



CNERC

NEWSLETTER

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FEATURE STORY

CNERC Annual Technical Symposium 2021

CNERC Annual Technical Symposia are organized as technical platforms to promote technical discussions and exchange among research personnel of CNERC. The first Annual Technical Symposium was held in June 2020, and favorable responses from Project Investigators with over 20 nominations were received, and a total of 12 presentations were made during the one-day event.

The CNERC Annual Technical Symposium 2021 was held on 30 September 2021 as a half-day event, and it was our honour to have Ir Dennis Wan, Principal Assistant Secretary of Development Bureau, and Ir H. S. Kan, Government Engineer of Civil Engineering and Development Department, both of the Government of Hong Kong SAR, being our Honorable Judges. An invited presentation was made by Dr. H. C. Ho, Deputy Executive Secretary and Research Assistant Professor of CNERC, and there were a total of 8 presentations made by senior research students.



From left: Dr. H. C. Ho, Prof. Michael C. H. Yam, Ir H. S. Kan, Prof. K. F. Chung,
Ir Dennis Wan, Dr. Andy Y. F. Leung, and Dr. T. M. Chan.



The Symposium was kicked off with a welcome speech by Prof. K. F. Chung, Director of CNERC, and followed with an invited presentation by Dr. H. C. Ho.



Prof. K. F. Chung made a welcome speech.



Dr. H. C. Ho presented on “Design and Construction using High Quality Chinese Steels in Hong Kong and Beyond”.



Ms. Mengfei ZHU, Research Student (CEE) presented on “Structural adequacy of high strength S690 and S960 welded H-sections with splices”.



Mr. Partha DEBNATH, Research Student (CEE) presented on “Experimental and numerical investigation of CFST blind-bolted connections under tensile loading”.



Ms. Xuemei LIN, Research Student (BRE) presented on “Experimental and numerical study of the structural performance of bearing-type high strength steel bolted connections”.



Ms. Bingchen ZHOU, Research Student (ME) presented on “Control of continuous and discontinuous precipitation in advanced high-strength steels”.



Mr. Mohammed HUSSEIN, Research Student (BRE) presented on “A digital-twin based approach for sustainable logistics planning in modular integrated construction projects”.



Ms. Samantha LEE, Research Student (ME) presented on “Automatic vision-based seam detection and tracking system for robotic welding / sealing planning”.



Mr. Hao JIN, Research Student (CEE) presented on “Effects of welding to mechanical of high strength S690 steel: Multi-pass welding in thick plates”.



Mr. Dong WANG, Research Student (BRE) presented on “Modelling the optimal tower crane location in high rise modular integrated construction”.

After a rigorous discussion among members of the Judging Panel including Prof. K. F. Chung, Ir Dennis Wan, and Ir H. S. Kan, the following were selected as winners of the Young Researchers Competition:

CNERC Outstanding Young Researcher Award 2021

Ms. LIN Xuemei, Department of Building and Real Estate

CNERC Young Researcher Awards 2021

Mr. Partha DEBNATH, Department of Civil and Environmental Engineering

Mr. JIN Hao, Department of Civil and Environmental Engineering

Ms. Samantha LEE, Department of Mechanical Engineering

Ms. ZHU Mengfei, Department of Civil and Environmental Engineering

CNERC Young Researcher Merit Awards 2021

Ms. ZHOU Bingchen, Department of Mechanical Engineering

Mr. Mohammed HUSSEIN, Department of Building and Real Estate

Mr. WANG Dong, Department of Building and Real Estate

CNERC Annual Technical Symposium 2021

Date: 30 September 2021 (Thursday)

Time: 2:00 p.m. – 5:35 p.m.

Venue: Z208, The Hong Kong Polytechnic University

Time	Activities
2:00 – 2:15 p.m.	Opening Remarks
2:15 – 2:35 p.m.	Invited Presentation: “ <i>Design and Construction using High Quality Chinese Steels in Hong Kong and Beyond</i> ” Dr. H. C. HO, Research Assistant Professor, CEE & CNERC-Steel
2:35 – 2:55 p.m.	Presentation 1: “ <i>Structural adequacy of high strength S690 and S960 welded H-sections with splices</i> ” Ms. Mengfei ZHU, Research Student, CEE
2:55 – 3:15 p.m.	Presentation 2: “ <i>Experimental and numerical investigation of CFST blind-bolted connections under tensile loading</i> ” Mr. Partha DEBNATH, Research Student, CEE
3:15 – 3:35 p.m.	Presentation 3: “ <i>Experimental and numerical study of the structural performance of bearing-type high strength steel bolted connections</i> ” Ms. Xuemei LIN, Research Student, BRE
3:35 – 3:45 p.m.	Break
3:45 – 4:05 p.m.	Presentation 4: “ <i>Control of continuous and discontinuous precipitation in advanced high-strength steels</i> ” Ms. Bingchen ZHOU, Research Student, ME
4:05 – 4:25 p.m.	Presentation 5: “ <i>A digital-twin based approach for sustainable logistics planning in modular integrated construction projects</i> ” Mr. Mohammed HUSSEIN, Research Student, BRE
4:25 – 4:45 p.m.	Presentation 6: “ <i>Automatic vision-based seam detection and tracking system for robotic welding / sealing planning</i> ” Ms. Samantha LEE, Research Student, ME
4:45 – 5:05 p.m.	Presentation 7: “ <i>Effects of welding to mechanical properties of high strength S690 steel: Multi-pass welding in thick plates</i> ” Mr. Hao JIN, Research Student, CEE
5:05 – 5:25 p.m.	Presentation 8: “ <i>Modelling the optimal tower crane location in high rise modular integrated construction</i> ” Mr. Dong WANG, Research Student, BRE
5:25 – 5:35 p.m.	Judging Panel Discussion

ICE HKA Technical Seminar: Advanced Bridge Construction Technology – A Case Study of Cross Bay Link 2021.09.03

On 3 September 2021, the Institution of Civil Engineers Hong Kong Association organized a Technical Seminar on “Advanced Bridge Construction Technology – A Case Study of Cross Bay Link”, and it was supported by Civil Engineering and Development Department of the Government of Hong Kong SAR and our CNERC.

This Seminar was organized to disseminate latest technology and development of the construction industry. It brought together world class design and construction engineers, experts and researchers to share their experiences in adopting innovative concepts and new technology in the design and construction of the Cross Bay Link at the Tseung Kwan O, East Kowloon.

Mr. S. H. Lam, Permanent Secretary of the Development Bureau, was invited as the Guest of Honour to officiate the Seminar. Prof. K. F. Chung, Director of CNERC, was invited to present in this important event alongside with Ir Dr. Robin Sham, Mr. J. Kan, Ir Stephen Mak and Ir C. R. Hu. There were over 250 participants who attended the Seminar.



A group photo of all speakers with Ir S. H. Lam.

Meeting Prof. W. Huang, Vice-Minister of Ministry of Science and Technology in Beijing 2021.9.22

Mr. Eric H. Jiang, Research Fellow of CNERC met Prof. W. Huang, Vice-Minister of Ministry of Science and Technology in Beijing on 22 September 2021. During the meeting, Mr. Jiang updated Prof. Huang about the recent technical cooperation and exchanges of the CNERC in Mainland China, as well as the progress of CNERC's development of advanced steel structure technology and innovative engineering applications in recent years.



(From left) Prof. W. Huang, Vice-Minister of Ministry of Science and Technology and Mr. Eric Jiang, Research Fellow of CNERC.

Mr. Jiang Hao also reported to Prof. Huang about the research and innovative application results of the high-strength S690 to S960 steel in construction projects of the CNERC since 2015, and introduced the CNERC's participation in the Cross Bay Link, Tseung Kwan O, Kowloon, Hong Kong. That is, the welding technology applied on the double-arch steel bridge with a main span of 214 meters in the Cross Bay Link project. In the project, the CNERC solved the technical problems in welding and ensure the welding quality control of high-strength S690 steel in practical engineering applications. This steel bridge is the world's first major cross-bay bridge that uses high-strength S690 steel for modular construction. It uses 4,400 tons of 50, 60 and 70 mm thick high-strength S690 steel plates for efficient welding.



Academician Huang Wei has long been engaged in road, bridge and traffic engineering research and is an expert in road, bridge and traffic engineering. He is the former Dean of School of Transportation of Southeast University, Executive Vice President of Southeast University, Director of Jiangsu Provincial Construction Department, Deputy Governor of Jiangsu Provincial Government, Deputy Minister of Construction, Deputy Minister of Housing and Urban-Rural Development, Deputy Mayor of Beijing, Xinjiang Uyghur Member of the Standing Committee of the Party Committee of the Autonomous Region, Executive Vice Chairman of the Government, and current member and Vice-Minister of the Ministry of Science and Technology. In 2007, he was elected as an academician of the Chinese Academy of Engineering.

CEDD Innovation and Technology I&T Seminar, Civil Engineering and Development Department, Development Bureau, Government of Hong Kong SAR **2021.09.28**

On 28 September 2021, Civil Engineering and Development Department (CEDD) of Development Bureau of Government of Hong Kong SAR organized the “**CEDD Innovation and Technology I&T Seminar**” for the first time, and Prof. K. F. Chung, Director of CNERC, was invited to deliver a Plenary Presentation in the afternoon.

CEDD has been implementing a series of innovation and technology initiatives to support projects of land development, marine facility management and slope safety management as part of the "Construction 2.0" Campaign launched by the Development Bureau. In many of the initiatives, CEDD steers the **University-Government-Industry collaborations** for making improvements to achieve greater productivity, better works quality, safer working environment and higher sustainability in project delivery. Hence, the Seminar is organized to provide engineers and constructional professionals in the construction industry the latest information pertinent to Innovation and Technology adoption of CEDD as well as an opportunity for stakeholders to exchange ideas, and explore technical collaborations.

The Seminar was officiated by **Ir S.H. Lam**, *Permanent Secretary (Works)* of the Development Bureau, and there were over 1,000 engineers and constructional professionals attending the event on-line. A total of eleven presentations in 4 sessions were made while **Ir Ricky C.K. Lau**, *Director of Civil Engineering and Development Department*, delivered a Closing Address to conclude the Seminar.



A group photo of Ir S.H. Lam, Ir Ricky C.K. Lau, Ir Albert W.B. Lee, Ir Aaron K.M. Bok, Ir W.K. Pun, Prof. K. F. Chung, Prof. Kenneth Leung and Prof. T. Yu.



Prof. Chung delivered a presentation entitled "*Effective Use of High Strength S690 Steels in Construction*".



A group photo of Ir Ricky C.K. Lau, Ir Aaron K.M. Bok, Ir Dr Julian Kwan, Ir Michael Leung and Prof. K. F. Chung

Visit of Greater Bay Area Development Fund Management Limited

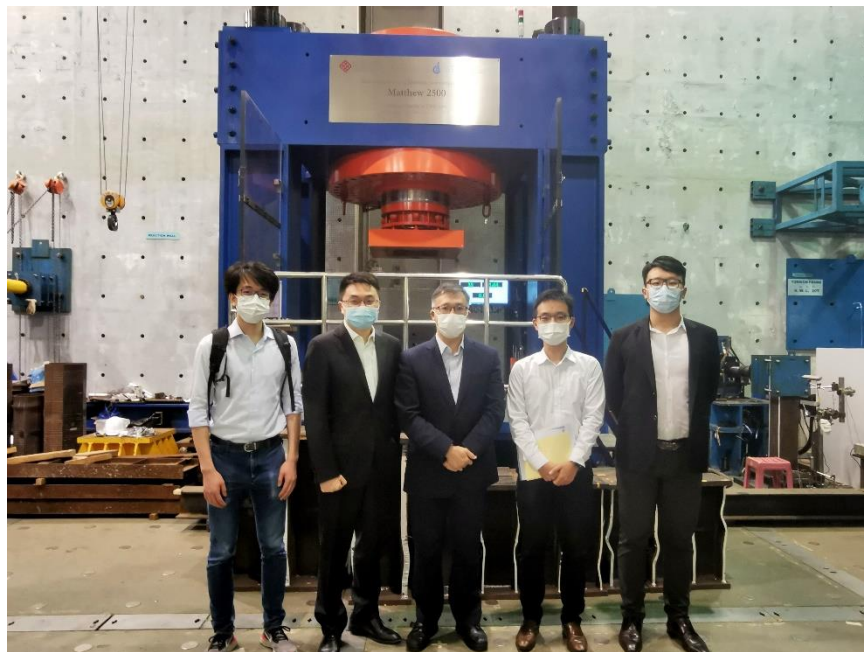
2021.11.11

Mr. Y. F. Zhou, Managing Director and Head of Industrial Technology of Greater Bay Area Development Fund Management Limited and his team together with Prof. H. T. Lu, Director of Mainland Development Office, PolyU visited CNERC on 11 November 2021.

The Delegation Team consisted of:

- Mr. Y. F. Zhou, Managing Director and Head of Industrial Technology of Greater Bay Area Development Fund Management Limited
- Mr. Y. H. Zhu, Director of Greater Bay Area Development Fund Management Limited
- Mr. Z. Q. Shi, Vice President of Greater Bay Area Development Fund Management Limited
- Prof. Haitian Lu, Director of Mainland Development Office, PolyU

The Delegation Team visited the Structural Engineering Research Laboratory, Laboratory Y001, of the PolyU, and inspected various research and testing capabilities for large scale structural tests. The Delegation Team was also introduced on a number of research and development projects on high strength S690 and S960 steels.



From left: Mr. Z. Q. Shi, Prof. H. T. Lu, Prof. K. F. Chung, Mr. Y. F. Zhou, and Mr. Y. H. Zhu

Visit of China Minmetals H. K. (Holdings) Limited

2021.11.15

Mr. Wei Chang, Executive Chairman of China Minmetals H. K. (Holdings) Ltd. led his team to visit CNERC on 15 November 2021. The Delegation Team of China Minmetals H. K. (Holdings) Limited consisted of:

- Mr. Wei Chang, Executive Chairman
- Mr. Qi Chang, General Manager
- Mr. Heng Zhang, Deputy General Manager
- Mr. Peigen Pu, Manager
- Ms. Jing Sun, Manager
- Mr. Yin Zheng, Portfolio Manager

The Delegation Team visited the Structural Engineering Research Laboratory, Laboratory Y001, of the PolyU, and inspected various research and testing capabilities for large scale structural tests. The Delegation Team was also introduced on a number of research and development projects on high strength S690 and S960 steels.



From left: Mr. Eric Jiang, Mr. Y. Zheng, Mr. H. Zhang, Mr. W. Chang, Prof. K. F. Chung, Mr. Q. Chang, Mr. P. Pu, Ms. J. Sun, and Dr. H. C. Ho



The delegation team visited the Structural Engineering Research Laboratory and the Welding Laboratory.

Prof. K. F. Chung reported to Mr. W. Chang, and Mr. Q. Chang the latest research activities and achievements of CNERC, in particular:

- Effective use of high strength S690 steels in construction, and their welding technology; and
- Application of high strength S690 steels in construction projects.

Mr. W. Chang expressed interests to collaborate with CNERC on business development of innovation technology in construction, in particular, use of high strength steel and modular integrated construction.



From left: Mr. W. Chang, Prof. K. F. Chung, and Mr. Q. Chang

Established in 1996, **China Minmetals H.K. (Holdings) Ltd.** is the wholly-owned subsidiary of China Minmetals Corporation. The core business of the company encompasses four major areas: *ferrous metal business*, *mineral resources business*, *real estate development* and *financial investment*. It plays a significant role as the overseas financing platform of the Headquarter of China Minmetals Corporation.

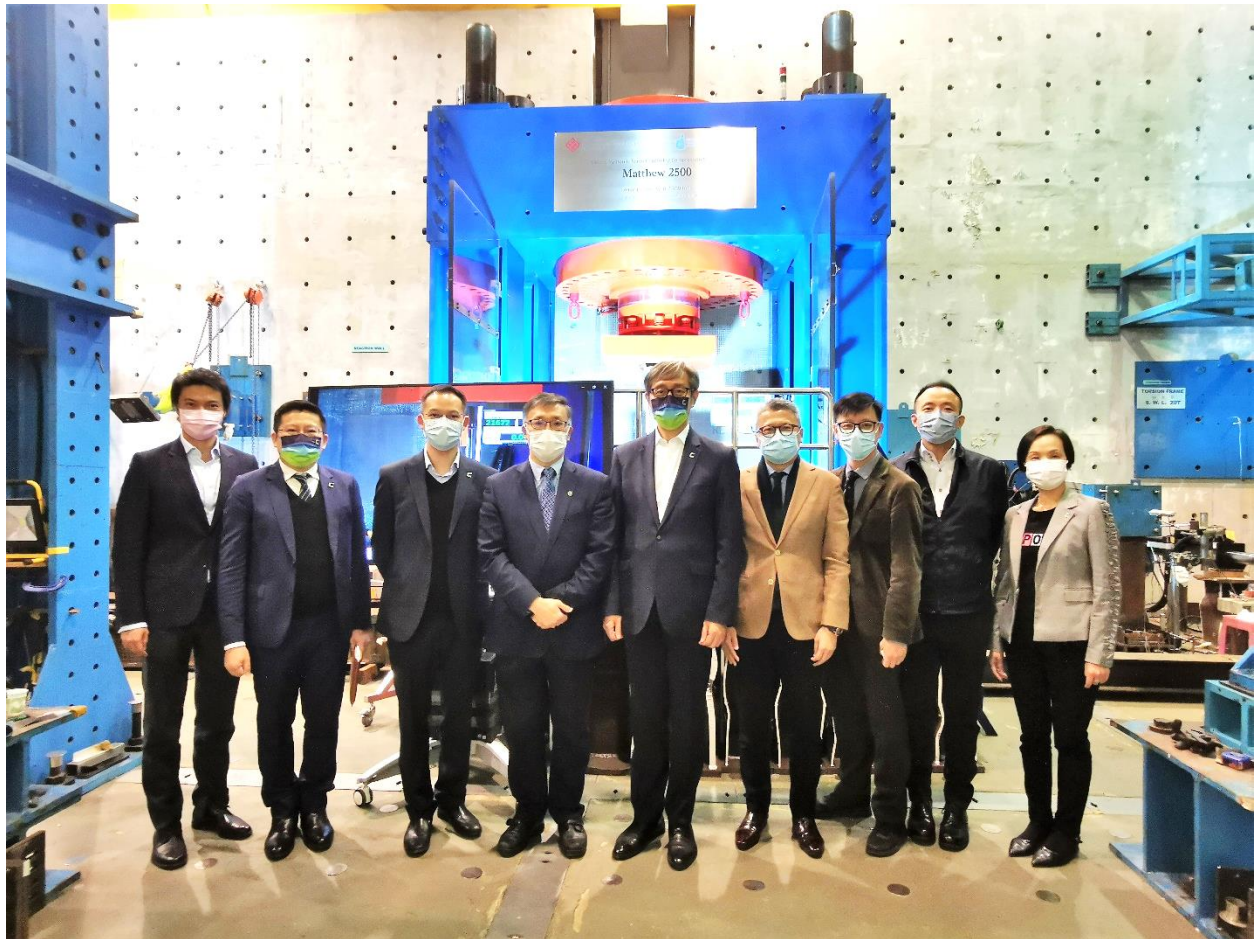
Visit of Cyberport

2021.12.02

Mr. Peter Yan, Chief Executive Officer of Cyberport, led his team to visit CNERC on 2 December 2021. The Delegation Team of Cyberport consisted of:

- Mr. Peter Yan Chief Executive Officer
- Mr. Howard Cheng Chief Operating Officer
- Mr. Will Yu Assistant Project Director
- Ms. Alice So Head of Entrepreneurship
- Mr. Ricky Choi Senior Manager, Smart Living

The Delegation Team visited the Structural Engineering Research Laboratory, Laboratory Y001, of the PolyU, and inspected various research and testing capabilities for large scale structural tests. The Delegation Team was also introduced on a number of research and development projects on high strength S690 and S960 steels.



From left: Prof. Daniel Tsang , Mr. Ricky Choi , Mr. Will Yu, Prof. K. F. Chung, Mr. Peter Yan, Prof. Michael Yam , Dr. H. C. Ho , Mr. Howard Cheng , and Ms. Alice So.



The Delegation Team had a discussion on possible collaboration with CNERC.

Prof. K. F. Chung reported to Mr. Peter Yan the latest research activities and achievements of CNERC, in particular:

- Effective use of high strength S690 steels in construction, and their welding technology; and
- Application of high strength S690 steels in civil engineering and building structures.

Mr. Yan and his team expressed interests to collaborate with CNERC on application of innovation technology in construction, in particular, use of high strength steel, robotic welding and modular integrated construction.



From left: Mr. Peter Yan and Prof. K. F. Chung

Cyberport is an innovative digital community with over 1,650 start-ups and technology companies. It is managed by Hong Kong Cyberport Management Company Limited, which is wholly owned by the Government of Hong Kong SAR. With a vision to be the hub for digital technology thereby creating a new economic driver for Hong Kong, Cyberport is committed to nurturing a vibrant tech ecosystem by cultivating talent, promoting entrepreneurship among youths, supporting start-ups on their growth journey, fostering industry development by promoting collaboration with local and international partners, and integrating new and traditional economy by accelerating digital adoption in both the public and the private sectors.

Visit of CMGE and iProA

2021.12.09

Mr. Hendrick Sin, MH, Co-Founder and Vice Chairman of CMGE Technology Group Limited (CMGE), and President of the Internet Professional Association (iProA) visited CNERC on 9 December 2021 together with Mr. Jacky Lam, Chief Executive Officer, iProA.

Both Mr. Sin and Mr. Lam visited the Structural Engineering Research Laboratory of the PolyU, and inspected various research and testing capabilities for large scale structural tests. They were also introduced on a number of research and development projects on high strength S690 and S960 steels.



From left: Mr. Hendrick Sin, Prof. K. F. Chung, and Mr. Jacky Lam visiting Laboratory Y001.

Prof. K. F. Chung reported to Mr. Hendrick Sin the latest research activities and achievements of CNERC, in particular:

- Effective use of high strength S690 steels in construction, and their welding technology; and
- Application of high strength S690 steels in civil engineering and building structures.

Mr. Sin expressed interests to collaborate with CNERC on application of innovation technology in construction, in particular, use of high strength steel, robotic welding and modular integrated construction.



From left: Prof. K. F. Chung and Mr. Hendrick Sin

CMGE is a leading international IP-oriented game-based ecological company. According to Analysys, as of 31 December 2020, CMGE had the largest amount of IP reserve among game group companies in the PRC (with a principal business as gaming), and launched the largest amount of mobile IP-based games among game companies in the PRC. On 25th September 2012, CMGE successfully listed on Nasdaq and became the first Chinese mobile game company listed on the U.S. stock market. The Company announced completion of its privatization in August 2015. On 31st October 2019, CMGE successfully listed on the HKEX (Stock code: 0302.HK).

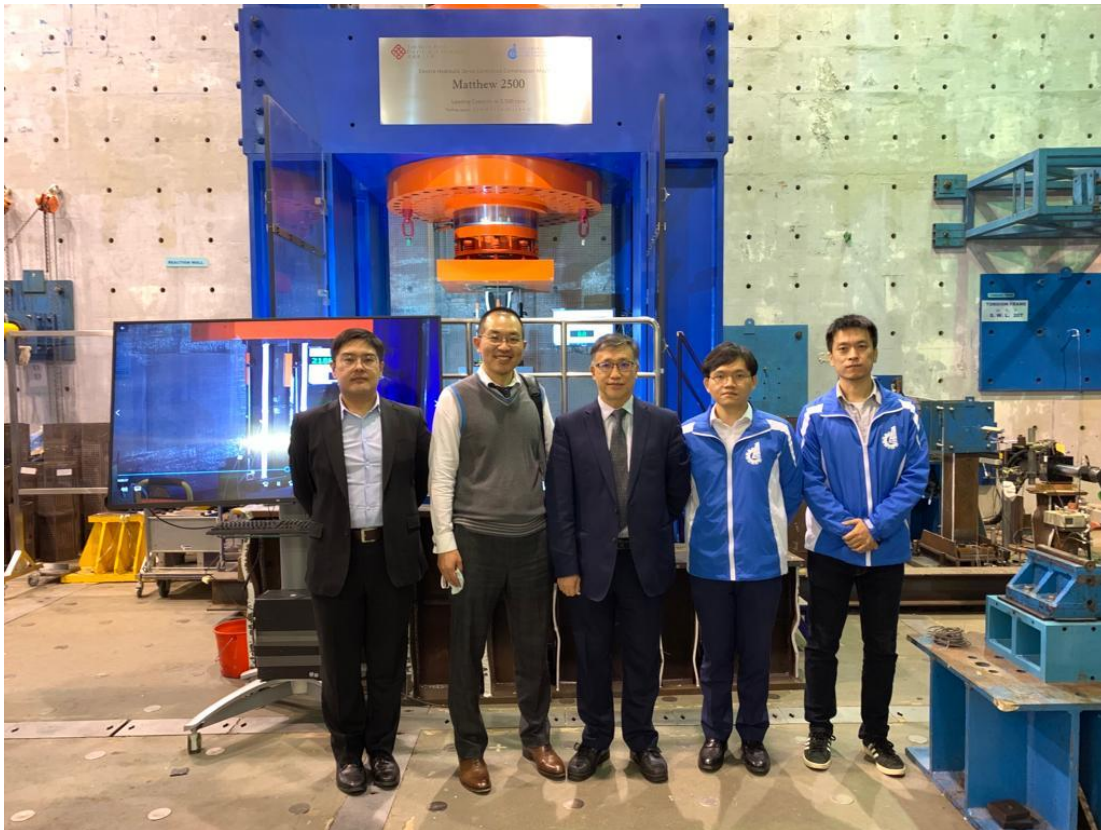
iProA was established in 1999 as a non-profit-making organization for professionals working with the internet. It is committed to promoting popularization of information and communication technology, narrowing the digital divide, making information and knowledge access more equal, and promoting professional development and correct application of internet technology in Hong Kong. At present, it has more than 7000 members in various membership categories. It creates business opportunities among members and job opportunities in Hong Kong, China and overseas.

Visit of Hewson Consulting Ltd.

2021.12.09

Mr. Chengrui Hu, Area Director of Hewson Consulting Ltd., visited CNERC on 10 December 2021.

Mr. Hu visited the Structural Engineering Research Laboratory of the PolyU, and inspected various research and testing capabilities for large scale structural tests. He was also introduced with a number of research and development projects on high strength S690 and S960 steels.



From left: Mr. H. Jiang, Mr. C. R. Hu, Prof. K. F. Chung, Dr. Y. F. Hu and Mr. H. Jin
at the Structural Engineering Research Laboratory (Y001)

Prof. K. F. Chung reported to Mr. Hu the latest research activities and achievements of CNERC, in particular:

- Effective use of high strength S690 steels in construction, and their welding technology; and
- Application of high strength S690 steels in civil engineering and building structures.

Mr. Hu expressed interests to collaborate with CNERC on application of innovation technology in construction, in particular, use of high strength steel, robotic welding and modular integrated construction.



From left: Prof. K. F. Chung and Mr. C. R. Hu

Hewson is an engineering consulting company with specialists delivering innovative design and construction solutions for bridges, structures and civil engineering projects throughout the world. It provides civil, structural and geotechnical consulting services for delivering creative engineering solutions for projects of any size or location, and is committed to uphold high standards in taking responsibility for the impact on the environment and wider community both now and in the future.

NAMI Symposium

New Materials & Designs for MiC Innovation in Hong Kong 2021.12.16

On 16 December 2021, Nano and Advanced Materials Institute Limited (NAMI) co-organized a Symposium on “New Materials & Design for MiC Innovation in Hong Kong” with Hong Kong Trade Development Council at the Charles K. Kao Auditorium of the Hong Kong Science Park in Shatin. The Symposium focuses on new construction materials and technology which drive innovative design and construction of MiC, and a number of leading construction professionals are also invited to share their experiences. Prof. Chung was invited to make a plenary presentation on MiC construction using high strength S460 steel, and Ir Dennis Wan, Principal Assistant Secretary of Development Bureau, Government of HKSAR, was invited as the Guest of Honour to officiate the Seminar. There were over 200 participants who attended the event both on site and online.



A group photo of all speakers including Prof. Chung, Ir Dennis Wan, Ir Ivan Sham, and Ir Prof. Joseph Mak.



Ir Dennis Wan officiated the Symposium.



Prof. K. F. Chung presented on
“Key issues on design and construction of MiC buildings for enhanced productivity”.



Panel discussion of the Symposium.

In collaboration with CNERC, the Nano and Advanced Materials Institute Ltd. was granted a 2-year project entitled “***Hong Kong Modular Integrated Construction Innovations***” in July 2019 by the Innovation and Technology Fund under the Innovation and Technology Commission of the Government of Hong Kong SAR. The total project sum was HK\$26M including an industrial funding at HK\$8M contributed by four industrial partners.

The 2-year project aims to develop innovative MiC hybrid structural systems using high performance concrete and steel. With advanced material development and innovation applications of high strength light weight concrete, specific physical and mechanical properties of these high performance concrete are developed according to prevailing architectural, structural and durability requirements. Through structural engineering design development, innovative MiC building systems and modules with high strength S460 cold-formed steel with specific construction methods and details are formulated for low to medium rise buildings.

The research work undertaken at PolyU is led by Dr. T.M. Chan with support from Mr. H. Jiang and Dr. Y.F. Hu, and a comprehensive design development for effective use of S460 cold-formed rectangular hollow sections (CFRHS) in MiC is successfully completed. Key areas of investigation are:

- Mechanical properties of both flat elements and round corners of CFRHS
- Residual stress distributions within the CFRHS
- Axial compression behaviour of stocky and slender columns of CFRHS
- Beam behaviour of CFRHS
- Tension deformation of CFRHS joints
- Deformation behaviour of CFRHS frames under lateral loads

CNERC RESEARCH

Starting from 1 July 2021, the Hong Kong Branch has set up 5 laboratories to focus on respective research area with details as below:

Project title	PI
Laboratory for Adaptive Tubular Structures	T. M. Chan (CEE)
Laboratory for Corrosion Protection Technology	K. F. Chung (CEE)
Laboratory of Mechanics and Steel Materials	H. C. Ho (CEE)
Laboratory for Resilient Steel and Smart Structures	Michael C. H. Yam (BRE)
Laboratory for Soil-structure Interaction With High Performance Construction Materials	Andy Leung (CEE)

For details of these Laboratories and their progress, please check out our website at:

<https://www.polyu.edu.hk/cnerc-steel/en/1-cnerc-laboratories/lab-ats/>

UPCOMING EVENTS

For details of CNERC's upcoming events, please check out our website at:

<https://www.polyu.edu.hk/cnerc-steel/en/news-events/upcoming-events/>

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