

Winter Weather Driving

The Washington area presents a number of challenges during cold weather that can impact emergency vehicle operations. The area most often experiences winter precipitation that changes forms throughout a storm, i.e. starting as rain changing to snow or ice. There is also frequently a freeze-thaw cycle following storms that cause roadways to clear and then become slippery again. Personnel must also recognize that the geography of Montgomery County makes it possible to have widely differing road conditions from one side of the County to the other. Apparatus operators need to be ready and able to manage winter weather operations so service delivery is not impacted.

Driving in Winter Weather

- SLOW DOWN, SLOW DOWN, SLOW DOWN. Increase your following distance. You need more time to see, more time to stop, and more time to maneuver.
- Avoid sudden or sharp steering, acceleration, or braking by knowing where you are going, slowing down, and expanding your look ahead distance.
- Snow reduces traction, however ice may completely eliminate it. Ice often accompanies or follows snow in the DC Metro area.
- Especially where ice is present, apparatus will slide when parked. If parking on a grade that is coated with ice or snow is necessary, operators need to take precautions such as placing the tires against a curb, placing wheel chocks on the downhill side of tires, and even placing a tire or two off of the pavement to an area of increased traction.
- When an especially treacherous area is identified that impacts a response, such as the street in front of a residence is iced over, communicate to other incoming units to avoid committing to it. This is particularly helpful in areas with lots of hills or valleys that can trap units.
- Deep snow and plow rows can create enough lift beneath a vehicle to cause the tires to lose traction. During extreme conditions consider remaining on main or plowed roadways and using alternate methods, i.e. walking, to reach a scene.
- If the vehicle becomes stuck, some things to try:
 - Quickly assess if your situation will have a negative effect on other apparatus or an incident and provide a Conditions-Actions-Needs report to PSCC or Incident Command via radio; do other units need to find another route?
 - Back out or alternate forward and backward movement to try and “rock” the vehicle to better traction
 - Use integral vehicle systems to assist with traction, i.e. differential locks, disable traction control, inter-axle locks
 - Stop, get out, and shovel under and around the apparatus
 - If the vehicle is equipped with standard tire chains avoid repeatedly and rapidly spinning the tires; this will destroy the chains

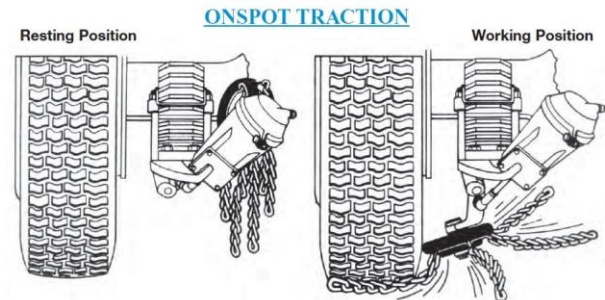
- If the vehicle is equipped with automatic tire chains spinning the tires is required to put the chains below the tires
- Remain patient and assess the need for assistance based upon the situation; frustration leads to poor decisions
- Roadways may appear wet when they're ice. If there is doubt about the surface conditions approach with the assumption of the worst-case scenario.
- Snow piles created by plowing are typically very dense and freeze solid. Striking a snow pile will be similar to striking a landscape boulder.
- Use the mirror heaters to keep the mirror from fogging when transitioning from the bay to the outdoors, and to evaporate ice or water from the face of the mirror.
- Keep the dashboard clear so the defroster can work. Do not block the vents with helmets, gloves, hoods, clipboards, traffic vests, towels, or any other items.
- Know how the climate controls work in the apparatus and engage the defroster before departing the firehouse. Attempting to find the defroster controls while traveling down the road leads to distractions and confusion in the cab.
- Pulling down the sun visor helps trap the warm air from the defroster near the top of the windshield. This is especially useful when driving in active precipitation.
- Keep the interior of the cab windows clean for quicker de-fogging.
- Top off your windshield washer fluid reservoir. The washer fluid not only keeps your windshield clean, it can work as a de-icer for your wipers and the glass.
- Refresh on the functions specific to your apparatus that may be needed in poor traction; all-wheel drive, automatic chains, inter-axle locks, differential locks, and automatic traction control.
- Carry a window scraper on the apparatus in case clearing the windows becomes necessary during a prolonged incident.
- Carry a scoop or snow shovel on the apparatus to assist if the apparatus becomes stuck.
- Roadway safety is always important for personnel working outside of apparatus, however winter driving conditions amplify the dangers. Approaching vehicles may identify personnel in the roadway, however may not be able to avoid them. Do not position personnel where they are exposed to approaching traffic and establish shadow areas to work.

Snow Chains or Cables

An important tool available for winter driving are tire chains. MCFRS apparatus have two general types of snow chains available: Automatic and Standard.

“On-Spot” or Automatic

Permanently mounted automatic chains, or “On-Spot” chains, consist of short lengths of snow chain attached to a small drive wheel that, when activated, contacts the sidewall of inside tire of the rear dual wheels. These devices rely on centrifugal force to throw the lengths of chain under the tire, therefore the tire must be rotating for the system to aid traction.



A primary benefit of this chain system is that the driver may engage and disengage it as roadway conditions change without leaving or stopping the apparatus. An electric switch mounted in the cab provides 12 volts to an air solenoid mounted on the vehicle's frame rail. Compressed air to the solenoid is supplied from either the vehicle's onboard air system or a 12-volt compressed air kit.

When the dashboard switch is activated, the solenoid opens allowing compressed air to enter the air chamber and lower the chainwheel so it contacts the inside of the tire. The friction between the tire and the rubber-covered chainwheel causes the chainwheel to rotate, creating enough centrifugal force to flail the chains out in front of the tire. (The principle of the system is similar to a small generator driven by a bicycle tire to operate a headlight.)


Six lengths of chain spaced at 60-degree intervals on the chainwheel ensure that there are always two (2) chains between the tire and road surface whether you are accelerating, braking or are in a wheel lockup condition. The traction from the chainwheel is obtained in forward OR reverse.

When the dashboard switch is turned off, the solenoid exhausts the air provided to the chain units and return springs in the air chambers bring the chainwheels back to their resting position.

For best operation these chains **should be engaged while the unit is moving**. Automatic chains work best when the apparatus can maintain slow but steady speeds, such as in shallow snow or on intermittently clear or covered roadways.

These chains will not work well in deep snow or when conditions bring the apparatus to a crawl.

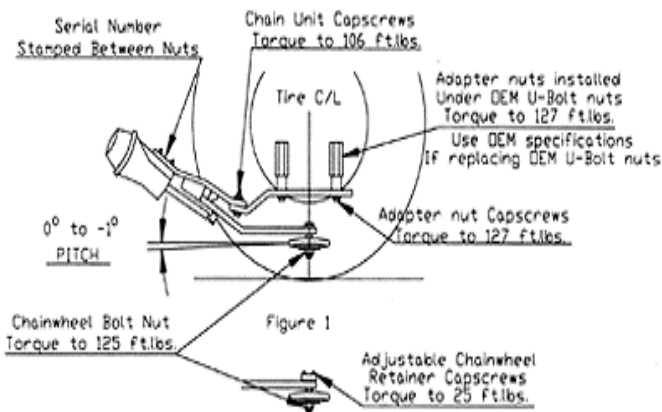
DO NOT drive faster than 25 mph when you are using “On-Spot” chains! RAISE the chains anytime that they are not absolutely necessary. Driving at higher speeds for prolonged periods **will** damage or destroy the “On-Spot” assembly and **will cause tire damage that may lead to failure.**



Onspot
Automatic Tire Chains

Keep your Onspots in tune
General Guidelines

Bulletin # 3130027



Serial Number Stamped Between Nuts

Chain Unit Capscrews Torque to 106 ft.lbs.

Tire C/L

Adapter nuts installed Under OEM U-Bolt nuts Torque to 127 ft.lbs. Use OEM specifications IF replacing OEM U-Bolt nuts

Adapter nut Capscrews Torque to 127 ft.lbs.

0° to -1° PITCH

Chainwheel Bolt Nut Torque to 125 Ft.lbs.

Figure 1

Adjustable Chainwheel Retainer Capscrews Torque to 25 Ft.lbs.

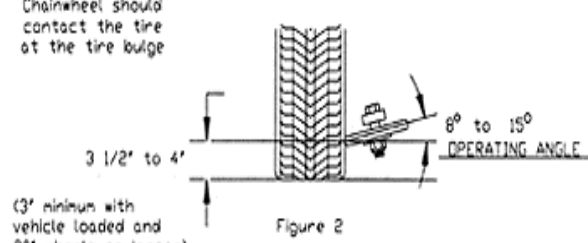
Grease Arm Bearings

Check Play In:
Ball Joint
Chainwheel Bearings
Arm Bearings

Check Tire Sidewall Pressure (minimum 20 Lbs)

Check Chainwheel Contact
Operating Angle
Pitch
Contact Height

Chainwheel should contact the tire at the tire bulge



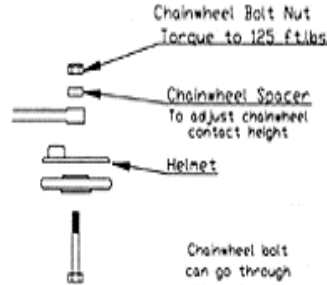
3 1/2' to 4'

8° to 15° OPERATING ANGLE

Figure 2

(3' minimum with vehicle loaded and 20" wheels or larger)

2 3/4" contact on loaded vehicle with 16" wheels and 170mm chainwheel



Chainwheel Bolt Nut Torque to 125 ft.lbs.

Chainwheel Spacer To adjust chainwheel contact height

Helmet

Chainwheel bolt can go through either direction

Figure 4

Red Chainwheel Driver Side
Blue Chainwheel Passenger Side

1-800-224-2467

Standard or "Drop"

Removable standard tire chains or snow chains are applied manually to the outside tire of the rear dual wheels. Standard tire chains offer better performance than "On-Spots" in deep snow, heavily rutted snow, and on ice.



On tandem axle apparatus they should be applied to the drive axle wheels. Note: If chains are installed on a Pierce All-Steer, the all-steer functions must be disabled.

Tire "chains" may also be in the form of cables which are somewhat easier to install, however offer a bit less aggressive traction in severe conditions.

Standard chains must be applied so that they are well distributed around the tire and fit snugly. Most require some form of spring or rubber band tensioner that is added once the chains are fastened around the tire.

DO NOT drive faster than 25 mph on clear pavement for any reason. As a general rule units running with standard tire chains should not be on the Interstate Highways. Driving at 25 mph on the Interstate produces one hazard, while driving at higher speeds with the chains on produces another. This rule can also impact patient transport practices. Officers may consider using a chained vehicle to access patients and remove them to cleared roads where they can be transferred to an unchained unit for transport.

Do not attempt to make turns with the rear differential locked while operating with tire chains. Turning can destroy the crosslinks by dragging them beneath the tire. Repeatedly spinning the tires will also destroy the crosslinks, so if the vehicle becomes stuck avoid aggressively spinning the tires if progress is not being made.

Simultaneous use of automatic and standard chains is possible because they affect different tires, however it should be an exception and not routine. Simultaneous use should be considered if standard chains are not providing sufficient traction for the situation, such as on ice or when stuck.

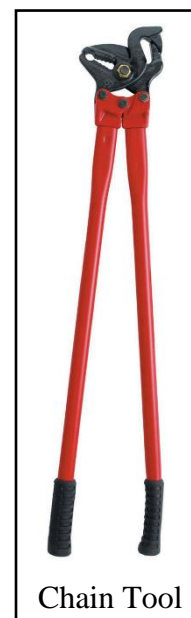
Leave the windows slightly down and constantly listen for the sound of broken chains. If a crosslink breaks, stop as soon as safely possible to avoid damage to the apparatus and park in a safe location. Notify PSCC that you are out of service until you can repair or remove the chain.

Units should carry lengths of coat hanger wire or mechanic's wire to secure latches and broken chain sections while out of quarters. Consider also carrying a chain tool to remove broken links in the field. In some cases, if the broken section cannot be secured, the entire chain may have to be removed before a unit can continue.

If severe conditions dictate chains for 4x4 vehicles to safely operate most manufacturers and off-road forums recommend installing chains on front AND rear axles. The vehicle manufacturer's guidelines should be followed in all circumstances and should be consulted BEFORE the winter season arrives to determine the suitability of tire chains and types of chains recommended. In addition to the vehicle manufacturer, the tire manufacturer should also be consulted to ensure the tires are compatible with snow chains.

Before the winter season, personnel should ensure the chains for their apparatus are available and they know how to install them. Improperly applied snow chains have caused significant damage to apparatus and delayed the response of units. In preparation for a winter season or predicted storm, consider these questions:

- Do you have the correct chains for each vehicle assigned to your station?
- Do you have spare sets of chains?
- Do you have enough crosslinks, tools, etc. to repair tire chains?
- Do you have the correct tensioners for each chain set to hold the chains tightly on the tires?



Chain Applications

The following guidelines should be followed for chain usage:

- **Less than 6 inches of snow on the ground or predicted:** Use the apparatus mounted “On-Spot” chains. Be sure to raise the chains on cleared pavement or when they are not needed for traction. Monitor the weather for changes that might produce more than 6 inches of snow and be ready to apply standard tire chains if conditions worsen.
- **6 inches of snow on the ground with more falling or forecasted:** Apply the standard tire chains, and **disengage** the “On-Spots”.
- **Blizzard Conditions:** Apply the standard tire chains. **Do not use the “On-Spot” chains unless you are stuck and have a tire that is spinning.** Disengage the “On-Spots” as soon as you regain traction.
- **Ice:** Apply the standard tire chains and **use them in conjunction with the “On-Spots”**. Recognize that ice is by far the most dangerous road surface encountered. Allow several times your normal stopping distance and reduce speeds dramatically prior to entering turns. Carry sand, absorbent, or ice melt to improve traction in small work areas and to aid you if you get stuck. **Recognize that other vehicles moving in your proximity may not have full control.**

All personnel must monitor the condition of the roadways in their response area for changes throughout their shift and report these changes to the on-duty station officer. This monitoring must include getting up periodically at night. All personnel should realize that changes in road conditions may force them to apply and remove chains more than once in their shift. Authority for applying chains will rest with the on-duty station officer unless orders are received from a higher authority. When the station officer makes the determination that chains are needed he or she will notify the on-duty Battalion Chief and the LFRD representative.