President’s Message….

On Monday September 18th, Lorraine Smith with Marioff, a UTC Company, made a great presentation on the unique characteristics of Water Mist Fire Systems that is an effective alternative fire protection technology.

We are very excited that 10 new members have joined our chapter since June and over 30 people attended our September chapter meeting. Our board of directors has worked hard to present meaningful programs at our monthly meetings. See the schedule in the Fusible Link for upcoming programs through June 2018.

Immediate Past President, Rich Reitberger presented the 2016-17 President’s Award to Jim Loftus for his tremendous effort organizing the Chapter Technical Seminar in May 2017. Rich also recognized Frank Savino with a Jim Tolos Service Award for his contributions to the chapter this past year.

In an effort to comply with SFPE International’s chapter reorganization, our board is soliciting the services of an attorney to organize the chapter as a nonprofit corporation. We will keep you posted on the progress. This process will result in new chapter bylaws that are in compliance with SFPE International requirements.

Our next chapter meeting is coming up quickly on Monday October 2nd. Make plans to attend and see Doug Baena from TowerIQ. His technical topic will be “Building Emergency Communication Systems”. Building code requirements call for all buildings to be capable of supporting public safety radio communications, as well as provide reliable communications and location services for civilian occupants. Doug will discuss the latest requirements and technology.

Thursday, November 9th, the chapter is sponsoring a bus trip to the TYCO Technology Center in Cranston, RI. Over 100 years of fire sprinkler history has taken place in this facility including some of the latest technology being employed in the field. Be sure to sign up soon as there is limited seating on the bus.

Paul

Chapter President
Paul McGrath called the meeting to order at 6:05PM with the usual salute to the flag and introductions. There were 31 in attendance.

The minutes of the June meeting were accepted by the members. The June, July and August Treasurer’s Reports were presented by Glenn Buser and accepted by the members. Paul asked for a member to assist in the upcoming financial audit and Mike Newman volunteered.

Paul presented Rich Reitberger with the Past Presidents’ pin and Fellows’ pin; thanked Rich for his service and congratulated him on his nomination and election to the grade of Fellow in The Society. Rich, in turn, presented Frank Savino with the James Tolos Service award and Jim Loftus with the President’s Award. He mentioned also that Dave Gluckman and Ernesto Vega-Janica were presented with those awards at the summer reorganization meeting. Congratulations and well done to each of you. We thank you all for your service.

The winners of the Chapter’s 2017 FPW Grant Program were announced. Their awards will be presented to Wallington FPB and Somerset County FM Assn soon. The Society has notified us that the Chapter has won a Bronze award which will be presented during the Societies October annual meeting in Montreal.

The Societies proposed changes to Chapter Organizations were discussed. At the NJ Chapter we will work to meet ‘Incorporated Chapter’ qualifications. Some benefits will be three new membership classifications of Chapter Member, Society Member or Dual Member. Chapter Members and Dual Members have full voting rights in Chapter affairs, now more clearly described. There will also be more flexibility in the qualifications for Chapter Officers and Directors. Only one of the Chapter’s executives will be required to hold Dual Membership to serve.

Ten new Applicants were accepted into the Chapter. Victor Sordillo as a Dual Member and Angelica Blanco; Jessie Cusanelli; Jorge Gamboa; Frank Genova; David Graziano; Sharron Halpert; Tom Hopper; Natasha Pandya; and Kevin Wheatley as Chapter Members. Welcome to you all.

Rich reported that the Education Foundation has recently awarded one scholarship for a total of $15,000 in awards given during this its first operating year while it earned about $14,000 from the golf outing.

Paul mentioned that the legislature has passed the new Carbon Monoxide rules and that a new fire code following IFC 2015 has been proposed and is expected to be adopted in January.

Andrea Uhl announced that the Engineers’ Club will be holding a symposium at Kean University on Oct. 2 from 3:00PM to 9:00 for the benefit of NJ’s homeless veterans. Admission is free and we are all invited.

Next Lorraine Smith of Marioff spoke to us about water mist systems. According to NFPA 750 to meet $D_{0.99}$ at least 99% of the droplets must be 1000 microns (\(\mu\)) or smaller (1mm). Low pressure systems, up to 175psi typically have droplet sizes 1000 \(\mu\); medium pressure systems 350 \(\mu\) and high pressure systems greater than 500psi droplets of 50 \(\mu\). Water mist works by cooling, inerting (expands 1,700X) and radiant heat blocking. Lorraine showed some graphics explaining that water mist knocks down heat rise faster than sprinklers and uses much less water. Water mist systems are commonly local application, total/compartment application or Building Configuration. According to NFPA 750 each system is tested to full scale fire, at maximum protected space height and maximum protected space volume.

Lorraine further pointed out that water mist works well in machinery spaces with warm fuel and hot surfaces and she showed two videos of system performance in a fire test and during an actual shipboard fire. Also that it has many light hazard/HC-1 applications and a new data center application for hot/cold aisle arrangements.

The meeting was adjourned at 8:05PM.
NJSFPE announces a Technology excursion to the Tyco (Johnson Controls) Technology Center in Cranston RI

Thursday November 9, 2017

The Cranston RI lab is home to a number of sprinkler technology innovations under the Grinnell name. This site has over 100 years of continual technological advancements in water-based fire protection and piping products. Frederick Grinnell in 1869, pioneered the automatic sprinkler industry, and served as a major influence in the creation of the National Fire Protection Association in 1896. All from this location. See where history was made in our industry. You don't want to miss this event. Lunch Provided. Cost is $30/pp

Note: Tour is limited to the first 35 Chapter Members who sign up.

From: FM Global parking lot - 300 Kimball Drive, Parsippany, NJ 07054

Time: Bus leaves at 6 AM SHARP!

Return: Should be back in Parsippany at about 6 PM

Click Here to Register online
https://events.r20.constantcontact.com/register/eventReg?
oeidk=a07eehz103k8856932a&oseq=&c=&ch=

Or send in your name and payment to: NJSFPE - Bus Tour 2017
PO Box 8268
Parsippany, NJ 07054

Name: _________________________________ Enclose $30
Make checks payable to: NJSFPE
The Dubai Land Department (DLD) through its regulatory arm Real Estate Regulatory Agency (RERA) has started to take proactive and preventive measures to reduce the number of fire incidents in the emirate.

The statement made last Saturday followed several fire incidents at high-rise buildings across Dubai in recent years.

RERA said it is now strongly encouraging all owners to replace non-fire-resistant building facades in collaboration with the city's real estate developers, reported the Xinhua News Agency.

Mr Mohammed Khalifa bin Hammad, Senior Director of the Real Estate Regulatory Department at RERA, said: "By replacing building facades that do not comply with our fire resistance safety requirements, we are supporting DLD's vision of making Dubai the world's safest and securest residential and investment destination."

Mr John Peters-Dickie, Director at Odice, a French producer of thermal insulating materials, told Xinhua: "In Dubai, we see rising demand for our fire-resistant cladding material which has helped real estate developers to reduce insurance costs once our product is installed."

The 79-storey Torch Tower in the Dubai Marina area caught fire on 5 August this year. While no human losses were reported, the blaze caused massive damage to the building. The tower was previously razed by fire in February 2015.
Analysis of Water Distribution, Droplet Size, and Momentum Efficiency from Two Open Head Sprinklers

Abstract

Fire suppression using water is not only dependent on getting the agent to the fire source but the condition of that agent when it arrives. The spray pattern, droplet size, and momentum play a significant role in the ability of water to suppress and extinguish a fire. The size and speed determine if the droplet is more likely to cool and suffocate the fire or wet the fuel surface to eliminate flame spread[i]. A combination of all three methods (cooling, wetting, and suffocation) occurs, however larger droplets at higher velocities will more likely wet the fuel surface while smaller droplets or mist may not penetrate the fire to reach the fuel source. Instead, the mist results in higher rates of heat transfer and reduced oxygen levels around the fire[iii]. The spray pattern determines if water will reach a given area at the designed water density. An apparatus called the 4S and its related software measure and model the distribution of water from a sprinkler or spray nozzle. The data provided gives a detailed map of the spray pattern, momentum, and droplet distribution for the sprinkler at known water flow and pressure conditions. The results of testing two sprinkler heads to identify pattern distribution, velocity and droplet size are discussed. The testing compared a conventional head with deflector to a rotor based nozzle. The nozzles were of a similar k-factor and run at comparable pressures resulting in similar flow rates. This testing was done in collaboration and support of the development of a new transformer fire suppression design.

[ii] Bobby J Melvin, Comparison of Fixed Fire Fighting System Effectiveness in Road Tunnels – High Pressure Mist vs. Standard Sprinkler


Introduction

The motivation for this project was born from the utility industry and a widely accepted fire suppression system design for transformer fire protection. Currently many transformers are protected using what has been deemed a “birdcage” transformer design, figure below. This design uses small k-factor nozzles with short throws. The nozzles are placed in close proximity to the transformer and uses low water pressure resulting in excessive (30-40) nozzles to protect the transformer. This system design meets the requirements of the NFPA standard supplying 0.25 gpm/ft² on the surfaces of the transformer body.

The system, however, does not adequately protect itself from an explosion event. NFPA 15 section 6.3.6 Protection of piping against damage where explosion potential exists states:

Where water spray systems are installed in areas having an explosion potential they shall be installed in a manner that will minimize damage to the piping and system control and actuation valves.

In many cases, the failure of the transformer results in a “burp” of the casing. Although not as rapid as an explosion, the over pressurization results in bowing of the steel transformer casing and violent vibrations. In recent transformer fires it was reported that the piping was damaged severely enough to result in the discharge of water from the severed pipe rather then the sprinkler heads. The addition of the water spreads the fire and mineral oil adding to the fire size and environmental impact.

A second design is used within the utility industry. This design is known as the “inverted goal post” or “horseshoe” design. In this design piping is pulled back from the transformer and fixed hand line nozzles are placed around the edge of the transformers. The appropriate spray is determined during final commissioning and setscrews are used to fix the spray setting in place. This has several advantages that include protection from explosion due to the installed distance and ease of maintenance.
The drawback to the design is that the nozzles used are not approved for use in fixed systems, or as NFPA code states “approved for the purpose”. The nozzles tend to come from manual operations on the firefighting side, figure below. These nozzles are used because of the ability to throw water the desired distance. The manual nozzles supply a large amount of water to the transformer resulting in a conservative water design density compared to what is required by code. It was the intent of this research to find, test, and approve a nozzle that could be used in the horseshoe design, be approved for the use, and optimize water usage to meet NFPA design densities.

This research compares two nozzle types. The first nozzle evaluated was a deflector plate nozzle typical of those used in the birdcage design. The second nozzle is a rotor-based design, figure below. Although the purpose of the nozzles is similar (use in a deluge system) the formation of the water spray is significantly different. The deflector nozzle uses the water momentum and deflector plate to spread and break up the water jet into the spray. The rotor nozzle uses the momentum to drive the rotors circular motion and the rotor holes, with varying angles, distribute the water. Nozzles were selected based on the k-factor and working pressures so water usage was similar.
The deflector plate nozzle had a k-factor of 7.2 and was run at 60 psi resulting in a flow of 55.8 GPM (211.2 LPM). The rotor nozzle had a k-factor of 8.9 and was also run at 60 psi resulting in a flow of 68.9 GPM (260.8 LPM).

**Experimental Setup and Procedure**

To determine the momentum, droplet size, and distribution from a given nozzle the 4S apparatus was used. The 4S provides detailed measurements of a nozzle spray using shadowgraphy, laser, and other diagnostic techniques. Depending on the nature of the nozzle (tines/slots or not), the characterization may vary in complexity. A spray nozzle is placed into the spray scanning system and run at a given pressure and flow rate. For these experiments a pressure of 60 psi was used as both nozzles overlapped at that working pressure. The droplet formation differs for each sprinkler arrangement (k-factor, pressure, type) but the water generally leaves the deflectors of a sprinkler as a sheet then forms ligaments and finally drops as the water moves away from the head. The tines and slot function to further disperse the concentration of water, figure above. The rotor droplet formation will differ slightly from those of a deflector plate as the rotor will not produce a sheet but rather a line as it exits the rotor holes. The break up of the line will be governed by the same physics seen with the deflector nozzle and sheering forces caused by the rotor. The formation of droplets will depend on the instability of the sheet (deflector) or line (rotor) that is determined by the pressure, friction, surface tension, and viscous forces. Measurements are taken in the apparatus at a fixed distance that ensures the droplet development has matured and can be modeled further using established fluid dynamic models such as FDS.

**Momentum**

The images in the figure above depict the momentum present 0.35 meters below the sprinkler. The droplet size (mass) and velocity give the momentum. Although the droplet size Dv0.5 is smaller for the rotor nozzle, there is higher momentum due to the velocity of the droplets. The deflector plate causes the water leaving the sprinkler to loose a significant amount of forward momentum but serves the purpose of breaking up the water stream and redirecting the spray outward. Due to the absence of a deflector plate, the rotor water spray does not lose the momentum but is broken up due to the increased forces maintained from the initial water pressure. The momentum is preserved in the forward direction as depicted by the graph. The downward momentum pressure and cumulative momentum flux is greater for the rotor nozzle along the radius of water spray. The rotor maintains 45.8% of the potential momentum from the jet while the deflector plate nozzle is only capable of maintaining 16.1% at the same water pressure. The preservation of momentum is significant in the design of the transformer fire suppression system as the momentum will dictate the throw of the water and therefore the distance the piping can be placed from the transformer.
Droplet size
The droplet size is presented as a Volume Median Diameter (VMD) of Dv0.5. So the drop size is measured in terms of volume, with 50% of the total volume of drops having diameters larger than the median value and 50% of the volume of drops having diameters smaller than the median value. The rotor produced a Dv0.5 of 0.57 mm while the deflector produced a Dv0.5 of 1.038 mm. The smaller size is due to the rotor hole size producing a smaller string of water that is then broken up by the shearing forces exhibited on the water and air friction.

Conclusion
Using the data collected from the 4S apparatus, models of the spray were used to determine the appropriate placement of the nozzles to obtain the desired design density. FDS was used to model the spray based on flux and droplet size. Based on the data collected from the two nozzles and the goals for the transformer protection design, the rotor was the better fit for the application due to the higher momentum and water densities in the forward direction when placed in the horizontal orientation. It is yet to be determined what, if any, effect the change in average droplet size between the two nozzles will have on the suppression and containment of a transformer fire.

Major Changes to NFPA 13- 2019 Edition

Lucas Pfannenstiel, PE of Lockton attended a recent seminar on the planned changes to NFPA 13. The following are some of the major points noted from the seminar:

1. Eliminating redundancy (300 found cases)
2. Re-looking at how the code is structured. It’s too much right now it too many places.
3. Reorganizing.
4. Chapter 8 will be separated into many different chapters
5. New standard will be 2019
6. Chapters will be based chronologically on when needed during design and installation process.
7. Each sprinkler type gets its own chapter now
8. Plan for separate books for Imperial units and metrics in the future. Metric will be NFPA 13M. 2019 will be the same, but future will change.
9. A separate cheat sheet will be provided on how to navigate the new NFPA 13 in 2019 when its released.
Donate today and help a Fire Protection Engineering student reach their goal of becoming an FPE. Your donation is also tax deductible. www.njsfpe.org/scholarship_fund_donations

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**Fusible Link**

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<td>Dec. 4</td>
<td>Speaker: Tristan Mackintosh, CEO SafeSpill Systems—Topic: “Spill Protection Systems for Flammable Liquids”</td>
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<td>Jan 8</td>
<td>Recent Fire Loss Investigations—Lessons Learned—Jerry Naylis, Technical Fire Services</td>
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<td>Feb 5</td>
<td>Protection of Auto Storage &amp; Retrieval Systems—Joe Janiga, FM</td>
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<td>March 5</td>
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<td>April 19</td>
<td>Chapter Technical Seminar—Details to follow</td>
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<td>May 7</td>
<td>Fire Pump Arc Flash—Tracey Bellamy, Telgian</td>
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<td>June 4</td>
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<td>June 18</td>
<td>Dave Barber, Principal Engr, Arup—Topic: “Tall Wood Buildings”. Annual Chapter meeting and election of officers.</td>
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HELPFUL LINKS

ADAAG  http://www.access-board.gov/adaag/about/index.htm
AFAA National  http://www.afaa.org/
AFSA  http://www.firesprinkler.org/
ANSI  http://web.ansi.org/
ASHRAE  http://www.ashrae.org/
Campus-Firewatch  http://www.campus-firewatch.com/
Coffee Break Training  http://www.usfa.dhs.gov/afa/coffee-break/
CPSC  http://www.cpsc.gov/
CSAA  http://www.csaa.org/
Municipal Codes (E Codes)  http://www.generalcode.com/Webcode2.html
FM Global  http://www.fmglobal.com/
FSDANY  http://www.fsdany.org/regs.htm
FSI  http://www.firesprinklerini=a=ve.org/
FSSA  http://www.fssa.net/
Fire Tech Productions—Nicet Training (FTP)  http://www.firetech.com/
Home Fire Spklr Coalition  http://www.homefiresprinkler.org/
AFAA-NJ  http://www.afaanj.org/
National of Fire Equipment Distributors (NAFED) -  http://www.nafed.org/index.cfm

2017-2018 CHAPTER COMMITTEES

STANDING COMMITTEES

Program
Mike Newman

Arrangements
Vicki Serafin, Chairperson

Membership
Paul McGrath, Chairman

Nominating
Marvin Maradiaga
Jim Burge

Auditing
Vanessa Gallagher, Chairman
Rich Reitberger

Archivist/Historian
Jim Tolos, Vicki & Nicole

Speakers Gifts
Rich Reitberger

Communications
Fusible Link—Brad Hart
bradhart07438@yahoo.com
Ann Crisostomo—Coordinator

Communications-Other
Paul McGrath
Mike Newman

Mailing/Automation/e-mail—Vicki Serafin, Chairperson
Webmaster—Mike Newman & Paul McGrath

SPECIAL COMMITTEES

Spring Seminar
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Dave Kurasz—Sprinkler Speakers Coordinator
Jim Lothus—Alarm Speakers Coordinator
Paul McGrath—Vendor Coordinator

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Jim Tolos, Chairman
Joe Janiga
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Career Recruitment
Tim Costello, Chairman
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Marios Michaelides

Chapter Excellence Awards
Ernesto Vega-Janica

PE Examination
Donna Spano

Chapter Seminar/Field Trip
Richard Reitberger, Chairman
Ed Armm, CoChairman
Dave Gluckman
Nathan Goriy

Legislative
Richard Reitberger, Chairman
Jerry Navis
Dave Kurasz

Finance
Rich Reitberger - Chairman
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1/2 Page: ...................... $ 3.00
Full Page: ...................... $ 1,000

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Vicki Lynn Serafin - Membership
CC: NJ Chapter SFPE
P.O. Box 6038
Parsippany, NJ 07054-1136

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Any questions call Vicki at 973-541-8771

Thank you for your continued support!