Chapter 63
Vehicle Rescue and Rescue Awareness Operations

Learning Objectives

- Define the term rescue
- Explain the medical and mechanical aspects of rescue situations
- Explain the role of the paramedic in delivering care at the rescue site and continuing through the rescue process to definitive care

Learning Objectives (Cont'd)

- Describe three levels of skills for responders to a technical rescue incident and how they differ
- Describe in order priorities for safety in any rescue
- Describe phases of the rescue operation
Learning Objectives (Cont’d)

• List three capabilities that situational awareness gives the emergency responder
• List and describe types of personal protective equipment needed to operate safely in a rescue environment, including head protection, eye protection, hand protection, personal flotation devices, thermal protection and layering systems, high-visibility clothing, and specialized footwear

Learning Objectives (Cont’d)

• Integrate principles of rescue awareness and operations to rescue patients from highway incidents
• Have a working knowledge of various technological improvements found on vehicles today that can affect emergency medical, safety, extrication, and rescue operations at motor vehicle incidents

Learning Objectives (Cont’d)

• Explain supplemental restraint, airbag systems, and methods to neutralize them
• Describe the necessary practices and procedures to resolve concerns presented by a hybrid gasoline, electric vehicle involved in a fire, crash, or extrication incident
Learning Objectives (Cont’d)

- List and describe major categories of safety hazards related to EMS personnel working at vehicle crash, fire, and rescue incidents
- Describe electrical hazards (above and below ground) commonly found at highway incidents

Learning Objectives (Cont’d)

- List four phases of rescue for dealing with entrapment or extrication at a crash scene and describe individual extrication tasks that comprise each phase of the process
- Explain typical door anatomy and methods to access stuck doors

Learning Objectives (Cont’d)

- Develop specific skills in the emergency stabilization of vehicles, access procedures, and awareness of specific extrication strategies
- Explain assessment procedures and modifications necessary when caring for entrapped patients
Learning Objectives (Cont'd)
- Explain the differences in risk between moving water and flat water rescue
- Given a picture of moving water, identify and explain features and hazards associated with hydraulics, strainers, dams, and hydroelectric sites

Learning Objectives (Cont'd)
- Explain the effects of immersion hypothermia on the ability to survive sudden immersion, and self-rescue
- Explain the phenomenon of cold protective response in cold water drowning situations
- Given a list of rescue scenarios, identify the victim survivability profile and differentiate rescue from body recovery situations

Learning Objectives (Cont'd)
- Explain specific methods for the assessment of spinal stabilization
- Explain why water entry techniques are methods of last resort
- Explain rescue techniques associated with “talk, reach, throw, row”
Learning Objectives (Cont’d)

• Explain the self-rescue position if unexpectedly immersed in moving water
• Given a series of pictures, identify which would be considered confined spaces, potentially oxygen deficient

Learning Objectives (Cont’d)

• Identify hazards associated with confined spaces and risks posed to potential rescuers, including oxygen deficiency, chemical/toxic exposure/explosion, engulfment, machinery entrapment, and electricity

Learning Objectives (Cont’d)

• Identify poisonous gases commonly found in confined spaces, including hydrogen sulfide, carbon dioxide, carbon monoxide, low and high oxygen concentrations, methane, ammonia, and nitrogen dioxide
• Identify the components necessary to ensure site safety before confined space rescue attempts
Learning Objectives (Cont'd)

- Explain the hazard of cave-in during trench rescue operations
- Define low angle, high angle, belay, rappel, and scrambling
- Explain different types of rescue litters and the advantages and disadvantages associated with each

Learning Objectives (Cont'd)

- Describe the procedure for basket litter packaging for low-angle evacuations
- Develop proficiency in patient packaging and evacuation techniques that pertain to hazardous and rescue environments

Learning Objectives (Cont'd)

- Explain procedures for low-angle litter evacuation, including anchoring, litter and rope attachment, and lowering and raising procedures
- Explain nontechnical high-angle rescue procedures with an aerial apparatus
Role of Paramedic in Rescue Operations

- Rescue
  - Act of delivery from danger or entrapment
  - Locating endangered persons
  - Remove from danger
  - Treat injured
  - Transport

Role of Paramedic in Rescue Operations (Cont’d)

- Medical and technical skills of rescue
  - Medical care and rescue simultaneous actions
    - Rescuers and medical providers corroborate
    - Access and assess the patient
    - Assessment and treatment begin at accident site
    - Patient released from entrapment
    - Medical care continues throughout incident

Role of Paramedic in Rescue Operations (Cont’d)

- Medical and technical skills of rescue
  - Paramedic must have awareness of rescue situation
    - Understanding of hazards
    - Know when attempting rescue is unsafe
    - Have skills to carry out rescue when safe
    - Understand rescue process
Skill Levels for Rescuers

- Awareness
  - Minimum capability for responder who could be first on scene
  - Remains in safe zone
  - Rescuers bring patient to provider

Skill Levels for Rescuers (Cont’d)

- Operations
  - Hazard recognition capability
  - Equipment use
  - Techniques necessary to support and participate in rescue

Skill Levels for Rescuers (Cont’d)

- Technician
  - Hazard recognition capability
  - Equipment use
  - Techniques necessary to coordinate, perform, and supervise rescue
  - Search, rescue, recovery
Safety in Rescue Operations

- Priorities for safety in rescue
  - Personal safety
  - Safety for rescue team
  - Safety for bystanders, other uninvolved persons
  - Safety of rescue patient

Phases of Rescue Operation

- Arrival and scene size-up
  - Command and scene assessment
    - If first at scene, establish incident command system
    - Establish immediate priorities
    - Safety needs for incoming responders and patient

Phases of Rescue Operation (Cont'd)

- Arrival and scene size-up
  - Number of patients and triage
    - If multiple patients, begin triage
    - If single patient, assess medical needs, establish priorities
  - Search and rescue versus body recovery
    - If location of patient is unknown, begin search
    - If dead, urgency diminishes
Phases of Rescue Operation (Cont'd)

- Arrival and scene size-up
  - Risk versus benefit analysis
  - Potential rescue strategy is worth potential dangers
  - Additional resources
    - Determine if needed
    - Delays can be detrimental

- Command and control
  - Incident command system
  - Establish immediate priorities
  - Establish safe zones
  - Incident action plan
  - Time to access and evacuate
    - Progress report provided to IC

- Hazard control
  - First arriving identifies hazards to make scene safe
  - Situational awareness
    - Emergency responder’s ability to:
      - Maintain accurate perception of the external environment
      - Identify source and nature of problems
      - Detect situation requiring action
Phases of Rescue Operation (Cont’d)

- Hazard control
  - Situational awareness
    - Factors that diminish situational awareness
      - Insufficient communication
      - Fatigue and stress
      - Task overload
      - Task underload and boredom
      - Group mindset
      - Philosophy of “press on, regardless”
      - Degraded operating conditions
      - Rapidly changing and unplanned operational conditions

Phases of Rescue Operation (Cont’d)

- Hazard control
  - Situational awareness
    - Ways to prevent loss of situational awareness
      - Actively question and evaluate progress of mission
      - Analyze your own individual situation
      - Update and revise your image of the mission
      - Use assertive behavior when necessary

Phases of Rescue Operation (Cont’d)

- Gaining access to patient
  - Determine best way to access the patient
  - Stabilization
    - Medical stabilization and monitoring patient
    - Physically stabilizing in litter
    - Continues during transport
Phases of Rescue Operation (Cont’d)

- Medical treatment
  - Starts at first contact through definitive care
  - Perform rapid assessment
  - Identify and manage life threats
  - Airway management, oxygenation
  - Spinal stabilization
  - IV fluid therapy
  - Longer rescue: temperature control, nutrition, elimination

Phases of Rescue Operation (Cont’d)

- Disentanglement
  - Releasing patient from physical entrapment
  - Driven by patient’s needs
  - Take into account both rescuer and patient safety

Phases of Rescue Operation (Cont’d)

- Patient packaging
  - Preparing patient for transport
  - Secure to prevent further injury
- Transportation and evacuation
  - Nature of transport planned before securing patient
  - Decide if procedures performed before or during transport
Rescuer Personal Protective Equipment

- Personal protection from blood-borne pathogens
- Helmets
  - No standards
  - Helmets for high-angle rescue
  - Helmets for water rescue

Rescuer Personal Protective Equipment (Cont’d)

- Eye protection
  - Falling and flying debris
  - Dust and metal particles
  - Smoke and noxious gases, chemicals, and blood-borne pathogens
  - Ordinary prescription glasses do not provide enough protection
- Hearing protection
  - Earplugs, earmuffs

Rescuer Personal Protective Equipment (Cont’d)

- Hand protection
  - Examination gloves
  - Work gloves
  - Cleaning gloves
- Foot protection
  - Hiking boots
  - Ankle support
Rescuer Personal Protective Equipment (Cont’d)

- Clothing
  - Must provide:
    - Protection from blood and body fluids
    - Resistance to chemicals commonly found at scenes
    - Resistance to wind chill
    - Resistance to rain
    - High visibility
    - Resistance to tearing and cutting
    - Ability to wick sweat away from skin

Rescuer Personal Protective Equipment (Cont’d)

- Clothing
  - Fire and flight operations
  - Highway operations
  - Cold weather
- Personal flotation devices
  - Meets Coast Guard standards for flotation
  - Type III preferred

Vehicle Crash Rescue and Extrication

- Airbags
  - Frontal
  - Side impact
  - Knee bags
  - Undeployed airbag hazard
    - Accidental deployment has already happened
    - Can occur even if power is disconnected
Vehicle Crash Rescue and Extrication (Cont'd)

- Emergency procedures for airbag-equipped vehicles
  - Loaded airbag
Vehicle Crash Rescue and Extrication (Cont'd)

- Vehicle crash procedures
  - Electrical system shutdown
    - First unlock electrical locks, roll down electric windows
    - Move electrically powered seats as necessary
    - Unlock, release hood, trunk, hatchback or tailgate latch
    - Move gear selector to park position and turn ignition off
    - Remove key, place on dashboard above steering column
    - Cut battery cables, negative first
Vehicle Crash Rescue and Extrication (Cont'd)

- Vehicle crash procedures
  - Scanning for airbags
  - Determining status of every airbag
  - Maintain 10 × 18 × 5-inch inflation zone

Vehicle Crash Rescue and Extrication (Cont'd)

extrication with undeployed airbags present

- Avoid:
  - Unintentionally powering electrical firing circuit
  - Causing propellant to react by mechanical force, exposure to heat, spark, static electricity
  - Puncturing or cutting into high-pressure cylinder of stored gas airbag system
  - Placing yourself or the patient, equipment within 10 × 18 × 5-inch inflation zone
  - Strip before cutting
Gasoline and electric hybrid vehicles
- Hybrid vehicle has two electrical systems: standard 12-volt and high-voltage system
- Contain 500 volts DC current
  - Coded with orange color
Vehicle Crash Rescue and Extrication (Cont’d)

- Gasoline and electric hybrid vehicles
  - Crash procedures
    - Identify hybrid vehicle
    - Stabilize vehicle
    - Gain access to passenger compartment
    - Shift gear selector lever to park
    - Turn off ignition and place key on dashboard
    - Verify that dash light indicating energized hybrid system goes out
    - Shut down vehicle’s 12-volt electrical system at battery

- Emergency procedures at fire incident
  - Normal firefighting procedures
  - Fire originating in battery pack or wiring has high-voltage concerns
  - Melted batteries

- Emergency procedures at a crash incident
  - Stabilize vehicle
  - Consider lock/out/tag our procedure
Vehicle Crash Rescue and Extrication (Cont'd)

- EMS responder safety at vehicle crash scenes
  - Environmental hazards
  - Incident scene hazards
  - Vehicle hazards

- Safety while working in or near moving traffic
  - Emergency workers killed every year
  - Prompt traffic control necessary
  - Use vehicle as initial traffic control
  - “Safe parking” or “blocking”
  - Place vehicle upstream at angle to traffic
  - Right or left block
  - High visibility marking in vehicles
  - Obstructed lane > 1
  - Wear high visibility vest or jacket
Vehicle Crash Rescue and Extrication (Cont'd)

- EMS responder safety at vehicle crash scenes
  - Establishing the hot zone
  - Highest risk closest to crashed vehicles
  - No fuel, fire spill: 50 feet in all directions
  - Fire: 100 feet in all directions
  - Hazmat: 2000 feet to start
  - Wires down: one intact pole beyond damaged pole

- Need for standby protection
- Vehicle fluid leaks and spills

- Vehicles on fire
  - Serious safety threat
  - Large amount of gasoline/diesel
  - Alternative fuels
  - Magnesium in vehicle parts
Vehicle Crash Rescue and Extrication (Cont'd)

- Vehicles on fire
  - Wires down at crash scene
  - Energy can travel through ground
  - 19,900 volts common in resident area
  - Amperage is flowing through object
  - Establish hot zone
  - Ensure deenergized before entering
  - "Duck walk" while approaching scene
  - Even though wires appear dead, can be energized

Vehicle Crash Rescue and Extrication (Cont'd)

- Phase 1
  - Activities of initial responders
  - Set stage for incident
    - Arrival and safe parking
    - Scene size-up
    - Establish command
    - Scene/vehicle stabilization
    - Airbag scanning
    - Electrical system shutdown
    - Hazard control
    - Initial patient access opening

Vehicle Crash Rescue and Extrication (Cont'd)
Vehicle Crash Rescue and Extrication (Cont'd)

- **Phase 2**
  - Disentanglement phase
  - All tasks necessary to open doors and sidewalls of vehicle

Vehicle Crash Rescue and Extrication (Cont'd)

- **Phase 3**
  - Remove roof
  - Provides greatest access to patient

Vehicle Crash Rescue and Extrication (Cont'd)

- **Phase 4**
  - Movement of dashboard, instrument panel, firewall structure
Surface Water Rescue

- Moving water, common hazards
  - Drowning machines
    - Hydraulic
      - Caused by water moving over uniform obstruction to flow
    - Low-head dams
    - Rivers and streams
    - Backflow trap objects and people
    - Fatigue and hypothermia

Surface Water Rescue (Cont’d)

- Moving water, common hazards
  - Strainers
    - Formed by object or structure in current that allows water to flow but strains out large objects
    - Trees, fences, grates, dam intakes
    - Current holds them against strainer
  - Foot or extremity pin
    - Only way to rescue is upstream
    - Extremity caught, loosened the way it was caught
    - Never wade in streams deeper than mid-tibia

Surface Water Rescue (Cont’d)

- Moving water, common hazards
  - Dams and hydroelectric intakes
    - Upstream side of dam
      - Sucked into intake or spillway
      - Invisible from water level
    - Downstream side of dam
      - Bottom of spillway can cause hydraulics
  - Flat water (slow-moving or still water)
    - Use PFDs when and around water
    - Alcohol use in 25–50% of drownings
Surface Water Rescue (Cont’d)

- Water temperature and drowning
  - Any water <98°F causes hypothermia
  - Water causes heat loss 25 times faster than air
  - Cold protective response
    - Mechanisms by which individuals can survive extended periods of submersion
      - “Metabolic icebox”
    - Protective physiological response

- Cold protective response
  - Survivability factors
    - Age
    - Submersion length of time
    - Presence of trauma
    - Contaminants inhaled from water
    - Posture in water
    - Physical condition

- Survivability
  - Unless physical signs of death, hypothermic victim is considered salvageable
  - Must be rewarmed and assessment made before death is confirmed
  - Follow protocol
Surface Water Rescue (Cont’d)

- **Water temperature and drowning**
  - Cold water survival
    - Heat escape lessening position
      - Knees flexed, drawn toward chest
      - Arms pressed firmly against sides of chest

Surface Water Rescue (Cont’d)

- **Moving water rescue training**
  - In-water spinal stabilization
    - Head splint technique
      - Approach victim from side
      - Move victim’s arms over head
      - Hold victim’s head in place by using victim’s arms as splint
      - If face down, rotate victim toward rescuer to face-up position
      - Ensure open airway
      - Maintain position until cervical collar is applied

Surface Water Rescue (Cont’d)

- **Moving water rescue training**
  - In-water spinal stabilization
    - Cervical collar application
      - Second rescuer determines collar size
      - Second rescuer holds open collar under victim’s neck
      - Primary rescuer maintains immobilization and patient airway
      - Second rescuer brings collar to back of neck; primary rescuer allows second rescuer to bring collar around neck and throat while second rescuer maintains airway
      - Second rescuer secures fastener on collar
      - Second rescuer secures victim’s hands at waist
Surface Water Rescue (Cont’d)

- Moving water rescue training
  - In-water spinal stabilization
    - Backboards and victims extrication
      - Submerge board under victim at his or her waist
      - Never lift victim to board; allow board to float up to victim
      - Secure victim with straps, cravats, other devices
      - Move victim to extrication point at shore or boat
      - Always extricate victim head first
      - Avoid extrication through surf to prevent capsizing
      - Maintain airway management during extrication

Surface Water Rescue (Cont’d)

- Overview of water rescue techniques
  - Basic principles of water rescue
    - Never underestimate power of moving water
    - Do not enter without highly specialized training and equipment
    - Priorities are always self-rescue first, fellow rescuers second, victim last
    - All rescuers must wear PFDs

Surface Water Rescue (Cont’d)

- Overview of water rescue techniques
  - Basic water rescue model
    - Talk
    - Reach
    - Throw
    - Row
Surface Water Rescue (Cont’d)

- Overview of water rescue techniques
  - Rescue safety equipment
    - Properly fitting PFD
    - Helmet for head protection
    - Knife for entanglement protection
    - Whistle for location
    - Thermal protection

Surface Water Rescue (Cont’d)

- Overview of water rescue techniques
  - Victim safety equipment
    - Flotation for victim
    - Immobilization equipment
    - Extrication equipment
    - Thermal protection equipment
    - Resuscitation equipment
    - Transportation equipment

Surface Water Rescue (Cont’d)

- Self-rescue
  - Cover your mouth and nose during entry
  - Protect your head and keep face out of water
  - If in flat water, assume HELP position
  - If moving water, do not attempt to stand up
  - Float on back with feet downstream and head pointed toward nearest shore at 45° angle
Hazardous Atmospheres

- **O₂-deficient environments and confined spaces**
  - Confined spaces requirements
    - Large enough and configured so that body can enter and perform work
    - Has limited or restricted means for entry or exit
    - Not designed for continuous employee occupancy

Hazardous Atmospheres (Cont’d)

- **O₂-deficient environments and confined spaces**
  - Permit-required confined space
    - Contains or has potential to contain hazardous atmosphere
    - Contains material with potential for engulfing entrant
    - Has internal configuration so entrant could be trapped or asphyxiated by inwardly converging walls or floor that slopes
    - Contains other recognized serious safety or health hazards

Hazardous Atmospheres (Cont’d)

- **Confined space hazards**
  - Hazardous atmospheres
  - Poisonous gases
  - Fire and explosion
  - Engulfment
Hazardous Atmospheres (Cont’d)

- Confined space hazards
  - Machinery entrapment
  - Electricity
  - Structural hazards
  - Fall hazards

Hazardous Atmospheres (Cont’d)

- Emergencies in confined spaces
  - Steps for safe entry into confined space
    - Environmental monitoring
    - Atmospheric monitoring
    - Lock out/tag out for all power
    - Rescuer lowering and retrieval system in place

Hazardous Atmospheres (Cont’d)

- First actions for arriving EMS personnel
  - Establish safe perimeter
  - Restrict any additional entry to space
  - Assist attempting remote retrieval
  - Determine type of work being done when accident happened
  - Determine number of workers inside
  - Ensure area for workers to put on PPE is safe
  - Ensure retrieval devices in place
Hazardous Atmospheres (Cont’d)

- Roles and responsibilities of the first responder
  - Hazards
    - Contaminants
    - Determine type, extent, possible problems created

Rescue from Trenches and Cave-ins

- Causes of trench cave-in, collapse
  - Lip of or sides cave in
  - Wall shears away & falls in
  - Spoil pile too close to edge, causing collapse

Rescue from Trenches and Cave-ins (Cont’d)

- Causes of trench cave-in, collapse
  - Factors
    - Previously disturbed soil
    - Intersecting trenches
    - Ground vibrations from trucks or machinery
    - Dirt pile too close to edge of trench
    - Water seepage
Rescue from Trenches and Cave-ins (Cont’d)

- Initial response
  - Secondary collapse likely
  - Secure scene
  - Initiate command
  - Secure perimeter
  - Only qualified personnel within perimeter

Rescue from Trenches and Cave-ins (Cont’d)

- Medical consideration in trench rescue
  - Crush injury
  - Hypothermia
    - Warm IVs
    - Warm air ventilation fans

Hazardous Terrain

- Steep slope, low-angle terrain
  - Rescue in low-angle environment
- High-angle/vertical terrain
- Flat terrain with obstructions
Hazardous Terrain (Cont’d)

- Patient access in hazardous terrain
  - Belaying
  - Rappelling
  - High-angle litter evacuation

Hazardous Terrain (Cont’d)

- Patient packaging
  - Basket litters
    - Standard stretcher for hazardous terrain rescue
    - Metal basket litters
    - Plastic basket litters

Hazardous Terrain (Cont’d)

- Patient packaging
  - Flexible litters
    - Wraps closely around patient
    - Easier to work with in confined spaces
    - Becomes more rigid when conforms around patient
Hazardous Terrain (Cont’d)

- Packaging and securing the patient in litter
  - Packaging:
    - Protect patient from physical and environmental hazards
    - Make patient comfortable
    - Physically stabilize patient to prevent harmful movement
    - Allow access for monitoring
  - Litter patient restraint
    - Manufactured patient restraint system
    - Improvised litter patient tie-in

Hazardous Terrain (Cont’d)

- Packaging and securing the patient in litter
  - Protecting patient:
    - Litter shield
    - Face shield
    - Goggles
    - Helmet
Hazardous Terrain (Cont’d)

- Packaging and securing patient in litter
  - Fluids
    - Pressure infuser bag
    - BP cuff
    - Prevent air embolism
    - J loop or saline lock with fluid boluses
    - Freezing fluids in cold weather
  - Accessibility
    - Package in consideration of monitoring patient

Hazardous Terrain (Cont’d)

- Packaging and securing patient in litter
  - Airway management
    - Can roll in case of vomiting
    - Suction at head of litter
    - Lateral recumbent position with vacuum mattress
  - Padding
    - Areas of tissue pressure
  - Patient restraint for other terrain
    - Prevents patient from sliding

Hazardous Terrain (Cont’d)

- Packaging and securing patient in litter
  - Packaging patient with possible spinal injuries
    - Half-length spinal immobilization devices such as Kendrick extrication device
    - Oregon spine splint
    - Vacuum mattress
Hazardous Terrain (Cont’d)

- Packaging and securing patient in litter
  - Protecting patient from environmental concerns
    - Cold
      - Protect from wind, cold, rain
    - Waterproof and windproof outer layer
    - Maintain access to all sides of patient

Hazardous Terrain (Cont’d)

- Packaging and securing patient in litter
  - Protecting patient in litter
    - Litter underside
      - Protect from protruding objects
      - Pad bottom
      - Pad hollow spaces

Hazardous Terrain (Cont’d)

- Packaging and securing patient in litter
  - Packaging for long bone fracture
    - Rigid splints and protective bandages
    - Sager emergency traction splint
    - Kendrick extrication device
Hazardous Terrain (Cont’d)

- Packaging and securing patient in litter
  - Patient movement
    - Litter slings
    - Little wheels

Hazardous Terrain (Cont’d)

- Low-angle and high-angle evacuation
  - Rope lowering systems
    - Controlled lowering of rescue load
  - Braking systems
    - Devices through which rope is run for controlled lowering of rescue load
    - Brake bar rack
Hazardous Terrain (Cont’d)

- Low-angle and high-angle evacuation
  - Hauling
    - Mechanical advantage hauling system
    - Hauling low-angle evacuation

Hazardous Terrain (Cont’d)

- Belay
- Training and equipment
  - Failure catastrophic, severe injury/death
- Use of an aerial apparatus
  - Tower ladder or bucket trucks
Hazardous Terrain (Cont’d)

- Use of helicopters in hazardous terrain rescue
  - Must have knowledge of potential of helicopters
  - Must have precise location for pilot
  - Ground safety
    - Keep clear of rotors
    - Approach only when directed
    - Buckle and unbuckle seatbelt when directed
    - Wear eye protection
    - Do not throw objects to or from helicopter

Hazardous Terrain (Cont’d)

- Use of helicopters in hazardous terrain rescue
  - Air safety
    - Do not smoke
    - Keep clear of controls
    - Hold loose objects securely while in flight
    - Stay alert for hazards, towers, transmission lines
    - Avoid unnecessary talk with flight crew
    - Keep seat belt and shoulder harness fastened until instructed by pilot to unbuckle

Hazardous Terrain (Cont’d)

- Use of helicopters in hazardous terrain rescue
  - Helicopters maneuvers
    - Hovers
  - Short haul
  - Sling load
  - Hoist rescue
Chapter Summary

- Rescue is patient-driven event
- Rescue must combine technical and medical skills

Chapter Summary (Cont’d)

- Rescue often involves a patient needing medical care
- Three levels of skills needed for responders to technical rescue incident
  - Awareness
  - Operations
  - Technician

Chapter Summary (Cont’d)

- Priorities for safety in any rescue are, in order
  - Personal safety
  - Rescue team safety
  - Safety of bystanders
  - Patient safety
Chapter Summary (Cont’d)

- Phases of a rescue operation
  - Arrive and size up the scene
  - Establish command and conduct scene assessment; determine number of patients and triage if necessary
  - Determine if the situation is search and rescue/body recovery
  - Conduct risk versus benefit analysis
  - Request additional resources
  - Estimate time to access and evacuate

Chapter Summary (Cont’d)

- Phase 1 includes activities with which the responding crew members would initially be involved on arrival: scene safety, vehicle stabilization, patient access, and initial medical care
- Phase 2 is the disentanglement phase in which the sidewall on one side of the vehicle is removed, giving EMS providers maximal room for patient care and sufficient space to package and remove the patient

Chapter Summary (Cont’d)

- Phase 3 activities involve removal of the vehicle roof
- Phase 4 requires movement of the dashboard, instrument panel, and firewall structure of the vehicle away from front seat passengers
- Maintain situational awareness throughout the rescue by being aware of everything happening in the environment
Chapter Summary (Cont’d)

- Patient packaging prepares the patient for transport and involves physically stabilizing the patient to prevent additional injury.
- PPE includes clothing and equipment to protect the wearer from injury and death; it may include helmets, hearing protection, hand protection, foot protection, and protective clothing.

Chapter Summary (Cont’d)

- Downed electrical wire should never be moved by responders.
  - Preferred action is to secure the scene.
  - Communicate with any stranded occupants of the vehicle.
  - Await the arrival of professional utility company personnel.

Chapter Summary (Cont’d)

- Airbags not deployed present responders with obvious safety concerns for both responders and the patient.
Chapter Summary (Cont’d)

- Recommended vehicle crash procedures for hybrid vehicles include:
  - Hybrid vehicle identification
  - Vehicle stabilization
  - Access to passenger compartment
  - Shift gear selector lever, turning ignition off and placing key on the dash
  - Checking dash light indicating energized hybrid vehicle system goes out
  - Shutting down hybrid vehicle’s 12-volt electrical system at the battery

Chapter Summary (Cont’d)

- Because of forces created, moving water is dangerous to individuals and rescuers
  - Hydraulics and strainers create particularly dangerous hazards
  - Water causes heat loss 25 times faster than air; water temperature lower than 98ºF will cause hypothermia

Chapter Summary (Cont’d)

- Cold protective response can result in individuals surviving extended periods of submersion; the patient is never cold and dead—only warm and dead
  - Individuals who accidentally fall into cold water should use basic tactics to survive, including techniques such as HELP and huddle
Chapter Summary (Cont’d)
• Spinal immobilization in water requires special training; only trained water rescue responders should attempt a rescue, including in-water immobilization

Chapter Summary (Cont’d)
• Basic principles of water rescue include: never underestimate the power of moving water, do not enter the water without specialized training and equipment, and always wear PFD
  ➢ Basic rescue model for untrained rescuers is talk, reach, throw, and row
  ➢ Rescuers need PFD, helmet, knife, and thermal protection
  ➢ Victim safety: need flotation along with equipment for immobilization, extrication, and thermal protection

Chapter Summary (Cont’d)
• Confined spaces are particularly dangerous for rescuers; OSHA has defined confined space (permit space)
  ➢ Hazards in confined spaces are atmospheric dangers, fire and explosion, engulfment, electricity, structural hazards, and fall hazards
  ➢ OSHA requires a permit process before the rescuer can enter a confined space
Chapter Summary (Cont’d)

- Among first actions for EMS personnel at a confined space emergency are to
  - Establish a safe perimeter
  - Prevent additional entry to the space
  - Assist in remote retrieval
  - Determine from permit/entry supervisor the type of work being done at the time of the accident

Chapter Summary (Cont’d)

- Trench collapse is one of most dangerous calls for EMS personnel
  - The first steps are to secure the scene, initiate command, and secure the perimeter
- Rescue in hazardous terrain can be challenging and dangerous; it requires specialized training for the individual and the team

Chapter Summary (Cont’d)

- Rescue often involves transporting the patient in a litter; must know which litters are appropriate, how to package and secure the patient, how to protect the patient, and how to arrange medical equipment for use during transport
- Among the skills needed in low-angle/high-angle evacuation are knowledge of placing anchors, rope lowering systems, braking systems, and hauling systems
Chapter Summary (Cont’d)

- In working with helicopters, rescuers must understand helicopter limitations, ground safety, and air safety
  - Helicopter rescue techniques are one-skid landing, hovering, short haul, and sling load

Questions?