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WORLD MARITIME UNIVERSITY

Dalian, China

**STUDY ON APPROACHES OF PROMOTING
THE MODERN MARITIME VOCATIONAL
EDUCATION IN CHINA:
STAKEHOLDER ROLE AND RESPONSIBILITY**

By

Shi Xiaolei

The People's Republic of 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 SAFETYAND ENVIRONMENTALMANAGEMENT)

2017

DECLARATION

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

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

(Signature): Shi Xiaolei

(Date): June 29, 2017

Supervised by: Bao Zhongjun

Professor

Dalian Maritime University

Assessor: _____

Co-assessor: _____

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Time flies, one and a half years has already been passed. After five years I went into the campus again, becoming attached to the World Maritime University and Dalian Maritime University. Everything is the best arrangement. During the one and a half years, I went through the tests of 18 courses and suffered from the coldness in the northeast of China, during which nobody but only I can understand the difficulties.

The more you pay, the more you will gain. I was proud that I could resist the pressure. I finished all of my homework and examinations successfully under the condition of my weak English foundation, which greatly enhanced my self-confidence, allowing me to overcome the difficulties in the future life and work. I always believe that diligence can make up one's dullness and a slow sparrow should make an early start. maybe I am not sailing professional, maybe my English level is low, but with the help of the professors, instructors and classmates, I can do the best.

In the process of writing the thesis, thanks to the meticulous guidance of the instructor Professor Bao Zhongjun, I avoided a lot of detours. I deeply admired Professor Bao's great achievements of the international convention and the deep understanding of the latest development of shipping. He gave me lots of important suggestions from the overall and detailed aspects, so that I could adjust my thinking in time and complete my thesis successfully. Here I'd like to express my heartfelt thanks once again.

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broaden my international perspective, which will become the most valuable wealth in the future. At the same time, I'd like to express my gratitude to the three teachers for our class, including Wang Yanhua, Bao Zhongjun and Zhao Jian. As a bridge, they shortened the distance between Malmö and Dalian.

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ABSTRACT

Title of Dissertation: **Study on Approaches of Promoting the Modern
Maritime Vocational Education in China:
Stakeholder Role and Responsibility**

Degree: **MSc**

China is not only a big ocean and shipping power, but also a great power with lots of crew. The crew played an important role in building the maritime power, promoting the "the Belt and Road", serving the Yangtze River economic belt, strengthening the development of water transportation and so on. It has made outstanding contributions to China's national economy and social development as well as an important strategic resource for our country.

China's government has always attached great importance to the development of the crew. China always adheres to the people-oriented concept, strengthens the legal construction of law and regulations system, protects the legitimate rights and interests of the crew, promotes the quality of the crew, enhances great social atmosphere of respecting, caring for and loving the crew which promotes the growing of the crew and safeguarding the healthy development of the shipping industry forcefully.

With the further development of economic globalization, the shipping industry will play a more important role in economic development and social progress. Maritime vocational education shoulders the responsibility to cultivate specialized talents of navigation, and plays a basic, overall and guiding role in the development of the shipping industry.

"China crew development plan (2016-2020)", issued by Ministry of Transport of the People's Republic of China (referred to as MOT) clearly stated that by 2020, the overall goals of the development of our crew are that the crew training system will be more complete, the market mechanism will be more sound, the foundation and environment of the crew development will be improved apparently, the crew team will be more adapted to the needs of national strategy and shipping development, the ability of serving the international shipping will be further enhanced, thus basically realizing the transformation from the power with lots of crew to the power with strong crew. This fully reflects the government's confidence and determination to strengthen maritime vocational education and make great efforts to develop high-quality crew, which also shows that China has a great potential in developing maritime industry.

How to cultivate high-quality maritime talents better and faster in the maritime vocational education to meet the growing needs of the maritime business has been the major issue concerned by maritime workers. Over the years, China's maritime vocational education has made reform in many aspects, such as curriculum settings, teaching content updating, practical teaching and foreign language teaching, but from the employer's reflection, the gap is still great, especially some aspects including the practical operation skills, the quality cultivation of the crew, the level of ship management and understanding of the new ships are obviously less competitive. Using the modern maritime vocational education from institutions of higher learning as the entry point, this thesis deeply analyzes the status quo of maritime education and training in China, and introduces the main amendments about the maritime education in the Manila Amendments to the STCW Convention. On this basis, through learning the advanced practice of countries with developed maritime education and combining with China's reality, the author clarifies the rights and responsibilities of the stakeholders including government departments, schools, enterprises, crew and so on and puts forward to further strengthen and improve China's policies and measures of modern maritime vocational education and jointly

build modern maritime vocational education system so as to vigorously promote the development of shipping industry.

KEY WORDS:Maritime vocational education,The Manila Amendments,Role and Responsibility,Stakeholder

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LIST OF ABBREVIATIONS

| | |
|-------------------|---|
| AMSA | Australian Maritime Safety Authority |
| BDI | Baltic Dry Bulk Index |
| BRM | Bridge Resource Management |
| China MSA | Maritime Safety Administration of the People's Republic of China |
| ECDIS | Electronic Chart Display and Information System |
| ETO | Electrical Officer |
| ERM | Engine Room Resource Management |
| FDQB | The Foundation Degree Qualification Benchmark |
| FHEQ | the Framework for Higher Education Qualifications |
| HEIs | Higher Education Institution |
| IMO | International Maritime Organization |
| MCA | the Maritime and Coastguard Agency |
| MOE | Ministry of Education of the People's Republic of China |
| MOT | Ministry of Transport of the People's Republic of China |
| MNTB | Merchant Navy Training Board |
| STCW Convention | the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers |
| TAFE | Technical And Further Education |
| the Belt and Road | the Silk Road Economic Belt and the 21st-Century Maritime Silk Road |
| VTS | vessel traffic service |
| QAA | The Quality Assurance Agency for Higher Education |
| XML | Extensible Markup Language |

CHAPTER 1

INTRODUCTION

1.1 The system of maritime education and training in our country

The international nature of the maritime industry and its high technicality determines that modern maritime vocational education is clearly different from general vocational education. It not only needs to meet the requirements of relevant domestic regulations but also the requirements of relevant international maritime organizations. Thus, maritime education can be considered an internationalized vocational education. In our country, maritime education is mainly carried out by maritime institutions and some social training institutions. The government education department is mainly responsible for the academic education of maritime institutions. The maritime administrative institutions are responsible for the management of seafarers' training and supervising the implementation of the relevant laws and regulations in maritime institutions and training organizations(Luo,2012,p.13).

China's maritime education and training system can be expressed in Figure 1.1:

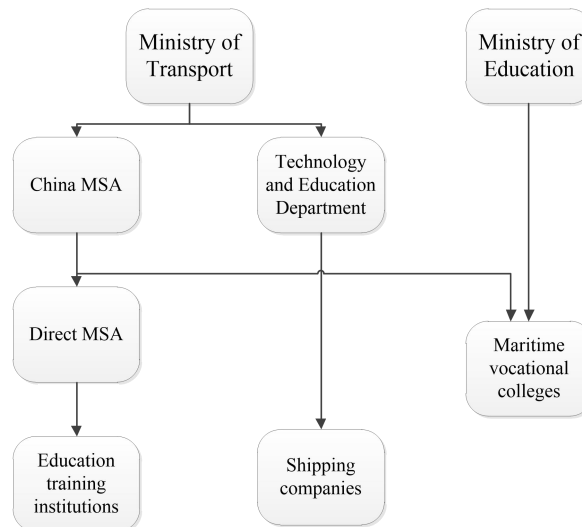


Figure 1.1: China's maritime education and training system

Source:www.moc.gov.cn

Summary: Maritime vocational colleges are the main force of China's maritime vocational education, assuming most of the work of crew education and training work. Under the joint leadership of the Ministry of Education and the Ministry of Transport, they built the world's largest maritime vocational education and training network, which laid a solid foundation for the development of China's shipping industry.

1.2 Maritime vocational colleges student enrollment

In recent years, the marine major enrollment of China's maritime crew training institutions has been decreasing(as shown in Figure 1.2).In 2015, the number of maritime major of China's maritime crew training institutions was 14960, including 8193 with driving major and 6767 with marine engineering major (including electrical and electronic engineering), see details in Table 1.1.

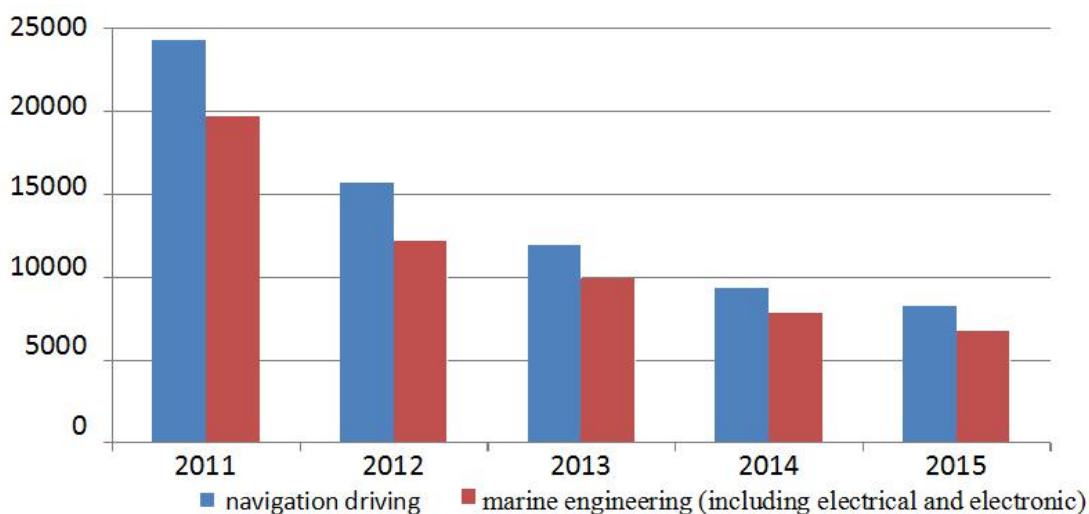


Figure 1.2: Number of enrollment of maritime majors in maritime vocational colleges from 2011 to 2015

Source:China's Seafarers' Development Report 2015

Table 1.1:China’s maritime vocational colleges maritime professional enrollment,2015(Unit: person)

| Type | Number of admissions | | | |
|---------------------------------------|----------------------|--------------------|-----------------------|-------|
| | navigation driving | marine engineering | Electronic electrical | Total |
| Four-year undergraduate diploma | 2309 | 2438 | 115 | 4862 |
| Three -year college Education | 4650 | 3327 | 234 | 8211 |
| Secondary Vocational School Education | 956 | 458 | 0 | 1414 |
| two-year college diploma | 244 | 166 | 0 | 410 |
| Non - maritime engineering | 34 | 29 | 0 | 63 |
| Total | 8193 | 6418 | 349 | 14960 |

Source:China’s Seafarers’ Development Report 2015

Summary: With the downturn in the shipping industry,at the same time China's higher education has entered the stage of popularization and educated people have more educational choices. In recent years, the overall enrollment of maritime institutions has been declining(Wu,2008),however,the professional superiority of the crew has been significantly reduced,the crew has lack of sustainable development.

1.3 On-the-job training

In 2015, in addition to the students of maritime vocational colleges, 10404 people have completed competency training for the captains and senior officer, 5744 people for able seafarer decks and seafarer engines as is shown in Table 1.2 and 17671 people have completed special training for passenger ships, oil tankers, chemicals ships, liquefied gas carriers and so on, as you can see Table 1.3.

Table 1.2: Number of suitable training for seafarers in 2015 (unit: person)

| Duties | captain | chief officer | third officer | chief engineer | second engineer | fourth engineer | able seafarer deck | able seafarer engine | Total |
|------------------------|---------|---------------|---------------|----------------|-----------------|-----------------|--------------------|----------------------|-------|
| The number of trainers | 1914 | 3487 | 76 | 1830 | 3017 | 80 | 4023 | 1721 | 16148 |

Source: China's Seafarers' Development Report 2015

Table 1.3: Number of special trainers for seafarers in 2015 (Unit: person)

| Training programs | Cargo operation basic training | Cargo operation senior training | Cargo operation senior training | Cargo operation basic training | Cargo operation senior training | The crew special training | Total |
|------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------|-------|
| | Oil and chemical tanker | Oil tanker | Chemical tanker | Liquefied gas ship | Liquefied gas ship | Passenger ship | |
| The number of trainers | 3001 | 2771 | 1526 | 542 | 538 | 9293 | 17671 |

Source: China's Seafarers' Development Report 2015

Summary: As a part of China's maritime vocational education, on-the job training bear the important responsibility of knowledge updating and crew promotion, which is an extension of school education and embodies the concept of lifelong education.

1.4 Seafarers' competency examination and certification

China MSA manages seafarers' competency examination and certification work as a whole. The affiliated maritime administrative agencies at all levels are specifically responsible for the seafarers' competency examination and certification work according to their areas of duties. China now applies the national seafarer qualification examination system, which adopted two

approaches of theoretical examination and practice evaluation(Ruan, 2013). The two approaches have different contents and methods but complementary. The theoretical examinations have been fully paperless, which are just answered on the computer. In order to operate conveniently, all subjects are objective questions and the subjective questions are canceled, which although the reduction of the workload makes it more difficult to analyze and judge the true level of the overall and individual students. In 2015, 106541 people have completed the seafarer competency examination and assessment (see Table 1.4), 140191 competency certificates of various types of maritime crew have been issued.(see Table 1.5).

Table 1.4: The seafarers' competency examination and assessment for 2015

| Maritime crew certificate of competency examination, assessment statistics (person) | | | | | | | | | |
|---|----------------|-----------------------|--------------|----------|--------------------------|-----------------|-----------------------|--------------|----------|
| Rank / position | | Unlimited flight area | Coastal area | Subtotal | Rank / position | | Unlimited flight area | Coastal area | Subtotal |
| 3000 gross tonnes and above | Captain | 2666 | 1279 | 3945 | 3000 kilowatts and above | Chief engineer | 2266 | 709 | 2975 |
| | Chief officer | 6146 | 3290 | 9436 | | Second engineer | 5919 | 2195 | 8114 |
| | Second officer | 116 | 24 | 140 | | Third engineer | 95 | 21 | 116 |
| | Third officer | 18440 | 4956 | 23396 | | Fourth engineer | 13240 | 3233 | 16473 |
| 500-3000 Gross tonnage | Captain | 7 | 767 | 774 | 750-3000 kilowatts | Chief engineer | 77 | 1030 | 1107 |
| | Chief officer | 107 | 1122 | 1229 | | Second engineer | 105 | 1227 | 1332 |
| | Second officer | 1 | 11 | 12 | | Third engineer | 2 | 15 | 17 |
| | Third officer | 0 | 22 | 22 | | Fourth engineer | 5 | 32 | 37 |

| | | | | | | | | | |
|-----------------------------|----------------|-------|-------|-------|-----------------------------|-----------------|-------|------|-------|
| Less than 500 gross tonnage | Captain | -- | 241 | 241 | Less than 750 kilowatts | Chief engineer | -- | 143 | 143 |
| | Chief officer | -- | 146 | 146 | | Second engineer | -- | 167 | 167 |
| | Second officer | -- | 18 | 18 | | Third engineer | -- | 6 | 6 |
| | Third officer | -- | 9 | 9 | | Fourth engineer | -- | 3 | 3 |
| Senior able seafarer deck | | 0 | 0 | 0 | Senior able seafarer engine | | 0 | 0 | 0 |
| Able seafarer deck | | 13244 | 1470 | 14714 | Able seafarer engine | | 7762 | 714 | 8476 |
| GMDSS operator | | 11416 | 193 | 11609 | Electronic electrician | | 1565 | 72 | 1637 |
| | | | | | Electronic technician | | 247 | 0 | 247 |
| Total | | 52143 | 13548 | 65691 | Total | | 31283 | 9567 | 40850 |

Note: "-" indicates that the job is not set for the category.

Source: China's Seafarers' Development Report 2015

Table 1.5: The issuance of various types of maritime crew competency certificate

| Marine ship crew certificate of competency certificate statistics (piece) | | | | | | | | | |
|---|---------------|-----------------------|--------------|----------|--------------------------|-----------------|-----------------------|--------------|----------|
| Rank / position | | Unlimited flight area | Coastal area | Subtotal | Rank / position | | Unlimited flight area | Coastal area | Subtotal |
| 3000 gross tonnes and above | Captain | 4959 | 2089 | 7048 | 3000 kilowatts and above | Chief engineer | 4252 | 1319 | 5571 |
| | Chief officer | 3406 | 1816 | 5222 | | Second engineer | 2572 | 807 | 3379 |

| | | | | | | | | | |
|-----------------------------|----------------|-------|-------|-------|-----------------------------|-----------------|-------|-------|-------|
| | Second officer | 5481 | 2281 | 7762 | | Third engineer | 4554 | 1513 | 6067 |
| | Third officer | 8921 | 1608 | 10529 | | Fourth engineer | 6913 | 2049 | 8962 |
| 500-3000 Gross tonnage | Captain | 80 | 1282 | 1362 | 750-3000 kilowatts | Chief engineer | 128 | 1866 | 1994 |
| | Chief officer | 76 | 886 | 962 | | Second engineer | 90 | 928 | 1018 |
| | Second officer | 24 | 710 | 734 | | Third engineer | 57 | 768 | 825 |
| | Third officer | 0 | 46 | 46 | | Fourth engineer | 6 | 69 | 75 |
| Less than 500 gross tonnage | Captain | -- | 1806 | 1806 | Less than 750 kilowatts | Chief engineer | -- | 1579 | 1579 |
| | Chief officer | -- | 1061 | 1061 | | Second engineer | -- | 909 | 909 |
| | Second officer | -- | 725 | 725 | | Third engineer | -- | 455 | 455 |
| | Third officer | -- | 93 | 93 | | Fourth engineer | -- | 54 | 54 |
| Senior able seafarer deck | | 5748 | 2287 | 8035 | Senior able seafarer engine | | 3696 | 1371 | 5067 |
| Able seafarer deck | | 21221 | 8780 | 30001 | Able seafarer engine | | 15721 | 5232 | 20953 |
| GMDSS operator | | 7440 | 170 | 7610 | Electronic electrician | | 274 | 6 | 280 |
| | | | | | Electronic technician | | 7 | 0 | 7 |
| Total | | 57356 | 25640 | 82996 | Total | | 38270 | 18925 | 57195 |

Note: "--" indicates that the job is not set for the category.

Source: China's Seafarers' Development Report 2015

Summary: The competency examination and certification are a result inspection and presentation of maritime vocational education. Over the years, through teaching reform and other measures, the examination pass rate is also rising with the improvement of training quality. By the analysis of data in table 5 and 6, we can see in terms of the evaluation, the number of licensed seafarers of 3000 gross tons and above is the highest. And for the other levels of ships, mainly captain, chief officer, chief engineer and second engineer take the examinations evaluation. In terms of certification, the number of able seafarer deck and engine is the highest.

1.5 Current situation of the development of the crew in our country

1.5.1 Crew team size and structure

In 2015, the number of China's newly registered crew was 53843 people, including 30523 sea crew members and 23320 river crew members. By the end of December 31, 2015, China has a total of 13,70224 registered crew members, which ranks the first in the world, including 638990 sea crew members (470512 crew members of the International shipping vessels, 168478 members of coastal shipping crew of 168478 people) and 731234 inland river crew members. The ratio is shown in Figure 1.3 in detail.

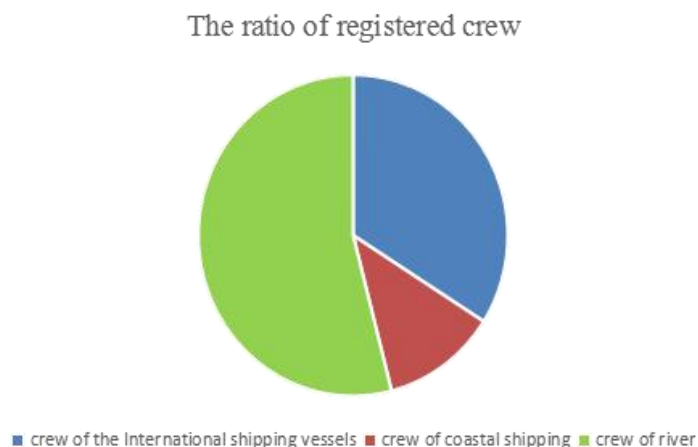


Figure 1.3: The ratio of registered crew

Source: China's Seafarers' Development Report 2015

1.5.2 Composition of the age of the crew

Making analysis of the age structure of the seafarers' crew in China which holds the certificate

of competency for international voyage vessels. The scope of the study is aging from 18 to 60 years old, which meets the age requirement of the seafarer's certificate of competency. The overall age distribution statistics of the seafarers are shown in Table 1.6 and Figure 1.4 ,Figure 1.5

Table 1.6: Age of distribution of crews for international vessel ship competency certificate(Unit: person)

| Duties | 18≤~ <20 years old | 20≤~ <30 years old | 30≤~ <40 years old | 40≤~ <50 years old | 50≤~ <60 years old | ≥60 years old | Total |
|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------|--------|
| Captain | 0 | 3 | 3021 | 8819 | 3009 | 626 | 15478 |
| Chief officer | 0 | 376 | 6645 | 1668 | 487 | 204 | 9380 |
| Second officer | 0 | 5189 | 8359 | 1264 | 433 | 47 | 15292 |
| Third officer | 0 | 24598 | 5131 | 467 | 13 | 1 | 30210 |
| Chief engineer | 0 | 3 | 2532 | 8486 | 2993 | 623 | 14637 |
| Second engineer | 0 | 283 | 5268 | 1452 | 473 | 220 | 7696 |
| Third engineer | 0 | 4512 | 7649 | 1434 | 488 | 88 | 14171 |
| Fourth engineer | 0 | 20489 | 3591 | 404 | 18 | 0 | 24502 |
| Able seafarer deck | 24 | 56512 | 23382 | 14753 | 7451 | 791 | 102913 |
| Able seafarer engine | 14 | 43222 | 16164 | 11477 | 4652 | 540 | 76069 |
| Total | 38 | 155187 | 81742 | 50224 | 20017 | 3140 | 310348 |

Source: China's Seafarers' Development Report 2015

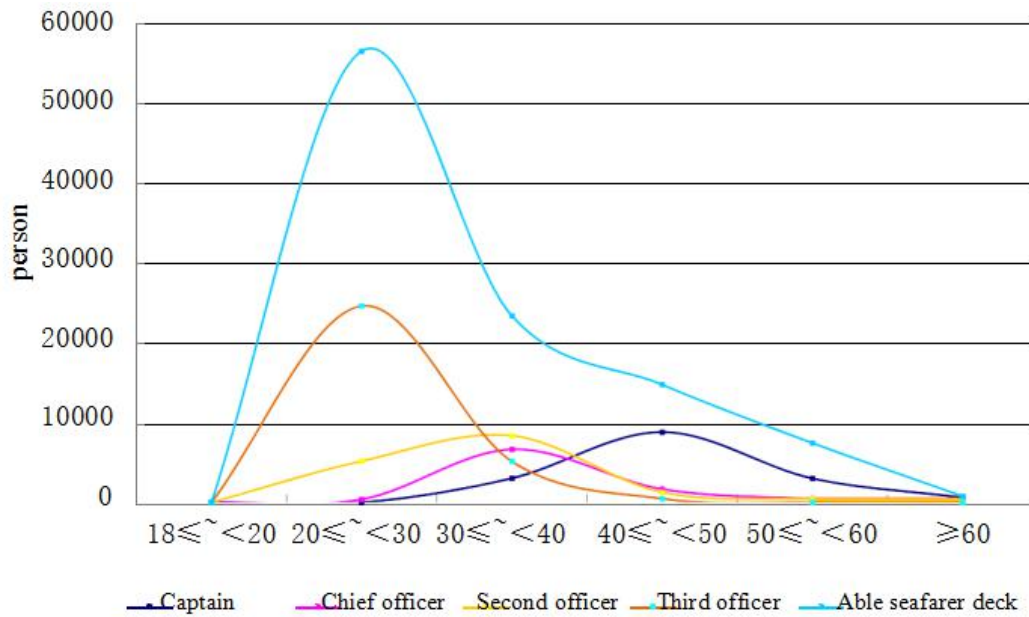


Figure 1.4: The age distribution of the captain and deck crew of the international voyage vessel

Source: China's Seafarers' Development Report 2015

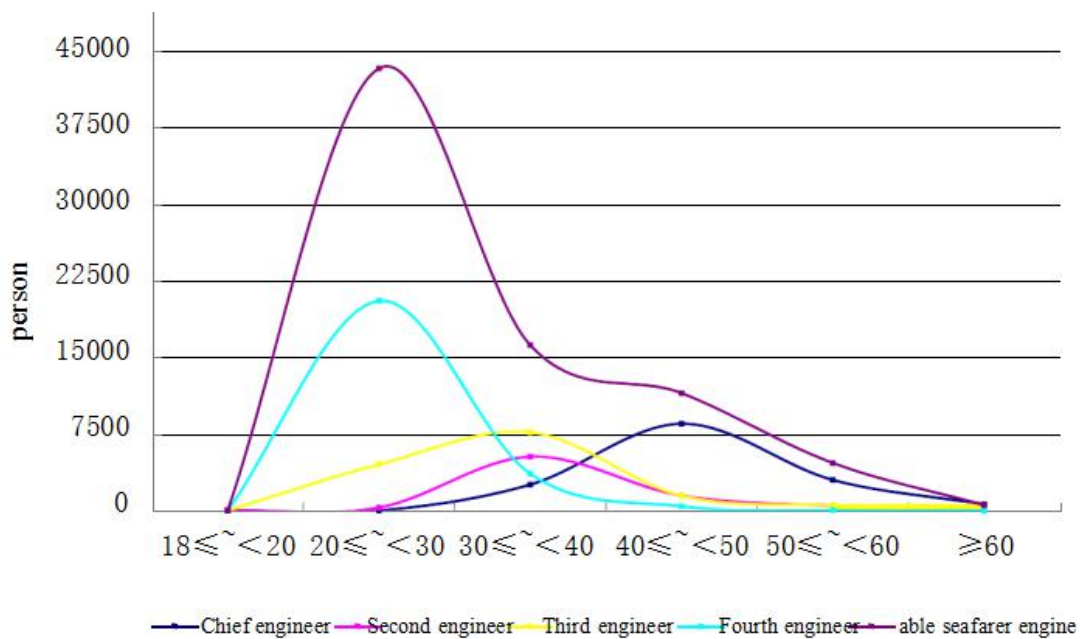


Figure 1.5: The age distribution of the engine crew of the international voyage vessel

Source: China's Seafarers' Development Report 2015

The result of Figure 1.4 and Figure 1.5 show that the age distribution of captain and deck crew are similar, operating crew are the main parts of crew under the age of 40 age, and

management crew are the main parts of the crew over 40 years of age, which accounts for 52.34% of the total number; About 70% of crew are under the age of 40 years old and only 30% of crew are over 40 years old. In terms of the age structure of the total crew, we can see the ages of our international sailing ship crew are in a young state.

1.5.3 Investigation of occupational satisfaction of crew

The job satisfaction of the crew is an important index which is directly related to the stability of the crew. This paper constructs the evaluation index system of the crew satisfaction from the five aspects including the crew work itself, education and training, salary and welfare, working relationship and working environment(Hong & Weng,2015).It mainly makes investigations for COSCO Group, China Shipping Group, Sino trans Group and other shipping companies which participated in the on-the job training of crew training center of Dalian Maritime University(Xu,2008).The measurement scale of job satisfaction was graded according to Likert and divided into "very satisfied" and "satisfied" Satisfied "" dissatisfied "" very dissatisfied ". A total of 106 valid questionnaires were retrieved, twchich are detailed in APPENDIX A, and the main survey results are shown in Table 1.7.

Table 1.7: Results of the crew's job satisfaction test

| category | project | Very satisfied | Satisfied | Neutral | Dissatisfied | Very dissatisfied | Overall satisfaction |
|-------------|---------------------------------------|----------------|-----------|---------|--------------|-------------------|----------------------|
| Work itself | Satisfaction in boat time | 9.4 | 32.7 | 38.4 | 16.7 | 2.8 | 80.5 |
| | Job stress satisfaction | 6.3 | 25.8 | 45.9 | 19.2 | 2.8 | 78 |
| | Play your ability to be satisfied | 7.5 | 41.2 | 40.9 | 9.4 | 0.9 | 89.6 |
| | Work and family conflict satisfaction | 7.5 | 25.8 | 32.4 | 28.3 | 6 | 65.7 |
| | Ship condition satisfaction | 6.6 | 27 | 46.5 | 17.9 | 1.9 | 80.1 |

| | | | | | | | |
|------------------------|--|------|------|------|------|------|------|
| Education and training | Satisfaction with training on board | 11 | 35.2 | 40.3 | 12.3 | 1.3 | 86.5 |
| | Satisfaction with company training | 10.7 | 31.1 | 39 | 16 | 3.1 | 80.8 |
| Wages and benefits | Satisfaction with Total Revenue | 1.9 | 17 | 41.2 | 31.4 | 8.5 | 60.1 |
| | Satisfaction in the wages of the ship | 2.2 | 15.4 | 42.8 | 30.5 | 9.1 | 60.4 |
| | Satisfaction with leave treatment | 1.3 | 11.6 | 28.3 | 39 | 19.8 | 41.2 |
| | Welfare guarantee satisfaction | 3.1 | 15.1 | 38.4 | 28.6 | 14.8 | 56.6 |
| Working relations | Satisfaction with ship leadership | 11 | 40.3 | 44.3 | 4.1 | 0.3 | 95.6 |
| | Relationship with colleagues on board | 18.6 | 50.3 | 29.9 | 0.9 | 0.3 | 98.8 |
| | Relationship with company manager satisfaction | 8.8 | 31.4 | 45.9 | 11.6 | 2.2 | 86.1 |
| working environment | Promotion space satisfaction | 6.9 | 31.8 | 41.8 | 18.2 | 1.3 | 80.5 |
| | Promotion | 5.7 | 28.9 | 45 | 17.9 | 2.5 | 79.6 |

| | | | | | | | |
|--|--|-----|------|------|------|-----|------|
| | time satisfaction | | | | | | |
| | Satisfaction of living conditions on board | 4.7 | 23.9 | 46.5 | 21.4 | 3.5 | 75.1 |
| | Welfare guarantee satisfaction | 6.6 | 23 | 29.6 | 31.1 | 9.7 | 59.2 |

Source: The author, Investigation of occupational satisfaction of crew.

The relationships with colleagues on board, with the ship leadership, to play their own ability, on board training satisfaction are among the sectors with the highest satisfaction. In recent years, the professional training of maritime institutions and business training including maritime culture and education, the complementary dependence of various types of work, the company's uninterrupted business training provided great supports for the crew work. At the same time, the marine technology is highly professional, and the crew only can reflect their ability and value during working in ships. So these factors of work satisfaction are higher.

The last five items with low satisfaction are the satisfaction of the leave, the welfare, the satisfaction of the ship's wages, the total income and the disembarkation of the society. The first four items belong to the factors affecting the wage and welfare, which shows that in recent years, ship wages are not much superior to the same level of land staff, and the crew is not satisfied with the pay and benefits. For the satisfaction of social attribution, most of the crew little community or no exchange opportunities with other sectors during the holidays, the nature of their work is not understood and recognized by the land, social sense of belonging is also at the level of dissatisfaction.

The last five items with low satisfaction are the leave treatment, welfare guarantees, the wages in the ship, the total income and sense of belonging after work among which the first four items belong to factors of wages. It shows that incomes have been influenced by the relationship between supply and demand and shipping cycles a lot. Most of the crew of the ship haven't had more wages than the staff working on land at the same level and the crew

have been unsatisfied with the wages and benefits. In terms of the satisfaction of the sense of social belonging, most of the crew have had few contact with the company, and no opportunities to communicate with other departments or groups in the community. Their nature of work has not been understood and recognized by the people on land. the work reputation of professional has declined and sense of social belonging is also at the level of dissatisfaction(Wang,2012).

Therefore, there is a large room for improvement for the crew of the employing units, educational institutions and the government. We must pay close attention to the crew's ideological trends, adhere to the principle of employee satisfaction, deeply understand their needs, and then effectively meet the working conditions, work environment, training and other management services at even beyond the expectations of the crew, thereby enhancing the job satisfaction of the crew. We should focus on improving the crew's unsatisfactory factors, give full play to the working enthusiasm, initiative and creativity of the crew, take appropriate measures to improve the crew's job satisfaction, maintain the healthy and stable development of the crew so as to promote the healthy development of the shipping industry and achieve the goal of power with strong seafarers.

1.5.4 Summary

The size of China's crew generally meets the needs of the shipping development, but needs to make further development in structure according to the market demands. The distribution of ages is not reasonable, which takes on a pyramid shape. The total number of crew is high but there are few experienced crew. Most of the captain and chief engineer of the crew are at the age of 40-50; And most of the first chief officers, first engineers, second officers and second engineers are at the age of 30-40; Most of the three officers and engineers are at the age of 20-30 and most of able seafarer decks and engines are 20-30 years old. This shows that the age structure of our senior officers puts generally 10 years as a class and is slowly accumulated. But after ages with the largest number, it began to decline sharply, indicating the loss of crew is serious and the crew is unsatisfied with the living conditions, social status and other items. At the same time, the level of training and certification is general. They generally agreed that the pass rate is low, which is a reality needed to recognized for the maritime vocational education. We should carry out targeted education and training activities and adopt pointed activities according to the different ages of the crew and types, tonnages and navigation areas

of the ships, improve the business skills and comprehensive qualities of the crew, strengthen the humanistic care, maintain the crew continuous competency and promote the safe development of enterprises and the healthy growth of the crew.

CHAPTER 2

Impact of the Manila Amendments to the STCW Convention and Code on modern maritime vocational education

The International Maritime Organization requested that seafarers be required to meet the requirements of the Manila Amendments to the STCW Convention and Code from 1 January 2012. As a transitional provision, Regulation I/15 allows for a State Party to continue to issue, recognize and endorse certificates under the present provisions of the STCW Convention until 1 January 2017. However, taking into account the failure of some administrations to ensure that all crew members hold certificates in compliance with the requirements of the Manila Amendments to the STCW Convention and Code by 1 January 2017, the MSC 97 session decided to extend the transition period for six months to 1 July 2017. (IMO MSC 97, 2016)

The Manila amendments poses a serious challenge to crew duties, educational models and training programs of the maritime institutions, seafarers 'education ,training institutions and shipping companies. At the same time, it had a positive influence on promoting the overall quality of our seafarers objectively (Zheng, 2012).

2.1 Amendments directly related to crew education and training

The 2010 Manila Amendments are relatively more content, which is directly related to maritime education as shown in Table 2.1:

Table 2.1: Main amendments

| Serial number | Main amendments |
|---------------|--|
| 1 | Ordinary crew promotion of engineer qualifications are increased to "completion of not less than 12 months of experience in metalworking and |

| | |
|----|---|
| | accreditation", including not less than 6 months of service on duty. |
| 2 | New minimum certification requirements for senior able seafarers |
| 3 | The bridge / ship resource management becomes a mandatory competency standard |
| 4 | The addition of mandatory leadership and team work skills to use the competency requirements |
| 5 | Knowledge of new marine environmental awareness, understanding and proficiency requirements (for captain and deck) |
| 6 | Added mandatory minimum requirements for electro-technical officers |
| 7 | Identify the mandatory minimum requirements that all the crew are familiar and basic safety training and practicing, increase the basic knowledge of marine environmental protection, effective communication on board, team work, understand and take measures to control fatigue and other new contents |
| 8 | Clarify that all seafarers must hold a Certificate of Conformity for Security Consciousness and that the seafarer who is assigned to have a security duty should also hold a Certificate of Conformity with Security Liability |
| 9 | New requirements for using electronic chart display and information system (ECDIS) to maintain a safe flight duty |
| 10 | Advocate the use of electronic navigation astronomical calendar and astronomical calculation software |
| 11 | New requirements for mandatory competency for persons who is directly responsible for cargo handling, stowage, immigration, barge and other persons operations related to the goods |
| 12 | Add the contents of the report in accordance with the general requirements of the ship reporting system and the VTS reporting procedures |

Source:the Manila Amendments to the STCW Convention and Code,2010

In the case of crew duties, the Manila Amendments to the STCW Convention and Code have been revised. Ten new concepts have been added that Electro-technical Officer, Electro-technical Rating, Able Seafarer Engine, Able Seafarer Deck and so on are completely different from the new crew duties.

In the area of education, Convention Party B-I6 has increased the E-learning and Distance Learning recognized by the State party. The Convention also especially requires that distance education systems used by maritime institutions educational and training institutions must be more flexible and can share data through the internal Internet and wide area networks such as XML (Extensible Markup Language) as well as having the ability to resist hackers and prevent tampering.

In the case of training programs, the amendments to the STCW Convention Manila moved BRM (Shipboard Resource Management) from Part B of Chapter VIII to Part A of Chapter n and Chapter VIII. The mandatory requirements for the operational capacity of the operational crew BRM are incorporated into Part A of the Convention.

In the case of applying for an Electro-technical Officer's job, the Manila Amendment requires the crew to obtain the certificates when they complete basic safety training and are proficient in lifeboat search and rescue boat training, advanced fire training, first-aid training, security awareness training and training of designated security officers. The Manila amendment also add the relevant training content of the Electronic Chart Display and Information System (ECDIS) and make the requirements of the ECDIS Competency, mandatory for both management and operational crew.

2.2 Analysis of the impact of the Manila Amendment to the STCW Convention and Code on modern maritime vocational education

2.2.1 Impact on maritime vocational colleges

Put forward higher requirements for the teaching resource allocation of the navigation major the 2010 Manila Amendments added three assessment contents including ECDIS, BRM and ERM. The practical operation and exercise equipment must be added to the basic equipment according to the convention; at the same time ship security training and the effective training of the crew's special skills also put forward new requirements for the training venues, facilities and equipment construction of the maritime institutions; the improvement of the contents and standards of skill assessment also proposed the demands of adding incinerators, sewage treatment plants and other equipment(Sun & Yao, 2013). The new electro-technical officer also face the tasks of newly opening "ship electrical and electrical technology"

major.(Luo,2012)

The quality of the professional team of maritime professionals put forward higher requirements in the Manila Amendment to the STCW Convention and Code, a number of competencies such as BRM, ERM.ECDIS and Ship Safety Training have been added to the relevant competency standards for senior officers and crew. Many of the new contents are new knowledge or skills for faculty members engaged in maritime education. With the further advancement of IMO's electronic navigation strategy, the continuous development of modern shipbuilding technology, measurement technology, information technology, computer technology and network technology will make the navigation technology change with each passing day in the future. Teachers in maritime institutions must actively participate in the special training and knowledge updating to improve their competency.(Wang et al, 2017)

The training quality management system and training syllabus of education training institutions need to be revised.STCW Convention Manila amendment has increased the minimum competency standards of the operating crew. China's domestic laws and regulations have also made major adjustments and the training institutions should make great adjustments to the quality management system correspondingly, thus meeting the training requirements of operating crew proposed by Convention and domestic regulations to ensure that the training of high-quality talents with technical skills can be trained in the short school term.

2.2.2 Impact on other stakeholders

2.2.2.1 The duties of the maritime authority change

The duties of the maritime authority also need to be adjusted.In addition to the targeted modification of the rules and normative documents of the existing education, training, examination, evaluation and certification, the amendment has made the following new requirements to the Administration:

First, need to approve the people who are responsible for the physical examination of the staff and implement quality control of physical examination and the issuance process of the health certificate; need to supervise how to implement the mandatory provisions in this amendment, such as the new boat familiar training programs that the company are responsible for, the

minimum break time for the crew to prevent alcohol and drug abuse and ensuring the effective language communication on the ship at any time(Liu, 2012).

The second is to increase auditing duties of applying for the documents during the issuance of the certificate, and the updating numbers of certificates is also increased; A number of mandatory training and certification projects are added. The competent authorities need to determine whether these new jobs should be added according to the actual needs of ships. This will be on the maritime vocational education to meet some of our practical requirements, better performance(Song, 2014).

2.2.2.2 The functions of the shipping company change

Firstly,changes in the functions of the domestic crew, this revision of these new mandatory standards may lead to increased staffing, especially the countries with flag of convenience may be the first to require mandatory ETO (support level and operation level), senior duty sailors, senior duty crew and other duties, which will lead to the requirement of the new personnel for the owners of all the ships that hang on flags of convenience(Chen, 2013).

Secondly,ship training and training records are required to be improved.The 2010 Manila Amendments have increased the contents of the training requirements and projects on board.Training programs that can be carried out on board safety training in basic safety training need to be rigorously trained and documented in accordance with the requirements of the Convention. In addition, the crew's minimum rest time record is the mandatory record required by this amendment.These new requirements increase the responsibility of the shipping company for training and recording on board(Wang & Shu, 2012).

Lastly,the qualities and responsibilities of the crew have increased.In this revision, a number of competency projects on management skills have been added to the relevant competency tables of the senior officers, which will improve the quality of the officers, as reflected in the management skills including the ability of management, communicating and information processing as well as external communication and contacts. In addition, for the basic safety training in Chapter VI, it clarifies that the maintenance of skills training every five years will enhance the crew's basic safety competency. Therefore, after this revision, the crew's basic safety skills will be provided and the capacity of the senior officers will also be improved. At

the same time, the obligations of the crew to participate in training will also increase. In addition to participation in the basic safety training in Chapter VI must be carried out on shore, the training provided by the company must be accepted. These need to be completed by ship companies and vocational schools with joint efforts.

2.3 the Manila Amendments to the STCW Convention and Code in our country

China has fully implemented the STCW Convention, strengthened international exchanges and cooperation, and actively participated in the IMO human factors, training and duty subcommittee work, which achieved remarkable results. China's implementation of the STCW Independent Evaluation Report passed the IMO audit and kept the identity of IMO white list with zero-defect. To carry out the differentiation study between the STCW Convention and the the training of our crew, China has made some revisions on the core document which is "*China's Republic of China Seafarers' Competency Examination and Certification Rules*" (referred to as the New Rules) correspondingly, which promotes the maritime vocational education well. In general, on the basis of satisfying the requirements of the Convention, China has established a set of complete mechanism of the education and training, examination and certification as well as crew promotion(Zhang, 2015).

2.3.1 Some of the changes to the New Rules

In order to adapt to the changes in international rules, to standardize the crew training and seaborne crew examination, certification, to protect the quality of the crew; to adapt to the crew training diversified development, to carry out "sandwich" education, electronic training, on board training, and further improve the "*People's Republic of China seafarers' competency examination and certification rules* ", the navigation area, the ship grade, duties, competency standards and matching training certificate has been improved.

The amendments mainly include:

To increase the "shipping companies should arrange the people with appropriate certificates of competency to fill vacancies as soon as possible" to improve our policy on the management of special circumstances. (Article 35)

To increase the "River to Sea" arrangements to meet the needs of direct arrival between rivers

and seas. In Article 61, a member of the inland river vessel with a valid certificate of competency shall be given a corresponding training, examination and endorsement through the route, which may undertake the corresponding duties on the ship's direct ship in a specific route. The specific measures shall be made by China MSA.

Adjusted to the "*Training, Maritime Qualifications and Competency Requirements for Applicants for Maritime Crew*":

.1 Sailors/mechanic and senior duty sailors/mechanic training path:

Cancel the training requirements for lifeboats and rescue boats, increase the ways of a number of rapidly growing sailors and watchmakers in accordance with the boat trainees and trainee record book requirements, complete on board internship lasting 3 months. Cancel the competency training requirements of senior duty sailors/mechanic job to meet the 12-month sailor/mechanic maritime service qualifications and in the next 6 months in accordance with the trainees and trainees required to complete the book not less than 3 months On board the trainee. Or distribute certificates after meeting the 18-month sailor/mechanic maritime service qualifications and passing the appropriate examinations.

.2 To change the probationary requirements of the crew from the original "corresponding level or lower grade" to "the corresponding navigation area and grade".

.3 Encourage cooperation between school and enterprise. In the note to increase "by the National Maritime Administration to assess the quality of the system operation, training quality and social reputation of the training institutions, on-the-job training during training period, trainee qualifications can be included in the support level and operational level of internship qualifications.

2.3.2 Comparison of license path map

The core of the New Rule is that the formation of the certification path for our crew is perfect under the framework of the STCW Convention. Throughout the Manila Amendments to the STCW Convention and Code, the "main output" is the crew competency certificate issuing system and a series of ancillary specific crew suitability standards, the core is the crew certificate and issuing system. This indicates that the extent to which the validation of the

New Rule conforms to the Manila Amendments can be carried out primarily through validation. Through the certification path map can be very intuitive understanding of the Manila Amendments to the crew to obtain a certificate of competency requirements, as well as China's compliance New Rules. See Figure 2.1& Figure 2.2:

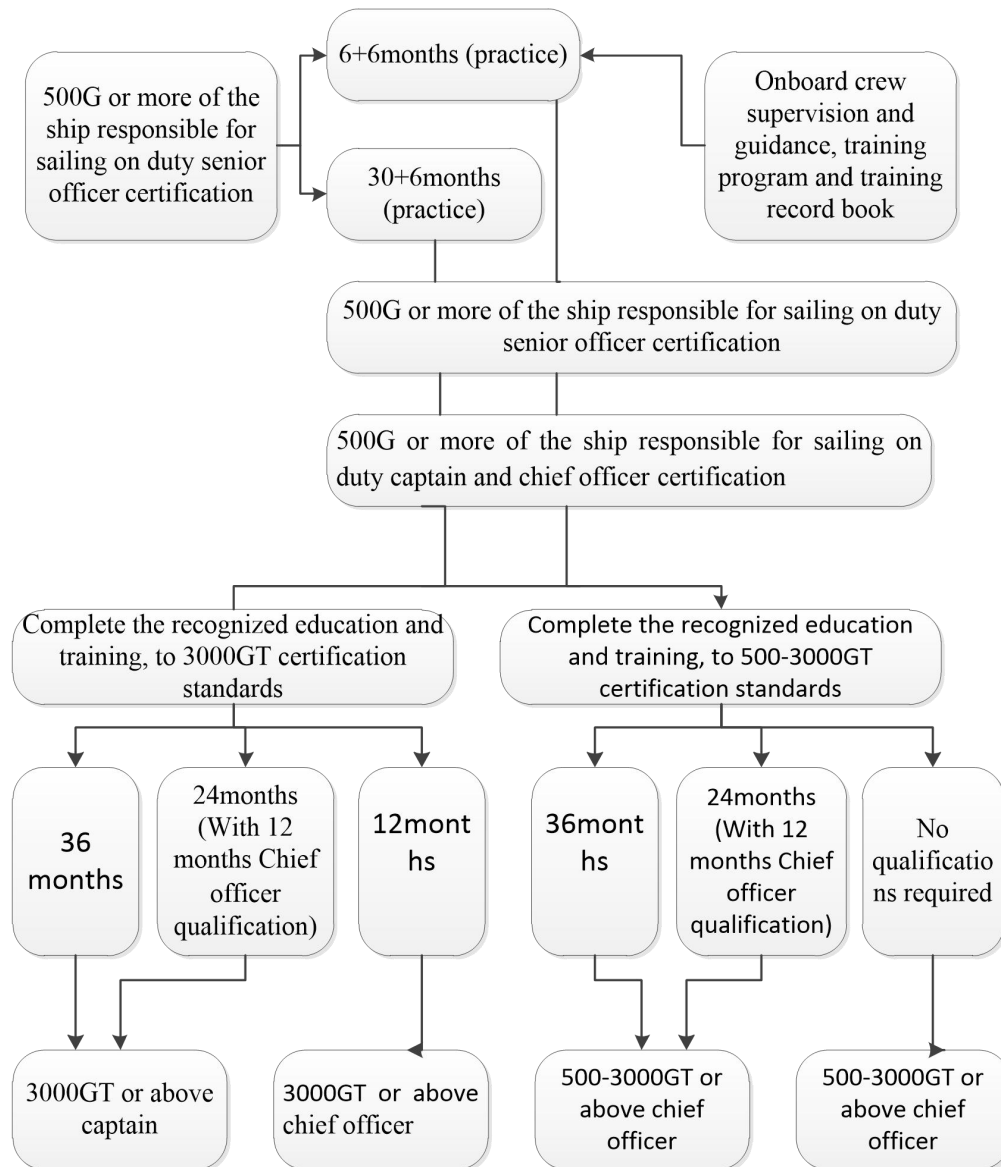


Figure 2.1: certification requirements for deck officers and master on vessels of 500 gt or above,as required by the Manila Amendments

Source: the Manila Amendments to the STCW Convention and Code

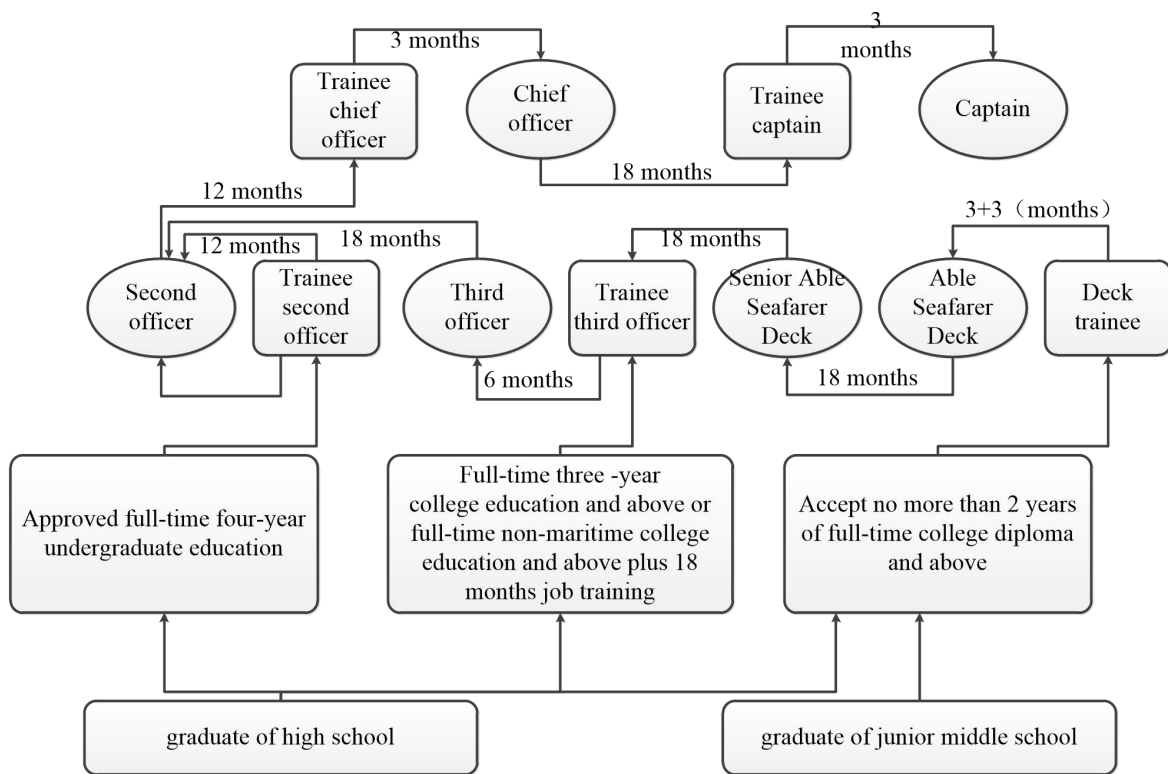


Figure 2.2: career promotion for seafarers engaged in unlimited voyages , as defined by the New Regulation

Source:People's Republic of China seafarers' competency examination and certification rules

Summary:The Manila Amendments to the STCW Convention and Code has a positive significance for China's current maritime career. China has conscientiously fulfilled the STCW Convention,established a rapid response mechanism, a proposal formation and reserve mechanism, carried out STCW Convention and China's crew training differentiation research, and constantly improved domestic law Regulations,which set a direction for our crew vocational education and training.

CHAPTER 3

Opportunities and Challenges Faced by Modern Maritime Vocational Education in China

Analysis the opportunity and challenge of maritime vocational education in China, we must grasp the four characteristics of maritime education itself: Firstly, in training more emphasis on practicality, because of its special nature of maritime education that be care of combine theory with practice, which is the focus of training. Moreover, maritime graduates in the process of obtaining a diploma and degree certificate, at the same time also need to obtain the appropriate crew certificate of competency. Secondly, in the training of personnel, maritime education in particular requires students to have the correct political direction, strong foreign language skills, skilled professional knowledge, better marine safety and environmental awareness, international competitiveness, and a certain degree of management and management. Thirdly, in the educational content, by the crew's professional characteristics, maritime education with international versatility. Especially after the adoption and entry into force of the Manila Amendments, the educational content, teaching methods and examination methods of maritime education have been greatly affected, and the educational content of maritime education has a certain degree of international normality. Fourthly, in the cost of education, for the reasons of marine practice and simulation teaching, maritime education than traditional education needs more funding, teaching a larger school, but also equipped with teaching practice boat, maritime education teaching process is always Through the suitability of the crew to meet the professional characteristics.

In order to gain an in-depth understanding of the opportunities and challenges faced by modern maritime vocational education in China, and listen to the opinions of the authoritative people, the author, with the resources of the instructor's instruction, conducted the appointment of the vice president of Dalian Maritime Vocational and Technical College on March 14, Field interviews, the specific contents of the finishing see APPENDIX B.

3.1 Opportunities

3.1.1 Promoting China 's Maritime Education and International Practice

The contents of the maritime education and training regulated by the Manila amendments reflect the international training and training of international standards, reflecting the development trend of international maritime education. The promulgation and its full implementation of the Manila amendment provided an opportunity for the promotion and realization of our maritime education and international standards. To promote the maritime education and international standards, we will increase the maritime institutions of foreign exchange activities, learn to organize advanced concepts and experience of maritime education from the developed countries, and further improve the quality of maritime education in China(Zhang, 2015).

The Manila amendments has increased the guidance for distance learning and E-learning recognized by the State party, providing an opportunity for reform of maritime education and teaching methods. Distance education and audio-visual education is a new type of educational technology combining computer network and multimedia technology, which maritime education organizers should actively develop and adopt. Active use of multimedia network classroom technology, through the use of images, audio, video and other multimedia technology to make the curriculum more intuitive, vivid image to make up for the difficulty of navigating education which is difficult to achieve on-site teaching(Cheng, 2006). Through the Internet for distance teaching, to use of existing teachers resources more rationally, to complete more teaching tasks, improve the efficiency of teaching work, so that more practical links from the laboratory into the simulator operation to save equipment investment. And use the powerful features of the simulator to set more and more complex scenes to meet the needs of different levels of students(Li, 2006).

3.1.2 China's internal development environment to promote the role of maritime vocational education

Firstly, the state attaches greater importance to maritime vocational education. The Ministry of Education, Ministry of Transport in February 2012 jointly issued "on the further improvement of the quality of navigation education a number of opinions", once again

stressed that "Improve the quality of maritime education." "The State Council, responsible for the healthy development of the maritime industry, put forward a number of opinions," and proposed that improve the maritime industry personnel training system and mechanisms to strengthen the construction of seafarers, especially senior seafarers, and vigorously develop professional and international shipping talent." China 's crew development plan (2016 - 2020) proposed navigational personnel training to dock national policy, adhere to the application-oriented, the implementation of classification management, training multilevel adaptation of modern shipping development crew talent team. Which all reflect the country's attention to maritime vocational education, and will provide opportunities for the development of maritime vocational education.

Secondly, the reform of China's shipping market will improve the occupant's attraction, thus promoting the development of maritime vocational education. Global shipping shows a sustained downturn trend, and China's shipping industry supply side of the structural reform will promote the merger and reorganization of shipping companies to speed up industrial restructuring and upgrading(Zeng & Chen, 2016). The integration of shipping industry structure is conducive to optimizing the configuration of the crew and promoting the distribution of the crew income. The formal performance of the Maritime Labor Convention, 2006, laid a legal foundation for improving the working environment on board and protecting the salaries and benefits of the crew, which is conducive to maintaining the rights and interests of seafarers and improving the marital development environment and promoting the professional development of seafarers.

3.2 Challenges

3.2.1 The international shipping economy is in a doldrums

The global shipping industry benchmark - the Baltic Dry Bulk Index (BDI) has long been sluggish (see Figure 3.1), the world economy is weak, the main maritime market capacity surplus. By the end of January 2016, in the previous 12 months, Tonnage calculation, the world merchant fleet increased by 3.5%, but the demand increased by only 2.1%. Excess capacity situation is further exacerbated in recent years, the growth of merchant fleet in Table 10, leading to deterioration of the living environment of seafarers, and the fluctuations of this industry cycle have no sign of the end in the short term.

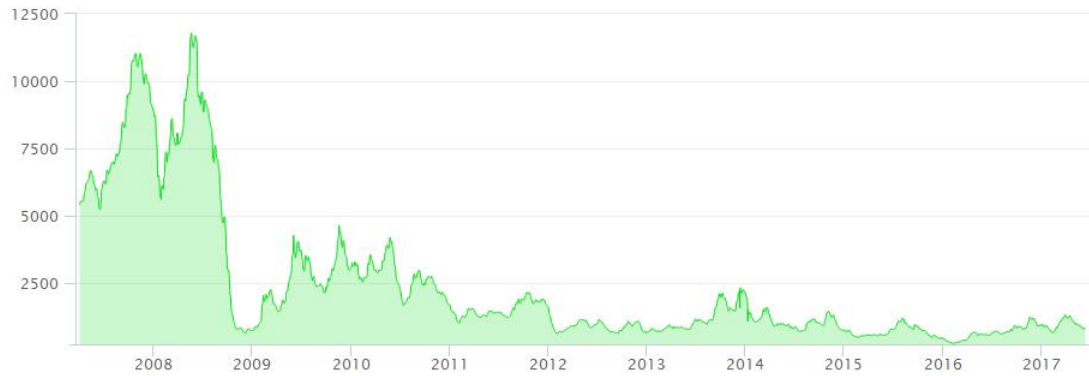


Figure 3.1: Baltic dry bulk freight index (BDI)

Source:<http://www.eworldship.com/app/data>

By 2016, it was the biggest challenge for the global shipping giants in the year 2016, when the financial crisis was the biggest year in the year 2008:2016. In November, the world's shipping industry veteran Maersk announced that the third quarter of the shipping sector in the first quarter of the year, the first three quarters of the loss of 9.22 billion yuan in the first three quarters; A loss of \$ 122 million, a loss for two consecutive quarters. The downturn in the shipping market has a certain impact on the employment of the crew, which is also the challenge that China's maritime education and training need to face(<http://www.eworldship.com>).

3.2.2 The international competitiveness of the crew trained in our country needs to be strengthened

At present, China's maritime education enrollment is large, but mostly positioning for the general crew of the scale of education. However, in fact from the shipping business employer feedback situation, high-quality crew in particular who are suitable for special vessels, large and large Ship, high-tech ship crew are still insufficient. The number of our overseas crew is not commensurate with the status of China's human resources, and China's registered crew reached more than 1.37 million people, which ranked first in the world. The world's international merchant fleet only provided 243,635 seafarers, and the Philippines also 215,500, Indonesia 143,702, Russian Federation 87,061, India 86,084, Ukraine 69,000 (UNCTAD,2016), and did not pull the gap with the Philippines and other countries, indicating that China's training of maritime special talents international competitiveness is insufficient of.

In addition, the overall quality of students needs to be further improved. From the actual situation most of the maritime institutions of the marine professional are professional learning are the focus, the breadth of the curriculum is not enough, which directly led that the knowledge of graduates is very narrow, especially the lack of economic, legal aspects knowledge. The students do not know how to operate the market and maximize the benefits for the company to create. On the other hand, there are also generally low levels of English in the maritime institutions, which are in line with the internationalization of seafarers, compared with the requirements of the Manila amendment for seafarers, especially senior seafarers' English proficiency. There is a considerable gap, which also caused the lack of international crew competitiveness(Guan,2016).

Finally, the competitive advantage of Chinese seafarers in the international maritime market lies in the low labor costs, the wages of Chinese seafarers not only are far lower than Europe, the United States, Japan and other regions and the country's seafarers wages, but also lower than those of the Philippine seafarers, which is one of the advantages of Chinese seafarers in the international seafarers' labor market competition(Zhang, 2015). However, with the development of China's economy, the labor cost of our country is also improved accordingly. The advantage of our crew is gradually decreasing and partly because of the decline of competitiveness.

3.2.3 Occupational attraction of crew decreased

With the sustained and rapid growth of China's economy, the income gap between land and sea gradually decreased; the separation of management personnel has made the crew to reduce career development opportunities, and welfare and security has reduced the sense of belonging; Somali pirates have been rampant and maritime accidents have happened, and risks of shipping have increased And so on, which makes the maritime career social status and decent greatly reduced. Coupled with the rapid development of shipping and shipbuilding industry in recent years, the provision of a large number of attractive land-based jobs for experienced and experienced crew members(Lu, 2007). In 2015, The world fleet provides approximately 1,545,000 jobs for seafarers in international shipping (Baltic and International Maritime Council and International Chamber of Shipping, 2016). Approximately 51 per cent of positions are for officers, compared with 49 per cent for ratings, that is, non-officer sailors

such as able seafarer or ordinary seafarer. For the first time in history, the proportion of officers is higher than that of ratings, reflecting technological advances and lower demand for manual on-board work. After the improvement of living standards, the only child of the 80 after 90 after the happiness of the concept of the same time, which not only made some changes and pay more attention to family reunion, and so on, but also makes the seafarer career lost the past attraction. The decline of the social status of senior officers and the attractiveness of seafarers will directly affect the quality of students in maritime institutions and affect the professional thinking and learning motivation of maritime students, thus affecting the quality of maritime talents.

3.2.4 Maritime vocational education diversified training system has not yet formed

Crew education and training capacity-building need to be planned including the formation of a number of diverse levels, rational distribution for different markets of the crew education and training institutions. With the advancement of the integration of institutions of higher learning and the advancement of affiliation, the institutions and the centralized management departments of the former central ministries and commissions and large state-owned enterprises have undergone great changes. China's higher vocational maritime institutions which are also in the tide of this reform continue to grow and develop. In its development process, there are three main categories: the first category is that the original Ministry of Transport and local traffic management departments run the secondary shipping or shipping schools. The second category is that the original central subordinate or large state-owned enterprises run the specialized secondary schools and other local institutions merged or upgraded from the development of the third category is the ship equipment manufacturing professional as the core of the ship Manufacturing institutions from land to water transport from the expansion and evolution. From the current situation, the first category of institutions often puts the maritime professional as the core, the development of a number of shipping-related professional, its maritime professional teaching resources are rich, strong school, school funds have a reliable guarantee timely tracking the changes in the shipping market and international and domestic regulatory changes, and dynamically add the resources of running schools, is the main force of China's maritime vocational education; the second category of institutions is that mostly integrated transport colleges and universities, most road transport professional as the core professional, Because of the large investment, Sailing

major is low efficient of school, which has been a "marginalized" trend, the performance of school funding is insufficient, the schools are not large and not high quality, lack professional teaching resources and added slow; The history of sailing professional are short and have limited resources. The turbine professional teaching resources are richer than the navigation technology, and navigation technology are mostly in the start and development stage. (Jiang et al, 2012) The classification and management system of the crew education and training institutions, the evaluation mechanism of teaching quality, the exit mechanism of the education and training institutions, etc. The diversified crew education and training system have not yet formed.

3.2.5 Shortage of educational resources

The teachers who have sailing experience are so few, from the nautical class of teachers in our country affected by the traditional concept and social factors, a large part of the teachers are directly decided to stay in school after graduation, maritime institutions between teachers There is no regular flow of scientific mechanisms, a large part of the maritime class teachers are not navigational experience, the proportion of senior positions is very low, with the captain, the number of engineers qualified for the number of engineers is very few, which resulted in the maritime education and training cannot be a good combination of theory and practice of the situation. As a result of interest-driven, teachers in the low treatment of the mainland institutions, holders of mobile mobility of teachers, and teachers have a large mobility. On the other hand, it is difficult for the senior staff of the company to establish a more stable part-time faculty member on the land-based professional school, and the appointment and management of part-time teachers are relatively high, and the randomness and unpredictability are large Difficult, so the teachers who are appointed by institutions in the long-term are few, and most of them are who mainly retire or leave the crew.

Teaching facilities and equipment resources are insufficient, and training high-quality navigation personnel needs the equipment must comply with international conventions and China's maritime bureau of the relevant provisions, need to invest a lot of money. Its input is much higher than that of ordinary engineering colleges, and the government investment is the main source of funding our maritime institutions. According to the relevant provisions of the state finance, investment in maritime education is far from meeting the needs of a variety of professional equipment with the maintenance and renewal of the need for a lot of money,

resulting in a number of institutions such as teaching facilities, simulators and other resource shortages, many schools do not have their own Internship ship, teaching equipment resources cannot meet the curriculum teaching and evaluation project training requirements(Jiang,2011).

3.2.6 Maritime Education Interests The good situation of mutual promotion has not yet been formed

From the various forms of maritime education and training, the schools have a large part of the educational responsibilities, but lack understanding of the needs of enterprises and the market, curriculum and training model have continued the experience of the past, the parties are coordinated and communicated, mutual promotion Good situation has not yet formed. The company is only responsible for the recruitment of the crew, how to improve the overall quality of the crew, the crew need to master what skills, did not issue their own voice, and they are the best understanding of what kind of navigational talent. The focus of the work of the government authorities is that the safety of navigation is not enough for the most basic vocational education as a whole in the shipping industry, and the policy guidance for improving the occupancy and social status of the crew and thus enhancing the occupational attraction of the crew not enough. The parties are responsible for enrollment and training, the enterprise is only responsible for the recruitment and the government is only responsible for monitoring the safety of navigation, the parties don't make joint efforts to form a joint, smooth communication channels yet to be established.

CHAPTER 4

Foreign maritime vocational education situation

This paper chooses the representative British and Australian countries as a research, analyzing the maritime vocational education system of the two countries and providing reference for our country.

4.1 The Basic Degree Education System for British Maritime Studies and Its Enlightenment

Britain is a traditional shipping power, and the world's pioneer in maritime education. The research level of the maritime education research is leading in the world position. The shipping industry is essential to the island of the UK, is one of the country's traditional industries, even in the fleet The United Kingdom still insists on building its own crew, through the reform of the maritime education system, to ensure that the British traditional maritime transport industry to the healthy development of the British maritime transport industry, The World Maritime Development Review In the 2016 report, the UK ranked ninth in the world's shipowners.

Table 4.1: Ownership of world fleet, 2016

| Country or territory | Number of vessels | | | Dead-weight tonnage | | | | |
|--------------------------|-------------------|--------------|-------|---------------------|--------------|-------------|-------------------------------------|------------------------------|
| | National flag | Foreign flag | Total | National flag | Foreign flag | Total | Foreign flag as percentage of total | Total as percentage of world |
| 1 Greece | 728 | 3 408 | 4 136 | 64 704 141 | 228 383 091 | 293 087 231 | 77.92 | 16.36 |
| 2 Japan | 835 | 3 134 | 3 969 | 28 774 119 | 200 206 090 | 228 980 209 | 87.43 | 12.78 |
| 3 China | 3 045 | 1 915 | 4 960 | 74 106 227 | 84 778 140 | 158 884 367 | 53.36 | 8.87 |
| 4 Germany | 240 | 3 121 | 3 361 | 11 315 790 | 107 865 615 | 119 181 405 | 90.51 | 6.65 |
| 5 Singapore | 1 499 | 1 054 | 2 553 | 61 763 603 | 33 548 770 | 95 312 373 | 35.20 | 5.32 |
| 6 Hong Kong (China) | 854 | 594 | 1 448 | 67 522 162 | 19 853 100 | 87 375 262 | 22.72 | 4.88 |
| 7 Republic of Korea | 795 | 839 | 1 634 | 16 107 565 | 62 726 629 | 78 834 194 | 79.57 | 4.40 |
| 8 United States | 782 | 1 213 | 1 995 | 8 155 717 | 52 123 421 | 60 279 138 | 86.47 | 3.36 |
| 9 United Kingdom | 332 | 997 | 1 329 | 5 247 009 | 46 194 091 | 51 441 100 | 89.80 | 2.87 |
| 10 Bermuda | 14 | 404 | 418 | 503 077 | 47 950 084 | 48 453 161 | 98.96 | 2.70 |
| 11 Norway | 858 | 996 | 1 854 | 17 576 954 | 30 610 893 | 48 187 847 | 63.52 | 2.69 |
| Taiwan Province of China | 122 | 776 | 898 | 5 094 232 | 41 047 112 | 46 141 345 | 88.96 | 2.58 |

Source: UNCTAD. (2016). Review of maritime transport 2016. Review of Maritime Transport, volume 13(4), 251 – 257.

British education sector, maritime industry and other relevant departments in the field of maritime education have also passed the relevant laws and regulations and established and improved the vocational education based on the qualification and credit framework (QCF) credits accumulating a series of entry-level maritime skills vocational education¹ and the National Higher Education Diploma (HND) Education Qualification System, the framework for merchant navy Foundation Degrees, the National Higher Education Certificate (HNC) and the National Higher Education Diploma (HND) and building the above level and type of education between the "overpass", , which has constituted a talent cultivation system with British multi-mode characteristics(Cheng,2016).

4.1.1 Basic degree education system for British maritime industry

In 2005, under the guidance of the British Foundation for the Advancement of Education, after consulting the relevant shipping companies, trade unions, the Maritime and Coastguard Agency(MCA) and the institutions and institutions of higher education with a long history of navigation and training in marine engineering and engineering, the Merchant Navy Training Board (MNTB) has developed a basic degree system for British maritime studies with the assistance of the Maritime Skills Alliance(MSA). The purpose of the framework is to guide the parties concerned to develop various types of maritime professional basic degree programs that are of great importance to the carriage of merchant ships and to ensure that the conditions for the qualification of the officers of the officers as required by the MCA are met(Sun et al, 2013).

4.1.1.1 Overview of the basic degree education system in the UK

The Foundation is at Level 5 of the Framework for Higher Education Qualifications in England(FHEQ²), which is comparable to the five levels of the UK Qualification and Credit Framework (QCF) and is equivalent to the Scottish Professional Diploma (SPD). According

¹ Include Level 1 Award in Exploring Maritime Skills, Level 1 Certificate in Maritime Skills in Vessel Engineering, Level 1 Certificate in Maritime Skills in Hospitality and Catering on Board a Vessel, Level 1 Certificate in Maritime Skills in Deckhand and Seamanship, Level 1 Diploma in Exploring Maritime Skills

² FHEQ was promulgated by the UK Government Higher Education Quality Assurance Agency in August 2008.

to the Bologna Declaration, the basic degree does not mark the end of the first cycle of higher education (undergraduate level), and requires further study and assessment (ie,an honorary degree certificate)³(QAA,2010).

The UK basic degree is adapted to the needs of the development of higher education and vocational education in the UK. It is tailored to educate people over 18 years of age, with job-based learning, highlighting the training of various skills, which has distinctive vocational education characteristics. (Teaching, auxiliary training, vocational practice), teaching content (curriculum does not exist in the national model), places (school class,workplace), learning schedule (full-time or part-time) are have a certain degree of flexibility to take credits and the conversion, to facilitate the realization of the "side of the work side to learn." After obtaining a basic degree, the educators can continue to study to obtain a higher degree. It is possible for the learners who have not previously considered who have a higher education have the opportunities to achieve further study and lifelong learning, which built a overpass for the General education and vocational education(Dong, 2014).

The basic degree system strengthens the cooperation between enterprises and institutions, and integrates academic education and skills learning, learn from the experiences of setting up and cultivating a long-term higher vocational education in the UK so that educators can learn knowledge and skills according to their professional needs, which meets the requirements of both the educated and the hiring. Basic degree has unique characteristics and different from the other five qualifications and six grade qualification of the initial stages⁴. Basic degree training programs focus on the development of intellectual and practical skills in the curriculum design emphasis on learning to apply, usually at least with a Bachelor's degree to honor the training program convergence. In general, the basic degree has the characteristics of employer participation, accessibility, cohesion, continuity, flexibility, and co-cultivation. Although for each feature, it is not a basic degree of the patent, but in a qualification, only basic degree can be set to integrated the above characteristics as a whole(Liu,2016).

4.1.1.2 Basic degree program for maritime studies

³ See: www.qaa.ac.uk/assuring-standards-and-quality/daput.

⁴ In the UK FHEQ framework, with the level of 5 include: Diploma of Higher Education, Diploma in Higher Education. With the same level of six include: Graduate certificates, Graduate diploma, Professional Graduate Certificate in Education (PGCE), Bachelor's degrees, Bachelor's degrees with honours.

Degree grant request

The granting and awarding of a basic degree must be carried out by an educational institution that are with degree grant rights and ensure that the appropriate criteria are met. Educational institutions such as nautical colleges and further education colleges, which do not have the right to grant degrees, can grant the right to cooperate and carry out joint training under the supervision and authorization of the latter.

Quality standards

The design of the basic degree program for maritime majors is designed to meet the relevant laws and standards of higher education in the country, including "*the UK Quality Code for High-mail Education*", FHEQ, FDQB⁵, etc., and also to meet the relevant industry regulations and standards, including MCA promulgated the "training and certification guide" and syllabus, MNTB joint MSA issued the "National Occupational Standard (NOS)", the IMC promulgated by the STCW Convention(Wang, 2012). The training plan should be designed in accordance with the relevant regulations promulgated by the Quality Assurance Agency for Higher Education(QAA).It should specify the knowledge structure, comprehension abilities, skills and other characteristics that the educator should have to complete the plan. It also needs to explain the specific teaching methods and evaluation matters. The knowledge requirements of the STCW Convention constitute the main skeleton of the basic degree program and the addition of management and leadership skills. The basic degree training program is different from the HND training program, which not only embodies the former is the "work-based learning" and "independent learning and critical thinking ability training" integrated training model, but also reflected the contents of the two learning methods and Evaluation are different(QAA, 2015).

Basisc degree program is integrated with National Training scheme (National Training Schemes) because the navigation class specialized talent training is different from other science and engineering major, which needs to consider both academic degrees on the basis of education, and the STCW convention and MCA standards of competency requirements, therefore the three aspects including school learning and training, maritime performance practice are necessary, and it is difficult to finish just by colleges, which needs completed by colleges and universities,enterprises participating countries. Therefore, MNTB for senior crew

⁵ FDQB: The Foundation Degree Qualification Benchmark FDQB describes the distinctive features of a Foundation Degree as a qualification in its own right at Intermediate level in the FHEQ in terms of its purpose, general characteristics and generic outcomes. <http://www.qaa.ac.uk/reviews/foundationDegree/benchmark/FDQB.pdf>

cultivation integrates basic degree is recommended for the national training plan, and introduced a special guidelines.(Guidelines on the integration of Foundation Degree programs into national schemes for training cadets.) in the guiding principle pointed out that national training programs need to be in Higher Education Institutions(HEIs), Providers and Shipping company,MCA,Professional bodies,MNTB,under the close cooperation of educators to complete.Institutions of higher education are mainly responsible for education quality assurance,diploma recognition, credits of accumulation and conversion,set up an honorary degree path, the training plan framework, etc.Cultivating party responsible for admissions and standards, professional orientation learning scheme design implementation and evaluation, education quality assurance, the student individuality education plan and development plan making, submit to the MCA or MNTB training scheme such as the examination and approval matters, provides the STCW short courses and Marine engineering professional workshop skill learning, etc.Shipping company is mainly responsible for funding opportunities for students, providing professional orientation study on board appointed training, guidance of protecting students practice training on board and ensuring that meeting the requirements of MCA is funded, arrange students to school learning, providing the STCW short courses and Marine engineering professional metalworking practice,etc.MCA is responsible for supervising the implementation of relevant laws and regulations standard and ensuring compatible with STCW convention and related matters, including maritime practice situation, check,free of competency certificate test standards, etc.Professional group is mainly responsible for professional consultation to ensure the training plan should reach the professional level;MNTB mainly is responsible for organizing the navigation class specialized degree in relevant seminars, training scheme of examination and approval, recommending relevant industry introduction to professional standards and providing industry general record book,etc.(Nersesian & Mahmood,2009)

The national training program lasts for three years, including four main elements:

First, the basic degree of navigation professional training program. Achieve 240 credit⁶ of basic degree, the training objectives are: to meet the STCW Convention and Code on Captain /Chief engineer and Chief officer/Second engineer position in the core academic and skills, knowledge and understanding of the requirements;through the transfer of activities management, project management, personnel Management and resource management of the

⁶ 1 credit=10 hours of learning.

relevant knowledge, the initial have a certain management and leadership; have job and career transformation ability; with critical thinking ability, independent learning and research capabilities.

Second, vocational orientation study plan. Drivers in professional orientation study of ship shall not obtain credits that shouldn't be less than 25% of the total credits (60 credits), in the school, in the understanding of the skills, knowledge and ship to achieve mastery through a comprehensive study, promote each other. Engineer's career orientation study and project course (should be reached to the same level of the other engineering professional) total well obtain credits that reach about 25%.

Third, the internship program (not included in career orientation learning). Need to complete the MCA first certificate of competency required for maritime service qualification training and record in the training book.

Fourth, the STCW Convention provides other short-term courses with the Marine Engineering Professional Workshop Skills Learning Program.

The National Training Program, which integrates basic degree education, uses the "third-order five-part" design of the sandwich structure. See APPENDIX C for the integration of the National Training Program for Basic Education (Example of Driver Training Program) and APPENDIX D Integrated National Training Program for Basic Education (Example of Engineers Training Program)(MNTB, 2005).

4.1.2 Establishment and significance of basic degree frame system

Britain set the basic degree of navigation class with strategic and practical significance. In terms of strategic significance, it can contribute to the UK's ability to remain in the world maritime industry leader and be able to win in the competitive world maritime industry; the practical significance lies in the use of the current number of naval institutions and faculty in the UK to cultivate a team of highly qualified British crew members to meet the demands of maritime industry in the number and quality of maritime professionals

One is conducive to remodeling and maintaining the practitioner's maritime skills base. As

early as the beginning of this century, based on the long-term development of the domestic maritime industry and to maintain the prestige in the international maritime sector strategic considerations, the British government thinks that the reshaping and maintenance of the maritime skills of practitioners is the core of the current shipping policy. That Maritime industry has a maritime skill demand for practitioners as a whole. This is reflected in the fact that maritime skills are not only the needs of ocean-going fleet development, but also the necessary conditions of a large number of related industries on the shore who have the experiences of navigating and maritime expertise(Wen & Zhang, 2013).

The second is conducive to improving the level of British seafarers' skills. The British government recognizes that with the overall improvement in the level of global crew education and training, the traditional advantages of high-quality officers in the UK for many years are being challenged and threatened to increase occupational attraction, thus ensuring that the UK still has a higher professional level in the future, which is important for the crew team and technical management personnel team.

Three is conducive to the management of the crew capacity. The study shows that for senior Officers(captain,chief engineer,chief officer,second engineer),the efficiency is more dependent on its management capacity rather than professional and technical ability,so the focus on training senior crew management Capacity and its ability to improve their maritime competence is of paramount importance.

Four is conducive to the crew to raise and promote their career development. Overall, the British maritime industry did not attract enough students to support the development of the industry, especially the maritime industry. At present, the British maritime industry is committed to those who have acquired or intend to obtain higher education qualifications but did not enter the maritime industry graduates to expand the number of crew raised. The basic degree of maritime majors is a key factor attracting the attention of this target group and will serve its lifelong employment in the industry (sea or shore).

4.1.3 Enlightenment of Basic Degree Education System for British Maritime Studies

British navigational degree basic degree system is the British new era of higher maritime

education reform and development of one of the landmark results of China's maritime education, which has a positive significance of reference and important reference value.

4.1.3.1 Build a degree Degree to transform a bridge, update and transform educational philosophy

British maritime class FD, HNC and HND, including vocational education, and degree education, at the same time they established an effective way to convert between the two, so that those who were not originally interested in accepting maritime degree education, in the completion of vocational education And to obtain vocational qualifications, there are ways to continue to study; also those who originally planned to accept maritime degree education, in the appropriate time to choose to continue to complete degree education, or from degree education to vocational education to enter the work link earlier(Dong, 2015). In addition, the learning process of FD model can be accumulated as the British university standard credits and European standards credits, so that students have many choices. China's current maritime education, although they are divided into undergraduate sailing education (degree education), vocational and secondary vocational education (vocational education), there is no good distinction between the three, especially the degree of education and vocational education Between, almost no significant difference, which to some extent caused maritime education resources and waste of talents. At the same time, there are still some barriers to transformation between maritime education at all levels. In particular, the conversion from secondary to higher vocational and the transition from higher vocational to undergraduate are all in the form and can not truly reflect the difference between knowledge and professional skills. In view of this, the education department should refer to the British maritime education and degree transformation between the reform of the existing maritime education system, to build a bridge between the various levels of maritime education to activate the mobility of maritime personnel, so that the development of talent and the layout tends to be reasonable(Wu, 2014).

4.1.3.2 To play the advantages and role of shipping companies to promote the rapid development of school-enterprise cooperation

Shipping industry is a very practical industry, so in the process of education and training personnel we should pay more attention to the cultivation of its practical ability. On the one hand, we must follow the law of higher education to complete the school theory course

education in the higher education curriculum system, and on the other hand, through the experiment, practicing the ability of transforming the theoretical knowledge and skills into practical work. How to balance the two to optimize the maritime professional training model is the key. Due to the historical, social, economic and cultural reasons, in the maritime professional personnel training model, the difference between China and the British is large, highlighting the theory and the practice of teaching time between the distribution. According to the statistics of APPENDIX C and APPENDIX D, the maritime practice and theoretical hours ratios of senior drivers and senior engineer training programs in the national training programs with basic degree education are 53: 47 and 38: 62 respectively, Maritime undergraduate institutions of the maritime professional training program of incomplete statistics, maritime practice and theoretical hours than this value. One of the main reasons for this difference is that shipping companies do not participate in depth, that is, there is no real cooperation between schools and enterprises. British maritime professional basic degree education in the student enrollment has been signed with the shipping business employment agreement, two stages of the sea internship companies are in the company on board the company, the company and the ship according to the school teaching plan arrangements for internship content and equipped with a person responsible for the guidance Supervision and inspection. Since the students who have signed the employment agreement with the company after graduation to the company to work for a certain number of years, schools and enterprises can do their duties, and possess high quality to complete the whole process of personnel training. China has also been engaged in school-enterprise cooperation for many years, but still remain in the form, although some maritime institutions and some shipping companies in the student sea practice signed a strategic cooperation agreement, but the implementation of the situation still needs their own work step by step, however, the effect is not ideal. Shipping companies are the main body of the maritime professionals, which should be involved in the process of personnel training as soon as possible, in particular, to play their own advantages, to provide more internships at sea, and do a good job in the ship practice students guidance, supervision and inspection personnel training aspects of the work(Dong, 2012).

4.2 Enlightenment from Australia 's maritime vocational education

Australia's maritime education, training and research in the international community enjoy a high reputation in the world. Australian federal government attaches great importance to access to the country's rich financial support, taking the normative fund-raising approach, the

relevant institutions continue to develop steadily, the domestic shipping industry and port development play a very important role. This thesis mainly introduces the status of Australian maritime education, summarizes the characteristics of maritime education of Australian Maritime Academy and focuses on the introduction of Technical and Further Education (TAFE) model, and then discusses the lessons and thinking of China's maritime education reform.

4.2.1 Overview of Education at the Australian Maritime College

The Australian Maritime College (AMC) was originally one of Australia's three separate maritime institutions, which is located on the Tamar River in Launceston, Tasmania. The Institute is a comprehensive institution with the marine education as its core which is Incorporated into the University of Tasmania in Australia in 2008. It is a national comprehensive secondary school which integrates vocational education, undergraduate education and doctoral education. The Australian Maritime Institute is also a member of the Commonwealth University Federation and the International Maritime University Alliance, accredited and recognized by the Association, such as the Royal Logistics and Transport Association (CILT), the Australian Maritime Engineers Association, the British Science and Technology Association, the Australian Maritime Safety Agency, etc.

4.2.2 Maritime Education Advantage of Australian Maritime Academy

4.2.2.1 Maritime education legislation establishes the status for the college

The Australian Maritime Academy Act of 1978 was adopted by the Australian Federal Conference and promulgated and, on that basis, founded the Australian Maritime Institute in 1978. This top-down mechanism creates a unique advantage in many institutions of higher learning. Thanks to the high priority attached by the Australian federal government, the school has received abundant financial supports from the state. Under the standard fund-raising approach, the school has been developing steadily and continuously, which plays a very important role in the development of China's shipping industry and port(Zhang, 2002). The Maritime Academy Act defines the functions of the school in both education training and scientific research. This kind of comprehensive university, which takes research as the basic prerequisite for the development of vocational education, has benefited from the

establishment of the Australian maritime education legislation and at the same time, it has improved the level of the university to train the shipping talents for the country, and has an important position in the scientific research and development of the national marine international strategy(Liu, 2013).

4.2.2.2 Educational philosophy is advanced and pragmatic

The concept of Australian vocational education stands at the forefront of international educational philosophy combined with the actual needs of the country, which has established a multi-cycle life-long education model, VET ability-based qualification system and training packages and other educational methods.

.1 Based on lifelong education as the theoretical basis, the implementation of flexible teaching model Australian Maritime Institute of maritime education has broken through the limitations of traditional one - time education, the establishment of the "theoretical study - work - re - theoretical study - re - practice" multi-cycle life - long education model. In the continuous education model, the school provides a series of courses and training system from the professional certificate, undergraduate, master's degree to the doctor. According to the statistics, the average Australian citizen changes the work for seven times during lifetime. Mature lifelong education model makes personal career's interests are met, personal development can be fully realized, and makes the practice of work and theoretical learning cycle to promote each other. This circular education model focused on student-centered concept of the cycle of education model has achieve a personalized development(Liu, 2010).

.2 To capacity training as the core, emphasizing practical

The Australian Maritime Institute focuses on ability-based education, which is based on the ability of the pragmatism to cultivate students' professional competence, cognitive ability, emotional attitudes and values. The ability-based teaching method breaks the traditional teacher-based teaching system, which focused on student-centered and emphasized that different students in different learning situations can adopt different learning strategies, learning contents and learning time as well as different students' learning styles, interests, needs to mobilize the enthusiasm of students to learn and promote the cultivation of all aspects of the abilities (Competency based training). For example, in the hull training room, students make their own ship model, simulate the waves in the laboratory, carry out various

tests; in the cavitation laboratory, the students in the simulation studio, To carry out the results test and apply to the warship design; in the raft training, simulate real night weather training.

.3Use of training packages efficiently and establish national qualification system

During the course of the visit, the understanding and using of the training package was an important topic. A training package is a set of standards and qualifications for identifying and assessing the skills required by learners in a particular industry or business. It is established by the National Industry Skills Council and approved by the federal government. The training package is used by all professional trainers in Australia. It contains the qualifications and individual competence modules (professional competence) that are required to meet the job requirements. The authoritative authority is that the learners can obtain the entire national unity of Australia through pass of qualification; allow individuals and businesses in training to have the flexibility to facilitate learners to participate in training.

How to use the training package for the Australian Maritime Academy:

Select the development project, determine the industry skills association and set the training package in the qualification certificate (28) package, dividing into sub-level, sub-sectors, sub-projects; according to the actual content of the training package, add skills package, capacity unit; determine the development time, records, version numbers, the curriculum forms (a group of courses can form a certificate) and different channels between the channel to get through, to give training institutions assessment guide. The most fundamental is to integrate the national system, industry guidance, government, colleges organically together, ensuring that schools work closely with the industry and teachers, trainers, assessors, students and can obtain valid certificates.

4.2.2.3 Focus on the promotion of teachers' comprehensive ability

There are two main ways for the double faculty trained by the Australian Maritime Academy: the social hiring (captain level) and adding the internship experiences highly graduation in the teaching experience. They not only stress the practical ability of teachers, but also pay more attention to teaching ability. In the teaching process to add experiences on board, more flexible time, the duration of the boat can be long or short, the purpose is to be able to combine with the actual teaching at any time, and going to work with the purpose of teaching and research projects, while not just to increase qualifications. Teachers put focus on teaching

skills rather than crew qualifications. In addition, the school attaches great importance to teachers of scientific research and innovation ability aimed at cultivating research-based and technical teachers. The evaluation criteria for teachers should be implemented in the development of teaching and research, information technology reform, participation in international research and so on.

4.2.2.4 Curriculum system integration

Australian Maritime Academy curriculum system has ample horizontal subjects, and comprehensively improves the overall quality of students; in the vertical term, the integration system of undergraduate - graduate - doctoral students is clear. The school attaches great importance to the cultivation of maritime humanities. In the campus with world-class laboratories, the early residence home when landing is still in use, the steam era voyage with the steam engine also placed in the glass room for people to visit, the existence of these historical sites makes teachers and students have the feelings of the sailing humanistic demonstrates that the school focus on natural history and culture education, which has a rich cultural heritage.

4.2.3 Reasonable application of TAFE model

The specialized vocational education institutions under the jurisdiction of the Australian Government are known as TAFE (Technical and Further Education), the Vocational and Technical Education Institute. For a long time, the Australian government has actively learned the advanced international vocational education development model, and continuously improved the vocational education system to meet the needs of market and social and economic changes. TAFE Higher Diploma is issued by the Australian Government, equivalent to China's higher vocational education level. The evaluation methods of the course are: written response, observation, oral examination, field operation, third party evaluation, certificate, interview, self-evaluation, work piece production, submit case analysis report, video, etc., it requires students to be fully qualified, instead of 60 points for the adoption of standards, emphasizing the practice of operation. Table 4.2 is a number of TAFE courses approved by AMSA. The application of TAFE model has provided great help to the development of maritime education in Australia. Analyzing some of its characteristics, helped to understand the essence of HNA education in Australia and provide references for the

modern maritime vocational education in China.

Table 4.2: TRAINING- APPROVED COURSES

| Deck Officer | Engineer Officer |
|--|--|
| Course and College | Course and College |
| Master (STCW Reg II/2) <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) | Engineer Class 1 (STCW Reg III/2) <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) |
| Master <3000GT (STCW Reg II/2) <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) | <ul style="list-style-type: none"> • TAFE NSW Hunter Institute |
| Master <500GT Master <24m FG (STCW Reg II/2 & II/1) <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • OTEN Maritime Studies • TAFE NSW Hunter Institute | Engineer Class 2 (STCW Reg III/2) <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • TAFE NSW Hunter Institute |
| Chief Mate (STCW Reg II/2) <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) | Engineer Watchkeeper (STCW Reg III/1) <ul style="list-style-type: none"> • Australian Maritime College • TAFE NSW Hunter Institute |
| | Engineer Cadet (STCW Reg III/1) <ul style="list-style-type: none"> • Australian Maritime College • TAFE NSW Hunter Institute |
| | Rating |
| Chief Mate <3000GT (STCW Reg II/2) | Course and College |
| | Chief Integrated Rating Course |

| | |
|--|---|
| <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) | (STCW II/5 & III/5) |
| <p>Mate <500GT</p> <p>(STCW Reg II/2 & II/1)</p> <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • OTEN Maritime Studies • TAFE NSW Hunter Institute | <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • TAFE NSW Hunter Institute |
| <p>Watchkeeper Deck</p> <p>Watchkeeper Deck <500GT</p> <p>(STCW Reg II/1)</p> <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • OTEN Maritime Studies • TAFE NSW Hunter Institute | <p>Navigation Watch Rating</p> <p>(STCW II/4)</p> <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • TAFE NSW Hunter Institute |
| <p>Watchkeeper Deck <3000GT (Yachts)</p> <p>Master <500GT (Yachts)</p> <p>(STCW Reg II/2 & II/1)</p> <ul style="list-style-type: none"> • Australian Maritime College • OTEN Maritime Studies | <p>Able Seafarer - Deck</p> <p>(STCW II/5)</p> <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • TAFE NSW Hunter Institute |
| <p>Deck Cadet</p> <p>(STCW Reg II/1)</p> <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) | <p>Integrated Rating Course</p> <p>(STCW II/4 & III/4)</p> <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • TAFE NSW Hunter Institute |
| <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) | <p>Engine Room Watch Rating</p> <p>(STCW III/4)</p> <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • TAFE NSW Hunter Institute |

| | |
|--|---|
| | Able Seafarer - Engine (STCW III/5) <ul style="list-style-type: none"> • Australian Maritime College • South Metropolitan College of TAFE (Fremantle) • TAFE NSW Hunter Institute |
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Source: Fact Sheet STCW 27 SEAFARER CERTIFICATIONS, Australian Maritime Safety Authority, <https://www.amsa.gov.au/forms-and-publications/fact-sheets/amsa1590.pdf>

TAFE mode has the following characteristics:

4.2.3.1 Marketization of Vocational Education Development

The Australian government will place the vocational education into the market environment, the management model of the government to the school is similar to managing enterprises, and the government will no longer provide full funding, with school funds mainly led by the market. The Government adopted the way the market tender, the Institute to develop training programs. The government has the right to recover the funds. If the college fails to complete the training task, the government has the right to recover the funds. Putting the colleges into the market economy not only promotes the marketization of vocational education, but also makes the colleges in the vocational education competition achieve better development.

4.2.3.2 Perfection of vocational education system

Australia TAFE education model has a perfect life-long education system, and build effective convergence system of vocational qualification certificate, academic certificate and degree certificate. The vocational education and higher education have convergence effectively, the pre-vocational education and post-vocational education can also be closely linked, which fully embodies the concept of lifelong education and reflects the needs of the development of the times. The model has established a legal document to protect the smooth development of vocational education. The training package set by the government, industry, vocational institutions including the certification framework at all levels and national standards of accreditation forms a sound professional skills certification system. The training objectives

and competencies required for each profession should be clearly defined in the training package. The training package has become a training guide for TAFE institutes, which fully reflects Australia's career-oriented and capacity-based educational purposes. At present, colleges are set up in strict accordance with the requirements of the training package.

4.2.3.3 *vocational education leading industry*

Australia TAFE model fully embodies the close ties between vocational education and industry. The Australian government and local governments as well as colleges have industrial advisory bodies, and formulated the "Australian National Training Board agreement" and established the industry Leadership. In the agreement, the leadership of vocational education and training decisions has been established. The organization is composed of experts from related industries and co-ordinated by the National Training Bureau. In terms of the industry needs and vocational training and other aspects, it provides the policy basis for the government, colleges. The organization has handled the relationship between the government and the business and the college, and it can convey the government's immediate policy and attitude to the colleges and enterprises quickly, and can provide the information of the enterprise's personnel for each college. At the same time, the education and training conditions of the colleges are recommended to the relevant enterprises. The TAFE faculties have specific and professional settings basis, carrying out according to the joint development of professional standards, the specific implementation by the various colleges and related enterprises joint arrangements, at the same time, adjusted at any time according to market conditions. Through the highly involved in the industry, the government, the colleges and the enterprises are connected with each other and closely follow the market trends to realize the effective combination of labor demand and supply in Australia and better achieve match in quantity and quality(Zeng & Chen, 2017).

4.2.3.4 *Vocational education management functions clear*

TAFE colleges are jointly managed by the federal government and state governments. The vocational education and training management system are the same and share resources. The federal government and the state government, educational institutions and industries have their clear functions to promote the coordinated and orderly development of vocational education. TAFE colleges are mainly responsible for the implementation of specific teaching,

having no right to develop syllabus and set up courses, but can choose their own teachers and decision-making forms dependently, in terms of the use of funds, they have the autonomy. Australia TAFE model is particularly clear in the management function, supported by the federal government and the state government, the government has two institutions, one is the decision-making body, the other one is the advisory body, responsible for the development of vocational education policy. The development of certificates and diploma specific standards, The specific work by the National Training Director, the federal government and the state government strictly regulate the curriculum of TAFE colleges and the development of the syllabus.

4.2.3.5 Vocational education to establish standardization and humanization

TAFE colleges are established with strict registration standards, only having good teacher conditions and marketing system, and in line with industry standards can register. At the same time, the training package for vocational training and assessment also has strict standards. In Australia, there are 11 industries that have the appropriate training package, and the above mentioned Australian Maritime Academy training package is one of its assessment of the contents of a unified Competency standards and test standards that meet the knowledge and skills requirements of the training package. In addition, the service awareness of the TAFE colleges also reflects its humanity, demonstrates a variety of teaching methods in teaching to meet the student's learning needs, and to provide students with full services during and after the examinations, to provide students with the opportunities to pass the examinations, which puts the interests of students first, and the results put into force after the sign of the students, which fully reflects the TAFE Institute of human education.

4.2.4 Reference and Inspiration from Maritime Education and TAFE Mode of Australian Maritime Academy

4.2.4.1 Maritime education legislation is urgently required

China's maritime education management system is "two-sector-oriented" of the education department and the maritime sector. Maritime education activities must be in line with the provisions of the education authorities, but also meet the maritime bureau on the provisions of maritime training. However, the education authorities and the maritime sector lack the

necessary consultation, and there is no clear responsible entities to bear the main, so that disengagement of management activities conducted according to their own rules. Navigation institutions are difficult to make creative development between the two educational activities. There is no shared resources, co-ordination difficulties, directly restricting the development of vocational education. In the Australian TAFE model, the federal government and the state government are managed together at the same time, the industries and the education sectors are highly involved, the parties coordinate and cooperate with each other, share resources and perform their own duties. China's urgent need to shape the maritime education legislation, clear the main body of responsibility and consultation mechanism, the use of the law will be bureaucratic in the maritime education in the interdisciplinary effect of effective constraints, and in the national financial support, enrollment system, employment methods, practice system, teacher system The formation of legal constraints, from top to bottom to carry out maritime education activities to ensure the effective use of educational resources, unified standards, improve the status of maritime education.

4.2.4.2 improve the curriculum system, the establishment of training packages, build "double teacher" teachers

Reform the traditional theory-based curriculum form, putting the enterprise capacity requirements and professional standards as the purpose of setting the ability-based teaching objectives, curriculum and job are closely related, making the students master knowledge and skills which master the positions as much as possible and analyzing the competency requirements of each job position. Each module corresponds to one or more competencies and sets different teaching objectives for each competency unit. Learn from the Australian TAFE model development training package, making the contents of vocational education standardized and highly linked to the industry. The training package as a vocational education instruction manual, the vocational schools in accordance with the training package to implement the standard was audited by the government, with legal effect, at the same time, to update the content to ensure the timeliness of training packages at any time.

China's vocational education can learn from the Australian TAFE model in the appointment of full-time professional teachers or corporate teachers, pay attention to industry experience, not the pursuit of highly educators, but must have teacher training qualifications and assessment

of four certificates to speed up the "double teacher" construction, and establish the conditions of service and evaluation system of full-time teachers, appropriately improve their welfares, encourage the community to invest in vocational education. Improve the "double teacher" teacher incentive mechanism to enhance the enthusiasm of teachers to learn more, attracting more "double teacher" teachers to join the practice of teaching. Based on the practice of research, develop new training courses to improve teaching and research ability and training services, such as China's Qingdao Ocean crew vocational college in 2014 and 2015, twice in the Arctic channel development research projects, and in 2016 for China Ocean Shipping Group Co., Ltd. shared service center to "Arctic Channel --- ice-breaking sail open ocean new route" as the title of teaching, according to the situation of Arctic channel development and combined with the results of "Yongsheng" ship Arctic navigation, polar navigation ship crew training research, the system explains the practical significance of the development of the Arctic channel and far-reaching impact, combined with theory and practice to improve the level of teacher research and teaching.

4.2.4.3 Change the concept, to build a lifelong and nationalized vocational education environment

China should learn from the mode of vocational education in Australia, establish the supporting relevant mechanisms, and strictly regulate the vocational institutions and related business cooperation mechanism. At the same time, establish employment access mechanism and the institutional standards, require practitioners must obtain the qualification certificate from the legal strict assessment system. Vocational education only meets the market demand standards, in order to better integrate with the market. In the Chinese cultural concept, vocational education is still biased, and the vast majority of parents will choose high school, and continue undergraduate education, who do not want to choose vocational education and conflict with the skills of learning, modern sailing vocational education needs to create a good cultural atmosphere, change the traditional School thinking, eliminate this prejudice, improve the relevant institutional construction, improve the development of vocational education social environment, so that vocational education can be recognized by the whole society. Establish a sound education system, implement the vocational education and general education credits mutual recognition system for basic education, vocational education, higher education to build a good conversion platform for all levels of education to provide a good way to connect, so that pre-service and post-vocational education Effective convergence,

full-time training and effective training in-service training for the whole society to provide open learning resources, so that all types, all levels of staff can find their own training methods and career development space, to promote vocational education and the people.

4.2.4.4 Domestic self-convergence and seeking foreign cooperation

There are only few mainly well-known China's maritime institutions such as Dalian Maritime University, Shanghai Maritime University, Jimei University, Wuhan University of Technology, and a number of specialized institutions such as Qingdao Ocean crew professional college, Jiangsu Maritime Vocational and Technical College, as well as a number of secondary specialized schools. In terms of maritime education, secondary vocational schools, higher vocational colleges and universities are not closely connected with each other. To consider the overall quality of training for students, we should focus on professional training in convergence and consider cooperation with foreign maritime institutions. Australian Maritime Institute and Chongqing Jiaotong University cooperation in marine engineering technology and navigation technology professional international cooperative education project has been approved by the Ministry of Education, and in 2016 formally enrollment. This way of cooperation is worthy of the maritime institutions of the same kind to learn from, and our maritime institutions can send sea, land professional teachers to the Australian Maritime Institute to do visiting scholars or apply for a master's degree, doctoral degree, involved in the other related teaching and research work. Dalian Maritime University has a number of maritime professional teachers to the school to learn training exchange.

In terms of the enterprise participation, the participation degree of China's enterprises in vocational education is not high, initiative and enthusiasm are not high. While the Australian vocational education industry has a high degree of participation, The industry plays a leading role in vocational education, which fully participates in the establishment of training systems and curriculum development. The government should increase the support of vocational education, and increase the financial support for the development of schools for enterprises to provide financial support and preferential policies to stimulate the enthusiasm of enterprises to participate in vocational education. In the Australian TAFE model, the establishment of a diversified investment system, government, enterprises, and individuals can invest in vocational education, open up overseas vocational education market, network teaching, cost savings. China can learn from the Australian school model, to encourage public and private

joint school, to attract enterprises to invest in vocational education, and to encourage vocational institutions to generate income. Vocational institutions can use the resources with the unique advantages for the community or enterprises to provide training, so that schools have the skills to provide services and products, which pursues a better development of vocational education.

CHAPTER 5

On the Reform of Maritime Vocational Education in China

With the decline in the number of enrolled students in maritime institutions, the task of modern maritime vocational education in China is changed from the scale development to the needs of China's rapid development of the shipping industry to adapt to the development of large-scale ships and modern special vessels, which are through the changing of concept of improving the quality of our future maritime crew. Higher vocational education has three major identities of higher education, vocational education and job training. The task of education is not only to teach knowledge and skills to people, but also to improve the personality, to make ordinary students become excellent crew, so that it has a good professionalism, vocational skills, access to vocational qualification certificate, and sailing as a lifelong career. On the way of modern sailing vocational education reform in China, we need the concerted efforts of all parties, make suggestions, recognize their own roles, and earnestly implement their own responsibilities. Through the discussion of the previous chapters, there are many reasons for the problems of modern maritime vocational education in China, and the way of solving is also multifaceted. In this thesis, according to the influencing factors of various stakeholders, the author draws lessons from the practice of Britain and Australia and makes some reform suggestions to the enterprises, institutions, government, crew and other stakeholders.

5.1 Enterprise

Business is the crew of the use of units, the ultimate beneficiaries. The crew for the shipping business to create economic benefits, so the shipping company should bear that the crew to cultivate the main responsibilities. The newly revised New Rule also expressly states that the shipping company shall, as soon as possible, supplement the vacant posts for the parties to the ship with the appropriate certificate of competency. Therefore, shipping companies are a key

part of China's modern maritime vocational education. The shipping companies should take the initiative to fulfill their responsibilities.

5.1.1 Develop planning to strengthen on-the-job education and training for seafarers

The shipping enterprise shall formulate the training and development plan of the crew, strengthen the on-the-job education and training of the crew, and take targeted training according to the types of the ship, the tonnage. The navigation waters and the requirements of the ship's safety management, Business skills and comprehensive quality, to maintain the crew continued to adapt to promote the safe development of enterprises and the healthy growth of the crew. Improve the crew salary system, pay a variety of social insurance for the crew to solve their worries.

5.1.2 Actively participate in strengthening school-enterprise cooperation.

First, the injection of funds, shipping industry and enterprises in the principle of voluntary parties, to the higher vocational colleges to inject funds to send personnel to participate in school management and major matters of decision-making, and schools to grasp the direction of running schools, and even "school-enterprise" By the business executives, directly funded by the shipping companies to set up, direct investment and maritime institutions to run schools, establish an independent, specialist maritime institutions or establish independent accounting of the maritime education base, training centers and other institutions, which has accumulated a lot of experiences, through the direct introduction of foreign navigation education and training resources, in addition to part of the problem of inadequate financing of maritime education, but also on the domestic navigation education in the cultivation of ideas, teaching content and methods have some reference, and a deeper level to develop China's abundant labor resources, such as China's largest shipping companies - China Ocean Shipping Group under the Qingdao Ocean Shipping Association, China Shipping Group held by the Shanghai Maritime Vocational and Technical College, established by the direct investment enterprises, and enterprises and the inherent "blood" relationship and congenital The advantages of cooperation, for many years of useful exploration and practice, to achieve a win-win situation for college and business for China's maritime industry to cultivate a large number of outstanding talents.

Second is to implement order training. Shipping companies can put forward conditions of the talent to school, demand for order-based training and participate in the development of teaching plans and training programs, reform personnel training model and mechanism. Shipping companies can do enrollment with the maritime institutions, learn from the practice of Australia and other countries. Enterprises should sign agreement with students who interested in sailing in advance, then send students to study in the name of enterprise, it not only can mobilize the enthusiasm of enterprises, but also help to solve the students' internship problems and employment problems, the outstanding students from poor family can also be agreed during the study by the enterprise, including tuition fees or even part of the cost of living expenses, then institutions can solve financial problems in some extent. In this condition, enterprises can recruit more satisfying talent at the same time, the school's training objectives will be more clearly, which can effectively reduce the current blindly due to blind enrollment caused by the waste of navigation resources.

Third is to build a practice base. build a practice base with schools and to provide advanced teaching equipment and technology, send professional and technical personnel to do part-time teachers to help schools for skills training of students, so that students can learn real skill. Enterprises can propose a request on the modern seafarers, knowledge structure cultivation of students' professionalism and service awareness requirements, or through dialogue and communication, to find the weak links in teaching, targeted to reform, so that Students will be able to cope with various tests in the future when they work on board. Schools can be based on the actual situation, accept the enterprise teaching content and its effect assessment, the curriculum system, teaching plan, content and methods to make the necessary adjustments or reform, so as to continuously improve the quality of teaching, so that students' knowledge structure and quality can adapt to industry requirements. In addition, internships as an important part of the practical teaching of navigational colleges and universities, enterprises can provide internship base for internships so that enterprises can test the performance of students in the school and school's Teaching effect, and timely feedback in the teaching of the problems, navigational institutions widely exist in the difficult problem of student practice, it can also be partially resolved. Conditional shipping companies can also enter into agreements with maritime institutions to set up corporate scholarships, to meet the conditions, outstanding performance of the maritime students to be rewarded. Although many large-scale Chinese and foreign shipping companies have set up various scholarships in domestic maritime institutions

in these years, it is also possible to increase the intensity and breadth of corporate scholarships in view of the relatively poor areas of the maritime students who are mainly recruited from the middle and western regions. Enterprises format a good reputation among students in the graduation "double election" on the selection of outstanding students, of course, the school should also give the appropriate preferential terms.

Fourth is to develop commissioned training. Enterprises can commies schools to help train staff to save training time, venues, teachers and fees. Due to the professional characteristics of ocean-going crew, maritime institutions and shipping companies carry out on-the-job training is also an important part of school-enterprise cooperation. At any time, in accordance with the latest needs of the shipping industry's own needs and navigation technology, the latest requirements of the international conventions and training methods means the latest changes, the joint development of more targeted crew knowledge update training to explore from the "demand" training to "diagnostic" training changes , Enterprises entrust schools to help train staff, take pulse of shipping companies, develop training programs and innovate training content.

Fifth is to play the advantages of enterprises, open up the channels of teachers on board, arrange teachers take jobs or internship in different companies, different ship type, different routes , create double teacher. In addition, through the relevant experts to go to school for scientific research, academic activities and special reports, exercise teachers research ability, open the academic field of vision, master shipping trends and technical trends, effectively improve the level of teachers. But also to carry out research projects, sharing the results of the project to achieve win-win situation.

5.2 Maritime vocational colleges

Maritime vocational colleges should implement the crew training responsibilities. As a crew education and training institutions, maritime vocational colleges should continue to improve the quality of education and training management system, application-oriented, improve training methods, strengthen the practice training, strengthen the teacher's ability and continue to improve the quality of training.

5.2.1 Teacher aspects

5.2.1.1 improve the teacher assessment system

Sailing institutions should improve the classification of teachers management and classification evaluation methods, develop maritime professional teachers professional titles or job evaluation, employment, assessment, promotion, rewards and punishments and other methods which according to the characteristics of the maritime industry taking teacher participation in the shipping industry technology applications, new product development, social services as the important content of professional and technical positions (title) assessment and job performance assessment .

5.2.1.2 Strengthen the construction of "double teacher" professional teachers

Maritime institutions should regularly arrange teachers engaged in professional courses on board the ship to ensure that teachers' certificates are continuously valid. We encourage school to employ captain, chief engineer in naval practice experience and comprehensive quality as part-time teachers. We should make maritime professional teacher training program which focus on problems of certificate of competency certificate and teacher shortage. We should increase the proportion of teachers with professional experience in maritime navigation, improve the professional teachers to the nautical line of regular practice system, systematically master the technical process, accumulate practical work experience, improve the practical teaching ability; hire shipping senior executives and business backbone as part-time teachers, increase the proportion of part-time teachers step by step, and gradually form a practical skills courses mainly by the corresponding high-level level of part-time teachers to teach the mechanism.

5.2.2 Teaching aspects

5.2.2.1 Strengthen the practice of teaching

We should working closely with the shipping companies, and constantly improve the conditions of training and practice base, improve the proportion of class practice; business participation, system design practice teaching, provided by the school site and management, enterprises to provide equipment, technical and teacher support; Efforts to increase the

students inland river navigation practice and maritime practice internship time to improve students practical ability; make full use of modern information technology, to promote the operation of navigation simulator to enhance the practice of teaching and skills training efficiency and effectiveness; to build school-enterprise interactive information teaching platform to explore the development of the shipping industry, navigation technology applications and other real-time transmission to the school classroom, to promote the reform of professional teaching.

Strengthen the construction of practical teaching conditions. Strengthen the construction of experimental training base inside and outside the school nautical education; encourage and promote the shipping enterprises to create additional training positions, receive student internship and actively promote the formation of national internship fleet.

5.2.2.2 Course design

In the whole modern maritime vocational education, the most critical focus is the college education, and college education needs to be carried out under the scope of the Convention and the domestic laws and regulations, in the meantime, it also needs to meet the market demand, meet the enterprise requirements, accept the teaching evaluation of the department, cultivate qualified crew. The final foothold is at the daily course arrangement, the quality of the curriculum is the core of education, meet the requirements of all parties and successfully complete the teaching tasks need reasonable training curriculum design. In order to ensure the different types of different levels of maritime education and training institutions and different teachers of class quality can achieve the same effect, curriculum design ideas need to career demand-oriented, opportunity work process development, action-oriented teaching design, take students as the main body, design the course content combine knowledge, theory and practice integration , see Figure 5.1:

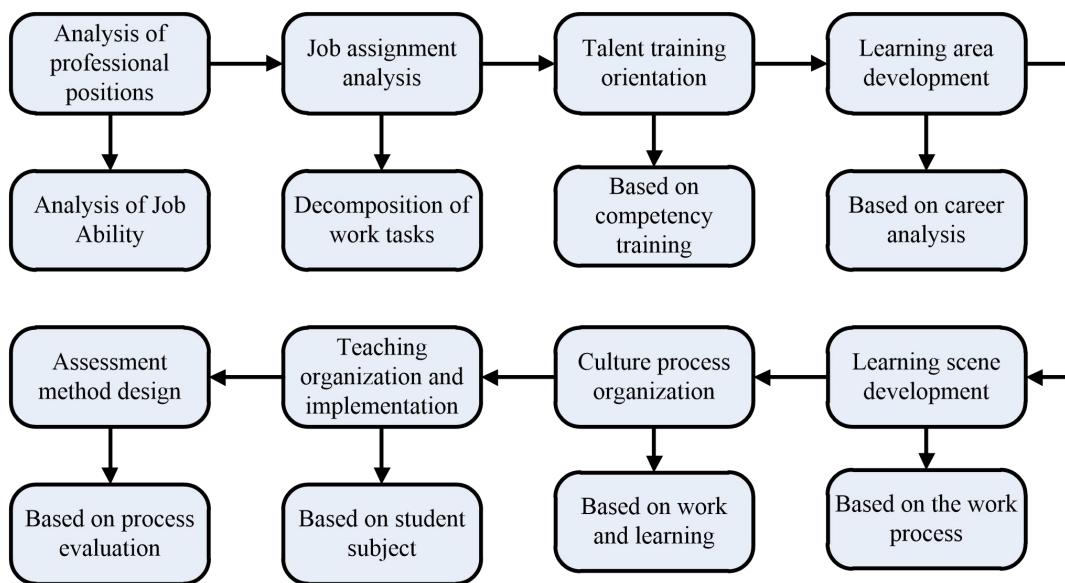


Figure 5.1:Curriculum development train of thought

Source: Jiang, Z.X. Based on the amendment of STCW Manila navigation class specialized teaching reform and practice, pp.248

5.2.2.3 *strengthen the overall quality*

Higher vocational education is employment-oriented and adhere to the education-oriented and moral education first, take strengthen moral education and cultivate people as the fundamental task; we should add socialist core value system, modern enterprise excellent cultural concept into the whole process of personnel training; We should strengthen the legal education and pay attention to cultivate the integrity of students, professionalism and sense of responsibility, compliance with the law awareness; We should emphasis on the comprehensive development of students (1) to improve the quality of education and professionalism, to strengthen the practice of education, to improve the ideological and political work of the targeted and effective; , (2) To promote the quality of education, to enhance students 'self-confidence, to meet the needs of students to grow, to promote students to become talent; (3)to develop students' social adaptability, education students to establish lifelong learning philosophy, improve student learning ability, learn to communicate and teamwork, Practical ability, creativity, employ ability and entrepreneurial ability.

5.2.2.4 *Innovative crew training methods*

We should explore the "one-stop" boat training and practice test mode. We should construct

distance education platform to achieve resource sharing. According to the demand, we should establish crew distance education sites in education and training institutions from large or remote areas.. On the basis of the remote training of the crew, we should consider the needs of the crew training, to promote the crew training, electronic training, the E-maritime process and optimize the education and training resources. We should take use of "Internet +" teaching platform to carry out micro classes, Mu class, flip classroom and mobile classroom teaching, use innovative teaching methods to attract student interest, training high-quality talent which adapt to the development of science and technology

5.2.2.5 Enrollment

First is to improve the characteristics of the professional characteristics of the recruitment policy. We should take measures to actively attract high-quality students to apply for navigation class sailing, continuously carry out maritime majors in accordance with the arduous professional admission policy in advance; we should implement funding policy for college students in financial difficulties to ensure that all maritime students successfully completed their studies; enrollment plan should give priority to the western region to promote educational equity. Maritime institutions should increase publicity efforts to attract more candidates are love sailing and in good physical and mental quality.

The second is to promote the maritime professional graduates on board employment. We should encourage the maritime institutions to strengthen cooperation with shipping companies and seafarers' service organizations, implement the "order-based" personnel training mode, encourage enterprises to adopt compensatory state student loans, set up various types of scholarships and grants to improve the crew working conditions, etc. We should take measures to attract maritime professional graduates on board work. We stodgily strive to research and formulate policies to protect the rights and interests of maritime graduates and further expand the channels of employment of maritime graduates to overseas shipping enterprises.

Third is to establish professional early warning mechanism. We should introduce employment and working condition of graduates by the third party, and use evaluation results as the main basis of adjustment and allocation of enrollment plan. We analysis professional advantages and the trend in the next few years, we should make full use of third-party evaluation of the

enrollment plan dynamic adjustment evaluation, set the enrollment plan, professional settings based on scientific data.

5.2.2.6 Cultural construction

First is to actively carry out foreign exchange and cooperation in maritime education, carry out various forms of foreign exchange activities. We should learn from advanced concepts and experience of maritime education in developed countries, carry out bilateral countries cooperation in running schools in accordance with the law; We should support maritime institutions to recruit foreign students, carry out overseas school and improve our international influence of maritime education.

Second is to carry forward the maritime culture, heritage maritime civilization and strengthen the construction of maritime culture, give full play to the role of cultural education. Sailing colleges and universities should build a number of maritime culture and education base; they should regularly organize summer camps of maritime institutions , trainee boat tour, marine and marine culture theme report, maritime knowledge and skills competitions and other activities. Maritime institutions should use the World Maritime Day, the International Seafarer Day and the China Maritime Day activities as opportunities,, extensively promote navigation culture activities to promote the Chinese maritime culture which based on the campus and the community.

5.3 Government authorities

We should implement the responsibility of the crew training management. Government departments should implement the responsibility of the management and training of the crew education, do overall planning of the crew education and training institutions set up to regulate the crew education and training behavior, improve the quality of education and training to improve the crew education and training policy environment.

5.3.1 strengthen supervision and improve the construction of laws and regulations

First is to carry out the crew legislation to implement the "2006 Maritime Labor Convention" and other international conventions, we should see this as an opportunity to promote the

revision of the "*Regulations of the People's Republic of China Crew*" and its supporting regulations, modify and improve the "*crew health inspection requirements*" , we should establish and improve maritime labor conditions, inspection and crew repatriation, shipowners liability financial guarantee and other legal protection of the legal system of the crew, in line with China's national conditions, to meet the needs of international shipping development of the crew management laws and regulations system to promote Chinese health and sustainable development.

Second is to establish the crew standard system, modify and improve the "People's Republic of China crew training management rules" "People's Republic of China maritime crew crew test and issuing rules", make training methods on board training. According to the competency requirements of the different qualifications of the crew, we should combine with the actual situation and knowledge of the crew training, refine the training content, methods, time and evaluation requirements, the formation of the system of crew training knowledge system. We should develop the crew training program, modify and improve the special training programs of passenger ship, dangerous goods ship, improve relevant training and competency standards. We should work out crew training simulator performance standards, clear that the simulator can be used instead of real ship training subjects, content and specific requirements. We should develop crew training and management of distance education, we should compile the crew of distance education, training platform construction and training concourse production norms.

Third, we should set up the maritime professional quality audit management for institutions of higher learning, the institutions must pass the quality audit management and their maritime professional graduates have the qualification to participate in the crew qualification certificate examination; for the institutions whose the quality system is running well, own high quality personnel training, and good social reputation, we should authorize the certificate of competency and practical assessment of the work in accordance with the relevant provisions of the crew . The maritime authorities shall carry out the training permit system for the maritime education and training institutions. Sailing education and training institutions should establish a "crew education and training quality system", after obtaining the relevant certificate and then apply for certification training, special training, qualified training project qualification, with reference to the British experience, to develop in line with China's national conditions and shipping Industry development of the specialized certification standards.

5.3.2 Overall planning of the crew education and training capacity building.

First, we should accelerate the development of the crew of modern vocational education, the establishment in a wide range of crew education and training system to encourage the crew to continue learning. The relevant departments of the transportation department shall co-ordinate the training and education work of the maritime institutions and training institutions so as to promote the formation of a group of training and training institutions for the crew with different levels and reasonable distribution and for different markets. We should improve the crew vocational education and training infrastructure construction, increase the actual ship and simulator investment, and continue to maintain the effectiveness of training qualifications. We should implement crew education and training institutions classification management, improve the crew education and training institutions of teaching quality evaluation mechanism to explore the third party teaching quality assessment, we should establish the crew education and training institutions exit mechanism. We should promote the introduction of measures to encourage schools and enterprises to run schools to promote shipping companies and education and training institutions to jointly run schools to build a training base to support the excellent captain, the crew involved in teaching and construction of "double teacher" type teachers.

The second is to promote the IMO demonstration courses in China's crew education and training, to further improve the quality of our staff training. We should open our crew training in cooperation with foreign shipping enterprises and training institutions to carry out crew training and learn from the international advanced crew training concept and training model. We should implement the "China-ASEAN⁷ Maritime Education and Training Development Strategy", strengthen exchanges and cooperation with ASEAN countries in the training, and play a more active role in regional personnel training. We should explore the mechanism and mode of training of foreign seafarers in our country, and to further facilitate the participation of crew members from Hong Kong, Macao and Taiwan.

5.3.3 Further regulate the management of seafarers' service market

We should improve the enterprise qualification access mechanism, the establishment of fair

⁷ ASEAN: Association of Southeast Asian Nations

competition, reasonable and orderly seafarer labor market environment. We should promote the value and contribution of the crew, to create a good atmosphere of the crew culture. We should build the crew public service platform, to explore the construction of government-led, business, trade unions, social organizations and other parties involved in the sharing platform, integration of service resources and service capabilities for the crew to provide career planning, employment guidance, legal aid, information consultation and other public services Products that promote crew growth and career development. Give full play to the role of Shanghai International Shipping Center, to promote the establishment of the Chinese crew public service center for the crew to provide public services, to accept the crew complaints, coordination of the crew to deal with emergencies, promote the crew career, promote the development of the crew policy recommendations. We should promote the establishment of the crew casualties litigation cases judicial linkage mechanism, and effectively protect the legitimate rights and interests of the crew. We should promote the establishment of relevant government departments, enterprises, trade unions, social organizations to promote the development of the crew mechanism for cooperation, and fully mobilize the development of social forces service crew. The introduction of maritime institutions or vocational education graduates to participate in the crew examination and job promotion of preferential measures. We should strengthen the basic research, promote education, human resources and social security departments in the crew education and training and social security and other aspects of the introduction of preferential policies, with the relevant departments to promote the study of personal tax benefits of seafarers, to enhance the occupant attraction. We should study international conventions, deepen bilateral and multilateral maritime maritime areas of international cooperation, and actively carry out maritime talks, participate in intergovernmental social security negotiations, safeguard the legitimate rights and interests of our seafarers.

5.3.4 Actively promote decentralization

We should cancel the administrative examination and approval matters that restrict the operation of the crew market, release the vitality of the market, and promote the effective role of shipping companies, crew service agencies and social organizations. Constructing national and local crew service associations and other industry organizations to improve the self-management capacity of the crew market, the development of market operation norms and practitioners of moral standards, and urge member units to effectively fulfill their social

responsibilities and improve the operational capacity of employees and comprehensive quality. The establish the seizure market system, supervise the integrity of the main market operators, improve service quality, and promote the crew industry self-management, self-restraint and self-supervision. Improving the crew to serve the escrow management regulations, rationalize the management relationship, regulate the crew to send services, improve the crew rights protection mechanism, strengthen the government's regulation of the market, and effectively protect the legitimate rights and interests of the crew. The implementation of the responsibility of the parties to the market, the formation of corporate responsibility, industry self-discipline, the integrity of the crew, government supervision and other parties to cooperate with the market supervision system to achieve the orderly competition and efficient operation of the crew market.

5.4 Crew

As a "terminal end" of navigational vocational education, the trainees who want to be a qualified crew need to have excellent overall quality and have their own responsibilities, they need to do the following:

First, the crew should establish the concept of lifelong learning, to seriously study the ability to quickly grow into a crew when in school. After participating in the work, they also need to participate in on-the-job training in time and update the knowledge structure for better work.

The second is to strengthen the physical exercise, as a special occupation, the crew needs higher physical quality of the individual requirements, when sailing in the sea, the crew need to overcome a variety of extreme weather and sea conditions, so students need to strengthen their own exercise to face the complex environment of maritime work . While learning basic skills and expertise, they should strengthen physical exercise.

Third, we pay attention to the cultivation of non-intellectual quality, such as professionalism, service obedience and a high sense of responsibility. On the one hand, the company's management is more stringent, there will be the appropriate penalties in violation of training management rules or training of qualified crew. On the other hand, the domestic crew market competition is more intense, it is a pity if the crew lose their jobs due to these non-intellectual factors. In short, in the driven of economic interests and the development needs, the crew also

need to pay attention to the cultivation of non-intellectual quality.

Fourth, we should pay attention to the adjustment of interpersonal communication and work pressure regulation. Due to the special nature of the sea life and the working environment, the crew's interpersonal relationship has significant professional characteristics and special communication principles. The internationalization of ship manning makes the crew come from different countries, different nationalities, different languages, different customs and rituals work together on a ship, these factors make the ship's interpersonal relationships become more complex. This requires the crew to have a strong ability to adapt, with a variety of races, beliefs and personality of the people, avoid the bad influence of environmental changes and interpersonal communication. Proper handling of the ship's interpersonal relationships not only is conducive to the safety of the ship and the efficiency of the operation of the ship, but also the enthusiasm of the crew work, potential and creative play.

CHAPTER 6

Conclusion

Global shipping shows a sustained downturn trend, China's shipping industry supply side of the structural reform will promote the merger and reorganization of shipping companies to speed up industrial restructuring and upgrading, which is conducive to optimize the configuration of the crew, promote the crew income distribution and other core system construction, make the crew more attractive and has brought new impetus to the development of China's maritime vocational education. China's maritime vocational education in the development process adhere to the market-oriented mode, give full play to the market in the allocation of resources play a decisive role in the training of crew training and management model, application-oriented, and strengthen the quality of training to improve the crew's practical ability and overall quality. We adhere to the problem-oriented, fully mobilize the enthusiasm of all parties, to form a concerted effort to promote the coordinated development of maritime vocational education. We adhere to the goal-oriented, promote the crew to grow, enhance the crew's professional attraction, deepen international exchanges and cooperation, improve the international competitiveness of our crew, service national strategy and shipping development.

It is helpful to promote the development of China's maritime economy and the construction of marine power, it is conducive to promote the implementation of labor employment and foreign labor policy as well as safeguard national interests. It is helpful to enhance the international competitiveness of Chinese seafarers and protect the legitimate rights and interests of seafarers in China, enhance the international status of Chinese seafarers, and constantly strive to improve the level of education and the core competitiveness of the crew, establish a responsible image of the shipping power.

In the whole process of modern maritime vocational education, the government, enterprises, institutions, students and other stakeholders constitute an important factor in vocational

education, all parties are promoting a closed loop including composition needs, education and students tripartite, demands, education and students, these three aspects are in mutual promotion, demands feedback to the college education, educational institutions training students, students meet market demands . The market feedback the condition of students to education, then education readjust the training trainees, and students meet the demand of market. Tripartite interaction forms a virtuous circle, clarify the rights and responsibilities of all parties, which is conducive to simplify complex relationship, find key point and , comprehensively promote the development of maritime vocational education.

The objectives of the various stakeholders are consistent, that is to promote the development of China's maritime vocational education, and then complete the goal of the marine power, in this common goal, through the interests of the parties to the consultation mechanism to take the lead in government officials, the establishment of the industry build a shared platform by government leaders, enterprises, schools, social organizations and other parties involved in the integration of service resources and service capabilities for the crew to provide one-stop education and training, career planning, employment guidance, legal aid, information consultation and other public service products, consultation to solve the problems encountered in maritime vocational education, and promote the development of maritime vocational education.

If the whole process of education adopts the logic of time to divide, the role and responsibility during the process of all parties are very clear. In the early stage, we take market demands as its guidelines, enterprise make use the mode of service packs, commissions, and custom patterns to recruit tailor-made maritime talents from the school and training institutions . The main departments of government in charge of the macro control combined with international conventions and the actual situation, ,and do proper adjustment of the number of institutions All parties work together to improve the crew's sense of honor and attraction, to ensure the stability of the number of enrollment. The government introduced the relevant laws and regulations to promote the seafarer's market and make it more standardized, the interests of seafarers are guaranteed; enterprises strengthen the crew of the literati care and welfare treatment; institutions strengthen the maritime professional construction and improve teaching quality. In the medium term, school conducts admissions and training according to the needs of the market feedback, designs the perfect course, strengthens the theory and practice, and ensures that the trainees meet the needs of the enterprises. Government departments

strengthen the quality of school teaching inspection, carry out teaching assessment and the crew of the examination as well as certification work. In the latter part of the year, the company recruits the crew to carry out the responsibility of cultivating the the shipping enterprise. The shipping enterprises shall adopt to targeted training to enhance crew's business skills and comprehensive quality according to the requirements of different types of ships, tonnage, navigation waters, and the company's requirements for the safety management of ships. Keeping the crew in a sustainable manner and promote enterprise safety development and crew healthy growth. The shipping company shall as soon as possible arrange vacant posts for the parties to hold the corresponding certificates of competency, the crew shall strengthen their vocational skills, perform their duties and choose their posts according to their own wishes, the operational norms of the market, the orderly flow of the crew, integrity mechanism is initially formed.

In the coordination and cooperation between the interests of the parties, for the different markets of the diversified crew training model initially formed, remote and on-site combination of the crew education and training system, the crew skills improve steadily, to cultivate a meet national strategy and shipping development. The crew needs to adapt to the large-scale ship, standardization, professional development trends and meet the need for changes in the mode of transport of ships, the number of crew to adapt to the basic structure is relatively reasonable and quality significantly improved. Towards the maritime vocational education training system to further improve, the market mechanism has been more perfect, the foundation and environment of the crew development have been improved obviously. The crew team has been more adaptable to the needs of national strategy and shipping development. The ability to serve international shipping has been further improved. The goal of transfer the big country in the shipping industry to the strong has been constantly moving forward.

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APPENDIX: A

Crew Satisfaction Questionnaire

Age _____ **Duties** _____ **Company** _____

| category | project | Very satisfied | Satisfied | Neutral | Dissatisfied | Very dissatisfied | Overall satisfaction |
|------------------------|--|----------------|-----------|---------|--------------|-------------------|----------------------|
| Work itself | Satisfaction in boat time | | | | | | |
| | Job stress satisfaction | | | | | | |
| | Play your ability to be satisfied | | | | | | |
| | Work and family conflict satisfaction | | | | | | |
| | Ship condition satisfaction | | | | | | |
| Education and training | Satisfaction with training on board | | | | | | |
| | Satisfaction with company training | | | | | | |
| Wages and benefits | Satisfaction with Total Revenue | | | | | | |
| | Satisfaction in the wages of the ship | | | | | | |
| | Satisfaction with leave treatment | | | | | | |
| | Welfare guarantee satisfaction | | | | | | |
| Working relations | Satisfaction with ship leadership | | | | | | |
| | Relationship with colleagues on board | | | | | | |
| | Relationship with company manager satisfaction | | | | | | |

| | | | | | | | |
|------------------------|--|--|--|--|--|--|--|
| working environment | Promotion space satisfaction | | | | | | |
| | Promotion time satisfaction | | | | | | |
| | Satisfaction of living conditions on board | | | | | | |
| | Welfare guarantee satisfaction | | | | | | |

Note: Please fill in the column that you think will be filled with "√", the questionnaire for the secret way, only for academic statistics, there will be no privacy leak, please fill out the truth.

APPENDIX: B

An Opportunity and Challenge of Modern Maritime Vocational Education in China

Interviewer: Author

Interview time: March 14, 2017

Interviewee: Vice President of Dalian Maritime Vocational and Technical College

Interviewer: I'm glad that you have the time to share your opinions, should we start?

Interviewee F: Ok, let's do it.

Interviewer: Can you talk about the national policy of the development of maritime vocational education?

Interviewee F: At present, our country encourages the development of vocational education, "the decision of state council's to accelerate the development of modern professional education" which was released in 2014, and then the Ministry of Transport and the Ministry of Education issued the development of maritime vocational education, these two policies show the guidance and direction of the development of vocational education.

Interviewer: Can you talk about the current problems and development trends of maritime vocational education?

Interviewee F: At present, China's vocational education is facing a series of problems, including the "last mile" problem, society can not use the talents directly that colleges and universities cultivated, they also have to spend a lot of time and energy on vocational training to meet shipping enterprise's job demands. There are two sides to the training of the crew. One is that the trained crew can not meet the requirements of the enterprise. Another is that the teaching conditions at the navigation college are not good enough. We have not enough funds for education, like other major equipment on hundreds of thousands of yuan, but some professional navigation equipment of a few million, need more funds, but the school can not fully meet your needs.

Interviewer: What are the problems in Vocational Education for seafarers?

Interviewee F: For seafarers, there are two problems. One is the high cost of learning, tuition fees and training fees are very high, for them is a burden. On the other hand, the wages and social status of the crew are relatively low, and their attraction is not enough. There is a very real problem, is the competency test pass rate is relatively low, the crew must spend a lot of time to prepare for the exam, I think this is not reasonable, because the crew is the main operation of the machine, as long as he is capable of driving the ship, in the actual work can work well on the line. From this perspective, I think the difficulty of competency test should be reduced.

Interviewer: Will this change in the future?

Interviewee F: For the future development trend, I think it still depends on the joint efforts of all parties. Led by the government departments, schools, enterprises to cooperate to solve the existing problems. Step by step, and slowly change the bad situation, then, with the prosperity of the shipping industry, navigation vocational education can achieve higher development.

Interviewer: Please combine the actual situation of your institute, talk about some suggestions about the vocational education of maritime?

Interviewee F:As far as our college is concerned, the work we are doing now has three aspects. One is the cooperation with enterprises to open a class, all the students after graduation to work in the enterprise, so tuition and other fees are made by companies, enterprises, schools, the crew of three party signed a contract to regulate the duties of the parties. If this model works well, our college will expand, expand, and work with more companies and open more classes. Second we are doing the right thing college curriculum reform in the period of learning from the teacher took together to study for a long time on the ship, to learn the theoretical knowledge in practical operation, please ship crew also participate in the lecture. This is also a process of learning for teachers, not only to train students, but also to train the teacher. The third is to make suggestions for government departments to make decisions, and hope that the government can help us to reform our teaching.

Interviewer: Thank you for attending my visit. Do you have anything else to add?

Interviewee F:It should be almost all of them. You can also check our information for other ones. If you have time, I can show you around our class. You can also ask crew members for some information.

Interviewer: Thanks again!

Interviewee F:You are welcome.

APPENDIX: C

Indicative model for deck cadet scheme, incorporating Foundation Degree programme (References to 'Level' are to the QCA National Qualification Framework – September 2004)

| Stage | Phase | Duration | Content |
|--------------------------------------|---------------------------|--|---|
| Induction and Initial Training | 1 First college phase | 4 weeks | Company and college induction (3 weeks). STCW Basic Training - Personal Survival Techniques, Elementary First Aid, Fire Prevention and Fire Fighting, Personal Safety and Social Responsibilities (1 week). Theoretical and practical aspects of Proficiency in Survival Craft and Rescue Boats (PSC&RB) and Efficient Deck Hand (EDH) certificates. NB: Examination for PSC&RB and EDH takes place in Phase 5. |
| | | 15 weeks | Level 4 Foundation Degree subjects (credit value in brackets): study skills (10); maths and science (10); ship construction (5); meteorology (10); navigation (10); cargo (10); navigation aids theory (5). |
| | 2 First sea phase | 8 months (approx) | Shipboard induction, familiarisation and development of basic seamanship and seafarer skills. Undertake work-based learning at level 4 (20 credits) based on: ship/cargo operations and bridge/navigation operations. Undertake planned training documented in Training Record Book. |
| Training and Development | 3 Second college phase | 30 weeks | Assess/consolidate work-based learning from Phase 2. Level 4 Foundation Degree subjects: Navigation Instruments (5); Management (20); Engineering (5); College devised (10). Level 5 subjects: Navigation (20); Cargo (10); Management (5); Ship stability (15); Law (10); Research skills (10); College devised (10) |
| Skills development and certification | 4 Second sea phase | 10 months (aprox) | Emphasis moves from basic skills to bridge/cargo handling duties and responsibilities, including understudying the role of the OOW. Undertake work-based learning at level 5 (40 credits) based on: ship/cargo management; bridge/navigation management; management of safety and security of the vessel. Complete programme of shipboard training documented in Training Record Book. |
| | | | 3 weeks |
| | 5 Third college phase | 8 weeks | STCW short courses: Examination for PSC&RB and EDH certificates; GMDSS; Medical first aid; NARAS(O) - simulator; Advanced fire fighting |
| 4 weeks | | Preparation for MCA oral examination for OOW certificate of competency | |

APPENDIX: D

Indicative model for engineering cadet scheme incorporating a Foundation Degree

| Stage | Phase | Duration | Content |
|-------------------------------------|--|----------|---|
| Induction and initial Training | First college phase – semester one | 6 weeks | College induction (1 week), STCW Basic training – Personal Survival Techniques, Fire Prevention and Fire Fighting, Personal Safety and Social Responsibilities, Tanker familiarisation course (if required). Mathematics and study skills bridging programme (4 weeks) |
| | | 19 weeks | Foundation degree programme, level 4 units: Mathematics for Engineers (15), Marine Operations (10), Ship Stability (5 of 15), Engineering mechanics (5 of 10), Heat transfer and combustion (5 of 10), Electrical power (5 of 15), Work based investigation (10 of 15). Undertake 35% of MNTB workshop training skills. |
| | First sea phase | 19 weeks | Shipboard induction, familiarisation with marine operations, undertake basic training tasks within Shipboard Training Record Book. Undertake work based learning at level 4 based on: Risk assessments, two mini investigations based on specific and defined marine operations |
| Training and development | Second college phase – semesters two and three | 31 weeks | Foundation degree programme, completion of all level 4 units: Ship Stability + Ship construction (10 of 15), Engineering mechanics (5 of 10), Heat transfer and combustion (5 of 10), Electrical power & systems (10 of 15), Work based investigation (5 of 15), Marine Management (10), Health and Safety and Risk Assessment (10), Instrumentation and Control Principles (10). Review of cadet performance for progression from Level 4 to level 5 Foundation degree programme, level 5 units: Marine control applications (15), Mechanical Principles (10 of 15), Engineering thermodynamics (10 of 15), Electrical and Electronic principles (10 of 15), Marine Plant Operations (5 of 10), Marine Plant Technology (10 of 15). Undertake 35% of MNTB workshop training skills |
| | Second sea phase | 30 weeks | Development of shipboard operations and skills. Complete programme of Shipboard Training Record Book. Undertake work based learning based on: Investigation on specific and defined marine topic for Engineering Design/Project unit, investigate marine management operations onboard. |
| Skill development and certification | Third college phase – semester four | 21 weeks | Foundation degree programme, completion of all level 5 units: Mechanical Principles (5 of 15), Engineering thermodynamics (5 of 15), Electrical and Electronic principles (5 of 15), Marine Plant Operations (5 of 10), Marine Plant Technology (5 of 15), Business Management (10), Further Mathematics (10), Engineering project/design (15). Award of Foundation Degree Undertake final 30% of MNTB workshop training skills |
| | | 3 weeks | STCW Advanced training – PSC and RB, Advanced Fire Fighting, Medical First Aid, Advanced Tanker Safety course |
| | | 1 week | Preparation of MCA oral examination for EOW certificate of competency |