Exploration on Establishment of Off-campus Training Base for Civil Engineering Professional Master

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**Abstract.** The training of civil engineering professional master focuses on cultivating practical talents and its training method is different from that of academic masters. This paper proposes the establishment of off-campus training bases to train masters of civil engineering in order to establish a leadership group based on school-enterprise joint work and make full use of teacher’s resources. Not only work on projects, but also select better training base according to complementary advantages. In this paper, a new idea was provided that improved the establishment of off-campus training bases for civil engineering masters training.

1. Introduction

In recently years, rapid progress in various fields, especially on economic development has been made in China. Chinese society needs more talents to help on national future development. Education on civil engineering not only plays an important role in national development, but also is given a huge value as the foundation of national economic development. Nowadays, there are two types of masters training in civil engineering in Chinese universities. One is an academic master degree and the other is a professional master degree. The cultivation of professional masters focuses on the application and practical ability to which is supposed to deal with actual problems, such as the problems related to industry and the Internet. Consequently, the establishing of off-campus training for civil engineering masters is necessary.

No. 1 document [2009] released by the Ministry of Education of China pointed out that the goal of professional master’s degree training is to make sure the masters own specific ability and extensive professional knowledge in a certain professional field. The masters should undertake professional skills and management work with proper professional qualities of high-level applied professionals [1]. In recently years, relevant national ministries and commissions have advocated placing professional degree off-campus training bases in a strategic position for key development. The practice base is the main step for the cooperation of universities and enterprises to enhance the practical ability of civil engineering masters.

2. The Significance of the Establishment of Off-campus Training Base for Civil Engineering Masters

It’s well known that civil engineering is a discipline with a strong connection between theory and practice. Students are required to master strong practical ability during actual training. The theoretical knowledge learned in school is far from meeting the needs of future work. Therefore,
universities and teaching mechanism should focus on the establishing of off-campus training bases and strengthen the cooperation between enterprises and universities. Furthermore, it is necessary to encouraging teachers and students to leave university and enter enterprises.

In 2015, the Ministry of Education of China issued the "Opinions on Further Promoting the Reform of Professional Degree Postgraduate Training Model", which requires training mechanism to unite with related enterprises, establish professional masters’ training bases and develop joint recruitment and training models. In response to the spirit of the national document, the National Engineering Master Education Steering Committee formulated the "Deepening the Comprehensive Reform Tasks of Professional Master Education" to establish off-campus practice bases, promote school-enterprise cooperation, and improve the quality of practical education as deepening reform of engineering master education. The establishment of off-campus training based for civil engineering masters is one of the most crucial tasks in China, which require the learning from other relatively successful cases in the establishment of foreign universities’ off-campus training bases. For example, Stanford University in the United States has established cooperative relations and laboratory with a large number of companies for students to practice with; Cambridge University in the United Kingdom established Cambridge Academy of Sciences in universities, establishing a bond with the industry to provide students with high-quality practical conditions [2]; the Massachusetts Institute of Technology named "Plan to form a national science and technology", which entitled students with a one-year cross-border practical opportunity [3]. From the above documents and foreign cases, it can be seen that the establishment of off-campus training bases has a great impact on the practice teaching of civil engineering masters. Promoting the development of off-campus training bases is very important for the cultivation of civil engineering masters.

3. Establishment Strategy of an Off-campus Training Bases for Civil Engineering Masters

3.1. Establishing a Leading Group for School-enterprise Work in Universities

In the process of establishment of off-campus training bases for civil engineering masters, universities should improve the off-campus cooperation mechanism, encourage teachers to strengthen the establishment of cooperative relationships with enterprises. Information collection on off-campus enterprises through the establishment of a school-enterprise work leadership group and conduct project approval according to the needs of enterprises [4]. Make the best use of different kind of high-quality resources while integrating the needs of various enterprise to ensure the stability of the cultivation base. More dominance should be gained in future base establishment work.

3.2. Using Advantage of Teacher’s Resources

Making the best use of faculty resources specifically means that the establishment of off-campus training bases on civil engineering masters mainly relies on the establishment of cooperative relationships between university professors and enterprises or scientific research institutions in the professional field. University professors are able to accumulate human resources and recommend students to off-campus training bases on professional practice through personal relationships. For instance, Harbin Institute of Technology has run this mode. The master's degree in civil engineering of the school used the professors as a link to establish cooperative relations between enterprises and scientific research institutes. And a joint training cooperation with Harbin Institute of Building Research and Heilongjiang China Railway Engineering Bureau was set up. Moreover, some
professors are working as technical consultants or chief engineer of design institutes in research institutes or certain companies. They use personal relationships to establish off-campus training bases for civil engineering masters and provide students with off-campus professional practice opportunities. In this model, university mentors are the key link between companies and universities while establishing an off-campus training base. They also provide more opportunities for civil engineering masters to enter off-campus training bases for actual practice. The start of faculty resources is one of the main models for the construction of off-campus training bases for civil engineering masters. The advantage is that it can make the best use of university to provide masters with accurate and highly matched companies to practice as interns. The professors have a full grasp of the professional practice process of masters. Mentors are given the chance to pay a visit to company while improving their own ability.

3.3. Supported by Projects

Using the project means that strengthening the cooperation of the two sides. There are three main ways. The first is to establish an off-campus training base for civil engineering masters with projects as the carrier. Moreover, university and enterprise can cooperative establishment projects and seek joint projects for enterprises to realize the industrialization of scientific research results. At the same time enterprises cooperate with universities to complete projects for their own development needs. The second method is that enterprises or research institutes establish their own projects. Enterprises will cooperate with universities in the form of orders after the projects are established. The third method is that mentors or masters propose preset projects and trying running in the first place. The university mentors and companies can co-work if they find a good and proper chance in certain field. Once the project was completed successfully, both sides could be motivated and move forward towards next step, taking the "joint training" model of the Civil Engineering Institute of Tongji University as an example. The company sends its own project topics to the university and connects with the professor. The professor and the enterprise reach a consensus and establish an off-campus training base. The professor sends masters to participate in the enterprise project. After the students come to the off-campus training base, they can participate in project placement internships. Colleges and enterprises inspect masters through projects. During the entire training process, on-campus professors, off-campus professors, and masters can communicate regularly with the development of the progress of project. Under this model, masters can complete professional practice and thesis. The relationship between universities and enterprises is strengthened during projects. Some projects are linked to graduate thesis to mobilize students' enthusiasm. However, the continuity of projects is difficult to guarantee. Consequently, the application of new projects is uncertain.

3.4. Choose the Training Base According to Complementary Advantages

The establishment of the training base doesn’t differ too much among model. Although the resources required for the establishment of the off-campus training bases on the master of civil engineering are different from that of on-campus training, the superior resources being exchanged externally will lead to success. After determining the training base, professors should consider the balance of resource relationships in order to avoid the formation of resource dependence and ensure the stability of the training base. This balance of resource dependence is based on common interests [5]. In the establishment of off-campus training bases on masters in civil engineering, colleges and universities choose off-campus superior resources to establish bases and they need to pay attention
to the needs of partners. Both parties can acquire corresponding benefits from cooperation. There is no doubt that this is the basis for a stable relationship between universities and companies.

4. Conclusion
This paper emphasizes the importance of establishing an off-campus training base for civil engineering masters. According to the currently situation, there are a lot of unsatisfactory establishment feedback about off-campus training bases for civil engineering masters. The masters' professional practice results have not reached the expected standards. After discussion and research, this paper purposes the idea of establishing a school-enterprise work leadership group, making full use of teacher’s resources, supported by projects and the strategy of selecting the training base following to the advantages. This paper would be provided new strategy of improving masters' practical ability and education reform in university.

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References