The Maryland Fire and Rescue Institute of the University of Maryland is the State’s comprehensive training and education system for all emergency services.

The Institute plans, researches, develops, and delivers quality programs to enhance the ability of emergency service providers to protect life, the environment, and property.
Lesson 1-2: Legal Aspects of Emergency Vehicle Operation

Student Performance Objective

• The student will be able to identify and explain local, state, and federal laws and standards that pertain to emergency vehicles, their operators, and their operation.

Overview

• Definition of Key Terms
• NHTSA Terms
• Responsibility of an EVO
• Definition of EVO Laws and Standards
• Risk Management Policies
• Rules of the Road
• Accident Investigation
**Definition of Key Terms**

- **Policy**—a principle or course of action adopted toward an objective.

- **Procedure**—prescribes specific ways of doing specific activities which regulates the formal steps in an action or a series of steps followed in a particular order.

**Definition of Key Terms**

- **Guideline**—a statement, indication, or outline of policy by which to determine a course of action.

- **Rule**—a principle set up by an authority prescribing or directing actions or forbearance.

**Definition of Key Terms**

- **Regulation**—a rule or order prescribed by an authority to regulate conduct

- **Constitutional Laws**—laws that come from the U.S. Constitution and guarantee the rights of the individuals involved

- **Statutory Laws**—laws that come from legislative acts
Definition of Key Terms

• **Ordinances**—enacted by a governing body or its agent (a city or county)
• **Agency Rules and Regulations**—enacted by local agencies or jurisdictions

NHTSA Terms

• **Qualified Privilege**—a minor exemption from the statutory rules of the road granted when an EVO is operating in emergency mode.

  A qualified privilege is a statement which appears in the statutes and specifies an exception to the rule such as: “The operator of an authorized emergency vehicle may park in a no-parking zone as long as the operator does not endanger life or property.” — NHTSA

NHTSA Terms

• **True Emergency**—a situation in which there is a high probability of death or serious injury of an individual or significant property loss.
• **Due Regard/Care**—the degree of care that a prudent person would use under similar circumstances
NHTSA Terms

• Negligence—the legal deficiency or wrong that results whenever a person fails to exercise a degree of care that a prudent person would use under similar circumstances.
• Gross Negligence—Reckless disregard of the consequences of an act to another person

NHTSA Terms

• Willful and Wanton—intentional or with careless indifference, considered the most serious form of negligence
• Vicarious Liability—legal liability placed on one person for the acts committed by another person

Responsibility of an EVO

• Prepare efficiently
• Respond safely to the incident
• Transport crews
• Work with other crewmembers
• Avoid collisions
Definition of EVO Laws and Standards

• Maryland Motor Vehicle Laws
  ▪ TR 11-118 and TR 22-412.4—Emergency vehicle definition
  ▪ TR 11-162—Definition of a stop
  ▪ TR 19-103 and TR 21-106—Liability for negligent operation of an emergency vehicle
  ▪ TR 21-106—Emergency vehicle privileges
  ▪ TR 21-405—Operation of vehicles on approach of emergency vehicle

Definition of EVO Laws and Standards

• Maryland Motor Vehicle Laws
  ▪ TR 21-510—Pedestrians Yield the Right of Way to Emergency Vehicles
  ▪ TR 21-706—Overtaking and Passing a School Vehicle
  ▪ TR 21-801—Basic Rules for Operating a Vehicle
  ▪ TR 21-1003—Stopping, Standing, or Parking prohibited in specified places
  ▪ TR 21-1109—Following Fire Apparatus Prohibited

Definition of EVO Laws and Standards

• Maryland Motor Vehicle Laws
  ▪ TR 21-1110—Crossing Fire Hose
  ▪ TR 21-1120—Wearing earphones, headsets etc. is prohibited (exceptions for EVOs)
  ▪ TR 21-1408—Prohibited Turns
  ▪ TR 21-218—Audible and Visual Signals on Vehicles
  ▪ TR 22-401—Horns and Warning devices
  ▪ TR 22-412.4—Seatbelts or restraining devices in emergency vehicles
**Risk Management Policies**

- Risk management policies
  - Provide a plan for all vehicles
  - Establish SOPs/SOGs
    - Safe and defensive driving (emergency and non-emergency)
  - Riding on apparatus
  - Operating and speed restrictions
  - Driving records
  - Establish emergency response routes

**Rules of the Road**

- DO NOT drive vehicles without prior training
- Maintain annual refresher/recertification training
- Understand all local, state, and federal rules
- DO NOT drive under the influence of drugs or alcohol (legal or illegal)
- Maintain proper following distances
- Do not operate vehicles in reverse unless unavoidable
- Use spotters
Rules of the Road

- Bring all vehicles to a stop at the following:
  - Stop signals (lights, signs, traffic officers, etc.)
  - Blind intersections
  - Intersections with some lanes obscured
  - Upon approach of a school bus with red flashing lights
  - Unguarded railroad crossing
  - Activated railroad crossings

Rules of the Road

- Use fire apparatus to shield personnel and equipment while working at the scene.
- Accept officer responsibilities when there isn’t one present
- DO NOT move the vehicle unless all personnel are seated and restrained or secured
  - NO DONNING PPE WHILE RESPONDING!!!

Accident Investigation

- Conduct a post-crash testing program for drug or alcohol abuse
- Implement accident investigation procedures
- Take appropriate action, correct problems, and prevent reoccurrences
- Maintain a collision data collection system on all drivers and apparatus
- Present reports to the Fire Chief on all vehicle and safety violations
Student Performance Objective

- The student will be able to identify and explain local, state, and federal laws and standards that pertain to emergency vehicles, their operators, and their operation.

Review

- Definition of Key Terms
- NHTSA Terms
- Responsibility of an EVO
- Definition of EVO Laws and Standards
- Risk Management Policies
- Rules of the Road
- Accident Investigation
Lesson 2-1: 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
  - Acceleration
    - Drive wheels will lose traction on road surface
    - Don’t apply brakes
    - Ease off accelerator
    - Straighten out front
  - Locked wheel
    - 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.

Service brakes
Transmission gear selection
Retarding device

Stopping and Braking Apparatus

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

Driving too fast for road conditions
Failing to anticipate obstacles
Improper use of auxiliary braking devices
Improper maintenance of tire air pressure and adequate tread depth

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

- Auxiliary braking systems help reduce brake fade and service maintenance costs.
  - Exhaust brakes
  - Engine compression brakes
  - Electromagnetic retarders
  - Transmission retarders

- 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:
  - Reduces vehicle instabilities
  - Electronic stability control cannot prevent all instabilities from occurring
  - Driver/Operator should always use safe driving techniques

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.

- 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
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.

![Backup Camera Image]

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

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

![Spotter and Backing Communication Image]
### 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.

### 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

- Spotters should also watch for:
  - Tree limbs
  - Low overhead wires
  - Sign posts
  - Other hazards

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
Lesson 2-2: Working Safely On and Around Apparatus

Student Performance Objective

• After completing this lesson, the student shall be able to identify safety considerations when working on and around emergency vehicles. In addition, students will be able to demonstrate skills in safely operating and driving an apparatus.

Overview

• Working Safely On and Around Apparatus
Working Safely On and Around Fire Apparatus

- **Compartment Doors**
  - Safety of the work environment can be improved by encouraging good practices with compartment doors.
  - Open doors can cause injuries to people who accidentally walk into them.
  - Open horizontal doors can be mistaken for walking surface and be damaged.

  *Compartment doors must stay closed when not in use*

- **NEVER** step on open compartment doors. They do not support heavy weight. Falls can cause serious injury or death.

- It may sometimes be necessary to climb or walk on parts of an apparatus that do not have railings.
  - Have second person present
  - Walk only on slip resistant surface
  - Maintain three points of contact to get off
  - Wear PPE according to local policy
Working Safely On and Around Fire Apparatus

• New apparatus must include positive restraints for all hoses carried on the apparatus.

Working Safely On and Around Fire Apparatus

• WARNING: Secure hose and other equipment before placing vehicle in motion. Loose hose may drag behind vehicle and injure or kill.

Working Safely On and Around Fire Apparatus

• Aerial apparatus may carry the hose under the aerial ladder and have a chute that guides it out the back.
  - Ensure hose connections do not get caught in chute
  - Lay hose according to chute design
  - Check for obstructed couplings to avoid damage
  - Maintain speeds of 5 mph (10 km/h) or less
Working Safely On and Around Fire Apparatus

• Many departments store equipment in the cab or other crew areas.
  - SCBA packs
  - Helmets
  - Flashlights
  - Axes
  - Maps
  - Medical supplies
  Secure in brackets or storage cabinet
  Minimize equipment amount stored in crew areas

Working Safely On and Around Fire Apparatus

• WARNING: Secure equipment in the crew areas before placing the vehicle in motion. Unsecured equipment may cause serious injury or death in a crash.

Working Safely On and Around Fire Apparatus

• Apparatus may have hydraulic components and tools that are potentially hazardous.
  - Know the types of hydraulic fluids
  - Leaks may cause burns or injuries
    - Some may be toxic to human tissue
    - All are covered in the SDS/MSDS
  - Know the appropriate PPE to wear
  - Know your hydraulic extrication tools
Working Safely On and Around Fire Apparatus

- Driver/operators must take care when removing inlet and discharge caps.

  Check for trapped pressure before removing caps

  Open bleeder valve or drain valve
  - Release trapped pressure

  Remove cap
  - Remove cap slowly and carefully
  - No standing in front of cap

Student Performance Objective

- After completing this lesson, the student shall be able to identify safety considerations when working on and around emergency vehicles. In addition, students will be able to demonstrate skills in safely operating and driving an apparatus.

Review

- Working Safely on and Around Apparatus
Lesson 3-1: Driving Range Rules and Exercise Demonstration Videos

Student Performance Objective

• The student will be able to explain and demonstrate application of the rules and procedures during driving range exercises, with guidance

Overview

• Range Safety Rules
• Serpentine Exercise
• Stall Parking Exercise
• Lane-Change Exercise
Overview

• Turning-Around Exercise
• Diminishing Lane Clearance Exercise
• Controlled Braking Exercise

Range Safety Rules

• Headlights must be on
• No unauthorized vehicles or people can be on course
• All vehicle occupants must wear restraints
• Resetting cones will be done when there are NO vehicles on the course
• Fire extinguishers must be carried on all vehicles in the range

Range Safety Rules

• The maximum speed is 25 mph
• The driver will be signaled by verbal cues
• The distances between cones will be adjusted to fit the vehicles as required
• Range exercises will not be held if the range is wet, icy, or snow-covered
• All vehicles will be inspected by instructors and EVOs that day
• Participants must dress appropriately for the weather
Range Safety Rules

• Guidelines
  – Students will present valid licenses for the proper class of vehicle they will drive
  – Instructors will demonstrate the course
  – Students will make arrangements with their chiefs and/or presidents to use vehicles from their departments

Range Safety Rules

• Guidelines
  – Students will bring two copies of their station’s pre-trip checklist
  – Students must be accompanied by an instructor while negotiating the course
  – Students will complete the exercises without striking cones
  – Instructors will sign off on all 7 exercises

Range Safety Rules

• The Safety Officer
  – Designates the secure area for conducting activities
  – Keeps bystanders and observers clear of the activity
  – Sets up a system of uniform hand signals and backing procedures
  – Ensures that all pre-response safety checks are completed prior to the start of the driving range
Range Safety Rules

- The Safety Officer
  - Ensures non-participating vehicles are restricted from the area
  - Monitors the use of range safety equipment
  - Controls all people and vehicles in the driving area
  - Alerts the lead instructor and stops all activities that are deemed unsafe

Serpentine Exercise

- Purpose: measures driver’s ability to steer the vehicle within the close limits without stopping
- Repetition: allows the driver to move forward and backward through the evolution with familiarity
- Pattern: allows the driver to properly steer the vehicle in and out between adjacent cones
Serpentine Exercise

• The serpentine exercise provides practice in directional steering
• Potential performance problems include
  – Improper entry angle
  – Under- or over-steering
  – Improper use of mirrors

Set Up

• Four cones spaced 30 to 38 feet apart
• Operator’s responsibility
  – Drive the vehicle through and then back through

Stall Parking Exercise

• Purpose
  – Drive past a docking bay and back into the space
  – Back down a street, alley, or confined space with vehicles on either side
• Repetition: driver moves forward and backward through the evolution
• Pattern: driver will properly steer the vehicle into a confined space
Stall Parking Exercise

- The stall parking exercise
  - Provides practice in backing up
  - Provides practice for parking an ambulance at a hospital emergency room unloading point
- Potential performance problems
  - Under- or over-steering in reverse
  - Relying on partner rather than mirrors

Stall Parking Exercise

- Set Up
  - 20 to 40 feet from the “street” line
  - Stall at least 12 feet wide by 20 feet deep
- Operator’s responsibility
  - Back into a stall from the left or sight side
  - Drive out 40 feet then back into the stall from the right or blind side
  - Stop the vehicle 12 inches from the “street” line markers

Lane-Change Exercise

- Purpose: measures driver’s ability to make sharp turns and steer the vehicle within close boundaries.
- Repetition: driver moves forward and backward through the evolution.
- Pattern: driver will properly steer vehicle from lane to lane between adjacent cones. This maneuver should be done without stopping.
### Lane-Change Exercise
- The lane-change exercise provides practice in making right and left turns and establishing precise alignment through lanes.
- Potential performance problems include:
  - Speed fluctuation
  - Beginning turns too early or too late
  - Under- or over-steering

### Lane-Change Exercise
- **Set Up**
  - 250 to 270 feet long and 46 feet wide
  - Alternating cones stalls placed every 80 to 85 feet, 12 feet wide
- Operator’s responsibility: make the series of right and left turns to move through each of the successive stalls and then reverse direction and back through.

### Turning-Around Exercise
- **Purpose:** measures driver’s ability to turn the vehicle around in a confined area in order to move or position it.
- **Repetition:** driver moves vehicle forward and backward through evolution.
- **Pattern:** driver will properly steer vehicle into confined area between adjacent cones and back out to reverse direction.
Turning-Around Exercise

- The turning around exercise
  - Provides practice in pulling into a narrow space and backing up
  - Develops valuable skills for making various types of turnabouts
- Potential performance problems
  - Under- or over-steering in forward and reverse
  - Not using mirrors appropriately to judge distances
  - Crossing too many lanes of traffic

Turning-Around Exercise

- Set Up
  - 12 feet wide
  - 20 feet deep
- Operator’s Responsibility
  - Back into a confined area from the left or sight side
  - Drive out 40 feet, then back into the area from right or blind side

Diminishing Lane Clearance Exercise

- Purpose: measure driver’s ability to steer the vehicle in a straight line while braking, judge distance to objects, and stop within one foot of an obstacle
- Repetition: driver moves vehicle forward and backward through evolution
- Pattern: driver will properly steer the vehicle within a course bordered by cones which are progressively closer together without stopping
**Diminishing Lane Clearance Exercise**

- The diminishing lane clearance exercise provides practice in negotiating a narrow track with a wide vehicle and maintaining a straight path of travel if emergency braking or stopping is required.
- Potential performance problems:
  - Speed fluctuations
  - Improper use of mirrors

**Diminishing Lane Clearance Exercise**

- **Set Up**
  - 75 feet long
  - For an 8-foot vehicle, the lane should be 9 feet 6 inches at the start and 8 feet 2 inches at the end.
- Operator's responsibility: driver must drive the vehicle between the cones until reaching the end of the course and then back through it.

**Controlled Braking Exercise**

- **Set Up**
  - A cone-marked approach lane 12 feet wide, leading to a cone barrier and continuing 100 feet beyond the barrier.
  - A left lane adjacent to the approach lane, starting 50 feet from the barrier and extending 60 feet beyond the barrier with the ends closed.
  - A double cue cone in the approach lane 50 feet from the barrier.
Controlled Braking Exercise

• Remember
  – Hands at 9 and 3
  – If the wheels lock up, release the brake to regain rolling traction
  – Threshold braking is braking to the point of lock up but lock up does not occur

Controlled Braking Exercise

• Operator’s responsibility
  – Proceed down the approach line at a pre-selected speed of 20-25 mph as conditions permit
  – At the double cue cone, the instructor will give verbal command to initiate braking and evade the barriers
  – When the command is given the student should steer the vehicle to evade the barrier, and simultaneously brake.
  – Steer back to the right- or left-hand lane and come to a full stop after clearing the first barrier and prior to the second barrier

Controlled Braking Exercise

• Potential performance problems
  – Locking brakes and wheels and losing steering control
  – Over-steering and not making it back to the proper lane in time
  – Under-steering and hitting the first barrier
  – Anticipating the cue and braking too soon
  – Not coming to a full stop at the end of the course
  – Brake fade
Student Performance Objective

- The student will be able to explain and demonstrate application of the rules and procedures during driving range exercises, with guidance.

Review

- Range Safety Rules
- Serpentine Exercise
- Stall Parking Exercise
- Lane-Change Exercise

Review

- Turning-Around Exercise
- Diminishing Lane Clearance Exercise
- Controlled Braking Exercise