

Investigate the Possible Impacts of Differential Seafarers' Career Progression on Seafarer Competence in China

Lidong Fan, Dr Jiangan Fei, Dr. Capt Ulf Schriever, Dr Si Fan

Australian Maritime College, University of Tasmania

With the rapid development of advanced science and technology, the frequency of marine accidents caused by external factors, such as haphazard breakdown of engines or disastrous weather, is declining; while internal factors related to the human element remain the dominant contributor to such incidents. In order to minimise mishaps associated with the human element, seafarers must keep pace with the fast development of modern ships. The safety and security of ships and those on board and the preservation of the marine environment depend very much on the professionalism and competence of seafarers. This has been well embodied in the recent international conventions as well as some national regulations. In addition to the Maritime Labour Convention 2006, the Manila Amendments 2010 are of supreme relevance to the improvement of seafarer competence. China has introduced some new regulations and amended some existing ones to improve the competency of Chinese seafarers and to ensure the overall effective implementation of the Manila Amendments 2010. The Regulations on Competence Examination and Certification for Seafarers in China, 2004 were amended in December, 2011. China has developed a relatively comprehensive system related to seafarers and maritime education and training institutes have undergone great changes accordingly. One of the major ones is the introduction of the regulations on differential seafarers' career progression. Since the regulations are relatively new, little research has been done to evaluate possible impacts on Chinese seafarer education. The purposes of this paper are to: a) compare the different pathways now available in China for seafarer career progression; and b) examine the possible impacts of the new regulations on the quality control of maritime education and training and the seafarer competence in China.

Keywords: Maritime education and training; Chinese seafarers; career progression; seafarer competence; STCW; Manila Amendments

1. Introduction

In order to ensure that necessary global standards will be in place to train and certify seafarers to operate technologically advanced ships in the near future, the "Manila Amendments" were adopted at a Diplomatic Conference in Manila, the Philippines, held in June 2010 and entered into force on 1 January 2012, with a five-year transitional period until 1 January 2017 under the tacit acceptance procedure. The Amendments are of great significance in shaping the short and medium-term education and training of seafarers and their respective careers at sea. The role of seafarers in shipping is becoming increasingly salient these years. Efforts are being made to recognise the importance of the human element where seafarers and their roles in world shipping are concerned [1]. Various technologies have been introduced to relieve human operators from repetitive tasks. However, technology itself is subject to failures, and the Man Machine Interface (MMI) may bring more complications [2].

Research reveals that seventy to ninety per cent of recent major marine incidents are related to the human element [3] and research and investigation need to focus on people who have to cooperate with each other on board [4]. The safety and security of ships and those on board, and the preservation of the marine environment depend very much on the professionalism and competence of seafarers. In order to acquire this professionalism and competence, seafarers must undergo sufficient and high quality maritime education and training (MET) beforehand. This has been well embodied in the Manila Amendments 2010 and recognised by China as a member state of the International Maritime Organization (IMO).

In order to promote the competency of Chinese seafarers and to ensure the overall effective implementation of the Manila Amendments 2010, a series of ancillary regulations has been introduced or amended in recent years in China. The educational and training process in maritime education and training institutes is to a great extent influenced by the IMO legislative activity [5]. For example, the Regulation on Competence Examination and Certification for Seafarers in the People's Republic of China 2004 (Regulation 2004) [6] was amended and adopted by the Ministry of Transport of the People's Republic of China (MoT) as a new regulation in 2011 (Regulation 2011) [7] against the background of the Manila Amendments 2010. As a result, Chinese MET institutes have undergone great changes, one of which is the introduction of the differential seafarers' career progression with an aim to control and improve the quality and competence of seafarers in different professional positions. The concept of the differential seafarers' career progression is seen as offering more alternative progression paths for prospective seafarers with different academic qualifications. In order to make these alternative progression paths practicable, MET institutes must develop well-balanced curricula to guarantee well-designed and internationally recognised programs leading to higher qualifications and certifications for seafarers as they advance their careers [5]. This paper aims to a) compare the different pathways now available in China for seafarer career progression; and b) examine the possible impacts of the new regulations on the quality control of maritime education and training and the seafarer competence in China.

2. Seagoing Service Requirements under Related Regulations

The IMO strongly emphasises the quality and competence of seafarers who must adapt themselves to the increasing complexity of technology and management on board ships. Since 2001, IMO has started to place human element considerations at the centre of its work to reduce shipping-related accidents and to lessen related consequences. The International Safety Management (ISM) Code and the 1995 Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) are the most important instruments, both of which are concerned primarily with people rather than technology. The ISM Code deals with corporate management and sets out how shipping companies must establish effective structures and procedures that create and promote a safety culture, while the STCW deals with seafarers and the standards to which they must be educated, trained and certified [8].

Some countries have put in place processes for progression to encourage ratings to become senior officers. In China, Regulation 2011 lays out a path for ratings to move through the ranks to senior officer positions in order to make the occupation more attractive to young persons. The new policy emphasises seafarers' practical sea experience rather than stringent academic qualification for career

progression. This means seafarers with lower academic qualifications can progress to the captain or chief engineer position by undergoing required training and prolonged seagoing service. The onshore training, ranging from 3 months to 24 months, must be carried out in MoT-recognised training institutes. For a Chinese seafarer with a bachelor degree who wants to progress to the master or chief engineer level, the requirement of total seagoing service (including on board training) by Regulation 2011 is 12 months shorter than that required by Regulation 2004. Low academic qualifications may be supplemented or made up by prolonging seagoing service [7]. The requirements of seagoing service for different positions are detailed in Table 1.

Ranks	Regulation 2004 [6]		Regulation 2011 [7]	
	Bachelor degree	High school	Bachelor degree	High school
Master/chief engineer	18m	N/A	18m	18m
Chief Mate/chief engineer	12m	N/A	12m	12m
Second officer/third engineer	12m	N/A	12m	18m
Third officer/fourth engineer/ETO	12m	N/A	N/A	30m
Able seafarers	Nil	N/A	Nil	18m
Ratings	Nil	6m	Nil	6m

Table 1 Comparison between Regulation 2004 and Regulation 2011 relating to seagoing service requirements

3. Seafarers' career progression paths

In China, the 9-year compulsory education includes 6-year primary and 3-year junior high schooling. After this, students can choose 3-year senior high school or vocational school education [9]. After the national higher education entrance examination, the majority of senior high school graduates will go onto higher education comprising 4-year universities or 3-year vocational colleges [10]. Generally, students with higher examination scores go to universities while those with lower scores go to vocational colleges.

The new seafarer career progression approach primarily aims to improve the attractiveness of a seafaring career while meeting international and domestic standards. In China, a major quandary in the industry is that those who are deemed academically suitable for career progression are often unwilling to spend their working life at sea while those with a lower education level are more inclined to remain at sea for longer. The new regulations are designed more preferable for the latter group: an enticement to stay on as active seafarers and to advance to the top of the profession.

According to Regulation 2004 [6], lower education qualification, for example, high school education or below, was a barrier for seafarers to progress to an officer position in China. This barrier was removed in the new regulation system for seafarers in China in recent years. Nowadays, it is possible for seafarers to progress to the top position with only high school qualification, although the master of a passenger ship serving on a voyage of 50 nautical miles or more between two ports must hold a tertiary degree or above according to Clause 8 of Implementation Rules of Regulation 2011 in China [7].

Data from the Ministry of Transport of the People's Republic of China [11] showed that, in 2014, there were 1.97 million seafarers and 155 seafarer education and training institutes, including 18 four-year universities, 32 three-year vocational colleges, 42 two-year vocational colleges and 63 training centres. With a total output of 9,000–12,000 nautical graduates every year, research finds that 42% per cent of nautical students will work on board ships for 1–5 years while 4% will not choose seafaring at all [12]. This high drop-out rate poses a great challenge for China in maintaining an experienced and skilled workforce to operate its ever expanding merchant fleet.

As far as candidates with different academic backgrounds are concerned, those with a higher education qualification have faster career progression than those with lower education background. Maritime students with tertiary degree or above can become officers serving on international voyages, while maritime students without tertiary degree have to serve as officers on near-coastal voyages before being eligible to work on international routes.

Figure 1 illustrates seafarers' progression paths with different educational qualifications. The time shown in the flowchart is the minimum requirement. As far as the total length of progression is concerned, only the first part of career progression (before progressing to second officer or third engineer) is different across different pathways while the second part of career progression is the same.

For a maritime university graduate, the progression to captain or chief engineer is the fastest one. After passing all examinations and evaluations for a Certificate of Competency (CoC) and complete a 12-month on-board training, the candidate can become a second officer (2/O) or a third engineer (3/O). After that, the candidate can continue to progress to chief officer (C/O) or second engineer (2/E) after 12-month seagoing service, 3-month theoretical preparation training in recognised training institutes and 3-month on-board training. With another 18-month seagoing service, 3-month theoretical preparation training in MoT-recognised training institutes, and 3-month on-board training, the candidate can then progress to captain or chief engineer level provided that the candidate passed all examination requirements. The minimum total length of their career progression for maritime university graduates is therefore 54 months. For a maritime vocational college graduate, the candidate has to become a 3/O or a 4/E or an electro-technical officer (ETO) before progressing to 2/O or 3/E, which requires a minimum of 12 months. The total length for their career progression is 72 months, 18 months longer than their tertiary graduate counterparts. Two-year vocational school graduates have to apply for near-coastal junior officer positions before oceangoing ones requiring additional 12 months in their career progression. The total length of their career progression becomes 84 months. Non-maritime engineering college graduates, due to their lack of maritime training experience, need 18-month maritime training before becoming eligible candidates as 3/O or 4/E or ETO serving on oceangoing ships. The total length of career progression for them is 90 months, 18 months longer than their counterparts from 3-year maritime-related vocational college. The longest pathway exists for students with only high school education qualifications, totalling 130 months, because they must start as ratings and it takes at least 88 months for them to become a 2/O or 3/E as compared with 12 months for graduates from 4-year maritime-related universities. The differences in the length of progression of different pathways reflect the importance and benefits of maritime-related academic qualifications while at the same time acknowledge the possibility of people of non-maritime and lower academic qualifications progressing to senior positions.

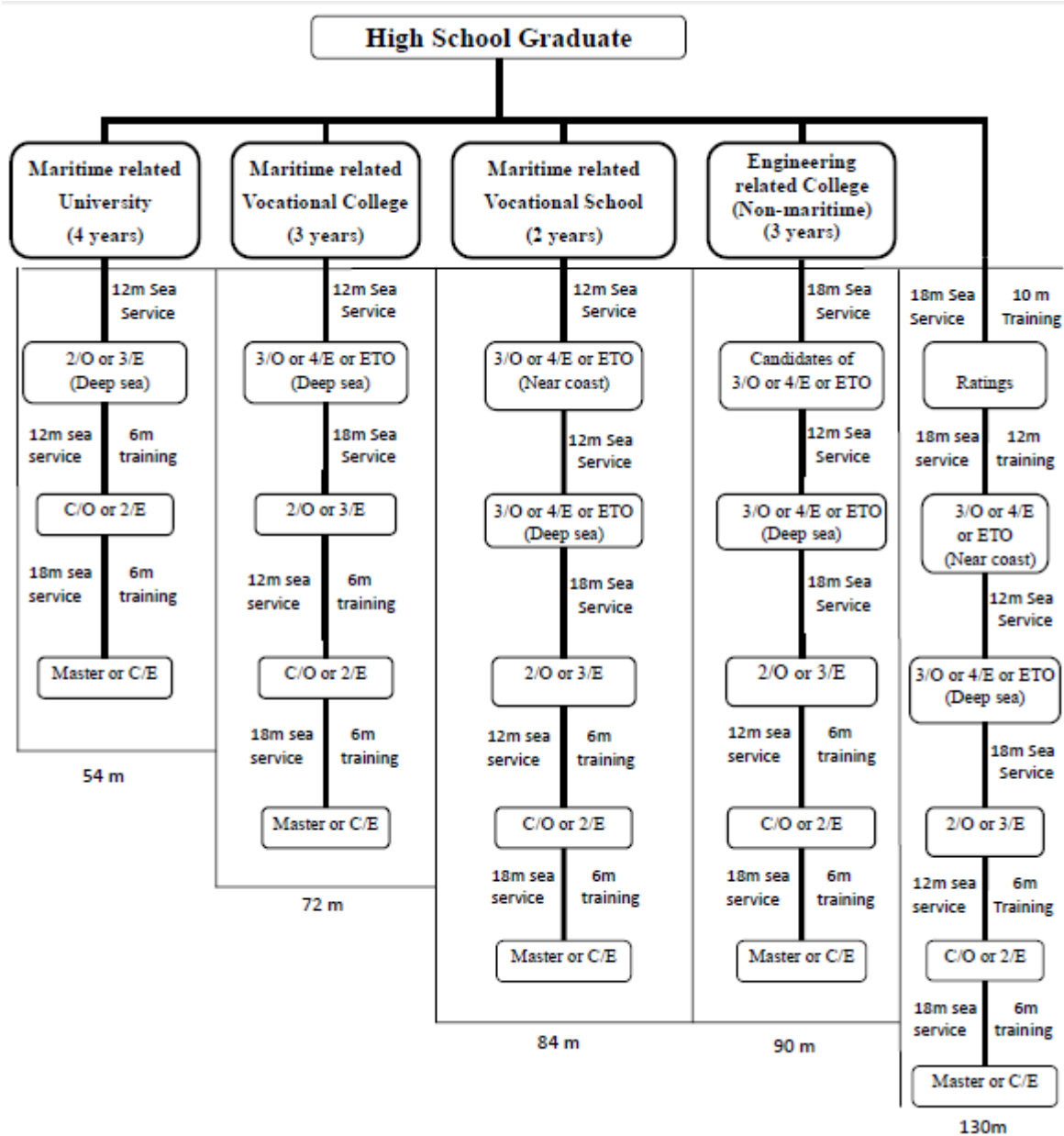


Figure 1 The Minimum length of career progression via different pathways (m: month)

4. Discussions

4.1 The effects of adjustment of requirements for educational qualification

Due to China's economic development, there is little wage difference between ratings at sea and workers onshore. The increasing wage levels of onshore jobs have made seafaring unattractive causing many ratings to drop out in recent years since they could not progress to higher positions under Regulation 2004 due to their lower educational qualifications. In view of the characteristics of seafaring, much emphasis is placed on the practical experience instead of academic qualifications under Regulation 2011. The lowered requirement for academic qualifications can attract more candidates for senior officers on board. It provides a possible channel for ratings of lower education to

progress to top positions. Generally, seafarers starting from ratings have more practical experience and get used to the life at sea earlier than those with higher educational qualifications. Research shows that seafarers with a lower educational background are more determined to work at sea and have lower drop-out rate than those with higher educational qualification [13]. It is, therefore, hoped that the new channel will not only allow ratings of outstanding capability to progress to top positions, but also mitigate the shortage of senior officers in China in the long term. Furthermore, although the employment rate of nautical graduates in China remains above 95% [12], data show the drop-out rate of senior officers with bachelor degree is up to 70% to 80% during the span of 5 to 10 years at sea [14]. The reason for this is that there are many shore-based job opportunities for seafarers who have bachelor degrees and some seafaring experience. The rationale behind offering a shortened career path is to keep officers at sea in top positions for longer so that they can fully utilise the knowledge acquired at university.

4.2 The effects of incorporating on-board training into practical teaching

On-board training is included in practical teaching under Regulation 2011 as one part of approved education and training [7], which again highlights the importance of practical knowledge and experience. Without approved on-board training, students cannot apply for the examinations and evaluations for a CoC. The new approach of incorporating on-board training into practical teaching has shifted the responsibility from shipping companies to MET institutes to provide required on-board training opportunities for their students. Due to the very high cost involved, only a small number of institutes can afford the financial burden of owning a training ship. As a result, many institutes have to cooperate with shipping companies to facilitate on-board training. Otherwise, they might be eliminated from the business. The cooperation strategy and elimination process, to some extent, may ultimately contribute to the quality control of maritime education and training in China.

The new approach not only allows students to accumulate sea experience, but also helps them get used to work and life at sea earlier. It may be an effective practice and experience for junior officers of higher educational qualification who find it difficult to get used to the real working and living environment on board [15]. The earlier they experience the real working environment, the better they will be prepared for their future work at sea. The “sandwich” model of learning in institutes, going to sea and coming back to learn in institutes, is considered an organic combination of theory and practice.

4.3 Effects on maritime higher education in China

Regulation 2011 will affect maritime higher education in China since seafarers do not have to formally enrol in maritime colleges or universities any more to obtain their maritime-related academic qualifications in order to progress to top positions. Consequently, maritime colleges and universities might lose market share on student recruitment, creating a new challenge to maritime higher education institutes when prospective seafarers have alternatives to progress to the master or chief engineer level. Generally, there is no salary difference between masters of different academic qualifications. It can be expected that some senior high school graduates may choose to take maritime training rather than higher education to start their seafaring careers due to the significant expenses on tertiary education in China. Maritime higher education providers, thus, need to strengthen their competitive advantages to attract prospective students because fewer people would be willing to pay high tuition fees and spend

four years in a university without seeing concrete benefits. In some cases, some shipowners prefer to place and financially support some prospective officers in institutes. In order to reduce their investment costs, shipowners may prefer generic engineering graduates to maritime students who have higher education qualifications. If shipowners have to financially support nautical students for their 4 years of education, then it would be more cost-effective for them to support generic engineering students to take 18 months maritime training to become a 3/O or 4/E. All these factors may affect the scale of student recruitment for maritime higher education in China.

4.4 Challenges for the implementation of Regulation 2011

Notwithstanding the differential career progression for seafarers of different academic qualifications, the standards of examinations and evaluations for CoC apply to all prospective seafarers. It is a great challenge for candidates with lower academic qualifications to pass the national examinations and evaluations for CoC. It is anticipated that, the pass rates of CoC examinations for students of lower academic qualifications are significantly lower compared to those with higher academic qualifications. Meanwhile, it is a known fact that in China the pass rate of maritime English examination is always the lowest, which might discourage some prospective seafarers with lower academic qualifications from pursuing higher positions. Moreover, IMO raises the standard of seafarers' maritime English proficiency in STCW 2010 [16], requiring that companies are at all times responsible for effective oral communication onboard their ships, which may become a challenge for some candidates of lower educational qualifications.

5. Summary and Conclusion

Regulation 2011 introduced two new career progression pathways. A lack of higher education qualifications can be supplemented by prolonging seagoing service, which allows seafarers of lower academic qualifications who are keen to pursue a seafaring career to fulfil their dreams. The fact that students of generic engineering majors can now choose a seafaring career after 18 months of maritime training has greatly enlarged the recruitment pool for prospective ship officers. The Regulation will encourage more new entrants to pursue their career for longer and consequently contribute to the sustainable development of the Chinese seafarer workforce.

University graduates are encouraged to remain longer at sea by shortening the time needed to progress to the master or chief engineer level. Again, the overall active seafaring career can be prolonged as a result. Substandard training institutes may be eliminated by the heightened standards of practical training under Regulation 2011. All these will have a positive impact on the quality and competence of Chinese seafarers as a whole.

Notwithstanding the additional two progression pathways to the master or chief engineer level, candidates may face challenges in reality. The examinations and evaluations for CoC are always the greatest challenge for them, particularly maritime English examination. The new regulation is still in the early stage of implementation. It will take years to show the full effects of the regulation on seafarers, MET institutions, and the Chinese shipping industry as a whole. Further research is required to examine the effectiveness of the implementation of Regulation 2011 in the future.

References

- [1] Trenkner P, Cole CW, "The STCW Manila Amendments and their Impact on Maritime English", *Constanta Maritime University Annals*, (2012), p 17.
- [2] Schager B, "Human error in the maritime industry: how to understand, detect and cope", *Marine profile*, Sweden, (2008).
- [3] Andersen TT, "Introductory Address", *Seafarers International Research Centre Symposium Proceedings (2011)*, Cardiff: Seafarers International Research Centre (SIRC), (2011).
- [4] Horck J, "An analysis of decision-making processes in multicultural maritime scenarios", *Maritime Policy & Management*, Vol 31, (2004), pp 15-29.
- [5] Albayrak T, Ziarati R, "Training: Onboard And Simulation Based Familiarisation And Skill Enhancement To Improve The Performance Of Seagoing Crew", *International Conference on Human Performance at Sea, HPAS 2010*, Glasgow, Scotland, UK, 16th-18th June, (2010).
- [6] MOT, "The Regulations on Competence Examination and Certification for Seafarers in the People's Republic of China", *Gazette of the State Council of the People's Republic of China*: Ministry of Transport of the People's Republic of China, (2004).
- [7] MOT, "The Regulations on Competence Examination and Certification for Seafarers in the People's Republic of China", *Gazette of the State Council of the People's Republic of China* Ministry of Transport of the People's Republic of China, (2011).
- [8] O'Neil WA, *IMO-globalization and the role of the seafarer*, Edited by: Organization IM. London: IMO, (2001), pp 1-3.
- [9] MOE, "9-year Compulsory Education", *CHINA.ORG.CN*: Ministry of Education, (2014).
- [10] Wang S, "A History of Rural, Economic, and Social Policies in China", *The Centre for Social Development at Washington University in St. Louis*. <http://csd.wustl.edu/Publications/Documents/WP08-13.pdf>, (2008).
- [11] MOT, *Information Platform for Seafarers and Institutes*, Beijing: the Ministry of Transport of the People's Republic of China, (2014).
- [12] Fei J, Lu J, "Analysis of students' perceptions of seafaring career in China based on artificial neural network and genetic programming", DOI: 10.1080/03088839.2013.873545, *Maritime Policy & Management*, (2014), pp 1-16.
- [13] Mou D, "Analysis of Causes and Countermeasures of Seafarers' Mobility in Company A", *China Water Transport*, (2009), pp14-17.
- [14] Cha W, "Analysis of Seafarers' Turnover Rate in State-owned Shipping Companies", *Science Technology and Industry*, Vol 13, (2013); pp 96-99.
- [15] Smith M, Roggema J, "Emerging organizational values in shipping: The matrix organization—towards a multiple skill structure", *Maritime Policy and Management*, Vol 7, (1980), pp 241-254.
- [16] Trenkner P, Cole C, "Raising the Maritime English bar: The STCW Manila Amendments and their impact on Maritime English", *Proceedings of the 22nd International Maritime English Conference*, (2010), pp 3-16.