PSCO himself / herself and regional manager before it is put into effect.

Concerning the trainer for a specific training plan, a trainer for ship inspection would be designated as a training tutor after the discussion between ship inspection manager and port state control working group two weeks prior to the training. The tutor would provide guide, suggestion and help for new entrant PSCOs and answer questions from them during the training period.

Training course for new entrant PSCOs consists of four modules, training time for each module will last for two to three weeks and the total training time will last for 10 weeks. Module 1 includes the introduction to the training and the familiarization with training. In the first week the new entrant PSCOs will be introduced basic

knowledge related to familiarization with accupational health and port state control officers' equipments, in the last week the new entrant PSCOs will accept some basic information about indicated region or port area. During the training of module 1, the new entrant PSCO will receive an assignment booklet which consists of 10 missions. Module 2 and 3 are one-to-one training. Module 2 will introduce information about PSC inspection according to knowledge background and working experience of specific PSCO, and then the new entrant PSCO will observe real PSC inspection activities. Module 3 is on-the-job training, in which the new entrant PSCO is requested to come up to the expectation of grasping relevant international conventions and Australian national law by observing more PSC inspections or participate PSC inspection activity as a candidate. Module 4 is training in a place called School of Surveyors where the new entrant PSCOs from different regions can communicate with each other to enhance their abilities of PSC inspection. Of course, new entrant PSCOs should review knowledge and skills acquired during the training course so that they can finish their missions in the assignment booklets.

3.4.2.2 Training for existing PSCOs in Australia

On-job training is required for the existing PSCOs in Australia. The annual on-job training course is designed based on the amendments of international conventions and Australian national laws, the trend of PSC inspection, the assessment of work of PSCO and feedback and feed-forward of PSC activities. PSCO seminar is one type of on-job training, which will is offered one or twice per year by AMSA and mainly focuses on skills of PSC inspections with emphasis on operational practice. Additionally, AMSA provides special training courses for some PSCOs, such as coordinator of accident, ISM auditor, seafarer examiner, etc. and third party training course for PSCOs who have no certificate of completion in ocean-going ship survey

field. The aim of third party training course is to help existing PSCOs understanding the influence of maritime conventions and other mandatory instruments on PSC inspection activity.

3.4.3 Training system for PSCOs in Japan

Statistics from the Memorandum of Understanding on Port State Control in the Asia-Pacific Region show that there are 131 dedicated and 54 non-dedicated PSC Officers working in 10 District Transport Bureaus (and 1 Okinawa General Bureau) and 50 Transport Branch Offices and Maritime Offices (Tokyo MOU, 2012). And there are three levels of PSC Officers (principal PSCO, senior PSCO and PSCO) in every District Transport Bureaus under the Ministry of Land, Infrastructure, Transport and Tourism of Japan (MLIT). Information of national arrangement for PSC also provided the Organization Structure for PSC in Japan (Figure 4). It is interesting that PSC Officers in local office are not under the charge of the Port State Control Office in General Affairs Office of the Maritime Bureau of the MLIT from the view of administrative governmental organizations. But PSCO training system in Japan is very effective and efficient in such inconvenient situation of organization structure.

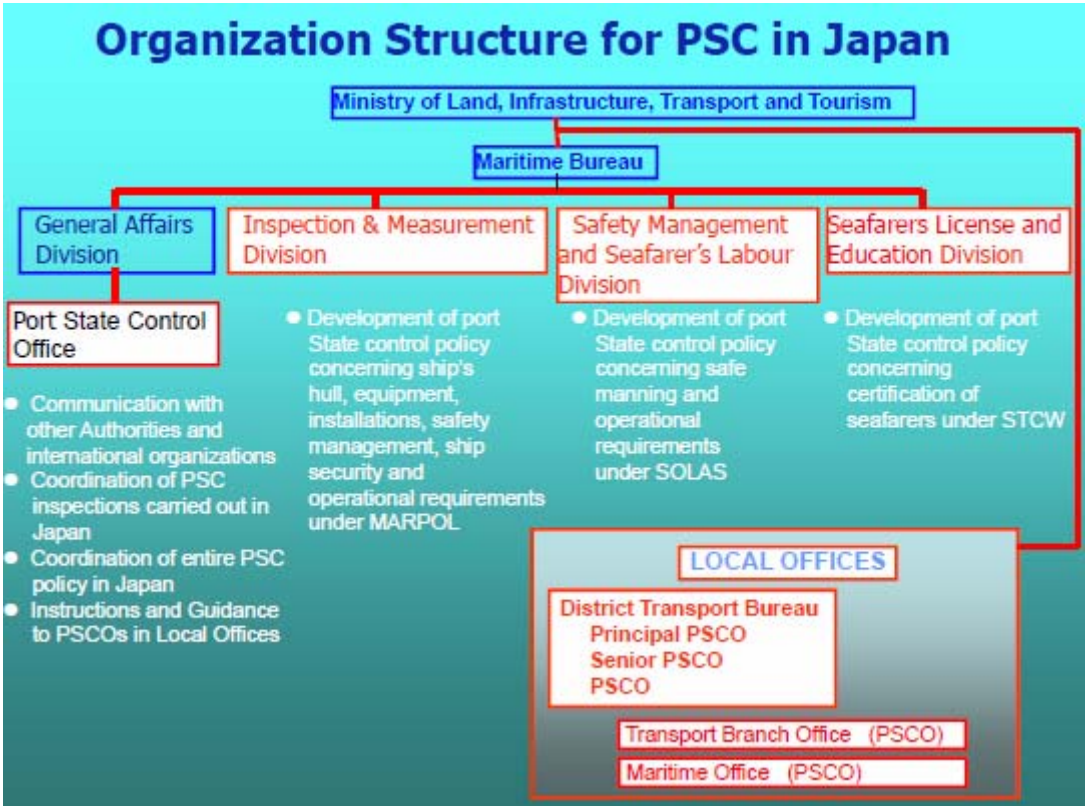


Figure 4: Organization Structure for PSC in Japan

(Source: National arrangement for Port State Control of members, 2103, Tokyo MOU)

Port state control was initiated in Japan in 1983 and it became a special work in 1997 (Ministry of Land, Infrastructure, Transport and Tourism of Japan, 2013). Nowadays, Japanese government has arranged three types of training for PSCOs in general – the basic training programme, the refresher training programme and the PSCO exchange programme. The basic training programme is held by the Maritime Bureau of the MLIT and provided for new entrant Port State Control Officers in Yokohama. The courses of basic training programme are mainly composed of International conventions, IMO mandatory instruments, PSC procedures, basic knowledge of ship survey and certification and so on. After the in-class lectures, new entrant PSCOs

will be sent to local ports to participate in PSC inspection as candidates. The refresher training programme is offered to the experienced PSCOs by local PSC office of District Transport Bureau. This kind of training programme includes seminars or lectures on new amendments of relevant mandatory instruments and new guides on specific aspect of PSC inspection. The refresher training programme is conducted by Trainer PSCO, which means the Principal PSCO or the Senior PSCO in most time, shares his studies or experiences to harmonize the technical level on carrying out PSC inspection for a specific PSCO. The PSCO exchange programme in Japan is quite different from that in other port states including China. As a part of training system, the PSCO exchange programme adopts a policy that the PSCOs in Japan have to move to another port every 2-3 years to continue their jobs, in other words, they must leave a working place within 3 years even though they are still working as PSCOs in Japan.

3.4.4 Training system for PSCOs in Tokyo MOU region

Tokyo MOU is the third signed regional organization of memorandum of understanding on Port State Control which was established in 1994 with 18 member authorities including China. According to the new integrated strategic plan for Technical Cooperation Programme (TCP) for the years from 2011 to 2015, three components - training, harmonization of PSC procedures and update of knowledge – are inclusive (International Maritime Organization, 2011). Those three parts of TCP can be regarded as three sub-groups of a training system because enhancing the consistent level of technical on PSC activity in the MOU region is the finality of these arrangements.

3.4.4.1 Training

Training is aiming to provide PSCOs with the opportunity to learn about knowledge or skills of PSC which has three types, the General Training Course (GTC), the Specialized Training Course (STC) and the Expert Mission (EM) in the Tokyo MOU region. The GTC is designed to train PSC officers by providing them with comprehensive basic knowledge on PSC. The STC is designed to provide PSC officers with an opportunity to acquire in-depth knowledge and experience in a specialized field. And the EM is designed to assist an Authority intending to organize a national training.

3.4.4.2 Harmonization of PSC procedures

The goal of harmonization of PSC procedures is to share experience and expertise among PSCOs and Authorities in order to promote harmonization of port State control procedures through PSCO Exchange (PEX). The programme is a bilateral exchange scheme among the participating authorities: each authority sends its PSCO to another authority in exchange for receiving a PSCO from a different authority.

3.4.4.3 Update of knowledge

Update of knowledge is to keep PSCOs updated of expertise on PSC with a type of training course – the Seminar, which is to provide a forum for exchanging views and experiences of PSCOs of member authorities to enable them to update their technical knowledge of PSC procedures including guidelines of the concentrated inspection campaign of the current year. The Seminar is held in a different country on an annual basis by the secretariat of the Tokyo MOU.

3.4.5 Training system for PSCOs in Paris MOU region

As the first regional organization on port state control, Paris MOU provides various training courses and seminars which are organized by national Maritime Authorities, the European Maritime Safety Agency (EMSA) and the Secretariat of the Paris MOU for PSCOs to ensure effective and harmonized inspection procedures which are followed throughout the Paris MOU region (Paris MOU, 2010).

The training policy in Paris MOU region consists of two parts, one for new entrant PSCOs and the other for experienced PSCOs (International Maritime Organization, 2011). For new entrant PSCOs a framework was developed to ensure that all relevant knowledge and practice is included in the training before a PSCO is authorized by a member Authority to perform the Syllabus of Competence (SOC) for new entrant PSCOs. The Professional Development Scheme (PDS) for PSCOs has been developed to give member Authorities a standard for the level of competence of PSCOs within their Administration. Following framework for PSCO training mentioned above, the Paris MOU had hosted many training programmes in its region, for instance, IMO meeting document of PSCWS 5/9/5 displayed training programmes that were provided between January 2010 and March 2011.

(1) EMSA/Paris MOU New Entrant Programme;

(2) EMSA /Paris MOU Refresher Programme;

(3) 4th Specialized Training on Bulk Cargoes;

(4) Paris MOU PSC Seminar 50;

(5) Paris MOU Train-the-Trainer Course for the CIC on Tanker Damage

Stability;

(6) Training on the New Inspection Regime (NIR) and THETIS;

(7) Paris MOU BI tool/ Report Builder Training for Advanced Users;

(8) Paris MOU 10th Expert Training on the Human Element; and

(9) Paris MOU 9th Expert Training Safety and Environment.

3.5 The advantages and disadvantages of training system for PSCOs in China

Based on analysis of training system for PSCOs in China and some other port state authorities and regional organizations on port state control, this dissertation tries to identify the advantages and disadvantages of contemporary PSCO training system from five aspects - the logistics, the types of training, the trainers, the trainees and the assessment of training.

Logistics is the essential ingredient for a training system which comprises budget, teaching materials and place for training in a certain sense. China Maritime Safety Administration has afforded adequate budget on PSCO training programmes in 2013 according to *The Schedule for Training in 2013 of the China Maritime Safety Administration*, is about 1,316,000 RMB. But teaching materials is far behind a detailed teaching syllabus like Part C of the IMO model courses (International Maritime Organization, 2001). And the operational practice place for basic training course is on the training ship M/V YU KUN of the DMU, which is not sufficient for new entrant PSCOs who have no experience of onboard work because the training ship has no cargo holds and relevant equipments.

The types of training for PSCOs in China have covered almost all programmes established in Tokyo MOU region, such as the basic training, the refresher training, the PSCO exchange programme, the seminar, etc. But to date the E-learning technology, which is very convenient and very abstemious, has not been used for PSCO training system.

Regarding the trainers, fortunately, PSCO training programme could invite senior PSCOs and experienced surveyors to teach the trainees. But on the contrary, the trainer team is not stable which would lead to the inconsistent result of training for a specific training programme because of the chaotic teaching materials organized.

A trainee is the terminator of a training system for PSCOs. The advantage is that most of them have received high education in relation to maritime engineering; the disadvantage is that most of them had no experience as a ship surveyor, a master, a chief mate or a chief engineer. But there is a serious problem according to statistics that the percentage of trainees involved in the basic training course to be the PSCOs is only approximate 20% - the number of existing PSCOs is 289 and the number of trainees is over 1500 (from the first to the 25^{th} basic training course). The issue is the waste of training resource and the poor management for nominating trainees.

Unfortunately, when it comes to the assessment of training system, there is no precise measure on assessing the effectiveness, the operability, the applicability of the logistic, the type of chosen training, the trainer and the trainee in a specific training course. Of course there is no uniform criteria for assessing each component of a training system.

Chapter IV: Theories on training system

This chapter will introduce some theories or concepts on training system to theoretically optimize the current training system for PSCOs in China. Given the specific training system is being studied of this dissertation, theories on training system will mainly focus on open and closed system, feed-forward and feedback of a system behavior, and the effect of training and the training design basics.

4.1 Open System and Closed System

Gerald M. Weignberg stated that “A system is a way of looking at the world” (Weignberg, G. M., 1975, p.105). System can be divided into two types: the open system and the closed system. The closed system is like a crystal – nothing enters and nothing leaves. By contrast, the open system continuously interacts with its environment or surroundings. Figure 5 from Wikipedia illustrates the model of open system. Training system is one kind of open systems, so that its reality materializes in external links and in distinction between the open system and its environments. Based on consideration above, training system for PSCOs in China should not only take into consideration on the internal elements such as the trainer, the trainee, the teaching materials and the timetable arrangement but also the external elements such as the logistics, the demands of real workload, etc.

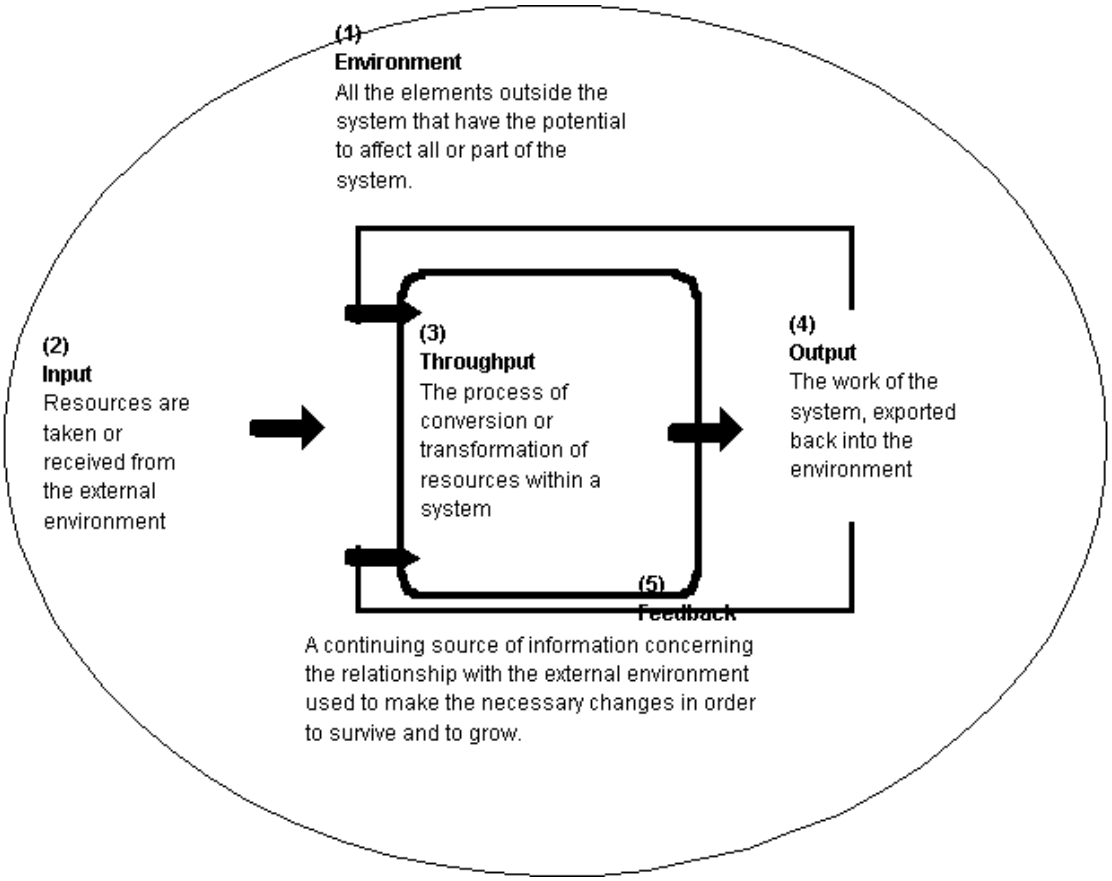


Figure 5: The model of open system

(Resource: Wikipedia, http://en.wikipedia.org/wiki/File:Basic_Open_System_Model.gif)

4.2 Feedback and Feed-forward for a system behavior

Dr. Raphaël Baumler (Baumler, R., 2013) supplied a figure (Figure 6) to describe control systems in his lecture handout. There are three loops of control system: loop (a) shows the simple control system which has no adjustment or anticipation signal so that the disturbance may invalidate the output or damage the system; loop (b) has a feed-forward in the phase of input which will add information extracted from disturbance to the input for system adjustment; loop (c) has a feedback from the output to the input of a system which will provide information taken from the output

for continuous adjustment to the stable output. Training system for PSCOs in China also has disturbance in internal and external. In order to maintain a continuous stable output of training system for PSCOs, the impacts of feed-forward from the training design and feedback from the training review should be considered.

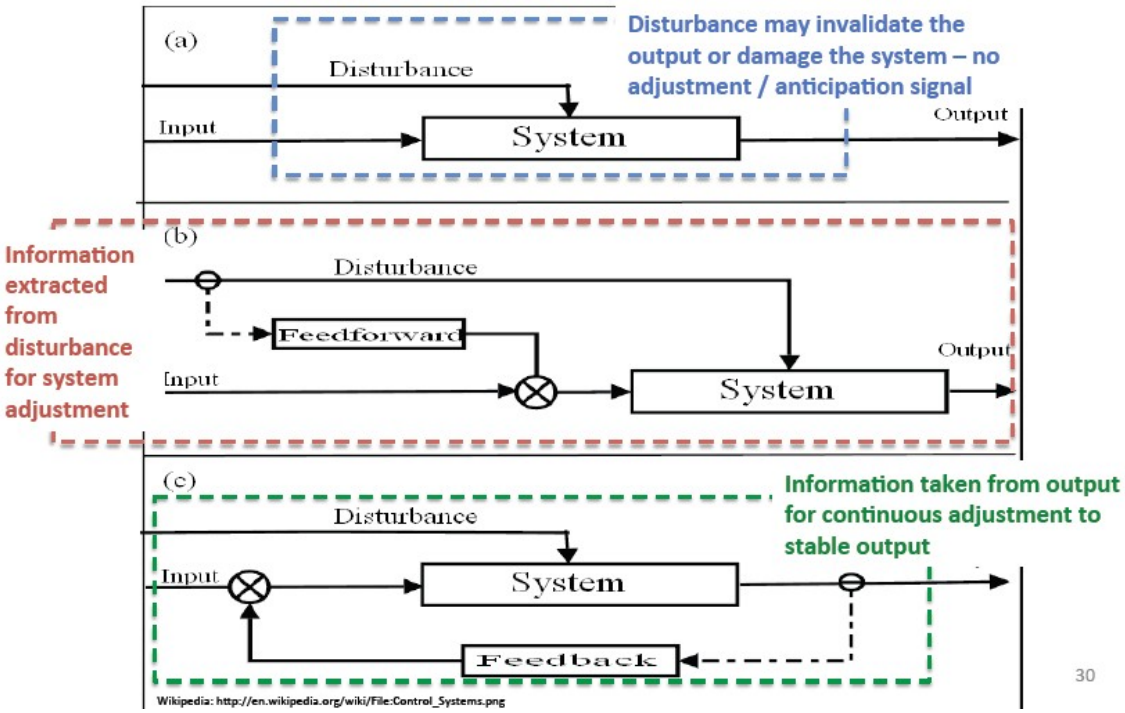


Figure 6: The impacts of feedback and feed-forward on system behavior

(Resource: Baumler, R., 2013, System Approach, p. 30, Unpublished lecture handout, World Maritime University.)

4.3 Effect of Training

Why do we need training? Figure 7 has explained the answer to this question specifically – progress from novice to an expert (Baumler, R., 2013). In conscientiology, the activity of control from novice to expert is from consciousness to subconsciousness, which means that the activity of control of a novice is quite

difficult while that of an expert is quite natural. This change benefits from training which provides a way of inputting gradual building of expertise to a system. The PSCOs have special obligations and rights so that they need to master lots of knowledge and skills to do their jobs like experts rather than novices. Training is the right way to help PSCOs acquire consolidated expertise in relation to port state control activity. Of course, the training system for PSCOs in China has the same goal.

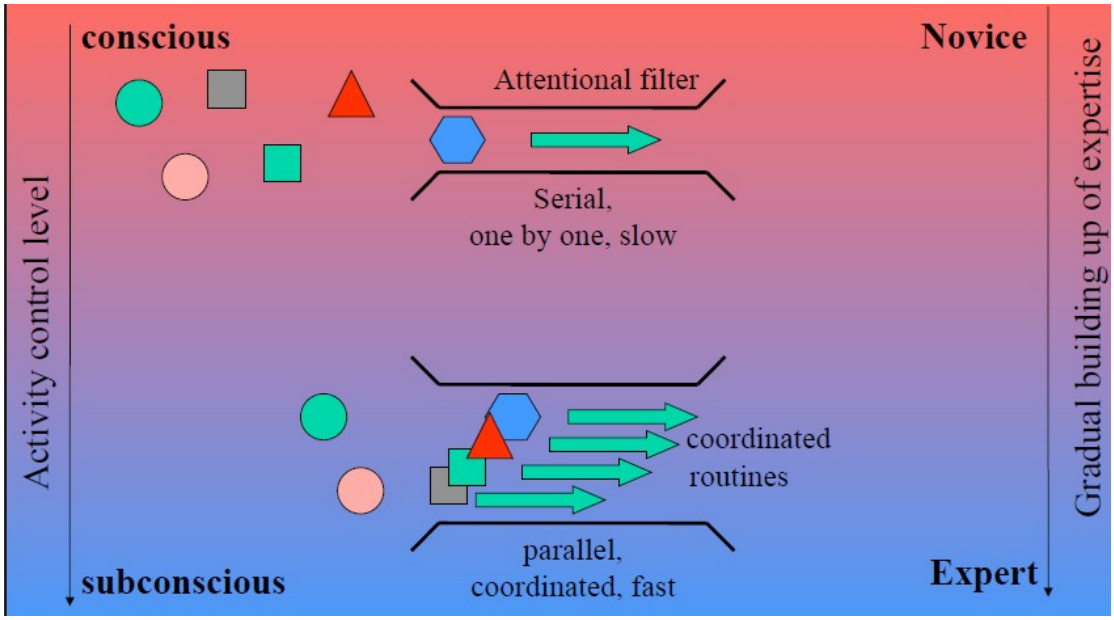


Figure 7: The effect of training

(Resource: Baumler, R., 2013, Error Performance, p. 50, Unpublished lecture handout, World Maritime University.)

4.4 Training Design Basics

Saul Carliner listed 38 Basic Rules of training design in his famous book "*Training Design Basics*" (Carliner, S., 2003, pp.1-13). Those basic rules have benefited a lot of training designers in many fields. Here this dissertation would like to narrate his

ideas on basic principles of training design which I believe are useful when it comes to designing the training system for PSCOs in China.

The first set of basic principles is the essentials of human performance improvement. One of the essentials is that all training programmes must produce measurable improvements in human behavior. Sometimes these improvements in behavior offer tangible benefits, for example, new entrant PSCO has the ability of doing right job to defend the rights of a port state. The second essential of human performance improvement is that training programmes must address the gap between current and ideal performance. And the third essential is that training might not fill the performance gap. Taking a training programme alone does not always result in measurable changes in workplace behavior, in other words, not all performance problems can be solved through training.

The second set of basic principles is that when designing and presenting training programmes, we must treat adult learners like adults. Mr. Saul Carliner pointed out seven must-follow principles of adult learning.

(1) Adult learning is andragogy, not pedagogy;

(2) Adult learners are pressed for time;

(3) Adult learners are goal oriented;

(4) Adult learners bring previous knowledge and experience;

(5) Adult learners have a finite capacity for information;

(6) Adult learners have different motivation levels; and

(7) Adult learners have different learning styles.

Therefore when designing training system for PSCOs in China, it should not be neglected that PSCOs as adults enter training with experience, with preconceived notions of the subject and with other needs.

Chapter V: Measures to optimize of training system for PSCOs in China

According to the qualifications of a PSCO mentioned in Chapter II and the analysis of existing training system for PSCOs in Chapter III and theories on training introduced in Chapter IV, this Chapter will discuss specific measures on optimizing the training system for PSCOs in China from the following 6 aspects.

5.1 Policy of training system for PSCOs in China

In general, the policy of training system for PSCOs in China shall be performance-oriented or goal-oriented. As we know, the PSCO billet is one kind of legislation enforcement with power. As a consequence, it is very attractive for staff working in Maritime Safety Administrations in China. In a certain sense, PSCO is the good among the great in the officials' team of legislation enforcement in China MSA. The traits of trainees, whether new entrant PSCOs or experienced PSCOs, are adult learners with good educational backgrounds and enough working experience related to maritime administration. However, PSCO training system is an open system as mentioned in Chapter IV. Consequently, the external factors should also be considered at the top-level of training design. Therefore, on the one hand, the policy

of training system could be to enhance harmonization and standardization of the knowledge and proficiency of PSCOs in China. On the other hand, the reasonable distribution of the training source - the logistics, the trainees and the trainers - should be well arranged.

5.2 Logistics of training system for PSCOs in China

Logistics is the guarantee of reasonable outcomes of training system for PSCOs in China. Here logistics will be defined as an aggregate of the budget, the training materials, and the place for training.

With the change of regulation of governmental finance, the budget for human resource in China Maritime Safety Administration has become more transparent and more precise. It is interesting that the budget of training for PSCOs is not calculated by the Financial Department or the Human Resource Department of China MSA, but by the Ship Control Division which has the responsibility for PSCOs management. The budget is then submitted to the Financial Department after the ratification of General Director. In this circumstance, my suggestion is that we should pay attention to the budget itself not to the bureaucratic procedures. The annual budget for PSCO training should comprise the expenditure of the transportation and the daily consumptions of the trainers, the trainees and the staff of training management, the fee of the training materials, the payment of the classroom and/or the place for practice at least.

Training materials for PSCOs in China are chaotic as mentioned in Chapter 4. The reason for in this situation is that there are no module courses for PSCO training, especially for new entrant PSCO training. Also as indicated in the previous chapters,

IMO has provided module courses for PSCO training, but unfortunately, to date China MSA has not adopted those module courses in training system. Another reason for chaotic training materials maybe is the unstable trainer team. China MSA has no special trainer team in PSCO training field. A trainer is nominated for a specific training programme just about 1-2 months before indicated training course. Trainers for some subjects of new entrant PSCOs training course might be changed every year. My suggestion for training materials is that China MSA should set a Syllabus of Competence for new entrant PSCOs and adopt the IMO module courses with amendments. After that, China MSA could organize some experts from Maritime Safety Administrations or Classification Societies or Universities to develop module courses for PSCOs in China and establish a procedure for amending those module courses.

Place for training is also very essential for trainees because environmental factors would impact on the effectiveness of a training course. The current pattern is that all of the lectures and discussions are arranged in the meeting room of the designated hotel which I think is the best arrangement with no need to change. However, with regard to the operational practice place for the new entrant PSCOs, I believe that visiting the M/V YU KUN is very useful but is not good enough. It is known that a PSCO should inspect all types of ships calling his/her ports, so that he/she needs more types of ship to visit when he/she takes his/her practice course during the training to get the reality impression of what he/she has learnt in class. My suggestion for choosing operational training place has two options. The first one is to arrange more kinds of ships for visiting but due to the limitation of budget and the consideration of safety of trainees, the operational practice could be held mainly on M/V YU KUN, then visiting some different kinds of ships briefly. The other option is to establish a simulator system in virtual space or to make an agreement with related

laboratory in university or research institutions to provide the opportunity of practicing for new entrant PSCOs.

5.3 Types of training system for PSCOs in China

George Piskurich (Piskurich G., 2003, p. 5) states in his famous book *Trainer Basics* that training methods include classrooms, self-instruction, job aids, video, computers, satellites, e-learning, electronic performance supports systems, virtual reality, so on and so forth. And he also indicated that training is all about gaining the knowledge or expertise to achieve some specific skill or goal.

Types of training system for PSCOs in today's China have been mentioned in Chapter III, which include basic training for new entrant PSCOs and updated training for existing PSCOs. In the recent years, China MSA has developed its PSCO training system at rapid speed and the training system is more cooperative with the technical cooperation strategy of the Tokyo MOU. But there is a phenomenon that all the types of the training system for PSCOs in China are the face-to-face training which will consume much budget of the transportation, the hotel and meeting room rent and the catering, etc. The limitation of budget may result in the ratio of coverage of training for PSCOs, especially for the existing PSCOs, could not achieve 100%. The worse situation is that updated training course would be provided usually once per year for specific PSCOs and most existing PSCOs might have not enough opportunities to attend the seminars and PSCO exchange programmes. Therefore, from my perspective, there is a blank space for continuous refreshing of expertise for the existing PSCOs in China.

Correspondingly, my suggestion for the measures on optimizing the types of training

is introducing the e-learning tool as the supplement into the current training system for PSCOs in China. There are many options for introducing the type of e-learning, for instance, establishing a user group of QQ, initiating a user group of Weichat or constructing a database for PSCOs in the internal network, and so on. E-learning tool has the advantages of convenience, speediness, thriftiness and high coverage rate, which could provide not only the daily refreshing of expertise related to the port state control activities for existent PSCOs but also the materials for preview for new entrant PSCOs before they attend the training course. In addition, there is a key point for the effectiveness of e-learning tool that the section chief for PSCO in the headquarters of China MSA must nominate a particular official to manage the platform of e-learning to ensure the accuracy and the validation of materials put on the platform for sharing within the PSCOs.

5.4 Trainers of training system for PSCOs in China

The trainer team for PSCOs in China is not very stable as mentioned in the previous Chapters. And almost all the trainers of the trainer team who are nominated for a specific training, for new entrant PSCOS in particular, came from the Maritime Safety Administrations because they are Subject Matter Experts (SME) in relation to port state control activity.

My suggestion for the nomination of trainers consists of two aspects, for the basic training course and for the refresher training course. The basic training course is provided for the new entrant PSCOs, of which the members of trainer team should be more stable due to the chaotic training materials used and be composed of SMEs from the Maritime Safety Administrations, the Universities, the Classification Societies because of the theoretical knowledge of security, safety and environmental

protection needed. However, sometimes the professors from university or the surveyors from the classification society have much more abilities relevant to maritime safety matters than SMEs from the Maritime Safety Administrations. For the refresher training course, I would like to introduce the “train-the-trainer” concept into the training system. As mentioned above, the refresher training course is composed of the updated training programme, the seminar, the PSCO exchange programme and so on; however, the coverage rate of refresher training could not reach 100 percent for various reasons. Therefore, in some cases, the training system for refresher should adopt the “train-the-trainer” regime when it is at the stage of top-level design of training system for PSCOs in China. This regime can guide the trainees in refresher training course to be the “trainers” after they finish their training course. The “train-the-trainer” regime is not only letting trainees share their experiences acquired in the refresher training course briefly, but arranging them to train their colleagues following the way they were trained.

5.5 Trainees of training system for PSCOs in China

Table 2 shows the classic classification of apprentices according to Mr. George Piskurich (Piskurich G., 2003, p. 5). Following this classification, in the training system for PSCOs in China, they are trainees if they are trained in the basic training course, they are learners if they are trained in the updated training course and they are participants if they are trained in the seminar and the PSCO exchange programme. But nevertheless, for the sake of convenience, all of the trainees, the learners and the participants are named “trainees” in general in this dissertation. According to the analysis mentioned in Chapter III and the requirements of being a PSCO indicated in Chapter II, the key problem for trainees is the waste of training sources or the management of nominating trainees.

My suggestion for this issue is to establish a tracing regime of the trainees. This regime is very simple but based on the reality in the context of governmental organizations arrangements in China, which has four steps: firstly, the Maritime Safety Administrations that nominate trainees to attend basic training course shall establish a database of all trainees; secondly, the indicated Maritime Safety Administrations shall add working positions of trainees during the following 2-3 years; thirdly, the indicated Maritime Safety Administrations shall reporte the database to the headquarters of the China MSA for analysis; lastly, China MSA shall add the feed-forward factor to the training-system based on the feedback from the trainee's tracing regime to influence the inputs of training system for PSCOs in China.

The trainee's tracing regime may receive a good expectation of reducing the waste of training sources and enhancing the management of nominating trainees following the specific qualifications of being a PSCO. But to be honest, this regime might bring the reduction of budget for PSCO training programmes from the top level design of training system in China MSA due to the decrease of the number of trainees which results from the stricter requirements of trainee's nomination. How to solve the contradiction is still in dispute for the research in my dissertation.

Table 2: The classification of apprentices

Name	**What the name may mean to you**	**What this person may actually do**
Attendee	Someone who shows up on	Shows up, maybe

	time	
Audience	Someone who will laugh and clap for you	Pays attention, if entertained
Student	Someone who will behave like a child	Keeps quiet, takes notes, and answers questions if you ask first
Trainee	Someone who expects to be trained	Waits to be taught
Participant	Someone who takes an active role in training	Interacts with others and shares ideas when asked
Learner	Someone who is looking for value from your class	Shares ideas willingly and leaves with information that he or she can apply back in the workplace

(Resource: Piskurich G., 2003, *Trainer Basic*, p. 5, American Society for Training and Development.)

5.6 Assessment of training system

Training system for PSCOs in China is an open system as mentioned in Chapter IV. Therefore, review and assessment of PSCO training system should focus on the input and outcome of training-system and training-system itself rather than only on training-system itself.

My suggestion on this topic has two parts, assessment of the input and outcome of the training system and assessment of training-system. For the first part, the input and outcome of PSCO training system are composed of the logistics, the nomination of the trainers and trainees, and the ability in relation to PSC billet of the trainees acquired from the training programme. The method of assessment of the input and

outcome can be implemented by answering the following questions.

- Is the budget adequate for the training programme?
- Are the training materials suited for the training programme?
- Is the place appropriate for the training programme?
- Is the procedure for nomination of the trainers followed well?
- Is the members' team of trainers stable for the training programme?
- Is the procedure for nomination of the trainees followed well?
- Are the trainees satisfied to PSC inspection activities as the goal mentioned in the training plan?

For the second part, assessment mainly emphasizes on training-system itself, which includes the organization of lecture, the management of facilities, the monitoring of trainees, the coverage and conformity of the training syllabus, the organization of examination, and the feedbacks of the organizations, the trainers and the trainees. Assessment of training-system can be conducted by addressing the following questions.

- Are the lectures complied with the training syllabus or not?
- How about the organization of lectures?
- How about the management of facilities?
- Is the examination organized well?
- What is the most favorite subject? And why?
- What is the least favorite subject? And why?
- Who is the most popular lecturer? And why?
- Who is the least popular lecturer? And why?

Chapter VI: Conclusion

Training aims to make a novice become an expert as mentioned in Chapter IV, PSCO needs professional knowledge and skills to fulfill the position of port state control; therefore, training system is very important for PSCOs in China. This study has identified the specific requirements of being a PSCO and introduced the historical training system for PSCOs in China and its development, and the training systems in other port state authorities and regional organizations, such as the USCG, Australia, Japan, Tokyo MOU and Paris MOU.

In order to analyze the situation of current PSCO training system in China, some theories or concepts, for instance, open and closed system, feed-forward and feedback for system behavior, effect of training and training design basics are introduced into the top-level of optimizing training system.

Based on discussions from six aspects on how to optimize the current training system for PSCOs in China, this study has given some suggestions:

(1) PSCO training system is an open system as mentioned so that the external factors should also be considered at the top-level of training design.

(2) Logistics is the guarantee of reasonable outcomes of training system for PSCOs in China, so that the budget, the training materials, and the place for training must be well arranged.

(3) Introducing the e-learning tool as the supplement into the current training system for PSCOs in China is a good option for saving the training budget and expanding the range of training.

(4) The trainer team for PSCOs in China should be more stable and should consist of experts not only from the Maritime Safety Administrations but also from the Universities, the Classification Societies. In addition, train-the-trainer is a good concept which should be introduced for establishing the trainer team.

(5) The trainee's tracing regime may receive a good expectation of reducing the waste of training sources and enhancing the management of nominating trainees following the specific qualifications of being a PSCO.

(6) Assessment of PSCO training system should focus on the input and outcome of training-system and training-system itself rather than only on training-system itself.

Reference

Australian Maritime Safety Authority. (2013). *Port State Control in Australia*. Retrieved May 26, 2013 from the World Wide Website: http://www.amsa.gov.au/shipping_safety/Port_State_Control

Baidu. (2013). *China Coast Guard.* Retrieved May 25, 2013 from the World Wide Website: http://baike.baidu.com/view/10248987.htm?fromld=10247639

China Maritime Safety Administration. (2002). *The regulations on PSCO and FSCO management.* No. 178. 2002. Ship Control Division. China Maritime Safety Administration.

China Maritime Safety Administration. (2012). *The plan for constructing, studying and practicing "four-type Maritime Safety Administration" within all Maritime Safety Administrations in China*. No. 668. 2012. China Maritime Safety Administration.

China Maritime Safety Administration. (2013). *The Schedule for Training in 2013, China Maritime Safety Administration.* No. 103. 2013. Human Resource and Education Division, China Maritime Safety Administration.

Dalian Maritime Safety Administration. (1995). *The History of Dalian Maritime Safety Administration.* p. 40. ISBN7-80555-966-X/F.91. Dalian Press. Dalian, China

Gao Lijun. (2013). *Training management of and technical support to AMSA surveyors.* pp. 50-53. *China Maritime Safety*. 2013 No.4. Editorial Office of China Maritime Safety. Tianjin, China

George Piskurich. (2003). *Trainer Basics*. p. 5. American Society for Training & Development. ISBN: 1-56286-350-9

International Maritime Organization. (2001). *Model Course 3.09: Port State Control*. IMO Publication. TA309E. London

International Maritime Organization. (2011). *Procedures for port state control, 2011*. p.6. A 27/Res.1052

International Maritime Organization. (2011). *Procedures for port state control, 2011*. pp.7-8. A 27/Res.1052

International Maritime Organization. (2011). *Training activities of the Tokyo MOU.* Tokyo MOU. PSCWS 5/9/3

International Maritime Organization. (2011). *Training for port State control officers (training policy).* Paris MOU. PSCWS 5/9/4

International Maritime Organization. (2013). *Port State Control.* Retrieved May 28, 2013 from the World Wide Website: http://www.imo.org/ourwork/safety/implementation/pages/portstatecontrol.aspx

Ministry of Land, Infrastructure, Transport and Tourism of Japan. (2013). *Port State Control in Japan.* Retrieved May 27, 2013 from the World Wide Website: http://www.mlit.go.jp/maritime/safetyenv/psc/01.html

Paris MOU. (2010). *Port State Control Officer. About us.* Retrieved May 28, 2013 from the World Wide Website: http://www.parismou.org/Organization/About_us/2010.12.28/Port_State_Control_Officer.htm

Raphaël Baumler. (2013). *Chapter 2: System approach.* p. 30. Unpublished lecture handout. World Maritime University. Dalian.

Raphaël Baumler. (2013). *Chapter 5: Error performance*. p. 50. Unpublished lecture handout. World Maritime University. Dalian.

Saul Carliner. (2003). *Training design basics*. pp. 1-13. American Society for Training and Development. ISBN: 1-56286-348-7

Tokyo MOU. (2012). *National Arrangement for PSC. Administrative*

Information. Retrieved May 27, 2013 from the World Wide Website: http://tokyomou-private.org/mou/members/administrative_information/national_arrangement_for_psc.php

United States Coast Guard. (2013). *Port State Control. Training Quota Management Center.* Retrieved May 25, 2013 from the World Wide Website: http://www2.tracenpetaluma.com/tqc/cschool_selectC.asp?cc=501864&c=30

Weinberg, G. M. (1975). *An introduction to general systems thinking.* p. 105. New York: Wiley

Wikipedia. (2013). *History. Port State Control.* Retrieved May 13, 2013 from the World Wide Website: http://en.wikipedia.org/wiki/Port_state_control

Wikipedia. (2013). *Open system model (basics).* Retrieved May 31, 2013 from the World Wide Website: http://en.wikipedia.org/wiki/File:Basic_Open_System_Model.gif

Wkipedia. (2013). *United States Coast Guard.* Retrieved May 25, 2013 from the World Wide Website: http://en.wikipedia.org/wiki/United_States_Coast_Guard