

HKIE YMC Overseas Delegation to the Netherlands

HKIE-YMC OVERSEAS DELEGATION 2015 TO THE NETHERLANDS



LIVING WITH WATER
BUILDING WITH NATURE

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

Young Members Committee
青年會員事務委員會

HONG KONG INSTITUTION OF ENGINEERS
YOUNG MEMBERS COMMITTEE
CONTINUING PROFESSIONAL DEVELOPMENT COMMITTEE



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YMC Chairmans Message

Delegation Manager's Message



Advisors' Messages



The annual YMC Overseas Delegation is an excellent event for our young engineers to gain valuable experience on both technological and cultural aspects of foreign countries and broaden their global horizons. The Netherlands is the ideal destination for this year's overseas delegation under the theme of "Living with Water, Building with Nature".

The Netherlands, located in western Europe, is a country with most of its land below sea level and about 20% of its land mass is reclaimed from the sea and from lakes. It is no wonder that Dutch engineers are experts in water management, flood control and protection and land reclamation. The Netherlands is a world leader in research and technological innovation as well as the design and manufacturing of high-tech equipment and

products. They are also very advanced in the use of sustainable energy, in particular off-shore wind power generation.

I am extremely impressed that the trip was very well planned and all delegates took part in the preparation and execution of it. The delegation had a packed itinerary, visited remarkable engineering projects including the Maeslant storm surge barrier, Maasvlakte 2 reclamation, the Floating Pavilion and an underground waste water treatment plant in Rotterdam, a sludge incineration plant, a waste water treatment plant using the Nereda technology and a waste fired power plant in Amsterdam. The knowledge and experience gained from these visits will be invaluable to their professional career advancement. We also visited the Delft University of Technology and the Royal Dutch Society of Engineers and had an insightful experience sharing with their representatives. The cultural visits to Kinderdijk windmills, Alkmaar cheese market and Keukenhof flower show as well as the cycling in Utrecht were also very pleasurable.

I would like to commend the Delegation Manager Ir Kenneth Cheung for his great leadership and the concerted effort of the entire delegation for their excellent teamwork in successfully organising this meaningful study trip. I am sure everyone of us have had a wonderful time and enjoyed a fruitful journey as much as I did.

Victor CHEUNG
President, the HKIE



For many years, the YMC Overseas Delegation, jointly organised by the Young Members Committee and the Continuing Professional Development Committee, has been amongst the most prominent activities for our young members. There is no exception this year.

With the theme on "Living with Water, Building with Nature", the obvious choice of destination for this year's Delegation is the Netherlands: a country with nearly half of its land area lies below sea level and is world-known for its engineering achievements to combat the might of the North Sea. In particular, the "Delta Works", a massive marine defense project, has long been recognised as the Wonders of Netherlands. Apart from water infrastructure, the Delegation itinerary also focuses on the outstanding Dutch practice on waste management and sustainable transportation, both issues are most relevant to the key problems that Hong Kong has been facing. I am sure that this event has widened the technical horizon of all the participants.

I wish to express my heartfelt appreciation to the Delegation Manager Ir Kenneth Cheung, the YMC Chairman Ir Ryan Chak and the CPDC Chairman Ir S.T. Chan for their strong leadership, and the young delegates for all their efforts in successfully organising this Delegation and the year-long local series of preparatory activities. Well done!

Raymond CHAN
Immediate Past President, the HKIE



The Young Members Committee Overseas Delegation 2015 spent 10 days in the Netherlands. It is not a big country in terms of size and population, but one with great technological achievements, something that engineers can learn a lot about.

Mention the Netherlands to any person, and the first things that come to his or her mind will possibly be windmills and dykes. A large part of the land mass of the Netherlands is below sea level, so one can quickly visualize the amount of effort the Dutch put into protecting their land against flooding. No wonder they are at the forefront in studying the impact of climate change and sea level rise. Another thing is that windmills have been around the Netherlands

for many centuries, and some of them are actually used for draining low-lying areas. This is a prime example of how the Dutch have been harvesting this renewable energy much earlier than most of other countries, and putting it into good use in their particular geographical setting.

These are just some of the topics that the Delegation has looked at, and there are other equally fascinating areas that the Delegation has gained first-hand information by actually visiting and seeing for themselves.

I wish to congratulate the Delegation under the leadership of Kenneth for making this visit such a success. I firmly believe that all members of the Delegation will fondly remember the time and effort they have spent together in preparing for the visit, and more importantly the experience that they have gained from this Delegation.

C C CHAN
Senior Vice President, the HKIE



I would like to express my heartfelt congratulations to the YMC for having another successfully organised overseas delegation to the Netherlands.

The Netherlands is a smart choice for the delegation. The Netherlands is a country where about a quarter of its land lies below sea level, and the Dutch has a long history of fighting against water. With the clear objective to live with the water, the Netherlands has world renowned water infrastructure which were built since the 1920s. The Netherlands also rank highly on advancement in waste management and incineration technology. I trust that all delegates have gained a lot after the visit, not only through technical visit and seminar but also the valuable sharing

sessions with young engineers in the Netherlands.

The delegation has been prepared for months while the teamwork of the YMC Delegation under the leadership of Ir Kenneth Cheung, the Delegation Manager, has been well demonstrated and is particularly impressive.

I would also like to take this chance to appraise YMC to publish this report and to prepare the debriefing presentation to share their learning experiences. I am looking forward to joining the debriefing presentation conducted by the delegates.

Joseph CHOI
Vice President, the HKIE





It is my privilege to be one of the Advisors for the YMC Overseas Delegation and I would like to take this moment to congratulate everyone who organised and attended this year's visit to the Netherlands.

The YMC Overseas Delegation is one of our Institution's most important events. The YMC Overseas Delegation team was formed in the autumn of 2014, and the 16 delegates, who didn't know one-another and came from different engineering backgrounds organised this impressive trip within just a few months. It is hard to believe that everything was organised and finalized so quickly, which speaks volumes on the delegates' and our members' commitment and can-do attitude. It is an extraordinary journey whose value is not limited to the visit itself and I am convinced

these budding engineers will be the pillars of society in the near future.

This year's theme was "Living with Water, Building with Nature". Given that the Netherlands has more than half of its land mass below sea level and that 60% of its population lives in these areas, the Dutch have a strong incentive to innovate around water and land use.

Given the country's unique geographical conditions and the increasing pressures coming from climate-change, the Dutch have great experience and expertise that Hong Kong's engineers can benefit from. I am convinced that our visiting delegates were inspired by this trip and the benefits to Hong Kong would be felt in the years to come.

Finally, I would like to make a special mention to the Delegation Manager, Ir Kenneth CHEUNG and his team. Together, they have supported the delegates and have paved the way for their success.

I look forward to joining the Delegation on one of their future programs and wish them continued success and rewarding journeys.

Thomas CHAN
Vice President, the HKIE



This trip is reminiscent of a YMC delegation to the Netherlands in 2002 which I had the honour and pleasure of participating. As I was not available to accompany this Delegation, I had gone through the programme and note it was focused on water infrastructures, waste management, waste to energy and transport projects for which the Dutch are leading in technology and proven with successful operations. These topics are also very relevant to the current needs of Hong Kong to deal with our increasingly serious problems on waste, on energy efficiency and conservation, and to combat air pollution and climate change. I am sure members of the delegation would now be in a better position to contribute towards solutions to deal with these problems.

Apart from enhancing the engineering knowledge, the visit to Alkmaar cheese market and Keukenhof must have also broadened the vision of the delegates on art and humanity.

Exchange with overseas organisations and professional bodies is a mission of the Hong Kong Institution of Engineers, this Delegation had demonstrated it had fulfilled this role well with diplomacy and elegance.

I congratulate YMC in successfully organising this event which does all of us pride.

Otto POON
Past President, the HKIE





I have always supported HKIE YMC organising overseas delegation, and feel privileged to be included in the list of Advisors. I would have loved to join the delegation, as I have done many many years ago, but work commitment had once again prevented me from joining the delegation and learning with our young members.

Hong Kong is a small place and we engineers would not have the opportunity to learn the full picture unless we have the exposure to see how others solve their problems. "Seeing is Believing" and there is simply no other alternative but to experience it by visiting.

The Netherlands, apart from a Country rich in diary produce, has been renowned for its engineering achievements. Their ability to control floods with innovative dam technology allowed their inhabitants to live safely and comfortably below sea-level. Their famous windmills conquer wind power at least a century before modern wind energy gets widely adopted in other parts of the world as contemporary renewable energy. Their Delft University of Technology produces excellent engineers that other countries admire and revere. HKIE YMC had wisely chosen the Netherlands to visit and I am sure their delegates have benefitted a lot from seeing the facilities and meeting their counterparts.

Apart from feeling envious of their golden opportunities, I must congratulate the Delegation Manager, Ir Kenneth Cheung, for his able leadership, other organisers for supporting, and the delegates for their teamwork in making this visit a resounding success.

I look forward to seeing future delegations being equally successful.

Edmund LEUNG
Past President, the HKIE



I would like to congratulate the Young Members Committee (YMC) for having organised the successful overseas delegation to the Netherlands in 2015. No doubt, the overseas delegation is the 'signature event' in YMC's long list of activities every year. It provides good opportunities to our young engineers to widen their knowledge horizons on overseas engineering practices for continuing professional development purpose. That is why CPD Committee has no hesitation in providing financial support to this meaningful event every year.

The theme this year is "Living with Water, Building with Nature", focusing in three major areas which are "Water Infrastructure Cooperation", "Waste Management & Recycling" and "Sustainable Transportation". The Netherlands as the chosen destination is a well made decision. The country is renowned for its long history in fighting against water, most bike-friendly country in Europe and its expertise on water infrastructures. With the impending municipal solid waste charging scheme in Hong Kong, it is timely to cover waste management and recycling in this delegation given its high reputation in this area. Sustainable transportation is another hot topic of the day.

During the selection interview of the delegation team, I saw the eagerness of our young engineers to broaden their horizon to face future challenges in their engineering careers through the visit and their commitment to make the visit a success. The delegation from preparing for the local seminars/visits, liaising with overseas organisations, finding sponsorships and final debriefing is a challenging team building and project management project for all the delegates. I am glad to see all their hard work had ended in a fruitful trip and a dedicated and coherent team.

From the intensive programme and vigorous exchange with counterparts in the Netherlands, I am sure the Delegation has achieved its objectives, and the delegation report will be informative and insightful to our young engineers.

Lastly, I take this opportunity to congratulate YMC, in particular Ir Ryan Chak, Ir Kenneth Cheung and their team for their success in organising this Delegation.

S T CHAN
Chairman, the HKIE - Continuing Professional Development Committee





Overseas visit has been one of the feature events of the YMC with which everyone associated supports and cherishes. It is not because of the exotic experience that in reality many of our younger generation are not short of but because of the intensity, duration and deliverable of the programme. Determination of theme, selection of delegates, liaison of places to visit, establishing of contacts to exchange, financial planning, logistics arrangement and execution of the designed plan are a real life example of resolving a complex problem. The result this year is another success that has set a precedent more difficult to follow. The YMC Delegation has demonstrated professionalism and proved to be a pride of us. Our legacy as the leading Chinese city in education and technology application continues.

The Netherlands has established as a major world power before the British and the American and they are still pioneers in trade and finance. Dutch auction, for instance, is probably still more convenient to auction goods quickly when compared with the auction that we are familiar with. Similar to Hong Kong, the Netherlands has a high level of economic freedom and is the transportation hub of our respective regions. With shipping, fishing, agriculture, trade, and banking as the leading sectors of the Dutch economy, many of the infrastructures are designed, constructed and operated in an efficient and sustainable manner that is the example to be followed by others. Dutch engineers are reputed to be international and innovative people as the Dutch society is one of the most liberal even by the standard of the Western world. I trust the Delegation have been inspired by the places that they have visited and the people whom they have encountered with.

Cycling is a widely used mode of transport in the Netherlands and it is estimated that the Dutch have at least 18 million bicycles, or more than one per capita. I am pleased to learn that the Delegation have experienced part of the 35,000 km of dedicated cycle tracks and the large bicycle parking facilities in city centres and at train stations. Are we able to promote more green transportation means in Hong Kong to reduce pollution and combat climate change?

Lastly, I would congratulate the YMC in particular Ir Kenneth Cheung and his team to have organised this successful Dutch Visit. I look forward to seeing more overseas visits in the years to come.

Gary KO
Chairman, the HKIE - Professional Assessment Committee





YMC Chairman's Message



I write to congratulate the success of the YMC Delegation 2015 to the Netherlands!

Organising overseas delegation to widen the exposure of young engineers on important engineering topics is a YMC tradition. Carrying on the footsteps of our predecessors, we organised a delegation to the Netherlands this session with the theme "Living with Water, Building with Nature". The Netherlands has a high reputation on water infrastructure, waste management, recycling system and waste-to-energy plants. Throughout this delegation, I appreciate that our delegation team could explore different hydraulic engineering works, study waste management system

and experience green transportation of cycling. It is hoped that their observations and knowledge could be applied and shared with other engineers in Hong Kong.

I would like to express our sincere gratitude to our advisors, including Ir Victor CHEUNG, Ir Raymond CHAN, Ir C C CHAN, Ir Thomas CHAN, Ir Dr. Otto POON, Ir Edmund LEUNG, Ir S T CHAN and Ir Gary KO, for giving supports and advices to the delegation. I must express my particular thanks to President Ir Victor CHEUNG to take time out from his busy schedules in joining our trip and giving us valuable advices.

This delegation also owes its success to the strong backing of the HKIE Continuing Professional Development Committee and the generous support of the sponsoring companies, which are gratefully acknowledged.

Lastly, my sincere gratitude goes to all delegates taking part in this delegation particularly the great effort made by the Delegation Manager, Ir Kenneth CHEUNG, and the two Deputy Delegation Managers, Mr. Ambrose CHEN and Mr. Alan YANG, that make this Delegation a successful one.

From preparation work to overseas logistics, from organising seminars and visits to writing this delegation report, all are done by our delegates. Therefore, I invite you to read this report in detail. I hope that you could share our view as if you were to participate in this Delegation.

Ryan CHAK
Chairman, the HKIE-YMC



Delegation Manager's Message



Engineers have been responsible for building and protecting communities over the centuries from natural challenges such as flooding. Hong Kong is no different. In recent years, we have also embraced the idea in bringing development of infrastructure and building into balance with protecting the environment. We, as engineers, shall grasp onto the idea by designing with a new attitude whereby merging the natural elements into the design. Based on this reason, the YMC has organised the YMC Overseas Delegation 2015 to The Netherlands with the theme of "Living with Water, Building with Nature" to serve as an inspiration for young engineers to acquire new experience and engineering practice in the Netherlands.

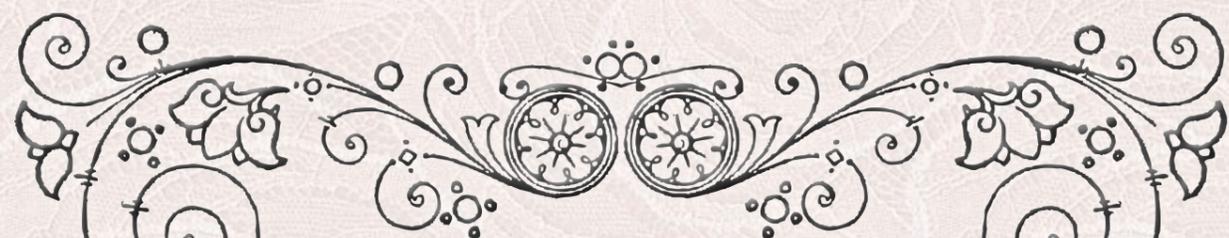
On behalf of the Delegation Team, I would like to take this opportunity to express my sincere thanks to the overseas and local organisations for hosting us and giving us insights into our key study areas. Special thanks are given to Mr Wilfred MOHR, the Netherlands Consulate General in Hong Kong, and Ms Betty LIU for giving us tremendous help with the overseas contacts and a wonderful presentation about the Netherlands before our delegation.

It is our great honour to have received supports and advices from our advisors including Ir Victor C K CHEUNG, Ir Raymond K S CHAN, Ir C C CHAN, Ir Joseph K H CHOI, Ir Thomas K C CHAN, Ir Dr. Otto L T POON, Ir Edmund K H LEUNG, Ir S T CHAN and Ir Gary C W KO. They have given us valuable advices and considerable supports throughout the planning stage of delegation. Their guidance during this process was valuable to this delegation as well as our delegates.

Many thanks are expressed to the HKIE-Continuing Professional Development Committee and our sponsors, without their generous financial support, we would not be able to bring this Delegation to a success.

Last but not least, I must express my truthful thanks to all delegates, especially the Deputy Delegations Managers, Mr Ambrose CHEN and Mr Alan YANG for their works and great effort in organising this Delegation; as well as Ir Ryan CHAK, the YMC Chairman, for inviting me as the Delegation Manager.

Kenneth CHEUNG
Delegation Manager, HKIE-YMC Overseass Delegation 2015
Deputy Chairman, the HKIE-YMC



INTRODUCTION



Background of YMC Delegation

Composition of Delegates

Why The Netherlands?

Theme & Objectives





Background of YMC Delegation

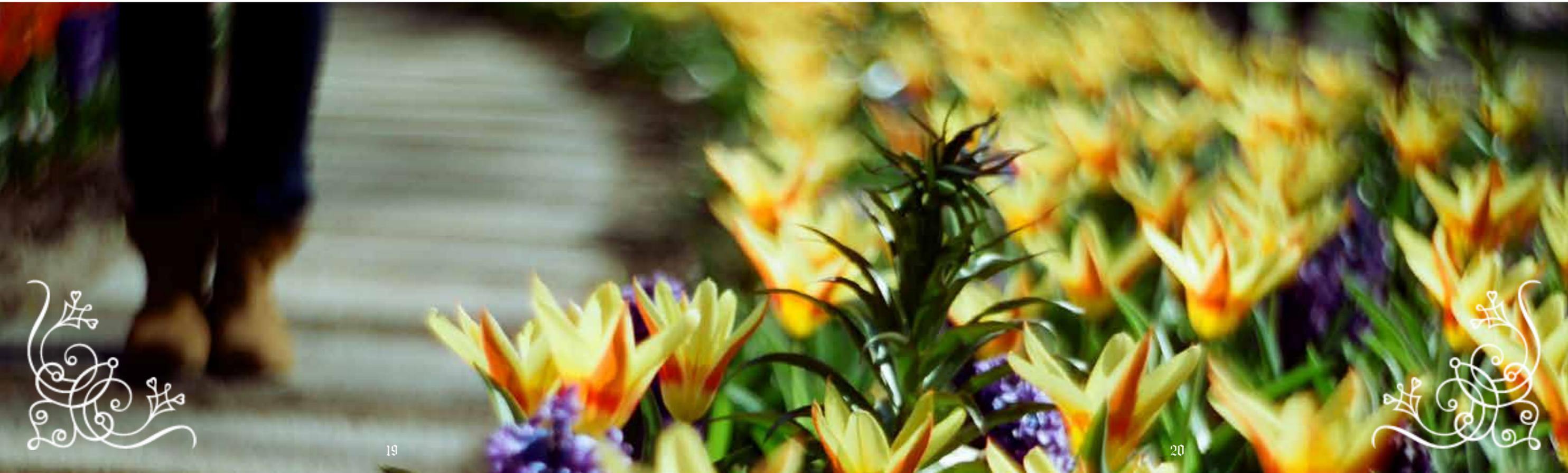
Since 1991, YMC has been organising Delegations to various parts of the world. A specific theme is chosen for each Delegation with the following objectives:

- To widen the vision and horizon of young engineers;
- To appreciate latest engineering practices around the globe and assess the applicability of these practices in Hong Kong;
- To promote Hong Kong and its engineering practices; and,
- To enhance the relationship between HKIE and Mainland/Overseas Institutions.

These objectives can be achieved through the Delegation and a series of local seminars and visits held before and after the Delegation.

Composition of Delegates

Similar to previous YMC overseas delegations, overwhelming response had been received during the recruitment of delegates in October 2014. In November, sixteen delegates were chosen from a group of elite young engineers by advisors through interviews. These delegates came from various engineering disciplines, including Building Services, Civil, Environmental, Geotechnical, Mechanical, and Structural engineering. They work in different sectors of engineering professions, ranging from government departments to public sectors, developers, consultants, and contractors.





Why The Netherlands?

Following the success of Overseas Delegation to New Zealand in 2014, from which young members appreciated how the engineers in New Zealand strive for excellence in different industries, the YMC has organised another Overseas Delegation in 2015 to The Netherlands. The Netherlands is a country which about a quarter of land lies below sea level. With its long history fighting against water, different water infrastructure such as polders, canals, dams, dikes were built since the 1920s. The country also has a high reputation on waste management and recycling system including the adoption of state-of-the-art technology in their waste-to-energy plants. The Netherlands is also renowned for its invention and innovation since the old days and they have taken it further in their development of transportation from cycling infrastructure to green mobility management.



Theme and Objectives

The HKIE-YMC Overseas Delegation is a sustainable program that arouses young engineers' potential in leadership and motivates their vision to learn from overseas good practices, from which the delegates can gain knowledge on technological development and applications.

This Delegation, with the theme of "Living with Water, Building with Nature," aimed to explore the latest technologies. The Netherlands uses to enhance its close relationship with water and its natural surroundings. While in the Netherlands, the delegates visited private companies, government organisations, professional bodies, and universities to experience first-hand the importance of sustainable development. Furthermore, a series of ten local seminars and visits related to the theme had been organised. These experiences broadened and enriched the young engineers' technological knowledge in different application areas.

Under the theme of this Delegation, delegates focused in three major study areas which are "Water Infrastructure Cooperation," "Waste Management & Recycling," and "Sustainable Transportation." This report encapsulates the results of the study conducted by the delegates.





AREAS OF STUDY



Water Infrastructure Cooperation

Waste Management & Recycling

Sustainable Transportation





Water Infrastructure Cooperation

In the Netherlands, about a quarter of the country's land area is below sea level and vulnerable to flooding. Historically, the extreme low pressure weather of the North Sea has caused extreme flood disasters in the Netherlands, where millions of lives were lost. The Dutch coastline has been changed considerably by both man and nature over the centuries. The Dutch are well known for their expertise in water management. From the early Middle Ages onwards, they have reclaimed and defended land from the sea by building dikes and storm surge barriers. Their drainage systems consist of ditches, canals, and pumping stations (replacing the iconic windmill), which keep the low-lying lands, called polders, suitable for habitation and agriculture. The water infrastructure of the Netherlands have been extremely effective in protecting the country - the Netherlands has not suffered a major flood since 1953. The Maeslantkering storm surge barrier, which protects the Port of Rotterdam while maintaining a clear shipping route, is one of largest moving structures on Earth. The Zuiderzee Works and Delta Works in the Netherlands are declared by the American Society of Civil Engineers as one of the Seven Wonders of the Modern World. However, in the face of the changing global climate and increasingly challenging situation, the Dutch must continue to upgrade their flood resiliency. Flexible solutions are now being devised to deal with this uncertain future. One such initiative, 'Building with Nature', is headed by the Public-Private Partnership (PPP) Ecoshape. The consortium is made up of government, research institutions, and private enterprises forming a unique network of expertise that work together to develop the concept and have it realised in projects. The ultimate goal is to integrate these engineering solutions in water safety and water supply while recognising that the environment is a dynamic system that should be adapted to. Projects like Room for the River, sand engine, and floating house are examples of ecodynamic projects that have been successfully implemented in the Netherlands.



Waste Management & Recycling

Waste and wastewater management had always been a top issue in developed countries. Most countries and cities have been seeking for a solution to either minimise waste and wastewater production or to retrieve resources from waste produced, if waste production is inevitable. The waste management problem in Hong Kong is imminent. The type and quality of wastes produced in Hong Kong are greatly affected by its economic development. While other Asian cities have had very good results in waste reduction, Hong Kong has generated around 80% more waste than 30 years ago (Environment Bureau, 2013). This growth of waste has put a tremendous pressure on the entire waste chain, in particular, on the landfills in Hong Kong, which are the only way of disposal. We are, therefore, interested to look for solutions to deal with such situations, either to change people's mindset to reduce waste, or to recover usable resources during the waste treatment process. The Netherlands' waste management strategy is highly regarded around the world. With the cutting edge thermal waste treatment technology and a very structured waste management framework, the Dutch are able to retrieve 61% of the municipal solid wastes (MSW) to recycle and reuse, 38% of which are treated in incinerators, with only 1% of the MSW generated deposited in landfills. It is therefore beneficial to study the Dutch's waste management strategies, from the waste reduction programme to the infrastructure, to tackle our own waste problems. The problem raised in wastewater treatment is the balance amongst social, economic, environmental, and engineering needs. Facing the recent scarce of land resource and energy, both Hong Kong and the Netherlands have been striving to achieve high standard effluent quality at minimal plant footprint. Hong Kong addresses the needs by tanks reconfiguration or chemical enhancement, while the Netherlands provides fundamental solutions by technology revolution. The prospect for wastewater treatment industry is another leap to achieve the transition from a waste approach to a resource approach. With such transition, the future wastewater treatment plant (WWTP) will not only provide efficient treatment for wastewater, but also act as a powerhouse to return nutrients, energy, and recycled water back to the communities.

Sustainable Transportation

As cities grow and with the coming of urbanization, the development of an effective and sustainable transportation system becomes one of the utmost important tasks for the public and private sectors, as well as policy makers. The Netherlands is a cycling paradise. There are over 25,000 miles of high-quality, traffic-free cycle routes, allowing cycling to flourish as a major form of transportation in the Netherlands. The turning point took place in 1971, when the jump in numbers of cars caused a sharp rise in the number of pedestrian and cyclist deaths on the road where more than 3,000 people were killed by motor vehicles, 450 of them were children. In response, a social movement demanding safer cycling conditions for children was formed, called Stop de Kindermoord (Stop the Child Murder). To this day the Netherlands continues to enhance their biking culture and facilities, where central train stations have underground parking for up to 10,000 bikes. Bicycle parking facilities are ubiquitous in the Netherlands - outside schools, office buildings, and shops. Furthermore, people who live in flats without special bike storage facilities can expect to be allowed to leave their bikes in a communal hallway. Aside from infrastructure, laws were established for the benefit of cyclists, such as the "strict liability" law, where without finding proof of fault, the motorist is held wholly liable and must pay damages to the cyclist, if and only if, the cyclist is proven not to be at fault. To enhance the network of talents in the field of transportation, independent organisations such as Connekt work within the Netherlands providing the necessary link between companies and authorities to improve mobility in the Netherlands in a sustainable manner. Effective campaigns, such as the 'Lean and Green' programme, encourage and reward companies for reducing CO₂ emission, which is similar to the Hong Kong Building Environmental Assessment Method (HK-BEAM) programme for the construction industry. There are more than 200 organisations participating in the programme in the Netherlands, all targeting to achieve a more sustainable future for transportation. All the above mentioned examples are promising technologies currently being implemented in the Netherlands. They serve as successful sustainable engineering solutions in their respective fields. This Delegation aims to study and discuss the possible utilisation of these solutions for the betterment of Hong Kong.



A large, intricate black and white decorative border with symmetrical scrollwork, floral motifs, and circular patterns. The text "OVERSEAS EVENTS" is centered within this border.

OVERSEAS EVENTS



Maeslantkering	March 29 AM
Maasvlakte	March 29 PM
Floating Pavilion	March 30 AM
Water Studio	March 30 PM
NWP	March 30 PM
KIVI	March 30 PM
SNB Sludge Incineration Plant	March 31 AM
TU Delft [Superbus]	March 31 PM
TU Delft [GLARE]	March 31 PM

TU Delft [Sand Engine]	March 31 PM
Connekt	March 31 PM
Dokhaven WWTP	April 1 AM
Arcadis	April 1 PM
Kinderdijk	April 1 PM
Royal HaskoningDHV & Garmerwolde WWTP	April 2
Dutch Cycling Embassy	April 4
AEB Waste Fired Power Plant	April 7 AM

Maeslantkering

March 29 AM
1130 - 1300 hr

The first event of our Delegation in the Netherlands was a visit to the Maeslantkering (Maeslant barrier), a movable storm surge barrier, which is a part of Delta Works in the Netherlands where its construction started since 1991. The representative of the Keringhuis (Barrier House) at Maeslantkering, Mr Peter Persoon, gave the delegates a presentation on the history of the flood disaster that occurred in 1953 and how the Delta Plan was developed to prevent flooding from happening in the Netherlands again.

After that, he led the delegates to the information centre to learn more about the delta works projects. Interactive sections dedicated to the history of flooding in the province of Zeeland and the network of flood barriers of the Netherlands were introduced to the delegates. These advanced system were developed to protect the country from flooding. Furthermore, the delegates were introduced to further information on flood prevention projects in other countries, such as England, Italy, and Russia, which can also

be found in the centre.

In order not to hinder the shipping channel, the current barrier design is chosen with the movement of the barrier facilitated by a 680kg structural steel ball joints with 10m diameter located on the two sides of the river. The floating gate design allowed the construction to take place in dry conditions, keeping vital parts of the barrier on dry land and minimising maintenance. Mr Peter Persoon took the delegates to the site of the barrier outside the Keringhuis, and described its structural design and operation.

To provide the delegates with more information, a presentation was given by Mr Gijs van Ginneken after the outdoor visit. From the presentation, the delegates learnt the water control measures and planning in the Netherlands. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.



Maasvlakte

March 29 PM
1500 - 1700 hr

As one of the current large-scale Dutch reclamation projects carried out under the Port of Rotterdam, Maasvlakte 2 (MV2), was proposed to expand the existing port of Maasvlakte in the North Sea by providing an additional 2,000 hectares of land. The expansion project was initiated as it was anticipated that the existing port and growing industrial complex would be rapidly reaching its full capacity in 10 years.

Upon arrival to the MV2 Information Center - Future Land, our speaker Mr Daan Thomassen explained to us the economic initiatives behind the project. Apart from the urgent needs to accommodate the logistic sector, the expansion of the existing port can also stimulate transportation of goods by rail and inland shipping which in turns can help the reduction of carbon emissions. He then shared with us the technical constraints experienced during the massive reclamation construction. As the main element of reclamation, a number of studies were carried out to ensure abundant supply of sand below the North Sea. Besides, Mr Thomassen highlighted that the Port Authority expressed concerns on environmental impacts, thus undertaking an extensive ten year

Environmental Impact Assessment to look into the possible environment effects brought on by the construction of Maasvlakte 2. Sand extraction totaling 240 million m³ was required to be dredged from the North Sea. Therefore, continuous measurements were taken over ranges of control points to monitor the silt profile before and after the sand extraction.

The visit was followed by a bus tour along the completed quay walls and reclaimed land. We visited the three container terminals, namely APM terminals, Rotterdam World Gateway, and Euromax to learn about the facilities for efficient handling of containers.

The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.





Floating Pavilion

March 30 AM
0900 - 1100 hr

The delegates visited the Floating Pavilion located in the centre of Rotterdam. construction that was completed in less than a year.

Dr. ir. Rutger de Graaf introduced the Dutch vision of 'Blue Revolution' which involved building floating agricultural and fish farms that utilise the carbon dioxide and nitrogen produced from the city. The delegates then toured around the Floating Pavilion to learn about the structural concepts and features that reduce the energy consumption of the building.

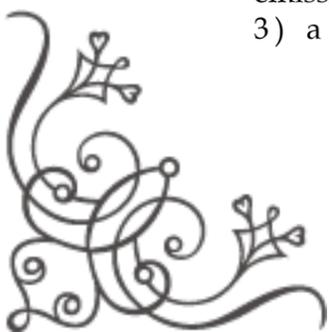
The Floating Pavilion serves as a pioneer in the implementation of 'Blue Revolution' idea and it

The delegates learnt that the Floating Pavilion consists of three hemispheres made up of ultra-light ETFE material mounted on the steel frame. To reduce energy input on maintaining the room temperature, transparent ETFE are installed at the lower part of the hemisphere to intake the heat from the sun while the upper part of hemisphere are installed with non-transparent ETFE to repel the ultraviolet light. Furthermore, since the Auditorium requires a more stringent control on the room temperature, additional phase change materials are installed in the wall panel. As a floating structure, it also has the mobility to be shipped to other areas to facilitate city development. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenter.



was constructed to exhibit the following:

- 1) a climate proof solution against the rising sea levels;
- 2) an energy efficient building that leads to reduction in CO₂ emission; and
- 3) a fast track floating



Water Studio

March 30 PM
1300 - 1400 hr

The delegates visited the architectural firm Water Studio which specializes in the design of floating building, landscape, and urban planning solutions with floating components. Apart from the local developments, they have also worked on several floating projects in China, United Arab Emirate, and the Maldives. Architect Ms Ankie Stam shared the company's concepts on the possibilities of constructing flexible land on aquatic territories. This would essentially replace conventional building design which has the limitation on any dynamic change and requiring construction and demolition of buildings whenever there is changing demand of land. Ms Stam went on further to elaborate their prediction on the top ten trends regarding to the use of floating city. Major points include:

- 1) scarless development - a constructed city can be removed easily to meet the need of the future generations;
- 2) flood and hurricane resilient city due to its floating nature;
- 3) instant green solution - allows integration of green landscape into developed cities where most of the land has been used for residential and commercial development; and
- 4) expanding the urban area with flexible components -develop a city that is easy to modify.

The delegates had a very fruitful experience and gained comprehensive insights on the potential of new floating solutions. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.





Netherlands Water Partnership

March 30 PM
1500 - 1800 hr

The delegates visited the office of the Netherlands Water Partnership (NWP). Their Senior Project Officer South-East Asia, Ms Lies Janssen, gave the delegates an introduction of NWP, where she explained that NWP is a comprehensive network that unites Dutch water expertise and acts as a centre of information on water expertise, policy developments, and market opportunities. They believe that by putting their heads together as a network, more can be achieved in solving global water related challenges. A united voice is stronger than 200 individual voices. Moreover, by entering markets in clusters, offering expertise as a one-stop-shop, Dutch companies can increase their world market share considerably.

Later, Ms Marjolein van Zuilekom, Policy Advisor, the Ministry of Infrastructure and the Environment explained the Delta Technology Network. Since Dutch water management is well known internationally, the Dutch water management skill and knowledge is being exported all over the world.

The delta approach involves a strategic planning process for delta development that integrates sustainability, institutional, physical, and socio-economic aspects. Currently, they have applied the technology in deltas of countries such as Bangladesh, Indonesia, Egypt, and Myanmar. Ms Afke van der Woude, representative of the Young Expert Programme (YEP) bureau introduced about the YEP Water programme where Dutch young professionals to acquire professional experience abroad by taking their first step in an international work environment via Dutch organisations. The delegates had a rewarding learning session about the current Dutch water infrastructure and the idea of sharing knowledge and technologies among private companies, institution, and the government, as well as the rest of the world. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.



KIVI

March 30 PM
1830 - 2130 hr

Koninklijk Instituut Van Ingenieurs (KIVI) is the largest engineering association in the Netherlands. Established on 31 August 1847, KIVI has forty disciplinary fields, a Young Engineers section, a Students section, and sixteen regional sections. Similar to the HKIE, KIVI aims to promote the importance of technology in the society with the investment in education, research, and innovation.

A networking event with KIVI was organized by Mr Jasper van Alten, Commissioner External Relations of Young KIVI Engineers, at the KIVI Headquarters in Den Haag. The event started with a walking dinner and delegates were engaged in conversations with local engineers. Prior to the sharing session, Ms Michaela dos Ramos, Executive Director of KIVI, delivered a welcoming speech. Delegation Manager, Ir Kenneth Cheung, then presented on the recent developments of the HKIE and HKIE-YMC.

The delegates continued the presentation on the recent developments in Hong Kong with regards to the delegation's three study areas. After the presentation by the delegates, engineers from various disciplines including Mr Gijs van Ginniken, ir. Jelle de Jong, Ms Aline Kaji, Mr Berend Puts, and ing. Bunyamin Erdogan presented topics on water safety, sand engine, and mobility management.

The sharing session provided invaluable experience and demonstrated the integration of innovative ideas into engineering design. Delegates had the opportunity to exchange with local professional engineers, broadening their horizon on the latest technology applied in the Netherlands. They enjoyed the event and thank KIVI for their warm hospitality. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.



SNB Sludge Incineration Plant

March 31 AM
0830 - 1130 hr

N.V. Slibverwerking Noord-Brabant (SNB) Sludge Incineration Plant is the largest sludge incineration plant in the Netherlands with a treatment capacity of 100,000 tonnes of dry sludge per annum, accounting for 30% of communal sludge in the Netherlands. It adopts fluidized bed mono incineration technology with gas cleaning system including selective non-catalytic reduction system and electrostatic precipitator. An overview of the plant's recent developments with guided tour was presented and led by ir. Marcel Lefferts, Director of SNB and ir. L.F.J. (Luc) Sijstermans, Manager of Process and Environment. Sewage sludge, with approximately 23% of dry solid content, is delivered from wastewater treatment plants. To ensure the homogeneity of the sludge, it is thoroughly mixed in the bunker and dried prior to infeed to four identical lines of incinerators. Operation routines and considerations such as optimum oxygen conditions and performance of various treatment systems were also introduced by the plant representatives. Reducing operation cost and air emissions and achieving

energy-neutral sludge treatment processes are two of the main objectives of the plant operation. This is achieved through the installation of two high pressure boilers of 60 bar to increase electricity production and promoting recovery of useful materials from the treatment process, including reuse of bottom ash for road construction materials and provision of steam generated to an adjacent lime production plant. A substantial amount of phosphate is present in sewage sludge and ash produced from the incineration process, due to the use of phosphorous in agriculture in the Netherlands. The development of phosphate recovery was discussed, where 100% of phosphate recovery could be achieved in mono incineration process and no artificial fertilizer would be required. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.



Delft University of Technology [Superbus]

March 31 PM
1230 - 1330 hr

The Superbus presentation was delivered by ir. Joris Melkert. Currently, the project has been completed in Dubai. The research and development team of Superbus was headed by the late Prof. dr. Wubbo Ockels, dr. Ing Antonia Terzi, and ir. Joris Melkert. They carried out research into the accompanying infrastructure, logistics, safety, reliability, and economic viability. Freestanding dedicated bus lanes would be developed, which would be kept frost-free by means of geothermal heat. This would prevent delays and reduce maintenance costs. An on-line reservation system would enable passengers to make reservations and channel them, thereby minimizing the number of stops needed. Most of the technical innovations utilized in Superbus were derived from Formula One and the aviation industry. Lightweight construction techniques and aerodynamic designs were introduced, making the Superbus more stable and controlled at high speeds.

During the seminar, ir. Melkert also explained the importance of the drag coefficient in vehicle design. The design goal of Superbus is a Cw-value of 0.3 or less; in other words, the Superbus would have the same drag coefficient (air and road drag) at 150mph as an ordinary bus at 70mph. The Superbus structural frame was built almost completely from carbon-epoxy composites which has a very low viscosity and a long pot life. Towards the end of the seminar, two videos demonstrating the advance technologies utilized in the design of the Superbus. All delegates expressed their interest in hoping to see superbuses roaming the road in the future. The seminar ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.



Delft University of Technology [GLARE]

March 31 PM
1330 - 1430 hr

The visit to the Aerospace Laboratory at TU Delft was conducted by Prof. dr. Jos Sinke. In the laboratory, the composite material, GLARE, was first introduced, and its various applications were shown in the laboratory tour. GLARE is a metal reinforced material with layers of glass-fibre, bonded together with epoxy. Comparing GLARE with conventional aluminum, there are various advantages for using GLARE, namely better corrosion and fire resistance and lower specific weight. GLARE has been used in various machines and vehicles over the years after it was invented in the 1970s, but on a small scale, such as in a very small portion of aerofoil and fuselage - end-users worried about the safety of the material. Later, it was largely used in the airplane Airbus A380 as more researches and studies on this composite material proved it to be reliable. During the tour, delegates were able to observe GLARE under testing for its fatigue properties. There is another composite material, carbon fibre reinforced plastic (CFRP), which is currently competing with GLARE. CFRP has better mechanical properties and a lower cost of production. As such, Professor Sinke is now carrying out research on strengthening the mechanical properties and reviewing the production methods to reduce the cost of GLARE such that it is more favorable to the buyers, hence more practical for a wider range of applications. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenter.



Delft University of Technology [Sand Engine]

March 31 PM
1430 - 1530 hr

Coastline of the Netherlands is exposed to the North Sea and is susceptible to erosion impact. Dr. ir. Matthieu de Schipper, Assistant Professor in TU Delft and Director of Shore Monitoring & Research, introduced the idea behind the sand engine, which is located in Zuid-Holland, along the western coast. The speaker introduced the problems regarding coastal squeeze and the narrowing of coastal areas, and the different solutions such as seawalls, dams, and the sand engine. The concept of Momentary Coastline was also mentioned, explaining how shoreline monitoring is carried out. The sand engine is predicted by modelling with morphological and hydrodynamic data processing, where the data was collected periodically. Topographic maps were generated and field experiments were carried out to show the erosion and sedimentation occurring along the shoreline. After having an informative presentation, we were led by Mr Saulo Meirelles, researcher on lower shoreface morphodynamics, to the hydraulics laboratory in TU Delft, where conditions along the shoreline are simulated. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.

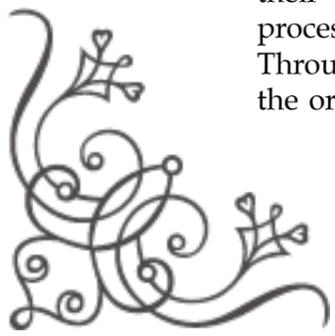




Connekt

March 31 PM
1700 - 1830 hr

Connekt is an independent network of companies and authorities with the aim to improve transportation in the Netherlands in a sustainable manner. Connekt focuses on mobility, such as Intelligent Transportation System (ITS), logistics, and public transport, by connecting members and sharing knowledge and experience. In addition, Connekt organizes activities that facilitate the exchange of knowledge and co-operation between its 125 members, such as public authorities, private companies, and knowledge institutions. During our visit to the Connekt's headquarters, we were first introduced to the non-profit program 'Lean and Green', which was founded by Mr Kenrik Goijer. The programme is committed to social responsibility and aims to create a more sustainable environment. Organizations that sign up for this programme are required to set up an action plan which aims to reduce the carbon dioxide emissions by 20% in five years and reduce costs by making their logistics and mobility processes more sustainable. Throughout this programme, the organizations are guided by Connekt to develop a systematic and standardized logistics chain to alleviate the traffic congestion. The delegates also learned the importance of setting up a neutral logistics information platform from Mr Tzvetan Stanchev. The platform requires information from shippers, logistics service providers, mainports, and government, which can help to alleviate mis-communication problems and help to speed up the entire logistics process. After the presentations, we had a relaxing and interactive sharing session with the two presenters from Connekt and Ms Lia Hsu, Project Manager. We came to the conclusion that in the coming future, it is crucial to have smart mobility, which can better utilize existing infrastructure capacity, improve road safety and accident management. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.



Dokhaven Wastewater Treatment Plant

April 1 AM
0900 - 1100 hr

Dokhaven WWTP is currently the only underground WWTP in the Netherlands. It was constructed and operated by one of the Dutch regional water authority, Waterschap Hollandse Delta (WSHD). Due to high construction, maintenance cost and expected nuisance to the surrounding residential area, the underground option was proposed and implemented. The WWTP was designed for the sewage catchment including the centre of Rotterdam and Southern and Western parts of the city with a population equivalent to 650,000. Ms Ingrid van Gelderen, Ms Charlotte van Erp Taalman Kip, and Mr Floor Besten, the Communication Advisor, Innovation Technologist, and Process Engineer for Dokhaven WWTP, respectively, warmly welcomed and guided the delegates through the visit to this treatment plant. After the treatment, the treated water will be pumped into the river via four duty pumps. The sludge from the wastewater is then transferred to the sludge treatment plant (STP) 600m from the WWTP. In ventilation, the WWTP intakes air and the used air within the WWTP will be discharged to the STP through a twin 1.8m diameter pipeline to be treated before being released out through a 50m tall ventilation shaft. Despite the operation of the WWTP underground, the ground surface is still available as a green space for the people to enjoy. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.

The WWTP is 11m below ground and consists of two levels. Wastewater intake is delivered by 6 nos. of 1.2m to 1.8m diameter rising mains from different municipalities to the WWTP. The wastewater treatment technology applied in the plant includes Absorption-Belebung (A/B) technology, Single reactor system for High





Arcadis

April 1 PM
1200 - 1500 hr

As one of the largest consultancies in the world, Arcadis' engineering philosophy is to strike the right balance between the needs of the natural environment, the people, and the communities, resonating with the Dutch way-of-life. Mr Piet Dircke, Global Leader of Water Management, and Mr Rob Steijn, Director of Rivers, Coasts and Seas, shared their experience during our visit to Arcadis' Rotterdam office. With increasingly severe weather events, major cities have been subject to flood disasters in the past decade. There would be high risk for cities to merely rely on 'hard' solutions for protection; instead, Arcadis' flood protection projects are based on the concepts of multifunctional solutions, adaptation to climate change, and social resilience to catastrophic events. For example, the Benthemplein water square is an urban floodplain designed to store rainwater and transforms as a public recreational area during dry weather.

Eco-shape, a Private-Public initiative. Their "Building with Nature" programme focuses on solutions with ecodynamic design principles, recognizing that nature is a dynamic system that we need to adapt to, not fight against. Special guest Ir Frank Rieck, Professor of Future Mobility at the Rotterdam University of Applied Science, shared with us the research of their eMobility-Lab. Working with other research groups and companies, the Future Mobility group examines practical and sustainable solutions of electric vehicles in Rotterdam, such as public transportation and sanitation vehicles. The delegates then introduced the HKIE and Hong Kong's engineering projects. The speakers asked poignant questions and a discussion on sustainable engineering solutions ensued. We would like to express our sincerest gratitude to the speakers and Arcadis for hosting the delegation and providing such a comprehensive sharing session.

Arcadis is involved in various initiatives that integrate the idea of "Building with Nature". They play a leading role in



Kinderdijk

April 1 PM
1600 - 1730 hr

Windmills are considered a Dutch icon throughout the world. In Kinderdijk, the visit started with a boat tour, where the delegates experienced the beauty of the nineteen mills, pumping stations, low and high storage basins, ditches, and sluices together forming an ingenious water management system in the low-lying polders. After the tour, a presentation was given at the visitor center where the delegates learned about the history of Kinderdijk. Dutch inhabited the area of Alblasserwaard starting around 750 BC. At that time, the area was a swampy region and inhabitants dug ditches and diversion streams, allowing excess water to flow away. The windmill technology was developed in the Netherlands after the famous St. Lucia's flood in 1287. While it became increasingly difficult to handle water drainage in the boggy ground in the region, storage basins were built to drain the polder in the 17th century, followed by the construction of the windmills between 1738 and 1740. In the Netherlands, the number of windmills reached its peak at 9,000 windmills in the 19th century. After the Industrial Revolution, most of the windmills were replaced by the steam engine and electric pumping station for higher efficiency. Now, there are only less than 1,000 windmills left in the Netherlands, with Kinderdijk being the last place in the world with so many windmills close together in an authentic polder landscape (kinderdijk.org, 2001). The delegates are delighted to witness this masterpiece of human creative genius. At the same time, it is an outstanding example exhibiting an important interchange of human values on developments in technology and landscape design since the Middle Ages.

kinderdijk.org. (2001). Kinderdijk: a unique location. Retrieved from <http://www.kinderdijk.org/hist.shtml>



Royal HaskoningDHV & Garmerwolde Wastewater Treatment Plant

April 2

Royal HaskoningDHV is a global provider of consulting services and engineering in the areas of aviation, buildings, energy, industry, infrastructure, maritime, mining, transport, urban and rural planning, and water. “What differentiates our company from other consultancies,” said Mr Andreas Giesen, Director of Innovation & Product Development for Water Technology, “is our emphasis on R&D on innovative and sustainable solutions to meet our clients’ needs and enhance the society.” Mr Giesen then briefed us about some water patents of DHV, with focus on Nereda®, an award-winning biological wastewater treatment technology using aerobic granular biomass. Nereda® is grown with a mix of bacteria that is able to treat and remove biological oxygen demand (BOD), nitrogen, and phosphorous. Nereda® uses an optimized sequencing batch reactor (SBR)-circle comprising (1) simultaneous fill and decant, (2) aerate, and (3) fast settling.

With some basic information of Nereda®, we were then guided by Mr Giesen to visit Garmerwolde WWTP, the largest Nereda® installation to date. The original Garmerwolde WWTP adopts Absorption-Belebung (A/B) system with treatment capacity of 235,000 p.e.. To accommodate a larger capacity and to meet more stringent nutrient standards, a 140,000 p.e. Nereda® unit was added to work in parallel with the existing plant. The Nereda® unit can treat around 41% of the total inflow and provide better effluent quality with 75% less space and 50% less energy consumption comparing to the existing A/B system. The direct comparison between Nereda® and A/B system in Garmerwolde WWTP was impressive and well demonstrated the advantages of this innovative technology. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.



Dutch Cycling Embassy

April 4

Cycling is at the heart of Dutch culture. As a renowned city for cycling, the Dutch implemented many cycling-friendly facilities and nurtured cycling experts to continuously enhance their cycling networks and infrastructure development. At the start of the visit, the delegates were greeted by ir. Mirjam Borsboom from Movida Transportation Solution. She first led the delegates to visit bicycle parking lots and demonstrated the use of simple smart-card parking system. To gain first-hand experience with the cycling culture, the delegates explored around the cycling city, Utrecht on bike. The delegates then visited the Dutch Cycling Embassy (DCE) headquarters and a presentation was given by ir. Borsboom. The DCE is one of the most renowned public-private network. DCE is a non-profit organization that is funded by the Dutch Governments and public and consists of a group of cycling experts which aims to establish seamless integration between cycling and the public transportation network in its local community. One of the projects they collaborated with the government which greatly benefited the Dutch society is the development of bicycle parking lots. The world’s largest bicycle parking lot is now located at the Utrecht Central Hall Station - a three-storey building that can accommodate over 4,000 nos. of bicycles. DCE believes that there are three fundamental pillars which have contributed to the overall success of the Netherlands’ cycling network development; they are:- Hardware: Infrastructure support; Software: Skills and knowledge on cycling, and; Orgware: Cycling policy structure and vision of policy makers. DCE also conducts many cycling seminars and workshops to parties abroad to advocate the use of cycling in their daily living. The biking experience in Utrecht was unique and memorable. The Dutch cycling culture that was learnt from the Embassy has definitely opened the minds of the delegates on cycling as a form of transportation, rather than merely a leisure activity.



Afval Energie Bedrijf's Waste Fired Power Plant

April 7 AM
0800 - 1030 hr

Afval Energie Bedrijf (AEB)'s Waste Fired Power Plant (WFPP) is one of six incineration lines of AEB Waste-to-Energy Plants in Amsterdam. It is the most representative MSW incineration plant in the Netherlands. It was an honor to have Mr Evert Lichtenbelt, Strategic Advisor & Energy of AEB and Mr André Struker, Strategic Advisor of Waternet, sharing with us an overview of the AEB WFPP's development and giving the delegates a guided tour. Started with a presentation, the delegates learned that over 530,000 tonnes per year of MSW together with a small amount of sludge and chemical waste are treated by AEB WFPP, whereas no oil-contaminated waste is received. It adopts the moving grate incineration technology with flue gas treatment system comprising selective non-catalytic reduction, electrostatic precipitator, fabric filter, and scrubber.

neighbouring Amsterdam West WWTP, which delivers sewage sludge and biogas, AEB WFPP provides WWTP with electricity and heat. AEB WFPP makes a large contribution to the sustainability goals of Amsterdam. To achieve "optimal recycling", valuable materials such as metals are recovered from bottom ash that can also be treated to produce construction materials. An eight-year communication programme was conducted in an open and transparent manner in order to overcome public opposition to the implementation of AEB WFPP. To obtain public support, different parties in the society with high environmental and health concerns were involved in the consultation. The visit ended with a souvenir presentation with our HKIE President Ir Victor Cheung and our Delegation Manager Ir Kenneth Cheung to thank the presenters.

A guided tour is then carried out to understand the operation of AEB WFPP, where it achieves sustainable energy recovery with a net energy efficiency of 31.2% (i.e. approximately 880kWh per tonne of MSW). In coordination with the





LOCAL EVENTS





Introduction

To enrich delegates' understanding on the current development of transportation network, water infrastructure and waste management in Hong Kong, local series, comprising six technical visits and four seminars were organised from December 2014 to May 2015. The following table summarizes the local events according to the respective study area.

Study Area	Topic	Date	Speaker
Water Infrastructure Cooperation	Technical Visit to Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities	13 December 2014	Mr. Tim YIP
	Seminar on Expansion of WSD Tai Po Water Treatment Works	8 January 2015	Ir Stephen TING
	Technical Visit to Happy Valley Underground Stormwater Storage Scheme	14 February 2015	Ir Ellen N S CHENG
Waste Management & Recycling	Technical Visit to Dunwell Yuen Long Plant	29 November 2014	Mr. S C HO
	Seminar on Waste Management Strategies in Hong Kong	25 February 2015	Ir Elvis AU
	Seminar on the development of Integrated Waste Management Facilities and Organic Waste Treatment Facilities in Hong Kong	9 March 2015	Ir Elvis AU
Sustainable Transportation	Seminar on Cycle Track Development in Hong Kong	3 December 2014	Ir Thomas CHU
	Technical Visit to Tsing Ma Control Area	7 March 2015	Mr. Eric W K CHAN
	Technical Visit to Power Electronics Research Centre	18 March 2015	Prof Eric CHENG
	Technical Visit to Container Terminal No. 8	16 May 2015	Mr. T K CHENG





Water Infrastructure Cooperation

Water brings lives, is a common management approach in controlling the volume of surface runoff. By temporarily storing a portion of the surface runoff coming from the upstream flow to the downstream catchment can be reduced and controlled within the capacity of the downstream drainage system.

Rapid urban development in the 80s had turned large areas of natural ground into hard paved areas. As a result, rainwater which was formerly seeped into the soil, became surface runoff. The expansion of built-up areas in close proximity to the major watercourses had also reduced the areas' flood carrying capacities, further aggravating the flooding problems. One of the solutions in resolving the flooding problems in Hong Kong Island involves three approaches: 1) provide interception at the upstream – the construction of Hong Kong West Drainage Tunnel, 2) create storage space in the midstream – the implementation of the Happy Valley Underground Stormwater Storage Scheme and 3) upgrading drainage pipes at the downstream – the lower catchment drainage improvement works.

The delegates visited the Happy Valley Underground Stormwater Storage Scheme prior to the delegation. Stormwater storage

With a total land area of 1,108km², only 6.9% are residential areas, while 66.6% are woodland/shrubland/grassland/wetland. This calls for the use of land reclamation, which involves turning what is originally water into usable land space.

A technical visit to Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities (HKBCF) was organised prior to the overseas delegation, aims to provide the participants with the project overview, progress, and technical information on reclamation works as well as the solutions to the different site constraints and environmental impacts.

The HKBCF will be located on an artificial island of about 150 hectares reclaimed from the open waters, the new non-dredge reclamation method is used in order to minimize the potential environmental impacts on water quality and marine ecology. One of the non-dredge reclamation methods is to sink a series of large circular steel cells through the marine mud into a firm layer of alluvium underneath. The geotextile and 2m thick sand blanket are laid over marine mud prior to the installation of stone columns filling with aggregates. Sheet piles for the steel cells are then installed by using the vibrating hammer. Rock fill and armour are placed

to form stable seawalls. As there will be no dredging and disposal of marine mud for the whole reclamation works, the water quality impact will be reduced and it will also help to preserve the marine ecology especially the Chinese White Dolphins habitat. To further protect the Chinese White Dolphins, the silt curtains are deployed and dolphin monitoring is carried out during site work.

One of the most important aspects we as engineers must safeguard for the public is the safety of drinking water. A seminar on the expansion of the Tai Po Water Treatment works given by Ir Stephen Ting of Black and Veatch (HK) updated us on the latest Hong Kong development in maintaining adequate supply of fresh water. Tai Po Water Treatment Works (WTW), established in 2003, is one of the water treatment works in Hong Kong to supply fresh water to the Kowloon region. Hence, expansion of the Tai Po WTW is required to cope with in-situ re-provisioning of Sha Tin Water Treatment works and to enhance flexibility, reliability, and resilience of the water supply network. The project is procured under a Design-Build Contract for provisioning of an additional treatment stream to increase the design output from 400 MLD to 800 MLD. Some key features

Waste Management & Recycling

of this project include the use of ozone disinfection as the preferred treatment process to reduce the use of chlorine and increase protection against microbial pathogens, as well as, the rationale of high rate dissolved air flotation unit, which would be able to reduce footprint and release space for intermediate ozone contactor. Instead of having constant battle with water, Hong Kong go with the way of living with water by effectively

diverse and store it. Furthermore, Hong Kong continue to develop highly effective water infrastructure to safeguard the quality of fresh water supplied to every household. While there is gain through development, there might be lost in other aspects. Hong Kong continue to develop with means of creating more lands through reclamation, much care is carried to ensure sustainable habitat of all marine lives in water.

Hong Kong is facing an imminent problem with the disposal of MSW. The Environmental Bureau of the HKSAR Government has published the "Hong Kong Blueprint for Sustainable Use of Resources 2013-2022", which sets out the comprehensive strategy, targets and action plans for waste reduction, recycling, and treatment for the coming ten years.

The delegation is honoured to invite Ir Elvis Au of the Environmental Protection Department (EPD) to share the challenges and opportunities faced in the implementation of waste policies in Hong Kong. In order to reduce waste in a substantial amount, five-pronged strategies on waste management are proposed, which are waste reduction at source, food wise Hong Kong, clean recycling, waste-to-energy and sanitary landfilling. An action agenda, which is built upon social mobilization coupling with the right policies, legislation, and investment in modern waste infrastructures, is established to tackle with various types of waste. Various policies and actions will be implemented in phases, including policy and legislation development on quantity based MSW charging and producer responsibility schemes; recycling and recovery hardware investment on community green stations and treatment plants; and public engagement schemes.

Food waste, which constitutes about 40% of MSW in Hong Kong, are to be dealt with promptly to reduce reliance on landfills. Ir Au explained the set up of Food Wise Hong Kong Campaign in promoting food waste prevention and reduction to households, businesses, and schools. Residential estates and the commercial and industrial sectors are engaged in partnership schemes to recycle food waste by composting method.

Implementation of recovery and recycling infrastructures is one of the important steps for comprehensive waste management in Hong Kong. A seminar on the development of the Integrated Waste Management Facilities (IWMF)



Technical visit to Happy Valley Underground Stormwater Storage Scheme



Technical visit to HZMB-HKBCF



Seminar on Expansion of WSD Tai Po Water Treatment Works

and the Organic Waste Treatment Facilities (OWTF) was organised with an aim to introduce common waste treatment technologies and share the latest progress on the development of waste infrastructures. To minimize disposal of waste to landfills, the IWMF, featuring treatment capacity of 3,000 tonnes of MSW is currently under development. Various thermal treatment technologies, such as moving grate incineration, gasification, plasma gasification, and co-combustion were also discussed. According to Ir Au, selection of technology was based on careful evaluation, with due consideration on provenness of technology in terms of reliability, flexibility in operation and environmental performance. With careful evaluation, the IWMF will adopt moving grate incineration technology, which is adopted in the majority of waste to energy plants worldwide, for bulk reduction of MSW. Surplus electricity generated from the facilities will also be exported to local power grid. Ir Au also presented the development of OWTF Phase 1 for treatment of 200 tonnes/day of source separated organic waste by anaerobic digestion and composting technology.

Surplus electricity adequate for use by 3,000 household and 7,000 tonnes of compost product will be produced each year upon commissioning. In addition to public-owned waste infrastructure, promoting the engagement of local private recycling industry is also a crucial aspect to achieve sustainable waste management. Technical visit to Dunwell Waste Oil Recycling Facilities was organised to enhance delegates' understanding on the current development of waste oil recycling management process, final product detail information, and safety facilities. Located in Yuen Long Industrial Estate, Dunwell is one of the major privately owned waste oil recycling facility in Hong Kong collecting and recycling waste lubricating oil from engines, machineries, and transformers. According to the speaker, Mr. S C Ho, Dunwell has the honor to be the first company ever from Hong Kong awarded the China Environmental Science and Technology Awards - Silver Prize with Dunwell's Vibrating Membrane Advanced Treatment (VMAT) - waste oil recycling technology by the Ministry of

Environmental Protection by economic development, of the People's Republic of lifestyle, and habit. These local China. Latest researches, such as Recovery of Dye and Heavy Metal Ions with Regenerable Nanosorbent in wastewater from textile and electroplating industry were also introduced to delegates in the visit. The types and quantities of waste generated are influenced

series provided an overview on the latest progress of waste management in both the public and private sector. Policies and framework were introduced to achieve the vision of "Use Less Waste Less" lifestyle with key actions to achieve the waste reduction targets.



Technical visit to Dunwell Yuen Long Plant



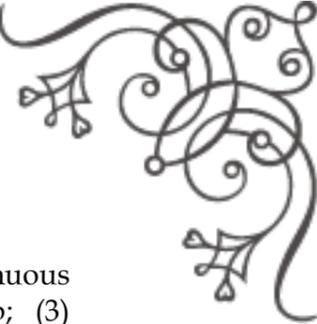
Seminar on the development of IWMF and OWTF



Seminar on Waste Management Strategies in Hong Kong



Sustainable Transportation



Transportation plays an important role in Hong Kong. According to the government statistics, there are over 12.4 million passenger journeys everyday which are made on public transport system. A large number of Hong Kong residents still rely on transportation by private cars on the road network which made traffic congestion one of the everyday issues. With the development of technology, there are now surveillance systems on highways where traffic can be controlled and managed in an effective way. At the same time, in order to minimize the environmental impact by the transportation sector, sustainable transport is introduced such as promotion on the use of electric vehicles and development on comprehensive cycle track system in the New Territories.

Surveillance systems on highways were first introduced in the Tsing Ma Control Area (TMCA). The major parts of the TMCA include Tsing Ma Bridge, Kap Shui Mun Bridge, Ma Wan Viaduct, Ting Kau Bridge, and Cheung Tsing Tunnel. The TMCA was part of Hong Kong strategic road network to the Lantau Island and Airport and had been opened to the public since 1997. The Traffic Control and Surveillance System were set at different strategic locations. The video surveillance system captured the real-time situation within the control area and they are transmitted to simultaneously at the control rooms, at Tsing Yi side and Lantau side. The duty officers stationed in the either control rooms could then oversee the situation and response quickly to weather changes or traffic accidents. The visit started by an introduction seminar, by Mr. Eric Chan, and was followed by a visit to the Tsing Yi side control room, where the delegates learnt about the real-time traffic monitoring system and the operation of surveillance system. The delegates were then taken to travel along the lower deck of Tsing Ma Bridge, which is open for traffic only during emergency or adverse weathers such as typhoon and rainstorm. At the lower deck, Mr Chan explained the different measures in case of emergency or accident such as car crash or breakdown of the MTR. The visit ended at the Lantau side

control room where the beautiful nature; (2) continuous monitoring system of toll collection was demonstrated. Cycling is widely regarded as a sustainable mode of transportation. Comparing bicycles to motorized vehicles, bikes consume no fossil fuel, hence, no air or noise pollution while also providing a mean of physical exercises for cyclists. In Hong Kong Chief Executive's Policy Address in 2007, the Hong Kong Government is planning and developing a comprehensive cycle track system in the New Territories. Constructing a comprehensive cycle track in Hong Kong is not an easy task in both technical and people aspect including design constrains such as track gradients and management of existing traffic; negotiation with the green groups and discussion with districts councils. Ir Thomas Chu introduced to us the current cycle track conditions in Hong Kong and the different facilities under development to ensure a more user-friendly cycling system. He then shared with us the development progress and constraints/challenges associated with the project, where the main objectives are ensuring both cyclist's safety and environment protection. In addition, Ir Chu explained on the design considerations for cycle tracks, namely, (1) enjoyment in

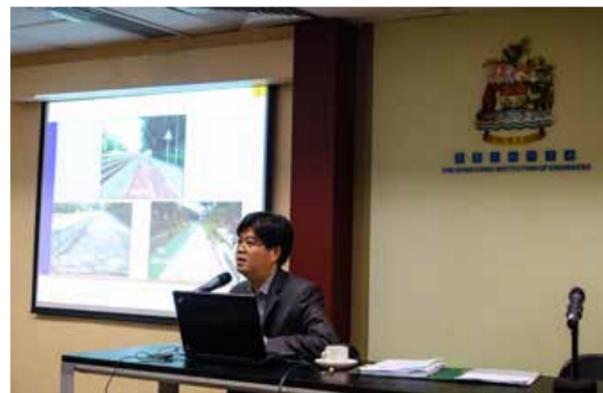
residents and (4) prevention of land resumption. Electric vehicles (EVs) are becoming more popular in Hong Kong recently. Research has been conducted by several institutions and our delegation visited one such institution, the Power Electronics Research Centre at Hong Kong Polytechnic University to learn about the development of EVs. The highlight project of the research centre is MyCar™. The research began in 1997 and was then officially manufactured by GreenTech Automotive (GTA) and was first launched in the US market in Mississippi. With the unconventional and remarkable battery management and charging system of the vehicle, it can travel over 110km on flat surfaces with a maximum speed at 64km/h in a single charge. It can also be fully recharged within six to eight hours through regular household socket. MyCar™ has obtained several international credible recognitions complying with the European standards and its technology was proven safe and reliable in the major markets. Other technologies which are existing features of MyCar™ or applicable to the future EV development were also



discussed such as Solar Powered Air Conditioning systems, EV charging station with Octopus or electronic payment system, and In-wheel Motor. While the Netherlands has one of the largest ports in the European region, our delegates ought to gain knowledge on the container terminal development in Hong Kong. A technical visit was organised to the Container Terminal in Kwai Chung. In Hong Kong, the container terminals cover a total area of 279 hectares with 24 berths handling an average of 22 million TEUs annually. Hong Kong ranks fifth for total containers turnover globally in the year of 2015. While the terminal operates 24 hours a day and 365 days a year, the terminal operation and maintenance team provides top of the line service. The various vehicle and machinery, as well as, the day-to-day terminal operation flow were introduced during the visit. Various improvement works such as the energy saving of rubber tired gantries project were presented, where after the implementation, air pollution in the terminal area was largely improved and a total fuel savings of 30% was achieved. The visits provided the delegates an overview of current development in sustainable transport in Hong Kong so that the delegates can also appreciate the sustainable transportation development in the Netherlands.



Technical visit to Container Terminal No. 8



Seminar on Cycle Track Development in Hong Kong



Technical visit to TMCA





Water Infrastructure Cooperation

Flood Risk Management

The Netherlands

With over 50% of its population living below sea level, the increasing rate of sea level rise poses an imminent threat to the Netherlands. Since the 1920s, protection works from storm surges and tides at the

developed and built a system of hard solutions such as dams, dikes working alongside canals, sluices, locks, pumps, and storm surge barriers over the past 30 years.



Area of the Netherlands below sea level
(Retrieved from <http://www.floodmap.net/>)

North Sea along most of the Netherlands coastline have been implemented in order to protect the country from being inundated. Known as the Delta Works, the Dutch have

Delta works
(Retrieved from https://en.wikipedia.org/wiki/Delta_Works)

The Netherlands adopted an integrated approach, namely a “safety chain” approach in flood risk management which covers objectives and measures in prevention, protection, preparation, response, and recovery (Government of the Netherlands, 2015). The Delta Programme was first



developed to defend against flooding by surge barriers and interconnected dams. In recent years, due to global climate change and consideration for sustainability, “no regret” concept was introduced to the Delta Programme. The Delta Programme, upkeep with long term funding and legal basis, has been running since first implemented and approaching into its fifth phase. Apart from the Delta Programme, extensive research are being done to also focus on the monitoring works at the North Sea waves and sea levels to forecast the coming trend of storm surges under the influence of climate change (Government of the Netherlands, 2015).

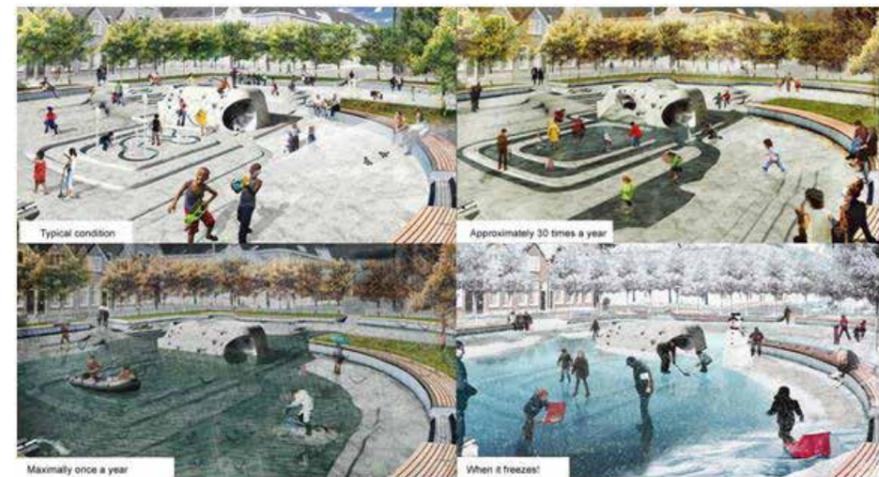
In addition, frequent intensive rainfall and heavy downpour poses a great threat of flooding in urban areas along the seashore. To reduce the impacts in these areas, flood prevention scheme were developed to relieve the floods by expanding the existing capacity of the drainage system. Three measures including construction of stormwater interception tunnels on upstream, temporary flood storage tanks on midstream and pipe upgrading in downstream were implemented (Draignage Services Department, 2015a).

Water Storage Scheme in the Netherlands

The Netherlands also incorporates the stormwater storage concept as one of their urban solutions to prevent flooding in built-up areas susceptible to heavy

Hong Kong

Hong Kong is vulnerable to flooding due to storm surge caused by approaching tropical cyclones due to its geographic



Water Square Under Various Weather Conditions
(Retrieved from <http://watercollectors.tumblr.com/page/4>)



downpour. While space is limited, the Dutch has brought upon innovative solutions to merge the storage scheme into the infrastructure. For example, the City of Rotterdam developed an underground water storage tank, with a capacity of ten million litres, underneath an underground car park. While these double purposes of parking cars and retaining excess water will always remain separate, the Dutch also explore on ideas of merging some dual purposes storage scheme such as water squares. These water squares are open areas which are purposely fill up in a controlled manner during heavy rainfall and can be transformed as open recreational space during dry period.

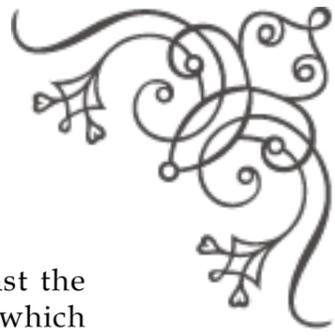
Water Storage Scheme in Hong Kong

Whereas in Hong Kong, Happy Valley Underground Stormwater Storage Scheme is one of the examples for underground flood storage tanks. Aiming to alleviate the flooding problem by providing a temporary underground storage in the midstream, the tank will temporarily store part of the stormwater collected from the upstream catchment for attenuating the peak flow through the downstream

stormwater drainage systems after heavy rainstorms. The stormwater will then be discharged via pump and gravity drains to the outfall and thus greatly reduces the risk of flooding in low-lying area (Draignage Services Department, 2015b). While this case is an excellent example of providing water storage with dual purposes, Hong Kong can also consider the water square approach, as many city parks can be converted or re-developed with dual purposes, providing both leisure and storm water storage.

Storm Surge

Storm surge, created by a low-pressure-induced dome of water drawup, can pose a great threat with high tide and wind with sea level rising up to 3m. In Hong Kong, the storm surge comes with the typhoon. The Netherlands often suffers from storm surge originating from the North Sea. The worst happened in 1219, where over 36,000 lives were lost in the St. Marcellus' Flood. To protect the Netherlands from such threat, the Dutch started the Zuiderzee work and built the Afsluitdijk (Sterl, Brink, Vries, Haarsma & Meijgaard, 2009).



Afsluitdijk, one of the largest dikes in the Netherlands was built across the Oosterschelde estuary. The dike was designed to withstand tidal waves up to 3m high, protecting the people living behind it (Deltawerken, 2004). To ensure that land and people are protected from threat of seawater level rise due to climate change, strengthening works in line with the current standards at these dams, dikes and storm surge barriers are being implemented.

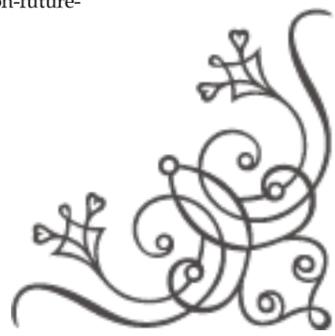
Maeslantkering, one of the most remarkable examples for movable storm surge barriers in the Netherlands was specially designed to hold off storm surges as well as to maintain the ports of Rotterdam and Antwerp accessible. In the case of storm surge, the two gates are rotated into the channel in a closed position. To act as

a massive barrier against the storm surge, the gates, which are of hollow structure are filled with water and sink firmly to the river bed. Once the storm is cleared, water is pumped out of the structure and float back to its original position, thus traffic can then be resumed.

In Hong Kong, storm surge is seldom heard in our daily life. In the near future, we are facing the same threat of sea level rise as a consequence of global warming. The intensity of typhoons will increase with the climate change. The risk of storm surge frequency will also increase. This could be a good time for Hong Kong to consider the storm surge in our future planning in term of safety and economic effect. The Netherlands shall be a good example for us on tackling the future disaster.



Maeslantkering
(Retrieved from <http://oceans.mit.edu/featured-stories/engineering-hurricane-protection-future-3-questions-chiang-c-mei/attachment/maeslantkering-barrier>)



Building with Nature, Living with Water

With about a quarter of the territories lying under the sea level, the Netherlands has spent centuries to create artificial land for agricultural use. Since the 12th century, the Dutch had started draining swamp to create arable land suitable for farming and developed water pumping system to pump away the water to maintain their land, which was known as the poldering technique. The Netherlands was the result of building in nature while working against the sea level. With the effect of global climate change, the Dutch started to question whether their traditional way of building artificial land with the poldering system is the best solution. In addition, there is an increasing need in adopting sustainable development to ensure a healthy ecology system that are essential for both food and water supply, while maintaining the system to reduce the risk of dike failure that can possibly lead to catastrophic flooding. The Dutch started to progress the way towards of building with nature, and more importantly to start living with water, which they have spent centuries to pump away for maintenance of the artificial land.

Hong Kong and the Netherlands are both surrounded by water, having a high population density, facing the risk of flooding and are both looking forward to a sustainable development. In view of the high similarities, Hong Kong may learn such phenomenal concepts from Netherlands and apply them to the future development.

Building with nature in the Netherlands – Sand Engine

The project takes place in the Netherlands' coast which consists of a large area of sand and dunes and is part of the sea defense system to protect the low lying hinterland. Due to the structural erosion caused by the diminishing supply of river sediment and rising sea level, the Dutch has been constantly nourishing the coast with small volume of sand dredged from the North Sea. The special feature of sand engine is the concentrated nourishment of large sand volume that allows the tide to bring the sand along the coast for the next twenty years. The sand engine not only lowers the carbon footprint and frequency of disturbance on the ecosystem, but it also creates a hook-shaped peninsula which provides an area for recreation of citizen, a resting

place for seals, and a habitat for flatfish. This demonstrates how the Dutch use innovative engineering concepts to enhance their defense against the sea while bringing benefits to the nature. (De Vriend, H.J. and Van Koningsveld, M. , 2012)



Formation of hook Peninsula in less than two years after the construction of sand engine (Retrieved from <https://www.flickr.com/photos/zandmotor/11996625986/>)

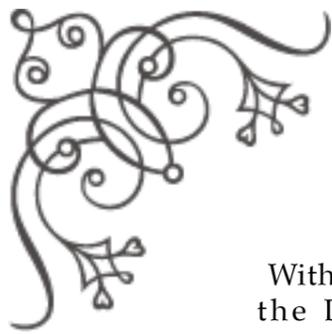
Application of Sand Engine in Hong Kong for coastal protection

Hong Kong has a high demand for beach facilities due to its limitation of land availability. In 2012, the Hong Kong government built a public beach at Lung Mei, Tai Po. Despite construction has been completed successfully, debates have been made on the damage of ecology of marine life and the concern on sand loss similar to the Golden Beach in Tuen Mun (Legislative Council HK,

2012). The Netherlands' coasts face similar environmental problems due to sand erosion where Sand Engine has now been experimented to be one of the solutions. Sand Engine might not be the best solution in Hong Kong in short term as the flow of the largely nourished sand can be unpredictable and extensive researches with computer simulation are required to predict the formation as was done in the Netherlands. However, it is worthwhile to start emphasizing on the concept behind Sand Engine to create a recreational land for both human and the ecology while minimising the disturbance caused to ecology, making it a building with nature project.

Living with nature in the Netherlands – Floating house and Blue Revolution

With an increasing risk on dyke failure due to sea level rise, the Dutch began to consider building the land above water using floating technology. By living with the water, rather than against it, they are looking to turn the threat into opportunity. It is obvious that the floating technology is also one of the solutions to make the cities more resilient to flooding.



With the floating technology, the Dutch also raised the possibility of building above the sea and looked to energy sustainable development. The idea of Blue Revolution has been raised by Delta Sync in 2012 as an option to resolve the land scarcity with water urbanization and enhance agricultural activities. The proposal involves the construction of agricultural land on the floating city which utilises carbon dioxide and nutrients produced from the city for agriculture, forming a cyclical metabolism and improving the efficiency of agricultural activity. (Delta Sync, 2012)

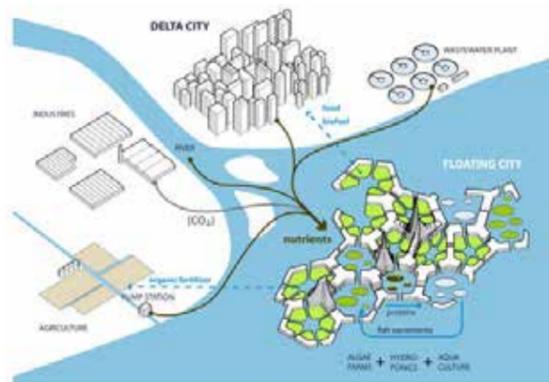
which consist of approximately 600 junks to accommodate the residents who are mostly fishermen. Living on water in Hong Kong is a tradition inherited from its history, rather than a solution to future development. Nevertheless, as an archipelago city Hong Kong has the potential to adopt the floating technology to a wider extent.



The Aberdeen Floating Village
(Retrieved from <http://www.tourism-review.com/travel-tourism-magazine-aberdeen-floating-village-explore-the-history-of-hong-kong--article2001>)

Advantage of extending the city into the aquatic territories

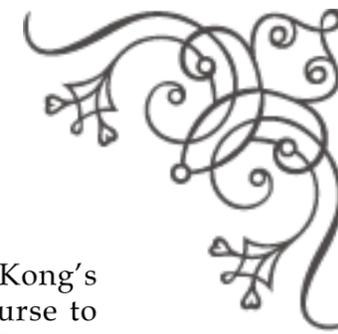
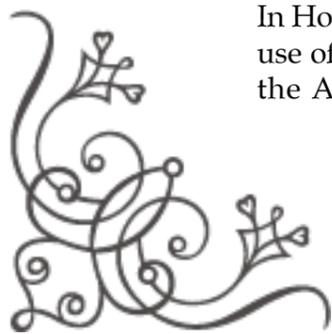
Energy efficient solution - Building on water opens for the possibility of using the sea water as a temperature controller with less energy input on air conditioning system. One of the most typical examples is the Floating Mosque in Dubai that has been designed by Waterstudio, the wall panels and columns of the mosque are both designed to have water



Concept of blue revolution illustrating the interaction between the developed city and floating development
(Retrieved from <http://www.deltasync.nl/deltasync/fileadmin/template/main/projecting/BlueRevolution.pdf>)

Application of living with water in Hong Kong

In Hong Kong, the most popular use of floating house is found in the Aberdeen Floating Village



flowing in their interior. Not only can it provides an iconic architectural feature, it also acts a heat insulator against the extreme temperature outdoor. (TEDx talk, 2014)



The Floating Mosque in Dubai with water flowing in columns
(Retrieved from <http://www.waterstudio.nl/projects/30>)

Improvement on variety of land use

As a commercial city, land scarcity is the most critical problem in Hong Kong. The land use is mostly focused on commercial and residential buildings to support the economic activities and the high demand of living houses. With the use of floating buildings, more recreational facilities such as green parks and sport facilities which have a lower land economic turnover but vitally important for both the health and social aspects of the citizens can be brought into Hong Kong. The Floating Golf Course in Maldives designed by the architect Waterstudio, can be

one solution for Hong Kong's introduction of golf course to public. (Waterstudio, 2013)



Floating Golfcourse in Maldives
(Retrieved from http://i.telegraph.co.uk/multimedia/archive/02309/Floating-Golf-Cour_2309760i.jpg)

Creation of dynamic city with high mobility - Furthermore, since floating modules can be easily relocated and substituted by other like the shifting of ships. It eases the difficulties in city planning and minimises the need of demolition for any change of land use. This allows the future generation to easily relocate the constructed houses or infrastructure on water without significant demolition, giving a scarless development. For the urban fabric that expands into the water, the choice on urban components are flexible and can be alternated to meet any future change in city planning. (Koen Olthuis & David Keuning, 2010)





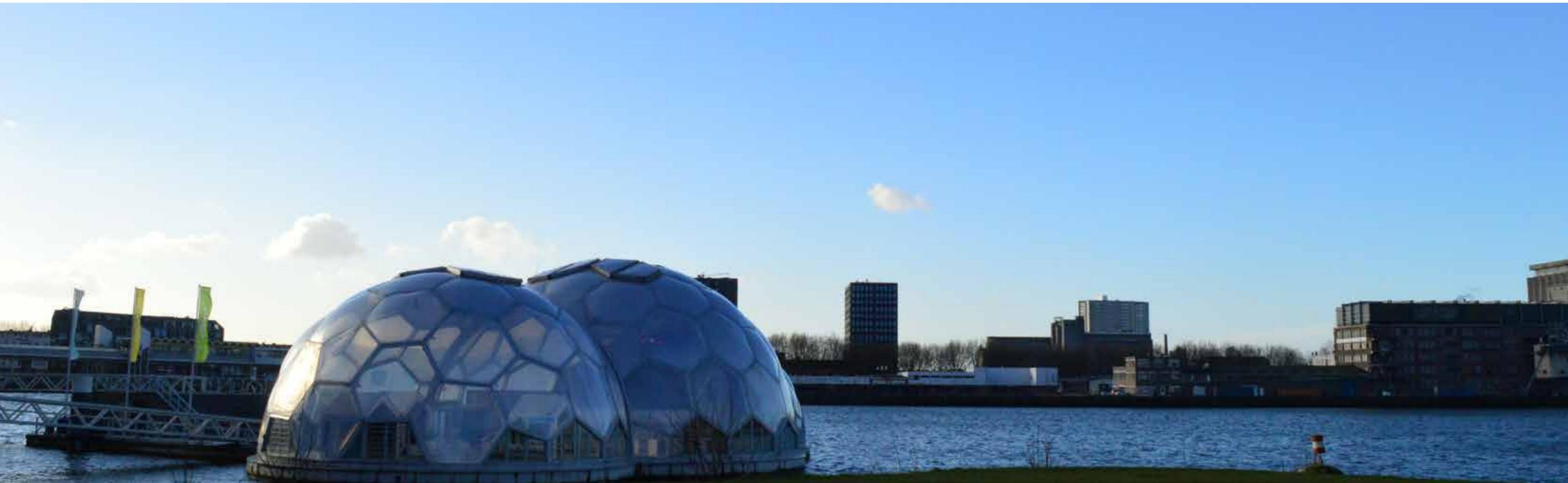
Challenges on application of floating technology in Hong Kong

Despite of the advantages in terms of energy sustainability and flexibility in city planning, there are several obstacles which limit the use of floating technology in Hong Kong. Firstly, adapting floating houses come with higher initial cost and has not been moved into

mass production yet. Secondly, floating house involves private ownership of aquatic territories which can be controversial. Furthermore, the demands of high building and resilience to typhoon are crucial factors in Hong Kong and are less considered in the Netherlands. The development of government recognised design regulation for floating house might also be one of the most difficult challenges.

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Waste Management & Recycling

Waste Management

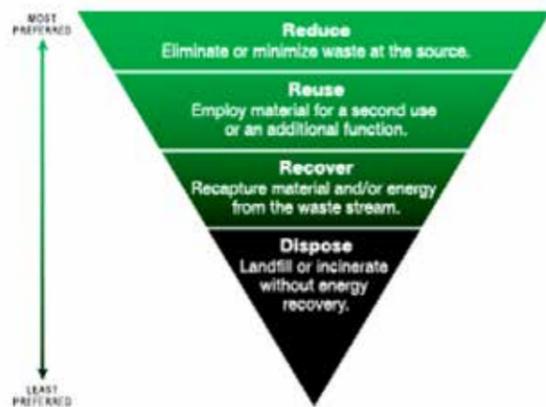
Waste Management in the Netherlands

The waste management system in the Netherlands is highly regarded, with one of the highest recycling rates in the world. The recycling rate (including composting) was over 60% in 2011 (Waste Statistics in the Netherlands, 2013). The Netherlands' waste policy framework is formulated upon the waste hierarchy, known as the Lasnik's Ladder: avoiding waste as much as possible, recovering usable

residual waste, and, only then, landfilling what is left over in an environmentally-sound way.

Key waste initiatives, qualitative targets, and action plans are detailed in the National Waste Management Plan stipulated under the Waste Management Act. Once in every six years, the central government authorities, the Ministry of Infrastructure and the Environment update the plan and formulate strategies with defined targets in the coming years. The Second National Waste Management Plan 2009 – 2015, looking ahead to the period up to 2021, was established with key objectives to limit waste generation and promote recycling and recovery of construction, demolition, and industrial waste. It also aims to flesh out the policy framework for specific categories of waste as well as particular aspects relating to licensing, imports and exports, and the corresponding monitoring (EIONET, 2009).

In order to stimulate recycling and avoiding waste, the Netherlands had adopted various instruments including enforcement of legislation with advanced monitoring



The 4-tiered waste hierarchy of the Netherlands with waste reduction at source as the top priority (Retrieved from <http://rwsenvironment.eu/subjects/from-waste-resources/elements-dutch-waste/>)

and valuable raw materials from waste, generation of energy by incinerating the

system, financial instruments like volume-based waste fee system, implementation of separated waste collection system, and education with effective communication on the result of the waste management programme.

The Netherlands had implemented a landfill ban for 35 categories of waste, including all combustible and biodegradable waste. In parallel to the ban, a landfill tax, one of the financial instruments, was also introduced in the same year with a view to promote waste reduction and recycling, thus reducing reliance on landfills (European Environment Agency, 2013). With various policies making landfilling more expensive than incineration, most of the waste in the Netherlands is treated by incineration, where landfilling is kept to a minimum as low as 1% (Waste Statistics in the Netherlands, 2013).

The landfill tax levy is more effective in combination with the promotion of extended producer responsibility (EPR). The producers and importers are responsible for the management of the products put on the market when these products are discarded.

Waste Management in Hong Kong

In the 1990s, under the policy framework "Environmental Hong Kong 1989", a waste transfer and disposal network, with three strategic landfills and various refuse transfer stations, was introduced to deliver waste with land and marine transportation. Up till now, landfilling remains the major disposal method of solid waste. In 2013, 14,300 tonnes of solid waste (including construction waste) was disposed of at landfills daily.

With the introduction and enactment of the new Blueprint in 2013 (Environment Bureau, 2013), Hong Kong has taken initiatives to transform waste management structure with a target in recycling rate, landfilling rate, and incineration rate of 55%, 22%, and 23% respectively. The overall target is to reduce MSW disposal rate by 40% on a per capita basis by 2022.

Hong Kong has been relying totally on landfilling since the 90's which is very unique compared to other countries including the Netherlands. In Hong Kong, most of the waste that are disposed into landfills are free of charge, with the

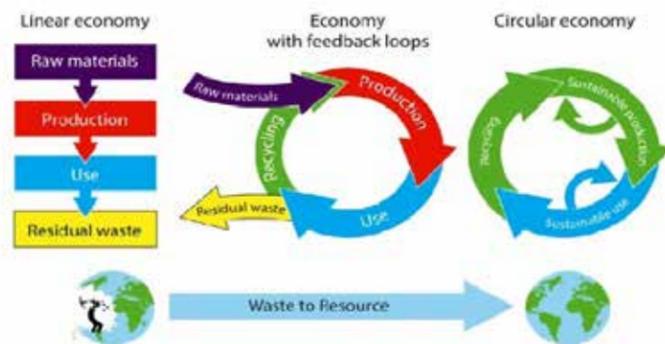
exception of construction waste, chemical waste, and clinical waste, which are charged based on a statutory charging scheme. Development of modern waste infrastructure is one of the key aspects to motivate and change the traditional waste culture.

Discussion

Resources recovery

Further to the operation of waste-to-energy facilities in compliance with stringent

2013). The Netherlands is taking the opportunity to move towards circular economy. Raw materials and energy are managed more concisely, with an aim to keep materials circulating in the value chain through smart design, reuse, and optimal recycling. Under circular economy, residual waste and plant emission can be beneficially reused with market values and reduce the use of raw materials.



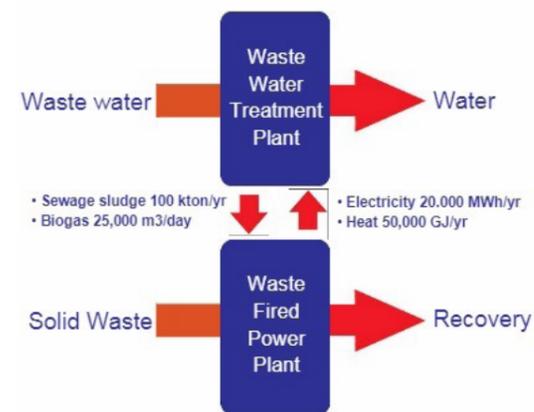
Transition from waste to resource (Bastein, Roelofs, Rietveld, & Hoogendoorn, 2013)

emission standards and best practical technologies, the Dutch have taken one step forward to formulate strategies for enhancing resources recovery. The concept of circular economy is put forward in the operation of the waste facilities. Circular economy refers to the industrial system based on the reuse of products and raw materials, with the objective to promote value creation in the system (Bastein, Roelofs, Rietveld, & Hoogendoorn,

The transition to circular economy is being put into practice in the waste infrastructure. As one of the key operation strategies, the operators have been aiming to recover as much useful materials and resources as possible from the treatment process. In the SNB sludge incineration plant, two-thirds of the steam generated at the plant is utilised internally for sludge drying. Half of the exhaust is also used in an adjacent

plant for lime production. The sludge incineration ash in the Netherlands contains a high level of phosphate. SNB has investigated the possibilities of recycling the residues for phosphate, which is considered as one of the most important raw materials under the European Union. About 99% of ash and residues are recovered while the residual is transported to Germany for further technological recovery.

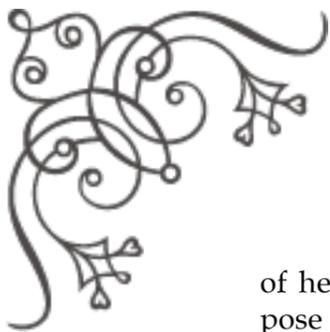
With the installation of high pressure steam turbine generator units, AEB WFPP achieves a net energy efficiency of 30%, with surplus electricity output to the grid. To utilise its strategic location and enhance resources recovery, AEB WFPP has established collaboration with the Amsterdam West WWTP, where sludge and biogas are being supplied to the AEB WFPP and electricity and heat are supplied to the Amsterdam West WWTP.



Collaboration between AEB WFPP and Amsterdam West WWTP (Retrieved from <http://www.rvo.nl>)

For the development of the IWME, beneficial use of bottom ash from the incineration process is one of the potential ways to enhance resources recovery. This strategy not only enhances sustainable waste management from an environmental point of view, but also potentially increases profits from selling of the recyclables. Innovative bottom ash treatment technologies are being developed in the Netherlands to recover non-ferrous metal and produce cleaner materials that can be used without restrictions (Dutch Waste Management Association, 2013). Despite track record for application of bottom ash as road base and landfill cover in the Netherlands, US, and other European countries, application in Hong Kong is still in investigation phase.

One of the challenges encountered in resources recovery in Hong Kong is that the quality of the recyclables needs to be defined. Standards in operation procedures for the recyclers and users are essential to improve efficiency and ensure that health, safety, and environmental concerns are readily addressed. In particular, bottom ash produced from the incineration process may contain elevated levels



of heavy metals, which would pose environmental and health concerns. Without proper information provided, including composition and size of the recyclables and associated testing to confirm the safety of application, the potential market would not readily engage in using recyclables from waste stream.

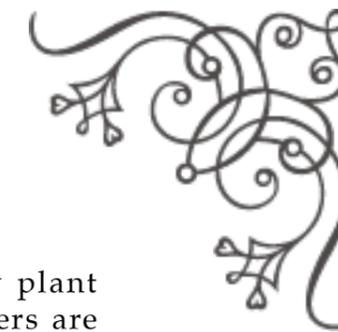
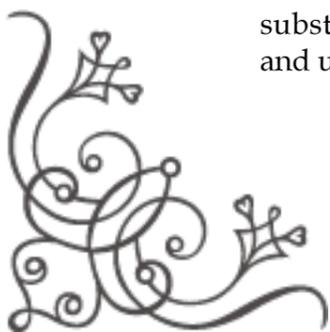
Economic benefits are the key driving force for the operators to promote resources recovery. Hence, securing adequate outlets for recyclables is crucial in ensuring that recyclables are competitively-priced. The cost of pre-treatment of residual waste and transportation cost should be compensated by the selling price or savings in materials reuse.

In order to promote reuse of recyclables from waste stream, a set of well-defined operation and testing standards shall be developed. Proven overseas experience serve as good references to facilitate such development. Trial tests and investigation studies shall be carried out to confirm that recyclables are viable substitutes to existing materials. Apart from demonstrating the feasibility of such reuse or substitution, potential markets and users shall also be identified

to provide economic incentives for operators to invest in resources recovery throughout the treatment process.

With the successful collaboration between AEB WFPP and Amsterdam West WWTP, it would be beneficial for operators of waste infrastructure in Hong Kong to further explore the possibilities of supplying resources to premises/establishments in close vicinity. This could reduce the transportation cost and associated environmental impacts. One of the examples in Hong Kong would be the collaboration of the operators of the North East New Territories (NENT) Landfill and the Hong Kong and China Gas Company Limited, where biogas generated from the landfilling activities is supplied through underground pipeworks to the gas production plant in Tai Po.

Most of the waste infrastructure in Hong Kong are publicly owned, where contractors are employed to carry out the design, construction, and operation of the facilities (DBO Contracts). Hence, several parties including the owners, contractors, and potential users will be involved in the recovery scheme. Moreover, a substantial amount of investment would



be required in the treatment of recyclables and transportation and delivery network. For successful implementation of such scheme, the ownership of such recyclables shall be clearly defined, including parties involved in the sale of recyclables. Most importantly, the contract shall clearly state how the profits from selling recyclables will be shared amongst the owners and the contractors. A clear demarcation of equipment and delivery network, with due consideration on the operation and maintenance responsibility, shall be established.

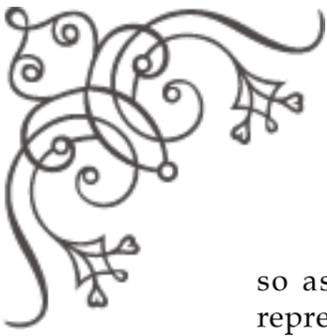
Public reception of incineration Despite opposition reported in the construction of incineration waste facilities, the Dutch generally accept thermal treatment as one of the viable treatment methods over landfilling. From the AEB WFPP, which is located in close proximity to the urban population of Amsterdam, 130,000 households in the city will be connected to heating network by 2030 (AEB Amsterdam, 2013). During various development stages of the AEB WFPP, stakeholders from relevant parties were engaged in open discussion to exchange views on the operation

of the facilities. Key plant performance parameters are also monitored by independent authorities and made available to the public.

In Hong Kong, there is heated debate on the development of the IWMF, as the public are concerned on the selection of thermal treatment technology and potential health and environmental impacts related to air emission from the facilities. Public engagement shall continue during the construction, commissioning, and operation stages of the project. Maintaining a highly transparent and reliable monitoring system, which is accessible by the public, is essential to demonstrate compliance with the stringent emission standards. A Continuous Emission Monitoring System (CEMS) shall be set up in the IMWF to perform real-time monitoring on gas exhaust from the chimney (Environmental Protection Department, 2011)

Apart from the state-of-the-art technologies, the IWMF would adopt the specific green design concept similar to the Sludge Treatment Facilities (STF) in Tuen Mun. The design would reflect the attitude of simple, green, and sustainable





so as to create IW MF into a representative image of waste infrastructure under Hong Kong's latest waste management strategy. In order to enhance the community's awareness of "waste not" culture, an environmental education centre (EEC) would be set up at the IW MF to introduce and promote the philosophy of waste-to-energy technology as well as education on environmental protection.

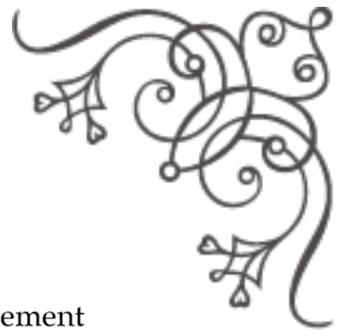
The opposition of the development of waste infrastructure is accompanied by a low level of trust. Encouraging citizen participation in all phases of waste management to help gain awareness, input, and acceptance is the key public relations strategy to gain public trust and mutual understanding. Relevant policies and actions such as waste reduction policies and recycling programmes shall also be implemented together with the waste infrastructure to induce changes in the behaviour and attitude towards waste.

Conclusion

Under the Statement of Intent on waste management collaboration between Hong Kong and the Netherlands signed in 2013, both places would cooperate and exchange their waste management strategies coupled with scientific studies, as well as technological developments through the interaction of government, industry, education, and research institutions. With reference to the successful experience in waste handling and waste-to-energy technology adopted by the Netherlands, Hong Kong should learn and build a well-defined waste management policy with quantitative targets, together with comprehensive waste processing infrastructure.



Wastewater Management



Wastewater Management in the Netherlands

The Netherlands is often described as the "drainage gully of Europe" (Made in Holland - Water Technology) - when the various rivers reach the Netherlands after a long journey through several different countries, the water would no longer be the sparkling mountain water that it once was. However, it is precisely because of her unique geographic position and the need for water purification that the Dutch have constantly endeavoured in innovation of wastewater treatment technologies.

The Netherlands has a rich history in the advancement of sewerage system design and wastewater treatment technology. Dutch cities were connected to a sewerage system as early as the 19th century (Made in Holland - Water Technology), and today, the sewerage system in the Netherlands is extensive and well-maintained, providing effective service on wastewater collection and conveyance. As for wastewater treatment, the Dutch have been on the march to adopt innovative technologies since the 1970s (Made in Holland - Water Technology)

in response to the enforcement of stringent environmental protection legislations such as the Pollution of Surface Waters Act.

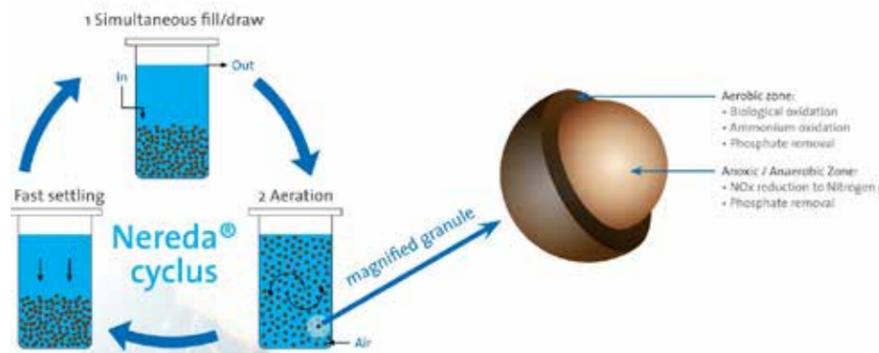
In the past decades, removal of organic matters had always been the fundamental and primary objective for treatment of wastewater. Over the years, the intent to control the level of nutrients in effluent was put in the spotlight as eutrophication in the water body became a concern.

Nowadays, facing the increasing demand in land use and awareness in energy consumptions, much effort has been put towards R&D for technologies that can achieve energy neutrality at minimal footprint in treatment plants. One good example is the Nereda® technology applied in Garmerwolde WWTP. This technology uses compact granules that comprise a group of microorganisms to simultaneously remove the key contaminants such as organic matters, nitrogen, and phosphate. The granular characteristic of the Nereda® sludge also enables fast settling, which helps to shrink the settling tank, hence significantly reducing the plant size by



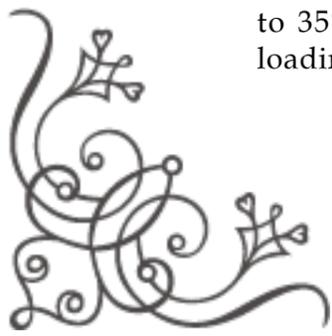


three-quarters (Pool, 2014). Moreover, its sequential batch operating mechanism with minimal number of mechanical equipment can dramatically lower the energy consumption comparing to the conventional processes. Other than Nereda®, the Dutch researchers have also pioneered several other wastewater treatment processes, most notably Anammox® (anaerobic ammonium oxidation). Anammox® is more of Anammox®'s potential, a demonstration project is being carried out in the Dokhaven underground WWTP in Rotterdam to refine the process by lowering its operating temperatures to 10 to 20°C and nitrogen concentrations (Dutch Water Sector). With a promising result of this project, the Cold Anammox® technology can replace the current B-stage treatment for nitrogen removal in mainstream Dokhaven to



Nereda® process (Retrieved from royalthaskoningdhv.com)

also a process that makes use of granular sludge, except it operates under an anaerobic condition to treat sewage liquors with highly concentrated ammonia. It converts ammonia directly to nitrogen gas, bypassing the conventional nitrification-denitrification process (Pool, 2014). Anammox® is a proven process to work at temperatures of 30 to 35°C and at high nitrogen loading. As a trial to uncover achieve better effluent quality at a lower energy consumption and smaller footprint. The Dutch professionals have defined themselves a common theme for the advancement of urban wastewater management in the next decade called NEWS (Nutrients, Energy, and Water) (STOWA, 2010), implying the transition from a waste approach to a resource approach. The future WWTP will not only



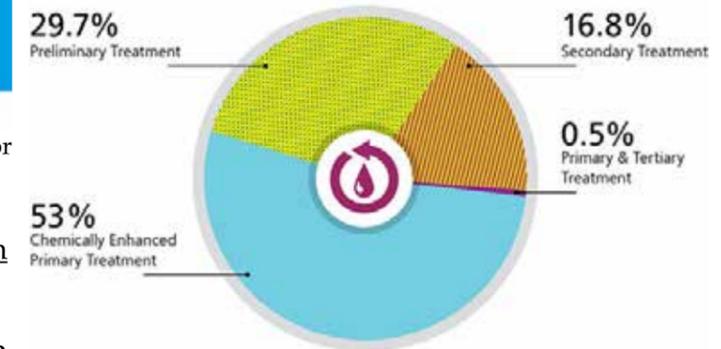
provide efficient treatment for wastewater, but also act as a powerhouse to return nutrients, energy, and recycled water back to the communities.

carried out for the remaining population located at relatively remote areas.

At present, DSD is operating 68 Sewage Treatment Works (STW) with total annual treatment capacity of about 1,021Mm³ of sewage, among which, around 53% is treated by Chemically Enhanced Primary Treatment (CEPT), 30% by Preliminary Treatment, and 16% by Secondary Treatment, while the remaining is treated by Primary and Tertiary Treatment (DSD, 2014).



Stowa report: NEWS: The Dutch roadmap for the WWTP of 2030

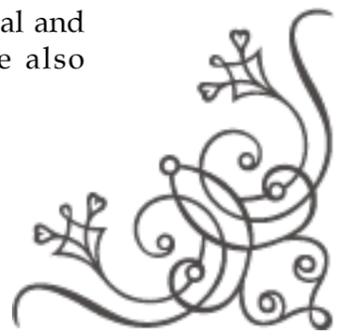


Sewage treatment level in Hong Kong (Retrieved from <http://www.dsd.gov.hk/>)

Wastewater Management in Hong Kong

DSD of the HK SAR Government is responsible for the management of the sewerage system, including the collection, treatment, and discharge of wastewater. A sewerage network of nearly 1,700km (DSD, 2014) long has been laid to collect sewage from the territory. The system is now serving over 93% of the total population, while the construction of sewers is being

To improve the water quality of the world renowned Victoria Harbour in Hong Kong, wastewater is collected for centralised treatment at Stonecutters Island STW before discharging into the Harbour. Recently, nutrients removal and disinfection system are also





being incorporated in various STWs to meet the long-term goal of sustainable development.

Similar to the Netherlands, Hong Kong is densely populated and facing a pressing need to increase land supply for various beneficial uses to support social and economic development. As an example of accommodation, the relocation of the Sha Tin STW to caverns is fundamentally a feasible approach to release the existing land resources (DSD, 2014). Such relocation would not only provide about 28 hectares of land, but also reduce the environmental nuisances to the surroundings by using the caverns as natural barriers.

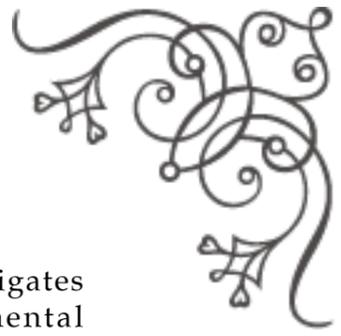
Discussion

From the introduction of sewerage system and the construction of WWTPs as hardware, and the revolution of the treatment technologies as software, the focus of the wastewater treatment has been changing to balance social, economic, environmental, and engineering needs. Starting off from the initial intent to safeguard public health from infection of diseases, then to protect the water bodies from pollution, and the migration to the recent response to energy

conservation, the prospect for wastewater treatment industry is leaping forward to achieve resources recovery to address the scarcity in natural resources.

Many WWTPs in the Netherlands can meet the more stringent effluent standards than the EU Directive in force with an additional tertiary treatment step to remove phosphate and nitrogen (Netherlands in top 3 of EU members that fully comply with treatment of urban waste water, 2013). Other than producing high quality effluent to harmonise with the natural water bodies, the Dutch have successfully invented and commercialised some notable energy-saving technologies such as Nereda® and Anammox®. These achievements can undoubtedly demonstrate their expertise in wastewater treatment is second to none. However, they are yet to be satisfied and have moved another step ahead to promote the innovative idea of 'sewage mining' (Water and the Dutch). With this transition from a waste approach to a resource approach, an important objective is to be added to the future WWTPs – recovery and production of nutrients, energy, and water.

Hong Kong has also been striving to protect her water

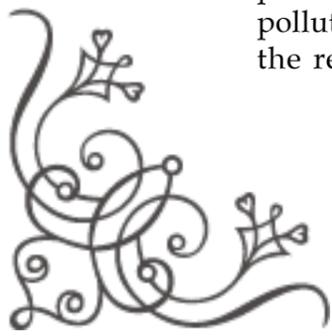


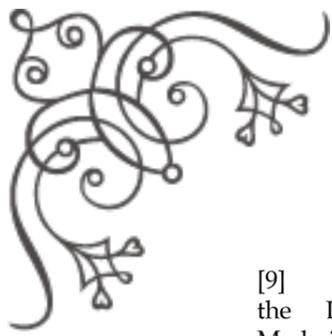
body by all means, such as enactment of the water pollution control ordinance, extension of the public sewerage system, and upgrade of STW with advanced processes, among other initiatives. Similar to the Netherlands, minimal footprint of the STW is required in Hong Kong so as to release more land resources for other beneficial uses. The adoption of double-decked sedimentation tanks and the wide application of CEPT process are typical examples in Hong Kong to reduce STW footprint. Hong Kong has also put forward the idea of relocating STW and other less visibly favourable facilities into its natural hilly terrain. This

approach not only mitigates the adverse environmental impacts in the local community level, but also vacates land that could be re-purposed for more ideal functioning on an urban planning perspective. To seek fundamental improvement in terms of space occupancy and energy consumption, the Dutch's ambitiousness in technology revolution is indeed a good example to follow. With the launch of several pilot tests of innovative treatment processes, Hong Kong is exploring her best avenue for the advancement of wastewater treatment.

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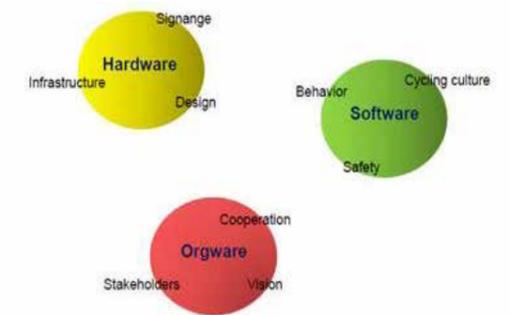
Sustainable Transportation

Cycling

Cycling in the Netherlands

Unlike other developed cities such as Hong Kong or New York, the Dutch consider cycling as a major mode of transportation in its country. Throughout its development history for cycling, the Netherlands has implemented an extensive range of innovative programmes and initiatives to encourage the use of bikes. The success of its planning can be seen by its remarkable reputation as the world's friendliest cycling city as well as recognition as having the world's highest rate in bike utilisation over the decades.

the Netherlands placed high priority integrating breaking lines next to the motorized traffic lines, maximising safety by separating cyclists from motorised traffic; furthermore, cycling paths are also provided for low-speed arterial roads. The Dutch have implemented a wide range of infrastructure which facilitates cycling since 1976 in numerous communities and areas. One particular item which has shown the Dutch's foresight in cycling is the method of road construction.



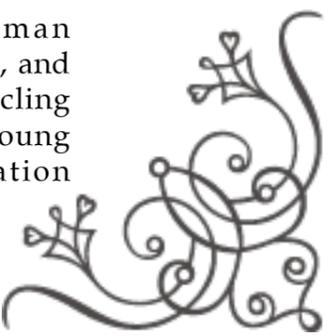
Organisation of cycling

The structure of cycling in the Netherlands is extremely systematic and comprehensive. Its structure mainly consists of three crucial pillars, namely Hardware, Software and Orgware. Each pillar seamlessly facilitates the overall development and human behavioural changes of the Dutch.

Hardware consists of the cycling infrastructure, which includes signage, cycling network, traffic control logistics and enhancement of cycling related facilities. A report published by a global traffic survey corporation states that

In recent years, the sealed shoulder approach is adopted to provide a greater level of separation between cyclists and motorists. The separation width is approximately 2.5m to 3m depending on the speed limit of motorways. (Wooldridge, 2014)

Software includes human behaviour, cycling culture, and safety. The culture of cycling starts at a particularly young age with cycling education





commencing at around the age of three to four. The Dutch educate their young generation with the importance of cycling safety and its associated green contributions to the environment. With limited school bus services, the main approach of getting to school is cycling hence assists in embedding the idea of cycling in children in their early lives. Political figures in the Netherlands also act as role models to strengthen the country's determination in cycling.

Orgware consists of cooperation, stakeholders' support, and overall vision for cycling. It is equally important as it serves as a bridge between Hardware and Software, as well as facilitates campaigns supporting the use of bicycles. Under the legislation and regulations imposed by the Dutch Government, such as "no helmet policy" and "strict liability" (where motor driver would likely be held responsible in case of accident) have helped to promote cycling across the country. The successful B-riders campaign is an innovative campaign focusing on commuters who take biking trips from 0 to 20km daily. Cyclists are encouraged to set their target online and those who achieve their target will

be awarded €8-18 cents/km. B-riders also developed a mobile application which keeps track of cyclists' daily performance over GPS and informs all registered members on their respective achievements. In addition to the B-riders, a gaming platform named "Van 5 naar 4" is also set up for users to adopt green transportation methods, such as biking and carpooling, on normal working days. This campaign also allows competition among companies and the winning company will be awarded points. Orgware is an essential pillar to influence cycling attitudes among the Dutch.

Cycling in Hong Kong

While the Netherlands has done an incredible job in cycling, Hong Kong is still in the developing stage regarding such aspect. In the aforementioned three pillars of the Netherlands' cycling structure, Hong Kong needs to acquire much support and incentives under each of the crucial pillars. For hardware, even though the Hong Kong SAR Government has been expanding bike routes and improving connectivity in the rural area over the past couple of years, the rate of development is still considerably slow in comparison. Owing to the hilly



topography and lack of land in Hong Kong, practicing grounds for cycling is not readily available in all districts which may have inhibited the overall success in our local biking development. Furthermore, Hong Kong has relatively few local incentives and subsidies to support cycling development. It is worthwhile to focus on the Software development by promoting cycling to the younger generation. Currently, Hong Kong does not have much Software support for cycling as children are not encouraged to learn how to bike at an early age. By making reference to the Dutch's approach, the concept of using bikes daily can be embedded in the minds of Hong Kong locals and gradually strengthen the cycling culture in our community.

Discussion

The Netherlands is inarguably the world's top leader when it comes to cycling. Nonetheless, the cycling development and performance between the Netherlands and Hong Kong are not directly comparable due to the differences in geographical locations, economical structure, and lifestyle. When determining the feasibility of cycling of a particular location, it is important to address and discuss the following items:- v

- Level of goals and achievements: Hong Kong may establish and review achievable targets annually when planning the future development of cycling;
- Cycling concerns: Hong Kong should address any existing cycling concerns in accordance with the hilly topography and lack of land for better future planning;
- Target group and their potentials: The target groups for local cycling need to be considered as it directly correlates to the long term planning (over 10 years) for cycling infrastructure facilities; and
- Motives and resistance in cycling in a particular country: Hong Kong should closely examine the pros and cons of local cycling to avoid clash of values in our existing jurisdiction and political environment.

The Dutch cycling model serves as a good reference for Hong Kong in expanding our cycling network in the near future. The Hong Kong SAR Government plays a significant role in providing support and allocating resources in making Hong Kong a more sustainable and cycling friendly city in the years to come.



Mobility Management

The Netherlands, one of the most densely populated and developed countries in the world, has recently been strategically planning, implementing, and improving their transportation system. Through better management and collaboration in different transport systems (i.e. railway and road networks) and personal mobility management (i.e. mature cycling culture), the synergy created is the key factor in boosting up the economy and the sustainability of the ever-growing mobility within the country.

The "Lean & Green" initiative

Connekt, a Dutch non-profit professional networking institution for sustainable mobility, had first introduced and implemented a stimulation programme called "Lean and Green". This programme aims to motivate different businesses and authorities to bring them to the next level of sustainability and cost-effectiveness without imposing extra burden to our vulnerable environment.

There are two stages of recognition awarding. In the first stage, participating organisations of "Lean and

Green" would have to commit themselves to a target of 20% reduction in their logistic activities for the next five years with a practical proposal and detailed action plan. The proposal needs to be approved by the Netherlands Organisation for Applied Scientific Research. In the second stage, awarded organisations will have to successfully execute the approved action plan throughout the course of five years. Upon completion of the 5-year execution stage, an independent auditor would carry out a full audit of submissions in order to confirm the validity of the achieved 20% reduction in CO₂ target.

Unlike ordinary labels for sustainability, Connekt's programme emphasises both "Lean" and "Green", such that organisations can have a clear and crucial goal of lower costs with lower emissions of CO₂ at the same time by evaluating their inefficiencies of their current logistic practices. With more efficient modes of transport, companies or organisations can essentially reduce their operation costs, hence increasing their profits and diminishing adverse impacts to the environment.

The "Lean and Green" programme also provides with a platform to share and expedite innovative ideas through brainstorm sessions held by Connekt for different corporations by joining together and discussing about the most effective CO₂ reduction practices. In addition, all the information and effectiveness of the used approaches are recorded by Connekt and are shared with the "Lean and Green" community, a unique platform that facilitates open innovation. The programme has been a substantial success

Potentials and Difficulties of Implementing "Lean and Green" in Hong Kong

Based the Feasibility Study Report on "Lean and Green" in Hong Kong, 2013 (Netherlands-Asia Honours Summer School, 2013), the framework can be formed with existing parties in Hong Kong to comprise the four elements, namely executive party, government/authority, assessment party, and auditing party. The Green Council, a non-profit, non-government organisation advocating sustainable production processes in all businesses, is the recommended candidate as the executive party in Hong Kong to implement the label. Government could support financially and provide assistance to access a broader network of companies. However, the suitability of a private auditing party, such as Furgo Certification Service Ltd., is still worth exploring. Hong Kong, with the mature support and standards compatible with Western civilisation, would be relatively easy phase for the "Lean and Green" programme to be adopted or customized for implementation. However, there would be substantial challenges when trying to establish new



Lean & Green in Germany
(Retrieved from <http://lean-green.nl/uploads/cache/nchff7sa3h.jpg>)

in Western Europe. It was expanded to three different countries apart from the Netherlands; they are namely, Belgium, Germany, and Italy. There are other areas, including Hong Kong, that are exploring the possibilities of implementing the programme.



credential systems here in Hong Kong. First of all, the lack of expertise in assessing proposal of reduction of CO₂ emission of the applicants will be one of the biggest challenges for implementing "Lean and Green" in Hong Kong. Currently, there is no organisation or institute that provide such services of conducting assessment on candidates' proposals on emission reduction plan. Therefore, overseas institutes need to be invited as the initial assessor when implementing such assessment. Local scholar or talents should be placed or encouraged to get involved in their work so as to acquire the knowledge and help establish our own assessment institutes in Hong Kong.

Secondly, funding is always the major issue for most NGOs, especially when it comes to an organisation with authority to award recognition in certain aspects. Initial funding from the government and sponsorship of founding members of the programme would be inevitably the primary choice. However, how to maintain the balance of finance once it is kick-started would be one of the challenges.

Thirdly, education and public awareness is necessary in the promulgation of "Lean and

Green" programme in Hong Kong. Through education and promotion, the public will be able to know more about the importance of the reduction of CO₂ emissions and thus makes a very good initiative to reduce emission in a proactive way.

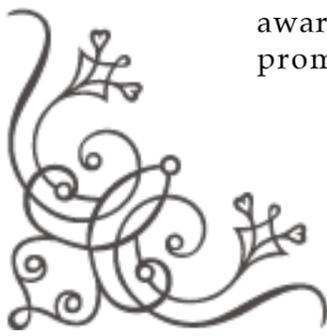
Nevertheless, the programme has to be resilient in order to be fully for Hong Kong's situation to utilise its possibilities. A more environmentally friendly Hong Kong can then be realised upon the establishment of such a programme.

Intelligent Transportation System (ITS)

ITS is an advanced application which, via the use of innovative services relating to different modes of transport and traffic management, enables various users to be better informed and make safer and 'smarter' use of transportation networks. (Wikipedia, 2015)

In 2010, a new legal framework called ITS Directive (2010/40EU) was enforced to step-up the deployment of ITS across Europe. It defines a number of priority areas and actions for the next 7 years from 2010.

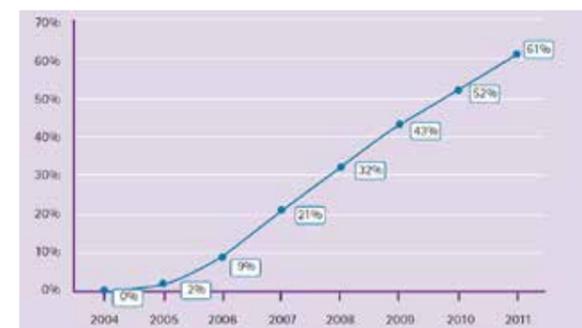
A steady growth in both goods and passengers logistics has shown the imminent need



of improved utilisation of the existing infrastructure. However, such need requires the introduction of intelligent traffic management and information with ITS as a tool. Due to the foreseeable growth of traffic, the Dutch government adopted a new approach (i.e. more monitoring and detection systems with new technological developments, such as Radio Data System - Traffic Message Channel (RDS-TMC), Traffic Control Centres, and the implementation of Incident Management on the Dutch road network to further ensure the safety and efficiency of the usage of the road network in the Netherlands.

In the past ten years, the connectivity between individuals through mobile devices with complete coverage of network has reached the next level. As a result, new ITS options that were unthinkable some years ago have now become available.

Potentials and Difficulties of Implementing ITS in Hong Kong



Penetration of navigation devices per household in the Netherlands (2011 is a forecast) (Connekt, 2011)

Similarly, Hong Kong is a highly developed region with a large population and an inevitably large volume of traffic. Improvement on mobility management is a top priority for solving the heavy congestion problems in Hong Kong, such as with the implementation of ITS. The hardware, such as road infrastructures, well-developed communication networks, and popularity of usage of mobile devices in Hong Kong are the major factors for applying such systems. Real-time data can be transferred through our sophisticated network instantaneously for better mobility management for individuals and corporations.

The systems can be almost implemented seamlessly in Hong Kong thanks to the highly developed infrastructures. ITS is vital within this concept: new coordination centres need to be established which take care of different traffic flows, the synchronisation of services, and the harmonisation of transportation means. The history of cooperation between the public and private sectors in the Netherlands can be taken as reference for the implementation in Hong Kong.





ITS network
(Retrieved from <http://orangemtc.com/images/er.png>)

However, it can be foreseen that infringement of social privacy could be argued. The location

information retrieved from individuals by the potential service provider in the private sector should be handled with confidentiality, but it is difficult to ensure the information would not be exploited by other parties. Also, how to effectively legislate the registered vehicles with GPS needs to be well thought out. The successful implementation of ITS regarding these aspects in the Netherlands should be carefully studied to address these issues.

Public-Private Partnership and Triple Helix

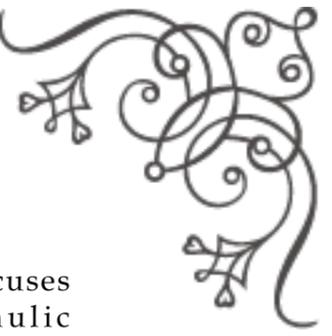
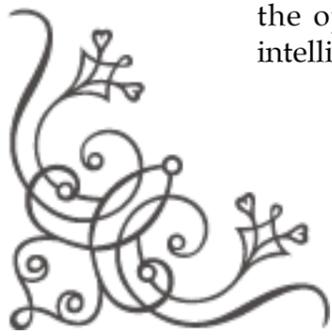
PPPs play a major role in implementing Dutch development cooperation policy. PPPs are partnerships collaborating the government, the private sector, research institutions, and civil society organisations together.

There are some advantages of implementing PPP in a project. If the private sector is involved in projects at an earlier stage, the government can take optimum advantage of the knowledge, intelligence, and creativity found in the private sector, thus leading to better solutions. Moreover, the private sector has the opportunity to contribute intelligent ideas and to improve

their operational processes. This promotes innovation, which in turn benefits the government. Besides, PPPs allow for improved risk diversification. The risks are assigned to parties that are in the best position to manage them, thus releasing the government from the obligation to bear the full burden.

PPPs in the Netherlands - The Triple Helix

The concept of Triple Helix plays a key role in the implementation of PPPs amongst academics, industry, and authority. Collaboration between representatives of the Triple Helix may improve



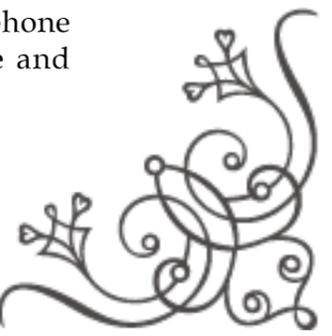
the intended analytical level and narrow down the gap between the management level and frontline members. Research and development projects in university-industry collaboration may make use of their strengths on academic knowledge and practical experiences such that the best solution can be sought. During the delegation, several examples of Triple Helix were encountered.

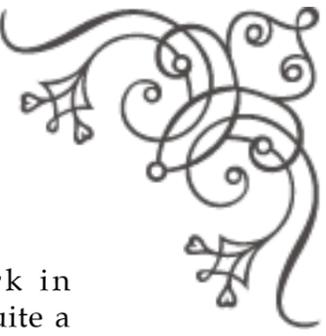
NWP is a comprehensive network that unites Dutch water expertise. The partnership, consisting of 200 members from private companies, government, knowledge institutes, and NGOs, acts as a centre of information on water expertise, policy developments and market opportunities. However, NWP is more than an information source; the organisation also initiates, coordinates, and executes projects for its members, such as trade missions, exhibitions, and conferences.

Another example of a Private-Public initiative is Ecoshape. Arcadis plays a leading role in this consortium representing a broad range of organisations and disciplines including public parties, industry, and academia. Their "Building with

Nature" programme focuses on developing hydraulic engineering solutions with ecodynamic design principles at the forefront. Multiple pilot projects worldwide, such as sand engine and natural shoreline protection, allow the organisation to "learn by doing". With its cooperative network, Ecoshape is able to implement pilot projects in real-world situations more efficiently, applying these solutions while extracting useful data. As Ecoshape gains more experience with the "Building with Nature" concept, knowledge and solutions to create climate-proof delta cities are being developed for the near future.

Like NWP and Ecoshape, Connekt is an independent network of companies and authorities that links up parties to improve mobility in the Netherlands in a sustainable manner. It is a public-private cooperation consisting of 125 authorities, companies and knowledge institutions. ITS was initiated by the Ministry of Transportation. Through Connekt, it was able to collaborate with various companies from the private sector. Its targets are to reduce road side assistance, increase individual use of smart phone technology, and upgrade and





standardize regional traffic regulation to national level. This project also increased the awareness within citizens and not to rely solely on the government. It shares the responsibility of achieving sustainable transportation from solely government to PPC and Alliance. Under ITS, the Dutch Automated Vehicle Initiative (DAVI) was initiated by private sector and supported by the Dutch government.

PPPs in Hong Kong

PPP has quite a long history in Hong Kong, having been brought to the territory by the colonial government. Some examples include the Cross Harbour Tunnel, which has now been transferred back to the public sector, the Chemical Waste Treatment Centre on Tsing Yi Island, and the TMCA. These projects represent a good spectrum of the PPP model. The Chemical Waste Treatment Centre is run by private operators who are paid by the government according to the amount of waste handled. The TMCA consists of 16 km of highways run by a private consortium which collects tolls from users to pay for the area's management, operation, and maintenance. However, the PPP model in Hong Kong does not always

work well. The Western Harbour Crossing concession agreement is a toll adjustment mechanism which allows tolls to be automatically adjusted higher if traffic volume fails to generate the amount of revenue expected. Conversely, it allows a toll increase to be deferred if traffic volume exceeds projections. Unfortunately, this mechanism only works when the economy is good. Successful PPP cases overseas suggested that they tend to offer their operators a stable income stream.

Regarding the stable income stream, we must also consider the position of the end-users. Users may be willing to pay more for a more efficiently-run facility or service, but this also depends on the extent to which this facility or service remains affordable to them. On the other hand, if the private sector operator is forced to keep fees low, it may not be able to maintain the quality of the facility or service at an optimum level. Therefore, a right balance and mutual trust must be achieved for a successful PPP project.

There are many construction projects in Hong Kong that can be undertaken as PPPs. We have highly experienced private sector operators who can show us how these projects

are performed. Then the government can have a better picture of the capital, operation and maintenance costs right from the beginning. After all, as users we could enjoy the affordable service with high efficiency and quality.

Getting a PPP to work in these projects requires quite a delicate balancing act. PPPs ultimately would benefit all the stakeholders, users, and Hong Kong as a whole, and would achieve a win-win-win position for all.

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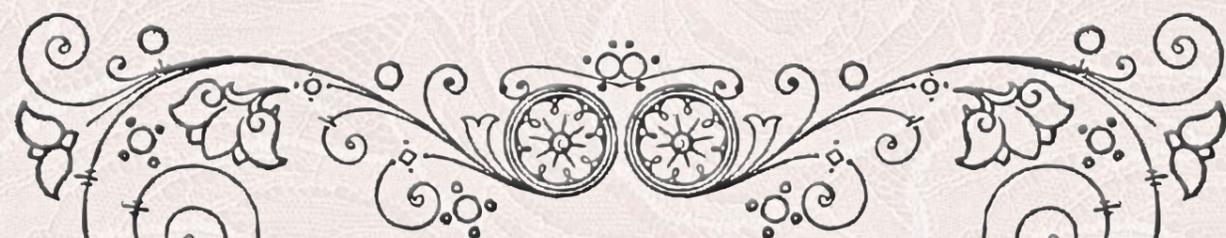
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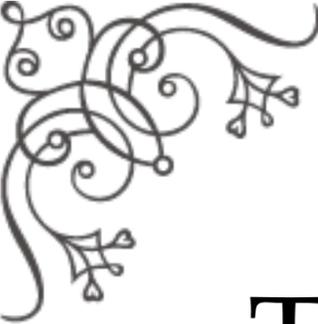
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CONCLUSION





CONCLUSION

The Netherlands, a country of close relationship with water, has always ranked high on international livability measure among other nations. Taking on the theme of “Living with Water, Building with Nature”, the delegates explored different parts of the Netherlands.

The preparation of this Delegation dates back to August 2014. Sixteen delegates were selected to organise this eleven-day Delegation. The delegates are divided into study groups to focus on three study areas, namely “Water Infrastructure Cooperation,” “Waste Management & Recycling,” and “Sustainable Transportation.” Members of each group focus on studying topics in the respective domains and providing insights from the Delegation.

As climate change brings increasingly severe weather events and continuous sea level rise, coastal cities must find ways to become climate proof. During this Delegation to the Netherlands, it became clear that physically separating humans from nature is no longer the best solution; instead, engineers should look to creating sustainable solutions that can adapt to and utilise the dynamic environment.

The Netherlands has been at the forefront in developing and testing various innovative solutions – urban flood plains with multiple functions, floating community developments, and sand engine are just some of the projects that have already been implemented. Furthermore, continuous data collection and research is being conducted to improve these concepts through the work of PPPs. Hong Kong should look closely at their own engineering solutions and ensure that they will keep our home resilient in the face of inevitable catastrophic events.

With the advancement in waste and wastewater management of the Netherlands, this Delegation had provided us some insights on how the Netherlands tackle such problems. With the success in waste handling, waste-to-energy technology and public engagement adopted by the Netherlands; Hong Kong should, through the recent collaboration with the Dutch, gain and make use of the experiences to develop a better waste management policy together with comprehensive waste processing infrastructure.

Both WWTP in Dokhaven and Garmerwolde gave us very good examples towards an energy efficient WWTP with

minimal footprint. While Hong Kong has taken a different approach through physical and chemical aspects in a WWTP, the Netherlands has taken a more fundamental approach to tackle the wastewater problems.

Sustainable transportations in the Netherlands mainly consist of its renowned cycling culture and development in intelligent mobility network. By enhancing the three pillars, hardware, software and orgware into their cycling culture, the Dutch has further developed their cycling system that can be shared and exported to other countries. Moreover, the Dutch have fully demonstrated their advance engineering with ITS to optimise transportation management. Sustainable transportation programme such as ‘Lean and Green’ is also a suitable model to be employed in Hong Kong to encourage social responsibilities and eco-awareness in the private sector.

In addition to the technical studies and visits in The Netherlands, the delegates were also delighted to visits overseas institutions such as KIVI (The Royal Netherlands Society of Engineers), Delft University of Technology, Netherlands Water Partnership,

and Connekt. Through the exchange sessions, the delegates gained a better understanding on the engineering culture and working environment as an engineer in The Netherlands.

Locally in Hong Kong, the delegates organised a series of local seminars and visits on topics related to the theme of this Delegation for understanding the current situation in Hong Kong and also combining the findings from The Netherlands to provide a comprehensive study on the Delegation to share among other young engineers of the Institution.

The Delegation was held successfully with the support of advisors, local, and overseas hosting organisations and sponsors, not to mention the dedication and enthusiasm of the delegates from various disciplines. This Delegation is just a start. We sincerely invite you to join our efforts with the learning from this Report in sustaining our engineering profession and building Hong Kong into a better living city.



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Delegates' Profiles

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Acknowledgement

Acronyms



Advisors' Profiles



Ir Victor CHEUNG Chi Kong
President, The HKIE

Ir Victor Cheung is the President of the Hong Kong Institution of Engineers. He is a Registered Professional Engineer in Building Services and Fire Disciplines. After graduation with BSc (Hons) Degree with first class honours in Environmental Engineering at the London South Bank Polytechnic, Ir Cheung pursued further studies and obtained a Master Degree in Energy Engineering from the University of Surrey in UK. Ir Cheung has over 38 years of experience in building services engineering working on a wide spectrum of building and infrastructure projects. He is a Director of J. Roger Preston Ltd, a leading building services engineering consultancy in the South East Asia region established in 1962.

Ir Cheung is very active in professional and community services and has served on numerous advisory and technical committees and task groups over the years. He is particularly interested in promoting energy efficiency and environmental sustainability and has been heavily involved in the development of the Building Energy Code for the HKSAR Government. He was a founding member of the Professional Green Building Council and a Director since 2009. He is currently a member of the Energy Advisory Committee of the Environment Bureau of the HKSAR Government.

Ir Cheung has chosen "Inspire the Young" (啟發新一代 工程展未來) as the theme of his presidency of the Institution. The sustainable development of Hong Kong and the wider world will need a steady supply of high-calibre engineers with the passion and dedication to tackle challenges associated with issues such as urbanisation, climate change and an ageing population. To maintain this supply of new bloods, it is important to attract young talents to pursue careers in engineering. The goal is to show the young generation what a meaningful and dynamic profession engineering is and how they can contribute to society and realise their potential by embracing it.



Ir Raymond K S CHAN
Immediate Past President, The HKIE

Ir Raymond CHAN Kin Sek, aged 63, was the Head of the Geotechnical Engineering Office of the Hong Kong Special Administrative Region of China between 1998-2011 before his retirement, responsible for a wide spectrum of geotechnical functions including the management of the Hong Kong slope safety system to mitigate the risks of landslides and geohazards in Hong Kong. Ir CHAN has over 40 years' experience in civil and geotechnical engineering. He has published over twenty five key-note lectures and the state-of-the-art papers on landslide risk management and geotechnical engineering practice in Hong Kong. Currently he is the Director (Geotechnical) of Meinhardt (C&S) Limited.

Ir CHAN had served on the Accreditation Advisory Board of the Industry Department and various advisory boards of the Engineering Departments of the University of Hong Kong, the Hong Kong University of Science and Technology and the Hong Kong Polytechnic University. In 1999-2002, Ir CHAN was appointed Adjunct Professor and the Chairman of the Steering Committee of the Jockey Club Research and Information Centre for Landslip Prevention and Land Development of the University of Hong Kong. He was a member of the Scientific Committee of the international Integrated Research on Disaster Risk (IRDR) Program between 2009-2012. He is also an advisor to IRDR (China).

Ir CHAN has been an official Justice of Peace between 1997-2012. Currently he is the Guest Professor at the Hong Kong University of Science and Technology and the Immediate Past President of the Hong Kong Institution of Engineers. In December, 2012, he was conferred the Bronze Bauhinia Star (BBS) for his dedicated and meritorious service to the Government for over 34 years, particularly in significantly enhancing slope safety in Hong Kong.



Ir CHAN Chi Chiu
Senior Vice President, The HKIE

Ir Chan is a civil engineer by profession. After graduation from the University of Hong Kong in 1976, he worked in the then Highways Office and Drainage Division of the Government for two years, and then continued his engineering career in the Water Supplies Department. He has been involved in the planning, design and construction of new waterworks projects, operation and maintenance of the water supply and distribution system, and the provision of customer services.

In 2008, he was transferred to the Civil Engineering and Development Department, taking charge of the planning, management and implementation of development and infrastructure projects in the North and West New Territories. From September 2010 to February 2014, he was the Director of Drainage Services, overseeing all aspects of wastewater and stormwater drainage services, covering capital projects for new infrastructure, improvement works to existing assets, operation and maintenance of existing systems and facilities, and collection of sewage services charges. He is currently the Senior Vice President of the Hong Kong Institution of Engineers.



Ir Joseph K H CHOI
Vice President, The HKIE

Ir Joseph CHOI Kin-hung is the Managing Director of Hsin Chong Construction Company Limited.

He has over 44 years of multi-dimensional and multi-functional experience across contracting and client organisations in Hong Kong, Chinese Mainland, Taiwan, Macau and overseas. Before joining the Hsin Chong, he was the general manager for the Kowloon-Canton Railway Corporation and MTR Corporation Limited responsible for the design and construction of various new railway lines.

Ir CHOI graduated from the University of Aston in Birmingham, United Kingdom with a degree of Bachelor of Science in Civil Engineering. He is a Fellow of the Hong Kong Institution of Engineers; Fellow of The Hong Kong Institution of Highways and Transportation; Member of the Institution of Civil Engineers, a Chartered Engineer, and a Registered Professional Engineer. Ir CHOI is a director of Engineering Forum Limited and a member of Engineers Registration Board. He is also a member of Departmental Advisory Committee for the Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University; a council member of Hong Kong Contractor Association; and a council member of The Hong Kong Institution of Highways and Transportation.



Ir Thomas Kwok Cheung CHAN
Vice President, The HKIE

Ir Thomas K C Chan received his education in Hong Kong and United Kingdom. He has over 30 years of experience in the field of power and building services engineering. He is currently a Director of Parsons Brinckerhoff (Asia) Limited.

Ir Chan has also been active in various professional and academic community services and has held the office of different Engineering and Educational institutions. He is currently a Vice President of Hong Kong Institution of Engineers.



Ir Dr. Otto L T POON, BBS, OBE

Past President, The HKIE

Ir Dr. POON is a Chartered Engineer with 50 years' E&M engineering experience and the founder of Analogue Group of Companies. He had participated in public services both to the community and the engineering profession which included, among others, Advisory Council on the Environment, Energy Advisory Committee, Solicitors Disciplinary Tribunal Panel, Council for Sustainable Development, Trustee Board of Institution of Mechanical Engineers, UK, Chinese Mechanical Engineering Society, PRC, as well as being the President of the Hong Kong Institution of Engineers (1998-99), President of Hong Kong Association of Energy Engineers (2004-08), President of Association of Energy Engineers, Hong Kong Chapter (2006-09), Chairman of Hong Kong Climate Change Forum (2010-11) and President of the Hong Kong Federation of Electrical and Mechanical Contractors (2007-13).

He is a Member of Election Committee - Engineering Subsector of Hong Kong Legislative Council and also serves, among others, as the Chairperson of Lift and Escalator Safety Advisory Committee, Chairman of School Advisory Committee of School of Energy and Environment of CityU, Member of International Advisory Committee of the Research Institute for Sustainable Urban Development of PolyU, Member of Governing Council of Hong Kong Quality Assurance Agency, Director of Hong Kong Green Building Council and Adviser to Bauhinia Foundation Research Centre .

He was awarded OBE and BBS. He was conferred the University Fellowship by PolyU, Honorary Degree of Doctor of Technology (Hon D Tech) by Coventry University, UK, and Honorary Fellowship by University of Central Lancashire, UK. He was also elected as an Outstanding PolyU Alumni, an Outstanding IMechE Branch Member of the Year (2003-04) and an Honorary Member by The Chinese Mechanical Engineering Society. He was inducted into the Hall of Fame of the Hong Kong Institution of Engineers.



Ir Edmund K H LEUNG, SBS OBE J.P.

Past President, The HKIE

Edmund Leung is a professional engineer with broad-based experience covering power, manufacturing and construction industries. Graduated from the University of Hong Kong in Mechanical Engineering, he worked for the power utilities, a manufacturer, contracting and consulting organizations and helped to plan, design and construct many infrastructure projects including railways and tunnels and many complex building projects.

He retired from Hyder Consulting Limited in 2003 and served as part-time advisors and independent non-executive directors for various organizations. In 2009 he re-embarked on full time work when he was appointed as the Managing Director of Hsin Chong Construction Group Limited. He retired again in 2012 but was subsequently appointed Chief Officer of Kowloon-Canton Railway Corporation in 2013. He has been active in public services, and has extensive involvements in engineering and education sectors. For engineering sector, he had served as the President of The Hong Kong Institution of Engineers, Chairman of the Hong Kong Branch and Council Member of the Institution of Mechanical Engineers in UK. For education sector, he had served as Council Member and then Vice Chairman of the Hong Kong Council for Academic Accreditation, Council Member of Lingnan University, and Chairman of the Advisory Board for Vocational Education of the Vocational Training Council.

He is an Honorary Fellow of the University of Hong Kong and of Lingnan University. He is presently a Deputy Chairman of The Hong Kong Institute of Directors. He had recently completed his terms as Chairman of the Process Review Panel for the Financial Reporting Council, Chairman of the Energy Advisory Committee, Board Member of the Airport Authority Hong Kong, and Member of the Town Planning Board. He was conferred an OBE in 1996, appointed Justice of Peace in 1997, and awarded a Silver Bauhinia Star in 2009.



Ir Chan Siu Tack

Chairman, HKIE - Continuing Professional Development Committee

Ir Chan is an Assistant Director (Estate Management) of the Hong Kong Housing Department, Hong Kong SAR Government. He graduated from the University of Hong Kong with a degree in civil engineering, and is a civil and structural engineer by profession.

He worked in civil engineering consultancy for sometime before joining the Hong Kong Housing Department in 1984. He has extensive experience in the planning, design, project management and contract administration for the construction of public housing developments, and estate management and maintenance of public housing estates.

He is a Fellow of the Hong Kong Institution of Engineers and the Institution of Structural Engineers. He participates actively in various professional institution's activities. He has been the Chairman of the HKIE Structural Division and Council Member of the Institution of Structural Engineers. He is currently the Chairman of HKIE Continuing Professional Development Committee and HKIE Structural Discipline Advisory Panel, and Council Member of the HKIE.



Ir Gary C W KO

Chairman, HKIE-Professional Assessment Committee

Educated in electrical engineering, Ir KO commenced his career initially in a power utility and moved to the contracting business by joining Kum Shing Group as a Contracts Manager in 1991. He is currently the Executive Director and Chief Operating Officer of Kum Shing Group to oversee multi-disciplined engineering business.

His past service in the HKIE includes Council Member, Chairman of the Electrical Division and Chairman of the Continuing Professional Development Committee. His current chairmanship includes Chairman of the Gas & Energy Division, Chairman of the Professional Assessment Committee and Chairman of the Special Group on Fund Raising for Institution's Accommodation. In addition to the service to the HKIE, he is an Honorary Advisor of the Hong Kong & Kowloon Electrical Engineering & Appliances Trade Workers Union, Member of the Election Committee of the Chief Executive, Honorary Treasurer of Munsang College School Sponsoring Body and Vice Chairman of Admissions, Budgets and Allocations Committee of the Community Chest.





Delegates' Profiles



Ir Kenneth K W CHEUNG

(Civil Engineering)
Delegation Manager, HKIE-YMC Overseas Delegation 2015
Deputy Chairman, the HKIE-YMC

Kenneth obtained his Bachelor of Applied Science in Civil Engineering from the University of British Columbia in Canada and Master Degree in Infrastructure Project Management from the University of Hong Kong. He is currently the Project Engineer of Airport Authority responsible for supervision on the construction works of the Midfield Concourse project in the Hong Kong International Airport. He has also been actively participating and contributing himself to the HKIE-YMC and is now the Deputy Chairman of the HKIE-YMC.



Ms Emily H T YU

(Geotechnical Engineering)
Secretary, HKIE-YMC Overseas Delegation 2015
Committee Member, the HKIE-YMC

Emily obtained her Bachelor of Applied Science in Geological Engineering from the University of British Columbia, Canada. Before her move to Hong Kong, she worked in the environmental and oil and gas sectors in Canada. She is currently an Assistant Engineer of Atkins China Ltd., and has been involved in major projects such as reclamation works design for the Hong Kong-Zhuhai-Macao Bridge and as a geologist for the tunneling works of the Guangzhou-Shenzhen-Hong Kong Express Rail Link. She also contributes actively to the HKIE-YMC as a Committee Member and enjoys organizing activities for young engineers to encourage work-life balance.



Mr. Ambrose H T CHEN

(Mechanical Engineering)
Deputy Manager, HKIE-YMC Overseas Delegation 2015
Committee Member, the HKIE-YMC
Committee Member, Mechanical, Marine, Naval Architect and Chemical Division

Ambrose obtained his Master Degree in Mechanical Engineering from Imperial College London; and a Master Degree in Environmental Engineering from the University of Hong Kong. He is currently working for the Environmental Protection Department, HKSAR Government in the field of Asbestos Legislation and Control. Being a Committee Member in the HKIE-YMC, Ambrose participates actively in organising events and functions for promoting young engineers in Hong Kong.



Ms June K Y YIP

(Building Services Engineering)
Treasurer, HKIE-YMC Overseas Delegation 2015
Committee Member, the HKIE-YMC

After graduate, June was involved in some Hong Kong Engineering Projects including North Lantau Hospital, MTRC - Kwun Tong Line Extension, New Broadcasting House of RTHK, Central Wan Chai Bypass(HY/2011/08), and Tseung Kwan O-Lam Tin Tunnel. This is the first year that June is being a committee member in YMC.



Mr. Alan YANG

(Structural Engineering)
Deputy Manager, HKIE-YMC Overseas Delegation 2015
Co-opted Member, the HKIE-YMC
President's Protégé 2014/15

Alan graduated with a Bachelor Degree in Civil Engineering at the University of Waterloo, Canada. He worked as an intern in Canada and Singapore on various projects. In 2011, he joined Ove Arup Hong Kong office, where he was involved in the design of the 530m tall East Tower in Guangzhou and mega development in Macau. He also experienced various engineering outreach activities, such as building footbridges in rural areas in China and carrying out seismic assessments for schools in Nepal. As HKIE-YMC Committee Member & President's Protégé, Alan strives to excel in his field and inspires the younger generation.



Mr. Alex C Y LOK

(Mechanical Engineering)
Local Liaison Officer, HKIE-YMC Overseas Delegation 2015

Alex obtained his Bachelor of Engineering in Mechanical Engineering and Bachelor of Laws (LLB) in the University of Hong Kong and the University of London respectively. He has completed the HKIE Graduate Scheme "A" Training in Mechanical discipline and he is now working in Swire Properties Ltd. Over the past few years in work, he involves in water and sewerage treatment, building services engineering and property management. This is his second time to join HKIE-YMC Overseas Delegation. He is keen to broaden his horizons in engineering field and hopes to explore engineering knowledge in the Netherlands through this Delegation.



Ms Amanda N Y YEUNG

(Environmental Engineering)
Local Liaison Officer, HKIE-YMC Overseas Delegation 2015

Amanda obtained her Bachelor Degree in Chemical and Environmental Engineering and Master Degree in Environmental Engineering from the Hong Kong University of Science and Technology and the University of Hong Kong respectively. She is now working for the Environmental Protection Department of the HKSAR Government as an Assistant Environmental Protection Officer. Amanda has been involved in various environmental-related projects and has assisted in project management of Hong Kong's first Integrated Waste Management Facilities and other solid waste/ wastewater treatment facilities in Hong Kong and overseas. She also enjoys sharing her experience with people from different fields of work.



Mr. Michael C Y LAU

(Structural Engineering)
Logistics Officer, HKIE-YMC Overseas Delegation 2015

Michael obtained his Master of Engineering in Civil & Environmental Engineering from Imperial College London, United Kingdom. He is currently working in Ove Arup & Partners HK Ltd. as an assistant resident engineering for the Galaxy Cotai Site in Macau. He also has the experience in the design of superstructure for other casino projects in Macau which are currently under construction. He is keen to explore projects in other engineering disciplines to enrich his knowledge and experience. In leisure time he plays tenpin bowling and he was the team captain of university bowling team before graduation.



Ms Lisa L KUANG

(Environmental Engineering)
Logistics Officer, HKIE-YMC Overseas Delegation 2015

Lisa joined AECOM Asia Company Limited upon graduating from HKUST with a Master Degree in Environmental Engineering. With the four years of continuous exposure to a wide spectrum of local and overseas environmental projects, she is equipped with the capability of conducting detailed design and site supervision works. Her portfolio includes waterworks improvement, deodorization system design, sewage treatment work upgrade, and solid waste treatment etc. Recently, Lisa is taking part in the contract administration and management team of a local mega project, the modern Integrated Waste Management Facilities featuring treatment capacity of 3000 tonnes of municipal solid waste per day.



Mr. T K CHEUNG

(Mechanical Engineering)
Overseas Liaison Officer, HKIE-YMC Overseas Delegation 2015
Event Coordinator, the HKIE-YMC

T.K. obtains his Bachelor degree from the Hong Kong Polytechnic University and Master degree from the University of Hong Kong. Upon his graduation, he worked in the Meinhardt (M&E) Ltd. He has been involved in major projects such as Shangri-la Hotels and the CRC MixCitys and developed a strong foundation of the engineering design work. He is now joining the CLP Power Hong Kong Limited in the Emission Control and Boiler Auxiliary Equipment team. Recently, he is taking part in the research, contract administration and site supervision of the Selective Catalytic Reduction reactor improvement project.



Ms Jacqueline Y T CHAN

(Environmental Engineering)
Logistics Officer, HKIE-YMC Overseas Delegation 2015

Jacqueline graduated with a Bachelor Degree in Environmental Engineering at the University of Waterloo in 2011. She is currently working in the Hongkong Electric Company Limited as an Environmental Engineer. To further enhance her engineering knowledge, she is currently pursuing a Master's Degree in Mechanical Engineering at the University of Hong Kong. As a Graduate Member of the HKIE, Jacqueline is active in promoting the importance of sustainability and engineering professions.



Ms Elizabeth W S LEUNG

(Civil Engineering)
Overseas Liaison Officer, HKIE-YMC Overseas Delegation 2015

Elizabeth obtained her Bachelor Degree in Civil Engineering from the University of Melbourne, Australia. Upon graduation, she joined Atkins China Ltd and is now pursuing a Master Degree in Infrastructure Project Management at the University of Hong Kong. She has been heavily involved in stormwater drainage and sewerage design in projects such as Hong Kong Link Road and Hong Kong Boundary Crossing Facility of the Hong Kong-Zhuhai-Macao Bridge Project. She is currently working as an Assistant Resident Engineer of the Reconstruction and Rehabilitation of Kai Tak River Project that involves widening of river, deepening of riverbed and nullah wall strengthening works.



Mr. Jefferson K K NGAI

(Civil Engineering)
Overseas Liaison Officer, HKIE-YMC Overseas Delegation 2015

Jefferson graduated from The University of Hong Kong with a bachelor degree in Civil Engineering. He is currently working as an Assistant Resident Engineer at Arup for Hong Kong Boundary Crossing Facilities (HZMB - HKBCF). He has also been involved in a wide range of projects such as marine structure designs and analysis, reclamation settlement assessment, dredging profile and sequence designs in both Hong Kong and East Asia region. Despite having acquired substantial knowledge and experience in designs and implementation, he is also an extrovert who is keen on expanding his professional and social networks as well as broadening his horizon.



Ms. Nikita H H CHAN

(Environmental Engineering)
Publication Officer, HKIE-YMC Overseas Delegation 2015

Nikita graduated with a Bachelor Degree in Civil and Environmental Engineering at the Hong Kong University of Science and Technology. She is currently working as an Environmental Engineering Graduate in the Environmental Protection Department, HKSAR Government and has been involved in major waste management related projects including the Sludge Treatment Facilities, Integrated Waste Management Facilities and West New Territories Landfill Development. She has also engaged the implementation of the Food Wise Hong Kong Campaign in food waste avoidance and reduction.



Mr. Benson P Y YAU

(Mechanical Engineering)
Publication Officer, HKIE-YMC Overseas Delegation 2015

Benson obtained his Master and Bachelor Degree in Mechanical Engineering from the Hong Kong University of Science and Technology. He joined Kai Shing Management Services Ltd, during which he assist a technical team not only on maintenance of building services installations, but also on handling various building services contractors in carrying out alteration, addition, improvement in commercial complex building according to end user's requirements. He is willing to meet new people in different sectors. In leisure time, he likes playing badminton and hiking.



Ms. Janet H Y YUEN

(Geotechnical Engineering)
Publication Officer, HKIE-YMC Overseas Delegation 2015

Graduated from Imperial College with a Master Degree, Janet is working for Geotechnical Engineering Office. Assisted contract administration for the in-house Landslip Prevention and Mitigation Programme, she also acquired site experience at MTR Shatin-To-Central Link. During her Bachelor study at the University of Hong Kong, she participated in Project Mingde which aims to provide schooling opportunities for less fortunate children in China. She always wishes to outreach to the needs through the profession. Awarded as "HKIE-YMC Outstanding Helper" in 2014, she enjoys organizing activities with different people by taking part in a variety of events. At leisure, she likes playing dragon boat and painting.



Delegates' Messages

Kenneth

Being part of this Delegation is an exciting and unforgettable experience! Let alone given a chance to be the Delegation Manager and work with a team of extraordinary and enthusiastic delegates in the overseas delegation this year.

Through visiting the Netherlands, which is widely recognised as the country of close relation with water, has certainly broadened our view and knowledge. Not only the aspect of water infrastructure, but also the idea of bringing the water or natural elements into their design. In addition to the technical side, the Netherlands is an amazing place with fabulous scenery including their tulips, windmills, heritage buildings, etc.

Rewarding experience extends to the friendship gained among the Delegation through hours of hard work and fun we had together before, during, and after this Delegation. This Delegation undoubtedly widened our horizons and boosted our passions to create a better Hong Kong.



Water Infrastructure Cooperation Group

King

This overseas delegation to Netherland provides me a memorable experience that I cannot get from elsewhere. It give me a stun picture while knowing that half of the Dutch is living under water, and some even living 9m below the sea level. I appreciate much on the way they live with water and their dedication on building a sustainable future. This delegation not only gave me an insight into Netherland but also inspired my thinking on engineering solution on sustainable development. I would like to express my sincere thanks to our teammates on all their effort to make this learning trip fruitful and memorable.

Emily

This year's trip to the Netherlands was jam-packed with inspirational projects, friendly people, and stunning scenery. The Dutch are dedicated to their sustainable way of life; it was an inspirational trip to see man-made structures engineered in perfect harmony with nature. Eleven days was definitely not enough! Organizing an overseas trip is a challenging task; organizing an overseas delegation with 15 young engineers is an unforgettable experience! Thanks to the President and his wife for taking the time to join us on the trip, and to our advisors, HKIE-CPDC and YMC for their continuous support. Finally, thanks to the team for your dedication and friendship!

Janet

Strong hydraulic engineering, colourful tulips and delicious Herring fish are my first impression to the Netherlands. I found she has much beyond these after the delegation. As a member in Water Infrastructure study group, by taking site visits and interacting with outstanding local professions, I appreciate Dutch's vision and efforts in coping with Climate Change by living with water instead of fighting against water. Also, the learning journey with our HKIE President Victor, his wife Salina and 15 delegates inspired me to look at things from different perspectives. I eager to put forward my learning outcomes and contribute to the engineering society.

June

It was the first time I had been in Europe, also was an invaluable experience for me to take part in this Delegation, to visit engineering projects and exchange with overseas professionals. The eleven-day trip was affluent in exchanging ideas with engineers in the Netherlands who are facing challenges and problems which are different from us. Affected by geographical factors, the Dutch people are having high consciousness on flood control and waste management to treat their place friendlier. I was appreciated to learn the way to strive a balance in between human development and being environmentally friendly from Dutch citizens.

Michael

The Oversea Delegation in Netherlands has been a fantastic experience for me to expose to the engineering infrastructure and the Dutch's engineering philosophy. I am fascinated with their vision on sustainability as well as their creativity on using nature to resolve the challenges. I believe what we have gained throughout the delegation are valuable assets and I hope our sharing is useful for the readers. I would also like to take this opportunity to thanks for the large effort of planning and preparation from other delegates to achieve such fruitful experience and it is my greatest honour to be part of the team.





Waste Management & Recycling Group

Ambrose

It is my third time joining the delegation, and every time I earned a lot. The Netherland Delegation provided me a chance to review the environmental problems in Hong Kong: what we are facing, how the Dutch overcome those problems and become the top in terms of environmental friendly country. Despite technical knowledge, it is also my pleasure to work with this amazing team, and every time I joined YMC delegations, I can always find the same vigour and enthusiasm in planning and executing the delegation. Delegation is, and always, a good way to sharpen my leadership skill and to gain friendship!

Amanda

The Netherlands has been well known for its breathtaking scenery and unique culture, from windmills, tulips to cheese. Together with the advisors and 15 other young and enthusiastic delegates, this Delegation was a memorable and rewarding one with various technical visits and social events. I was particularly impressed by the Dutch's mindset on overcoming natural constraints and working with the environment towards sustainable development. I was also exposed to innovative engineering concepts such as floating houses, sand engines, comprehensive cycling network and resources recovery on waste management. Special credits to our President, his wife and fellow delegates in making this 11-day trip full of inspiration and happiness.

Elizabeth

The HKIE YMC Overseas Delegation has once again given me a golden opportunity to learn the engineering development in other countries - this time to the Netherlands. Through this delegation, I was fascinated by the Dutch's innovative design in their infrastructures and technology. Also, I appreciated how they have committed deeply in sustainable development and the different approaches they adopt to overcome the natural constraints. I would like to express my sincere thanks to the President, advisors and delegates for their unlimited support and teamwork in bringing together this wonderful delegation. The delegation is undoubtedly an unforgettable and valuable experience.

Lisa

The Netherlands is a country inextricably linked with water. As a young environmental engineer, I pay my tribute to the Dutch's vision and innovative approach in reforming the future of water management. This delegation has granted me the invaluable chance to explore the numerous cutting edge treatment processes, to view the state-of-the-art water infrastructures, to enjoy the ecofriendly experience of bike commuting, and to embrace the breathtaking scenery of tulips and windmills. I am most impressed by the Dutch engineers' respect to nature through immersing their masterpiece with the environment in harmony. This trip has indeed seeded in me the attitude to take in truly become professional engineer.

Nikita

The Netherlands is a beautiful country with the combination of traditional and modern times. Through the delegation, I am impressed by the sustainable way of the Netherlands to solve the problems of flooding, waste, and transportation network with decisiveness and willingness. I believe that Hong Kong could also learn from the Netherlands' successful experience in promoting the development of infrastructure with "Building with Nature" approach and comprehensive communication programme. It is my honor to be part of this fruitful and meaningful delegation to experience the philosophy of their environmental policy which maintains and improves the quality of living in the Netherlands.



Sustainable Transportation Group

Alan

Ever since when I was young, I always listen to fascinated stories about the Netherlands, about its beautiful windmill, colourful flowers and the amazing ways living below sea level. During this trip, I am able to witness the tremendous engineering efforts the Dutch dedicated towards living with water and working towards a sustainable future. With tons of fun and learning packed into 11 amazing days. They are valuable experiences I will remember for the rest of my life. Special thanks must be dedicated to our president Victor and his wife Salina going on to this amazing journey with us and inspire us along the way.

Alex

This is my second time to join overseas delegation. Like previous one, I was able to broaden my horizons and learnt the advanced technologies in different disciplines. The Netherlands is located next to the North Sea which makes most of her lands under the sea level. The Netherlands is also one of the green countries in the world where she has the low carbon dioxide emission rate. They have sophisticated sustainable transport and waste treatment which makes their cities more environmental-friendly. Hong Kong, in my opinion, could learn from them to make our city green.

Benson

Windmills, tulips, cheese and football are my first impressions of the Netherlands. It is an unforgettable and amazing experience to join an oversea delegation with 15 young and friendly delegates coming from a variety of backgrounds and engineering disciplines. Through the delegation, I gained not only engineering knowledge, but also cultural, social and environmental aspects which widen my horizon, also strengthened my soft skills, such as communication skills, presentation skills and leadership skills. I would like to thank HKIE- YMC and advisors for continuous support, and all delegates for their contribution to the delegation.

Jacqueline

The Netherlands has always been a mystical place for me. The fields of tulip, the world famous wind turbines and the never ending piles of cheese make me in awe of the wonderfulness of this coastal city. I am thankful for the opportunity to explore this country with the HKIE President and 15 other delegates. The Dutch's foresight in engineering and management planning to accommodate future needs has indeed widened my exposure and experiences in every possible way. I am looking forward to use what I have learned in this delegation and contribute to the betterment of the engineering society in near future.

Jefferson

This delegation to the Netherlands is no doubt a rewarding experience for our young engineers. As the representatives of HKIE, we strived to foster the cultural and technical exchange between talents in both places. Throughout the trip, I thrived to explore all the stunning Dutch engineering projects such as Maeslantkering, a gigantic moving storm surge barrier, which has contributed to sustainability for the betterment of society. It is my honour to be part of the delegation team, working with all my eminent teammates. This journey has reassured my passion in engineering and will forever be an unforgettable page in my career.







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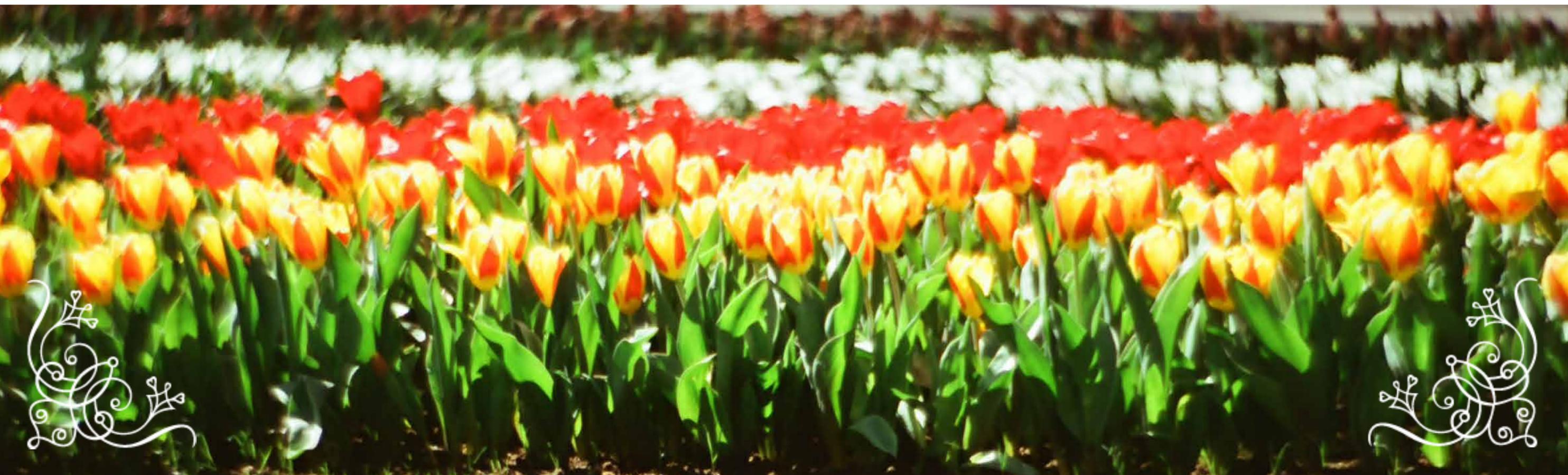
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Ir Victor C K CHEUNG



Acronyms

A/B	Absorption-Belebung	EPR	extended producer responsibility	IWMF	Integrated Waste Management Facilities	SHARON	Single reactor system for High activity Ammonium Removal Over Nitrite
AEB	Afval Energie Bedrijf	EU	European Union	KIVI	Koninklijk Instituut Van Ingenieurs		N.V. Slibverwerking Noord-Brabant
Annamox ®	Anaerobic Ammonium Oxidation	EV	electric vehicle	MLD	million litre per day	SNB	Sludge Treatment Facilities
BOD	biological oxygen demand	GPS	global positioning system	MSW	municipal solid waste	STF	sludge treatment plant
CEMS	Continuous Emission Monitoring System	GTA	GreenTech Automotive	MV2	Maasvlakte 2	STW	sewage treatment works
CEPT	Chemically Enhanced Primary Treatment	HKBCF	Hong Kong Boundary Crossing Facilities	NENT	North East New Territories	TEU	twenty-foot equivalent unit
CFRP	carbon fibre reinforced plastic	HK-BEAM	Hong Kong Building Environmental Assessment Method	NGO	non-government organisation	TMCA	Tsing Ma Control Area
CPD	Continuing Professional Development	HKIE	Hong Kong Institution of Engineers	NWP	Netherlands Water Partnership	TU Delft	Delft University of Technology
DAVI	Dutch Automated Vehicle Initiative	HKSAR	Hong Kong Special Administrative Region	OWTF	Organic Waste Treatment Facilities	VMAT	Vibrating Membrane Advanced Treatment
DCE	Dutch Cycling Embassy	HZMB	Hong Kong-Zhuhai-Macao Bridge	p.e.	population equivalent	WFPP	waste fired power plant
DSD	Drainage Services Department	ITS	Intelligent Transportation System	PPP	Public-Private Partnership	WSD	Water Supplies Department
EEC	environmental education centre			RDS-TMC	Radio Data System-Traffic Message Channel	WSHD	Waterschap Hollandse Delta
EPD	Environmental Protection Department			SBR	sequential batch reactor	WTW	water treatment works
						WTP	wastewater treatment plant
						YEP	Young Expert Programme
						YMC	Young Members Committee





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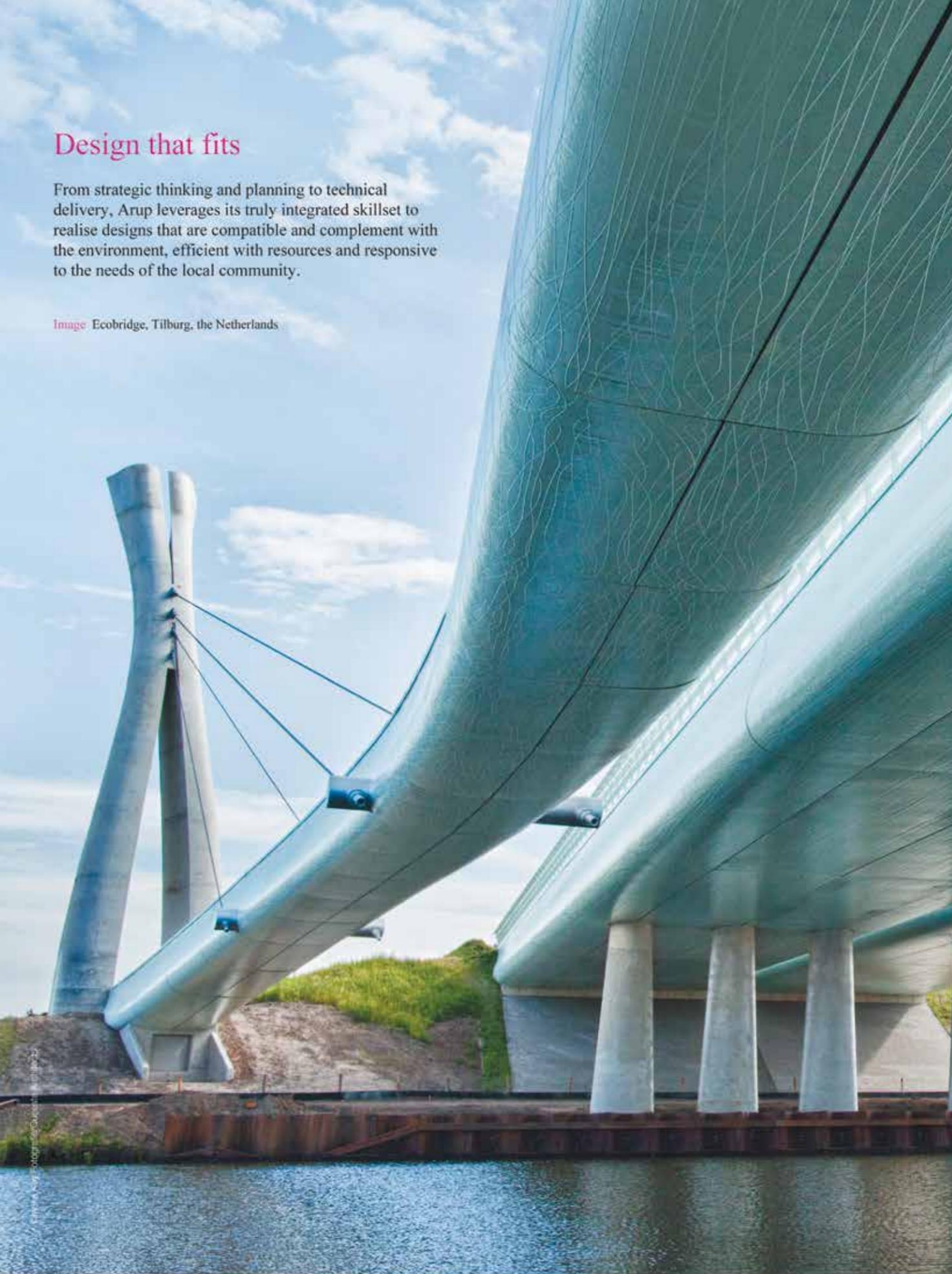
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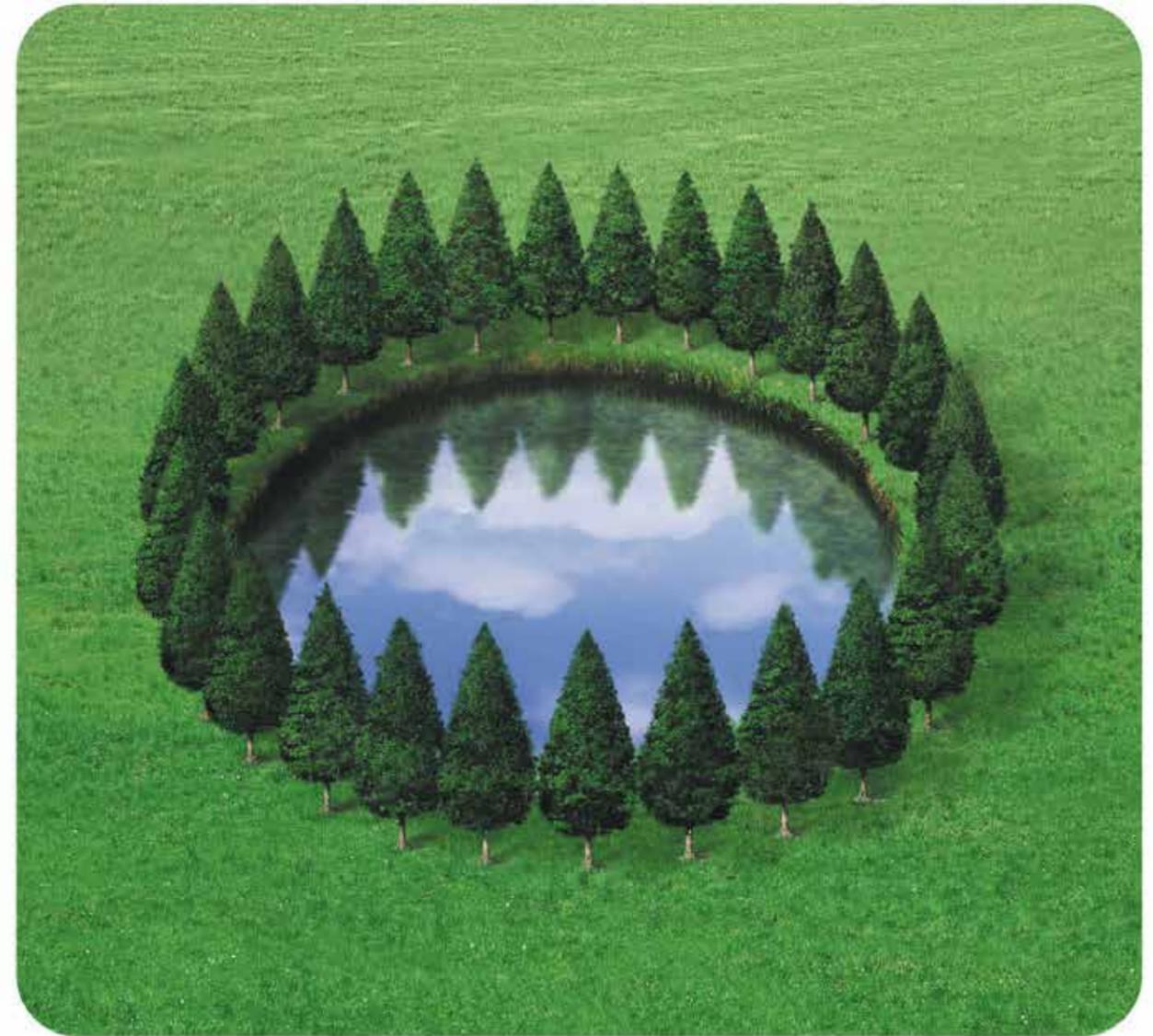
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