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FIRE PROTECTION HISTORY: HOW "SAFE" IS "SAFE ENOUGH"? CIRCA 1910

By Richard Schulte

Since September 11th, there has been a debate in the fire protection field going on regarding the purpose of building code regulations. Prior to 9/11, it was generally accepted that the purpose of the building code was to provide a "reasonable" level of fire safety for building occupants. While there was, and is, plenty of room for debate over the level of safety which constitutes a "reasonable" level of safety, since 9/11 some in the fire protection field now believe that the purpose of the building code is to address improbable events in an attempt to prevent any and all catastrophic building failures which might occur.

Aside from the fact that it is simply not possible to imagine what improbable events may occur at sometime in either the near term or distant future, and the magnitude of these events, those that advocate this new standard for building regulation have not, as of yet, addressed a number of issues.

First among the issues which have not been addressed is whether or not society can actually afford to construct buildings which are capable of resisting all sorts of improbable hazards. Second among the issues which have not been addressed is how do we maintain this higher level of protection over the course of years assuming that the building has been designed to provide a higher level of safety for the occupants.

Clearly, designing buildings to provide a higher level of safety than provided prior to September 11th will be costly. While the World Trade Center (WTC) towers were designed to resist hurricane force winds which occur infrequently in New York, the WTC towers were clearly not designed for aircraft much larger than those which existed at the time of construction to be intentionally flows into the towers at a high rate of speed. Would the WTC towers have been constructed if the building code mandated that the towers be designed to resist the collapse of the buildings under the conditions which occurred on September 11th? Most engineers would say that it is simply not possible even today.

Of course, no one has suggested that tall buildings be constructed to withstand the events which occurred on September 11th. Instead, proponents of the "new standard" for building construction have not stated what events they have in mind. The "new standard" is that building codes simply be made more restrictive so that buildings better resist some undefined improbable event. This approach to building regulation would seem to defy logic in that any and all more restrictive provisions could be considered to be acceptable for inclusion in the building code.

Forty years ago, high rise office and residential buildings were required to be fire resistive construction and be provided with a fire alarm system and a standpipe system. The fire record of these buildings provided with these three fire protection features was relatively good. In the late 1960's and early 1970's, fire protection professionals suggested that the safety of high rise buildings would be improved further by the installation of sprinkler protection.

While it was agreed that the level of protection provided for the occupants of high rise buildings would indeed be increased by providing sprinkler protection for these buildings, it was also agreed that the installation of sprinkler protection was simply too costly to consider. In order to encourage the installation of sprinkler protection in high rise buildings, building codes included an alternative which allowed the reduction in passive fire protection features in high rise buildings provided with sprinkler protection (in order to offset the cost of providing sprinkler protection).

Apparently post-September 11th, high rise buildings provided with sprinkler protection are no longer considered to be "safe" buildings, despite the excellent fire safety record of sprinklered high rise buildings in the United States-a major fire has never occurred in sprinklered high rise building in the United States, except on September 11th, and the average number of fire fatalities which occur in sprinklered high rise office and residential buildings is close to zero (0) on an annual basis. How can buildings where few, if any fire fatalities occur, still be considered to provide a sub-standard level of safety for occupants? Good question, but that's where we are at at present.

With the background above, it may be of interest to go back a century to see how this issue was addressed in 1910. A presentation titled "*Fire Insurance vs. Preventive Measures in Buildings*" was made at the 14th annual meeting of the National Fire Protection Association by the president of the Royal Architectural Institute of Canada, F. S. Baker. A few excerpts from the text of Mr. Baker's presentation are as follows:

> "*The debate at once begins, and it is this point which I am endeavoring to bring before this meeting, as to whether it is advisable to spend large sums of money in preventive measures, or whether it is better to build a sound, substantial building, reasonable fire resisting, but without the application of the numerous devices for preventing or extinguishing fire, which admittedly cost very large sums of money.*"

"*In these days of grace the architect is expected to advise his client on the matter of investment, and all of the above, therefore, comes within his field.*"

"*Of course in making this comparison I am eliminating that feature which protects the lives of the occupants of the building and which is no doubt one of the main objects of this Association's existence, but if this was the only thing to be considered, our friends the fire insurance men for whom we all hold such a high regard, would be replaced at this meeting by the life insurance men, who, I believe are conspicuous by their absence.*"

Source: "*Proceedings of the National Fire Protection Association*", Volume 1909-1911.

While the excerpts from Mr. Baker's presentation above may be a little cryptic, the reference to the "*absence*" of "*life insurance men*" clearly means that the number of fire fatalities occurring in commercial buildings in the 1910 were few and far between, not unlike the number of fire fatalities occurring in high rise office and residential buildings protected by a sprinkler system today. In other words, both the cost and the benefit of providing building fire protection should be considered.

Once sprinkler protection is provided in a high rise building, the probability of a fire fatality occurring in a high rise building is minimal. Given this fact, the ratio of cost to benefit of each additional fire protection feature provided (above and beyond sprinkler protection) is relatively high. Can the cost of fire protection features, other than sprinkler protection, be justified in high rise buildings? Most professionals in the field would respond affirmatively to that question, however, there is little doubt that a "point of diminishing returns" will be reached somewhere along the line. It would seem, based upon today's fire safety record for high rise buildings, that we have indeed reached that point.

Given this, it seems reasonable to ask: can exceeding the standard of "reasonable" code provisions be economically justified?

At least until this point in time, no attempt has been made by the proponents of a higher standard than "reasonable" code provisions to justify the need for an increased level of safety in high rise buildings than was being provided prior to September 11th. Should an economic (cost/benefit) analysis be provided by the advocates of a higher level of safety in high rise buildings in order to justify abandoning the "reasonable" code provisions standard?

Common sense tells us that the answer to that question is yes. Common sense also tells us that it seems reasonable that all fire safety provisions included in building codes should be subjected to a cost/benefit analysis.

Mere speculation as to the cost/benefit of providing additional fire protection features in buildings (beyond those already mandated) should not be considered to be an acceptable method of writing building code provisions.

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