

### Deep Concern of Extending Travel Distance in Performance-Based Design Projects

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Firemen should follow some firefighting and rescue practices supported by appropriate training. There would be challenges on not following the scheme [1]. Such training had been demonstrated to be appropriate for fighting against building fires with fire safety provisions following the prescriptive codes [2-6]. For construction projects with difficulties to comply with those prescriptive codes, fire engineering approach (FEA) [7-9] can be used since 1998. This is a good practice following overseas development of performance-based design (PBD) for new architectural features [10], particularly those claimed for providing sustainability but might be in conflict with fire safety requirement. Large halls to provide natural ventilation and daylighting are good examples. Implementing FEA/PBD might be the only choice during the transition period before updating and upgrading the code. Note that codes in Hong Kong cannot be set up so quickly as in other places such as Mainland China. A long consultation period is needed. The karaoke establishments bill is an obvious example [11].

As pointed out recently [12], PBD was not only used for cases where the prescriptive codes were not yet updated, but simply used in many places for reducing the construction cost. FEA/PBD certainly should not be implemented just for reducing the cost. On the contrary, implementing FEA/PBD projects might be even more expensive for buildings without prescriptive fire code yet. Taking supertall building (classified to be over 300 m by CTBUH [13]) as an example, applying the same set of code for buildings of 100 m tall to buildings of 1000 m tall should be reviewed. It is obvious that a 1000 m tall building should have much more fire safety provisions than required.

There are many examples of FEA/PBD projects extending the travel distance in large and tall halls due to many reasons, such as providing daylighting and natural ventilation. Some even require people to walk a distance [2-6] much longer than the specified values in overseas design guides. Such design, including emergency escape passage (EEP) [14] in subway tunnels, should be watched. The FEA/PBD reports only demonstrated that occupants can evacuate in time by computer software. Some subway stations are even not fully covered by sprinklers, leaving firemen to fight against big fires. Not until recently [15], very few FEA/PBD reports touched upon the effect on firefighting and rescue strategy, potential health

impact on firefighters and intervention of installed fire service systems. Note that firemen are expected not only to carry heavy equipment for fighting fires, but also carrying people out.

Training for firefighters is well-established on suppressing building fires following prescriptive codes as demonstrated in the past decades. Extending the maximum travel distance [2,6] would impose difficulties in firefighting and rescue, and might even affect the valuable life of brave firemen. Note that they have to wear heavy portable breathing apparatus (PBA) and the associated air bottles, firefighting equipment and fire hydrant into the fire site with hazardous environment. They need to carry injured occupants or the disabled out. A normal PBA can only operate for 30 minutes.

A question is therefore raised:

Is it fair for them to walk a long travel distance exceeding the maximum allowed value?

This is a big issue referring not only to new projects. All existing buildings going through FEA/PBD since 1998 with extended travel distance much longer than code specification [2,6] should be carefully reviewed. It is already very unfair to leave the responsibility of fighting against big fires to firemen under hazardous environment with fire safety provisions not complied with the codes. Asking them to walk through such extended long distances from 30 m to over 100 m in large halls, and 750 m to 1500 m in EEP of subway tunnels for firefighting and rescuing people trapped inside must be prevented.

Fighting fire in buildings without adequate fire safety provisions is very dangerous for firemen. Academics were blamed for not training fire engineers properly so that they cannot work out responsible fire safety design; but only keep on saying that hall (such as airport terminal) is safe without any experimental evidence.

An immediate action is to implement appropriate fire safety management by assigning more security guards to those places with extended travel distance to avoid any small accidental fire from happening. Big halls for public transport and tunnels going through FEA/PBD with timeline analysis should be checked carefully [16-19]. Of course, full-scale burning tests must be carried out to avoid using flawed concept [17].

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