

FIRE SAFETY AND DESIGN CHALLENGES OF MULTI-STORIED AND MIXED USE BUILDINGS

May 2007

Keywords:

high rise buildings; multi-storied buildings; tall buildings; urban habitat; fire safety; survival; escape means; evacuation; safety engineering

Abstract:

In order to increase the chances of survival during a fire emergency, the time available for a person to leave the danger zone must be longer than the time needed to make the escape. For tall buildings, providing time for people to reach safety requires unique considerations with regard to the potential for flame spread, challenges in fire suppression, the extended time occupants could be exposed to smoke and heat, and the potential for thermal weakening of the building structure. Over the past two decades, there have been major advances in both the science of fire and its application to fire safety engineering. Building owners want to know how their building will cope with an extreme event and what design enhancements if any are required to meet these new threats. Simply relying on the old Building Code methods of fire protection may no longer be sufficient.

The Story

The regional cities around the world are undergoing extensive urban regeneration.

A key feature of this is the desire to increase the proportion of residential developments in the city centers and introduce landmark buildings of the highest quality. This has ultimately lead to proposals for many multi-storied residential and mixed-use schemes. Standard building codes cannot adequately address fire safety design in such schemes which introducing major impact to save lives.

The traditional codes are either unduly restrictive, stifling development, or they do not provide adequate protection to occupants and fire fighters. If we are to continue to regenerate our cities with architecturally stimulating buildings, which are sufficiently commercially sound to facilitate their construction, we must face the fire safety and life safety challenges of modern multi-storied design in the world. It is important to understand how new approach and innovative solutions can be developed to meet the challenges of these buildings.

It has therefore been necessary to develop a range of fire escape and life safety engineered solutions, which can deliver safe and efficient evacuation.

The multi-storied residential designs developed in 1950's and 1960's typically comprised 10 – 20 storey developments, committed solely to residential use (ancillary commercial accommodation was often provided on the same site). Many projects were developed as single stair designs, all without the use of sprinklers and typically without common fire alarm systems.

Notwithstanding this, the fire safety legacy of these buildings has not been a matter of great concern. Whilst some may argue that all such schemes are an accident waiting to happen, the statistical evidence does not support this. Recent studies have concluded that the fire risk arising to individual apartments in high-rise residential schemes is no greater than in low-rise housing and that whilst there may be a disproportionate number of fires at high-rise sites, this can be attributed to issues such as vandalism of service accommodation at the base of multi-storied schemes and arise primary from a social and community basis.

The height, use and locations of the new breed of multi-storied schemes, coupled with the performance based regulatory framework, a legacy of social housing multi-storied and limited 'standard' guidance has created both the need and opportunity for a re-evaluation of fire safety in multi-storied residential and office schemes and the application of fire engineering to deliver safe, economic and architecturally stimulating buildings.

It is important that when considering the fire safety challenges that one develops solutions, which also address the key design challenges of multi-storied buildings. The fire strategy for a project must allow the building tenants to safely escape and to prevent life loss.

In addition to the design challenges, which impact on fire safety, there would also appear to be a perceived inherent additional risk in multi-storied buildings. Recent amendments to standard design guidance has included the following statement which is made with respect to dwellings:

“Increased height brings extra risk, both in the time needed for escape and the difficulties posed to the fire service in attempting to assist evacuation, effect rescue or fight fires.”

In a residential multi-storied scheme, the escape stairs are considered to be a place of safety for occupants escaping from the fire relative to the apartment, which is on fire. This is common principle across all internationally recognized building codes. If this is the case, then the height of the building has no relevance to the time it takes to get to a place of safety. Only the distance traveled on the fire floor is critical. This is the most important fact, which say that new means of egress should be there, giving the opportunity for a quick, safe and reliable escape and evacuation.

The fact is that deaths in residential apartments are not occurring in the common escape areas and are unrelated to the height of the building. Deaths in residential and office buildings (over 99%) are not in the common areas, they take place within the dwellings. Sadly the pattern so commonly observed of a correlation between social class and smoke detector provision / maintenance, are the key factors. Providing certified, recognized independent escape devices and systems in multi-storied apartments and offices will increase the odds of saving lives in case of variable threats as fires, earthquakes and terror actions.

CONCLUSIONS

Multi-storied projects present challenges, which have not been considered previously. Such schemes are on the increase and encouraged by the current planning and economic environment. Most of the existing and proposed multi-storied schemes should apply for Life Safety Engineering based solutions to overcome these challenges.

The “Story” about Fire Safety and Saving Lives in Multi-storied buildings emphasis the need of an unique solution under the name ” DOUBLEXIT BUILDING EMERGENCY ESCAPE SYSTEM”: All- in- one solution which provide independent, simple, safe, quick and reliable mean of egress for use in emergency when all primary means of egress are not available. “DOUBLEXIT” patented product, introduce the latest technology, driven by a commitment to technical excellence and high quality solutions that are completely reliable and effective for the need to save lives.

For more information about the “DOUBLEXIT “ please visit: www.doublexit.com

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