

Visit to Beijing, China

2018.11.13-14

CNERC paid an official visit to Beijing, China for technical exchange during 13 – 14 November 2018. The CNERC delegation team consisted of:

- Ir Prof. K. F. Chung Director of CNERC
- Dr. H. C. Ho Deputy Secretary General of CNERC
- Mr. Jin Hao PhD Student of PolyU

During the two-day visit, the CNERC delegates visited leaders, researchers and technical personnel of the following organizations:

- Mr. Dang Bao Wei, Deputy Secretary-General; Mr. Liu Zhe Secretary-General and Mr. Liu Min, Vice Chairman of the China Construction Metal Structure Association
- Prof. Shi Yongjiu and Dr. Ban Huiyong of Tsinghua University
- Mr. Ye Haowen, Chairman; Mr. Ou Yaming, General Manager and Mr. Zhang Aimin, Chief Engineer of China Construction Science & Technology Group Co., Ltd.
- Dr. Tian Zhihong and her research team from Shougang Research Institute of Technology

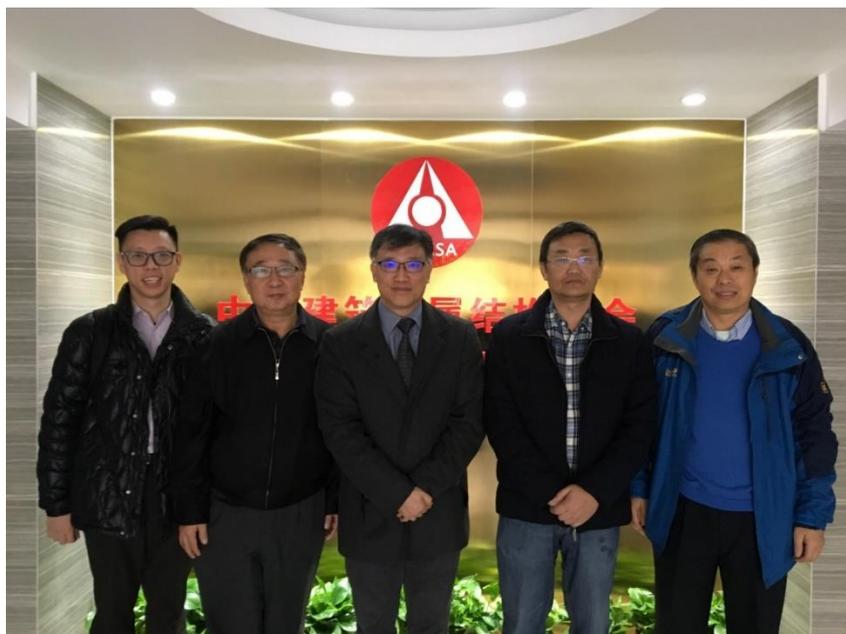
Itinerary of this visit by the CNERC is as follows:

1. To visit China Construction Metal Structure Association and discuss the prospects and potential problems of practical application of high-strength steel
2. To visit Tsinghua University and to give an invited lecture to the students
3. To meet with representatives of Nangang Co., Ltd. to discuss the construction of high-strength steel collaboration project
4. To visit China Construction Science & Technology Group Co., Ltd. to discuss on collaboration in modular construction and assembled construction
5. To visit Shougang Research Institute of Technology to summarize the collaboration research projects on high-strength steel development

Meeting with China Construction Metal Structure Association

In the morning of 13 November 2018, the CNERC delegation team visited the China Construction Metal Structure Association (CMSA), and had a technical meeting on the research progress of high-strength steel for construction and potential problems in its application with the Deputy Secretary-General of National Security, Prof. Y. J. Shi, Secretary-General Liu Zhe and Vice Chairman Liu Min. Prof. K. F. Chung first introduced the work and achievements of the CNERC's recent research on domestic high-strength steel, and confirmed Chinese steel is suitable for European design specifications, as well as presented the latest edition of the "Effective Design and Construction to Structural Eurocodes EN1993-1-1" to the Deputy Secretary-General. This version has added the guide on application of Chinese Steel Q690 according to the European standard, laying a foundation for export of Chinese high-strength steel to overseas market. Prof. Chung also introduced the recent preliminary research results of residual stress on welding of the Center. In addition, Prof. Chung raised that combining the current problems identified under the research process of high-strength steel, he proposed new high-strength steel and welding materials for construction has to be developed, and the corresponding welding technology has to be further improved.

Mr. Dang Bao Wei, Deputy Secretary-General of CMSA fully affirmed the past research progress and achievements of the CNERC, and believed that it is in line with the strategic development under the national "Belt and Road" direction, and this "Technical Guidebook" paves the way for the export of Chinese steel. Mr. B. W. Dang believed that it is necessary to develop a new type of high-strength steel for construction as proposed by Prof. Chung. Moreover, he raised questions and research directions on high-strength steel welding methods and efficiency in conjunction with the construction engineering practice. Both parties had a detailed discussion on "High Performance Materials Development – Design – Construction".



From left: Dr. H. C. Ho, Mr. Z. Liu, Prof. K. F. Chung, Mr. B. W. Dang, Prof. Y. J. Shi

Visit of Tsinghua University

In the afternoon of 13 November 2018, the CNERC delegates visited Department of Civil Engineering, Tsinghua University. Prof. K. F. Chung was being invited to give a special lecture on Q690 high-strength steel research and its application prospects in construction to the civil engineering students of Tsinghua University. Prof. Y. J. Shi, Department of Civil Engineering, Tsinghua University and Dr. H. Y. Ban also attended the lecture.

Prof. Chung firstly thanked Tsinghua University for the invitation and the attendance of all the students. Regarding Chinese high-strength steel, Prof. Chung is full of confidence. In the past three years, he studied the field of Q690 high-strength steel, including material properties, structural parts, welding material properties, welded structural column experiments, etc., and explained the results of high-strength steel to the students. The interim outcome of the CNERC is the publication on “Selection of Equivalent Steel Materials to European Steel Materials Specifications”. In addition, from the perspective of a teacher, Prof. Chung shared his long years of experience in research. Subsequently, Prof. Chung shared the latest research results of the CNERC, the microstructure and mechanical properties of the Q690 steel welding heat affected zone, and provided new ideas and insights for the exploration of material properties in civil engineering. At the end, he invited all the Tsinghua students to come to the CNERC to exchange ideas and jointly promote the development and application of high-strength steel.



Invited lecture by Prof. K. F. Chung at the Tsinghua University



Group photo of the Tsinghua University students with Prof. K. F. Chung

Meeting with Nangang Co., Ltd.

During the meeting, Prof. Chung and the representatives of Nangang Co., Ltd., Mr. Zhao Baijie and Dr. Deng Wei, discussed the collaboration project of “overseas promotion and quality assessment of constructional steel” of Nangang, and refined and clarified the responsibility of both parties, which laid a solid foundation for overseas promotion of steel.

Prof. Chung first introduced the experimental results of the application of Nangang Materials in the CNERC, and confirmed the application prospects of Nangang Q690 steel. Nangang also agreed to promote the development goal of Chinese constructional steel to international markets, and confirmed the research and development direction of high-strength steel for construction in the Center. Nangang expressed its willingness to continue to support the research work of the CNERC and deepened the collaboration between the two parties.

Meeting with China Construction Science & Technology Group Co., Ltd.

In the morning of 14 November 2018, the CNERC delegation team visited the China Construction Science & Technology Group Co., Ltd., and had a meeting with the Chairman Mr. Ye Haowen, General Manager Mr. Ou Yaming, Chief Engineer Mr. Zhang Aimin and Deputy General Manager Ms. Liu Ruonan, and discussed on joint development of fabricated buildings.

Prof. Chung first introduced the mission, vision and research work of the CNERC. After that, he talked about the prefabricated construction and the needs of Hong Kong's transitional prefabricated composite housing, as well as numerous examples of British and Australian assembly building applications, detailing the necessity of prefabricated buildings, the advantages compared to traditional architectural forms and technical aspects and feasibility. At the same time, it was pointed out that due to aging issue of the population, and the average age of construction workers increased, the prefabricated buildings are also in line with social needs.

Chairman Ye Haowen also recognized the scientific research level and achievements of the CNERC, and at the same time, he reported the application results of the CCT Group in the prefabricated buildings have been combined with “mold-rebar tying-casting concrete-conservation-assembly” that a detailed introduction to the automated production all in one line was told. Chairman Ye also explained the various technical problems in the actual production process in conjunction with the Changchun Public Housing Project of China Construction Science & Technology Group.

After that, both parties conducted an in-depth discussion on joint development projects: steel structure modular buildings and dismantled buildings. Combined with the Chinese building codes and seismic grade requirements, the modular building structure form of “steel frame + building module” was preliminarily formulated. For disassembled buildings, according to the attributes applied to the troops, preliminary requirements such as repeated disassembly and assembly, high discreteness of modules, thermal insulation capacity, etc. are established.



From left: Mr. A. M. Zhang, Ms.R. N. Liu, Mr. Y. M. Ou, Mr. H. W. Ye, Prof. K. F. Chung, Dr. H. C. Ho, and Mr. H. Jin

Visit of Shougang Research Institute of Technology

In the afternoon of 14 November 2018, the CNERC delegates visited Shougang Research Institute of Technology, and concluded the phased results of the jointly conducted research project on “Structural Engineering Application of Welding Q690 High Strength Steel”:

First of all, Prof. Chung introduced the update on CNERC-Shougang Joint Engineering Research Laboratory for High-strength and High-efficiency Structural Steel. After that, Prof. Chung explained the progress of welding Q690 high-strength steel, including: the current Q690 steel material properties, structural parts performance, weld material properties, microstructure changes in the heat affected zone after welding, etc. He also asked Dr. Tian Zhihong and her research team to prevent and improve the deterioration of microstructure after welding. In addition to answering the questions, Dr. Tian also said that this series of questions has pointed out the direction for the research and development of steel for Shougang's new building structure.

For the application of high-strength steel in building structure, Prof. Chung introduced that the newly published "European Standard EN1993-1-1 Steel Structure Design Technical Guidebook" of the CNERC, which has already incorporated the design part of Q690 steel, and has stepped out of the Chinese high-strength in the first step of steel application. Prof. Chung then gave the Technical Guide to Dr. Tian. At the same time, the "Technical Guide for Steel Production and Specification for Chinese Building Steel Structures" published by the CNERC was also presented to Dr. Tian.



Prof. K. F. Chung together with Dr. Tian Zhihong (middle) and her research team