WASTELINE : SUMMER 2015

The Newsletter of the Hong Kong Waste Management Association
Web Site: www.hongkongwma.org.hk

Message from the Editor:
This Newsletter requires your participation. We would like to hear your experiences in implementing good waste management practices in Hong Kong or overseas. If you have an interesting story to tell, please write to me at barry_adcock@sita.hk

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Blueprints Update by the SEN at Spring Reception

The Spring Reception, held on the evening of 18 May 2015 at the Hong Kong Club, saw about 100 members and guests of HKWMA gathering for networking and to hear an address by the Secretary for the Environment (SEN).

The first business of the evening, however, was to hold an Extraordinary General Meeting to vote on the review of the annual rates of subscription for members of the Association that had been proposed by the Executive Committee. The proposals, which incorporated the first increase in subscription rates since the Association had been founded 21 years before, had been circulated to members before the meeting for their review. When put to the vote, the proposals were passed unanimously with no votes against and no abstentions.

Following the vote, the Chairman of the Association, Ir. Kenny Wong, was pleased to note that the Legislative Councillor for the Engineering Functional Constituency, Ir. Dr. W. K. Lo, was in attendance.

Ir. Kenny Wong, Chairman of HKWMA; Mr. K.S.Wong, Secretary for the Environment (SEN); Ir.Dr.W.K.Lo, Legislative Councillor for the Engineering Functional Constituency and Ms. Alice York

In introducing the address by the SEN, Mr. K.S. Wong, the Chairman noted that 2015 was a special year because, after a great deal of effort, a series of waste management facilities had been approved by the Legislative Council, i.e. extensions to the three existing landfills and Hong Kong's first waste-to-energy incinerator for several decades, the IWMF.

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The SEN started his address by thanking Ir. Dr. W.K. Lo for helping guide the Government's proposals through LEGCO to ultimate approval. The SEN said that his address would comprise an informal update on progress in realizing the goals of the 2013 Blueprint for Sustainable Use of Resources and the Food Waste and Yard Waste plan published in 2014 by the Environment Bureau. He summarized the principal goals of the Blueprint including waste separation at source, waste charging, PRS, recycling, landfill extensions, waste incinerators etc. The PRS on plastic bags had been extended to all retailers and further PRSs were to be introduced shortly with those on Waste Electrical and Electronic Equipment (WEEE) and glass bottles being the first. Approval had been given for the WEEE plant at the ECO Park in Tuen Mun and it was expected to enter operation in 2017. The SEN stressed that the separation of waste at source depended on the introduction of MSW charging which was crucial to its success. After consultation, the community in general had given its support for the introduction of waste charging and law drafters were working on the necessary legislation.

With regard to dealing with food waste, which was 40% of landfill waste, to ensure its success there needed to be a change in mindset among the population, especially among the young people as encouraged by the Food Wise Hong Kong Campaign which coincidently had been launched exactly two years before on 18 May 2013. Another initiative that was in place was the allocation of HK$18 million to subsidize NGOs to collect food that would otherwise be disposed of, for distribution to needy people. A major part of the food waste plan, the OWTF in North Lantau, had started construction and was due to be completed in 2017. To encourage more recycling, a taskforce had been set up, headed by the Chief Secretary, and a large fund had been established to support the industry but the distribution of the funds still awaited LEGCO approval. In addition, Government was working with the Hong Kong Quality Assurance Association to upgrade the quality of waste oil recycling in Hong Kong.

The SEN giving his Blueprints Update

The SEN reported that Community Green Stations were being set up in all 18 districts of Hong Kong and the first one had just been opened in Shatin, to encourage green education as well as the collection of materials suitable for recycling. The next one was due to open in Eastern District at the end of 2015 with Wong Tai Sin and Islands already under construction. The sites had been fixed for seven more. These stations were being operated by NGOs who were better at communicating with local communities than the Government or more conventional contractors would be.

The SEN reminded the audience that Government was investing HK$30 billion in waste-to-energy and landfill extensions. As far as waste-to-energy was concerned, the Sludge Treatment Facility (STF) had been commissioned and the formal opening had been scheduled. This facility recovered energy from a waste product and fed it into the grid and had facilities for community outreach and education incorporated in the design. Prequalification for the IWMF at Shek Kwu Chau was presently in progress with completion of the facility aiming for 2023 after a considerable delay had been encountered in achieving LEGCO approval. There was also a judicial review still before the Court of Final Appeal. As well as the initiatives set out in the Blueprint and the Food Waste Plan, a new initiative had been kicked off by Government : a two-year study on waste management infrastructure to support a circular economy. The idea of the study was to more effectively support recycling and other initiatives to

make waste management more environmentally friendly in the future.

After he had completed his update, the SEN answered questions from his audience.

Former Chairman of HKWMA, Ir. Louis Chan, asked that as far as waste incineration was concerned, the IWMF on its own was not enough and what was Government's future policy on what was going to happen next. The SEN referred Ir. Chan to the new initiative he mentioned at the end of his address : the Government was starting a new comprehensive study on all options including mooted new technologies, locations etc. for the thermal treatment of waste. Similarly, in response to a question from Ir. P.K. Lee, who asked what could be done in the next ten to twenty years to promote a circular economy, the SEN replied that that was also part of the brief for the new study.

Another former Chairman of HKWMA, Mr. Alexi Bhanja, reminded everyone that HKWMA had been pushing waste charging for years and asked what progress had been made recently. The SEN in his answer agreed that waste charging was fundamental to the whole waste management picture. Recently, the Sustainable Development Council had undertaken a significant consultation with the public on what rate would be suitable to charge, whether all waste should be brought into a charging scheme at the same time or whether commercial and industrial waste should be charged for first with domestic waste following later, etc. The answers to these questions had been taken back to LEGCO and the necessary legislation was presently being drafted. Trials had been undertaken in some public housing estates, the results of which would help indicate which ideas were most suitable for the implementation of charging whether by separate kerbside collections, prepaid bags, or other means. The SEN reminded everyone that drafting new legislation took a lot of time. For instance the extension of the plastic bag levy to all retailers took six years.

Another former Chairman of HKWMA, Ir. Daniel Cheng, asked the SEN why Hong Kong had a problem with food waste now : thirty years ago all food waste was fed to pigs. Why could Hong Kong not go back to that system and then treat the pig waste which was much easier than treating food waste? The SEN said that was another topic to be looked at in the two-year study but that experience from Taipei was that feeding food waste to pigs didn't work very well any more because the food humans ate and threw away now was more complex than before. In fact, representatives from Taipei were coming to Hong Kong to learn about our OWTF which they saw as the future for food waste treatment.

Ir. Dr. W.K. Lo extended a large vote of thanks to the SEN who, working with the waste management profession, was managing to push forward the development of waste management facilities despite the present difficult political situation. He said it was clear to everyone that public education and suitable incentives were the key to effective future waste management.

HKWMA executive committee member, Ir. Dr. Kaimin Shih, reported that as part of their waste management course at Hong Kong University, the students were being told that they needed to come up with solutions as to how we could recycle more waste and he asked what the Hong Kong Government were doing, in addition to charging, to promote recycling. The SEN reported that EPD were working with the Housing Department and other landlords to set up facilities for collecting recyclables, especially glass. Also a new Smartphone App had been launched to show the public where all the recycling collection points were. EPD had also launched a Facebook page giving up-to-date news of recycling initiatives etc. The SEN further reminded his audience that Hong Kong was the first city in Asia to require ocean-going ships to use clean fuel while in port. He further noted that the previous week Government had launched a third Blueprint, an Energy Saving Plan for Hong Kong, which targeted to reduce the energy intensity used per unit of GDP by 40% within ten years. The main effort to achieve this goal should be at home and it could be helped by the electricity companies analyzing consumers' bills to set benchmarks for

electricity consumption per sq ft of dwelling size. Another part of achieving the goal was that all new Government buildings, including new public housing estates, would be built to the gold standard of the Building Environmental Assessment Method (BEAM). The main challenge on energy consumption was private commercial buildings where the Government was arranging discussions with the main stakeholders to plan the way forward.

HKWMA Chairman, Ir. Kenny Wong, summed up the SEN's address and proposed a vote of thanks that was endorsed by everyone present.

The SEN and Dr. W.K.Lo with Exco and YMC Members

Present and former Exco members enjoying the cocktails

Reported by Barry Adcock

Chairman's Update

It has been nearly one year since I was elected to be the chairman of HKWMA. With the unfailing support of the Executive Committee as well as the energetic Young Members' Chapter, we have organized and participated in a wide range of activities and continued to take the leading role in the waste management field by actively responding to government's policy initiatives & consultations.

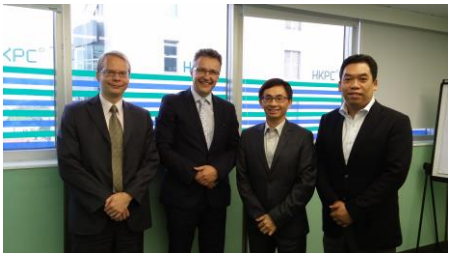
I would like to update members on a few issues since the last AGM:

- The membership of HKWMA had attained a record high of about 250 by June 2015, including organizational, institutional and individual members.
- We have offered our views on a few government initiatives, including the 2015 Policy Address Consultation, the $1Bn Recycling Fund, PRS on WEEE and the Future Development of the Electricity Market.
- We have organized and participated in over 20 high quality events, including international conferences, technical seminars, site visits and social events.
- We have organized a new round of the Professional Course in Waste and Environmental Management in the first half of this year. The course has just ended with a high level of participation of over 30 students.
- The proposal for the Student Chapter has been endorsed by the ExCo and we look forward to forming student chapters in a few universities in the coming months.
- We formed a delegation to attend the 2-Coast Forum in Taiwan in November 2014 and will likely form a delegation again to the upcoming 2-Coast Forum in Mainland China in the last quarter of 2015.
- To foster greater exchange of updated technical information between waste management professionals and stakeholders we are planning to organize a conference on the sustainable use of wastes as construction materials in the second quarter of 2016.
- We have held our first ever Extraordinary General Meeting in May 2015 to approve an increase in our membership fees; the first since the inauguration of HKWMA in 1994. With the approval of the new membership fees as well as the increase in the number of representatives from organizational and institutional members, we are committed to continue providing benefits to our members such as sponsorship to attend study missions, technical visits, etc.

In addition we have been active in establishing a wider network with various stakeholders to look for collaboration opportunities. To name a few we have met with the Guangdong Environmental Sanitation Association, the Guangdong Urban Waste Disposal Industry Association, the Malaysia Green Building Confederation, the Consuls General of the Netherlands and Finland as well as the Former Netherlands Minister of Housing, Spatial Planning and Environment.

I look forward to meeting you all in the near future.

With Professor Jacqueline Cramer (third from left - Former Netherlands Minister of Housing, Spatial Planning and Environment). Mr Wilfred Mohr (first from right - Consul General of the Netherlands), Ir Victor Cheung (second from left - President of the Hong Kong Institution of Engineers 2014/15) and experts from the Netherlands



With Mr Jari Sinkari
(second from left - Consul General of Finland),

With Ms Chen Shan Kun
(Eighth from left – President of the Guangdong Environmental Sanitation Association)

Kenny Wong, Chairman
Hong Kong Waste Management Association

Professional Course in Waste and Environmental Management 2015

Jointly organised by Hong Kong Waste Management Association (HKWMA), The Hong Kong Institution of Engineers (Environmental Division) (HKIE), The Institution of Mechanical Engineers (HK Branch) (IMechE), and The Hong Kong Polytechnic University (Hong Kong PolyU)

The HKWMA jointly organised a professional course in waste and environmental management with the HKIE, IMechE and Hong Kong PolyU starting in March 2015. The course was designed for those who wished to pursue their careers in the direction of waste and environmental management and for industry professionals who needed to formulate their company environmental policy or improve the environmental performance of their company. The course covered the following topics:

- *Introduction to Pollution Control and Environmental Management;*
- *Waste Management Policy and System of Hong Kong;*
- *Waste Management Technologies (including waste collection, treatment and disposal);*
- *Introduction to the Hong Kong Environmental Impact Assessment Process; and*
- *Technical visits to the Sludge Treatment Facility (STF) at Tuen Mun and Chemical Waste Treatment Centre (CWTC) at Tsing Yi.*

The course was delivered by a number of Hong Kong's leading waste and environmental management professionals including Ir Kenny Wong, Ir CF Lam, Professor Irene Lo, Ir Jude Chow, Ir Barry Lee, Ir CM Choi and Frank Wan.

Chairman of HKWMA, Ir. Kenny Wong, presenting his lecture on Waste Management Policy

Attracted by the interesting course content and the exceptional lecturers, over 30 professionals and students attended the course. Feedback from the participants was encouraging and most participants found the course useful in that it had broadened their knowledge of waste and environmental management systems and infrastructure in Hong Kong.

Course members visiting the CWTC at Tsing Yi

The course would not have been successful without the Executive Committee members and senior members of HKWMA who volunteered their time to share their unparalleled insights and knowledge of the waste industry with the participants. Also, a note of appreciation is recorded to the dedicated YMC members of the HKWMA who contributed a lot of their time and effort to coordinate the lectures and the site visits. Special thanks to the Hong Kong PolyU for providing the venue for the course. The participants who completed the course have been offered one year's free membership of HKWMA. With the success of the course, HKWMA hopes to organise similar courses in the coming years.

Reported by Frank Wan

The 8th Two-Coasts Forum on Sustainable Solid Waste Management on 16-19th November 2014 in Kaohsiung, Taiwan

SUMMARY

The *Two-Coasts Forum on Sustainable Solid Waste Management* (海峽兩岸四地固體廢物管理論壇) is an annual forum for government officials, industry experts and professionals from China, Taiwan, Hong Kong and Macau to share their latest strategies and technologies in waste management. The first forum was held in 2007. The professional organizations that take turns to organize the event in the different places are the Chinese Institute of Environmental Engineering in Taiwan (CIEnvE, 中華民國環境工程學會), the Chinese Association of Urban & Environmental Sanitation in the Mainland (CAUES, 中國城市環境衛生協會), the Hong Kong Waste Management Association (HKWMA, 香港廢物管理協會) and the Macau Institution of Engineers (MIE, 澳門工程師學會). In 2014, Taiwan hosted the 8th Forum in Kaohsiung with organizers including the Sustainable Environment Research Laboratories of National Cheng Kung University (SEnvRL, NCKU, 國立成功大學永續環境實驗所), CIEnvE, and The Formosa Association of Resource Recycling (FARR, 台灣資源再生協會). High ranking government officials as well as representatives from respective organizations made presentations in the forum on policy and technologies aspects of waste management. Technical visits were also arranged for further understanding of the operations of incineration plants, food waste treatment plants and contaminated soil remediation treatment in Taiwan.

The Forum commenced on 16th November 2014 at the Zenda Suites Tainan Hotel. The forum aimed to act as a think tank focusing on regional solid waste management strategies by means of policies formulation and technological advancements.

At the beginning of the opening ceremony the guests of honor, including Professor Hong-Sen YAN, Vice Principal of NCKU, Mr. Tzi-Chin CHANG, Deputy Minister of the Environmental Protection Administration of the Executive Yuan (EPAEY) in Taiwan and Ms. Huang-Zhen ZHANG, Secretary of the Environmental Protection Bureau of Tainan City Government (EPBTCG), each gave a speech greeting the delegates and forum audiences. They all expressed their great appreciation for the joint effort of delegates in contributing solutions for regional environmental challenges. They also introduced the current direction of solid waste management in Taiwan's and Tainan's policy address and briefly introduced the infrastructure and schemes for driving a more sustainable Taiwan.

Delegates from each jurisdiction, including Professor Shi-Fang KANG, Chairman of CIEnvE, Mr. Xiao-Hui ZHOU, Vice Chairman of CAUES, Mr. Victor LI, Vice Chairman of HKWMA and Ir. Seng-Fat WONG, Vice Chairman of MIE, then gave short speeches to express their sincere gratitude to the organizers for providing the platform for them to share the latest waste management strategies and technologies with their peers.

Organizers and the guest of honor of the 8th Two-Coasts Forum on Sustainable Solid Waste Management

Ms. Ying-Ying LAI, the Deputy Director of the disposed waste management division of the EPAEY, delivered a talk on "Current Situation and Policies of Disposed Waste Management in Taiwan". She shared the history and strategy of how waste reduction and recycling were promoted in Taiwan during the last 30 years by various political tools. A list of policies had been adopted in Taiwan since 1987 to achieve zero-waste and a sustainable material cycle. These included the extended producer responsibility scheme, banning of disposable utensils, restriction in packaging materials, bulky waste repairing scheme, banning disposal of mercury-containing thermometers and batteries, food waste recycling scheme, etc. The policy framework was set by the EPAEY, while the implementation details were determined by local governments.

Representatives from Tainan City Government then introduced the implementation details in Tainan City based on the policy framework set out by the EPAEY. Mr. Jian-San LIN, Senior Technical Specialist of the EPBTCG, gave a presentation on "The Development of Tainan City's Urban Solid Waste Management". He explained that several government departments and teams were combined to facilitate waste collection and charging. The frequency of waste collection had been reduced from once per day to four times per week. There was not as much waste reduction as they had expected after its implementation, yet it helped save energy and manpower on waste collection through this practice.

A speech titled "Recycling and Reuse of Bulky Waste" was then delivered by Mr. Zuo-Xiang LIN, the Deputy Captain of the environmental inspection team of EPA. He reported that there were around 136,000 tonnes of bulky waste being disposed of per year in Tainan. The bulky waste was classified into repairable and non-repairable types. The valuable bulky waste, such as wooden furniture, was sent to skillful workers for repairing or crafting into new utensils. These repaired products were sold in second hand shops set up by local government. Citizens could buy those repaired products while the profit contributed to the costs of the recovery operation. The non-repairable bulky waste was crushed and sorted. Coarse wooden pellets were then used for spreading in gardens and for covering soil, while finer sawdust was used as a bulking agent in composting plants. In order to further reduce waste disposal an online platform called "i2so5" was also set up for citizens to sell and buy second hand products. Besides, the city government repaired old electrical appliances donated by citizens and then offered them to the underprivileged for free. The government also provided an electrical appliances' "clinical repairing service" to citizens at a very low charge, (only NTD 50 each), thereby saving them from being thrown away.

In order to reduce the transportation cost and to make recycling more convenient, Mr. Zhi-Ming LUO, Assistant Manager of the Da Fon Environmental Technology, introduced their patented innovative idea on recyclables collection, namely City Circle. City Circle was a convenience shop for waste, which featured functions including collecting recyclables and selling reusable and recycled products. Each user could register a membership card (like Hong Kong's octopus card) with RFID. The user could self-serve by beeping the card and weighing the bag of recyclables collected. Credits would then be added to the card. The user could then use those credits to purchase reusable / recycled products inside the shop. The system provided incentives for citizens to recycle more.

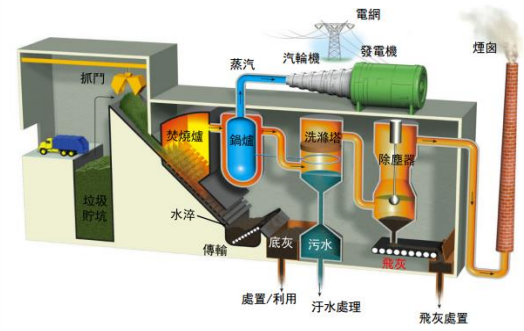
Mr. You-Ren CHEN, Assistant Manager of the 映誠股份有限公司, told the delegates that there were around 1.017M tonnes of incineration residue generated annually in Taiwan. After mechanical separation, chemical extraction of heavy metals and rinsing, the bottom ash could be used to make low density concrete with high permeability. Mr. Chen also claimed that any water that permeated through this concrete could pass the safety standard of USEPA. He also said that the selling price of their product was lower than that of natural material.

Several other technical service providers from Taiwan introduced their new services and research findings.

Mr. Zhong-Jin XU from 華門工程顧問公司 focused on the revitalization of landfill sites and discussed the four major approaches to achieve it, including 1) greening, 2) restoration as parks, 3) change in land use and 4) trash removal.

Mr. He-Da ZHUANG from 吉將環境公司 suggested using electrolysis to treat leachate produced in landfill sites before conducting nano-filtration, thereby increasing the durability of the filter membrane. He claimed that this method could help reduce the total cost of the treatment.

Ms. Pei-Yu LIN from Sino Environmental Services Corp. presented the results of blood tests to check the dioxin levels of their employees working in their incineration plant. The health monitoring results showed that the dioxin level of all employees examined did not exceed the safety standard.



Typical operation flow of incineration plant in Taiwan

Professor Jian-Rong LIN from the Chia Nan University of Pharmacy & Science reported on the "Management of Food Waste Composting and its Performance Review". He presented how soil conditioner could be made from food waste generated at source and the subsequent distribution of compost through retail outlets. As they did not send the compost for quality assurance and certification they could not sell it on the market. Citizens could get the compost for free by exchanging it with recyclables e.g. 2kg of aluminium cans.

Delegates from China, including Professor Hai-Yun XU from the China Urban Construction Design & Research Institute Co. Ltd. and Professor Jian-Guo LIU from the School of Environment, Tsinghua University, shared the current situation of municipal solid waste management in China and fly ash problems arising from the incineration of solid waste.

Vice President of the HKWMA, Mr. Victor LI, also shared the changes and opportunities ahead in waste management in Hong Kong and introduced some new local policies and infrastructures.

Discussion sessions were arranged during the day-long forum to allow the delegates to further discuss specific questions. With intensive knowledge and information exchange among speakers and forum participants, this forum successfully became a unique think tank opening up new ways to approach the solutions for many regional challenges in solid waste management.

The forum at Zenda Suites Tainan Hotel

HKWMA delegates

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TECHNICAL VISITS

Visit 1

Visit to Tainan Refuse Incineration Plant (台南城西垃圾焚化廠)

Quick facts of the facility –

- Treatment capacity: 900 tonnes/ day
- Refuse storage: 8,000 m^3; roughly equivalent to 2,700 tonnes of refuse
- Electricity generator: 15,800 kW engine (25% for internal use, 75% sell out)
- Area: 14.5 hectare
- Fly ash and reaction ash treatment: solidification→landfill
- Incineration residue was sorted into metal, non-metal, coarse and fine aggregate for recycling and sending to landfill.
- They liaised with temples and encouraged citizens to burn 冥財 and 京金 by batch in the facility to control air pollution.

Exterior of the incineration plant

Sorting of incineration residue

Location specifically for burning 冥財 and 京金

Discussion during the visit

The most impressive part of the facility was the high standard of environmental monitoring and ecological conservation in the whole district. They did not simply fulfill statutory requirements, but also achieved betterment by adopting low carbon operation and conserving nature with the result that there was a high abundance of birds being recorded in the area. The social acceptance of the facility was also very high as they had built a waterpark with spa, heated pool, wave pool and slides for the nearby community to enjoy.

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Visit 2

Visit to Food Waste Composting Plant of Western Tainan City Government
(臺南市城西廚餘堆肥廠)

Quick facts of the facility and operation –

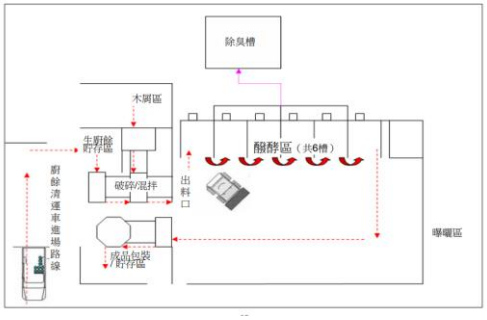
- Treatment capacity: food waste 10 tonnes /day (moisture 90%)
- Input food waste source: commercial &industrial food waste (raw food waste)
- Mixing the food waste with coarse sawdust which comes from crushed non-repairable bulky waste as discussed at the forum.
- Ratio of sawdust: food waste is roughly 1: 3, helping to adjust the moisture content of the compost to become 50%-60%.
- There are ventilation pipes installed below the fermentation bins.
- Composting period: 35-42 days
- Compost output: 20 tonnes/ month, which is distributed to local farms.
- The fermentation period and control of the fermentation bins

Bin	Fermentation time	Fermentation Temperature	Ventilation Frequency	Drainage	Rotation Frequency
Bin 1	7 days	30-40 °C	15 min per hr	Once per day	Three times per week
Bin 2	7 days	40-50 °C	15 min per hr	Once per day	Twice per week
Bin 3	7 days	50-60 °C	15 min per hr	Once per day	Twice per week
Bin 4	7 days	60-70 °C	15 min per hr	Once per day	Once per week
Bin 5	7 days	70-60 °C	15 min per hr	Once per day	Once per week
Bin 6	7 days	60-40 °C	15 min per hr	Once per day	Once per week
Bin 7	-	Room Temp	Curing Stage		

The composting plant

The director explaining the operation flow

城西小型廚餘堆肥廠平面配置簡圖



Layout of the composting plant

Coarse sawdust acting as bulking agent

Fermentation bin

Ventilation Pipe

Steam generated during bio-digestion

Visit 3

Visit to Sustainable Environment Research Centre of National Cheng Kung University (國立成功大學永續環境科技研究中心)

The centre had a treatment plant as a demonstration for treating special waste. It was financially self-sustaining with both government subsidy and waste treatment charging fee from external parties at NTD 30 per kg. There were three core components in the design, including incineration, physicochemical treatment and plasma technology.

Quick facts of the facility –

- **Incineration system**
  Design capacity: 375 kg/ hr
  Design calorific value: 3000 kcal/ kg

- **Physicochemical treatment system (Batch system)**
  Input: laboratory waste (e.g. CN, Hg, acid, alkaline, heavy metal)
  Treatment Capacity: 625 kg/ hr
  Treatment technology: oxidation, neutralization, sedimentation, absorption, separation and coagulation

- **Plasma system**
  Input: Bottom ash from incinerator and sludge from physicochemical system
  Treatment capacity: 125 kg/ hr
  Fusion temperature: 1,400 - 1,500 °C
  Output: Solidified highly polluted material (e.g. heavy metals). The output slag can be used for construction material without secondary contamination. Heavy metal will not be leached out when the temperature is lower than 1,000°C.

The black pieces are the slag remaining after plasma treatment.

Delegates from Taiwan, Macau, China and Hong Kong participated in the site visits

Visit 4

Visit to China Petrochemical Development Corporation An-Shun Site
(中石化(台鹼)安順廠土壤污染整治場址)

The old An-shun Plant conducted mercury cell electrolysis to electrolyze the saline water for making chloralkali. According to the investigation of 台灣省水污染防治所, An-shun Plant used about 2.4 tons of mercury at that time. The factory discharged mud, sewage and other types of waste contaminated with mercury directly to the environment. Besides, Taiwan Alkali Co. tried to make and sell pentachlorophenol and sodium pentachlorophenol (herbicide) in 1946 at the same site, which produced residual products such as dioxin. After long-term exposure to the pollutants, the soil and groundwater had been contaminated with different levels of mercury, pentachlorophenol and dioxin. China Petrochemical Development Corporation (CPDC) was then accused by the government as being the responsible party that caused the soil contamination. Therefore, CPDC needed to remediate the area.

Plantation for removing heavy metals from soil

Treated soil covered by plastic sheets

Quick facts of the site –

- Sludge and river-bed soil removal for further treatment.
- Heat degradation to treat dioxin.
- Condensation of mercury for mercury recycling.
- Plantation to speed up heavy metal removal from the soil with the plant being burned after a certain period and then removed.
- CPDC spent NTD 200M per year to treat 500K tones of contaminated soil.

Reported by Angelina Ng

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Third International Conference on Solid Waste – 19 to 23 May 2015

The 3rd International Conference on Solid Waste: Knowledge Transfer for Sustainable Resource Management (ICSWHK2015), organised by the Sino-Forest Applied Research Centre for Pearl River Delta Environment (ARCPE), Hong Kong Baptist University, was successfully held from 19th to 23rd May 2015 in Hong Kong. The conference at the Hong Kong Convention and Exhibition Centre gathered over 500 professionals from 57 countries to share their experience and knowledge in regard to sustainable waste management. The conference addressed an extensive coverage of topics including technological advances, public relations as well as political reinforcement. This conference marked an important milestone along the journey to sustainable resource management.

Impressive numbers of presentations, 162 speeches and 183 posters, were delivered this year. The conference themes underlined crucial issues from regulation improvement to technology development, including waste management and strategy, anaerobic digestion, composting, bioenergy, sludge management and treatment, hazardous and industrial waste management, E-waste, construction and demolition waste, thermal technologies, biochar, etc.

To mark the opening of the conference, Mr. K. S. Wong, J.P., Secretary for the Environment, delivered an illuminating speech on the up-to-date waste management framework and the prospective visions in Hong Kong. Mr. Wong's opening address was followed by plenary talks given by the keynote speakers. Prof. Klaus Fricke from Technical University of Braunschweig, Germany shared his views on anaerobic digestion development and highlighted the operational challenges, which are valuable references for concerned users including Hong Kong. Prof. Jonathan Wong of Hong Kong Baptist University showed the advancement of composting in an urban setting in terms of more successful nutrient fixation as well as odour and pathogen control. Dr. Hermann Koller from the International Solid Waste Association, Austria, and Dr. Mervyn Jones from the Waste and Resources Action Programme, UK, introduced effective managerial concepts pertaining to political and economic incentives that facilitate waste prevention and recycling.

To enhance the operation and efficiency of the local recycling industry, a "Recyclers Forum: Sustainable Development of Hong Kong Recycling Industry" was held on 21st May as a special public session. This forum was strongly supported by the Environmental Protection Department of HKSAR (EPD), which provided a platform for Hong Kong's local recyclers to learn the technologies, operational practices and experience from other regions. Ms. Anissa S. Y. Wong, J.P., Permanent Secretary for the Environment, was the officiating guest of the forum. Mr. H. M. Wong, Assistant Director of EPD and Ir. Kenny Wong, Principal Consultant of Hong Kong Productivity Council of Environmental Management Division, led an overview of the waste recycling performance in Hong Kong as well as the forthcoming Recycling Fund.

The session entailed insightful sharing by local and overseas experts in the recycling industry and the direction regarding the local industry development evoked intriguing discussion on and off stage. Mr. Jacky Lau, Chairman of the Hong Kong Recycled Materials & Re-production Business General Association Ltd. stood for outsourcing of the recyclable pretreatment instead of valorisation and re-production in Hong Kong in consideration of the limited land resources and the premature source-separation practice of the community. However, Mr. H. M. Wong remarked that the Government supported and encouraged the local re-manufacturing business, for example, via the establishment of Eco-Park. He also upheld the importance of research and development to realise waste valorisation in the local context.

Inspiring stories and dialogues signified the great success of the conference where stakeholders from various sectors came from across the globe and proactively engaged themselves in the betterment of solid waste management. If interested, more details are available on https://arcpe.hkbu.edu.hk/conf2015/.

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Dr. Thet Zin, Deputy Minister, Ministry of Environmental Conservation and Forestry, Myanmar; Mr. K. S. Wong, J.P., Secretary of the Environment, HKSAR; Prof. Albert S. C. Chan, President, Hong Kong Baptist University, HKSAR; Prof. Nickolas J. Themelis, Columbia University, USA; Prof. Jonathan Wong, Hong Kong Baptist University, HKSAR (from left to right)

Recyclers Forum: Sustainable Development of Hong Kong Recycling Industry

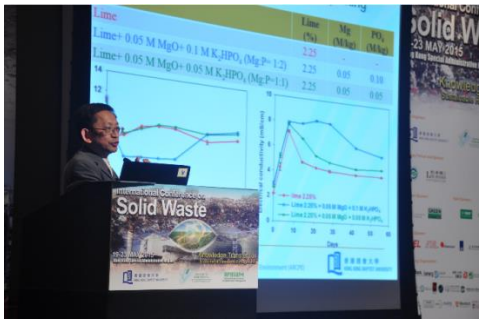
The large audience at the conference

Recyclers Forum: Sustainable Development of Hong Kong Recycling Industry

Reported by Iris Yu, Season Chen and Dan Tsang

Dr. Mervyn Jones,
Waste and Resources Action Programme, UK

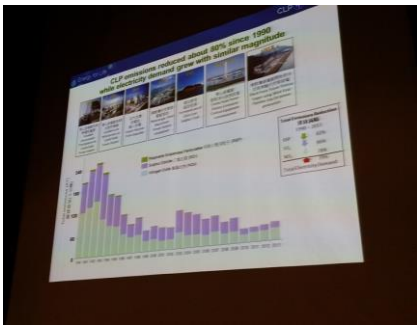
Technical Visit to CLP Power's Castle Peak and Black Point Power Stations



Prof. Jonathan Wong

Castle Peak Power Station

Black Point Power Station



Performance of CLP in Emission Reduction throughout the Years

The technical visit to CLP Power's Castle Peak and Black Point Power Stations was successfully conducted on 1 November 2014 together with HKIE with around 25 participants from each organization.

In this event, we could visit one of the world's largest coal fired power stations and one of the world's largest gas-fired combined cycle power stations, Castle Peak Power Station and Black Point Power Station respectively.

Castle Peak Power Station was constructed in the 1980s with four 677MW generating units. The primary fuel in this plant is coal. With the Emissions Control Devices for reducing particulates, sulphur dioxide and nitrogen oxide emissions, Castle Peak Power Station is one of the cleanest coal-fired power stations in the world.

Black Point Power Station is Hong Kong's first natural gas-fired power station. The combined cycle gas turbine technology at Black Point enables exhaust energy produced to be re-captured through an additional steam cycle so that higher plant efficiency can be achieved. It produces 50 per cent more electricity without requiring any additional fuel. The use of natural gas has enabled a vast reduction of total emissions and made a great contribution to a cleaner world.

We attended a sharing session on CLP's environmental management and initiatives presented by one of our members, Mr. C.M. Choi, and visited the ElectriCity. We had a site tour to look around both Castle Peak Power Station and Black Point Power Station. From the visit, we gained a better understanding of the key environmental aspects and associated environmental control technologies of CLP.

Visitors' Centre in Castle Peak Power Station – ElectriCity

Model of a Generating Unit

Model of Coal Pulveriser

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Sample of Coal Delivered to the Castle Peak Power Station

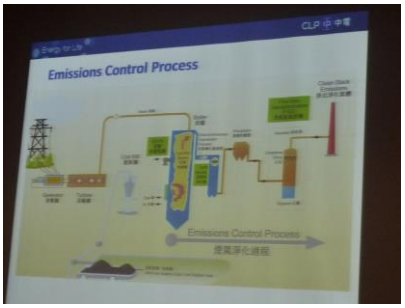
Stacks at Black Point Power Station

Steam Turbine in Castle Peak Power Station

Lamp Driven by Wind Turbine and Solar Panels at Black Point Power Station

Real Time Monitoring of Electricity Generation from CLP Power Plants

Photo with HKIE Members



Emissions Control Process in Castle Peak Power Station

Photo of HKWMA Members

Reported by Connie Chan of YMC

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Forum on The National Environmental Protection Act in China

The National Environmental Protection Act in China has recently been revised and came into effect on 01 Jan 2015. This revision entails substantial changes and in particular more stringent requirements on various environmental aspects.

On 22nd November 2014, the Hong Kong Green Strategy Alliance (HKGSA) organized a Forum, supported by HKWMA, and invited a high level Central Government official (國家環境保護部政法司規處副長 李靜雲女士) to brief the delegates on these key changes. Moreover, key speakers from the local arena also shared their insights on the implications of the Act's revisions to the current business and professional practice. Over a hundred delegates attended the Forum.

In the opening , Miss Li Jingyun(李靜雲女士), of the Environmental Protection Department in China, presented a keynote speech titled "新環境保護法的新進展" to report the overall progress of major amendments to the country's Environmental Protection Law (EPL).

After the first keynote speech delivered by Miss Li, Ir. Daniel M. Cheng MH, JP, of the Federation of HK Industries, and a former Chairman of HKWMA, presented "新環保法規對珠三角港商危與機". During the session from HKPC, Mr. Tsang Kam Lam BBS, JP, General Manager of Environmental Management, presented "國內新的環保政策及法規對制造業可能的影響"

The new amendments to China's environmental law put powerful new tools into the hands of environmental officials and the public. Most notably, the revisions make three critical improvements: 1) they add a new fine penalty system that will continue to accumulate for each day the pollution violations continue (by eliminating the previous one-off fine system); 2) they formalize a much-needed performance assessment system that is based on an official's environmental protection record rather than solely on economic growth; and 3) they allow for non-governmental organizations to take legal action against polluters on behalf of the public interest.

The new penalty system calls on local environmental protection bureaus to issue corrective orders and fines to violators and, beginning the day after the corrective order is issued, collect a fine for each day the violation continues, based on the original penalty amount. Local governments may strengthen these daily penalty provisions by expanding the types of violations that are subject to continuous daily fines.
(行政機關可以自責令改正之日的次日起，按照原處罰數額進行按日連續處罰。同時規定，地方性法規還可增加按日連續處罰的違法行為種類.)

The amendments will give China's Ministry of Environmental Protection (MEP) greater legal authority to regulate and penalize polluters. Examples of actions that would meet harsher punitive measures include:

- the competent authorities are allowed to take measures such as restricting and suspending production in order for the company concerned to rectify the situation. Additionally, the authorities may also directly order the enterprises concerned to suspend or shut down production,

- the competent departments may close down and detain facilities and equipment causing pollution discharge. Such measures do not exist in the current law and the Revised Law provides greater powers to the authorities in order to punish companies for the discharge of pollutants,

- the Revised Law establishes a "daily penalty" system and sets no limit on the total amount of the fines. The fines specified in the Revised Law shall be implemented according to factors such as the operating costs of pollution prevention and control facilities and direct losses arising from violations or illegal gains, and

- the Revised Law establishes a "pollution blacklist". The pollution blacklist will record all environmental violations and will be publicly available.

The overall impression of the forum was that it was well organized in an excellent venue. The forum ended with a detailed discussion between the audience, the speakers and Ir Dr the Hon W.K. Lo BBS, MH, JP Chairman of HKGSA, on all aspects of the new amendments to the Environmental Protection Law.

Reported By Jude Chow

Management Options for Energy-from-Waste Air Pollution Control Residues (APCRs)

With the recent commissioning of the Sludge Treatment Facility and the imminent construction of the IWMF, Hong Kong's first new waste-to-energy incinerator to be built in several decades, the question of how best to manage ash from incinerators is back on the Hong Kong agenda. It was therefore timely that a seminar was held at the Hong Kong Polytechnic University on 10th December 2014, jointly organized by the PolyU, the HKIE Environmental Division and HKWMA.

Professor CS Poon of PolyU introduced the speaker for the evening, Dr. Julia Stegemann, from University College London in UK. Dr. Stegemann began her talk by advising her large audience that she had been working on this topic for thirty years because it was problematic and difficult and kept coming back. The talk would concentrate on toxic metals in APCRs and their effect on the technical properties of blended cement. To put the topic into perspective, Dr. Stegemann quoted some World Bank figures from 2011 (which she said she considered to be an underestimate). The World Bank estimated that in 2011 the world produced 1.3 billion tonnes of municipal solid waste (MSW) and that this quantity was expected to double by 2025 (i.e. just over 10 years ahead). Of this quantity, 16% was expected to be treated by combustion and 60% would be sent to landfill. The combustion of waste in 2011 produced 2.1 billion GJ of energy which was about 2% of global industries' energy requirement. The residues from combustion of waste amounted to about 60 million tonnes a year of which 6 million tonnes were APCRs, which were considered hazardous, while the other 54 million tonnes, or 90%, were bottom ash which was considered to be not hazardous.

Dr. Stegemann then showed a diagram of a typical mass-burn process with particular reference to the acid gas scrubber and the collection of the APCRs in a bag house. The talk would focus on APCRs, also colloquially known as fly ash. This material was mostly calcium chloride hydroxide, which was soluble, and the excess lime from the scrubbing process with some other non-combustible elements including metals. The general properties of APCRs, which typically represented about 2 to 6% of the incoming MSW volumes, were : they were very alkaline and therefore corrosive with Ph of 12 and above; they had a high content of heavy metals particularly zinc and lead; they had a high content of soluble anions particularly chlorides and sulphates; they were difficult to recover or treat and they were not produced by incineration, the final products that made up APCRs came in in the waste. Any thermal treatment process for waste would generate the same end-products including pyrolysis or gasification as well as mass-burn. With these properties, it was an important question to ask what happened in the natural environment where leaching by groundwater could wash out the metals from the residues. There was no treatment of the residues that could prevent this leaching process if the residues were allowed to come into contact with groundwater. Solutions to the problem included putting the residues in suitable excavations left over from salt mining, stabilizing the residues and putting them in a secure landfill or using them in construction materials after adding a suitable binder.

Dr. Stegemann then went into more detail on the last option : the potential role of residues in the production of blended cements. The worldwide cement industry was presently using 5 billion tonnes of raw materials annually, so it could be seen that 6 million tonnes a year of APCRs represented only a little over 0.1% of the total. 11 billion GJ of energy were used annually to produce cement, which was about 11% of the global total energy consumed. APCRs could be used in cement by integrating them into coal fly ash from power stations or blending them into cement as an additive. People

had tried burning MSW directly in cement kilns but it led to some problems because the low calorific value of the MSW could upset the operation of the kiln. World cement demand was volatile which made blended cements attractive because they didn't need new plants to increase production : existing waste product (i.e. APCRs) could just be added to the cement together with other waste products like Ground Blast Furnace Slag and Pulverized Fuel Ash, with these combined waste products making up to 20% of the total weight of the cement.

One problem with adding APCRs to ordinary portland cement (OPC) was that it added sodium, potassium and chloride ions which were soluble. Another problem was that APCRs also had much higher levels of elements like cadmium, lead, zinc and copper than normal unblended OPC. The leachability of APCRs and APCR / cement mixes could be measured by the "Steady State Batch Extraction Test" in which the Ph could be adjusted to see the effect on leachability. Ph levels of 11 to 12 occured naturally in APCRs and at this level of alkalinity laboratory tests showed that virtually all the lead present was leached out. In pure cement mortars leaching was an order of magnitude less, mainly because the concentration of elements in cement was much lower to start with. It was a similar story for zinc although for both metals laboratory test results were not yet conclusive. If the tests were carried out over a long term with recirculated leachate, starting with plain water, after 64 days sulphate and chloride ions leached from APCRs were very much higher than from cement.

If APCRs were considered for incorporation in blended cements, it was very important to find out their effect on the strength of cement and concrete and to find out whether APCRs were pozzolanic. Dr. Stegemann said that there was not much data yet on these aspects and what there was contradictory. The definition of pozzolanic activity was if a material reacted with lime to gain strength which was checked by seeing whether calcium silicon hydrate was produced as expected from the reaction but other compounds were also formed. So far it was not clear that the addition of APCRs at a particular proportion could improve concrete strength. If the addition of APCRs was increased over 50% that had a dramatic adverse effect on the concrete strength. Even for additions of 15% or less of APCR, the strength increased up until 90-days age but thereafter it dropped off dramatically and after a couple of years the aluminium and sulphate ions in the APCRs reacted together and the mortar turned to powder with no strength. So, from research to-date, the general conclusion was that APCRs had a deleterious effect on cement paste and concrete mortar strength. At best the effect was variable. Also cement setting times were dramatically increased and the leaching of soluble salts from the APCR led to an increase in the matrix porosity and ultimately disintegration.

As noted before, globally APCRs from waste incineration were only about 0.1% of the raw materials needed for cements. At this ratio toxic metals and chlorides would be very significantly diluted and the mobility of low concentrations of metal pollutants was reduced in cement-based matrices. However, amongst other effects, it had been noted that the chlorides remained mobile which could lead to a risk of corrosion and environmental pollution. Overall, therefore, Dr. Stegemann thought that having concentrated the toxins from the waste in the APCRs it was best to keep them there and put them out of harm's way rather than dilute them in building materials and spread them back into the environment through leaching. The moral of this approach was that "dilution was not a solution to pollution".

In response to questions from the audience at the end of her talk, Dr. Stegemann referred to the much discussed worry about the presence of dioxins in the flue gas from waste incinerators. She said that modern incinerators produced far less dioxins than fireworks and that as dioxins were not soluble, they were not considered a problem if APCRs were used in blended cement and other building materials. As regards the disposal of cement-stabilized APCRs in co-disposal landfills with MSW, she reminded the audience that the acid environment in a landfill would ensure that heavy metals eventually leached out because of the highly soluble chloride content. Accordingly, adding cement to the APCRs before the co-disposal was a waste of time and money. These effects

had been seen in tests at a landfill in Switzerland where blocks disintegrated eventually. Overall, therefore, she considered that co-disposal with MSW was not a good idea and that disposal in salt mines was the best solution.

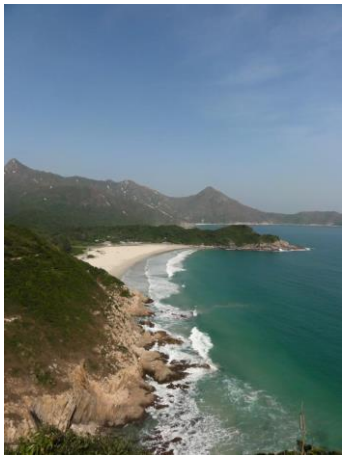
With regard to the ash from Hong Kong's Sludge Treatment Facility, Dr. Stegemann said it should not be hazardous because as far as she knew there were no metals present in the waste stream being incinerated. Ashes from burning timber were more dangerous in that respect. The most important factor in determining leachability, as measured by TCLP tests, was Ph. Cement stabilization of APCRs was very expensive and largely ineffective in reducing leachate generation. Salt mines were a very favourable location for the disposal of APCRs because the presence of solid salt underground indicated that there had been no water present during geological time. However, the same could not necessarily be said of granite caverns with groundwater present where leaching could occur. To make blending of APCRs with cement successful, the APCRs would have to be washed first to remove the metals and other toxic elements.

Reported by Barry Adcock

YMC Gathering – Hiking at Sai Kung

YMC gathered to go hiking on a very nice sunny day on 13th December 2014. We challenged part of Stage 2 East Sai Kung Peninsula of the Maclehose Trail, which began at the East Gate of the High Island Reservoir to Pak Tam Au. We ran through the impressive country including the peaks, uplands, peninsulas and bays around Tai Long Wan.

Firstly, we made a steep ascent to Sai Wan Shan. Climbing up here, we had majestic views over a superb coastline. After dropping down to Sai Wan, the Trail followed the beaches to Ham Tin, then turned inland over the coastal hills. We had supplies from the local stores at Ham Tin and Tai Long Wan, e.g. traditional beancurd jelly with ginger juice, instant noodles and soft drinks.



The hiking lasted over 7 hours, from 8am to 4pm. This experience not only strengthened our physical condition, but also trained our tolerance, perseverance and persistence to overcome any challenges we encounter in the future. Although we were all exhausted, we had an unforgettable experience and we developed deeper friendship within YMC.

Reported by Cammy Kong

Technical visit to Hong Kong International Airport re Waste Management Practices and Facilities

YMC organized a technical visit to Hong Kong International Airport (HKIA) on 10th January 2015. The visit was popular with 28 members and guests attending.

Ms. Tammy Fung, the Senior Officer for the Environment, and Mr. Tommy Wan, Assistant Manager for the Environment, greeted the party in the media room and introduced the background information on the carbon reduction and waste management initiatives of HKIA.

The Hong Kong Airport Authority (HKAA) had set up a long term target to recycle 50% of waste generated at HKIA by 2021. As part of the programme to meet the target, food waste recycling was started in 2003 and extended to all food and beverage outlets, airline caterers and major business partners on the airport island in 2013. The collected food waste was first treated on-site and was then converted into compost or fish food at off-site plants.

After the briefing, the party visited one of the restaurants located in Terminal 2 and the food waste composter at the landside waste station to understand the on-site food waste collection and treatment process. The staff of restaurants drained out the liquid from the collected food waste and then put it into designated bins and plastic bags provided by HKAA. HKAA took responsibility for the treatment of the collected waste to facilitate and streamline the procedures. The compost generated was used in HKIA landscaping works.

Before the end of the site visit the party also visited the wastewater treatment plant. HKIA had adopted a triple water system to collect wastewater for recovery from restaurants and hand basins in the terminals, from aircraft kitchens and from aircraft washing. The treated wastewater was used for irrigation in landscaped areas.

Photo of the party during the visit

Presentation of Certificate of Appreciation to Mr. Tommy Wan by Ir Kenny Wong, Chairman of HKWMA

Reported by Christina Ho

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Food Waste Forum

On 24th January 2015 the Hong Kong Waste Management Association was co-organiser for the Food Waste Forum held at the Hong Kong Polytechnic University. The aim of the forum was to share knowledge on strategies, policies and action plans for management of food waste using case studies from Hong Kong and Taiwan with a view to highlighting the food waste challenges faced in Hong Kong in the coming years.

HKWMA chairman Kenny Wong facilitated the forum that included key note presentations from distinguished policy makers, academics, non governmental organisations and practitioners comprising:

- Dr WK Lo, Legislative Council Member who provided the introduction to the forum and set the scene for the food waste challenges faced in Hong Kong;
- Elvis Au, Assistant Director for EPD who spoke on the Hong Kong Food Waste Policy and Programme;
- Dr Hung Yi-Chen, Director Taiwan EPA who spoke on Food Waste Policy in Taiwan;
- David Chan, HKPC who spoke on Technology and Practices for Onsite Food Waste Recycling; and
- Dr William Yu, World Green Organisation who spoke on Waste Reduction and Community Engagement and shared experiences from pilot food waste recycling programmes on local housing estates.

Hong Kong Context, Policy and Programme

Dr WK Lo and Elvis Au each provided contextual views on the current situation in Hong Kong by way of reference to old practices, the recent past, the new chapter and the way forward for food waste management.

At the time of the forum approximately 36% of all municipal solid waste comprised food waste and Government had set ambitious targets in the Food Waste and Yard Waste Plan 2014-2022 to reduce food waste disposal to landfills by 40%.

To achieve this target the Government had embarked upon numerous initiatives to promote reduction of waste through the Food Wise Campaign launched in 2013, reuse and donation of food via food banks and funding support through the Environmental Conservation Fund, provision of infrastructure within public housing estates and Government facilities to enable effective collection and separation of food waste at source and the provision of a network of organic waste treatment facilities that would convert food waste into energy. By 2022 the Government planned to achieve a target of 800 tpd of treatment capacity through a network of organic waste treatment facilities and the first of these facilities, with a 200tpd capacity, was currently under construction at Siu Ho Wan.

Elvis Au highlighted that Hong Kong's annual food waste generation was approximately 0.13 tonne/capita compared with 0.07 tonne/capita in Taipei. Education and behavioural change were equally important as well as the provision of the supporting infrastructure. The entire community had a role and responsibility to reduce food waste.

Elvis Au indicated that ongoing studies were further assessing strategies and plans beyond the current Year 2022 horizon of the Food and Yard Waste Plan. These studies embraced how circular economy principles could be embodied within future policy and how waste treatment facilities could provide co-treatment and co-location and he cited specific pilot studies for co-digestion of food waste and sewage sludge.

Elvis Au concluded his presentation by describing the aspiration of EPD to reach a sustainable waste strategy that had at its core recycling and waste recovery.

Taiwan Case Study

Dr Hung Yi-Chen described the 20 year journey that the Taiwan EPA had taken to actively implement policies and strategies for food waste reduction and beneficial re-use for food waste to energy or other uses such as animal/fish feed in Taiwan.

In terms of food waste generation the proportion of food waste within the municipal solid waste stream was similar to that encountered in Hong Kong. The Taiwan EPA realised that tackling food waste was key to any zero waste policy and realised that provision of treatment infrastructure needed to be in place to enable effective implementation of reduction and recycling strategies. These policies had evolved over time to the maturity that waste separation was now mandated through legislation and penalties imposed for non-compliance. Dr Hung provided statistical data that demonstrated the effectiveness of these policies and showed that reduction in waste had a beneficial impact on GDP growth.

Technology and Practices

Due to the unfortunate illness of David Chan his presentation was delivered by Kenny Wong from the HKPC. The presentation described organic waste treatment technologies and the application of each technology at different scales from local housing estates to regional/municipal facilities. The technologies described compared conventional anaerobic digesters and package composting plants that converted food waste into liquid fertiliser, solid fertiliser and/or animal feed with dehydration plants and municipal scale waste to energy plants that derived biogas or biofuels. The selection of the appropriate technology and the reliability of a consistent quality organic fuel source was highlighted and was a key consideration for any technology selection. Within Hong Kong examples of successful pilot plants were in operation at public housing estates and food processors. The presentation highlighted the need to carefully control organic waste quality to suit the specific treatment process. The speaker highlighted the challenge for the majority of treatment processes was to optimise the energy yield for waste to energy applications and to define suitable outlets for compost or other end products from the treatment processes. Given the unique geography of Hong Kong end products such as animal feed or compost had few outlets so future applications required more innovative use of the end products arising from organic treatment.

Local Case Study

Dr William Yu from the World Green Organisation discussed how his organisation had been engaging the community to reduce and separate waste at source and highlighted some of the behavioural drivers associated with waste separation and charging.

Specifically, Dr Yu provided a detailed case study of how his organisation had run an organic waste collection programme in a private housing estate in Tseung Kwan O. The pilot programme engaged 200 households who were provided with organic waste bins for daily collection by an organic waste processer. The pilot programme did not charge residents initially and participation rates were high, especially among families with young children.

The daily route of waste separation, collection and disposal at an organic collection point provided direct educational value with a high percentage of residents considering their efforts to be worthwhile. Upon completion of the three month pilot residents were requested to continue the same programme but to contribute a notional charge. The impact of charging had a direct influence on participation even though the fee proposed was relatively small. The case study highlighted that the community was willing to engage when the appropriate infrastructure and logistics were available but costing remained an emotive issue and establishment of appropriate mechanisms for charging remained an area that required further community engagement or direct support from Government

Summary

The forum yielded active discussion amongst participants with private sector organisations seeking an insight as to how they could participate and promote other organic waste reduction and treatment activities beyond those initiated by Government.

The forum highlighted that the community was willing to engage with waste reduction and source separation activities but the mechanisms for charging and incentives remained significant drivers of behavioural change.

Panel members responding to audience questions: [L to R: Kenny Wong, Dr Yi-Chen, Dr WK Lo, Dr William Yu, Prof. Irene Lo]

Audience in the HKPoly U Lecture Theatre during Elvis Au's presentation

Reported by David Pegg

JCEIA Annual Conference on Municipal Solid Waste Management

The Joint College Environmental Innovation Alliance (JCEIA) has been formed by a group of current and graduate environmental students from various colleges across Hong Kong and it strives to offer a wide-ranging platform for intellectual exchange on different environmental issues through various events from time to time. This year JCEIA's main focus has been solid waste management in Hong Kong and with the support provided by the Department of Civil & Environmental Engineering of the Hong Kong Polytechnic University, JCEIA organized its Annual Conference on the subject of Municipal Solid Waste (MSW) Management on 24th January 2015 at the Hong Kong Polytechnic University.

It was a highly enjoyable afternoon which provided the guests with more information on MSW management in Hong Kong. It also provided an opportunity for an open discussion on the policies for MSW management and recycling. Over 200 guests, including students, scholars, government officials, green groups and corporate representatives, attended the event. It was opened by Mr. Henry Ho, Chairman of JCEIA. The conference in the theatre featured the current waste reduction systems, community engagement and environmental education. During the event the keynote speaker - Mr. K. S. Wong, JP, Secretary for the Environment of the Environment Bureau, shared his perspectives and vision on the current solid waste management strategies and the future planning for reducing solid waste disposal.

Guest speaker Mr. Mark Venhoek, CEO of SITA Waste Services Ltd., shared his view with the audience on the challenges and the current technologies in the waste recycling industry. His talk was followed by further guest contributions from Ms. Bertha Wu, Sustainability Manager of The Link Management Limited, and

Mr. Mike Kilburn, Senior Manager (Environment) of the Airport Authority Hong Kong who introduced the audience to the solid waste reduction systems and operations within their premises.

Mr. Heba Chan, Senior Project Officer of Food for Good, also showcased the food waste management initiatives of his organization, whereas Dr. William Yu, CEO of World Green Organisation shared his experience in community education on waste management within society.

Following these insightful talks, a panel discussion was facilitated by Dr. Dan Tsang of Hong Kong Polytechnic University. The keynote speaker and guest speakers had a thought-stimulating discussion with the audience about the contemporary issues, including overseas waste reduction policies for citizens' behavioural change, economic incentives through producer responsibility schemes and waste charging, as well as career prospects in waste management.

This conference delivered a unique platform for the stakeholders to interact and exchange their views on the MSW management system of Hong Kong with experts from different sectors.
For further details or to make an enquiry, please email general@jceia.org or visit http://www.jceia.org/.

The packed lecture theatre during the conference

The expert panel answering questions from the audience

Mr. Edmond Lau, VP of JCEIA; Dr. Daniel Tsang, Assistant Professor of Department of Civil & Environmental Engineering at Hong Kong Polytechnic University; Mr. Mike Kilburn, Senior Manager of Airport Authority Hong Kong; Mr. Mark Venhoek, CEO of SITA Waste Services Ltd.; Mr. KS Wong, Secretary for the Environment of HKSAR government; Dr. William Yu, CEO of World Green Organisation; Mr. Heba Chan, Senior Project Officer of Food for Good; Mr. Henry Ho, Chairman of JCEIA

Reported by Edmund Lau, Fiona Chu and Dan Tsang

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Technical Visit to Food Waste Conversion Plant at Park Island

On 14th February 2015, HKWMA YMC organized a visit to the Food Waste Conversion Plant at Park Island.

With 5,000 residential units, Park Island introduced a food waste recycling campaign in 2006. Up to 2015 the estate had installed three food waste treatment facilities which treated an average of 6.2 tonnes of food waste every month.

Dipl.-Ing. Heinrich Schumeckers, a specialist in compositing technologies, first gave all the visitors an engaging presentation about the work principle of the food waste conversion plants and the social and environmental benefits of the compositing technologies.

AEL's Engineers then led the visitors to check out different processes and gave them further details. Park Island's food waste conversion plants comprised a Bin Lifter, a Cylindrical Digestive Bioreactor, a Condenser and a Bio-Filter. All the process equipment was operated in an automatic mode by a dedicated control system. After putting pre-sorted food waste into the plant, microorganisms grew under high temperature(50°C-60°C) and digested food waste into carbon dioxide, water vapor and compost. The whole process was clean and organized with no hygienic problems. The compost produced, once matured, was very suitable for plant growth. To make use of the compost, a garden had even been set up in Park Island for residents to grow their own plants.

Food waste conversion plant used in Park Island

Food waste collected from Park Island residents

Mr. Schumeckers explaining the composting technologies

Operator demonstrates how the plant works

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Operator collecting the fresh compost from the plant

Fresh compost produced by the food waste conversion plants

Matured compost ready to help plants grow

In summary, the Food Waste Conversion Plant used in Park Island proved that it played a positive role in greening the island's living environment.

Reported by Lo Chun Hei for YMC

Technical Seminar on Plastic Shopping Bag Charging

On 21 March 2015, HKWMA and CIWEM with other supporting organizations held a technical seminar at Hong Kong Polytechnic University on Sustainable Waste Management Policy and Implementation – Plastic Shopping Bag Charging and others in the pipeline. It was an honor to have Ir Dr Lo Wai Kwok as the guest speaker to open the seminar which featured two special topics of the day. The two speakers on the special topics were Ir Kenny Wong, chairman of HKWMA and Dr Alain Lam, Head of the Government Waste Management Policy Group. The seminar was conducted in Cantonese. The event was well attended by over a hundred people.

The Speakers, Ir. Dr. W.K.Lo, Ir. Dr. Alain Lam and Ir. Kenny Wong (L to R)

Ir Dr. Alain Lam's topic was "Sustainable Waste Management: Producer Responsibility". He first gave an overview of the government's policies relating to the Blueprint for Sustainable Use of Resources, reviewed policies targeting waste reduction and showed how producer responsibility would be linked in with other initiatives like, for example, waste charging. He discussed the possible mechanisms and the identified constraints in the fee collection for waste charging as well as how it might be implemented. Charging mechanisms needed to accommodate three different classes of premises, as follows: 1. residential estates with waste disposal by FEHD; 2. small residential

dwellings with waste disposal at the collection point; and 3. commercial, industrial or residential premises with waste disposal by private contractors. He emphasized that recycling effectiveness relied on source separation, effective collection, proper handling and recycling with identified market outlets. There were currently different producer responsibility schemes in place, for example for glass bottles, plastic shopping bags and WEEE which were helping to promote effective recycling. He believed that public education, effective government policy and the provision of proper infrastructure would lead to a behavioral change that would ensure effective recycling and thus achieve a circular economy for resources recovery and waste reduction.

HKWMA Chairman Ir Kenny Wong, who was also the principal consultant for government on this plastic bag levy implementation exercise, delivered the second presentation topic: "Full Implementation of the Plastic Shopping Bag Charging Scheme". Kenny first introduced the background of the new plastic shopping bag levy and compared it with the previous plastic bag levy. The implementation would be effective on April 1 2015, with only a one month grace period being granted. Many representatives from retailers attended the talk to understand the details of the law. Kenny also discussed charge exemptions, charge implementation and recommendations. Exemptions applied to those plastic bags considered non-air tight packaging. For example, the use of plastic bags for food hygiene reasons would not be charged. Kenny used very vivid graphics to illustrate the difference between air-tight and non-air-tight packaging and therefore when a customer would need to pay the 50cents levy.

The Speakers during the Q&A Session

During the Q&A session which followed the presentations, members of the audience were very eager to raise questions. Kenny, Alain and Dr WK Lo were all very responsive to the questions. In particular, many of the audience were concerned as to whether their business would be affected and whether the items they sold could be exempted. Kenny advised the questioners that a direct line would be set up that they could call to enquire about specific details of the expanded scheme.

The Speakers with the Seminar Organisers

To conclude, this seminar was held in a timely manner, which was about two weeks before the effective date of the Plastic Bay Levy Implementation. It helped companies ease their concerns. The seminar highlighted the key items of the extended scheme so that members of the audience who might be managerial staff of retail companies would be able to plan and provide appropriate training to their staff to suit the change.

Reported by Kitty Lee

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Seminar on "Turning Waste Glass Bottles to Eco-friendly Construction Materials"

On the evening of 23 April 2015 HKWMA and CIWEM, with the support of Hong Kong Polytechnic University, organized a seminar on recycling glass bottles into construction materials. The talk was given by Professor C.S. Poon of Hong Kong PolyU, a former Chairman of HKWMA.

Prof. Poon enlightened his audience to the fact that in 2013 Hong Kong produced 250 tonnes of waste glass bottles per day of which 170 tonnes per day were beverage bottles. Of this total only 17% was recycled. The reasons the recycling rate was so low were because there was no glass manufacturing base in Hong Kong and therefore there was no outlet for recycled glass; there was no mandatory Producers' Responsibility Scheme (PRS) in place for glass; glass was heavy; was of a low intrinsic value and was expensive to transport.

The possible use of recycled glass in construction products had been studied since 1963. The research showed early on that the use of glass in concrete could lead to expansion as a result of alkali-silica reaction (ASR), because concrete was alkaline and glass was mostly silica. As a result, the use of crushed glass as an aggregate in concrete had largely been limited to exposed aggregate for architectural effect. More recently, however, it had been discovered that if the glass was crushed to a powder it did not promote ASR and even exhibited some pozzolanic properties.

The Construction Department of PolyU was presently looking at three main avenues for the reuse of glass: in road sub-base, concrete blocks and Supplementary Cementitious Materials (SCM). Studies were being carried out on 10mm size crushed glass (cullet), 5mm cullet and glass powder. The preparation of these materials for use in research minimized washing to save costs and resources. The main uses investigated were as a decorative aggregate in architectural features for 10mm cullet, sand replacement in concrete for 5mm cullet and glass powder as a partial cement replacement in concrete.

Prof. Poon giving his lecture

For the first of these research avenues, it had been found that when cullet was used in unbound granular road sub-base, with the particle size distribution being adjusted to meet the required specification, CBR tests on the compacted materials were satisfactory with the CBR increasing as more cullet was used as a replacement material. There was, however, a small decrease in the maximum dry density that could be achieved.

The second avenue of research, on eco-glass blocks, had been pursued at PolyU for 15 years. The mix proportions of the three types of crushed glass were being adjusted to make the maximum use of the glass while meeting the product strength and durability specifications and as a result had now been accepted and were being used on Highways Department and Housing Department jobs in Hong Kong. It had also been found that the strength of blocks increased with the addition of more PFA which addressed the ASR problem arising from the silica in the glass. This finding applied for using glass to replace 25%, 50% and 70% of the aggregate in the blocks. After early tests showed that the ASR effect was unacceptable with glass aggregates, the addition of PFA allowed the expansion caused by ASR to come within the 0.1% specified limit. However, it had been found that if the blocks were dry-mixed with glass aggregate, the ASR effect was limited so that the 0.1% expansion limit at 14 days was satisfied. Research was continuing but this result was thought to be because higher porosity in the glass aggregate could accommodate the gel formed from ASR without inducing a resultant overall expansion of the block.

PolyU was now developing a third generation "Titania" eco-block. With a surface layer of titanium dioxide (TiO2) on the blocks with recycled demolition waste being used as coarse aggregate and glass cullet as fine aggregate these blocks exhibited eco-friendly properties. In sunlight, TiO2 could convert nitrogen dioxide in the atmosphere to nitrate, helping clean the air. If a 5mm thick layer of crushed glass was used on the surface, more sunlight got to the TiO2 making it more effective in reducing nitrogen dioxide in the atmosphere. The TiO2 acted as a catalyst and did not react with the concrete. One drawback was that TiO2 was very expensive so it was not widely used, typically at only 2 – 5% cement content. The PolyU held a patent on their eco-blocks which had been made under licence since 2006 and recently were used in the outside paving to the Zero-Carbon Building in Kowloon Bay.

A Full House Listening to Prof. Poon

As part of the development of SCM, new research was being undertaken on self-compacting architectural mortar using as much recycled glass as possible with white cement to give an attractive architectural finish. It had been found the compressive and flexural strength of the mortar reduced as the glass content increased because of the lower bond strength between smooth glass and the cement gel compared with natural aggregate. It should be remembered that the transparent nature and refractive properties of crushed glass were attractive to many architects and therefore research into these applications was continuing.

Professor Poon noted that the results of all the research he had described in his talk had been published and were available for reference. Other results that had come out of the research showed that when very fine green glass powder (PSD less than 45 micron) was tested for Strength Activity Index (SAI) to ASTM C618 it was found to be comparable to PFA. Metakaolin was also used sometimes in industry to reduce the effects of ASR, but metakaolin was very expensive. It had now been found that it could be largely replaced by ground glass powder. Another aspect looked into by the PolyU's researchers was to apply Lifetime Carbon Audit (LCA) studies to see if recycling glass was a good thing overall for global warming potential. It was noted that if waste glass could be recycled locally, it avoided the cost of landfill disposal and transportation so it was attractive from the LCA point of view.

Recently there had been a move to allow similar products made in China using recycled glass to be imported into Hong Kong for Government projects. Whilst this was attractive for contractors because the products were competitively priced, they had led to problems because there was no clear specification at the site of manufacture. In addition, some commentators had accused the Hong Kong Government of using tax-payers' money to import waste from China into Hong Kong. This problem was being exacerbated by the Government requiring three quotations before placing an order for such materials. Because the size of the Hong Kong market could not support three domestic manufacturers, one or more of the three quotations was always from Mainland China.

Professor Poon was pleased to note that the Government was introducing a PRS for glass bottles soon involving about 50,000 tonnes per annum of beverage bottles. However, what could we do with all that glass? As noted above, it could be ground to a powder to replace cement in concrete products which the LCA results show is advantageous. To really encourage the use of eco-projects in construction, however, more widespread PRS and waste charging needed to be introduced without any further delay.

Prof. Poon Answering Questions at the Q&A Session Chaired by Ir. Kenny Wong

At the end of Professor Poon's talk, Ir. Kenny Wong, the Chairman of HKWMA, chaired a question and answer session. In response to a question on the difficulty of selling eco-blocks, Professor Poon replied that it would become far easier when comprehensive PRS and waste charging was introduced. On a question about costs, with eco-blocks being more expensive than similar products made from natural aggregates, Professor Poon once again said it would be better after the PRS was introduced because that would add revenue to the recycler. Regarding a question about not washing the glass to reduce costs, Professor Poon said that for products with an exposed glass finish then more washing was carried out than for cullet to be used as aggregate replacement in concrete products. In response to a question about whether or not Government had any intention of using glass in sub-base, Professor Poon revealed that the Government was undertaking trials at the moment.

Prof. Poon with Representatives of CIWEM and HKWMA after the Seminar

Ir. Kenny Wong gave a warm vote of thanks to Prof. Poon which was enthusiastically endorsed by the audience's applause.

Site Visit to Sludge Treatment Facility (STF) at Tsang Tsui

A technical visit to the Sludge Treatment Facility (STF) at Nim Wan was successfully conducted on 25th April, 2015 with around 30 participants from various organizations.

During the visit we were able to visit the equipment zone, the Environmental Education Center (EEC) and the garden within the STF.

The STF has adopted state-of-the-art treatment technology with a capacity up to 2,000 tonnes of wet sludge per day. The sewage sludge is currently disposed of at the three landfills at South East New Territories (SENT), North East New Territories (NENT) and West New Territories (WENT). Due to the limited capacity of the existing landfills, the STF is targeted to treat the sewage sludge from public Sewage Treatment Works (STWs) by high temperature incineration. Through the high-tech thermal process, it can significantly reduce the volume of waste requiring final disposal at landfill by up to 90%.

The facility also incorporates an EEC to provide a free environmental service to the public. Free electric shuttle bus service are being provided for local residents and organizations in Tuen Mun to facilitate their visits to the EEC.

The design and construction of the STF started from 2010 and the facility was now in partial operation. At first we attended a briefing session at the EEC. The speakers explained how the STF project is alleviating the sewage sludge issue. The STF has been designed to be self-sufficient and sustainable since the thermal energy recovered is used to support the facility's operation needs. After the briefing session, we had a site tour to closely observe the incineration process, only part of which was in operation. Apart from the exhibition zone, we were also shown around the indoor spa pools and a café. Finally, we also had a visit to the garden outside.

Reported by Barry Adcock

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The briefing session given by STF management

A view from the EEC to the WENT Landfill

Certificate of Appreciation awarded to STF management by HKWMA

Indoor spa pool

HKWMA group photo

Outdoor leisure garden

A close look at the incinerator

HKWMA group photo in the garden

Reported by Ray Zhou for YMC

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Symposium on Resources Recycling and Green Technologies for Hong Kong Construction Industries, 19 June 2015

The Nanotechnology and Advanced Materials Symposium: "Resources Recycling and Green Technologies for Hong Kong Construction Industries", with a focus on Business Opportunities and Technical Innovation, was held at the Hong Kong Polytechnic University (PolyU) on 19th June 2015. The symposium, which was co-organised by the Nano and Advanced Materials Institute Limited (NAMI), Department of Civil and Environmental Engineering (CEE) of PolyU and Hong Kong Trade Development Council (HKTDC), impressively attracted a full house of more than 100 guests on the Friday afternoon. Researchers from NAMI and PolyU introduced their novel and practicable approaches for recycling construction and building materials and transferring advanced technical innovations into the industry to explore potential business opportunities in Hong Kong.

The symposium started with welcoming remarks from Prof. Y. L. Xu, Dean of the Faculty of Construction and Environment of PolyU, as well as Dr. Ivan Sham, Director of Research and Development of NAMI. Through the update on research progress of the Faculty and CEE department, Prof. Xu highlighted the significant contribution of academia to the construction development and environmental improvement. Afterwards, Dr. Sham illustrated how applied research and development centres could help mingle the industry with academia. Both opening speeches shed light on the importance of a supporting platform to innovative ideas and incubate technology.

The invited talks thereafter covered timber waste recycling technologies, slag recycling and the practicability of alkali-activated cement for new construction materials, glass and sewage sludge ash recycling and production of photocatalytic functional Eco-blocks with recycled construction waste and waste glass.

Dr. Daniel Tsang, Assistant Professor of CEE, delivered the first speech on recycling technologies for waste timber formwork that continuously burdened our landfills. Economically viable methods were proposed to transform timber waste into high-performance construction and building materials such as wood plastic composites and cement-bonded particleboards. The following speaker, Dr. Garrison Chau, Project Leader from NAMI, introduced an environmentally benign alternative to traditional cement developed out of concern for the extensive greenhouse gas emissions associated with worldwide cement production. Such cement surrogate was derived from recycled ground granulated blast-furnace slag (GGBS) by alkali activation technology. The next speaker, Dr. J. G. Dai, Associate Professor of CEE, echoed Dr. Chau's remarks by sharing his cutting-edge studies and in-depth evaluation of the mechanical properties and micro-structures of plain and fibre-reinforced alkali-activated slag (AAS) mortar/concrete.

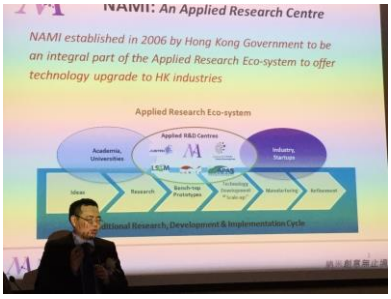
After the tea break, Dr. Bo Li, Research Engineer from NAMI, presented successful technologies that had been developed to recycle waste glass and sewage sludge ash into fabric reinforced cementitious matrix (FRCM) and lightweight aggregates, respectively. Dr. Li added that the techniques (i.e., pelletisation and carbonation process) adopted for aggregate production were able to immobilise the heavy metals in sludge ash, thereby reducing the treatment cost as an economic advantage. Prof. C. S. Poon, Professor and Associate Head (Research & Development) of CEE, fascinated the audience with the third generation Eco-blocks, which comprised construction waste and waste glass as aggregates, together with specially-designed deployment of a small quantity of titanium dioxide for promising photocatalytic function. The latest version of Eco-blocks presented several environmental benefits such as air-purifying, self-cleaning and antibacterial properties while enabling a cost-effective production.

Last but not least, in a Q&A session, the five speakers shared thoughtful opinions on the feasibility of closed-loop recycling and cost-benefit analysis of various aspects of resource recovery. This interactive symposium served as an effective communication bridge between the academic experts and industrial practitioners. It undoubtedly helped different sectors to join hands and seek potential collaborations for boosting the growth of a technology-based recycling industry, which will play an indispensable role in sustainable waste management.

Q&A session. Prof. C. S. Poon, Dr. Daniel Tsang, Dr. Garrison Chau, Dr. Bo Li, Dr. J. G Dai (from left to right)

Reported by Season Chen, Iris Yu and Dan Tsang

Prof. Y.L. Xu, Dean of Faculty of Construction and Environment, Chair Professor of Structural Engineering at Hong Kong Polytechnic University



Dr. Ivan Sham, Director of Research and Development of Nano and Advanced Materials Institute Limited

Dr. Daniel Tsang, Dr. Ivan Sham, Prof. Y. L. Xu, Prof. C. S. Poon, Dr. J. G Dai, Dr. Garrison Chau, Dr. Bo Li, (from left to right)

HKIE Environmental Paper Award – A Novel and Eco-friendly Method for Recycling Waste Formwork into Cement-bonded Particleboard

The Environmental Paper Award is a biannual event established by the Environmental Division of the Hong Kong Institution of Engineers (HKIE). The Award aims to recognise the excellence of our engineers who have dedicated themselves to developing a better environment and to encourage the widespread emergence of environmentally sound projects. A record-breaking number of 22 paper submissions was received this year and 8 papers were shortlisted for presentation to the Judging Panel in April. The Champion Award went to the team led by Dr. Daniel Tsang, Assistant Professor of Department of Civil & Environmental Engineering at The Hong Kong Polytechnic University, together with Dr. Kaimin Shih, Associate Professor of Department of Civil Engineering at The University of Hong Kong both of whom are members of the Executive Committee of HKWMA. Dr. Tsang was invited to present the paper on behalf of their brilliant team in the HKIE seminar: "A Novel and Eco-friendly Method for Recycling Waste Formwork into Cement-bonded Particleboard (CBP)". The seminar was jointly organised by the Environmental Division of HKIE and The Hong Kong Waste Management Association (HKWMA) at the HKIE Headquarters on 17th June 2015 and attracted a full house attendance of more than 120 people on the evening.

Dr. Tsang kicked off the presentation with an overview of the timber waste issue in Hong Kong, followed by exploring the viabilities of using waste wood for production of new construction materials. An innovative recycling technology was introduced to transform waste formwork into high-performance CBP in terms of strength, durability and fire-resistance for construction use. Environmental benefits such as thermal insulation and noise reduction were added values compared to traditional particleboards. This novel engineering approach also featured incorporation of green materials and carbon storage capability, which helped to mitigate carbon emissions and global warming potential. In addition to practical technology development, the speaker also highlighted the economic feasibility of CBP market in view of the forthcoming Waste Charging Scheme and Producer Responsibility Scheme. Dr. Tsang believed that further technical improvement of multi-functional CBP will encourage wider applications in our local industry and create new ways to provide pragmatic and sustainable solutions to waste recycling challenges.

Dr. Daniel Tsang,
Assistant Professor of Department of Civil & Environmental Engineering at Hong Kong Polytechnic University

Mr. Victor Li, Vice Chairman of HKWMA, hosted the Q&A session and the audience expressed their cordial interest in both technical details and managerial concept of this innovation. Dr. Tsang responded with gratitude for this opportunity to learn from the concerns of potential users from the industry. Chairman of the judging panel this year, Ir. Anthony Kwan, further remarked that this paper had covered essential elements from technical viability, economic feasibility to environmental compatibility as a ready-to-market technology, which was the key to the successful outcome for Dr. Tsang and his group.

Q & A session, Dr. Dan Tsang and Mr. Victor Li, Vice Chairman of Hong Kong Waste Management Association

Reported by Iris Yu and Season Chen

The seminar facilitated knowledge exchange between the presenter and an audience drawn from different sectors and also motivated more young professionals to excel in their vibrant environmental engineering research and projects.

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HKWMA Gives its Support

During 2015 HKWMA has been pleased to support the following events which are not reported elsewhere in this edition of "Wasteline"

- ***20 March 2015***
  BEC Course on Regulatory Compliance for Environmental Legislation in Hong Kong
- ***24 – 25 March 2015***
  HKIE Environmental Division Workshop on BIM in Environmental Protection in Hong Kong
- ***24 – 28 March 2015***
  CIWEM HK Study Mission 2015; Environmental Management and Facilities in Qingdao China
- ***17 April 2015***
  HKIE Environmental Division Annual Forum on "The Future Directions and Breakthroughs of Hong Kong's Environmental Industry"
- ***7 May 2015***
  Integrate 2015 Facility Management Conference : Hotels and Hospitality
- ***8 May 2015***
  CIWEM HK Conference : "Smart City – A New Paradigm in Environmental Management"
- ***May 2015***
  HKQAA Hong Kong Recycling Services Registration Scheme
- ***5 – 7 June 2015***
  HKIE Environmental Division Study Tour to W to E Incinerators in Suzhou and Nanjing
- ***17 July 2015***
  BEC Training Course on Applications and Regulation of EIA and SEA in Hong Kong
- ***18 July 2015***
  HKGSA Forum on new Environmental Legislation in Mainland China on Wastewater Policy
- ***2014 / 2015***
  AAHK Environmental Award Scheme

HKWMA Gives its Opinion

HKWMA papers have been submitted to Government / LEGCO as follows :

- ***November 2014***
  Suggestions for the CE's 2015 Policy Address
- ***22 April 2015***
  Engagement Session re Proposed HK$1B Recycling Fund
- ***4 May 2015***
  Legislative Council Bills Committee on Promotion of Recycling and Proper Disposal of WEEE
- ***29 June 2015***
  EnB Public Consultation on the Future Development of the Electricity Market in Hong Kong

Upcoming Events

- ***22 August 2015***
  Site Visit to Hong Kong's first Community Green Station in Shatin
- ***11 September 2015***
  AGM and 22nd Anniversary Dinner at Royal Plaza Hotel, Mongkok
- ***26 September 2015***
  Site Visit to ASB Biodiesel Factory (jointly with HKIE Env. Division)
- ***9 October 2015***
  BEC Training Course on EIA and SEA in Hong Kong
- ***Quarter 4, 2015***
  Two Coasts Forum in Mainland China
- ***April 2016***
  Conference on Waste to Construction Materials jointly organized by HKWMA with HK PolyU and Shenzhen University