

CITAC Inaugural Conference

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

“Embarking on a Journey of Innovation – an EMSD Experience”

Good morning, Mr. CHAN (Ka-kui, CIC Chairman), Ir HO (Thomas, CITAC Chairman), Ir HON (Chi-keung, PS(W)), distinguished guests and fellow colleagues.

I take great delight to be here at this important inaugural conference, to exchange ideas and experience with fellow experts on how we can better contribute to the construction industry through innovation. The theme of the morning session is about “Intuitional Framework to Facilitate Innovation in Construction”. When I first received the invitation from Albert (*Cheng, Executive Director of CIC*) to speak about innovation in construction, being an electrical engineer by profession with my experience mainly on design and maintenance of electrical and mechanical engineering systems, I did puzzle for a while whether I am a suitable person to speak on this subject. Hence, I would venture to share some thoughts about innovation based on our experience at EMSD and hope it will generate further discussions and fruitful sharing by fellow professionals and experienced practitioners from the construction industry.

Construction – Manifestation of Human Civilization

Human construction activities date back to the ancient times and evolve by different trends in time, marked with radical changes in materials, tools and methodologies used in different historic stages from ancient copper age to the twenty first century. Our ancestors surmounted the heat of the desert and the steep mountain ridges and gathered million tonnes of bricks, stones and concretes to build large structures and monuments. On top of their blood, tear and sweat, their primitive technologies available at that time were merely ropes, copper tools, sledges, wheelbarrows, pulleys and inclined planes. Egyptian pyramids, the Great Wall of China and many alike, stand testament to humanity’s passion for construction, forming the prominent representations of our human civilization and innovation.

Innovation & Technology in Construction Industry

Some basic construction materials and tools invented at the ancient times are still used nowadays, and have made long-lasting influence to our modern construction industry. On the other hand, we are living in an age in which technology creates abundant

possibilities. In fact, the innovation in a sector is often enabled by technologies and inventions in other interrelated areas. Curtain wall is a case in point. It was not compatible with earlier building methods which relied on exterior walls to carry the load. Then, sturdier columns were used as the building's support systems as steel and reinforced concrete became common building materials, rendering it feasible to use other materials for the building enclosures. At the same time, technological advancements allow glass to be used for exterior facades and thus giving rise to today's curtain walls. It has certainly gone a long way from the early use of glass as tips for spears when human being discovered obsidian, a natural form of glass, in the ancient time.

When it comes to the latest technologies in construction, many development will come to our mind. With the advances in microbiology, scientists are able to produce bio-concretes which have self-healing capability. On the other hand, advancement in information technologies brings about BIM and Virtual Reality, which is conducive to envisaging the structures to be constructed layers upon layers, making construction management and planning more efficient, and helping reduce safety risks. Recently, 3D-printing technology, originally a rapid-prototyping technique for the manufacturing industry in 1980, has been applied in pilot construction projects.

These innovative elements, often seemingly irrelevant to the traditional construction trade, have revolutionized the ways we construct nowadays. Thanks to these technologies, we can now build more efficiently and safely at the same or even lower cost, and what we build is ever more sustainable. These examples demonstrate that many problems in the construction industry may be tackled by a novel idea in other disciplines, as long as such idea is adequately initiated, developed and adopted.

An EMSD Experience

We, at EMSD, have been attaching great importance to innovation. We have been using quality control circle as a vehicle to harness staff's creativity in improving quality and productivity at work since 1991 when the Work Improvement Team Scheme and Business Process Improvement were introduced to the department. This is a bottom-up approach which helps foster team spirit and cultivate continuous improvement culture among staff. There are no lack of cases involving adoption and application of innovation and technology. For example, one team has implemented remote monitoring units to monitor the operating status of subway lighting that effectively reduce the manpower to perform site inspection. This has been further expanded to cover submersible pumps at subways, lifts and escalators at footbridge etc.

Another example is the construction of an automatic remote-control fly-ash robot to collect bone ashes in cremator flue, saving the need for the staff to enter into the flue gas channels to clean up the accumulated fly ashes. This has also got a Special Citation (Innovation) award under the Civil Service Outstanding Service Award Scheme in 2017.

We are also vigilant about the latest innovation and technology in the market and actively seek opportunities for application of such. For example, with the advancement in mobile technology, we are pursuing our e-Workflow system called Customer Centric e-Platform (CCeP) for maintenance job management. With online job dispatch functions, case handling time to be decreased, thus enhancing productivity. Whereas, with real time job progress update, the operators at fault call centre will have timely job information available at the operator consoles for answering clients' enquires. The frontline staff and the management can also obtain the same information timely. On the other hand, we are also implementing integrated Building Management System (iBMS) that enable remote monitoring and control of electrical, mechanical, air-conditioning and building services installations with a view to identifying and responding to faults at the earliest stage and enhancing maintenance effectiveness and efficiency.

The possibilities that can be brought by technology may be endless. The key to making a difference lies with matching our service demand with suitable technology. To this end, we have been in close liaison with universities for collaboration opportunities. For the past few years, we have supported universities to apply for Innovation and Technology Fund (ITF) for Electrical & Mechanical (E&M) and energy saving related research projects. We also provide assistance to universities by liaising with other government departments to offer testing grounds for them to trial run their research projects.

Moreover, EMSD has also been fostering collaboration with the trade partners and universities to develop innovative solutions to enhance operation efficiency and building energy performance of government buildings. In this connection, EMSD has organised a series of trade technology seminars and innovation technology sharing sessions. Afterwards, EMSD conducted visits to various schools/ departments/ institutes/ centres of the universities to understand their research areas and interests to see whether they can be applied to government premises. Recently, EMSD and Hong Kong Science and Technology Parks Corporation (HKSTP) co-organised the first Innovative Technology Day, in which various government departments, public organisations and start-ups from HKSTP's Incu-Tech Programme were invited to

participate. Together, we explored the feasibility of applying the start-ups' fruits of research to aid the operation of our partners departments.

Enhancement of the Institutional Framework

In the Chief Executive's 2017 Policy Address, the Government has promulgated a vision of building Hong Kong into a smart city, and has been putting a lot of emphasis on innovation and technology to bring new economic drive and improve people's daily lives. To support the government policy, EMSD has taken further steps to enhance the institutional framework to facilitate the adoption and application of innovation and technology. Let me share some initiatives that we are pursuing.

Collaboration Platform

We are developing a web-based "Innovation and Technology Collaboration Platform". Through this platform, EMSD can share the technological challenges and wish-lists of bureau and departments and public bodies, where the universities and start-ups could also propose matching innovation and technology solutions to resolve the problems. Validated performance reports of trial cases will be posted to the platform for sharing with the public. The platform will be launched in the coming months.

EMSD HQs as Testing Ground

We have designated EMSD Headquarters building and facilities as the testing site for suitable trial projects. Where a particular case warrants, we would also liaise with relevant government departments and public bodies to provide suitable venues for trial purpose. Apart from providing testing site, EMSD with a team of professional engineers and technical staff will provide the necessary engineering support for the trial Innovation and Technology projects and participate in the Measurement & Validation process in a professional and impartial manner. We allow academic institutions and start-ups to have better chances at being an early entrant to field-test their products or technology concepts and gain experience, thus refining their technologies to better match the market needs. Moreover, success cases will be posted to the "Innovation and Technology Collaboration Platform".

Organizational Change

In order to meet the new global trend of innovation and technology, many well-known innovative enterprises such as Microsoft, Google are keen on setting up innovative office to facilitate the creation of innovation culture. To meet the fast-changing needs of government departments and the public, EMSD shall develop agility with the aid of technology. Therefore, we are conducting internal structure review to quickly re-configure our organizational routine in response to change in the environment,

challenges and opportunities. A centralized “Inno-Office” will be established at corporate level for corporate business support and co-ordination of technology development for supporting various start-up projects. Whereas, various “Inno-Teams” will be formed at divisional level to take up the projects to develop their tailor-made innovative solutions that would meet the particular needs of our partners departments. We also encourage colleagues at cross-divisional level in the department to set up voluntary “Inno-Sandbox” to improve service processes and enhance efficiency through new thinking. We hope to create an organizational structure that promotes innovative development and technological applications.

Closing Remarks

Looking forward, we will continue to actively seek out opportunities to leverage innovation and technology to enhance our services. The application of BIM on asset management is one area. We have recently developed the BIM-AM Standards and Guidelines aiming to provide BIM modeling standard, coding standard and information requirement for E&M systems and assets at handover stage for building operation. We also commenced a pilot project at EMSD Headquarters building to assess the technical feasibility of applying BIM to asset management. In support of smart city initiatives, we would also provide technical input to various government departments, such as that related to the launch of the pilot “Multi-functional Smart Lampposts” at selected urban locations.

Back to the construction industry, we understand that CIC has spared no efforts in promoting innovation in the industry such as implementation of BIM, establishment of CIC Innovation Award to recognize the industry stakeholders’ achievements. Today, CIC has taken a great step further, that is, setting up the Construction Innovation & Technology Application Centre (CITAC).

While witnessing the birth of CITAC, we foresee a lot of opportunities of collaboration with CIC in promoting innovative technology for a better Hong Kong. Fellow members of the construction industry, EMSD stands ready to co-create a smart city with you.

Thank you.

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