

# CNERC

# NEWSLETTER

December 2017 Issue

September - December 2017

## FEATURE STORY

### International Symposium on Advances in Steel and Composite Structures 2017

An International Symposium on "Advances in Steel and Composite Structures 2017" jointly organized by the Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch) (CNERC) of the Hong Kong Polytechnic University and the Hong Kong Constructional Metal Structures Association (HKCMSA), was successfully held on 24 November 2017 with over 130 delegates from England, Malaysia, Mainland China, Hong Kong, and Macau attended.



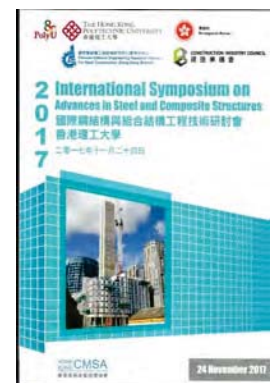
Over 130 delegates attended the Symposium.

In the coming decades, advances in Steel and Composite Structures are important to practicing engineers in Hong Kong due to huge demands on infrastructure construction, especially in China and the "Belt and Road" region. Steel and composite construction is very often adopted in super high-rise buildings, long span bridges and public structures due to their high structural efficiency with large strength-to-self-weight ratios as well as large flexural rigidities against instability and serviceability issues. This International Symposium provided a technical platform for the following renowned researchers and engineers to disseminate their experiences and research findings on advanced construction technology of steel and composite structures as well as "Modular construction for residential buildings" with special emphases on practical applications:

Prof. Mark R. Lawson	The Steel Construction Institute, U.K.
Mr. James Law, JP	James Law Cybertecture, Hong Kong SAR, China
Prof. Wang Hong	China Construction Steel Structure Corp. Ltd., China
Ir Naeem Hussain	ARUP, Hong Kong SAR, China
Ir K.H. Mok	Hip Hing Construction, Hong Kong SAR, China
Dr. Aaron J. Wang	CapitaLand Shanghai, China
Prof. H.H. Lau	Curtin University, Malaysia
Ir Prof. K. F. Chung	Hong Kong Polytechnic University, Hong Kong SAR, China

The following guests had attended the Opening Ceremony:

Ir C. K. Hon, JP	Permanent Secretary for Development (Works), Development Bureau of the Government of Hong Kong SAR, China	Prof. S. L. Chan	Hong Kong Polytechnic University
Prof. Alexander Wai	Vice President (Research Development), Hong Kong Polytechnic University	Prof. C. S. Poon	Hong Kong Polytechnic University
Ir K.T. Leung	Architectural Services Department	Dr. Andy Leung	Hong Kong Polytechnic University
Dr. Raymond Cheung	Development Bureau (Works)	Dr. Michael Leung	Hong Kong Polytechnic University
Mr. Mark Fu	Transport and Housing Bureau	Mr. W.C. Lee	Hong Kong Polytechnic University
Ms. Winnie Wong	Innovation and Technology Commission	Mr. Alvin Wong	Hong Kong Polytechnic University
Mr. Hamnus Chui	Housing Department	Mr. Matthew Lai	Wo Lee Steel Co., Ltd.
Ir L. X. Dai	China Construction Steel Structure Corp. Ltd.	Mr. Francis Yau	Aurecon
Dr. L. Gu	China Construction Steel Structure Corp. Ltd.	Mr. Lee Hoi Yuen	Sino
Mr. Z. M. Chen	China Construction Steel Structure Corp. Ltd.	Mr. Alan Li	Goldwave
Dr. H.Y. Shen	China Construction Steel Structure Corp. Ltd.	Mr. Chin Sai Ping	AECOM
Prof. Y. L. Xu	HK Polytechnic University		
Prof. William Lam	HK Polytechnic University		
Mr. Y. K. Pang	HK Constructional Metal Structures Association		
Dr. Paul Lam	HK Constructional Metal Structures Association		
Ir H.Y. Lee	HK Constructional Metal Structures Association		





From left: Prof. H.Wang, Prof.Alexander Wai, Ir C.K. Hon, Prof. K.F. Chung, Prof. Mark Lawson, and Ir K.T. Leung.



From left: Prof. K.F. Chung, Prof.Y.L. Xu, Prof.Alexander Wai, Ir C.K. Hon and Prof. Mark Lawson.



Opening Speech by Prof.Alexander Wai.



Prof. K.F. Chung presented a souvenir to Prof.Alexander Wai.



Ir C.K. Hon officiating the Symposium.



Prof. K.F. Chung presented a souvenir to Ir C.K. Hon.

After the Opening Ceremony, Prof. Mark Lawson represented The Steel Construction Institute, U.K., and Ir L.X. Dai represented the China Construction Steel Structure Corp. Ltd., China, and Prof. K. F. Chung represented the Hong Kong Polytechnic University, signed a MOU on collaboration of steel construction engineering research.

The three parties will work together to promote the export of high quality Chinese steel products to countries along Hong Kong, Southeast Asia and the “Belt and Road” regions through Hong Kong’s overseas construction projects, as well as to promote Chinese steel industry to the world and speed up the internationalization of Chinese steel industry.

After that, Prof. Chung had given a progress report on recent development of the CNERC.



Front row from left: Prof. Mark Lawson, Prof. K.F. Chung, and Ir L.X. Dai  
Back row from left: Ir K.T. Leung, Prof.Y.L. Xu, Ir C.K. Hon, Prof.Alexander Wai, Prof. H.Wang, and Mr.Y.K. Pang.





MOU signing ceremony.



Prof. K.F. Chung reported on recent development of the CNERC.

The Symposium Programme:



《國際鋼結構與複合結構工程技術研討會》2017

**International Symposium on  
Advances in Steel and Composite Structures 2017**

**Date :** Friday, 24<sup>th</sup> November 2017

**Venue :** Senate Room M1603, Li Ka Shing Tower, The Hong Kong Polytechnic University.

**Time :** 9:00 am - 5:20 pm (Registration will start at 8:30 am)

Time	Program	
9:00 am	<b>Opening Ceremony</b> <b>Welcoming Speech</b> Professor Alex Wai, <i>VPRD</i> <b>Guest of Honour</b> Ir C.K. Hon, <i>Permanent Secretary for Development (Works) Development Bureau, the Government of Hong Kong SAR</i> <b>Signing of MOU</b> <b>CNERC Report</b>	<b>Master of Ceremony:</b> Ir Prof. Michael C. H. Yam <i>Deputy Director &amp; General Secretary</i> CNERC
9:35 am Presentation 1	<b>Modular Construction for Residential Buildings</b> Professor Mark R. Lawson, <i>The Steel Construction Institute</i>	
10:15 am Presentation 2	<b>Adaptive City with Modular Structures</b> Mr. James Law JP, <i>James Law Cyberecture</i>	
10:35 am	<b>Refreshments</b>	
11:00 am Presentation 3	<b>中国钢结构行业发展趋势</b> 王宏教授 中建钢构有限公司	<b>Ir Prof. Joseph Y. W. Mak</b> <i>Chief Engineer</i> CNERC
11:40 am Presentation 4	<b>Effective Use of High Strength Steel Welded Sections in Buildings</b> Ir Professor K. F. Chung, <i>The Hong Kong Polytechnic University</i>	
12:20 pm	<b>Lunch Break</b>	
2:00 pm Presentation 5	<b>Design and Construction of Queensferry Crossing Scotland</b> Ir Naeem Hussain, <i>ARUP</i>	<b>Dr. T.M. Chan</b> <i>Deputy General Secretary</i> CNERC
2:40 pm Presentation 6	<b>Design and Construction of Niqu Centre 戲曲中心</b> Ir K.H. Mok, <i>Hip Hing Construction</i>	
3:30 pm	<b>Refreshments</b>	
3:50 pm Presentation 7	<b>Steel: A Versatile Materials for Versatile Mega Buildings</b> Dr. Aaron J. Wang, <i>Capitaland Shanghai</i>	<b>Ir Dr. Paul H. F. Lam</b> <i>Chairman Education &amp; Training Committee</i> HKCMSA
4:30 pm Presentation 8	<b>Steel Construction in Malaysia – Opportunities and Challenges</b> Professor H. H. Lau, <i>Curtin University Malaysia</i>	
5:10 pm	<b>Closing Remarks</b>	
5:20 pm	<b>End</b>	

# NEWS

## China Steel Construction Society Experts Committee – Annual Meeting cum Academic Seminar 2017

During 16 – 17 September 2017, The China Steel Construction Society (CSCS) Experts Committee organized an Annual Meeting cum Academic Seminar in Shenzhen with the support of China Construction Steel Structure Corp. Ltd. Prof. K.F. Chung, Director of the CNERC (Hong Kong Branch) attended the Annual Meeting, and being appointed as Executive Council Member of the Seventh Council of CSCS as well as Member of the Experts Committee.



Prof. K.F. Chung attended the group discussion among the Experts Committee.

Other famous experts who had attended this Academic Seminar included:

Prof. X.H. Zhou, Academician of China Academy of Engineering, and President of Chongqing University

Prof. J.G. Nie, Academician of China Academy of Engineering, Deputy Director of CSCS, and Director of Experts Committee

Prof. S.L. Dong, Academician of China Academy of Engineering, and Senior Consultant of CSCS

Prof. Q.R. Yue, Chairman of Chinese Metallurgical Construction Research Institute, and President of CSCS

Mr. X.F. Zhang, Director of Shenzhen Municipal Housing and Urban Construction Bureau

Mr. H. Wang, Chairman of China State Construction Engineering Corporation, and Deputy Director of CSCS



From left to right: Prof. Q.R. Yue, Prof. S.L. Dong, Prof. X.H. Zhou, Prof. J.G. Nie, and Mr. X.F. Zhang.

During the Annual Meeting, Mr. H. Wang, Chairman of China State Construction Engineering Corporation, and Deputy Director of CSCS; Mr. X.F. Zhang, Director of Shenzhen Municipal Housing and Urban Construction Bureau; Prof. J.G. Nie, Academician of China Academy of Engineering, Deputy Director of CSCS, and Director of Experts Committee; and Prof. X.H. Zhou, Academician of China Academy of Engineering, and President of Chongqing University had given a speech respectively.



Mr. H.Wang extended a warm welcome to the experts and scholars attending the Annual Meeting, and introduced to the experts on history of the China State Construction Engineering Corporation and its related performances. In Mr. X.F.Zhang's speech, he also expressed the importance of steel structure development to urban construction in Shenzhen. During Prof. J.G. Nie's speech, he mentioned that CSCS, especially the Experts Committee, should take initiative to promote development of structural steelwork, make good use of structural steelwork, and lead the Chinese Steel Construction Industry. Last but not the least, Prof. X.H. Zhou summed up his best wishes towards the work of the CSCS and the Experts Committee.



From left: Prof. X.H. Zhou, Prof. J.G. Nie, Mr. X.F.Zhang, and Mr. H.Wang.

In the working report, Mr. Z.X. Hou, Deputy Executive Director of the CSCS reviewed the major work of the Experts Committee over the past two years, and proposed the focus and main tasks of the Experts Committee for the next two years. At the same time, Mr. Z.X. Hou announced nine experts and scholars being shortlisted for the CSCS Lifetime Achievement Awards in 2017, namely W.Y. Zhou, H.G. Jin, H.C. Cui, Y.C. Zhang, G.Y. Yu, W.Z. Yang, S.T. Wang, S.T. Liu, and G.L. Ding. In addition, a list of new CSCS members were announced at the Annual Meeting, including Q.W. Wang, H.X. Wang and other 23 experts and scholars. While the nine winners of the Lifetime Achievement Awards shared their career and life experiences to the participants.

During the academic reporting session, Mr. L.X. Dai, Chief Engineer of China State Construction Engineering Corporation presented a report on "Structural steelwork development for a better city", and he shared practice and innovative design of the China State Construction Engineering Corporation. Prof. H.G. Jin, Senior Engineer shared innovative steel construction technology applied in Terminal of the Guangzhou Baiyun International Airport.

In group discussion, Z.H. Chen, Y.H. Wu and G.G. Zhou discussed the development of prefabricated structural steelwork, overseas steel construction projects, and cultural industry of structural steelwork, and visited the CSCS Steel Museum.

Prof. K.F. Chung had an expertise exchange with delegates of the CSCS, and provided relevant opinions and suggestions on the work of the CSCS.

中国钢结构协会专家委员 2016-2017 年度  
工作会议暨学术交流会  
会议指南



二〇一七年九月 深圳



# NEWS

## The Fourth Forum on Innovation on Architecture and Civil Engineering

Prof. K.F. Chung and Dr. T.M. Chan were invited by Prof. Xuhong Zhou, Member of the Chinese Academy of Engineering and President of Chongqing University, to attend the Fourth Forum on Innovation on Architecture and Civil Engineering which was held in Changsha from 22 to 24 September 2017. Prof. Chung was also invited to deliver a plenary lecture titled "Effective use of high strength S690 steel materials". Both Prof. Chung and Dr. Chan were also invited to participate in the Editorial Board Meeting of the Journal of Architecture and Civil Engineering. They had also visited the College of Civil Engineering, Hunan University as well as their testing laboratories.

The Fourth Forum on Innovation on Architecture and Civil Engineering was jointly organized by Division of Civil, Hydraulic and Architectural Engineering of the Chinese Academy of Engineering, the Chinese Civil Engineering Society, Department of Engineering and Material Sciences of the Chinese National Natural Science Foundation, the Editorial Board of Journal of Architecture and Civil Engineering, Hunan University, Chongqing University and Chang'an University.

A total of nine Chinese Academicians of Engineering, namely Prof. Jie Zhang, Prof. Jingquan Wang, Prof. Fulin Zhou, Prof. Kejian Ma, Prof. Xuhong Zhou, Prof. Jianguo Nie, Prof. Zhengqing Chen, Prof. Jianlong Zheng, Prof. Fuming Wang and more than 30 eminent experts and senior engineers, in particular, Prof. Qingrue Yue, Central Research Institute of Building and Construction, Prof. Yiyi Chen and Prof. Guoqiang Li of Tongji University contributed to the Forum. There were about 300 delegates attending the Forum, including engineers, academics and research students.



A group photo with Academicians, eminent experts, professors, researchers and engineers.



Prof. K.F. Chung, Prof. G.Q. Li and Dr. T.M. Chan.



Welcoming Speech by Prof. X.H. Zhou, Chairman of Organizing Committee.



Dr. T.M. Chan, Prof. K.F. Chung and Dr. K. Ke visiting the College of Civil Engineering, Hunan University.

# NEWS

## Technical Seminar on Effective Design and Construction to Structural Eurocodes

A Technical Seminar on Effective Design and Construction to Structural Eurocodes (EN 1990 & 1991, EN 1992, EN 1993 and EN 1994) was held on 29 September 2017 at the Hong Kong Polytechnic University. Owing to the overwhelming responses, there were two parallel sessions on 29 September and also a re-run of this technical seminar on 27 October 2017. These technical seminars are jointly organized by the Hong Kong Constructional Metal Structures Association and the CNERC (Hong Kong Branch) with support of the Construction Industry Council.



Presentation by Prof. K.F. Chung.

This technical seminar aims to promote the effective design and construction to Structural Eurocode 3. The topics of presentations of this seminar are listed in order as follows:

### **Introduction and Overview of Structural Eurocode 3**

by Ir Professor Michael Yam, The Hong Kong Polytechnic University and  
Ir Dr. Paul Lam, The City University of Hong Kong.

### **Section Capacities**

by Ir Dr. Paul Lam, The City University of Hong Kong and  
Dr. H. C. Ho, The Hong Kong Polytechnic University

### **Material Specifications**

by Ir Prof. K. F. Chung, The Hong Kong Polytechnic University and  
Dr. H. C. Ho, The Hong Kong Polytechnic University

### **Structural Instability and Column Buckling**

by Ir Prof. K. F. Chung, The Hong Kong Polytechnic University and  
Dr. T. M. Chan, The Hong Kong Polytechnic University

### **Structural Instability and Beam Buckling**

by Professor K.F. Chung, The Hong Kong Polytechnic University and  
Dr. T. M. Chan, The Hong Kong Polytechnic University

This Technical Seminar is part of professional development programme which was first organized in 2015 to introduce Structural Eurocodes to practicing civil and structural engineers in Hong Kong through coordinated presentations on structural behaviour, design development, and codified rules in order to enhance their technical capabilities. A total of 203 participants attended the Seminar on these two days, and positive feedbacks from participants were received.



Presentation by Prof. Michael Yam (Top Left), Dr. Paul Lam (Top Right), Dr. T.M. Chan (Bottom Left) and Dr. H. C. Ho (Bottom Right).



# NEWS

## The 15th East Asia-Pacific Conference on Structural Engineering and Construction

From 11 - 13 October 2017, the 15th East Asia-Pacific Conference on Structural Engineering and Construction (EASEC 15) was successfully held in Xi'an, China. This international conference was jointly organized by Tongji University and Xi'an University of Architecture and Technology. EASEC was firstly held in Bangkok during 15 - 17 January, 1986. Thereafter, the conference has been held in various countries and regions. The objective of this conference is to provide a forum for professional structural and construction engineers and researchers to present recent progress in research and development, and also to report implementation of new tools and technologies in practical applications. In EASEC 15, Dr. H. C. Ho, Dr. X. Liu, Mr. K. Wang and Mr. Y. F. Hu were invited to attend the conference and to report the latest research development of CNERC.



Nishino Medal and Prize were awarded at the opening ceremony.



Keynote speech by Prof. Sangdae Kim and Prof. James Ricles.



Keynote speech by Prof. Richard Liew.



Keynote speech by Prof. Roberto T. Leon and Prof. J. N. Reddy.



On the afternoon of 12 October 2017, a special session on "High Strength Steel" was held. The CNERC delegates presented a total of 6 technical papers, and received good peer recognition from conference participants.

**Study on Mechanical Behaviour of High Strength Steel Q690 H-sections under Axial Compression**  
by Mr. K. Wang

**Strength Reduction of S690-QT Welded Sections under Various Heat Input Energies**  
by Dr. X. Liu

**Numerical Study on Residual Stresses in High Strength Q690 Cold-Formed Circular Hollow Sections**  
by Mr. Y. F. Hu

**Tensile Tests on High Strength Steel Materials with High Precision Measurements**  
by Dr. H. C. Ho

**Hysteretic Behaviour of High Strength GMAW Weld Metals for S690 High Strength Steels**  
by Dr. H. C. Ho

**Numerical Investigation into Structural Behaviour of Long Spanning Composite Beams Perforated I-sections**  
by Mr. K. Wang



Presentations were delivered by CNERC delegates: Mr. K. Wang, Dr. X. Liu, Mr. Y. F. Hu and Dr. H. C. Ho.



# NEWS

## A Visit by China Association for Science and Technology

On 2 November 2017, CNERC was pleased to have delegates from China Association for Science and Technology (CAST) visited the centre. The delegation team consisted of:

### Communication Department of China Association of Science and Technology

**Mr. S. Zhang** Deputy Director  
**Miss R. Yang** Division Head  
**Mr. Z.W. Qiu**

### China Communications Construction

**Mr. M. Lin** Chief Engineer  
**Miss X.P. Fu** Director

### China Ship Development and Design Institute

**Mr.T.Wang** Researcher  
**Mr.W. Ding** Senior Engineer

### Beijing-Hong Kong Academic Exchange Centre

**Dr. C. H. Zou**

Prof. K. F. Chung, Director of CNERC gave a warm welcome to the delegates from CAST. Accompanied by Prof. Chung, the delegates visited the Structural Engineering Research Laboratory at PolyU. Prof. Chung introduced the establishment, recent development of the CNERC. He also showed some research experimental tests which have been conducted at the laboratory to the delegates.

The delegates spoke highly of the work of the CNERC and expected more exchange and cooperation can be developed in the future.



The CAST delegates visited the Structural Engineering Research Laboratory at PolyU.

## A Visit by Beijing-Hong Kong Academic Exchange Centre

On 22 November 2017, the following delegates from the Beijing-Hong Kong Academic Exchange Centre (BHKAEC) paid a visit to the CNERC:

Mr. KWOK Ming Wa, Director, Vice-President

Dr. C. H. Zou, Head of Division of Academic and Training, BHKAEC

Ms. LIN Li Juan, Head of Division of Science and Technology, BHKAEC, and Deputy General Manager, Beijing-Hong Kong International Training Centre

As originally suggested by Prof. YANG Chen Ning, the Centre was established and registered in Hong Kong in March 1985.

The Centre is a not-for-profit institution serving academic exchange. It aims to promote the initiation and development of activities involving academic, science and technology interflow, as well as cooperation between Hong Kong, Mainland and overseas institutes by providing enquiry services, liaison and financial assistance, etc.

The Centre is commissioned by Mainland education, science and technology units, and supported by the Liaison Office of the Central People's Government in the Hong Kong Special Administrative Region. At present, participation in the Centre's Board of Directors includes such institutions as the Ministry of Science and Technology, the Ministry of Education, the Chinese Academy of Sciences, the Chinese Academy of Social Sciences, the Chinese Academy of Medical Sciences, the China Association for Science and Technology, the National Natural Science Foundation of China, and the Liaison Office of the Central People's Government in the Hong Kong Special Administrative Region.

During the meeting, Prof. K. F. Chung reported on the main vision, recent developments and major research projects of the CNERC, including:

1. Effective use of high performance steel materials – Q690 ~ Q960,
2. Welding of high-strength steel and its structural characteristics of heat affected zone, and
3. Mechanical welding system with function of visual recognition of high-strength steel.

The BHKAEC is looking forward to the updated information on progress of these projects in the CNERC. At the same time, the BHKAEC appreciates the many technical publications published by the CNERC in contributing to the engineering application of modern steel structure technology as well as enhancing the competitiveness of Chinese steel industry and construction industry in the international market. Hence, making tremendous contributions to the "One Belt and One Road" strategic planning of the Mainland China. In addition, the BHKAEC will tender more support to the CNERC in promoting its work and experience of the CNERC to the government, universities and relevant research institutes and companies in the Mainland China.



Prof. K. F. Chung introduced the CNERC to delegates of the BHKAEC.



## A Visit by the Shougang Group - Capital Steel

The delegation team of Shougang Group visited the CNERC on 27 November 2017. The main guests included:

Mr. ZHANG Gongyan, Party Committee Deputy Secretary, Director and President  
Ms. LIANG Jie, Vice President

Established in 1919 and headquartered in Beijing, the Shougang Group has experienced a history of nearly 100 years. With the spirits of “pioneering, unremitting and hardworking”, and being “highly responsible, innovative and leading”, the Group keeps writing new chapters in serving and building up our country with iron and steel. At present, the Group has developed into a large-sized enterprise group centering on iron and steel and concurrently running businesses in mineral resources, the environment, static traffic, equipment manufacturing, construction and real estate, productive services and overseas industries in a cross-industry, trans-regional, cross-ownership and transnational manner. It has 544 wholly-funded, holding and sharing subsidiaries and 94,000 employees; its total assets rank No. 2 among iron & steel enterprises in China, and it has been listed in the Top 500 for six consecutive years since 2010.

During the meeting, Prof. K. F. Chung reported on the main vision, recent developments and major research projects of the CNERC, including:

1. The equivalent technical design standards for Chinese steel, and
2. Effective use of high performance steel materials – Q690 ~ Q960,

The delegates from the Shougang Group expressed their appreciation for the work and its many technical publications of the CNERC. They believe it will help promote the engineering application of modern steel structure technology and enhance the competitiveness of China's steel industry and construction industry in the international market, hence giving great contributions to the "One Belt and One Road" strategic planning of the Mainland China in enhancing the export of Chinese steel. The Shougang Group said it looks forward to collaborate with the CNERC in the future and invited the CNERC to visit the Shougang Group in Beijing.



The Shougang Group delegates visited the Structural Engineering Research Laboratory, PolyU.



From left: Victor Zhao, Sophia Xu, J. Liang, Zhanfg Gongyan, Prof. KF Chung, Victor Wu, and X.M. Fu.

# NEWS

## Forum on Transitional Pre-fabricated Modular Housing Jointly organized by the Hong Kong Polytechnic University and Transport and Housing Bureau

The Forum was jointly organized by the Hong Kong Polytechnic University and the Transport and Housing Bureau of the Government of Hong Kong SAR on 3 November 2017. It was organized to provide a platform to explore possibility of wide adoption of transitional pre-fabricated modular housing in Hong Kong. Under the leadership of Professor Alex Wai, Vice President (Research and Development) and Chairman of the Organizing Committee of the Forum, a total of 9 academic and researchers of the Faculty of Construction and Environment, a famous architect and a director of a social realty company presented on various issues about policies on land use, engineering and technical challenges as well as social developments associated with modular housing. The Forum was also hosted by Professor Alex Wai.

During the Opening Ceremony of the Forum, Professor Timothy Tong, President of the Hong Kong Polytechnic University, welcomed about 100 delegates attending the event. Then, Dr. Raymond So, Under Secretary of the Transport and Housing Bureau gave an Opening Speech, and he emphasized various imminent needs of Hong Kong to find ways to ease social problems related to shortage of housing.

### Programme of the Forum:

**Date:** 3 November 2017 (Friday)  
**Time:** 8:30am – 12:30pm  
**Venue:** Senate Room, 16/F, Li Ka Shing Tower, The Hong Kong Polytechnic University

### Programme:

8:30am Registration  
8:45am Welcome  
Prof. Timothy W. Tong  
The Hong Kong Polytechnic University  
8:50am Opening Remarks  
Mr. Frank Chan (represented by Dr. Raymond So)  
Transport and Housing Bureau, HKSARG  
8:55am Policy, Planning and Management  
Prof. Eddie Hui, Prof. Edwin Chan & Prof. Geoffrey Shen  
The Hong Kong Polytechnic University  
9:25am Structural, Fire Resistance and Foundation Designs  
Prof. K F Chung, Prof. Asif Usmani & Dr. Andy Leung  
The Hong Kong Polytechnic University  
9:55am Q&A  
10:15am Networking Session  
10:45am Built Environment, Transport and Underground Utility  
Prof. C M Mak, Dr. Lilian Pun & Ir. Dr. Wallace Lai  
The Hong Kong Polytechnic University  
11:15am Adaptable City  
Mr. James Law  
James Law Cybertecture  
11:30am Q&A  
11:50am Pioneer New Housing Models for Different Low-income Groups: Light Be's Experience  
Mr. Ricky Yu  
Light Be (Social Realty) Co. Ltd.  
12:05pm HKCSS's Transitional Pre-fabricated Modular Housing Project  
Mr. HW Chua  
The Hong Kong Council of Social Service  
12:10pm Q&A  
12:30pm End of Seminar



Dr. Raymond So addressing to delegates during the Opening Ceremony of the Forum.



Prof. Tong explained to the delegates about fundamental functions of modular housing.



Key messages of the presentations were summarized as follows:

- Presentation 1  
Government policy needed for modular housing  
Professor Eddie Hui, BRE

Modular building structures have been successfully deployed in countries such as the UK, US, Netherlands, Singapore and Mainland China in the past ten years, and recently, it was suggested as a possible solution to the current housing crisis in Hong Kong. Nevertheless, several hurdles, such as availability of suitable land sites and potential conflicts with existing laws and building regulations, need to be addressed. There are also concerns with cost-benefit considerations of land use, impacts on infrastructure and environment. It is suggested to conduct a holistic review on existing regulations (e.g. Town Planning Ordinance, Buildings Ordinances). It is also necessary to establish regulations that apply specifically to transitional pre-fabricated modular housing in Hong Kong.

- Presentation 2  
Planning and regulations for modular housing  
Professor Edwin Chan, BRE

With advance of pre-fabrication and modular design techniques, the construction process of modular housing is highly efficient. However, stringent planning and building regulations remain the main hurdle for these developments. The role of these transitional structures, i.e. whether they will be classified as temporary or permanent buildings, should be carefully considered, as this can have implications to possible exemptions of certain regulations, which facilitate their construction in Hong Kong. For fast provision of modular housing, many building regulations need to be revised to accommodate their construction, e.g. Building laws for temporary buildings (BP Reg 50) or contractor sheds (BPreG53) impose very stringent requirements.

- Presentation 3  
Construction management of modular housing  
Professor Geoffrey Shen, BRE

The supply chain management of modular housing is essential to its feasibility in Hong Kong. It is proposed to use smart objects and advanced information and communication technologies to support smart decision-making in the whole life cycle of modular housing units, from design, through production and construction, to use and demolition. These include Building Information Modelling (BIM) Platform enhanced with Radio-frequency Identification (RFID) techniques for various pre-fabrication and construction procedures. Such technologies enable real-time monitoring of logistics and construction processes, improving communication among various stakeholders.

- Presentation 4  
Structural design of modular steel framed housing  
Professor K.F. Chung, CEE

Modular construction using cold-formed steel technology has been developed for 20 years in the U.K. and the European Communities. From the structural engineering perspective, construction of 20 to 30-storey modular housing structures is readily achievable without any major issues. As a leading institute for sustainable infrastructure development and modern steel construction, the Chinese National Engineering Research Centre (CNERC) for Steel Construction (Hong Kong Branch) at PolyU is well positioned to develop and support prototypes as well as final products for modular housing in Hong Kong. It is also necessary to have expandable and demountable pre-fabricated pre-installed volumetric housing units with advanced jointing, and to integrate various constructional elements to satisfy building regulations for structural adequacy, fire safety, energy efficiency and acoustic insulation.

- Presentation 5  
Fire resistance design for modular housing blocks  
Professor Asif Usmani, BSE

Although tools for computer simulations and experimental studies are well developed for fire resistance in buildings, such research is limited for modular housing units. Physical fire tests on prototype modular units will be very useful in establishing performance-based criteria for fire safety assessments pertaining to the local needs and conditions. The following fire safety assessment should be carried out for prototype housing units in order to facilitate approval from regulatory agents in Hong Kong:

- a) an estimation of a likely fire hazard intensity;
- b) a CFD based fire scenario simulation followed by full scale fire tests;
- c) post-test simulations of fire and structural responses; and
- d) optimization of passive and active fire safety measures.

- Presentation 6  
Foundation design of modular housing blocks  
Dr. Andy Leung, CEE

Modular steel framed housing units are significantly lighter than those conventional reinforced concrete structures. This reduces foundation requirements, and opens up opportunities to better utilize areas where conventional housing developments are not feasible to be built. For example, adverse geologic conditions prevail in a number of Scheduled Areas (e.g. Northwest New Territories) or Designated Areas (e.g. Tung Chung) in Hong Kong. The lightness of modular units makes them possible solutions for these sites.

- Presentation 7  
Built environment of modular housing systems  
Professor C.M. Mak, BSE

Owing to the characteristics of being small in sizes and light in self-weights, and the requirement of air conditioning, the built environment in potential modular housing blocks in Hong Kong should focus on acoustic comfort, thermal insulation and ventilation. Existing design methodology and installation techniques should be optimized to cater for specific conditions of these modular housing units, such as luminous comfort, sound insulation using lightweight materials, and air-conditioning during hot and humid summers.

- Presentation 8  
Transport for modular housing blocks  
Dr. Lilian Pun, LSGI

Pre-fabricated modular housing provides a potential solution to ease housing problems in Hong Kong, and a well-established, easily-accessible public transportation system is essential to integration of these housing blocks to the society. Informatics technologies also help enhance accessibility to transportation system. Research on public transport and the HKeTransport system can assist determination of a suitable site for building these housing blocks, particularly with regard to nearby public transport stops, and connections to different parts of Hong Kong.

- Presentation 9  
Underground utility for modular housing blocks  
Dr. Wallace Lai, LSGI

Design, construction, operation and maintenance (O&M) of common ducts and pipelines for utilities (e.g. power, telecommunication, water, sewer and gases) should be standardized amongst various utility stakeholders. A Building Information Model and O&M menu should be specifically developed for modular housing blocks. Latest sensing technologies also allow continuous health monitoring of these ducts and pipelines to minimize risks of hazards or disruption of service.

- Presentation 10  
Adaptable City  
Mr James Law, James Law Cybertecture

Transitional pre-fabricated modular housing is essential an element of an 'adaptable city' as these modular housing units can be assembled and dismantled at various sites efficiently, depending on the needs of the society at different times. A unique innovation for modular housing in Hong Kong is the ongoing 'O-POD' project, where concrete pipe sections of 3 m diameter are converted into modular living spaces, turning redundant construction materials into reusable and adaptable housing units. A similar concept had been demonstrated through the award-winning 'AL-POD' project, where lightweight aluminium pod houses are fitted with interiors for self-sustainable use. These modular units can be easily transported and readily set up on typical sites, and they may also be stacked up to become high-rise structures.

- Presentation 11  
Foreseeable Challenges in using Pre-fabricated Modular Housing as Transitional Housing  
Mr Ricky Yu, Light Be (Social Realty) Co. Ltd.

Two recent projects of Light Be (Social Realty) Co. Ltd. are introduced.

The first project is the 'Light Home' project which aims to cater for transitional housing needs of responsible tenants. By matching these tenants with landlords who, with a sense of social responsibility, are willing to compromise parts of their rental income for a period of 2 to 3 years, these tenants are able to restore their family lives, and make good progress to their livelihood.

The second project is the 'Empowerment Housing' project which involves revitalizing a 50-year old, abandoned textile factory staff quarter building in Sham Tseng into a modern residential block in less than 2 years. The residential block provides more than 40 units to needy families.



# NEWS

## A Visit by Prof. WU Gang, Vice President of Southeast University

Prof. WU Gang, Vice President of Southeast University visited the CNERC on 7 December 2017. Prof. K. F. Chung reported on the main vision, recent developments and major research projects of the CNERC, including

1. The equivalent technical design standards for Chinese steel, and
2. Effective use of high performance steel materials – Q690 ~ Q960.

Prof. G. Wu highly praised the work of the CNERC and expressed his wish to collaborate and exchange with the CNERC in future. Southeast University (SEU) is one of the national key universities administered directly under the Central Government and the Ministry of Education of China. It is also one of the universities of Project 211 and Program 985 that is financed by the Central Government to build as a world-class university. Located in the ancient capital city of Nanjing, Southeast University has campuses such as Sipailou, Jilonghu and Dingjiaqiao, covering a total area of 392 hectares.

Among all the disciplines, the engineering subjects including architecture, landscape architecture, transportation engineering, civil engineering, materials science and other engineering disciplines are being selected as first-class subject ranked second in the country right next to Tsinghua University. In 2017 US News, SEU ranked 7th in World University Engineering Rankings in Mainland China, and 23rd in the world's ranking.



From left: Prof. G. Wu and Prof. K. F. Chung.

# NEWS

## IStructE China Young Researchers' Conference 2017

IStructE China Young Researchers' Conference 2017 on 23 December 2017 at Chongqing University, China. The CNERC delegates: Prof. K. F. Chung, Vice President of IStructE was one of the keynote speakers and members of the Conference Organizing Committee; Dr. T. M. Chan, Council Member of IStructE was one of the members of the Conference Organizing Committee; and Mr. Y. F. Hu was one of the presenters and award winner of The Third Prize of Outstanding Report.



## UPCOMING EVENT

### International Conference on Engineering Research and Practice for Steel Construction (ICSC2018)

The Second Announcement of the Conference is now available. For details of the Conference, please visit the ICSC2018 website: <http://www.icsc2018.com/>

For details of other CNERC's upcoming events, please check out our website at: <https://www.polyu.edu.hk/cnerc-steel/news-events-upcoming.html>

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