THE HONG KONG INSTITUTION OF ENGINEERS
香港工程師學會

STRUCTURAL DIVISION

ANNUAL REPORT 2019/2020

Contents

Committee Members 2019/2020

Ir Prof Ben YOUNG
Chairman
The Hong Kong Polytechnic University

Ir TSE Kam-leung
Immediate Past Chairman
Architectural Services Department

Ir LAM King-kong
Deputy Chairman
Housing Department

Ir CHAN Chi-kong
Hon Secretary
Arcadis

Ir Jenny LAU Ching-ling
Hon Treasurer
Architectural Services Department

Ir Kenneth CHAN Wai-yee
Committee Member
Highways Department

Ir Jacky CHIONG Kam-yueng
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Ir Dr Paul LAM Heung-fai
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Department of Architecture and Civil Engineering,
City University of Hong Kong

Ir CHIN Sai-ping
Committee Member
Aurecon Hong Kong Limited

Ir ALbert LEUNG Wing-keung
Committee Member

Ir Prof LO Sai-huen
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Department of Civil Engineering,
The University of Hong Kong

Ir Albert A Ray TAM
Committee Member
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Ir Kevin TANG
Committee Member
Greg Wong & Associates Ltd.

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The Technological and Higher Education Institute of Hong Kong

Ir Thomas WONG Kam-chuen
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YSK2 Engineering Co. Ltd.

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Architectural Services Department

Ir LIN Siu-mun
Committee Member
West Kowloon Cultural District Authority

Ir Ken NG Kin-shing
Ex-officio Member (Council Member (Division) and Discipline Representative)
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Ex-officio Member (AMC Representative)
AECOM Asia Company Limited

Ir Dr Joseph CHI Wuh-jian
Ex-officio Member (SSC Representative)

Ir Stanley LAI Ho-keung
Ex-officio Member (YMC Representative)

Ir Patrick HOU Man-wai
Co-opted Member
Gammon Construction Limited

Ir Tony CHOI Chi-keung
Co-opted Member
Ove Arup & Partners H.K. Ltd.

Ir LAU Chi-kin
Professional Assessment Committee Representative
Sun Hung Kai Properties Ltd.

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Observer

Ir Prof CHAN Chun-man
Observer
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The Hong Kong University of Science and Technology

Ir Ben TSE Wai-keung
Observer
BEN TSE & Associates Ltd.

Chairman's Report
Session 2019/2020

It is indeed my greatest honor to be the 41st Chairman of the HKIE Structural Division for Session 2019/20. Since becoming the Chairman, I have been most excited with the work of the Structural Division. It is a difficult time for all of us this year as we have encountered the outbreak of COVID-19. To follow the Government guidance, we have decided to cancel some of our events, such as the Annual Seminar, Structural Engineering Competition for Youth and Annual Visit in order to avoid mass gathering.

Thanks to the collective efforts of the Committee Members, the Division still has achieved another fruitful year, and I would like to briefly report at below.

Membership

As of April 2020, the Structural Division has a membership of 6,121 of which 301 are Fellow Members and 4,516 are Corporate Members.

Committee Major Activities

With the concerted effort of Committee Members, the Structural Division has organized approximately 10 activities in this session including:

- Technical meetings, seminars and site visits covering a wide range of topics
- Annual Dinner
- Structural Excellence Award

Major Events

Annual Dinner 2019 was successfully held on 1 November 2019 at JW Marriot Hotel Hong Kong, with a full house of over 450 members and guests. Ir Professor Jin-Guang TENG, the President of The Hong Kong Polytechnic University was the Guest of Honor of the event, sharing his insight on Structural Engineering Innovations with Emerging Materials.

Structural Excellence Award 2020 was conducted in April 2020. Entries are grouped into Project Award and Research & Development Award. This year we were pleased to have 20 project submissions and 5 research paper submissions selected for the finalist presentation. The Judging Panel, chaired by the Chairman of the HKIE Structural Division, consisted of President of the HKIE, directorate representatives from Architectural Services Department, Buildings Department, Housing Department and Highways Department of the HKSAR Government. This year we have invited 3 renowned professors from overseas as our reviewer. The award winners will be announced at the Division Annual General Meeting on 18 May 2020.

Continuous Professional Development

The Division has played an important role in the development of the codes of practice for structural design in Hong Kong, and has published explanatory handbooks for the benefit of the structural engineering profession. In October 2019, we had issued "An Explanatory Handbook to the Code of Practice for Foundations 2017". We will also soon issue a handbook for the Code of Practice for Structural Use of Steel to enhance the understanding on the design approach and application in second order analysis. We are also working on the updating of the Concrete Code Handbook and the Handbook to the Code of Practice for Structural Use of Glass 2018. We hope our members will find these handbooks helpful for their daily works and professional development as well.

We have organized various technical meetings, seminars and site visit to help support members on continuous professional development. In addition to those organized by our own, we collaborated with external institutions and bodies in conducting seminars, workshops and conferences for professional development. Through these activities we continue to build stronger links with external parties for promoting our profession.

Serving the Community

We have active participation in serving the community. Members are nominated to various Government committees and panels with an aim to render our professional advice to the Government in different aspects and at various stages of policy formulation, including the APSEC Discussion Forum of the Buildings Department, various standing technical committees on the drafting / review of local codes of practice of the Buildings Department, etc. Moreover, Committee Members play an important role as experts in the accreditation of university programmes, training schemes, and the assessment of application for registration as Registered Professional Engineer under the Engineers Registration Board.

The written examination of the HKIE Structural Examination was held on 29 November 2019 with 464 candidates. To help candidates prepare the examination, a seminar was held on 26 October 2019. The interview part will take place in June and July 2020. Candidates passing the HKIE Structural Examination and meeting the experience requirements will be eligible to become Corporate Member of the HKIE in the Structural Discipline.

Chairman's Report
Session 2019/2020

Appreciation

The Structural Division has now put in place various activities for parties ranging from practicing engineers, graduated engineers, university students to secondary school students. These are thanks to the collective efforts from past Chairpersons and Committee Members and, of course, to members' participation. I would like to take this opportunity to thank all Committee Members of this session for their invaluable supports to the Division in achieving another fruitful year.

The Structural Division will continue to promote the advancement of structural engineering and to facilitate exchange of professional knowledge for members. I look forward to your active participations and continued supports to the Division.

Ir Prof Ben YOUNG
Chairman of the HKIE Structural Division
Session 2019/2020

Discipline Matters

The HKIE Structural Examination

The HKIE Structural Examination consists of TWO parts: (a) written examination and (b) professional interview. Applicants passing both parts and meeting the experience requirements under the relevant routes to membership will be eligible to become Corporate Member of the HKIE in the Structural Discipline (subject to meeting other requirements in the HKIE Constitution). Passing the written examination is not a pre-requisite for taking the interview or vice versa.

The written examination of the HKIE Structural Examination 2019 was held on 29 November 2019 at the AsiaWorld-Expo. It consisted of two sections in the form of multiple-choice questions (one hour) and design questions (six hours). 464 candidates attended the written examination. Examination results will be announced in May 2020 and the professional interview will be held in June/July 2020.

Chairman of Examination Board

- Ir WONG Chi Ming

Chief Examiners of Design Questions

- Ir Prof CHAN Siu Lai
- Ir LEE Chi Chuen Alexis
- Ir LUK Win Kit Charles
- Ir TAM A Ray Albert
- Ir TANG Kevin

Chief Examiners of M.C. Questions

- Ir Prof CHAN Siu Lai
- Ir LAU Chi Kin
- Ir LAM King Kong
- Ir NG Kin Shing
- Ir NG Tim Yeung
- Ir OH Yuk Choi
- Ir Dr SU Kai Leung
- Ir TSE Kam Leung

Lastly, I would like to express my heartfelt thanks to the examination Board Chairman, Chief Examiners, Examination Markers and Interviewers and, in particular, the SD Committee, for the dedicated efforts throughout.

Ir Ken NG Kin-shing
Chairman of the HKIE Structural Discipline
24 April 2020

List of Marking Examiners

Ir Timothy John ALDEBURGH
Ir AU YEUNG Hoi Pang
Ir CHAN Chi Cheong
Ir CHAN Chi Kong
Ir CHAN Chi Ming Maverick
Ir Prof CHAN Chu Fai Edmond
Ir CHAN Chung Ming
Ir CHAN Ho Wai Winifred
Ir CHAN Kar Lock Eric
Ir CHAN Ngai Tung
Ir CHAN Sai Cheong Edward
Ir CHAN Siu Fai
Ir CHAN Wah Chi Eddie
Ir CHAN Wai Ching
Ir CHAN Wai Tong Tony
Ir Dr CHENG Hon Tung
Ir CHENG Koon Yuk
Ir CHEUNG Ching Ting
Ir CHEUNG Yiu Sun Wilson
Ir CHIANG Yu Ho Alex
Ir CHIK Wai Keung
Ir CHIU Chung Lai
Ir CHOI Chi Keung Tony
Ir CHOY Chun Chuen
Ir Prof CHOY Siu Chung Adam
Ir Dr CHU Chi Keung Paul
Ir CHU Wui Cheung
Ir CHUNG Kam Yin Robinson
Ir CHUNG Kwok Sang
Ir CHUNG Lung To
Ir David HUNG
Ir FAN Siu Kay
Ir Dr FOK Wing Huen
Ir FUNG Ho Wing
Ir FUNG Hoi Fai
Ir Nicholas James William HENRY
Ir HO Chung Leung Joseph
Ir HO Hoo Yin Danny
Ir HO Ka Kit Kenith
Ir HO Koon Ho
Ir HO Tak Hong Stephen
Ir HO Wai Kuen Adrian
Ir Dr HO Wai Ming Goman
Ir HOU Ting Fun Stephen
Ir HOWE Wing Chi David
Ir Dr HUI Ming Fong Lilian
Ir IP Kwong Fat Nandi
Ir IP Wai Leung
Ir KAN Shiu Kay Eric
Ir KONG Ming Paul
Ir KONG Shui Sun
Ir Dr KOON Chi Ming
Ir KU Kwai Yau
Ir KU Wai Ming
Ir KUO Tung Ming
Ir KWAN Kai Sing
Ir KWAN Kin Kei
Ir KWAN Po Jen Helen
Ir KWOK Chi Tak Philip
Ir KWOK Pang Hung
Ir KWONG Po Lam
Ir KWONG Shiu Kee Raymond
Ir KWONG Wing Kie
Ir LAI Ho Cheong
Ir LAI Hou Shun Otto
Ir LAI Wai Wah
Ir LAM Chun Yin Kevin
Ir LAM Ming Fai
Ir LAM Nga Yan
Ir LAM Pak Hung Jeremy
Ir LAM Ping Chuen Lysander
Ir LAM Tsz Fung
Ir LAM Wai Keung Kenny
Ir Dr LAU Chee Sing
Ir LAU Chi Keung
Ir Dr LAU Chi Keung
Ir LAU Chi Ming Albert
Ir LAU Chi Yau William
Ir LAU Kin Houng Henry
Ir LAU Man Ching Matthew
Ir Dr LAU Wing Hung Otto
Ir LAU Wing Yin
Ir LAW Yu Cheong
Ir Prof LEE Kai Kwong Peter
Ir LEE Kwok Keung Lucas
Ir LEE Mei Wai Teresa
Ir LEE Ping Kuen
Ir LEE Shih Ming
Ir LEE Shiu Ming
Ir LEE Wan Cheung
Ir LEE Wing Hong
Ir LEE Yat Sing Edwin
Ir LEE Yung Ling Christopher
Ir LEI Veng Kei
Ir LEUNG Chi Hung Ben
Ir LEUNG Chi Suen Francis
Ir LEUNG Chi Wing
Ir LEUNG Hung Kwong Derrick
Ir LEUNG Kin Fung Stephen
Ir LEUNG Kin Kwong
Ir LEUNG Pak Wai
Ir LEUNG Wai Bun
Ir LEUNG Wan Cheong
Ir LEUNG Wing Lok
Ir LEUNG Yu Wah
Ir LI Kwok Leung
Ir LI Ting Fan
Ir LIU Chi Kwun Albert
Ir LIU Sik Wing
Ir LIU Tai Chuen
Ir Dr LIU Yuk Shing
Ir LO Gon Fai Stephen
Ir LO Man Chiu Raymond
Ir LO Tak Fai
Ir LO Ting Kwong
Ir LOONG Chun Wah Bernard
Ir LUI Charn Kwan Pierre
Ir LUK Man Kit
Ir MAK Kwok Shing
Ir MAK Ming Fai
Ir MAK Tsz Yee
Ir Prof Neil Colin MICKLEBOROUGH
Ir MOK Chi Wah Martin
Ir MOK Hing Wah James
Ir NG Chun Chung James
Ir NG Pak Cheong
Ir NGAI Wai Bun
Ir NIP Ho Yin Frankie
Ir Peter TO
Ir SETO Cheuk Ming
Ir SHAM Sai Wah
Ir SO Kai Wing Claudius
Ir SO Kit Keung
Ir SO Wah Wai
Ir SO Yan Wing
Ir SONG Ngan
Ir SZE Wang Cho
Ir SZETO Suet Man Helen
Ir TAI Chi Ho
Ir TAI Chi Sing
Ir TAI Kwok Kuen
Ir TAM Hon Wing
Ir TAM Yun Lam Benson
Ir TANG Chi Ho Calvin
Ir TANG Lap Wing
Ir TANG Wai Ming Raymond
Ir TO Yui Kay
Ir TONG Fung Ming
Ir TSANG Chun Wing
Ir TSANG Ping Fai Kelvin
Ir TSANG Sau Chung Paul
Ir TSE Chun Kei Godvin
Ir TSE Pak Kin
Ir TSE Wai Keung
Ir TSE Wing Chung
Ir TSOI Wai Tong Martin
Ir WAI Sai Chong
Ir WAN Koon Piu
Ir WAN Yiu Lun
Ir WONG Bun
Ir WONG Che Ming Patrick
Ir WONG Chin To Louis
Ir WONG Him Sun
Ir WONG Hon Ping
Ir WONG Hon Wah
Ir WONG Kai Fat
Ir WONG Kin Kwok Simon
Ir WONG Kin Yan
Ir WONG Ko Yin
Ir WONG Kong Loi
Ir WONG Kwok Chuen Richard
Ir WONG Tim
Ir WONG Wai Hing
Ir WONG Wai Ki
Ir WONG Woon Ki
Ir WONG Yat Cheong
Ir WONG Yiu Wang Andes
Ir WOO Chun Kwok
Ir WU Chung Kei
Ir WU Fung Sing
Ir WU Kwok Wai
Ir WU Po Tak Alex
Ir WU Sai Him Hugh
Ir YAP Kin Yung
Ir YAU Hoi Ngan Alan
Ir YAU Yiu Fong
Ir YEUNG Chi Man
Ir YEUNG Fei Jenny
Ir YEUNG Yiu Wing
Ir YIP Wing Chung
Ir YUEN Chi Hung Maurice
Ir Dr YUEN Mui Rose
Ir ZHANG Shu

Event Highlights

HKIE, Structural Division Technical Meetings & Visits 2019 - 2020

Date	Details	Speaker	
16 September 2019	Technical Meeting on: **"Defect Detection using Acoustic-Laser Technique"**	Ir Dr Denvid Lau, City University of Hong Kong	
18 September 2019	Technical Meeting on: **"Technical Seminar on the effect of the cover depth on the cracking of concrete prisms with various arrangement and type of reinforcement bars"**	Dr Viktor Gribniak	
17 October 2019	Technical Meeting on: **"Ultrasonic Guided Waves for Non-destructive Evaluation of Structures"**	Dr Alex Ching-Tai NG, University of Adelaide	
24 October 2019	Technical Meeting on: **"From Thixotropy of Self-Consolidating Concrete to Smart Cast and 3D Printing"**	Dr Y. Qian, The University of Hong Kong	
7 January 2020	Technical Meeting on: **Tubular Structures**	Dr Tak Ming CHAN, The Hong Kong Polytechnic University	
18 January 2020	Technical Visit to **"West Kowloon Cultural Distrist"**	− Ir SM Lin, WKCDA − Ir Jimmy Wu & Jacky Zhong, AECOM − Ir Steven Jenkins, Lambeth	

Annual Dinner 2019

The Annual Dinner 2019 was successfully held on 1 November 2019 at the JW marriott hotel Hong Kong, drawing attendance of over 450 members and guests. The Annual Dinner 2019 is privileged to have Prof Jin-Guang TENG, the President of the Hong Kong Polytechnic University as the Guest of Hounour.

Other distinguished guests included Mr YU Tak-cheung, JP, Director of Buildings, Buildings Department, Mr Ricky LAU Chun-kit, JP, Director of Civil Engineering & Development, Civil Engineering and Development Department, Ms Winnie HO Wing-yin, JP, Deputy Director of Architectural Services, Architectural Services Department, Ms Connie YEUNG Kwong-yim, JP, Deputy Director of Housing (Development & Construction), Housing Department, Ir Dr HUI Ming-fong, Assistant Director/Existing Buildings 1, Buildings Department, Ir Dr Hon LO Wai-kwok, BBS, MH, JP, Legislative Councillor (FC), Mr Robert CHAN Cheuk-ming, JP, Principal Government Engineer, Highways Department and Ir Ringo YU Shek-man, President of HKIE.

Annual Dinner Organizing Committee 2019

Chairman
Ir LAM King-kong

Members
Ir Jacky CHIONG Kam-yeung
Ir Patrick HOU Man-wai
Ir LAU Chi-kin
Ir Ken NG Kin-shing
Ir Albert A Ray TAM
Ir Ben TSE Wai-keung
Ir Simon WONG Kin-kwok

Structural Excellence Award 2020

The Structural Excellence Award comes to over 20 years since 1998. It aims to promote excellence in structural engineering demonstrated through the design and construction of buildings and structures completed in the last two years.

There are two categories of entries, namely Projects and Research & Development (R&D). To follow the Government guidance of keeping social distance, Organizing Commitee has special arrangement this year. Jurors have given marks based on the submissions with no presentation required. On 11 April 2020, a virtual meeting has arranged for Jurors to have discussion and making final decision. Project Awards were decided with emphasis on Engineering Approach, Integration, Innovation / Creativity and Unusual Features, Buildability / Constructability / Safety, Energy Efficiency / Sustainability / Serviceability / Economy and Aesthetics. R&D Awards were selected to the importance to Engineering Application, Theoretical background, Innovation / Originality and Future Impact.

GRAND AWARD

Hong Kong Projects

- **The Public Rental Housing Development at Anderson Road Sites A and B**
  (Catergory: Residential)
- **One Hennessy**
  (Catergory: Non-Residential)
- **618 Shanghai Street**
  (Catergory: Heritage)
- **Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road**
  (Catergory: Infrastructures & Footbridges)

Mainland / Overseas Project

Raffles City Chongqing (RCCQ), China
(Catergory: Mainland / Overseas Project)

R&D Award

Nonlinear finite-element-analysis and design of steel-concrete composite ring (SCCR) joints

Members of the Judging Panel

Chairman
Ir Prof Ben YOUNG

Members
Ir TSE Kam-leung
Ir Humphrey HO Hon-kit
Ir Philip SHAM Sai-wah
Mr Jones LAI Kwok-chung
Ir Ringo S M YU

Overseas Reviewer
Prof HAN Lin-Hai
Prof Richard LIEW Jat-Yuen
Prof Daniel A NETHERCOT

Organizing Committee

Chairman
Ir LAM King-kong

Members
Ir TSE Kam-leung
Ir Prof CHAN Siu-lai
Ir LAU Chi-kin
Ir Ken Ng Kin-shing
Ir Ben TSE Wai-keung
Ir Jacky CHIONG Kam-yueng
Ir Prof LO Sai-huen
Ir Albert A Ray TAM

Structural Excellence Award 2020

GRAND AWARD

The Public Rental Housing Development at Anderson Road Sites A and B

Winner:
AECOM Asia Company Limited &
Yau Lee Construction Company Limited
Hong Kong Project - Residential

Client: Hong Kong Housing Authority
Structural Engineer: AECOM Asia Company Limited
Architect: Chau, Ku & Leung Architects & Engineers Ltd.
Main Contractor: Yau Lee Construction Company Limited
Precast Specialist: Yau Lee Wah Concrete Precast Products Co. Ltd.

Project Description

The Public Rental Housing Development at Anderson Road Sites A & B with a total gross floor area of approximately 338,000 square metres, comprises of 9 Residential Blocks (from 28 to 33 storey) providing over 7,200 units with landscaped gardens and recreation spaces.

Project Features

- Pioneer approach of Modular Integrated Construction (MiC) for Volumetric Precast Kitchen (VPK) and Volumetric Precast Bathroom (VPB)
- High coverage of Design for Manufacture and Assembly (DfMA) for all typical floor and external area
- Innovative 5D-BIM implementation in 2013
- Creation of a sustainable, energy-efficient Green Community

Structural Excellence Award 2020

GRAND AWARD

One Hennessy

Winner: **Arup**
Hong Kong Project – Non Residential

© Shot Around

© Shot Around

© Shot Around

Client: Bonny Ace Limited
Structural, geotechnical and façade engineer, and lighting consultant: Arup
Architect: DLN Architects Limited
Main Contractor: CR Construction Company Limited

Project Description

- One Hennessy is a “grade A” office building in Wan Chai with a total height of 149m, including a 30m height funnel shaped between its office tower and podium portion.
- This redevelopment transformed the old Asian House into a modern, slender office building and is granted Platinum in LEED Certification.

Project Features

- Reduction of bending stiffness at the funnel shaped structure creates challenges in controlling the natural frequency of building under wind load. Wind tunnel test is conducted for loading assessment.
- The funnel set-back provided additional green area footprint at podium. It also improved light penetration and air ventilation to pedestrian level.

Structural Excellence Award 2020

GRAND AWARD

618 Shanghai Street

Winner: **Ben Tse & Associates LTD**
Hong Kong Project - Heritage

Client: Urban Renewal Authority
Structural Engineer: Ben Tse & Associates LTD
Architect: Chau Lam Architects & Associates
Main Contractor: Wan Chung Construction Co., Ltd

Project Description

618 Shanghai Street is a conservation and revitalization project to preserve one of the few remaining shophouses clusters in urban area of Hong Kong. The ten blocks of pre-war shophouse at no.600-626 Shanghai Street are Grade II Historic Building in Antiquities Authority Grading.

Project Features

1.Retaining existing façade of the verandah of pre-war shophouses above the pavement along Shanghai Street while constructing new structure at the back to supporting it.
2.Retaining existing brick wall at no. 624-626 with the existing floor slab/beam be removed and construct the new structure on top-down approach.

Structural Excellence Award 2020

GRAND AWARD

Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road

Winner: **Arup**
Hong Kong Project - Infrastructures & Footbridges

© Arup

© Arup

© Dragages-China Harbour-VSL JV

Client: Highways Department, The Government of HKSAR
Structural Engineer: Arup
YWL Engineering Pte. Ltd.,
Mott MacDonald Hong Kong Ltd.,
Atkins China Ltd.
Main Contractor: Dragages-China Harbour-VSL Joint Venture;
China State Construction Engineering (Hong Kong) Ltd

Project Description

HKLR is a 12km long dual 3-lane expressway connecting HZMB Main Bridge at HKSAR boundary with Hong Kong Port, comprising a 9.4km viaduct section from HKSAR boundary to Scenic Hill on Airport Island, followed by a 1km long tunnel section to reclamation formed along east coast of Airport Island and a 1.6km long at-grade road section on reclamation connecting to Hong Kong Port.

Project Features

- Adopted 180m long span dual 3-lane viaducts across Airport Channel and Sha Lo Wan headland.
- Adopted drill & blast, mining, whole tunnel box jacking, and open cut & cover methods for the Scenic Hill Tunnel.
- Adopted non-dredged method for the seawall and reclamation for 23ha of new reclaimed land at Airport east coast.

GRAND AWARD

Raffles City Chongqing (RCCQ), China

Winner: **Arup**
Mainland / Overseas Projects

© CY Tang

© Arch Exist

© Arch Exist

Client: CapitaLand China
Structural Engineer: Arup
Architect: Safdie Architects
Main Contractor: China State Construction Engineering Corporation (CSCEC) 3rd/8rd Bureau

Project Description

Raffles City Chongqong is a mega-scale development located at the heart of Chongqing, facing the junction of Yangtze and Jialing River. With an overall gross floor area of 1,100,000m², it comprises a shopping mall and eight towers for residential, office, serviced residence and hotel use. It serves as an important transportation hub integrating bus terminal, subway station and ferry terminal.

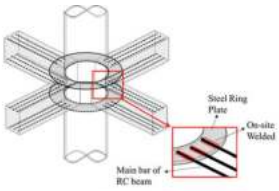
Project Features

- To address challenges brought by the two super slender buildings with slenderness ratio of 9.4, four mega columns schemes connecting with outrigger trusses and perimeter belt trusses was adopted to form an effective structural system and withstand high winds.
- Another feature is the Conservatory, a 300m-long glass-clad structure sitting astride four tall, slender and curved towers at a height of 250m above ground – a world's first.

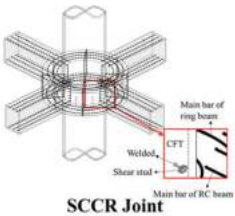
GRAND AWARD

Nonlinear finite-element-analysis and design of steel-concrete composite ring (SCCR) joints

R&D Award



SPCR Joint
The Conventional Type
(On-site welding is required.)



SCCR Joint
The New & Innovative Type
(Bar-fixing is required, eliminating on-site welding.)

Author(s): Liang Chen, Si-Wei Liu, Chi-Kin Lau and Siu-Lai Chan
Publication Date of Paper: October 2019
Published Journal(s): Journal of Constructional Steel Research

Project Description

Labor shortage in construction industry is an acute problem in Hong Kong to date. This leads to the need to raise the productivity in construction industry which can be achieved by using more efficient structural systems and forms. This research proposes a new form of composite joint of being high in construction efficiency that helps to alleviate the labor shortage problems.

Project Features

A new type of joint, i.e., steel-concrete-composite-ring (SCCR) joint, is proposed, which has been successfully used in several projects in Hong Kong. In the SCCR joint, the concrete pile and the reinforced concrete beams are connected by a reinforced concrete ring beam, eliminating the on-site welding.

COMMENDATION MERIT

Novum West

Winner:
C M Wong & Associates Ltd
Hong Kong Project - Residential

Client: Henderson Land Development Company Limited
Structural Engineer: C M Wong & Associates Ltd.
Architect: Ie, Siu & Chung Architects Limited
Main Contractor: China Overseas Building Construction Ltd

Project Description

Novum West at Queen's Road West is a comprehensive development next to HKU station. The building with 2-storey basement is surrounded by MTR tunnel, retaining walls, and a building on footings. Top-down construction method was adopted as an optimal engineering solution with considerations of public safety, construction speed and economy.

Project Features

Top-down construction with the adoption of a shoring system comprising permanent diaphragm walls, permanent R.C. structures, and steel stanchions for basement excavation helped minimize movements that would be created to the adjacent structures as compared to the traditional bottom-up method. Significant time saving in construction has also been achieved.

COMMENDATION MERIT

Peak Galleria

Winner:
AECOM Asia Company Limited
Hong Kong Project – Non-Residential

Client:	Hang Lung Properties Limited
Structural Engineer:	AECOM Asia Company Limited
Architect:	Aedas Ltd.
Main Contractor:	Hien Lee Engineering Co., Ltd.
Facade Contractor:	Pyrotech Engineering (Asia) Ltd.

Project Description

Peak Galleria, an iconic landmark in Hong Kong, is reopening after the completion of more than two-and-a-half-year redesign program. Reticular entrance glass structure “Gemstone” is supported by the existing RC structure. Second-order design analysis method was adopted to simulate the structural true behavior and achieve a safe and economical design.

Project Features

The design, fabrication and construction of the structure of Gemstone is extremely challenging, especially consider the 135 irregular joints in achieving the two-way curved 3D glass wall design. Innovatively applying the CNC cutting to shape all the 3D steel joints had successfully simplified the fabrication process and site installation.

COMMENDATION MERIT

Renovation Works for the West Wing of the Former Central Government Offices for Office Use by the Department of Justice and Law-related Organisations

Winner:
AECOM Asia Company Limited
Hong Kong Project - Heritage

Client: Department of Justice, the Government of the HKSAR
Structural Engineer: AECOM Asia Company Limited
Architect: Ronald Lu & Partners (Hong Kong) Limited
Main Contractor: Techoy Construction Company Limited

Project Description

The existing Former Central Government Offices, West Wing (constructed in the 1950's) is a Grade 1 historical building under the Antiquities and Monuments Ordinance. The project revitalized the West Wing into a modern office building to suit the unique needs of the Department of Justice and Law-Related Organization.

Project Features

- Existing Heritage Elements, i.e. timber staircase handrail, metal window frame and granite stone cladding were preserved. Structural Performance Tests were performed to demonstrate the integrity of the preserved elements.
- With low floor to ceiling height, bespoke strengtening works were adopted to accommodate additional loadings from heavy filling/storage systems.

COMMENDATION MERIT

The Hong Kong Jockey Club University of Chicago Academic Complex – The University of Chicago Francis and Rose Yuen Campus in Hong Kong

Winner:
Arup
Hong Kong Project - Heritage

© Revery Architecture Inc

© Revery Architecture Inc

© Ema Peter / Revery Architecture Inc

Client:	The University of Chicago
Structural Engineer:	Arup
Architect:	Revery Architecture Inc.
Main Contractor:	Paul Y. Builders Limited

Project Description

Situated on the historic site of Mount Davis, this iconic campus represents the intersection of heritage conservation and revitalization in Hong Kong; elegantly combining modern functionality with the preservation of and respect for the site's rich history, and featuring adaptive reuse of the heritage buildings in harmony with new construction.

Project Features

- Recast, strengthened concrete and underpinning works to preserve heritage features.
- Transparent anti-carbonation coating protecting against further concrete carbonation.
- New steelwork academic building whose longest beam spans up to 22m. Main building is supported by tall and slender columns of max. 17m in height and 600mm diameter, sitting on upgraded slope.

COMMENDATION MERIT

Avenue of Stars

Winner:
C M Wong & Associates Ltd.
Hong Kong Project – Infrastructures & Footbridges

Client:	New World Development Company Ltd.
Structural Engineer:	C M Wong & Associates Ltd.
Architect:	Ronald Lu & Partners (Hong Kong) Ltd.
Main Contractor:	New World Construction Company Limited

Project Description

The Avenue of Stars (星光大道) is the eastern node of a tourist attraction on the Tsim Sha Tsui waterfront for years. To upgrade the site, a revitalization project was commenced in which a new deck was constructed with re-use of existing foundation together with large span steel trellis and wave shape cladding.

Project Features

Project features of the revitalization project include the re-use of existing piles under verification of the structural integrity and chemical compositions by relevant tests; steel collar as main connection between existing piles and new crosshead; and semi precast crosshead and deck to minimize the cast-insitu work under marine conditions.

COMMENDATION MERIT

Central – Wan Chai Bypass – Tunnel (Slip Road 8 Section)

Winner:
China State Construction Engineering (Hong Kong) Limited
Hong Kong Project - Infrastructures & Footbridges

Client: Highways Department
Consultant: AECOM Asia Company Limited
Temporary Works Designer: Atkins
Main Contractor: China State Construction Engineering (Hong Kong) Limited

Project Description

Central-Wan Chai Bypass and Island Eastern Corridor Link (CWB) is one of the major infrastructure projects in Hong Kong. The project was the construction of a 4.5km dual 3-lane strategic road with 3.7km tunnel section connecting Central and Island Eastern Corridor in North Point along the northern shore of Hong Kong Island.

Project Features

The Slip Road 8 Section was constructed by the China State Construction Engineering (Hong Kong) Limited commenced in 2013, involving temporary reclamation and cut-and-cover tunnel construction at the existing Causeway Bay Typhoon Shelter. The excavation works were challenging, with over 30m depth below sea level and the cofferdam size of 250m X 50m, in which due consideration was taken for stability and safety of the excavation method. Another phase of the project highlight was the massive concrete cutting at the cut-off of diaphragm walls underwater, which was a breakthrough innovation in the construction industry in Hong Kong.

COMMENDATION MERIT

MGM Cotai Hotel Development - MGM COTAI

Winner:
SYW & Associates Ltd.
Mainland & Overseas Project

MGM Cotai

MGM Cotai Spectacle and Spectacle Roof

Guiness World Record

Client: MGM Grand Paradise S.A.
Structural Engineer: SYW & Associates Ltd.
Architect: Wong Tung & Partners Ltd.
Main Contractor: China State (Hong Kong) and China Construction (Macau) Joint Venture

Project Description and Features:

MGM COTAI, the latest addition to the MGM portfolio in China, is a US$3.4 billion “integrated” resort which redefines the way people experience art and entertainment through new technology. The ‘Spectacle Roof’ (approximately 140m x 70m) of MGM Cotai has achieved a GUINNESS WORLD RECORDS title on January 19, 2019, making it the first structural GUINNESS WORLD RECORDS title for Macau, China. MGM COTAI covers an area of 71,833m2, and has a gross floor area 446,290m2. The resort podium contains a three-level basement, a five-level casino, retail, function rooms, multiple ballrooms, the MGM Cotai Spectacle along with Spectacle Roof and the MGM Theatre. Situated above the podium is the MGM Cotai VIP Mansion and two separate 159m high hotel towers area comprised of three tiers each bringing to life a vibrant representation of “jewelry boxes”.

COMMENDATION MERIT

Spring City 66

Winner:
AECOM Asia Company Limited
Mainland/ Overseas Project

Client: Hang Lung Properties Limited
Structural Engineer: AECOM Asia Company Limited
Architect: Kohn Pedersen Fox Associates (Design)
WT Partnership (Administrative)
Main Contractor: China Construction Eighth Engineering Division. Corp. LTD (Mall)
Shanghai Construction Group (Office Tower)

Project Description

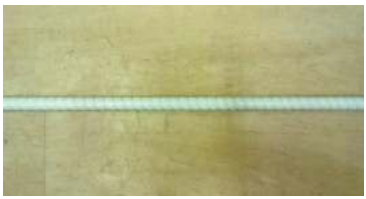
Located in the Grade-8 seismic intensity city of Kunming, Spring City 66 is a major complex development of about 432,000m^2 floor area above ground and 4-level basement. The mixed-use complex consists a 349m tall office tower, a 245m service apartment, a 5-star international hotel tower and a 6-storey luxury podium mall.

Project Features

The 349m Office Tower is the highest building in Kunming. Outriggers floors have been designated in three levels to maximize efficiency. To accommodate the unique architectural design of the podium mall, a new type of shear-yield metal damper and energy-dissipation shear wall system have been developed and applied.

COMMENDATION MERIT

Deformation Analysis of Fibre-Reinforced Polymer Reinforced Concrete Beams by Tension-Stiffening Approach



Author(s): P.L. NG, J.A.O. BARROS, G. KAKLAUSKAS, J.Y.K. LAM
Publication Date of Paper: 6 November 2019
Published Journal(s): Composite Structures, Volume 234

Aims of the research / Paper abstract:

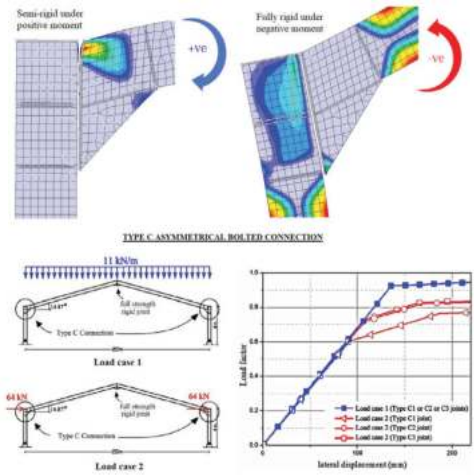
Fibre-reinforced polymer (FRP) is free from corrosion problem and is a viable alternative reinforcement material for concrete structures in lieu of steel reinforcing bars. This study addresses the deformation analysis of FRP reinforced concrete (FRP-RC) flexural members with thorough consideration of the tension-stiffening phenomenon in post-cracking state.

Brief on unusual features:

Aiming for serviceability assessment of FRP-RC beams in structural engineering practice to circumvent sophisticated theoretical models and constitutive models, parametrized tensile stress block is derived based on tension stress fields computed from nonlinear finite element analysis, and is proposed for use in member analysis for prediction of deflections.

COMMENDATION MERIT

Direct analysis of steel frames with asymmetrical semi-rigid joints



Author(s): LO Sai Huen, ChanLok Yan
Publication Date of Paper: 10 April 2019
Published Journal(s): Steel and Composite Structures

Aims of the research / Paper abstract:

With the advancement of Direct Analysis for asymmetrical semi-rigid connections, the adaptability of bolt connections for a wider range of steel structures with traditionally asymmetrical connections can be greatly improved, thus achieving greater reduction in on-site welding and allowing for greater construction speed and better safety on-site for traditional modular steel structures.

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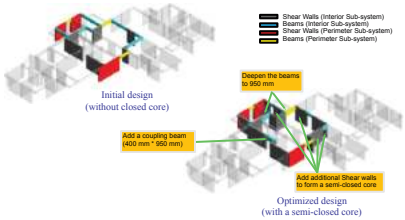
Brief on unusual features:

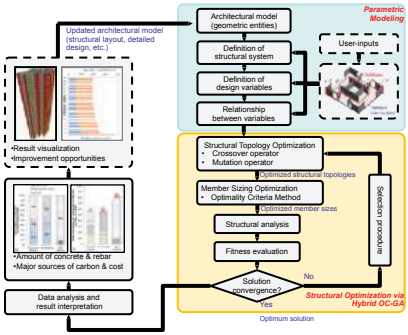
A unique modular solution presented by this research was implemented to three traditional hoarding works in Hong Kong since 2016. The simplification in connection fabrication details using this unique approach in connection design entails the combined use of Finite element modelling technique for a more accurate behaviour of semi-rigid joints in the Direct Analysis of the applied steel structure.

COMMENDATION MERIT

Parametric Modelling and Evolutionary Optimization for Cost-optimal and Low-carbon Design of High-rise Reinforced Concrete Buildings



Creation of a semi-closed core for reducing the torsional response and lateral displacement



Framework for parametric design-based structural optimization

Author(s): Vincent J.L. Gan, C.L. Wong, K.T. Tse, Jack C.P. Cheng, Irene M.C. Lo, C.M. Chan

Publication Date of Paper: 2 July 2019

Published Journal(s): Advanced Engineering Informatics

Aims of the research / Paper abstract:

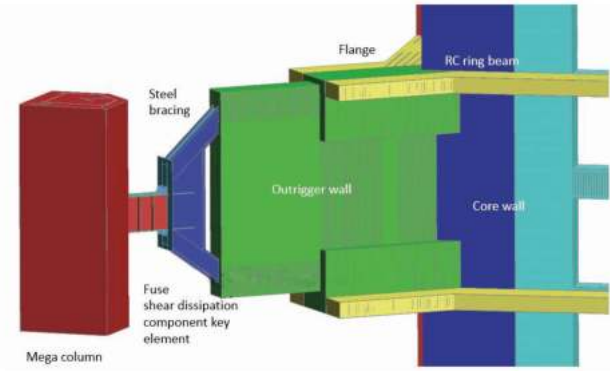
This research aims to develop a novel optimization approach for cost-optimal and low-carbon design of high-rise reinforced concrete structures, considering both the structural topology and individual element optimizations. Parametric modelling is applied to define the relationship between individual structural members and the behavior of the entire building structure. A novel evolutionary optimization technique using the genetic algorithm is proposed to optimize concrete building structures, by first establishing the optimal structural topology and then optimizing individual members. In an illustrative example, a high-rise reinforced concrete building is used to examine the proposed optimization approach, which can systematically explore alternative structural designs and identify the optimal solution. It is shown that the carbon emissions and material cost are both reduced by 18-24% after performing optimization.

Brief on unusual features:

The proposed method utilizes the stochastic genetic algorithm (GA) and the gradient-based optimality criteria (OC) method to enhance the design optimization of tall reinforced concrete structures. Given a building model, parametric modelling is first applied to parameterize the structural system and to identify the relationship between different structural members. The hybrid OC-GA method is then developed to optimize a building's structure, by first exploring the optimal structural topology and then determining the distribution of elements sizes. The overall optimization objective is to minimize the amount of embodied carbon and material cost, subject to a series of code-stipulated lateral drift and strength constraints. The proposed method enhances the optimality and efficiency in optimizing tall reinforced concrete buildings, which contributes to the existing body of knowledge for building design optimization. The findings also serve as a basis for more environmentally sustainable and cost efficient design of high-rise buildings.

COMMENDATION MERIT

Shaking Hands at High Level - Chongqing Raffles City



Author(s): Michael Kwok, Goman Ho, Penny Cheung and Li-Guang Zhu
Publication Date of Paper: 30 August 2018/ December 2015
Published Journal(s): Proceeding in Our World in Concrete & Structures

Aims of the research / Paper abstract:

- Conventional outrigger systems were designed either with steel truss or as concrete wall. Concrete is stiff but brittle in nature and therefore not good for seismic actions. Steel is ductile but less stiff than concrete and relatively high cost.
- The hybrid outrigger system is therefore an optimal solution for a safe but cost-effective solution for tall buildings especially those located in low to moderate seismicity areas.

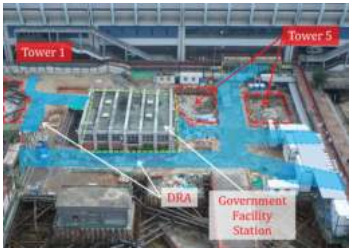
Brief on unusual features:

- It combines strengths of steel and stiffness of concrete, resulting in a hybrid form using concrete walls and steel bracings.
- The system also comes with a structural “fuse” will behave as rigid under ultimate limited state of wind action. In case of severe seismic shaking, this “fuse” component will yield and dissipate energy to protect the building.

FINALIST

SOL CITY

Winner:
Meinhardt (C&S) Ltd
Hong Kong Project - Residential



Client:	Loi Fu Investment Company Limited (ChinaChem Group)
Structural Engineer:	Meinhardt (C&S) Ltd
Architect:	Andrew Lee King Fun & Associates Architects Ltd
Main Contractor:	China Overseas Bldg. Construction Ltd

Project Description

The residential development includes three 26-storey towers, one 16-storey tower, 2-storey podium, and 1-storey basement serving as car park, provision of a footing bridge connecting to the MTR station. The site is of area about 8,398 m^2 on plan, located within the MTR protection zone (Scheduled Area no. 3) and Marble Zone (Scheduled area no. 2), with the existing DSD facility station in the central site portion, and adjacent sensitive receivers such as kindergarten, school, and church.

Project Features

Unusual and innovative structural engineering solutions are deployed to overcome challenges on site constraints: over 30m span deck over existing DSD facility station; foundation work at marble zone and DRA.

FINALIST

Hong Kong Science Park Expansion Stage 1

Winner:
Meinhardt (C&S) Ltd
Hong Kong Project – Non-Residential

Client:	Hong Kong Science and Technology Parks Corporation
Structural Engineer:	Meinhardt (C&S) Ltd
Architect:	Wong Tung & Partners Limited
Main Contractor:	Hip Hing Joint Venture

Project Description

The expansion of Science Park Expansion Stage 1 (SPX1) consists of 2 towers (17W & 19W) with various functions in R&D, laboratories, spaces offices & retail facilities. SPX1 is a pioneering project in Hong Kong that aims to showcase the “Smart” concept through sustainable architecture with structural provision and smart grid technology.

Project Features

Various assessments and structural provisional studies were used to reduce building energy usage and maximize the use of natural resources and minimize external impacts. Engineering approach, creativity, economy and serviceability were adopted in the superstructure design of SPX1 and innovation & unusual features were adopted in the footbridges foundation design.

FINALIST

K11 ATELIER King's Road

Winner:
C M Wong & Associatees Ltd.
Hong Kong Project – Non-Residential

Client:	New World Development Company Ltd.
Structural Engineer:	C M Wong & Associatees Ltd.
Architect:	P&T Architects and Engineers Ltd
Main Contractor:	New World Construction Company Limited

Project Description

K11 ATELIER King's Road is an office redevelopment project at North Point with site area around 3019m^2 and GFA around 45,290m^2 providing 25 storeys of Grade-A office units, an exhibition hall, retail and F&B spaces at the podium level, together with a 3 storeys basement carpark. The building height is approximately 125m.

Project Features

Project feature includes the use of composite column & composite wall to reduce the structural size and allows grand view at the main entrance; composite transfer beam to maximize headroom above the exhibition hall; flat slab to maximize headroom of the typical office floor; and 3 storeys of basement founded on footing foundation.

FINALIST

Water Supplies Department Tin Shui Wai Building

Winner:
Chun Wo Construction & Engineering Co., LTD
Hong Kong Project – Non-Residential

Client:	Water Supplies Department
Structural Engineer:	Mott MacDonald Hong Kong Limited
Architect:	Leigh & Orange Architects
Main Contractor:	Chun Wo Construction & Engineering Co., LTD

Project Description

The Water Supplies Department Tin Shui Wai Building provides an integrated, sustainable and universally accessible government offices with an education centre that facilitates public usage. The major elements of the building include offices, exhibition halls, lecture rooms, grey water treatment & rainwater harvesting system, car-parking area, storage facilities, etc.

Project Features

The design of this building was blended with a series of unusual and innovative features and a strong sight of buildability and sustainability. Key components include efficient layout, cost effective and good green building design, plastic concrete formworks, internal and external water recycling, use of BIM and point cloud during the design and construction stages, etc, making the project a wonderful success.

FINALIST

West Kowloon Government Offices

Winner:
Hip Hing Joint Venture
Hong Kong Project – Non-Residential

Client:	Government Property Agency, HKSAR Government
Structural Engineer:	Siu Yin Wai & Associates Limited
Architect:	Andrew Lee King Fun & Associates Architects Limited
Main Contractor:	Hip Hing Joint Venture

Project Description

West Kowloon Government Offices (WKGO) is located in Yau Ma Tei on a site area of 10,000m^2, covering two towers of 15 and 17 storey. The buildings host eight government departments from Buildings Department to Transport Department, with construction running from 2015 to 2019.

Project Features

WKGO has adopted the 3 "S" concept (Standardization, Simplification and Single Integrated Element) in structural design to enhance construction productivity. With the adoption of semi-precast slabs, aluminium formwork system, 4D BIM, 3D laser scanning and drones monitoring has highly promoted the safety, sustainability, innovation and creativity.

FINALIST

West Kowloon Reclamation – main works (remainder) – footbridge at the junction of Sham Mong Road and Tonkin Street West in Sham Shui Po

Winner:
Mott MacDonald Hong Kong Limited
Hong Kong Project – Infrastructures & Footbridges


Aerial Photo of Footbridge


View at Deck Level


Special LED Strip Lighting at Crosshead

Client:	South Development Office, Civil Engineering and Development Department
Structural Engineer:	Mott MacDonald Hong Kong Limited
Main Contractor:	Wang Kee Construction Company Limited

Project Description

This is a four-span steel footbridge system of total span length of 235m with skylight roofs to allow appropriate extent of sun shading and natural lighting through the roof (see attached aerial photo). The footbridge equipped with six lifts, four covered escalators, two covered staircases and direct connections to the adjacent developments, the property development above MTR Nam Cheong Station and the future Hoi Tat Estate.

Project Features

The main spans of the footbridge system are in the form of warren trusses comprise galvanised steel circular hollow sections painted in light bronze colour, together with the light green skylight roofs and light brown glass balustrades, the footbridge system nicely blend-in with the surrounding environment (see attached deck photo). LED lights are adopted along the bridge spans, while special circular LED strip lights have been installed at the crossheads (see attached crosshead photo) to reduce carbon emission and achieve environmental friendliness.

FINALIST

Wuxi Hang Lung Center 66 - Phase 1 Office Tower 2

Winner:
Meinhardt (C&S) Ltd
Mainland & Overseas Project

Client:	Hang Lung Properties Limited
Structural Engineer:	Meinhardt(C&S) Ltd
Architect:	LWK & Partners (HK) Ltd.
Main Contractor:	CSCEC China Construction First Group & Development Co. Ltd.

Project Description

The project consists of two rectangular volumes with echo to office tower 1 with a curve lines on main façade. The building comprises of 21 numbers of Grade A office floors above a 6-level of existing podium including a new 4-level Cinema from 3F to 6F, and linked directly to the existing mall.

Project Features

The positions of columns were revised to suit the new layout. To accommodate the existing structure in podium, 5 floors of slanted columns in lower portion of Tower change in gradient controlled in between 1:7.3 to 1:22 with special connection details for the existing columns to ensure anticipated building performance.

Best Reporter Awards 2020

Best Reporter Awards were introduced in November 2005 to encourage participation in the events organized by the Structural Division; to promote interests in the respective themes of the events; and to promote report writing skills among members.

Date	Winner	Report Title
24 October 2019	Mr POON Wai Yin	Technical Seminar – From Thixotropy of self-consolidating concrete to SmartCast and 3D Printing

Best Student Awards 2019

This awards is sponsored by structural engineering firms in Hong Kong for commendation of universities undergraduates who have demonstrated excellent overall academic results and high level of competence in structural engineering.

Sponsor	University	Awardee
Wong Pak Lam & Associates Consulting Engineers & Architects Ltd.	City University of Hong Kong	Mr LI Chao-ran
GYU Limited	The Hong Kong University of Science and Technology	Mr Bernadino
C M Wong & Associates Ltd.	The University of Hong Kong	Mr MAK Tsun-hang
T.K. Tsiu & Associates Ltd.	The Hong Kong Polytechnic University	Mr LI Kin-ming

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Session		Name of Chairman
1st	79/80	Ir TSUI Tack-kong
2nd	80/81	Ir Prof Fred NG Sai-ho
3rd	81/82	Ir Dr Raymond HO Chung-tai
4th	82/83	Ir Andrew NGAI Bick-yau
5th	83/84	Ir David George HOLMES
6th	84/85	Ir Brian POON Hon-yin
7th	85/86	Ir David CHAN Wing-keung
8th	86/87	Ir Barry John STUBBINGS
9th	87/88	Ir Dr LAW Kwok-sang
10th	88/89	Ir Patrick YIM Chun-nam
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12th	90/91	Ir Bruce Malcolm FOX
13th	91/92	Ir TSE Pak-kin
14th	92/93	Ir Ricky SO Yau-chi
15th	93/94	Ir Hugh WU Sai-him
16th	94/95	Ir Ignatuis LAU Yik-sum
17th	95/96	Ir WONG Chi-ming
18th	96/97	Ir CHEUNG Kwok-ming
19th	97/98	Ir Prof KO Jan-ming
20th	98/99	Ir Prof James LAU Chi-wang
21st	99/00	Ir Kenneth Lau Kwong-hon
22nd	00/01	Ir Prof Reuben CHU Pui-kwan
23rd	01/02	Ir Prof Paul PANG Tat-choi
24th	02/03	Ir Johnny FAN Siu-kay
25th	03/04	Ir Helen KWAN Po-jen
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27th	05/06	Ir Prof CHOY Kin-kuen
28th	06/07	Ir CHENG Yan-kee
29th	07/08	Ir KWAN Kin-kei
30th	*08/09*	Ir CHAN Siu-tack
31st	09/10	Ir LAU Chi-kin
32nd	10/11	Ir Dr KOON Chi-ming
33rd	11/12	Ir Dr Eddie LAM Siu-shu
34th	12/13	Ir Gabriel YU Lin-keung
35th	13/14	Ir Prof CHAN Siu-lai
36th	14/15	Ir Martin TSOI Wai-tong
37th	15/16	Ir Ken NG Kin-shing
38th	16/17	Ir LEUNG Kwok-tung
39th	17/18	Ir Edward CHAN Sai-cheong
40th	18/19	Ir TSE Kam-leung
41st	19/20	Ir Prof Ben YOUNG