Heavy Vehicle Rescue Technician (2021)

Course Plan

Course Details

Description: This course provides the knowledge and skills to prepare an emergency responder to extricate victim(s) from a heavy vehicle in a safe and effective manner in accordance with AHJ policies and procedures. Topics include sizing up an incident; creating an incident action plan; establishing safety zones; mitigating hazards; stabilizing and creating access and egress openings for rescue from a vehicle resting on its wheels, side, and roof or in a multi-hazard configuration or environment; coordinating heavy equipment to lift, move, or stabilize a heavy vehicle; disentangling and removing victims; and terminating an incident. This course incorporates awareness, operations, and technician training based on NFPA 1006 (2021).

Designed For: All emergency personnel who perform heavy vehicle rescue.

Prerequisites: Common Passenger Vehicle Rescue (2021) **or** Vehicle Extrication (2015) **or** Auto Extrication (1996)

Standard: Attend and participate in all course sections

Successful completion of all skills identified on the Training Record

Hours: 24 hours

(6.5 lecture / 17.5 application)

Max Class Size: 32

Instructor Level: SFT Registered Heavy Vehicle Rescue Technician Instructor

Instructor/Student Ratio: 1:32 (lecture)

1:8 (skills/teaching demonstrations)

Restrictions: All instructors counted toward student ratios, including application components, must be SFT Registered Heavy Vehicle Rescue Technician Instructors.

SFT Designation: FSTEP

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Required Resources

Instructor Resources

To teach this course, instructors need:

- One (or both) of the following texts:
  - *Vehicle Extrication Levels I and II: Principles and Practice* (and instructor tool kit) David A. Sweet, Jones & Bartlett Learning, revised 2nd edition (or newer)
  - *Principles of Vehicle Extrication* Fire Protection Publications, International Fire Service Training Association (IFSTA), 5th edition (or newer)
- NFPA 1006: Standard for Technical Rescue Personnel (2021)
  - Physical or digital access to current edition
- Full structural personal protective equipment (including hand, eye, and respiratory protection)

Online Instructor Resources

The following instructor resources are available online at https://osfm.fire.ca.gov/divisions/state-fire-training/fstep-curriculum/

- None

Student Resources

To participate in this course, students need:

- Course text selected by instructor (instructor determines whether students must purchase text and which one)
  - *Vehicle Extrication Levels I and II: Principles and Practice* (and instructor tool kit) David A. Sweet, Jones & Bartlett Learning, revised 2nd edition (or newer)
  - *Principles of Vehicle Extrication* Fire Protection Publications, International Fire Service Training Association (IFSTA), 5th edition (or newer)
- Full structural personal protective equipment (including hand, eye, and respiratory protection)

Facilities, Equipment, and Personnel

Facilities

The following facilities are required to deliver this course:

- Standard learning environment or facility, which may include:
  - Writing board or paper easel chart
  - Markers, erasers
  - Amplification devices
  - Projector and screen
  - Laptop or tablet with presentation or other viewing software
  - Internet access with appropriate broadband capabilities

- A training site with the NFPA 1006 required facilities, structures, work areas, materials, props, tools, and equipment of adequate size, type, and quantity to fully and safely support the cognitive and psychomotor training required to deliver the Heavy Vehicle Rescue Technician (2021) curriculum

Equipment

Student safety is of paramount importance when conducting the type of high-risk training associated with this Heavy Vehicle Rescue Technician course.

- The equipment listed below is the minimum for the delivery of this course.
- The student is responsible for providing all PPE and ensuring that all PPE meets AHJ and site requirements.

The following equipment is the minimum required to deliver this course:

Category	Equipment
Incident action plan (IAP)	One for each skills day (tactical worksheets and ICS 201)
Hand tools	Bolt cutters, crowbar/pry bar, flat head axe, Halligan tool, hack saw and spare blades, pick-head axe, pike pole (or equivalent), flashlight, sledgehammer, spring-loaded center punch, cable cutters, seatbelt cutter (or equivalent), webbing, utility rope, duct tape, basic mechanic's tool kit, heavy vehicle tool kit
Power tools	Circular saw, reciprocating saw
Fire extinguishers	One per skills station
Extrication tools	Cutters, spreaders, rams
Stabilization	Cable/chains/rope/sling (determined by AHJ), manufactured strut systems, cribbing, wedges, step chocks, wheel chocks
Vehicles	1 heavy vehicle, 1 passenger vehicle
Specialized heavy equipment	One of the following: wrecker, rotator, crane, or equivalent
Victim Immobilization and Protection	Determined by AHJ
Victims	Manufactured or improvised rescue mannequins (determined by number of vehicles used)
Lifting equipment	Air bag set, struts, hydraulic and mechanical jacks
Other supplies as needed	Salvage covers, straight or folding ladder, hearing protection (one/student minimum), brooms, shovels, absorbent
For all equipment, ensure that you have the power source, operating supplies (blades, fuel, etc.), and cleaning supplies.	

Personnel

The following personnel are required to deliver this course:

- Any instructor counted toward student ratios must be an SFT Registered Heavy Vehicle Rescue Technician (2021) Instructor.

Time Table

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.5	0.0	
Unit 1 Totals	**0.5**	**0.0**	**0.5**
Unit 2: Incident Response			
Topic 2-1: Sizing Up an Incident	0.25	0.0	
Topic 2-2: Creating an Incident Action Plan	0.5	0.25	
Topic 2-3: Recognizing the Need for Technical Rescue Resources	0.25	0.0	
Topic 2-4: Supporting an Operations- or Technician-level Incident	0.25	0.0	
Topic 2-5: Recognizing Incident Hazards and Initiating Isolation Procedures	0.25	0.25	
Topic 2-6: Establishing Fire Protection	0.25	0.25	
Topic 2-7: Isolating Potentially Harmful Energy Sources	0.25	0.25	
Topic 2-8: Mitigating Hazards Associated with Alternative Fuel Vehicles	0.25	0.0	
Unit 2 Totals	**2.25**	**1.0**	**3.25**
Unit 3: Vehicle Stabilization			
Topic 3-1: Stabilizing a Heavy Vehicle	1.5	4.5	
Unit 3 Totals	**1.5**	**4.5**	**6.0**
Unit 4: Lifting and Moving			
Topic 4-1: Lifting a Heavy Vehicle	0.25	2.0	
Topic 4-2: Coordinating Heavy Equipment to Lift, Move, or Stabilize a Heavy Vehicle	0.25	2.0	
Unit 4 Totals	**0.5**	**4.0**	**4.5**
Unit 5: Access and Egress			
Topic 5-1: Determining Vehicle Access and Egress Points	0.25	0.5	
Topic 5-2: Creating Access and Egress Openings for Rescue	0.75	6.0	
Unit 5 Totals	**1.0**	**6.5**	**7.5**
Unit 6: Victim Rescue			
Topic 6-1: Disentangling Victims	0.25	1.0	
Topic 6-2: Removing a Packaged Victim to a Designated Safe Area	0.25	0.25	
Unit 6 Totals	**0.5**	**1.25**	**1.75**
Unit 7: Incident Termination			
Topic 7-1: Terminating a Vehicle Incident	0.25	0.25	
Unit 7 Totals	**0.25**	**0.25**	**0.5**

Segment	Lecture	Application	Unit Total
Formative Assessments			
Determined by AHJ or educational institution	**0.0**	**0.0**	**0.0**
Summative Assessment			
Determined by AHJ or educational institution	**0.0**	**0.0**	**0.0**
Course Totals	**6.5**	**17.5**	**24.0**

Time Table Key

1. The Time Table documents the amount of time required to deliver the content included in the course plan.

2. Time is documented using the quarter system: 15 min. = .25 / 30 min. = .50 / 45 min. = .75 / 60 min. = 1.0.

3. The Course Totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment). It is the instructor's responsibility to add this time based on the course delivery schedule.

4. Application (activities, skills exercises, and formative testing) time will vary depending on the number of students enrolled. The Application time documented is based on the maximum class size identified in the Course Details section.

   The following is a breakdown of what a program might look like if there were fewer students. These estimates may need to be adjusted based on student abilities.
   - 40 – 50 Students = 260 hours
   - 30 – 40 Students = 180 hours
   - 20 – 30 Students = 120 hours
   - 1 – 20 Students = 60 hours

5. Summative Assessments are determined and scheduled by the authority having jurisdiction. These are not the written or psychomotor State Fire Training certification exams. These are in-class assessments to evaluate student progress and calculate course grades.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, skills exercises, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
    - Restroom locations
    - Food locations
    - Smoking locations
    - Emergency procedures
2. Identify classroom requirements
    - Start and end times
    - Breaks
    - Electronic device policies
    - Special needs and accommodations
    - Other requirements as applicable
3. Review course syllabus
    - Course objectives
    - Calendar of events
    - Course requirements
    - Student evaluation process
    - Assignments
    - Activities
    - Required student resources
    - Class participation requirements

Discussion Questions

1. Determined by instructor

Application

1. Have students complete all required registration forms.

Unit 2: Incident Response

Topic 2-1: Sizing Up an Incident

Terminal Learning Objective

At the end of this topic a student, given an incident, background information and applicable reference materials, will be able to size up a heavy vehicle incident so that the scope of the rescue is determined, the number of victims are identified, the last reported location of all the victims is established, witnesses and reporting parties are identified and interviewed, resource needs are assessed, primary search parameters are identified, and information required to develop an initial incident action plan is obtained.

Enabling Learning Objectives

1. Identify types of reference materials and their uses
   - Emergency response guides
   - AHJ standard operating procedures and guidelines
2. Describe risk/benefit assessment
   - Rescue vs. recovery
3. Identify resource availability, capabilities, and limitations
4. Describe elements of an action plan and related information
   - Formal (ICS roles) vs. informal
   - Determined by incident complexity
5. Describe how size up relates to the incident management system
6. Describe information gathering techniques and how that information is used in the size-up process
   - Pre-incident
   - En route
   - On scene
   - Evolving
7. Describe basic search criteria for heavy vehicle rescue incidents
   - Additional compartments to search (sleepers, busses, RVs, trailers, etc.)
8. Read technical rescue reference materials
9. Gather information
10. Use interview techniques
11. Relay information
12. Manage witnesses
13. Use information-gathering sources

Discussion Question

1. When does scene size up begin?
2. What specialty resources to support heavy vehicle rescue are available in your AHJ?
3. How would you search the following heavy vehicles to find victims: a motor home, a tractor and trailer, and a tour bus?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. For any content identified as “determined by AHJ”, adjust content to reflect the policies, procedures, guidelines, and best practices of the AHJ delivering or hosting the course. This applies to all topics in this course plan.

CTS Guide Reference: CTS 1-1

Topic 2-2: Creating an Incident Action Plan

Terminal Learning Objective

At the end of this topic a student, given agency guidelines, planning forms, and an operations- or technician-level vehicle incident or simulation, will be able to create an incident action plan for a heavy vehicle incident and conduct initial and ongoing size-up so that a standard approach is used during training and operational scenarios, emergency situation hazards are identified, isolation methods and scene security measures are considered, fire suppression and safety measures are identified, vehicle stabilization needs are evaluated, and resource needs are identified and documented for future use.

Enabling Learning Objectives

1. Describe operational protocols
   - Determined by incident and AHJ
2. Identify specific planning forms
   - Determined by incident and AHJ
3. Identify types of vehicles common to the AHJ boundaries
   - 10,000 lbs. (gross vehicle weight rating) and up
4. Describe heavy vehicle hazards
   - Multiple unstable objects
   - Weight
   - Cargo
   - Access issues
   - Potential for roll over
   - Potential for collapse
   - Exposed vehicle components
   - Fluid leaks
5. Describe incident support operations and resources
   - Determined by incident and AHJ
   - Consider truck company, rescue company, hazmat unit, specialized heavy equipment, extended operational needs
6. Identify heavy vehicle anatomy as it relates to an incident action plan
7. Identify “multi-hazard configuration or environment” incidents
   - Configuration = two or more independently unstable objects
     - Vehicle on top of vehicle
     - Object on top of vehicle
     - Vehicle on top of object
     - Chassis and load
   - Environment
     - Cliffs
     - Water
     - Rocks
     - Structure
8. Describe fire suppression and safety measures
9. Apply operational protocols

10. Select specific planning forms based on the types and position of vehicles
11. Identify and evaluate various types of heavy vehicles within the AHJ boundaries
12. Request support and resources
13. Identify commercial/heavy vehicle anatomy
14. Determine the required fire suppression and safety measures

Discussion Questions

1. What types of heavy vehicles are common in your AHJ?
2. How does a vehicle's construction impact your incident action plan?
3. How does a vehicle's use impact your incident action plan?
4. What hazards are unique to a multi-hazard configuration?
5. What additional resources and equipment might be required for an incident involving a multi-hazard configuration?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation for one vehicle placement or configuration.

Instructor Notes

1. ELO 4: Introduce the concept here. Topic 2-5 has more in-depth content.
2. ELO 6: Introduce the concept here. Topic 5-1 has more in-depth content.
3. ELO 8: Introduce the concept here. Topic 2-6 has more in-depth content.

CTS Guide Reference: CTS 2-1 / CTS 3-1

Topic 2-3: Recognizing the Need for Technical Rescue Resources

Terminal Learning Objective

At the end of this topic a student, given AHJ guidelines, will be able to recognize the need for technical rescue resources at an operations- or technician-level incident so that the need for additional resources is identified, the response system is initiated, the scene is secured and rendered safe until additional resources arrive, and awareness-level personnel are incorporated into the operational plan.

Enabling Learning Objectives

1. Describe operational protocols
   - Determined by incident and AHJ
2. Identify specific planning forms
3. Identify types of incidents common to the AHJ
4. Identify hazards
5. Describe incident support operations and resources
   - Determined by incident and AHJ
   - Examples:
     - HazMat Team
     - Specialized heavy equipment (wrecker, rotator, crane, etc.)
     - EMS
6. Describe safety measures
7. Apply operational protocols
8. Select specific planning forms based on the types of incidents
9. Identify and evaluate various types of hazards within the AHJ
10. Request support and resources
11. Determine the required safety measures

Discussion Questions

1. What factors determine when an incident requires additional or specialty resources?
2. What process does your AHJ use to request resources?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 1-3

Topic 2-4: Supporting an Operations- or Technician-level Incident

Terminal Learning Objective

At the end of this topic a student, given an incident, an assignment, an incident action plan, and resources from the tool kit, will be able to support an operations- or technician-level incident so that the assignment is carried out, progress is reported to command, environmental concerns are managed, personnel rehabilitation is facilitated, and the incident action plan is supported.

Enabling Learning Objectives

1. Identify support roles and responsibilities
    - Traffic control
    - Fire suppression
    - Establishing safety zones
    - Notifications
    - Resource requests
    - Logistical support
    - Emergency medical services
2. Describe AHJ operational protocols
3. Identify hazard recognition
4. Describe incident management
5. Identify PPE selection
6. Describe how to select and use resources
7. Identify scene support requirements
8. Apply operational protocols
9. Function within an incident management system
10. Follow and implement an incident action plan
11. Report the task progress status to a supervisor or incident command

Discussion Questions

1. What are some of the roles and responsibilities of an awareness level responder during an incident?
2. What are some common hazards that occur at a heavy vehicle incident?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 1-4

Topic 2-5: Recognizing Incident Hazards and Initiating Isolation Procedures

Terminal Learning Objective

At the end of this topic a student, given scene control barriers, personal protective equipment (PPE), requisite equipment, and available specialized resources, will be able to recognize incident hazards and initiate isolation procedures so that all hazards are identified; resource application fits the operational requirements; hazard isolation is considered; risks to rescuers, bystanders, and victims are minimized; and rescue time constraints are considered.

Enabling Learning Objectives

1. Describe hazard recognition, isolation methods, and terminology
    - Vehicle stability
    - Leaking fluids (vehicle and victim)
    - Cargo/hazmat
2. Identify resource capabilities and limitations
3. Identify types and nature of incident hazards
    - Situational
        - Traffic
        - Weather (rain, snow, fog, glare, etc.)
        - Terrain (rocks, trees, water, elevation, etc.)
        - Road construction
        - Hazardous materials
        - Location (train tracks, hairpin turns, wires, etc.)
    - Vehicle
        - Propulsion (fuel, hybrid, alternate)
        - Restraint systems
        - Electrical
        - Cargo
        - Other (contents, struts, exotic metals, etc.)
4. Describe equipment types and their use
    - Absorbents
    - Tools
    - Equipment
    - Visual identifiers
5. Describe isolation terminology
6. Describe isolation methods
    - De-energize vehicle
    - Lock-out/tag-out
    - Remote emergency shut offs
    - Air systems
    - Safe distance from air bags
7. Identify operational requirement concerns
    - Responder safety

- Patient safety
- Public safety
- Environmental safety

8. Identify common types of rescuer and victim risks
    - Moving vehicles
    - Hazardous materials
    - Electrocution
    - Fire
    - Biohazards
    - Psychological impact
    - Injury
    - Death
9. Describe risk/benefit analysis methods and practices
10. Describe methods for controlling access to the scene
    - Flagging
    - Caution tape
    - Personnel (crew, law enforcement, DOT)
11. Identify and types of technical references
    - NFPA 1006 (current edition)
    - Text identified by instructor
12. Identify incident hazards
13. Assess potential hazards to rescuers and bystanders
14. Place scene control barriers
15. Operate control and mitigation equipment

Discussion Questions

1. What heavy vehicle features create hazards for rescuers?
2. What risks might rescuers encounter when isolating or mitigating hazards?
3. What kind of air bag systems might you find on a heavy vehicle?
4. What is a simple way to reduce electrical hazards in a heavy vehicle?

Application

1. Students will practice this skill at multiple skill stations and must describe it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 1-2

Topic 2-6: Establishing Fire Protection

Terminal Learning Objective

At the end of this topic a student, given an extrication incident and fire control support, will be able to establish fire protection so that fire and explosion potential is managed, and fire hazards and rescue objectives are communicated to the fire support team.

Enabling Learning Objectives

1. Identify types of fire and explosion hazards
    - Fuels
    - Fuel Additives (ethanol, methanol)
    - Specialty metals
    - Batteries
    - Pressurized cylinders
    - Restraint devices
    - Ignition sources
    - Cargo
2. Describe types of extinguishing devices
    - Water (1½" diameter charged hoseline minimum)
    - Foam (tender or eductor)
    - Extinguishers
3. Describe agency policies and procedures
    - Determined by AHJ
        - Fire suppression policy
        - Rapid intervention personnel policy
4. Identify types of flammable and combustible substances and types of ignition sources
5. Describe extinguishment or control options
6. Identify fire and explosion hazards
7. Operate within the incident management system
8. Use extinguishing devices
9. Apply fire control strategies
10. Manage ignition potential

Discussion Questions

1. What components of a heavy vehicle are a potential fire or explosion hazard?
2. What is your agency's policy on protection lines during a heavy vehicle rescue?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-2

Topic 2-7: Isolating Potentially Harmful Energy Sources

Terminal Learning Objective

At the end of this topic a student, given a heavy vehicle, vehicle tool kit, and PPE, will be able to isolate potentially harmful energy sources, including propulsion power, restraint systems, and construction materials, so that all hazards are identified and isolated, systems are managed, beneficial system use is evaluated, and hazards to rescue personnel and victims are minimized.

Enabling Learning Objectives

1. Identify types and uses of PPE
2. Identify types of energy sources
    - Kinetic vs. potential
    - Electrical
    - Fuel
    - Chemical
    - Pneumatic systems
        - Fuel pumps
        - Air bags (passive restraint devices)
        - Alternative fuel systems
        - Air suspension systems
    - Gravity
    - Mechanical
    - Topographical
3. Describe system isolation methods
    - Operate beneficial systems in support of tactical operations before isolating
4. Describe specialized system features
5. Describe tools for disabling hazards
    - Determined by AHJ
    - Determined by incident
6. Describe AHJ policies and procedures
7. Select and use hazard-specific PPE
8. Identify hazard
9. Operate beneficial systems in support of tactical objectives
10. Operate tools and devices for securing and disabling hazards

Discussion Questions

1. What systems should you address before isolating power?
2. What are some common energy source locations in or on a heavy vehicle?
3. What tools or equipment does your agency use to manage energy sources?
4. How are the energy sources on heavy vehicles different from those on common passenger vehicles?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-5

Topic 2-8: Mitigating Hazards Associated with Alternative Fuel Vehicles

Terminal Learning Objective

At the end of this topic a student, given an alternative fuel heavy vehicle, heavy vehicle tool kit, and PPE, will be able to identify and mitigate hazards associated with alternative fuel vehicles so that all hazards are identified and isolated, systems are managed, beneficial system use is evaluated, and hazards to rescue personnel and victims are minimized.

Enabling Learning Objectives

1. Identify an "alternative" fuel vehicle
   - A motorized vehicle propelled by anything other than gas or diesel alone
2. Identify alternative fuel sources
   - Electrical
   - Hybrid
   - Hydrogen
   - Biodiesel
   - Natural gas
     - Compressed (CNG)
     - Liquified (LNG)
   - Liquefied petroleum gas (LPG)
3. Identify types of alternative fuel heavy vehicles in the AHJ
   - Buses
   - Trash trucks
   - Semi-trucks
   - Box trucks
4. Identify hazards associated with alternative fuel vehicles
   - Electrical/hybrid
     - Electrocution
     - Exotic metal fires
     - Burns
     - Respiratory damage
     - Death
   - Gasses
     - Fire
     - Explosions
     - Compressed cylinders
     - Burns
     - Respiratory damage
     - Death
5. Describe how to isolate hazards
   - Determined by AHJ
   - Determined by manufacturer emergency response guides
   - Determined by safety data sheets (SDS)
6. Describe policies and procedures of the AHJ

Discussion Questions

1. What type of alternative fuel heavy vehicles operate in your AHJ?
2. How do you identify an alternative fuel heavy vehicle?
3. What hazards are associated with alternative fuel heavy vehicles?

Application

1. None

Instructor Notes

1. There are no psychomotor skills associated with this topic.

CTS Guide Reference: CTS 2-6

Unit 3: Vehicle Stabilization

Topic 3-1: Stabilizing a Heavy Vehicle

Terminal Learning Objective

At the end of this topic a student, given a heavy vehicle, a technician-level heavy vehicle incident or simulation, a vehicle tool kit, and PPE, will be able to stabilize a heavy vehicle resting in its position of use, on its roof, on its side, or in a configuration or environment where multiple concurrent hazards must be managed to access or remove the occupants, so that the vehicle is prevented from moving during the rescue operations; entry, exit, and tool placement points are not compromised; anticipated rescue activities will not compromise vehicle stability; selected stabilization points are structurally sound; stabilization equipment can be monitored; and the risk to rescuers is minimized.

Enabling Learning Objectives

1. Identify factors that impact stabilization
    - Vehicle size or type
    - Vehicle position
    - Multiple vehicles or objects
    - Ground surface (dirt, gravel, sand, mud)
    - Topography (water, cliffs, rocks, embankments)
    - Access needs
    - Contaminants
    - Cargo/load
2. Describe types and rated capacities of stabilization devices
    - Chocks
        - Wheel
        - Step
    - Vehicle systems (ignition, brakes, etc.)
    - Cribbing
    - Struts
    - Cables, chains, ropes, slings
        - Marrying/joining together vehicles/objects
    - Air bags
    - Specialized heavy equipment
3. Describe mechanisms of heavy vehicle movement
    - Horizontal Movement
        - Vehicle moves forward or rearward on its longitudinal axis or moves horizontally along its lateral axis
    - Vertical Movement
        - Vehicle moves up and down in relation to the ground while moving along its vertical axis
    - Roll Movement

        - Vehicle rocks side to side while rotating about on its longitudinal axis and remaining horizontal in orientation
    - Pitch Movement
        - Vehicle moves up and down about its lateral axis, causing the vehicle's front and rear portions to move left or right in relation to their original position
    - Yaw Movement
        - Vehicle twists or turns about its vertical axis, causing the vehicle's front and rear portions to move left or right in relation to their original position
    - Multiple objects with potential to move in multiple directions
4. Identify types of stabilization points
    - Single vs. Multi-point (based on access needs)
    - Vehicle placement (may already provide stabilization)
    - Need to stabilize multiple objects (may not all be vehicles)
5. Identify types of stabilization surfaces
    - Solid structural surfaces (determined by vehicle)
    - Non-vehicle surfaces (rocks, structures, utility poles, etc.)
6. Describe types of vehicle construction components as they apply to stabilization
    - Frame
    - Undercarriage
    - Platform
    - Trailers
    - Loads
    - Use what is available based on resting position of vehicles
7. Describe AHJ policies and procedures
8. Select, operate, and monitor stabilization devices

Discussion Questions

1. What environmental or topographical features in your AHJ could be involved in a vehicle rescue incident?
2. What tools and equipment does your agency use to stabilize a heavy vehicle?
3. How can heavy vehicle location or position impact stabilization needs?
4. How is stabilizing a tractor-trailer different from stabilizing a school bus?
5. How is stabilizing a heavy vehicle resting on its roof different from a vehicle resting on its wheels?
6. How is stabilizing a heavy vehicle resting on its side different from a vehicle resting on its wheels?
7. How is stabilizing a heavy vehicle in a multi-hazard configuration different from a solo vehicle?
8. How does your agency marry or join together vehicles or objects?

Application

1. Students will practice this skill at multiple skill stations and must perform stabilization once for each of the following devices on at least one vehicle placement or configuration:
    - Chocks (or equivalent)

- Cribbing (or equivalent)
- Struts (or equivalent)
- Air bags
- Cables, chains, ropes, or slings
- Specialized heavy equipment
- Marrying/joining together a vehicle and another vehicle or object

Instructor Notes

1. None

CTS Guide Reference: CTS 2-3 / CTS 2-4 / CTS 3-2

Unit 4: Lifting and Moving

Topic 4-1: Lifting a Heavy Vehicle

Terminal Learning Objective

At the end of this topic a student, given a heavy vehicle incident, a vehicle tool kit, and PPE, will be able to lift a heavy vehicle so that unanticipated movement is prevented during the rescue operations; entry, exit, and tool placement points are not compromised; anticipated rescue activities will not compromise vehicle stability; selected lift points are structurally sound; lifting equipment can be monitored; and the risk to rescuers is minimized.

Enabling Learning Objectives

1. Describe types of lifting devices
   - Air bags (high, medium, low pressure)
   - Struts
   - Jacks
   - Specialized heavy equipment
   - Hydraulic tools
2. Describe mechanisms of vehicle movement
3. Identify types of lifting points
   - Single point vs. multi-point (based on access needs)
4. Identify types of lifting surfaces
   - Pre-existing (some vehicles) vs. improvised
   - Solid structural surfaces (determined by vehicle)
5. Describe how to capture a load
   - Cribbing (6x6 or 4x4 – determined by vehicle)
     - Box (crosstie)
     - Solid (crosstie platform)
     - Modified crosstie
   - Struts
   - Alternative material
6. Describe hazards associated with lifting heavy vehicles
   - Size and configuration
   - Load shifts
   - Unknown weights
   - Unknown cargo
   - Center of gravity changes
   - Dispersed cargo
   - Animal cargo
7. Describe AHJ policies and procedures
8. Describe types of vehicle construction components as they apply to lifting
9. Deploy and operate lifting devices
10. Deploy cribbing or struts
11. Recognize competent lift points

12. Calculate weights and center of gravity
13. Assess vehicle stability
14. Use tools or systems to prevent unwanted movement

Discussion Questions

1. Why would you use 6x6 cribbing instead of 4x4?
2. What hazards should you consider when lifting a heavy vehicle?
3. What types of cargo could you encounter during a heavy vehicle incident?

Application

1. Students will practice this skill at at least one skill station and must perform it once for evaluation.

Instructor Notes

1. ELO 2 was already covered in Topic 3-1 but should be referenced here in relation to lifting and moving vehicles.

CTS Guide Reference: CTS 3-3

Topic 4-2: Coordinating Heavy Equipment to Lift, Move, or Stabilize a Heavy Vehicle

Terminal Learning Objective

At the end of this topic a student, given a heavy vehicle incident, heavy equipment and an operator, a vehicle tool kit, and PPE, will be able to coordinate the use of heavy equipment as part of a plan to lift, move, or stabilize a heavy vehicle so that the objective is met and the risks to the responders are minimized.

Enabling Learning Objectives

1. Describe methods of requesting heavy equipment
   - Determined by AHJ
2. Describe methods of communication
   - Radio
   - Hand signals
   - Face-to-face
3. Describe how to use rigging
   - Under direction of operator
4. Determine estimated weights to be moved or lifted
5. Perform coordinated integrated lifting or moving operations utilizing heavy equipment

Discussion Questions

1. Where can you find the weight of a commercial vehicle?
2. What heavy equipment is available in your AHJ?
3. Who determines the appropriate rigging?

Application

1. Students will practice this skill at at least one skill station and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 3-4

Unit 5: Access and Egress

Topic 5-1: Determining Vehicle Access and Egress Points

Terminal Learning Objective

At the end of this topic a student, given structural and damage characteristics and potential victim location(s), will be able to determine heavy vehicle access and egress points, so that the victim location(s) is identified; access and egress points for victims, rescuers, and equipment are designated; flows of personnel, victims, and equipment are identified; existing entry points are used; time constraints are factored; selected entry and egress points do not compromise vehicle stability; chosen points can be protected; equipment and victim stabilization are initiated; and AHJ safety and emergency procedures are enforced.

Enabling Learning Objectives

1. Describe heavy vehicle anatomy and construction features
    - Seven sides (top, bottom, four sides, inside)
    - Frame construction
        - Unibody
        - Solid frame
    - Suspension
    - Doors
    - Roof
    - Pillars/posts
    - Glass
    - Restraint systems
    - Trailers
    - Drums
2. Identify access, egress, and purchase points
    - Primary – existing (doors, windows, emergency exits)
    - Secondary – created (cutting)
3. Identify routes and associated hazards
    - Routes
        - Primary
        - Secondary
    - Hazards
        - Broken glass
        - Sharp objects
        - Leaking contaminates
        - Victim protection
        - Vehicle height (fall risks)
4. Describe AHJ standard operating procedure
5. Describe emergency evacuation and safety signals
    - Determined by AHJ
6. Identify access and egress points and probable victim locations

7. Assess and evaluate impact of vehicle stability on the victim

Discussion Questions

1. What are some non-cutting access and egress points on a heavy vehicle?
2. What emergency and evacuation signals do you use in your agency?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-7

Topic 5-2: Creating Access and Egress Openings for Rescue

Terminal Learning Objective

At the end of this topic a student, given a technician-level heavy vehicle incident or simulation, a heavy vehicle tool kit, specialized tools and equipment, PPE, and an assignment, will be able to create access and egress openings for rescue from a heavy vehicle resting on its wheels, roof, side, or in a configuration or environment where multiple concurrent hazards must be managed to access or remove the occupants, so that the movement of rescuers and equipment complements victim care and removal, an emergency escape route is provided, the technique chosen is expedient, victim and rescuer protection is afforded, and vehicle stability is maintained.

Enabling Learning Objectives

1. Describe access and egress equipment
    - Electrical
    - Mechanical
    - Hydraulic
    - Pneumatic
    - Alternative
    - Ladders
2. Describe techniques and hazards
    - "Try before you pry" (least invasive to most invasive)
    - Door access
        - Hinge side
        - Latch side
        - Full removal
        - Third door conversion (semi sleeper compartment)
    - Dash displacement
        - Lift
        - Roll
    - Glass removal
        - Side windows
        - Rear window
        - Windshield
        - Sunroof/moonroof
    - Sidewall removal (B post blow out)
    - Roof access
        - Flap
        - Removal
    - Rear access
        - Tunneling
    - Seat displacement
    - Pedal displacement
    - Floor pan displacement

3. Describe AHJ policies and procedures
4. Select and operate tools and equipment
5. Apply tactics and strategy based on assignment
6. Perform hazard control based on techniques selected
7. Demonstrate safety procedures and emergency evacuation signals

Discussion Questions

1. How would you prioritize selecting access and egress points?
2. What tools does your AHJ use to create access and egress?
3. In what situations would you use a third door conversion?
4. How do you prioritize access and egress points on a vehicle resting on its roof?
5. How do you prioritize access and egress points on a vehicle resting on its side?
6. What technique is most often used to create access and egress points for a vehicle resting on its roof or side?
7. In a multi-vehicle configuration, how do you prioritize where to create access and egress points?
8. What hazards can be created while making access and egress points?

Application

1. Students will practice this skill at multiple skill stations and must perform once for each of the following techniques—removing glass, removing a door, removing a roof, displacing a dash (lift), and displacing a dash (roll)—on at least one vehicle placement or configuration.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-8 / CTS 2-9 / CTS 3-5

Unit 6: Victim Rescue

Topic 6-1: Disentangling Victims

Terminal Learning Objective

At the end of this topic a student, given a heavy vehicle extrication incident, a vehicle tool kit, PPE, and specialized equipment, will be able to disentangle victim(s) from a heavy vehicle that has come to rest on its wheels, roof, side, or in a configuration or environment where multiple concurrent hazards must be managed to access or remove the occupants, so that undue victim injury is prevented; victim protection is provided; and stabilization is maintained.

Enabling Learning Objectives

1. Describe tool selection and application
   - Cutting tools
   - Spreading tools
   - Lifting tools
2. Describe stabilization systems
   - As indicated by county (LEMSA) EMS policies and procedures
3. Describe protection methods
   - Eye protection
   - Respiratory protection
   - Exposure protection
   - Debris protection
4. Describe disentanglement points and techniques
   - Structural components (pedals, dash, steering wheel, etc.)
   - Safety systems (seat belts, air bag, etc.)
   - Foreign objects (trees, signposts, etc.)
   - Cargo (boxes, tools, ammunition, etc.)
5. Describe disentanglement dynamics
   - Basic laws of physics
   - Change in victim condition
6. Operate disentanglement tools
7. Initiate protective measures
8. Identify and eliminate points of entrapment
9. Maintain incident stability and scene safety

Discussion Questions

1. What victim stabilization systems does your agency use?
2. What type of victim protection equipment does your agency use?
3. What are common entanglement points that may trap victims?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-10 / CTS 3-6

Topic 6-2: Removing a Packaged Victim to a Designated Safe Area

Terminal Learning Objective

At the end of this topic a student, given a victim transfer device, a designated egress route, and PPE, will be able to remove a packaged victim to a designated safe area, as a member of a team from a heavy vehicle that has come to rest on its wheels, roof, side, or in a configuration or environment where multiple concurrent hazards must be managed to access or remove the occupants, so that the team effort is coordinated, the designated egress route is used, the victim is removed without compromising victim packaging, undue injury is prevented, compartment syndrome due to crush injuries is managed, and stabilization is maintained.

Enabling Learning Objectives

1. Describe patient handling techniques
   - As indicated by county (LEMSA) EMS policies and procedures
   - Goal is patient outcome, not vehicle outcome
   - Goal is to minimize harm to victim
2. Describe the incident management system
   - As it relates to disentangling and removing victims
3. Describe types of immobilization, packaging, and transfer devices
   - Qualified medical personnel to address before victim removal
   - As indicated by county (LEMSA) EMS policies and procedures
4. Describe types of immobilization techniques
   - Qualified medical personnel to address before victim removal
   - As indicated by county (LEMSA) EMS policies and procedures
5. Identify signs and symptoms of compartment syndrome
   - Qualified medical personnel to address before victim removal
   - In accordance with (LEMSA) EMS policies and procedures
6. Describe how to use immobilization devices
7. Identify victim decontamination needs prior to transport
8. Use immobilization, packaging, and transfer devices for specific situations
9. Use immobilization techniques
10. Apply medical protocols and safety features to immobilize, package, and transfer
11. Use all techniques for lifting the patient

Discussion Questions

1. What tools and equipment does your agency use to immobilize patients?
2. What rescuer actions could contribute to victim injuries?
3. Who is responsible for determining how a patient is handled, packaged, and transported?
4. Who is responsible for patient decontamination?

Application

1. Students will practice this skill at multiple skill stations and must perform it once for evaluation.

Instructor Notes

1. None

CTS Guide Reference: CTS 2-11 / CTS 3-7

Unit 7: Incident Termination

Topic 7-1: Terminating a Vehicle Incident

Terminal Learning Objective

At the end of this topic a student, given PPE specific to the incident, isolation barriers, and an extrication tool kit, will be able to terminate a heavy vehicle incident so that rescuers and bystanders are protected during termination operations; the party responsible for the operation, maintenance, or removal of the affected vehicle is notified of any modification or damage created during the extrication process; scene control is transferred to a responsible party; potential or existing hazards are communicated to that responsible party; and command is terminated.

Enabling Learning Objectives

1. Describe PPE characteristics
   - PPE requirements change in IDLH vs non-IDLH
   - Decontamination requirements
2. Identify hazards and risks
   - Reevaluate mitigated and ongoing hazards
   - Complacency
   - Normalized deviance
   - Fatigue
3. Describe isolation techniques
4. Identify statutory requirements identifying responsible parties
   - Determined by AHJ
5. Describe how to use accountability systems
   - PAR – personnel accountability report
6. Describe reporting methods
   - Determined by AHJ
7. Describe post incident analysis techniques
   - Determined by AHJ
   - Critical incident stress debriefing
8. Select and use hazard-specific PPE
9. Decontaminate PPE
10. Use barrier protection techniques
11. Collect data and *implement* record keeping/reporting protocols
12. *Conduct* post incident analysis activities

Discussion Questions

1. What hazards and risks can be present during incident termination?
2. Who are some common responsible parties for the operation, maintenance, or removal of the affected vehicle?
3. What critical incident stress management resources are available to you?

Application

1. Students will practice this skill at at least one skill station and must describe it once for evaluation.

Instructor Notes

1. The psychomotor components of this lesson plan are not practiced in this class. Students will participate in cleaning up the drill ground but will not actually terminate an incident.

CTS Guide Reference: CTS 3-12

Skill Station Recommendations

Safety / Engine

- PPE selection / donning
- Scene size up
    - Incident Action Plan (IAP)
    - Resources
- Scene safety
    - Zones
    - Traffic
    - Hazards / hazardous materials
- Apparatus
    - Spotting / warning devices (cones, flares, etc.)
- Extinguishment
    - Minimum 1½" hose line
    - Dry chemical
    - Other water source

Stabilization

- Vehicle position
    - Wheel resting
    - Side resting
    - Roof resting
    - Other
- Vehicle disabling
    - In park, keys/fob removed, brake set, in gear, etc.
- Wheel chocks
- Cribbing
- Jacks
- Anchoring
    - Chains, level, slings, bindings
- Lifting

EMS/Victim Rescue

- Mechanism of injury
- Triage
- Victim/patient safety during extrication
- Spinal precautions
- Victim/patient packaging
- Extricate/transfer
- Advanced EMS skills
- Documentation

Extrication/Disentanglement

- Assess / egress
- Glass management
- Door removal
    - Hinge side
    - Latch side
    - Sidewall
    - Third-door conversion (optional)
    - Sliding door (optional)
- Roof
    - Roof removal
    - Roof flap
- Dash displacement
    - Lift
    - Roll
- Alternative extrication techniques
    - Truck tunneling (optional)
    - Floor pan drop (optional)
    - Seat displacement (optional)
    - Pedal displacement (optional)

Incident Termination

- Post incident analysis
- Decontamination
- Notifications
- Documentation
- Tool and equipment rehabilitation

Tool Lab

- Hydraulic/E-draulic
    - Power unit/batteries
    - Spreaders
    - Cutters
    - Rams
    - Combi tool
    - Accessories
- Hand/Power tools
    - Striking, prying, pulling, cutting
        - Engine / Truck company / AHJ compliment
    - Other AHJ tools
    - Pneumatics
        - Air bags
        - Air chisel (optional)

How to Read a Course Plan

A course plan identifies the details, logistics, resources, and training and education content for an individual course. Whenever possible, course content is directly tied to a national or state standard. SFT uses the course plan as the training and education standard for an individual course. Individuals at fire agencies, academies, and community colleges use course plans to obtain their institution's consent to offer course and provide credit for their completion. Instructors use course plans to develop syllabi and lesson plans for course delivery.

Course Details
The Course Details segment identifies the logistical information required for planning, scheduling, and delivering a course.

Required Resources
The Required Resources segment identifies the resources, equipment, facilities, and personnel required to deliver the course.

Unit
Each Unit represents a collection of aligned topics. Unit 1 is the same for all SFT courses. An instructor is not required to repeat Unit 1 when teaching multiple courses within a single instructional period or academy.

Topics
Each Topic documents a single Terminal Learning Objective and the instructional activities that support it.

Terminal Learning Objective
A Terminal Learning Objective (TLO) states the instructor's expectations of student performance at the end of a specific lesson or unit. Each TLO includes a task (what the student must be able to do), a condition (the setting and supplies needed), and a standard (how well or to whose specifications the task must be performed). TLOs target the performance required when students are evaluated, not what they will do as part of the course.

Enabling Learning Objectives
The Enabling Learning Objectives (ELO) specify a detailed sequence of student activities that make up the instructional content of a lesson plan. ELOs cover the cognitive, affective, and psychomotor skills students must master to complete the TLO.

Discussion Questions
The Discussion Questions are designed to guide students into a topic or to enhance their understanding of a topic. Instructors may add to or adjust the questions to suit their students.

Application
The Application segment documents experiences that enable students to apply lecture content through cognitive and psychomotor activities, skills exercises, and formative testing. Application experiences included in the course plan are required. Instructors may add additional application experiences to suit their student population if time permits.

Instructor Notes
The Instructor Notes segment documents suggestions and resources to enhance an instructor's ability to teach a specific topic.

CTS Guide Reference
The CTS Guide Reference segment documents the standard(s) from the corresponding Certification Training Standard Guide upon which each topic within the course is based. This segment is eliminated if the course is not based on a standard.

Skill Sheet
The Skill Sheet segment documents the skill sheet that tests the content contained within the topic. This segment is eliminated if the course does not have skill sheets.