President’s Message

Hello Everyone,

Another month has passed and we are getting ready for the April meeting. The NJSFPE year is rapidly coming to an end. The Chapter turns 30 years old this April and we are looking to celebrate. I hope all can make it to the anniversary celebration meeting.

Our seminar will be in May. Further information will follow shortly. I look forward to seeing all of you in two weeks. Enjoy the crazy weather as it has to get warm soon??

Best Regards

Glenn Deitz
NJSFPE Chapter President

April 1st marks a major milestone for the NJ Chapter as we officially turn 30 years old. A special meal will be offered at our April 2 meeting. A short review of the history of the Chapter will be given by Rich Reitberger. Why not come out and meet the members of your NJ Chapter?

http://www.sfpe.org/Chapters/NewJersey.aspx
The meeting was called to order at 6:00 by Dave Gluckman our Vice President. Introductions followed the salute to the flag as is our custom.

The General Meeting Minutes for our February membership meeting were read by Ed Armm our secretary and approved by motion as published in the Fusible Link. The Treasurer’s Report for March was read by Rich Ravaioli, both the minutes and treasurer’s reports were accepted by motion as written.

Rich Reitberger reported on our technical seminar which will be held on May 22 at the Holiday Inn Newark Airport. The hotel is located at 160 Frontage Road, Newark, NJ and can be reached at 973-589-1000. A link to the hotel for directions can be found at: http://www.ichotelsgroup.com/h/d/hi/1/en/hotel/ewria/transportation. The seminar will be presented by American International Group, Inc. (AIG), who are world leaders in insurance and financial services. The presentation will focus on business protection and continuation under threats of terrorism. Business continuity will be discussed. Chemical plants as well as fuel storage and pharmaceutical companies along the NJ Turnpike will be part of the presentation. Rich is also working with the NJ Office of Homeland Security & Preparedness to provide a speaker as well.

Finally Rich reminded everyone that our joint golf outing will be June 25th and again will be hosted by the US Military Academy West Point.

Ed Armm let everyone know that the Automatic Fire Alarm Association of NJ has a web site which he maintains, the site can be found at www.AFAANJ.org. The site has a section that offers code updates for NJ as well as some information concerning NYC as well. For those members that hold a Fire Alarm Permit in NJ information can be found as to the training and CE offerings around the state.

Vinny Fichera provided our Legislative Committee report. Vinny reported that there have been some major actions taken recently by the State of NJ some highlights of which are:

- Recent regulations were enacted by the State requiring all nursing homes, regardless of construction type, be fully equipped with automatic fire sprinkler protection. This requirement also includes existing nursing homes. There are approximately 400 nursing homes in the state, of which it is believed that approximately 50 are not completely protected and will have to be retrofitted.

- Another recent regulation that has gone into effect is the requirement for all residential group homes to be fully protected by automatic fire sprinklers. It is estimated that there are approximately 1200 of these group homes spread out across the State. In my capacity as Executive Director of the NJ Fire Sprinkler Advisory Board (NJSAB), we are assisting the NJ Division of Developmental Disabilities in developing a fire sprinkler retrofit plan of action to implement these requirements over the next 3-5 years. These group homes are typically single-family homes that are renovated to accommodate between 4 and 15 physically, developmentally or mentally disabled children and/or adults. They can range in size from 2000 to 6000 square feet and are located in practically every municipality throughout the State.

- In the February 5th NJ Register the UCC Rehab and UFC Retrofit regulations were amended concerning nightclubs. For occupancy loads of 100 or more, automatic fire detection systems are now required. For occupancy loads of 300 or more, fire sprinkler systems are now required. In both cases, it is now required to tie alarm activation to sound systems to shut them down when there is an alarm as well as to turn lighting systems up. To protect the law and safety of occupants the voluntarily reduction of the occupant load to eliminate the need for the fire sprinklers is specifically prohibited. This amendment applies to all nightclubs that are modified under the Rehab code, and any nightclub constructed prior to the 1990 edition of the BOCA National Building Code.

- As the lead organization of the High Rise Safety Coalition, we met with Governor Corzine, DCA Commissioner Susanne Bass Levin and State Fire Marshall and...
Director of the Division of Fire Safety Larry Petrillo to discuss the urgent need for regulations requiring the retrofit of existing high-rise buildings that lack full fire sprinkler protection. The Division of Fire Safety is in the final stages of completing a survey of all high-rise buildings in the State. Based on their preliminary results, there are as many as 500 high-rise buildings in the State that are not adequately protected by fire sprinklers. Of this amount, approximately 450 are residential occupancies. While there are numerous issues surrounding such regulation, the biggest is the cost impact to building owners. The NJSAB is presently working with the Division to develop cost impact data. The Governor and the Commissioner acknowledged the problem and committed to working towards a solution.

Tonight's speaker needed no introduction; however, Rich Reitberger introduced our own Past President, Joe Janiga from FM Global. Joe's presentation was entitled "The Changing Face of Standard Commodities Used in Large-Scale Fire Testing" which was originally presented at the NFPA World Safety Conference & Exposition in Orlando, Florida on June 4-8, 2006. Joe's presentation focused on how commodities were classified by NFPA and how FM testing developed commodity packages to meet these classifications for the purposes of physical fire testing which is used as the basis of FM Global's requirements for the safety and protection of their clients.

Joe opened by showing slides depicting what storage originally looked like with racks only three rows high to what they have become which is four or five rows high with higher and higher ceilings. He stated that fire protection for storage is basically a balancing act. Heat from burning material moves upward. It must have sufficient avenue to reach fire protection equipment above and activate it quickly. Heat is not just moving up, you realize, so the longer it takes to activate the protection the larger the fire spreads in 3D. The upward movement of heat is called the fire plume and commonly occurs in the flue space of a rack or in the air space between loads of palletized storage, 30-40mph is not uncommon plume velocity. This fire plume impedes the sprinklers water droplets from reaching the fire. When a sprinkler opens at the roof water droplets are at room temperature and sized based on orifice size, sprinkler type and discharge pressure etc. As they move downward they 'run a gauntlet' being buffeted and heated by the fire plume which can be anywhere from 1,000 to 2,000° F. Many water droplets are evaporated or pushed away before they reach the burning surface of the fire where they are most needed. Joe reminded us that the larger the fire hazard the stronger the plume and the taller the building the longer the gauntlet.

Joe showed a slide with a graph that presented the historical perspective of Commodities and their classification. Until the end of WWII, warehouse buildings were basically 20 ft high with palletized storage and plastic materials did not exist. So practice in the 70s was to classify commodities in a 2x2x2 array under a 30ft ceiling in 2 tests. FM's tests included one without automatic sprinklers and another with 1/2" orifice 165° F with a 0.30 density, they measured the number of sprinklers that fused, the ceiling gas temps and the maximum burning rates along with some other data. This testing led to the sprinkler design curves many of us have used for most of our careers which were based on a single point test of metal lined double tri-wall cartons on wood pallets for Class 2 commodities. The development of the Fire Products Calorimeter (FPC) in the 1980's led to new testing in the late 90's and into 2000 using the Fire Products Calorimeter Fire Plume Quantification Method. The FPC allowed a scientific study of heat release, heat flux, oxygen consumption and gasses released from test fires.

Joe explained that with the introduction of plastics which really started to increase in the 1970's Class 4 was created based on what we technically refer to as SWAG. (Contact the editor if you need this explained) The next series of slide reviewed each commodity classification and their corresponding fuel package compositions.

The presentation further explained the testing performed by FM using the Fire Plume Method, the effects of Ceiling Flows on the test measurements and finally the Fire Products Calorimeter Method. FM learned that with the fire products calorimeter method allowed them to remove some of the uncertainties of fire plume testing under ceilings.

All their testing led FM to some conclusions, oddly they found that the plastic commodities fire testing had not changed very much over the years, however, the class 1, 2 and 3 commodities had. The focus was on class 2 commodities and more and more tests showed sprinklers failing to suppress or control the fires. This lead FM to determine what had changed, they discovered that modern cardboard containers have changed these containers now more and more petroleum based chemical products for sizing, binders and glues and may use...
more of them to accommodate the shorter fibers of recycled paper. Continued testing led to the realization that the water absorbency of packaging had gone from over 300 grams per square meter in just four minutes in the 1990’s to around 100 grams in 2000 and even lower in 2004.

The fire growth rate increasing with the water absorption rate decreasing has presented a problem to not just insurance companies and underwriters but to their clients as well.

Change attributable to different glue and sizing agents in corrugated board manufacturing as well as recycle content have led to subtle changes affecting the accuracy of both FM’s and NFPA’s standards. Sprinklers have changed, cardboard has changed and what might have been adequately protected in the 70’s and 80’s might not today.

In closing, Joe stressed that some consolidation of commodities may have to take place as well as demands on automatic sprinklers, density, operating area and pressure are areas where we are required to look further. For a brief period FM de-listed their approval for K11 Control Mode Specific Application Sprinklers (since restored), as for answers they are looking to EFSR sprinklers for suppression as well as the issues spelled out above.

As always, Joe provided us with technical information that will force us all to work harder and think more. After a short Q & A period the meeting concluded at 8:15.
Assessment of Time to Loss of Tenability Due to Smoke, Irritants, Asphyxiants and Heat in Full-Scale Building Fires - Effects of Suppression and Detection on Survivability

This article was taken from the “Fire Suppression and Detection Research Application Symposium” February 22-26, 1999. This is the third part of this article published in the Fusible Link.

David A. Purser BRE Ltd. Fire Research Station, Garston, Watford WD 2 7JR UK

TOXIC AND PHYSIOLOGICAL HAZARDS IN FIRES AND CONCENTRATION/TIME—DOSE RELATIONSHIPS

There are a number of potential effects on occupants during a fire, which tend to occur in a particular order. Incapacitating effects include:

(a) Impaired vision resulting from the optical opacity of smoke
(b) Impaired vision from the painful effects of irritant smoke products on the eyes and respiratory tract pain and breathing difficulties or even respiratory tract injury resulting from the inhalation of irritant smoke (gases and particulates). In extreme cases this can lead to collapse within a few minutes from asphyxia due to laryngeal spasm and/or bronchoconstriction. Lung inflammation may also occur, usually after some hours, which can also lead to varying degrees of respiratory distress (persons with asthma or other lung diseases being particularly vulnerable).
(c) Asphyxiation from the inhalation to toxic gases resulting in confusion and loss of consciousness (children, the elderly and persons with heart or respiratory diseases being particularly vulnerable).
(d) Pain to exposed skin and the upper respiratory tract followed by burns, or hyperthermia, due to the effects of heat preventing escape and leading to collapse.

All of these effects can lead to permanent injury, and all except (a) can be fatal if the degree of exposure is sufficient.

With regard to hazard assessment the major considerations are:

1. The time when physiological or psychological effects are likely to occur which might affect occupant behavior and delay escape.
2. The time when incapacitating effects are likely to occur which might prevent escape, compared with the time required for escape.
3. Whether exposure is likely to result in permanent injury or death.

Up to a certain level of severity, the hazards listed in (a)-(d) cause an impairment of escape capability or tenability, by inhibiting occupants from entering smoke filled areas or reducing the efficiency and speed of escape. Where occupants are encouraged to remain in a place of relative safety, the hazards may affect this strategy by reducing the tenability of the refuge. These effects lie on a continuum from little or no effect at low levels to relatively severe incapacitation at high levels, with a variable response from different individuals. It is important to make some estimate of effects that are likely to delay escape, which may result in fewer occupants being able to escape during the short time before conditions become so bad that escape is no longer possible. Often most important in this context is exposure to optically dense and irritant smoke, which tends to be the largest such sub-populations are the elderly and the approximately 15% of children and 5% of adults who are asthmatic (Brodie, 1996). The elderly and particularly those with impaired cardiac perfusion, are particularly susceptible to asphyxiants gases. Thus the average lethal carboxyhaemoglobin

Variations in susceptibility

The methods for assessing the effects of toxic gases are based partly upon experimental and reported effects in humans and partly upon animal studies. These methods involve the exposure dose or concentration predicted to produce a given effect on humans expose fire effluent. However, this exposure dose or concentration actually represents the maximum in a statistical distribution of subjects' responses surrounding that exposure dose concentration, i.e. the mode, or most frequently expected exposure dose for an exposed population. Individual exposure doses or concentrations for the response would in statistically distributed around the mode in a probability curve. The overall human contains a number of sub-populations, which exhibit greater sensitivity to various toxicants, principally due to compromised cardiovascular and pulmonary systems the largest such sub-populations are the elderly and the approximately 15% of children and 5% of adults who are asthmatic (Brodie, 1996). The elderly and particularly those with impaired cardiac perfusion, are particularly susceptible to asphyxiants gases. Thus the average lethal carboxyhaemoglobin
concentration in adults dying in fires or from accidental CO exposure is lower in the elderly (Nelson, 1998). Also it has been shown in experimental studies that time to the onset of pain in an exercise test is significantly reduced by 2% Carboxyhaemoglobin in angina sufferers (Hinderliter, 1989). This could be very important when attempting to escape from a fire. Asthmatics, (and sufferers of other lung conditions such as chronic bronchitis and reactive airways dysfunction syndrome) are particularly susceptible to bronchoconstriction upon even brief exposure to very low concentrations of irritants, with distress, severely reduced aerobic work capacity, collapse and death resulting depending upon the sensitivity of the individual and the severity of the exposure. It is the objective of fire safety engineering to ensure that essentially all occupants, including the sensitive sub-populations, should be able to escape safely without their experiencing or developing serious health effects. Thus, safe levels for exposure of the human population to fire effluent toxicants must be significantly lower than those determined from experiments with uniformly healthy or even human surrogates.

Evaluation of the effects of optically dense, irrigant, smoke on visibility

Optically dense smoke affects exit choice and escape decisions, as well as wayfinding ability and the speed of movement of occupants. These effects depend upon the concentration (optical density) of the smoke and its irritancy to the eyes and upper respiratory tract. Fundamental work on this subject was carried out by Professor Jin in Japan. In experiments where people were asked to walk down a smoke-logged corridor, Jin, (1076) found that for non-irritant smoke, walking speed decreased with smoke density, and that an optical density of 9.5/m (extinction coefficient 1.15) walking speed decreased from approximately 1.2 m/s (no smoke) to 0.3 m/s (Figure 1). Under these conditions people behaved as if they were in total darkness, feeling their way along the walls. When people were exposed to irritant smoke, made by heating wood chippings, movement speed was reduced to that in darkness at a much lower optical density (optical density 0.2 OD/m, extinction coefficient 0.5), and the experience was found to be more distressing.

In addition to these effects upon movement speed, there is the problem of deciding whether people will move at all. In a number of studies of fires in buildings, a proportion of people (approximately 30%) were found to turn back rather than continue through smoke logged areas. (Wood, 1972; Bryan 1977). The average density at which people turned back was at a “visibility” distance of 3 meters (0.33 OD/m, extinction coefficient 9.76), and women were more likely to turn back than men. These effects are summarized in Table 1. A difficulty with this kind of statistic is that in many fires in buildings there is a choice between passing through smoke to an exit or turning back to take refuge in a place of relative safety such as a closed room. In some situations people have moved through very dense smoke when the fire was behind them, while in other cases people have failed to move at all. Behavior may also depend on whether layering permits occupants to crouch down to levels where the smoke density is lower, and if low level lighting is used to improve visibility. However it is likely that some people will not move through dense smoke.

Based upon considerations such as those described above for the optical density and irritancy of the smoke it is possible to set tenability limits for smoke density appropriate to particular fire scenarios, in relation to the physiological effects on the ability of occupants to see sufficiently well to escape efficiently, and possible psychological effects on their escape behavior. Appropriate limits will depend upon the building and occupant characteristics. For example, for small spaces with short travel distances to exits, it may be possible to set less stringent tenability criteria if occupants are familiar with the building. For large spaces it may be necessary to set more stringent tenability limits, particularly if occupants are likely to be unfamiliar with the building and need to be able to see much further in order to orient themselves to find exits. With regard to the effects of irritancy on the ability to see, it may be necessary to use more stringent smoke density tenability criteria for scenarios where the smoke evolved is likely to be highly irritant to the eyes. Other factors to be taken into consideration would be the complexity of the space, the lighting and the visibility of the signage. Suggested tenability limits are presented in Table 1. In order to assess the visual obscuration effects of smoke, a concept of Fractional Effective Concentration (FEC) has been developed, whereby the smoke concentration is expressed as a fraction of the concentration of irritants, with distress, severely reduced aerobic work capacity, collapse and death resulting depending upon the sensitivity of the individual and the severity of the exposure. It is the objective of fire safety engineering to ensure that essentially all occupants, including the sensitive sub-populations, should be able to escape safely without their experiencing or developing serious health effects. Thus, safe levels for exposure of the human population to fire effluent toxicants must be significantly lower than those determined from experiments with uniformly healthy or even human surrogates.

FEC_{smoke} = [OD/m]/0.2 for small enclosures or [OD/m]/0.1 for large enclosures (1)

<table>
<thead>
<tr>
<th>Smoke Density and Irritancy (OD/m (extinction coefficient))</th>
<th>Approximate Visibility (diffuse illumination)</th>
<th>Reported Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Unaffected</td>
<td>Walking speed 1.2 m/s</td>
</tr>
<tr>
<td>0.5 (1.15) non-irritant</td>
<td>2 m</td>
<td>Walking speed 0.3 m/s</td>
</tr>
<tr>
<td>0.2 (0.5) irritant</td>
<td>Reduced</td>
<td>Walking speed 0.3 m/s</td>
</tr>
<tr>
<td>0.33 (0.76) mixed</td>
<td>3 m approx.</td>
<td>30% people turn back rather than enter</td>
</tr>
</tbody>
</table>

Suggested tenability limits for buildings with:
- Small enclosures and travel distances:
  - OD/m 0.2 (visibility 5 m)
- Large enclosures and travel distances:
  - OD/m 0.08 (visibility 10 m)

Table 1. Reported effects of smoke on visibility and behavior

![Figure 1: Walking speeds in non-irritant and irritant smoke](image)
Meeting Dates/Programs 2006-2007

<table>
<thead>
<tr>
<th>DATE</th>
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<tr>
<td>April 2</td>
<td>Fire on the 14th Floor - An Interactive Emergency Response Exercise - Rich Reitberger, Affiliated FM</td>
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<tr>
<td>May 7, 2007</td>
<td>Insurance Industry Update - Steve Fomchenko, Property Manager, XL Insurance, Mike Newman, Johnson &amp; Johnson; Brad Hart, Lockton</td>
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<td>May 22</td>
<td>Chapter Annual Seminar - Corporate Antiterrorism Protection - Details to Follow</td>
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<tr>
<td>June 25, 2007</td>
<td>Golf Outing - West Point</td>
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2007-2008 New Jersey SFPE Nominations for Officers and Directors

In Compliance with the Nomination Section of the Constitution and By-Laws of the New Jersey Chapter of the Society of Fire Protection Engineers, The Nominating Committee submits the following slate for Officers and Directors. The election will be conducted at the next Annual Business Meeting, scheduled for Monday June 11, 2007, at the Hanover Manor.

President    Dave Glukman
First VP    John Cholin
Second VP    Ed Armm
Secretary    Rich Reitberger
Asst. Secretary    Brad Hart
Treasurer    Bob Murray
Asst. Treasurer    Rich Ravaioli

Chapter Members Vinny Fichera (Second Term), Glenn Buser (First Term), John Warnet (First Term) and Jerry Naylis (First term) remain as Board of Directors member-at-large.

Chapter Member Glenn Deitz will be Immediate Past President, a voting member of the Board of Directors and Chair of the Nominating Committee. The Nominating Committee and the Board of Directors welcomes volunteers to serve in leadership capacities within the organization including Committee activities and the Board itself. No other members made their interests and willingness to serve known to the Nominating Committee prior to this report. Any member with a desire to run as a candidate for Chapter Officer or Director is encouraged to do so. They must contact the Chapter Secretary, Ed Armm (212-695-6670) at least four weeks prior to the Annual Business Meeting. In accordance with the New Jersey Chapter By-Laws, candidates must submit the signatures of five voting members of the New Jersey Chapter SFPE along with their letter of intention to run for any of the above positions. According to the calendar, the deadline is Monday May 16, 2004.
MEETING NOTICE

Date: April 2, 2007

Place: Hanover Manor
16 Eagle Rock Avenue
East Hanover, NJ

Price: In Advance - $22 At door - $25

Dinner: 5:00-6:00 (Cash bar for mixed drinks)
Dinner at 6 PM

Speaker(s): Rich Reitberger, Affiliated FM

Topic: Fire on the 14th Floor - An Interactive Emergency Response Exercise

Please note for this meeting:
All officers, directors and committee chairman are requested to attend a meeting at 4:00 p.m. at the Hanover Manor.

PLEASE COMPLETE AND RETURN WITH YOUR CHECK PAYABLE TO “SFPE NJ CHAPTER” TO:

Vicki Serafin
Affiliated FM
400 Interpace Parkway, Bldg C
3rd Floor
Parsippany, NJ 07054-1196
Phone: (973) 541-6771
Fax: (973) 541-6909

NAME: ____________________________

COMPANY: _______________________ TELEPHONE: ______________

ALL RESERVATIONS SHOULD BE RECEIVED BY FRIDAY, MARCH 30, 2007. TELEPHONE RESERVATIONS OR CANCELLATIONS SHOULD BE RECEIVED BY NOON OF THE MEETING DAY.
2006-2007 CHAPTER COMMITTEES

STANDING COMMITTEES

Program
John Cholin, Chairman
Consulting - Nick Chergotis & Peter Rullo

Arrangements
Vicki Serafin, Chairperson

Membership
Dave Gluckman, Chairman

Nominating
Rick Reitberger, Chairman
Chuck Gandy
Glenn Buser

Scholarship Fund
Chuck Gandy, Chairman
Robert Hall
Mike Machette
Dave Gluckman

Auditing
Joe Janiga, Chairman
John Warnet

Archivist
Rich Reitberger, Chairman
Nicole Davidowitch

Historian
Jim Tolos

Communications
Fusible Link—Brad Hart
Ana Cristostomo—Coordinator
Mailing/Automation/e-mail—Vicki Serafin, Chairperson

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Jim Tolos, Chairman
Joe Janiga - Co-Chairman

Career Recruitment
Al Dopart, Chairman
Glenn Delz
Dave Gluckman

Golf Outing
Richard Reitberger, Chairman
Joe Janiga

Awards
Frank Savino, Chairman
Rich Reitberger

PE Examination
John Cholin, Chairman
Joe Janiga
Mike Newman
Chuck Gandy

Chapter Seminar/Field Trip
Richard Reitberger, Chairman
Dave Gluckman
Joe Janiga

Legislative
Rich Reitberger, Chairman
Vinnie Ficarra
Jerry Nayle

Finance
Rich Reitberger - Chairman
John Cholin
Bob Murray