

Bureau of Land Management
ENGINE
DRIVER ORIENTATION
BL300



Student Workbook

January 2008

FIRE ENGINE DRIVER ORIENTATION

COURSE OBJECTIVES

Upon conclusion of this course, students will be able to:

- Engage in a discussion about bureau policies and regulations related to driving a government engine.
- Perform a driver walk-around inspection.
- Describe and demonstrate the S.T.O.P. procedure.
- Correctly start and move a parked engine to another location.
- Demonstrate engine maneuvering procedures including but not limited to backing, positioning, parking, and braking.
- Demonstrate how to properly use spotters.
- Describe and demonstrate effective spotting techniques.

INTRODUCTION

Driving is one of the most hazardous endeavors we engage in during the course of our jobs. Vehicle-related accidents are often one of the leading causes of firefighter deaths annually.

Every year accidents result in significant expenditures from damage to property and equipment, not to mention the costs associated with medical treatment and loss of time and productivity of injured employees. While not all accidents can be avoided, knowledge of how to safely operate and work around vehicles can significantly reduce the exposure to accidents and near misses.

The goal of the Engine Driver Orientation course is to provide all personnel with the foundation of knowledge to make sound decisions and maintain situational awareness while operating and working around engines so that everyone comes home safely.

This training is the first part of a process to train and educate entry level and first year BLM engine crewmembers to drive or move an engine in an emergency situation or around the parking lot of a governmental site. For engines not covered by the Commercial Driver's License (CDL) requirements, this could also mean running for parts in town, driving the engine in fire camp (fueling or getting supplies), and repositioning the engine on the fireline. For engines covered by CDL requirements, the driver would need a CDL training/learner permit, and a qualified CDL passenger in the cab to run for parts, drive in fire camp, and reposition an engine on the fireline.

BUREAU POLICIES

Drug-Free Work Place

No one who is mentally or physically impaired (overly tired, on medication, intoxicated, etc.) will be permitted to drive an engine or other vehicle.

Engine Operation

Drivers and all passengers must be properly seated in an enclosed cab and belted in with an approved seat belt when traveling on highways or off road.

Posted speed limits will not be exceeded. Lower speed limits should be used during poor weather conditions or changing environmental conditions.

You must have a current state driver's license in your possession for the appropriate vehicle class before operating the engine.

- A CDL Instruction Permit is available by taking the appropriate written tests for the type of vehicle you will operate.
 - An instruction permit is valid for up to 180 days.
 - A Commercial Driver's License (CDL) Instruction Permit driver must be accompanied by a person who has a valid CDL license and is seated beside the driver.
- A Commercial Driver's License (CDL), with appropriate endorsements is required when:
 - The engine GVWR is 26,000 lbs or more.
 - Towing a vehicle 10,000 lbs GVRW or more.
 - Hauling hazardous material requiring the vehicle to be placarded.

THE S.T.O.P. PROCEDURE—PREPARATION FOR MOVING A GOVERNMENT ENGINE

All drivers of fire engines are responsible to use the S.T.O.P. procedure when preparing to move or drive an engine. The engine will not be moved until all four items in the S.T.O.P. procedure are addressed.



S eat belts on?

T ools and equipment stowed?

O perator and Crew have Situational Awareness?

P ersonnel accounted for?

“S” – Seat belts on?

Seat belts must be available and used in Bureau motor vehicles. Without exception, seat belts must be worn at all times by drivers and passengers, regardless of the distance to be traveled or the time involved.

The driver is responsible for asking passengers if they are wearing their seat belts and ensuring that they are worn at all times.



S eat belts on?

T ools and equipment stowed?

O perator and Crew have
Situational Awareness?

P ersonnel accounted for?

“T” – Tools and equipment stowed?

Ensure that all tools and equipment are secured in cabinets or approved storage areas before moving the engine.

“O” – Operator (driver) and crew have situational awareness?

- Determine if the engine is clear of hazards.
- Never back a engine without checking behind the vehicle.
- Utilize spotters (vehicle occupants) whenever possible.

“P” – Personnel accounted for?

- Ensure all personnel are accounted for and their locations are known.
- Communicate your intentions to all personnel before moving the vehicle.

DRIVER WALK-AROUND

The driver walk-around will be done every time the engine is moved. This allows the driver to complete a 360° visual inspection of the engine.

The walk-around begins as you approach the engine and continues in a clockwise direction beginning and ending at the driver's side door.

Things to be looking for before moving the engine include:

- Rocks in the way of tires
- Holes, berms, ditches, etc.
- Large stobbs or downed trees
- Chock blocks secured and in place
- Gear or equipment around or under engine
- Vehicles parked behind the engine
- Personnel relaxing or sleeping around engine
- Body damage while away from the engine
- Cabinet doors closed
- Side and overhead clearance in and near the path your vehicle will travel

PRE-TRIP INSPECTION/PREVENTATIVE MAINTENANCE CHECK

A fire engine pre-trip inspection is done to help the engine operator and crew personnel find problems that could cause a crash or breakdown. This inspection should not be confused with the driver walk-around which is done every time the driver moves a vehicle.

- Should be performed daily, generally at the beginning of each shift, even if the vehicle is not moved.
- All BLM engine and water tender pre-trip inspections will be documented in the Fire Engine Maintenance Procedure and Record (FEMPR).
- This inspection is not the responsibility of a first- or second-year engine crewmember.
 - The first- or second-year crewmember will usually help in completing this inspection, however.

ENGINE SPOTTER USAGE

If there are two or more engine crewmembers, always use a spotter. There are blind spots or danger zones where you cannot see. If you are by yourself and there are other firefighters around, ask for help.

If you are alone and have no help, get out of the engine and do a visual check for yourself.

Engine Danger Zones

When working in close proximity of a moving engine, there is an increased risk for an accident to occur. Given the size of our engines and the environment we work in, there are operator “blind spots” or danger zones. This visual aid was developed to help in identifying these areas.

Engine Danger Zones



Green Zones

The green zones are located directly left and right of the fire engine.

- Whenever possible, operate in the green zone.
- The green zones usually allow for visual contact with the operator.

Yellow Zones

Yellow zones are limited visibility and mirror use areas.

- Notify the driver when you are in these areas.

Engine Danger Zones



Red Zones

The red zones are located directly in front and behind the fire engine.

- Never work in the red areas while the engine is moving.
- Notify the driver prior to entering red zones.
- Stay out of the red zone where the driver has no visual.
- The red area in front of the engine extends 10 feet out from the front bumper.
- You must have visual contact with the driver when working in front of the vehicle beyond the 10-foot range.

When to Use a Spotter

Spotters should be used when

- Backing up
- Off-road pioneering
- Hazardous conditions exist
- Low vehicle clearances exist
- Narrow/confined driving spaces exist

Spotter Techniques

- Spotter should have a clear line of sight to the driver. Spotter position should be located as follows:
 - Forward movement: Outside the forward red zone on the driver side windshield
 - Backing movement: Outside the rear red zone on the driver side mirror
- Spotter and driver should understand a common set of hand signals.
- Spotter and driver need to communicate on the planned action.
 - Where are we going to park?
 - How far off the shoulder do we want to be?
 - What areas are we going to be traveling through?
- Spotter distance from engine will depend on various situations at the time of the maneuver; however, visual contact between spotter and driver shall not be compromised.
- If driver loses sight of the spotter, the driver should stop immediately and determine the spotter's location.

SITUATIONAL AWARENESS (SA)

Situational awareness (SA) in driving and moving engines is your perception of what is happening or has happened around the engine. Lack of good situational awareness is the leading cause of vehicle-related accidents.

Crew Safety

- Know where your crewmembers or personnel are located.
- Never move an engine without ensuring all personnel are clear of the vehicle.
- Communicate with personnel on vehicle maneuvers before moving.
- Honk your horn before moving the engine.
- Understand the engine danger zones.

Safety Equipment

Make sure safety equipment is being used correctly.

- Never move a vehicle until all passengers have their seat belts fastened.
- Adjust the driver's seat to fit your body.
- Adjust mirrors to give you better SA.
- Make sure the back-up alarm is working.

Pay Attention to Your Surroundings

Immediate Surroundings

- Road conditions and type
- Road shoulders
- Clearances
- Ground cover and type

General Surroundings

- Rock piles/rock outcroppings
- Ravines/cliffs
- Damaged roads and/or bridges

Engine Placement at the Fireline

Ingress and Egress

- Never drive an engine into a place where you cannot exit easily.
- Parked engines need to be faced towards an exit (escape route).
- Do not block traffic or other fire vehicles.
- Leave keys in unattended engines during fire operations.
- In unattended engines, windows should always be rolled up.
- When possible park engines in the black.
 - Watch for hot spots under tires.
 - Watch for venting fuel from engine fuel tanks.

Fireline Hazards

Be aware of fireline hazards when parking the engine (snags, rolling debris, etc.)

Parking on a Hill

- Turn the wheels uphill or into the inside/embankment.
- Firmly set the emergency brake or parking brake.
- Put shifter in “Park” (if automatic transmission) or in a forward gear (if manual transmission); do not leave the transmission in neutral.
- Turn off the engine.
- Chock the wheels.
 - When utilizing chocks, make sure they are on the correct side in reference to the slope.
 - When working in hilly areas along roads during pumping operations and the engine must be moved frequently, always use chocks keeping in mind slope changes.
 - Assure the chocks are approved to hold the weight of the engine and will grip the road surface.

STARTING THE ENGINE

Starting a BLM fire engine is not like starting your truck or car that most of you drove to work today. Not only do we have to deal with the complicated diesel motors of today but also the integrated fire package system.

There are other components, gauges, and switches that need to be tended to before starting the engine. We will take a look at these components, gauges, and switches as we go through this section.

Battery ON/OFF Switch

Most BLM engines will have a battery ON/OFF switch located inside the driver side door next to the driver's seat.

- This switch needs to be in the “ON” position for the engine to start and pump to run.
- When leaving the engine unattended, you should turn the battery ON/OFF switch to the “OFF” position to avoid battery drain.

Driver Adjustments

- Adjust the driver's seat.
 - Type 4 and Type 3 engine seats are air adjusted by a valve under the seat.
 - Type 6 engine seats are adjusted by conventional means.
- Adjust driving mirrors for proper alignment and maximum view.

Power Control Consol

Most fire engines have a power control consol that contains the power switches to operate the following features:

- Emergency Lighting – Activates the emergency lights
- Body Master – Provides power to the fire package
- Pump Master – Provides power to the pump
- Radio – Provides power to the radio

Automatic Transmissions

Engines equipped with an automatic transmission must be in the “Park” (“P”) position or “Neutral” (“N”) position to start (varies by transmission manufacturer/model).

Manual Transmissions

The clutch must be depressed to start engines equipped with manual transmissions.

Ignition

Start the motor by turning the ignition key.

- Allow glow plugs to warm up.
- Watch to see that water and glow plug indicator lights go off.

Alarms and Buzzers

- All alarms and buzzers should sound or come on.
- Wait for alarms and buzzers to go off before releasing the parking brake.

Gauges

All gauges should display within normal operating ranges.

Parking Brake

Release the parking brake.

Air Brake System

- Drivers will need to release the parking break by firmly pushing in the parking brake control.
 - This diamond-shaped, yellow, push-pull control knob is located on the vehicle dashboard and within the driver's reach.

Hydraulic Brake System

- Drivers will need to release the parking break by firmly pushing in, or pulling out, the parking brake control.
 - This may be a foot pedal or in-dash lever.

STEERING WHEEL HAND POSITIONS AND TURNING TECHNIQUE

- Place hands at the 10- and 2-o'clock positions on the steering wheel.
- Place your thumbs on the outside of the wheel.
 - This helps to avoid injury in the event the steering wheel reacts to the front tires hitting an object such as a rock.
- Maintain the proper hand position for all driving conditions.
- Use the hand-over-hand technique when turning.

SHIFTING MANUAL TRANSMISSIONS (4- OR 5-SPEED)

Starting the Engine

1. Depress the clutch.
2. Select the proper gear.
 - Second gear (generally) when starting on level ground
 - First gear when starting on steep slopes

Up Shifting

1. Bring the tachometer to between 2,500 and 3,000 RPM.
2. Depress the clutch.
3. Shift to a higher gear.

Down Shifting

1. Bring the tachometer to 1,500 RPM (avoid lugging the engine).
2. Depress the clutch.
3. Shift to a lower gear.

Starting on a Hill or Slope

1. Set the parking brake.
2. Put right foot on brake; left foot on clutch.
3. Shift into first gear.
4. Let clutch out slowly as you slowly depress accelerator.
5. Feel a pull forward; then release the parking brake.
6. Maintain RPM through the climb.

AUTOMATIC TRANSMISSION

Starting the Engine

- Start the engine in park.
- Put right foot on the brake pedal.

Select the Proper Gear for Travel

- First or second – low-speed crawl out
- Second through fourth – city driving
- Second through fifth – highway driving

Putting the Engine in Motion

- Release the brake pedal, and drive in proper gear.
- If the transmission shifts constantly, go to a lower gear selection.

AIR BRAKE USE

Normal Stops

- Apply the brakes hard at first and gradually release as speed is reduced.
- Do not “fan” the brakes.
 - “Fan” refers to the repeated rapid application and releasing of the air brakes during a stop.
 - Avoid this action since it results in poor brake performance lowering the reservoir and air line pressures.

Downhill Runs

- Use the proper gear reduction to maintain the engine at a safe speed.
- Brake application can be made intermittently to keep the engine well under control.

General Braking and Stopping Issues

- Allow for extra stopping distance since a fire engine is heavier than your personal vehicle.
- Be aware that water in the tank can slosh around even in a baffled tank.
- There is more slippage when braking on gravel roads than on paved roads.
- Apply gentle but firm pressure on the brake pedal.
 - Do not lock up the wheels (dynamite braking).

TERRAIN CONCERNS IN OFF-ROAD VEHICLE DRIVING

Mud and Sand Areas

- Make sure the 4-wheel drive transfer case is engaged before entering the area.
- Maintain momentum.
- Keep front tires straight.
- Maintain a smooth, steady speed.

Side Hills

- Be aware of water load shifting (weight transfer).
 - Full versus partial tank of water
- Be aware of how load structuring affects your center of gravity.
 - Coolers
 - Packs
 - Hose

- Be aware of soil types the engine is traveling over and their effects on sliding or rollovers
 - Loose and sandy
 - Hard pan
 - Rocky or gravelly

Hills

- Select the proper gear before climbing a hill.
 - Do not force shifting while on a hill; you could miss a gear and stall.
- Down shift on the crest of a hill before descending.
 - This prevents free wheeling and missing a gear.

Road Shoulders or Dozer Berms

- Understand an engine's center of gravity when going over or coming out of road shoulders or dozer berms.
- Understand break-over angles when going over or coming out of road shoulders or dozer berms.

CONCLUSION

Final Thoughts

- Never move an engine without ensuring that personnel are clear!
 - Use spotters where appropriate.
 - Honk the horn prior to moving an engine.
 - Buckle up!

Lesson Objectives

OUTSIDE EXERCISES

The outside exercises are made up of several driving stations and provides students the opportunity to practice in a controlled environment the principles learned during classroom instruction.

During the outside exercises, you will:

- Perform a driver walk-around.
- Demonstrate driver situational awareness.
- Demonstrate the S.T.O.P. procedure.
- Perform an engine start up.
- Drive an engine in a controlled environment.
- Use spotters when appropriate.
- Be evaluated by an instructor.

This course is not pass/fail, but an orientation opportunity to operate and learn on the engine you will be assigned to this season. Additional instruction and driving time may be needed throughout the season to complement your development processes.

NOTES

FIRE VEHICLE DRIVING ORIENTATION STUDENT EVALUATION

Student: _____ Date: _____

Duty Station: _____ Vehicle used during

Evaluator: _____ evaluation: _____

Engine Driver Orientation Checklist		Evaluator Initials
1.	Properly performed/described the S.T.O.P. procedure.	
2.	Completed driver walk-around.	
	• Checked under and around engine.	
	• Ensured cabinets were secure.	
	• Ensured equipment was secure.	
	• Pulled chocks.	
3.	Properly starts vehicle.	
	• Ensured battery ON/OFF switch was in “ON” position.	
	• Ensured the body master switch was in “ON” position	
	• Ensured that seat belts were on.	
	• Performed driver adjustments.	
	• Ensured that gauges were functioning properly.	
	• Allowed glow-plugs to warm up.	
	• Released parking brake.	
	• Used proper gears.	
	• Engaged parking brake.	
• Set chocks.		
4.	Maintained situational awareness.	
	• Utilized spotters.	
	• Ensured there was communication between spotter and driver.	
	• Understood engine danger zones.	
	• Accounted for personnel safety.	
	• Utilized mirrors.	
5.	Performed smooth starts and brake application.	
6.	Correctly backed an engine.	
7.	Correctly parked an engine.	
8.	Properly shut down an engine.	
9.	Maintained control of vehicle.	

