Experience of Improving Teaching Quality of Steel Structure Course

Yangbing Liu and Shuang Wang

ABSTRACT

Based on the study on the teaching practice of steel structure courses in research university and local university, how to improve the teaching quality of steel structure course in local universities was analyzed. From the aspects of the teaching contents, teaching methods and means, characteristics of steel structure course were researched and reformed. The teaching practice results show that the reform has enriched the teaching content, stimulated students’ interest in learning, and enabled students to truly integrate into the class. It also improved the ability of engineering practice, promoted educational reform in universities, and greatly improved the teaching quality.¹

KEYWORDS

Steel structure course, teaching quality, engineering practices, teaching method.

INTRODUCTION

With the development of economic construction, the demand for civil engineering talents is also changing. At the same time, local colleges and universities are also in an important period of transformation and development of applied technology. Combining the characteristics of civil engineering disciplines

¹Yangbing Liu, Shuang Wang. College of Civil Engineering, Nanyang Institute of technology, Nanyang, China, 473004.
and the needs of society, how to train the excellent civil engineers is important. It is also the key research for civil engineering specialty under the transition context.

During the 13th five-year plan period, the country vigorously promoted the prefabricated buildings. The demand for personnel's quantity and quality of steel structure industry is higher and higher. On the one hand it is hard for companies to hire people, but on the other hand it is also difficult for graduates to find jobs in steel structure enterprises [1]. The professional knowledge involved in the steel structure course is the necessary knowledge for the relevant work of steel structure. Only by mastering and flexibly applying this professional knowledge can we adapt to the development of the industry and become the talents needed by the enterprise. But many colleges and universities only attach importance to traditional structure courses, while the setting of steel structure course is not taken seriously. Furthermore some teachers and students have less practical experience in the field of steel structure, give too much emphasis on theoretical calculation in the teaching process, and lack of training in practical engineering ability. After the students complete the steel structure course, they only know how to calculate the length of the weld and bolt numbers and cannot handle the actual project. It has serious influence on the teaching results.

Therefore the cultivation of students' practical engineering ability is always the aim of steel structure teaching. Under the circumstance of transformation and development of local universities and great teaching-hour reduction, it is a new challenge for teachers to further improve the classroom teaching quality, truly make the students to grasp knowledge firmly, learn and use closely and train students' engineering quality and innovative consciousness. Through the many years' teaching experiences, the teaching reform is carried out on teaching content, teaching focus and teaching methods and means by combining with the characteristics of local universities. The main work is as follows.

**OPTIMIZATION TEACHING CONTENT&ENGINEERING CASE TEACHING**

There is a certain overlap between the steel structure course and the prerequisite specialized course. In the case of limited time, it is very important to reduce the unnecessary repetition of the content of other professional courses, optimize the content of the course, and introduce practical engineering cases into classroom teaching. For example, the calculation of stress and loads and basic design methods, etc. are repeated with other courses. The repetition of knowledge points between courses results in wasted classroom hours and the disconnection of content leads to difficulties in learning and lack of learning motivation which all directly affect the teaching effect of steel structure course. During the optimization of course content, it is necessary to straighten out the connection between the course and other courses, as well as the teaching needs of post-secondary specialized courses.
The practical engineering case is the most vital resource in the classroom teaching of steel structure. It can not only enrich the steel structure course teaching content, also can achieve the theory with practice to appropriately adjust teaching contents, collect the latest achievement of the development of the steel structure and introduce it to steel structure course teaching. It can also turn the boring theory in textbooks into vivid practical engineering, arouse students' learning enthusiasm, and make students understand the development status and prospect of steel structure industry.

On the one hand, combining with the characteristics of local universities, the practical engineering case teaching is used to solve the problem of lack of engineering background and serious disconnection between learning and using. On the other hand, each year the college organizes structural model design competitions in order to improve students' understanding of basic concepts and engineering practice ability. These makes the students feel the real value of the steel structure in actual engineering, rather than the fact that the steel structure will only be used to calculate the problem of the book.

**PAY ATTENTION TO BASIC CONCEPTS AND THEORIES, APPROPRIATELY WEAKEN THE PROBLEM SOLVING SKILLS**

Based on survey results of the actual learning outcome for more than 200 students in grade 2013 and 2014, it is found that some students are confused about basic concepts and theories, only solve problems in a particular step, have no idea why they did them that way, and lack of understanding of the physical meaning of the method. Only by understanding the basic concepts and theories can we truly master the calculation method and solve practical problems. However, in the process of explaining basic concepts and theories, students do not really understand them, and most of the time they are memorized by rote. This causes students to only solve certain problems. Even if the solution was got successfully, students did not grasp the core knowledge, and a slight change could make them get lost in the problem. Without strong grasp of basic concept and theory, too much to teach the concluding skill, too many problem-solving skills were taught, just like a building have gorgeous appearance, but there was no solid foundation, which could not been tested by the practice.

**BASED ON THE STUDENTS' ACTUAL ACADEMIC CONDITIONS, AVOID THE FULL - CLASS INDOCTRINATION**

Due to the reduction of class hours, in order to give more knowledge to students, teachers are lecturing all around the class and students have difficulty keeping up with the teacher. Although the teaching outline of steel structure course of local colleges is basically the same as that of research universities, the knowledge which
students actually master varies widely and even the most basic knowledge is not learned well. In turn, it also discourages students’ learning enthusiasm and reduces the teaching effect. Therefore, in the practical teaching process, heuristics and discussion teaching methods, various effective forms such as setting up problems, group discussion and classroom teacher etc. are used to arouse students’ enthusiasm and participation based on the students' actual academic conditions.

In addition, we should make full use of modern information technology to give full play to the advantages of various teaching methods and unify them. On the basis of traditional blackboard and multimedia teaching, mooc and network education platform is used to carry out teaching guidance and extra teaching to enrich teaching contents, perfect teaching methods and stimulate students interest in learning.

CONCLUSIONS

The teaching practice results show that the reform effectively improve the teaching quality. The learning attitude has changed from fear of steel structure to now active learning. The mastery of knowledge has changed from what seems to be not clear to the present understanding and mastery. The failure rate is greatly reduced from 50% to 10%. It not only cultivates students' interest in learning, but also enables students to truly integrate into the classroom, enhance the interaction between teachers and students, and improve the teaching quality.

ACKNOWLEDGEMENT

Financial support for study of the paper is provided by the transformation development undergraduate major core curriculum reform special project of Nanyang institute of technology NoHXKC2016039.

REFERENCES