

Chapter 11.0

Rescue and Extrication

Rescue and extrication is a common practice at Pendleton Fire Department. Located with the interstate freeway running between the North and South District of Pendleton, motor vehicle accidents and extrication are not an uncommon occurrence. In addition to motor vehicle accidents, Pendleton has many surrounding areas that incorporate the use of heavy machinery, ATVs, and other equipment. Being familiar and competent with the tools used on the rescue unit are crucial for operations in conjunction with emergency medical services care.

This chapter will be broken down into the following sections:

- 11.1** Rescue and Extrication equipment
- 11.2** Rescue and Extrication Techniques
- 11.3** Rescue and Extrication Evolutions



Section 11.1

ALL TOOLS SHOULD BE OPERATED WITH PROPER PPE AND EYE PROTECTION/FACE SHIELDS

Airbags- airbags are used for the lifting of vehicles and equipment/heavy objects in rescue situations. When placing air bags, they should be centered on top of each other, as well as at the object's lift point. It is critical that they are placed as close to center as possible to avoid shifting of the load or having the bags "kick out." If there is any concern about potential damage due to contact with sharp edges, the bags should be protected. The airbags are supplied by an SCBA bottle as shown below and are carried in 3 sizes.



*See the tools chapter for the sequence of events for setting up the airbags for use.

Air Chisel- the air chisel is used for cutting through sheet metal and other thing materials. It has sharp chisel style ends that are placed into the end of the air chisel and used to cut through metal in back and forth motion pneumatically. The air chisel also has a small pneumatic impact wrench that can be used to disassemble car doors, machinery, etc. The air chisel is supplied by an SCBA bottle as shown below.



See the tools chapter for sequence of event for setting up the air chisel. You can also locate the instructions on the inside of the lid of the tool box that stores these tools.

Cribbing-Cribbing is one of the most frequently used and essential tools during rescue operations and is considered to be among the strongest means of support. Gravity is inescapable; thus, cribbing is used to transfer the weight of a load into a “footprint” and provide a simple temporary support during rescue operations. The rescue unit carries many styles including blocks, wedges, and “step chocks” as seen below.



Come-Along-The come-along tool is a portable hand operated ratchet lever winch. It is really 3 tools in one, a winch, a ratchet, and a mechanical advantage.



Hand Tools- From top to bottom in the picture below are the Halligan tool, crow-bar, sledge hammer/maul, pry-axes, Flat head axe, and bolt cutters. These tools are similar to those carried on other fire apparatus and may be used for rescue operations where striking tools, purchase points, or cutting tools are needed.



The tools below from left to right consist of the Glass/Windshield saw that also houses a glass punch in the black handle, and tools boxes with common hand tools such as crescent wrenches, pliers, tin snips, wire cutters, screw drivers, Allen wrench headsets, etc.



Hydraulic Extrication Tools (E-TOOLS)

The electronic hydraulic tools are the forefront of extrication equipment and are carried on the rescue unit at Pendleton Fire. There is also an E-Tool Spreader/Cutter carried on the ambulances at Pendleton Fire for first line extrication when arriving on scene without a rescue unit initially available. These tools require battery check and changes, and should be turned on and operated regularly to check for defects.

The Cutters (parrot beak) - This tool weighs in at around 50lbs and is the primary cutting tools for extrication on the Rescue Unit. It is capable of cutting thick metal and vehicle parts. Always open the jaws of the tool before moving to make the cut.



The Spreaders- Spreaders are used for spreading apart materials and metal, opening doors that cannot be opened without extrication tools, or for lifting a vehicle or object away from the ground (with cribbing ready) when airbags are not suitable or time is a factor. This tool weighs around 44lbs and has a max spreading distance of 28". The maximum spreading force is 147,924 lbs and has a pulling force of 13,039 lbs . Always be sure to fully close the jaws before making a purchase point of inserting the tool into an area for use.



The Ram- The hydraulic ram is used for spreading apart materials, such as performing dash rolls in combination with the o'connell plate. The tool has a maximum spreading distance of 53" and is just under 24" collapsed. The tool weighs around 42lbs.



Porta-Power hydraulic tool- used in smaller spaced to spread materials and operated manually via a hand powered pneumatic pump.



O'Connell Plate-most frequently in vehicle extrication, where they will help make dash rolls quicker and safer. When Heavy Rescue is necessary, the O'Connell Plates are instantly available to anchor systems, pull up to 19,000 Lbs. of concrete or debris (using your hydraulic extrication equipment if necessary).



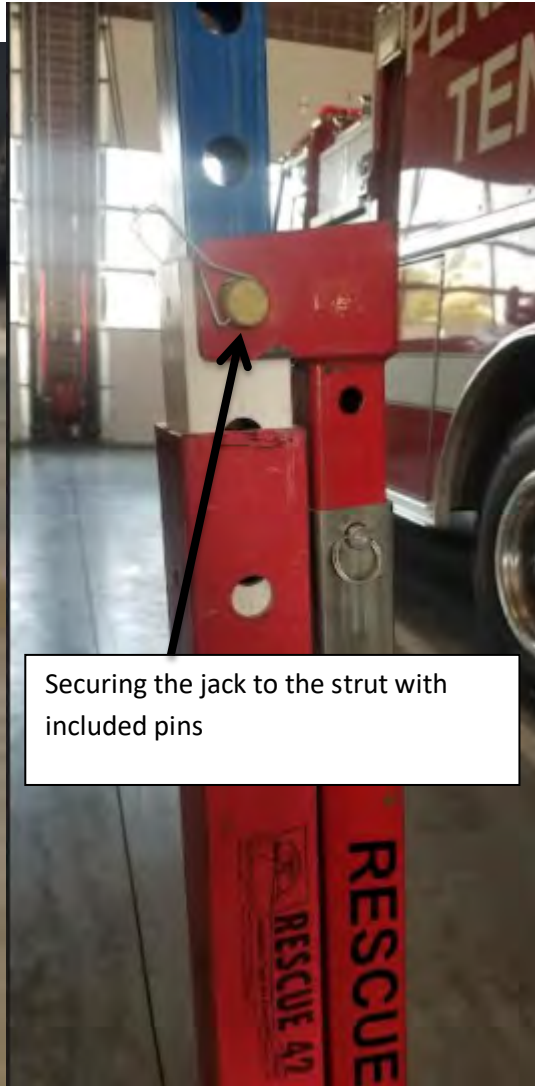
Rescue 42 Strut/Jacks- The rescue 42 struts are used for stabilization of heavy objects such as car on its side. The strut can be used alone along with some accessories such as chains or ratchet straps to secured firmly from the base to the object, as shown in pictures below. The strut is made of a steel body with kevlar infused composite telescoping sections that give a wide range of lengths and uses, and can be broken down and stored easily. The composite material is shown to be 4x as strong as steel. The strut can be paired with a jack as shown below on the right, and can turn the strut into an 8,000lb ram.

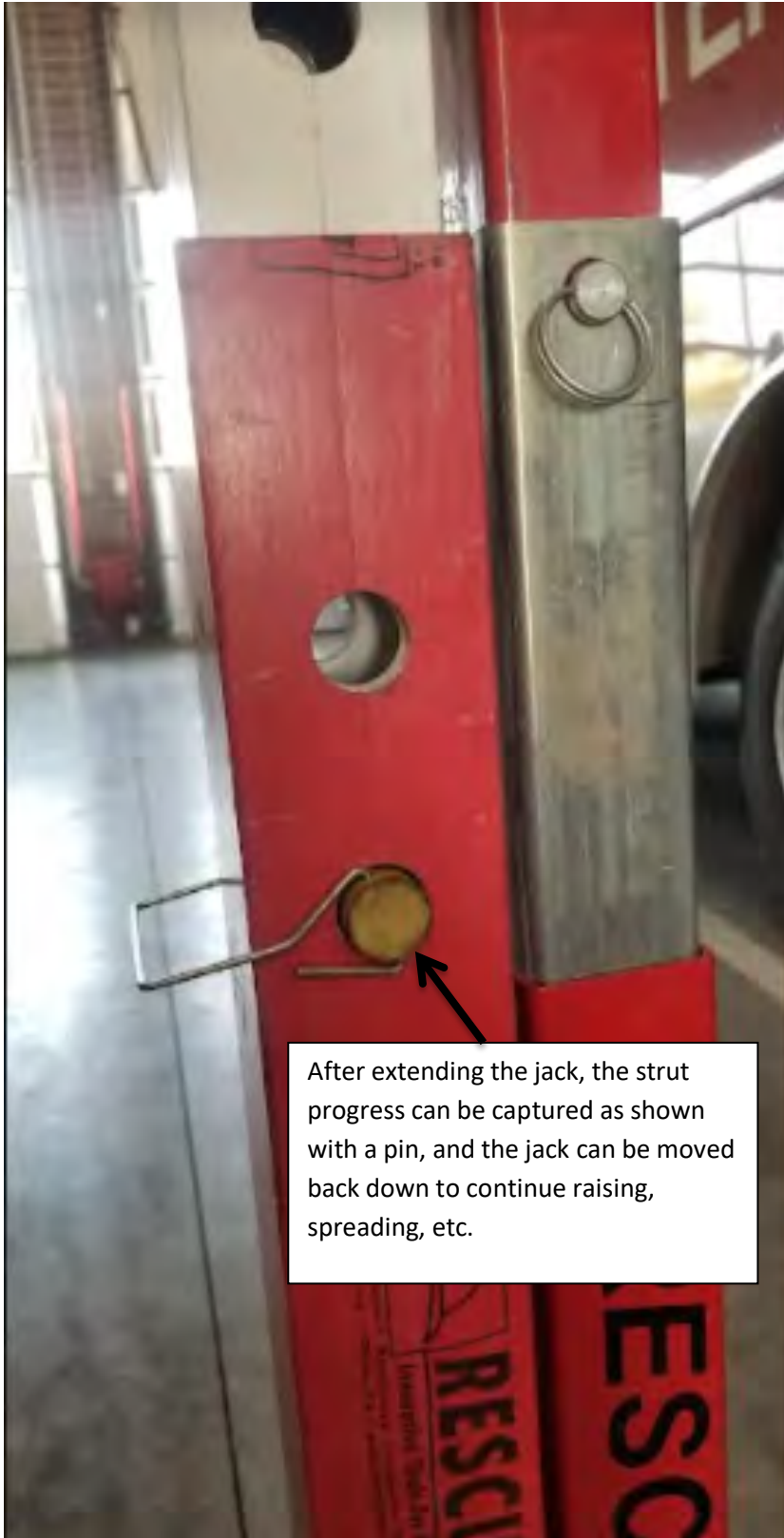


Rescue 42 strut extended with pins placed



Rescue 42 strut with jack attached





After extending the jack, the strut progress can be captured as shown with a pin, and the jack can be moved back down to continue raising, spreading, etc.



Attachments and accessories shown for the Rescue 42 strut/jacks start on top and moving clockwise: Hook assembly, tripod attachments with base chain, heavy chain for lifting/spreading, and ratchet straps for securing the base to an object.

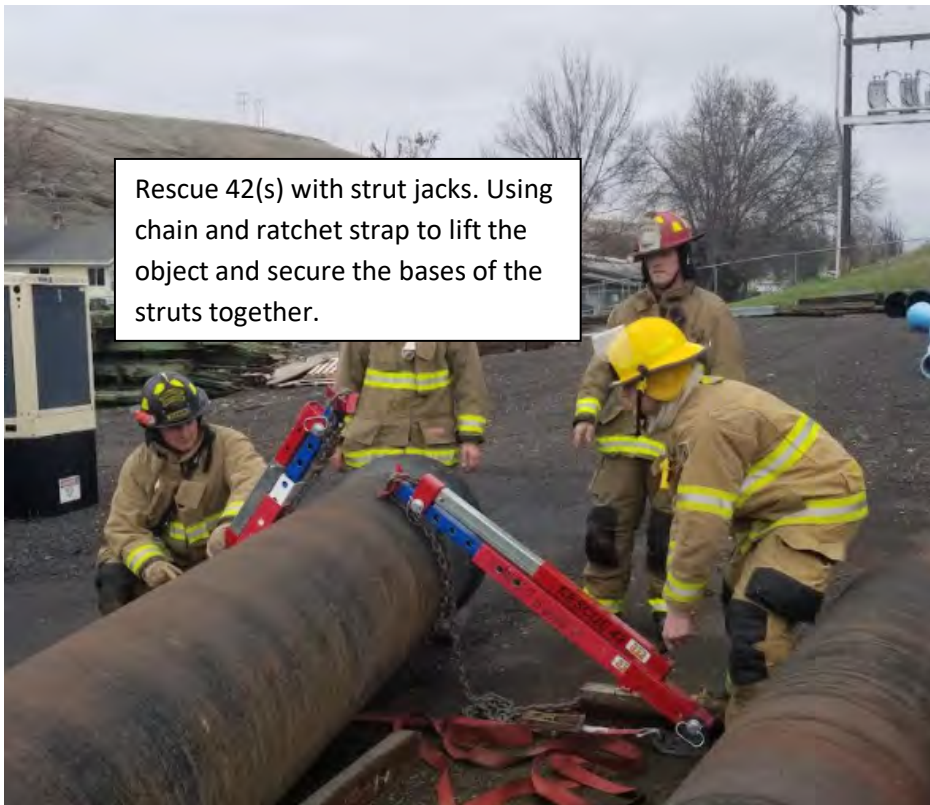




Strut with jack shown alongside an E-tool ram for car stabilization and extrication. Notice the ratchet strap securing the base of the strut to the vehicle.



A rescue 42 strut jack being used against a vehicle with chain securing the base of the strut to the vehicle.



Rescue 42(s) with strut jacks. Using chain and ratchet strap to lift the object and secure the bases of the struts together.

Sawzall (with blades, generator, and cord reel) - The Sawzall is used in combination with the portable generator to cut metals and other materials in many scenarios of rescue and extrication. Use the cord reel to allow for extended length of use.



Stokes Cart- Used to move stokes basket with more ease.





Stokes Basket- A litter widely used in search and rescue. Its key feature is that it can be disassembled for transport.



SKED- the Sked stretcher is a revolutionary design which provides outstanding patient protection and security. The Sked comes equipped for horizontal hoisting by helicopter or vertical hoisting in caves or industrial confined spaces. When the patient is packaged the stretcher becomes rigid. The SKED is also extremely useful for moving patients in snow, etc.



Misc. Rescue/Extrication Tools and Equipment



SCBA cylinders

Salvage Covers

Edge Protection (ropes)

Spill Kit/HAZMAT absorbents



Rope rescue equipment (requires further training)

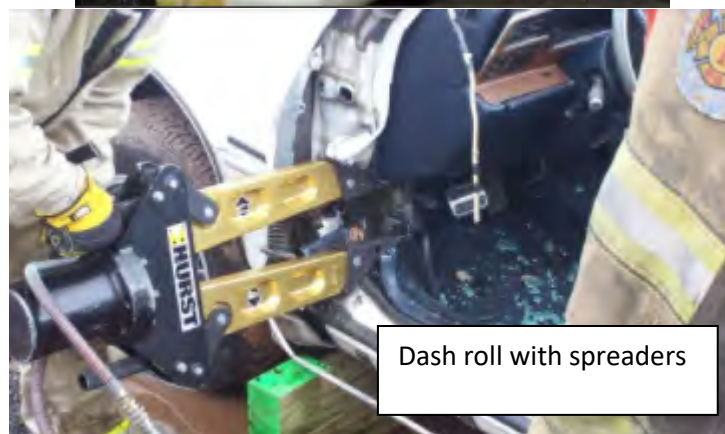
Throw Bag (rope) for rescue, water rescue, etc.

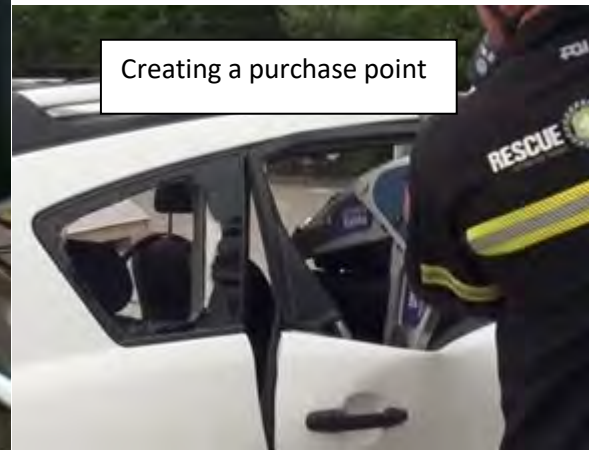
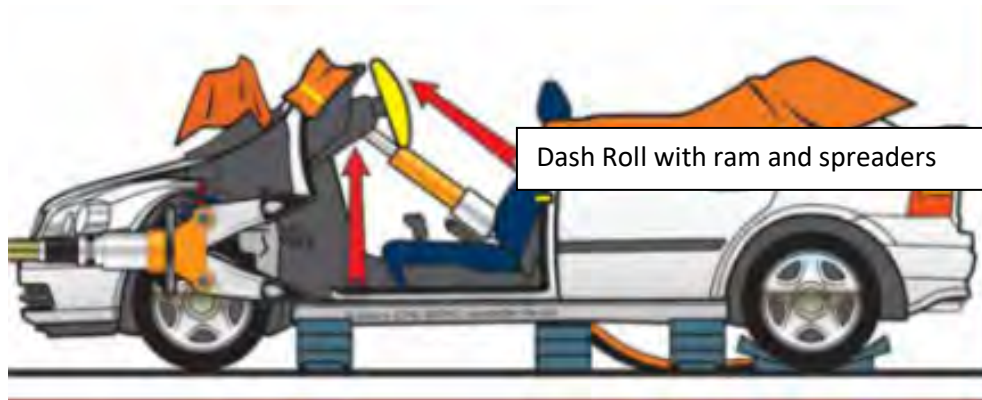


Section 11.2

Rescue and Extrication Techniques

There are many ways to make entry into a vehicle for patient extrication. Some of the most crucial aspects are the anatomy(s) of vehicle(s), the desired outcomes, and the capabilities of tools and techniques. Practicing with the tools and equipment with real vehicle/heavy objects/machinery is the best way to gain experience and knowledge of how your tools and techniques will best serve the situation that is encountered, for no two situations will ever be the same.





Stabilization of vehicles and objects should always be part of the plan, whether using cribbing, struts, or by other means such as flattening the tires of a vehicle. Cutting power to a vehicle by removing a section of battery cable is always advised as well, but not before potentially utilizing that power source to move seats, windows, door locks, etc. When disconnecting the battery cable, first disconnect the black and then the red (positive +) by removing a small section of cable. When cutting glass, be sure to do so as far from the victims as possible, and protect victims with blanket or sheet if possible.

Basic Vehicle Anatomy

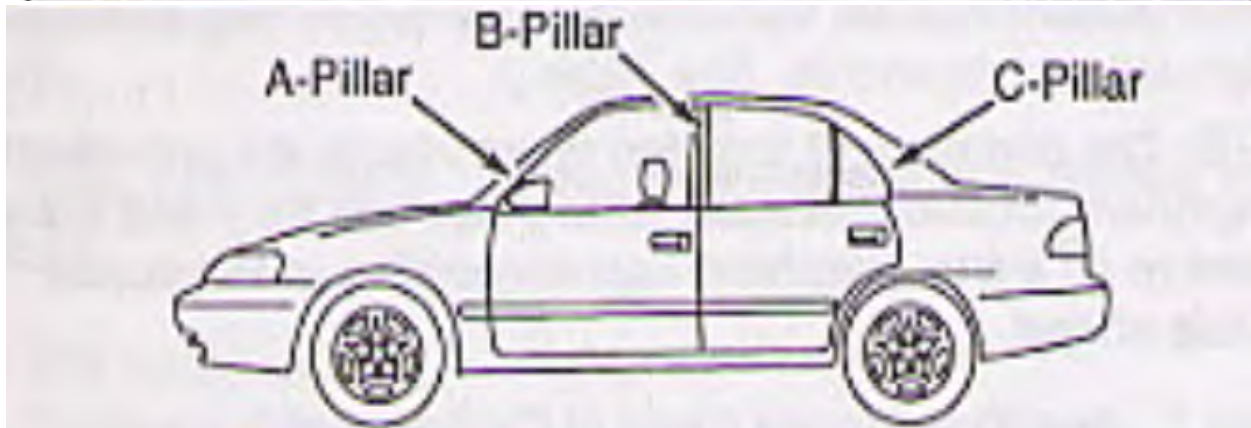
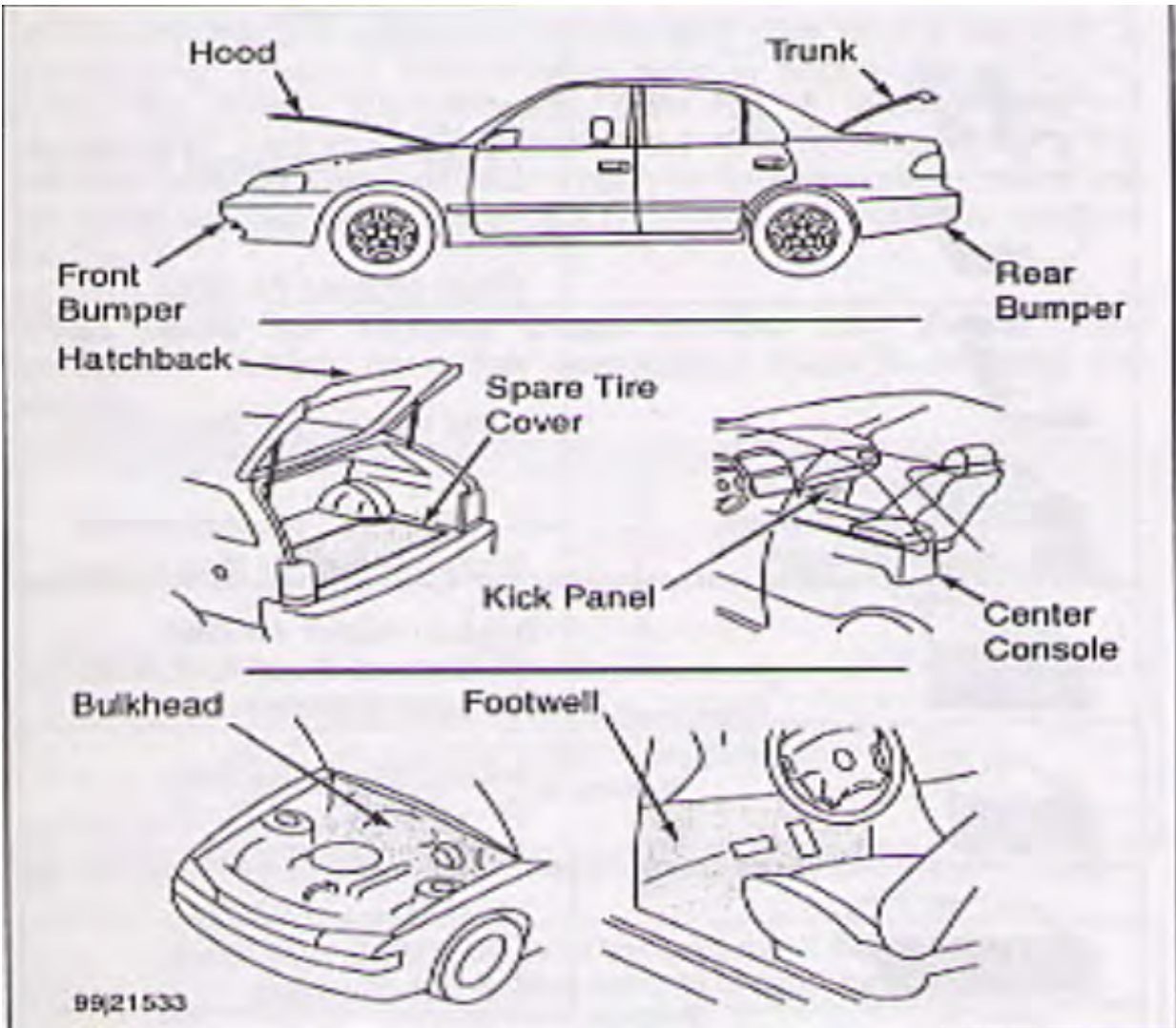




Fig. 7: Identifying Roof Rail



Section 11.3

Rescue and Extrication Evolutions

Rescue and Extrication evolutions should involve the use of automobiles and/or heavy equipment and machinery. Utilize relationships with local wrecking/tow yards such as Frankie's Towing, etc. Be sure to utilize as many tools as possible while training on vehicles. Becoming proficient with auto extrication and rescue practices takes diversity in training and the ability to adapt and overcome. If one becomes too reliant on a specific tool and fails to become familiar with other options, he/she may find themselves with limited options and abilities in diverse situations. Attempt to make the training more realistic by adding the component of a victim via a training manikin. Give individuals or teams objectives and limit them to unfamiliar tools and techniques to help with building a greater foundation of knowledge and confidence.