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Innovative Thinking on Professional Ability Training of Railway Track Engineering Detection Technology

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Abstract: *The thesis first briefly discusses the present situation and background of railway track engineering testing training, and thus leads to the importance and necessity of realizing the innovation of relevant vocational ability training. Then, combining the design of training content, the application of training mode and the optimization of training conditions, the thesis discusses the strategic points of the innovation of railway track engineering inspection technology vocational ability training.*

Keywords: *detection technology of railway track engineering; Vocational ability training; Training innovation*

1. Introduction

Railway track engineering inspection has strong technical and professional characteristics, and plays an important role in ensuring the construction and application of railway engineering projects. Therefore, we must do a good job in the education and training of relevant professional talents. At present, the traditional training activities with simple structure and rigid form are no longer applicable, so it is imperative to innovate and optimize the professional ability training of railway track engineering inspection technology.

2. The Implementation Background of the Innovation of Railway Track Engineering Detection Technology Vocational Ability Training

At present, the laws, regulations and certification system in the field of railway track engineering inspection in China have become more and more perfect, so strict requirements are put forward for relevant employees to have comprehensive literacy and hold certificates. At the same time, based on the synchronous development of China's railway engineering inspection industry and the construction of professional talents, the concepts of "integration of work and study" and "internet plus" have deeply penetrated into the relevant vocational training markets. In this context, in order to ensure the advancement and competitiveness of vocational ability training, it is necessary to improve the situation and innovate constantly to meet the requirements and needs of industries, policies, talents and other parties [1].

3. The Strategic Points of Innovation in the Professional Ability Training of Railway Track Engineering Detection Technology

3.1 Refine the design training content

At present, the demand and requirements for talents in the field of railway engineering testing are more and more diversified and comprehensive. In this context, in order to ensure the advanced and effective related vocational ability training activities, it is necessary to do a good job in the refinement and innovation of training content. In practice, the training system can be modularized, as follows:

First, the module of "Railway Track Engineering Detection Technology". In this module, the training content mainly includes three parts: ballasted track detection, ballastless track detection and track geometry and position inspection. Among them, the training tasks of ballasted track detection project are ballast detection and spike pull-out test, ballastless track detection project is CRTS1, CRTS2 and CRTS3 slab ballastless track cement emulsified asphalt mortar detection, and track geometric position inspection

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project is track geometric position detection under static and dynamic conditions.

Second, the "public basic knowledge" module. In this module, the training content mainly includes three parts: basic knowledge of railway engineering test, relevant laws, regulations and management system, and management of railway engineering site laboratory. The specific training tasks are basic and diverse, such as commonly used terms in test, probability theory and mathematical statistics, qualification identification of inspection and testing institutions, quality management system of inspection and testing institutions, standardized management of railway engineering site laboratory, and information management of railway engineering site laboratory.

Thirdly, the module of "Railway Engineering Concrete Detection Technology". In this module, the training content mainly includes three parts: concrete raw material detection, concrete detection, mortar and grouting material detection. The specific training tasks are set around concrete and its raw materials, such as cement detection, aggregate detection, concrete mix design, concrete performance design, masonry mortar detection and plastering mortar detection.

Fourthly, the module of "Railway Engineering Subgrade Detection Technology". In this module, the training content mainly includes four parts: subgrade filling test, subgrade compaction test, foundation bearing capacity test and foundation treatment test. The specific training tasks are mainly related to road foundation test and test technology application, such as graded gravel test, improved soil test, compaction coefficient test, dynamic penetration test and composite foundation load test [2].

Fifthly, the module of "Railway Engineering Bridge and Tunnel Detection Technology". In this module, the training content mainly includes six parts: railway bridge and culvert engineering test detection, tunnel engineering test detection, concrete entity quality detection, concrete pre-jacking beam inspection, waterproof material detection and steel test detection. The specific training tasks involve underwater concrete, shotcrete, steel protective layer, waterproof coiled material and other test detection aspects.

Among the above modules, the first two are compulsory modules and the last three are optional modules. This design system can not only meet the technical learning and qualification requirements of relevant personnel, but also effectively match different engineering types and work scenarios.

3.2 Reasonable implementation of training arrangements

On the basis of constructing the curriculum system and defining the training content, the training arrangement needs to be further done.

First of all, the major of railway track engineering has strong operational and practical characteristics. If we only adopt written and textual training methods, it will be difficult to meet the needs of students to improve their ability. At the same time, pure theory teaching is not only difficult to ensure students' effective participation in technical learning, but also not conducive to trainers to comprehensively evaluate the students' learning progress and effectiveness. Therefore, when arranging training courses, we must ensure the combination of theoretical teaching and practical teaching, and focus on specific training projects and training tasks. For example, in the training of ballast track testing project, it is necessary to design theoretical teaching parts, such as ballast technical requirements and testing rules, ballast testing methods, sulfur cementing materials, performance testing methods of sulfur products, etc., it is also vital to design practical teaching parts such as ballast testing, sulfur cement performance testing, concrete sleeper screw Anchorage strength testing and so on. In this way, on the one hand, it can simultaneously improve the students' level of theoretical cognition and practical skills in ballasted track detection, and can also achieve the benign training effect of guiding practice with theory and consolidating theory with practice.

Secondly, based on the differences in knowledge capacity and importance of different training projects and training links, in order to fully meet the output needs of curriculum knowledge and achieve efficient use of training resources, it is also necessary to make reasonable arrangements for class hours. For example, under the framework of the module "Railway track Engineering Inspection Technology", CRTS1, CRTS2 and CRTS3 slab ballastless track cement emulsified asphalt mortar have the largest amount of knowledge and relatively high technical importance, so the proportion of course hours should be the highest, 24 class hours (8 class hours for all three models).

The second is the nail pull-out test course, which is 6 class hours. The time required for ballast detection, track static geometry inspection and track dynamic geometry detection is the least, all of which are 4 class hours. By adopting this way of allocation of class hours, it can not only provide a guarantee

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for the reasonable control of training progress and training efficiency, but also provide sufficient time conditions for students to learn knowledge, digest knowledge and train skills.

Thirdly, in order to carry out technical training from multiple angles and forms, and to realize the scientific construction of an efficient classroom, it is necessary to arrange a variety of training activities and curriculum links in the teaching process, such as subject guidance, case introduction, demonstration operation, guiding practice, group training, achievement display and so on, so as to promote the standardization and flow of the training project.

Finally, the training program should be given some flexibility in order to adapt to different learners and learning scenarios. For example, on the basis of the conventional curriculum system and training content, a certain expansion module, namely supporting materials, can be set up. If the students' theoretical cognitive ability is poor and their professional basic knowledge is weak, they can choose the expansion course of "Public basic knowledge" and general materials for self-study. If the trainees' practical ability is poor, they can appropriately increase the number or duration of training courses, so as to ensure the comprehensive improvement of their professional ability of railway track engineering testing.

3.3 Using advanced training mode

In the new era of "internet plus'', we should actively use new resources and new tools to optimize and upgrade the traditional training mode in order to improve the advanced and practical training. For example, we can abandon the concept of materialization and immobilization of courses, and adopt online teaching on the Internet, mobile micro-course teaching, community-based resource self-study and other means. In this way, it can not only improve the utilization and openness of curriculum resources, but also meet the differentiated learning conditions of different types of students, such as enterprise employees, students in school and people waiting for employment. On this basis, online test files can also be set up according to chapters and modules. after completing a specific stage of study, students can "unlock" the learning tasks and training resources of the next stage only if they participate in the test and pass the test.

At the same time, online or offline question banks can be set up in relevant training platforms to provide strong support for students' self-help tests and autonomous learning. In this way, on the one hand, it can provide a channel carrier for training evaluation, and realize the practical reflection of students' learning achievements through the test results.

On the other hand, it can also enable students to have a solid and comprehensive understanding of important and difficult knowledge in the process of examination, answer and error correction, so as to help students establish a more solid and systematic professional knowledge system of railway track engineering testing technology and provide guarantee for the implementation quality of training activities.

3.4 Reasonable innovation of training conditions

In the practice of training innovation, we should also do a good job in the conditional innovation of training mechanism and training resources. For example, we can establish a training mechanism of school-enterprise cooperation, introduce customized elements into training courses, and realize the directional transportation of professional talents to enterprise posts. In this way, it can not only meet the matching will of talent employment and enterprise recruitment, but also realize the integration and utilization of skills training resources and enterprise operation resources. For another example, we can build a "double-qualified" teaching staff and bring outstanding workers from industries and enterprises into the ranks of training lecturers, which will not only help solve the problem of "theorization" in training construction, but also help ensure the "integration of knowledge and practice" in the learning process and training results of students.

4. Conclusion

To sum up, it is imperative to do a good job in training and innovating the professional ability of railway track engineering detection technology. In the specific innovation practice, we should not only innovate the curriculum system, actively realize the refinement and comprehensiveness of training content, but also optimize and update the mode, resources and mechanism. Only in this way can we ensure the effectiveness and advancement of training construction.

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