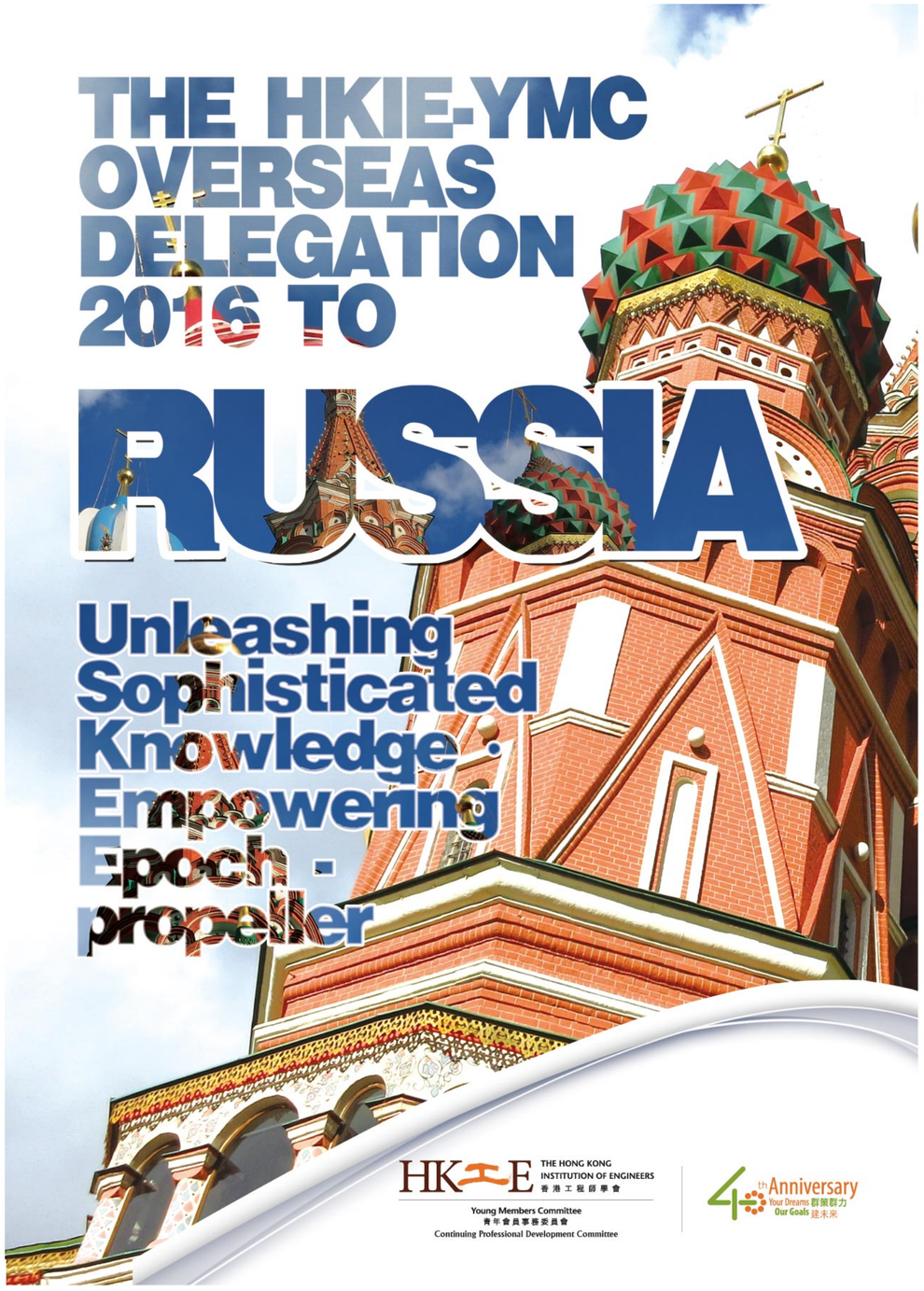
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THE HKIE-YMC
OVERSEAS
DELEGATION
2016 TO
RUSSIA
Unleashing
Sophisticated
Knowledge -
Empowering
Epoch -
propeller
HKIE THE HONG KONG INSTITUTION OF ENGINEERS 香港工程師學會
Young Members Committee
青年會員事務委員會
Continuing Professional Development Committee
40th Anniversary
Your Dreams 群策群力
Our Goals 建未來

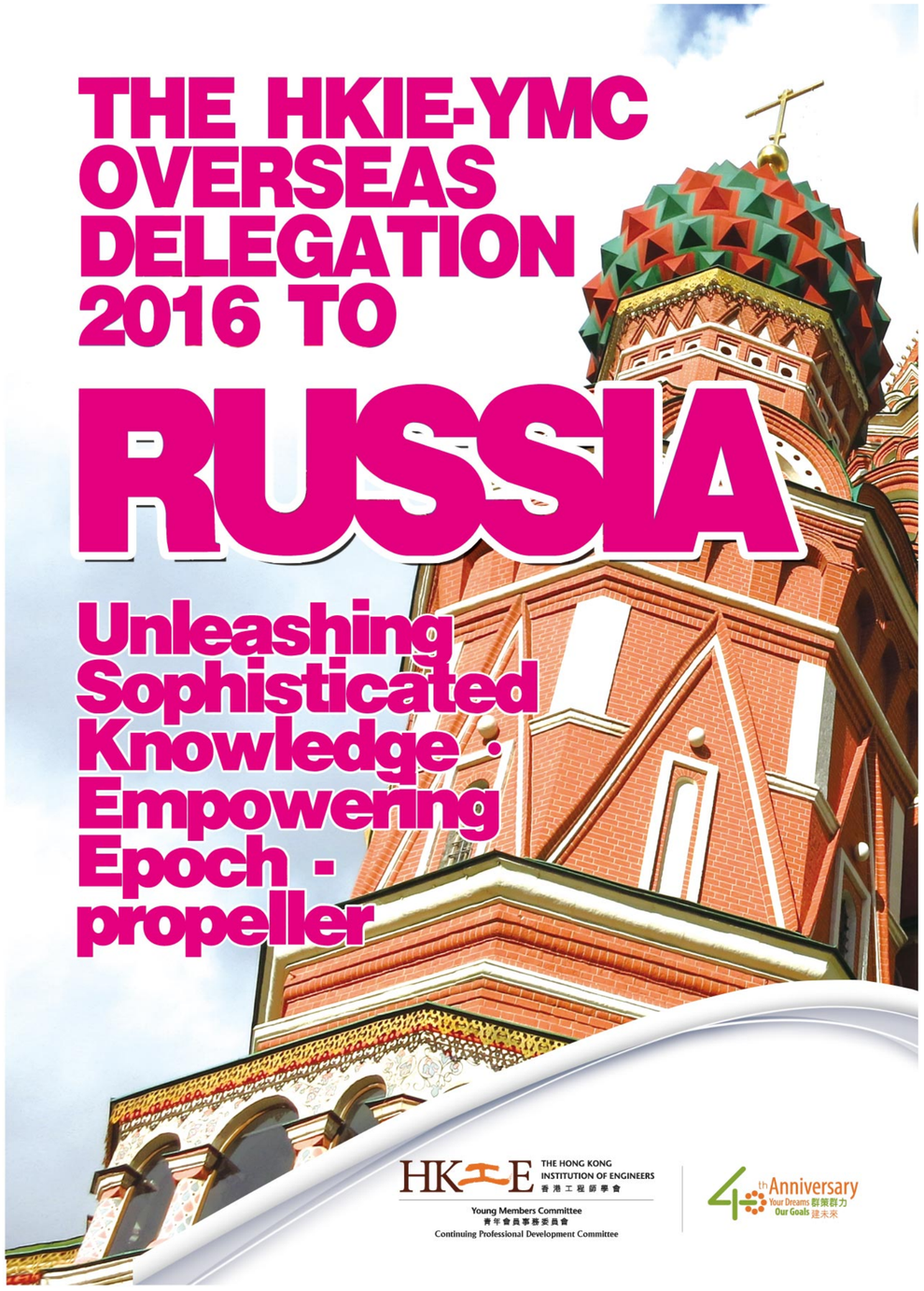

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Messages

Messages from advisors



Ir C C CHAN, SBS, JP

The President,
The Hong Kong Institution of Engineers

I had the great pleasure of participating in part of the YMC Overseas Delegation Visit to Russia. I joined them from 20 to 24 March 2016 in Moscow, but had to miss the visit to St Petersburg because of my other commitments.

The first impact after landing at the airport in Moscow was -5°C. That sort of temperature continued for the next few days, and even colder at night, but we were blessed by sunny weather most of the time. While we were not used to the cold outdoor temperature of March in Russia, it was usually quite warm indoors, and even more so when I experienced the enthusiasm of the delegates and the hospitality of the hosts.

The second impact came when we had the opportunity of meeting the Russian Green Building Council Board Chairman. He was a gentleman that I looked up to – I guess he stands at least 200mm taller than me. Joking aside, he won my respect for his zeal in promoting the green building concept in Russia and in coordinating with counterparts in different economies for the betterment of our society.

The YMC should be commended for putting in a lot of effort in planning the visit. The itinerary covered a good mix of different disciplines of engineering and had a balanced mode of interaction, including formal meetings, seminars and technical visits. Even during the trip, they tried to line up more visits to make the best use of their time in Russia. Their team spirit and managerial skill were distinctly demonstrated throughout the trip. I am sure they had gained a lot experience from these few days in Russia and from the months of working together before and after the visit. I wish them all the best in their future endeavours.



Ir Victor C K CHEUNG

Immediate Past President, The Hong Kong Institution of Engineers

I would like to commend the YMC for having successfully organized the Overseas Delegation to Russia this year. As expected, the trip was well planned and all Delegates took part in the preparation and execution of the trip. The concerted effort of the delegation team members made the event much more fruitful and meaningful.

I find the theme of this year's Overseas Delegation – Unleashing Sophisticated Knowledge • Empowering Epoch-propeller most interesting. The three main focuses (1) energy productions, (2) development of transportation and its facilities; and (3) sustainable buildings are very relevant to Hong Kong's current development.

Russia is famous of its technological development such as nuclear technology and space technology. Through this trip, our young engineers had the opportunity to gain valuable insight on the past achievements and the latest development of this grand country. I am sure that the experience gained through the learning and sharing process of the Delegation will be most beneficial to their professional career advancement.

I would like to congratulate the Delegation for accomplishing this successful mission.



Ir Joseph K H CHOI

Senior Vice President, The Hong Kong Institution of Engineers

As the world becomes better connected, both physically and virtually, there are growing demands for the services of professional engineers in all disciplines, regardless of where we live. Having an international perspective literally opens up a world of opportunities for our young engineers. China's Belt and Road Initiative is one example of where Hong Kong engineers can participate in major international projects.

With the above in mind, the HKIE-YMC Overseas Delegation programme is designed to help broaden the horizons of our young talents through international exchanges. Indeed, I am honoured to be an advisor for this very meaningful annual event.

The theme of the 2016 YMC Delegation is "Unleashing Sophisticated Knowledge • Empowering Epoch-propeller". With the increasing global focus on improving energy and environmental efficiency, YMC has chosen Russia as this year's destination to demonstrate the engineering sector's commitment to address topics of social concern. As an energy-rich country with advanced technology in the area, Russia provides an invaluable opportunity for our young engineers to learn about present-day best practices.

Russia also has the longest single continuous railway in the world, and our young engineers can understand more about the construction of railway infrastructure from their Russian counterparts.

The 15 delegates coming from different engineering disciplines have shown true team spirit during the nine-day trip and helped each other to deepen their learnings and insights gained.

Taking this opportunity, I would like to express heartfelt appreciation to the YMC leaders and organizers for making the Delegation a success and I am looking forward to the active involvement of more young engineers in this event next year.



Ir Thomas K C CHAN

Vice President, The Hong Kong Institution of Engineers

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 organized and attended this year's visit to Russia.

The YMC Overseas Delegation is one of our Institution's most important events. This YMC Overseas Delegation team was formed in the autumn of 2015; and the 15 delegates, who from different engineering backgrounds and had not known one-another organized this impressive trip within just a few months. It is hard to believe that everything was organized 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 is "Unleashing Sophisticated Knowledge • Empowering Epoch-propeller". Given that Russia has a long history and it is an important stop for the Belt and Road Initiative. I trust that Russia has a special meaning to our youngster as the destination of this delegation. The Russian culture is still influencing the Slavs nations. By understanding Russia, it would open their eyes on a great East Asia and Eastern Europe. By this delegation, I trusted that our young engineers are well-prepared for the development of countries around Belt and Road Initiative and contribute to the future development of Hong Kong and our country.

Finally, I would like to make a special mention to the Delegation Manager, Ms Candy FUNG and her 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.



Ir Dr Philco N K WONG

Vice President,
The Hong Kong Institution of Engineers

I would like to express my heartfelt congratulations to the YMC for organizing another overseas Delegation successfully. With the theme "Unleashing Sophisticated Knowledge • Empowering Epoch-propeller", Russia is definitely an ideal destination.

Russia is no doubt an energy superpower in our world. She has the world's largest natural gas reserves. Not just fossil fuels, but the renewable energy development for Russia is also flourishing. She is one of the leading countries for the renewable energy development. With the advanced and mature energy industry, engineers in Russia play an important role on the economic development for the entire country. Through different technical visits and engineering society meeting, I believe all Delegates had broadened their engineering knowledge and strengthened the relationships with their Russian counterparts. Russia is one of the countries of BRIC. Being one of the fastest growing countries in the world, the Delegation can also take this chance to understand more about this unique opportunity and seek collaboration in the future.

I am impressed that the trip was very well organized and all delegates took part in the preparation and the execution. The itinerary was packed to utilise the Delegation exploration to the local engineer society. 13 events, including technical visits, seminars and society meetings were held successfully during the trip.

Last but not least, I wish to congratulate the success of the Delegation team under the leadership of Ir Kenneth CHEUNG and Ms Candy FUNG. The effort by the Delegation team is definitely the key leading to the successful trip. I am looking forward to seeing the future programmes organized by the Delegation and wish the team every success.



Ir Dr C M KOON

Chairman, Continuing Professional Development Committee, The Hong Kong Institution of Engineers

The membership of the Institution is growing in each passing years. Every new member is highly talented and is tuned to serve his/her respective sector. We live in a changing world and in order to understand the changes more deeply, we have a mounting responsibility to understand ourselves. One of the most effective ways is to engage in continuous learning and taking action on what we learn.

To be successful, young members need to feel connected to the Institution. There are many professional activities in which to participate. To stay connected, you must participate in Institution's activities as far as practicable.

I am confident that the learning that you get by the way of action learning in the Overseas Delegation 2016 to Russia will not only help you to realize your true potential but also will be regarded as the most effective method of training and development in personal effectiveness.

It is with great pleasure that I am involved with the YMC to select delegates and sharing my knowledge and experience in part of the preparatory work.



Ir Edmund K H LEUNG, SBS, OBE, JP

Past President,
The Hong Kong Institution of Engineers

I have had the privilege and honour to have been invited to be one of your delegation advisors for many years, and once again, I have the pleasure to write in congratulating another year of successful mission.

I always support the organizing of overseas delegations for young engineers as I believe in "seeing is believing". Reading about a place is at best two dimensional. A personal visit to these places brings knowledge and experience with further dimensions. It is only with visits that one can experience the different culture and systems. Hopefully, such valuable experience, both technical and cultural, will become useful later in one's career.

Compared to Hong Kong, Russia is probably as far away in terms of culture and standards as we can imagine. They have a low population density, their technical expertise is strong in some areas though weak in others, and they speak a different language which is not even remotely related to English nor Spanish, so there is no chance for Hong Kong people trying to guess the meaning of a sentence simply by reading it, as none of the words have similar roots to the languages that we are familiar with.

I am sure it has proven to be a worthwhile visit, and I can guess the excitement and attraction of the visit must have been immense. I cannot wait to read the delegation report and to listen to the presentation and learn from them.

I take this opportunity to congratulate Delegation Manager Candy FUNG for her able leadership, and all other delegates for excellent teamwork. I know it was not easy to organize this delegation and therefore it is even more valuable and interesting that they have accomplished this difficult task. I hope they set a good example to future delegations and I look forward to seeing those future events being equally successful.



Ir Dr Otto L T POON, BBS, OBE

Past President, The Hong Kong Institution of Engineers

Innovation is now the keyword for the development of Hong Kong and the YMC of HKIE is riding on this momentum.

Traditionally, YMC conducted their annual technical visits overseas to the first-world countries. It is making a breakthrough by visiting a communist country and a controlled economy: it has crossed a psychological barrier and broaden its vision to a new horizon. This is truly innovative.

I am delighted that the Delegation achieved a lot in visiting a power plant and a major German electrical engineering company in Moscow, had productive exchanges with professional bodies in air conditioning, in green building technology and the Union of Scientist and Engineers. It was noted that more female engineers practicing in Russia making useful contributions to the industries and economy.

Apart from technical exchanges, I am sure the Delegation benefitted from visiting The Hermitage which is one of world's top royal museums amongst other historical sites; understanding the civilisation and culture of the people.

It is heartening to note the Delegation found the Russian people warm and friendly. This leads me into thinking the people are by nature nice everywhere. It is often the political system that conditions people to behave differently.

I congratulate the Delegation, under the bold and able chairmanship of Ms Candy FUNG, had set a precedence, crossed cultural barriers and achieve a big success in its adventure into the relatively unknown.



Ir Gary C W KO

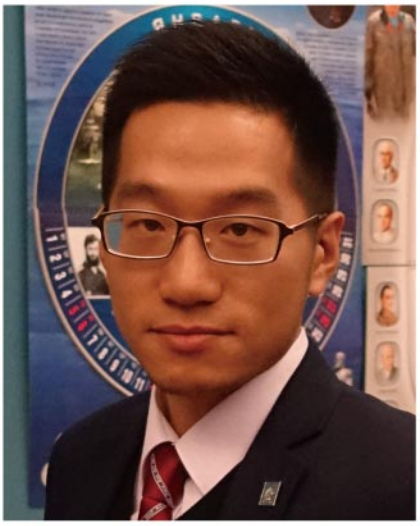
Chairman,
Professional Assessment Committee,
The Hong Kong Institution of Engineers

I am writing to congratulate the YMC to have successfully completed an Overseas Visit to Russia in March 2016. The largest country in the world, though with a strong heritage, is foreign to most of us. Vast difference in culture and language has not yet hindered the pride of our profession to liaise, select and establish contacts to conduct the visit. The delegation does not only cover technical exchange but also open the eyes of delegates and our counterparts to a mutual culture that is distant from each other. The legacy of YMC in the promotion of Hong Kong engineers is further enhanced.

I am delighted to note that all delegates are committed to attending every detail of the entire course of 8 months in connected with the Visit. The process is a golden opportunity for peer learning to polish their life skills for career advancement. I sincerely wish that the YMC will continue this annual feature event so as to benefit more young engineers to develop themselves.

To conclude, may I share with all YMC delegates a quote from Alexander Pushkin, who is widely recognised as the greatest of all Russian writers, “So, play and sing, friends of my years!”

Messages from Delegation Chairman & Delegation Manager



Ir Kenneth K W CHEUNG

Delegation Chairman
Chairman, the HKIE – YMC

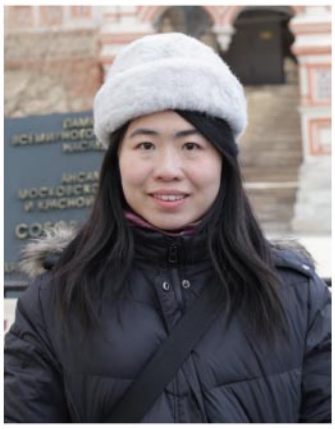
I write to congratulate the success of YMC Overseas Delegation 2016 to Russia. Organizing overseas delegation to widen the exposure of young engineers in engineering topics is YMC's tradition. Carrying on the footsteps of our predecessors, we organized a delegation to Russia this session with the theme "Unleashing Sophisticated Knowledge • Empowering Epoch-propeller" to serve as an inspiration for young engineers to acquire experience and engineering practice in Russia. Throughout this delegation, I appreciate that our delegation team could learn energy utilisation with environmental consideration, technological advances in digitalisation, and green building design and policy in Russia. It is hoped that their observations and knowledge could be applied and shared with other engineers in Hong Kong.

It is our great honour to have received supports and advices from our advisors including Ir C C CHAN, Ir Victor C K CHEUNG, Ir Joseph K H CHOI, Ir Thomas K C CHAN, Ir Dr Philco N K WONG, Ir Dr Otto L T POON, Ir Edmund K H LEUNG, Ir Dr C M KOON 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.

I must express my particular thanks to President Ir C C CHAN to take time out from his busy schedules in joining our trip and giving us valuable advices.

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 Delegation Manager, Ms Candy FUNG, the Deputy Delegations Managers, Ms Yani KO and Ms Lee Man WONG for their works and great effort in organising this Delegation and making this Delegation a very successful one.

From preparation work to overseas logistics, from organizing 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.



Ms Candy M Y FUNG

Delegation Manager
Deputy Chairman, the HKIE – YMC

When tasked to lead a group of young engineers to visit a country with rich engineering history, I choose Russia as our destination without any reservations. I recalled back when I was an undergraduate student, most of our engineering textbooks were written by former Union of Soviet Socialist Republics (USSR) engineers and scientists, especially in the fields of fluid mechanics and dynamic. Prior to the 17th century, Russia was a relative rural area. Under the leadership of Emperor Peter the Great, Russia started to westernize and become one of the major powers. With lots of ups and downs, she reached her zenith under the rule of Stalin. Russia is not only one of the two superpowers in the world, but also a leading country in technology. Although in the 1980s, USSR's technology development faced challenges due to economic downturn, it did not affect the leading role of Russia in military technology.

Since the new millennium, Russia reaffirmed its leading power status by its economic development. With its rich of natural resources particularly oil and natural gas, Russia finds a unique way for developing her economic. Unfortunately, the recent growth has slowed with the drop in the price of oil and gas. How do the changes affect them? Similarly, Hong Kong is likely to face economic downturn. However, our lack of natural resources led us to explore alternative ways for sustainability. How could Russia inspire us?

In the past, Russia's application of technologies was focused on military and State-owned enterprises. Recently, technologies were released for private enterprises in a free market. It is axiomatic that the technology infrastructure (engineering education system and engineering research & application) will be the major power in future development. With the theme "Unleashing sophisticated knowledge • Empowering Epoch-propeller", our study focuses on the energy utilization in term of their resources, our choice inside digital revolution, sustainable building design with green policy for community and ways to enhance competitiveness under the globalisation.

On behalf of this Delegation, I would like to take this opportunity to express our heartfelt gratitude to the overseas and local organisers. Without their support and arrangement, our Delegation trip would not make a success.

I would also like to express our sincere gratitude to our advisers, Ir C C CHAN, SBS, JP, the President of the HKIE, Ir Victor C K CHEUNG, the Immediate Past President of the HKIE, Ir Joseph K H CHOI, the Senior Vice President of the HKIE, Ir Thomas K C CHAN, & Ir Dr Philco N K WONG, the Vice President of the HKIE, Ir Otto L T POON, BBS, OBE, the Past President, Ir Edmund K H LEUNG, SBS, OBE, JP, the Past President, Ir C M KOON, the Chairman of the HKIE-Continuing Professional Development Committee and Ir Gary C W KO, the chairman of the HKIE-Professional Assessment Committee. Our advisers had provided considerable supports in conducting interviews, attending meetings during the planning stage and joining our visits in Russia. Their guidance during this process is valuable to this trip as well as our Delegates.

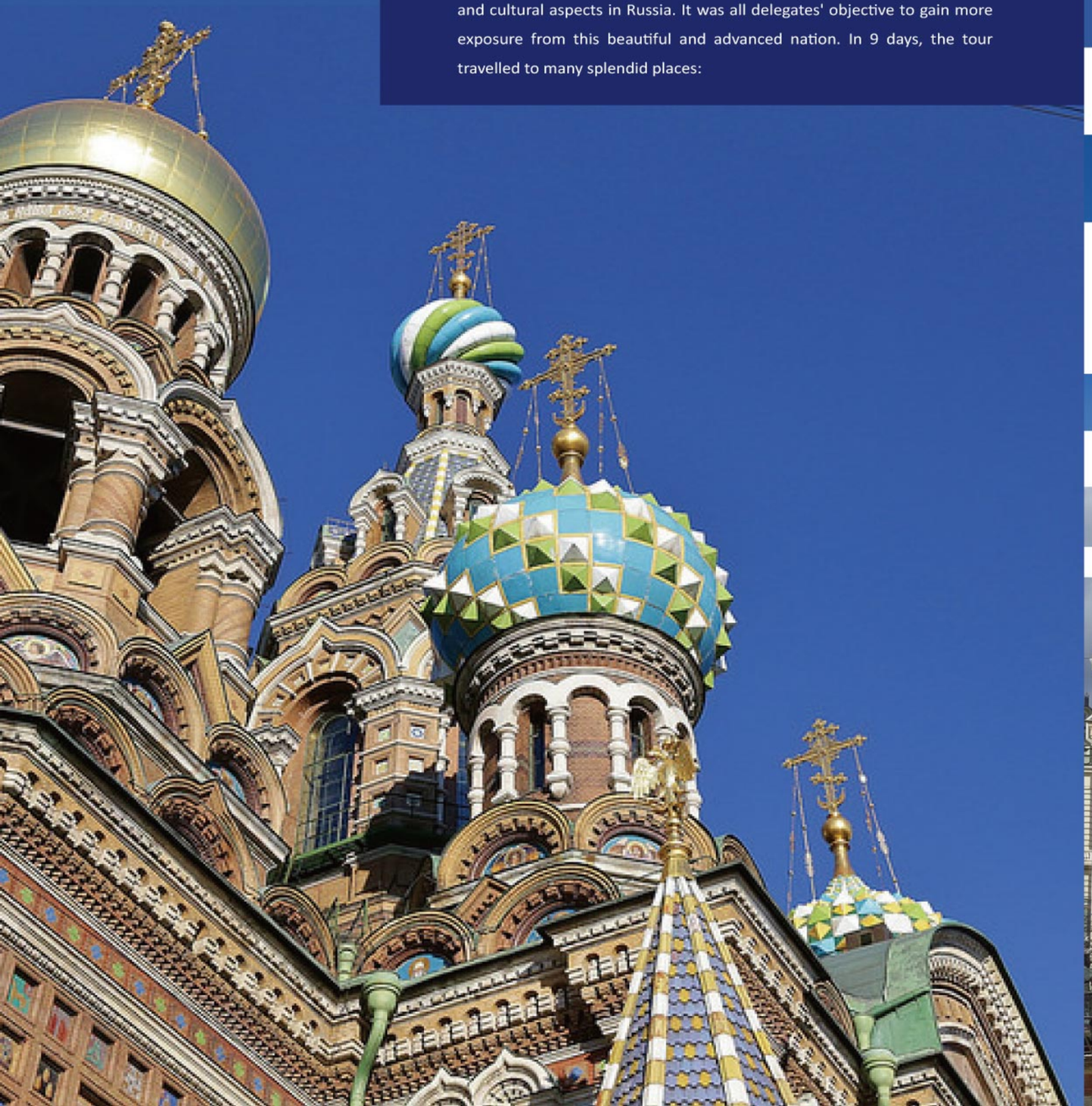
Special thanks are given to Mr Alexey POLYAKOV, the co-founder of the Russian Green Building Council, Mr S M ZHENG, Embassy of the People's Republic of China in the Russian Federation, and Mr Yuri TARASENKO, Siemens LCC for giving us a hand on arranging seminars, visits and meetings. Many thanks are expressed to the HKIE-Continuing Professional Development Committee and our sponsors, without their generous financial support, we would not be able to carry out this Delegation.

I am indebted to the Team for their supports and endeavour to preparing the trip, conducting various studies and writing this Report.

Last but not least, I need to express my thanks to the Delegation Chairman Ir Kenneth K W CHEUNG and the two Deputy Delegation Managers Ms L M WONG and Ms Yani Y Y KO, for their contribution and great efforts to make this delegation truly memorable and successful. It is my honor to be a part of the Team.

Overseas Events

"Seeing is believing." The delegation trip to Russia was fruitful, substantial, and simply eye-opening. Well-prepared, delegates paid visits to various sites and venues which demonstrated as live examples in both technical and cultural aspects in Russia. It was all delegates' objective to gain more exposure from this beautiful and advanced nation. In 9 days, the tour travelled to many splendid places:



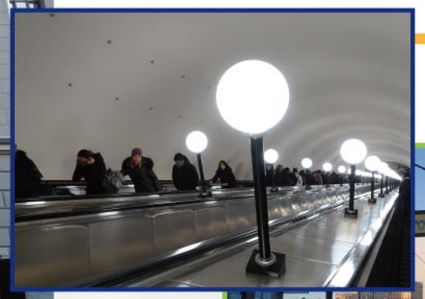
Delegation Timeline

Date: 19th Mar 2016 to 27th Mar 2016
Location: Moscow (5 days 4 nights), St. Petersburg (4 days 3 nights)

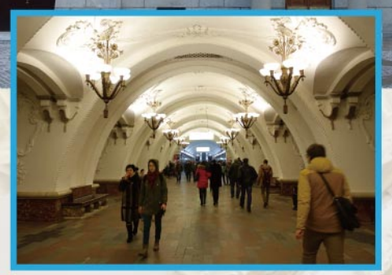
Date	Time	Category	Activities
19th Mar (Day 1)	PM	Visit	Moscow Metro Tour
20th Mar (Day 2)	AM	Visit	Museum of Cosmonautics
20th Mar (Day 2)	PM	Cultural event	Visit to Kremlin / Red Square / St.Brazil's Cathedral
20th Mar (Day 2)	PM	Cultural event	Bolshoi Theatre: Modern Choreography Night
21st Mar (Day 3)	AM	Visit	Control Centre of Moscow Metro
21st Mar (Day 3)	PM	Exchange	Moscow Aviation Institute
21st Mar (Day 3)	PM	Exchange	International Union of Scientific and Engineering Association
22nd Mar (Day 4)	AM	Seminar	Building Energy Efficiency / RuGBC / ABOK seminar
22nd Mar (Day 4)	PM	Visit	Siemens Office-Building Tour
22nd Mar (Day 4)	PM	Seminar	Power Plant Gas Turbine Technology seminar
23rd Mar (Day 5)	PM	Visit	Kolomenskaya Cogeneration Power Plant
23rd Mar (Day 5)	PM	Visit	Country Park Business Centre
24th Mar (Day 6)	AM	Visit	Siemens Gas Turbine Technologies (SGTT) - Gas Turbine & Compressor Production Site
25th Mar (Day 7)	PM	Visit	Bureau of Technics - Green Building Design Seminar
25th Mar (Day 7)	PM	Visit	Bureau of Technics - SkandiKlubb construction site
26th Mar (Day 8)	AM	Cultural event	The Hermitage (The Winter Palace)
26th Mar (Day 8)	PM	Visit	Museum of Urban Electrical Transport
27th Mar (Day 9)	AM	Cultural event	Summer Palace of Peter the Great











Moscow Metro Tour

PM

19-Mar

Upon arrival to Moscow, the Delegates visited the Moscow Metro system and rode on one of the most famous underground rapid transit rail systems. The Moscow Metro system was well-known for its stations design, as well as being the deepest metro system in the world.

First opened in 1935, the system now expanded to the size of about 200 stations spanning more than 300 kilometres of tracks. Upon entering the metro station, seemingly endless escalators were seen. The escalators are necessary to access the tracks running deeply underground. Reaching the platform level, beautiful statues and fine decorations on the wall transformed the stations into mini-art galleries. Delegates were told the fascinating designs were legacies, aiming to show the greatness of the former Soviet Union. The Moscow Metro system was a huge contrast when compared to the atmosphere with Hong Kong's modernized metropolitan stations.

The Moscow Metro system runs at 90-120 seconds intervals; similar frequency is achieved by Hong Kong's Metro system. However, the trains of Moscow Metro have much shorter and narrower bodies compared to its counterparts in Hong Kong. Furthermore, platforms were not equipped with screen doors, which aroused concerns on safety. We were told that station incidents were uncommon.

Delegates had a great evening in the metro. It is enjoyable to see such beautiful stations.

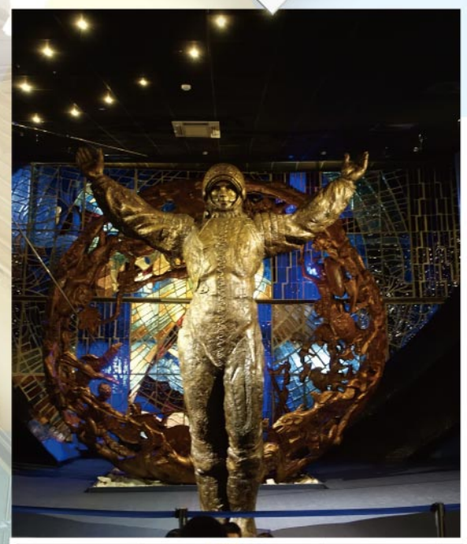


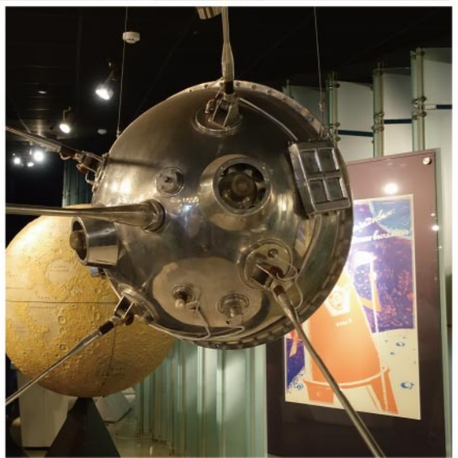




AM

20-Mar





Museum of Cosmonautics

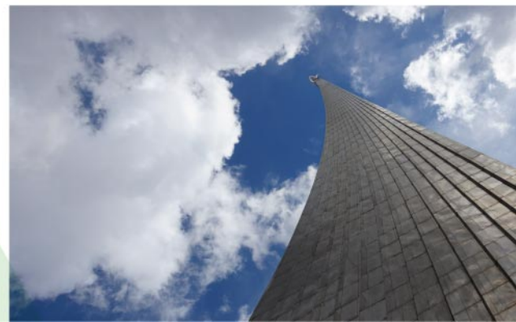
The Memorial Museum of Cosmonautics located at Prospekt Mira of Moscow is a museum dedicated to age-long space exploration by Russia and other countries. It opened to public on April 10th, 1981, on the 20th Anniversary of the first manned space flight. The site originally was where the Monument to the Conquerors of Space erected in 1964. The museum was built within the base of the monument.

The outstanding landmark has been jointly designed by architects Michail Barsh and Andrey Kolchin, and also sculptor Andrey Faydish-Krandiyevskiy. The upper part of the monument comprised of a vast slanting obelisk of steel and titanium that reached to a height of 99 metres, topped by an 11 metres-tall rocket pointed toward the sky. The obelisk's base is faced with granite tiles decorated with reliefs showing cosmic themes and reports about Soviet space explorers by Russian News Agency "TASS" during the Soviet era.

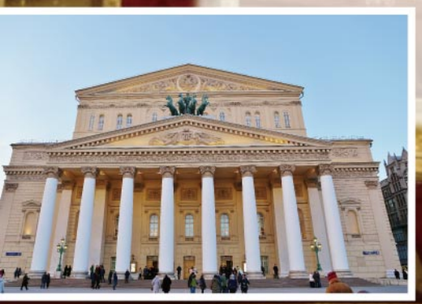
The exposition in the museum provides a retrospect of the Soviet space science evolution from the first man-made satellites Sputnik-1, the first manned space flight with cosmonaut Yuri Gagarin, followed by the first space walk, Moon exploration programs, to solar system exploration programs and international space research programmes. Furthermore, the displays traced the history of space exploration, including the first interplanetary satellite flights, the first dogs in space and man's journeys to the cosmos. There was a well conceived display that explains how astronauts survived a space flight, which interested the delegates deeply.

The museum also showed how aerospace technology changed human lives, by displaying space inventions which has already seeped into our daily lives and became very ordinary items, such as canned food, gym equipment, instant noodles, space clothes, sunglasses, etc.

The sheer aesthetics of the displays was very impressive. The otherworldly sheen of the spacecraft-construction materials were combined with a host of cosmos-themed artwork. The exhibition is a compelling reminder of space exploration as mankind's great adventure.



Bolshoi Theatre: Modern Choreography Night





PM

20-Mar

Delegates had a wonderful night in paying visit to the Bolshoi Theatre at Moscow. Literally means “Big Theatre”, it was one of the most famous playhouses in the world, with its fame in the state-of-an-art ballet performances and its deep historical background.

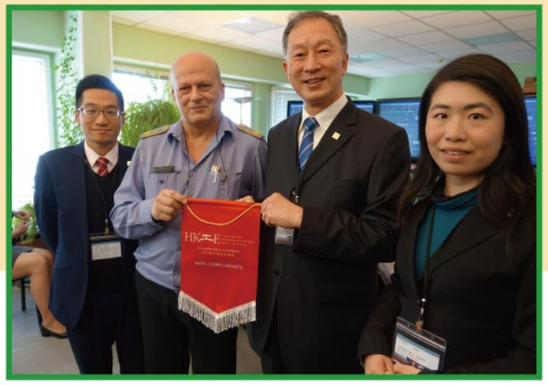
As a symbol of Russian performing arts, the origin of the prestigious theatre can be traced back to the 18th century. It was established as a private theatre for Moscow prosecutor Prince Pytor Urusov in 1776, granted by renowned leader Catherine the Great. It was later damaged by fire for two times, and was last repaired and modified to the current status in 1856 during the coronation of Tsar Alexander II. The theatre then became the centre of performance arts and banquets including masquerades, balls and other forms of entertainment.

The theatre building was typically in classical architecture design. At the front of the theatre, it featured eight tall columns in ancient Greek Ionian style. Its milky white façade was fully occupied by artistic, meticulous carvings and sculptures. In its interior, magnificent decoration gave the sensation of nobility to the audiences, bringing in the feeling of antique. The theatre itself was indeed an art piece. In its reconstruction in 2011, many lost features of the historical building were re-instated.

In paying visit to such a notable theatre, the delegates seized the chance in watching three shows of ballet in one act, including "Short Time Together", one of the most popular repertoires at the time. The contemporary ballet shows were carried out by professional ballet dancers with precise coordination and combination of lighting effects, orchestral music and elegant dancing poses as well as body languages. The emotional plots of erotic love and hatred were well performed and displayed to all the audiences.

Beyond engineering and technical strength, the visit to Bolshoi Theatre served as an example in depicting the soft power of Russia. It was an impressive and unforgettable experience for all delegates.





PM

21-Mar

Control Centre of Moscow Metro

The visit started with an introduction given by Mr Konstantin, Chief of OCC. He briefed the Delegates on the purpose of the center, the interaction between different departments during emergency and future expansion plan.

OCC was established in 2004 to monitor two of the metro lines with highest crime rate. The footage from security cameras installed on trains and within stations are stored at OCC to aid the identification of suspects or in case of emergency in the metro system. Additionally, OCC also operates as the conference room to share experience and knowledge with other railway operators or institutions.

The delegates visited DC. Mr Andrey, Chief Dispatcher, noted that each Moscow metro line has its own mini dispatch center located on the same floor. In case of emergency, the manager would walk around and coordinate the move for evacuation. Within each dispatcher center, modern digital displays were used to monitor the real time situation at each track junctions, power supply and train schedule. One of the major duties for the center staff is to compare the planned schedule with real time data for making adjustment accordingly.

Currently, the maximum capacity for the metro lines was reached. However, the progress for future expansion plan is hindered due to the contraints of existing structures. The current solution will be enhancing the cooperation between different forms of transport, like buses and train. In short, participants overall found the visit a fruitful experience that promoted their understanding in railway operation in Russia.





Moscow Aviation Institute



Moscow Aviation Institute (MAI) was a national research university established in 1930. MAI is the leading higher education in the field of aviation and aerospace technology both within Russia and worldwide. It was one of the 14 universities in entire Russia to be awarded as National Research University in 2015. With its deep history, the institute was known as the cradle of many aeronautic professionals and cosmonauts. Leaders and founders of Russian aviation giants such as MiG, Sukhoi, Tupolev, are graduates from MAI.



PM

21-Mar

Delegates were first briefed by representatives of MAI on the history and structure of the school. The institute was formed by 11 schools providing more than 200 disciplines to about 22000 students. Students were provided with both theoretical and practical training on every parts of various aviation machines. The Institute is equipped with a vast of facilities, including plenty of classrooms and over a hundred of different laboratories. Teaching tools include flight simulator or even retired planes from the Russian Air Force for students to learn piloting and manufacturing an aircraft. Students would learn in studios design and aircraft centres according to their level, and work on different kinds of planes, from civil aircraft and sophisticated fighter jets, and even drones. Meanwhile, students also have opportunity to go on exchange with 74 universities worldwide during regular or summer semesters. The institute had long been using Russian as the defacto teaching language, but is currently provoking and promoting lecturing in English. MAI shows its intention and ambition in integrating with the world.

Delegates were shown retired military aircrafts for educational purpose for students. We were astonished and excited by the extensive numbers and types of aircraft conserved by the institute. It was much appreciated as students studying in the institute can get first-hand experience when studying aviation knowledge by simply visiting the laboratory.

The exchange and visit to the Moscow Aviation Institute eye-opening.

International Union of Scientific and Engineering Associations





International Union of Scientific and Engineering Associations were founded in 1866 and it is celebrating its 150th anniversary in this year. The organisation was formed by 10 national associations of science and engineering from Russia, Ukraine, Kazakhstan and other countries of the Commonwealth of Independent States, as well as another 35 professional societies and associations. Accompanied by the chancellor from the Chinese official, a formal meeting with the Associations was conducted in exchanging academic, industrial and cultural information.

At the beginning of the meeting, participants took turns to introduce themselves and to greet each other with formal etiquette. Afterwards, Russian representatives gave an induction on the background and the function of the association to fellow delegates. In return, the President of HKIE, Ir C C CHAN, delivered an appreciation address with a brief introduction of Hong Kong as well as HKIE to the Association.

During the meeting, the Russian representatives and delegates has discussion over development of renewable energy in Russia and Hong Kong. Some examples of application of wind energy, solar energy in Russian and in Hong Kong were briefly compared. And in terms of process of energy production, both places face the difficulties on transmission stability and handling pollution problems. In terms of energy policies, the Associations depicted the major three parties in the market as producer, consumer and transmission owner in Russia. The current issue was to come up with an equilibrium point between every party, in the sake of gaining the best interest for the pubic and market stability.

Moreover, in developing youngsters into the engineering industry, both Russia and Hong Kong notice the importance of providing opportunities to young engineers. The Russian representatives showed interest in learning the accreditation method within the engineering industry in Hong Kong, and also criteria and the path to become a Chartered Engineer. In nurture young engineers, the Associations were organising activities like the annual event "The year award for Engineer", in encouraging young engineers to move into the industry.

Beyond knowledge and cultural exchange, the visit had established a bridge for each other for future visit. Appreciation is given to the chancellor to coordinating the visit.

AM

22-Mar



Siemens Office - Building Energy Efficiency / RuGBC / ABOK seminar

The seminar was jointly organised by Russian Green Building Council (RuGBC) and Russian Association of Engineers for HVAC, Heat Supply and Building Thermal Physics (ABOK) at Siemens headquarter.



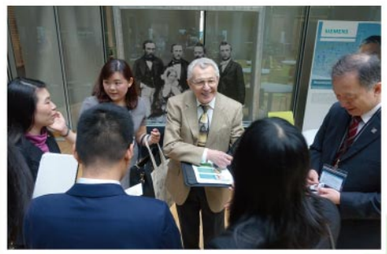




Prior to the seminar, delegates had a short warm up chatting session with their counterparts in Russia, exchanging opinions on each other's work. Afterwards, representatives from Siemens, RuGBC, ABOK and Ir C C Chan took turns to deliver welcoming speech to the audience, follow up by introduction of delegates to ABOK and RuGBC. Originally founded in 1990, ABOK is an associate member of American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE). It developed a list of standards for HVAC in Russia, and participated in the pioneer project of energy efficient building in Russia. On the other hand, RuGBC is a non-profit organisation dedicated in accelerating the development and adoption of market-based sustainable building practices. The Council also introduced Building Research Establishment Environmental Assessment Method (BREEAM) standard and Leadership in Energy and Environmental Design (LEED) rating system for sustainable buildings industry in Russia. The seminar covered topics on segments, figures and trend of Russian new construction market for HVAC automation, as well as energy efficiency practice in buildings in Russia. In return, delegate Mr Jimmy Lok introduced sustainable buildings in Hong Kong to the audience.

During the break time delegates had a discussion with the ABOK representative, about the career of female engineers at Russia. She commented that architects in Russia were required to acquire a certain level of engineering knowledge so as not to design something that are not buildable. The conversation was inspiring.

The seminar was eventually wrapped up by a souvenirs exchange session between Siemens, ABOK, RuGBC and HKIE.



Siemens Office-Building Tour

PM

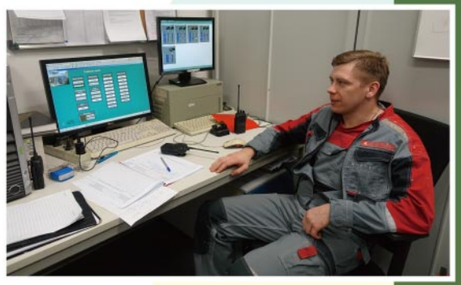
22-Mar

Achieving GOLD certification of Leadership Energy and Environmental Design (LEED) – Commercial Interiors in 2012, Siemens office building is not only energy-efficient and eco-friendly, but also innovative in terms of design and space organization.

With the latest intelligent building management system, it allows the efficient use of resources and reduces CO^2 emissions and creates the micro-climate. The building management system is not limited to control its heating systems and air conditioning, other building services like lighting, blind control, security, access control and energy distribution are also integrated as well as monitoring and condition verification. It ensures the operations using with minimum energy consumption and cost optimization, and thus helps create a comfortable microclimate.

Green building monitor provides monitoring of resource consumption in the building, which monitors the level of water, electricity and heat spent on office maintenance. The decoration is also eco-friendly materials were used.

The building is divided into different functional areas, which allows the choice of the freedom and variety of opportunities for productive work. Open space of office- without walls and the traditional division into rooms it helps to maximize internal collaboration and communication between employees, as well as the efficient use of space. While here, we feel quite comfortable and safe and do not worry about safety of data and personal belongings.



In this site visit, we know that Siemens values the health and safety of people working there. At the planning and design of the building, all the comfort of employees is taken into consideration. It has everything people need for work and communication: comfortable work space, two-level underground parking for cars and bicycles, cafes and sushi bars, as well as a bank, travel agency and medical centre. Apart from that, the office equipment is designed with ergonomics. For example, the height of working desk is adjustable that everyone can stand / sit to work at their comfortable setting. Last but not least, sufficient light (both day light and artificial light), fresh air and living plants are also supporting this green building.









Power Plant Gas Turbine Technology Seminar

At start, Mr Torzhkov Vlasdislav, the Head of Field Sales in Central Asia and Belarus of Siemens, introduced delegates to the basic components of gas turbines, different types of Power Plants and optimization of plant.

An impressive video showing the manufacturing process of SGT-750 industrial gas turbine (GT), illustrating its three main components: compressor, combustion chamber and the turbine itself. Heavy duty gas turbines with output ranging from 100 to 400 MegaWatt can be further classified into different type. Under which, a simple open cycle gas turbine has an electrical efficiency of approximately 38%, while a combined cycle unit is able to produce electrical efficiency up to 60%. It was because the combined cycle unit was able to generate extra electricity by heating up steam from exhaust gas, which is utilized to drive a steam turbine generator set. To further improve efficiency and environmental performance of GT, further enhancement can be made the inlet guide vane of compressor, Dry-Low Emission (DLE) technology of combustor, blade materials and cooling system in turbine.

There are four major types of power plant: (I) Electricity generation; (II) Cogeneration or Combined Heat and Power (CHP): simultaneous production of heat and power from a single source, which can have overall fuel efficiency up to 80%; (III) Trigeneration: Production of electricity, heat and cooling with absorption chiller in the one process; (IV) Quadgeneration: Combined production of electricity, heat and cooling and the recovery of carbon dioxide from the exhaust gas for industrial process. For multi-generation plant, the ratio of electricity produced and exhaust heat for cooling/heating can be varied to meet the specific site requirements.



Mr Vlasdislav commented on the general market demand on power plant performance, and the corresponding configurations and conditions to meet the demands.

AM

23-Mar

Kolomenskaya Cogeneration Power Plant







Delegates were honored to the visit the Kolomenskaya Cogeneration Power Plant. The power plant was located just outside of Moscow and was newly built to begin its operation in 2009. The facility was the state-of-an-art, and in accordance with Russian tradition, the three gas turbines are named by the investors, after his two daughters and wife.

Delegates were greeted by the head of the Kolomenskaya power plant along with representatives from Siemens Power Generation team. A presentation on introducing the operation and maintenance of the plant was delivered by the plant manager.

Kolomenskaya was able to generate and to produce both heat and electricity at the same time, which is supplied to the local users. The total installed capacity of the power plant was at 136 MegaWatt. The heating capacity was 171 calories per hour. The electricity efficiency was 37%. However, the overall efficiency was up to 88% with account of heat production. The power plant was directly connected to the local power grid. Its heating module generates heat from the exhaust of electricity turbine to provide heating water to the district heating system. In terms of maintenance, it was separated into two to three maintenance group, conducting different scale of inspection respectively by 100,000, 200,000 and 30,000 hours of operation time.



Delegates were invited to walk inside the operating plant accompanied by plant engineers. We toured down the boiler plant as well as the interior of a turbine chamber. We were able to see all of the components presented in the presentation put in operation in various points of the power plant. It was truly a great experience for the delegation.

PM

23-Mar

Country Park Business Centre



The Country Park Business Centre is a complex of multifunctional office buildings located in the North-Western region of Moscow province. The premises consist of three buildings, Country Park I, II and III, which were built in 2004, 2009 and 2012 respectively. The business centre was developed under the concept of "city within a city". Apart from office floors, there were also apartment floors inside the buildings for residential and other facilities such as medical centre and stores in providing support to the residences and tenants.

Upon arrival, an introduction of the project was given by staff from BPS, the management company of the business centre. They practically place the venue away from severe traffic congestion, high office rental price, and insufficient office areas in the city centre of Moscow. The initial thought in developing the complex was to examine the feasibility in applying Building Information Modeling (BIM) to manage energy efficient of building during both construction stage and operation stage. Through the implementation of BIM, they reduced the size of plant room dramatically and adopted many energy-efficient measures in the buildings. With the aid of BIM software, the maintenance team shall immediately read the location, the status, flow rate, temperature, and dimension of ducts behind the ceiling. It helped engineers to maintain and improve the energy efficiency of the building promptly. Demonstration of BIM software and regarding ways in displaying building information was carried out at the scene. However, due to low return of investment (long pay-back period), the management team had no intention on applying any green building certification at the moment.





After the introduction session, delegates were guided to tour around the complex. Supporting facilities such as supermarket, medical service, car service, kindergarten, were visited. The venue was remotely located from city centre of Moscow. Regarding the accessibility of the centre, pier was available for guests and tenants in accessing to the complex through yacht, as an alternative of transportation through highway.







Siemens Gas Turbine Technologies(SGTT) - Gas Turbine & Compressor Production Site

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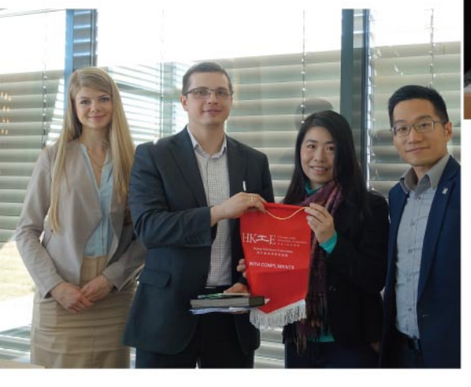
24-Mar

The delegation tour visited the Gas Turbine and Compressor production site at Gorelovo Industrial Park, St. Petersburg. It is our purpose to study, to learn proficient gas turbine manufacturing technique from Siemens and exchange precious industrial and cultural experience with each other. The delegates first received an introduction presentation from the group head of gas turbine rotor design, Mr Alexander Pavlov. Then the delegates toured the site and learn about manufacturing process of Siemens gas turbine accompanied by Mr Pavlov.

The history of Siemens Gas Turbine Technologies (SGTT) can be traced back to 1991, established as a Joint Venture company between JSC "LMZ" and Siemens AG. The current site of the factory was raised at 2015. The company engaged in R&D projects introducing, localizing, assembling, selling and servicing gas turbines in Russia and Commonwealth of Independent States (CIS) countries. Base on the demand of units at certain power rating of the local market, the SGT5-2000E and SGT5-4000F series are the most popular models among the local customers at the moment.

Tour down the production line, the delegates feasted their eyes comprehensively on the gas turbine manufacturing process. Components like blades on different stages of the turbines and compressors and other parts and mechanisms were neatly placed at the scene, awaiting for further machining procedures. Explained by Mr Pavlov, Siemens achieves manufacturing a certain stage of a turbine or compressor rotor effectively by modularizes the blade mounting process. Blades were acquired from blade manufacturer and be quickly assembled on the mounting base of the rotating parts. The delegates also observe the working situation of other machineries such as large scale face-plate lathe and horizontal boring and milling machines for different manufacturing works on turbines and compressors.





The delegates received the most updated information of the gas turbine manufacturing industry and gained precious knowledge on compressor and turbine assembling process and casing manufacturing from Siemens. The visit was finished as delegates received a full pocket of knowledge with joyfulness.



Bureau of Technics - Green Building Design Seminar

AM

25-Mar

Building sustainability is one of the study areas for the Overseas Delegation to Russia. In general, sustainable buildings refered to those designed, built, renovated and operating in an ecological and resource-efficient manner aimed to maintain the living standard. The purpose is to reduce the overall impact to our environment. In hopes to gain deeper insight of sustainable buildings in Russia, we had visited the design office of Bureau of Technics in Saint-Petersburg.

Bureau of Technics operates a wide span of business, including Mechanical, Electrical, and Plumbing services (MEP) design, installation, consultation, energy modeling, and Computational Fluid Dynamics (CFD) simulation. Engineers and designers from Bureau of Technics shared their techniques of CFD simulation and energy modeling as well as Leadership in Energy and Environmental Design (LEED) and Building Research Establishment Environmental Assessment Method (BREEAM) certification. GREEN ZOOM, a localised Russian certification, was also introduced.

Delegates Mr Samson Leung and Mr Damon Leung subsequently outlined the topic “Sustainable Buildings in Hong Kong” on regulatory structure, building energy efficiency, certification and adoption of green building services design in Hong Kong.

Delegates rotated to different departments of the company for detailed discussion on topics in MEP design, certification, energy modeling and CFD simulation. The sharing between Bureau of Technics and HKIE-YMC OD was fruitful and in-depth.





AM

25-Mar

Bureau of Technics - SkandiKlubb Construction Site







To gain the most solid experience of engineering in another country, the best method would be conducting a construction site visit. SkandiKlubb was a residential building project in St. Petersburg, and it has many special engineering design features which can be borrowed. For instance, due to the cold weather in Russia, space heating is far more important than space cooling. To optimize energy efficiency and indoor air quality, an air to air heat exchanger was equipped at each individual flat. The cold fresh air was first heated by the warm exhaust air. A steam coil further heats the fresh air to the desired temperature. This design provides better indoor air quality in the flat by having a well air change rate compared to conventional space heater.

The steam in the heating system was generated by a centralized boiler plant. The plant is isolated from the district heating network for easier preventive and corrective maintenance. Moreover, isolating from the district heating network can assure a stable supply of space heating to the residents as the local system is not affected by the public system. This system also is claimed to be as efficient as using the district heating as the heating load in this estate is high enough.

To further enhance the indoor air quality, the fresh air supplied to each flat is passed through a HEPA filter and a bag filter before entering the flat. In other words, each flat is equipped with a mini-AHU. A raised concern is that the occupants might not have enough knowledge to handle the problem of the "mini-AHU". From the developers, they have assigned a 24/7 standby maintenance team to handle these problems. They had also mentioned that the occupant could clean and change the bag filter and HEPA filter in their own flat.



PM

26-Mar

Museum of Urban Electrical Transport









Located at SrednyProspekt, St. Petersburg, the Museum of Urban Electrical Transport was opened in 1967. Formerly a tram service depot, it is the oldest museum of electrical transport in Russia.

Electrical tram started to serve St. Petersburg in 1907, with wooden carriages being used for passenger service. The museum showcased a variety of trams and trolley buses which were used in active surface in Russia throughout the last century, including both rolling stocks for passenger service and service units. Following the guided tour arranged by the museum, history and development of urban electrical transport in St. Petersburg was explained in detail. For instance, the electrical tram was indeed evolved from horse-driven carriage running on rail without stopping at any stations during its journey. The boarding method of the tram used to be much different from what we have in current days, and hence, passengers had to hop-on and hop-off by themselves. Shortly after in 1930s, tram with a wider carriage was designed according to American tram standards, which was also the last type of tram without heating inside the carriage. In the Soviet era, the second generation of metal carriage came into service. These carriages were used until the 1960s. In addition, it was told that during WWII, some carriages were even used as temporary medical carriers, with clinical equipment on-board to transport injured soldiers.

On the other hand, trolleybuses came into service in St. Petersburg in 1936. At the beginning it was considered as a more prestigious mode of transport, with fare about 3 times as compared to normal trams. However, trolleybuses were more flexible to operate in comparing to ordinary trams, as they are not constrained by the tracks, which limit many factors such as the turning radius and gradient.



Nevertheless, it is now a controversial issue on whether trams should be abolished especially in the central urban district of St. Petersburg, as some claims that trams occupied road space and stops frequently, which slows down traffic and causes congestion.

Local Events

In preparation for the study, distinguished organization and speakers with diversified expertise were invited to share their knowledge of precision technologies and green initiatives adopted in various fields. In total, more than 500 members attended the seminars or visits organized under this series. This section highlights the local event series with the following table summarizing the local activities according to the date of event.

Date	Topic
12th Dec 2015	Technical Visit to Hong Kong Aircraft Engineering Company Limited (HAECO)
19th Dec 2016	Technical Visit to CLP Nuclear Resource Centre
9th Jan 2016	Technical Visit to Kai Tak District Cooling System and Electrical and Mechanical Services Department (EMSD) Headquarters
30th Jan 2016	Technical Visit to Shatin to Central Link (SCL) Contract 1103
20th Feb 2016	Technical Visit to Hongkong Electric Co. Control Centre & Condition Monitoring Centre
27th Feb 2016	Technical Visit to CLP Castle Peak and Black Point Power Stations cum Seminar on Natural Gas Production
5th Mar 2016	Technical Visit to Holiday Inn Express Hong Kong SoHo
9th Mar 2016	Seminar on the Design and Construction of MTR HKU Station
12th Mar 2016	Technical Visit to Water Supplies Department (WSD) Tuen Mun Hydropower Plant
14th Mar 2016	Seminar on Hong Kong International Airport (HKIA) Three-Runway System
23rd Apr 2016	Technical Visit to North Kowloon Magistracy (NKM)



Technical Visit to Hong Kong Aircraft Engineering Company Limited (HAECO)





2015
12-Dec

Jointly organized by the YMC & CPDC of HKIE, a group of about 20 members participated in a visit to the maintenance facilities of Hong Kong Aircraft Engineering Company Limited (HAECO) on 12th December 2015. The visit is one of the local events of YMC Overseas Delegation 2016.

HAECO was established in Hong Kong in 1950. It is one of the largest Maintenance, Repair and Overhaul (MRO) service providers in terms of capacity. The visit was focused on the facility at Chek Lap Kok, comprised of three heavy maintenance hangers. The visit started with a welcome from Mr SK Chan, Technical Trainer in HAECO. Then, he introduced the background of HAECO and led a tour showing different sections of the facility. Participants observed the daily operations of aircraft maintenance, including large aircraft parts such as engine blades cleaning, and small cabin equipment such as emergency oxygen generator inspection.

At the hanger, Mr Chan explained how the hanger accommodates 2 large or 3 small aircrafts at the same time for various types of tests. For instance, the "Type A check" would require 1-2 days, which is the shortest test. On the contrary, the longest "Type D check" would take approximately a month, as it requires disassembling of exterior fittings and a detailed examination on the aircraft structure. And questions about types of aircraft handled by HAECO were raised. It was explained that the cost for personnel training, availability of service parts, the abundance of the aircraft type around the world, and the compatibility of equipment are factors in considering taking up a specific aircraft type in business.

Participants showed much interest in varieties of aircraft inspections and testing methods. Many were discussing about the facility and even the building structure. In short, participants had overall found the visit a fruitful experience that promoted their understanding in aircraft maintenance. On behalf of YMC, we would like to thanks Mr Thomas Chan and Mr SK Chan from HAECO for arranging such a fruitful visit for us.







Technical Visit to CLP Nuclear Resource Centre

2015

19-Dec

With warm welcome from Ir Richard Fung of CLP, 30 YMC members enjoyed a delightful morning by paying a visit to CLP Nuclear Resource Center on Saturday, December 19th 2015. Led by Ir Fung, the participants toured the center and learn about nuclear energy from the informative exhibition hall.

The exhibition starts from induction on types of energy and fuel resources that are currently in use, and hence bringing out the history of nuclear power development. Considered as a sustainable, low-carbon power generation method, nuclear energy in modern era is obtained from a reaction process known as nuclear fission. The released energy can be used to generate heat driving the steam turbines to produce electricity.

Further, operations and distribution of types of nuclear reactors including Pressurized Water Reactor and Boiling Water Reactor were introduced. The structure of fuel pellet as well as fuel rod was illustrated in detail.

Ir Fung then rose out public's concern and sorrow when it comes to words like "radiation" and "nuclear". "People freak out, and obviously, tend to dodge from it. Who wants to suffer from such kind of nightmare, not to mention if it is right next to one's home door?" said Ir Fung. Speaking of nuclear safety, he reviews the cause and aftermath of several catastrophic nuclear disasters in the past. Ir Fung compares newly designed power plants with their predecessors and explains the improvements being installed, like related countermeasures when nuclear accident takes place. Disposal method of nuclear waste was also introduced to the participants, before listing the steps for decommissioning a nuclear plant.

In addition, Hong Kong is also participating in the World Association of Nuclear Operators (WANO), an international group of nuclear power plant operators on achieving standards of nuclear safety to share precious ideas and experiences.





2016

9-Jan

Technical Visit to Kai Tak District Cooling System and Electrical and Mechanical Service Department (EMSD) Headquarters





Sustainability is crucial to maintain the living standard of both current and future generations. To better understand energy conservation technologies that contribute to sustainable development, 30 YMC members visited the Kai Tak District Cooling System (KTDCS) and EMSD Headquarters on 9 January 2016.

KTDCS is a large scale centralized air-conditioning system to distribute chilled water to user buildings via underground piping network. We were guided on a tour around KTDCS. For the reason of centralized chillers management, DCS machines can be operated in optimal efficiency, thus giving a higher energy efficiency (up to 35%) and lower carbon emission. As the first DCS project in HK, KTDCS has been providing chilled water to cruise terminal and Ching Long Shopping Centre since early 2013.

Mr Tommy Lo of HKDCJV illustrated to us the working principle of DCS with a scaled model of chiller plant, showed us the machines arrangement in a chiller plant, and explained to us the system control in the control room. This made us understand more about the design and operation philosophy of KTDCS, for example, the ring piping circuit to improve reliability and the leakage sensors around piping insulation. We also realized the challenge of KTDCS in estimating cooling water demand for advanced machine warm-up (an hour before chilled water delivery), which requires a good communication with customers.

We also visited the EMSD Education Path. We were introduced ice thermal storage tanks to utilize non-peak hour energy, environmental friendly chillers to reduce pollutants, renewable systems to make use of solar energy (PV, solar water heating system, and light-tube) and simple envelope designs to reduce energy for air conditioning (double glazing windows and shading). After this visit, we learnt that we can be more sustainable with only a slight modification in buildings, such as installing a guide vane under a window to redirect sunlight for indoor illumination.



Technical Visit to Shatin to Central Link (SCL) Contract 1103

2016

30-Jan

Shatin to Central Link (SCL) is a developing project which will provide an option of transport running through the New Territories, Kowloon and Hong Kong Island. The SCL is expected to relieve the bottlenecks at the Beacon Hill Tunnel Section of the East Rail Line, the Shek Kip Mei to Prince Edward Section of the Kwun Tong Line and the Nathan Road/cross-harbour section of the Tsuen Wan Line.

French contractor Vinci Construction Grands Projets has been awarded the HK$2.73 billion contract by MTR Corporation Limited. Named Contract 1103 - Hin Keng to Diamond Hill tunnels, it is part of the new Shatin to Central Link (SCL) project. The project involves the design and construction of a 4 kilometre tunnel, of which 2,475 m will be by drill-and- blast and 1,400 m of twin running tunnels will be excavated using a 7.4 m diameter slurry tunnel boring machine (TBM), connecting Hin Keng and Diamond Hill. This is the first tunnel passing through the Lion Rock since the construction of Lion Rock Road Tunnels 40 years ago.

Apart from the tunnel building across mountain, underground tunnel method is also employed to build the section near the existing Diamond station. Within said developed and densely populated district, the TBM method for tunnel construction not only minimizes road surface works but also produces less dust and noise nuisance compared to the cut and cover construction method as most of the works take place underground. Previous job references have shown that the TBM method create minimal vibration at ground level, therefore residents are unaware of much vibration when the machines pass beneath them. As such, the use of TBM minimises impacts on the environment and traffic conditions.

Among the project's challenges, there is an interface with a water tunnel with 6 metres separation where a non-blasting zone has been imposed by the Water Supplies Department (WSD), driving the TBM under the existing Kwun Tong Line, and the presence of a fracture zone near the Ma Chai Hang shaft.









2016

20-Feb

Technical Visit to Hongkong Electric Co. Control Centre & Condition Monitoring Centre

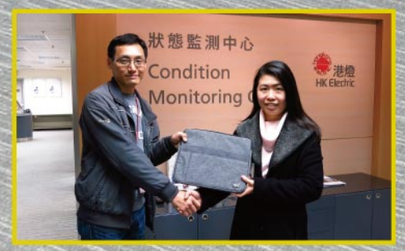
The Hongkong Electric Co is one of the power companies in Hong Kong, which supplies electricity to Hong Kong Island and Lamma Island. Its power plants are located on Lamma Island and the Control Centre & Condition Monitoring Centre is located on Apleichau.

The Control Centre operates round-the-clock to ensure that electricity is delivered in a safe and efficient manner. At the Control Centre, we can see a big monitor display an overview picture of the generation, transmission system and distribution system. The system is in form of graphic with colour scheme and vital information such as voltage level and circuit status. The Hongkong Electric Co Engineer informed us that there will be simulation of fault cases for control system engineer staff to practise, so that they would react fast in case there was real event occurred.

After that, we went to Condition Monitoring Centre. At this centre, there are demonstration and display boards on different kinds of condition monitoring. For example, Switchgear Condition Monitoring, Transformer Condition Monitoring, Overhead Line Condition Monitoring, Cable Condition Monitoring, Total Combustion Gas Monitoring, Partial Discharge Monitoring, and Lightning Protection & Monitoring. A Hong Kong Electric Company Engineer also explained to us the method monitoring under different conditions, such as Frequency Response Analysis, Equipment Internal Inspection, Dust Measurement and Distribution Cable Diagnostic Testing.

Sustainable energy generation and power grid development are critical factors in urban planning and development. As such, reliable electricity supply is one of the key advantages in Hong Kong which relies much on equipment operation reliability and competent engineers.









Technical Visit to CLP Castle Peak and Black Point Power Stations cum Seminar on Natural Gas Production

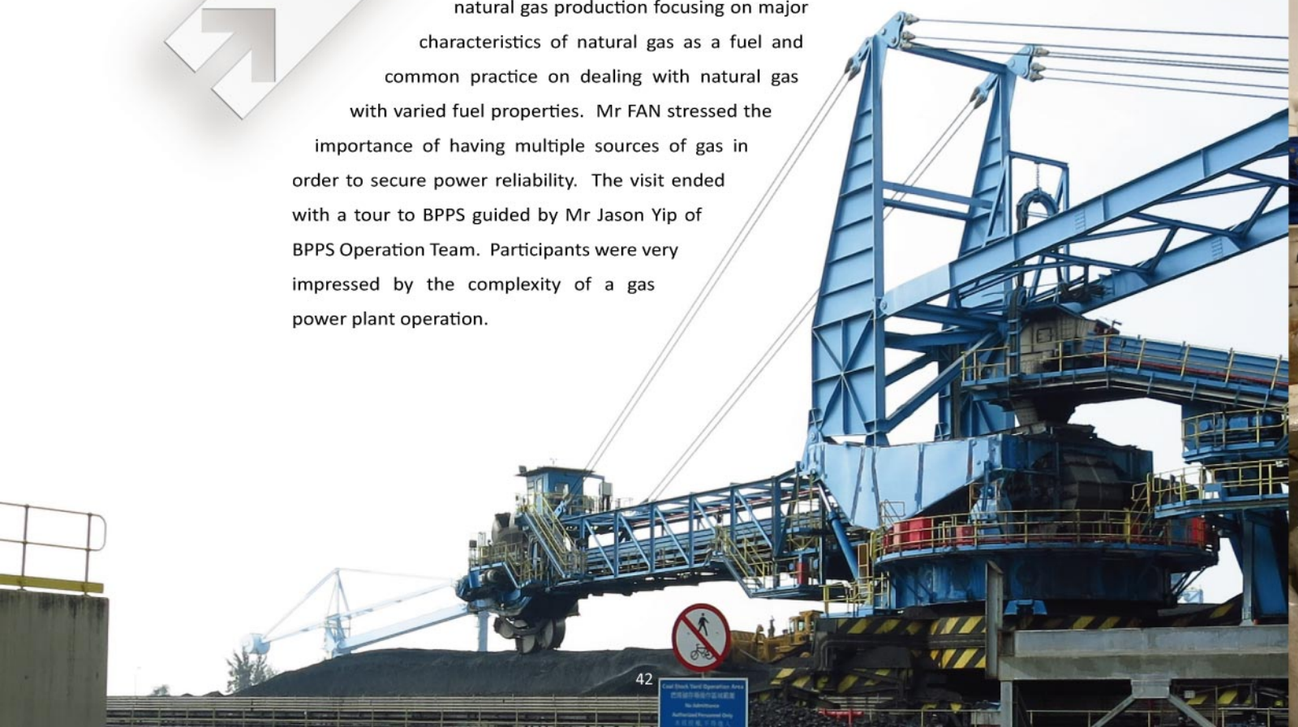
27-Feb-2016

"Are Hong Kong people willing to pay for a cleaner future?"

CLP Power Hong Kong Limited is one of the two electricity providers in Hong Kong which serves over 5.9 million people with the supply area that includes Kowloon, New Territories and most of the outlying islands. CLPP has three power generation plants in HK, namely Black Point Power Station (BPPS), Castle Peak Power Station (CPPS), and Penny's Bay Power Station (PBPS). A visit to BPPS and CPPS was organized for learning on power generation plants firing in coal and/or natural gas. Mr Jason FAN, CLP Commercial Manager, delivered seminar and arranged for participates to understand natural gas production.

The visit started with a tour guided by Ms Kammy HO from CPPS Operation Team to CPPS gallery hall followed by site by shuttle to have an overview of coal-firing power generation. We learnt about basic operations of CPPS, and technologies adopted to improve environmental performance of the power plant. Low NOx burners, Electrostatic Precipitator and low Sulphur content coals are three major means to control NOx, RSP (Respiratory Suspended Particles) and SOx respectively. Since 2010, new emission control systems have been installed to further lower the emission of SCR, FGD and OFA. These control systems strive a balance between environmental responsibility and reasonable electricity production cost, and hence tariff.

Afterwards, Mr Jason FAN, Commercial Manager, delivered a seminar on natural gas production focusing on major characteristics of natural gas as a fuel and common practice on dealing with natural gas with varied fuel properties. Mr FAN stressed the importance of having multiple sources of gas in order to secure power reliability. The visit ended with a tour to BPPS guided by Mr Jason Yip of BPPS Operation Team. Participants were very impressed by the complexity of a gas power plant operation.



Technical Visit to Holiday Inn Express Hong Kong SoHo

5-Mar-2016



Holiday Inn Express Hong Kong SoHo has been in operation since 2012. It is the first commercial high rise building in the world to achieve triple platinum of Green certificates (BEAM Plus, LEED and BCA Green Mark). It is also the flagship of Green Building with a number of innovative ideas on Energy Optimization Solutions (EOS) and sustainable practices. The visit was focused on green and innovative ideas adopted in the building.

The visit was divided into two parts: a seminar followed by a tour showing different green intelligent functions adopted, hosted by Ir Antonio Chen, the representative of the main contractor of this project.

During the seminar, Ir Antonio CHEN introduced the innovative green features used in the building, such as pattern recognition energy saving solution in common area. He further explained those features could bring the hotel a significant saving in terms of energy consumption and operational cost. Also, he stressed the importance of the design phase in the building cycle for adopting the green innovative ideas, as it would be challenging to install green functions into an existing building due to building structural constraints and other building regulations.

After which, participants were guided to experience those green features and the design of the features were illustrated in more detail. For example, pipelines inside the plant room are well organised, which can make the maintenance work afterward more efficient. Others innovative green feature like chilled headboard and intelligent room roller were experience and how these functions were explained.

With Ir Chen's professional guidance, all participants learnt from those green and innovative ideas implemented which is the new direction for future projects.

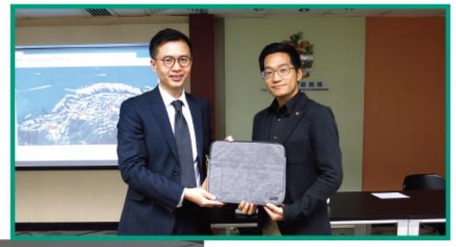


9-Mar 2016

Seminar on the Design and Construction of MTR HKU Station

Ir Patrick CHENG, Construction Manager of Contract 1109 of Shatin to Central Link, presented the design and construction of the West Island Line (WIL). The WIL runs across the densely populated areas of the Island's Western District, extending the Island Line from Sheung Wan to Kennedy Town with intermediate stations at Sai Ying Pun and The University of Hong Kong.

To begin, Ir Cheng briefed the participants on the background of WIL including economical and social benefit, community life revitalization as well as environment preservation. Planning consideration regarding limited availability of land in Western District, major civil construction in an area of high density of population and dilapidated buildings, highly elevated mountainous terrain along the railway alignment and significant interface with operating railway was also depicted. Ir Cheng further described the project management and procurement strategy of WIL.



Ir Cheng subsequently focused on the design and construction of HKU Station and its entrances. Overview and challenges in the aspects of blast design, construction logistics, utility diversion, temporary traffic diversion and public safety were illustrated in detail. The seminar received overwhelming response and the audience queried about land use, fire safety and civil construction during the well-received Q&A session.



Technical Visit to Water Supplies Department (WSD) Tuen Mun Hydropower Plant



Water Supplies Department (WSD) Tuen Mun Hydropower Plant, housed at the Tuen Mun Water Treatment Works (TMWTW), is the city's first hydropower which harvests a total of about 3 million kiloWatt hour of electricity a year, equivalent to a 2,000-tonne reduction in carbon emissions when completed. The first stage of the project was completed in July 2013 of 180 kiloWatt design capacity.

While Hong Kong is hardly the ideal city to develop huge hydropower power plant due to geographic constraint, this plant succeed from a well-thought out engineering design as a significant renewable energy project.

12-Mar 2016

There are three requirements that must be met if a hydropower scheme is to be feasible, which include: 1. The plant should not disturb the normal operation of the water treatment works 2. Stable water flow with sufficient surplus head available 3. Local load is heavy enough to consume the power generated.

The first was achieved by design of system including protection grading and interlock design. The second and third gave rise to why the TMWTW site was selected. TMWTW was designed to receive water from Tai Lam Chung Reservoir, which provided a static head and stable water flow to the equipment. In addition, the treatment works ensured a large and steady consumption of power, from which electricity generated could be fully utilized in the high-voltage pumping station. The speaker noted that the hydropower scheme has an energy conversion ratio of more than 80%, much higher than other renewable energies such as wind system and solar power.

This innovative renewable energy project considered economic viability, operation and maintenance and network connection to utility. It is good demonstration to promote development of renewable energy in Hong Kong.





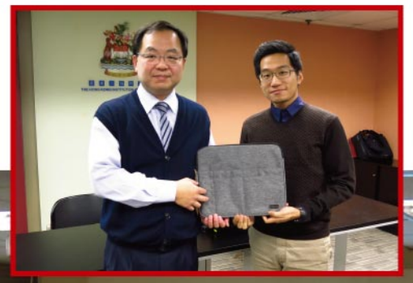
Seminar on Hong Kong International Airport(HKIA) Three-Runway System

2016
14-Mar

Since its opening at Chek Lap Kok in 1998, Hong Kong International Airport (HKIA) has grown to become one of the busiest airports in the world. In 2015, HKIA serviced 68.4 million passengers, handled 4.38 million tonnes of cargo and accommodated 406,000 air traffic movements. With more than 100 airlines connecting to 180 destinations worldwide, it is a leading regional and international aviation hub that maintains Hong Kong as "Asia's World City". The expansion of the HKIA into a Three-Runway System is the largest development planned for HKIA, and the scale of the works is comparable to the original construction of the HKIA.

The seminar speaker Mr Tommy LEUNG started with a presentation that introduces the Three-Runway System and the project progress. The Three-Runway expansion includes a new concourse, air traffic control tower and central commercial node. All this new facility will be linked to the existing terminal 1 and 2 by an automated people mover system. The Airport Authority will also construct a new baggage handling system with smart control. Mr LEUNG also mentioned the construction programme with the expected completion duration of 8 years in detail. The land reclamation for the new runway would take around four years to complete, as the planned runway is be located on top of solid that contains heavy metal.

Discussion about the benefits of three runway expansion was conducted.





Technical Visit to North Kowloon Magistracy (NKM)



2016
23-Apr

To understand the implementation of building sustainability, a visit to North Kowloon Magistracy (NKM), currently the campus of Savannah College of Arts and Design Hong Kong (SCAD) was organized.

Previously as North Kowloon Magistracy from1960 to 2005, the building was the one of first premises batch to join the Revitalising Historic Buildings through Partnership Scheme by Hong Kong Government. After renovation and reformation, the building reopened as SCAD Hong Kong in 2010.

Accompanied by Mr Bernardo CORONADA-GUERRA and Mr Raymond CHAN, the participants toured the campus and began to soak themselves into the artistic atmosphere. Under the efforts of designers, the grave courthouse building has successfully transformed into a peaceful art school. In creating an environment which blended consistency and creativity, colourful ornaments were used to redecorate the cold empty white walls, and natural sunlight was cleverly gathered through the window to shed light on the hallways. The atmosphere stimulates and inspires art students constantly. As for functionality, the courtrooms, the old juvenile court, detention cells were reborned as homework lab, computer room and library, respectively. From sanction to cultivation, the modifications were made without making much structural change.

Marks of history were deliberately retained during the reformation. The rubbing mark on the bar of the dock made by the grieved and raged accused can still be clearly seen, depicting the scenes of every interrogation in the old days. The old-style window lattice dated back in 1960s further reflected the age and history of the building.

Fruitfully, the tour was ended up with joy. Participates learnt bringing harmony to a chastening place, as well as a fine example of sustainable use of buildings.



Insight of Energy Utilisation

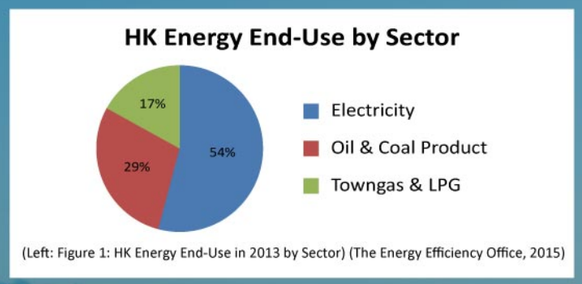
Recently, Hong Kong has a few policies addressing the utilisation of energy such as reviewing the scheme of control for major utility companies and public consultation of fuel mix of location electricity generation. Russia is a one of the countries with huge reserve on the fossil fuels. There are alternative energy sources in Russia. We would like to explore overseas know ledges on power generation and using co/tri-generation system. This chapter is going to discuss the energy market and using of co/tri-generation system in Russia and Hong Kong.

1.Energy usage and Fuel Mix in HK & Russia

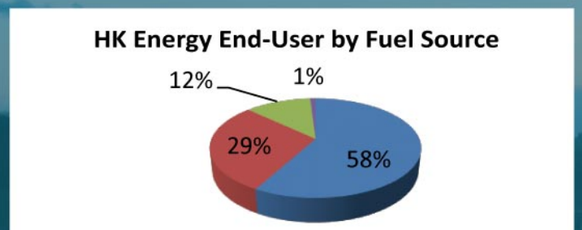
*E*nergy is present in different forms on the Earth and is utilized in different ways in our service. Take for example in Hong Kong, electricity accounts for major energy consumption (54 %), refer to Figure 1 (The Energy Efficiency Office, 2015). Hong Kong increases her consumption of electricity being an international financial centre surrounded by skyscrapers that never sleeps.

Huge amount of electricity is required to support the building services operation and the economic activity in commercial and residential sectors. Mainly, the climate situation leads to energy consumption. Hong Kong locates in East-Asia with a subtropical climate of a heating degree day of 170 and cooling degree day of 2304 (ASHRAE, 2013) . Hong Kong often finds herself in hot and humid weather. A strong demand on cooling is therefore required, whereas rarely there is heating need unless precise temperature control is requested. Air-conditioning system makes up 26% of the total electricity used (The Energy Efficiency Office, 2015).

With respect to energy end usage in Hong Kong, over half of employs oil and coal products; around 30% producing oil & coal product; 12% nuclear energy; and the remainder renewable energy & others, refer to Figure 2 (Enviromental Bureau, 2014) (The Energy Efficiency Office, 2015).

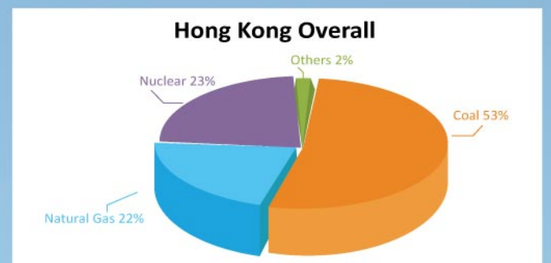


(Left: Figure 1: HK Energy End-Use in 2013 by Sector) (The Energy Efficiency Office, 2015)



(Right: This is Figure 2: HK Energy End-User by Fuel Source; (Enviromental Bureau, 2014)

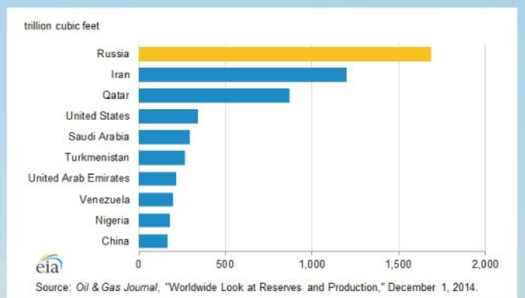
Hong Kong lacks of natural resources. She imports a portion of electricity from China. In order to best utilise available energy resources, the concept of fuel mix is introduced. "Fuel mix" for electricity generation refers to the mixture of energy sources to generate electricity. Recently, Hong Kong discusses a new distribution of fuel mix. In 2012, coal accounted for 53% of overall fuel mix, refer to Figure 3 (Enviromental Bureau, 2014).

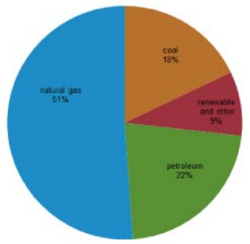


(Name as Figure 3: Fuel mix of Hong Kong in 2012) (Enviromental Bureau, 2014)

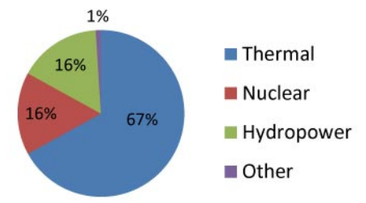
In contrast, Russia is one of the countries with very high latitude. Hence, take Moscow as an example, it has a very high heating degree day of a 4662 and low cooling degree day of 131 (ASHRAE, 2013). As the largest country in the world, Russia is rich in natural resources and one of the largest producers of oil and natural gas globally, refer to Figure 4. Thereby, natural gas is the primary energy source for electricity generation, refer to Figure 5. Since there is a large energy demand in both electricity and heating, it creates enormous opportunities to reuse the waste heat (by product of electricity generation). Hence, different heat reclaim methods are used and the system is known as co-generation plant. The overall efficiency of the system can rise from around 30% to over 80%.

In the visit to Kolomenskaya Power Plant, Cogeneration power plant was introduced. That is a power plant with mainly heat generation to supply the surrounding residents. Its major electricity production source is thermal, produced by fossil fuel such as coal and natural gas, and electricity is generated as a by-product of heat, refer to Figure 6. Nuclear and Hydro-power split the rest of the portion of electricity production source evenly.





(Figure 5: Russia's Energy-use by Fuel Source in 2012)
(U.S. Energy Information Adminstration, 2015)



(Figure 6: Russian Electricity Production by Fuel Source in 2012
(U.S. Energy Information Administration, 2015)

Differences between Hong Kong and Russia in terms of energy usage are observed and summarized with their respective fuel mix in Table A.

Table A: Comparison between Energy Usage and Fuel Mix in HK & Russia

	Russia	Hong Kong
Major Energy usage	Heating	Cooling
Major fuel mix for energy	Natural Gas (51 % in energy consumption)	Coal & Oil (58% in energy consumption)
Generation Plant	Decentralised and mainly for heat generation (not all of them are cogeneration), within a small community, owned by enterprises	Centralised and mainly for electricity generation, located mainly at remote area
Use of renewable energy in electricity production	16%, mainly hydro-power	Less than 2%
Use of Nuclear energy in electricity production	16%	23%
Energy Market	Deregulated (U.S. Energy Information Administration, 2015)	Regulated with vertical integration of Generation Transmission and Retails
Future development in energy usage	-Increase Natural Gas usage -Improve gas turbines performance -Shut down aged Plant -Develop combined heat and cogeneration for industrial heat loads -Develop Renewables -Facilitate an enhanced use of Compressed Natural Gas (CNG) as motor fuel	-Consider to increase Natural Gas or Nuclear Energy in Fuel Mix -Enhance fuel diversity -Upgrade the existing plants -Encourage development distributive renewable energy -Promote electric vehicles -Develop alternative energy source, e.g. waste

It was observed that Russia is striking in line with the global trend for emission control, energy saving and increase energy utilization (or efficiency) through different means. Though Hong Kong is also doing well, there are bundles to learn from Russia. We would focus on the use of distributive combined heat and cogeneration for industrial heat loads as a study.

2.Co-generation

Simply speaking, co-generation is a generation plant or process which produces two type of energy usage (primary and secondary energy) with the same fuel source, which increase the utilization/efficiency of energy in fuel. It could be applied to both generation plant and capture energy from wastes. Combined Heat and Power (CHP) Plant is common example of co-generation plant which produce electricity and thermal energy. There are also tri-generation (generating three type of energy usage such as electricity, district heating/cooling and steam for industrial process) and quad-generation are illustrated in the figure 7 with examples of energy usage.

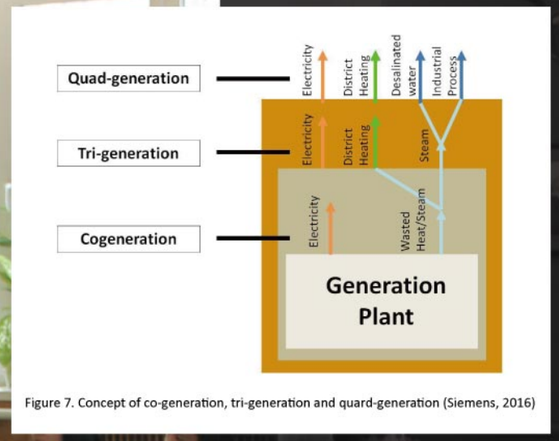
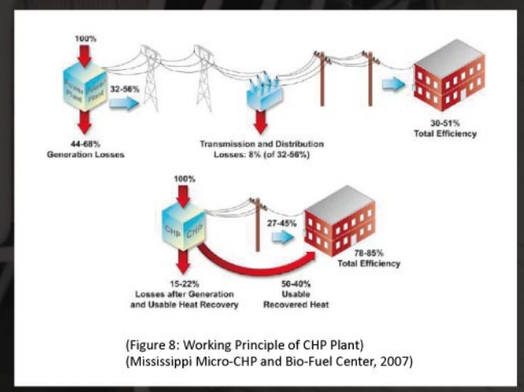


Figure 7. Concept of co-generation, tri-generation and quard-generation (Siemens, 2016)

According to International Energy Agency 2014 Annual Report (Decentralized Energy, 2015), in Russia, cogeneration accounts for 30% of all heat production; natural gas accounts for 60% of cogeneration and on-site power; coal (20%) and oil products (5%). The total efficiency of a modern Combined Heat and Power (CHP) Plant is 85%–90%, whereas at a condensing power plant, more than half of the fuel energy is lost as waste heat to the environment. Industrial heat consumption provides a special opportunity to produce electricity at a highly efficient CHP facility.

Waste heat is always a by-product of power generation. Greenhouse gases (GHGs) emission is one of the important factors accelerating global warming. In the view that space and water heating consumes more energy than cooling and other system, so it is an effective measure to utilize that wasted heat to improve the overall efficiency. Figure 8 shows a simplified diagram indicating the working principle of CHP plant. The simplest CHP plant should consist of an engine as a prime mover to provide mechanical energy for electric generator for electricity generation. Depending on the system configuration, around 25-35% of the fuel energy is converted to electricity. And the remaining over 60% of the fuel is converted to waste heat as by-product. In CHP plant, heat recovery device is added to reclaim the waste heat. Depending on engine, fuel type and application of hot water/steam (temperature and pressure of steam and water affects the efficiency of heat recovery), around 30-60% of the heat can be reclaimed for heating.



(Figure 8: Working Principle of CHP Plant)
(Mississippi Micro-CHP and Bio-Fuel Center, 2007)

Russian industries are particularly attractive for CHP, since there is significant industrial heat generation available for them using extra thermal energy for electricity production. In addition, there are the following benefits for its adoption: 1. Saving Tariff, 2. Enhancing Supply Security and 3. Introducing Competition to the Wholesale Energy Market. High-energy industrial users in Russia see the value of on-site power and self-generation in an environment of rising electricity prices and insecure supply. However, according to professionals in Russia, a lack of technical know-how combined with unsupportive policies restricts rollouts:-1, Lack of policy support and 2. Lack of Single Authority for Management.

Though, contrast to Russia, the application of co-generation in Hong Kong is commonly to utilize the wasted heat or energy through electricity generation or other industrial process, and our main initiative is for better environmental performance by increasing the energy utilization efficiency of fuel/electricity supplied, we could see the same benefits and challenges when adopting decentralized or industrial co-generation in Hong Kong.

During the delegation, we exchanged ideas with Russia's professionals and we observed the successful factors of widely adoption of decentralized or industrial co-generation. They would be covered in following section.

2.1 Availability of usable energy source for secondary energy



(Figure 9: Landfill Gas Utilisation Plant at Shuen Wan Landfill)
(Environmental Protecting Department, 2016)

- **L**andfill Gas, (Environmental Protection Department (EPD), HKSAR Government, 2015)
All three existing strategic landfills (namely West New Territories Landfill, South East New Territories Landfill and North East New Territories) utilises landfill gas for energy production. The current uses include generating electricity for on-site infrastructures, such as offices, maintenance workshop, pumping stations; and to power the leachate (wastewater from landfill) treatment facilities. Current users included Nethersole Tai Po Hospital.

Energy source is an important factor in reliability and control of emission for cogeneration. Russia owned the largest district heating networks around the world (International Energy Agency, 2014). The purpose of using CHP plant is to reclaim those wasted heat from electricity generation and the wasted heat is usually ready for use.

Contrast to Russia, Hong Kong trends to concern more in environmental performance likes carbon emission and air pollutions in development so that the adoption of cogeneration is more focused on environmental performance. And hence, some alternative energy sources like biomass, biodiesel, fuel cell system would be considered in order to reduce the carbon emission. As mentioned in Table A, making use of wasted energy source is key in Hong Kong Sustainable Development (Environment Bureau, 2015). Indeed, more than Municipal Solid Waste (MSW), many plants or facilities had already retrofitted to generate energy making use of wasted resource such as:-



(Figure 10: Layout of Sha Tin Sewage Treatment Works)
(Drainage Services Department, 2011)

- **B**iogas, (Drainage Services Department (DSD), 2015)
Currently, DSD's major secondary Sewage Treatment Works (STW) in Sha Tin, Tai Po, Shek Wu Hui and Yuen Long employ anaerobic digestion process in sludge treatment. Its application included Biogas Hot Water Boiler, Dual Fuel Engine Generator and Combined Heat and Power (CHP) Generation System



(Figure 11: T-Park) (T-PARK, 2016)

- **S**ludge, T-Park
T-Park, which is just opened in May 2016 is a demonstration of turning waste into energy. "Sludge" is a thick mud-like by-product of sewage treatment from toilet, cooking and washing, etc. It is collected and treated in STW before discharging into water bodies. The heat energy generated from the incineration process of sludge is recovered and turned into electricity that can support the needs of the entire facility.

2.3 Loads/demands to consume the secondary energy produced

Similar to the Tuen Mun Hydropower Station we visited in Hong Kong, sufficient loads/demands to consume the secondary energy produced are critical factors to evaluate the technical feasibility of co-generation, considering the transmission loss if the secondary energy co-generated is not used locally.

Therefore, the selection of centralized and decentralized (localized) plant is always a debatable question. In co-generation plant, decentralized plant always enjoys the benefit of adequate quality of waste heat and reduction of transmission lost for both electrical and thermal energy. While for the centralized plant, the fuel cost, has lower installation cost due to its economy of scale.

In Russia, they focused more on the distributed generation such as combined Heat and Power (CHP). Decentralized energy is produced within a smaller community rather than at a large plant elsewhere and sent through the national grid. This local generation reduces transmission losses and lowers carbon emissions. However, the cogeneration plant is usually owned by utilities rather than industrial which have wasted heat that could be contributed to the grid or for own use.

Based on our discussion with Russian professional during our delegation, it is found that even relative cheapness of production by centralized plant, power transmission is rather expensive. The considerable distances of energy transmission result in relatively high loss leading to increases in the resource cost. Subsequent to high grid costs, the development of their own energy generation system may be economically sounder for major consumers.

It seems that for several industrial owners especially, for those consume large amount of heat would prefer to build their own plant.

As of Hong Kong is a high dense city with small area, the concerns on adopting a CHP plant is quite different from that of Russia, however, their selection criteria also giving us a good indication on the promotion of the use of cogeneration in future projects. In Hong Kong, it is considerable to adopt decentralized co-generation at high load density area. Co-generation plant could make use of wasted heat or other energy source to produce electricity, which enable smoothing out power system peak load and used in this way to leverage power equipment that improve returns across a whole power generation and transmission portfolio.

2.3 Government Incentives and Regulations

In order to promote the use of CHP plant, government and public sectors play important roles. All over the world, the major type of incentives includes taxation arrangement, subsidies and regulations.

Around the world, there will be some externality taxes on social and environment cost by the ineffective energy uses. However, in both Russia and Hong Kong, the electricity cost is relatively low compared with other European countries. Furthermore, the electricity market in Russia is a monopoly by the state-own companies in the past and recently, these power companies have become private owned. As International Energy Agency (IEA) indicated there is the power and energy sector in Russia which is still strongly controlled by the government. to the government could still exercise control the carbon emission in the market given sufficient investment on the power generation market . As there is no taxation regarding the carbon emission, the promotion of cogeneration plants seems highly dependent on the user's preference.

Recently, the Russian is reforming its distribution network under the Regulatory Asset Base (RAB) regulation. However, despite the benefits of on-site power, there are no clear standards and requirements for grid-parallel operation. There is a constant problem in Russia: how to regulate transfer of surplus power into the grid, and how the customers with on-site generation should be treated. And, subsidizing or encouragement is actually absent.

Despite the importance of Russia's heat sector, there is no single government authority responsible for its management and development. The management requires cooperation from several distinct bodies, including the ministry of regional development, the Federal Tariff Service and the ministry of energy. Also, without regulator or governmental regulation, collection of payment for energy is very difficult in district heating schemes because a housing block is connected. If you have a housing block with 70 households and 20 do not pay on time, it is hard to get the money.

Relatively, Hong Kong has a relatively better control on the carbon emission and promotion of using demand side energy efficiency measure by the scheme of control of the utility company. For instance, CLP Power, one of the two power utilities in Hong Kong, has set a carbon emission reduction target of 75% from 2007 baseline by 2050 for her power plants (CLP Group, 2010). So, even Hong Kong does not have any externality taxation, it provided some incentive for local utility companies to reduce its emission. However, there is no incentive provided by the government in adopting cogeneration plant in Hong Kong.

3. Recommendation on Cogeneration in Hong Kong

The using of cogeneration plant in Hong Kong seems will be a trend in the future. Examples of cogeneration project delivered by governmental related bodies include DSD. With prior experience, the potential of developing industrial cogeneration is promising.

Although, different from Hong Kong, Russia mainly focuses on heat generation, in which electricity is the cogeneration product, Hong Kong could consider making use of industrial wasted heat (e.g. power generation plant or manufacturer plant) as a source of decentralized cogeneration. Specifically, the concept can be realized in centralized power plant, in which the heat from exhausted gas can be used for drying machines of nearby laundry services. Another possible source for the heat generated is power transformers surrounding urban area. The heat loss of power transformers can also be captured for use. For example, the power transformer in

There are some concerns of the moderation on the power sector in Russia, however, it is out of the scope of this delegation and will not be discussed in this report.

United Kingdom receives electricity from the grid at 132,000 volts have been installed to capture and successfully recycle the heat in the adjoining art gallery (UK Power Networks, 2013) .

Nevertheless, our team identifies that there are some hurdles such as grid connection and governmental regulation in adopting these plant and might require the government and utility company to sort out before widely adoption. The opportunity to sell (or just provide) heat and electricity to surrounding industries depends on a number of factors which have to be put in place to facilitate the growth of industrial on-site power. These include

a. Clarifying grid connection rules and consistent technical requirements for the grid connection of industrial facilities

While the Energy Efficiency Office in Electrical and Mechanical Services Department (EMSD) published the "Technical Guidelines on Grid Connection of Small-scale Renewable Energy Power Systems" in 2015, the Technical Guidelines only provides information on the safety aspect, equipment protection aspect, reliability aspect, and power quality aspect of small-scale renewable energy systems for up to 1 mega Watt generation. There are limited information about specify requirements for cogeneration likes safety aspect in dual-feeding different forms of energy.

b. Establish a permit system for industrial on-site generation projects

There is no permit system to monitor the maintenance and operation of cogeneration system. We should consider the long-term prospects of the commercialization of cogeneration.

c.Provide information campaigns with incentive programmes to raise stakeholders' awareness and know-how.

In the current microeconomic situation, capital investment into their own production facilities is likely to be a successful long-term development strategy. Therefore information should be provided for investor, owner, users or general public for decision making in different aspects likes investment strategies.

4. Conclusion

In this report, the current situations of energy utilization in Russia and Hong Kong are generally compared. And we observed the usages of cogeneration and Combined Heat Power (CHP), with the common ideas of utilizing the wasted energy source (likes heat) from primary generation, are trends to achieve higher energy utilization. We can see that several projects "turn wasted into energy" have been completed in Hong Kong. Incorporate with better governmental guideline, monitoring and management, there are several opportunities in Hong Kong that the same ideas could penetrate to industrial or even commercial use in the future for better utilizing our energy source and, further, reducing carbon emission of centralized power plant.

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Green Policy for Community

Introduction

Hong Kong is a major seaport, financial centre and the business hub of Asia. The tiny portion of land has led to a concentrated high-rise environment and very high population density. According to the Hong Kong Special Administration Region (HKSAR) Government Report (Environmental Bureau, 2015), there are over 8,000 of government facilities, 42,000 of building in private sector, over 50 buildings taller than 200m and more than 270 buildings taller than 150m. Building is one of the major contributors for greenhouse gas (GHG) emission over the world (Intergovernmental Panel on Climate Change, 2014). Construction cycle has taken up about 30% of energy consumption globally (International Energy Agency, 2010). Substantial amount of energy was used to support our high GDP economy. Thus, one of the major focus areas in promoting the green economy in Hong Kong is the energy saving on buildings and transportation.

As a member of Asian Pacific Economic Cooperation (APEC), Hong Kong signed the Sydney Declaration in 2007 and Honolulu Declaration in 2011 that provided for member economies to reduce their respective energy intensity by at least 25% by 2030, and for APEC economies as a whole to reduce the aggregate energy intensity by 45% by 2035, using 2005 as the base year in both declarations. In May 2015, the Environment Bureau in collaboration with the Development Bureau and the Transport and Housing Bureau published the Energy Saving Plan for Hong Kong's Built Environment 2015-2025+ to steer Hong Kong towards the target of energy intensity reduction by 40 % by 2025 using 2005 as the base. The plan introduces key actions which includes public sector commitment towards creating an energy conscious policy drive and identifies gaps to be filled in pushing for a greener built environment in Hong Kong. Most importantly, the plan proposes major next steps for the government and relevant stakeholders in order to continue push the energy saving agenda forward.

To reduce the overall impact of the built environment on human health and the natural environment, different countries have taken similar approaches. They are mainly focusing on the efficiency of using energy, water, and other resources and the way to protect occupant health and improve employee productivity.

Russian Government enacted law and launched programmes (Industrial Efficiency Policy Database, 2010) to achieve reducing energy intensity per unit GDP in whole by 40% till the 2020 in comparison with 2007. Also there is a requirement to decrease the greenhouse gas emissions by 25% till the 2020 compared with 1990.

Apart from energy, reducing waste, pollution and environmental degradation are also concerned. Other design concerns include economy, utility, durability, and comfort. Throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition, structure and the using of process shall be environmentally responsible and resource-efficient.

Good indoor environment is another important goal of green building. Statistics shows that poor indoor environment in developing countries are suffering from sick building syndrome which induces serious illness and premature death. There is about 11% of people in the world are dead due to poor indoor environment directly and indirectly (UNEP SBCI, 2010).

The HKSAR Government is sparing no effort in promoting energy efficiency inside building. The Electrical and Mechanical Services Department (EMSD) of the HKSAR published the Building Energy Codes (BEC) since 1998, to specify the minimum design standards of four key types of building services installations in buildings. In 2012, the Buildings Energy Efficiency Ordinance, Cap 610 (BEEO) was fully implemented which established both the energy efficiency standards of a building for its design and the means to evaluate its energy efficiency performance in operation. Meanwhile, the Energy Efficiency (Labelling of Products) Ordinance (Cap. 598) (EELPO) promotes energy saving by informing customers of the energy efficiency performance of products and encourages product suppliers to make available more energy-efficient products. With the positive outcome of the Paris Climate Conference held in December 2015, greater efforts to combat climate change are not only within the Government but also in collaboration with various sectors of the community.

Green building assessment schemes are addressing built environmental concerns as well as the economy considerations. Their settings are specified to their own society. Some of them may also have promotion on green building for increasing employment rate (UNEP SBCI, 2007) and society development. The international policies, however, may not be suited the local situations. There are quite a number of unit situations which shall not be assessed and not be considered. A modified system was developed to suit the unit geography.

In Hong Kong, a voluntary private sector initiative conceived in 1996 – The Building Environmental Assessment Method (BEAM) (BEAM Plus for New Building, 2012). BEAM Plus which is maintained by the Hong Kong Green Building Council (HKGBC) and BEAM Society (HKGBC and BEAM Society, 2012). Currently, it has the latest version of version 1.2 and it was modified from Hong Kong BEAM. The scheme is targeting to develop and maintain a building in a more sustainable way. It has special emphasis on safety, hygiene, reducing pollution and resources with six categories namely Site Aspect (SA), Material Aspect (MA), Energy Use (EU), Water Use (WU), Indoor Environmental Quality (IEQ) and Innovation & Additions (IA). The scheme allows the building developers exempting some of the credits according to the building nature and site conditions.

In Russia, according to different stakeholders and parties, there are no existing laws or regulations regarding the sustainability in Russia. There are several Green Building certifications adopted in Russia. Most of them are International standards yet one of them is developed by Russia herself which is called "Green Zoom". This Green Building Certification aimed to provide a more suitable assessment method for the buildings in Russia.

It is initiated by the Guild of Managers and Developers, the association of property managers, developers and other real estate professionals of Russia and CIS countries. The Green Zoom is making reference to another international well-recognized assessment scheme Leadership in Energy and Environment Design version 4.0 (LEED v.4.0) with certain adoption to Russian construction industries practices and local policy (Green Zoom, 2014). As such, being similar to LEED, Green Zoom is issued to the building fulfilled the programme requirement after assessment. Different classes of certificate, namely Bronze, Silver, Gold and Platinum, would be delivered with respect to the total points gotten from the above areas.

The following factors will be assessed, namely Surrounding, Water Efficiency, Energy Efficiency, Materials, Internal Environment Quality, Innovation and Regional features.

These assessment tools have their specific goals and ideas for promoting green environment and aligning with the government policies. These schemes are classified into six areas and are discussed below.

Surrounding

Site location and transportation are related to the urban development. In Hong Kong, the BEAM Plus required the design to comply with the basic facility and environmental considerations (Planning Department, 2011). While the Green Zoom do not have any specific requirement on this aspect. One of the site aspects is the promotion of quality public transportation. Green Zoom emphasize on the quality transit and bicycle facilities whilst bicycle is not counted as a credit in BEAM Plus. One of the plausible explanations is that Hong Kong was overcrowded with cars on the road and there is no additional path for cycling in urban area, using bicycle in urban area may danger both the cyclers and drivers unless there is major change in the infrastructure in our city. In terms of land use, both BEAM Plus and Green Zoom specified the requirement of ecological impacts and use of greenfield and brownfield.

One of the visiting points in Moscow – Country Park Business Centre would be a good example to realise this ideology. Gaining access to the centre would be one of the main concerns to the occupants there. The business centre in fact provides many ways for accessing. 24/hr taxi, shuttle bus, metro and even yachts are all available for accessing to Centre. The high accessibility offers a great degree of flexibility and convenience to occupants and also facilitate the interaction among the business centre, the downtown city and others region in Moscow. Moreover, the whole business centre project was planned and developed with a concept of "city with city". This idea has been realized by creating a small community in the centre. There are a lot of facilities such as salon, supermarket, clinic, kindergarten, etc. to offer basic services to occupants, satisfying their needs.

Water Efficiency

Water efficiency is to reduce the quantity of used water sources and its possible cost. Water use can be reduced by demand side control, reduce of water loss and use of non-traditional water source. One of them is outdoor water use reduction. Both BEAM and Green Zoom have a performance requirement on the amount of water being saved. While only Green Zoom have credit to encourage reduction of water consumption within a specific number of water cycle by improving the water filtration system. BEAM Plus has also required amount of total water being harvested or recycled.

Holiday Inn Express Hong Kong SoHo has also done a good example in this area. 2 nos. of rainwater recycle storage tank (total volume of 10,000L) are installed to collect the rainwater and condensed water from fan coil units for reuse. Irrigation shall be used by neutralized recycled water 5.7% fresh water consumption is saved from the rainwater and A/C condensate collection for irrigation fresh water consumption is saved from the rainwater and A/C condensate collection for irrigation use. Besides, by implementing different water saving fixtures, 47.8% water saving has been achieved.

Material

Construction of building consumes huge amount of materials and affect the ecological system. In terms of planning and construction method, construction and demolition waste management plan as required in BEAM Plus to reduce the material need to diverse for landfill. It is very important to reduce the waste generated by existing building. It is found that BEAM Plus have credit to encourage the re-use of existing building's material. It is believe that is related to the situation in Hong Kong, lacking of natural resources. Green Zoom has credit on building life-cycle impact reduction as well as the building product disclosure and optimization on environmental product declarations, sourcing of raw materials and material ingredients. While BEAM Plus is the only assessment scheme include modular and standardizing design and prefabrication.

Holiday Inn Express Hong Kong SoHo has also done well in this aspect. During the construction stage, the team has calculated an optimal structural design with considering the building orientation. This help reducing the large amount of concrete compare to other similar buildings. On the other hand, hotels often use grand material such as marble for decoration. However, the harvest of marble will cause environmental damage. Holiday Inn Express Hong Kong SoHo widely used starfon, which is a kind of recycled materials, to replace huge amount of marble.

Energy

There are about one-third of energy is consumed by buildings (IEA, 2010). It has a great potential on reducing global energy consumption.

Building energy simulation is a tool for demonstrating the energy saving, although it cannot study the interaction between different systems. It is found that BEAM Plus has an assessment scheme on that, but not in Green Zoom. Also, BEAM Plus considered the peak electricity demand in the scheme.

Apart from the demand side, the assessment scheme in BEAM Plus has considered the on-site renewable system from the electricity generation side. While Green Zoom only has credit for energy performance and fundamental commissioning and verification. It is believe that Russia has been planted various types of high efficient energy plants like nuclear plants, and renewable energy plants such as hydropower plants which are common in Russia since 50's, consideration on having assessment scheme and take the electricity generated by renewable system into account seems unnecessary.

Lastly, it is interesting to note that only the BEAM Plus has set requirement for the energy use in carpark and also govern the selection of household apparatuses including air-conditioning unit and cloth drying machine. From the comparison of the scheme, BEAM Plus seems having a higher coverage on Energy part.

Indoor Environmental Quality

Good indoor environment quality can improve workers' productivity and working quality.

Both the assessment schemes have credits to the amount of fresh air intake, and indoor air quality performance. BEAM Plus has more considerations on the indoor environmental quality. Besides, hygiene is one of the considerations in BEAM Plus; while it is not found in Green Zoom. This may be due to the outbreak of severe acute respiratory syndrome (SARS) in 2003 which has significant impact in the assessment criteria. BEAM Plus also has credits on vibration, outdoor air pollution and barrier free access. It seems that these credits aligned with the policy of local authority and suited the trend in Hong Kong. In Green Zoom, there is a credit on space cooling and heating, as well as reducing the use of heat from CHP and gas heaters. It is believed that these are a region specific concern.

Incentives of Green Building Assessment

Since the early 1990, there has been an increasing importance to the question of sustainable development. However, the green buildings require an initial investment at the construction stage, due to theirs complexity, additional simulations and special features. This often forces developers to choose projects with a shorter payback periods. Sustainable development is difficult to promote in private sector without sufficient incentives or legislative requirements. On this aspect, Hong Kong and Russia have different approaches.

In Hong Kong, the green building market has become more and more mature. Incentives measures have been introduced to the market by Building Department, the HKSAR Government. A maximum 10% gross floor area (GFA) concession would be granted to developer for construction of environmentally friendly features. This measure effectively motivates developers to adopt green features in a building (Building Department, 2014).

Among 364 assessed BEAM Plus projects as of 3 May 2016 (Hong Kong Green Building Council, 2016), there are 53 projects rated as Final Platinum or Provisional Platinum that are demonstrating excellent building performance in various aspects.

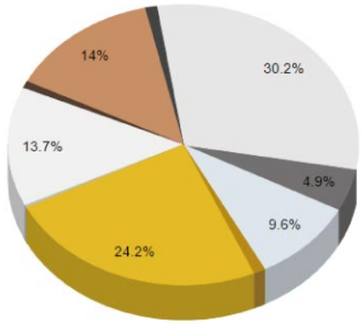


Figure 1: Distribution of assessed BEAM PLUS projects grouped by project type (Hong Kong Green Building Council, 2016)

*I*ncluding all new buildings and existing buildings projects under assessment scheme BEAM Plus version 1.1 and 1.2 since 2010.

Project Type	Number of Projects
Commercial	135
Government, Institutional and Community	129
Hotel	59
Industrial	21
Mixed Use	104
Others	20
Residential	340
Total registered projects	808

Figure 2: Number of Registered BEAMPlus projects (Hong Kong Green Building Council, 2016)

Project Type	Number of Projects
Commercial	66
Government, Institutional and Community	57
Hotel	23
Industrial	7
Mixed Use	40
Others	7
Residential	164
Total assessed projects	364

Figure 3: Number of Assessed BEAM Plus projects (Hong Kong Green Building Council, 2016)

In Russia, "Green" certification is not yet commonly adopted. But sustainability has become an increasingly hot topic amongst developers, landlords and tenants in recent years. One of the key drivers for the Green Development in Russia has been the adoption of the new Law on Energy Efficiency in 2009, followed by heightened market expectations of a further tightening of environmental legislation. The number of BREEAM and LEED certified projects in Russia has grown rapidly from only two schemes seen in 2010 to 43 objects by the end of Q3 2014. In 2013 alone the number of certified buildings increased by 21 (Tom M. et al, 2014). Yet the total green building is still negligible compare to the whole market in Moscow.

It is a new page in Russia after the implementation of the Energy Efficiency Law coming up with the amendments to the Tax Code, which outlined the possibility of lowering the tax burden for businesses which use energy-efficient appliances. The new legislation has also influenced market participants as, for example, some Russian banks started offering loans for the purchase of energy efficient equipment. We believe that the role of Russian Government in the environmental regulation will gradually grow further.

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Other relative advantages to both landlords and tenants of sustainability certification, such as demand from environmentally aware companies, better brand recognition, improved costs and rental premiums are also a key factor for building premises. The cost savings on utility bills can also up to 30% by estimate. However, it is not an attraction to clients since the utility expense in Russia is relative low.

Summary

Some good practices in sustainable buildings area were learnt comprehensively by interacting and sharing with the local experts and industry stakeholders there, and taking on-site visiting. The invaluable and rewarding experience enables us to explore the current building sustainability in Russia. Meanwhile, the knowledge gained and observations from the journey arouse our reflection on existing Hong Kong situation.

Our observations reveal that the ideology of building sustainability is supported by both public and private sectors in both places. Due to their time difference in introducing green building assessment scheme, there are lots of similarities but also some notable divergences.

Both Russian and Hong Kong government have introduced regulations and policies regarding to buildings to create a green built environment, for example, the energy efficiency improvement policy (Green Building Council Russia, 2016) and Buildings Energy Efficiency Ordinance (BEEO) (Electrical and Mechanical Services Department, 2015) in Russia and Hong Kong respectively. There are more and more buildings registered as a green building, and this reflected that private sectors are interested in the green buildings concept. In addition, both places even developed their own local assessment method to help adding more commercial value to buildings in terms of cost saving and building image, by certifying them as a green building.

Furthermore, the excellence of heritage reservation work in Russia is another highlight of our trip. The heritages in Russia, such as Summer Palace and Bolshoi Theatre, are well preserved with modern building service equipment. Their good practices on heritage preservation would be a good demonstration for Hong Kong as a reference.

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Inside Digital Revolution

Overview

The Digital Age (also known as the Information Age or Computer age) refers to the period starting from the digital revolution, which shifts the whole world from traditional industries to an economy based on information computerisation (Castells, 1999) (Cambridge Dictionaries Online, 2016). Since the digital revolution, digital electronics (digital logic circuits) began to emerge, replacing mechanical / analogue electronic technologies in computing and communications (Techopedia, 2016). The widespread use of digital logic circuits enabled the invention of computers, digital cellular phones, and, maybe also the most impactful, the Internet.

Information is the essence in the Digital Age, creating a knowledge-based society immersed in a high-tech global economy, which provides convenience and efficiency in many aspects of life. Products and services now serve personalized needs of individuals, through analysis of data and preferences.

The Way to the Present

The invention of transistor in 1947 (Ament, 2005) brought about the possibility of advanced digital computers. Reaching the 1970s, home computers gradually became affordable (Sanderson, 2011), together with video game consoles, and entered the subsequent golden age in the 1980s, when computers made its way into businesses, industries, schools and homes (Walton, 2006) (Miklós, 2013). Personal computer manufacturers such as Apple and Commodore came to be known to the public. By the late 1980s, many businesses were dependent on computers and digital technology.

Digital cell phones found its place into the modern world in the 1990s, starting with the once famous brand Nokia (Cox, 2012). On the other hand, digital cameras were also marketed in the same decade (Antoniak, 1991), and almost wiped out traditional film photography in the millennium (Musgrove, 2006).

In the millennium, computers continued to gain popularity. By 2000, 51% of households in the United States owned a personal computer , as compared to 15% in 1989 (Jennifer Cheeseman Day, 2005). During the decade, the trendy word was “online”------access to the Internet. One billion people were on the web by 2005 (Telecom, 2006). Meanwhile, rapid development of cell phones and mobile network allowed more people in developing countries to gain access to the Internet. 2.7 billion people are “online” by 2013 (Delhi, 2013).

Walking towards the present, connectivity and social networks took the lead in digital communications. Cloud computing is also entering the stage, and gained popularity in recent years. Meanwhile, many products have digital computers embedded into its control modules, providing convenience to user control, at the same time give rise to possibility of Internet of Things (IOT).

City Characteristics of Hong Kong & Moscow

Both Hong Kong and Moscow are leading cities within their region. They both shifted from a mainly industrial city to a regional finance centre, being the headquarter locations of large corporations (Moscow still has much industrial activities, while Hong Kong is mainly office activities.). Both cities face common challenges of modern cities---increasing living costs, high real estate price, low birth rate, etc.

In Hong Kong, the population density is very high, the land population density as at mid-2014 stood at 6 690 persons per square (Census and Statistics Department, 2015). High demand on the city’s infrastructure is present. A facility such as the metro system is on heavy load. Meanwhile, labour cost in Hong Kong is high. According to Hays Global Skills Index, Hong Kong ranked top in wage rise pressure among 31 countries. A certain amount of corporations are constantly looking for alternative ways to substitute manual labour.

On the other hand, service industry contributed about 90 percent of Hong Kong's gross domestic product. Within the developed city, expectations on service quality and safety are always increasing. People demand better, faster products and services, and yet do not want to pay more from the pocket. Digital technology is being utilized in the aim of providing better services and reducing cost in various industries.

Building Information Model: technology in management

One of the examples is Building Information Modelling (BIM), which is a useful management system for construction sector. BIM is a process involving the generation and management of digital representations of physical and functional characteristics of places. Building information models (BIMs) are data files (often but not always in proprietary formats) which can be exchanged or networked to support decision-making for construction and engineering projects.

BIM technology has rapidly emerged in recent years in the construction industry and many people claim that BIM can reduce construction and design efforts/resources for building and engineering projects. By facilitating early coordination among different disciplines, BIM significantly reduces variation orders for rework, hence shrinking construction schedules and project costs. The BIM concept envisages virtual construction of a facility prior to its actual physical construction, in order to reduce uncertainty, improve safety, work out problems, and simulate and analyze potential impacts. Sub-contractors from every trade can input critical information into the model before beginning construction, with opportunities to pre-fabricate or pre-assemble some systems off-site. Waste can be minimised on-site and products delivered on a just-in-time basis rather than being stock-piled on-site. One of the visited sites

showed a good sample of using BIM. The team of the Country Park introduced how they utilised BIM for reducing plant room size and saved space to a more effective use. They are originally a team in IT discipline. The BIM helped them for effective managing the whole construction and the procedures, and finally completed the Country Park with LEED platinum certificate award. While the PBS team involved in the Country Park project, BIM provided a virtual information model to be handed from the design team (architects, landscape architects, surveyors, civil, structural and building services engineers, etc.) to the main contractor and subcontractors and then on to the owner/maintenance operator; each professional added discipline-specific data to the single shared model. This reduces information losses that traditionally occurred even if a new team took 'ownership' of the project, and provides more extensive information to the PBS team. That's why they can have the maintenance easily. They proudly showed the services inside ceiling void by scanning QR code on the wall. This helped the operator in real as they do not require to demolish ceiling for checking the models. It is believed that BIM can step further in the role of construction world.

Currently HK and Russia are on the same page / at the same pace in BIM development, due to the current trend of the industry. In Hong Kong, BIM application has only been adopted in new building projects but not common. The application in the Operation and Maintenance (O&M) stage of the lifecycle of buildings is starting explore. Some studies on the use of BIM as an asset management tool for some pilot government projects are being carried out.

Practically, the use of BIM is not only beneficial to building design and construction processes, but also be extended to FM/AM and O&M stages by seamlessly conveying the necessary asset information from an as-built BIM model. With appropriate integration/interfacing between BIM and a variety of O&M systems/tools that can assist and streamline O&M workflow together with FM/AM system for asset and service order management.

Both Hong Kong and Russia are doing researches and promotion on BIM. In Hong Kong, the Electrical and Mechanical Services Trading Fund (EMSTF) took on the challenge to explore the potential benefits of integrating Asset Management (AM) as well as other electronics O&M subsystems/tools with BIM. EMSTF has proposed a self-developed BIM-AM pilot system at our EMSD Headquarters building for exploiting BIM in asset management and realised the concept in an integrated BIM-AM system featuring multiple O&M systems/tools in one single platform.

It was found that real-time integration of the BIM-AM system with a Building Management System and CCTV system would enable O&M staff to carry out pre-diagnosis remotely and rectify faults in E&M systems effectively. While interfacing with other electronics systems, such as Radio Frequency Identification (RFID) and Real Time Location systems, the BIM-AM system would facilitate O&M staff to efficiently locate critical equipment and components using the handy mobile devices. The capabilities of O&M subsystems/tools would be significantly enlarged by their synergy with BIM, and can also help O&M staff respond faster to incidents and emergencies.

Through simulation of actual O&M work scenarios using an Air Handling Unit (AHU) room model and a fire sprinkler system model, the results demonstrate that the BIM-AM system can enhance the maintainability and availability of E&M facilities in buildings.

There are also studies in Russia about the use of BIM. The staff in Bureau of Technics has been studying the 5D modelling. Currently, most BIM applications is applied with 3D-level modelling in Russia. While in Hong Kong, 5D has been developed for few years, and they are studying 7D at the moment. 3D means the three dimensional space; while the fourth dimension and the fifth dimension are the timely procedures and cost respectively. The sixth dimension is referring to asset management and facility management. And the next dimension is not widely used in construction, they are referring to energy and environmental performances of the project. (Bouygues Construction Communication Department, 2014) Russian believes BIM will revolute the construction world. The role of consultants will be overlapped with contractors. Nowadays, consultants have the design whilst contractors modify the design to suit site condition. BIM brings the coordination for every discipline, including structural engineers and building services engineers, to the design stage. BIM will have been built up a model with coordinated services with exact locations, the time of installation and its total cost at the design stage. The Construction Industrial Centre (CIC) in Hong Kong has been studying on the strategic implementation of BIM for few years. There is a working group formed by professionals/ specialists, project clients, contractors and academics to collect the views and concerns on the adoption of BIM as well as the benefits and constraints inside. BIM standards (Construction Industrial Centre, 2015) have been published in July 2015 which established a set of industrial specifications and common practice. The model has been used for prototyping with 3D printers as part of a design intent review process. The construction world may step much further change once the development of both BIM and 3D printing system matured. 3D printing is one of the most talked about technology today for manufacturing literally anything from automobile parts, to clothing, to body replacements. The manufacturing principle of a 3D printer is fairly simple. Just like an inkjet office printer, it deposits material, layer by layer, to build any object out of a 3D CAD model. 3D printers are becoming affordable. And BIM models are also 3D models of buildings. There have been some printed buildings under testing around the world. Foreseeing that the revolution is coming, the role of consultant, contractor and workers may be totally changed, due to the digitalization.

Apart from BIM, digital technology is also applied in many other aspects around us, especially within service operations where flow of information is intense and complex control is needed.

Hong Kong's MTR: digitalized control

Hong Kong's MTR system carries more than 5 million passengers (trips) per day (Anon., 無日期), which is one of the world busiest. To cope the operation need, it has a number of large-scale digital control systems, be it the operational control system, train control, or the communication system.

From the example of MTR, Hong Kong makes use of digital technology so as to provide a more reliable service. It is a fact that computer systems can run almost 24 hours, maybe with minor interruptions in between; yet in human operations fatigue is an issue that can never be eliminated. Also, computer system is able to give steady performances without being hindered by environmental conditions. Last but maybe the key difference between manual operation and computer control is the fact that computers will not have human errors, or affected by emotions. Pre-set actions could always be carried out. People's perception towards computer is that it can perform objective actions, unlike human who are subjective are can make careless mistake. This may also be a reason why people in Hong Kong would prefer computer systems to enhance service quality.

Another advantage that digital/computer systems provide is high traceability. Computer records could easily be generated by a data logger programme. The ability of tracing changes is beneficial if undoing or scenario comparisons are needed. Also, digital records are much more durable and replicable than traditional means (e.g. paper record). This is essential in the world nowadays where information is crucial.

Moscow Metro: staying on solid grounds

While we are all used to Hong Kong's way of doing a task, the visit to Moscow Metro headquarters and operation control centre is out of our expectation. Compared to Hong Kong, many of their operations were manually operated. For instance, train control is performed by train captains. Train scheduling is done by personnel with pencil and ruler in the dispatch control centre. Cabin broadcasts are performed also by the captain instead of using pre-recording messages; and a large mirror for vision is place at the forefront of platform, instead of installing CCTV for the purpose of monitoring platform situations by the captain.

One might relate a low service quality to such a manually controlled system. Nevertheless, Moscow metro is also one the world's busiest metro system (Levy, 2015), with headways of 90-120 second, and also on-time service level comparable to the MTR (Metro, 2016). This seems to show that manual system can perform as well as complex computer systems.

Compare and Contrast

Digging into the topic, Moscow metro relies on a dedicated professional team who has experience in handling different situations. More station staff might be needed to oversee the whole operation. Learning from them, the importance of a professional and passionate team is emphasized.

Rethinking about manual control over computerized control, computer systems might be too rigid to deal with unexpected incidents. When daily changes and decisions are too complex to be put into programmed response, it might not be beneficial to have computerised control system. On the other hand, although manual operation could require more manpower, it might be able to provide higher flexibility.

Seeing the difference, it looks to us that even in the Digital Age, manual work is still beneficial. We cannot deny that computer systems could be used to substitute manual work to certain extent, especially for routine tasks. Nevertheless, situation involving complex situations, or even emotions (which computers do not have), still requires human to make ad-hoc decisions. Capability and skills of personnel should not be neglected. Nevertheless, there seems to be already a loss of skills due to automation or technology in society nowadays. For instance, it was said that loss of pilot skills paved the way to more and more airplane crashes, due to increasing reliance on auto-piloting. (The Associated Press, 2011) Or another example closer to daily life: we now are being less capable of remembering phone numbers of our friends, just because our phones already do the entire job for us. Some may argue that these skills are not needed anymore because of "technology" has shared our responsibility, yet is this true at all? In Kissinger (2014), it has highlighted that communication technology threatens to diminish the individual's capacity for an inward quest by increasing his reliance on technology. It looks to us that technology could enrich the mind of researchers yet diminish the capability of leaders, in turn decision making ability might be hindered, which would most probably bring negative impact to society. Human analysis of data collected still plays an important role for decision making.

In the digital age, cost of setting up computers is becoming lower and lower, on the contrary, labour training cost is generally increasing throughout the world. Besides monetary efforts, training time and effort in looking for suitable personnel cannot be eliminated as well. In many case, manual operation is not possible over the night.

With all the discussion, advantages of automation have spoken for itself. Nevertheless, the potential drawback as discussed cannot be ignored. While we often look for the most cost-effective way of making things right, it seems to be still a question whether we can opt for more technology. After all, we are a society of people, decisions with emotional consideration is still an important part in our life. Projecting into society, "people-related" decisions as such welfare and social policies shall still be made by human. Computers should not be replacing human throughout all work and jobs. The extent to which the digital age occupies our life shall be carefully considered. However, no matter the result, it is for certain that computers and digital technology have become an inseparable part in most people's life.

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Education

*L*ately, the outflow of engineering professionals has brought back people's attention on restoring the value of vocational education at Hong Kong. Once entitled as one of the "Four Asian Dragons" during 1960s, Hong Kong's manufacturing and engineering industry experienced a fast growing and great expansion period, successfully nurtured a generation of engineers who equipped with sophisticated techniques and knowledge. Though, Hong Kong was developed into a financial centre during the last quarter of 20th century. The golden generation began their retirements, and educations on young engineers were more focus on theories. Precious experiences accumulated from predecessors were fading away rapidly. Under the trend of globalisation, Hong Kong continues its pace on social structure transformation. Different skills with various levels are potentially required in view of the needs of economics especially when opportunities arise for Hong Kong to contribute to major initiatives for national developments of China, e.g. the “Belt and Road” initiative. Reinstating the vocational training brooks no delay to offer work-ready graduates to the real world.

On the other hand, with the strong foundation of manufacturing industry and abundant supply of natural resources, the economy of Russia was indeed greatly rely on its technological and energy export. Being one of the strongest military powers during the Cold War era, the Soviet Union armed to its teeth in rivaling the United States. Russia's engineering industry was also heavily backed by the military demand. From that Russia's engineering education does put focus on vocational training and it is vastly popularised among its civilian. Yet, despite of its brilliant development, Russia is in its thirst in modernising its education, by reaching its hands to the world after being a lone wolf on its engineering education development for ages.

Through this delegation, we had a glim on the state of affairs of Russia's engineering development. As we conducted direct exchange with local engineers and paid visit to engineering institution facilities, it trigged an introspection of the methodologies on successfully nurturing future engineers.

In this passage we will briefly review and compare the situation of engineering education, and the challenges facing by Hong Kong and Russia, under the clash of globalisation.

Russia	Hong Kong
11 Years of Compulsory education • Regular schools Comprehensive Education • Lyceums Comprehensive Education, but specialised in Math & Science • Gymnasiums Comprehensive Education, but focus on Humanities / Languages (Clyde, 2014)	**12 Years of Compulsory education** • 6 years in Primary schools • 6 years in Secondary schools Comprehensive Education
Exam at Grade 9 (equivalent to F.3 at Hong Kong) Continuing as General education (High school) Vocational School Receive vocational training in preparation for career	• **After the 9th year (F.3):** Continuing as General education (F.4 to F.6 High school) Vocational Education -Receive vocational training in preparation for career
Major Open exam when Grade 11 (Unified State Exam USE)	**Open exam upon finishing F.6 (HKDSE)**
Tertiary Education • Undertaken in a single stage • Typically 5 or 6 years • Upon finish, Specialist diploma will be acquired **(IAU, World Higher Education Database (WHED), 2006)** • Specialist diplomas were perceived equal to Western MSc/MA qualification **(Ministry of Education and Science of the Russian Federation, 2013)**	**Tertiary Education** • Universities Bachelor's degree after 4 years • Community Colleges Higher diploma after 2 years Student to choose whether going into career, or continuing to higher education if qualification is met • Vocational Training Colleges Certificates in specialised skill Student to choose whether going into career, or continuing to higher education if qualification is met
Military College Education • Typically 4 years • Ranked as equivalent to specialist degree	

◆ Since 2007, Russia is reforming the education system with a two-tiered approach: 4-year bachelor + 2 year Master's degree

Overview of Education System

*I*nherited from the elitism during the colonial age of British rule, education system of Hong Kong resembles the Western education system in its structure, though, under heavy influence of Confucianism in terms of ideology. Currently, students would normally receive 12 years of school-based education, before reaching to higher level such as universities or colleges. At the stage of Tertiary education, students would go through open examination, and get into higher education in Universities, colleges or vocational training schools. And upon acquiring diplomas or qualifications from college, one can choose to further pursue for bachelor degree by enrolling into third year or fourth year of University, if qualification of the student was met to standard.

Unlike the Western education model, Russia’s civilian tertiary education was divided between a minority of traditional wide curriculum universities and a larger number of narrow specialisation institutes. The tertiary education was undertaken in a single stage, typically five or six years in duration, which resulted in a specialist diploma. (IAU, World Higher Education Database (WHED), 2006) Specialist diplomas were perceived equal to Western MSc/MA qualification. (Ministry of Education and Science of the Russian Federation, 2013) The person who awarded the specialist diploma needed no further academic qualification to pursue a real world career. Military college education lasted four years and was ranked as equivalent to specialist degree.

Education reform when facing Globalisation - Russia

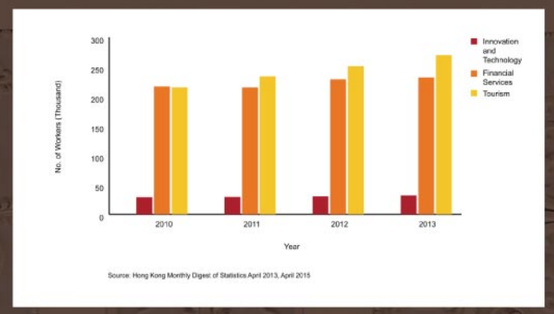
*E*ngineering education was represented by vast amount of high level colleges and institutes at universities in Russia. With the endeavour of engineers and scientists, the Russians engineering academics did made undeniable contributions and created indelible impact to the world. Their effort resulted in a maturely developed, specialised education system in many singular engineering professional aspects. Such approach ensures comprehensive and highly focused training of a person towards its learning subject or professional in both theoretical and vocational ways. For instance, the Moscow Aviation Institute (MAI) visited by the delegates was a very typical vocational school which was claimed as the cradle of aeronautic technology professionals. Not only to fulfil the domestic needs on a stable supply of professional engineering personnel. Russian natural science achievements and engineering developments, especially in chemical engineering and aircraft industries were indeed, of high interest by their colleagues from other nations as well. (Julia N. Ziyatdinova, 2015)

Despite it had successfully developed its own way throughout the years, the Russian engineering education had also made itself a much self-isolated system. It is not until the decay of Soviet Union and the born of the Russian Federation, in stimulating a kickback of intensive outgoing academic mobility in Russian engineering education. With the downfall of the old Communist system, it was the first time for the engineers and engineering educators in Russia to realise the needs of modernisation. To deal with such challenge, Russian engineering education began to establish networking and cooperation relationship with overseas universities. For example, dual degree programmes were developed recently between Kazan National Research Technological University and University of Merseburg in Germany, in developing modern curricular in chemical engineering. Another cooperation with Vet Tri University at Vietnam was also started at the same time, in providing engineering education to exchange students from Vietnam, while opening up new industrial market for engineering application at South East Asia. (Julia N. Ziyatdinova, 2015) Such collaboration benefits both countries, and most importantly, can help Russia to open up its engineering education system to the world.

However, in making such a breakthrough, language had become a major obstacle. Although many distinguished works and learning materials were published by Russian research universities and large network of journals with high reputations, a vast majority were kept in Russian language. Translation and adjustment in language became a major challenge at the moment. In our visit to the Moscow Aviation Institute, their presentation of the introduction materials is keeping in Russian. We cannot understand unless the speaker explains to us. However, delegates notice the willingness of the school in making progress to increase the pace on its internationalisation. The school had been drastically increasing the scale in providing modified course which was taught in English based on the existing curriculum. The institute was known as the spearhead in Aviation education, and yet it is striving to tackle the challenge on becoming internationalised.

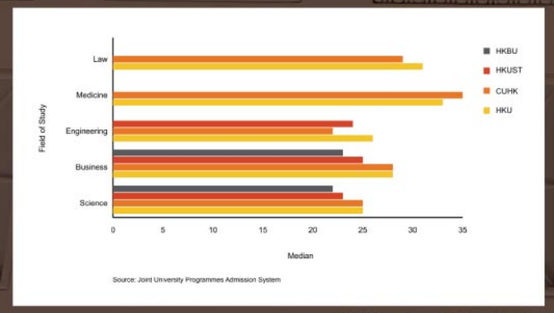
Education reform when facing Globalisation - Hong Kong

Hong Kong was once experienced a vigorous growth of manufacturing and engineering industry. At the time the majority of people were suffering from poverty. Only few families were able to support their children to continuing schooling after receiving the compulsory government funded education. Many youngsters began to work since their juvenile. And most of them began their career through on-job training under the guidance of a master (known as "Si Fu"). They accumulated their engineering professional with hand-on experiences under such tough environment. In 1982, the Hong Kong Government set up the Vocational Training Council(VTC) under the regarding Ordinance to promote vocational education in Hong Kong for catering the needs of skilful person in the rapid industrialisation. Due to raise of economy in Hong Kong since 1980s as well as lower land rental rates and labour costs in Mainland China, most factories shifted to the Mainland in 90's. The tremendous development in service sector causes 87.7% of the workforce employed in this sector, as of 2008 (Economywatch Content, 2010)



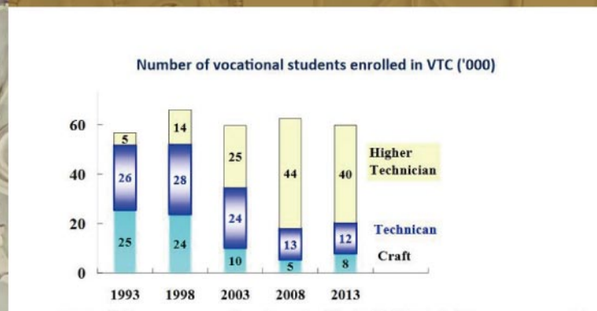
Employment in Various Industries (Lap-chee TSUI, 2015)

One possible explanation to science and engineering degrees being less attractive to prospective students is the limited career prospects. Engineering programmes face strong competition to attract students with the best academic results, as reflected by the universities' admission medians of various degree programmes. According to 2014 Joint University Programmes Admission System data, not only are the admission requirements for engineering and science degrees significantly lower than those of law and medicine, they are also lower than that of business programmes.

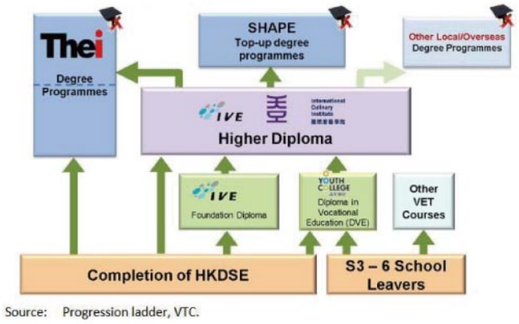


2014 Hong Kong Universities' Admission Median (Lap-chee TSUI, 2015)

Hong Kong could possibly face an acute shortage of skilled engineers. Work-ready students become a necessity. In order to reintroduce the career potential and benefits of vocational training to the new generations, HKSAR Government had continued to upgrade the skill content in the curriculum of VTC. The proportion of VTC students taking higher technician courses (both part-time and full-time) in overall VTC students is increased by more than six-fold within the past two decades, from just 9% in1993-1994 to 66% in 2013-2014 (Research Office, Legislative Council Secretariat, 2015). By contrast, the respective ratio for students taking craft courses originally designed for leavers of lower secondary education fell sharply over the same period, from 45% to 13%. (Research Office, Legislative Council Secretariat, 2015) The figures above indicates the younger generation realise the importance of pursuing higher knowledge, and the approach by HKSAR Government can temporarily relief the stress of insufficient skilled engineering professionals. Though, following the retirement of veterans in engineering industry, the needs on technical personnel remains big and there is a demand on further expand the scale of vocational training for long term period. In further blending higher education with vocational training, Technological and Higher Education Institute of Hong Kong (THEi) was the Institute newly established by the Vocational Training Council in 2012, in providing a new and extra option in provoking youngsters to participate in vocational education. The courses offered vocationally-oriented bachelor's degree programmes with real-life projects and industrial attachments to develop competent professionals for the industry. (THEi, 2015) This is in line with the recent call by the HKSAR Government for society to recognise the important role played by vocational and professional education in the economy.



Increasing students enrolled as higher technician level in recent years in vocational education at Hong Kong



Progression pathways of Hong Kong vocational training

In order to maintain the international competitiveness, especially when opportunities arise for Hong Kong to contribute to major initiatives for national developments, e.g. the "Belt and Road" initiative (Curriculum Development Council, 2015), Education Bureau of the HKSAR Government is studying the possibility of implementation of STEM (Science, Technology, Engineering and Mathematics) in primary and secondary education. This educational trend equips students with proper knowledge and skills to meet the challenges in society and around the world. The renewal of the school curriculum also focuses on whole-person development and lifelong learning.

Merits from each other

In the past three decades, Hong Kong had successfully transformed into an international financial city. While the younger generations are striving to maintain their own competitiveness through learning theories, sophisticated techniques were losing away and fewer people would have the capability in solving hands-on issues. Though, unafraid of the trend of globalisation, Hong Kong is well equipped in terms of its soft power. With a mixed historical background, Hong Kong has strong connections with the Western world. But we are lacking of professional, specified technique in engineering. Education Bureau has been studying the feasibility of STEM. Once STEM applied to primary and secondary educations, we believe that the population of engineering will be increased. The case in Russia can be an example for Hong Kong. During our exchange with Russian engineers, we were told that knowledge of engineering was highly seeped among Russian even to an ordinary civilian due to its importance. Russians think that the professions offer a way of life morally superior to the marketplace (Rieber, 1990). We hope this is the future scene in Hong Kong as well. Russia, in contrast, is like a supernova ready to shine again after the downfall of the old red empire. Rose up to be one of the fastest growing economic markets, it is hunger to expand its own market and to reach out to the world. Russia has a strong foundation in technical and engineering techniques background, and currently looking for bridging the connection to the globe. Provided the needs on Hong Kong and Russia, we can see a great potential in developing both places into collaborative partners. In strengthening Hong Kong's weak point in engineering technology, we can invite engineering professionals from Russia to come to our newly started vocational institutes to provide consultancies service. Else we can establish the collaborative relationship between institutes of Hong Kong and Russia, by sending Hong Kong engineering students to Russia institutes and conduct exchange studies. At the same time, Russia can use Hong Kong as a stepping stone in discovering international market, and expand the connection by utilising Hong Kong's advantage on our well setup network with the international.

Engineering industry requires solid knowledge both hands-on training and theories in lecture. In the process of learning, it is the very key factor in maintaining ones curiosity. And by being curious of a subject or object, one would naturally be industrious, and find his creativities and inspirations naturally towards his studying matter. During our visit to Moscow Aviation Institute, it is not hard to find statues of engineering works almost anywhere within the campus. Components like turbines and aircraft winglets were discovered around the corner of the streets. And to allow students to have first-hand practicing experience, actual civilian aircrafts and MiG fighter jets retired from the troops were supplied to the institute for studying purpose. Students can directly be in touch with their studying object and it can be easily accessed right after lectures. And in creating the spark of curiosity, it is nothing easier to build up ones interest since ones infant. Interestingly, the delegates discovered a toy model of sustainable building when shopping a toy store at Moscow. It was designed for kids yet it was highly resemble to the actual object in detail. Through our observation, the youngsters have been soaking into an atmosphere, by educating them the importance of engineering in their lives since they were raised up as a juvenile.

The background on engineering studies was also required for other professionals. We were told by the staff in Bureau of Technics that students who study architecture would also be required to study engineering. And after graduation they can choose to be an architect or an engineer. Vice versa, aeronautic engineers would also have to be familiar on piloting a plane, and hence flight simulator was equipped at MAI. Also, due to the well-developed manufacturing industry, the demand on engineers was stable, leaving no worries for graduates in having a good career in engineering field. Whilst in Hong Kong, engineering industry is affected by economic downturn and political issues. To attract new comers, the government and all stakeholders shall work hard together to keep the number of projects stable.

Somewhat sharing the same as Russia, Hong Kong's traditional education atmosphere was always criticise as inflexible, which is lack of creativity and the initiative to in thinking outside the box. Learning was in spoon-fed and "target-oriented" style (South China Morning Post, 2015). Students were trained up to tackle examinations by memorising the materials. Many Russian professors require students to take notes during the lecture or seminar. They often tell students what exactly to write down, and if they see someone is not taking notes they may ask the student to leave the classroom. And it is usually up to students' choice at Hong Kong. (Malinovskaya, 2012) While in Hong Kong, the students' grades were not revealed to the whole class, it was common for a Russian teacher to announce students' grades publicly in the presence of the whole class. It is also common for Russian professors to put a list of students' names and grades next to the names on their office door, so everyone at the university can see the students' grades. (Malinovskaya, 2012) Such approach can provoke competitiveness between students, but also creating a huge psychological pressure towards them.

While engineering was usually claimed to be a "male-job" at Hong Kong, the delegates found it was surprisingly common for women to devote themselves into the engineering industry, proving that women can also have a good career development in the field in Russia.

Hong Kong has always claimed to be the furnace of blending the culture of the East and West. However from the delegation, we can discover our shortcomings and something we can learn from Russia. It would be the most beneficial if we could inspire the students to have strong intention on pursuing vocational, and keep them focus on Higher Order Thinking Skills, and also provide opportunity for students to further pursue their own interests across multi-disciplines. Vocational training is filling an important gap, and offering work-ready graduates to the real world. The gap between employers' expectation and graduates' perspectives are hopefully bridged. In order to inspire more youngsters to join the engineering industry, we shall create the atmosphere which arouses the importance of having engineers in society. Propaganda can be done such as establishing museums specialising in engineering. And instead of dismantling or abandoning the retired machines into landfills, we can refurbish them as statues and exhibit them at appropriate locations for appreciation by students or ordinary civilian.

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Conclusion

Russia and Hong Kong are distance by 4,400 km. However, there is almost all (99.5%) of Hong Kong exports to Russia is dominated by re-export of goods originated for other countries. Foremost Mainland mainland China uses well-developed and efficient logistics facilities of Hong Kong to transport goods to Russia. (Nikolay, 2012) Hong Kong-based entrepreneurs rendering services to Russian customers can take advantage of the significant liberalization programme and enhance their customer network in Russia. Well-known and highly reputed Hong Kong construction conglomerates can also expand into Russia's construction, engineering and real estate-related sectors. Under the policy of Belt and Road, it is expected that more career and investment opportunities in Russia for our coming generations. Given this background, the YMC organized this Delegation to study how engineers in Russia utilise the natural resources and develop the community.

The preparation of this Delegation dates back to August 2015. 16 delegates were selected to organise this 9-day Delegation. The delegates are divided into three study groups. Namely Energy Production Group, Development of Transportation and its Facilities Group, and Sustainable Buildings Group. Members of each group focus on studying topics in the respective domains of each group and, where applicable, provide recommendations to comparable cases in Hong Kong.

Overall, the delegates have identified 4 major areas of insights, they are Energy Utilisation, Green Policy for community, Digital Revolution and Preparation for future leaders in Engineering World.

Energy Utilisation is important in order to maintain the supply of natural resources and implement a more efficient power generation. The delegates visited Kolomenskaya Power Plant, in which they learnt the application of combined heat and power plant (CHP). The efficiency of CHP is 85-90% whereas at a condensing power plant, more than half of the fuel energy is lost as waste heat to the environment. The government is currently promoting the application of CHP; however, CHP system is not commonly adopted in Hong Kong as heating rarely a major concern in local building design. So the application of CHP system could only suit certain type of premise. Also due to comparatively low energy cost in Hong Kong, the use of CHP system would not be solely focused on cost saving. Some alternative energy sources like biomass, biodiesel, fuel cell system would also be considered for environmental protection. Besides, when the delegates visited the Gas Turbine and Compressor Production site, the staff there also gave the delegates a good indication on the promotion of the use of CHP in future projects. These shows that "turn waste into energy" is possible. With better governmental guideline, monitoring and management, there are several opportunities in Hong Kong that the same ideas could penetrate to industrial or even commercial use in the future for better utilizing our energy source and, further, reducing carbon emission of centralised power plant.

Despite the environmental concern from energy resources, we also concerned on the environmental issue from the demand side. Therefore the delegates visited several sustainable buildings obtained green building certification to learn their best practices. In one of the visit, Siemens showed us a good example of maintaining green building; at the same time, provided a more comfortable and safe workplace to staff. Delegates experienced the green and humanity provisions by walking around the Siemens Building. The building also got a higher efficiency on on the building services loading including but not limited to air-conditioning and use of water. Another visit to the Country Park Business Centre showed us how they utilised the modern management tool – Building Information Modelling (BIM) to construct the whole park efficiently and effectively. They are proud of the well-planned spatial arrangement for different supporting facilities. And hence, more spaces reserved for other usages. However to our best understanding, there is mandatory requirement or attractive incentive in Russia for implementing green designs. However, the demand of adoption of different green building design and associated certification scheme is ever increasing. Dated back to last decade, before Hong Kong provide the incentive of additional GFA for the building undergone green certification process, building applying these certification is not common. It raised a question which we may need more time to exploare on how different of culture influence our design practices.

Digitalisation shortened the distance between people and enable human being to manage and analysis more data. One of the examples is BIM as the Country Park Business Centre and the Bureau of Technics showed us. They believe 5D models will revolute the construction world. The role of consultants will be overlapped with contractors. Moreover, the construction world may step much further change once the development of both BIM and 3D printing system matured. There have been some printed buildings under testing around the world. Foreseeing that the revolution is coming, the role of consultant, contractor and workers may be totally changed. Under the trend of digitalization, we may often ask what improvements have brought by these technologies. Russian demonstrate another side to us. The delegates visited Moscow Metro and surprised that the control centre is full of manual-operation items. Train scheduling is done by personnel with pencil and ruler. A large mirror for vision is place at the forefront of platform, instead of installing CCTV for monitoring platform situations by the captain. However, Moscow metro is also one the world's busiest metro system with on-time service level comparable to the MTR. There may be lot of reasons that they cannot start the digitalization process. But, it is a golden opportunity inspiring our young engineers to revisit the purpose of using digital system and what is our attitude toward the future challenges in front of big data.

To conserve these valuable knowledge and carry on to the successors, education is one of the most usual ways. There is a great demand of increasing technical knowledge in a country to enhance competence under the globalisation. In view of the needs on vocational training, Moscow Aviation Institute (MAI) in Russia is an example. The institute is focusing on aerospace engineering, and courses are a thorough theoretical knowledge combines with various practical skills. Until the present, the development of Russian aeronautics and astronautics is based mostly on the activities of institute professors and alumnus. The real examples of aircrafts, helicopters, spacecrafts and rockets; flight simulators; advanced systems of signal and image processing; modern computer facility, etc. are available for students and researchers; they are also exciting the delegates. While engineering programmes in Hong Kong face strong competition to attract students with the best academic results, as reflected by the universities' admission medians of various degree programmes. Hong Kong could possibly face an acute shortage of skilled engineers. Work-ready students become a necessity. Since 2012, Technological and Higher Education Institute (THEi) is found to provide vocationally-oriented bachelor's degree programmes with real-life projects and industrial attachments to develop competent professionals for the industry. This is in line with the recent call by the HKSAR Government for society to recognize the important role played by vocational and professional education in the economy. Step further, Education Bureau is studying the possibility of implementation of STEM (Science, Technology, Engineering and Mathematics) in primary and secondary education. Vocational training is filling an important gap, and offering work-ready graduates to the real world. The gap between employers' expectation and graduates' perspectives are hopefully bridged.

It is worth noting in this delegation, apart from the technical visits and seminars, the delegates also paid courtesy meeting with overseas institutions such as ABOK, RuGBC, and International Union of Scientific and Engineering Association. Through these meetings, the delegates got a better understanding of the working environment of Russian engineers.

Locally in Hong Kong, other than preparing this Delegation Report and a debriefing session in June2016, the delegates organised 11 local visits and seminars from December 2015 to April 2016, on the topics related to the theme of this Delegation for other young engineers of the institution. The YMC believes that this approach can maximize the learning benefits of the delegation as a whole.

This Delegation has addressed some of the challenges faced by engineers today and strengthened connections of the YMC with other engineering institutions in Russia. But this is not the end of the story, YMC will continue to organise more events for young members in the coming future, to maintain the excellence in the engineering profession.

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Profile of Advisors



Ir C C CHAN, SBS, JP

The President,
The Hong Kong Institution of Engineers

Ir CHAN, graduated from the University of Hong Kong, is a veteran professional civil engineer with experience in government departments including the then Highways Office and Drainage Division of the HKSAR Government, Water Supplies Department and Civil Engineering and Development Department.
Ir CHAN is very active in professional and community services. He is currently an Honorary Fellow of the Chartered Institution of Water and Environmental Management and an Adjunct Professor of the Department of Civil and Environmental Engineering at the Hong Kong University of Science and Technology.



Ir Victor C K CHEUNG

Immediate Past President,
The Hong Kong Institution of Engineers

Ir CHEUNG is a Registered Professional Engineer in Building Services and Fire disciplines. He graduated with first class honours in Environmental Engineering, and obtained an MSc in Energy Engineering from the South Bank Polytechnic and the Surrey University in the United Kingdom respectively.
Ir CHEUNG has over 39 years of experience in the field of electrical & mechanical and building services engineering and is responsible for a wide range of building and infrastructure projects.
Ir CHEUNG is also active in community services and has served on various task forces, boards and committees for government, NGO's and professional bodies.

Ir Joseph K H CHOI

Senior Vice President,
The Hong Kong Institution of Engineers



Ir CHOI graduated from the University of Aston, Birmingham, the UK, in Civil Engineering.
Ir CHOI is a Fellow and the Senior Vice President of the Hong Kong Institution of Engineers ("HKIE"). He is also the Chairman of the Administration Board, and an ex-officio member of the Planning Committee of the HKIE. Besides, Ir CHOI is also the Vice Chairman of Council of China's Foreign Trade of the China Council for the Promotion of International Trade, a member of the Engineers Registration Board, and a Fellow and Council Member of the Hong Kong Institution of Highways and Transportation.



Ir Thomas K C CHAN

Vice President,
The Hong Kong Institution of Engineers

Ir CHAN received his education in Hong Kong and the 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 the Hong Kong Institution of Engineers.

Ir Dr Philco N K Wong

Vice President,
The Hong Kong Institution of Engineers



Ir Dr WONG is a civil engineer who has over 35 years of experience in large-scale infrastructure projects in Hong Kong, Mainland China and overseas. He is currently the Projects Director of MTR Corporation responsible for new railway projects from design to completion.
Ir Dr Wong is enthusiastic in participating in professional and community services. He is a Fellow of the Hong Kong Institution of Engineers and the Institution of Civil Engineers in the United Kingdom, and a council member of Construction Industry Council. He is also a visiting professor of Tsinghua University in Beijing, and an adjunct professor of the Hong Kong Polytechnic University.



Ir Dr C M KOON

Chairman,
Continuing Professional Development Committee,
The Hong Kong Institution of Engineers

Ir Dr KOON has more than 35 years of experience in the building construction industry. He is a Fellow of the Hong Kong Institution of Engineers and a chartered engineer of UK institutions. He was the Chairman of Technical Committees for the Code of Practices on Foundations, Precast Concrete Construction, Loadings, Site Safety Supervision and Guidelines for Bamboo Scaffolds.
Ir Dr KOON also actively participates in community services. He is the Chairman of the Community Services Committee of the Hong Kong Institution of Engineers, and a member of the Engineers Registration Board.



Ir Edmund K H LEUNG,

SBS, OBE, JP
Past President,
The Hong Kong Institution of Engineers

Ir LEUNG, graduated from the University of Hong Kong in Mechanical Engineering, is a professional engineer with broad-based experience.
He has been active in public services, and has extensive involvements in engineering and education sectors. He is presently the Chairman of the Process Review Panel for the Financial Reporting Council and Deputy Chairman of The Hong Kong Institute of Directors. He had also served as the President of the Hong Kong Institution of Engineers.
He was conferred an OBE in 1996, appointed Justice of Peace in 1997, and awarded a Silver Bauhinia Star in 2009.



Ir Dr Otto L T POON, BBS, OBE

Past President,
The Hong Kong Institution of Engineers

Ir Dr Poon is a Chartered Engineer with over 50 years of E&M engineering experience. He is the Founder and Chairman of ATAL Engineering Group.
Over the years, he has been participating in public services both to the community and the engineering profession. He is a Past President of Hong Kong Institution of Engineers, and Life President of Hong Kong Federation of Electrical and Mechanical Contractors.
Presently, he serves as the Chairperson of Lift and Escalator Safety Advisory Committee, Member of Governing Council of Hong Kong Quality Assurance Agency, and Director of the Hong Kong Green Building Council.



Ir Gary C W KO

Chairman,
The Professional Assessment Committee,
The Hong Kong Institution of Engineers

Ir KO is a qualified electrical engineer. He has served the HKIE as Council Member, Chairman of the Electrical Division, Gas & Energy Division, and Continuing Professional Development Committee. He is now the Chairman of the Professional Assessment Committee. His services outside the Institution includes Honorary Advisor of the Hong Kong & Kowloon Electrical Engineering & Appliances Trade Workers Union, Executive Committee Member of the Hong Kong Electrical Contractor Association, Vice Chairman of Admission, Budgets and Allocation Committee of the Community Chest, etc.

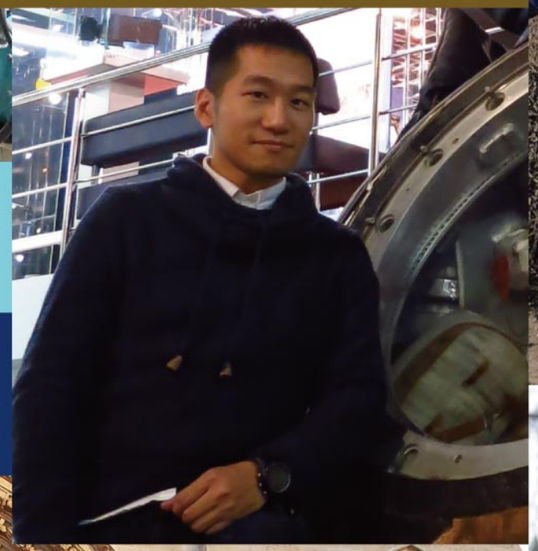
Profile of Delegates



Ms Candy M Y FUNG

Building Services Engineering
Delegation Manager

Candy obtained her Bachelor of Engineering in Building Engineering (Building Services Engineering) from the City University of Hong Kong and Master of Science in Fire and Safety Engineering from the Hong Kong Polytechnic University. Upon her graduation, she joined Parsons Brinckerhoff (Asia) Limited and is currently working as a Senior Engineer in the company. She joined the HKIE-YMC as a helper in 2009 and is the Deputy Chairman of the current session



Ir Kenneth K W CHEUNG

Civil Engineering
Delegation Chairman

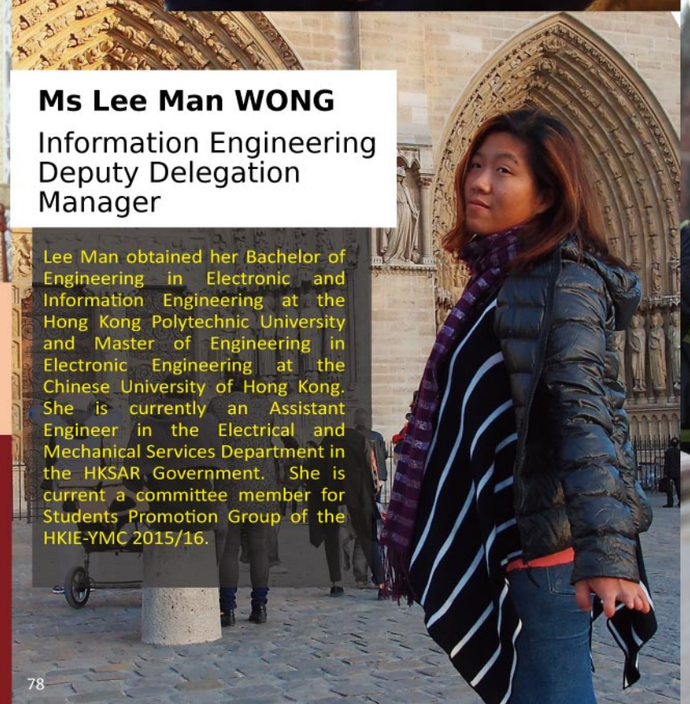
Kenneth obtained his Bachelor of Applied Science in Civil Engineering from the University of British Columbia in Canada and Master of Science from the University of Hong Kong. He is currently working as the Project Engineer of the Third Runway Division in the Hong Kong Airport Authority. He has been actively participating and contributing himself to the HKIE-YMC and is the Chairman of the current session



Ms Yani Y Y KO

Electrical Engineering
Deputy Delegation Manager

Yani obtained her Bachelor of Engineering and Master of Science in Electrical Engineering in Hong Kong. She is currently an Engineer II of CLP Power Hong Kong Limited, and has been involved in major projects such as Condition-based Maintenance development in Power System. She is currently a committee member for Graduates Promotion Group of the HKIE YMC 2015/16.



Ms Lee Man WONG

Information Engineering
Deputy Delegation Manager

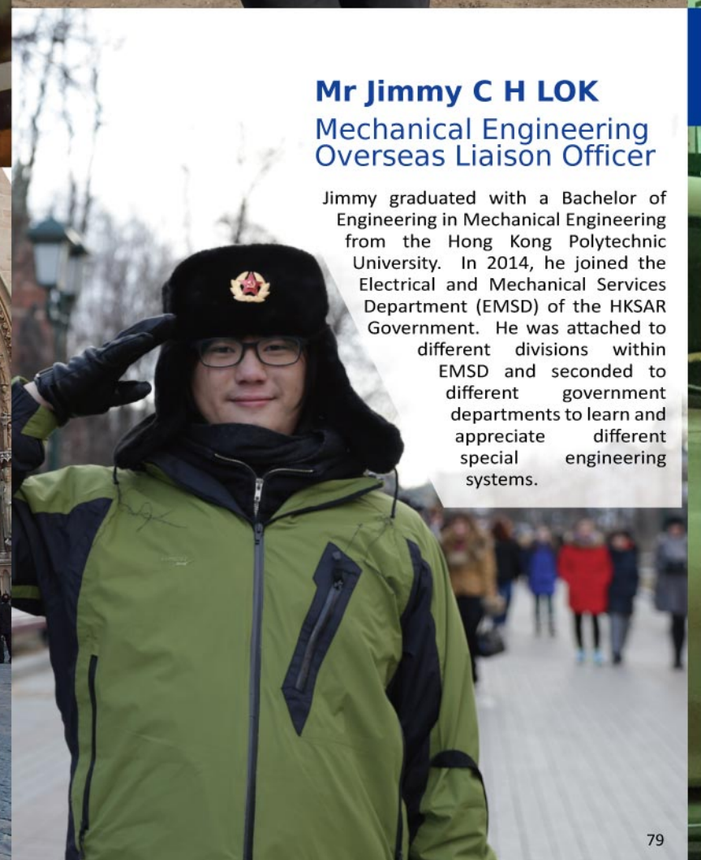
Lee Man obtained her Bachelor of Engineering in Electronic and Information Engineering at the Hong Kong Polytechnic University and Master of Engineering in Electronic Engineering at the Chinese University of Hong Kong. She is currently an Assistant Engineer in the Electrical and Mechanical Services Department in the HKSAR Government. She is current a committee member for Students Promotion Group of the HKIE-YMC 2015/16.



Ms Rita P Y LEUNG

Energy Engineering
Treasurer

Rita obtained her Bachelor of Engineering in Manufacturing Systems Engineering from the City University of Hong Kong. Starting from her internship, she has been working at Siemens (HK) Limited and is currently working as an Energy Engineer. She keeps learning and is pursuing a Master of Science in Energy and Environment. She joined the HKIE-YMC as a helper since 2014, and is now a Co-opted Member.



Mr Jimmy C H LOK

Mechanical Engineering
Overseas Liaison Officer

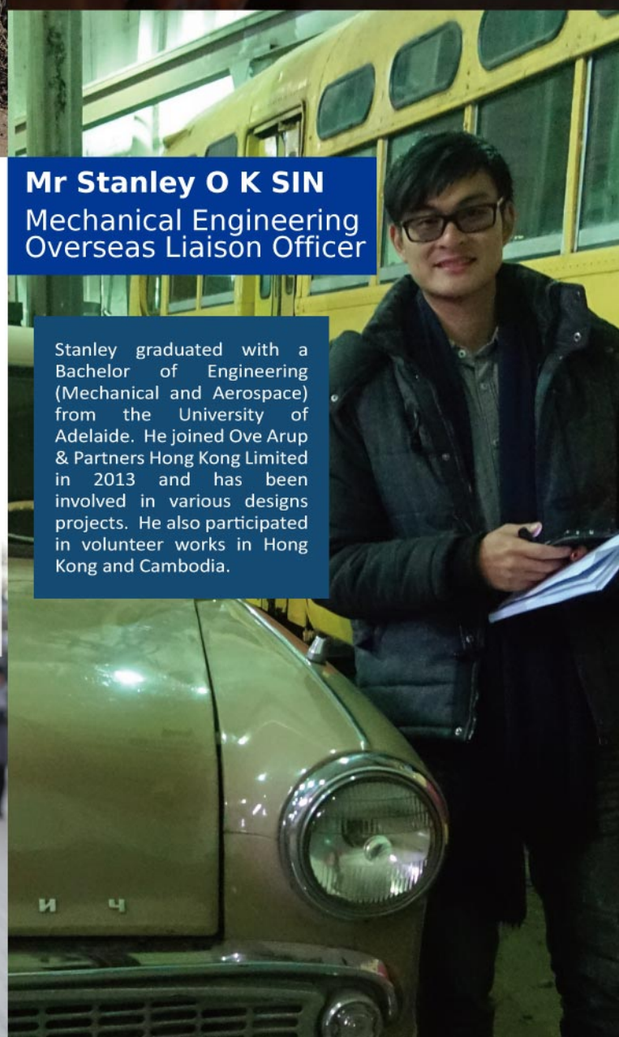
Jimmy graduated with a Bachelor of Engineering in Mechanical Engineering from the Hong Kong Polytechnic University. In 2014, he joined the Electrical and Mechanical Services Department (EMSD) of the HKSAR Government. He was attached to different divisions within EMSD and seconded to different government departments to learn and appreciate different special engineering systems.



Mr Timothy Z T LUN

Mechanical Engineering
Secretary

Timothy acquired his Bachelor of Science in Mechanical Engineering from the Northern Illinois University. Upon graduation, he joined CLP Engineering Limited as an Engineer Trainee. He is currently participating in E&M maintenance task at Castle Peak Power Station. He joined the HKIE-YMC as a helper in 2015.



Mr Stanley O K SIN

Mechanical Engineering
Overseas Liaison Officer

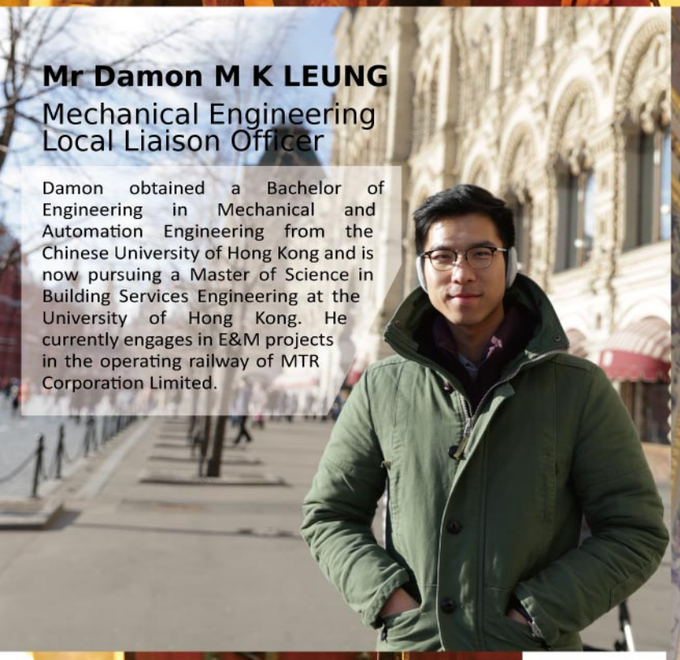
Stanley graduated with a Bachelor of Engineering (Mechanical and Aerospace) from the University of Adelaide. He joined Ove Arup & Partners Hong Kong Limited in 2013 and has been involved in various designs projects. He also participated in volunteer works in Hong Kong and Cambodia.



Ms Christabel H Y WAI

Electrical and Computer Engineering
Overseas Liaison Officer

Christabel graduated from the George Washington University with Master of Arts in International Science and Technology Policy furthering her dual degree from Carnegie Mellon University – Bachelor of Science in Electrical and Computer Engineering, and Bachelor of Arts in Global Studies.



Mr Damon M K LEUNG

Mechanical Engineering
Local Liaison Officer

Damon obtained a Bachelor of Engineering in Mechanical and Automation Engineering from the Chinese University of Hong Kong and is now pursuing a Master of Science in Building Services Engineering at the University of Hong Kong. He currently engages in E&M projects in the operating railway of MTR Corporation Limited.



Mr Hugo Y K CHAN

Logistics and Transportation
Engineering
Logistics Officer

Hugo received his Bachelor of Engineering in Logistics Management & Engineering from the Hong Kong University of Science and Technology. He is now working in Hong Kong Logistics Technology and Systems Limited as Graduate Engineer, under Scheme "A" training.



Ms Fanny H F YEUNG

Telecommunications Engineering
Local Liaison Officer

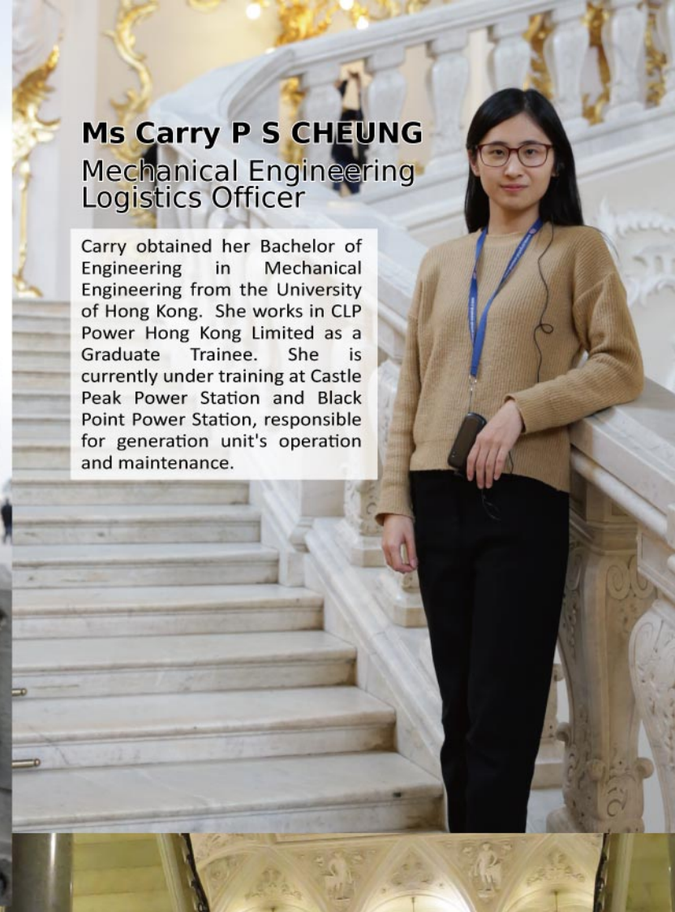
Fanny obtained her Bachelor of Engineering in Electronic and Communications Engineering from the University of Hong Kong. She joined PCCW as a Graduate Trainee and then promoted to Trainee Engineer. She has completed the HKIE "Scheme A" training and is now working in System Planning and Design Team for Mobile Network Integration project.



Mr Samson S H LEUNG

Logistics and Transportation
Engineering
Publication Officer

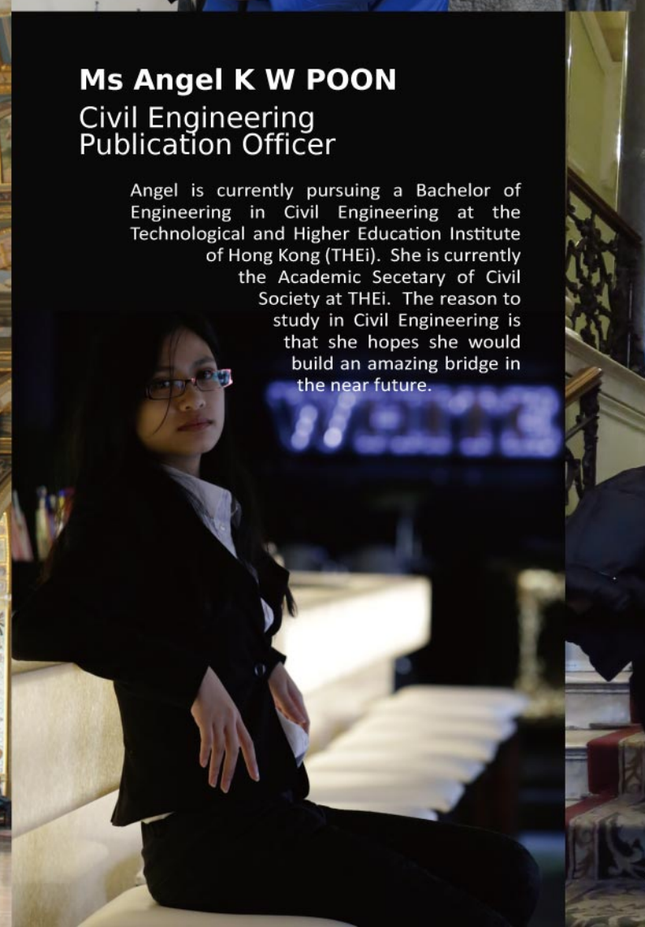
Samson received his Bachelor of Engineering in Logistics Management and Engineering from the Hong Kong University of Science and Technology. Upon his graduation, he joined Hong Kong Logistics Technology & Systems Limited as a Graduate Engineer and is currently undertaking the HKIE "Scheme A" training.



Ms Carry P S CHEUNG

Mechanical Engineering
Logistics Officer

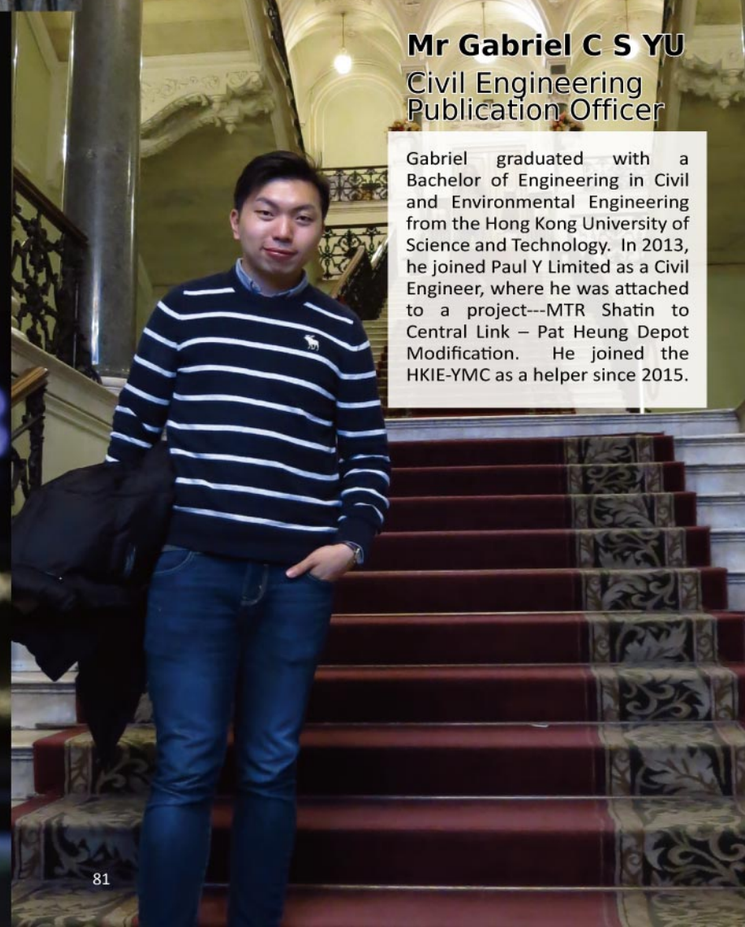
Carry obtained her Bachelor of Engineering in Mechanical Engineering from the University of Hong Kong. She works in CLP Power Hong Kong Limited as a Graduate Trainee. She is currently under training at Castle Peak Power Station and Black Point Power Station, responsible for generation unit's operation and maintenance.



Ms Angel K W POON

Civil Engineering
Publication Officer

Angel is currently pursuing a Bachelor of Engineering in Civil Engineering at the Technological and Higher Education Institute of Hong Kong (THEi). She is currently the Academic Secetary of Civil Society at THEi. The reason to study in Civil Engineering is that she hopes she would build an amazing bridge in the near future.



Mr Gabriel C S YU

Civil Engineering
Publication Officer

Gabriel graduated with a Bachelor of Engineering in Civil and Environmental Engineering from the Hong Kong University of Science and Technology. In 2013, he joined Paul Y Limited as a Civil Engineer, where he was attached to a project---MTR Shatin to Central Link – Pat Heung Depot Modification. He joined the HKIE-YMC as a helper since 2015.

Message from Delegates

Ms Lee Man WONG

It was my great honor to work with the 15 selected diligent and enthusiastic delegates in the overseas delegation this year.

Russia is a beautiful and mysterious country with a lot of historical artefacts and architecture. Working together with the delegates for more than 8 months, we experienced and gained far more than solely technical knowledge and overseas experience in our delegation, and it given me many new experiences. With every experience, we change and grow. Thanks to our advisors and the HKIE-YMC for their continuous support in our engineering journey. Thanks to all the delegates for their hard work and dedication!

Mr Jimmy C H LOK

This delegation has given me a golden chance to explore engineering around the world and broaden my horizons. Though visiting construction sites and communicating with local engineering experts, I could appreciate different engineering culture and perspectives in a different country. A quixotic engineering design in Hong Kong could possibly be the best solution in Russia. Having these impacts made me a more comprehensive thinker. Having the exclusive experiences and unforgettable memories would be the most worthy things in joining this delegation.

Ms Candy FUNG

Russia is a place I admire to go for a long time. I'm glad that we have finally visited to this marvelous country. When we started to plan the trip to this country, we faced dire straits due to the language barriers and a totally different culture. Luckily under the help from advisors, delegates and friends, the trip has been successfully and safely furnished. This is an amazing experience for me, from planning to completion of the delegation, I learned a lot and I'm glad to encounter different people who inspired me a lot.

At last, I would like to express my gratitude to all advisors, reviewers, delegates and friends, it cannot be achieved without any of you. Thank you!

Mr Samson LEUNG

It is my great honour to take part in the overseas delegation to Russia. Undoubtedly, this nine-day fruitful journey in Moscow and St. Petersburg has provided us with invaluable knowledge and experience in our engineering exposure, from past public transportation to cutting-edge space technology, from cultural heritages to modern sustainable buildings, from gas turbine design to its manufacture, and also friendship, collaboration, enthusiasm and other things that we may not learn without this delegation. All the unforgettable memories and rewarding experience we shared would definitely broaden our horizons and enable us to become a successful engineer to engineer a better society.

Mr Stanley SIN

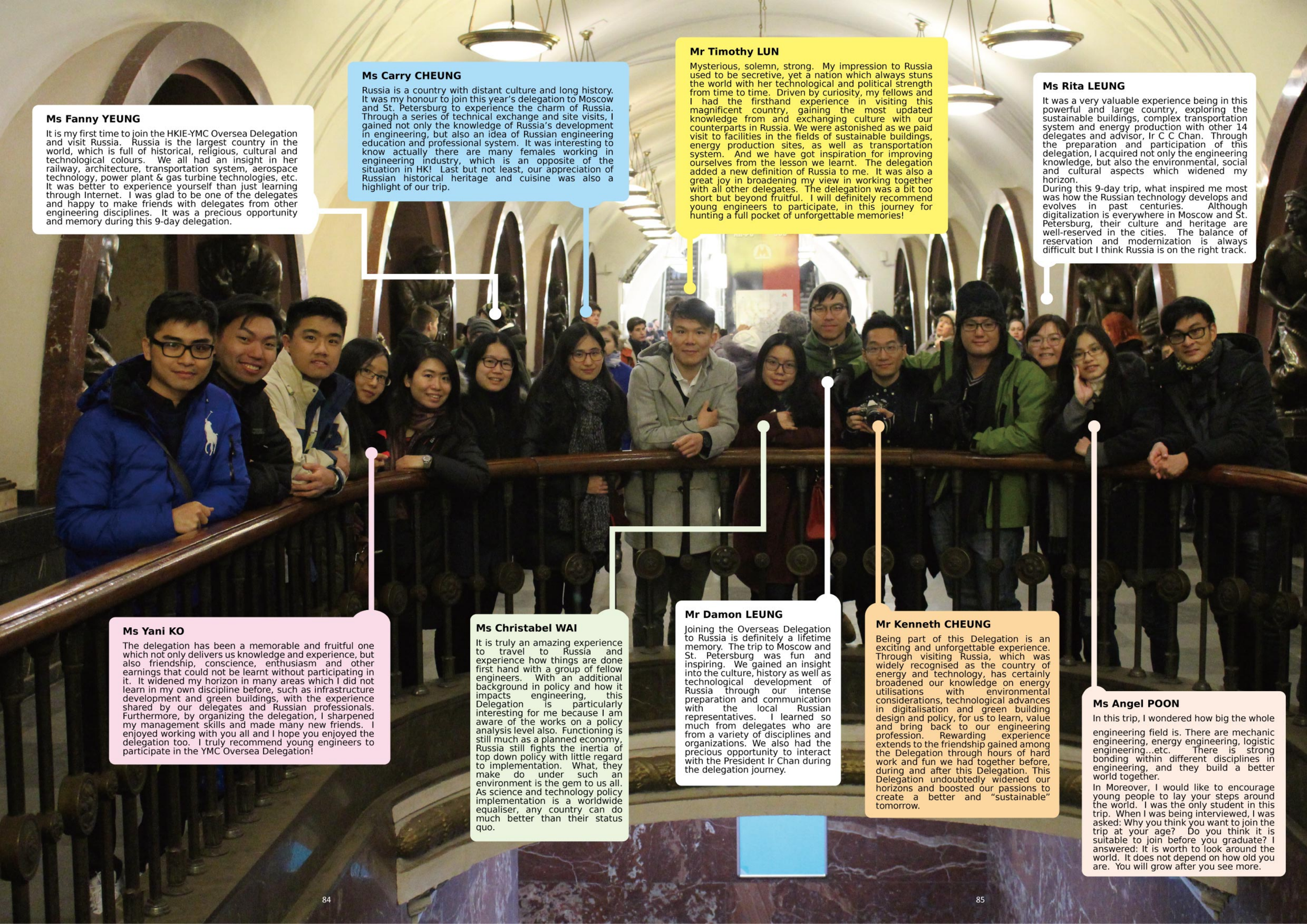
It is a life time experience for me to travel to Russian. Not only can I have the opportunity to visit Russian engineering facilities, but also the chance to speak with local engineers. Such meaningful and successful delegation to Russia would not be happened without all the hard work from this year delegates and advisors. Throughout this 9 day trips, we have explored Moscow and Saint Petersburg with a series of technical exchanges and site visits. I was truly inspired by Russian cultural, history and her knowledge in engineering development in the past centuries. I would no doubt to introduce the HKIE-YMC overseas delegation to all the young engineers.

Mr Gabriel YU

Participating in this delegation has been one of the most rewarding experiences in my life which my engineering exposure has been widened on energy technology, sustainability building construction, green approach in Russia. On the other hand, I was deeply moved by our enthusiasm. The positive energy has contributed to the success of this delegation. I would no doubt to introduce the YMC delegation to our engineering friends and colleagues.

Mr Hugo CHAN

Perception towards a country before being there is often wrong-the delegation to Russia once again affirmed my belief. Russia might have been perceived with a sense of secrecy, and a poor economy. On the other hand, I thought Russians are rude and cool. Nevertheless, these are all wrong statements. Surely Moscow and St. Petersburg are cities with history and heritage, yet they are definitely not backward. Advanced production technology from SGTT can be evidence. Well-preserved Hermitage Museum and the traditional European city outlook at St. Petersburg show how preservation can co-exist with urban development. Last but not least, more-than- enough rounds of coffee treat are signs of warm welcome from exchange parties from Russia. Throughout the delegation, my horizon is broadened, and it is a very fruitful experience.



Ms Fanny YEUNG

It is my first time to join the HKIE-YMC Oversea Delegation and visit Russia. Russia is the largest country in the world, which is full of historical, religious, cultural and technological colours. We all had an insight in her railway, architecture, transportation system, aerospace technology, power plant & gas turbine technologies, etc. It was better to experience yourself than just learning through Internet. I was glad to be one of the delegates and happy to make friends with delegates from other engineering disciplines. It was a precious opportunity and memory during this 9-day delegation.

Ms Carry CHEUNG

Russia is a country with distant culture and long history. It was my honour to join this year's delegation to Moscow and St. Petersburg to experience the charm of Russia. Through a series of technical exchange and site visits, I gained not only the knowledge of Russia's development in engineering, but also an idea of Russian engineering education and professional system. It was interesting to know actually there are many females working in engineering industry, which is an opposite of the situation in HK! Last but not least, our appreciation of Russian historical heritage and cuisine was also a highlight of our trip.

Mr Timothy LUN

Mysterious, solemn, strong. My impression to Russia used to be secretive, yet a nation which always stuns the world with her technological and political strength from time to time. Driven by curiosity, my fellows and I had the firsthand experience in visiting this magnificent country, gaining the most updated knowledge from and exchanging culture with our counterparts in Russia. We were astonished as we paid visit to facilities in the fields of sustainable buildings, energy production sites, as well as transportation system. And we have got inspiration for improving ourselves from the lesson we learnt. The delegation added a new definition of Russia to me. It was also a great joy in broadening my view in working together with all other delegates. The delegation was a bit too short but beyond fruitful. I will definitely recommend young engineers to participate, in this journey for hunting a full pocket of unforgettable memories!

Ms Rita LEUNG

It was a very valuable experience being in this powerful and large country, exploring the sustainable buildings, complex transportation system and energy production with other 14 delegates and advisor, Ir C C Chan. Through the preparation and participation of this delegation, I acquired not only the engineering knowledge, but also the environmental, social and cultural aspects which widened my horizon.

During this 9-day trip, what inspired me most was how the Russian technology develops and evolves in past centuries. Although digitalization is everywhere in Moscow and St. Petersburg, their culture and heritage are well-reserved in the cities. The balance of reservation and modernization is always difficult but I think Russia is on the right track.

Ms Yani KO

The delegation has been a memorable and fruitful one which not only delivers us knowledge and experience, but also friendship, conscience, enthusiasm and other earnings that could not be learnt without participating in it. It widened my horizon in many areas which I did not learn in my own discipline before, such as infrastructure development and green buildings, with the experience shared by our delegates and Russian professionals. Furthermore, by organizing the delegation, I sharpened my management skills and made many new friends. I enjoyed working with you all and I hope you enjoyed the delegation too. I truly recommend young engineers to participate in the YMC Oversea Delegation!

Ms Christabel WAI

It is truly an amazing experience to travel to Russia and experience how things are done first hand with a group of fellow engineers. With an additional background in policy and how it impacts engineering, this Delegation is particularly interesting for me because I am aware of the works on a policy analysis level also. Functioning is still much as a planned economy, Russia still fights the inertia of top down policy with little regard to implementation. What, they make do under such an environment is the gem to us all. As science and technology policy implementation is a worldwide equaliser, any country can do much better than their status quo.

Mr Damon LEUNG

Joining the Overseas Delegation to Russia is definitely a lifetime memory. The trip to Moscow and St. Petersburg was fun and inspiring. We gained an insight into the culture, history as well as technological development of Russia through our intense preparation and communication with the local Russian representatives. I learned so much from delegates who are from a variety of disciplines and organizations. We also had the precious opportunity to interact with the President Ir Chan during the delegation journey.

Mr Kenneth CHEUNG

Being part of this Delegation is an exciting and unforgettable experience. Through visiting Russia, which was widely recognised as the country of energy and technology, has certainly broadened our knowledge on energy utilisations with environmental considerations, technological advances in digitalisation and green building design and policy, for us to learn, value and bring back to our engineering profession. 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 and "sustainable" tomorrow.

Ms Angel POON

In this trip, I wondered how big the whole engineering field is. There are mechanic engineering, energy engineering, logistic engineering...etc. There is strong bonding within different disciplines in engineering, and they build a better world together.

In Moreover, I would like to encourage young people to lay your steps around the world. I was the only student in this trip. When I was being interviewed, I was asked: Why you think you want to join the trip at your age? Do you think it is suitable to join before you graduate? I answered: It is worth to look around the world. It does not depend on how old you are. You will grow after you see more.

Acknowledgement

We would like to express our deepest gratitude to the following organizations for their helpful guidance and enduring support leading to the success of this Delegation:

- ABOK (Russian Association of Engineers for Heating, Ventilation, Air-Conditioning, Heat Supply and Building Thermal Physics)
- Bureau of Technics
- CLP Power Hong Kong Limited
- Country Park Business Centre
- Electrical and Mechanical Services Department
- International Union of Scientific and Engineering Associations
- Holiday Inn Express SoHo Hong Kong
- Hong Kong Aircraft Engineering Company Limited
- The Hongkong Electric Company Limited
- Kolomenskaya Power Plant
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- Schneider Electric (Hong Kong) Limited
- The Hong Kong and China Gas Company Limited
- Wings & Associates Consulting Engineers Ltd.
- Wo Lee Steel Co. Ltd

We would like to express our special thanks to the following people who generously assist us in this Delegation:

- Mr Alexey POLYAKOV
- Ir Annie CHAN
- Mr Dmitry GOLUNOV
- Mr Ernest TSANG
- Ir Iman LAI
- Ms Irina FEDOROVA
- Mr Jury FILIPPOV
- Ir Patrick CHENG
- Ms Sally LEUNG
- Mr Tommy LEUNG
- Ms Valeria VLASOVA
- Ir Vincent LEUNG
- Mr Yuri TARASENKO
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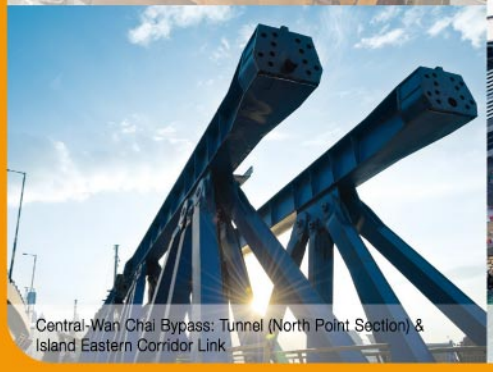
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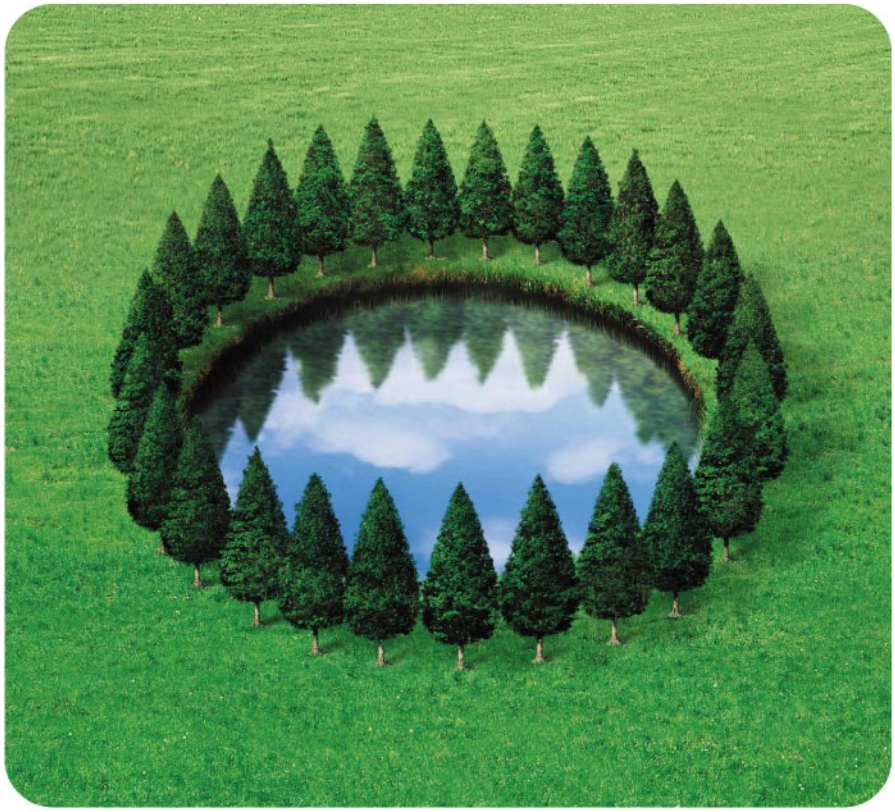
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As Hong Kong's oldest energy utility, our pioneering green initiatives date as far back as the early 70's, when we began using naphtha rather than heavy oil and coal to produce town gas. This move has reduced the emission of sulphur dioxide over the years, contributing to the prevention of acid rain. In 2006, we took another significant step forward, when we introduced natural gas as a feedstock in addition to naphtha. Together with the use of landfill gas for gas production purposes, we have been able to lower emissions of carbon dioxide even further to the impressive level of 20%. Looking forward, we are committed to the ongoing exploration and supply of clean energy to ensure a green and sustainable future for our young people and the generations to come.

煤氣 Towngas





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E: hyder.hk@ arcadis.com
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