



Safety Brief

JCFPD Training Division

January 2008

2008-1



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Safety-Who's Responsible?

A safety program relies upon many different people to be effective. Chief Jim Angle, in his book *Occupational Safety and Health in the Emergency Services*, argues that the safety program can be visualized as a wheel, with each responsible party viewed as a spoke of the wheel. These spokes include:

- The Incident Commander,
- The Incident Safety Officer,
- District Management,
- Supervisors, and
- Individual Responders.

The strength of a wheel is only as strong as the weakest spoke. Similarly, the strength of a safety program is only as strong as the weakest participant. This issue focuses upon the role of individual responders.

You Are Important!

Individual responders may be the most important link in the District's safety program! Why?

No matter how many safety policies are written, or how many incident safety officers are appointed, the safety attitude of individual responders is the key to safety. Because we often respond from our homes, safety must begin at home also. Obviously, no safety officer will be present at your house!

Safety Do's for Individual Responders

Here are some safety suggestions for individual responders.

Do Be:

- *An active team player.* You are a member of a team. Your safety attitude and actions will have a positive or negative affect upon your team. Be prepared to perform your assigned tasks. Watch out for your team members and remind them about safe procedures.
- *A leader.* Display safety leadership to your team mates. Set a positive example, especially for less-experienced firefighters.

- *A good communicator.* This includes both listening and speaking. Listen for clues of hidden hazards, and speak up to suggest safer ways of accomplishing the tasks assigned. When working as a team, communicate with all team members. For example, when raising a ladder or carrying a folding tank, talk to all firefighters and make sure that the team lifts together on command.
- *Aware of surroundings.* Maintain constant awareness of surroundings for you and your team. Look for danger signals and communicate your safety concerns to others.
- *Aware of your limitations.* If you know you can't perform a task by yourself, ask for help. Lifting injuries can be avoided by using additional firefighters.
- *Together.* Stay with your assigned team. Remember, NO FREELANCING!

Safety Don'ts for Individual Responders

There are also some practices we should avoid. Consider these safety don'ts.

Don't Be:

- *Preoccupied.* Emergency responders never know when the pager might sound. When notified of an emergency, start thinking about the incident and the potential outcomes. Put other thoughts out of your mind and focus upon the emergency.
- *Complacent.* Don't let your guard down. Seemingly innocent calls (trash calls, MVAs) have serious hazards and can cause injuries.
- *Surprised.* Many events at an emergency can be predicted, including fire extension and building collapse after fire exposure. Predict bad outcomes and be prepared.
- *A Hero.* Remember your own limitations and the limitations of your team. Balance risks and benefits.

Protecting Yourself

You are the most important link the District's safety program. Adopt a positive safety attitude!



Safety Brief

JCFPD Training Division

February 2008

2008-2



BLEVE

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On Saturday, January 19, 2008, firefighters from the Knob Noster and Warrensburg stations observed a BLEVE as they arrived at a barn fire on SE 581 Road. After investigation, it appears that a 55 gal drum catastrophically ruptured, sending a fireball throughout the structure, knocking down an exterior wall and collapsing the roof. Firefighters had not entered the building, and no one was injured.

In the past 15 years, there have been three BLEVEs during fires at farms. A BLEVE in Quebec in 1993 at a cattle barn killed four fighters, injured three other firefighters and five civilians, including one in a vehicle over 700 ft struck by debris. In 1997, a BLEVE in Illinois at a grain dryer fire killed two firefighters and seriously injured two others. In 1998, a BLEVE at a turkey farm in Iowa killed two firefighters and injured seven other responders.

Hazards for Firefighters

A BLEVE (Boiling Liquid Expanding Vapor Explosion) occurs when a liquid inside a container reaches a temperature above its boiling point at normal atmospheric temperature. The container fails because the internal pressure exceeds the container's ability to withstand the pressure. The container's shell may be weakened by fire or mechanical damage caused by corrosion or impact.

The size of the BLEVE is dependant upon the weight of the container and the amount of liquid vaporizing as the container fails. Deaths from missiles have occurred up to 800 ft from large containers, while deaths from burns have occurred up to 250 ft from larger containers.

Avoiding Injury

When responding to emergencies involving liquefied petroleum gases, there are several operational issues to be considered.

- **If no fire, control leaks**
Use intact valves or control devices to stop or slow the flow of flammable gases, if possible.

- **Dissipate gas vapors**
Use ventilation techniques or apply water streams to vapor to prevent the vapors from reaching a flammable mixture within the flammable range.
- **Don't extinguish burning venting gas**
When venting LP gases have ignited, allow these fires to continue to burn. Protect the container by applying water at the point where heat contacts the container.
- **Apply water to containers if containers are exposed to fire**
Water should be applied directly to the vessel at a rate of 500 gpm at each point of flame impingement. Elapsed time is a critical consideration for the incident commander. A BLEVE can occur in less than ten minutes of intense flame impingement on a dry outer surface of a container.
- **Establish an adequate water supply**



The amount of water needed is based upon the size of the leak or fire and its location. Consider the following questions:

- Is there sufficient volume for an extended application of water?
- Is the water supply available year round, including droughts and cold weather?
- How long will it take to establish the water supply?
- **Offensive or defensive operations?**
The incident commander must use a "risk vs. benefit" analysis to decide whether to apply water to vapors or exposed containers (offensive attack) or establish a safe evacuation area and allow the gas to burn off or allow a BLEVE to occur. If large volumes of water cannot be safely applied to the container, a large evacuation zone should be established to protect firefighters and civilians.

Protect Yourself

BLEVEs can occur even when relief valves are operating. Although rupturing containers may generally fail along the length of the container, sections of the tank will be thrown in all directions. When the decision is made to apply water, use unattended hose streams or master streams to protect firefighters from hazards.



Safety Brief

JCFPD Training Division

March 2008

2008-3



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Railroad Crossing Safety for Emergency Responders

When fire vehicles with firefighters are involved in collisions with trains at railroad crossings, fire organizations lose because firefighters are killed or injured and equipment is destroyed. To prevent these accidents, it is recommended that fire districts plan routes to avoid railroad crossings. If crossings cannot be avoided, then the fire district should plan routes to include crossings with active warning devices, such as flashing lights and gates, and with a clear line of sight along the track in both directions. However, JCFPD has many rural crossings without warning devices and compromised lines of sight.

A 31-year-old career fire fighter in North Carolina died after the ladder truck he was driving collided with a train at a railroad crossing with two sets of tracks while returning from a false alarm. The gates at the crossing were down and warning lights activated. The northbound train moved slowly forward, and then stopped after clearing the crossing to wait for permission from the dispatcher to proceed. A tanker car obstructed the fire fighter's view of an approaching southbound train. He drove around the first lowered gate, over the tracks and into the path of the second train. The force of the impact ejected the fire fighter from his vehicle, resulting in his death.

Driving Tips

Look:

- ⊗ Look both ways before crossing, because trains may come from either direction
- ⊗ If possible, plan routes to avoid highway-rail grade crossings. Otherwise use crossings with active warning and clear sightlines down railroad tracks in both directions
- ⊗ When stopped at the rail signal light, be sure your front bumper clears the tracks by at least 15 feet.

Listen:

- ⊗ Before crossing the tracks, roll down the windows, turn off siren and have all crew members listen for the train horn.

Live:

- ⊗ Always heed flashing lights, closing gates and stop signs.
- ⊗ Wait for the lights to stop, gates to rise and trains to pass before crossing the tracks.
- ⊗ Never back up or stop on tracks.

If a Train Approaches While on the Tracks

If your vehicle becomes hung up or stalls on the crossing, get everyone out and keep a safe distance from the tracks. If time permits before exiting, turn on the vehicle's emergency lighting system (strobe light, flashers). If you hear or see a train approaching, move everyone at the crossing *away from the tracks in the direction of the oncoming train*. When a locomotive strikes a vehicle, it pushes it forward. By heading in the direction of the oncoming locomotive you'll be moving away from any debris resulting from the impact.

Railroad Crossing Safety for Emergency Responders

- ⊗ Approximately every two hours, a train hits a person or vehicle.
- ⊗ Nearly half of all vehicle-train collisions occur at crossings with functioning, active warning devices.
- ⊗ Trains can not stop quickly or swerve to avoid collisions – an average train going 55 mph takes more than a mile to stop.
- ⊗ Optical Illusion: Trains are much closer and moving faster than they appear.
- ⊗ Average freight trains weigh about 12,000,000 pounds. The average fire apparatus weights between 25,000-40,000 pounds. When a train hits a fire apparatus, the train always wins.



CROSSBUCKS

JCFPD recommends that all fire apparatus should come to a complete stop when approaching a railroad crossing. **Stop,**

look, listen, and live at all railroad crossings, whether you are responding to an emergency or returning to a station.



Safety Brief

JCFPD Training Division

April 2008

2008-4



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Clean Your Gear!

Firefighting is a dirty job. Responding to emergencies often gets our gear covered in dirt, soot, and unknown chemicals. Dirty gear needs to be cleaned regularly to firefighters from exposure to contaminants. The following suggestions will help keep your protective clothing clean and functional, and help keep you safe!

Hazards for Firefighters

Firefighters often believe that dirty gear is the sign of someone who isn't afraid to take a hose to the seat of the fire. But did you know that dirty turnout gear can actually be harmful to firefighters and minimize your safety?

Some of the problems associated with dirty gear include:

- ❑ Dirty gear may conduct electricity;
- ❑ Dirty gear may ignite, even though the material is flame-resistant;
- ❑ Dirty gear will absorb heat rather than reflect heat;
- ❑ Dirty gear doesn't 'breathe' as well as clean gear;
- ❑ Dirty reflective trim is less visible;
- ❑ Dirt and contaminants can weaken fabrics;
- ❑ Dirt and contaminants may add weight to gear; and
- ❑ Dirt and contaminants can be hazardous to firefighters.



Dirty turnout gear should not be cleaned at home in your personal washer and dryer. Contaminants removed from your gear may transfer to your family's clothing, exposing them to the same contaminants that were removed from your gear.

Avoiding Injury

There are two types of cleaning for turnout gear; routine cleaning and advanced cleaning. Routine cleaning should be completed any time your turnout gear gets dirty. Advanced cleaning should be completed every six months, or when your gear is too dirty to be cleaned using routine cleaning techniques.

During routine cleaning, your gear remains in service, although it may still be damp or wet. First, you should brush off any dry debris. Other debris should be gently rinsed off with water. A soft brush can be used to gently scrub the fabric and help lift dirt and contaminants from the surface of the gear. After gentle scrubbing is complete, the gear should be rinsed to remove the dirt and debris. Mild detergents can be used to help remove the dirt. To avoid spreading dirt and contaminants, the garment layers should be isolated during cleaning.

Advanced cleaning requires that your turnout gear be removed from service for a short time. Advanced cleaning should be conducted every six months, or when routine cleaning will not removed soil and contaminants from the protective clothing. Advanced cleaning requires the use of specialized washing and drying equipment for proper cleaning. JCFPD has purchased this specialized equipment and installed it in the new headquarters station in Warrensburg. All firefighters are encouraged to use this equipment periodically to keep their gear clean.

Before placing turnout gear in the washing machine, all layers of the turnout gear should be separated. Where possible, vapor barriers should be washed with vapor barriers, and outer shells washed with outer shells. Vapor barriers should be turned inside out (membrane side turned inside) for washing and drying. Hoods can be washed and dried with vapor barriers. All closures, including pocket closures, hook and loop, snaps, zippers, hooks and dees should be fastened. Mild detergent has been provided for use in the washing machine.

Protect Yourself

Keep your gear clean. Routine cleaning will keep the reflective material functional and firefighters looking professional. Periodic advanced cleaning, using JCFPD's new specialized washing and drying equipment, will reduce exposure to toxins and cancer-causing contaminants such as hydrocarbons or asbestos. Now that this new equipment is available, take the time to use it and keep your gear clean.



Safety Brief

JCFPD Training Division

May 2008

2008-5

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Physical Hazards of Fire Fighting

Just as self-contained breathing apparatus and heat-resistant protective clothing have protected and saved firefighters from the hazards of interior structural fire fighting, health promotion, physical fitness programs, medical screening, appropriate job restrictions and subsequent treatment can reduce the incidence of sudden cardiac death (heart attack).

Over a 10-year period studied in the National Fire Protection Association (NFPA) report, 440 firefighters – 43.7 percent of those who died on the job – experienced sudden cardiac death (heart attacks and other heart-related sudden death), typically triggered by stress, over exertion or being out of shape.



NFPA was able to obtain medical information for 308 of those 440 firefighters. It found that 134 had previously suffered a heart attack, undergone bypass surgery, or angioplasty/stent placement. The majority had known heart disease, but were not on restricted duty. An additional 97 had severe blockage of the heart's arteries but it

is unclear whether this was known prior to their deaths.

Most firefighters who die on duty do not die on the "fire ground," the location where a fire is being fought. For the second consecutive year, less than 30 percent of the deaths occurred on the fire ground, the lowest rate on record. (And of these 29 fire-ground fatalities, 10 were caused by sudden cardiac death.)

In 2006 104 fire department personnel died in the line of duty. The following are non heart attach victims. Of these 104 deaths, a brief, non scientific collection concluded the following non cardiac arrest victims:

- 12 deaths while specifically operating a hoseline.
- 11 deaths while performing suppression operations.
- 8 deaths specifically stating the member was trapped.
- 7 deaths caused by, or related to a building collapse.
 - 5 deaths while conducting searches.
 - 2 deaths while overhauling, related to building collapse.
- 1 death specifically stating the member was disoriented.
- 1 death involving the incident commander during a working incident

To survive the physical hazardous of firefighting you need to be in shape physically. You need to know the conditions and limitations of your body. You need to let others know (station officers) when your body is not able to firefight. Finally to prevent heart attack, you need to eat healthily, stay in shape, and have a scheduled physical to make sure you can physically do the job safely and not become a statistic.



Safety Brief

JCFPD Training Division

June 2008

2008-6



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Seat Belts Save Lives

The figures are familiar: 40,000 people die each year in car accidents, the leading cause of death for people under the age of 35. Safety belts can prevent death in about half of these accidents. If you know this and are still not wearing a safety belt, you may need to ask yourself why not. But first, let's look at what happens when a car crashes.

The Human Collision

Imagine running as fast as you can - into a wall. You'd expect to get pretty banged up. Do you think you could stop yourself if the wall suddenly loomed up when you were two feet away from it? This is exactly the situation you face when the front of your car hits something at only 15 miles an hour. The car stops in the first tenth of a second, but you keep on at the same rate you were going in the car until something stops *you* - the steering wheel, dashboard or windshield - if you're not wearing your safety belt. Bad enough at 15 miles an hour, but a 30 miles you hit "the wall" four times as hard as you would at 15. Or to put it another way, **with the same impact you would feel as if you fell three stories.**

A properly worn safety belt keeps that second collision - the human collision - from happening.

Wear It Right

"Properly worn" means with both straps snugly fitted to transfer the impact of the collision to the parts of your body that can take it - your hipbones and shoulder bones. With just the shoulder strap on, you can still slide out from under it and be strangled, while the lap belt alone doesn't keep your face from hitting the steering wheel.

What's Your Reason For Not Wearing One?

- *"I'm only going to the shopping center."* Actually, this is the best time to wear a safety belt, since 80% of traffic fatalities occur within 25 miles of home and under 40 miles an hour.
- *"I won't be in an accident: I'm a good driver."* Your good driving record will

certainly help you avoid accidents. But even if you're a good driver, a bad driver may still hit you.

- *"I'll just brace myself."* Even if you had the split-second timing to do this, the force of the impact would shatter the arm or leg you used to brace yourself.
- *"I'm afraid the belt will trap me in the car."* Statistically, the best place to be during an accident is in your car. If you're thrown out of the car, you're 25 times more likely to die. And if you need to get out of the car in a hurry - as in the extremely tiny percent of accidents involving fire or submergence - you can get out a lot faster if you haven't been knocked unconscious inside your car.
- *"They're uncomfortable."* Actually, modern safety belts can be made so comfortable that you may wonder if they really work. Most of them give when you move - a device locks them in place only when the car stops suddenly. You can put a little bit of slack in most belts simply by pulling on the shoulder strap. Others come with comfort clips, which hold the belt in a slightly slackened position. If the belt won't fit around you, you can get a belt extender at most car dealerships.
- *"I don't need a belt - I've got an airbag."* Lucky you! An air bag increases the effectiveness of a safety belt by 40 percent. But air bags were never meant to be used in place of safety belts, since they don't protect against side impacts at all.

JCFPD POLICY AND PROCEDURE

No. P2001-003: Driving/Operating District Vehicles States the following : All safety restraint systems shall be utilized by any member driving or riding in a District vehicle during any emergency, non-emergency or training activity

Wear your seat belts, it's the law, District policy and it can save your life in a motor vehicle accident.



Safety Brief

JCFPD Training Division

July 2008

2008-7



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Staying Safe is Hot Weather

Firefighting is hot dangerous work but when you must fight fires in the summer, the heat can make it even more dangerous. Exposure to heat can cause heat related disorders that include heat cramps, heat exhaustion and heat stroke.

Heat cramps are involuntary muscle contractions caused by failure to replace fluids or electrolytes, such as sodium and potassium. Cramps can be relieved with stretching and by replacing fluids and electrolytes.

Heat exhaustion Heat exhaustion is less dangerous than heat stroke. It typically occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating. Fluid loss causes blood flow to decrease in the vital organs, resulting in a form of shock. With heat exhaustion, sweat does not evaporate as it should, possibly because of high humidity or too many layers of clothing. As a result, the body is not cooled properly. Signals include cool, moist, pale, flushed or red skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion. Body temperature will be near normal.

Heat stroke is a medical emergency caused by a failure of the body's heat control which stops sweating which causes the body temperature to rise. Heat stroke is characterized by hot dry skin, a body temperature above 105.8 F (41 C), mental confusion, loss of consciousness, convulsions, or even coma. Send for medical help at once and begin rapid cooling with ice or cold water, fanning the victim to promote evaporation. Treat for shock if necessary. For rapid cooling, partially submerge the victim's body in cool water.

Fire fighters should take extra precautions to ensure the safety of firefighters during extreme hot weather. The following are some suggests to help prevent heat related illnesses.

1. Keep hydrated. Drink lots of water, on duty and off duty. Have drinking water available on all apparatus, in all chiefs' cars and all other fire department vehicles. Urge firefighters to drink

- plenty of water before coming on duty.
- 2. Avoid soft drinks, sugary drinks or caffeinated drinks.
- 3. Urge personnel to get plenty of rest while off duty.
- 4. Urge personnel to report any and all symptoms of dehydration, heat cramps, heat stroke or heat exhaustion.
- 5. Limit outdoor exercise.
- 6. Establish a rehabilitation center at major incidents. If possible, set up the rehab center under a tent or in a shaded area.
- 7. Set up an extra hose to provide a place for firefighters to cool off.
- 8. Use a folding tank to cool off with.
- 9. Request additional personnel at major incidents to relieve the first-arriving crews



Acclimatization to the heat can occurs in 5 to 10 days of heat exposure as the body:

- 1, Increases sweat production
- 2. Improves blood distribution.
- 3. Decreases the heart rate, and lowers the skin and body temperatures.
- 4. You can acclimatize by gradually increasing work time in the heat, taking care to replace fluids, and resting as needed. You maintain acclimatization with periodic work or exercise in a hot environment.

Summary: Heat goes hand in hand with fire fighting, however the summer temperatures can provide too much heat for the firefighter. Learn the signs and symptoms and be ready to take preventative measures if you experience any of the signs of heat cramps, heat exhaustion or heat stroke.



Safety Brief

JCFPD Training Division

August 2008

2008-8



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Firefighter Close Calls

Something bad can happen on any call to which we respond. Unfortunately, we can't always predict what bad things will happen on which fire. The following incidents and the photo were taken from the website "Firefighter Close Calls" (www.firefighterclosecalls.com). You can find many more close calls to learn from at their website.

Structure Fire Incidents

- Monday, August 4, 2008. Firefighters working inside a building appear to have the fire under control. However, the Incident Commander reports that fire is venting 30 feet above the roof line. Soon after, the roof collapses while crews are still in the building. **LESSON**-Check with interior crews regularly. Conditions inside should match conditions visible outside.
- Wednesday, July 2, 2008. Crews respond to a fire in a building converted from an automotive garage. During overhaul, an oil-change pit is found in the main floor covered by 2" x 8" boards. **LESSON**-Always sound the floor ahead of you. Unexpected holes may not be seen under smoky conditions. You never know what you'll find.



Wildland Fires

- Wednesday, July 23, 2008. Firefighters in Caldwell County, NC are fighting a wildland fire in mountainous terrain. The sky is clear, with no clouds. While firefighters are resting, lightning strikes a snag and the current flows through the root system and burns and shocks eight firefighters sitting on the ground. All suffer some burns, with several firefighters spending days in the hospital. **LESSON**-You cannot anticipate all weather phenomena. Always consider how conditions might change, even if that change is a low probability.

- Wednesday, June 11, 2008. Firefighters mop up a groundcover fire in an area with lots of tree litter. One firefighter steps into a 3' deep hole covered by palm tree fronds. **LESSON**-Be cautious walking through heavy ground litter. Holes may be hidden by leaves and branches.

Vehicle Fires

- Monday, September 1, 2008. Crews working a vehicle fire on an interstate hear tires squealing. All firefighters are wearing PPE and high visibility vests. The firetruck was on the shoulder with warning lights on and no lanes blocked. Firefighters see car sliding towards engine, but then driver regains control and drives away on the interstate. **LESSON**-Never turn your back on traffic. If you must look away, assign one person to watch oncoming traffic.
- Friday, August 8, 2008. Firefighters respond to a car in a parking lot with an engine compartment fire. Approaching from the front corner of the vehicle, firefighters hear a loud pop—later identified as a hood strut. The strut exited the engine compartment through the grill, landing 80' away. **LESSON**-There's no such thing as a "normal" fire. Train thoroughly and follow procedures on EVERY call.

Training

- Saturday, June 28, 2008. Firefighters training with portable monitor engage in horseplay and fall into solid stream (800 gpm through an 1-3/4" tip). Water stream strikes firefighter's ribs, launching him five feet through the air. Helmet lands 30 feet away. There are no serious injuries. **LESSON**-Horseplay is NEVER appropriate during training sessions. Our tools can easily hurt someone. Act in a safe manner, and look out for the safety of others around you.

Protect Yourself

Learn from these close calls. In many cases, we are just one action away from injury or even death. Working together, we can all go home from each incident!



Safety Brief

JCFPD Training Division

September 2008

2008-09



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Firefighter Injuries-2006

Every year, firefighters are injured doing their jobs. Hazardous conditions are often present, and all firefighters, whether paid or volunteer, must focus on safety to avoid being injured. For many years, firefighters just accepted the risks associated with our job and even took great pride in the numbers of firefighters injured and killed. Over the past few decades, our attitudes towards safety have changed—for the better—and we now have safer equipment, improved work techniques, and watch out for each other. Yet firefighters are still being injured!

Hazards for Firefighters

Firefighters get injured in many different ways. In 2006, according to NFPA estimates, 83,410 firefighters received line-of-duty injuries. This number is up from the totals of the previous five years. The last time this many firefighters were injured was in 2000.

When looking at the types of duty where injuries occurred, activities on the fireground were the most dangerous (44,210 or 53.0% of all injuries). Injuries received at non-fire emergencies totaled 13,090 (15.7% of all injuries). Training activities resulted in 7,665 (9.2%) of all injuries, while injuries received responding to or returning from emergencies totaled 4,745 (5.7%) of all injuries. Finally, 13,690 (16.4%) injuries occurred during other on-duty activities.

As noted above, 44,210 injuries were received on the fireground. We know that the fireground can be a dangerous place, so we need to understand what kind of injuries occurred in 2006. Fireground injuries included:

- Sprain or strain (20,655);
- Wound, cut, dislocation, or fracture (8,705);
- Smoke, gas inhalation, or respiratory distress (3,755);
- Fire or chemical burns (3,070);
- Thermal stress (2,280);
- Burns and smoke inhalation (575);
- Heart attack or stroke (350); and
- Other (4,820).

For many of these injuries, adopting safer work practices or wearing personal protective equipment correctly might have reduced the number of injuries.

Avoiding Injury

How can firefighters better protect themselves and avoid injuries. One method of thinking about firefighter safety fits the acronym SAFEOPS. Here's what SAFEOPS means:

- **Supervision.** Incident commanders, fire officers, and incident safety officers, along with other specialized safety personnel, must work towards eliminating hazards and adopting safer work practices.
- **Attitude.** Firefighters are now much more aware of hazards and how to protect themselves. They must continue to look out for each other when on-duty.
- **Fitness/Wellness.** Healthy firefighters are safer firefighters. Taking care of your body is a personal action that only you can do.
- **Education.** Safety education is available on a wide range of topics. If you need additional information, contact the Training Division for assistance.
- **Organizational Involvement.** All members of JCFPD must take care of ourselves and each other. When you see a safety hazard, either fix it immediately or let your station officers know about the problem. Working together makes all of us safer.
- **Procedures.** JCFPD has adopted SOPs and SOGs intended to improve the safety of all responders. Familiarize yourself with these internal documents and follow them.
- **Standards/Regulations.** There are many standards and rules in place to improve our safety. We should become familiar with these standards and adapt our work practices to meet the intent of these standards.

Protecting Yourself

Even though safety officers may be appointed at incidents, only YOU can adopt safe practices and procedures. Think about your safety on the scene!



Safety Brief

JCFPD Training Division

October 2008

2008-10



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Backing Accidents

Backing accidents account for 25% of all automobile accidents, according to the National Safety Council. Most drivers operate a vehicle in reverse less than one mile each year, so the high percentage of backing accidents should encourage all drivers to exercise caution while backing.

District firefighters must back vehicles almost everyday. Some backing occurs at emergency scenes, but every apparatus must be backed into the station at the end of each call. Backing accidents can result in damages to vehicles, buildings, equipment, and occasionally to other firefighters or civilians. Repairs use up financial resources that could be used for other purposes.

Hazards for Firefighters

Both drivers and firefighters must exercise caution when vehicles are backing. Drivers must ensure that apparatus only move when it is safe. There are several operations where backing vehicles can cause injuries.

- Firefighters should not ride on apparatus that are backing up. A 25-year old Los Angeles FD firefighter was killed in 2004 when she fell off a backing engine and was run over. Ironically, she was acting as the "Tailboard Control Officer" when she slipped off the truck.
- Tanker operations present several hazards. JCFPD relies upon a tanker-based water supply. As a result, tankers are often backed into position to dump their water. Firefighters operating as spotters should avoid standing or walking between moving apparatus and stationary objects, including both portable tanks and parked vehicles. Spotters should stand in a position where they can see the mirrors of the backing vehicle at all times. If the driver loses sight of the spotter, the driver should immediately stop the vehicle and wait for the spotter to become visible again.



Avoiding Injury

The best way to avoid backing accidents is to park vehicles so that backing is avoided. JCFPD policies and guidelines require that drivers practice backing techniques during their training period. In addition, JCFPD vehicle operators must follow established guidelines when backing apparatus, both at the emergency scene and at the station. The following are some recommended actions to avoid backing accidents.

- Drivers should conduct a walk-around inspection before moving any apparatus. During the walk-around, drivers should look for obstructions behind and to the side of the vehicle.
- Drivers should ensure that at least one window is open when backing. Although shouted warnings may not be heard, drivers should be listening while backing.
- Dismounted spotters are recommended and should be utilized when personnel are available. When backing the vehicle, the spotter should remain visible in the mirror at all times. Drivers and spotters should consider using radios to communicate during backing operations.
- Spotters should stand beside, but never behind the vehicle being backed. A fire chief in Wisconsin was killed in July 2008 when a tanker being backed into a station suddenly accelerated, pinning the chief against another vehicle.
- The vehicle should be backed at low speed at all times.

Protecting Yourself

Backing fire apparatus can be very dangerous. Whenever possible, drivers should park apparatus so that they can drive out instead of backing up. Spotters should be utilized to avoid accidents.



Safety Brief

JCFPD Training Division

November 2008

2008-11



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Firefighter Boots

Firefighter boots are designed using two different types of materials—rubber boots and leather boots. Johnson County Fire Protection District issues each firefighter a protective ensemble for structural firefighting that includes rubber boots designed for structural firefighting. Keeping your boots in good condition will help protect your feet during structural firefighting activities.

Hazards for Firefighters

Structural firefighting takes place in building being demolished by fire. Construction workers protect their feet during construction and demolition activities. Firefighters face the same hazards, while also contending with hazards most construction workers don't have to think about. Foot hazards include:

- Thermal injuries;
- Slippery surfaces;
- Cuts, punctures, and abrasion;
- Electrical current;
- Falling building materials; and
- Falling objects.

Structural firefighter boots are required to meet the standards of NFPA 1971 *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Firefighting*. Structural firefighting boots are designed to protect the feet of firefighters from the hazards identified above. Firefighter boots include a steel toe to protect against falling objects, and a steel shank and midsole to protect against punctures through the sole, such as nails and other sharp objects. The sole of the boot is designed to have a deep tread to provide traction. Brad Hubbard, a former Lieutenant at JCFPD, noted in his January 2008 article in *Fire Engineering* that boots with worn tread should be replaced to maintain firefighter safety.

Firefighter boots also have additional material covering the toe and the instep to provide

abrasion resistance for protection at high-wear points. Additionally, firefighter boots should have a flame-resistant lining to provide thermal protection.

Avoiding Injury

Firefighters are responsible for conducting regular checks of their boots to ensure that they are in good working condition. The care and maintenance of firefighter boots should not be overlooked.

Firefighter boots should be regularly cleaned with a mild detergent. This is easily accomplished in a work sink. Both the soles and the uppers should be kept clean. While cleaning, inspect the rubber for cuts, punctures, and abrasions. When the rubber surface is compromised and the boot leaks, you should contact your station officers to arrange immediate replacement. If the soles are worn, the boots should be replaced.

Boots should always be worn with bunker pants to protect against thermal injuries, cuts, and abrasions during structural firefighting activities. During wildland firefighting, structural firefighting boots can be worn without structural firefighting pants.

Boots should fit the foot properly. The foot should fit securely within the boot to prevent ankle injuries, provide secure footing on ladders and uneven surfaces, and avoid blisters. Boots should be sized to fit the foot while wearing socks.

Protect Yourself

Firefighters should regularly inspect their structural firefighting boots. Keep your boots clean. When boots are worn or damaged, notify your station officers to arrange immediate replacement. Keep your boots in good condition, and your feet will be protected.





Safety Brief

JCFPD Training Division

December 2008

2008-12



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Control of Hazardous Energy (Lockout Tagout)

Firefighters can encounter hazardous energy during maintenance, repair, and emergency response activities. Hazardous energy can be found in many forms, including electrical, mechanical, hydraulic, pneumatic, chemical, and thermal energy sources. Energy sources may be active (such as electrical sources), while other sources may store potential energy (such as flywheels or airbag inflators).

Hazardous energy sources must be disengaged, isolated, or blocked (often called Lockout Tagout) to protect firefighters who must work around hazardous energy devices. Firefighters can encounter hazardous energy in buildings on fire, during vehicle rescue activities, or when working on or around farm machinery or industrial equipment.

Hazards for Firefighters

In the private sector, OSHA regulations provide guidance for safe work practices around hazardous energy. Although JCFPD is not under OSHA regulation, we can benefit from this guidance.

There is a difference between turning off a machine and actually disengaging a piece of equipment. Turning off a control switch opens the circuit, but a short circuit at the switch could energize the machine. And if precautions are not established, someone could turn the machine on and start the machine while firefighters are exposed to moving parts. Also, because many machines or systems have multiple hazardous energy sources, each control point must be identified and secured.

Firefighters might be electrocuted, or lose fingers, arms, and legs, or suffer severe crushing injuries when machinery activates unexpectedly. Hazardous energy is considered adequately isolated, blocked, or dissipated when an unplanned event would not reactivate the

flow of energy. This includes the weight of firefighters operating on or around machinery.

Avoiding Injury

Firefighters can protect themselves, injured victims, and other rescuers by following several steps:

- Identify all hazardous energy sources, including stored or residual energy, in the work area where firefighters, victims, or rescuers are working.
- Isolate, block, or dissipate hazardous energy at points of control that cannot be overridden or bypassed with reasonable effort.
- Secure all points of control to prevent unauthorized personnel from reenergizing the machine or system. Securing sources can include using a lock, tag, or stationing a radio-equipped firefighter at the control point to prevent operation.
- Maintenance, repair, or emergency operations must not begin until hazardous energy sources have been isolated, blocked, or dissipated, and the control point(s) are secured. If hazardous energy sources cannot be completely secured, firefighters and officers must consider the risks and benefits of the operation before exposing themselves and others to possible injury.



Protect Yourself

Firefighters regularly interact with hazardous energy sources. This can occur in the station while maintaining or repairing equipment. Firefighters will also encounter hazardous energy sources during emergency operations.

Firefighters and officers must think about the different types of energy present in a machine, vehicle, or other equipment. Controlling energy sources might save a finger, arm or leg, or even a life!