

Exploration and Practice of Universities Helping Enterprises' Technological Talents to Renew Their Knowledge—Case Study on the Cultivation of High End Technical Talents in the National Knowledge Renewal Project of the Iron and Steel Industry

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Abstract: Under the new era, the iron and steel industry actively promotes the new development concept, and to achieve high-quality development of the iron and steel industry, the construction of talents, especially professional and technical talents is the key factor for enterprise development. With the rapid development of the industry, there are some problems in the construction of professional and technical talents in enterprises. By analyzing the problems in the talent team of the steel industry, and with the help of the national knowledge renewal project, this paper summarizes the practices of our school in the construction of the talent team of the steel industry: ideologically, with the ideological and political concept of the university curriculum as the guidance of the values, inherit the red gene, enhance the sense of honor of the profession, and cultivate a cadre team with excellent ideas in technology and management for the country and enterprises. At the same time, relying on the talent training project of the National Knowledge Renewal Project, the training of high-level and innovative talents for iron and steel enterprises will be realized; At the institutional level, we should take multiple measures to achieve the separation of management and education, integration of production and education, and build a high-level, high-quality, and complex university enterprise talent training overpass model. It is of great significance to finally realize the knowledge sharing between schools and enterprises, help the national manufacturing development strategy, and realize the great rejuvenation of the country.

1. Background

The iron and steel industry is an important basic industry of the national economy and an important symbol to measure the comprehensive national strength and national defense strength of the country. Comrade Mao Zedong said, "One grain, one steel. With these two things, everything is easy to do." Since the founding of the CPC a hundred years ago, especially since the founding of New China, the iron and steel industry has achieved rapid development from small to large, from weak to strong,

creating a miracle in the history of iron and steel development in the world, and laying a "steel" foundation for the Chinese nation to strengthen and enrich the people. Since the 18th National Congress of the Communist Party of China, the iron and steel industry has actively implemented the new development concept and made efforts to promote the high-quality development of the iron and steel industry. The transformation and upgrading of steel enterprises is extremely urgent. Independent innovation, energy conservation, environmental protection, green and low-carbon. The proposition and implementation of every concept are inseparable from talents. Enterprise talents are the key factor for enterprise development. For steel enterprises with strong professionalism, to better develop in the modern market economy environment, the construction of professional and technical talents team is particularly important.

The knowledge updating project for professional and technical personnel was first proposed by the former Personnel Department in September 2005. In 2011, the Ministry of Human Resources and Social Security issued the Notice on Printing and Distributing the Implementation Plan of the Knowledge Renewal Project for Professional and Technical Talents (RSBF [2011] No. 112) in accordance with the requirements of the National Medium and Long term Talent Development Plan (2010-2020). The goal is to focus on the adjustment of China's economic structure, the development of high-tech industries and the improvement of independent innovation ability in 12 key areas, including ecological environment protection and energy resources, large-scale continuing education on knowledge updating was carried out. As the basis of manufacturing industry, iron and steel industry is the key field of knowledge updating project implementation.

2. Problems of technical talents in steel industry

(1) Due to the influence of industry environment, geographical location, salary, working environment and other factors, the brain drain is serious. At the same time, with the upgrading and transformation of enterprises, around 2012, iron and steel enterprises had a difficult time. There were problems such as single product, insufficient innovation, overcapacity, etc., and profits decreased or even a loss occurred when selling a ton of steel. [1]In this case, the treatment of employees has seriously declined, professional technicians have changed careers or job hopping, and college and technical secondary school graduates have also transferred from related majors to other industries for employment. As a result, the number of technicians in later enterprises decreased significantly. There is a situation of using high salary and other conditions to recruit mature and high-end technicians.

(2) The existing technical personnel in iron and steel enterprises have outdated knowledge and need to be updated urgently. The iron and steel industry in China is too negligent about the use of talents. Many iron and steel enterprises only pay attention to the existing talents of employees, but ignore the training of this talent group, and do not effectively develop the potential of employees, which leads to the shortage of talents and the serious difficulty in improving the technical quality. In addition, the production technology process of iron and steel enterprises has the unique characteristics of "many points, long lines, and wide range", and the professional requirements of the post are very strong. In this case, many young talents with high academic qualifications cannot play their potential well. As a result, there is no better personal development space for the existing high-quality talents in the enterprise, and the construction and cultivation of the talent team are also restricted. After taking up the post, it basically belongs to the system of "contract term system, one post lifelong system", and there is basically no "two-way choice" right to dominate their labor. However, it is difficult to break through the scope of professional learning and the scope of improvement of core competence.

(3) There is a serious shortage of high-end complex technical talents. In the enterprise, the majority of technicians in a single discipline, such as those in metallurgy who do not understand machinery and information, and those who learn machinery who do not understand metallurgy, are in serious

shortage of multidisciplinary talents and lack the ability to solve problems in work. With the upgrading and transformation of enterprises, the requirements of enterprises for complex talents who can solve complex problems are particularly prominent, which has become a great obstacle to the development of state-owned steel enterprises.

(4) The enterprise talent training plan is not scientific enough and lacks unified planning. The problems in the current talent training work are mainly due to the unscientific planning of the training work and the lack of unified planning for the guidance of the training work [1]. Enterprises should pay attention to the consistency of talent training and work. Only with the guidance of advanced system training planning, can the training work be truly implemented.

3. Build a bridge for updating professional knowledge in response to existing problems

Since its establishment, Beijing University of Science and Technology has shouldered the heavy task and mission of "making the country strong through steel and rejuvenating the country through science and education". The school was born and prospered because of steel. It has trained a large number of high-level professionals for the industry. As a well-known university in the steel industry, it is known as the "cradle of steel". The university has always adhered to the mission of the university and served the strategic needs of the country, adhered to the window role of talent training and social service functions, attached importance to the continuing education of non academic qualifications in the context of large engineering courses, and clearly put forward the "One Hundred Enterprises and Ten Thousand People Plan", that is, during the "Fourteenth Five Year Plan" period, the university will further build a service-oriented continuing education system for the steel industry, it also aims to cultivate 10000 high-level professionals for 100 iron and steel enterprises through non academic continuing education. Let the high-quality educational resources of Beijing University of Science and Technology fully serve the construction of a learning society and a lifelong learning system. In particular, since the implementation of the National Knowledge Renewal Project, we have seized the opportunity to take multiple measures to achieve the integration of production and education, so as to further improve the quality of enterprise talent training.

3.1. Guided by the values of ideological and political concepts in university courses, cultivate a team of high-tech cadres

The development of the national manufacturing industry requires a group of highly qualified technicians who have the spirit of craftsmanship of a great country and advance and retreat together with the honor and disgrace of the country. They are professional, and the first is ideological. Therefore, the inheritance of the red gene in ideology is particularly important. This is not only reflected in the education of students at school, but also more important for employees who are already working in enterprises[2].

In the process of enterprise training in our school, teachers pay attention to the close combination of professional education with national strategy and industry development, and the close combination of teaching objectives with moral cultivation, scientific and technological literacy and innovation awareness. While implementing the world science and technology frontier and building a curriculum resource library that includes teaching courseware, videos, engineering cases and other knowledge and technology iterative updates, great attention is paid to ideological guidance, and red genes oriented to corporate culture are collected and sorted to form a library of ideological and political materials that "one enterprise, one feature" and "one lesson, multiple cases". In many courses, we require teachers to organically combine ideological and political concepts with professional knowledge, integrate feelings, generate empathy, and achieve common progress. Under the guidance of ideological and political elements, the whole process and all directions of ideological and political

education can achieve the organic unity of updating and imparting professional knowledge and curriculum ideological and political system.

Taking the core course Rolling Production Principle and Practice specially prepared for continuing education non academic training in the direction of material engineering of the school's materials and chemical engineering specialty as an example, the course content includes the basic principle and production practice of rolling production, and integrates ideological and political elements in the whole teaching process. For example, (1) through the introduction of the case of "deck steel", a key component of China's first domestic aircraft carrier, which is used as the deck material, the steel service in the construction of steel, science and technology, military, energy, transportation, and infrastructure power, as well as its contribution to the "the Belt and Road" initiative, so as to integrate into the rise of great powers and support the idea of national rejuvenation; (2) When talking about the cutting-edge technology of materials discipline, it will closely connect with the national strategy of "carbon peak, carbon neutral" and intelligent manufacturing; (3) Through telling the development history, deeds of heroes and various corporate cultures of the enterprise, integrating the red gene of the enterprise, the concept of strengthening craftsmanship, professional norms and lifelong learning is established. Through these cases, the trainees of enterprises at all levels have deepened their understanding of the national conditions, enhanced their national self-confidence and pride, and emphasized the responsibility of China's steel enterprises and the spirit of great craftsmanship, so that they fully understand the importance of socialist core values, traditional virtues of the Chinese nation, and Secretary Xi's requirements for great craftsmanship in the new era.

3.2. To achieve the goal of "the government sets up a platform and universities serve", and achieve the goal of serving society and industry

As early as September 2005, the former Ministry of Personnel proposed the knowledge updating project for professional and technical talents. In 2011, according to the requirements of the Outline of the National Medium and Long term Talent Development Plan [2010-2020], the Ministry of Human Resources and Social Security issued the Notice on Printing and Distributing the Implementation Plan for the Knowledge Updating Project for Professional and Technical Talents (RSBF [2011] No. 112). It is one of the 12 major talent projects organized and implemented at the national level according to the requirements of the National Medium and Long term Talent Development Plan (2010-2020). The goal and task is to carry out large-scale continuing education on knowledge renewal in 12 key areas, including equipment manufacturing, information, new materials, ecological environment protection, and energy resources, focusing on China's economic restructuring, development of high-tech industries, and improvement of independent innovation capabilities. As a major pillar industry of the country, the iron and steel industry is a key field for the implementation of the national knowledge renewal project.

With the help of the platform of the National Knowledge Renewal Project, as the first institution of higher learning in the iron and steel industry established in New China, the University has successively applied for and undertaken more than ten advanced research classes of the National Professional and Technical Talents Knowledge Renewal Project. After returning, the beneficiaries continued to teach and share the content to the engineering and technical personnel of the same enterprise in groups, and the actual number of audiences increased exponentially. The training period of 10 has built a good platform for knowledge updating, technical innovation and technical exchange of professional and technical talents in iron and steel enterprises. It has truly achieved the goal of "serving the society and the industry" and the national manufacturing development strategy.

3.3. Building a high-level, high-quality, and composite enterprise talent training overpass model

First of all, we should establish an efficient cooperation mechanism for continuing education management and education, focus on the forefront of industry technology and the hot issues of enterprise production practice, and help enterprises achieve the growth of high-level compound talents.

Since the 18th National Congress of the Communist Party of China, the iron and steel industry has actively implemented the new development concept, mastered key core technologies, improved independent innovation ability, and achieved energy conservation, environmental protection, green and low-carbon development. All these proposals to promote the high-quality development of the iron and steel industry have outstanding requirements for talent construction and training. Beijing University of Science and Technology seized the opportunity to give full play to the unique advantages of the school's disciplines, and strive to build a high-level, high-quality and complex enterprise talent training overpass model to help the development of the national manufacturing industry.

The university has established an efficient platform for continuing education management and education cooperation. On the premise of understanding the needs of enterprises, the university has jointly designed a program based on the characteristics of these academic disciplines to achieve multi modular integrated teaching, quickly transfer the cutting-edge theories and technologies of the industry, interdisciplinary theories and technologies to enterprise technical talents, transform them into actual productivity, and provide high-level continuing education services for enterprise technical talent. We will continue to deepen the training of high-level and complex talents, and promote the organic connection of education chain, talent chain, industry chain and innovation chain. At the same time, in the design of the scheme, we should be flexible and innovative, combine with the actual situation of the enterprise, and directly let the students take the subject with them to study theory and tackle practical problems, so as to quickly form targeted solutions. If a certain period of training in Jiuquan Iron and Steel Company is completed, each student in the class has at least one technical reform plan to implement, and there are three more students. When training high-end talents for Shougang Jingtang, theory+project research (problems in enterprise production) has formed a postgraduate training mode.

Secondly, the school has established a long-term mechanism for integration of production and education to encourage young teachers to have more than 1-2 years of enterprise work experience. The school encourages outstanding young and middle-aged teachers to engage in engineering technology research at the enterprise postdoctoral workstation, as well as to take temporary posts in large metallurgical enterprises or local industrial parks. The evaluation and appointment of professional titles and qualifications are equivalent to the qualification of studying abroad; At the same time, we signed a cooperation agreement with the enterprise to build a joint talent training base for production, teaching, research and use. The students of the school can practice in the enterprise, and the excellent engineers of the enterprise can teach students. The introduction of these measures has promoted these young teachers to combine theory with practice, become a member of the excellent teaching staff, and promote the technological upgrading and academic growth of enterprise engineering and technical personnel. While driving the technological innovation of the enterprise, it also promotes the construction of the double first-class school.

3.4. Doing a good job in extending educational services and achieve sustained growth of enterprise talents

Efforts should be made to extend continuing education services, build a platform for exchange, discussion and sharing of technical talents in the industry, and effectively improve the production

technology level of the steel industry and the industry influence of the school. Through the establishment of special WeChat groups and training class WeChat groups, the metallurgical technology exchange activities after the training, as an important part of our technical training, extend the discussion of new technical problems emerging in steel production practice to outside the classroom and continue to serve enterprises. Some teachers irregularly share their research results with the group. These WeChat groups have a growing influence in the industry, for example, the number of members of the "Case Study of High level Continuous Casting Technicians Seminar" group has reached more than 350. The continuation of technical exchange activities after the training has built a platform for professional and technical personnel of iron and steel enterprises to exchange and share knowledge and technology, which has a positive role in promoting the overall level of iron and steel production technology in China.

References

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