Lesson 2-2: Stopping, Braking and Backing Apparatus
Student Performance Objective

• After completing this lesson, the student shall be able to identify safety considerations when stopping, braking and backing an emergency vehicle. In addition, students will be able to demonstrate skills in safely operating and driving an apparatus.
Overview

• Stopping and Braking Apparatus
• Backing Apparatus
• Communicating while backing Apparatus
Stopping and Braking Apparatus

• Driver/operators must consider the weight of the apparatus and several conditions before applying the brakes.

Excessive or abrupt braking → Skid
Stopping and Braking Apparatus

• Driver/operators establish visual lead time by scanning the path of travel far enough ahead based on their speed.

Visual lead time

- Determines sufficient reaction time and stopping distance
- Helps match distance surveyed ahead with speed of travel
Stopping and Braking Apparatus

• Driver/operators should know the braking characteristics for the vehicle they are operating.
Stopping and Braking Apparatus

- Other factors may affect the driver/operator’s ability to stop the apparatus.

- Road conditions
- Speed of apparatus
- Vehicle weight
- Type and condition of vehicle brakes and tires
Stopping and Braking Apparatus

- Recognizing and avoiding conditions that lead to skids is an important skill.

Practice should be performed at facilities with skid pads.
Practice should be supervised by qualified instructors.
Practice should be done on approved apparatus.
Stopping and Braking Apparatus

• Skids
  – Acceleration and locked wheel skids are the most common

<table>
<thead>
<tr>
<th>Acceleration</th>
<th>Locked wheel</th>
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<tbody>
<tr>
<td>• Drive wheels will lose traction on road surface</td>
<td>• Locked wheel is caused by braking too hard at a high rate of speed</td>
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<tr>
<td>• Don’t apply brakes</td>
<td>• Wheel direction doesn’t matter</td>
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<tr>
<td>• Ease off accelerator</td>
<td>• Ease off brake then straighten front wheels</td>
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<tr>
<td>• Straighten out front</td>
<td>• Slow gradually until at a safe speed</td>
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Stopping and Braking Apparatus

• In a vehicle with a standard transmission, do not engage the clutch until the vehicle is under control and just before stopping.

Skid is under control

Gradually apply power to wheels or apply brakes as needed
Stopping and Braking Apparatus

• Maintaining control when descending grades during icy conditions requires a balance of techniques.
Stopping and Braking Apparatus

• The loss of vehicle control is sometimes due to driver error.

<table>
<thead>
<tr>
<th>Driving too fast for road conditions</th>
<th>Failing to anticipate obstacles</th>
</tr>
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<tbody>
<tr>
<td>Improper use of auxiliary braking devices</td>
<td>Improper maintenance of tire air pressure and adequate tread depth</td>
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Driver error
Stopping and Braking Apparatus

• Most new apparatus are equipped with an all-wheel ABS.

Minimize chance of skid when brakes are applied forcefully

Maintain steady pressure on brake rather than pumping pedal

Realize that some apparatus automatically shut off auxiliary brake if ABS activates

Recognize that apparatus without ABS require auxiliary brake to be manually deactivated
Stopping and Braking Apparatus

• Auxiliary braking systems help reduce brake fade and service maintenance costs.

- Exhaust brakes
- Engine compression brakes
- Electromagnetic retarders
- Transmission retarders
Stopping and Braking Apparatus

- Driver/operators should be aware of traction features on apparatus and trained how to use them.

- **Auxiliary traction control systems**
- **ATC**
- **DCDL**
- **Interaxle differential lock**
Stopping and Braking Apparatus

- Stability control systems are designed to help prevent roll-overs or tipping.

- Electronic Stability control cannot prevent all instabilities from occurring
- Driver/Operator should always use safe driving techniques
STOPPING AND BRAKING WILL BE FURTHER ADDRESSED IN:

SKID AVOIDANCE & MANAGEMENT

Emergency Vehicle Operator Course
Backing Apparatus

• Backing fire apparatus can be a hazardous action because of the vehicle’s size and because the mirrors do not provide a full view around the apparatus
Backing Apparatus

• Driver/operators should always follow SOPs and local ordinances when backing vehicles.

- Safety guidelines should always be followed
- All apparatus should be equipped with a warning alarm
- Some apparatus may be equipped with backup cameras
- Use all means at your disposal to safely back apparatus
When possible, avoid backing!
If you must back...

Key 1 AIM HIGH IN STEERING.
- Choose the safest location possible

Key 2 GET THE BIG PICTURE.
- Search for all potential hazards

Key 3 KEEP YOUR EYES MOVING.
- Scan, don’t fixate

Key 4 LEAVE YOURSELF AN OUT.
- Surround yourself with space

Key 5 MAKE SURE THEY SEE YOU.
- Use warning devices - Make eye contact
SAFE BEHAVIORS

BACKING

• Planning ahead to minimize backing
  o Eliminate the need to back – find another route
  o Position to back to open areas or away from obstacles
  o If you can avoid backing, don’t do it!

• As you pull into an area, notice landmarks or obstacles that will be behind you when backing – leave yourself space!

• Avoid backing into open roadways or uncontrolled traffic

• Backing needs to be smooth and methodical
  o Steering and pivot points will be much more pronounced when in reverse

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SAFE BEHAVIORS

BACKING

Before and during backing the driver should:

• Roll down their window
• Remove their headset
• Give clear directions to the backers
• Go only as fast as the backers can adjust
• Check both mirrors and the backup camera – do not fixate; keep your eyes moving
• Back only as far as necessary
Backing Apparatus

• CAUTION: The driver/operator must not rely solely on backup cameras to provide a full and accurate view of the scene. Spotters are still required.
Backing Communication

- Communication between the driver and backer (spotter) is important to avoid accidents and personal injury.

**Radio or hand signals**

**Spotters**

- Use Reflective vests
- Deploy an Appropriate number
- Keep in sight at all times
- Stop backing when spotters deem situation unsafe
Backing Communication

- CAUTION: Upon losing sight of a spotter, the driver/operator must stop immediately because the spotter could be killed or injured by the apparatus.
Backing Communication

- Spotters should always be positioned in the vision of the driver/operator. The spotter should

  - Remain visible in the driver’s side mirror
  - Remain visible in the right side mirror if hazards are present
  - Remain in the same mirror once position has been established
  - Keep away from shadows or glare spots
  - Request additional spotters if necessary
SAFE BEHAVIORS
BACKING

• Spotter priorities – rear driver’s side ➔ front curb side ➔ rear curbside
• If there is no spotter available:
  o Reconsider backing up. Is it really necessary right now?
  o Make a reasonable attempt to get someone to act as a spotter.
  o If a spotter cannot be obtained, get out the unit and walk around the unit completing a "circle of safety" and survey the backing area. Before proceeding to back unit, being sure to also check overhead clearance.

• Give a final warning of two horn blasts just prior to backing.
• If you lose sight of spotters – STOP
• The best spotter is another apparatus operator
Backing Communication

• CAUTION: Mirrors may become obscured in wet or snowy weather. Driver/operators should keep a squeegee or towel close by to keep mirrors clear during inclement weather.
Backing Communication

- Spotters should use slow, exaggerated hand signals to communicate with the driver.

- ![Backing straight](image1)
- ![Backing toward left side of apparatus](image2)
- ![Backing toward right side of apparatus](image3)
Backing Communication

- Slowing down
- Stopping
- Pull forward and reestablish backing
Backing Communication

• Spotters should also watch for:
  – Tree limbs
  – Low overhead wires
  – Sign posts
  – Other hazards
SAFE BEHAVIORS
BACKING

Effective spotters:
• Know the intended path of the vehicle
• Maintain eye contact with the driver and know the blind spots
• Remain focused on the task and take it seriously
• Look behind, around, below, and above the vehicle
• Wear traffic vests and carry handlights
• Recognize stopping distance requires reaction time and braking distance – signal before it is too late!
• Use visible, clear, and recognized hand signals
• Stop the driver if uncertainty develops

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Effective spotters:

- Conduct a circle check of the vehicle of their own
- Identify and communicate any potential obstacles or hazards to the driver
- Position themselves 8-10 feet away from the apparatus and in the line of sight of the driver
  - Avoid being in pinch points between the apparatus and fixed objects
- Use a talk-around channel when conditions make verbal communications between the driver and the ground personnel important, i.e. low-visibility, complex maneuvers, confined areas
BACKING
STANDARD HAND SIGNALS

STOP

TURN

DIMINISHING CLEARANCE

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EVOC – MCFRS Addendum
SAFE BEHAVIORS
APPARATUS BLIND SPOTS

If you cannot see the driver, they cannot see you!

If you can see the driver, do not assume they see you!
Student Performance Objective

• After completing this lesson, the student shall be able to identify safety considerations when stopping, braking and backing an emergency vehicle. In addition, students will be able to demonstrate skills in safely operating and driving an apparatus.
Review

• Stopping and Braking Apparatus
• Backing Apparatus
• Communicating while backing Apparatus