

## A study on a China's pilot training regime

Weifeng Li†, Jiagen Yu† & Robert Desrosiers‡

Dalian Maritime University, Dalian, People's Republic of China†  
US Navy, United States of America‡

**ABSTRACT:** This article provides an overview of the initial and periodic training required by maritime pilots directed by the China Maritime Safety Administration in accordance with IMO's (International Maritime Organization) A.960 *Recommendation on Training and Certification and Operational Procedure Maritime Pilot other than Deep-sea Pilot* and China's pilot training requirements. The article, then, goes into some detail describing how pilot training is implemented in China, when considering the course setting, class hour arrangement, theory and practical class distribution of different classes of pilot, as well as trainers' qualifications. Based on the results of the Chinese pilot training regime, the recommendations being made are not only to improve China's pilot training programme, but also to establish where China's best practices may be implemented in other countries engaged in pilot professional development.

### INTRODUCTION

Entering and exiting a port is often considered the most dangerous portion of a ship's voyage due to navigational hazards and traffic congestion. Captains of seagoing ships have no way of memorising and becoming accustomed with the meteorology, hydrology, topography and port operation practices of every port. Hence, they must request the assistance of local experts, harbour and river pilots, to provide them with advice. The pilots are specially engaged to guide ships entering or exiting a port, and berthing operations without relieving the captain of their responsibility and duties. Every day pilots have to operate different ships from various countries, which involves an in-depth knowledge of ship operating characteristics and local waters, as well as the ability to work across cultures.

Maritime pilots play an important role in promoting maritime safety and protecting the marine environment, as well as maintaining the high standards of pilotage services already established in China and in many other countries [1]. Since each pilotage area requires highly specialised experience and local knowledge on the part of the pilot, the International Maritime Organization (IMO) and the International Maritime Pilots' Association (IMPA) did not intend to become involved with either the certification or licensing of pilots or the systems of pilotage practiced in various countries. Rather they laid out a set of standards to enable countries and pilots to achieve the best possible outcome.

In China, this is achieved through the Maritime Safety Administration (MSA) of the People's Republic of China, which is responsible for the certification or licensing of a maritime pilot through the testing and assessing of the experience, qualifications and suitability of an applicant. MSA administers its maritime pilots' certification and licensing programme through the *Regulations on Pilot Registration and Qualification Management for Pilots of People's Republic of China* [2], which incorporates IMO's Resolution A.960.

This article provides an overview of the initial and refresher training required by pilots in China, followed by a description of how China implements pilot training, class hour arrangement, theory and practical class distribution for different classes of pilot. The qualification and experience of the trainers is also discussed. Based on the results of China's pilot training regime, recommendations have been both for improving China's pilot training programme, and establishing where best practices identified in China can be implemented in other countries.

### CHINA'S PILOTAGE SITUATION

With the development of the global economy, China has made an increasingly important impact on the global waterborne trade. According to international practices and China's national regulations, foreign, as well as some Chinese registered ships arriving and departing from China's ports, are required to take a pilot aboard. This is not only required to guarantee the safety and reliability of ship and port schedules, and maintain public security and stewardship

of the port environment, but it also functions as a means of ensuring the nation's sovereignty over territorial waters, as well as performing a national defence security function.

China has 45 maritime pilot organisations and a total of 1,704 pilots that include 926 first class pilots, 489 second class pilots and 289 third class pilots [3]. China's pilots comprise almost 14% of the world's pilots. Since 2011, China's pilots have been safely guiding over 1,000 ships a day in and out of Chinese ports. China's pilots are comprised of two basic groups, seaport and river port pilots, divided into three classes: first, second and third class pilots. First class pilots represent the most experienced pilots, while the third class pilots are the least experienced.

#### COURES REQUIREMENTS FOR PILOT TRAINING

The Department of Training and Certification of China's MSA having taken into consideration the functions and responsibilities of China's pilots and the IMO's A.960 recommendations for pilot training, in order to develop a well-defined syllabus for each class of pilot licensure, as shown in Table 1. The training requirements address the characteristics and requirements for each class of pilot. The courses fall into two assessment categories: written assessments and practical assessments.

Table 1: Pilot training courses [4].

Course Pilot class	Written assessment courses								Practical assessment courses		
	Ship handling	Ship collision avoidance	Port, hydrology and meteorology	Duties and maritime laws	Marine traffic engineering	Pilot's English	Ship collision avoidance and ship signals	Channel and pilotage	Pilot's practice	Listening and speaking of pilot's English	Incidents investigation and analysis
<i>Seaport pilots</i>											
Third class	✓	✓	✓	✓		✓			✓	✓	
Second class	✓	✓	*	*		✓			✓	✓	
First class	✓	✓			✓	✓			✓	✓	✓
Change of pilotage area			✓	✓					✓		
Change to river port pilot				✓			✓	✓	✓		
Refresher	✓		✓	✓					✓	✓	
<i>River port pilot</i>											
Third class	✓					✓	✓	✓	✓	✓	
Second class	✓			*		✓	✓	*	✓	✓	
First class	✓				✓	✓	✓		✓	✓	✓
Change of pilotage area				✓				✓	✓		
Change to seaport pilot		✓	✓	✓		✓			✓	✓	
Refresher	✓						✓	✓	✓		

\* Sea/river second pilot candidates who already have a third class pilot's license are exempt from these tests

According to the IMO Resolution A.960 *Recommendations on Training and Certification and Operational Procedures for Maritime Pilots other than Deep Sea Pilots*, pilot training should cover the study of the IMO Standard Maritime Communication Phrases (SMCP), when the pilots are not native English speakers. In order to achieve and maintain a high proficiency of communication between the pilot and bridge team, the Chinese pilot training scheme must invest a significant amount of time incorporating verbal and written English and SMCP training across all levels of pilot training.

#### TRAINERS' QUALIFICATION

China's MSA provides a clear outline in regards to trainer qualifications [2]. Each course concentration requires a subject matter expert on different aspects of the pilot's required knowledge and practice, such as ship handling. MSA recognises, and makes allowances for, courses that reside outside the traditional expertise of seafarers, such as maritime law. If a theory trainer satisfies the requirements, they can also fill a practical trainer position. In addition, all trainers must be full-time employees of a certified pilot training institute. A trainer cannot be a part-time or temporary employee of a training institute.

The qualification requirements for trainers in various topics are outlined below [4]:

- Pilot duties, maritime laws, port hydrology and meteorology trainers need to satisfy one of the following conditions:
  - Have a pilot major senior professional title with a minimum of five years’ first class pilot service experience or
  - Have an associate senior professional title or higher, with a minimum of six months of seagoing experience as a chief officer, and have at least five years of teaching experience.
- Ship handling and collision avoidance trainers need to satisfy one of the following conditions:
  - Have at least five years of seagoing experience as an unlimited master and have a minimum of two years of teaching experience or
  - Have an associate senior professional title or higher in the marine transportation field, and have a minimum of two years of seagoing experience as an unlimited master.
- Pilot English trainers need to satisfy one of the following conditions:
  - Have a Bachelor degree or higher and an associate senior professional title of English major, with a minimum of six months of seagoing experience or
  - Have a minimum of one-year seagoing experience as an unlimited master and have at least one year of professional English teaching experience;
- Trainers in practical assessment courses need to satisfy one of the following conditions:
  - Have a minimum of five years of seagoing experience as an unlimited master or
  - Have a minimum of six months of seagoing experience as a chief officer, and have at least three years of large vessel simulation teaching experience.

## PILOT TRAINING IN CHINA

### Theory Courses Arrangement

To comply with the requirements for pilot training intuitions and as outlined in the *Regulations on Examination and Certification of Competence for Seafarers of the People’s Republic of China* [5] and considering feedback from pilots and their associations, China’s training institutes have selected several captains and professors with rich seagoing experience and academic knowledge to conduct pilot training and have developed a set of syllabi for pilot training arranged by pilot classification. The syllabi and proposed instructors’ names and qualifications are submitted to the China MSA to be vetted and approved prior to the implementation of the training scheme.

Examining the pilot training course class hour distribution for different classes of pilot (see Table 2) and the main contents of training courses (see Table 3), it can be seen that China’s pilot training programme complies with IMO A.960. It should be noted that China must spend a significant amount of time on English studies in order to ensure pilots can communicate effectively within the international maritime environment.

Table 2: China’s seaport pilot training courses’ class hour distribution (class hours).

Courses	Ship handling	Ship collision avoidance	Port, hydrology and meteorology	Duties and maritime laws	Marine traffic engineering	Pilot’s English	Pilot’s practice	Listening and speaking of pilot’s English	Incidents investigation and analysis	Total class hours
Third class pilot	60	66	Setting according to specific circumstance	32		48	80	72		292
Second class pilot	58	56	Setting according to specific circumstance	32		48	80	72		346
First class pilot	56	50			62	48	100	72	120	508

Table 3: Part of China's pilot training courses main contents (Navigation College, 2015).

Course Name	Main contents
Ship handling	<ul style="list-style-type: none"> <li>• Ship handling for piloting, anchoring, berthing and unberthing;</li> <li>• Manoeuvring with and without tugs, and emergency situations;</li> <li>• Factors affecting ship performance, such as wind, current, tide, channel configuration, water depth, and the interaction of ships with the bottom and bank including squat;</li> <li>• Manoeuvring behaviour of the types of ships;</li> <li>• Limitations imposed by particular propulsion and steering systems;</li> <li>• Use and limitation of various type of tugs;</li> <li>• Emergency and contingency plans;</li> <li>• Bridge equipment and navigational aids, pilot card.</li> </ul>
Ship collision avoidance	<ul style="list-style-type: none"> <li>• International Regulations for Preventing Collisions at Sea, 1972;</li> <li>• National and local navigational safety and pollution prevention rules;</li> <li>• Information of lights, light vessels, buoys and beacons;</li> <li>• Fog signals, racons, radio beacons and other electronic aids.</li> </ul>
Port, hydrology and meteorology	<ul style="list-style-type: none"> <li>• System of buoyage;</li> <li>• General set, rate, rise and duration of the tides, wind, current and anchorage.</li> </ul>
Duties and maritime laws	<ul style="list-style-type: none"> <li>• International conventions of navigation safety and pollution prevention;</li> <li>• Master-pilot relationship;</li> <li>• Operation procedures;</li> <li>• Embarking and disembarking procedures.</li> </ul>
Marine traffic engineering	<ul style="list-style-type: none"> <li>• Communication and availability of navigational information;</li> <li>• Systems of radio navigational warning broadcasts and the type of information;</li> <li>• Traffic separation schemes, vessel traffic services and vessel management systems.</li> </ul>
Pilot's English	<ul style="list-style-type: none"> <li>• IMO SMCP;</li> <li>• Communication with the master, other vessel, management department, etc.</li> </ul>
Ship collision avoidance and ship signals	<ul style="list-style-type: none"> <li>• International Regulations for Preventing Collisions at Sea, 1972;</li> <li>• National and local navigational safety and pollution prevention rules;</li> <li>• Information of lights, light vessels, buoys and beacons;</li> <li>• Fog signals, racons, radio beacons and other electronic aids.</li> </ul>
Channel and pilotage	<ul style="list-style-type: none"> <li>• Channels, shoals, headlands and points;</li> <li>• Depths of water throughout the area;</li> <li>• Course and distances of the area.</li> </ul>
Pilot's practical	<ul style="list-style-type: none"> <li>• Ship handling, BRM;</li> <li>• Emergency and contingency plans.</li> </ul>
Listening and speaking of pilot's English	<ul style="list-style-type: none"> <li>• IMO standard maritime communication phrases;</li> <li>• Communication with the master, other vessels, vessel traffic service, port and terminal management, etc.</li> </ul>
Incidents investigation and analysis	<ul style="list-style-type: none"> <li>• IMO Code for the investigation of marine casualties and incidents.</li> </ul>

### Practical Courses Arrangement

Practice is the most effective method to consolidate theory and is an important method to improve a pilot's understanding and proficiency. The ability to train and assess pilot trainees in a simulated practical environment has led to improvements in their ability to control and predict ship motion in a variety of circumstances and conditions. Placing students in such situations, they may rarely experience, is a key component of the training. The practical experience is enhanced by the ability to replay simulations and by letting the trainees discuss and critically analyse their actions and decisions, and important aspects of pilot training.

To facilitate the practical learning experience, China's training institutes divide trainees into teams of four, with five teams comprising a training group. Each group is assigned four trainers that consist of two primary trainers and two assistant trainers.

The main trainers are required to hold a master license and have extensive seagoing experience. They are responsible for task introduction, requirements during navigation, and facilitating the briefing and debriefing sessions. The assistant trainers assist the main trainers in carrying out the plan by providing an interactive simulation establishing and changing the environment settings (sea state, weather, etc) and traffic conditions, as well as taking on the roles of traffic services and other ships. Through the use of lead and assistant trainers, China's training institutes are able not only to satisfy and

comply with the regulatory requirements pertaining to trainers' qualification and develop a pool of future lead trainers, but also to enhance the quality of experiential training.

## DISCUSSION OF BEST PRACTICES AND RECOMMENDATIONS

There are two practices that set China's training institutes apart from other training institutes. The first is the use of feedback from pilots and pilot associations. By encouraging both formal and informal feedback, the Chinese pilot training programme can be slightly changed and small adjustments made in the training plans to reflect developments in technology, international regulations, and capabilities of pilots and mariners.

The second-best practice is the use of assistants both to enhance the realistic training experience and to develop a pool of professional lead trainers.

However, there are several shortfalls. As noted above, a significant amount of time is required to be spent on maritime English, primarily the SMCP. However, the requirements do not take into account the actual usage of the SMCP. In an unpublished qualitative study on master-pilot communications in the United States, it was found that many US seafarers had never been exposed to, or even knew of, the SMCP [6], making the use of the SMCP limited. This may present a problem for pilots when interacting with native English speakers. A pilot using SMCP-based maritime English may experience communication difficulties when one party is using the SMCP and the other is not. This also exposes another weakness in maritime English training, in that both English and non-English speakers have a variety of accents and pronunciations. Thus, while a non-native English speaker may have mastered the content of the SMCP, the pronunciation may impede effective communication.

Pilots are also exposed to a variety of nationalities and cultures when boarding vessels. They have very little time to acclimatise themselves to a particular ship and crew, which may lead to errors resulting from cultural misunderstandings. Unfortunately, neither IMO's A.960 nor MSA regulations require training in cross cultural communications.

These problems could be addressed by China's use of assistant trainers. While MSA requires trainers to be full-time employees of a certified training institution that provision does not apply to assistant trainers. Through the use of assistant trainers, China's training institutes could leverage part-time maritime professionals to allow pilot trainees to experience non-standard maritime English and accents.

## CONCLUSIONS

The IMO, through A.960, does not direct mandatory elements for the certification or guidance of maritime pilots. Rather, the IMO has published recommendations on the training, certification and operational procedures for maritime pilots. As a result, and in full consideration of IMO's A.960 resolution, China's MSA has developed a detailed set of regulations for the provision of pilot training and certification to meet the needs of the various classes of pilots, focusing on a quality regime that takes into consideration aspects of course syllabi, class hour arrangements, the distribution of theory and practical instruction.

The MSA has also taken into consideration the educational environment, ensuring that quality is maintained in regard to training equipment and facility requirements, trainer's qualification and trainee's service experience. Dalian Maritime University, Dalian, PRC, as a training institute, according with its specific conditions, has developed an efficient and effective pilot training programme that integrates the theoretical and practical elements of pilot training, while ensuring unmatched and exceptional training experience.

## ACKNOWLEDGEMENTS

This work was financially supported by the Fundamental Research Funds for the Central Universities, grant number 3132015009 for which the authors are grateful to the donor.

## REFERENCES

1. IMO and IMPA. Recommendations on Training and Certification and Operational Procedures for Maritime Pilots other than Deep-Sea Pilots - (A960). London, UK: International Maritime Organization (2004).
2. MSA. Regulations on Pilot Registration and Qualification Management for Pilots of People's Republic of China. Beijing, China: Marine Safety Agency (2013).
3. CMPA. China Maritime Pilots Association (2016), 28 November 2016, [www.chinapilotage.org](http://www.chinapilotage.org)
4. MSA. Administrative Rules of Seafarers' Training in the People's Republic of China. Beijing, China: Marine Safety Administration (2013).
5. MSA. Regulations on Examination and Certification of Competence for Seafarers of the People's Republic of China. Beijing, China: Marine Safety Agency (2011).
6. Desrosiers, R., *Effective Bridge Communications: Maritime English and Cognition*. Raleigh, NC: North Carolina State University (2016).