Climate-resilient ground infrastructure
Departmental Events

Scholarship Presentation Ceremony

The Scholarship Presentation Ceremony for 2017-18 was held on April 16, 2018 in Convocation Room, HKU and the event was attended by recipients, donors and teaching staff. There were a total of 23 recipients including BEng and MSc(Eng) students. The Guest of Honour, Ir Lam Sai Hung, Director of Civil Engineering and Development, delivered a speech and presented souvenirs to sponsors thanking them for their generosity in offering contributions to the cause of academic excellence. It was a chance not only for the students to thank their donors personally, but also for them to interact and exchange with prominent engineers from the industry.

Modular Integrated Construction Technical Training Course

The Centre for Innovation in Construction and Infrastructure Development organized a one-day Modular Integrated Construction (MiC) Technical Training Course at The University of Hong Kong on April 25, 2018.

HKU Civil Centennial Future Scholar Scheme

Fourteen students from top universities in mainland China visited our Department from July 13 - 31, 2018 under the HKU Civil Centennial Future Scholar Scheme. The Scheme was established to invite high caliber students who are interested in joining our Department as research postgraduate students to visit and conduct research for a period of 2-3 weeks. During the visit, seminars, discussion sessions and other activities were organized for these students, which allowed them to get to know our learning environment and their potential supervisors and future research work.

Informal gathering for MSc students

An informal gathering was organised for all MSc(Eng) students including the current students and the graduates of the Department on March 1, 2018 from 5:30 to 7:00 p.m. Around 13 students and teachers joined the event. It was a good opportunity for our students to meet their teachers and discuss matters of interest or concern in an informal setting.

Staff Activities/News

Activities

Dr. W. Pan

Professor B. Young delivered a keynote speech on “Development, Feasibility and Recommendation of MiC for Hong Kong” at the Modular Integrated Construction (MiC) International Conference at Hong Kong on April 24, 2018.

Professor B. Young delivered a keynote speech on “Post-fire mechanical properties of high strength steels” at the 12th International Conference on Advances in Steel-Concrete Composite Structures (ASCCS 2018), which was held during June 27-29, 2018, Valencia, Spain. The international conference was organised by Universitat Politècnica de València, Spain. The conference was well attended by more than 120 participants coming from 25 countries.

Professor B. Young delivered an invited Plenary Speech entitled “Enhancing Construction Productivity and Quality Through Innovation” at the AISA Quality Management Symposium 2018 organised by the International Six Sigma Council (ISSC) at Hong Kong on May 10, 2018.

Professor B. Young delivered a keynote speech on “Additive manufactured high strength steel tubular sections” at the Eighth International Conference on Thin-Walled Structures delivered an invited speech entitled “Development, Feasibility and Recommendation of MiC for Hong Kong” at the Modular Integrated Construction (MiC) International Conference at Hong Kong on April 24, 2018.

Dr. J. Yang and his Ph.D. students visited Technical University of Berlin during August 18-22, 2018 under the RGC’s Germany-Hong Kong Joint Research Scheme. The joint project aims at developing a better understanding of the behavior of monopile foundations for offshore wind turbines.

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(ICTWS 2018) held in Lisbon, Portugal from July 24-27, 2018. The conference was well attended by 187 delegates from 29 countries spanning the five continents. The conference program included 5 keynote and over 180 technical papers.

### News

**Dr. C.P. Wong**
- was appointed as a Member of Committee on Taxi Service Quality, The Government of HKSAR, for three years with effect from January 9, 2018.
- was elected as a Committee Member of the Chartered Institution of Highways and Transportation (Hong Kong Branch) for the term 2018-2019.

**Professor S.C. Wong**
- was reappointed as Vice Chairman of the Town Planning Board, The Government of HKSAR, for two years with effect from April 1, 2018.
- was reappointed as a member of the Advisory Committee on Post-service Employment of Civil Servants, The Government of HKSAR, for two years with effect from September 1, 2018.
- was appointed as a member of the Support Group on Long-term Decarbonisation Strategy, Council for Sustainable Development, The Government of HKSAR.
- was elected as a committee member of the Chartered Institution of Highways and Transportation (Hong Kong Branch) for the term 2018-2019.

**Professor B. Young**
- was elected as a member of the Logistics and Transportation Division Committee of the Hong Kong Institute of Engineers for the term 2018-2019.
- was reappointed as Associate Dean (Development and External Relations) of the Faculty of Engineering for three years with effect from June 1, 2018.
- was appointed as Warden of the Hornell Hall for three years with effect from April 1, 2018.

### HKU Excellence Awards

Congratulations to Professor B. Young for the Outstanding Researcher Award and Professor T. Zhang for the Outstanding Research Student Supervisor Award. The Presentation Ceremony was held on March 26, 2018 at the Rayson Huang Theatre.

**Long Service Award**

Ms. Fung Ying Lin, Senior Technical Officer, received the HKU Long Service Award at the Presentation Ceremony held in Loke Yew Hall on June 12, 2018. Ms. Fung has served the University for 15 years.
Research Highlights

Climate-resilient ground infrastructure (Dr. Sérgio Lourenço)

The ongoing and predicted changes of weather patterns in different regions of the globe towards drier or wetter seasons including more frequent weather extremes require adaptability from ground infrastructure. To minimize the risk of landslides, swell-shrink, erosion and long-term degradation, solutions to actively control wetting and drying in the ground are needed. Synthetic water repellent granular materials have been tested for water harvesting and proposed as landfill and slope covers. By adjusting the magnitude of water repellency, they offer the unique advantage of controlling water infiltration and allow their deployment as semi-permeable or impermeable barriers. Other advantages include (1) volumetric stability (comparing to clays which swell-shrink), (2) high air permeability and low water permeability (preventing the built-up of air pressure while allowing condensation from water vapour), (3) suitability for flexible applications i.e. the water-tight behaviour is not lost if the material deforms, (4) improved adhesion aggregate-bitumen in pavements (depending on the type of coatings). Application areas include hydraulic barriers (e.g. for engineered slopes and waste containment), pavements and other waterproofing systems.

Water repellency can be achieved through chemical treatments whereby particles are coated with waxes, oils or silicone films, and it is particularly powerful at sub-millimetric scales, when the interfacial forces (air-solid-water) dominate gravity. To date, our research has been aimed at (1) identifying the chemical compounds that develop high and stable water repellency, (2) assessing the durability of the water repellent coatings in granular materials, (3) determining the hydraulic and mechanical behaviour of these new coated materials and, (4) demonstrating their use as slope covers including other applications. This has been established through a series of research grants funded by the Engineering and Physical Sciences Council (United Kingdom) (EP/K007904/1, EP/I008756/1) and the Research Grants Council (Hong Kong) (17203417, 17205915, 17200114) since 2012, involving colleagues from several overseas academic institutions (Swansea, Cardiff, Northumbria, University College London and Leibniz University Hannover) and industry partners (AECOM and Ove Arup).

Key results to date have revealed that, (1) silanes such as dichlorodimethylsilane, octadecyltrichlorosilane and trimethylchlorosilane induce high and stable water repellency in silica sand; the presence of residual water, organic matter and other non-mineral matter strongly constrains and delays the development of water repellency. (2) Water repellency can be enhanced by physical means; particles with finer sizes and angular shapes offer a higher level of water repellency. (3) Adhering powders treated with silanes on particles further accentuates the level of water repellency. (4) Results from triaxial tests on coated sands at different silane concentrations, revealed that the shear strength and critical state locus are unaffected for a low silane concentration. (5) Flume tests conducted in sands of variable water repellency revealed that an increase in water repellency reduces infiltration and shortens the time for runoff generation, with the effects amplified for high rainfall intensity. Moderately water repellent soils were able to sustain infiltration for longer than both the wettable and water repellent soils, which presents an added advantage if they are to be used in the built environment as barriers. These results have been published in leading geotechnical journals such as Geotechnique and Engineering Geology and in related journals (Journal of Hydrology, European Journal of Soil science). This work has been implemented by several MPhil. and Ph.D. students including Dr. Hengyi Kang, Dr. Yunesh Saulick, Mr. Shuang Zheng, Mr. Deyun Liu, Mr. Hongjie Lin and Mr. Xing Xin.

Research Grants (2018/19 Exercise)

The following teachers were awarded the General Research Fund and the Early Career Scheme of the Research Grants Council:

General Research Fund

Dr. W.Y. Szeto
Dynamic modeling and management of taxi markets with multiple e-hailing services and taxi classes

Professor S.C. Wong
Dynamic macroscopic modeling of crowd dynamics under panic conditions

Professor K. Shih
Zero metal discharge from electronic waste treatment: control metal speciation in glass-ceramics

Dr. J. Yang
Exploring the relationship between soil liquefaction resistance and shear wave velocity: A new approach and perspective

Professor Z.Q. Yue
Learning more lessons from a catastrophic man-made slope failure disaster in Shenzhen

Professor B. Young
Cold-formed high strength steel hollow section joints under axial compression

Early Career Scheme

Dr. J. Choo
Waterless fracturing for unconventional energy production: Coupled geomechanics-flow modeling and investigations

Dr. H. Ye
Sustainable smart and functional concrete for steel corrosion control in concrete infrastructure
Updates on Project Mingde

The Architizer A+ Popular Choice Award

The Dabao project has won the Architizer A+ Popular Choice Award in the Architecture + Humanitarianism category, together with two Special Mentions in the categories Primary & High school and Architecture +Learning.

About the Dabao Project:

Dabao village is remotely situated within the scenic mountain range of Guangxi province in China. This completely isolated settlement provides home to around 110 families of an ethnic minority group called the ‘Yaos’, who have their own very distinctive dialect and culture.

Due to their seclusion and poverty, the village lacked a safe environment for the children to learn. Thus, the Dabao project aimed at providing the Yaos with a primary school, which at the same time serves as a community centre. The design and construction process was an active dialogue between Dabao villagers and the team, a reciprocal exchange in culture, knowledge and skills. As a result, the design responds to and shows a deep understanding of the people and place for which it was designed. The outcome of the project is a piece of architecture attuned to its environment and transformed by the obstacles that arose during the process.

The building is situated within the paddy fields on the mountains of Dabao. The design concept is structured around the use of layers of walls in addressing the challenges originated from the steep topography of the site. Bamboo as an abundant supply in the area, has been made use of for a long bamboo façade along the southern site. It not only acts as a protective barrier from the road outside, but also regulates the transmission of noise and daylight whilst ensuring privacy of occupants at the same time. The use of different diameters and lengths of bamboo tubes responds adequately to the different light requirements of the rooms for their respective functions.

The main level of the building houses two classrooms and a community library. An outdoor playground and gathering area is located on the second level with access to the roof of the building accessible for the children to play and for villagers to rest.

About the Award:

The Architizer A+ Awards is the largest awards program focused on promoting and celebrating the year’s best architecture and products. Its mission is to nurture the appreciation of meaningful architecture in the world and champion its potential for a positive impact on everyday life. The best work in front of a global audience of 400+ million.

Receiving entries from over 100 countries, less than 10% of all entrants received recognition this year, making it highly competitive representing the best of architecture worldwide.

The World’s Best Architecture, an annual compendium of the world’s most inspiring architecture, will be published in partnership with Phaidon. Featuring select A+ Awards Typology and Plus winners, the book is the definitive guide to the year’s best buildings and spaces. The 2018 Winners Edition will be available in January 2019.

Judges:

Winners are chosen by an illustrious jury including such industry luminaries as Denise Scott Brown, Bjarke Ingels and Tom Kundig, as well as personalities from beyond architecture like Tony Hsieh (CEO, Zappos), Yves Behar (Fuseproject), John Edelman (CEO, Design Within Reach), Cameron Sinclair (Architecture for Humanity) and Barry Bergdoll (MoMA).

About Project Mingde

Project Mingde was established by the Department of Civil Engineering in 2004. It provides an open platform for nurturing our students to acquire not only hard skills, but also to possess soft skills, such as a sense of social responsibility, by participating in real-world on-going civil engineering projects in remote impoverished regions in China and other Asian countries.
We have a slogan “We grow as we build” and that is the core value of Project Mingde. Project Mingde attracts not only Civil Engineering students, but also students from other disciplines and institutions to participate in this meaningful programme. We hope that students would have personal growth through this experiential learning opportunity and participation in various real-life projects; and also education in impoverished localities in China could be provided. For more information about Project Mingde, please visit our official website at http://www.civil.hku.hk/mingde/.

Alumni are welcome to join Project Mingde and if you are interested to be part of us, please contact Dr. C.P. Wong at cpwy@hku.hk (for projects) or Dr. K.H. Law at adalaw@hku.hk (for communications).

**Kindergarten for Guigang Duling Primary School**

Dr. C.P. Wong led 7 HKU students and 7 other students from South China University of Technology visiting Duling Primary School on March 6-8. They conducted land surveying for the construction site of the proposed kindergarten, and prepared a topographic map for architectural modelling. They had a fruitful discussion with the school principal and local villagers for their comments on the preliminary architectural design.

Another trip was arranged in May 6 students joined the trip to inspect and supervise the renovation and strengthening works of the existing teaching block. The new shelter helped keep the second floor cooler and prevent rainwater leakage from the rooftop. In the discussion with the school principal, he expressed his great concern about the safety of using tiles to decorate the façade wall. The project team agreed to carry out a mock-up test to examine the stability and durability and improve the design to avoid accidents.

**Wangdong Footbridge**

Professor L.G. Tham and Professor Z.Q. Yue led two visit trips to the collapsed Wangdong Footbridge with 8 students in April and August. This footbridge was the major river crossway to Wangdong Primary School before it collapsed caused by a severe flooding in 2016. The walking time of the school children between home and school was significantly prolonged. The students conducted landing surveying of the site and discussed some potential restoration ideas with the contractor and local government officials. The students are now working on the feasibility study report to identify the project value and preparing various schemes that are both structurally feasible and financially viable to reconstruct the footbridge.
Toilet of Trung Dung Secondary School, Vietnam

Last summer, Project Mingde collaborated with World Vision Vietnam to build a toilet at Trung Dung Secondary School. 14 undergraduate students (9 from the Department of Civil Engineering, 4 from the Faculty of Social Sciences and 1 from the Department of Comparative Literature) joined the 7-week summer training in Vietnam to supervise the construction works from June 11 to July 27. They also involved in capacity building activities to teach the school children about water and sanitation knowledge, and conducted needs assessments in the nearby communes and proposed solutions to improve the living condition of local villagers.

Wangdong Summer Camp

In June, Project Mingde Student Association organized a 5-day 4-night summer camp in Rongshui. 11 HKU students from various departments and facilities (Engineering, Architecture, Education, Social Sciences, and Medicine) visited Wangdong Xiang Center Primary School for voluntary teaching. They spent two days with the local school children and taught them English and Science. They built friendships through the classes and games with the children. They also visited different native Mao style villages and learned from the villagers about their unique culture. It was a valuable experience to the participants and it deepened their understanding on the rural living condition in Mainland China.
**Student Awards**

Mr. Cheung Ho Ming (CivE 2 2017-18) was awarded the Talent Development Scholarship under the HKSAR Government Scholarship Fund 2017-18.

Mr. Cheung Yu Lung (CivE 2 2018-19) was awarded the Hong Kong Chiu Chow Chamber of Commerce Scholarship 2017-18.

Mr. Chui Man Hin and Mr. Li Dick Kei (CivE 4 2017-18) were awarded the Hui Yin Hing Scholarship 2017-18.

Mr. Lee Chun Ngai Jason (CivE 3 2017-18) was awarded the Endeavour Merit Award under the SAR Government Scholarship Fund 2017-18.

Mr. Mak Tsun Hang (CivE 3 2017-18) was awarded the Young Tsun Dart Scholarship 2017-18.

Ms. Meng Yue (CivE 4 2017-18) was awarded the Hui Yin Hing Fellowship 2018-19.

Mr. Pan Yiyuan (CivE 2 2017-18) was awarded the Young Tsun Dart Scholarship 2017-18 and the YC Cheng Engineering Scholarship 2018-19.

Mr. Tse Chit Hei Jordan (CivE 2 2017-18) was awarded the Chun Wo Foundation Scholarship 2017-18 and the Chevalier Engineering Scholarship 2018-19.

**40th Anniversary of the Civil Engineering Class of 1978**

The Civil Engineering Class of 1978 celebrated their 40th Anniversary this year and a home coming event was organised on June 22, 2018. The group was warmly received by both the Dean and the Head.

They enjoyed a campus tour, a visit to the Department and two laboratories, and then a dinner with family members.

**Award in the 10th Inter-University Invitational Civil Engineering Competition, 2018**

HKU Civil Engineering students (from left to right) Fei Fan (graduate), Song Hang (Year 4) and Vong Lok Teng (Year 4) led by Assistant Professor Dr. X.W. Deng won Excellent Model Fabrication Award at the 10th Inter-University Invitational Civil Engineering Competition (IUICEC) in June 2018.

IUICEC is held biennially, and the hosting institution is the University of Macau this year. This competition aims to provide an international platform for civil engineering students to show innovation ability, corporation and professional civil engineering design techniques, while exchanging ideas and establishing friendships with students from other universities.
This year, all teams were required to follow the certain rules to design and construct a wooden curved bridge model using the given materials during the competition period. The result of competition was mainly based on the bridge’s load-carrying capacity and deflection examined under both static and dynamic tests. In addition, a detailed design report and the presentation was also be scored by a judge panel consisting of the team leaders from different universities.

Competing with a number of teams consisting of passionate students and experienced professionals, HKU’s structural model got well acknowledged. It is a great achievement for both the students and Department.

Alumni Sharing

A Bridge Constructor and a Bridge Player - Dr. W.P. Zen

It never occurs to me that I will write something in Civil Engineering Newsletter not on my construction experience, but rather on the fact that I am a Bridge player, all because in the recent Asian Games, Hong Kong Men’s Team (of which I am a member) won a silver medal in the first time Bridge was introduced as an official sport.

After the Asian Games, the most common question I was asked during interviews is: What is the attraction of Bridge to you, and is there anything you can learn from Bridge and later be used in your work?

For those who do not play Bridge, it might be a bit hard trying to understand the beauty of Bridge. Let me put it this way:

1. Bridge is a game without complete information – As a player only sees his/her own cards, and has to use his logic and judgment trying to work out all the four hands during bidding and play/defense, a lot of the times one cannot be 100% sure, nevertheless we need to take the action that most likely lead to success.

2. Bridge is a gentlemen game – Each pair at the table need to disclose ALL the partnership bidding and carding understanding to the other pair, so there cannot be any ‘private’ understanding. All Bridge players compete on judgment, card reading, technique and partnership understanding (based on bidding, playing and deduction).

3. Bridge is a fair game – In a team match, the same (say 16) hands are played by the two teams in direct competition, say at Table 1 team A site North/South, thus team B site East/West, and at table 2, it will be team B sitting North/South and team A East/West. The result of every hand is thus compared. Half of the time a hand ends in a tie as both teams achieve the same result, but the other half is that either Team A does better or vice versa. At the end of the match, all the results will be added to decide the winner and, as such, the luck factor is reduced to a minimum.
4. Bridge is a game of ‘life’ – As explained above, because Bridge is a game of incomplete information, one can work on probability, but rarely certainly, a line/bid you choose might be ‘right’ 90% only of the time, but it may happen you encounter the remaining 10% distribution, so a ‘right’ decision does not guarantee you will win the hand. However, if you keep on following the ‘90%’ line instead of the 10%, in a long match, you will win by miles.

What do I learn from Bridge that is applicable to work or life?

a) You can’t do it yourself – Unlike chess, Bridge needs a partner (and sometimes teammates) and you must work in harmony to get the best possible result. You need to be able to think from your partner’s angle, and the difficulties he faces, and also realise that everybody makes mistake, and have to learn how to cheer up the partner when things do not work out.

b) Keep doing the ‘correct’ thing – In work and in life, we need to make decisions based on incomplete information, you analyse the situation, your strength and weakness (as well as those of the opponents), and then logically work out the ‘most appropriate’ action you should take and then go ahead. This may not guarantee you that you can win on this hand, but in the longer term, you will surely be a ‘winner’ in life as well as in work.

c) Learn to accept defeat – Most of the time you lose a match because the other team plays better (or your team makes more mistakes), but there are occasions on which you lose by luck. No matter what the reason is, we need to acknowledge defeat and try to do better next time. We come to realise that the same is true in life, and naturally by definition there will be a lot more losers than winners.

d) The next hand is the most important – Whether you win or lose on a previous hand, your focus should always be on the next hand that you are going to play, as you can affect the result of the next hand, yet nothing you can do about the last hand. This is very similar to a Zen Master saying「面對它，接受它，處理它，忘記它」, which is a useful piece of advice to anybody anywhere.

e) Never give up – There are numerous cases of one team overtaking their opponent at the very last hand of the match, so everything is not over until the match is over! Since first, you never know the result at the other table until the match is all finished; and second because if you hold a lousy hand, you know the other team sitting at the same position will hold the same hand, so what you are trying to do is make the most out of your ‘weak’ hand (and its hidden strength). This is very similar in business situation when you meet a much stronger competitor, but there will always be areas that you may have an edge over them. Be positive!