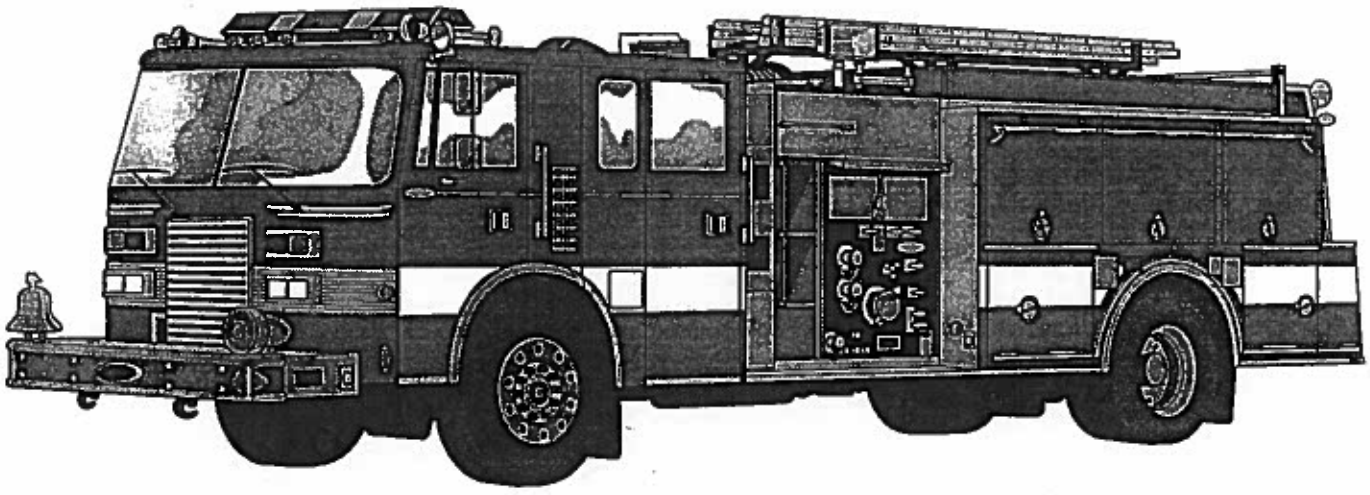
PRE-TRIP SAFETY INSPECTION FOR FIRE APPARATUS OPERATORS



PURPOSE

To review the appropriate techniques for conducting a proper pre-trip inspection for fire apparatus weighing over 26,000 lbs GVWR (gross vehicle weight rating.)

Students will be able to identify all tools necessary to implement a pre-trip inspection program within their department.

OVERVIEW

➔ Who should conduct pre-trip inspections and when?

- Each apparatus operator on vehicles over 26,000 GVWR with two axles, and over 10,000 GVWR with three axles.
- Prior to driving the apparatus for the first time

➔ What is a pre-trip safety inspection?

- Safety overview to make sure apparatus is safe to drive
- Should be done without use of special tools or crawling under apparatus. It's a 'one-knee operation.'
- Should be completed in 15-20 minutes excluding fire department related tool and equipment checks.
- The pre-trip safety inspection is a 7-step process as recommended by DMV and must be demonstrated to get a class 'B' or 'A' license including firefighter restricted 'B'. We have combined two steps in the following process to make it a total of six steps.

➔ **List of Applicable Laws**

- It is unlawful for a driver to drive a vehicle that is not in safe operating condition or is not equipped as required by law. It is also unlawful for anyone to direct a driver to do so. *13 CCR-1230*

➔ **List of Applicable Laws** (cont'd)

Driver Inspection

- Before driving a motor vehicle, the driver shall:
  (a) be satisfied that the motor vehicle is in safe operating condition;
  (b) review the last vehicle inspection report required to be carried on the power unit;
  (c) and, sign the report, only if defects or deficiencies were noted by the driver who prepared the report, to acknowledge that the driver has reviewed it and that there is a certification that the required repairs have been performed. *C FR 49 396.13*

Vehicle Inspection Report(s)

- (a) Report required: Every motor carrier shall require its drivers to report, and every driver shall prepare a report in writing at the completion of each day's work on each vehicle operated and the report shall cover at least the following parts and accessories:
  -service brakes including trailer brake connections
  -parking (hand) brake
  -steering mechanism
  -lighting devices and reflectors
  -tires
  -horn
  -windshield wipers
  -rear vision mirrors
  -coupling devices
  -wheels and rims
  -emergency equipment
  (b) Report content: The report shall identify the motor vehicle and list any defect or deficiency discovered by or reported to the driver which would affect safety of operation of the motor vehicle or result in its mechanical breakdown. If no defect or deficiency is discovered by or reported to the driver, the report(s) shall so indicate. In all instances, the driver shall sign the vehicle inspection report. On two-driver operations, only one driver needs to sign the report, provided both drivers agree as to the defects or deficiencies. If a driver operates more than one vehicle during the day, a report shall be prepared for each vehicle operated.
  (c) Corrective action: Prior to operating a motor vehicle, motor carriers or their agent(s) shall effect repair of any items listed on the vehicle inspection report(s) that would be likely to affect the safety of operation of the vehicle.

➔ **List of Applicable Laws** (cont'd)

(1) Motor carriers or their agent(s) shall certify on the report(s) which lists any defect(s) or deficiency(s) have been corrected or that correction is unnecessary before the vehicle is again dispatched.
(2) Motor carriers shall retain the original copy of each vehicle inspection report and the certification of repairs for at least 3 months from the date the report was prepared.
(3) A legible copy of the last vehicle inspection report, certified if required, shall be carried on the power unit. *CFR 49 396.11*

INSPECTION TIPS

➔ Sequence of the inspection is up to you but having a system is very important.

➔ Remember to look each and every time. Don't take what you are looking at routinely. Really look at things.

➔ Achieve an inspector's mind set prior to starting the inspection. Eliminate distractions both physical and mental.

➔ Use your hands and ears in addition to your eyes to inspect all components. "Look, listen and feel," like in CPR.

ACTUAL INSPECTION - 6-STEP METHOD

Step 1 - Vehicle Overview

- Note overall condition of vehicle as you approach the apparatus. Identify major leaks, broken equipment or hanging components.
- Enter the cab and review past inspection reports and maintenance records for discrepancies.
- Adjust driver seat and mirrors for proper fit and visibility.
- Do not start the apparatus until fluids have been checked.

Step 2 - Engine Compartment

- Check engine oil levels. Engine should have been off for 15-30 minutes to get proper reading. Oil should be black. (Gray would indicate water in the oil.)

- Check coolant level. If cap is cool enough to handle with a bare hand, it is probably safe to open. Coolant should be full and not have oil or fuel in the water.

- Check power steering fluid.

- Automatic transmission fluid should be checked only weekly since engine should be running and the fluid should be hot. Look for drips around transmission.

- Check all hoses. Hoses should be pliable and connections should be tight. No rust should be visible at connections. Hoses should not be weeping.

- Check all belts for proper tension. Belts are too loose if screeching is heard when engine is revved up - may also smoke. Check for a change in tension from previous inspections. (Rule of thumb: belt should flex no more than ½" if on fixed pulleys or 1" if retractors are present.)

- Check for any kind of unusual leaks: fuel, water, oil, hydraulic fluid, power steering fluid.

- Check for loose components: loose wires, loose bolts, etc.

- Check battery fluid level if applicable.

Remember, you don't have to be a mechanic to see something unusual here. Just look, listen and feel. If unsure, call in a mechanic.

Testing Tip: Candidate needs to be able to verbalize all the above areas and also know where to add fluids if necessary.

Step 3 - Check Lights

- Turn on headlights and 4-way flashers. Check from outside, front of vehicle. Cycle high beams, and turn off headlights and 4-way flashers. Note: both headlights must work and a high-beam indicator should be working on the interior of the cab. If both headlights are not working, you cannot operate the apparatus. Headlights are turned off right away because they rapidly draw down the battery.

- Turn on marker, clearance lights and turn signals. Inspect all lights on apparatus.

- Brake lights should be tested by utilizing a helper or by using a device or object to push the brake pedal down.

  Note on lights: if the *apparatus* has the light, it must be checked as part of the lighting check. This includes code III lights and spotlights.

  Clean all lights and reflectors as you walk around.

Step 4 -Walk-Around Inspection

- Remember, this is a safety inspection only. Ensure that all compartments and tools are secure. Make sure you actually check the items.

- Left front side:
  - Driver door and mirror – mirrors should be clean, have no cracks or stickers, and be secure.
  - Left front wheel and tire – start at the outside of tire and work your way to the center.

  Note on tires: *tires should be free from cuts or bulges. Look at the "belly" of the tire to identify if it is properly inflated. If in doubt, gauge it. The tire pressure for fire apparatus is routinely kept at the maximum identified operating pressure listed on the side of the tire. The steering tires should have a minimum of 4/32"(1/8") of thread. This is usually twice the height of the wear bars that are found between each thread. Recaps cannot be run on the steering wheels of any apparatus.* **Valve stems should not be leaking, bent or cracked.**

  Note on wheels: *rims should not have any cracks or welds. Cracks usually appear between lug nuts or between lug nuts and the center of the rim. Lug nuts should be tight and without rust around them. Rust indicates a possible loose nut or stud. Check hub oil level if an indicator window is present or look in the cup if indicated. Sealed hubs should not be leaking (inside or out.)*

- Check the condition of the front suspension including U-bolts, springs, shackles, and spring hangers. Work from the center of the vehicle to the inside of the wheel. Remember to look for loose bolts, cracks, out-of-position or hanging components. Also, the wheel should be generally centered in the wheel well.

- Look at the opposite brake drums, pads and components for cracks, oil and loose components. Check air hoses for damage. Brake drum should not have major cracks.
  ***Note on brake pads**: brake pads should have a minimum of ¼" of material, or the minimum that is recommended by the manufacturer.*

- Left midsection:
  - Check for security of tools and compartments.
  - Check frame for cracks and loose components.
  - Check fuel filler cap for rubber gasket. Check full tank and fuel lines for security, damage and leaks.
    ***Note on fuel system**: If any fuel is leaking or cap is missing or the tank is damaged, the apparatus should be immediately placed out of service.*

- Left rear:
  - Check condition of rear wheels and tires.
    ***Note on dual tires**: dual tires should not be touching and should be the same size and type (bias ply and radials should not be mixed.). Minimum thread depth is 2/32" or 1/16." Tire wear depth should be similar for both tires. The tire with the most thread will tend to heat up to excessive temperatures. Make sure you look at the valve stems carefully.*
  - Check suspension and undercarriage including rear differential for condition and leaks.
  - Check brakes for cracks, wear and air hose condition. Remember: brakes are only checked visually on the pre-trip inspection. It is best to check opposite side brake component. Slack adjusters should be checked weekly or per department's SOPs. Maximum movement of air brake push rod should not exceed 2" - check manufacturer's specifications. (Most brakes will have problems if over 1-1/4" of slack.) Excessive distance between pads and drums when parking brake is off will also indicate brakes need adjustment.
  - If brakes are in need of repair, a mechanic should be called in immediately.
  - Drive line should be secure and without damage. (You must be certified to set slack adjusters.)

- Rear of apparatus:
  - Lights and reflectors should be clean and operational.
  - Splash guards should be properly attached. (Rule of thumb: splash guards should be no more than 8" off the ground.)
  - Equipment should be secured.

- Right side - same as left side with the addition of:
  - Exhaust system - should be properly attached and without leaks particularly around the cab of the apparatus. Look for black soot anywhere on the pipe that would indicate a leak. Straps should be secure.
  - Check battery condition and security (if applicable.) Batteries should be properly strapped down and wires should not be bare. Wires should not touch sides of metal compartments.

- Front of the apparatus:
  - Check windshield for cracks.
  - Check front axle and condition of steering components. Look for lose bolts, cracks or improperly positioned components.
  - Windshield wipers should have no cracks and have proper tension against glass. They will be operationally tested in cab.

Step 5 - Start the Engine and Inspect the Cab

- Make sure parking brake is applied and transmission is in neutral, and start the engine.

- Look at the gauges and make sure the oil pressure, ammeter/voltage regulator and air pressure gauges are operating and reading correctly.

- Warning lights and buzzers should go out quickly.

- Check condition of controls for looseness or sticking and that they are properly positioned:
  - Accelerator - smooth with no sticking
  - Steering wheel - no excessive play (greater than 45 ° +/- is excessive and dangerous). Many mechanics consider anything over 2" of total play as excessive.
  - Horn operation
  - Windshield wipers and washer
  - Light switches (headlights, turn signals, 4-way flashers, clearance lights)
  - Window defroster and cab heater

- Check mirrors for proper adjustment.

- Secure all loose articles in cab.

Step 6 - Test the Air Brake System

- Apparatus should be chocked on the downhill side (preferably, the rear side.)

- Static air leakage
  - With a fully charged air system, turn off the engine and release the service and parking brakes. Check air pressure drop for one minute. (*The drop should not exceed 2 PSI in one minute for a single vehicle or 3 PSI/minute for a combination vehicle.)*

- Applied air leakage
  - Apply full steady pressure to the service brake pedal. (*After the initial drop, the air pressure should drop no more than 3 PSI for a single vehicle or 4 PSI for a combination vehicle in one minute.)*

- Check the low pressure warning signal
  - Turn on the electrical source without starting the engine and pump the brake pedal to reduce the tank air pressure. An audible or visual alarm should come on between 55 and 75 PSI. Whatever alarm or alarms that were installed by the manufacturer must be working.

- Check air build up, governor cut out and cut in, and buildup rate
  - Start the engine and let the air pressure build.
  - It should build from 85 to 100 PSI within 45 seconds (in dual air systems) at normal operating RPM's.
  - Let it continue to build until it stops increasing. It should cut out below 130 PSI. Cut out is recognized when needle stops moving. Sound is not a good indicator.
  - Next, pump the brake pedal until the pressure starts building again. It should start building somewhere above 85 PSI (95-100 PSI is preferable.) Pump down very slowly. Two or three pumps usually does it.

- Test the service and parking brakes
  - Fasten your seat belt and allow the apparatus to move forward. Apply the service brake. Any pulling to one side or delayed stopping should be checked by a mechanic.
  - Allow the vehicle to move forward again and apply the parking brake. If the vehicle does not immediately stop, the brakes need to be repaired and/or adjusted.

Complete pre-trip inspection paperwork.

End of pre-trip inspection.