



**FIRE / RESCUE**

*January, 2020 Edition*

# THE FIRE LINE

**Fond du Lac Fire/Rescue  
Monthly Newsletter**

## FROM THE BALCONY

*A message from Chief Peter O'Leary*



### ***Lasting Impressions***

Last month I was giving a talk at a Leadership Summit at the Oshkosh Corporation and at the end of my remarks I was asked a number of questions from those in the audience. One question was prefaced by, "This is a fun question, do you watch any fire related shows on TV and if so, what do you watch?" Well the first thing that came to me was when I watched Emergency in the 70's, but I think he was asking me for a more current response. Then I quickly realized half of the attendees probably never watched an episode of Emergency.

I began to do a quick scan in my mind of the television shows currently on which had something to do with Fire and EMS services. I blurted out that I watch Chicago Fire, not for its content, but for some comic relief from the reality we share in our profession and the perception Hollywood has when they depict our profession. I did reassure the audience that most of everything they see on TV which shows firefighters in action are not reality, which drew a good laugh from the crowd.

The man's question did cause me to ponder more after I got off the stage. What do ordinary people think when they watch EMS/FIRE dramas? Do they think we all sit around in the kitchen and day room waiting for the next run? Are there certain members who hang out on old sofas on the apparatus floor playing cards and reading the paper? The scenarios played out on TV are entertaining for me, and for many reasons I am glad it's not our reality. I trusted they knew that, but I was not sure.

I do think that if camera crews followed us for a shift, they would be inspired, informed and gain a stronger respect for the work of our profession. Yes it might not be must see TV, but the daily interaction you all have with our citizens is nothing short of remarkable. Whether you are hosting scouts earning merit badges for first aid or speaking to special needs adults, you all do it with purpose, commitment and passion. Our emergency responses continue to grow and you continue to deliver by giving people hope, care, love and a friendly smile. As we close out 2019, think about your highlight real for 2019 and all the good you did for others; I am sure the people you impacted the most haven't forgot about you and your solid commitment to our city and to them. I continue to be filled with gratitude for the work each of you do and wish you all a great 2020.

*Until Next Month,  
Be Safe and Be Well.*

### ***INSIDE THIS ISSUE:***

From the Balcony	1
National Fire Incident Reporting	2-3
Operations by the Numbers	4
Managing the PEA Patient	5-6
News from the Station	7
Primary Search Techniques	8-10
New Construction	11
Sprinkler System Freeze Protection	12-15
Safety Tip	16
Peer Fitness Tip	17-19

### **UPCOMING EVENTS**

Tuesday, January 7th  
*Envision Career  
Connections Academy*

Monday, January 20th  
*New Recruit Academy Begins*

**HAPPY  
NEW  
YEAR**

**2020**

# FOND DU LAC FIRE RESCUE OPERATIONS

*By: Assistant Chief Erick Gerritson*



## **National Fire Incident Reporting System (NFIRS)**

*Every incident our fire apparatus responds to creates an incident number that gets entered into NFIRS. Each week I review the NFIRS reports to ensure accuracy in reporting. Quarterly we have training sessions to review any trends in reporting and corrective action that can help improve our statistics. Below is an article that explain the history and reason why we report to NFIRS.*

The National Fire Incident Reporting System (NFIRS) is a reporting standard that fire departments use to uniformly report on the full range of their activities, from fire to Emergency Medical Services (EMS) to severe weather and natural disasters.

NFIRS is a model of successful federal, state, tribal, U.S. territory and local government partnerships. The database constitutes the world's largest national collection of fire department response incident information.

### **NFIRS history**

The Federal Fire Prevention and Control Act of 1974 (PL 93-498) authorizes the National Fire Data Center (NFDC) in the USFA to gather and analyze information on the magnitude of the nation's fire problem, as well as detailed characteristics and trends. The act further authorizes the USFA to develop uniform data reporting methods, and to encourage and assist state agencies in developing data and reporting fire damage.

To carry out the intentions of the Act, the NFDC established NFIRS in the mid-1970s.

NFIRS has two objectives:

1. To help state, local, tribal and U.S. territory governments develop fire reporting and analysis capability for their own use.
2. To obtain data that can be used to assess and subsequently to combat the fire problem more accurately at a national level.

### **Benefits of using NFIRS**

- Fire departments can use NFIRS to track and manage apparatus, personnel and casualty information, document the full range of department activity, and justify budgets with summary and statistical data.
- Fire departments can use NFIRS data to focus on current community challenges, predict future issues, and measure program performance.
- By contributing to NFIRS, fire departments help the U.S. Fire Administration (USFA) to:
  - Analyze the severity and reach of the nation's fire problem.
  - Use NFIRS information to develop national public education campaigns.
  - Make recommendations for national codes and standards.
  - Determine consumer product failures.
  - Identify the focus for research efforts.
  - Support federal legislation.
- The modular design of NFIRS makes the system easy to use because it captures only the data required to describe an incident.

# FOND DU LAC FIRE RESCUE OPERATIONS

*By: Assistant Chief Erick Gerritson*



## ***National Fire Incident Reporting System (NFIRS), continued...***

### **How NFIRS works**

After responding to an incident, a fire department completes the appropriate NFIRS modules. Each module collects a common set of information that describes the nature of the call, the actions firefighters took in response to the call, and the end results, including firefighter and civilian casualties and a property loss estimate.

The fire department submits its all-incident data to the state, tribal or territorial agency responsible for NFIRS data. The agency gathers data from all its participating departments and reports the compiled data to the USFA. The fire department can also submit their data directly to the USFA's NFIRS National Database through import tools designed specifically for this process.

The NFIRS software is available at no cost to states, tribal, territorial agencies and fire departments. To download the software, visit [https://www.usfa.fema.gov/data/nfirs/user\\_tools/index.html](https://www.usfa.fema.gov/data/nfirs/user_tools/index.html).

### **Facts about NFIRS**

- NFIRS is the world's largest, national, annual database of fire incident information.
- The NFIRS database comprises about 75 percent of all fires that occur annually.
- Every U.S. state and the District of Columbia report NFIRS data.
- The Department of Defense, Native American tribal and U.S. territory governments participate in NFIRS.
- Participation in NFIRS is voluntary.
- More than 24,480 fire departments reported in NFIRS for year 2017.
- Participating fire departments reported 27.9 million incidents, including 1.2 million fires for year 2017.
- Thirty-eight fire departments with a protected population of over 500,000 participate in NFIRS.

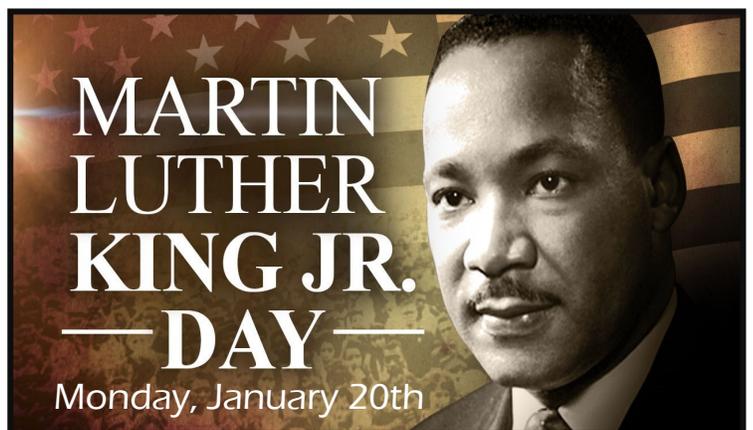
*Reference; the National Fire Incident Reporting System, April 2019- US Fire Administration*



***Until next Month...Stay Safe!***

**OPERATIONS BY THE NUMBERS**

<b>NOVEMBER, 2019</b>	<b>THIS MONTH</b>		<b>YEAR-TO-DATE</b>	
<b>PREVENTION</b>	<b>Last Year</b>	<b>This Year</b>	<b>Last Year</b>	<b>This Year</b>
Total Inspections	197	281	2,752	2,871
Total Defects	115	172	1,866	1,758
<b>SUPPRESSION</b>				
Alarms Involving Fire	6	11	123	107
Fire Mutual Aid Given	0	3	15	13
Fire Mutual Aid Received	0	0	0	1
Service/Good Intent Calls	47	51	518	490
False Alarms & False Calls	24	24	287	367
Other Calls	8	8	147	166
Total Fire Alarms & Calls	85	94	1,075	1,130
<b>EMS</b>				
Total Ambulance Calls	515	480	5,583	5,754
Total Fire & Ems Responses	600	574	6,658	6,884
Fire Property Loss	\$500.00	\$16,550.00	\$350,165.00	\$433,468.00
Fire Contents Loss	\$0.00	\$25,210.00	\$144,260.00	\$219,906.00
Engine Assisted EMS Calls	183	211	2,319	2,545



at City of  
Fond du Lac Fire/Rescue



at fdlfire



# The Code Summary

By: *Todd Janquart*  
Assistant Chief of EMS

## 5 Tips for Managing the PEA Cardiac Arrest Patient

*Since the differential diagnosis for PEA is wide and ACLS offers little guidance, try these tips to improve the chances of patient survival.*

A cardiac arrest patient who presents with PEA as their initial rhythm is a challenge to the resuscitation team. The differential diagnosis is wide, and the ACLS algorithm for PEA and asystole doesn't offer much in the way of guidance. Maybe that's why patients who present with PEA seem to have worse outcomes than those with shockable rhythms [1,2].

Despite that evidence, successful resuscitation is possible. These patients exemplify the idea that ACLS is a holding pattern, providing organ support while the resuscitation team identifies and fixes the underlying cause. Here are 5 tips to give you a better shot at bringing back a patient with pulseless electrical activity (PEA):

### 1. PAY ATTENTION TO THE ECG RHYTHM

The H's and T's mnemonic is a somewhat comprehensive listing of possible causes of PEA, but it doesn't provide much in the way of guidance on which possible causes you should look into first. The ECG rhythm, or more specifically whether the QRS is narrow or wide, can give you some insight into likely reasons this patient arrested. Littmann, Bustin, and Haley have a great article that explains this approach in detail. Here's a summary [3]:

Narrow QRS complexes typically indicate an inflow or outflow problem with the right side of the heart. Problems like hypovolemia, tension pneumothorax, or hyperinflation of the lungs decrease inflow of blood into the right atrium and ventricle, reducing stroke volume and cardiac output. Cardiac tamponade or a pulmonary embolism obstructs the right ventricle's ability to pump blood to the pulmonary circulation and to the left atrium and ventricle.

Wide QRS complexes typically indicate a metabolic problem (such as hyperkalemia or sodium-channel blockade from a toxic overdose), or left ventricular failure (either acute or chronic).



Acquiring a 12-lead ECG during a rhythm check can provide clues to the cause of the arrest.

### 2. ASSESS THE PATIENT'S MEDICAL HISTORY

Paying attention to the characteristics of the ECG rhythm can narrow the field of possibilities some, but assessing the patient's medical history and performing a quick physical exam are still crucial for identifying the cause of PEA. Are there risk factors for PE or hyperkalemia? Any scene indicators that an overdose might have occurred? Jugular venous distension or minimal chest rise that might suggest cardiac tamponade or tension pneumothorax?

### 3. GET A 12-LEAD ECG

If there aren't any big red flags pointing you towards any of the possible H and T causes, consider stopping CPR for enough time to acquire a 12-lead ECG. Before raising objections, hear me out; you can still place the precordial electrodes appropriately (or very closely) while chest compressions are ongoing, and acquiring a 12-lead ECG only takes about 10 seconds, so there's no need to pause high-quality CPR for longer than the AHA currently recommends.



# The Code Summary

By: *Todd Janquart*  
*Assistant Chief of EMS*

## ***5 Tips for Managing the PEA Cardiac Arrest Patient, continued...***

And in cases where the likely cause of arrest is elusive, the information from a 12-lead ECG can help immensely. If you're not up to speed on the suspicious findings for coronary occlusions, hyperkalemia, or pulmonary embolism from a 12-lead ECG, get studying!

### **4. IF IT'S PEA FROM TRAUMATIC ARREST, HOLD OFF ON CPR**

If your protocols allow field termination or not starting CPR, follow your protocol. If they don't, what a wonderful topic to research and present to your medical director, especially if the number of providers on scene is limited.

The AHA recommends standard-practice CPR in cases of traumatic cardiac arrest, but offers no evidence that it works, and the survival rate from traumatic cardiac arrest is dismal [4]. The likely causes of PEA in traumatic arrest are hypovolemia, tension pneumothorax, and cardiac tamponade; if the hands can be redirected from chest compressions to a procedure that corrects an underlying cause, like airway management, IV/IO access and a fluid bolus, decompressing a pneumothorax, pericardiocentesis, or binding the pelvis, prioritize that instead of mashing the chest.

Maybe a more polite way to say this is "do not prioritize chest compressions over life-saving interventions." If none of those interventions work and you decide to transport the patient, or if enough providers are on scene, CPR still may have a role in managing traumatic cardiac arrest, but it's definitely debatable.

### **5. INVESTIGATE POINT OF CARE ULTRASOUND**

Point of care ultrasonography has a lot of potential uses in the prehospital setting, but use during cardiac arrest is arguably the most useful. Looking at the inferior vena cava can help identify patients who need fluid; looking at the lungs can help identify patients with a tension pneumothorax; looking at the left ventricle during a rhythm check can assess left ventricular function. Ultrasound has a lot to offer the resuscitation team (and the patient) during a PEA arrest.

Cardiac arrest that presents with PEA can be a tough nut to crack, and many times, a bolus of epinephrine every 3-5 minutes just won't cut it, but these strategies for PEA management can help you dissect your way down to the underlying cause. And at the end of the code, that's what offers your patient their best chance for survival!

*Author Ben Dowdy from August 19th, 2019 online edition of EMS1.com.*

***I'm interested in the fact that the less secure a man is,  
the more likely he is to have extreme prejudice.***

***Clint Eastwood***

## News from the Station

These fine folks (and Santa!) helped collect donations for the Salvation Army in the Bucket Brigade on Friday, December 13th. Donations were accepted outside of Station 1 and at the KFIZ studios. Michels Corporation from Brownsville generously matched up to \$16,000! The Event was a huge success!



FDLFR participated in the downtown Fond du Lac Christmas Parade on Saturday, December 1st.



FDLFR Lieutenant Andy Golla discusses ambulance compartment layout with Braun Ambulance representatives Chad Brown and Jarret Hammons who were recently visiting at FDLFR.

FDLFR medics recently provided First Aid training and a station tour to Cub Scout Troop 3730 from Eden.



**Well trained people  
are the best defense  
against fire.**

**By: James Knowles III**  
*Assistant Chief Training/Safety*

## **Primary Search Techniques & Strategies**

*The most critical—and potentially the most dangerous—task that is performed on the fireground is the primary search. Primary search might be conducted at a variety of fire incidents, from a minor fire (smoke condition caused by an overheated light ballast, wall outlet smoking, etc.) to a serious fire (an apartment with several rooms on fire in a multiple dwelling).*

### **Search basics**

When it comes to defining a primary search, the IFSTA *Essentials of Fire Fighting Manual* provides this description: “A rapid but thorough search performed before or during fire suppression.” Some lecturers will even use terms like “fast and furious” to describe the act. The IAFC’s *Rules of Engagement for Structural Firefighting – Increasing Firefighter Survival*, states the following: “Our goal as firefighters is to save lives. The fire service has a long history of aggressive search and rescue operations as an initial priority of first-arriving fire companies. History (and firefighter fatalities) also reflects that firefighters are exposed to the greatest risk of injury and death during primary search and rescue operations.”

The primary search involves many factors. The first and most important factor is the mission objective. The mission objective in a primary search is to locate victims and the seat of the fire. The objective is based on the initial size-up. Some size-up factors may include, but are not limited to:

- Known life hazard vs. potential life hazard
- Occupant accountability/survivability
- Building construction
- Size and extent of the fire
- Established water source
- Available equipment/staffing

Another vital factor that must be taken into consideration is the experience level of the individual firefighters conducting the primary search. An inexperienced firefighter may not recognize signs of imminent danger, and may search too far without the protection of a charged handline. An experienced firefighter has been down the hallway before. They may recall similar situations and avoid potential hazards. The firefighters’ mission is to save lives, not to get seriously injured or killed in the process.

When there is a known life hazard, our mission objective is very clear. The risk vs. reward factor is very high, and the aggressiveness in which we conduct our primary search is adjusted accordingly. Know that aggressiveness does not equal “fast and furious”; that approach to primary search lends itself to a firefighter missing landmarks, and possibly becoming disorientated or trapped. Searching too quickly poses the possibility of searching past victims. An aggressive search is one that is controlled, deliberate, methodical and thorough.

### **Primary search steps**

Let’s now review some basic search techniques and methods that will aid the firefighter in conducting an effective primary search. Search techniques that are determined and deliberate ultimately reduce the risk of becoming disorientated or trapped, thereby accomplishing the mission of locating victims and locating fire.



**Well trained people  
are the best defense  
against fire.**

**By: James Knowles III**  
*Assistant Chief Training/Safety*

### ***Primary Search Techniques & Strategies, continued...***

Information-gathering is critical to formulating your primary search mission. This information comes from occupants/witnesses. Some examples: Witness states victim was last seen at the second-floor bedroom in the rear; neighbor states that the family is away on vacation; occupant states that everyone is out of the house etc.

The location and severity of fire in relationship to where victims are trapped is a key factor, as is the color, volume, velocity and density of the smoke in relationship to the point of entry. Is it possible that trapped occupants can survive with existing fire conditions?

Some other factors to consider in the information-gathering phase:

- Staffing at the scene: Will there be enough for a search team of two going interior with two firefighters outside (2 in/2 out)? Will the search team be conducting the primary search prior to having an established handline in place?
- Water source: Is there an established water source? Is the engine moving in and putting water on the fire?
- Building construction factors: Is the building woodframe, platform/balloon, fire proof/non-fire proof, residential/commercial, above grade/below grade/upper floor.
- Point of entry: Where will the crew enter—front/side door main means of egress, upper floor window, cellar entrance? Will firefighters require a ground ladder or an aerial ladder?

When these factors are evaluated, the firefighter will have a sound plan to begin their primary search.

#### **Search position**

Firefighters should search on their hands and knees. This keeps their hips and shoulders orientated in the direction of travel. If a piece of ceiling (sheetrock/plaster) falls on them or if they get hit with a water stream, the firefighter will likely keep their orientation. Another advantage of searching on all fours is that temperature is lower on the floor level. If there is a rapid change in fire conditions, the firefighter will have a better chance for survival. Further, fire victims tend to be on the floor or in beds that are all low. I have never encountered a victim levitating in the air. By crawling on all fours, it allows the firefighter to distribute their weight over a larger area, and avoid falling into burned out or compromised floors. Additionally, at the floor level, it is easier for firefighters to determine room layout. By sweeping the wall with a hand, the firefighter can feel radiators (indicative of exterior walls), door openings, windows, furniture and appliances.

#### **During the search**

The pace of your primary search should be planned and deliberate. While searching, the firefighter should pause every 8 to 10 feet or whenever they encounter a landmark (doorway, window, appliance). By pausing, the firefighter mentally gathers information that will aid in the search mission, and help them stay orientated, monitor fire conditions and make the search more productive. Each time the firefighter pauses, they should orientate themselves, recalling landmarks that were passed and take mental notes.





Well trained people  
are the best defense  
against fire.

**By: James Knowles III**  
*Assistant Chief Training/Safety*

### ***Primary Search Techniques & Strategies, continued...***

At each pause, the firefighter should listen for six important items:

1. Radio transmissions: “Engine 1 Chauffeur to Command, I have an out-of-service hydrant”; “Engine 1 Chauffeur to Command, I can’t get the rig in pump”; “Engine 1 Officer to Command, we can’t locate the fire”; “Engine 1 Officer to Command, we have a burst length”; “Engine 1 Officer to command, we have water on the fire.” Listen for any urgent transmissions—collapse feared, command requesting to go to a defensive attack, fire communicating to an exposure, etc.
2. Communications with other search team members: “I’ve got another room to my right.” “I have a staircase.” “Are you OK?”
3. Water application: Listening for the hose stream.
4. Ventilation: Listen for the sound of windows breaking, saws operating.
5. Victims: Listen for moans or cries.
6. Fire: Listen for crackling.

The inside search team should always search with a complement of the following tools:

- Thermal imaging camera: A TIC is an outstanding aid in conducting a primary search. When the firefighter pauses, it is an excellent time to view the six sides of the room (four walls, ceiling and floor). The firefighter will reaffirm the room layout, will be able to monitor the fire environment (thermal contrast, convection heat energy) and locate victims.
- A 2½-gallon water can and 6-foot pike pole: The water extinguisher can help contain the fire to a room when applied at the ceiling level. The 6-foot pike pole can be used to find fire in the ceiling overhead, eliminating the risk of getting cut off from your main means of egress. It can also be used to pull a door closed isolating the fire to a room.

Set of irons (flat head axe and Halligan tool): These tools are used for forcible entry, particularly useful in multiple dwelling fires, forcing adjacent apartment doors to create an area of refuge. The Halligan is a firefighter survival tool used to breach walls if the firefighter becomes trapped.

#### **Practice, practice, practice**

Search skills must continually be practiced. Total familiarization with your SCBA and SCBA emergency maneuvers must also be practiced. When the tones go off at 4 a.m. and the dispatcher goes over the department radio reporting a structure fire with people trapped, you must be ready, prepared and trained to do your job. Remember the key elements of a successful primary search. The firefighter must be aggressive, deliberate, controlled, methodical and thorough. Train and prepare—your life and the lives of others depend on you being ready for game day. Stay low!

*Source: Mastronardi, P. (2017). Primary search techniques & strategies. Firehouse. Retrieved from: <https://www.firehouse.com/operations-training/article/12345327/primary-search-techniques-strategies>*

# FIRE PREVENTION ....

*That's what it's all about!*

**By: Troy Haase  
Division Chief of Fire Prevention**



## ***Current Status of New Construction***

- Mercury Marine Plant 17 at 545 W. Pioneer Road - Building is under construction.
- Mercury Marine Plant 98 Addition at 545 W. Pioneer Road - Building is under construction.
- Lenz Truck Center at 536 Seymour Street - Building is under construction.
- Eilertson Electric at 920 Willow Lawn Road - Buildings are under construction.
- Fairfield Inn at 935 S. Rolling Meadows Drive - Building is under construction.
- Riviera Maya at 609 West Johnson Street- Building is under construction.
- Ducharme Cottages at 100-400 Ducharme Parkway - Buildings are under construction.
- River Hills Mixed Use Development on S. Main Street - Buildings 1, 2, 3, 4, 5 & 8 are complete and 6 & 7 are under construction.



# FIRE PREVENTION ....

*That's what it's all about!*

By: Troy Haase  
Division Chief of Fire Prevention



## Sprinkler System Freeze Protection

Kevin Hall, P.E., NFSA's Manager of Engineering Research addresses the importance of protecting sprinkler systems from the cold weather. This information is relevant to protecting fire sprinkler systems from freezing as the seasons begin to change and as parts of the country are already seeing their first frost.

The requirements for protecting sprinkler pipe against freezing are contained within section 16.4.1 of NFPA 13-2019:

### 16.4.1 Protection of Piping Against Freezing.

**16.4.1.1\*** *Where any portion of a system is subject to freezing and the temperatures cannot be reliably maintained at or above 40°F (4°C), the system shall be installed as a dry pipe or preaction system.*

**16.4.1.1.1** *The requirements of 16.4.1.1 shall not apply where alternate methods of freeze prevention are provided in accordance with one of the methods described in 16.4.1.2 through 16.4.1.4.1.*

Cold temperatures start to be a concern for water-based fire protection systems at around 40°F (4°C) because this is the temperature where fresh water starts to form ice crystals, which can progress quickly to freezing as the temperature is lowered to 32°F. While the first option mentioned in the standard is to use a dry or preaction system, this TechNotes will focus on the ways to protect wet pipe systems from freezing. The installation standards allow the same general alternatives for protection against freezing:

1. Insulated coverings (NFPA 13-2019 sections 16.4.1.1, A.16.4.1.1, and 16.4.1.3)
2. Antifreeze systems (NFPA 13-2019 section 16.4.1.2)
3. Heat-tracing systems (NFPA 13-2019 section 16.4.1.4)

Heat loss calculations (NFPA 13-2019 16.4.1.5)

### Insulated Coverings

Where large pipes are installed that have sufficient thermal mass, short runs through an unconditioned space may be able to be protected simply with insulated coverings:

**A.16.4.1.1** *Water-filled piping can be run in spaces above heated room, such as attics, even if the space above the room is not heated itself. Insulation can be located above the pipe to trap the heat from below and prevent the pipe from freezing. It is important not to bury the piping in the insulation because if too much insulation ends up between the pipe and the heated space, the insulation will prevent the heat from getting to the pipe. This method of protecting the pipe is acceptable to this standard.*

**16.4.1.3** *Where aboveground water-filled supply pipes, risers, system risers, or feed mains pass through open areas, cold rooms, passageways, or other areas exposed to temperatures below 40°F (4°C), the pipe shall be permitted to be protected against freezing by insulating coverings, frostproof casings, or other means of maintaining a minimum temperature between 40°F and 120°F (4°C and 49°C).*

For smaller pipes that can freeze more quickly additional heat sources may be required. In this case, the additional heat source can be an adjacent conditioned space with insulation tented over the pipe. When installed properly, the use of tented insulation prevents the pipe from freezing by allowing heat transferred from a conditioned space to dominate the heat loss to an unconditioned space, like an attic. NFSA has been developing a white paper on the suggested practices when this method is chosen and should be available early next year. Additionally, a Tech Tuesday on Insulation Practices was presented last June and is available on the NFSA Online Learning platform.



# FIRE PREVENTION ....

*That's what it's all about!*

By: Troy Haase  
Division Chief of Fire Prevention



## Sprinkler System Freeze Protection, continued...

### Antifreeze Systems

As permitted in NFPA 13-2019 section 16.4.1.2, NFPA 13 additionally requires all antifreeze solutions to be listed except in the case of premixed propylene glycol used in ESFR systems in Chapter 8: System Types and Requirements:

#### 8.6.2\* Antifreeze Solutions.

**8.6.2.1\*** *Except as permitted in 8.6.2.2, antifreeze solutions shall be listed for use in sprinkler systems.*

**8.6.2.2** *Premixed antifreeze solutions of propylene glycol shall be permitted to be used with ESFR sprinklers where the ESFR sprinklers are listed for such use in a specific application.*

In addition to conforming with local health regulations, the solutions must also follow The Standard for Antifreeze Solutions for Use in Fire Sprinkler Systems, ANSI/CAN/UL 2901 which has been available through Underwriters Laboratories (UL) since December 19, 2013 as an outline of investigation and has recently passed ballot to become a consensus standard by both ANSI and SCC standards.

The installation requirements for listed solutions are consistent in NFPA 13R and in NFPA 13D. New antifreeze systems are permitted to use glycerine or propylene glycol if the antifreeze is limited to piping supplying a specific portion of the building subjected to freezing conditions and if the AHJ has been convinced that no other option is available (NFPA 13D -2019 section 9.2.2.2\*).

### Antifreeze System Maintenance

Maintenance of these systems poses an additional challenge. The rules of new editions of NFPA 13 do not apply to existing systems installed under older editions. Maintenance of existing systems is generally performed in accordance with NFPA 25 which allows existing antifreeze systems that were installed under older editions of NFPA 13 to have the solution replaced with propylene glycol or glycerine with the following additional limitations from NFPA 25-2020 section 5.3.3.4:

**5.3.3.4.1\*** *For systems installed prior to September 30, 2012, listed antifreeze solutions shall not be required until September 30, 2022, where one of the following conditions is met:*

(1)\* *The concentration of the antifreeze solution shall be limited to 30 percent propylene glycol by volume or 38 percent glycerine by volume.*

(2)\* *Antifreeze systems with concentrations in excess of 30 percent but not more than 40 percent propylene glycol by volume and 38 percent but not more than 50 percent glycerine by volume shall be permitted based upon an approved deterministic risk assessment prepared by a qualified person approved by the authority having jurisdiction.*

**5.3.3.4.3** *Premixed antifreeze solutions of propylene glycol exceeding 30 percent concentration by volume shall be permitted for use with ESFR sprinklers where the ESFR sprinklers are listed for such use in a specific application.*

Where jurisdictions are utilizing standards issued in 2007 or earlier, it is still in the best interest of all of the stakeholders to be aware of the current requirements. Although no official amendment has been made by NFPA to the 2007 or prior editions, it would be prudent to consider the information that is available. The hazard with antifreeze does not change depending on which edition of the standard is being used for installation purposes. Failure to acknowledge these limitations could create a potential liability as the information is readily available in the newer editions.



# FIRE PREVENTION ....

*That's what it's all about!*

By: Troy Haase  
Division Chief of Fire Prevention



## Sprinkler System Freeze Protection, continued...



### Heat-tracing Systems

Like antifreeze solutions, heat-tracing systems are required to be listed:

**16.4.1.4** *Listed heat-tracing systems shall be permitted in accordance with 16.4.1.4.1 and 16.4.1.4.2.*

**16.4.1.4.1** *Where used to protect branch lines, the heat-tracing system shall be specifically listed for use on branch lines.*

**16.4.1.4.2** *Electric supervision of the heat-tracing system shall provide positive confirmation that the circuit is energized.*

After the release of the previous special editions addressing this topic, UL LLC developed the Outline of Investigation for Electrical Resistance Trace Heating and Associated Controls for Use in Sprinkler and Standpipe Systems (UL 515A). With more similarities to antifreeze solutions, this outline of investigation was used as the basis of a listing for the first heat-tracing system for use on sprinkler branch lines.

### Installing and Maintaining Antifreeze for 13D

New antifreeze systems are permitted to be glycerine or propylene glycol if the antifreeze is limited to piping supplying a specific portion of the building subjected to freezing conditions and if the AHJ has been convinced that no other option is available. In these cases, they are permitted to use premixed glycerine solutions at a maximum concentration of 48% by volume or premixed propylene glycol solutions at a maximum concentration of 38% by volume.

Systems installed in accordance with NFPA 13D do not need to meet NFPA 25 nor the rules discussed above. Instead, NFPA 13D-2019 has its own simplified requirements to deal with antifreeze in existing systems:

#### 9.2.2\* *Antifreeze Solutions.*

**9.2.2.1** *Except as permitted in 9.2.2.2, antifreeze solutions shall be listed for use in new sprinkler systems.*

**9.2.2.1.1** *For existing systems, antifreeze solutions shall be limited to premixed antifreeze solutions of glycerine (chemically pure or United States Pharmacopoeia 96.5 percent) at a*

*maximum concentration of 50 percent by volume, propylene glycol at a maximum concentration of 40 percent by volume, or other solutions listed specifically for use in fire protection systems.*

**9.2.2.2\*** *Premixed solutions of glycerine (chemically pure or United States Pharmacopoeia 96.5 percent at a maximum concentration of 48 percent by volume or propylene glycol at a maximum concentration of 38 percent by volume shall be permitted to protect piping that is supplying sprinklers in a specific area of the dwelling unit, where acceptable to the authority having jurisdiction.*

**9.2.2.2.1\*** *Documentation shall be presented to the AHJ to substantiate the use of the antifreeze solution.*

**9.2.2.3\*** *The specific gravity of the antifreeze solution shall be checked by a hydrometer with a scale having 0.002 subdivisions.*



# FIRE PREVENTION ....

*That's what it's all about!*

By: Troy Haase  
Division Chief of Fire Prevention



## Sprinkler System Freeze Protection, continued...

### Heat Loss Calculations

The last freeze protection remedy does not involve any additional coverings or materials, just an analysis by a professional engineer:

**16.4.1.5** *Water-filled piping shall be permitted to be installed in areas where the temperature is less than 40°F (4°C) when heat loss calculations performed by a professional engineer verify that the system will not freeze.*

The only freeze protection method where analysis is required is when sprinkler pipe is installed in a space where the ambient temperature is between 32°F and 40°F, but the system is not subject to freezing. All other methods described here within, would not require this in-depth analysis as long as the intent of the standard is followed.

### Other Freeze Protection Methods

The next special edition of TechNotes will focus on annual dry pipe maintenance, but in the meantime, these past articles are pertinent as we begin to prepare for the winter months:

#### "Don't Forget the Dry System"

*In general, dry sprinkler systems are a great way to protect the system from freezing conditions. Although the water arrival time is delayed, it can still control a fire when adequately designed under the dry system criteria. (Valentine 2011)*

#### "Dry Sprinkler Installation"

*In several cases, sprinkler protection needs to be extended into spaces subject to freezing and a complete, separate, dry pipe or anti-freeze system is cost-prohibitive to install. .... The dry sprinkler connected to the wet system is the ideal device to cover small areas that are subject to freezing temperatures... (Hugo 2011)*

### Summary

As the cold season is upon us, it is important now to check all of your sprinkler systems and make sure they are ready for winter and adequately protected from the cold. The use of antifreeze in new systems is limited by the parameters of its listing, and even then, some colder climates may require multiple freeze protection methods to maintain the exposed piping at an acceptable temperature. With a variety of freeze protection options, new installations should utilize the most cost effective and efficient method for the project and existing buildings should be inspected and maintained to comply with the requirements of the installation standards prior to the next big freeze.

Source: National Fire Sprinkler Association, Keven Hall, "Sprinkler Freeze Protection", November 13, 2019, Web December 2, 2019.



Every vehicle should have an emergency supply kit located in the trunk. Kits should be checked every six months, and expired items should be replaced to keep it up to date.



Cell Phone  
Charger



First Aid Kit



Jumper Cables



Spare Tire



Flares

BUILDING AN EMERGENCY SUPPLY KIT

## FOR YOUR CAR

### WHY?

Because you never know when you will encounter winter weather or an emergency road closure

AMERICA'S  
*PrepareAthon!*  
BE SMART. TAKE PREP. PROCEED.



Water,  
Snacks



Full Tank  
of Gas



Mittens,  
Hat, Boots  
Warm Clothes



Sand or  
Kitty Litter



Flashlight



Snow Shovel  
and Brush



Blankets



Tow Rope

# PEER FITNESS TIPS

By: Peer Fitness Trainer  
Jack Prall

## *Self Care Practices to Help You Manage Stress*

People often seek out health and exercise professionals in hopes of changing their eating and physical-activity habits. They may point to their late-night munching, workplace snack foods, a lack of motivation to exercise, or sedentary leisure-time activities as barriers to good health, but they rarely consider the impact stress has on their health and ability to meet their goals. Despite this oversight, chronic stress often disrupts health behaviors and has a profound impact on overall well-being.

This article explores the behavioral consequences of stress and highlights strategies you can use to boost your stress resiliency, bringing you closer to your health and fitness goals.



### **Implications of Chronic Stress**

High stress levels have vast implications on mental, emotional and physical health.

“My clients are often sleep deprived, angry, overwhelmed, anxious and depressed as a result of chronic stress,” says Kelly Lynch, LCSW, a licensed therapist and certified life coach. “They tend to exercise very little, emotionally eat highly processed foods, and go through cycles of damaging emotional outbursts as a result of poor coping strategies and little -to-no self-care,” she says.

“Many of my clients have over-committed themselves,” says Erin Laverone, chief life optimizer at Vitality Central, a health-coaching organization based in Austin, Texas. “This often leads to burnout and the downward spiral of “screw it” mode, where a not-so-great choice is made out of mental and physical exhaustion, which then leads to many more not-so-great choices, followed by feelings of guilt and even more stress.” Though stress itself is not inherently bad, in excess, it can negatively impact our health behaviors, specifically eating, physical activity and sleep.

### *Stress and Eating Behavior*

Stress impacts both how much and what type of foods we eat. During the early phases of an acute stress response, hunger is often blunted. Hormones that help prepare the body to respond to stress have an inhibitory effect on appetite. However, hormones that surge during the stress recovery period, such as cortisol and other corticosteroids, stimulate appetite.

Interestingly, eating behavior in response to stress differs depending on an individual’s relationship with food. Restrained eaters—those who normally restrict the amount or types of food they eat—show an increase in consumption in response to stress, while those who do not restrict show a decrease in consumption (Sapolsky, 2004). This may be related to the increased reward value restrained eaters place on food.

Stress also changes the types of foods we crave. During periods of prolonged stress, we are biologically wired to crave foods that offer energy, such as those high in fat and sugar (Yau and Potenza, 2013). “Nutrition becomes a little more challenging for clients with high stress, because they tend to get used to eating highly processed foods, which taste great,” says Lynch.

If food is used as a coping mechanism for clients dealing with repeated stressors, and we try to alter their eating habits without dealing with the causal mechanisms, any eating improvements they create are likely to be short lived. By addressing stress as a potential underlying factor driving consumption, we can better help clients create stress resiliency practices and sustainable eating habits.

# PEER FITNESS TIPS

By: Peer Fitness Trainer  
Jack Prall

## *Self Care Practices to Help You Manage Stress, continued...*

### *Stress and Physical Activity*

Feelings of stress and the anticipation of stressful events have been shown to reduce physical activity behavior. While exercise is a well-known stress reliever, individuals experiencing stress are, paradoxically, less likely to engage in it (Burg et al., 2017). It's also known that stress can increase the risk for developing many chronic diseases, and the reduced participation in physical activity when stressed may at least partially explain this relationship (Stults-Kolehmainen and Sinha, 2014).

Perceived lack of time, a notable stressor, is one of the most cited reasons for skipping out on regular physical activity (Ebben and Brudzynski, 2008; Erickson and Gillespie, 2000), as it makes the thought of finding time to exercise feel overwhelming.

"I always call exercise 'movement,'" Lynch says. "Many of my stressed-out clients are very resistant to the word exercise, because it simply feels like one more obligation piled on their already overflowing plate. A simple shift to [describing physical activity as] movement tends to feel more accessible and manageable for them."

### *Stress and Sleep*

Anticipation of next-day stress is related to shortened sleep duration and reduced sleep quality (Akerstedt, 2006). Sleep and stress work in a cyclical manner, such that reduced sleep can increase the perception and effects of stress, and high stress levels disrupt sleep. Poor sleep quality can, in turn, affect a variety of other factors including mood, appetite, energy and exercise recovery.

"Our brains tend to function very poorly in terms of being able to process information logically when we're tired," Lynch explains. "With the appropriate amount of quality sleep, we better equip our brains to be able to process information we're presented with in the most effective ways."

With its widespread effects on an array of health behaviors, addressing clients' stress levels and offering resiliency techniques are vital components of comprehensive coaching programs. The following evidence-based, coach-approved strategies can be used to help your clients build a repertoire of stress-management skills, allowing you to more holistically impact your clients' well-being.

### **Stress-resiliency Strategies**

#### *Reframe Your View of Stress*

One of the most useful tools for navigating daily stressors is reframing the impact of these stressors on our lives. A stress mindset involves our attitudes and beliefs about the effects of stress. These mindsets alter the way we respond to stressors, both physically and psychologically. Those who view stress as adaptive report lower levels of depression, higher levels of happiness and greater life satisfaction than their stress-is-detrimental counterparts (McGonigal, 2015).



"As awareness increases around what eustress looks like," continues Lynch., "we then have the chance to shift the language they use to describe those experiences. We have given such a huge amount of power to the experience of stress and how negative we believe it is. However, if we shift the language we use to describe stress, we also begin to shift the experience of it. Language helps us put ourselves back in the driver's seat of our lives, instead of letting our emotions choose the direction."

"Reframing is a big part of my coaching practice with clients," explains Laverone. "Your frame of view shapes your attitude and how you interpret your life. I often ask clients to look for the learning opportunities in their problems and to focus on what super powers they can bring to the situation, rather than dwelling on potential negative qualities," she says.

# PEER FITNESS TIPS

By: Peer Fitness Trainer  
Jack Prall

## *Self Care Practices to Help You Manage Stress, continued...*

### **Sensory Meditation**

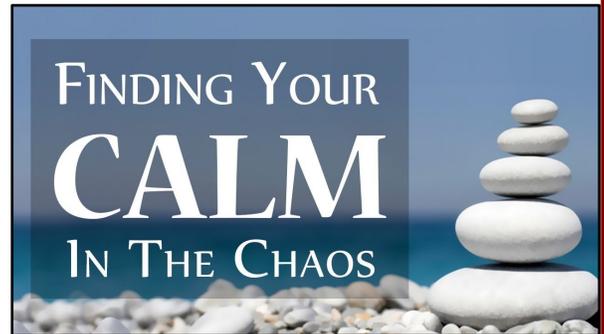
A sensory meditation involves the intentional exploration of each of the five primary senses: taste, smell, sight, sound and touch. This can be done in any space, sitting inside, walking in nature and even while eating. Clients systematically explore each sense, noticing each sensation, without judgment.

Engaging in mindfulness practices outdoors can be particularly beneficial. “Sunshine, fresh air, and the sounds of nature are very helpful in calming many people’s minds and providing some time for regeneration,” says Laverone.

### *Breathing Techniques*

The body’s stress response is governed by the sympathetic nervous system (SNS), the part of the autonomic nervous system that is responsible for fight or flight. When activated, it increases heart rate, breathing rate, blood pressure and sweating, and sends blood away from the core. It can also arouse feelings of anxiety. The parasympathetic nervous system (PNS), often referred to as the “rest and digest” component of the body’s autonomic nervous system, has the opposite effects, reducing arousal, conserving energy and sending blood to the digestive system.

Chronic stress can lead to repeated activation of the SNS, making a person feel jittery, anxious and exhausted. Stimulating the PNS reduces these sensations and promotes restoration and calm. One of the simplest ways to stimulate the PNS is through the breath.



“In the heat of the moment, you’ve got to breathe,” says Laverone. “Being able to focus on and rhythmically gain control over your breathing is shown to have profound positive effects on your physiological state, which in turn allows you to better control your emotions, feelings and thoughts, leaving you with better behavioral control,” she says.

**Soft belly breathing:** This technique simply involves getting into a comfortable position and allowing the belly to be soft, while breathing deeply into the abdomen.

**360 breathing:** This practice involves filling the belly with breath in three different directions: front to back, side to side and top to bottom. Instruct clients to place their hands around their ribcage, thumbs facing back. Have them perform three breaths front to back, followed by three breaths side to side and then three breaths top to bottom. (Rather than shrugging the shoulders during top to bottom breathing, encourage clients to think about filling the pelvic floor with air.) Finally, have clients take three breaths in all directions.

### **Navigate Stressors to Improve Health**

Stress can hinder your behavior-change efforts and diminish your overall well-being. Begin to reframe stress, recognize its impact on your daily lives and incorporate strategies to increase your stress resiliency. “The biggest point I emphasize to all my clients, when it comes to stress resiliency is that simple is better,” says Lynch. “When working with really stressed-out folks, simplicity is like a breath of fresh air.”

*by Kelsey Graham, Contributor Ace Fitness*