



Knuckle Buster



Newsletter of the Wisconsin Association of Emergency Vehicle Technicians
www.waevt.com

July 2013

Spring Seminar Successful

The 46th Annual Spring Seminar was held on Wednesday and Thursday, May 15-16, 2013 at the FVTC Fire Training Center in Neenah, WI. The classes this year were Detroit Diesel Engine updates, troubleshooting and maintenance with Gary Stroik from Inland Power Group; Brake Maintenance, including disc and s-cam, with Bob Pawluk of Bendix; and FRC Pressure Governors and Electronic Controls with Brian Roehrich. We had 45 attendees this year.

Elections were held at Annual Meeting

Elections for two Executive Board positions were held at the Annual Dinner Meeting Wednesday, May 15th, 2013. The two positions that were up for election next year are President, currently held by Jon Coutts, and Recording Secretary, currently held by Rick Taylor. Both were unanimously reelected. Next year the positions of Executive Secretary (Mark Evel), Vice President (Mike Meyer) and Treasurer (Dave Kamps) will be up for election. Mark and Dave have declared their intent to not run again as they are not active in the maintenance field any longer. Please consider joining the board to keep the organization operating.

Fall Seminar September 19

The Annual Fall seminar will be held Thursday, September 19 at 9:00 AM to 1:00 PM at the Fox Valley Fire Training Center on Neenah. We will have presentations by the Wisconsin State Patrol on DOT inspections and regulations, truck weight laws. If there is a specific item you would like covered by the State Patrol, e-mail Jon Coutts at <mailto:jdcoutts@sbcglobal.net>. He will send it on the WSP for inclusion in the class. The second session will be ground ladder testing with Randy Vandersee of Duo Safety Ladders.

2014 Spring Seminar

The 2014 Spring Seminar will be held May 14-15, 2014 at the Fox Valley Fire Training Center in Neenah, WI. The tentative classes are Cummins Engines, Waterous Pumps and NFPA 1911 inspections. These are subject to change as none have been confirmed yet.

From Fire Chief InService August 27, 2010 (Reprinted with permission)

Put the Brakes on

By Ralph Craven and Brian Brown

Your daily apparatus-inspection list, that is.

While many fire departments have programs in place that require daily apparatus inspections, many do not. In some departments, the daily inspection is primarily a tool inventory in addition to a fire pump and/or aerial operation check. But a thorough daily apparatus inspection program should be in place to ensure that the apparatus is response-ready and safe to drive.

Some states require that engineers/driver operators of fire apparatus have commercial-vehicle driver licenses and conduct pre-trip inspections. One item that is mandatory in such inspections is the brakes. Many fire departments do not take the time to insure that the engineers who operate the vehicles are properly trained to identify problems that are associated with the brakes on their vehicle.

The most-often-overlooked issue is referred to as slack-adjuster travel. All air-brake systems have several components that need to be inspected and tested, including valves, lines, tanks, air dryers, brake chambers and slack adjusters.

Brake chambers: All air-brake systems have brake chambers that are identified as Type 20 through Type 36. The number indicates the square inches of effective-air-pressure area that a brake chamber has. The most-common type of brake found on fire apparatus is the clamp-type S-cam brakes. The brake chamber is a diaphragm-type actuator that converts the energy of air pressure into mechanical force.

Slack adjusters: Slack-adjuster travel is the distance traveled by the push rod in the brake chamber to the slack adjuster in order to apply the brakes. For instance, the maximum travel for a Type-30 brake chamber is two inches, or a 90° angle or less while looking at the slack adjuster. The maximum travel for other brake chambers varies depending on the size.

All the driver needs to verify is the maximum travel of the slack adjuster when the brakes are applied. This can be done by chocking the vehicle, placing someone in the driver seat (do not start the vehicle), releasing the parking brake, applying air pressure by stepping on the brake pedal and holding it in place. Once all of this is carried out and it is safe, the engineer/driver operator can roll under the vehicle on a creeper and visually look at each slack adjuster at every wheel position. A tape measure also can be used to verify the slack-adjuster travel by the inches moved when the brakes are released. After the under-truck inspection is performed, if the slack adjuster exceeds the maximum travel allowed based on the manufacturer information (see table on page 93), then it needs to be adjusted.

NFPA 1911, 1071 and 1002 identify out-of-service criteria. Common items are missing linings, audible air leaks at chambers, too-thin linings and pads, loose air chambers, and loose or broken spider or camshaft brackets. Consult NFPA standards documents or contact the commercial division of your local state or law enforcement agency if you need more guidance.

OTHER CHECKLIST ITEMS

There are other items that need to be inspected when the shift starts. If yours is a volunteer department, you can check these items after you return and before the next call.

Parking-brake check (daily inspection): Refer to NFPA 1901 and 1911, as well as your most current IFSTA manual, and then locate a steep grade that will adequately test the parking brake. You may not be able to find a 20% grade in your area. The engineer/driver operator is seated in the vehicle and is applying the service brakes, apply the parking brake and set the wheel chocks an inch or two forward of the front or rear tires. Have the engineer/driver remove their foot from the brake pedal and check to see if the parking brake holds the truck on the grade.

The parking brake can also be tested by the engineer/driver operator alone. Place the unit on a flat surface. Be sure the brake should hold the vehicle by shifting into a lower gear and then gently press the throttle so that a pull is created against the parking brake.

Hydraulic-brake check (daily inspection): With the engine running, apply firm pressure to the service brakes with the brake pedal and hold for five seconds. The brake pedal should not move (depress) during the interval. If the vehicle is equipped with a hydraulic brake reserve (backup) system, leave the key off, depress the brake pedal and listen for the sound of the reserve system electric motor. Also, check that the warning buzzer and/or light are off. Check the service (foot) brake operation by moving the vehicle forward slowly (about 5 mph) and apply the brake firmly. Note any vehicle "pulling" to one side, unusual feel or delayed stopping action.

DOT air-brake check (daily inspection): Air-brake safety devices vary; however, this procedure is designed to ensure that any safety device operates correctly as air pressure drops from normal to a low-air condition. For safety purposes, in areas where an incline is present, you will need to use wheel chocks during the air-brake check. The proper procedures for inspecting the air-brake system are as follows:

- **Air-leakage rate (static check):** With a fully charged air system (typically 120 psi), turn off the engine, chock the wheels, release (push in) the parking brake button (all vehicles) and trailer air-supply button (for combination vehicles and tillers) and time the air-pressure drop. After the initial pressure drop, the loss rate should be no more than 2 psi in one minute for single vehicles and no more than 3 psi in one minute for combination vehicles.
- **Air-brake system leaks:** With parking brake (all vehicles) released (pushed in), apply firm pressure to the service brake pedal. Watch the air-supply gauge and listen for leaks. After the initial pressure drop, the loss rate for single vehicles should be no more than 3 psi in one minute and no more than 4 psi in one minute for combination vehicles and tillers. If the air-loss rate exceeds these figures, have the air system repaired before operating.
- **Low-pressure warning alarm and/or signal:** Turn the key to the "on" position. Rapidly apply and release the service brake pedal to reduce air-tank pressure. The low-air-pressure warning signal must come on before the pressure drops to less than 60 psi in the air tank. If the warning alarm/signal doesn't work, you could be losing air pressure without knowing it. This could cause the parking spring brakes to activate suddenly. Remember, if this should happen while driving the vehicle, only limited braking can be done before the parking spring brakes automatically come on.
- **Automatic spring brakes:** Continue to rapidly apply and release the service brake pedal to further reduce air-tank pressure. The trailer air-supply button (if it is a combination vehicle or tiller)

and parking brake button should pop out when the air pressure falls to the manufacturer's specification, usually between 20 psi and 40 psi. This causes the parking spring brakes to come on.

- **Air-pressure buildup:** Based on current DOT standards, when the engine is operating at 1,200 rpm, the air pressure should return to 120 psi within 90 seconds in dual-air systems. If the vehicle has larger-than-minimum air tanks, the build up time can be longer and still be safe. Check the manufacturer's specifications. Most fire apparatus have rapid air-buildup tanks, so your build up time could be considerably less. Know your fire apparatus. If the air pressure does not build up fast enough, the apparatus air pressure may drop too low while driving, requiring an emergency stop.
- **Service brakes:** Wait for normal air pressure and then release the parking brake and trailer air-supply button for combination vehicles or tillers. Move the vehicle forward slowly at about 5 mph and apply the brakes firmly using the brake pedal. Note any vehicle "pulling" to one side, unusual feel or delayed stopping action. This test may show you problems that you otherwise would not know about until you needed use of the brakes on the road.
- **Air-brake adjustment:** Remember that if your brakes are marginally in adjustment when the brakes are cold, they will certainly be out of adjustment when the brake drums build heat. As the drums heat up, they expand and move away from the brake lining, causing the brake chamber pushrod and slack adjuster to travel even farther. Always have a certified EVT, ASE mechanic or Title 49 CFR 396.25 brake inspector do any adjustments or repairs to your vehicle.

Obviously, there are many ways to perform brake check inspections and it is critical to have a program in place. If you don't, your department is crossing a dangerous line concerning the lives of the firefighters and the citizens they are sworn to protect. A daily inspection of the brakes is a proactive approach to improve apparatus safety while significantly reducing the legal liability for any department. A well-oiled apparatus inspection-and-maintenance program is not just fleet maintenance, but also risk management.

Ralph Craven, Craven & Associates, was in the fire service for 23 years and actively involved in the maintenance of fire apparatus. In the eighties, Craven co-founded and was president of the National Association of Emergency Vehicle Technicians. He is an expert witness on aeriels and fire apparatus and served as investigator with the National Highway Safety Transportation Association. Craven also teaches classes on fire apparatus and safety across the country.

Brian Brown is the fleet-services bureau chief for the South Metro Fire Rescue Authority in Centennial, Colo. He also is an award-winning emergency vehicle technician, Level I and II. Brown is an academy instructor for the Colorado Fire Mechanics Association and presented at the Fire Department Safety Officers Association's annual Apparatus Symposium.

CLAMP RING-TYPE BRAKE CHAMBER DATA

Dimensions in inches

TYPE	EFFECTIVE AREA (SQ. IN.)	OUTSIDE DIAMETER	MAXIMUM STROKE	BRAKES SHOULD BE READJUSTED AT THIS MAX STROKE
6	6	4½	1 5/8	1¼
9	9	5¼	1¾	1 3/8
12	12	5 11/16	1¾	1 3/8
16	16	6 3/8	2¼	1¾
20	20	6 25/32	2¼	1¾
24	24	7 7/32	2¼	1¾
30	30	8 3/32	2½	2
36	36	*	*	2¼

Source: Bendix

Maximum stroke with brakes adjusted should be as short as possible without the brakes dragging.

*Dimensions listed do not include capscrew head projections for rotochambers and bolt projections for clamp type brake chambers.

EVTA Bulletin Board

Do you have a problem that is causing you trouble and can't figure out? Go to the EVTA Forums and become a member of the site. There is no charge and there are technicians and factory personnel from around the country asking and answering questions on all topics. There are several WAEVT members on the board as well. If you haven't visited the website, it is a very valuable source of information and sharing. You do need to register to post to the site, but there is no cost. Visit the site at www.evta.info/forums.

E-Mail Addresses

Thank you to all those that provided your e-mail addresses. We would like to utilize e-mail for sending information and newsletters to help keep costs down. If you receive the newsletter by US Mail and have an e-mail address please send it to Jon Coutts at jdcoutts@sbcglobal.net.

Training Opportunities

WAEVT Fall Seminar September 19, 2013 FVTC Fire Training Center, Neenah, WI

Hale Pump Schools <http://www.haleproducts.com/Main/Content,30,10.aspx>

Pierce Factory Training <http://www.piercemfg.com/company/training.cfm>

EVT Certification Commission <http://www.evtcc.org/>

Spartan Motors Fire Truck Training Conference Oct. 6-10, 2014

http://www.spartanchassis.com/cps/trainingcenter/downloads/2013_FTTC.pdf

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