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SPRINKLER PROTECTION AND REDUNDANCY IN TALL BUILDINGS

By Richard Schulte

The reliability of sprinkler protection has been an issue for over a century. Insurers began to collect comprehensive information on sprinkler system failures immediately after the first sprinkler installation standard was developed by the National Fire Protection Association (NFPA) in 1896.

A few days ago, the reliability of sprinkler protection was again questioned in an International Code Council (ICC) Code Technology Committee (CTC) tele-conference. The following is the text of an e-mail note written following the tele-conference:

"I noted a dichotomy of thinking in the teleconference this morning. On the one hand, it was stated that the fire service is concerned about (doubts) the reliability of sprinkler protection. On the other hand, the code permits smoke control/management systems to be designed assuming that the sprinkler protection will be operative and control a fire.

It would seem that if the fire service thinks that redundant systems are required because sprinkler protection is not sufficiently reliable, then the smoke control/management system should also be designed based upon the assumption that the sprinkler protection will fail. If the smoke control/management systems are not designed assuming sprinkler system failure, then these systems are not redundant systems.

Note that the atrium provisions contained in the IBC (and the LSC) permit the atrium smoke control system to be designed assuming that the sprinkler system is both operative and effective. Hence, the atrium smoke control system is not a redundant system.

Based upon the statistics on sprinkler reliability, we can say that sprinkler systems are not 100 percent reliable. There are two approaches to remedy this-the first approach is to build in redun[n]cy into the code; the second approach is to improve the reliability of sprinkler systems.

The way to improve the reliability of sprinkler systems is to enforce NFPA 25 or do routine inspections of sprinkler system installations.

It seems to me that the second approach would be the most efficient and effective approach. The reason for this is that the redundant systems that we provide are also not 100 percent effective. In fact, the reliability of the redundant systems is far less than the reliability of sprinkler systems. Without routine inspections and maintenance, the effectiveness of the redundant systems deteriorates over time. Hence, the desired redundancy is not actually achieved, but the cost of the building construction is increased. That sounds like a lose-lose proposition.

It was noted that the IBC permits the elimination of the area of refuge in buildings protected by a sprinkler system. It was also noted that the fire statistics tell us that this is reasonable. To my knowledge, there has never been a sprinkler system failure in a building which has resulted in the death of an occupant with a physical disability. That's quite a record.

The statistics for office buildings that we looked at in August indicated that the annual number of fire deaths occurring in office buildings in the US was 4 and that none of these fatalities occurred in sprinklered buildings. That tells me that sprinklers are effective, even if they are not 100 percent reliability [reliable].”

Statistically and anecdotally, there is no doubt that our tall buildings are “safe”. Since we began installing sprinkler protection in high rise buildings in the early 1970's, a major fire has never occurred in a high rise building protected by a sprinkler system in the United States, with the exception of on September 11th. That record spans the course of nearly 4 decades.

Although the fire service in the United States may question the reliability of sprinkler protection in tall buildings, it should be noted that our construction codes assign the responsibility for the inspection of existing buildings (to verify that fire protection/safety features are being maintained) to the fire service. If the protection provided by sprinkler protection is not being properly maintained, it can only be concluded that the fire service is not doing its job with respect to the inspection of existing buildings.

In response, the fire service claims that there is simply not enough personnel to properly inspect existing buildings to verify that fire protection features are being properly maintained. In my view, the fire service claim regarding insufficient personnel is a valid one, but only because the fire prevention aspects of the fire service's responsibilities are not emphasized. Preventing structure fires (or limiting the impact of structure fires that do occur) is just as important, if not more important, than fighting structure fires which do occur.

Fire prevention activities are simply another means of fighting fires. The most effective and efficient means of fighting fires is through fire prevention. Fire prevention activities are also the “safest” means of fighting fires.

It’s time for the fire service to finally start taking fire prevention activities seriously. Perhaps then, the fire service’s fears about the reliability of sprinkler protection in tall buildings would be allayed.

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