Adapted for
Montgomery County Fire & Rescue
Driver Training Program

MARYLAND FIRE AND RESCUE INSTITUTE • UNIVERSITY OF MARYLAND

Emergency Vehicle Operator

Lesson 2-2:
Stopping, Braking and Backing Apparatus

EVO

Student Performance Objective

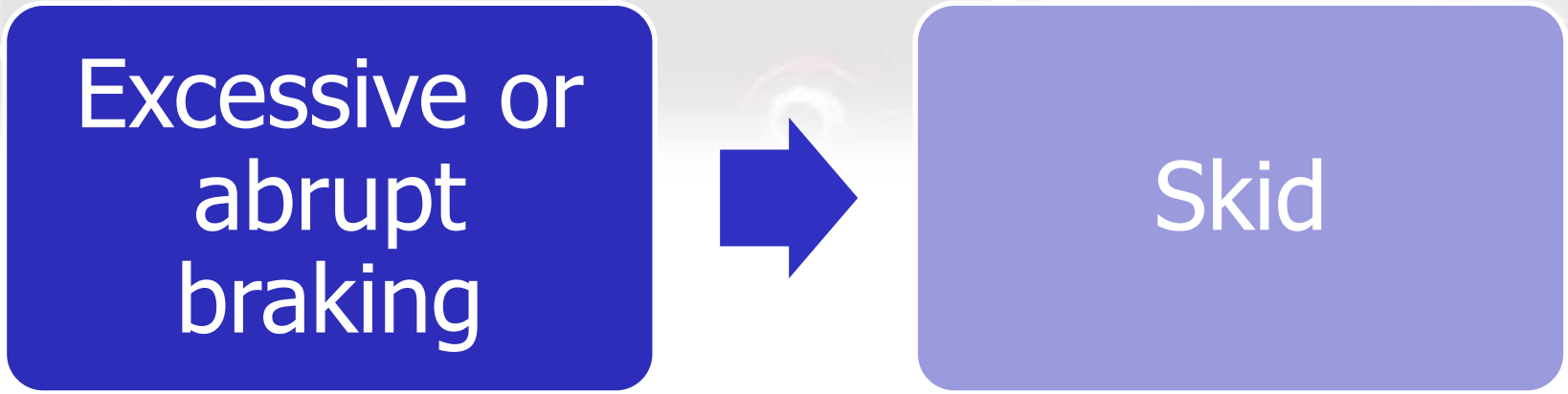
- After completing this lesson, the student shall be able to identify safety considerations when stopping, braking and backing an emergency vehicle. In addition, students will be able to demonstrate skills in safely operating and driving an apparatus.

Overview

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

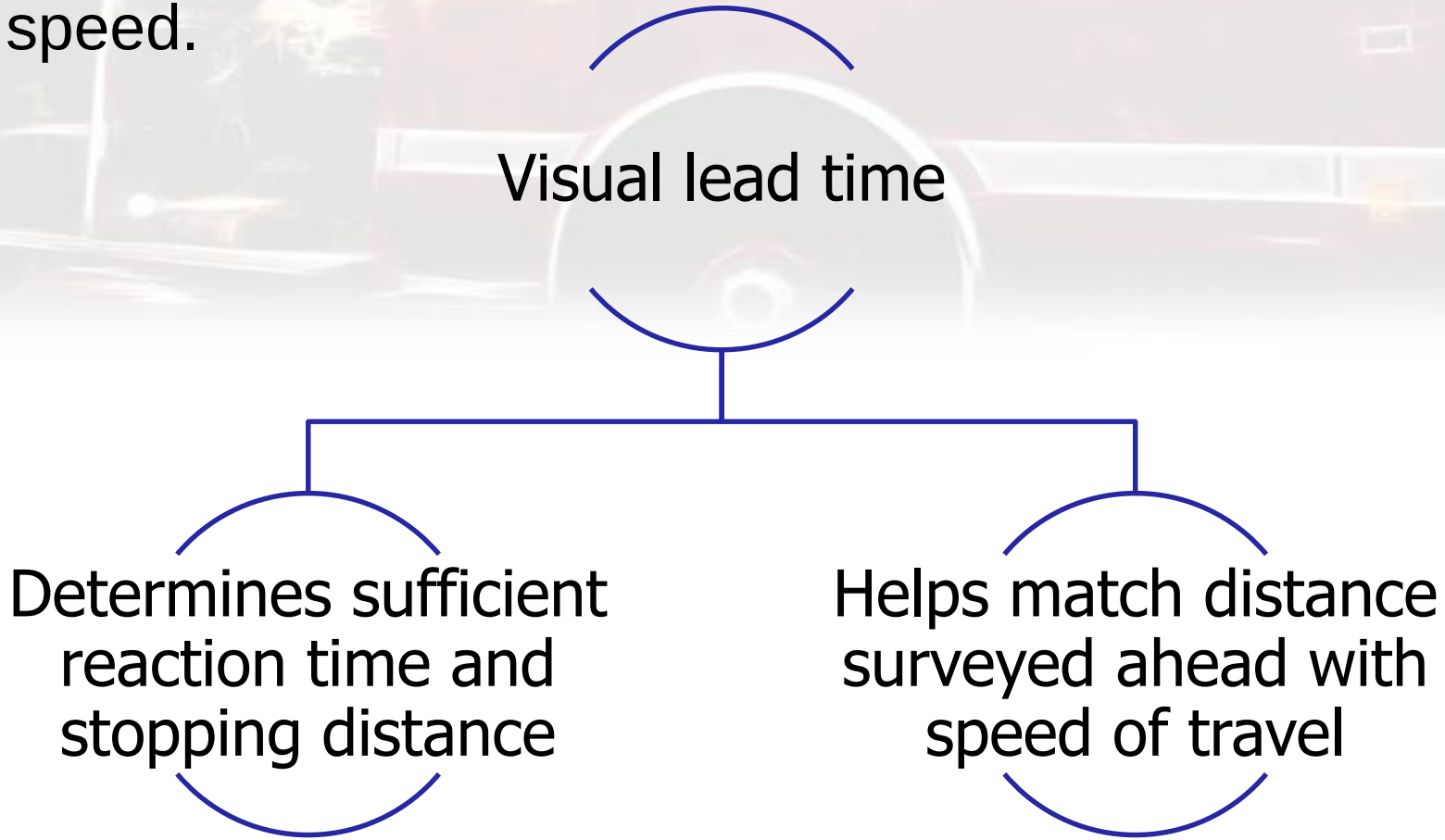
Stopping and Braking Apparatus

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



Stopping and Braking Apparatus

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



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

Acceleration	Locked wheel

• Drive wheels will lose traction on road surface
  • Don't apply brakes
  • Ease off accelerator
  • Straighten out front
	• Locked wheel is caused by braking too hard at a high rate of speed
	  • Wheel direction doesn't matter
	  • Ease off brake then straighten front wheels
	  • Slow gradually until at a safe speed

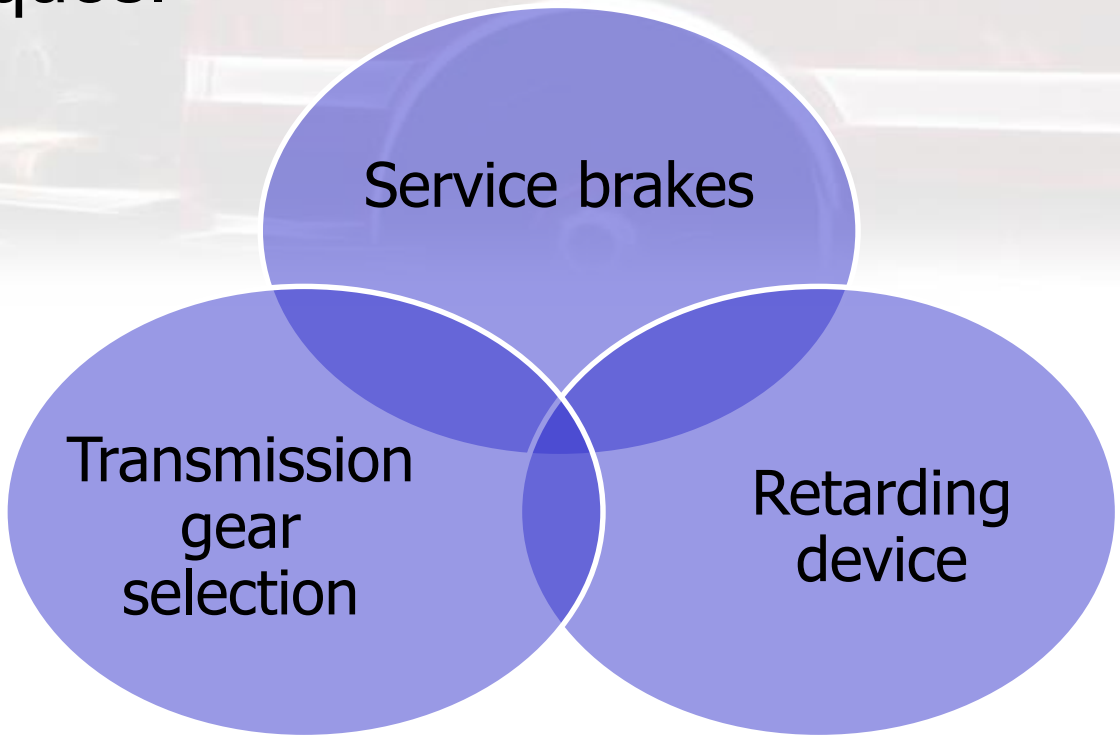
Stopping and Braking Apparatus

- 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

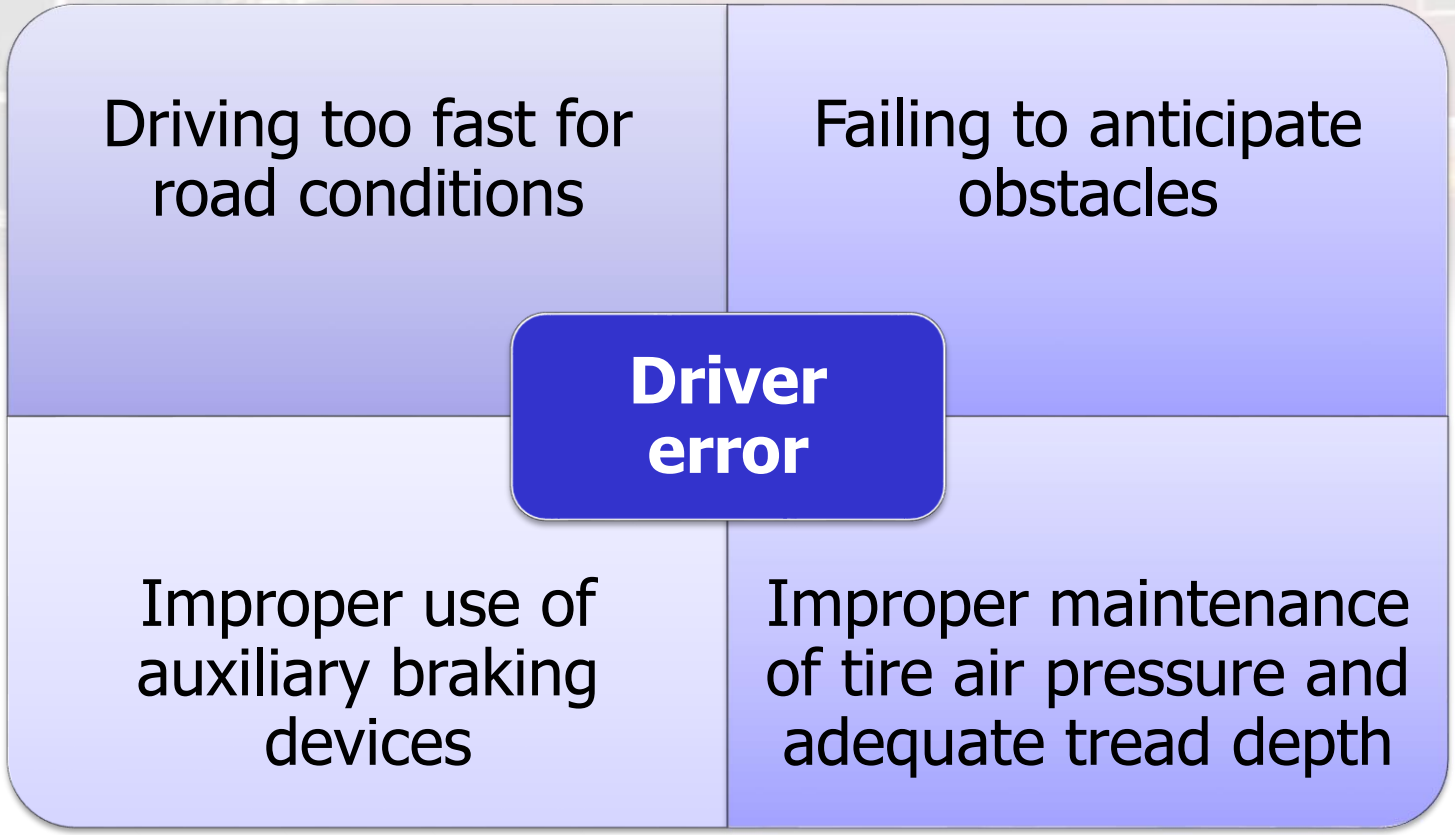
Stopping and Braking Apparatus

- 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.



Stopping and Braking Apparatus

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

Minimize chance of skid when brakes are applied forcefully

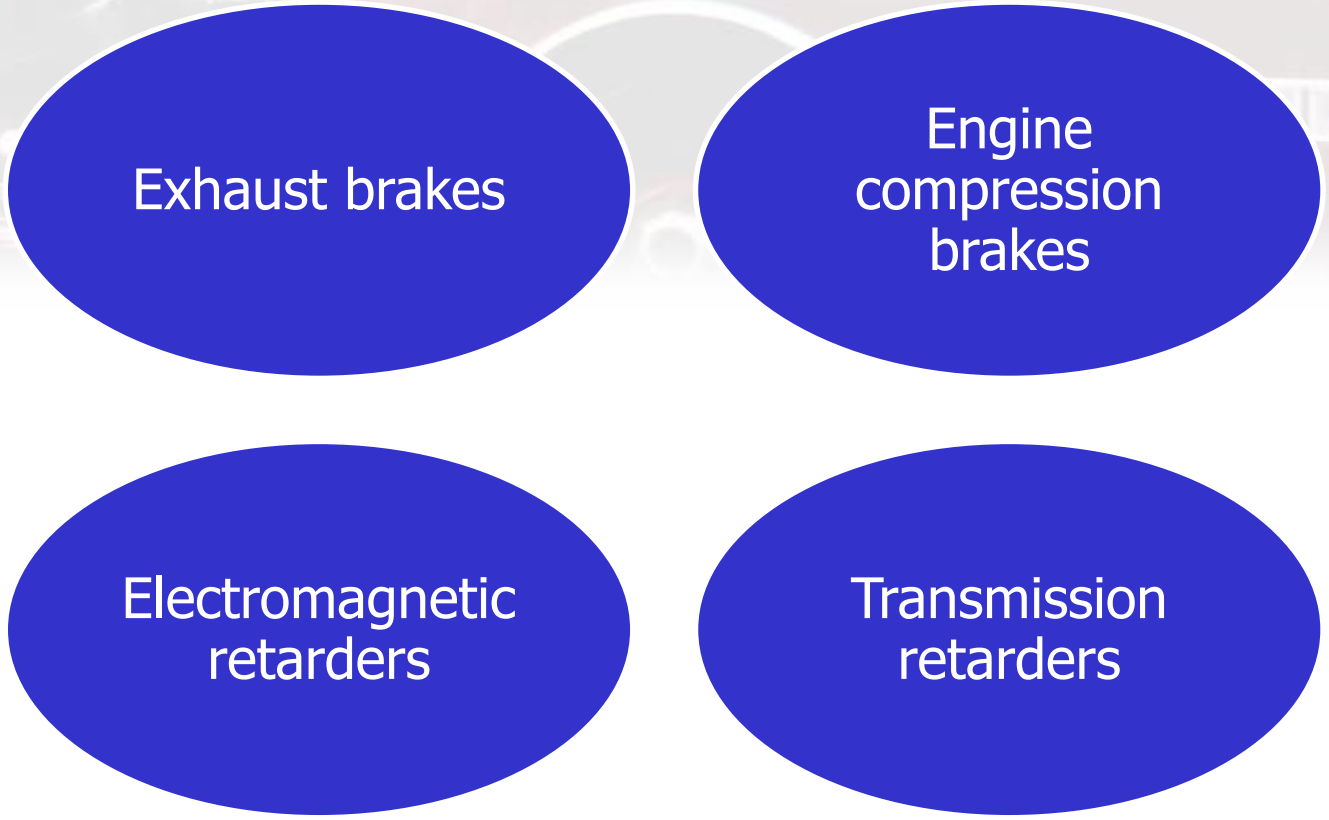
Maintain steady pressure on brake rather than pumping pedal

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.



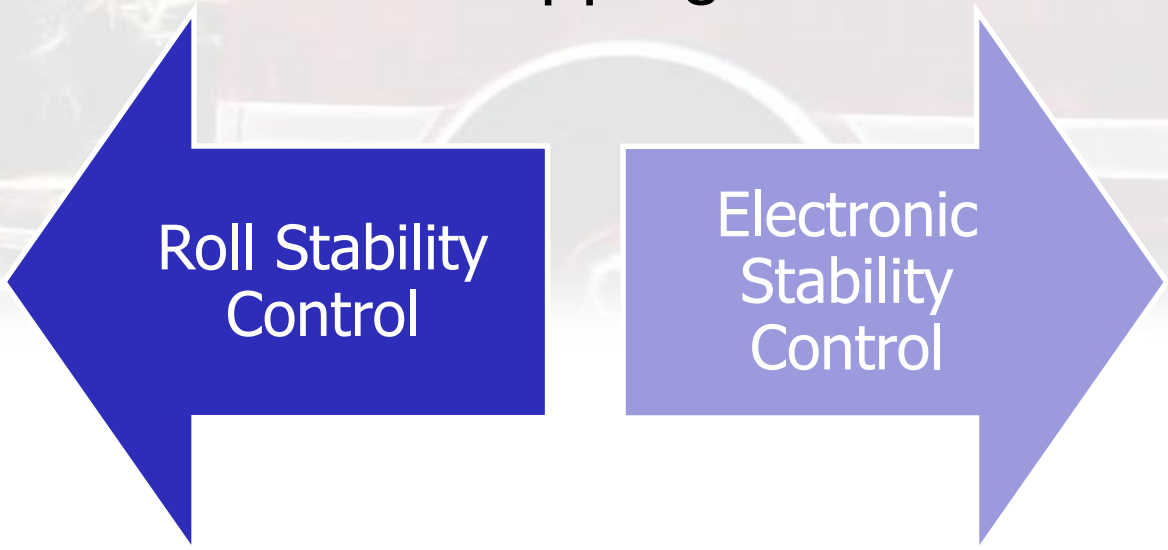
Stopping and Braking Apparatus

- 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.



Reduces vehicle instabilities

- 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
  - Eliminate the need to back – find another route
  - Position to back to open areas or away from obstacles
  - 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
  - Steering and pivot points will be much more pronounced when in reverse

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

GET

OUT

AND

LOOK

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

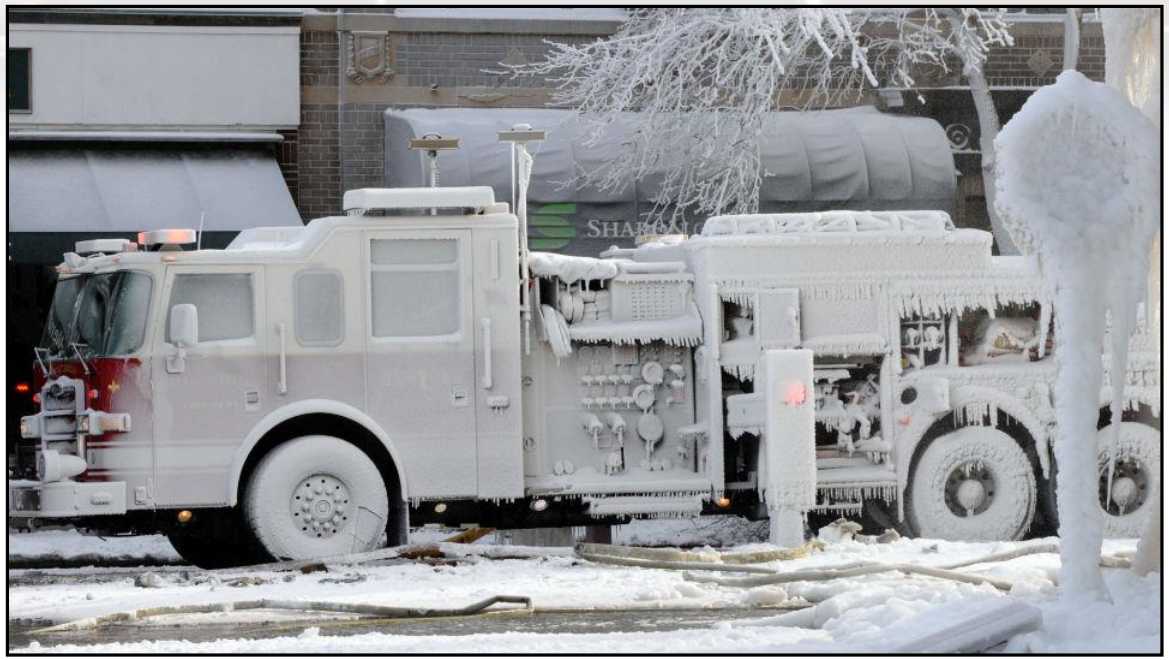
Request additional spotters if necessary

Safe Behaviors
Backing

- Spotter priorities – rear driver's side ➔ front curb side ➔ rear curbside
- If there is no spotter available:
  - Reconsider backing up. Is it really necessary right now?
  - Make a reasonable attempt to get someone to act as a spotter.
  - 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

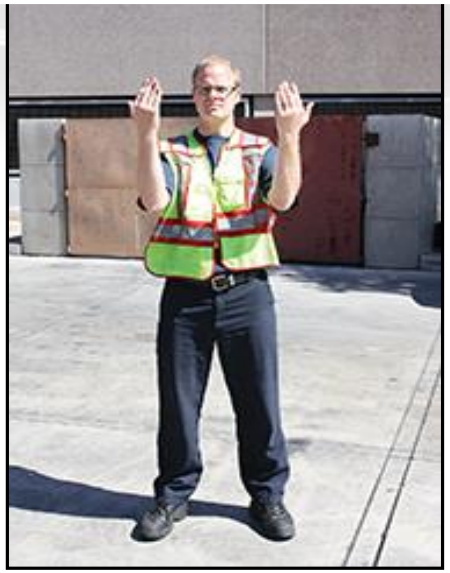
- CAUTION: Mirrors may become obscured in wet or snowy weather. Driver/operators should keep a squeegee or towel close by to keep mirrors clear during inclement weather.



Backing Communication

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

Backing straight



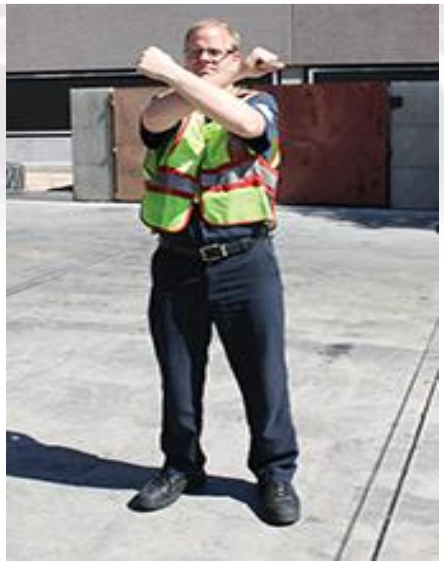
Backing toward left side of apparatus

Backing toward right side of apparatus

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

Safe Behaviors
Backing

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

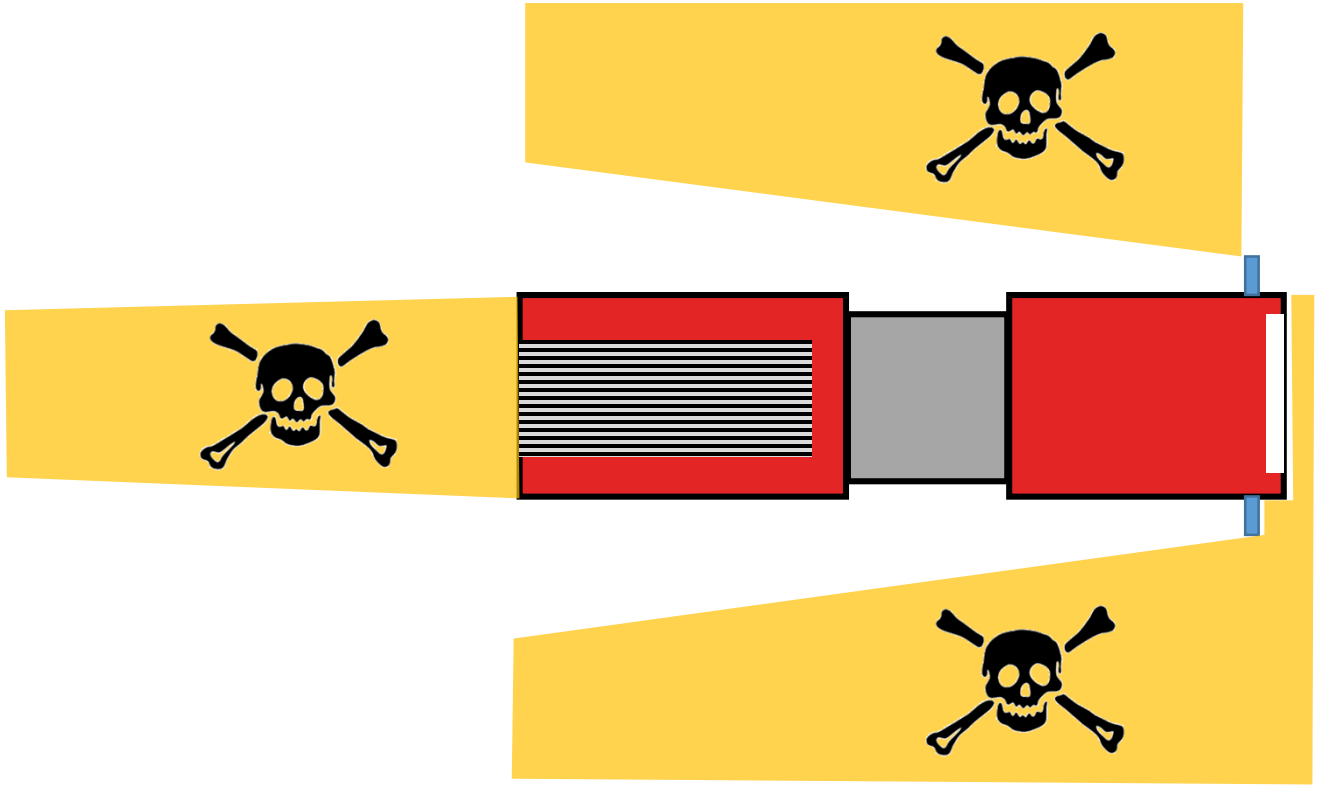
Backing
Standard Hand Signals

STOP

TURN

DIMINISHING CLEARANCE

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