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The second expert meeting on CSCS Group Standard "Design of steel structures using 690-960MPa high strength steel" in Beijing
2025.05.21-22

During 21 - 22 May 2025, the second expert meeting along with a special report meeting on CSCS Group Standard "Design of steel structures using 690 – 960MPa high strength steel" has been successfully held at Tsinghua University, Beijing. The special report meeting aims to introduce the research background and draft basis of group standard clauses, so as to lay a foundation for the smooth convening of the second expert meeting on 22 May 2025. The drafting work of the group standard is jointly undertaken by CNERC and Tsinghua University. As core members of CSCS group standard drafting team, Prof. K. F. Chung, Director of CNERC, Dr. H. C. Ho, Deputy Executive Secretary of CNERC, and Dr. Y. F. Hu, Research Assistant Professor, leading a delegation of seven research personnel attended the meeting. The meeting was co-chaired by Prof. Chung and Prof. Y. J. Shi from Tsinghua University.

The special report meeting was co-chaired by Prof. Chung and Prof. Shi

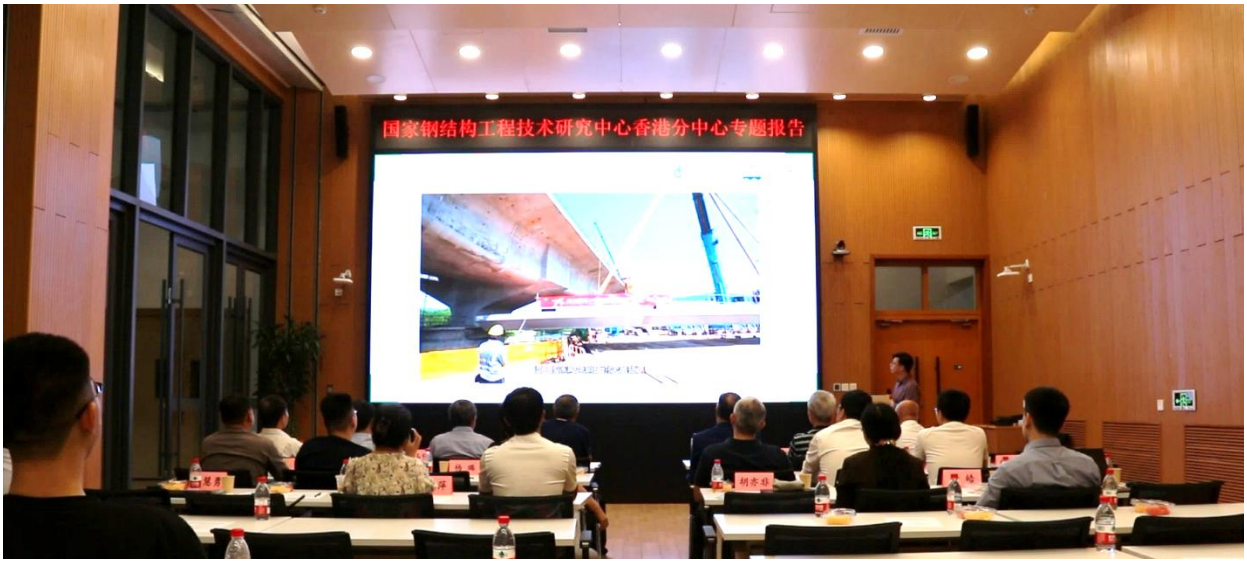
Lists of drafters：

No	Name	Title	Organization	Note
1	**K. F. CHUNG**	Professor	The Hong Kong Polytechnic University	Principal drafter
2	**Yongjiu SHI**	Professor	Tsinghua University	Principal drafter
3	**H. C. HO**	Principal Research Fellow	The Hong Kong Polytechnic University	Principal drafter
4	**Huiyong BAN**	Associate Professor	Tsinghua University	Principal drafter
5	**Y. F. HU**	Research Assistant Professor	The Hong Kong Polytechnic University	Principal drafter
6	**X. L. YU**	Senior Research Fellow	The Hong Kong Polytechnic University	Drafter
7	**M. F. ZHU**	Postdoctoral Fellow	The Hong Kong Polytechnic University	Drafter
8	**H. JIN**	Postdoctoral Fellow	The Hong Kong Polytechnic University	Drafter
9	**X. F. YANG**	Postdoctoral Fellow	The Hong Kong Polytechnic University	Drafter

Lists of experts：

No	Name	Title	Organization	Note
1	**Ailin ZHANG**	Professor	Beijing University of Technology	Expert
2	**Mingxuan HE**	Professor level senior engineer	China Baowu Steel Group Corp.	Expert
3	**Lijun WANG**	Design Master, Professor	Huachengboyuan Engineering Technology Group	Expert
4	**Zhan WANG**	Professor	South China University of Technology	Expert
5	**Tie XI**	Professor level senior engineer	Hebei Jinxi Iron and Steel Group Co., Ltd.	Expert
6	**Baowei DANG**	Executive vice president	China Construction Industry Association (Steel and Wooden Structures Branch)	Expert
7	**Yuyin WANG**	Professor	Harbin Institute of Technology	Expert
8	**Junjie LUO**	Professor	Guangzhou University	Expert
9	**Lu YANG**	Professor	Beijing University of Technology	Expert
10	**Fei XU**	Professor	Chongqing University	Expert
11	**Yanbo WANG**	Professor	Tongji University	Expert
12	**Ke KE**	Professor	Chongqing University	Expert

13	**Xuanding WANG**	Associate Professor	Chongqing University	Expert
14	**Cheng CHEN**	Associate Professor	Southwest Petroleum University	Expert
15	**Fangxin HU**	Associate Professor	South China University of Technology	Expert
16	**Mingxiang XIONG**	Associate Professor	Guangzhou University	Expert
17	**Andi SU**	Professor	Harbin Institute of Technology	Expert
18	**Zhipan ZENG**	Chief Engineer	Fujian Provincial Institute of Architectural Design and Research Co., Ltd.	Expert
19	**Juan WANG**	Professor	CapitaLand Co., Ltd.	Expert
20	**Lifen MA**	Chief Engineer	Zhenhua Port Machinery Company	Steel manufacturer
21	**Gaoyang YANG**	Chief Engineer	China State Construction Engineering Corp.	Steel manufacturer
22	**H. Y. LEE**	Chief Engineer	Hong Kong Constructional Metal Structures Association	Building contractor
23	**William LUK**	Director	Chun Wo	Building contractor
24	**C. F. CHAN**	General Manager	Gammon	Building contractor
25	**Dezhong ZHENG**	Mr.	China Construction Industry Association (Steel and Wooden Structures Branch)	
26	**Yanping SUN**	Ms.	Zhenhua Port Machinery Company	
27	**Qiang GUO**	Mr.	Zhenhua Port Machinery Company	



Experts meeting in progress

The special report meeting of CNERC (Hong Kong Branch) was held on 21 May 2025, and presentations were given on the following topics:

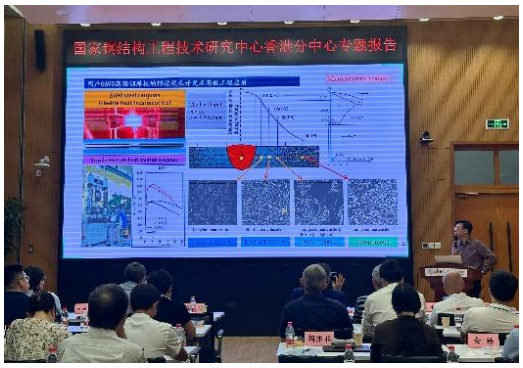
- Experimental and numerical investigations into welded H-sections and tubular sections
  Dr. Y. F. HU
- Column design of steel and composite columns under axial compression
  Dr. X. L. YU
- Effects of welding on structural performance of high strength steel thick welded sections
  Dr. H. JIN
- Numerical simulation on the structural behaviour of high strength S690 and S960 welded stocky columns
  Dr. M. F. ZHU
- Construction of footbridges of stiffened box girders with a total of 630 tons of S960 steel
  Dr. H. C. HO
- Structural behaviour of S960 welded sections: Experimental and numerical investigations
  Prof. K. F. CHUNG

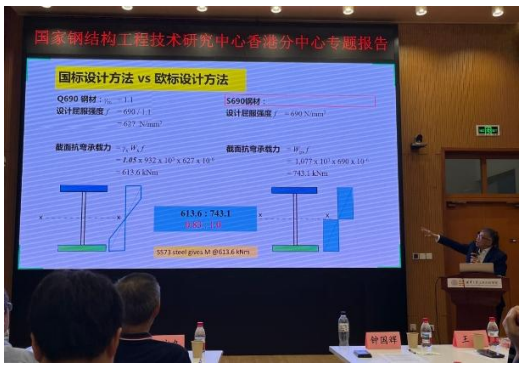
Dr. Y. F. HU

Dr. X. L. YU

Dr. H. JIN

Dr. M. F. ZHU





Dr. H. C. HO　　Prof. K. F. CHUNG

The special report is based on a number of experimental and numerical investigations on mechanical properties and structural behaviour of S690 and S960 welded sections completed by CNERC in recent years. Moreover, CNERC was appointed by the Civil Engineering and Development Department of the Government of Hong Kong SAR to provide technical advice on both welding technology and structural design of a public work project in Fanling North. A total of 630 tons S960 steel was adopted to build two large scale pedestrian foot bridge system.

Both the research work and the application of these S960 steel in construction projects were considered to be essential for technical promotion of the high strength steel construction technology. Many experts congratulated Prof. CHUNG and his team, and all of them commended highly the work of CNERC.

On 22 May 2025, the second expert meeting on the group standard “Design of steel structures using 690 ~ 960MPa high strength steel” was held in the New Civil Engineering Building at Tsinghua University. Prof. Yongjiu SHI from Tsinghua University, representing the standard drafting team and the conference organizer, delivered a welcoming address and hoped that the attending experts can provide valuable comments or suggestions on the first draft of group standard.

Photo of all attending experts

A welcoming address was delivered by Prof. Yongjiu SHI from Tsinghua University

Prof. K. F. CHUNG introduced the drafting progress of group standard to experts

Dr. Y. F. HU introduced the first draft of group standard to experts

Firstly, Prof. K. F. CHUNG and Dr. Y. F. HU provided a detailed introduction to the drafting progress, main contents and innovations of the group standard. Subsequently, the attending experts made intensive discussions encompassing the following issues of 690 ~ 960MPa high strength steel:

- Design parameters of the mechanical properties of high strength steel and relevant quality control requirements.
- Seismic performance-based design of high strength steel and technical requirements for seismic energy dissipation zones.
- The bending resistance design of cross section with plasticity development and section classification for: (1) compression member; (2) flexural member; (3) beam-column.
- Design buckling curve for high strength steel slender column, according to experimental data.
- Design method for welding joints of circular and square steel tubes, according to Eurocode 3.
- Design methods for the section resistances of CFSST and CFCST stocky columns and for the buckling resistance of CFSST and CFCST slender columns according to Eurocode 4; design method for composite beam according to the current GB standard.
- Special welding process and quality control requirements for high strength steel according to Eurocode and GB standard.
- Standardized expression of related provisions of welding process for high strength steel.

Prof. Yongjiu SHI

Prof. Ailin ZHANG

Prof. Lijun WANG

Prof. Zhan WANG

Prof. Tie XI

Prof. Yuyin WANG

Dr. Junjie LUO

Prof. Lu YANG

Prof. Yanbo WANG

Associate Prof. Xuanding WANG

Associate Prof. Cheng CHEN

Chief Engineer Lifen MA

After heated discussions, experts have reached a consensus on the following key issues:

- Agree that the partial material factor of 690 ~ 960 MPa high strength steel can be taken as 1.0 or 1.1 based on different quality controls to determine the design value of yield strength;
- Agree to adopt the plate width to thickness ratio and section classification method to select the relevant design values of section modulus, according to Eurocode 3;
- Agree to adopt the full plastic section modulus for design and the calculation method for bending resistance with plasticity development, according to Eurocode 3;
- Agree that 690 ~ 960 MPa high strength steel can be used for structural components such as buildings and bridges in China. Effective isolation and damping measures can be taken under major or rare earthquakes, and effective seismic performance-based design can also be adopted;
- Agree that when the seismic performance-based design method is adopted, the material properties of 690 ~ 960 MPa high strength steel without yielding under major or rare earthquakes shall meet: the yield ratio shall not exceed 0.95, and the elongation after fracture shall not be less than 12%. In general, plastic development is allowed to occur at the base of steel columns;

- Agree to adopt class a* buckling curve for welded H- and welded box- sections, according to experimental data;
- Agree to adopt Eurocode 4 design formulas to calculate the compressive resistances of axially and eccentrically loaded CFSST and CFCST stocky/slender columns with S690 steel and C60/75 concrete;
- Agree to adopt the welding process evaluation method and welding quality inspection method for 690 ~ 960 MPa high strength steel, according to Eurocode and GB standard.

Before the end of discussion, Design Master Lijun WANG emphasized: there is a relevant blank worldwide in design standards for the application of 690 ~ 960 MPa high strength steel. Therefore, the current group standard under drafting is critically important for global construction projects, and serves as a crucial basis for promoting the application of high strength steel structures both domestically and internationally. When our group standard adopts the Eurocode's design philosoply and expression method, it facilitates foreign engineers to learn from and reference China's design technology of high strength steel structures, and they also obtain a scientific and complete efficient design system. I think this is a good precedent.

Finally, Prof. K. F. CHUNG highly valued and appreciated the opinions and comments proposed by experts, and agreed to adopt them. A statement was made on the preliminary work and engineering applications of 690 ~ 960 MPa high strength steel closely related to the group standard drafting content. He sincerely hopes to work together with all experts to complete the group standard, and promote its extensive applications in practical engineering.

After the meeting, the experts visited the Major Engineering Structure Laboratory of Tsinghua University under the guidance of former Director Zonggang WANG. He gave a detailed explanation of the construction background and tortuous history of campus old and new laboratories, as well as the overview and function of experimental equipment and loading devices, and current experimental projects.

A group photo in Engineering Structure Laboratory of Tsinghua University

Expert Committee of CSCS Technical Group Standard “Design of steel structures using 690～960MPa high strength steel”

A group photo in front of the Cross Bay Link, Tseung Kwan O
group photo of the First Meeting of the Expert Committee

Special Symposium of Hong Kong Branch, CNERC

Location: Room B200, New Civil Engineering Building, Tsinghua University

2025.05.21 Wednesday	**Research progress on 690-960 MPa ultra-high strength structural steel**
14:30 pm	Welcoming address by Professor K.F. CHUNG, Director of CNERC (Hong Kong Branch)
14:40 pm Report 1	**Experimental and numerical investigations into welded H-sections and tubular sections** Presenter: Dr. Yifei Hu
15:00 pm Report 2	**Column design of steel and composite columns under axial compression** Presenter: Dr. Xianglin Yu
15:20 pm Report 3	**Effects of Welding on Structural Performance of High Strength Steel Thick Welded Sections** Presenter: Dr. Hao Jin
15:40 pm Report 4	**Numerical simulation on the structural behaviour of high strength S690 and S960 welded stocky columns** Presenter: Dr. Mengfei Zhu
16:00 pm	Coffee break
16:20 pm Report 5	**Construction of footbridges of stiffened box girders with a total of 630 tons of S960 steel** Presenter: Prof. K.F. CHUNG, Dr. H.C. Ho
16:40 pm Report 6	**Structural behaviour of S960 welded sections: Experimental and numerical investigations** Presenter: Dr. H.C. Ho, Prof. K.F. CHUNG
17:00 pm	**End**
18:00 pm	**Dinner** **Location: Jiasuo Restaurant, Tsinghua University**

Expert meeting on《Design of steel structures using 690 ~ 960 MPa high strength steels》

Location: Room B200, New Civil Engineering Building, Tsinghua University

2025.05.22 Thursday	**Expert Meeting on Group Standard of China Steel Construction Society**
9:00 am	**Second Expert Committee Meeting** Chairman: Prof. K.F. CHUNG & Prof. Y.J. Shi Welcoming address: Prof. Y.J. Shi **Major developments since First Meeting** Presenter: Prof. K.F. CHUNG & Dr. Y.F. Hu **Key contributions of the Standard** Presenter: Prof. K.F. CHUNG & Dr. Y.F. Hu
9:50 am	**Discussions by experts – I**
10:20 am	Coffee break
10:35 am	**Discussions by experts – II**
9:00 ~ 11:35 am	Summary of meeting minutes By Dr. X. L. YU and Dr. M. F. ZHU End of meeting
12:00 am	**Lunch** Location: Guanchou Yuan Dinning Hall, Tsinghua University
14:00 pm	**Technical visit** Location: Laboratory of Engineering Structure, Tsinghua University