

# ***SAFETY GRAM***

Volume 8, Issue 12

December, 2007



**MEASURE TWICE...**

**THINK.**

**PLAN.**

**ACT.**

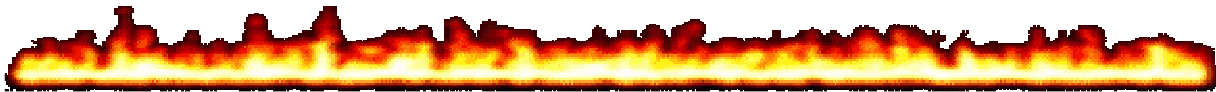


# *SAFETY GRAM*

VOL 8, ISSUE 12 December, 2007

## Contents

- **CYANIDE – THE QUIET KILLER**
- **SAFETY INITIATIVES**
- **MIKE'S MINUTE**
- **THOUGHT FOR THE MONTH**
- **CLOSE CALLS**
- **IT'S THE LAW**
- **ACCIDENTS AND INCIDENTS**



## **CYANIDE – THE QUIET KILLER**

Article By Janet Wilmoth, Command Post 09/14/2007

How often after a fire or response do you hear firefighters complain of headaches, dizziness or achiness? These symptoms are pretty typical after a long, strenuous physical activity, dehydration or lack of sleep. Recent research indicates, however, that these symptoms could indicate cyanide poisoning, which occurs in firefighters more often than recognized.

Early last year, a firefighter in Providence, R.I., was diagnosed with cyanide poisoning after responding to a building fire. Over a period of 16 hours, seven more firefighters were diagnosed with cyanide poisoning, including one who suffered a heart attack. It was only through a series of coincidences that emergency-room physicians checked that last firefighter for cyanide poisoning.

After the diagnoses, Providence Deputy Asst. Chief Curtis Varone turned his attention to the dangers of cyanide poisoning. He said that quite a bit of research had been done about the effects of cyanide poisoning and possible impact on firefighters, but that research isn't reaching the mainstream fire service.

According to Varone, blood tests aren't done routinely for cyanide poisoning, and the nature of the chemical makes it difficult to detect. The half-life of toxic cyanide is one hour. If a firefighter is close to being toxic when he leaves the incident, within an hour his toxicity level has dropped by half. Another hour and it's half again. It leaves the blood quickly, but continues to cause harmful effects, Varone said.

A second problem with diagnosing cyanide poisoning is that only eight laboratories in the United States can process the proper blood tests. Rhode Island Hospital is one of those eight and it stocks cyanide antidote kits.

Varone has been tracking the link between firefighters and cyanide poisoning and its correlation with firefighter heart attacks. Cyanide affects the organs involved with respiration, the brain and the heart. Repeated exposure to cyanide can affect the heart, Varone said. "It would be possible for someone to show cardiac arrhythmia for up to two weeks after exposure." Varone says that we could be underestimating the risk that cyanide exposure causes heart attacks.

Awareness is the important first step to prevention, Varone said. "Wearing the [SCBA] packs goes back to staffing: how many trucks at the fire, how many crews are available so nobody has to take their packs off." Also using longer-duration bottles allow firefighters to be protected earlier and for longer.

### **Other Cyanide Information**

- Hydrogen cyanide is produced by the incomplete combustion of natural fibers (such as wool and silk.)
- Due to different furnishings and construction materials, there are much higher levels of cyanide generated in today's fires.
- Synthetic polymers release large quantities of cyanide. These include plastics, melamine, polyurethane foam, polyester wadding, neoprene foam, nitriles and polyacrylonitriles, asphalt, nylon, rubber, pesticides, resins and fiberglass.
- Many of these synthetic materials ignite and burn two to three times hotter and faster than conventional materials, causing more fires to reach flashover quicker. Flashover is a high-temperature, low-oxygen condition, which promotes degradation of synthetics that release hydrogen cyanide and other toxic gases.
- Smoldering materials can release even higher levels of cyanide.
- Cyanide gas is essentially colorless and can be found outside the building and outside of visible smoke.
- Symptoms of cyanide poisoning are difficult to distinguish from CO exposure, cardiac problems, or fatigue from working hard at a fire.
- A number of experts now believe that many smoke inhalation victims could actually be suffering from cyanide poisoning.
- A National Institute of Standards and Technology (NIST) investigation of The Station nightclub fire in West Warwick, Rhode Island, shows cyanide more than likely played a role in the 100 deaths attributed to this fire.
- The most widely available treatment for cyanide poisoning in the U.S. is very nasty and contraindicated if suffering from CO poisoning or cardiac problems (in other words, not much help for us.) It also has too many side-effects to administer in the field.
- A treatment called hydroxocobalamin has been successfully used in France for several years and has revived a number of smoke inhalation victims.

- On Dec. 15, 2006, the Food and Drug Administration (FDA) approved Cyanokit® (containing the drug hydroxocobalamin, intravenous tubing and a sterile spike for reconstituting the drug product with saline) for the treatment of known or suspected cyanide poisoning. This treatment can be administered in the field. One dose costs over \$600.
- Cyanide is a potential terrorist weapon.

### Identifying Cyanide Poisoning in Victims

Unfortunately, there is no widely available rapid-acting blood test to confirm cyanide poisoning in a patient on the scene of an accident or structure fire, the most common route of cyanide poisoning. Therefore, cyanide poisoning must be identified presumptively in order to initiate life-saving interventions in a timely manner. At the scene of a fire, cyanide poisoning should be suspected in any person exposed to smoke in a closed-space regardless of whether burns have been sustained. Soot in the mouth and around the nose, combined with an altered level of consciousness, also suggests a high probability of cyanide toxicity. Signs and symptoms of cyanide poisoning may vary depending on the source and route of exposure as well as the amount of cyanide within the exposure:

Early Signs of Exposure to Low Concentrations	Later Signs of Exposure to Moderate-High Concentrations
<ul style="list-style-type: none"> <li>Rapid breathing</li> <li>Dizziness</li> <li>Weakness</li> <li>Nausea/vomiting</li> <li>Eye irritation</li> <li>Pink or red skin color</li> <li>Rapid heart rate</li> <li>Perspiration</li> </ul>	<ul style="list-style-type: none"> <li>Loss of consciousness</li> <li>Respiratory arrest</li> <li>Cardiac arrest</li> <li>Coma</li> <li>Seizures</li> </ul>

### Cyanide and Firefighter Heart Attacks

Excerpted from the [Report of the Investigation Committee into the Cyanide Poisonings of Providence Firefighters](#)

There are around 50 firefighter line of duty deaths each year from heart attacks. On average, 12 of those are actually on the fire scene. Another number we rarely hear is that approximately 200 to 300 firefighters suffer heart attacks at fire scenes every year and survive. How many of these fire-scene heart attacks remain non-fatal due to the outstanding ALS care provided by firefighters and paramedics at fire scenes, combined with outstanding treatment in our nation’s trauma centers? Very few professions operate with ALS units standing by when they work. Had 200 to 300 work-place heart attacks per year been

occurring among miners while they are mines, among commercial fisherman while they are at sea, or timber loggers while in the woods, a significant number of those heart attacks could be expected to be fatal due to the lag time of securing ALS care. This raises the question: is the fire service severely under-estimating the gravity of the risk of heart attack by focusing only on fatalities? Could the presence and outstanding ability of these on-scene ALS units be masking a problem that is much more serious than the currently cited statistic of fifty heart related firefighter fatalities per year would otherwise reflect? And what role does cyanide play in these heart attacks?

Cardiac abnormalities induced by cyanide are not limited to immediate on-scene affects, and may be causing some of the more than 800 to 900 heart attacks that firefighters sustain each year in the line of duty. Given the fact that cardiac abnormalities may not present immediately, many off-duty heart attacks (for which numbers do not exist) may also be related to cyanide exposures occurring at fires.

The long term effects of exposure to cyanide are not well understood nor studied. There is evidence which suggests that death from cyanide poisoning may occur up to eight days after the exposure. Because of cyanide's half-life, the connection is difficult to make. However, cyanide poisoning is known to cause cardiac abnormalities. NIOSH has recognized that electrocardiogram changes can be observed 2-3 weeks after a fire related cyanide exposure.

This issue is just starting receive recognition in the fire service and more study will certainly follow. In the meantime, minimize your exposures by wearing your SCBA (probably longer than might seem necessary), clean your bunkers after fires (even though they may not look dirty), and shower and change your clothes at the first opportunity. If you don't feel well during a fire or after, let someone know as soon as possible.

## **SAFETY INITIATIVES**

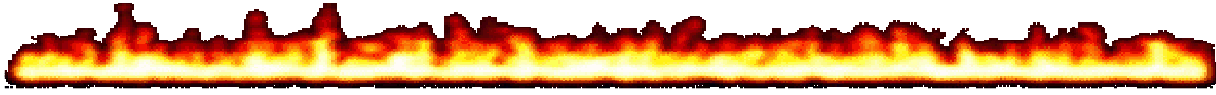
Every year in the United States, 100 firefighters die in the line of duty; one every 80 hours. In March 2004, over 200 fire service leaders gathered in Tampa, Florida to discuss ways to reduce these numbers. The Firefighter Life Safety Summit was hosted by the National Fallen Firefighter Foundation in cooperation with the United States Fire Administration. They established the objective of reducing firefighter fatalities by 25% in 5 years and 50% in 10 years. To support those milestones, the Summit produced 16 major initiatives intended as a blueprint for making changes to the fire service. These initiatives were first covered in the December 2004 Safety Gram. You can go to [www.everyonegoeshome.org](http://www.everyonegoeshome.org) for more information. I will be running a series covering each of the initiatives and including some action items that were drafted by the Safety, Health and Survival Section of the Arizona Fire Chief's Association in support of the initiatives.

What do you think about the initiative and the suggested action items? How does it apply to our department? How does it apply to you? Any other ideas? Let me know what you think.

 *Develop and champion national standards for emergency response policies and procedures.*

## Action Items

1. Each fire service organization and each State Fire Agency should work together to adopt a set of standard emergency response objectives that meet minimum standards and that serve as a model for Incident Command, Risk Management and Resource Deployment to enhance firefighter safety, ensure operational effectiveness and support Statewide and National Mutual Aid Systems.

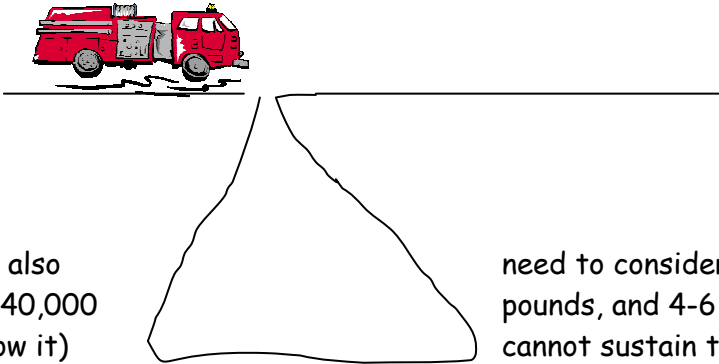


## MIKE'S MINUTE

### Washed out

By the time you read this, the heavy rains have probably subsided, and if something's going to happen to you, it probably already has. That being said, here are some gentle reminders of the dangers lurking in murky waters.

Roads (for the most part) are designed to be above water and attempting to continue on a flooded road should raise some "red flags". Even though it may seem solid when you begin driving on the flooded road, you have no idea what is taking place below the asphalt or concrete. Saturated ground becomes soft and susceptible to erosion or sink holes. That 12" hole in the pavement may blossom into an inverted cone as it travels downward.



You also  
of) 40,000  
below it)  
previously  
water and caution there is the word of the day.

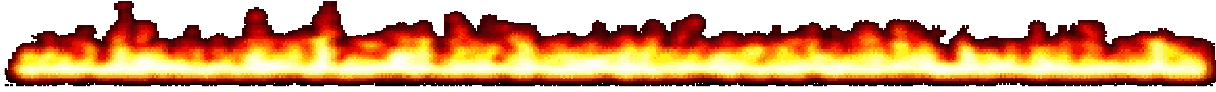
need to consider that your rig could weigh (in excess pounds, and 4-6 inches of pavement (with nothing cannot sustain that weight. Bridges that could hold your weight, may now be compromised by high

Not to mention the fact that the road may turn and next thing you know, you're spinning your wheels in a freshly plowed corn field.

Another thing to consider is the depth of the water that you're trying to get through. Conventional wisdom says that you can drive through water that's below your air intake. To be totally safe, don't let the water get above the center hub of the front wheel. There is NO room for error when it comes to sucking water into the air intake, and there is NO excuse for doing it. You've been warned.

The bottom line is...there needs to be a REALLY compelling reason to attempt deep water. Use your head.

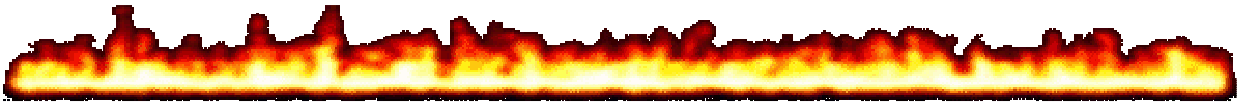
If you find something "in the last place you looked", why would you have kept looking?



## THOUGHT FOR THE MONTH

“Modern firefighting is an art which requires a vast store of professional knowledge and skill. It is impracticable for an individual to attempt to acquire adequate knowledge and skill from experience alone, a major part must be acquired through systematic study and training.”

*Lloyd Layman, Firefighting Tactics, 1953*



## CLOSE CALLS FROM FIREFIGHTERNEARMISS.COM

**Report Number:** 07-0000971

**Report Date:** 06/22/2007 10:18

### **Synopsis**

Firefighter sprayed in face while disconnecting Amkus tool

### **Event Description**

While conducting a weekly apparatus check on the rescue squad, the member was removing an Amkus tool from a line to check another tool. The pressure in the system had been dumped at the pump, but not at the tool. When the quick connect couplings were disconnected, a stream of fluid ejected from the hose and hit the member in the face. This stream lasted for several seconds and covered the members head and shirt with fluid. The member immediately washed his face and hands and changed his clothes. Luckily, the system does not use hydraulic oil but mineral oil and no harm or injury resulted.

### **Lessons Learned**

Training was conducted after the incident so that all personnel were familiar with the incident and what actions needed to be addressed. The crew was advised to activate the tool after dumping pressure at the pump. This will release any sustained pressure in the system. They were also instructed to look away from the couplings while they are being disconnected to protect against any spray that may eject from hose or tool. As this was during an apparatus check, eye protection was not required, but probably would have been good idea.

### **Demographics**

**Department type:** Combination, Mostly paid

**Job or rank:** Captain

**Department shift:** 24 hours on - 72 hours off

**Age:** 34 - 42

**Years of fire service experience:** 21 - 23

**Region:** FEMA Region III

**Service Area:**

### **Event Information**

**Event type:** On-duty activities: apparatus and station maintenance, meetings, tours, etc.

**Event date and time:** 05/08/2007 08:30

**Hours into the shift:** 0 - 4

**Event participation:** Witnessed event but not directly involved in the event

**Weather at time of event:** Clear and Dry

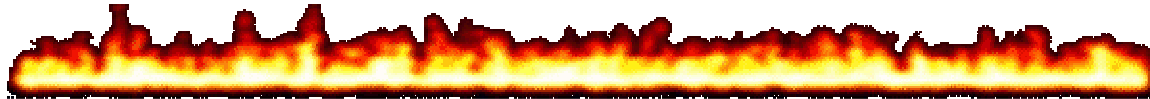
**Do you think this will happen again?** Uncertain

**What were the contributing factors?**

- Training Issue
- Equipment
- Human Error

**What do you believe is the loss potential?**

- Lost time injury
- Minor injury

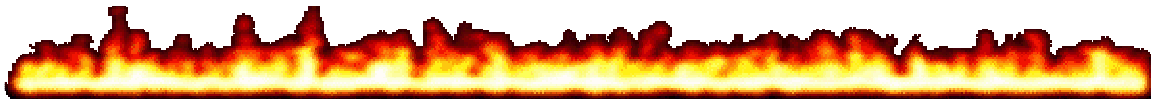


## **IT'S THE LAW**

*WAC 305 is the Safety Standards for Firefighters, the Washington State labor law that governs the way we do things. We are all familiar with WAC 305-05001(10&11). That is the 2 in, 2 out rule and it's exception. There are a lot more requirements that most of us aren't familiar with, so I'll be sharing some of the more obscure (though still important) rules which apply to us as firefighters. Consider how it might apply to what you do on a daily basis.*

### **WAC 296-305-04001 Respiratory equipment protection**

(3) Members using SCBA's shall operate in teams of two or more.



## **ACCIDENTS AND INCIDENTS**

	Total	Exposures	At a fire	Training	PT	EMS lifting	Other
Total	7		1		2	2	2
Medical Evals	2				1		1
Time loss	2				1		1

11/3/07 at 14:45, a low back strain occurred while assisting a patient seated on the floor to a standing position by reaching out with both hands and pulling her up. Felt low back muscle spasm. No treatment, no time loss.

1/7/07 at 16:30, shoulder pain was experienced while doing bench presses. Felt a twang in shoulder and stopped activity. Medical treatment and time loss.

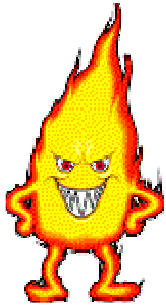
11/8/07 at 22:55, a shoulder strain occurred while lifting a patient in a tarp onto a gurney. Six people were carrying the patient at the time. No medical treatment, no time loss.

11/10/07 at 5:00, a knee strain occurred while hauling equipment during fire. Felt the knee tweak at the time and it tightened up later. It was dark out. No medical treatment, no time loss.

11/12/07 at 8:00, a back strain occurred while lifting a box of ropes from the floor. Felt a pop and dropped the box. No medical treatment or time loss.

11/16/07 at 6:30, experienced a muscle spasm in low back when bending over putting on bunker boots to go to alarm. Felt muscle spasm in low back. Medical treatment and time loss.

11/22/07 at 11:30, experience shoulder pain while performing dips on bars and felt pain. Had completed 4 sets previously. No medical evaluation or time loss.



#### HOT LINKS

<http://www.firetactics.com/default.htm>

[Firegeezer.com](http://www.firegeezer.com)

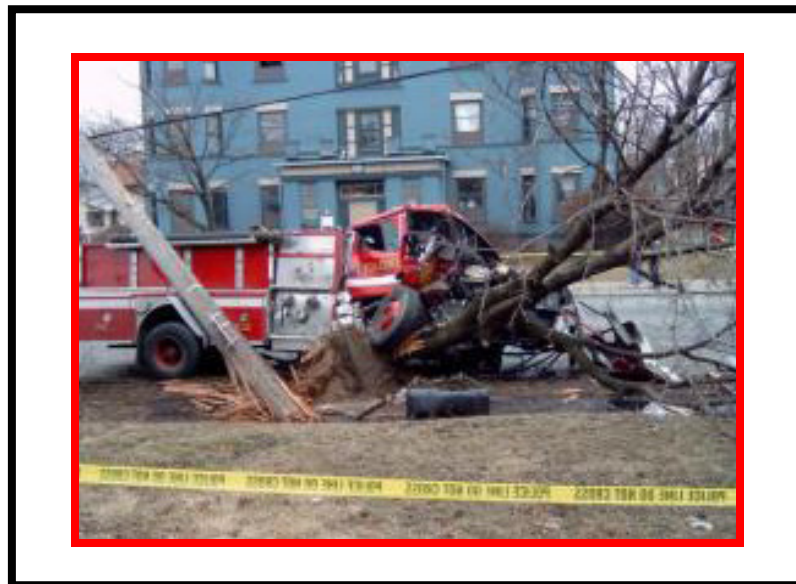
[Firefighter Cancer Support Network](http://www.firefightercancersupportnetwork.com)

[FirefighterCloseCalls.Com - Home of the Secret List](http://www.firefighterclosecalls.com)

[Chapter 296-305 WAC - The Washington State Legislature](http://www.wa.gov)

[www.firefighternearmiss.com](http://www.firefighternearmiss.com)

[www.everyonegoeshome.org](http://www.everyonegoeshome.org)



**Four firefighters injured.  
Slow Down.  
Wear your seatbelt.  
SECURE EQUIPMENT IN THE CAB**