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.
Rescue Technician—Vehicle and Machinery Extrication

Lesson 1-1
Introduction to VME/
Passenger Vehicle Anatomy and Hazards

Student Performance Objective

Given information from discussion, handouts, and reading materials, describe course components and student requirements and identify common passenger vehicle anatomy components and hazards.

Overview

- Introduction to VME
- Common Passenger Vehicle Anatomy
- Vehicle Hazard Identification
- Hazard Isolation/Mitigation
- Successful Completion of the Program
Introduction to VME
- Fill out paperwork
- Statistics
- Structure of class
- Attendance requirements
- Safety first
- Terms
- Overview of the extrication process

Common Passenger Vehicle Anatomy
- Terminology
- Evolution of the modern passenger vehicle
- Automobile Anatomy and Terminology

Vehicle Hazard Identification
- Vehicle interior and exterior hazards
- Environment hazards
- New vehicle hazards
- Alternative fuels, power sources
Hazard Isolation/Mitigation

- How things work and how to disable the system or mitigate the danger
- Requirements for additional specialized resources

Successful Completion of the Program

- The final written exam consists of 50 multiple-choice questions. A score of 70% or better is required for successful completion of the class. In addition, there is a final practical exam that also requires a score of 70% or better to complete the class. Students must complete the skill sheets prior to taking the final practical exam.

Student Performance Objective

- Given information from discussion, handouts, and reading materials, describe course components and student requirements and identify common passenger vehicle anatomy components and hazards.
Review

- Introduction to VME
- Common Passenger Vehicle Anatomy
- Vehicle Hazard Identification
- Hazard Isolation/Mitigation
- Successful Completion of the Program
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Lesson 2-1
Commercial and Heavy Vehicle Anatomy and Hazards

Student Performance Objective

- Given information from discussion, handouts, and reading materials, identify commercial and heavy vehicle anatomy components and hazards.

Overview

- Commercial and Heavy Vehicle Anatomy
- Vehicle Hazard Identification
- Hazard Isolation/Mitigation
Commercial and Heavy Vehicle Anatomy

- Bus Types
  - School buses
  - Transit buses
  - Commercial buses
  - Specialty buses

Bus Types

- School Bus
- Transit Bus
- Commercial Bus
- Specialty Bus

Commercial and Heavy Vehicle Anatomy

- Bus Anatomy
  - Construction types/components
  - Doors
  - Windows
  - Seats
  - Aisle width
  - Roof
  - Batteries
Commercial and Heavy Vehicle Anatomy

- Bus Anatomy (continued)
  - Fuel systems
  - Brake systems
  - Suspension systems

Commercial and Heavy Vehicle Anatomy

- Medium and Heavy Trucks
  - Straight truck
  - Tractor/trailer
  - Specialty

Truck Types
Commercial and Heavy Vehicle Anatomy

- Medium and Heavy Truck Anatomy
  - Cabs
  - Batteries
  - Fuel systems
  - Brake systems
  - Suspension systems
  - Fifth wheel
  - Trailers

Commercial and Heavy Vehicle Anatomy

- Rail Cars
  - Locomotives
  - Passengers cars

Commercial and Heavy Vehicle Anatomy

- Rail Car Anatomy
  - Electrical systems
  - Windows
  - Doors
  - Walls/roof
  - Brakes
Commercial and Heavy Vehicle Anatomy
- Industrial and agricultural vehicles
  - Local response area and vehicle types
  - General approach

Vehicle Hazard Identification
- Vehicle interior and exterior hazards
- Environmental hazards (terrain, power lines, weather, traffic, etc.)
- Alternative fuels, power sources

Hazard Isolation/Mitigation
- How things work and how to disable them
- Requirements for additional specialized resources
Student Performance Objective

- Given information from discussion, handouts, and reading materials, identify commercial and heavy vehicle anatomy components and hazards.

Review

- Commercial and Heavy Vehicle Anatomy
- Vehicle Hazard Identification
- Hazard Isolation/Mitigation
Rescue Technician—Vehicle and Machinery Extrication

Lesson 3-1
Machinery Anatomy and Hazards

Student Performance Objective
- Given information from discussion, handouts, and reading materials, identify machinery anatomy components and hazards

Overview
- Introduction to Machinery Rescue
- Machinery Anatomy
- Machinery Hazard Identification
- Hazard Isolation/Mitigation
- Lock Out/Tag Out
- Practical Exercises
Introduction to Machinery Rescue

What is a machine?
- A device that uses energy to perform a task

What types of energy sources are used?
- Hydraulic
- Pneumatic
- Electrical
- Heat

What are examples of machines that use each type of power?

Introduction to Machinery Rescue

Where are machines found?
- Industrial facilities
- Commercial establishments
- Educational facilities
- Health facilities
- Residential dwellings

What machinery exists in your response area?

Introduction to Machinery Rescue

Mechanical Advantage Devices

- Lever
- Pulley
- Wedge
- Wheel & Axle
Introduction to Machinery Rescue
Mechanical Advantage Devices

- Screw
- Gear
- Cam
- Chains and Belts

Introduction to Machinery Rescue
Mechanical Advantage Devices

- Ratchet
- Crank and Rod
- Compound Machines

Introduction to Machinery Rescue

General approach to machinery rescue
- Size-up (including all sources of information)
- Incident Action Plan
- Site and scene control
- Patient assessment (rescue vs. recovery)
- Hazard identification and mitigation
- Stabilization
- Extrication
- Termination
Machinery Anatomy

- Terminology – Varies with the machine being assessed
- Sources of Information
  - On-scene personnel
  - On-call personnel
  - In-house procedural documentation
  - Manufacturer documentation
  - Manufacturer telephone hotline

Machinery Hazard Identification

- Environmental Hazards
- Machinery Power Sources
- Stored Energy
- Manual vs. Automatic Operation

Hazard Isolation/Mitigation

- How things work and how to disable them
  - Assessment
  - Information sources
- Requirements for additional specialized resources and/or personnel
- Lock out/tag out (to be discussed next)
Lock Out/Tag Out

- A way to secure energy sources and prevent operation of a machine
- Generally applies to large and/or complex machines
- Frequently uses physical locks to ensure isolation of energy sources

Lock Out/Tag Out

- Devices must be:
  - Standardized
  - Identifiable
  - Durable
  - Not used for other purposes

Lock Out/Tag Out

Other Devices
Lock Out/Tag Out
- Operators and maintenance personnel should be involved
- Rescue personnel must assess and verify lock out/tag out
- Stored energy must be considered prior to proceeding with the rescue

Student Performance Objective
- Given information from discussion, handouts, and reading materials, identify machinery anatomy components and hazards

Review
- Introduction to Machinery Rescue
- Machinery Anatomy
- Machinery Hazard Identification
- Hazard Isolation/Mitigation
- Lock Out/Tag Out
- Practical Exercises
Rescue Technician—Vehicle and Machinery Extrication

Lesson 4-1
Stabilization

Student Performance Objective

- Given information from discussion, handouts, and reading materials, identify stabilization devices and methods and perform stabilization of a vehicle.

Overview

- Introduction to Stabilization
- Stabilization Devices
- Stabilization Methods
- Thinking Outside the Box in Stabilization
Introduction to Stabilization

- Stabilization is the first step in extrication

Stabilization Devices

- Safety and Device Use
- Cribbing
- Chocks
- Shoring
- Rigging
- Webbing
- Pneumatic Lifting Bags
- Tow Trucks

Stabilization Methods

- Safe Stabilization
- Vehicles
  - Center of gravity, position, size, and vehicle integrity
  - Vehicle upright
  - Vehicle on side
  - Vehicle on top
  - Vehicle entangled with another vehicle or object
  - Other positions
Stabilization Methods

- **Buses**
  - Center of gravity, position, size, and vehicle integrity
  - School, transit and commercial bus differences
  - Air suspension systems
  - Jack plates
  - Cribbing considerations

Stabilization Methods

- **Trucks**
  - Center of gravity, position, size and vehicle integrity
  - Unique considerations

Stabilization Methods

- **Railcars**
  - Center of gravity, position, size, and vehicle integrity
  - Unique considerations
Stabilization Methods

- Industrial and Agricultural Vehicles
  - Center of gravity, position and vehicle integrity
  - Unique considerations

Stabilization Methods

- Machines
  - Lock out/tag out
  - Sources of information

Thinking Outside of the Box
In Stabilization

- Stabilization in unique situations offers a chance to come up with new/unique approaches
Student Performance Objective

- Given information from discussion, handouts, and reading materials, identify stabilization devices and methods and perform stabilization of a vehicle

Review

- Introduction to Stabilization
- Stabilization Devices
- Stabilization Methods
- Thinking Outside the Box in Stabilization
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Lesson 5-1
Access and Egress

Student Performance Objective

- Given information from discussion, handouts, and reading materials, identify tools and methods used in access and egress and perform access and egress on a vehicle.

Overview

- Introduction to Access and Egress
- Access and Egress Tools
- Access and Egress Methods
Introduction to Access and Egress

- The relationship of stabilization and access/egress

Access and Egress Tools

- Safety and tool use
- Hand tools
- Air tools
- Electric tools
- Hydraulic tools
- Other tools

Access and Egress Methods

- Safe access and egress
- Coordination with EMS
- Glass removal
- Door/side panel removal
- Roof removal
- Access through floor
Student Performance Objective

- Given information from discussion, handouts, and reading materials, identify tools and methods used in access and egress and perform access and egress on a vehicle.

Review

- Introduction to Access and Egress
- Access and Egress Tools
- Access and Egress Methods
Rescue Technician—Vehicle and Machinery Extrication

Lesson 6-1
Disentanglement

Student Performance Objective

Given information from discussion, handouts, and reading materials, identify tools and methods used in disentanglement and perform disentanglement on a vehicle.

Overview

- Introduction to Disentanglement
- Disentanglement Tools
- Disentanglement Methods
Introduction to Disentanglement

- The relationship of stabilization, access/egress and disentanglement

Disentanglement Tools

- Safety and Tool Use
- Hand Tools
- Lifting Tools
- Mechanic's Tools
- Other tools

Disentanglement Tools

- Air Tools
- Pneumatic Tools
- Electric Tools
- Hydraulic Tools
- Other Tools
Disentanglement Methods

- Safe Disentanglement
- Working with EMS
- Vehicle Position Considerations
- Operations

Student Performance Objective

- Given information from discussion, handouts, and reading materials, identify tools and methods used in disentanglement and perform disentanglement on a vehicle.

Review

- Introduction to Disentanglement
- Disentanglement Tools
- Disentanglement Methods
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Lesson 7-1
Rescue Management—Evaluation, Strategy and Tactics

Student Performance Objective

- Given information from discussion, handouts, and reading materials, describe and perform the skills necessary to conduct rescue management.

Overview

- Introduction to Rescue Management
- Performing Planning and Size-Up
- Extrication Strategy and Tactics
- Establishing Safety Zones
- Establishing Fire Protection
- Removing a Packaged Victim
- Terminating a Level I Vehicle/Machinery Rescue Incident
Introduction to Rescue Management—
Evaluation, Strategy and Tactics

Now that you are armed with new skills, it is time to focus on how to put it all together.

Performing Planning and Size-Up

- Size-up questions to be answered
- Incident Action Plan
- Specific actions required in plan

Extrication Strategy and Tactics

- Types and numbers of vehicles
- Nature of entrapment
- Impact on other accident vehicles
- Priorities of extrication
Establishing Safety Zones
- Scene hazard identification
- Scene control zones

Establishing Fire Protection
- Local SOPs/SOGs
- Water supply
- Hoselines
- Extinguishers
- PPE

Removing a Packaged Victim
- Packaging (An EMS skill not taught in this class)
- Body mechanics and safe removal
- Emergency, urgent and non-urgent moves
- Types of packaging devices
Terminating a Level I Vehicle/Machinery Rescue Incident
- Restoring the scene
- Local police/fire/EMS protocols
- Responsibilities for scene control
- Hazard mitigation
- Restoring traffic flow
- Restoring operational readiness

Student Performance Objective
- Given information from discussion, handouts, and reading materials, describe and perform the skills necessary to conduct rescue management.

Review
- Introduction to Rescue Management
- Performing Planning and Size-Up
- Extrication Strategy and Tactics
- Establishing Safety Zones
- Establishing Fire Protection
- Removing a Packaged Victim
- Terminating a Level I Vehicle/Machinery Rescue Incident