

Research on Skill Enhancement Training for Workers in the Construction and Installation Industry under the Background of the New Vocational Education Law

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Abstract: In the context of the new vocational education law and the significant transformation of digitalization and informatization in the construction industry, this article conducts a survey and research on workers in the construction and installation industry and their career development plans. It analyzes the current situation and problems of skill improvement training for workers in the construction and installation industry, and studies how vocational education can empower the training content and forms of workers in the construction and installation industry under the industry transformation. It provides certain basis and new solutions for solving similar problems.

Keywords: Construction and Installation Industry Workers; Skill Training; Vocational Education.

1. Introduction

With the rapid development of building intelligence, the investment in building equipment accounts for an increasingly large proportion of construction investment. The requirements for construction and installation industry workers on construction sites have undergone new changes: the demand has increased, involving a wider range of professions (building water supply and drainage, building electrical, ventilation and fire prevention, intelligence, elevator installation, etc.).

With the widespread use of precision decoration engineering and the development of construction industrialization, the coordination requirements between installation and civil engineering, as well as installation and precision decoration, are becoming increasingly high. The precision requirements for reserved, pre embedded, and handover dimensions are also very high, making it difficult to control the cost of installation engineering; The changes in these situations have raised higher requirements for the professional competence and ethics of workers in the construction and installation industry at the construction site; Therefore, installation workers on the construction site urgently need to receive in-depth professional training in order to achieve higher construction quality[1].

2. Training Needs and Career Planning Status of Workers in the Construction and Installation Industry

According to the analysis of the survey sample, the age of the workers in the installation team on site tends to be younger, with 70% in the age group of 20-40 years old and 20% under 20 years old.

Many new generation construction workers are willing to work in professions such as water supply and drainage, electrical engineering, ventilation and air conditioning, and fire protection. One of the main reasons is that workers in the construction and installation industry have better working conditions and a salary level that is above average. If they can

serve as team leaders to contract engineering projects, their income will be higher; In addition, the development of new materials and processes on construction sites in the construction and installation industry is very rapid, which also requires technical workers engaged in installation to have strong acceptance ability, strong knowledge updating ability, and easy adaptability to the site.

From the on-site research data, it can be seen that workers engaged in installation have a junior high school education or above, and have an age advantage and basic educational background in receiving new knowledge and professional training. Their main communication tool is smartphones, which provide convenience for using new media technology, micro courses, micro videos, online teaching, and information-based teaching. This allows them to learn and receive professional knowledge training in any situation using their spare time.

The vast majority of on-site installation workers are confused about their career development and do not have a clear understanding of their own career path. Subjectively speaking, the direct purpose of most workers participating in training is to "have a job, find a position they are capable of, earn more money, and improve their salary level", and there is little in-depth thinking about "personal career development". The on-site investigation showed that most of the technical workers on site were unable to clearly state which aspects of knowledge they needed to learn in order to improve their own situation. They lacked systematic professional guidance and had unclear learning directions, resulting in a serious loss of willingness to receive training and weak learning autonomy.

According to the actual situation on site, the career development path plan for a new generation of ordinary workers who transform into construction industry workers is shown in Figure 1. The development of construction industry workers is divided into three stages: the first stage is the initial development stage, where ordinary workers transition from apprentices to construction industry workers, and the key stage is to become professional workers from an outsider; The second stage is the professional accumulation and development stage, where construction industry workers

move towards technical management positions; The third stage is the advanced stage, where construction workers engaged in installation reach the peak of professional development[2].

3. Training Content and Existing Problems for Workers in the Construction and Installation Industry

The research team conducted periodic surveys and analyses on workers' training willingness, training content, training mode, training effectiveness, training materials, training time and place arrangements, and who pays for training funds from both individual and enterprise perspectives within the research time frame.

The surveyed workers in the construction and installation industry believe that "vocational skills" and "safety knowledge" should be the most relevant, and training on "legal knowledge" and "construction technical specifications" should also be included. According to the analysis of the enterprise survey questionnaire, construction companies believe that the training content should be "basic skills for actual positions" accounting for 100%, and "safety knowledge" accounting for 60%. Some companies also believe that ordinary workers should be trained in knowledge related to "professional ethics" and "labor contract law". The direct purpose of training ordinary workers by enterprises is "quality management, schedule management, and safety management". Enterprises hope that their workers have high skill levels, high work efficiency, can avoid safety accidents, understand some labor contract laws, and have high quality for easy management.

Based on the practices of construction sites, especially for large enterprises, the control requirements for safe and civilized construction on construction sites are very high. There is a mature and strict "flying inspection" system for safe and civilized construction within the enterprise. The general contractor of the construction is very strict in managing safe and civilized construction. The project department has already put in place safety education systems such as pre job safety education or morning training for worker teams. Currently, the Provincial Department of Construction also has a mature training course network platform for "safety three categories of personnel" and a large amount of training resources. By making good use of these course resources and integrating safety inspection and education systems, industrial workers in construction enterprises can receive safety training, which can achieve the expected results.

4. Research on Training Content and New Forms for Workers in the Construction and Installation Industry

The first stage of the development of ordinary workers: the transition from apprentices to construction industry workers is the most crucial. It is not a problem to adopt the "mentorship" style of master apprentice for skill operation. Of course, there must be qualification requirements for masters, such as senior technicians or older, skilled and experienced masters. Of course, how to encourage this approach still needs to be studied. For construction technical specifications, the second stage of on-the-job training for construction industry

workers already has mature teaching resources (courses for mechanical equipment construction workers and quality inspectors); In the third stage, there are mature construction engineers (second level and first level mechanical and electrical engineering), but it is precisely because of training costs and time issues that the training in the first stage cannot be effectively carried out. Who will bear the cost, how to develop high-quality courses, how to establish a rigorous training mechanism, consolidate professional foundations, and promote the successful transformation of ordinary workers into construction industry workers are the most critical factors. Prior to this, ordinary workers had not yet been able to transform into construction industry workers, and they could only accept spending less on improving their professional skills. The personal questionnaire analysis of installation workers in the construction industry shows that only 13.7% of ordinary workers are willing to pay more than 300 yuan for training. In addition, due to the lack of relatively stable contractual relationships, construction companies are not willing to bear the cost of training ordinary workers. For the issue of training time, many ordinary workers often need to work overtime to earn money to support their families, and construction companies often rush to meet the deadline due to tight tasks. Therefore, it is unlikely to allocate a whole day for training during the start of construction[3].

Regarding safety and civilized construction training, the construction industry should establish unified safety education for key construction positions, as well as teaching resources on labor contract law, professional ethics, etc. It is best to offer specialized safety and civilized construction courses for installation majors. Professional theoretical training is extremely important for them, on the one hand, these new generation ordinary workers have not received professional theoretical learning; On the other hand, the on-site masters are unlikely to provide them with professional theoretical guidance. It is recommended to divide the assessment of junior installation workers into different specialties, such as plumbing or pipeline workers, electricians (including building strong and weak electricity), fire protection workers, etc.

In today's era of fully developed information technology and online teaching technology, it is necessary to establish a high-quality online teaching resource library for "Building Equipment Installation Engineering" (including teaching videos, electronic lecture notes, practice and testing systems, etc.), and create a large number of micro videos to make learning convenient, fast, and "anytime, anywhere", so that students can use smartphone terminals for self-directed learning. Big data technology can be used to monitor the length of students' learning time. Obtaining a job skill certificate through vocational skill appraisal is an effective method for testing the effectiveness of training and is also an extremely important step.

From the current situation of job identification for construction workers in China, there are many problems that urgently need to be solved, such as different identification standards in each province, uneven levels of fairness and transparency in the identification process, and difficulty in unifying the recognition of vocational skill certificates in different regions. This aspect still needs further research. For workers who have obtained skill identification certificates, electronic information files shall be established to record their training and professional qualifications. Each person can directly check all their training, educational records and

obtained vocational skills or job certificates in the information database according to their own ID number, so as to achieve the integration of personnel and certificates and follow the person. Adopting policies to incentivize enterprises to improve the treatment of certified personnel or establish a certification subsidy system for in-service personnel, encouraging construction industry workers to actively obtain certification.

In addition to the aforementioned measures, it is imperative to foster a collaborative ecosystem that integrates industry, academia, and research institutions to ensure that the curriculum for "Building Equipment Installation Engineering" remains relevant and up-to-date. This can be achieved by establishing partnerships with leading companies in the construction sector to provide insights into the latest industry trends and technological advancements. These insights can then be incorporated into the online teaching resource library, ensuring that students are equipped with the most current knowledge and skills required in the field.

Furthermore, to enhance the practical application of theoretical knowledge, virtual reality (VR) and augmented reality (AR) technologies can be employed to create immersive learning experiences. By simulating real-world scenarios, students can practice installation techniques and troubleshoot equipment in a controlled, virtual environment. This not only prepares them for the challenges they will face on the job but also reduces the risks associated with hands-on training in a live setting.

To address the disparities in job identification standards across different provinces, a unified national framework should be developed in collaboration with government agencies. This framework would standardize the criteria for skill identification and ensure that the process is conducted with a high degree of fairness and transparency. Moreover, to facilitate the recognition of vocational skill certificates across regions, a centralized digital platform can be established, allowing for seamless verification and authentication of certificates issued in different areas.

In terms of incentivizing workers to obtain and maintain their certification, a multi-faceted approach can be adopted. For instance, certified workers could be granted access to exclusive job opportunities, higher wages, and professional development courses. Additionally, a points-based reward system could be implemented, where workers accumulate points for each certification they achieve, which can be redeemed for various benefits such as scholarships, training programs, or even health insurance premiums.

Lastly, to ensure the long-term sustainability of these initiatives, continuous evaluation and feedback mechanisms should be put in place. Regular surveys and assessments can help gauge the effectiveness of the training programs and identify areas for improvement. By actively engaging with stakeholders, including students, educators, industry professionals, and policymakers, the education system can be

fine-tuned to meet the evolving demands of the construction industry and prepare the workforce for the challenges of the future.

5. Conclusion and Suggestions

In light of the necessity to enhance and refine the relevant legal frameworks, a significant portion of workers within China's construction and installation sector are predominantly supervised and managed by labor intermediary firms or through contractual team leaders. The construction industry typically embraces a "master apprentice" model, wherein technical workers lacking formal professional qualifications undergo training. The vocational skills training regimen for technical workers in China's construction and installation industry has not yet been standardized and legalized, posing challenges in compelling workers at construction sites to pursue professional qualifications and secure certifications. It is imperative to implement appropriate policies that heighten the motivation of regular workers to engage in training initiatives. Leveraging online teaching resources can facilitate the promotion of information-based instruction tailored to the unique characteristics of the workforce. Employing a master-apprentice approach to impart skills, standardizing the fairness and transparency of skill assessment processes, enhancing recognition and credibility, and effectively elevating the professional training efficacy of workers in the construction and installation industry are crucial steps that need to be taken.

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