

# Emergency Vehicle Operator

# Awareness

Student Guide

# Awareness

What does awareness mean to you?

How will focusing on awareness improve your performance?

Who benefits?

How being aware of your total driving environment improved safety.

Knowing what you should and should not do when responding to and returning from an incident.

Challenge yourself and those you train when driving apparatus.

Having the ability to “read” your environment.

The ability to have a higher level of consciousness, to foresee problems.

Having the ability to prevent a problem from occurring.

To reduce injuries to civilians

Reduce repair costs to the communities

Prevent an increase in property loss

from both accidents and the lack of timely response

# Goal

*To reduce firefighter deaths due to motor vehicle related accidents*

*primarily caused by:*

- *Failure to wear seatbelts*
- *Excessive speed*
- *Poor road conditions and failure to obey traffic laws*

**To reduce injuries to civilians**

**Reduce repair costs to the communities**

**Prevent an increase in property loss**

**from both accidents and the lack of timely response**

# The Problem

The current mindset of emergency vehicle operators is that “it won’t happen to me”

That can change with awareness.

Have you ever done these?

Didn’t wear a seat belt.

Didn’t ask passengers to buckle up.

Gone through all your forward gears before getting out of sight of the station.

Beat the first due unit to the scene.

Drove with one hand.

Got mad at the officer for correcting your driving.

Didn’t slow down for an intersection.

Beat another piece of apparatus through an intersection when they had the right-of-way.

Backed up without someone watching you.

Failed to put down or pick-up the wheel chocks.

Exceeded the speed limit while returning from a call.

Took the wrong position at a building fire.

Left your gear back at the station.

Drove when not feeling well.

Drove when emotionally upset

Drove while taking mood altering prescriptions and think you drive better.

Would not move the vehicle for someone to get out of a parking spot when you could have.

Drove according to reported fire conditions rather than actual road conditions.

If you have answered yes to any of these, you need to assess your driving awareness.

# Laws, Liabilities, Standards

## Legal Terms

### TRUE EMERGENCY

A situation in which there is a high probability of death or serious injury to an individual or significant property loss

### DUE REGARD

That a reasonably careful person performing similar duties and under similar circumstances would act in the same manner.

### NEGLIGENCE

A wrong that results whenever a person fails to exercise that degree of care that a prudent person would exercise under similar circumstances.

Slight.. Ordinary.. Gross

### GROSS NEGLIGENCE

Is reckless disregard of the consequences of an act to another person.

### WILLFUL & WANTON

Means intentional or with careless indifference.

(considered the most serious form of negligence)

### VICARIOUS LIABILITY

The legal liability placed on one person for the acts committed by another person.

Questions I've always wanted to ask but were afraid to have answered.

**If an emergency vehicle is in an accident, is the driver totally responsible or is the senior person on the apparatus responsible whether they are the officer or not?**

*Answer;*

Under normal circumstances, the person operating the vehicle would be responsible for the negligent operation of the vehicle. The person who is injured or whose property is damaged would attempt to prove the driver did or failed to do what a reasonably prudent driver with similar training and experience would have done or would not have done in the same circumstances. The hard part about proving negligence on the officer or senior man is the element of causation. In order to obtain a judgment against someone in a negligence action, one of the elements that the plaintiff must prove is causation. The defendant's negligence caused his injuries or damage. If an officer consistently allowed a driver to operate in an unsafe or negligent manner, and failed to take any actions to correct the situation, you could possibly bring an action for negligent supervision, e.g., that the officer negligently failed to properly supervise a person under his command.

**If I was the driver and found guilty of something my officer told me to do, who's liable?**

*Answer;*

The driver is responsible for the operation of the vehicle and the lives and safety of everyone riding in it, and for the lives and safety of everyone else on the road, there used to be a tradition, and it was probably only a tradition, but it was that an officer can only tell a driver two things regarding the operation of the apparatus, (1) to slow down, operate more carefully and obey the law, and (2) the approach that the officer wants to the scene of the incident, e.g. which direction or the front or the rear of the building, or the hydrant which he wants taken. In other words, fire ground tactics and strategy. All of the criminal responsibility rests with the driver, and all of the civil responsibility rests with the driver. He is totally responsible for the safe, non-negligent operation of the apparatus. Under another legal theory, if it could be proven that the officer negligently failed to supervise a person under his command, he might be held partially responsible. For example, if the driver consistently failed to come to a complete stop at red lights, and the officer did not do anything about it, and the apparatus was involved in an accident at a red light, the officer might be held partially responsible.

**How much responsibility, criminal and civil, rests with the officer (or senior person) and the actual driver?**

*Answer;*

All of the criminal responsibility rests with the driver, and all of the civil responsibility rests with the driver. He is totally responsible for the safe, non-negligent operation of the apparatus. Under another legal theory, if it could be proven that the officer negligently failed to supervise a person under his command, he might be held partially responsible. For example, if the driver consistently failed to come to a complete stop at red lights, and the officer did not do anything about it, and the apparatus was involved in an accident at a red light, the officer might be held partially responsible.

**Is there a mandatory seat belt rule for public safety vehicles?**

*Answer;*

Massachusetts General Laws Chapter 90, section 7 says, in part” ... every motor vehicle registered in the commonwealth which is privately owned and operated and designed for the carriage of passengers and which is used primarily for pleasure or for pleasure and business, including every such vehicle furnished or hire by a rental car agency but including every vehicle used for public or commercial purposes shall be equipped with two seat safety belts for the use of the occupants of the front seat....” Since public safety vehicles are not owned, operated and designed for the carriage of passengers, and since they are used for public purposes, they are exempt from the seat belt law.

**But my officer told me to go up the one-way street, am I off the hook if there is an accident**

*Answer;*

The driver of the apparatus is responsible for the operation of apparatus, and if he gets involved in accident, it is his conduct that will be judged. Massachusetts General Laws Chapter 89, section 7 says, in part “... and may drive such vehicle through an intersection of ways contrary to any traffic signs or signals regulating traffic at such intersection if he first brings such vehicle to a full stop and then proceeds with caution with due regard for the safety of persons and property...”.

**My chief instituted a policy, which downgrades the response of second due units to non-emergency status. I think we are at risk responding without emergency lights and audible warning devices. Should we use them or not?**

*Answer;*

If your department’s policy says that you should respond in a non-emergency status, then you should not be using your audible warning devices or emergency lights. However, you should obey all of the applicable traffic laws the same as any other vehicle on the road. Since it is not an emergency, you have no exemptions from the traffic laws.

# What You Can Learn To Reduce Your Chances

Know the Laws and Standards:

MGL 89 & 90

89-7~ Right of way for apparatus

89-7A~ Restrictions on use of ways

89-7B~ Operation of emergency vehicles

90-7E- Lights on POV

90-14~ Passing a school bus

540 CMR

NFPA 1500

NFPA 1002

NFPA 1451

## MGL 89-7

### Right of Way for Apparatus

Section 7. The members and apparatus of a fire department while going to a fire or responding to an alarm, police patrol vehicles and ambulances, and ambulances on a call for the purpose of hospitalizing a sick or injured person shall have the right of way through any street, way, lane or alley. Whoever wilfully obstructs or retards the passage of any of the foregoing in the exercise of such right shall be punished by a fine of fifty dollars or by imprisonment for not more than three months for the first offense and by a fine of not more than five hundred dollars or by imprisonment for up to one year for a second and subsequent offenses; provided, however, that for a third or subsequent offense the court or the registry of motor vehicles, in addition to any such fine or imprisonment, may suspend the license of the person so convicted and may order mandatory classroom retraining in motor vehicle and traffic laws.

## MGL 89-7A

### Restrictions on Use of Ways

Section 7A. Upon the approach of any fire apparatus, police vehicle, ambulance or disaster vehicle which is going to a fire or responding to call, alarm or emergency situation, every person driving a vehicle on a way shall immediately drive said vehicle as far as possible toward the right-hand curb or side of said way and shall keep the same at a standstill until such fire apparatus, police vehicle, ambulance or disaster vehicle has passed. No person shall drive a vehicle over a hose of a fire department without the consent of a member of such department. No person shall drive a vehicle within three hundred feet of any fire apparatus going to a fire or responding to an alarm, nor drive said vehicle, or park or leave the same unattended, within eight hundred feet of a fire or within the fire lanes established by the fire department, or upon or beside any traveled way, whether public or private, leading to the scene of a fire, in such a manner as to obstruct the approach to the fire of any fire apparatus or any ambulance, safety or police vehicle, or of any vehicle bearing an official fire or police department designation. Authorized police or fire department personnel may tow a vehicle found to be in violation of the provisions of this section or which is illegally parked or standing in a fire lane as established by the fire department, whether or not a fire is in progress, and such personnel shall not be subject to the provisions of section one hundred and twenty D of chapter two hundred and sixty-six. No person shall operate a motor vehicle behind any such fire apparatus, ambulance, safety or police vehicle, or any vehicle bearing an official fire or police department designation which is operating with emergency systems on, for a distance of three hundred feet. Violation of any provision of this section shall be punished by a fine of not more than one hundred dollars.

MGL 89-7B

## Operation of Emergency Vehicles

Section 7B. The driver of a vehicle of a fire, police or recognized protective department and the driver of an ambulance shall be subject to the provisions of any statute, rule, regulation, ordinance or by-law relating to the operation or parking of vehicles, except that a driver of fire apparatus while going to a fire or responding to an alarm, or the driver of a vehicle of a police or recognized protective department or the driver of an ambulance, in an emergency and while in performance of a public duty or while transporting a sick or injured person to a hospital or other destination where professional medical services are available, may drive such vehicle at a speed in excess of the applicable speed limit if he exercises caution and due regard under the circumstances for the safety of persons and property, and may drive such vehicle through an intersection of ways contrary to any traffic signs or signals regulating traffic at such intersection if he first brings such vehicle to a full stop and then proceeds with caution and due regard for the safety of persons and property, unless otherwise directed by a police officer regulating traffic at such intersection. The driver of any such approaching emergency vehicle shall comply with the provisions of section fourteen of chapter ninety when approaching a school bus which has stopped to allow passengers to alight or board from the same, and whose red lamps are flashing.

## Lights on Privately Owned Vehicles

Section 7E. No motor vehicle operated pursuant to section seven other than fire apparatus, ambulances, school buses, vehicles specified in section seven D used for transporting school children, and vehicles specified in section seven I shall mount or display a flashing, rotating or oscillating red light in any direction, except as herein provided; provided, however, that nothing in this section shall prohibit an official police vehicle from displaying a flashing, rotating or oscillating red light in the opposite direction in which the vehicle is proceeding or prohibit fire apparatus from displaying a flashing, rotating or oscillating blue light in the opposite direction in which the vehicle is proceeding.

A vehicle owned or operated by a forest warden, deputy forest warden, a chief or deputy chief of a municipal fire department, a chaplain of a municipal fire department, a member of a fire department of a town or a call member of a fire department or a member or a call member of an emergency medical service may have mounted thereon flashing, rotating or oscillating red lights. Such lights shall only be displayed when such owner or operator is proceeding to a fire or in response to an alarm and when the official duty of such owner or operator requires him to proceed to said fire or to respond to said alarm, and at no other time.

No such red light shall be mounted or displayed on such vehicle until proper application has been made to the registrar by the head of the fire department and a written permit has been issued and delivered to the owner and operator. In the event that the operator is not the registered owner of the vehicle, no permit shall be issued until said owner forwards to the registrar a written statement certifying that he has knowledge that such red light will be mounted and displayed on said vehicle.

Any person operating a vehicle upon which flashing, rotating or oscillating red lights herein authorized are mounted shall have the permit for said lights upon his person or in the vehicle in some easily accessible place.

## Passing a School Bus

Section 14: When approaching a vehicle which displays a sign bearing the words "SCHOOL BUS" and which is equipped with front and rear alternating flashing red signal lamps which are flashing, as provided in section seven B, and which has been stopped to allow pupils to alight from or board the same, a person operating a motor vehicle or trackless trolley shall, except when approaching from the opposite direction on a divided highway, bring his vehicle or trackless trolley to a full stop before reaching said school bus and shall not thereafter proceed until the warning signals are deactivated, unless directed to the contrary by a police officer duly authorized to control the movement of traffic.

## 540 CMR

540 CMR 2.06(6)(A)(ii) states in pertinent part, "Drivers may with a class D license operate emergency or fire equipment...such exempt drivers shall include...a member of a volunteer or paid fire organization, when either responding to an emergency or otherwise performing official duties..."

## NFPA 1500

### **6-2.1\***

*• Fire department vehicles shall be operated only by members who have successfully completed an approved driver-training program or by student drivers who are under the supervision of a qualified driver. Driver/operators of fire apparatus shall meet the requirements specified in Chapter 3 of this standard.*

### **6-2.2\***

*• Drivers of fire department vehicles shall have valid driver's licenses. Vehicles shall be operated in compliance with all traffic laws, including sections pertaining to emergency vehicles, and any requirements of the authority having jurisdiction.*

### **6-2.3\***

• Drivers of fire department vehicles shall be directly responsible for the safe and prudent operation of the vehicles under all conditions. When the driver is under the direct supervision of an officer, that officer shall also assume responsibility for the actions of the driver.  
Refer to liability issues in case of accidents.

### **6-2.4**

• Drivers shall not move fire department vehicles until all persons on the vehicle are seated and secured with seat belts in approved riding positions, other than as specifically allowed in 6-3.1.1 of this chapter.

### **6-2.5**

• During nonemergency travel, drivers of fire department vehicles shall obey all traffic control signals and signs and all laws and rules of the road of the jurisdiction for the operation of motor vehicles.

### **6-2.6\***

• The fire department shall develop standard operating procedures for safely driving fire department vehicles during nonemergency travel and emergency response and shall include specific criteria for vehicle speed, crossing intersections, traversing railroad grade crossings, and the use of emergency warning devices. Such procedures for emergency response shall emphasize that the safe arrival of fire department vehicles at the emergency scene is the first priority.  
This is the objective of NFPA 1451.

# NFPA 1500

## **6-2.8\***

- During emergency response, drivers of fire department vehicles shall bring the vehicle to a complete stop under any of the following circumstances:
  - a) When directed by a law enforcement officer
  - (b) Red traffic lights
  - (c) Stop signs
  - (d) Negative right-of-way intersections
  - e) Blind intersections
  - (f) When the driver cannot account for all lanes of traffic in an intersection
  - (g) When other intersection hazards are present
  - (h) When encountering a stopped school bus with flashing warning lights

## **6-2.9**

- Drivers shall proceed through intersections only when the driver can account for all lanes of traffic in the intersection.

## **4-2.10\***

- During emergency response or nonemergency travel, drivers of fire department vehicles shall come to a complete stop at all unguarded railroad grade crossings. Drivers shall assure that it is safe to proceed before crossing the railroad track(s). Drivers shall also use caution when approaching and crossing any guarded grade railroad crossing.

## **6-2.11**

Drivers shall use caution when approaching and crossing any guarded railroad grade crossing.

## **6-2.12**

- The fire department shall include in the driver-training program information on the potential hazards of retarders, such as engine, transmission, and driveline retarders, and shall develop written procedures pertaining to the use of such retarders.

## **6-2.13**

- The fire department shall develop written procedures requiring drivers to discontinue the use of manual brake limiting valves, frequently labeled as a "wet road/dry road" switch, and requiring that the valve/switch remains in the "dry road" position.

## NFPA 1002

### 1.4.2

The fire department driver/operator shall be subject to periodic medical evaluations as required by NFPA 1500, section 10.1, Medical Evaluation, to determine that the driver/operator is medically fit to perform the duties of a driver/operator.

### 4.1

General. Prior to operating fire department vehicles, the fire apparatus driver/operator shall meet the job performance requirements defined in: Section 4.2(Preventative Maintenance)  
Section 4.3(Driving/Operating

#### 4.2.1

Perform routine tests, inspections, and servicing functions on the systems and components specified in the following:

Batteries

Braking system

Coolant system

Electrical system

Fuel

Hydraulic fluids

Oil

Tires

Steering system

Belts

Tools, appliances and equipment

4.3.1 Operate a fire department vehicle, given a vehicle and a predetermined route on a public way that incorporates the maneuvers and features, specified in the following list, that the driver/operator is expected to encounter during normal operations so that the vehicle is operated in compliance with all applicable state and local laws, department rules and regulations, and the requirements of NFPA 4.2.2(4)

NFPA 4.2.2(4) The fire department shall develop and adopt a comprehensive written risk management plan that shall at least cover the risks associated with vehicle operations, both emergency and non-emergency. *(a combination of 4.2.1, 4.2.2 and 4.2.2(4))*

## NFPA 1002

### 4.3.1

4 left turns and 4 right turns

Straight section of urban business street or a 2 lane rural road at least 1 mile in length

1 intersection and 2 intersections where a stop has to be made

1 railroad crossing

1 curve, either left or right

A section of limited-access highway that includes a conventional ramp entrance and exit and a section of road long enough to allow 2 lane changes

A downgrade steep enough and long enough to require down-shifting and braking

An upgrade steep enough and long enough to require gear changing to maintain speed

One underpass or low clearance or bridge

### 4.3.2

Back a vehicle from a roadway into restricted spaces on both the right and left sides of the vehicle, ..., requiring 90-degree right and left-hand turns from the roadway so that the vehicle is parked within the restricted areas without having to stop and pull forward and without striking obstructions.

### 4.3.3

Maneuver a vehicle around obstructions on a roadway while moving forward and in reverse, given a fire department vehicle, a spotter for backing, and a roadway with obstructions, so that the vehicle is maneuvered through the obstructions without stopping to change the direction of travel and without striking the obstructions

Serpentine station in obstacle course.

### 4.3.4

Turn a fire department vehicle 180 degrees within a confined space, given a fire department vehicle, a spotter for backing up, and an area in which the vehicle cannot perform a U-turn without stopping and backing up, so that the vehicle is turned 180 degrees without striking obstructions within the given space.

## NFPA 1002

### 4.3.5

Maneuver a fire department vehicle in areas with restricted horizontal and vertical clearances, given a fire department vehicle and a course that requires the operator to move through areas of restricted horizontal and vertical clearances, so that the operator accurately judges the ability of the vehicle to pass through the openings and so that no obstructions are struck

### 4.3.6

Operate a vehicle using defensive driving techniques under emergency conditions, given a fire department vehicle and emergency conditions, so that control of the vehicle is maintained

### 4.3.7

Operate all fixed systems and equipment on the vehicle not specifically addressed elsewhere in this standard, given systems and equipment, manufacturer's specifications and instructions, and departmental policies and procedures for the systems and equipment, so that each system or piece of equipment is operated in accordance with the applicable instructions and policies.

## NFPA 1451

In response to a request by the National Transportation Safety Board in 1991, the Technical Committee on Fire Service Training started work on a new standard for a training program for fire service vehicle operation. The NTSB specifically requested NFPA “ ... emphasize that the safe arrival of the apparatus at the scene of an emergency is the first priority”

### 1.1

The purpose of this standard shall be to specify the minimum requirements for a fire service vehicle operation training program, including procedures for those members that drive or operate fire service vehicles, respond in private vehicles or unconventional means of transportation, and provide traffic control at the scene of an emergency.

These requirements shall apply to organizations providing fire suppression, fire and rescue training and other emergency services, including public fire brigades and departments, private industrial and contract fire departments, emergency medical vehicles and industrial fire brigades that respond off site.

- The intent of this standard is to meet all requirements of NFPA 1500 and 1002 regarding training and education.

### 4.2.3

The fire department shall evaluate the effectiveness of its vehicle operations training program at least once every 3 years

### 4.3.3

The fire department shall establish written standard operating procedures for safely driving, riding within, and operating fire department vehicles during an emergency response

### 4.3.5

The fire department shall establish written standard operating procedures for driving and operating fire department vehicles during a nonemergency response

## NFPA 1451

### 5.3.3

Fire apparatus driver/operators shall meet the requirements of NFPA 1002, ..., and NFPA 1500, ..., prior to being assigned as a fire apparatus driver/operator.

### 6.1.1

-Fire department vehicle driver/operators shall have a knowledge of applicable federal, state, provincial and local regulations governing the operation of fire service vehicles.

### 6.1.2

Fire department vehicle drivers/operators shall become familiar with all applicable DOT regulations.

### 7.1.1

- The AHJ shall have written policies governing speed and the limitations to be observed during inclement weather and under various road and traffic conditions.

### 7.1.2

- At no time shall driving regulations be less restrictive than state motor vehicle laws.

Refer to MGL 89 and 90.

### 8.1.4.1

Fire service vehicles shall be utilized as a shield from oncoming traffic wherever possible

### 8.1.4.2

Where acting as a shield, fire service vehicle warning lights shall remain on, and fluorescent and retro reflective warning devices such as traffic cones, illuminated warning devices such as highway flares, or other warning devices shall be used to warn oncoming traffic of the emergency operations and the hazards to members operating at the incident

## NFPA 1451

### 8.3.1

All persons riding in or on fire service vehicles or apparatus shall be seated in approved riding positions and shall be secured to the vehicle by seat belts whenever the vehicle is in motion

### 8.3.3

Members actively performing necessary medical care while the vehicle is in motion shall be secured to the vehicle by a seat belt, or by a safety harness designed for occupant restraint, to the extent consistent with the efficient provision of such emergency care.

### 8.3.6

While the vehicle is in motion, the donning or doffing of equipment and personal protective clothing that requires removal of any restraint belt or other device shall be prohibited.

# POV's

MGL  
Chapter 90, section 7E

Law regarding lights and sirens on privately owned vehicles (POV).

A vehicle owned or operated by a forest warden, deputy forest warden, a chief or deputy chief of a municipal fire department, a chaplain of a municipal fire department, **a member of a fire department of a town or a call member of a fire department or a member or a call member of an emergency medical service may have mounted thereon flashing, rotating or oscillating red lights**

MGL  
Chapter 90, section 16

...No siren shall be mounted upon any motor vehicle except fire apparatus, ambulances, vehicles used in official line of duty by any member of the police or fire fighting forces of the commonwealth or any agency or political subdivision thereof, and vehicles owned by call fire fighters or by persons with police powers and operated in official line of duty, unless authorized by the registrar....

## Responding in POV

You must come to a complete stop and insure the way is clear before proceeding through a red signal

This also pertains to POV, not just limited to Emergency Vehicles.

Make eye contact with other drivers who are stopped at the intersection before proceeding

Lights & siren only request right of way from other drivers. **They may not give it to you!**

Lights on POV's are usually fewer than on the Fire Apparatus. Do not assume that everyone sees them or understands what to do.

If we have a problem moving traffic with a large pumper/ladder, will others see and hear the POV?

# POV's

## Legal Issues

Are you covered by the town's insurance or your own when responding?

What if you are found responsible? Are you now "on your own?"

If covered by the town remember that what's best for the town isn't always what's best for you personally.

Criminal law requires guilt "beyond a reasonable doubt."

Civil law only requires a preponderance of the evidence.

You can be found not guilty criminally but, guilty civilly.

Elements for civil liability: duty to act, breach of that duty, the breach must be a proximate cause of the injury or accident, plaintiff must have suffered damages as a result.

Adopted by the IAFC's board of directors on Aug. 14 and unveiled at Fire-Rescue International in Dallas in August 2003, the alcohol use policy bans alcohol drinking "by any members of any fire or emergency services agency/organization at any time when they may be called upon to act or respond as a member of those departments.

### Federal Death Benefit Statute

No benefits shall be paid if the public safety officer was voluntarily intoxicated at the time of his death or catastrophic injury.

*US Department of Justice*

*Public Safety Officer Death Benefit Statute*

## POV's

“Develop standard operating procedures as they relate to responding to or returning from an alarm and monitor their use in privately owned vehicles”

Firefighters are useless if they never make it to the scene

Our job is to bring order to chaos: not create more

As a town department, we live and die by public opinion and perception

Don't expose yourself to unnecessary liability

Even if innocent, legal defense is expensive

Who will pay the legal fees?

If found guilty everyone is affected, you, your family, department, and community

### Ensure a Safer Response

- Drive with due care
- Slower means safer
- Listen and watch at RR crossings
- Awareness of others
- Open window
- Park safely
- Park wisely
- Wear seatbelts
- Never operate vehicle while fatigued
- Never operate vehicle while intoxicated or on medication
- Stop at all intersections

*Firehouse June 1998*

# POV's

## Basic Requirements

- Time on the department (12 months)
- Complete a certification course in EVO
- Familiar with Policies, Procedures and Fire ground Tactics
- Successfully complete a practical training evolution on a driving course

***These are points for becoming Motor Pump Operators that could be used while driving your POV.***

*Fire Chief October 1995*

# Vehicle Inspection

## Engine Compartment

### (Engine Off)

#### **Leaks & Hoses:**

- Look for puddles on the ground
- Look for dripping fluid on underside of engine and transmission
- Inspect hoses for condition and leaks

#### **Oil Level:**

- see that the oil level is within the safe operating range

#### **Coolant Level:**

- Inspect reservoir sight glass or remove the radiator cap and inspect for coolant level

#### **Power Steering Fluid:**

- Check for adequate fluid level

#### **Engine Compartment Belts:**

- Check the following belts for snugness (3/4" @ center of belt), cracks or frays
  - Power steering belt
  - Water pump belt
  - Alternator belt
  - Air compressor belt

## Cab Check / Engine Start

### **Clutch/Gearshift:**

- Put truck in park and start engine

### **Oil Pressure Gauge:**

- Make sure gauge is working
- Check that pressure gauge shows increasing or normal oil pressure or that the warning light goes out
- Temp gauge(if applicable) rises to normal operating range

### **Temperature Gauge:**

- Make sure gauge is working
- Temp gauge rises to normal operating range

### **Ammeter/Voltmeter:**

- Check that gauges show alternator and/ or generator is charging or warning light goes off

### **Mirrors & Windshield:**

- Clean & adjusted
- No illegal stickers, no obstructions, or damage to glass

### **Emergency Equipment:**

- Check for spare electrical fuses
- Check for the 3 red reflector triangles
- Check for a properly charged and rated fire extinguisher

### **Steering Play:**

- While engine running check for excessive play (play should not be more than 10 degrees) before front wheel moves

### **Wiper/Washers:**

- Check wiper arms and blades are secure, not damaged, and operate smoothly
- Windshield washers operating correctly

### **Lighting Indicators:**

- Test that dash indicators are working properly when corresponding lights are turned on:
  - Left turn signal
  - Right turn signal
  - Four-way emergency flashers
  - High beams

### **Horn:**

- Check both the air horn & electric horn

### **Heater Defroster:**

- Check to see if heat & defrost work

### **Parking Brake Check:**

- Apply parking brake only and make sure they hold by shift into a low gear and gently pull against the brake

### **Hydraulic Brake Check:**

- Pump the brake pedal 3 times, then hold it down for 5 sec. The brake pedal shouldn't depress during the 5 sec.
- Check back up system by shutting vehicle off and depress pedal and listen for electric motor
- Check the warning buzzer or light is off

### **Safety Belts:**

- Check to see if securely mounted, adjust and latches

### **Lights/Reflectors:**

- Check to make sure the external lights and reflectors are clean and functional:
  - Clearance lights
  - Headlights
  - Taillights
  - Turn signal
  - Four-way flashers
  - Brake lights
  - Red reflectors on rear and amber elsewhere

**Air brakes:** (see next section)

## **External Inspection**

Steering Box/ Hoses:

- Check steering box is secure and not leaking, look for any missing nuts, bolts, or cotter pins
- Check for power steering leaks or damage to power steering hoses

Steering Linkage;

- See that connecting links, arms, and rods from the steering box to the wheel are not worn or cracked
- Check the joints and sockets are not worn or loose and that there are no missing nuts, bolts, or cotter pins

Springs/ Air:

- Look for missing, shifted, cracked or broken leaf springs
- Look for broken or disoriented coil springs
- Air ride suspension should be check for damage and leaks

Mounts:

- Look for cracked or broken leaf hangers, missing or damaged bushings, and broken, loose, or missing bolts, u-bolts or other axle mount parts.

#### Shock Absorbers:

- Make sure they are secure and not leaking

#### Slack Adjusters:

- Look for broken, loose or missing parts
- The angle between the push rod and adjustor arm should be a little over 90 degrees when the brakes are released, and not less than 90 degrees when the brakes are applied
- When pulled by hand, the brake rod should not move more than 1”.

#### Brake Chambers:

- See that the brake chambers are not leaking, cracked, dented, and securely mounted
- Brake Hoses/ Lines:

Look for cracked, worn, leaking hoses, lines, and couplings

#### Drum Brakes:

- Check for cracks, dents, holes, and loose or missing bolts

#### Brake Linings:

- Check for visible amount of brake lining (if applicable)

#### Rims:

- Check for Damaged or bents rims. (can't have welded repairs)

#### Tires:

Check the following items on each tire:

- Tread depth – min depth 4/32 (nickel) on steering axles & 2/32 (dime) on all others

- Tire condition – tread needs to be evenly worn, look for cuts or other damage to treads and sidewalls. Make sure the valve caps and stems aren't missing, broken, or damaged
- Tire inflation – check proper inflation by tire gauge, or by striking the tire with a mallet

**Hub Oil Seals/ Axle Seals:**

- See that hub oil/ grease seals and axle seals are not leaking, if there is a wheel sight glass, oil level is adequate

**Lug Nuts:**

- Check to see if all lug nuts are present, free from cracks or distortion, not loose
- Make sure bolt holes are not cracked or distorted

**Spacers:**

- Check to see if not bent, damaged, or rusted through
- Spacer should be evenly centered, with the dual wheels and tires evenly separated

**Door(s)/ Mirror(s):**

- Check for damage and that they open and close properly from the outside.
- Hinges should be secure with seals intact
- Check that mirror(s), and mirror brackets are not damaged and are mounted securely with no loose fittings

**Fuel Tank:**

- Check to see if they are secure, cap(s) tight, and there are no leaks from the tank(s) or lines

**Battery Box:**

- Wherever located check to see if they are secure, connections are tight, and cell caps are present
- Connections should not show excessive signs of corrosion
- Battery box and cover or door must be secure

**Drive Shaft:**

- See that drive shaft is not bent or cracked
- Couplings should be secure and free of foreign objects

**Exhaust System:**

- Check system for damage and signs of leaks such as rust or carbon soot
- System should be connected tightly and mounted securely

**Frame:**

- Look for cracks, broken welds, holes or other damage to the longitudinal frame members, cross members, box, and floor

**Splash Guards:**

- Check splash guards or mud flaps for damage and are secured properly

**Doors:**

- Check that the doors and hinges are not damaged and that they open, close, and latch properly from the outside.

# Air Brake System

## Three Brake Systems in One

Service Brake

Parking Brake

Emergency Brake

## Air Brake Components

Air Compressor

Compressor Governor

controls when and how much air gets pumped into the air storage tanks

Air storage tanks and storage tank drains

## Parking Brake Control

Push/Pull diamond shaped yellow knob

NEVER push the brake pedal down when the spring brakes are on.

Don't use the brakes if they are very hot

In freezing temperatures they can freeze

Use wheel chocks to hold the vehicle.

Let hot brakes cool before using the parking brake.

If the brakes are wet, use light braking while driving in a low gear to heat and dry them.

## Dual Parking Control Valve

When you push the brake control "in", air from a separate tank releases the spring brakes so you can move the vehicle in an emergency.

## Spring Brakes

Knob “pushed in” the air storage tank fills and holds back the spring brake system allowing the truck to move.

Pulling the knob releases air from the air storage tanks and allows the “spring brake” system to hold the vehicle in a stopped position.

## Air Brakes Check

(10 steps)

1. Place chock blocks
2. Start engine and build up pressure to maximum (100-120 psi), turn of engine
3. Turn key to activate electrical system, release brake, check for no more than 2psi per min for single vehicles and 3 psi per min for combination vehicles (after initial 5-15psi drop)
4. Apply brake @90psi or more, hold brake, check for no more than 3 psi per min for single vehicles and 4 psi per min for combination vehicles (after initial 5-15psi drop)
5. Step on and off pedal to reduce air pressure, warning signal (light/buzzer) should come before air is less than 60psi
6. Step on and off pedal to reduce air pressure, parking knob should come on at manufacturers specifications (usually 20-45 psi)should come before air is less than 60psi
7. Re-start engine and bring to operating RPM. Pressure should build up from 85-100 psi in 45 sec in a dual system

**Note:** If air governor doesn't work as described, it may need to be fixed.

A governor that doesn't work properly may not keep enough air in the system for safe driving

### Air Brakes Check

(10 steps)

8. Check governor cut in by running engine at fast idle to cut off, release parking brake, step on and off pedal until governor cut in comes on at manufacturers specs (approx. 100 psi). Pressure should start to rise.

**Note:** any vehicle pulling to one side, unusual feel, or delayed stopping action. This test may show you problems they you may not find until you have to stop on the road.

### Air Brakes Check

(10 steps)

9. Test parking brake. Apply parking brake, put into gear, shut off engine, remove wheel chocks , restart engine, let run until governor cut out, put into low gear and see if the parking brake holds

10. Test service brake, use fully charged system, put into gear and drive forward at 5 mph, apply service brake firmly

If everything checks out then the vehicle is in a "ready" condition to drive

### Front Brake Limiting Switch

Limiting valves are used to reduce the chance of front wheel skidding on slippery surfaces

Braking is good under all conditions

## Supply Pressure Gauges

In the “slippery” position the limiting valve cuts the “normal” air pressure to the front brakes by nearly one half.

## Anti-Lock Brakes

Purpose is to:

Prevent the tires from locking under any conditions

When making an emergency stop using an ABS the driver should maintain pressure on the brake pedal even if the pedal starts to pulsate

## Retarders:

There are several different types of retarders available on the market today, engine, exhaust, transmission and driveline.

They all act much like a brake in that they slow the vehicle, or on a steep hill keep the vehicle from gaining speed.

All retarders are attempting to do the same thing, they are:

- *Trying to slow down the rear axle of the vehicle with some type of braking mechanism, that does not involve the regular service brakes on the vehicle.*

But if there's an excessive drag on the rear axle this can cause a yawing affect.

Telma & Jacobs make an electro- magnetic retarder.

- *This device uses electric current to create opposing magnetic forces on a large disk just forward of the rear end differential to create a drag.*

“Jacob’s” or “Jake Brake” is an engine retarder.

· Just as power is gained through combustion in your engine where fuel is injected into the combustion chamber, with an engine retarder, air is allowed in without any fuel. As compression takes place, you have a slowing, or retardation of the engine, which is mechanically hooked to the driveline, and therefore the tires. As a result, the bottom line is braking, and your regular brakes are saved.

The exhaust brake

The exhaust brake is simpler in operation than an engine brake. Essentially, the exhaust pipe of the vehicle is restricted by a valve. This raises the pressure in the exhaust system, forcing the engine to work harder on the exhaust stroke of its cylinders, so again the engine is acting as an air compressor, with the power required to compress the air being taken from the transmission, retarding the vehicle. A disadvantage of this system is that the exhaust pipe has to be engineered to accommodate the high pressure generated. The retarding horsepower available from this system is significantly lower than other systems. It can cause a marked increase in engine oil carry-over out the crankcase ventilation system.

## Braking Through Resistance

Allison's hydraulic retarder is basically a vaned flywheel in the transmission housing. The transmission directs oil into the retarder housing to absorb the vehicle's energy through the drive shaft. The absorbed energy is converted to heat and dissipated through the vehicle's cooling system. Resistance to the flywheel, augmented by stators on the inside of the housing, delivers braking power to the driving wheels. More oil in the housing means stronger braking. And since there's no mechanical friction or wear to shock the drive train, you'll have better control of maintenance costs, too. Allison models are available with output retarders mounted on the output shaft, behind the gearing. They generate the greatest braking at high drive shaft RPM and work independent of engine speed or gear ratio.

## Engine Retarders

If the roads are clean and dry the retarder can be used at any of the available settings.

Do not use on a slippery road

If the vehicle drive wheels begin to lock or the rear end begins to fishtail, immediately turn off the retarder system.









