Research on the Specialty Construction for Aviation Maintenance
Based on the Integration of Industry and Education

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Abstract. With the rapid development of China's aviation industry, the demand for aviation maintenance is increasing. Due to its importance in aviation transportation safety, the professional standards of aviation maintenance are higher than other industries and thus requires special training to foster expertise. Aiming at the supply and demand of professionals in the field of aviation maintenance in China, this paper analyzes the problems in personnel training of aviation maintenance specialty. It also puts forward a construction plan for aviation maintenance specialty under the structure of "Integration of Industry and Education," in order to guarantee highly-skilled professionals in aviation industry.

Introduction

According to the industry forecast, there is great potential in the future development of aviation maintenance industry, and China will have the fastest growing market. By 2023, the Asia-Pacific region will need about 215000 new aircraft maintenance personnel, nearly half of which in China. Therefore, the aviation maintenance industry is strategically important. There is an urgent need to cultivate aviation maintenance professionals to compete with advanced enterprises in the field of aviation maintenance around the world [1, 2].

The development and social progress of a country depend on professionals. Training professionals is the key task in education. What rules should aircraft maintenance professionals follow? How to ensure the quality of personnel training? These are all worthy of study and discussion. Furthermore, as the long aviation industry chain involves a wide range of professional categories, the aviation industry needs more than a simple combination of aviation maintenance theory and technical skills. It requires professionals with real compound techniques, innovation, international vision and interdisciplinary ability to integrate knowledge and skills from different fields. As a result, the teaching mode, curricula and teaching management should be reformed based on the integration of industry and education, and focus on the student-centered teaching concept and cross domain integration. The training objective, training mode and subject construction of aircraft maintenance specialty are the key research contents of personnel training.

Current Situation and Problems

Since aviation maintenance is a new specialty, the construction and training program of the discipline and specialty of the university is still in the exploratory stage, awaiting improvement and refinement. Firstly, due to the lack of research on the market demand of the professionals, not only the current positioning of aviation maintenance specialty, but the matching degree of training positioning and social demand are unclear.

Secondly, current training orientation of aviation maintenance professionals does not match the needs of the society. The school curriculum still follows the traditional "theory before practice" curriculum model, which is insufficient for integrating theory and practice. It’s necessary to tailor the curriculum system to the characteristics of maintenance specialty. In addition, there are few teachers
with both comprehensive theoretical knowledge and professional operation skills that meet the requirements of practical operation courses.

Furthermore, there are substantial differences between the training equipment and the actual aircraft maintenance site, which could lead to discrepancy between the students’ final capabilities and the requirements of the industry. However, the number of off campus practice bases is small, the school enterprise cooperation is loose, and the resource sharing mechanism has not been fully established.

Finally, the enterprises and society hardly played any role in the monitor and evaluation of teaching quality, which is currently composed mainly of the school teaching management department, teaching supervision and students. Aviation maintenance industry has a high standard of employment and its system of employment assessment. Current teaching quality monitoring, which is traditional, closed and one-way, is not only difficult to evaluate the teaching quality comprehensively and objectively, but may be deviated from actual industry needs.

**Specialty Construction Ideas**

According to the decisions of the State Council on speeding up the development of modern vocational education, modern vocational education should be oriented to the integration of industry and education, characteristic school management, promoting the connection between education and teaching reform and industrial transformation and upgrading, and strengthening school enterprise collaborative education. The construction plan of modern vocational education system (2014-2020) once again emphasizes that vocational schools should adhere to the integration of industry and education, in particular should promote the integration of vocational education into the whole process of economic and social development, reform and opening up. It can be seen that the integration of industry and education has become the navigation mark of the reform and development of vocational education in China [3].

Vocational education is one of the education types closely integrated with economic and social development. To serve the regional economic construction, the development of service industry and the employment of students are the starting point and the final goal of vocational education. The aim of aviation maintenance specialty is to cultivate high skilled talents. According to the practical characteristics of the aviation maintenance specialty, the construction of the aviation maintenance major with the integration of industry and education can better realize the effective docking of student training and employment. In addition to the general research methods of educational science, such as investigation, literature analysis and expert consultation, the methods adopted in this study pay special attention to the nature and actual development of vocational education and put forward the views with characteristics of vocational education.

In recent years, great changes have taken place in the development of vocational education and the training mode of maintenance personnel in the field of civil aircraft maintenance in China, especially in the mode of school enterprise cooperation, which is favored by vocational colleges and maintenance enterprises. School-enterprise cooperation not only promotes the development of professional disciplines in vocational colleges, but also provides sustainable human resources for enterprises, which creates opportunities to train the students’ professional skills and improve their efficiency. Based on this concept, we will gradually improve the post guided teaching mode and talent training program of school-enterprise cooperation and combination of work and learning [4]. The model of specialty construction thinking system is shown in Fig. 1.

![Figure 1. Specialty Construction Thinking.](image)
Specialty Construction Plan

Make a Reasonable Training Plan

The training orientation of aviation maintenance specialty is to cultivate high-tech professionals with good professional ethics, solid basic theoretical knowledge and advanced knowledge in aircraft maintenance specialty, strong practical operation ability and strong career development ability, and are engaged in aircraft maintenance technical work. At present, the maintenance personnel in various professional colleges and universities are trained according to the division of large aircraft sections and professional maintenance mode. However, some electronic and mechanical devices in aircraft maintenance are related to one another. Therefore, to ensure the airworthiness of the aircraft, it is necessary for the trainees to fully understand each section of the aircraft. It’s also necessary for the training institutes to investigate the market demand of aviation maintenance talents when making training plan [5-6]. In the course construction, the demand of aviation maintenance work must be laid as foundation. The structure of the course system is shown in Fig. 2.

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![Figure 2. Curriculum System Framework.](image)

The School cooperates with the Enterprise to Develop Curriculum, in order to realize the Docking of the Curriculum Content and Professional Standards

The standard of aviation maintenance industry is strict, and the basic condition of post entry is to obtain the qualification certificate issued by CAAC. Therefore, in the development of curriculum system, we must adhere to the industry standard and integrate the content of vocational qualification certificate examination into professional courses. New knowledge, new technology and new methods in the field of aviation maintenance should be included in the curriculum. In addition, according to the requirements of professional ability and quality, set up specific courses with relevant contents and requirements of CCAR-147, CCAR-66R1, AC-66R1-02 and AC-147-02, and carry out curriculum development and construction. The school and the enterprise jointly build a curriculum development team, formulate curriculum standards, compile teaching materials, share enterprise resources, and compile practical training projects. In this way, the course would be closer to the actual situation of professional posts, and the trainees better serve the enterprise.

Schools and Enterprises Cooperate to Build Training Rooms

With the help of the power of the enterprise, the school and enterprise jointly invest in the construction of training room to meet the needs of training. The school could hire technical personnel with practical experience from enterprises to give special lectures and professional guidance, to make the students understand the major contents of their learning, and carry out post education.

Practice in Real Workplace

In enterprises, the training mode of large aircraft maintenance personnel can be introduced, and the application-oriented engineer training mode can be adopted. When studying in school, students should master the necessary professional knowledge and ability. When the students practice in enterprises, they should take their work seriously as if they were real employees. The enterprises are responsible to appoint experienced technicians as instructors. This way, students can directly participate in the production, and the zero-distance docking between the professional personnel training and enterprise can be realized.
Schools and Enterprises Cooperate to Strengthen the Construction of Teaching Staff

The teaching of aviation maintenance is a very practical work. Teachers not only have to possess a wide range of professional theoretical knowledge, but also skilled hands-on abilities. Based on the characteristics of aviation industry and the needs of practical work, it is necessary to establish a team of teachers with reasonable structure, with outstanding skills in both theoretical and practical aspects. To achieve this, the school should employ experts with rich practical experience as external teachers, and should also motivate the current teachers to learn new theoretical knowledge and practical skills, and encourage them to obtain relevant qualification certificates. According to the certification requirements of civil aircraft maintenance training, at least one tenth of basic theory teachers should have aircraft maintenance license. The trainee instructor shall have at least 5 years of aircraft maintenance experience and receive at least 70 hours of training every 2 years. At the same time, the school should send relevant teachers to the aviation enterprises for practical training, so as to grasp the development trend of the aviation industry, and understand the actual requirements for expertise.

The School and the Enterprise Cooperate to Improve the Teaching Quality Monitoring System

Schools should establish a teaching quality monitoring system that cooperates with enterprises, and combine school evaluation and enterprise evaluation. The school should integrate the standard of enterprise employment with the standard of teaching quality monitoring system, evaluation method and feedback mechanism. The school could hire enterprise personnel to participate in the monitoring of teaching quality in the school, apply some of the quality management modes and innovative assessment methods from enterprises, and constantly improve the monitoring system of teaching quality.

Specialty construction is a systematic project, involving all aspects of teaching management. Based on the integration of industry and education, the research on the construction scheme of aviation maintenance specialty can not only promote the development of the school, but also lay a solid foundation for the rapid development of aviation industry. We will help transform and upgrade regional economies, enhance industrial competitiveness, and achieve coordinated social development.

Conclusions

This study focuses on the reform of aircraft maintenance professional training mode under the background of industry-education integration. Based on the integration of industry and education, and the cooperation between schools and enterprises, the reform will be well connected to national policies, industrial development, school education, expertise training and student employment. Focusing on the demand of professionals from cooperative enterprises and training of all-round technical expertise, the specific contents are as follows: (1) Promote the construction of discipline and specialty to adapt to the industrial transformation and upgrading; (2) Perfect the adjustment mechanism of professional training structure guided by demand; (3) Deepen the cooperation with enterprises and introducing them into education; (4) School and enterprises build and share productive training base; (5) Cultivation and integration of craftsman spirit into basic education; (6) Promoting the coordinated education of industry and school; (7) Strengthen the construction of the teaching staff for the integration of industry and education; (8) Improve the evaluation methods of teaching quality and professional skills; (9) Promote a two-way connection between supply and demand between industry and education; (10) Reform the training model by combining industry and school to enhance the training ability for compound expertise.

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References


