



August 2017 Issue May - August 2017

FEATURE STORY

CNER(

First Announcement – CNERC's first International Conference on Engineering Research and Practice for Steel Construction (ICSC2018)

International Conference on "Engineering Research and Practice for Steel Construction" (ICSC2018) is the first International Conference organized by the CNERC. A three-day international conference will be held in Hong Kong from 5 to 7 September 2018.

The objective of ICSC2018 is to provide a technical platform for effective exchanges on modern steel construction technology among researchers and engineers. A number of world renowned researchers and engineers will be invited to present their recent research works and construction projects in the Conference. It will definitely be a valuable networking opportunity among conference delegates.

The first announcement has been issued on 7 August 2017, for further details please refer to the ICSC2018 official website at: <u>http://www.icsc2018.com/</u>





### Technical Seminar on Effective Design and Construction to Structural Eurocodes, Hong Kong SAR

The Technical Seminar on Effective Design and Construction to Structural Eurocodes (EN 1990 & 1991, EN 1992, EN 1993 and EN 1994) was held on 12 May 2017 at the Hong Kong Polytechnic University (PolyU). This technical seminar is jointly organized by the Hong Kong Constructional Metal Structures Association and the Chinese National Engineering Research Centre for Steel Construction (Hong Kong Branch) with support of the Construction Industry Council.

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

Introduction and Overview of Structural Eurocodes by Dr. Michael Yam, The Hong Kong Polytechnic University.

EN 1990 Basis of Structural Design & EN 1991: Actions on Structures by Dr.T.M. Chan, The Hong Kong Polytechnic University.

EN 1992: Design of Concrete Structures by Professor J.S. Kuang, The Hong Kong University of Science and Technology.

EN 1993: Design of Steel Structures by Dr. Paul Lam, The City University of Hong Kong.

Effective Design and Construction using EN 1993 in Hong Kong, by Professor K.F. Chung, The Hong Kong Polytechnic University.

EN 1994: Design of Composite Steel-Concrete Structures by Professor K.F. Chung, The Hong Kong Polytechnic University.



This Technical Seminar 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 88 participants attended the Seminar this year, and positive feedbacks from participants were received.



Presentation by Dr. Michael Yam.



Presentation by Professor J.S. Kuang.



Group photo of Professor K.F. Chung, Dr. Paul Lam, Dr.T.M. Chan, and Dr. H.C. Ho with Ir K.C. Lam, Assistant Director of Civil Engineering and Development Department,



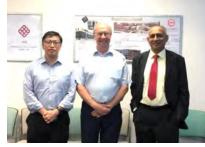
# A Visit by Prof. Brian Collins, University College London

CNERC was honoured to receive Prof. Brian Collins, Director of International Centre for Infrastructure Futures of the University College London, and Prof. Asif Usmani, Head of Department of Building Services Engineering, PolyU on 18 May 2017. Prof. Collins is also the Coordinator of a U.K. network of infrastructure research capability entitled "the UK Collaboratorium for Research in Infrastructure and Cities" (UKCRIC), which will provide leadership and support for the development and growth of a coordinated and coherent, world class U.K.-based national infrastructure research community.

The vision for UKCRIC (www.ukcric.com) firmly addresses the five key principles of the 2014 Science & Innovation Strategy:

- Allocation of resources based first and foremost on excellence.
- An ethos of collaboration, both within UKCRIC's initial membership, with excellent researchers nationally and internationally, and with industry.
- Coordinated by UKCRIC's Coordination Node, and underpinned by world-class facilities, an ability to respond to changing research needs in an agile way.
- A sense of 'place': research on the nation's major cities, with cities, for cities.
- A focus on openness: open access to facilities, open data, open software, open and consensual governance.

Prof. K.F. Chung made a thorough introduction on establishment, latest developments and deliverables of CNERC to Prof. Collins and Prof. Usmani, and various technical topics were discussed. Both Prof. Collins and Prof. Usmani were amazed to know the latest figures of Chinese steel production in 2016 as China contributed half of the world production.





From left to right: Prof. K. F. Chung, A fruitful meeting with much Prof. Brian Collins, and Prof. Asif information exchange. Usmani.

After the meeting, a visit to the Structural Engineering Research Laboratory was made.

Prof. Brian Collins is Professor of Engineering Policy at UCL, and is Director of the International Centre for Infrastructure Futures. He served as specialist adviser to the House of Lords Science and Technology Committee's inquiry into scientific infrastructure in 2013 and 2014. Before joining UCL, he served as Chief Scientific Advisor to two Government departments (Transport 2006 - 11; Business Innovation and Skills 2009 -11), with responsibility for overseeing science, engineering and technological activities, and ensuring that rigorous science and engineering evidence is used systematically throughout both Departments' policy processes (particularly including investment policy).



Prof. K. F. Chung, Prof. Brian Collins, and Prof. Asif Usmani at the Structural Engineering Research Laboratory, PolyU.



# A visit by Prof. Ahmed Elghazouli, Imperial College

CNERC was honoured to have Prof. Ahmed Elghazouli at the Imperial College London visited the CNERC on 7 June 2017. Prof. Elghazouli is Head of the Structures Section at the Department of Civil and Environmental Engineering, Imperial College London, with more than 25 years of experience in structural engineering research and specialist consultancy work worldwide. Imperial College London is one of the main collaborators of the CNERC in research, development and engineering application.

Prof. K.F. Chung introduced the background, establishment and positioning of the CNERC to Prof. Elghazouli, and Prof. Elghazouli provided valuable insights to the research and development activities of the CNERC.

Prof. Elghazouli was amazed to know about the challenges of the Chinese steel industry and its ever-increasing steel tonnages produced every year in the last 30 years. Prof. K. F. Chung informed him that one of the main functions of the CNERC being in Hong Kong was to act as a window for the Mainland China to promote export of Chinese Construction Industry, in particular, Chinese steel materials and structural steelwork.

Prof. Elghazouli advised that recently, he completed a research project on "application of stainless steel in marine environments", and he shared the view that corrosion was an imminent challenge facing by the steel construction industry in both the U.K. and Hong Kong. As stainless steel was very expensive, it was not obvious for practicing engineers to specify the use of stainless steel in reinforced concrete structures. Prof. K. F. Chung also reported to Prof. Elghazouli about a CNERC project on "atmospheric corrosivity of exposed structural steelwork", and seven outdoors stations in various parts of Hong Kong have been set up for long term corrosion tests on exposed steel structures.

A dinner gathering was held by Prof. K. F. Chung for Prof. Elghazouli in the evening to meet old and new friends on structural engineering and steel construction.





From left to right: Dr.T. M. Chan, Dr. Michael Yam, Prof. Ahmed Elghazouli and Prof. K. F. Chung.

Dinner among friends!

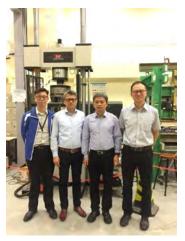


### A visit by Prof. Jin Di, Chongqing University

CNERC was honoured to have Prof. Jin Di of the Chongqing University (CQU) visited the CNERC on 15 June 2017. Prof. Di was an international expert on bridge engineering, and his research interests include design and construction of long span bridges, steel bridges, dynamic loadings and welding. He is currently Deputy Director of Research Centre for Steel Structures Engineering of the CQU.

Dr. Michael Yam introduced some of the on-going research projects of the CNERC on high strength steel structures to Prof. Di. Prof. Di was very interested to some of these projects, in particular, welding of high strength steel sections, and possible application in bridges. Prof. Di also updated the CNERC about current research projects in his Research Centre, and he looked forward to have research collaboration with the CNERC on fatigue tests on high strength steel welded sections.

Accompanied by Dr. Michael Yam, Dr. T.M. Chan and Dr. H.C. Ho, Prof. Di went to see a newly installed 500 kN multi-functional compression testing system, and he visited both the Structural Engineering Research Laboratory, and the Robotic Welding Laboratory.







From left to right: Dr. H. C. Ho, Dr. Michael Yam, Prof. Jin Di and Dr. T. M. Chan.

Prof. Di visited the Structural Engineering Research Laboratory, PolyU.

Prof. Di was very interested to see the robotic welding system in the Robotic Welding Laboratory.

### A visit by Professor Balthasar Novak, University of Stuttgart, Germany

CNERC was honoured to have Prof. Balthasar Novak and Dr. Heiko Richter from University of Stuttgart, Germany visit the Centre on 24 July 2017. Valuable information has been exchanged on research projects among the professors and research personnel of the CNERC. Prof. Novak and Dr. Richter also paid a visit to the Structural Engineering Research Laboratory, PolyU.



Prof. Balthasar Novak and Dr. Heiko Richter together with the CNERC delegates.



#### Visit to Shenyang, China

The technical visit to Shenyang was a great success that numerous collaborative plans were reached. During the visit, Prof. Chung briefed the AnSteel Group and the Northastern University the mission and objectives of the CNERC, as well as the Centre's development progress and its main research work. In addition, Prof. Chung also highlighted the latest research achievements of the CNERC, and a number of technical manuals. From this trip, the CNERC learned that the AnSteel Group is a leading state-owned enterprise of the Chinese iron and steel industry over the century, and the Northeastern University has dominated the steel fabrication and production process in recent years in conducting research on the technological development and production scale of the Chinese high-strength steel.

The CNERC delegates consulted the steel smelting experts to discuss the progress and application of the new high-strength steel materials; came into contact with various new steel products; and exchanged views and suggestions on the research and application prospect of steel and steel industry, which laid a foundation of the development and execution for the CNERC, as well as to promote communication and collaboration between the CNERC and the mainland steel industry.

On 29 July 2017, the CNERC delegation team was accompanied by Dr. H.Y. Ban of Tsinghua University and Mr. M. Liu, Senior Engineer, Iron & Steel Products Institute, AnSteel Group to visit the steel plates production line of the AnSteel Group, and learned about the entire production process of the hot rolled steel plate from the ingot to its finishing, and the productivity and the current steel specifications of the AnSteel Group.

In the afternoon, the CNERC delegation team visited the Iron & Steel Products Institute of AnSteel, and was warmly received by Prof. H.X. Hou, Director of Structural Steel Research Laboratory, AnSteel Group, Mr.W.B. Li, Mr. M. Liu and Mr.T. Zhang, Senior Engineers of Iron & Steel Products Institute. The iron and steel experts of AnSteel introduced the latest steel products and technology reports, including the advanced equipment of the AnSteel's plates production line to the CNERC, as well as a variety of steel mechanical properties in steel construction; fabrication of steel composite plates; production process and specifications; development of Longitudinal Profiled Plates (LP) in China and overseas; and research and application of Stainless Steel bimetal Composite Plates.

On 30 July 2017, the CNERC delegation team visited the State Key Laboratory of Rolling and Automation of Northeastern University, and warmly received by Prof. G.D.Wang, Academician and his research team. Prof. K.F. Chung briefly introduced the mission and research projects of CNERC, and both parties exchanged and discussed on numerous technical issues of high strength steel, including welding performance, structural performance of heat affected zone, QT and TMCP steel fabrication and the comparison on their performances, and refractory steel performance and standard experiments, etc. in construction.



W. Feng, Dr. H.Y. Ban, Prof. K.F. Chung, and Dr. H.C. Ho.



Dr. H.C. Ho, Prof. K.F. Chung, and Dr. H.Y. Ban Prof. H.X. Hou, Mr. W.B. Li, Mr. M. Liu, and T. Zhang.



#### Official Visit to Beijing, China

The two-day trip was successfully held, and achieved a number of collaborative proposals. During the activity, the CNERC delegates elaborated the mission and objectives of the establishment of CNERC, as well as the development process and main research areas. In addition, Prof. K.F. Chung highlighted the latest research outcomes of CNERC, including the technical guide books. After consulting the research progress and application of new high strength steel, and seeing a variety of new steel products, the CNERC delegates and steel experts from these organizations exchanged their views and suggestions on research trends and application prospects of steel and steel structure industry. Through the visit, it promoted the communication and collaboration between the CNERC and the steel and construction industry in mainland China.

On 31 July 2017, the CNERC delegates visited China Iron & Steel Association in Beijing, and had a technical communication meeting with Prof. J.D. Chi, the Vice Chairman of CISA, Prof. S.Q. Jiang, the Vice Department Director of CISA, Ms. M. Sun, the Vice Division Director of CISA, Prof. L.M. Wang, the Vice President of CMISI, and Ms.Y. Luan, the Chief Engineer of CMISI. In the meeting, the compilation issues were discussed for the book "Technical Guide of Chinese steel application in Steel Structure".

Prof. Chi strongly agreed with the work direction of CNERC, which aimed to support the development strategy of "One-Belt-One-Road", as well as to promote Chinese construction steel materials to overseas markets. He also introduced the new situation in reduction of production capacity and recent development of the steel industry in mainland China. CISA expressed their strong support for the compilation work of this technical guide book, while inviting two experts from CMISI to discuss the content in details.

With the agreement of the three parties, the technical guide would be an extensive reading of popular science. In the book, it introduces current production status and the common specifications of construction steel, and provides technical information of construction steel for drawing up project contracts and product requirements of domestic and international construction projects. It presents advices for equivalent selection of Chinese constructional steel and other countries, thereby promoting the high quality domestic steel products to the international market.

The CNERC delegates had a long discussion with Prof.W. Jing, Deputy Secretary General of CCIA, and Ms. S.Q. Zhai of CCIA, about the development of the construction industry in mainland China, Hong Kong, and Macau. Prof. K.F. Chung introduced the mission and objectives of the establishment of CNERC, as well as its positioning in the development strategy of "One-Belt-One-Road". Prof. W. Jing completely supported and appreciated the research achievements and the development direction of CNERC. He also invited Prof. K.F. Chung to give a speech at the "One-Belt-One-Road" seminar in December, to introduce foreign steel structure design codes and their differences. It would help the Chinese construction companies to learn from Hong Kong's experiences while going abroad, such as laws, regulations, professional standards, engineering project examples, etc.



Dr.T.M. Chan, Dr. H.C. Ho, Prof. S.Q. Jiang, Prof. K.F. Chung, Prof. J.D. Chi, Prof. L.M. Wang, Mr.Y.K. Pang, and Ms.Y. Luan.



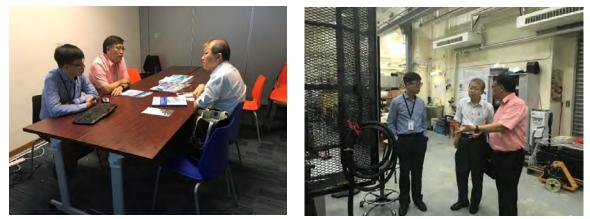
Dr. T.M. Chan, Prof. K.F. Chung, Prof. Y.H. Wu, Mr.Y.K. Pang, Dr. H.C. Ho.



#### A visit by Professor Eiki Yamaguchi, Kyushu Institute of Technology

CNERC was honored to have Prof. Eiki Yamaguchi of the Kyushu Institute of Technology visited the CNERC on 2 August 2017. Prof. Yamaguchi is the Vice President of the Kyushu Institute of Technology. He is famous for his research work in structural engineering, earthquake engineering and maintenance management engineering.

Prof. K. F. Chung introduced the background, establishment and positioning of the CNERC to Prof.Yamaguchi. Prof.Yamaguchi was interested in the publications of CNERC and he spoke highly of the contributions of the publications of CNERC to the constructional steel industry. Prof.Yamaguchi also gave some advice to the research students on their research work.



Prof. Yamaguchi had a meeting with Prof. K. F. Chung, and visited the Building Technology Laboratory.

#### A visit by Prof.Y.B.Yang, Distinguished Chair Professor of the Hong Kong Polytechnic University

CNERC was honoured to have Prof.Y. B.Yang of the National Taiwan University visited the CNERC on 10 August 2017. Prof.Yang was an international expert on Structural Engineering with special interests in steel construction and high-speed railway system. He is currently Distinguished Chair Professor of the National Taiwan University, and Distinguished Chair Professor of the Hong Kong Polytechnic University.

Prof. K. F. Chung introduced the background, establishment, positioning of the CNERC and the on-going research projects to Prof. Yang. Prof. Yang was very interested in these projects, in particular, atmospheric corrosivity of exposed structural steelwork under Work Theme A, effective high strength steel construction for sustainable infrastructure development under Work Theme B. Prof. Yang was also very impressed by our collaborative research work on structural behaviour of high strength steel welded sections, and he agreed that the research direction to robotic welding with computer vision is very important to steel construction.



Prof. K. F. Chung reported to Prof. Y. B. Yang on recent development of the CNERC, and Prof. Yang visited the Building Technology Laboratory.



#### Visit to China State Construction Engineering Corporation, Shenzhen, China

The visit was successful that the CNERC shared the current scientific research and engineering applications with the CSCEC so that the CSCEC understood the core mission and direction of the CNERC. At the same time, the CNERC know the strong professional team and numerous successful steel construction projects of the CSCEC, as well as the opportunities and challenges of the "one-belt-one-road" strategic development, and the latest development of green building and intelligent city. At the end, both parties reached a consensus on collaboration and set a number of collaborative agenda.

On 14 August 2017, the CNERC delegation team visited the Headquarter of CSCEC, and warmly welcomed by the CSCEC. The CNERC and the CSCEC had a technical exchange meeting, and reported the recent development and challenges of both parties. The following collaborative agenda was set on "one-belt-one-road" strategic development and internationalization of the CSCEC:

I. The CNERC and the CSCEC would jointly develop the online information platform to showcase the advanced engineering technologies of steel construction in Hong Kong and China's iconic steel infrastructures as reference for the engineers;

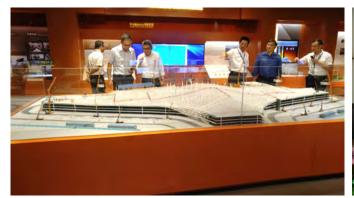
2. To conduct Technical Seminars on "Effective Design and Construction to Structural Eurocodes" as technical training to the CSCEC personnel;

3. To strengthen technical exchange between professionals of Hong Kong and Shenzhen, and provide technical training to technical personnel and undergraduate students.

After the technical exchange meeting, the CSCEC warmly welcomed the CNERC delegates by hosting a dinner banquet at the 38th floor of the headquarters building. During the dinner, both parties continued the vigorous discussion on the opportunities of "one-belt-one-road" initiatives. Also, the CNERC upcoming technical publications were introduced:

- The second edition of "Effective Design and Construction to Structural Eurocodes"
- "Hong Kong High-rise Residential Building Design and Construction Manual"

The CSCEC has established the first State Steel Museum. The Steel Museum is located in the Nanshan Houhai central district, adjacent to many of the world's top 500 corporate headquarters. The Steel Museum exhibits a brief history of the world's iron and steel metallurgical development, and explains in detail the development of the steel industry after the industrial revolution in the 19th Century. The museum focuses on the history and technology of steel exhibits, and displays physical exhibits, models, photos, texts and multimedia, etc.; combines collection, exhibition, research, education, and communication in one; and connects science, academic, interest, and participation together, so to let the visitors understand the development of the basement, and divided into 5 sections: prelude, steel structure history, steel structure technology, interactive area and 3D theater, which are open to the public and free of admission.



Mr. L.F. Zhang, Museum Curator briefed the CNERC delegates on the newly completed iconic projects of the CSCEC.



Meeting between the CNERC and the CSCEC.



### Visit of Research & Development Division, Construction Industry Council, Hong Kong

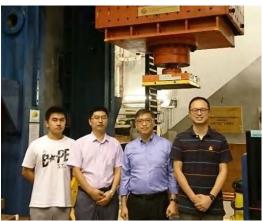
On 15 August 2017, CNERC received Dr. James Wong, Ir K. P. Lai, Mr. Terry K. W. Lam, and Dr. Andy Z. Li of Research & Development Division of the Construction Industry Council (CIC). It should be noted that CIC was a key industrial collaborator of CNERC, and one of its missions is to improve productivity of the local construction industry through innovation and application of modern construction technology. During the meeting, Prof. K. F. Chung reported recent developments as well as major research projects of CNERC. These include

- I. Effective use of high performance steel materials  $-Q690 \sim Q960$ ,
- 2. Structural characterization on heat affected zone of high strength steel welded sections, and
- 3. Robotic welding systems with computer vision and pattern recognition for high strength steels. CIC looked forward to receive updates from CNERC on further progresses on these projects.

Moreover, CIC commended on various technical publications of CNERC that they were able to facilitate engineering applications of modern steel construction technology. It was agreed that international practice on engineering design and management was very important to design and construction engineers in Hong Kong. Both CIC and CNERC would explore collaborations for synergy in the coming months.

### A visit by Dr. Weiyong Wang from Chongqing University

It was a pleasure of CNERC to receive Dr. Weiyong Wang of Chongqing University on 24 August 2017. Dr. Wang is currently an Associate Professor in the College of Civil Engineering, Chongqing University, and his research interests include fire structural engineering and steel and composite structures. Accompanied by Prof. K.F. Chung and Dr.T.M. Chan, Dr. Wang visited our robotic welding system in the Welding Laboratory, and the Structural Engineering Research Laboratory, PolyU.



Dr. Wang visited the Structural Engineering Research Laboratory, PolyU.

#### International Symposium on "Design of Steel & Composite Structures in accordance with Eurocodes"

The International Symposium on Design of Steel & Composite Structures in accordance with Eurocodes was organized by the University of Hong Kong on 25 August 2017, held in Cordis Hotel, Hong Kong, with over 120 delegates. The Symposium attracted experts, practitioners and scholars from China, Hong Kong, Malayasia, Macau and the United Kingdom to participate.

Prof. K.F. Chung and Dr. T.M. Chan were invited by Prof. Ben Young, the University of Hong Kong as keynote speakers. Prof. S. L. Chan was also invited to present in the event.



Dr. T.M. Chan, Prof. Dennis Lam, Prof. K.F. Chung and Prof. Ben Young.



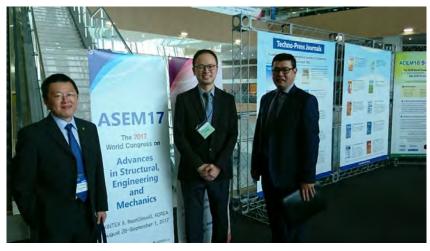
#### The 2017 World Congress on Advances in Structural Engineering and Mechanics (ASEM17)

The 2017 World Congress on Advances in Structural Engineering and Mechanics (ASEM17) was organized by the International Association of Structural Engineering & Mechanics (IASEM), Korea Advanced Institute of Science & Technology (KAIST), Korea Association of Computational Mechanics (KACM) and Korean Tunnelling and Underground Space Association (KTA) in association with Techno-Press Journals. This World Congress provided an excellent platform for experts, practitioners and scholars all over the world to share their latest research findings.

In this World Congress, Prof. Michael Yam was invited to organize and chair a special session -"Innovative applications in steel connections" while Dr. Tak-Ming Chan was invited to present a paper entitled "Design and performance of steel buildings in regions of low to moderate seismicity" in a special session – "Code developments in regions of low to moderate seismicity (II): Structural design of buildings" chaired by Prof. Han-Seon Lee and Prof Nelson Lam.



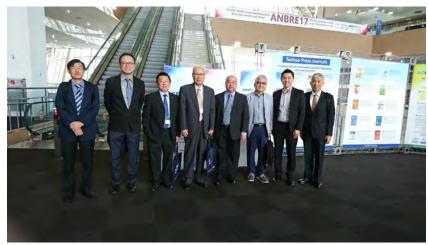
Prof. Michael Yam, Prof. Dennis Lam, Dr. Boksun Kim and Prof. Brian Uy.



Prof .Dennis Lam, Dr.T.M. Chan and Prof. Brian Uy.



Prof. Chang-Koon Choi (Congress Chair, KAIST) and Dr.T.M. Chan.



Mr Ek-Peng Lim, Dr.T.M. Chan, Prof. Dennis Lam, Prof. C.K. Choi, Prof. Nelson Lam, Prof. Han-Seon Lee, Dr. H.H Tsang and Prof. Keh-Chyuan Tsai.

# UPCOMING EVENT

CNERC is organizing various activities engaging the academic and industrial counterparts from time to time, and here are highlights of our upcoming events:

#### Technical Seminar on Effective Design and Construction to Structural Eurocode 3: BS EN 1993-1-1: Design of Steel Structures

Date: 29 September 2017 (Friday) Time: 9 a.m. – 5.15 p.m. Venue: Z414, PolyU

**Highlight:** The Eurocodes are a new set of European structural design codes for building and civil engineering works. Conceived and developed over the past 40 years with the combined expertise of the member states of the European Union, they are arguably the most advanced structural codes in the world. The Eurocodes are intended to be mandatory for European public works and likely to become the de-facto standard for the private sector – both in Europe and world-wide. The structural Eurocodes had been available as European pre-standards (ENVs) for several years, and all of them had been published as full European Standards (ENs) in 2007.

This Technical Seminar aims to promote effective design and construction to Structural Eurocodes with special emphasis on practical application, and the presentations are delivered by:

> Ir Prof. K. F. Chung The Hong Kong Polytechnic University Dr.T. M. Chan The Hong Kong Polytechnic University Dr. Paul H. F. Lam The City University of Hong Kong Ir Dr. Michael C. H.Yam The Hong Kong Polytechnic University

Owing to the withdrawal of various British structural design standards in March 2010, the Works Bureau of the Government of Hong Kong SAR has been migrating to Eurocodes in stages for the design of public works civil engineering structures while mandatory adoption of Eurocodes commences in 2015. Moreover, as many countries, in particular, Asian countries, have already adopted the structural Eurocodes for design and construction of building structures, there is a growing need for design and construction engineers in Hong Kong to acquire the new skills.

# **UPCOMING EVENT**

The CNERC International Symposium 2017 will be held on 24 November 2017 (Friday) at M1603, further details will be announced in due course.

# **Contact Us**

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