

Exploration and Practice of Training Excellent Engineers in Safety Engineering Major of Longdong University

Jufeng Zhang^{1, 2, a, *}, Fengfeng Yang¹, Tai Xu¹ and Chao Zheng¹

¹School of Energy Engineering, Longdong University, Qingyang 745000, China.

²School of Resource & Environment and Safety Engineering, Hunan University of Science and Technology, Xiangtan Hunan 411201, China.

^ajufeng6100229@126.com

Abstract

In the new century, with the rapid development of science and technology in the world, countries all over the world seize the highlands of science-technology and talent development. The development of high and new technology has a huge impact on the traditional economy, and profoundly changes people's production and life style. Therefore, the way of talent training in Chinese universities has also changed. The Ministry of education put forward the "excellent engineer training plan". As a local university in Western China, Longdong University plays an important role in the regional economic construction. Its personnel training is directly related to the regional economic construction and development of Gansu Province. Safety engineering is a new major established by Longdong University, and it is of great significance to train high-quality safety engineering talents. According to the training plan for excellent engineers, the school has increased capital investment, and comprehensively strengthened the practice base inside the school, the practice training base outside the school, the training of double qualified teachers and the comprehensive courses for students. The students' professional quality and skills have been greatly improved, which have been well adapted to the needs of regional economic development and well received by the society.

Keywords

Excellent engineer; In school experimental base; Out of school practical training base; Double teacher type; Comprehensive curriculum construction.

1. INTRODUCTION

Since the 21st century, the global economy has shifted from industrial economy to knowledge economy. Countries all over the world have vigorously cultivated high-tech talents. VR virtual reality technology, simulation robot, 3D printing technology, unmanned intelligent factory and other high-tech technologies have brought great impact on the development of traditional economy, brought revolutionary changes to people's production mode, and also brought about national economic development, development strategies and many other aspects (1). In order to ensure the optimization and upgrading of China's economic structure, China has formulated a series of medium and long-term talent development strategies to cultivate high-tech innovative talents. For example, the outline of the national medium and long term education reform and development plan (2010-2020), the outline of the national medium and long term talent development plan (2010-2020), and June 2010, the Ministry of education and the Chinese Academy of Engineering jointly established the expert committee of the excellent engineer education and training plan. In May 2015, Premier Li Keqiang proposed the "made in China

2025" strategic plan in the government work report. The outline of the plan aims to cultivate a large number of high-quality innovative engineering and technical talents with strong innovation ability and meeting the needs of economic and social development for the industrial sector, the world and the future, and to serve the country's strategy of taking the road of new industrialization, building an innovative country and strengthening the country with talents (2-5).

2. EXCELLENT ENGINEER TRAINING PLAN

On June 23, 2010, the Ministry of Education launched the "excellent engineer education and training plan", which aims to cultivate a large number of high-quality engineering and technical talents with strong innovation ability and meeting the needs of economic and social development.

The characteristics of "excellence plan" are as follows: first, the school enterprise in-depth cooperation in training engineers, breaking the teaching mode of school closed training engineers, so that the training of school engineering talents is directly oriented to the talent needs of relevant industries and enterprises; second, the school's training standards should be combined with industry standards to improve the training standards of engineering talents. Third, in the process of training, we should focus on cultivating students' engineering ability and innovation ability, adjust the curriculum structure, increase the content of practical courses and off campus practice, and provide more practical opportunities for students (6). According to the research summary of experts and scholars, the future engineers that "excellence program" wants to cultivate should have the following characteristics:

(1) Comprehensive knowledge structure with professional basic knowledge as the core. Professional basic knowledge is the professional characteristics of engineering talents. Therefore, excellent engineers must have solid professional basic knowledge, followed by knowledge structure of Humanities and Social Sciences, foreign language exchange foundation, policies and laws.

(2) Excellent engineering ability with engineering practice as the core. Engineering practice ability often represents the overall ability level of an engineer, and other abilities can only be reflected through engineering practice ability. At the same time, it includes good engineering consciousness, engineering innovation consciousness, engineering management ability and so on.

(3) Moral quality with responsibility as the core. The quality of engineering projects is often related to the safety and happiness of people's lives, so an excellent engineer must have a strong sense of responsibility to ensure the safety of engineering projects and provide people with a happy and secure living environment. Secondly, it should include the professional ethics of teamwork, perseverance and self-confidence.

(4) Learning habits centered on lifelong learning beliefs. In order to become an "excellent engineer", we must constantly learn new technology, cultivate new thinking, and make ourselves become an engineering talent with multi-disciplinary background. Therefore, the belief and learning habits of lifelong learning are very important. Engineers can become outstanding engineers only by continuous learning, practice and reflection.

3. GENERAL SITUATION OF SAFETY ENGINEERING MAJOR OF LONGDONG UNIVERSITY

The safety engineering major of Longdong University was established in 2011. The students trained are mainly serving Gansu and its surrounding areas. With the aim of training mining safety engineers, students are required to master basic engineering theory and professional

knowledge, having the ability to analyze and solve safety problems, and can be engaged in safety design, detection, evaluation, supervision and management in the field of mining engineering.

At present, the professional team is reasonable, teachers have high teaching level and strong scientific research ability. It is composed of more than 10 full-time and part-time personnel. They can meet the normal teaching and scientific research work, and undertakes more than 10 scientific research projects at provincial and municipal levels, and many horizontal scientific research projects. The research funds amount is more than 1 million RMB. They have won 5 provincial and ministerial science and technology awards, 8 municipal science and technology awards, and more than 10 national invention patents. More than 60 high-quality teaching and research papers have been published in home or abroad journals (7).

4. CONSTRUCTION OF EXCELLENT ENGINEERING INNOVATION PRACTICE BASE

4.1. Construction of Practical Skills Base in School

Practical skills are very important for the cultivation of excellent engineers' practical skills. According to the national vocational qualification standards or qualifications, through the recognition of the labor and social security administrative department of the government, students' practical skills or professional qualifications are evaluated and certified objectively, fairly and scientifically. At present, the school of energy engineering of Longdong University has four undergraduate majors, namely mining engineering, safety engineering, petroleum engineering, oil and gas storage and transportation engineering, more than ten engineers with various training qualifications and more than 800 students. With the advantages of talents, knowledge, technology and equipment, it can actively adapt to the regional economic development, improve the efficiency of human resource development and actively adapt to the labor market. It has a positive effect on skilled talents.

The energy college has a mining training skills appraisal center, including mine ventilation training room, coal mine disaster prevention training room, mining model training room, coal mine virtual simulation training room, geological specimen room, multi-functional machine room and preparation room, with a building area of 2000 square meters, more than 110 teaching experimental instruments, tool models, training platform systems, and assets. Some experimental equipment are shown in Figure 1-8. The total value is over 2 million 500 thousand yuan, and the advanced nature of the mining engineering experimental center is at the leading level in Gansu province. In Qingyang energy and chemical industry, there were 409 person times of training for 10000 skilled talents, 23 person times of pre job training for Changqing Oilfield Employees, 43 person times of mine ventilation workers, 32 person times of oil production workers, 65 person times of drilling workers and 12 person times of underground workers for vocational skill appraisal of students in energy engineering college. The total number of all kinds of vocational skills training reached 584.

4.2. Construction of Experimental Center in School

With the theme of "cultivating engineering and technical talents needed on site and enhancing social service ability", based on the construction concept of "tracking technology development, creating real environment, creating engineering atmosphere and cultivating professional ability", the construction principle is "environment professionalism, technology foresight, function radiation, management openness, use sharing and content diversity" Through transformation, upgrading, integration and improvement, the safety engineering experiment center has established a shared high standard training base integrating teaching, training, skill identification, scientific research and technical services. Safety engineering experiment center provides services for mining engineering, safety engineering, coalfield

geology and exploration technology and other majors, and can carry out cognition practice, course practice and process training. 102 public welfare projects such as mining technology, tunneling technology, mine lifting and transportation, mine ventilation, mine disaster prevention and control, mine rescue, mine safety monitoring and monitoring, mine pressure control, shaft and lane support, rock mechanics, mine survey and other related simulation test projects will be set up, and 100% of the tests and training projects required by the coal specialty will be set up to serve the students of each specialty. The proportion of theoretical teaching and experimental teaching of coal majors will reach 1:1.

At the same time, according to the requirements of openness, safety engineering test center also provides management training, short-term technical or special type of work training for coal enterprises in Longdong area.

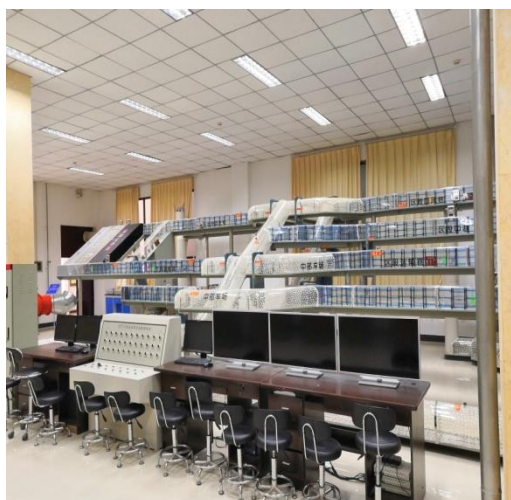


Figure 1. Simulated ventilation system



Figure 2. Emergency rescue equipment



Figure 3. Simulated gas drainage system



Figure 4. Simulated lifting system

**Figure 5.** Drying oven**Figure 6.** Cardiopulmonary resuscitation simulation**Figure 7.** Dust tester**Figure 8.** Emergency rescue equipment

4.3. Construction of Off-campus Practice Base

Practical teaching is the key role in the teaching of applied universities. Professional competence runs through all the links of practical teaching. However, due to the shortage of training sites, lack of experimental equipment, the formation of double-qualified teaching echelon, the lack of enterprise teachers with senior technicians or senior technical titles, and the insufficient participation of industry and enterprises, it is necessary to accurately grasp the talent training in the development of industry and society. Specific requirements of cultivation, in-depth design of teaching and training process, to achieve the docking of teaching process and production process, reconstruct the personnel training mode of production education and collaborative education, and carry out the construction of off-campus practice base. For this reason, the school has successively signed school-enterprise cooperation agreements with many companies. Such as Shanxi Coal Museum, Longdong Coal Company of Datang Group, Xinzhuang Coal Mine of Qingyang Coal and Electricity Group, Gansu Jinyuan Coal Industry Group Company, Fenghuangshan Coal Mine of Shanxi Jinmei, Practical Teaching Base of Shanxi Yuncheng Vocational and Technical College, 146 teams of Gansu Coalfield Geological Bureau, and so on. Focusing on “laying stress on the foundation, strengthening the application”, according to the guiding ideology of “innovation and serving the local areas”, Longdong University revised the talent training program through the way of school-enterprise alliance and complementary advantages, and established a new off-campus practice base.

5. CONSTRUCTION OF DOUBLE-TEACHER TEACHERS

According to the principles of setting up posts on demand, in order to select excellent posts, open recruitment is carried out, which is equal and fair. Meanwhile, we should change the management mechanism and closely match the post requirements to build a "double-qualified" teaching staff. For posts of different nature, specific post conditions and responsibilities should be set, job titles should be diluted and appointments strengthened.

We should broaden the channels of teachers' sources, implement the project of introducing and stabilizing high-level talents, and do a good job of introducing and stabilizing high-level talents and talents in short supply in disciplines and specialties. According to the current situation of the construction of "double-qualified" teaching staff, a reasonable plan for the introduction of talents has been worked out. Active training and strict checks should be made. Among the newly trained talents, senior professionals and postgraduates should be the key training objects. At the same time, attention should be paid to the introduction of a number of teachers with certain practical experience, strong application ability or development potential, with the emphasis on the introduction and training of subject and specialty belts. The leader should improve the overall level of the teaching staff according to the current situation and needs of the structure of the teaching staff.

The Ministry of Education's "Some Opinions on Improving the Teaching Quality of Higher Vocational Education in an All-round Way" points out that it is necessary to increase the proportion of professional teachers who have working experience in enterprises, arrange professional teachers to practice in enterprises, accumulate practical working experience and improve practical teaching ability. At the same time, a large number of professionals and skilled craftsmen from industrial enterprises should be recruited to serve as part-time teachers in schools. The proportion of part-time teachers should be gradually increased, and the mechanism of teaching practical skills courses by part-time teachers with corresponding high skill levels should be gradually formed. Therefore, in addition to the training of teachers in schools, we must also strengthen the construction of part-time teachers in enterprises, and realize the sharing of human resources with cooperative enterprises, so as to improve the quality of personnel training and optimize the construction of teachers.

6. CONSTRUCTION OF COMPREHENSIVE CURRICULUM SYSTEM

The students of safety engineering major of "excellence plan" should take engineering practice ability as the core to develop in an all-round way. Therefore, the school should first consider how to deal with the relationship between students' all-round development and professional education. However, because of the unreasonable curriculum system, there may be a contradiction between training objectives and professional education. Therefore, first of all, we should implement the public basic knowledge and general courses, carefully formulate the teaching contents and class hours of these courses, regularly update the teaching contents, consolidate the students' knowledge of Humanities and Social Sciences, and ensure that students can become a person with good humanities and Social Sciences Foundation and sound moral character before they become "excellent engineers". Secondly, the proportion of practical courses should be increased appropriately. The most important task for engineers in the future is engineering practice rather than theoretical research. Therefore, on the premise of ensuring the learning of main theoretical knowledge, some practical courses should be set up as much as possible to provide students with enough practice opportunities and training time. Finally, a reasonable curriculum evaluation system is established, so that the teaching effect of the curriculum can be fed back, and the comprehensive curriculum system is optimized by scoring and opinions.

7. CONCLUSION

Under the background of the transformation of local undergraduate colleges and universities to application-oriented universities, Longdong University actively promotes the construction of the training base by increasing investment, so as to meet the needs of students' curriculum experiment and training in the University. At the same time, the school actively promotes the in-depth cooperation with enterprises, cultivates students' professional skills and literacy, enhances students' professional competitiveness, greatly improves students' professional skills and literacy, and cultivates excellent safety engineering engineers.

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