CIPHE (Hong Kong Branch) Symposium 2018 - "Waterscape"

Opening Speech by Ir Alfred Sit JP, Director of Electrical & Mechanical Services

"ArcHaic to InnOvation (H_2O)"

Good morning ladies and gentlemen, it is my great honor to be here today. Please allow me to express my gratitude to Dr. Eric Wong for his invitation, providing such a wonderful opportunity for us to share our thoughts among different stakeholders in the industry.

Our theme today, as you might notice, is "Waterscape". But what is "Waterscape"? I would like to start with its prefix, "WATER". H2O from Archaic to Innovation.

The history of mankind begins with water where our ancestors gathered around lakes and rivers, solving basic needs by growing crops and breeding livestock. As everyone knows, civilizations were then formed after sufficient amount of time and offspring. A good evidence of the existence of ancient culture, is water feature, such as Roman Baths and Water Fountains in Babylon, as well as Lotus ponds and Shrines in China. These, are landscapes, that I believe "Waterscape" represents water landscapes.

On landscaping, I can assure you that our Keynote Speaker today, Mr. Tony Mui, as well as our Seminar Speakers Mr. Jeff Tung and Mr. Tony Cheung, will be in a much better position to share with us. As an engineer, I would like to elaborate more on water safety, efficiency and innovation behind the "Waterscape". But before that, what do we need to pay attention first?

For half of the century, the world population has been skyrocketing. Even though it is the commonest common sense that 70% of Earth is water, it is not as common for the fact that fresh water resource is very limited. Within the entire world's water storage, there is only 3% of fresh water, where less than half can be accessed and to be shared among 7.6 billion of people.

According to IWA's (International Water Association) statistics in 2014, Hong Kong was recorded a relatively large consumption comparing with other major cities such as Beijing, Barcelona and London, at about 210 liters per capita per day. Water Services

Department reported the daily fresh water consumption of Hong Kong is 2.72 million cubic meters in 2017, equivalent to 1,088 Olympic swimming pools.

In order to improve such situation, to balance the usages of water between different concerns, it is our responsibility to use water wisely. From “Needs”, “Sustainability” and “Safety”, a good question to ask is, what engineers have been contributing to safeguard and coordinate among glamourous waterscapes?

A reliable fresh water supply is of paramount importance in sustaining Hong Kong's development and economic growth. Behind the water that comes out from our tap 24/7, there are a series of engineering involved. Civil engineers build infrastructures and underground pipes connecting water sources; Electrical & Mechanical engineers with assistance from chemists filter, sterilize, transfer and deliver water to our homes.

Since 2008, Water Services Department has developed the "Total Water Management (TWM) Strategy", one of the key supply management initiatives is to diversify and develop water resources. Currently, about 70 to 80 percent of fresh water comes from Dongjiang where the rest are natural rainfall catchments.4 Considering the fact that we are surrounded by ocean, Tseung Kwan O Desalination Plant is one of the innovative projects concluded. Desalination is the process to remove dissolved salts and impurities from seawater producing drinking quality water. The plant will have a fresh water production capacity of 135,000 cubic metres (m3) per day with reservation for future expansion doubling the capacity to 270,000 cubic metres (m3) per day, which is nearly 10 percent of our daily usage!

Apart from resources, building designs nowadays are encouraged to incorporate sustainable development elements. The Trade and Industry Tower located in Kai Tak is the first Hong Kong Government office building achieved Hong Kong BEAM Plus Platinum and LEED Platinum. One of her green features is the use of Rainwater Recycling System. Rainwater is harvested and stored for irrigation of the iconic green ribbon on the building façade. Not only is this water saving, energy efficient due to the heat absorbed by the plantations, but also aesthetically pleasing.

Regulatory service is indeed one of the major services to the public of our department. EMSD is responsible for the development, promotion and implementation of energy efficiency and conservation; we also provide professional support to the Government on

the use of new and renewable energy as well as to protect public health and safety through various guidelines, codes of practice and execution of Ordinances. With respect to water usages, Buildings Energy Efficiency Ordinance (BEEO) regulates building service installations including water pumps.

The Fresh Water Cooling Towers Scheme is to promote the adequate use of ter resources for more energy-efficient water-cooled air conditioning systems. Despite the high efficiency of water as a heat rejection media, the operation temperature of the coolant water is ideal for Legionella growth that is harmful to our health. Hence, a Guideline on Good Operation and Maintenance Practice of Fresh Water Cooling Tower was released for public reference. The owners of cooling towers should maintain proper conditions of their installations to minimize contaminations and nuisances to the public. This is how engineering achieves a balance between water energy efficiency and public health and safety.

Most of the pumping and filtration systems for fountains, swimming pools, water slides and ponds in public parks are operated and maintained by EMSD. Even though our work might not be fully noticeable to the public, delivering high quality leisure services has always been one of our primary missions.

Nevertheless, regardless of the government's efforts in managing limited natural resources, we are only a small gear in the entire energy-saving mechanism. Your participation and the social awareness are essential. More importantly, in order to maximize the effect, innovation is an indispensable part! Let's see some innovative ideas over the globe.

Water curtain is not a new invention, yet in Hong Kong Science and Technology Park, it is installed as an enhancement to the interior design. At the meantime, it is also a temperature regulator to the indoor microclimate – that means, water evaporates by absorbing heat from the surrounding, to lower the ambient temperature, becomes an auxiliary air cooler without electricity.

Other than cooling, water curtain can be used to display information. In Japan, a precise water dripping control is used to show time, temperature and even music performances at Osaka Station City shopping mall as an attraction. While Australian on the other hand, deploys it at the Sydney Harbor Tunnel as a virtual barrier. The best part of this barrier

is that, besides an enormous “Stop” sign can be ‘hoisted’ in split-second, even if the driver is not able to halt in time, there will not be any immediate physical impact, except for a nice car wash.

All of the above applications happened in modern cities; How about in rural areas where basic technology like electricity is barely accessible? Let’s see how Filipinos renovated their home by an innovative water application. With innovation, light is brought into everybody’s home during the day, but what if a slice of technology is added as a seasoning? With technology, people extended their idea further to prolong hope throughout the night. Such combination between innovation and technology encourages humanity for greater accomplishments.

There is a Chinese saying, 水能載舟亦能覆舟, whilst we enjoy modern conveniences and the beauty of waterscapes, signs of Global Warming are recorded all over the world. Making reference to the tidal readings and recent satellite measurements collected by the National Geographic, over the past centuries, the Global Mean Sea Level (GMSL) has risen by 4 to 8 inches. To worsen the situation, the average annual sea-level-rising rate over the past 20 years is roughly double of the preceding 80 years. Someday in the future, lands might be overwhelmed by the ocean, where innovations like the floating city could be our last resort. Or perhaps harmony will be restored by everyone’s effort. Nevertheless, this ambitious idea is a very good example of how innovation and technology are applied to waterscape and human needs with the collaboration between engineers and architects. Designs nowadays tend to be multidisciplinary with integrated intelligence, where our ultimate goal is to create a sustainable environment for Civilization.

All in all, there are millions of possibilities between us and water, let’s work together, be innovative, and shape a better future. Thank you.

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