

# backdraft

The newsletter of Fire Protection Engineering / Code Consulting

Fall 2003



From the Editor

I apologize for the long delay since the Fall 2002 issue of *Backdraft*. My initial goal was to release a new issue every quarter. After evaluating the need for a quarterly publication and a need to reduce overhead costs I decided to make *Backdraft* a semi-annual publication. On special occasions a third issue may be issued during the year.

Another change in *Backdraft* is in the file download type and format. In the past *Backdraft* was available in both HTML and PDF formats. Starting with this issue only the PDF version will be available. If you need a PDF viewer, one can be downloaded at [www.adobe.com](http://www.adobe.com). The download of Adobe Reader is free.

The format has changed to meet the types of articles that will be published in the future. There will be a reduced number of regular section headings. When appropriate, additional sections will be added to specific issues of the newsletter. I hope the changes will be inconvenient to any of our readers.

Elliot L. Gittleman, FPE  
Editor



Fire Protection Engineering

## viewpoint

Elliot Gittleman, FPE - Principal ESH Consultants

### *Two Assembly Occupancies Emergencies*

Since the last issue of *Backdraft*, there have been two widely published events involving incidents at assembly occupancies. These resulted in loss of life and injuries. One incident took place at The Station nightclub in Rhode Island and the second at Chicago's E2 club. Since then there have been fires at other assembly occupancies; however, since there was no loss of life, news coverage has been minimal. The similarity at Chicago and Rhode Island involves the need to exit large numbers of occupants in a short period of time. Recently there was an article on NFPA's website, which identified the situation as "crowd crush". For this issue of Viewpoint, I will focus on the Rhode Island fire. The reader should understand that points made in this article could also be applicable in the Chicago event or any other emergency situation involving assembly occupancies.

Based upon news reports and interviews conducted by **60 Minutes**, the news media has focused on the lack of sprinkler protection as the primary cause for the large loss of life. As a fire protection engineer (member ICC, NFPA, SFPE) I am extremely disappointed by the new coverage of the Rhode Island fire, NFPA's response or lack thereof, and comments by various Fire Departments that they want all assembly occupancies to have fire sprinklers however they cannot change "The Code", meaning NFPA 101. Sprinklers would have helped, but the lack of sprinklers was not the only cause for the loss of life.

Another misconception forwarded by the news media is that NFPA 101 is the only code used in this country for egress requirements. This is not correct as NFPA 101 is not even a referenced standard of the building codes of most jurisdictions. The general public needs to understand that NFPA 101 is a model code, it is not law, regulation, ordinance, or code unless it is adopted by a legal authority such as the state government, counties, cities or communities. Jurisdictions that do not include NFPA 101 within their building or fire regulations cannot use NFPA 101 as the requirements for life safety. As an example, early in my career I was employed by the Department of the Navy. The Navy used the Uniform Building Code (UBC) to determine allowable building size and construction. For life safety and fire protection we relied upon NFPA standards, Factory Mutual Data Sheets, and NAVFAC published regulations.

Since leaving government service I haven't had a need to use NFPA 101 for a single fire protection project.

A number of weeks ago, **60 Minutes II** aired a follow-up on the Rhode Island fire. They interviewed Mr. James Shannon, former legal officer and now President of NFPA, and interviewed a member of the 101 committee. Having been NFPA's former legal council could explain his evasion of the question on why NFPA 101 has the requirement of more than 300 people before sprinklers are mandatory for assembly occupancies (This has now changed and has been reduced to 100 persons). Mr. Shannon kept stating that NFPA has always advocated the installation of automatic sprinklers which was not an answer to the question. As we all realize, you can advocate something but that does not make it law or regulation. The NFPA 101 committee member was also interviewed and indicated that neither he, nor other members of the committee knew the origin on the 300 person requirement. To give NFPA some leeway, we the viewers have no way of knowing how the response was edited by **60 Minutes**, thus Mr. Shannon's response may have been aired out of context.

Later in the **60 Minute II** presentation, the fire marshal or fire chief of the City of Miami Florida stated that he believed there would have not been a loss of life if the Rhode Island facility had a properly designed sprinkler system. When asked if it was required in Miami, the response was that for assemblies with 300 or less persons, the code did not require sprinklers. The code he referenced was NFPA 101. This individual also indicated that he could not change the "code". I appreciate his comments and opinions but disagree with both of his responses.

The comment that the code could not be changed to require sprinklers is erroneous. If a jurisdiction wants to have a code that is different than NFPA 101 or any other model code, then the jurisdiction can use the legislative process to adopt modifications to the model code. As an example, California has the California Building Code and California Fire Code. Those codes control fire protection and life safety issues within the state unless specifically modified at the local jurisdictional level. The California codes are based upon the Uniform Building Code (1997 edition) and Uniform Fire Code (2000 editions) as published by the ICBO and Western Fire Chiefs Association. The California changes and modifications were suggested by government organizations and industry organizations. They were approved and became law. If Miami wants to have assembly occupancies with fire sprinklers they can go through the process and require the sprinkler protection.



### *Insufficient exit capacity*

At the Chicago incident there was no fire. A panic situation was caused by the reported use of “Mace”. There were deaths and injuries when individuals were crushed in the exit. I believe some of those who died at the Rhode Island fire were the result of crushing injuries; they died before they were burned. Only the Coroner’s reports will verify or contradict this belief. I remember the images of people stuck in the pile up at the main exit while the building was being engulfed in flames. If they had not been crushed into the doorway opening they would have survived.

If there had been a sprinkler system would the outcome been much different? Possibly fewer death by fire, but deaths by crushing injuries would have occurred. The sprinkler system may not have extinguished the fire in the foam. It may have delayed the fire development, however those stuck in the crush at the door would have been subjected to intense heat and smoke, and may have died as a result of being crushed under a pile of people. Foam fires are difficult to extinguish, and fire retardant treated foam tends to produce additional products of combustion as a by-product of the fire retardant chemicals that have been added to the foam.

### *Fire in foamed plastics*

While employed in the Pacific Northwest, my employer had a fire in a fully sprinklered anechoic chamber lined with sound absorbing foam. Workers were operating with a hot work permit dismantling equipment in the chamber. There was a fire watch a member of the company’s structural fire department who was equipped with either a fire hose or fire extinguishers. As a result of the hot work activity the ceiling foam caught fire. Upon activation of the first sprinkler, the air expelled from the open sprinkler (dry pipe system) fanned the fire causing it to spread rapidly across the ceiling. The fire in this windowless structure continued for about 4 hours, with the sprinkler system operating and the local city fire department attempting an interior attack. Finally the water soaked foam became too heavy, fell to the recessed floor, which was under a few feet of water, and was extinguished. The sprinkler system did not extinguish nor control the fire in the foam material. The sprinklers did allow a slightly longer evacuation time but there were less than 10 people in the chamber.



## *Root Cause of life loss at Chicago and Rhode Island*

Let's address what I believe is the real problem, the root cause of the large loss of life; not the obvious causes. The exiting systems in these buildings were not adequate. This is not to say that they were in violation of the codes, but that there were violations with respect to reality. The exit widths and capacities were not adequate for a situation where many people would try to exit in a panic situation (If possible, review the NFPA Fire Journal on-line article on these two incidents). The Uniform Building Code (UBC) requires 0.20 inches of exit width for each occupant served by the exit door, with an overriding minimum of 36 inches; thus a single 36 inch wide door is capable of handling 180 people as an exit. If the building was burning would you like to be number 180?

According to the UBC when an assembly occupancy has an occupant load greater than 300 the main exit shall be sized to accommodate at least one half of the occupant load (UBC 1007.2 – 1997 edition). If at the Rhode Island fire there were more than 300 and less than 360 people in the club, the main exit would need to have a minimum required size of three feet (36 inches). A large size would allow additional occupants if other code issues were met. Images from the fire indicate the exit was two doors wide.

Where did the 300 person occupancy level come from? Who is to say without actual real life full scale testing that 300 is an acceptable value? Fifty or more years ago building construction and building contents contained limited amounts of hydrocarbon based products. Fires spread slower, smoke development was slower and the amount of time available to exit a building during a fire was greater. With today's materials this is no longer the situation.

Code requirements for exiting are inadequate. Now I apply ESH Consultants' concept of reality based engineering. Think about how you exit from an unfamiliar location; usually you leave via the same door that was used for entering the property. Assuming you are not a fire or safety professional, you probably did not take the time to identify whether the building had sprinkler protection, nor the location of the additional exits. This is critical as most individuals will try to go out the way they entered. Also, the host never explained where the additional exits were located or provided instructions or emergency personnel to assist during an emergency. At least when you travel by airplane you get instruction on how to evacuate, where the exits are located, and the crew is specifically trained in emergency operations. Maybe the codes should require 100% egress capacity at the main entrance and a full time staff to assist in emergency evacuations?





fire protection

## code discussions part 1

### NFPA versus ICC

Will the NFPA or ICC be the winners in getting their codes adopted by various jurisdictions? Both organizations will win a few and lose a few, thus meeting their true goal of increased sales and profit. For the end users, we only need to know which code will be enforced.

Each side is trying to prove themselves better than the other. NFPA claims to be a true consensus standard and argues that the ICC process is not. ICC claims to be a recognized as a consensus standard organization. As a user of codes from both of these organizations, and a member of both organizations, I find these arguments to be somewhat false or misleading.

Each NFPA member is entitled to vote on code changes. The catch, you must be at the NFPA meeting twice a year in order to vote. If you or your employer does not have the funds to pay all the expenses incurred in going to the meetings, then you cannot vote. NFPA usually gets between 5-10% of the membership at the meetings. Since it is a voice vote based upon volume, whoever sounds the loudest could result in a code change. So be in the front of the room with all your loudest comrades if you intend to win. If you are lucky someone may actually try a headcount of the voters. Such democracy! At least as a stockholder of a public company, I can choice to vote on issues either by mail, phone, internet, attending the meeting, or assigning a proxy to someone to vote on my behalf. Think of it, a 37 cents stamp, the Internet, or a toll free call versus airfare, hotels, meeting entrance fees, meals, etc. Who has a better method, publicly traded companies or NFPA?

The ICC is not much better. Under the ICBO (now part of ICC) I was considered a professional member however as I was not a building code official or a representative of a fire department, I was not allowed to vote on code changes because of my membership status. Again, so much for democracy.

Then again, does it really matter? I will use California as an example. Presently California uses the 2000 Edition of the Uniform Building and Fire Codes with California amendments (known as the CA. Building Code and CA Fire Code). Each of these codes has an application matrix for state agencies. In other words, state agencies aren't held to the same laws. The matrix identifies which sections are applicable to specific agencies, such as SFM, OSHPD, DSA, HCD, BOC, DOSH and DSH to name a few (contact the author for the



full name of these agencies). Imagine reading a code and having to determine which items are applicable based upon the appropriate. Think of the confusion when a building is subject to approval from multiple government agencies and there is a conflict in the accepted requirements.

Shorting after preparing the draft of *Backdraft* California Building Standards Commission adopted NFPA 1 and 5000. Many California government agencies wanted the ICC codes and only one indicated the desire for NFPA 1 and 5000. Why that occurred may be the subject of a future article. In short, California Building Standards Committee largest group of voting members are appointed by the Governor. Some committee members have been accused of potential conflicts of interest because they represent different unions whose members will be affected by the decision, or a member may be on the board or code committees of NFPA. Fire and Building departments are already preparing to request changes to the NFPA codes, and NFPA representatives have indicated that they will make substantial code modifications for use in California; basically a California only code.

I realize that both the NFPA and ICC codes have both good and bad points. They are too restrictive, too lax, or just the same depending on the code section and who you are or who you represent. Over twenty years ago I hoped for a unified building/fire code for the entire nation. It hasn't occurred and I now believe it doesn't matter. Jurisdictions will choose between NFPA, ICC or who knows what and make changes to meet their local needs. As an example, New York City does not adopt the New York State Codes, and during the 1970's and 1980's various cities in the Seattle metro area each had their own version of the Uniform Building and Fire Codes.

fire protection

## code discussions part 2



### Mobile Fueling—It's Coming Your Way

Mobile refueling is in fact coming to a city or town near you. As the authority having jurisdiction you will need to know if it is permitted in your fire code, or even addressed in the fire code. You may also be asked to allow the operation even if it is not specifically in the fire codes adopted by your jurisdiction.



What is mobile fueling? The International Fire Code defines Mobile Fueling as ***“The operation of dispensing liquid fuels from tank vehicles into the fuel tanks of motor vehicles. Mobile fueling may also be known by the terms Mobile Fleet Fueling; Wet Fueling; and Wet Hosing”***. This is becoming a service to commercial and industrial clients as a means of reducing expenses and operating costs, in order to improve their company’s bottom line.

As an example, during the past year a client asked for a code interpretation to determine if mobile fueling was permitted within a specific jurisdiction, and if not specifically permitted, to determine an alternative so that a permit could be approved. This was an interesting project for which there are misconceptions by some fire marshals. ESH Consultants asked a number of fire marshals for their opinion on whether they would allow mobile refueling. It appeared that some of the fire marshals did not fully understand the operation as they thought that if allowed, it would allow their neighbors to have their cars fueled in their driveway thus eliminating the need to refuel at a service station. To clarify, the mobile fueling operation would take place at commercial or industrial sites, and use the fuel truck’s driver to fuel the client’s motor vehicles during idle periods. This eliminates the need for the client to have an on-site fueling facility or to increase expenses by having the truck driver refuel at an off-site facility during normal working hours.

Consider a jurisdiction with multiple commercial/industrial parks where the occupants have fleets of deliver vehicles. Would you rather have a few qualified companies fuel the motor vehicles from mobile tank vehicles, or would you rather have each location have its own above or underground tanks and fuel pumps? Which would be safer and less of an environmental issue? Mobile refueling will be the answer if properly controlled.

Let’s consider a jurisdiction that uses a modified version of the 2000 edition of the Uniform Fire Code (UFC). The UFC allows mobile refueling but restricts it to a few specific situations: 1)Aircraft refueling, 2)Marine Craft and special marine equipment, 3)Emergency refueling, and 4)Construction Sites and Farms, and “similar” locations (I italicized similar because that is a vague term subject to all types of interpretations and is a term that should not be used or should be defined within the code). Based upon these restrictions, mobile refueling would not be permitted.

Yet if another code were used, mobile refueling would be allowed. The International Fire Code and NFPA Standard 1, *Uniform Fire Code*, 2003 edi-





tion allow mobile refueling. Both codes allow mobile refueling at commercial, industrial and governmental sites subject to the restrictions and requirements within the appropriate code. The IFC provides a list of 24 items in their requirements whereas NFPA 1 refers to NFPA 30A Section 9.6. The NFPA lists about 6 items that must be met for mobile refueling.

In our client's situation, ESH Consultants, on behalf of the client, petitioned the local fire department under the Uniform Fire Code Section 103.2.1, **Alternative materials and methods**. It was proposed that our client be allowed to follow the requirements of the IFC so long as they met the fueling requirements of the Uniform Fire Code. Permission to use the alternative was granted for a one year period so that the fire department can evaluate the operations for problems, and while awaiting a change to the existing fire code.

Please contact ESH Consultants if you would like assistance in getting a permit for mobile fueling in a jurisdiction where it is presently not considered in the fire code. If you are a fire department official who wants additional details on the alternative, please contact ESH Consultants at ESH.FIRE@SBCGLOBAL.NET or call 415-751-9461.



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