One Day Seminar on " Passive Fire Protection to Steel Buildings & Convention Centers, And The Challenges and Solutions in Building Envelope Waterproofing "

by Ir. Lo Seng Ling

Ir. Lo Seng Ling is currently a Secretary/Treasurer in Civil and Structural Engineering Technical Division (CSETD).

A One-Day seminar on "Passive Fire Protection to Steel Buildings & Convention Centers, and The Challenges and Solutions in Building Envelope Waterproofing" was organised by the Civil and Structural Engineering Technical Division (CSETD) of IEM on 26th September 2019. Total of 115 participants attended the seminar.

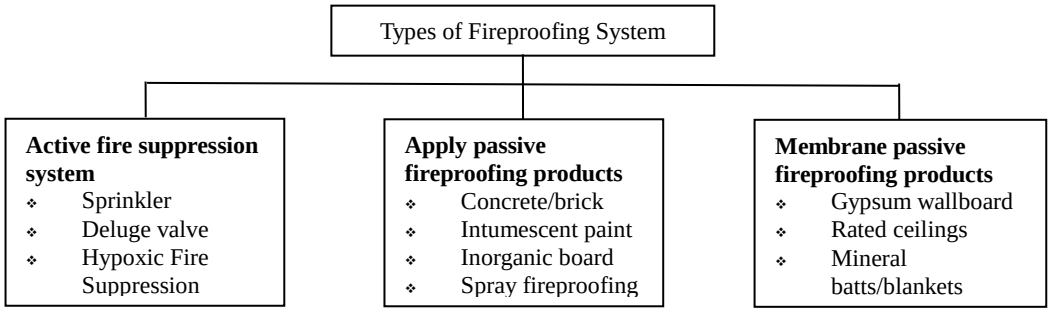
The seminar was presented by two speakers, Mr. Scott Whitelaw from Brisbane, Australia and Mr. Joe Ho from Hong Kong. Mr. Scott holds a Bachelor of Science Degree in Chemistry. He has been the Technical Manager of GCP in Australia and New Zealand for 20 years. He has broad experience in waterproofing, protective coating, fire proofing and air & vapour barrier technology, developing specifications with architects and engineers, technical & field application problem solving, product development, product testing and applicator training. He also has 28 years of experience as polyurethane development chemist in the waterproofing, construction and manufacturing industries.

Mr. Joe Ho obtained his Master Degree in Business Administration from University of Western Sydney in 2004. He is the Sales Manager for GCP (HK) Ltd overseeing fireproofing products sales and technical activities in ASEAN countries, China, Taiwan and India. He has over 20 years of experience in serving the structural fireproofing industry with competent knowledge and in-depth experience with respect to fire test codes and field application of the fireproofing products to assure the in-placed product quality and right product in right place.

The first session of the seminar was presented by Mr. Joe on the fireproofing products. Fireproofing products is a life-saving product critical for steel structures. During the first session of the seminar, Mr. Joe defined fireproofing product as "Any product that, in the event of fire, actively or passively acts to reduce the rate of temperature rise of a building elements." Building elements are any part of a building necessary to maintain the structural integrity or prevent the spread of fire when exposed to elevated temperatures including beams, columns. slabs, walls and roofs.

Fireproofing products are able to prevent structure failure or collapse. Structure steel will loss its strength as temperature increased, approximately 50% loss of strength at 1100°F or 593°C. Fireproofing products can also prevent of lateral and vertical fire spread. When the structure steel exceed the ability to carry the load, the steel will deflect and open path for smoke or fire to travel (vertically or horizontally) throughout the building.

The fireproofing products can be categorize into active fireproofing system and passive fireproofing products. In the seminar, Mr. Joe presented several types of passive fireproofing products and the advantages or disadvantages of each type of fireproofing products. He also highlighted the elements defined the fire resistance period are type of the product, usage of the building, height of the building floor, capacity of the product and installation of the fire system. To ensure the fire protection system perform according to the requirements, the fireproofing products shall be endorsed by professional third party, such as UL Mark on the products' packaging or with CERTIFIRE Certification. Besides, using appropriate fire resistance design and good installation through well-trained applicator also are equally important.



Types of Fireproofing System

Mr. Joe presented case study for fireproofing system application on Petronas Tower at Kuala Lumpur, City of Dreams Hotel D at Macau, Hong Kong Government Headquarter and Hong Kong Convention & Exhibition Center before he ended session 1. A token of appreciation was presented to Mr. Joe by the Chairman of IEM Civil and Structure Engineering Technical Divison, Ir. Chong Chee Meng, before the seminar break for lunch.

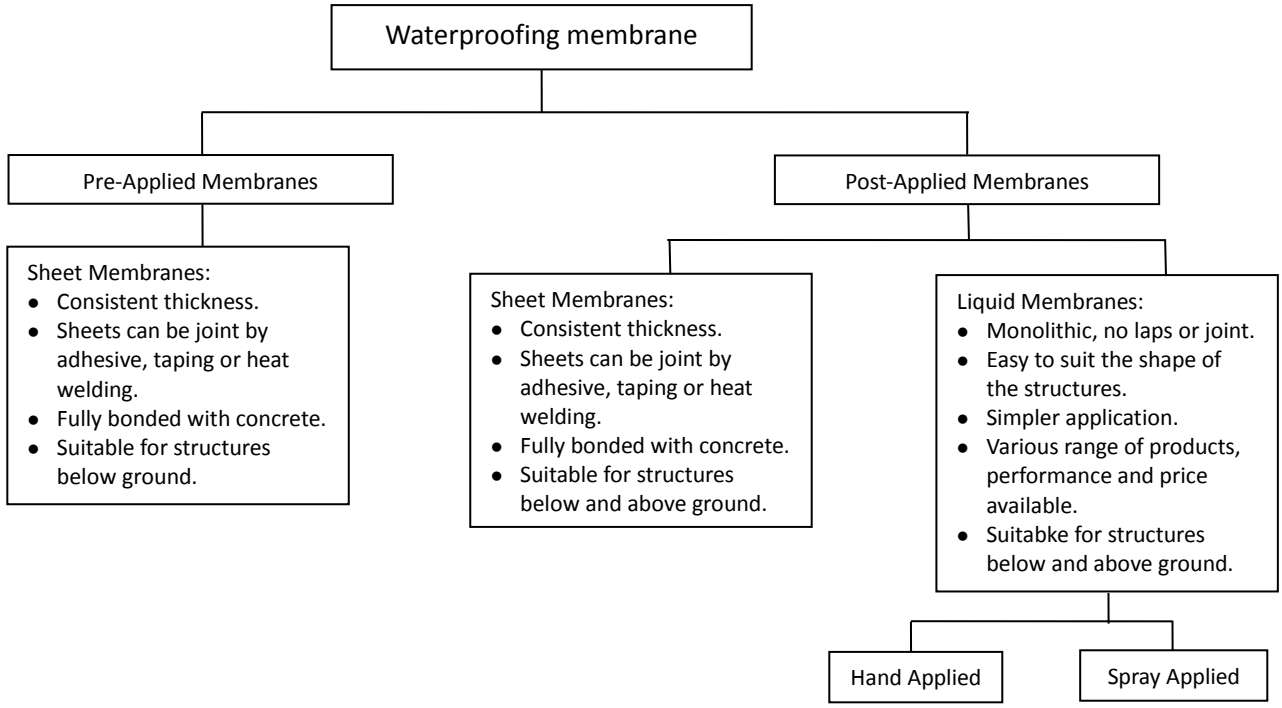
In the afternoon, the second session of the seminar was presented by Mr. Scott on "Challenges and Solution in Building Envelope Waterproofing". Mr. Scott started the presentation with defines waterproofing as the treatment of a surface to prevent the passage of liquid water and water vapour into the structures. Most of the structures below the ground water table are subjected to hydrostatic pressure during their life time. Therefore, the use of quality waterproofing system id essential to preserve the water-tightness of the structures. Water ingress to the structures can cause structure damage, reduced the life time of the structures, damage to the plant and equipment, damage to the personal properties, unhealthy living or work environment due to the fungal growth and etc.

The critical requirements of water proofing materials shall be as following:

- Fully water and vapour tight,
- Long term resistance to water, gas and chemical,
- Fully bonded to concrete substrate,
- Resistance to sunlight (UV) exposure,
- Fully sealed, proper lapping and termination detailing,
- Robust and flexible to accommodate structural movement,
- Fast and low hazard installation.

A good water proofing system shall be designed to prevent water entering the structures and caused damages to the structures. Water proofing membrane shall be applied to the same side of the structures as the source of water. Thus, the water pressure will constantly pushes the waterproofing membrane against the structures. However, proper planing is required during the construction stage to apply the waterproofing membrane on the structures at the same side of the water source. At the joint ares, such as expansion joint and construction joint, at least two types of waterproofing system are required. The joint shall be protected with primary waterproofing of membrane over the joint and secondary waterproofing of joint treatment.

The waterproofing membranes, either in term of membrane sheet or liquid, can be pre-applied or post-applied during the construction stage. Different types of waterproofing membrane and their advantages are shown the the following figure.



Types of Waterproofing membranes

The challenges in providing suitable waterproofing system for the structures, such as residential unit and tunnel, were also presented in session 2 of the seminar. The most challenging issue is the cost of the waterproofing system. Generally, waterproofing cost is less the 0.5% of the total project cost. Due to the owner, developer or government agency requested for cheaper construction cost, waterproofing system often is the first element to be reduced or compromised in the design stage. However, the cost for repairing the structure due to the failure of the waterproofing system is unpredictable huge. Other challenges such as choice of products, construction planning, detailing issues and etc were also presented in details.

A token of appreciation was presented to Mr. Scott by Ir. Chong Chee Meng as the Chairman of IEM Civil and Structure Engineering Technical Division before the seminar ended at 5pm.