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# Analysis on the Present Situation of the Training of Marine Electronic and Electrical Professionals in Local Undergraduate Colleges under the Context of "Belt and Road"

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## Abstract

This paper introduces the development history of marine electronic and electrical majors, analyzes the training status of marine electronic and electrical majors in local undergraduate colleges, and points out the existence of curriculum structure. Unreasonable, lack of teachers, imperfect experimental equipment, and unclear employment intentions of graduates, and put forward solutions to existing problems, with a view to the country's "area" All the way" strategy to train professional, professional, high-level, international high-quality shipping talents to provide reference.

## Keywords

Belt and Road; Marine Electronics; Undergraduate institutions; Talent development.

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## 1. Introduction

Ship electrical major was formerly known as ship electrical major, ship electrical major is One of the major specialties in marine engineering for training marine electrical crew. For many years, ship electrical crew members were ships. The safe and stable operation of the ship has played an important role. However, the STCW78/95 Convention After the entry into force in 1997, the position of electrician was no longer mandatory in the crew of the ship. As a result, the National Maritime Administration has also cancelled the assessment, examination, and Certification, many schools on the training of marine electrical staff was once interrupted, the electrical staff is also one the degree disappeared on some ships, and the duties originally performed by the motor personnel on the ships were respectively. Other personnel bear <sup>[1]</sup>.

However, with the development of the shipping industry and the use of new technologies for ships, especially electrical and electronic automation equipment and network communication technology are widely used in modern ships. The ship's electrical automation is getting higher and higher, and the crew is required to have electrical automation special knowledge and skills in network technology, ship pilots and ship engineers this knowledge and skills can not be acquired at the same time. Thus, the International Maritime Organization (IMO) met in London in January 2007 and decided to define the electronic crew Introduced into the STCW Convention rules. The new ship electronic electrician and the original ship the duties of the electrician are not exactly the same. The duties of the new ship electronic electrician and the scope of business includes not only the original electrical part of the ship, but also the ship service work duties and maintenance management of some electrical equipment on the bridge. January Diplomatic Conference of States Parties to the STCW Convention, International Maritime Organization, Manila (International Convention on Standards of Training, Certification and Watch keeping for Seafarers, 1978) (STCW78/10 Convention) and formally implemented on 1 January 2012 the crossing period is 5 years. According to the STCW78/10 amendment, each main propulsion device a ship with 750 kW and above must have an electrical and

electronic certificate the mandatory minimum requirements for members(Electro-Technical Office, ETO)<sup>[2]</sup>. Therefore, the role of ship electronic electricians on ships is becoming more and more important.

## **2. Market Supply and Demand of Ship Electronic Electrical Personnel in the Context of "Belt and Road"**

When Chinese President Xi Jinping visited Kazakhstan on September 7, 2013, he proposed to jointly build the "Silk Road Economic Belt." On October 3 of the same year, when President Xi Jinping visited Indonesia, he also proposed to jointly build the "21st Century Maritime Silk Road." The Belt and Road strategy was born[ 3] And ... With the deepening of the Belt and Road strategy and the continuous development of maritime trade, a large number of highly qualified, professional, professional and international shipping talents are needed. At the same time, due to the entry into force of the STCW78/95 Convention in 1997, the International Maritime Organization cancelled the mandatory staffing of ship electrical workers, resulting in the majority of maritime colleges and universities also canceling the enrollment of ship electrical students. It was not until 2007 that the maritime colleges began to recruit students from ship electronics and electrical majors. From 1997 to 2007, the training of marine electronic and electrical professionals appeared a fault of about 10 years, which led to the shortage of marine electronic and electrical professionals in the current talent market. At present, the demand for marine electronic and electrical professionals mainly focuses on ship-related industries such as ship transportation, ship repair and ship inspection. Although China is a shipping power, it is not yet a shipping power. China is currently in a period of strategic development from a shipping power to a shipping power. To build a first-class shipping power, we must strengthen the training of shipping talents. Therefore, how to develop navigation education. To further improve the quality of maritime education and train high-quality personnel who meet the strategic needs of the Belt and Road and meet the needs of the shipping market at home and abroad is an important issue to be solved in the study of maritime education. The training of ship electronic electrical personnel is an important part of it.

## **3. Current status of marine electronic and electrical professional personnel training in local undergraduate colleges**

After 2007, several well-known maritime colleges and universities began to restart the marine electronic and electrical majors. After the adoption of the STCW78/10 Convention in 2010, many local undergraduate colleges and universities began to set up marine electronic and electrical majors. Due to the different environment and conditions of each school, the problems and difficulties encountered in the process of running a school are also different. Through the investigation and analysis of the current situation of marine electronic and electrical professional training in local undergraduate colleges, the author finds that there are four problems: unreasonable curriculum structure, lack of teachers, imperfect experimental equipment, and unclear employment intention of graduates.

### **3.1 Unreasonable course structure**

The IMO Convention STCW78/10 stipulates that ship electronic electrical personnel must meet three functional requirements, namely "electrical, electronic and control engineering", "maintenance and repair", and "radio communication". When boarding the ship, it can complete the maintenance and management of various automatic devices of modern ships. According to the requirements of the Competence Examination for Ship Electronic Electrical Personnel issued by the Ministry of Transport, the Competence Examination for Ship Electronic Electrical Personnel includes five subjects: Electronic Electric Personnel English, Ship Engine Automation, Ship Electrical, Information Technology and Communication Navigation Systems, and Ship Management. When undergraduate colleges and universities in various regions are working out training programs for marine electrical and electronic professionals, the choice of course content and the setting of class hours are not

reasonable enough, and the starting time and order of some courses are also problematic. The lack of a reasonable course setting in accordance with the "Seaboat Crew Training Outline(2016 Edition)" has affected the teaching effectiveness and teaching quality, resulting in students' knowledge structure not being fully qualified for the work of the ship electronic electrical staff with a high degree of modernization.

### **3.2 Lack of teachers**

Due to the entry into force of the STCW78/95 Convention, most of the maritime colleges did not recruit students from ship electrical majors for some time, resulting in the current shortage of ship electronic electrical personnel. The establishment of the marine electronic and electrical major requires a large number of "double division" teachers with ship-based work experience. At present, the "double division" teachers in the marine electronic and electrical majors of local undergraduate colleges are seriously inadequate. The marine electrical and electronic major is a very practical specialty. Professional teachers not only need to have relevant theoretical knowledge, but also need to have certain practical skills. In this way, the students trained can meet the industry standards. The lack of "double teacher" teachers has seriously affected the quality of teaching.

### **3.3 Inadequate laboratory equipment**

A large number of experimental and practical equipment are needed to develop the marine electrical and electronic profession in order to enable the trained students to meet the requirements of the International Maritime Organization STCW78/10 Convention and the Training Program for Seaboat Crews(2016 Edition) issued by the Ministry of Transport. Mainly include ship power station simulator laboratory, PLC control laboratory, electronic and electrical process laboratory, turbine automation laboratory, sensor laboratory, motor and electric power drag laboratory, rudder laboratory, metalworking workshop(car, pliers, welding), electrical technology and electrical test room, English listening Conversation training rooms, water training centers, remote terminal examination centers that meet the examination requirements of the State Maritime Administration, and other laboratory equipment. Many local undergraduate colleges and universities have insufficient experimental training equipment because of the short running time, tight school funding, and poor running conditions.

### **3.4 Unclear intention of students to take up employment**

The marine electronic and electrical major is a special specialty. The work on the ship is relatively difficult. Many students of the marine electronic and electrical major are reluctant to board the ship after graduation. They are not very serious about learning in the school, and they do not attach importance to the examination of the certificate of suitability of the ship electronic and electrical personnel. The failure to pass the examination of the relevant subjects at the time of graduation not only affects the quality and effectiveness of the school's teaching, but also affects the students' own employment and future development.

## **4. Reform Measures for the Training of Marine Electronic and Electrical Professionals in Local Undergraduate Colleges**

### **4.1 Scope of scale control of navigable ships**

Optimizing the curriculum structure

The curriculum is strictly in accordance with the requirements of the International Maritime Organization STCW78/10 Convention and the Ministry of Transport's "Training Outline for Seaboat Crews(2016 Edition)", and the teaching content, number of hours and order of classes for each course are reasonable. The ship electronic electrician's qualifying examination is five courses, but it contains a lot of content. This requires the school to set up courses and optimize the course structure when doing talent training programs. When writing the syllabus for each course, the teacher must also combine the requirements of the "Seaboat Crew Training Outline(2016 Edition)". After the syllabus

for all professional courses is completed, it must be combined with the "Seaboat Crew Training Outline."

(2016 Edition) "to check to avoid too much repetition and gaps. The teaching content of professional courses may be more than that required by the Seaboat Crew Training Program(2016 Edition), but not less than that required by the Seaboat Crew Training Program(2016 Edition), so as to ensure the breadth and depth of the teaching content. It is also necessary to control the total number of class hours and not to excessively increase the student's learning pressure.

#### **4.2 Promote the introduction of "double teacher" teachers**

The lack of "double teacher" teachers is a major difficulty encountered by local colleges and universities in setting up marine electronic and electrical majors, which are very practical. Many practical courses, including some theoretical courses, require "double teacher" teachers to have better teaching results. After many schools introduced ship electronic electricians, they were allowed to enjoy the treatment of lecturers. The treatment of general school lecturers was relatively low, and the treatment of ship electronic electricians on board was quite different from that of ship electronic electricians. Therefore, the attractiveness of ship electronic electricians was not enough. It is recommended that schools improve the treatment of ship electronic electrical personnel, and increase some subsidies, such as certificate subsidies, to increase the attractiveness of ship electronic electrical personnel, introduce more ship electronic electrical personnel, and increase the proportion of school "double division" teachers.

#### **4.3 Shared resources, improved equipment**

Some local undergraduate colleges and universities lack experimental training equipment due to poor conditions and tight funding. For this situation, in addition to supplementing experimental training equipment, it can also be solved by sharing experimental training equipment with other professionals, such as sharing the ship power station simulator laboratory and turbine automation laboratory with the turbine engineering professional; Sharing instruments and equipment in communication and navigation with navigation technology professionals; Share electrical and electronic process laboratory, PLC control laboratory, metalworking training room(car, pliers, welding), motor and electric power dragging laboratory with other engineering professionals. Achieve resource sharing and save school costs.

#### **4.4 Strengthen Student Employment Guidance**

Since navigation is a difficult industry, with the improvement of the living standards of the Chinese people, many students who major in navigation do not want to board the ship after graduation and choose to develop on land. Although the school does not have to force students to board the ship, it must strengthen employment guidance for students and guide them in their career planning. Even those who do not board the ship must be encouraged to learn professional courses. It will lay a good foundation for the future development of land work, examination and research.

### **5. Summary**

In order to serve China's "Belt and Road" strategy and promote China's transformation from a shipping power to a shipping power, the paper analyzes the problems faced by China's local undergraduate universities in training marine electronic and electrical professionals and puts forward measures for improvement. It provides reference for local undergraduate colleges to train marine electronic and electrical professionals who meet the requirements of modern ships.

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