

**HKIE - Safety Specialist Committee (SSC)**  
**Annual Symposium 2018**

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

**“Safety Engineering: High Risk Activities”**

Good morning Ir. Dr. Joseph CHI, distinguished speakers, ladies and gentlemen,

1. *Opening*

I take great delight to be here at this meaningful annual symposium with a theme on safety engineering in high risk activities. First of all, I wish to express my sincere gratitude to the HKIE Safety Specialist Committee for promoting safety awareness of engineers and upholding safety standards in engineering practice for over 20 years since its establishment in 1995. The symposium today covers a wide spectrum of topics, such as tunneling works, risk management, lift safety, fire and water hazards. It brings experts from different areas to share their valuable views and experiences on safety engineering.

“Safety by design” plays a key role for the design, construction, operation and maintenance of buildings and infrastructure, in particular, for high risk activities. Apart from construction stage, a safe working environment for operation and maintenance stage is equally important. It is not uncommon to find cases of inadequate maintenance space for air-conditioners even in recent constructed properties. In certain cases, workers have to crawl out of the windows to get access to the air-conditioners. We, as engineers, can improve this situation at the early design stage.

Statistics by Labour Department shows a significant drop of the accident rate of construction workers by 43% over the past 10 years. However, when we look at the number of fatal accidents, there are 22 cases in 2017 which exceeds that in 2016 by 12. Admittedly, there is still room for improvement to build a safer industry.

As the regulator and facilitator, Hong Kong Government has been adopting multi-pronged approach to improve safety in high risk activities. For example, Occupational Safety and Health Council, together with the Labour Department, has launched sponsorship schemes for small and medium-sized enterprises (SMEs) to

acquire equipment to reduce risk for various work processes such as work-at-height and electrical works. Labour Department actively promotes safe practices. It has revised the Code of Practice for Bamboo Scaffolding Safety and formulated a new set of Guidance Notes on Safety and Health of Hand-dug Tunneling Work together with the industry to enhance occupational safety and health of workers. Development Bureau also actively promotes application of Building Information Modelling (BIM) and Modular Integrated Construction (MiC) in public works projects. Both applications are increasingly used in the industry to prevent high risk activities, apart from other benefits such as reducing cost and avoiding changes.

## 2. *SAFE*

The government and industry stakeholders have been making great effort to improve safety. On the other hand, technology has been reshaping our world in every possible manner in this era of Innovation and Technology (I&T). Yet, how could I&T provide impetus for further breakthroughs in improving safety, especially in high risk activities?

Look into the word “S A F E”. Maybe the word itself already gives us some hints.

## 3. *Smart*

First of all, S stands for Smart. With the inevitable trend of automation, technology can become an assistive or substitutive tool to minimize the risks. Hong Kong Government has adopted the use of drone in different aspects to reduce the risk of construction. For example, in a CEDD project of ground investigation for landslip prevention and mitigation works, drone is used to assist site familiarization and hazard identification. With the use of drone, workers do not have to climb the slopes in persons to familiarize the site and identify hazards. At EMSD, we also make use of technology in construction of an automatic remote-controlled fly-ash machine to collect ashes in cremator flue. This automatic machine can assist us to clean up the accumulated fly ashes and free our staff from entering into high risk environment, the flue gas channels. With the integration of technology, we definitely can do smart to improve safety.

## 4. *Alertness*

Secondly, A for Alertness. Technology can also be applied in raising humans' alertness. Advancement in information technologies speeds up the development and application of Building Information Modelling (BIM), which is conducive to envisaging the structures to be constructed layers upon layers, making construction safer by identifying high risk activities at an early stage.

There were a number of serious accidents related to work-at-height over the past few years. In response, RFID safety harness system has started to be applied in the industry to minimize the risk of work-at-height. RFID tags are embedded into safety harness for monitoring of its status. Alert message will be sent to the workers and supervisors' mobile device when the safety harness is not properly attached to the independent lifeline or anchorage point. The innovative RFID system could alert workers to comply with the safe working methods and avoid putting the workers at risk.

On the other hand, the Construction Innovation and Technology Application Centre of Construction Industry Council has recently demonstrated a creative idea by incorporating internet of things (IoT) sensors in safety helmets. The intelligent safety helmets could detect potential dangers to the users, for example, by equipping with body temperature sensor and heart rate sensor to detect the risk of heat stroke, and ultrasonic sensors to detect adjacent objects for avoidance of collision.

Technology application is diversified. With the correct use of technology, safety alertness can definitely be raised.

##### 5. *Force*

The third letter of "SAFE" is F which stands for Force. Sometimes, deterring is inevitably needed for human to act in proper and safe manner. Technology has been applied to force humans to behave safely in various applications. With the introduction of red light cameras and speed enforcement cameras in the 90s, the numbers of red light jumping cases and traffic incidents involving injuries have both been reduced by 40% or more at the scene with such installations. Nowadays, wearable devices are developed to trace the location of workers in construction sites or buildings. If a worker has accidentally entered into an unauthorized area, alarm signal will be sent to both the worker and his supervisor to stop the worker from entering into the restricted area. In the last year, there were a number of serious accidents related to lifting operation. Unauthorized entry to the danger zone of lifting operation should be prohibited. If the technologies had been used, the workers would have been immediately spotted and stopped before such tragedies happened.

Force, in other words, monitoring, is an effective way to change behavior and resolve the safety problems related to manner and carelessness of the workers.

## 6. Education

Lastly, E stands for Education. South Africa's first black president, Nelson Mandela, once said "Education is the most powerful weapon which you can use to change the world." Technology can be used as an education tool to cultivate safety mindset and habit in the industry. Stakeholders in the industry have already started applying Virtual Reality (VR) technology to make safety training more lively and interesting. In addition, VR has also been used to simulate dangerous conditions and high risk activities to train up workers' and supervisory staff's safety mindset by identifying mistakes in the simulations. We have known of software developed to make use of BIM to create a virtual reality of the site, allowing workers to simulate a site walk and learn about the safety precautions before entering into the actual site.

## 7. *Closing: Take Home Message – Co Co (Connect & Co-create)*

Opportunity of improving safety that can be brought by technology is endless. If all stakeholders in the industry, including project proponents, contractors, sub-contractors, and most importantly the safety professionals, do it together, we could make a difference. As the saying goes "Alone we can do so little, together we can do so much." (famous American author, Helen Keller) May I appeal to you all to work together to make the best out of technologies for improving safety. It is time for us, engineers, to apply technologies to help protect everybody from harm. Let's connect and co-create for our safer future.

Thank you.

22 June 2018