



Safety Brief

JCFPD Training Division

February 2006

2006-2



Structural Search & Rescue

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Firefighters conduct searches during structural fires to rescue occupants who haven't exited the structure and are exposed to fire hazards. There are two types of searches—primary searches and secondary searches. Primary searches are rapid and systematic, and are designed to

remove all savable victims from the structure. Secondary searches are slow and methodical, and are designed to locate deceased victims.

Hazards for Firefighters

There are many hazards for firefighters engaged in searching a structure. Firefighters must always recognize that their own safety is the highest priority. Structural fires can advance to the flashover stage in 4-10 minutes, depending upon the fire load. Additionally, smoke conditions will increase, making visibility a problem. These conditions can minimize survivability for occupants and firefighters.

Firefighters must always wear their issued PPE and SCBA (with functioning PASS device) inside burning buildings.



Firefighters must maintain situational awareness and know where they are in the building. Searchers can easily become disoriented under fire conditions. Searches should be performed by following a consistent pattern after considering the building's construction.

Firefighters assigned to the search function should work in teams, usually consisting of 2-4 firefighters. Pairs of firefighters improve overall safety and make it easier to carry the needed tools.

Firefighters assigned to search a structure should consider taking tools with them for safety purposes. First, a forcible entry tool should be carried. It can be used both to force entry and also to penetrate interior walls for escape from fire conditions. Second, each search team should have a portable radio with them. Radios can be used to call for assistance or report recovery of a victim. Third, each search team should carry a handlight. Although visibility may be poor, handlights can also be used as a beacon should the search team become disoriented.

Searches may be conducted with or without hoselines. Attack lines should be positioned to protect potential victims and the firefighters conducting a search. If conditions are still unsafe for searchers, victims may not be savable. However, hoselines provide additional safety in two ways. First, firefighters may protect themselves or victims if the exit is cut off by fire. Additionally, the hoseline will provide a path leading to the outside should firefighters become disoriented.

Avoiding Injury

Some safety tips for combating chimney fires include:

- Wear all personal protective equipment, including SCBA with PASS devices turned on;
- Coordinate search activities with attack operations;
- Search on hands and feet to avoid tripping on unseen obstacles;
- If disoriented, move to lower floors or to windows on outside walls. Close the door behind you and open a window to attract attention. Use portable radios to contact command.

Protect Yourself

Search crews are at high risk for disorientation. Maintain awareness of your location in the structure. Carry recommended tools to increase personal safety. Remember that the first priority for search teams is their own safety! If conditions are unsafe for firefighters, victim survivability will rapidly decrease.



Safety Brief

JCFPD Training Division

March 2006

2006-3



Wildland Firefighting

JCFPD firefighters often are called upon to fight ground cover fires involving grasses, leaves, and brush. These types of fires can spread quickly and threaten the safety of firefighters who are not prepared for rapidly changing conditions.

Hazards for Firefighters

Wildland firefighters have been taught for years to observe the **18 Situations That Shout Watch Out**. If we pay attention to these situations, we will avoid many of the hazards associated with wildland firefighting.

1. **The fire is not scouted and sized up.**
2. **You're in country not seen in daylight.**
3. **Your safety zones and escape routes aren't identified.**
4. **You're unfamiliar with weather and local factors influencing fire behavior.**
5. **You're uninformed on strategy, tactics, and hazards.**
6. **Instructions and assignments are not clear.**
7. **You have no communication link with crew members and supervisors.**
8. **You're constructing a fireline without a safe anchor point.**
9. **You're building a fireline downhill with fire below.**
10. **You're attempting a frontal assault on the fire.**
11. **There is unburned fuel between you and the fire.**
12. **You cannot see the main fire, and you're not in contact with anyone who can.**
13. **You're on a hillside where rolling material can ignite fuel below.**
14. **The weather is getting hotter and drier.**
15. **Wind increases and/or changes direction.**
16. **You're getting frequent spot fires across the fireline.**
17. **Terrain and fuels make escape to safety zones difficult.**
18. **You feel like taking a nap near the fireline.**



These 18 situations cannot always be avoided. But when these hazards are present, firefighters should adopt the **10 Standard Fire Orders** to provide safety for firefighters combating wildland fires.

Avoiding Injury

The National Interagency Fire Center urges firefighters to learn the **Ten Standard Fire Orders** to provide for firefighter safety during wildland firefighting. These have been slightly modified for JCFPD operations.

The first of the standard orders describe the hazards associated with fire behavior:

1. **Keep informed on fire weather conditions and forecasts.**
2. **Know what your fire is doing at all times. Observe personally or use scouts.**
3. **Base all actions on current and expected fire behavior of the fire.**

The next three standard orders detail how to address safety on the fireline, and are based upon the fire behavior issues listed above:

4. **Have escape routes and make them known.**
5. **Post a lookout when there is possible danger.**
6. **Stay alert. Keep calm. Think clearly. Act decisively.**

The next three standard orders are focused on organizational control. These issues should be addressed by the officers and senior firefighters in command at the scene:

7. **Give clear instructions and be sure they are understood.**
8. **Maintain prompt communications with your firefighters, your incident and sector commanders, and adjoining units.**
9. **Maintain control of your units at all times.**

The last of the standard orders sums up the safety philosophy you should adopt:

10. **Fight fire aggressively, but provide for safety first.**

Perhaps this should be changed to "Provide for safety first, and fight fire aggressively if it can be done safely."

Protect Yourself

Firefighters must watch out for themselves and other firefighters. You deserve to have your safety considered as the primary emphasis.

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Safety Brief

JCFPD Training Division

April 2006

2006-4



Firefighter Safety

Avoiding Injury

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We have known for a long time that firefighters face the risk of injury and death. At JCFPD, we are concerned about your safety, and want you to be aware of the hazards. Injuries can occur during five major types of activities, including responding to or returning from an incident, fireground activities (from arrival to departure), non-fire emergencies (rescues, spills, etc.), training, and other on-duty activities (such as inspections or maintenance duties).



Hazards for Firefighters

Firefighters must work safely in many different environments, which can increase the risks of injury. **Firefighters should always expect the unexpected!** Understanding these incidents will help to reduce the inherent risk of firefighting.

In 2003 (according to the NFPA), 105 firefighters died on duty. But did you know that 78, 750 firefighters were injured in the line of duty in 2003? This number represented a decrease of 2.5% from 2002.

About half (48.3%, or 38,045) of all firefighter injuries occurred during fireground operations. Major types of injuries during fire suppression operations included:

- Strains, sprains, muscular pain (44.2%);
- Wounds, cuts, bleeding, bruises (21.6%);
- Burns (7.3%); and
- Smoke or gas inhalation (6.1%).



Injuries also occur during emergency incident not involving fire. NFPA estimated that 13,855 injuries happened during non-fire emergencies. Another 14,550 injuries occurred to firefighters who were on duty, but not involved in emergency operations, often at the station. More than half (55.7%) of all non-fireground injuries were strains, sprains, and muscular pain.

Understanding the causes of injuries can help firefighters avoid being injured. The leading causes of fireground injuries in 2003 were:

- Overexertion or strain (32.4%);
- Falls, slips, jumps (27.6%);
- Exposure to fire products (10.6%); and
- Contact with objects (10.5%).

In 2003, fireground injuries averaged 24.0 injuries for each 1,000 fires attended. Non-fireground injuries averaged 0.70 injuries for each 1,000 incidents attended.

Protect Yourself

The officers and firefighters of JCFPD can reduce the number of injuries that occur each year. Several rules can help us keep firefighter safety as a primary principle of operations.

1. **Think before you act, rather than act before you think.**

Safety considerations should begin when the pager activates, and include all of the information gathered during previous responses.

2. **We may risk our lives a lot, in a highly calculated manner, to protect savable lives.**
3. **We may risk our lives a little, in a highly calculated manner, to protect savable property.**
4. **We will not risk our lives at all for lives or property that are already lost.**

The risks assumed by firefighters should always be proportional to the benefits gained by the activity. If the risks appear high, consider what types of control measures (safety equipment, assigning safety personnel, or alternative procedures) could reduce the risks to an acceptable level. When risks are acceptable, firefighters should be able to operate without suffering injuries.



Safety Brief

JCFPD Training Division

May 2006

2006-5



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Air Cylinders

Air cylinders are an essential part of fireground operations at JCFPD. Every SCBA is equipped with an air cylinder. We can recharge air cylinders on the scene, using the cascade system on JOCO 15, as well as recharging air cylinders at Station 1 using either a cascade system or an air compressor. Cascade systems are also composed of a series of air cylinders. All firefighters should be aware of the hazards associated with air cylinders.



A Cascade System

Hazards for Firefighters

There is a lot of stored energy in an air cylinder. Air cylinders used in SCBA are rated to hold 45 cubic feet of air at 2216 psi. Cylinders can be made from steel, aluminum, or composite materials wrapped with fiberglass. Air cylinders used in cascade systems operate at pressures of 4500 psi or higher.

Air cylinders must be hydrostatically tested to make sure the cylinder walls have not been damaged or weakened. Hydrostatic tests are conducted by filling the cylinder with water and pressurizing the water to a specified test pressure. Steel and aluminum cylinders should be hydrostatically tested every 5 years, and the test date is stamped in the cylinder shell. Steel and aluminum cylinders that have not been tested in the past 5 years should be taken out of service and not refilled. Composite cylinders have an effective life of 15 years after the date of manufacture. Composite cylinders more than 15 years old should be taken out of service.

Cylinders should be protected from damage. Threads should be covered by a protective cap when not in use. Valve assemblies should be protected against impact damage. Air cylinders can become missiles when valve assemblies break off because they are dropped or struck.

The air cylinders used in a cascade system should be secured at all times so they can't fall. Air cylinders should not be left standing in water or chemicals, as corrosion may occur. Air cylinders should be stored fully charged, and gauges should be checked monthly.

All air cylinders are equipped with an overpressure relief valve that will vent excess pressure. Stored cylinders exposed to fire or other heat sources can rapidly build up excess pressure. If the excess pressure is not relieved, the cylinder can rupture violently.

The compressed air produced by JCFPD's compressor (located at Station 1) is designed to deliver Grade D breathing air, with very little moisture and a limited amount of particulate. The air quality of the compressed air is required to be tested on a quarterly basis to ensure that air cylinders contain breathing air that is safe.

Avoiding Injury

Refilling air cylinders at the station or on scene can be a dangerous activity. Before refilling an air cylinder, you should:

- ☑ Inspect the cylinder for damage such as burn marks, blistered paint;
- ☑ Check the hydrostatic test date. If the cylinder is older than the test date, do NOT refill it.
- ☑ Use the fragmentation chamber carried on JOCO 15.



Fragmentation chambers are designed to deflect the blast of a ruptured cylinder upwards instead of outwards. However, it may not stop all fragments or pressure waves. Do not stand over the fragmentation chamber when filling the air cylinder from the cascade system or compressor.



Protect Yourself

Treat air cylinders with respect. Protect them from damage, and recognize the hazards associated with refilling air cylinders.



Safety Brief

JCFPD Training Division

June 2006

2006-6



Required Fire Flow

Water is the primary extinguishing agent used by JCFPD firefighters. Knowing how much water is needed in order to control various types of fires is an important safety skill. Predicting the required fire flow helps officers and firefighters determine the appropriate type of fire attack, determine if additional resources (firefighters, tankers, etc.) are needed, and determine the size and number of hoselines to be utilized.



Hazards for Firefighters

Too little water applied to a fire means that the fire continues to burn out of control. Too many resources committed to a fire increases the risk of motor vehicle accidents and makes units unavailable for another fire. Incident commanders should be able to estimate the rate at which water needs to be applied to fires.

Structure Fires

There are two methods of estimating the rate of application. The **Iowa State** formula has been around since the late 1950s, and is based upon research conducted on actual fires. The Iowa State formula is:

$$\text{GPM} = \frac{\text{Cubic Feet (L x W x H)}}{100}$$

A house that is 24' x 36' x 8' and fully involved should require a minimum of 69.12 gpm (6912 cu ft/100) to achieve fire control. This formula has repeatedly provided a good guide for fire commanders.

The **National Fire Academy** formula is based upon surveys of NFA students, rather than extensive testing. This formula is:

$$\text{GPM} = \frac{L \times W}{3} \times \# \text{ of floors} \times \% \text{ involved}$$

This formula applied to the structure fire above would require a minimum of 288 gpm if 100% of the one-story building was fully involved.

What is the difference between these formulas? Some people observe that the Iowa State formula should be applied to confined fires where the compartment has not vented. These same instructors suggest that the NFA formula is best applied to vented fires that are not oxygen-regulated.

Vehicle and Miscellaneous Fires

The required fire flow rate for vehicle fires is not based upon the relationship between fuel load and oxygen. Instead, experience has demonstrated that vehicle fires should be attacked with hose lines capable of flowing between 100-125 gpm. Booster lines only flow 25-30 gpm, resulting in an unsafe approach to firefighting. Hose lines for vehicle fires should be at least 1.5 inches in diameter, with 1.75 inch hose preferred. Obviously, large vehicles like tractor trailers may require even larger hose to provide adequate protection for firefighters.

Refuse containers, hay bales, and other miscellaneous fires require the incident commander to make a judgment call on the correct hose line size. It is always best to select a hose line that provides sufficient flow to absorb the heat produced by the fire. Again, 1.5-1.75 inch hose provides a minimum flow rate of at least 100 gpm, which should protect firefighters.

Avoiding Injury

Incident commanders should always anticipate the required fire flow rate for each fire. Once the right rate of flow for extinguishment is determined, the incident commander must call for enough tankers to provide sufficient water on the fireground to sustain the required flow rate.

Protect Yourself

The easiest formula to remember for required fire flow is: **Big Fire = Big Water**. Each fire has a critical fire flow rate that must be met in order to achieve extinguishment. Incident commanders, pump operators, and firefighters must be able to predict the amount of water and the rate of flow needed to put out any fire.

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Safety Brief

JCFPD Training Division

July 2006

2006-7



Traffic Control

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Emergency responders operating on or near roadways are responsible for their own safety, patient safety, and the safety of the motoring public. Equal consideration must be given for each of these groups, as overall safety is jeopardized when any one element (responder safety, patient safety, motorist safety) is ignored.



Hazards for Firefighters

Firefighters operating at the scene of motor vehicle accidents or grass fires near a roadway are exposed to being struck by vehicles, often moving at high speed. Additionally, the congestion associated with a motor vehicle accident often causes secondary accidents.

There are also legal issues associated with traffic control. In 1998, Missouri enacted a statute (RSMo 304.151) to reduce the danger for motorists. If firefighters ignore the provisions of this statute, the District could become partially liable for secondary accidents. Some of the implications of this statute include:

- Minor, non-injury accidents must be moved out of the roadway as soon as possible;
- Intentional placement of apparatus to restrict traffic flow requires implementing appropriate traffic controls; and
- Within 15 minutes of arrival on the scene, emergency responders must
 - Estimate the magnitude of the traffic incident,
 - Estimate how long the traffic incident will last, and
 - Set up the correct traffic controls.
- Traffic restrictions longer than one hour in duration require assistance from MODOT.



Avoiding Injury

Firefighters and incident commanders must implement traffic controls to protect the accident scene. Apparatus must be staged properly and

traffic must be managed to ensure the safety of responders, patients, and motorists. Short term traffic control may have to be provided by emergency responders.

Each traffic control zone has five components:

- Advance warning area—warns drivers that the driving pattern is changing ahead;
- Transition area—provides a space for lane changes, slowing, or stopping for a flagger;
- Buffer space—a short area between the transition area and the emergency work area;
- Emergency work area—large enough area for all emergency responders (including late arrivals); and a
- Termination area—where motorists resume normal traffic patterns.

Flaggers are an essential component of traffic control. Flaggers should be located 200-300 feet in advance of the emergency work area, stand alone (not in a crowd), and stand on the shoulder of the road. Flaggers should wear reflectorized material, such as a turnout coat or vest. Paddles or flags increase your visibility and should be used.

Apparatus can also be used to control traffic. Park apparatus at an angle that points the nose of the vehicle in the tapered direction that traffic should move. Turn the steering wheels so the apparatus will move away from responders if it struck from behind. Block only the lanes involved in the accident, and possibly one additional lane for safety of emergency responders. Use secondary apparatus to protect the scene and provide traffic control.

Protect Yourself

Firefighters operating as flaggers should NEVER stand in front of moving traffic. ALWAYS face oncoming traffic, and plan your escape route to rapidly move away from vehicles that don't stop or obey flagging signals. The goal of traffic control is to slow traffic, not stop traffic. Don't block all lanes of traffic unless it absolutely essential for responder or patient safety. Remember that motorist safety is also a responsibility for firefighters or incident commanders.



Safety Brief

JCFPD Training Division

September 2006

2006-9

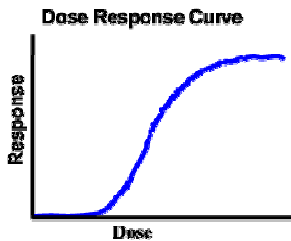


Chemical Hazards

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All firefighters are exposed to chemicals, whether those chemicals are used in the fire station or encountered during an emergency response. Most of these chemicals are not hazardous under normal circumstances, but all chemicals have the capability to cause harm under certain circumstances. This was first recognized by Paracelsus in the early 1500s, who observed that anything, can become a poison, if the dose is high enough. The dose-response relationship (right) illustrates how any product can be toxic, if consumed in a high dose.



Hazards for Firefighters

Firefighters can become injured by exposure to toxic doses of chemicals when chemicals enter the human body. Chemicals enter the body through four routes of exposure.

Inhalation-The primary route of chemical entry into the body is through the respiratory system. Firefighters can protect their lungs by wearing SCBA when chemicals are airborne.

Skin Absorption-Skin is normally a barrier against many chemicals. Ordinary structural fire protective clothing can become contaminated by chemicals and transfer the chemicals to the skin. Special chemically resistant clothing must be used to protect against skin absorption.

Ingestion-An often overlooked route of entry is ingestion. Firefighters may transfer chemicals into their digestive track by eating or smoking with contaminated hands. After exposure, firefighters should thoroughly clean the hands.

Avoiding Injury

So how do we minimize the injuries that come with exposure to chemicals? We should become more knowledgeable about the chemicals we use regularly in the station or might become exposed to during emergency responses.

Knowing the hazards of chemicals can help you protect yourself against accidental exposure.

Chemicals act in two different ways on the body. Some chemicals create **acute** effects. Acute effects are sudden and severe, resulting in immediate illness, irritation, or even death. Acute chemical exposures can affect different organs, depending on the route of exposures and type of chemicals. Acute exposures often result from high doses of chemicals over a short time period.

Other chemicals affect the body over time, resulting in **chronic** exposures. Chronic effects develop slowly, often resulting in long-term illnesses or work-related diseases. These outcomes can also result in death.

Air contaminants are the most common type of chemical exposures for firefighters. Air contaminants affect the body in different ways. They can result in irritation of the respiratory system. Air contaminants can also act as asphyxiants, preventing oxygen absorption into the blood stream, resulting in tissue damage, brain damage, or even death. Air contaminants can also affect the central nervous system, depressing the brain's function.



Scientists report the level of air contaminant that is harmful in terms of **lethal concentration**. A lethal concentration that can kill 50% of the exposed population in a specified amount of time is reported in safety literature as the LC₅₀. Because testing is not conducted on humans, testing is usually conducted on animals whose respiratory system is similar to humans.

Protect Yourself

Chemicals are present in our daily lives. Each chemical has different characteristics and affects the body in different ways. Additionally, chemicals enter the body in different ways. Firefighters must be aware of how chemicals affect the body and take actions to protect themselves. **BE SAFE!**



Safety Brief

JCFPD Training Division

October 2006

2006-10



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Incident Management

Firefighters face many types of emergencies. Most emergencies are routine and can be handled by a single unit or station. But some emergencies require multiple stations to respond and can become quite complex. For this reason, JCFPD has adopted an incident management system that can be used at routine emergencies or can be expanded to manage large, complex emergencies.

Hazards for Firefighters

Firefighters operating outside of an incident management system (IMS) can be injured because they are unaware of dangerous conditions developing at the emergency scene. This is often called freelancing. Firefighters engaged in suppression activities can push fire towards unsuspecting freelancing personnel who are unaware of changing tactics and conditions.

JCFPD has adopted an IMS that standardizes terminology and uses plain English on the radio. This common system of managing emergencies ensures that all personnel operate safely at emergencies. The district's accountability system is also part of an effective IMS.

Avoiding Injury

The JCFPD incident management system should be implemented at every emergency. By practicing our IMS skills at every call, we train ourselves to implement the IMS for large emergencies where an IMS is essential.

Every incident must have someone in charge. At JCFPD, an incident commander may be a station officer, a district officer, or a senior firefighter. The incident commander assumes a high level of responsibility, because all aspects of the emergency response rest on the shoulders of the incident commander.

The incident commander is responsible for establishing the incident priorities, sizing up the emergency, selecting the strategies and tactics

that will best stabilize the emergency, and assigning specific tasks to firefighters.

Incident Priorities

Establishing the incident priorities, along with an effective size-up, are the key tasks used by the incident commander to implement an effective IMS. There are three incident priorities for all emergencies: life safety, incident stabilization, and property conservation.

Life Safety. Life safety is the highest priority for all emergencies. Life safety extends beyond the occupants of the building or vehicle, and includes JCFPD personnel, other public safety personnel, and civilians who might be exposed to the emergency.



Incident Stabilization. Each incident is different, so specific actions may be different for each emergency. However, firefighters or other public safety personnel can never be exposed to risky activities, because that would violate the first rule of Life Safety.

Property Conservation. All district activities at an emergency incident should be guided by the principle of property conservation. Quick extinguishment, effective overhaul and salvage, and selection of tactics that minimize damage will enhance safety for both firefighters and the public we protect.

These priorities do not change, although our strategies and tactics are designed for each specific incident. By keeping the incident commander's priorities in mind, JCFPD personnel will be able to effectively implement the district IMS policies, thereby keeping emergency responders safe.

Protect Yourself

All JCFPD members are expected to implement and participate in the district incident management system. Freelancing is not tolerated and can lead to injuries, so turn in your accountability tag on every emergency response. The firefighter you protect might be you!



Safety Brief

JCFPD Training Division

November 2006

2006-11



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(Initial and Date
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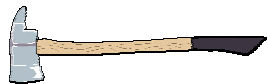
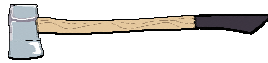
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Hand Tool Safety

Hand tools are used to apply additional force and energy to conduct various tasks. The safety objective associated with hand tools is to protect users from inflicting harm to themselves or others.

Hazards for Firefighters

Misuse of tools or using damaged tools can result in disabling injuries. These injuries can include loss of eyes and vision, puncture wounds from flying materials, bruises, cuts to hands and fingers, and even broken bones.



JCFPD carries many hand tools on its apparatus, and there are even more tools in use in the fire station. Each tool should *only* be used for the purpose for which it was designed. Inappropriate use can result in serious injuries.

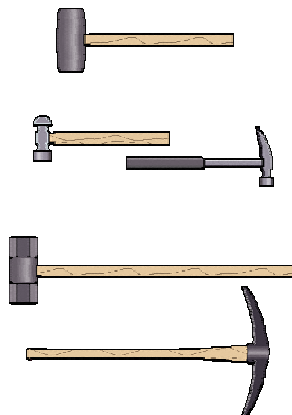
Avoiding Injury

There are six safety practices to be followed that will reduce the possibility of hand tool injury.

- **Use Personal Protective Equipment**
Always use the proper protective equipment for each tool. Eye and face protection should always be worn to protect against flying objects or liquids. Gloves may be needed to protect hands from cuts or bruises. Power tools may generate excess noise, requiring the use of hearing protection.

■ Select the Right Tool for the Job

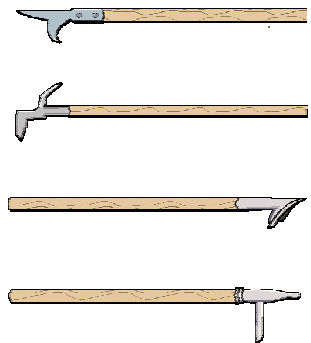
Avoid unsafe practices, such as striking hardened tools against other hardened tools (hammers against hammers) or using files or screwdrivers as prying tools. Wrenches should not be used as hammers. Pliers may slip, so use the correct-sized wrench instead.



- **Keep Tools in Good Condition**
Inspect tools before use. Know which parts of the tool are subject to stress or breaking. Look for wrenches with cracked or worn jaws; screwdrivers with broken tips or broken handles; hammers with chipped, mushroomed, or loose heads; or dull saw blades. All electrical tools or extension cords should have good plugs and uncut insulation.

- **Properly Ground Electrical Tools**
All electrical tools should have grounded plugs. Consider installing a ground-fault circuit interrupter (GCFI) on circuits that may be used around water.

- **Use Tools Correctly**
Incorrect tool use leads to many injuries. Common practices leading to injury include using screwdrivers on items held in the hand, knives pulled toward the body, and failure to ground electrical circuits. Other injuries are caused by not securing the work properly and striking two hardened surfaces together.



- **Keep Tools in a Safe Place**
Injuries are often caused when tools are improperly stored, whether on a fire truck or in the station. Be cautious when tools are stored overhead. Also, keep the cutting surfaces of sharp tools protected against accidental contact.

Protect Yourself

Hand tools should be inspected, especially after each use, to insure that they are in safe, working condition. Tools should be kept clean. Metal surfaces may need to be oiled periodically to reduce rust buildup. Check axes, pike poles, or striking tools frequently, ensuring that handles are not cracked and that the tool heads are securely fastened to the handle. Your safety depends on safe tool use!



Safety Brief

JCFPD Training Division

December 2006

2006-12



Cold Weather Safety

Station _____
(Initial and Date
to indicate
knowledge of
contents)

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Johnson County has survived its first snowfall this winter. This event reminds us that cold weather presents several hazards for firefighters. A review of these hazards may help us avoid injuries.

Hazards for Firefighters

Cold weather complicates the already hazardous tasks associated with firefighting. Cold weather presents the following hazards for firefighters.

- Cold injuries due to exposure;
- Injuries resulting from slips and falls;
- Hazardous driving conditions; and
- Operational concerns caused by snow.

Avoiding Injury

Firefighters and fire officers must take active steps to minimize the hazards associated with cold weather. For each hazard identified above, specific steps can be taken to avoid injuries associated with cold weather.

- Cold injuries can be expected due to exposure to low temperatures.



Firefighters engaged in emergency response often get wet. During cold weather, this can be dangerous! **Hypothermia** occurs when the body loses more heat than it produces, resulting in shivering, lowered body core temperature, and a decline in mental state. **Frostbite** occurs when the moisture in skin cells freezes due to lengthy exposure. The skin may appear pale and waxy and will feel cold.

- Cold weather means that water will freeze and form ice. This may happen at a station due to snowfall, or may occur at a fire scene due to hoselines. At the station, entry ways should be shoveled promptly to prevent slips and falls. Ice melt chemicals can be applied to remove ice more quickly. On the fire scene, be aware of where water runoff will occur. Avoid walking on ice where possible.

When ice cannot be avoided, walk slowly and use a tool to maintain your balance. Use extra firefighters to move heavy loads such as ventilation fans or ladders.

- The icy conditions found during cold weather can make driving very hazardous.



Firefighters should make sure that frost is removed from windshields and mirrors before responding to the station. Slower speeds may be required to get to the station safely. When driving apparatus, remember that **our first goal is to get to the emergency safely!** Emergency vehicles must slow down when roads are snowy or icy. Anticipate black ice (a thin layer of ice on asphalt) anytime the temperature is below freezing.

- Snowfall can affect operations. The extra weight of snow may impact on operations. Buildings are always being affected by gravity, and many buildings in our district are not built to any building codes. The dead load of extra snow load may cause buildings to collapse earlier than anticipated. Snowfall can also affect access to the building, making the placement of ladders more difficult. Roof operations may become impossible due to safety concerns. Finally, cold weather may complicate water supply operations, due to slower travel times, difficulty in reaching hydrants, and freezing conditions.

Protect Yourself

Fire officers and firefighters should look out for signs of cold weather injuries. Firefighters may need to be placed in warm apparatus cabs to recover from hypothermia. Operations may move more slowly due to concerns over icy or snowy conditions. Drivers of district apparatus must always be willing to slow the response in order to ensure that emergency vehicles arrive at the scene. Firefighting during cold weather can be done safely, even though operations may be slowed by conditions. Be safe during cold weather!