



# 2018 CICHE International Forum 國際交流 好評不斷



張武訓秘書長致詞

高雄市政府工務局  
黃志明副局長致詞

## Welcome Messages

Ladies and Gentlemen

Welcome to Taiwan and thank you for attending today's forum. Especially, I would like to thank Kaohsiung City Government and China Steel Corporation for co-hosting this forum and providing such a nice place for our activities.

Also, I would like to thank our honorable guests from abroad, including Professor Okada from JSCE, Professor Sohn from KSCE, Professor Yeung from Hong Kong University, Professor Wang from ASCE-Hong Kong, Mr. Bataa from MSCE, and all their delegation members.

Smart Engineering and Urban Features are the main topics of this forum. "How to apply modern technologies to create a smart city" has been a global trend for the past decade. Currently Kaohsiung City developments are the best example of these new technologies. From underground railway project to MRT, light rail system, to Kaohsiung National Stadium, Kaohsiung Exhibition Center, Maritime Cultural & Popular Music Center, the New Kaohsiung Train Station, ..., etc. are all implement the BIM, green, intelligent technologies into the project. And Kaohsiung already reborn from the harbor-heavy industrial intensive city into 21 century's green, smart and hazard prevention city. When you are free, please take some time for a site visit.

This morning we will have 5 keynote speeches to present you their viewpoints and achievements on smart engineering and urban related issues. And in the afternoon, we will have more than 24 presentations in 6 sessions, including Smart Engineering, Mega Civil Engineering, Energy, Disaster Prevention, Hydraulic Projects and Technologies and Young Engineer Sessions.

I am sure, through this forum, all the attendants from abroad and Taiwan can share their new ideas and technologies to help creating a better life for the public.

Again, I would like to thank you all for attending today's event and I hope you do enjoy your stay in Taiwan.

Best wishes to everyone!



*Wang Jaw-Lieh*

Wang, Jaw-Lieh

President

Chinese Institute of Civil and Hydraulic Engineering

December 7, 2018

各節議程及簡報已公布於土木網站，掃描 QR code 即可連結。

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## Keynote Lectures



## Urban Space Redesigned for Inclusive and Livable Cities — Kaohsiung Experience



Ching-Fu Chen

Distinguished Professor & Department Chair  
Department of Transportation and  
Communication Management Science  
National Cheng Kung University, Taiwan

## Expertise

Urban mobility, urban sustainability, economic analysis, tourism management

## Abstract

In recent years, the concept of “livable city” has spread all over the world. For many countries, the pursuit of economic growth is no longer the only indicator of progress; on the contrary, the ability to improve people's well-being through urban construction is becoming more and more prominent. This has also become the most concerned policy issue for the Kaohsiung City Government. We have developed parks and other green spaces, creating ecological wetlands and the largest green spaces in the country for everyone to enjoy. We built a 1,030 km bicycle route and built a friendly green network.

In order to expand the existing inland free trade port area, the municipal government is building a “Kaohsiung Asia New Bay Area” from a macro perspective, turning Kaohsiung into a new economic window for Taiwan. Its five major architectural projects with Kaohsiung's new vision showcase the charm and character of this ocean city.

When the railway undergrounding project completed, 15.37km long and up to 71.3hectares of corridors will connect 24 green lands such as Jhouzih Wetlands Park, Lotus Pond and Zhongdu Wetlands Park, which includes green corridors, waterways, bike paths and pedestrian walkways with diversified flowers and trees along the route.

This is Kaohsiung's experience, and we have done our best to build it and be proud of it.

## Some Aspects of Water-Supply Heritage 水道（自來水）土木遺の諸相



Masaaki Okada 岡田昌彰

Professor  
Dept. of Civil and Environmental  
Engineering, Kindai University, Osaka

## Expertise

Technoscape (landscape of technology, such as industrial landscape, civil-engineering landscape, etc), industrial archaeology, and heritage studies

## Abstract

Water-supply is one of the major roles of civil engineering and plays the critical role for people's daily lives. Water supply facilities, such as purification plants, dams, water towers or reservoirs have contributed for building present cities, however, people are inclined to take water supply itself for granted and did not pay enough attention to their social or cultural importance. This lecture collects case studies in Japan and Taiwan and will discuss on what significant facilities, water supply systems, and even “landscape” the precursors have established, and how we can reuse the precious legacies as civil engineering heritage.

In terms of adoptive, or cultural reuse of industrial, and civil engineering heritage, Taiwan is one of the forerunners and has many excellent case studies which have been internationally known through TICCIIH (The International Committee for the Conservation of the Industrial Heritage) Congress in Taiwan, held in 2013. This lecture would offer significant opportunity for engineers both of Taiwan and Japan to learn from each other's cases and philosophies.

## Engineering and Socio-Economical Aspects of the Hong Kong-Zhuhai-Macao Bridge



Albert T. Yeung 楊德忠

Associate Professor, Department of Civil  
Engineering, University of Hong Kong,  
Hong Kong  
Adjunct Professor, College of Mining  
Engineering, Taiyuan University of  
Technology, Taiyuan, Shanxi, China

## Expertise

Civil engineering, geotechnical engineering, environmental engineering, foundation engineering, electrokinetics, ground improvement, contaminated site remediation

## Abstract

The Hong Kong-Zhuhai-Macao Bridge, being situated in the waters of Lingdingyang (伶仃洋) of the Pearl River Estuary, is a mega sea-crossing infrastructure project in the Pearl River Delta of China. It consists of a series of bridges, sub-sea tunnels, viaducts and artificial islands connecting the Hong Kong Special Administrative Region (“Hong Kong”) (香港), Zhuhai City of Guangdong Province (廣東省) (“Zhuhai”) (珠海), and the Macao Special Administrative Region (“Macao”) (澳門), three major cities situated on the Pearl River Delta of China. The Hong Kong-Zhuhai-Macao Bridge will shorten the travel times among these three cities and benefit the economic development of the Pearl River Delta region significantly. The functions of the Hong Kong-Zhuhai-Macao Bridge Project are: (1) to meet the demand of passenger and cargo interflows among Hong Kong, Mainland China (particularly the western Pearl River Delta region) and Macao; (2) to establish a new land transport link between the east and west banks of Pearl River; and (3) to enhance the economic and sustainable development of the three major cities in the Pearl River Delta region. The opera-

tion of the bridge has just been commenced very recently. In this keynote lecture, the background of the mega project, and the engineering, in particular the geotechnical engineering and environmental engineering, and socio-economical aspects of the design, construction and operation of the bridge will be presented.

## Smart Sensing of Infrastructure based on Waves



**Jong-Sub Lee**

Vice Dean and Professor  
School of Civil, Environmental and  
Architectural Engineering, Korea University

### Expertise

Geo-characterization using waves, non-destructive testing and evaluations, in-situ geo-characterization, pile foundation

### Abstract

For the sensing of the infrastructure especially geo-infrastructures, which cover tunnel, rock slope, soil slope (or excavation) and pile foundations, waves including elastic and electromagnetic waves are introduced. For the construction of geo-infrastructures, rock bolts, pipe roof support system, or soil nails have been commonly used. In addition, the steel cages are required for the pile installation. The integrity of rock bolt, pipe roof support system, or soil nail has been evaluated based on elastic waves at high frequency and low frequency. As the elastic wave should be continuously generated for the sensing of the infrastructure, alternative method may be required. As an alternative method, electromagnetic wave is adopted. Note that the electromagnetic wave can be used for the integrity evaluation of the rock bolt, pipe roof support system, and soil nail. Furthermore, as the response of the electromagnetic wave of rock bolt, pipe roof support system, or soil nail can continuously monitored, the rock bolt, pipe roof support system, or soil nail can be used as a sensor itself. This presentation demonstrates that waves may be effectively used for the integrity evaluation and the sensing of the infrastructure.

## Moving Towards Smart, Green, and Resilient Cities



**Shen-Hsien Chen**

President  
Sinotech Engineering Consultants, Inc.

### Expertise

Smart, green, resilient and sponge city planning, water resource management & planning, construction management, hydrology

### Abstract

The increase in greenhouse gas concentration has led to global warming and extreme weather all over the world. A convincing proof for climate change in Taiwan is that the frequency of extreme weather events is increasing. The interval between extreme rainfall and extreme drought has been about 20 years before, but it is currently shortened to less than 5 years. "Smart city" is the direction that must be taken in the face of climate change and sustainable development. During the past decade, many smart city solutions have been developed in Taiwan for government agencies, enterprises and individuals to collect all the data through the integration of information and communication technology and internet-of-things technologies to respond to various challenges, analyze and make smart decisions to improve efficiency. Smart cities require building collaborative teams of practitioners across disciplines. Architect and engineering consultants play a key role in the success of the smart city solution. In this presentation, we will discuss the global challenges we are facing, challenges and opportunities for building the smart city, and present what we have done in the past and what we are doing presently and in the near future for building the smart, green, and resilient cities. As technology continues to evolve, value-added applications for the smart city have unlimited possibilities. It is believed that the works to get city smarter, greener, and more resilient never end. Success lies in people working together with a common vision of sustainable development in our industry, society and beyond.

## Session 1: Smart Engineering Projects & Technologies



## KAOHAUS Reward Feedback Regulations to Green Building Policy Implementation Results in Kaohsiung



**Joseph Yen-yi Li**

Associate Professor  
ShuTe University, Taiwan

### Abstract

In response to the trend of "sustainability", "green" and "health" in the global environment, To provide green building improvement for new and existing buildings to promote green building technology. Through green building technology research and promotion, Guide buildings in Kaohsiung to promote green building improvement. Since 2008, the Kaohsiung City Government started the research based program from the Urban Development and Urban Design, which try to identify both the climatic and urban structure in a sustainable way. In the year of 2011, the Bureau of Public Works promote the Kaohsiung LOHAS House Program, and encourage the Place-based autonomous regulations.

From the perspective of building management, the development trend of statutes is formulated. From execution to orientation, to revise the exclusive regulations in more suitable areas. Enhance recognition, identification, self-awareness and futuristic nature of buildings on the ground. It also has the vision of localization and expansion of the international outlook. It proposes specific environmental benefits to promote Kaohsiung's policy. Policy benefit correlation analysis factor, achieving the goal of policy sustainability.

## The Trends in Development of Smart Transportation



**Shang-Min Yu**

Project Engineer  
CECI Engineering Consultants, Inc., Taiwan

### Abstract

The rapid development of urbanization has led to the emergence of conflicts, therefore, many countries have begun to pay attention to and invest resources to build smart cities, and hope to solve problems through information and communication technologies to meet people's daily needs. Throughout the development of smart cities in the world, the application of smart transportation is an important breakthrough.

In this presentation, the importance of smart transportation is indicated from the perspective of smart city development. Since smart transportation development is closely related to technological development, several key technologies that affect the development trend of smart transportation, such as Big Data, Internet of Things, Machine Learning and Autonomous Vehicle are introduced from the viewpoint of Hype Cycle for Emerging Technologies. And then the renovation that pushing the smart transportation transformed from system-oriented into integrated service-oriented is described. Finally, a conclusion is drawn to clarify the future development trend.

## Physics-Based Coseismic Landslide Simulation Using SEM and MPM Methods



**Gang Wang**

Professor  
Hong Kong University of Science and Technology

### Abstract

Realistic prediction of coseismic landslides is crucial for the design of key infrastructure and to protect human lives in seismically active regions. Coseismic landslides are complicated nonlinear, progressive, large-deformation processes triggered by ground shaking. To date, analytical methods for estimating

coseismic landslides have been based on highly simplified models. With the advancement of computational technology, there is an opportunity to develop a physics-based model to study the complex failure process of coseismic landslides. On the regional scale, Spectral Element Method (SEM) is efficient in modeling a 3D wave field in complex topography. Regional scale landslide hazards are therefore simulated by combining 3D SEM wave simulation with Newmark displacement analysis. The study indicates that the landslides are significantly influenced by near-fault characteristics and topographic amplification of ground motions, as well as hydrogeological conditions of subsurface soils. On the local scale, the progressive slope failure process and post-failure large-deformation behavior, including triggering, runoff and deposition of landslide masses, is simulated by Material Point Method (MPM). Several benchmark cases are presented to demonstrate the efficiency of the numerical methods, including a case study of Hongshiyuan landslide in the recent 2014 Ludian earthquake.

## Session 2: Mega Projects



## Development of Kaohsiung Maritime Industry: An Overview of the City's Assistance to the Yacht Industry



**Ying-Pin Lin**

Director General  
Marine Bureau, Kaohsiung City Government

### Abstract

1. History of Taiwan yacht industry
2. Current development
3. Estimated development plan
4. Future direction.

## MRT EPC Turnkey Project



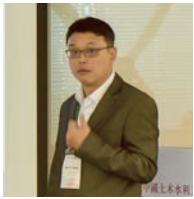
**Vincent Li**

Head of Marketing and Sales of Infrastructure  
Dept., Sales General Manager  
CTCI

### Abstract

1. Introduction of CTCI company profile and the references in MRT EPC Turnkey Project.
2. Introduction of the scope of work, equipment, interface management, system commissioning and experiences of MRT Power Supply System Turnkey Project.
3. Introduction of interface management, system commissioning and experiences MRT Systemwide E&M Turnkey Project
4. The tendering strategy of system E&M Project.

## Transit Oriented Development — Planning and Implementation



**Kelvin P.F. Tsang**

Associate Director  
Ove Arup & Partners Hong Kong Ltd.

### Abstract

The practicing engineers are subject to the boundary conditions and constraints from planning approval. Since early millennium, the speaker starts involving from the residential and commercial property development study as funding sources for railway development as part of financial study. We fulfill and also set out from constraints for future development. Some completed studies are implemented on site into the reality and to fulfill the challenges, some are being developed.

In the recent years, planning study engaged by the government which request the engineering support to demonstrate the feasibility before submitting for planning approval. Various constraints in planning and implementation stage would also demand engineering skills in redevelopment of some government facilities as part of revenue generation exercise.

### Session 3: Offshore Wind Energy

## The Renewable Energy Plans of Taiwan Power Company



**I-Cheng Chen**

Director  
Department of Renewable Energy, Taiwan  
Power Company

### Abstract

In the past few years, in order to meet the 20 percentage of electricity come from the renewable energy sources in Taiwan, more attention has been paid to the renewable energy development. Even Taiwan Power Company is committed to the development of renewable energy such as the Hydro-power Power, PV Station, Onshore and Offshore Wind Farm Construction. This presentation will address on the renewable energy plans of Taiwan power company.

This presentation introduces the profile of the Taiwan Power Company and our national energy policy and then will address on Taiwan Power Company renewable plans including grid on renewable energy projects and under construction plans of wind, PV and geothermal power plants will be illustrated.

## Offshore Wind Industry Development and Opportunities in Taiwan



**Tsung-Wen Huang**

Chief, Metal Industries Research &  
Development Center (MIRDC)  
Chief Secretary, Taiwan Wind Industry  
Association (TWIA)

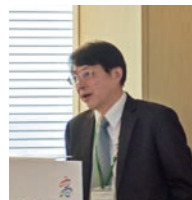
### Abstract

Taiwan strait possesses abundant high quality wind resources due to its unique geographic structure. However, it also encounters with strong typhoon and earthquake. The geological formation of seabed is also weak in weight supporting strength. The development of offshore wind power in Taiwan strait is consequently a mission of big challenge and opportunity. Taiwan's offshore wind power industry is still at its very beginning stage. We need great supports from abroad to overcome all those obstacles in order to turn the rich nature resource into treasure.

The future promising collaboration topics:

1. Offshore Wind Farm Development Experience sharing-
  - Strategy: industrialization policy, localization roadmap
  - EIA solutions: navigation, fishery, environmental studies and consultancy
  - Infrastructure and service: harbor layout, EPCI contract, etc.
2. Offshore Wind Turbine Components Manufacturing and Service-
  - Equipment: typhoon and earthquake-proof design and manufacturing technology
  - Service: Spare parts and O&M
3. Marine engineering-
  - Contract : foundation, cable and turbine installation
  - Equipment: CTV/Tugboat/Support vessel/Workboat/Barge, advanced offshore installation equipment

## The Development of Taiwan's Offshore Wind Power Components & Parts Industry



**Yuan-Liang Hsu**

Assistant General Manager  
Wind Power Construction Department  
Wind Power Business Development Committee

### Abstract

According to the statistics of WWEA, World Wind Energy Association, the capacity of wind power installed has reached 539.6 G by the end of 2017. The power generated is equivalent to the output of four hundred nuclear generators.

Taiwan landscape is small in area and densely populated, however, there is abundant in wind resources in the surround-

ings water. Offshore wind is potential and forward-looking green industry, which is well worth it for being developed in Taiwan.

Under the lead of CSC and MIRDC, twenty first local manufacturers got together in September, 2016 and Wind Team Alliance was formed for the purpose of becoming global component suppliers. Factory survey, capability gap identification and filling gap action plan for each team member was finished.

Next, the practical action of each team member is moving from survey and plan to technical transfer, R&D and facility investment. It is hoped the goal of becoming component suppliers can be achieved in the near future by the combination of industry, official and university and the strategic alliance with wind turbine suppliers and their technical guidance and support.

## Taiwan Offshore Wind Marine Construction Status and Offshore Wind Turbine Installation



**Kurt (Kuen-Cherng) Guo**

Deputy Director  
CDWE Preparatory Office CSBC  
Corporation, Taiwan

### Abstract

1. Overview and Current status of Taiwan Offshore Windfarm.
2. Offshore Windfarm construction cost share.
3. Wind Turbines Transportation and Installation.  
Incl. Installation Process, Marine Spread, Storage and Pre-assembly Site.
4. Construction work Workability and Safety Assessment  
Incl. Weather Restrictions, Lifting Operations, Harbor Assessment, Site Investigation
5. Marine Warranty Survey, (MWS)  
MWS are required for safe execution of offshore Transportation and Installation (T&I) works, The insurance can only be activated after the relevant COA(Certificate of Approval) is issued to the installation contractor.

### Session 4: Disaster Prevention Engineering



## Recent Development of Life-Cycle-Based Disaster Prevention/Mitigation of Bridges in Taiwan



**Yu-Chi Sung**

Professor and Dean  
National Taipei University of Technology  
Director, National Center for Research on  
Earthquake Engineering

### Abstract

In the past few decades, more attention has been paid to longevity of infrastructure. In Taiwan, the earthquake, flood, wind and material deterioration are the major disasters to the bridges during their life cycle and how to prevent/mitigate multi-disasters has been an important issue for bridge engineering.

This presentation introduces some researches and practical engineering applications on disaster prevention/mitigation to the bridges in the past few years in Taiwan. Some practical efforts on structural inspection/monitoring and maintenance/retrofit of the existing bridges together with some innovative technologies to decrease disaster-loss will be illustrated.

## Intelligent Natural Disaster Prevention



**Ko-Fei Liu**

Professor  
Department of Civil Engineering, National  
Taiwan University

### Abstract

Natural disaster caused by rainfall such as flood, landslide and debris flows are common experience in Taiwan. Taiwan already has a firm disaster prevention system established. Precision prediction and intelligent response system is the present goal. This report briefs the advancement in intelligent response in Taiwan.

## Retrospect of 1999 Chi-Chi Earthquake



**Lap-Loi Chung**

Research Fellow and Deputy Director  
General  
National Center for Research on  
Earthquake Engineering

### Abstract

In 1999, a devastating earthquake attacked central Taiwan. More than two thousand people were killed. Taiwan lies between Philippine Sea Plate and Eurasian plate. Thousands of earthquakes occur in Taiwan every year. People in Taiwan have to live with earthquakes. It is impossible to eliminate earthquake disasters but it is possible to minimize if some measures are taken. In this presentation, accomplishment in earthquake disaster reduction since Chi-Chi earthquake is introduced.

## Session 5: Water &amp; Material Development



## Innovative Thinking on Water Resources in an Industrial City



**Stephen Chu**

Section Chief  
Director General's Office Water Resources  
Bureau, Kaohsiung City Government

### Abstract

Include of I. Introduction II. Water Supply and Demand Planning III. Reclaimed Water in Kaohsiung IV. Conclusion

#### 1. Introduction:

- The largest port in Taiwan and the 12th largest container port in the world.
- Important industrial area, mainly for basic and chemical industry, accounting for 60 percent of the industrial output of the city.
- 8 main rivers in Kaohsiung
- 5 dams in Kaohsiung

#### 2. Water Supply and Demand Planning:

- Public water supply and demand in Kaohsiung City
- Roadmap of public water supply and demand in Kaohsiung City
- Multi-Water Resource Program in Kaohsiung City

#### 3. Reclaimed Water in Kaohsiung:

- Recycling-effluent of sewage treatment plant to become a novel water resource
- 6 model cases in Taiwan
- Recycle effluent from Fengshan Sewage Treatment Plant
- Preliminary Reclaimed Water Design
- Draw investment in BTO model
- Facility Optimization Evaluation

#### 4. Conclusion:

- Recycle sewage for sustainable water resources
- The reclaimed water is the basis of the continuous development when facing the water scarcity problem
- Fengshan project was launched last month; the Linhai project is currently under contract negotiation process and expected be contracted this year.

## Time-Dependent Behavior of Carbon Dioxide-Hydrate Bearing Soils



**Hiromasa Iwai**

Assistant Professor  
Nagoya Institute of Technology, Japan

### Abstract

Recently, not only Methane hydrates (MHs), but also carbon dioxide hydrates (CDHs), have been attracting attention from the viewpoint of CO<sub>2</sub> storage in the form of CO<sub>2</sub>-hydrates. It is essential, therefore, to investigate the mechanical behavior of gas hydrate-bearing sediments, especially time-dependent characteristics. In the present study, we carried out a series of undrained triaxial compression tests with a step-changed strain rate to understand time-dependent behavior of CDH. From the test results, CDH-bearing sand clearly exhibits strain rate dependency with an increase in hydrate saturation. It is interesting to note that hydrate saturation's dependency on strength does not appear in cases where the strain rate is quite slow.

## Development of Hydrological Calculation and Review Platform — Taoyuan Drainage Plan as an Example



**Hsuan-Yu Lin**

Engineer  
Water Resources & Hydraulic Engineering  
Department, Sinotech Engineering Consultants, Ltd.

### Abstract

Due to land use change from agriculture to urbanization, it has significantly impacted the regional water environment. The increment of impervious surfaces reduces the infiltration into soils, and increases the peak flow of surface runoff and decreased the time of concentration. Hence, assessing the impact of land use change on hydrological processes is important for both runoff distribution and runoff control management. Therefore, this project is proposed to develop the Smart drainage toolbox (SDT) for analyzing how the land use varied affects the water environment through the rainfall-runoff model and geographic information analysis for Taoyuan government. The SDT is composed of five-module, which are hydrology analysis, flow capacity analysis, runoff increment analysis, flood reducing facilities, and runoff control examination module. The flood reducing facilities consist with both public infrastructures (such as detention pond, pump station, drainage gate) and low impact development (such as rain garden, green roof, grass swale) facilities. The SDT can assist the Taoyuan government in reviewing the land development project proposed by the land developer, and help the decision maker for choosing suitable flood reducing facilities. Furthermore, the SDT toolbox is combined with the numerical model with fast computations capability. Also, the state-of-the-art numerical scheme allows computing with high-resolution information. The combination of the SDT and the numerical model can be used for flooding simulation and evaluating the impact of the land development project on the catchment scale. In conclusion, the combination of the SDT and the numerical model is expected to be useful to identify which control facilities can be used for the land development project.

## Enhancement of Self-Compactability of Fresh Concrete by Finer Air Bubbles



**Anuwat Attachaiyawuth**

Lecturer  
Faculty of Engineering, Sriracha Campus,  
Kasetsart University, Japan

### Abstract

The authors have developed a bubble-lubricated Self-Compacting Concrete (SCC) and named it "Air-enhanced Self-Compacting Concrete (air-SCC)". The level of self-compactability of air-SCC was similar to that of conventional SCC by making use of ball-bearing effect of entrained air bubbles. The purpose of the development of air-SCC was to make SCC a standard concrete so that the reliability of concrete structures with which designed performance may be attained in spite of the skill of its construction workers. No other material than ordinary Portland cement was in use. The unit cement content in air-SCC was around 370kg, similar to that of conventional concrete and it was effective in reducing the unit cost of SCC. Air bubbles with smaller diameter were suitable for enhancing self-compactability. A mixing method in which not all the material are to be poured into the mixer and high dosage of air-entraining agent were effective in making air bubbles finer.

### Session 6: Young Engineers Dynamics



## Enhancement of Self-Compactability of Fresh Concrete by Higher Adhesion of Mortar to Coarse Aggregate



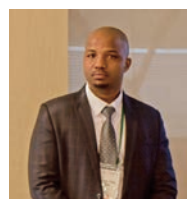
**Haruka Onishi**

Candidate for Master  
Graduate School of Kochi University of  
Technology, Japan

### Abstract

Self-compacting concrete with high water to cement ratio for no high strength may cause segregation between coarse aggregate and mortar during flowing through obstacle. Higher adhesion of mortar with coarse aggregate of a new type of segregation-inhibiting agent attained higher level of self-compactability. An index for the adhesion was proposed with the ratio of the funnel speed of the standard SCC mortar to that of the thinner funnel. A correlation between the index for the adhesion of mortar and the level of the self-compactability of fresh concrete including the mortar was verified.

## RECP and Vegetation Growth Effect on the Manning's Coefficient for Grass Ditch



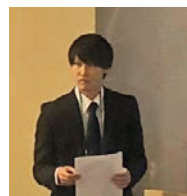
**Khayelihle Thabo Motsa**

Masters student  
National Pingtung University of Science and  
Technology, Taiwan (NPUST)

### Abstract

A laboratory study is conducted to analyze the effects of vegetation growth with Rolled Erosion Control Products (RECPs) on the Manning's coefficient ( $n$ ) in a grass ditch. Three types of vegetation are used in this study; Bahia, Carpet and Centipede grass. Sandy silt soil obtained from a local river bank is used for testing. The indoor test channel is rectangular in cross section with dimensions of 0.6 m wide, 0.6 m high, and 24 m long with an adjustable channel bed of 0 ~ 7 %. The grass is planted in stainless steel boxes and the test soil conditions include vegetated soil bed and vegetated erosion control mated covered soil bed with grass seed density of 25g/cm<sup>2</sup>. ASTM D6460 test method is used to conduct the tests. One flow condition, three different vegetation types at different growth stages, and one type of RECP is used in the study. Testing is done in three stages; four weeks, eight weeks and sixteen weeks after planting with each test lasting for 30 minutes. An Acoustic Doppler velocimeter is used to measure the velocity and the Manning's equation to determine the roughness coefficient ( $n$ ). A 90 HP flow pump capacity and 1% slope channel is used for testing. A software (Image J) is used to determine the area coverage of the vegetation in each of the test samples before testing. The Manning's coefficients increase as the grass grow and using RECP slightly increase the value. As the vegetation grows the rate of soil loss decreases. In all the conditions the Soil Loss Rate recorded is less than 1%. Using RECP with vegetation reduces the rate of soil loss.

## Development of Simple Testing Method of Ordinary Concrete for Acceptance at Jobsite



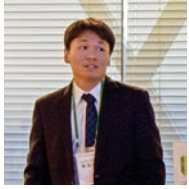
**Shota Fukuda**

Candidate for Master  
Graduate School of Kochi University of  
Technology, Japan

### Abstract

A simple testing method for acceptance of ordinary concrete at jobsite was developed for replacing slump test, in which concrete is filled into an upset cone hanged from the outlet of the pump or the shoot of the agitator truck. Concrete with sufficient slump value was supposed to flow through the cone while concrete with insufficient slump value was supposed to stop. The outlet of the cone with the diameter of 10 cm and 13 cm was suitable for slump of 18 cm for buildings and 12 cm for public works respectively. Either the air content or the grading of coarse aggregate did not affect the test result

## Influence of Sediment Particle Size for Ultrasonic Instrument in Hydraulic Dredging Monitoring



Je-Chian Chen

Ph.D. candidate

National Pingtung University of Science and Technology, Taiwan (NPUST)

### Abstract

Sedimentation directly affects the water supply of the reservoir and also has a significant impact on the environment. Conventional methods of hydraulic dredging use a mechanical pump to supply the driving power to remove deposited sediment

from a reservoir. In this study, an ultrasonic instrument was used to monitor the sediment concentration during hydraulic dredging and the amount of dredging was calculated so that it was possible to know how much sludge had been removed from the reservoir. However, the application of ultrasonic instrument in hydraulic dredging monitoring project still needs to be verified. Therefore, the purpose of this study was to understand the influence of the ultrasonic instrument when the sediment particle size changes and the feasibility of the ultrasonic instrument in hydraulic dredging monitoring. From the result, sediment particle size does affect the measurement of the ultrasonic instrument. However, the sediment with smaller size has no influence on sediment concentration measurement, and its slightly affects the concentration monitoring of ultrasonic instrument when the sediment concentration is low. The ultrasonic instrument is used to calculate the sediment particle size, and the results are used to correspond to the drying concentration, so that the accuracy has an increasing trend.



## 走讀高雄 感謝高雄市政府各單位大力協助

12月8日特別為外賓安排高雄市政建設以及高雄指標性建設參訪。  
行程豐富緊湊，外賓對於高雄整體建設印象深刻，讚嘆連連！

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C7 軟體園區站、衛武營國家藝術文化中心、寶業里滯洪池、  
澄清湖給水場

### ■ 特別感謝各單位之協助：

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