State of Michigan

Basic Vehicle Extrication
Student Guide

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Preface

The developer's of this course would like to thank you for participating, This course was designed to help you, the extrication team, stay current with the latest developments in vehicle construction and technology. Through continued education in this field, we can truly help to save more lives then those of yesterday.

We strongly encourage you to take this guide and make suggestions to further its' development. Through your participation, this course can only get better.

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General Motors
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Introduction

Introduction

The purpose of this course is to give you the basic concepts and methods to assist an extrication team in vehicle extrication.

The methods and tasks shown throughout this course have been approved by the Firefighters Training Council of Michigan as accepted methods for accomplishing vehicle extrication. However, they are ***not*** to be interpreted as the only methods used to accomplish a given task. Other specific methods and polices for achieving a task should and must be set forth by your department. The Firefighters Training Council of Michigan, the sponsors of this course, as well as the instructors presenting this course, cannot and will not guarantee the use of these tasks on the emergency scene. Only through training, conducted by your department, can you become proficient in your departments Standard Operating Procedures with regards to vehicle extrication.

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Definitions

Action Circle — A *clear zone* established early in an extrication incident; 3m to 4m (10' to 15') in all directions from the vehicle involved in the accident.

Air Restraint Bags — A part of the passive restraint system of a passenger car consisting of a deflated air bag which is filled quickly by gas using a device which is either electrically or mechanically activated upon impact of the vehicle. This bag system affords extra protection of the front seat's occupants during a vehicular accident.

Air Rescue Bags — An extrication tool consisting of air sacks or bags, compressed air hose, air regulator, control valves and a supply of compressed air.

Air Chisel — A metal cutting hand tool adapted from industry for use on the extrication scene. It is a system comprised of an air chisel gun, compressed air hose, air regulator, and compressed air supply.

Base Crib — A type of specified cribbing used as a base of support for rescue tools to rest upon while in use. Usually made of 2" x 8" boards of variable lengths.

Blanket Roll — A C-Spine immobilization tool used to immobilize the C-Spine of a patient lying on a long back board.

Body Position — The general term applied to the positioning of the rescuer's body away from dangerous areas near rescue tools while they are in operation under force.

Box Crib — This is an arrangement of 4" x 4" or 2" x 4" wood cribbing where it is stacked in parallel pairs at right angles to the parallel pair immediately below.

C-Spine — A very common term in vehicle extrication trauma patient care. This is short for cervical spine or neck area.

Catalytic Converter — A part of a passenger car's exhaust pollution control that super heats exhaust fumes, turning them into inert gases. This device can be extremely hot and is located under the car body in the undercarriage area.

Circle Survey — A method for rescue personnel to conduct a thorough survey of the accident scene which includes walking in a 360E circle of the entire scene.

Come-Along — A lifting or pulling tool. This is a portable hand operated winch. It includes an operating handle, cable spindle and casing, cables, and hooks. It is designed to be used in conjunction with rescue chain sling devices.

Command — A term used either to describe the person in control of an emergency scene or to denote that action of controlling an emergency scene.

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Definitions (Continued)

Command Post	The central control position on an emergency scene where the overall scene commander will be located.
Cribbing	Generally refers to the specially cut and/or assembled pieces of wood used to support raised objects, as ground pads or bases to place tools that are working, and as blocks over which chains and cables pass while moving objects.
Critique	Constructive criticism. This is usually a type of training session after an emergency incident or practical training session where rescue workers go over their efforts and see the things that they did well and how they could improve the things they didn't do so well.
Crowd Control	The safe and efficient removal of unnecessary people from the immediate area around the vehicles involved in an accident.
Cutters	The part of a hydraulic rescue tool system used to cut metal parts, sheets, tec.. It may be manually powered or powered by mechanically driven units.
D.O.T.	A common abbreviation term designating the Department of Transportation.
Dangerous Goods	Any product, substance or article that is listed in the federal Transportation of Dangerous Goods Regulations. Any article or substance that poses an inherent risk to life, property, or environment.
Dash Roll-Up	An actual displacement procedure where the front dash of an automobile is rolled or pulled up by using chains and come-alongs or heavy hydraulic or hand tools.
Dash Lift	A lifting manoeuvre on the front dash of an automobile used to lift the dash assembly up and off the trapped patients. This is usually done with heavy hydraulic spreaders, cutters and/or rams.
Disaster Box	A large box that is stocked with basic first aid supplies and stored for use by rescue personnel on scenes that involve a very large number of patients.
Displacement	A movement term that describes the moving of a part of a vehicle beyond its normal operating range, making space for the access and removal of trapped patients.
Door Latch Assemblies	The device which keeps the door of a vehicle closed.

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Definitions (Continued)

EMS	A common abbreviation of the Emergency Medical Services.
Evolution	Usually used as an educational term denoting a practical procedure. (ie. roof flap evolution)
Extrication	A very common vehicle rescue term that is used to describe procedures used by rescue personnel to remove patients trapped by the wreckage or by their injuries from vehicles involved in accidents.
Freeze	An internationally recognized term used when a rescuer wants other rescuers to make an emergency stop to their activities on the scene.
Full Protective Clothing	Specially designed protective clothing worn by rescue personnel while performing vehicle rescue procedures in and around the vehicle.
Full Frame	A type of vehicle construction in the undercarriage that is used in some station wagon type automobile and light trucks.
Golden Hour	That special first hour after the incident where a traumatized patient has the best chance for recovery from that trauma if they can be safely delivered to an emergency medical facility and a surgeon.
GPM	A fire service abbreviation term for Gallons Per Minute flow of a liquid.
Hatch Back	Common description of a vehicle that has a rear access door to the passenger compartment area or rear storage area.
Hazard Control	This describes the handling of hazards on the extrication scene. It can also denote a command sector or subdivision of command on the scene that is concerned with hazards.
Hazardous Haterials	Any materials exposed on an emergency scene that are hazardous by being poisonous, flammable, explosive, carcinogenic, or environmental pollutants. This is also known as Haz Mat in the emergency services.
Hose Lines	A fire service term that denoted water hose that carry water to the emergency scene from the fire engine.
Incident Command System (ICS)	A system of control of the incident scene set up by predetermined procedures for effective control of complex emergency operations such as extrication operations.

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Definitions (Continued)

Inner Circle Survey	The procedure of assessing a vehicle that has been involved in an accident; it includes a full circuit of the vehicle and assessment of the area in, around and under it.
Joint Command Post	A command post that is used by multiple emergency agencies on the scene of an emergency.
Kendrick Extrication Device (KED)	KED, a specially designed device for removing automobile accident patients.
Laminated Glass	Specially designed glass used in automobile windshields that is comprised of layered plate glass separated by clear plastic.
Loaded Bumper	A safety term describing vehicle bumpers that are impacted during an accident, compressing them upon their shock absorbing pistons and held in this compressed position by the subsequent wreckage.
Log Roll	A back boarding technique for placing a patient on a long back board.
Long Back Board	A spinal immobilization device upon which any patients suspected of having spinal column trauma are placed.
Manual Hydraulics	Hydraulically operated rescue tools in which the hydraulic power is generated by human effort on a manual pumping device.
Mechanisms of Injury	The actions or objects that cause traumatic injury to a patient during a vehicular accident.
Nader Pin	A door latch mechanism in all vehicles designed to keep the doors. Nader pins come in a variety of stlyles, depending on the manufacturer.
Overall Scene Safety	Describes the safety concerns of rescues for the entire scene of a motor vehicle accident, subdivided into personnel safety, patient safety, hazard control, traffic control, crowd control, and agency control.
Pancaked Vehicle	A vehicle rescue term used to describe an accident situation where the vehicle has come to rest on its roof with the roof crushed in upon the passenger compartment area.
Patient Access	A descriptive term that denotes the action of a rescuer getting to the trapped patient for patient assessment and care.

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Definitions (Continued)

Personnel Safety	A term for the well-being and protection of rescue personnel during extrication operations.
Pneumatic Power	Compressed air power. Any tool or device power source that is actuated by application of compressed air from an air compressor or compressed air tanks.
Post Crib	A specialized vehicle rescue term describing a long piece of wood board usually 4" x 4" x 5'-6', used to stabilize vehicles that are on their sides.
Posts	A vehicle anatomy term meaning the rolled sheet metal assemblies on vehicles that attach the roof to the main body of the vehicle. (ie. A-post, B-post etc.)
Powered Hydraulics	Hydraulically powered rescue tools where the hydraulic operations is powered by a gasoline engine, electric motor or PTO from the rescue unit.
Primary Survey	In vehicle rescue this is the initial patient check done by rescuers of trapped patients.
PTO	An abbreviation for the term Power Take Off. This refers to the tools and equipment that are attached to the rescue apparatus and operate off the engine of that apparatus.
Purchase Point	A small opening made by the rescuer that makes room for the insertion of larger rescue tools.
Ram	The part of a hydraulic rescue tool system used to push apart wreckage; it may be manually powered or powered by mechanically driven units.
Rescue Chain Sling Assembly	Chain assemblies usually provided in pairs that are used as anchor devices to which pulling tools are attached to move metal. These are made in the configuration of a sling and include hooks, connector, chain, round or oblong link, chain shorteners, and an identification tag.
Rescue Command	Also known as the Operations Officer. Is in charge of the rescue operation. Reports to the Incident Commander.
Rescue Chain Assemblies	Chain assemblies that are used as anchor devices to which pulling tools are attached in order to move metal. These are made in the configuration of chain, hooks and identification tag.
Roof Flap	The displacement procedure on an extrication scene that involves the cutting and folding up and away of the roof of the vehicle.

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Definitions (Continued)

Sectors	Subdivisions of the incident command that place specific tasks or areas of the scene under direction for individuals who report to command.
Short Spine Board	A shorter version of the long back board that is usually used to immobilize the spine of an injured patient in the sitting position.
Slashing Across the Throat	Means - Kill the power.
Space-Frame	A type of vehicle construction that uses a *bird-cage* type frame assembly to which body panels and parts are attached.
Spinal Immobilization	Critical trauma patient care that involves the maintenance of the spinal column, in-line, in-place so that further injury to that area due to patient removal and handling will be prevented.
Spreader	The part of a hydraulic rescue tool system used to spread apart wreckage. It may be manually powered or powered by mechanically driven units.
Stabilizing	In vehicle rescue, this usually refers to the securing of the wrecked vehicle in which an injured patient is trapped. It can also refer to the gaining control of and handling of a chaotic emergency scene or hazardous condition.
Stack Crib	Also known as a box crib. This is the configuration of 2" x 4" or 4" x 4" wood cribs that are placed in a stack as an object is being lifted by tools.
Staging Area	A designated area away from the extrication scene where additional apparatus and manpower are placed in reserve until needed at the scene.
Standard Operating Procedure	Formal guideline developed by the emergency organization to assist in pre-planning emergency operations and procedures prior to the incident.
Step Chocks	Specialized cribbing assemblies made out of wood blocks assembled in a stair step configuration. These are usually used to stabilize vehicles.
Straddle Lift	A method of placing a prone patient on a long board by lifting the patient and sliding the long back board under the patient.
Straddle Slide	A method of placing a prone patient on a long back board by sliding the patient onto the board.
T-Bone	A descriptive term that denotes the type of vehicle accident where a vehicle collides into the side of another vehicle.

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Definitions (Continued)

Tempered Glass	Specially designed glass used in automobile side and rear windows that is very resistant to breakage.
Third Door Conversion	A term that describes a displacement evolution used to open the rear side panel of a two-door automobile creating a *third door* or access opening to the trapped patient.
Thumbs Down	Means turn OFF the power to the unit.
Thumbs Up	Means turn ON the power to the unit.
Tilt Wheel Steering	This is the type of steering column assembly of a vehicle that adjusts up or down for the driver.
Tool Staging	A general vehicle rescue scene operation where tools and equipment are placed in a central designation area for the potential use at the damaged vehicles.
Track Cribbing	A cribbing set-up that entails the placing of 4" x 4" cribs so that they slide on themselves as chains or cables pass over them during steering displacement or metal moving operations.
Traffic Control	The safe rerouting or halting of vehicular traffic on a roadway in order to provide for the safe rescue effort.
Training Evolution	Learning operation, generally practical in nature, that develops hands-on skills for fire/rescue personnel.
Trauma	A general descriptive term that implies injuries to a person resulting from being struck by, hit against, or penetrated by an outside object or force.
Triage	A decision process where problems presented are given priority, giving the situation more orderliness for resolution. Usually used in context with patient handling and treatment of injuries.
Unit-Body	Also known as Uni-Body. A type of vehicle construction that uses the floor panes and undercarriage as a structural element of the vehicle eliminating the need for a full chassis for vehicle body support.
Wedge Cribbing	Cribbing shaped in the form of a wedge that are used to tighten and secure cribbing assemblies supporting weight. Usually used as a *gap* filler.
Working Load Limit	The recommended limit of force, measured in pounds of weight, that rope, chain, or cable can be safely operated with. It denotes how much weight the rope, chain or cable can safely lift. (Also denoted by the abbreviation W.L.L.)

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Objectives

Terminal Performance Objective

Given vehicle scenarios and using proper safety techniques, **PERFORM** a vehicle extrication in accordance with local and departmental Standard Operating Procedures.

Enabling Objectives

1. **Demonstrate** a working knowledge of vehicle and extraction terminology.
2. **Demonstrate** a working knowledge of extraction scene safety and tool operation.
3. **State** the importance of quick and complete documentation.
4. **State** the importance of conducting a team debriefing.
5. **Demonstrate** a working knowledge of the eight step team approach to vehicle extraction.
6. **Demonstrate** proper techniques for vehicle stabilization.
7. **Demonstrate** proper techniques for opening or removing the roof of a vehicle.
8. **Demonstrate** proper techniques for door and side removal of a vehicle.
9. **Demonstrate** proper techniques for the displacement of the dash and steering wheel.
10. **Perform** a hands-on vehicle extrication scenario working with a team of five rescuers.

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The Need For Command

Introduction

An effective ground rescue operation centers around one incident commander. If there is no command, or if there are multiple commands, ground rescue operations quickly break down in seven predictable areas:

- Action
- Coordination
- Planning
- Organization
- Communications
- Safety
- Staging
- Command and Control

Action

There are times when fire rescue personnel do not take the correct action. They do not follow the standard rules and principles of rescue and fire. Such actions may endanger lives and result in an expanded loss of property.

Solution:

Have a single command structure around tactical guidelines and require all personnel to know and follow those guidelines.

Coordination

When companies are not integrated under a central plan they will quickly engage in independent actions. This "free-lance" rescue and firefighting will often work at cross purposes with the actions being taken by other units on the scene.

Solution:

All tasks must be coordinated through a single incident commander. This person should establish the overall plan, assign companies to specific tasks and assist companies in achieving their tasks by using effective direction of the operations.

The goal of the Incident Commander is to achieve the maximum productivity from all available resources working together to perform a safe, timely scene rescue or fire scene.

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The Need For Command (Continued)

Planning

Effective rescue requires a plan that is based on a prediction of where the rescue is going and what will happen next.
If there is no Commander...there is no plan...no updating a plan...you're lost in chaos.
If there are multiple Commanders, the plans generated may not be the same - there will be a lack of coordination and efficient use of resources.

Solution:

A single Incident Commander! He will combine an effective pre-rescue planning system.
The Incident Commander should formulate the strategic plan based on experience and an understanding of rescue behavior, tempered by an appreciation of the environment, structural construction, concealed spaces, fuel load, hazardous material, and protection features.

Organization

Without a plan, it is doubtful that the participants will play their appropriate roles. This role confusion means uncoordinated action, resulting in the breakdown of the strategic, tactical, and task levels of rescue.

Solution:

A single Incident Commander! He will use a standard operating procedure that supports command coordination, and organization. Part of his procedure should be a communications plan that describes rescue ground information for all levels of operation.

Communications

Good communications is the backbone of a sucessful rescue operation. Poor communications risks our lives as well as those we are there to recue.

Solution:

A single Incident Commander! He will use a standard operating procedure to manage and control all communications.

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The Need For Command (Continued)

Safety

Uncontrolled rescue often leads to unnecessary, preventable injuries. All injuries have a detrimental effect on the entire operation, as well as their obvious effect on the victims.

Solution:

A single Incident Commander! He will use a standard safety operating procedure to command, manage and control the positions and functions of all companies at the scene. He must always reinforce safety.

Staging

Staging applies to all incoming apparatus and personnel and POV's. Staging will be automatically applied to all multiple units responding unless otherwise directed by the Incident Commander. Level 2 staging is used when an on-scene reserve of companies is required.

Command and Control

The role of the Incident Commander is one of a professional manager and commander. The term professional, refers to training, dedication, and the desire to perform to the best of ones' abilities and composure, career officer or volunteer.

The Incident Commander is the individual (first or last on scene, with or without rank) with overall responsibility for the whole scene.

The Incident Commander plans and provides:

- For safety and survival
- Protection, removal, and care for endangered occupants
- Decision making
- Command, control and communication
- Review and evaluation

The Incident Commander recognizes:

- That all tactical situations have the same basic elements and therefore a standard approach can be applied
- "Dead end" decisions must be avoided
- Decisions must be open-ended to allow for expansion
- The need to establish a plan of attack and initiate immediate action. Sometimes no action is the plan! REMEMBER (Hazardous Material)

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Command and Control (continued)

The Incident Commander:

- Is a leader
- Respects personnel
- Does not take advantage of rank, authority, or seniority
- Eliminate multiple standards
- Uses proper professional language on radio and on scene
- Command can be passed along as the need arises

Advantages of a command post:

- Stationary position and location
- A quiet place - to think and decide
- An advantage point from which to see the incident scene
- Inside lighting
- A place to write and record
- Access to radio and telecommunication
- Reference and pre-plan material
- Protection from the weather
- Space for staff
- Computers (in some systems)

Documentation

Introduction

In any job we do in the Fire Service, documentation is a process that should be done before, during and after an incident. In vehicle extrication, the process is no different.

The Process

Documentation should be done as soon as possible after the extrication has been completed and equipment is back in service. This should be no later than 24 hours after the incident.

Documentation may be done by incident commander on a simple incident, or by each rescuer on larger or more complicated incidents.

Your documentation should include but is not limited to:

- Fire department incident number
- Description of the vehicle extrication was conducted on including the Year, make, model, color, and license plate number
- Brief description of the vehicle appearance and damage
- Which tires were found flat, which did you flatten
- Which windows were broken, which did you break
- Were air bags deployed
- Were seat belts worn by the vehicle occupants
- Condition of the doors, were they locked, jammed, blocked or caved in
- Extrication methods used
- Extrication equipment used
- Briefly describe what you did and why you did it
- Take photographs or video if possible

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Debriefing

Introduction

There are two types of debriefing we will discuss here:

- Extrication Debriefing
- Critical Incident Stress Debriefing (CISD)

Extrication Debriefing

The goal of incident debriefing is team improvement. Here you can discuss better ways to communicate, use extrication tools, and define safety issues.

Critical Incident Stress Debriefing

In the Fire Service, CISD is starting to become a way of life. Incidents affect each one of us differently. In this forum, we can discuss how we feel and how the scene affected us. You might be surprised to find that something that was upsetting to you had the same effect on someone else. When we talk about these issues, it helps us to better cope with them.

CISD was designed by Jeffrey T. Mitchell, Ph.D. It is designed to minimize the impact of post-traumatic stress of a critical incident and to speed the normal recovery of normal people who have been exposed to abnormal events.

Critical incidents are events that are outside the usual range of experiences and are so powerful and sudden that they can overwhelm a person's ability to cope.

Examples of traumatic events include, but are not limited to:

- Death in the line of duty
- Suicides of emergency personnel
- Disasters
- Serious injury in the line of duty
- Accidental injuries to others caused by one's actions
- Significant events involving children
- Prolonged incidents which end in a loss of life
- Events with excessive media coverage
- A very violent person who has personally threatened the emergency provider
- Working on a person who is a relative or close friend and who is dying or in very serious condition
- Death to a civilian caused by emergency operations such as an accident between the civilian's car and the responding emergency vehicle

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Critical Incident Stress Debriefing (continued)

Common signs and symptoms are broken down into four key response areas:

- Emotional
- Cognitive
- Physical
- Behavioral

Let's break each one of these down to better understand them

- Emotional Response
  - Fear
  - Apprehension
  - Frustration
  - Anger
  - Wanting to hide or escape the scene
- Cognitive Responses
  - Memories
  - Dreams
  - Flashbacks
  - Ruminations
  - Sudden recall
  - Vivid Associations
- Physical Responses
  - Sweating
  - Dizziness
  - Heart palpitations
- Behavioral Responses
  - Sleep disturbances such as not wanting to go to bed in fear of what tomorrow may bring
  - Failure to maintain good working habits
  - Avoiding certain activities and situations
  - Mood swings
  - Poor concentration
  - Agitation
  - Blaming others

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Critical Incident Stress Debriefing (continued)

While not always symptoms of stress, it is important to note that emotional changes such as anxiety and depression, and behavioral changes such as increased alcohol intake, outbursts of aggress ive behavior and obsessive behavior are often the most observable signs of critical incident stress

One of the keys to CISD is that it must be conducted by an outside influence. A team member might be less likely to open up to a supervisor. The reverse is true, a supervisor, being in a leadership role might feel opening up to the very people that work him or her might damage their creditability as a leader. Their are many CISD teams setup around the state. Clergy are another great source for help.

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Safety and Safe Tool Operation

Introduction

On the fireground as well as on the extrication scene, everyone is a Safety Officer. We must constantly be aware of what is around us. This unit will discuss some safety issues but there are many more as no one scene is the same and hazards are always changing.

Personal Protective Equipment

For your safety, the following personal protective equipment is required:

- Fire helmet or rescue helmet
- Safety glasses or helmet visor
- Leather gloves or fire gloves
- Steel toe work boots or fire boots
- Turnout coat and pants or protective jumpsuit

Buddy System

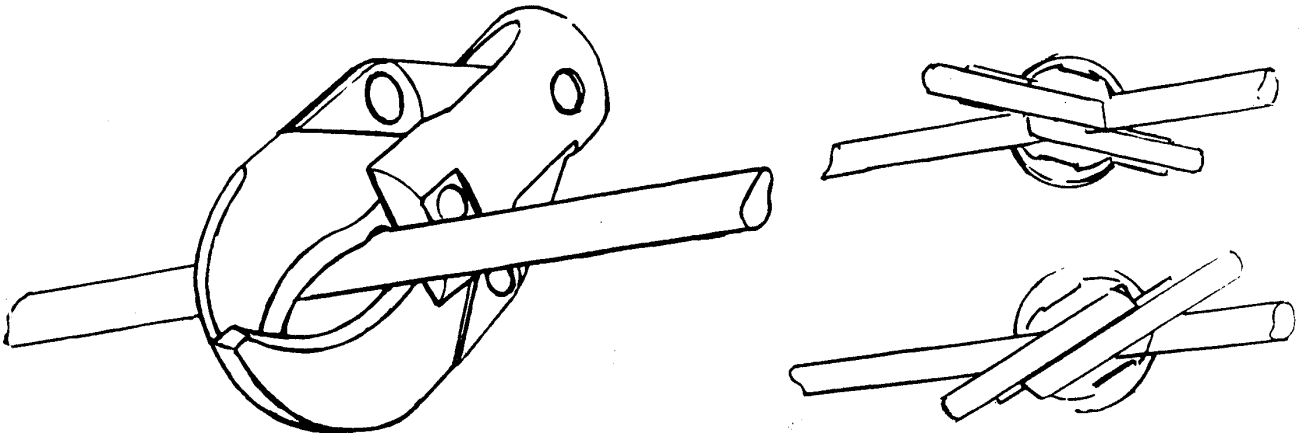
Use the buddy system. One person operates the tool while the second rescuer acts as the safety observer. Remember, two heads are better than one.

Tool Twisting

To prevent the cutters from twisting, start the cutters at a 90 degree angle to the material that is being cut. Cut metal supports at their weakest points. Avoid cutting the heavy gauge metal reinforcements at the hinges, door latches and seat belt anchor points. During the cut, the tool may rotate in order to maintain the proper cutting angle. Don't fight it, just watch it.

Illustration

The following illustration demonstrates tool twisting.



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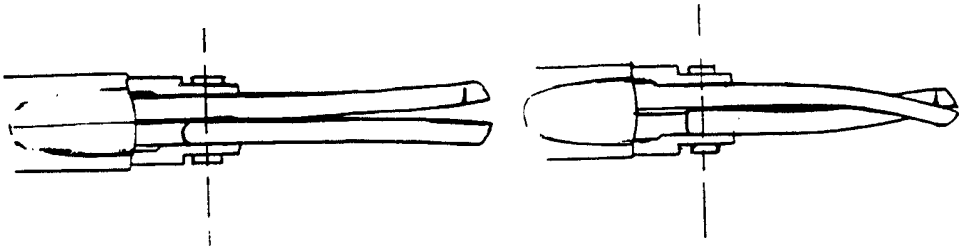
Blade Separation, Crossover and Snagging

Watch the blade position while cutting. Curved blades tend to crossover and straight blades tend to separate.

Illustration

The following illustration shows blade separation and crossover.

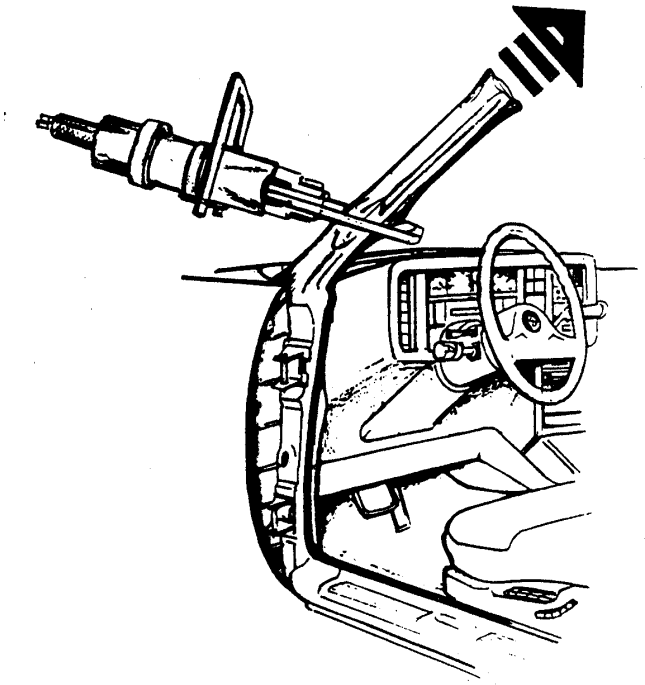


Part Displacement

You and your safety observer need to watch for propulsion of parts. Support or anchor single ended parts.

Illustration

The following illustration depicts part displacement.



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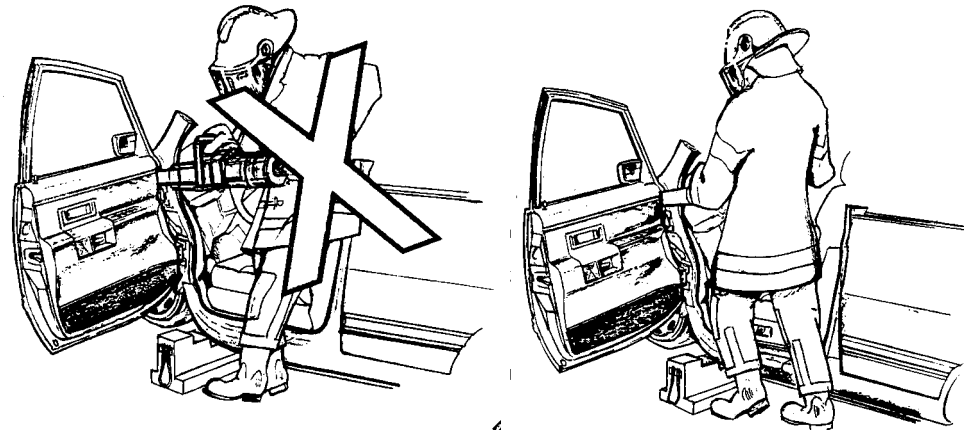
Positioning

Watch your positioning in relationship to the tool and the automobile. Stay on the outboard side of the tool. Don't stand between the tool and the vehicle or directly behind the tool. Be careful not to place yourself between the spreader and the patient.

Illustration

The following illustration shows right and wrong positioning.

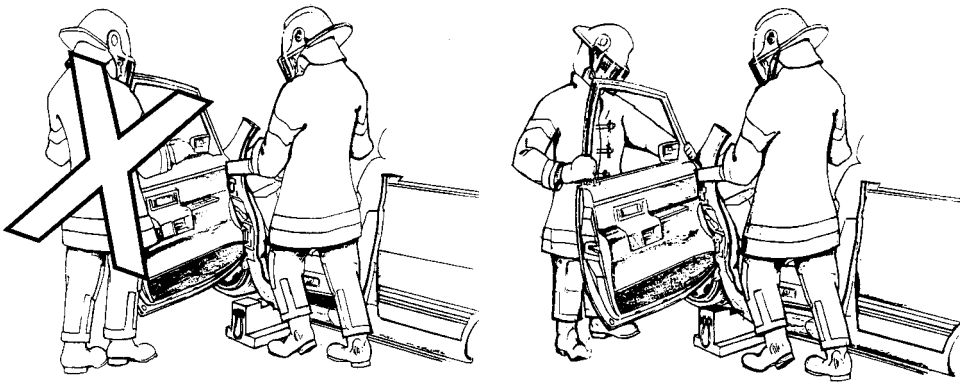


Door Ejection

Care should also be taken as to not block the automobile door with your body. Do not stand in line with the door, support it from the backside.
Always be alert and check for the location of other tools and hoses, do not force the door open on them.

Illustration

The following illustration shows the right and wrong positioning in regards to door ejection.



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Anchorage Points

Use realistic anchorage points. To avoid purchase point slippage, use rams metal to metal, remove plastic and rubber trim.

Soft and Hard Protection

Use soft and hard protection to protect the patient.

- Soft protection - blanket or salvage cover.
- Hard protection - short or long backboard.

Summary

Remember that the safety of the rescuer should be our top priority. Every member of your extrication team is a safety officer.

Initial Patient Survey

Introduction

Our number one priority is safety and patient care. This unit will introduce non medical personnel to some of the patient basics as well as introduce medical veterans to some issues they may not have thought of when someone is trapped in a vehicle.

Steps of an Initial Patient Survey

Review dispatch information (anticipate patient problems).

Overview the scene:

- Note hazards (wires, traffic, fire, fumes, crowds, etc.)
- Plan entrance and exit routes
- Assess available resources - call for help if necessary

Introduce yourself (to patient, bystanders, and other helpers):

- Give your name and role
- Ask patients name and use it
- Reassure and relax patient
- Gather information (use open ended and closed ended questions)
- Assess patient's level of consciousness oriented to: person, time, and event

Check airway, breathing, and circulation:

Note: Some med control authorities are now recognizing "ACBC", Airway, Cervical, Breathing, Circulation instead of "ABC".

- For trauma victims the jaw thrust method for opening the airway only maintaining C-spine stabilization
- Breathing >24 per minute <12 indicates a need to closely monitor the patient
- Is there a carotid pulse - control any obvious major bleeding

Utilization Review Criteria for ALS

BTLS standards should be used when considering the need for ALS. The following may also indicate the need for ALS:

- All head injuries and/or Altered level of consciousness
- Vehicle damage that invades the passenger compartment
- Severe extremity injury and/or Major Bleeding
- Respiratory difficulty
- Shock

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The Golden Hour

The Golden Hour Philosophy and how it works:

From the time of injury:

6 Minutes to arrive on the scene
15 Minutes to extricate
15 Minutes to package
6 Minutes to arrive to the hospital
15 Minutes to asses injuries in the emergency room

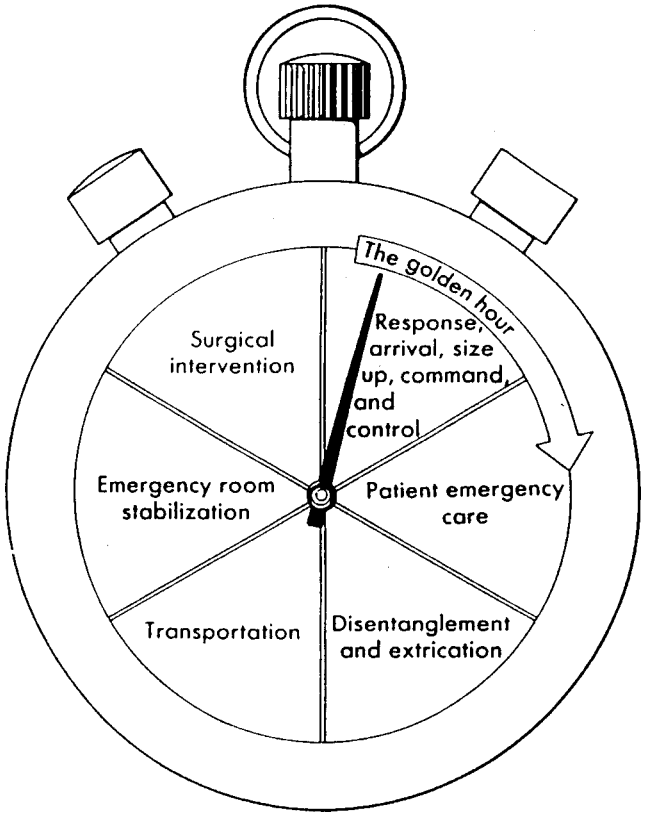
Definitive Care ----------Surgery

Mortality rate goes UP as TIME goes by

Extrication cannot be long and expect a positive outcome!

Illustration

This illustration shows The Golden Hour. The golden hour is an imaginary time frame within which a serious trauma patient has the best chances of surviving the injuries if extricated from the damaged automobile, transported to a medical facility, and delivered to a surgical team.



General Considerations of Vehicle Extrication

Introduction

This section covers some general considerations when performing a vehicle extrication.

Considerations

1. Survey the **WHOLE** scene. **TOTAL NUMBER of PATIENTS**. **ONE PRIORITY 1 PATIENT PER ALS AMBULANCE**. This does not mean only one victim to an ambulance.

2. One person must be in overall charge of rescue operations. Success or failure of a Rescue Scene is primarily dependant upon the effectiveness of Rescue Command. Coordinated team work is vital to a successful rescue operation.

3. Even though the EMT is responsible for the medical care of the patient, it is important to not let medical care slow down the extrication process. Team Work: It is important to remember that our job is to not cause any further injury to the patient or medical personnel in the vehicle.

4. If entry is impossible, or it extrication cannot be carried out and the injuries appear to be life-threatening, forcible entry by any means available should be made at once.

5. Keep your cool!

6. Determine your patient(s) condition before moving. Talk to him to reassure him and to evaluate his level of consciousness.

7. Conduct a proper I.P.S.: Document your findings.

8. Will additional help be required? It is better to call more help and not need them than to need and not have.

9. Always secure a wrecked vehicle utilizing appropriate placed wooden chocks, chains and/or cables, before entering.

10. A definite plan should be thought out before rescue efforts are begun. This not only promotes efficiency, but combats anxiety.

Continued next page

General Consideration of Vehicle Extrication (Continued)

Considerations (Continued)

11. Safety is a must to the patient as well as to the rescue personnel. Protect the patient from flying objects by covering him placing a barrier between him and the hazards. Rescue personnel must wear proper protective gear: coat, safety goggles, helmet, gloves, and above all else be skilled in the use of the rescue equipment available for your use. Don't count on your fellow rescue workers to know what you should have taken the time to learn.

12. While time is essential and should not be wasted, it is important that the necessary time be taken to assure that the proper methods for the situation are used.

13. The less complicated the rescue effort, the fewer things to go wrong. If equipment goes out of service, improvise according to your situation. Keep it simple.

14. Assess everything before doing anything. It is embarrassing to remove one door, only to have another rescuer go around to the far side and open the other door without difficulty.

15. The simplest and easiest way to unlock a door is to pull up on the locking button and operate the door handle. The interior person should be unlocking doors, cutting all seat belts, rolling all windows down, and handing out the keys upon entering the vehicle.

16. To safely remove a patient, you must adequately open the vehicle up from around the victim. This allows for proper packaging. All trauma victims are suspected of having spinal injuries until proven otherwise. Therefore, complete spinal immobilization is warranted.

17. Unwrap the car from the patient, much as if you were opening a precious gift. Unnecessary jarring of the patient may further extend his injuries. Do no harm.

18. Remember: An automobile is replaceable. If you need to destroy it to remove a patient - Do Not Hesitate. The insurance companies would much rather pay to replace an automobile than to support a person for the rest of their life.

Continued next page

General Consideration of Vehicle Extrication (Continued)

Considerations (continued)

19. It must be continually stressed that if anything the rescuer does causes pain to the victim he or she should immediately stop and ask himself - "What can I do differently?" - and determine if there is a better way. Eye contact should be made with your inside rescuer, and the safety person. Think and be calm!

20. Knowledge of basic procedures, familiarity with the capabilities of the available tools, and the thoughtful planning of the rescue effort add up to success.

21. Know that sometimes rescue is impossible ---Just as some injuries are fatal, despite your best efforts.

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Vehicle Geography and Anatomy

Introduction

In this section we will illustrate the many sections of a vehicle.

Vehicle Components

These terms depict the anatomy of a vehicle:

- Dashboard
- Firewall
- Energy-absorbing steering column
- Energy-absorbing bumper system
- Shocks / Struts
- Door collision beam
- Catalytic converter
- Rocker panel
- Transmission tunnel
- Door hinge & striker plate reinforcement

The following illustration shows the entire anatomy and geography of a automobile.

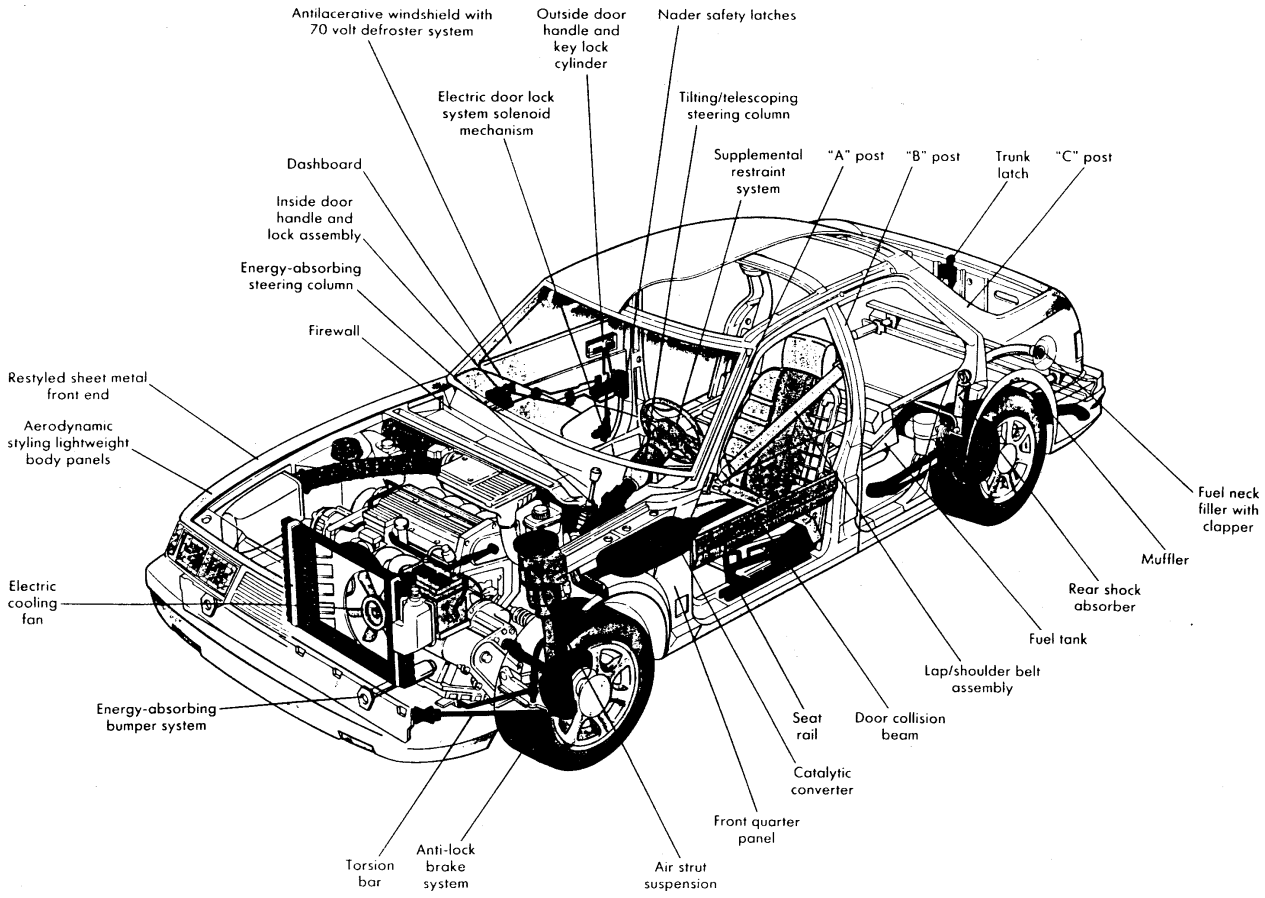

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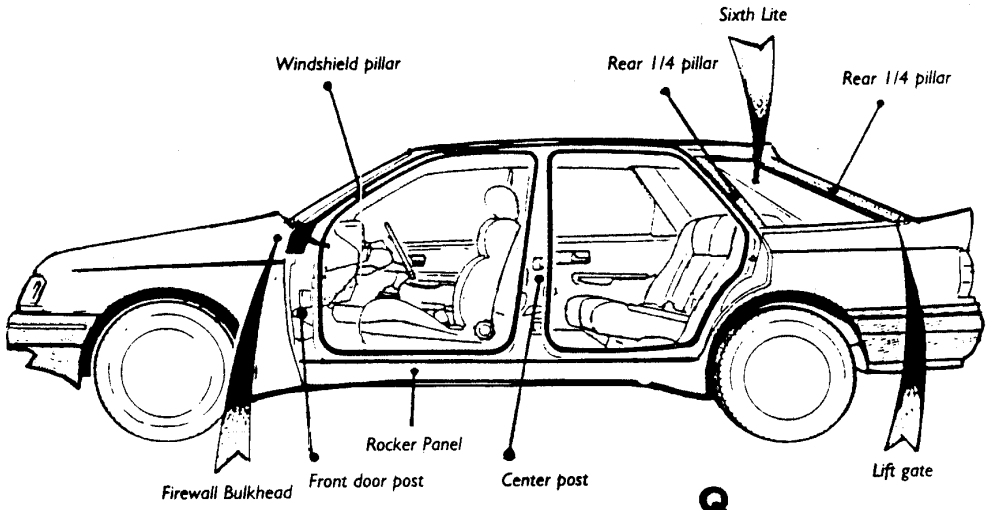
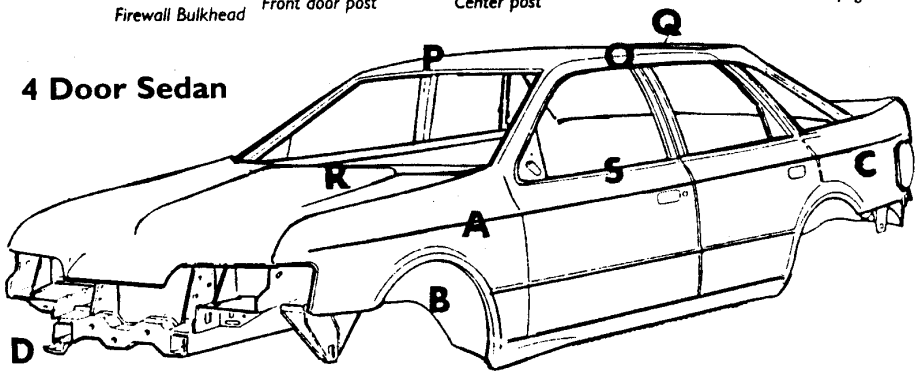
Illustration The following two illustrations show cutaway views of an automobile.





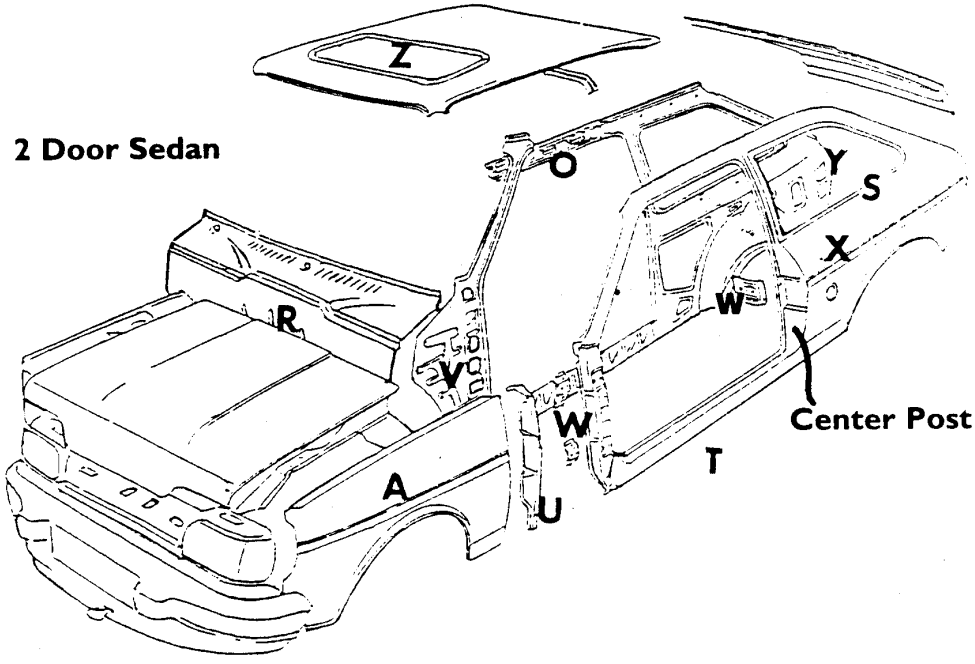


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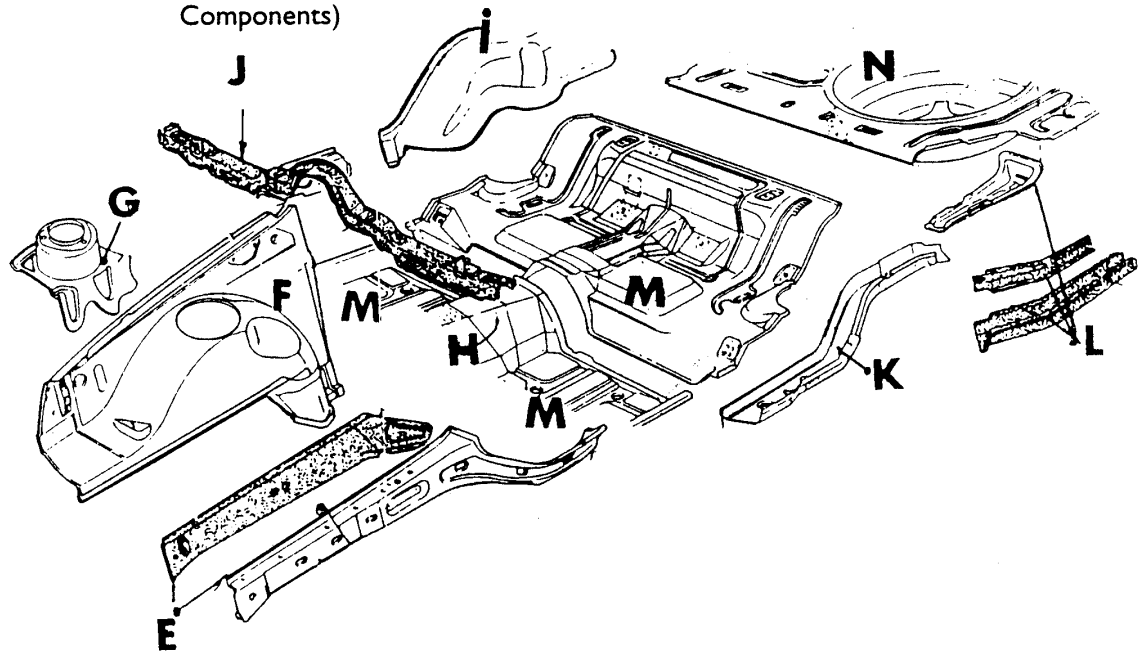
Illustration (continued)

Components:- (Panels, Linings, Connecting Plates, Reinforcements, Mountings and Bracing Components)



A. Front Fender/Wing
B. Plastic Fender Lining
C. Rear Fender
D. Front Crossbeam and Locking Plate
E. Front Sidebeam and Locking Plate (Front Longitudinal)
F. Inner Front Fender
G. Independent Strut Location Housing
H. Transmission Tunnel
I. Inner Rear Fender
J. Front Seat Crossbeam
K. Sidebeam
L. Rear Sidebeam, Connection Plate and Extension
M. Floorboard (Front & Rear)
N. Trunk Board
O. Roof Siderail/Cantrail
P. Front Roof Rail
Q. Rear Roof Rail
R. Firewall/Bulkhead
S. Window Line
T. Side Panel Assembly
U. Front Fender Re-inforcement
V. Sidewall
W. Door Hinge & Striker Plate Re-inforcement Plates
X. Rear 1/4 Panel
Y. Rear 1/4 Window
Z. Sun Roof

Continued next page

Vehicle Construction

Full frame construction:

- Newer luxury cars, trucks and older cars (don't assume however that the before mentioned vehicles are full framed as they may not be)
- All of the frame parts are welder together

Space frame construction:

- New mini-van construction
- Bird cage like frame
- Body panels glued in place

Unibody construction:

- New car construction
- No frame
- Reinforced sheet metal joints
- Body panels tack welded in place
- Light weight construction

Door latching devices:

- Nader pin
- Mini-wedge
- "D" bolt

Continued next page

Passive Restraint System

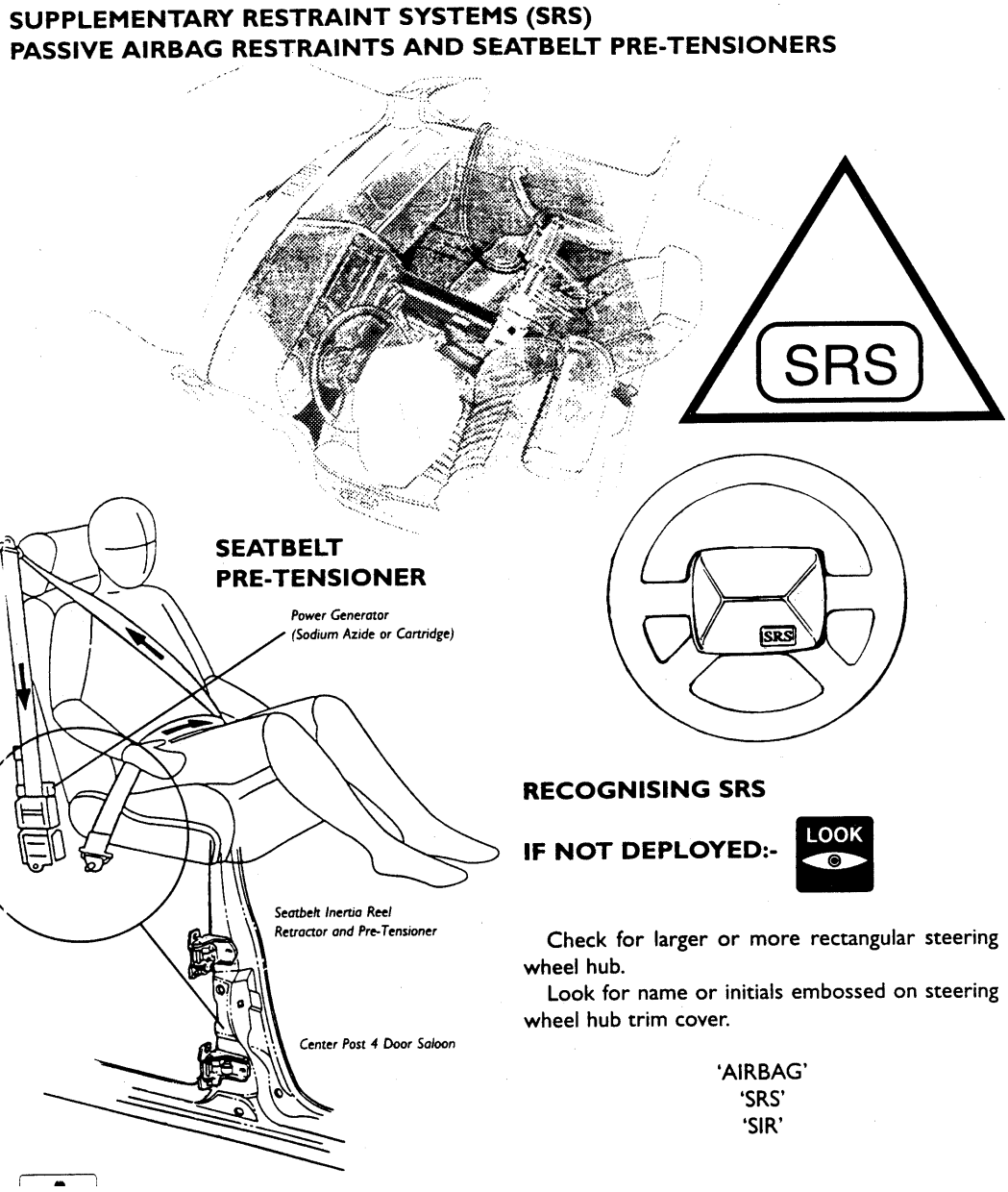
These terms depict the passive restraint system of a vehicle:

- SRS - supplemental restraint system
- SIR - supplemental inflatable restraint

- Drivers side airbag - sodium azide activated
- Passenger side airbag - argon & sodium azide activated

Illustration

The following illustration shows the passive restraint system.



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Terminology

Introduction

It is very important that all members of a extrication team practice proper terminology. When a team member says there is a priority one patient on the right side of the automobile, the member has invited confusion and valuable time could be lost. If the team member states that there is a priority one patient on the passenger side rear, the rest of the team knows right were that patient is located. This section will help familiarize you with the proper terminology we must use on the scene and in our documentation.

Vehicle Terminology

When describing a location on a vehicle, use the following:

- Drivers side
- Passengers side
- Front door
- Rear door
- Hood
- Trunk
- Roof
- Undercarriage
- A-post
- B-post
- C-post
- D-post

Crash Terminology

When describing a crash, use the following:

- T-bone - side impact collision
- Pancake - vehicle with roof flattened
- Under ride - vehicle under another vehicle
- Over ride - vehicle over another vehicle
- Roll over - vehicle that rolled over (position unimportant)
- Pin - person trapped in or by a vehicle
- Ejection - person ejected from vehicle

Continued next page

Extrication Terminology

This is the most important terminology to remember. This is used during the extrication and is a vital part of an extrication team. When performing an extrication, use the following:

- **FREEZE - stop all operations, now. (Safety call)**

- Up on.... - apply power to....
- Power unit - motorized hydraulic pump.
- Spreaders - hydraulic spreading tool.
- Cutters - hydraulic cutting tool.
- Ram - hydraulic pushing tool.
- Combination tool - hydraulic spreading & cutting tool.

Eight Steps of Vehicle Extrication

Introduction

There are eight steps to extrication that we **MUST** use. They are:

- Step #1. **REVIEW** - Review dispatch information
- Step #2. **OVERVIEW** - Conduct initial overview of the scene
- Step #3. **ESTABLISH** - Establish command using the incident command system
- Step #4. **INNER & OUTER CIRCLES** - Establish outer and inner circles
- Step #5. **STABILIZE** - Vehicle stabilization and control
- Step #6. **ACCESS** - Gain access to the patient
- Step #7. **PREPARE** - Prepare vehicle for extrication
- Step #8. **EXTRICATE** - Conduct the extrication

An easy way to remember this is: "**ROE IS APE**"

Continue next page

Eight Steps of Vehicle Extrication (Continued)

Step #1
Review Dispatch Information

Verify the correct location:

- Major intersection?
- Mile markers?
- Accident history at that location?
- Direction of travel?
- Other jurisdictions involved?

Number of vehicles involved:

- Single vehicle accident?
- Multiple vehicle accident?
- How many vehicles should I find?

Types of vehicles involved:

- Automobiles?
- Motorcycles?
- Vans or buses?
- Large trucks?

Number of suspected patients:

- Do I need additional resources?
- Do I need to notify area hospitals?
- Do I need to activate a disaster plan?

Continue next page

Step #1
Review Dispatch Information (Continue)

Type of collision impact:

- T-bone collision?
- Head on collision?
- Roll over accident?
- Chain reaction accident?
- Over ride or under ride accident?

Best approach directions:

- what is my best direction of approach?
- Are any streets closed due to the accident?
- Up hill, up wind, up stream?

Continued next page

Step #2
Conduct the Initial Scene Survey

Ask yourself the following questions:

- Do I see any safety issues that will effect my personnel?
- What do I have?
- How many vehicles are involved?
- How severely are the vehicles damaged?
- How many injured people do I need to plan for?
- Do I have the needed resources en-route?
- Do I need to call for additional resources?
- What effect does the weather have on the rescue?
- Are there any hazardous materials involved?
- What is the best approach for incoming apparatus?

The initial scene survey actually begins prior to your arrival at The accident scene.

The "think, plan, act" process should begin while you are enroute.

Begin to build your "a.p.e.".

- Apparatus
- Personnel
- Equipment

Continued next page

Eight Steps of Vehicle Extrication (Continued)

Step #3
Establish Command using I.C.S.

Establish who the incident commander is:

- ex. Brianwood Chief in command.

Establish and name your command:

- ex. Adams road command.

Provide the initial radio report:

- ex. Two car head on collision with injuries.

Request any additional needed resources:

- ex. Respond an additional engine and rescue to this location.

Report any specific response route information:

- ex. Have all incoming apparatus approach from the south.

Report or request any other needed information:

- ex. Respond additional police cars for traffic control.

Here is an example of how it all should sound together:

> Brianwood Engine 1, is on the scene of a two car head on collision. Brianwood Chief is establishing Adams road command. Respond an additional engine and rescue to the scene. Notify all incoming apparatus to approach from the south. Respond additional police cars for traffic control.

Continued next page

Step #4
Establish Inner and Outer Circles

The Inner and Outer circles are conducted by a two person team, one for the inner and one for the outer circle.

Extreme caution must be used as to not touch any vehicle until both inner and outer circle surveys have been completed and the incident commander gives approval to continue with the extrication process.

One team member establishes the inner circle as follows:

- Conduct a vehicle safety survey, 5 to 10 feet around the involved vehicle(s), looking for vehicle hazards above, in and below the vehicle(s). While looking in the vehicle(s), the member needs to look at the patients condition as well as looking for the possibility of additional patients that may have not been noticed by the reporting source.

The outer circle team member:

- Conducts a scene safety survey, 20 to 25 feet around the accident scene, looking for ejected patients, hazards overhead as well as hazards on the ground.

Once the both circles has been surveyed, report all findings back to command.

When command has the findings from the circles, an Action circle, Tool Staging circle and a Parts Dump area must be established.

- The Action circle is 10 to 15 feet around the involved vehicles and establishes the working area. Only necessary rescuers must be permitted in this area.

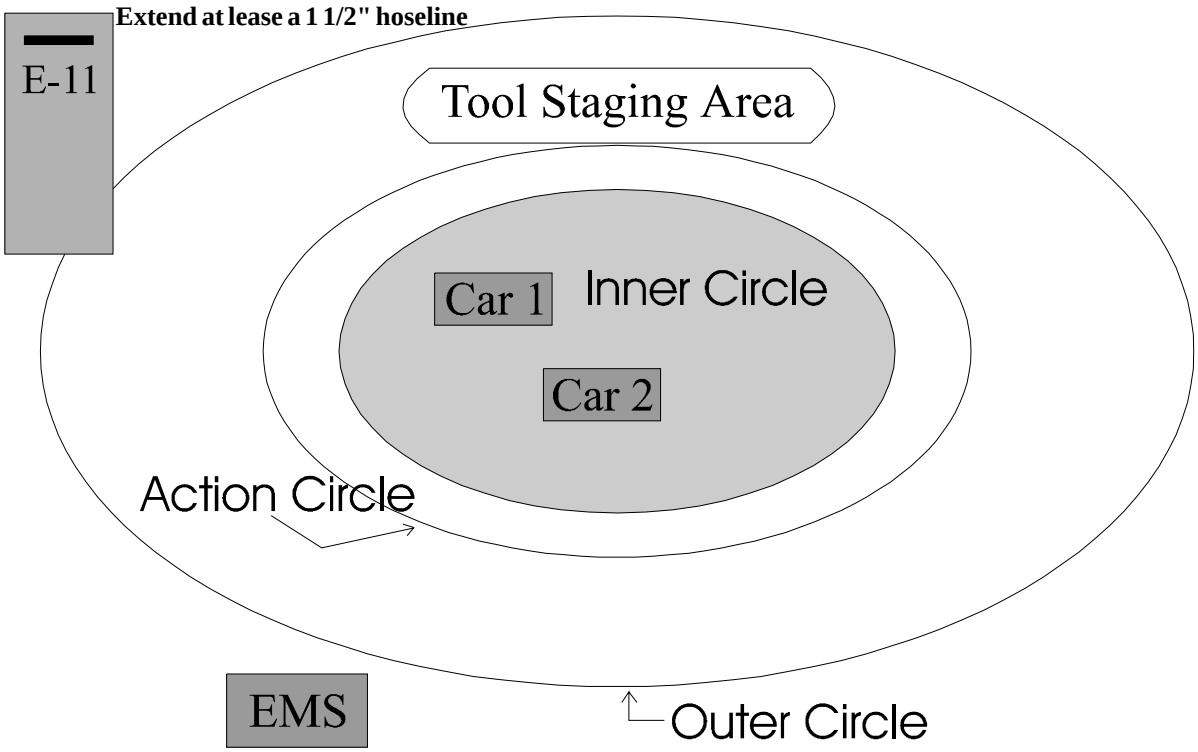
- The Tool staging area is set up at the outside edge of the action circle.

- The Parts dump area is set up at the outside edge of the action circle.

Continued next page

Illustration

The following illustration shows how the Inner, Outer, and Action Circles as well as the Tool Staging Area..



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Eight Steps of Vehicle Extrication (Continued)

Step #5
Vehicle Stabilization and Control

This is our first step in patient care. The total objective of vehicle stabilization is to get the weight off of the vehicle.

Stabilize the vehicle with step chocks, cribbing and wedges at a minimum of six stabilization points:

- Behind the front wheels
- In middle of rocker panel
- In front of rear wheels

If the vehicle needs to be moved, use a jack, a pry bar or the spreaders and don't move it more than necessary. Be cautious not to over crib as this may add additional twisting.

Remember, "Use a jack, or hurt your back".

Once the step chocks and cribbing are in place, command will give the command to flatten the tires to set vehicle on cribbing.

Illustration

In this illustration, you will see the proper placement of the step chocks as well as some cribbing in the trunk area. Remember to crib under the middle of the rocker panel as well.

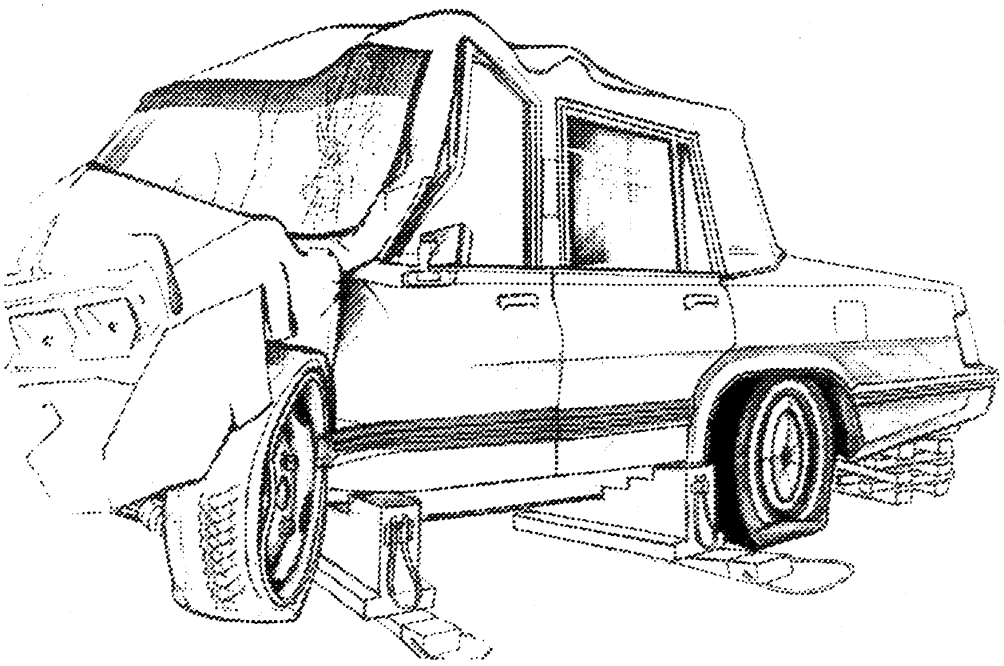

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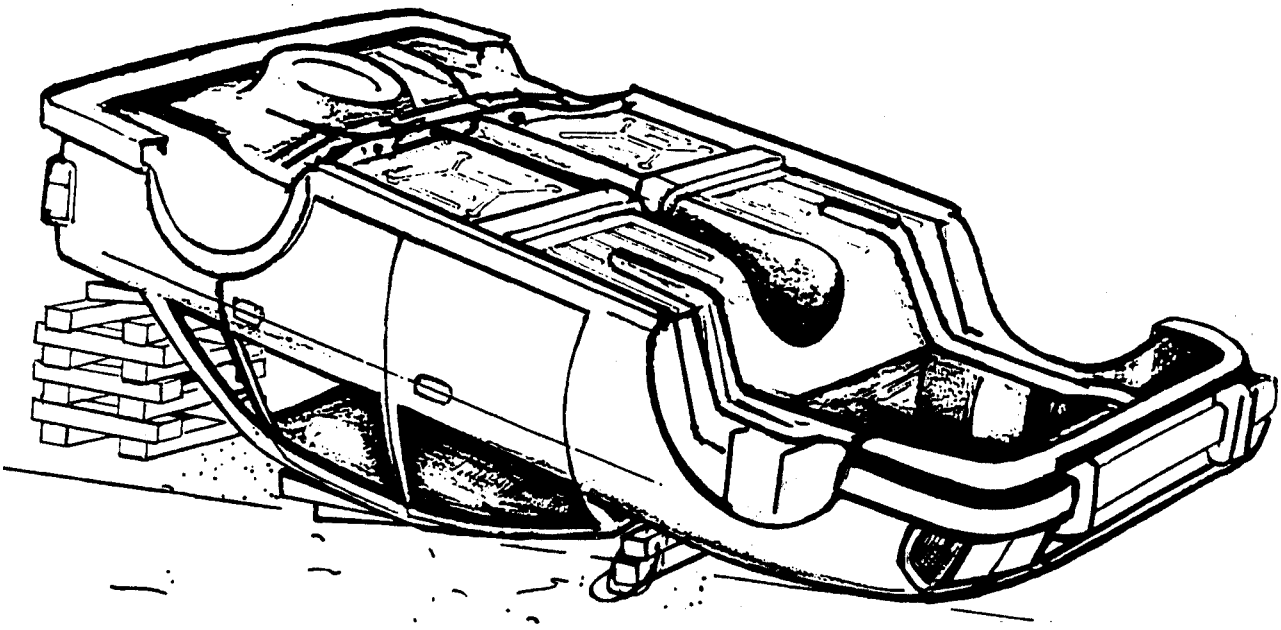
Illustration / Narrative The following illustration and narrative discusses securing an overturned vehicle.



The overturned vehicle which has come to rest on its side or on its roof, needs to be adequately secured, particularly where partial or total collapse of the roof structure has been experienced.

Where the windshield posts remain relatively intact the automobile will, in most instances, by virtue of the weight of the engine, come to rest at an angle, resting on the hood and the windshield posts.

Securing the automobile can normally be achieved simply and quickly by packing between the firewall/bulkhead.and the ground and wedging between the roof structure and the ground. On the larger and more weighty vehicle, cribbing can be used as a support between the trunk and the ground.

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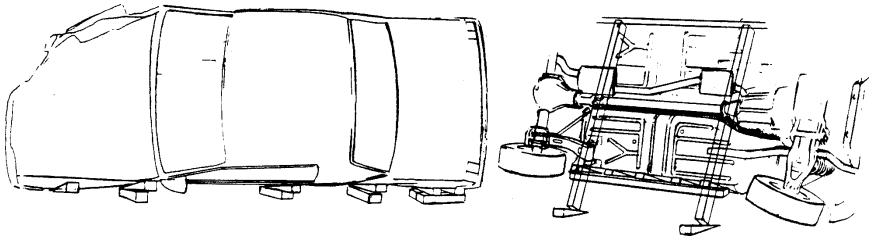
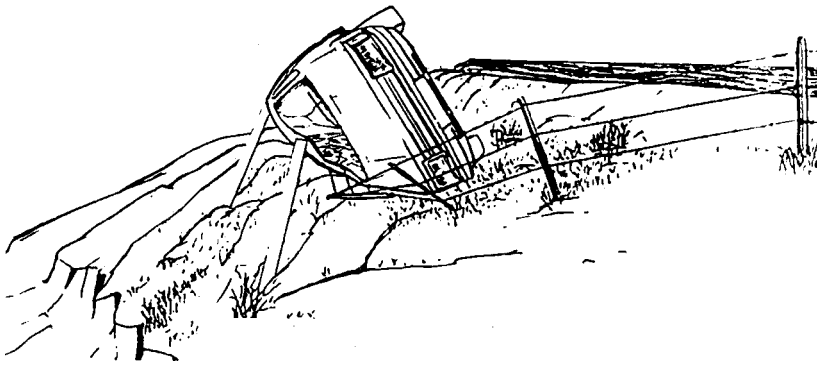
Illustration / Narrative The following three illustrations and narratives discuss securing a vehicle in a precarious position.



The automobile which has come to rest on its side in an on road position, will be relatively stable in so much as it is extremely unlikely to topple over, even with a heavy push. Nevertheless, it needs to be adequately secured to reduce as much movement as possible. Invariably it takes up a common position where its stability is maintained by the road wheels. Where a tire has deflated or a wheel come adrift it will make the vehicle more rickety. Automobiles in this position can be quickly and effectively secured using hi-lift jacks, props, wooden blocks and wedges.



An accident damaged vehicle may have come to rest on its side or roof, on uneven ground, a ditch or incline, or in a precarious position where it lies in an unstable condition. The circumstances may exist where any movement may alter the balance, further threatening life and limb. It is imperative to realistically secure the vehicle. If to proceed would mean taking a risk, the rescuer would then be jeopardizing their own well-being as well as compromising the situation.

We are not in the business to add to any existing danger and it will do well to remember that an injured rescuer is of no help to anyone and will detract from the overall efficiency of the operation. At worst, the accident can be turned into a disaster, likely to leave an indelible stigma on the service as a whole.

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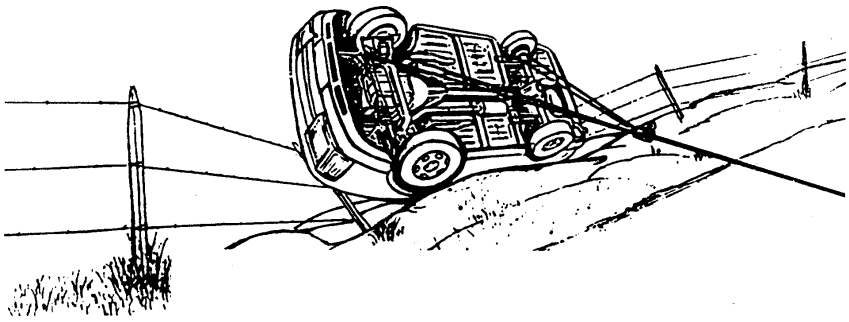
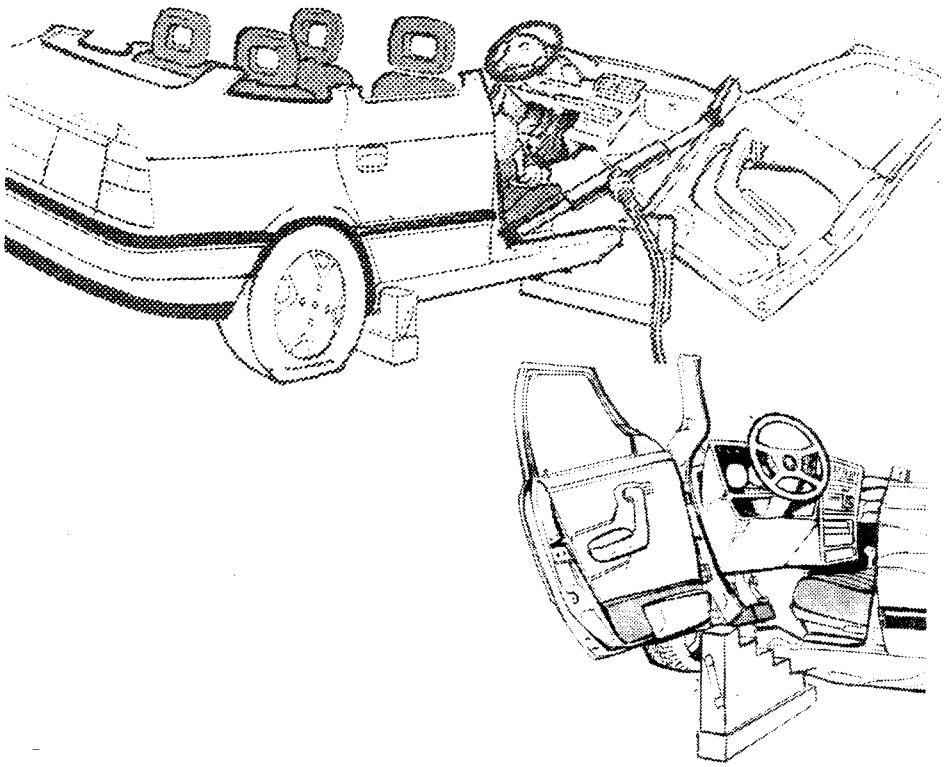
Illustration / Narrative (Continued)



Air bags, in conjunction with blocks/cribbage, are most suitable in securing a vehicle on soft or uneven ground. Portable or permanently fixed winches are an absolute necessity when faced with a vehicle in a precarious position. It would be unrealistic to secure a vehicle with a rope, except as a temporary measure, as the vehicle's weight may overcome the integrity of the rope. Where there is any shifting in the load, we should realize that the risk will be increased as rescuers climb in or onto the vehicle. Elasticity in the rope/ropes will be prone to allow shifting in the vehicle, loosening blocks or cribbage, particularly on soft or uneven ground.

Continued next page

Illustration / Narrative The following illustration and narrative discuses progressive stabilizing during evolutions.



The status of a stabilized vehicle can be altered when carrying out certain evolutions. It is essential to maintain a realistic balance and keep control of the situation at all times.

It is advisable to progressively support the vehicle when conducting evolutions such as 'dash roll up', 'traction pulling' and 'air bagging'. Any slack or movement should be taken up immediately by additional racking or cribbing.

Purpose designed stepped wedges are easily instated and offer a distinct advantage in controlling lifting and movement.

Stepped wedges can be most useful when conducting 'dash roll up'. As the dash is rolled forward and the floorboard raises, the wedge can be pushed further home to support the underside of the vehicle. A suitable wedge should also be inserted into the relief cut at the base of the front door post.

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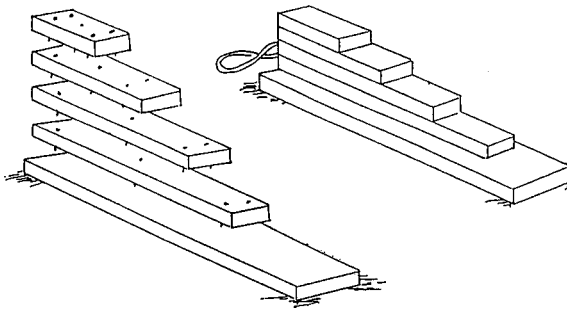
Illustration / Narrative The following illustration and narrative will help you design step chocks and wedge cribbing.

Step Chock Cribbing



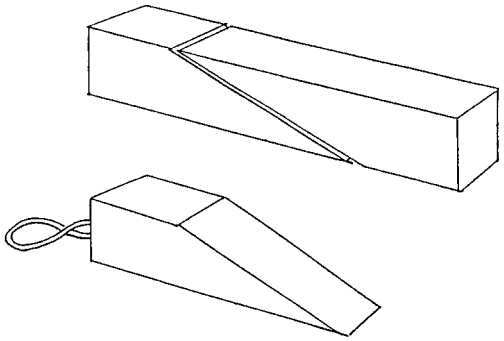
1. Make step chocks a size that will fit into the storage space on your unit.

2. Use 2" x 4" wood for the "steps" and 2" x 6" wood for the "base". The top step should be 5 or 6" long and each "step" increasing in size by 4 to 6" depending on the final overall length desired.

3. Nail, screw, or use wood dowels to-attach each piece, also use glue between each piece, this will add to the overall strength.

4. Place a rope handle at the end to assist in carrying the chock.

Wedge Cribbing



1. Cut a 4" x 4" crib in half with a diagonal cut starting 4" from the end.

2. Go to the other side with the cut to a point 4" from the opposite end.

3. Remember to make the wedges the right size for storage in the unit.

4. Mark the ends with a "W" for ease of identification. Place a rope handle on the end to assist in carrying.

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Step #6
Gain Access to the Patient

Remember the phrase, "Try before you pry"? Try opening the doors before you try breaking glass.

If you have to remove the glass to get in, start with the door or window furthest from the patient and announce "**Removing glass**" prior to removing the glass. Tell the patient that they are going to hear the glass break. Keep in mind that the rear window provides the largest access point. From here you can get someone inside to start patient care.

Once the glass is broken or you have gotten someone inside, place the vehicle in park, turn of the ignition, and remove the keys. Roll down the windows and unlock the doors.

Continued next page

Step #7
Prepare the Vehicle for Extrication

This is where command has to have the ability to control many things at one time. The following items can all be done at approximately the same time.

- Disconnect battery
  - Negative cable first and then tape off ends in order to avoid sparking
- Remove antenna; and if necessary, windshield wipers and exterior mirrors
- Remove all necessary glass
  - If you can roll down the window, leave about 1 inch of the glass showing. When you break the glass, it will collapsed into the door cavity. Make sure that you announce "**Removing glass**" prior to breaking the glass
  - Windshields are constructed of two layers of glass with a center layer of plastic and must be cut in order to be removed. They can be cut with saws, an axe or specialized tools
  - Side and rear windows are tempered glass and require 2,000 p.s.i. to break. When broken, they shatter into tiny pieces. These windows can be broken with a center punch or windshield wiper
- Make tool purchase points
- Constantly recheck vehicle stabilization

Continued next page

Eight Steps of Vehicle Extrication (Continued)

Step #8

Conduct the Extrication

Extrication is the removal of the vehicle from around the patient, Not the removal of the patient from the vehicle. When performing an extrication, you need to remember the golden hour and platinum ten minutes and use the following guidelines:

- Keep an open mind
- Recheck vehicle stabilization frequently
- Establish a back up plan
- Improvise, adapt, overcome

Our motto should be "Do no further harm"

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Extrication Options

Introduction

The following unit will discuss many different extrication options that you can use on a scene. These options are suggestions only. Use the extrication plan developed by your station when on scene. In this unit we will discuss the following options:

- Roof removal.
- Roof flap, back
- Roof flap, front
- Roof flap, side
- Door removal, latch side
- Door removal, hinge side
- Third door conversion
- Side removal, complete
- Side removal, fold down
- Side removal, front hinged
- Dash roll
- Dash lift
- Interior components

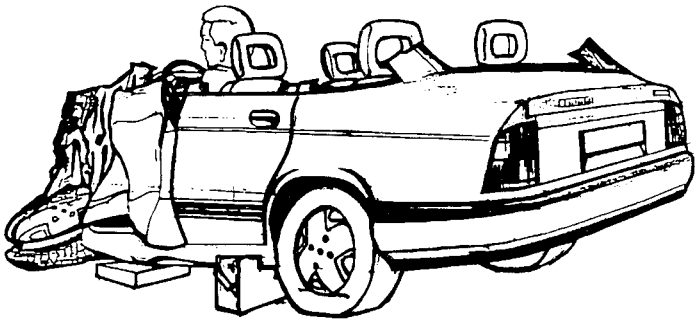
When performing one of the before mentioned options, remember that no one option may be right for your situation. The options mentioned here are just recommendations. You need to train using the options of your station.

Continued next page

Roof Removal

For a roof removal, use the following guidelines

- Open all doors which can be opened by hand
- Provide patient protection
- Cut front and rear seat belts
- Cut both A-posts at their mid points
- Cut both B-posts at the bottom
- Cut both C-posts
  - At the top on a two door
  - At the bottom on a four door
- Cut both D-posts
  - No D-posts on a two door
  - At the top on a four door
- Remove the roof to a safe location
- Be sure to support the roof during the cutting process
- Watch out for seat belt mounting plates when cutting
- Watch out for struts, remove them, do not cut them



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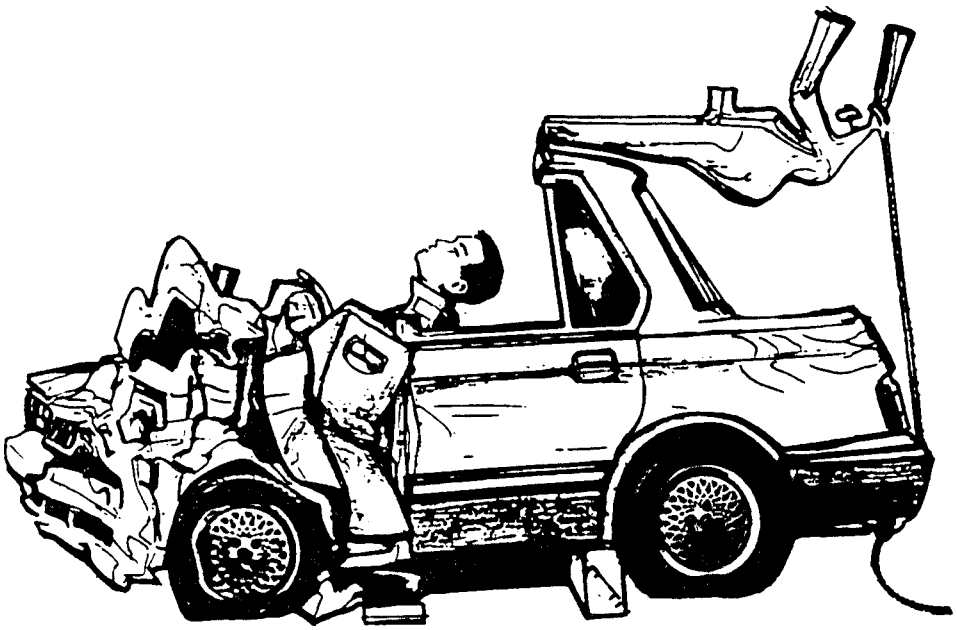
Roof Flop or Flap, Back

For a roof flop or flap to the back, use the following guidelines:

- Open all doors which can be opened by hand
- Provide patient protection
- Cut front and rear seat belts
- Cut both a-posts at their mid points
- Cut both b-posts at the bottom
- Cut both sides of the roof in front of the c-posts
- Fold roof back at cut points and secure to the vehicle
- Be sure to support the roof during the cutting process
- Watch out for seat belt mounting plates when cutting
- Watch out for struts, remove them, do not cut them



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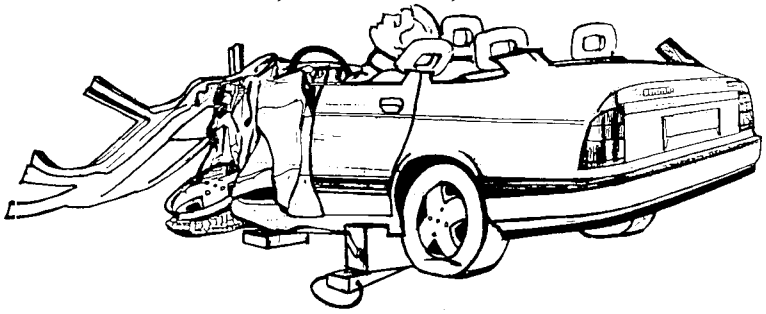
Roof Flop or Flap, Front

For a roof flop or flap to the front, use the following guidelines:

- Open all doors that are which can be opened by hand
- Provide patient protection
- Cut front and rear seat belts
- Cut both d-posts
  - No d-posts on a two door
  - At the top on a four door
- Cut both c-posts
  - At the top on a two door
  - At the bottom on a four door
- Cut both b-posts at the bottom
- Cut both a-posts at their mid point
- Fold roof forward using the windshield as a hinge
- Secure the roof to the vehicle
- Be sure to support the roof during the cutting process
- Watch out for seat belt mounting plates when cutting
- Watch out for struts, remove them, don't cut them



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Roof Flop or Flap, Side

For a roof flop or flap to the side, use the following guidelines:

- Provide patient protection
- Cut front and rear seat belts
- Cut all the posts on one side (driver or passenger)
- Make relief cuts on the roof in the area of the front windshield and in the area of the rear window
    - cuts should be made on the opposite side of the roof, maintaining enough distance from the posts to allow a proper fold
- Fold the roof to the side and secure to vehicle
- Be sure to support the roof during the cutting process
- Watch out for seat belt mounting plates when cutting
- Watch out for struts, remove them, don't cut them unless properly trained

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Door Removal, Latch Side

For a door removal, latch side, use the following guidelines:

- Provide patient protection
- Cut door mounted seat belts
- Gain access to the door latch
  - Use the tip of a prying tool
  - Fold door skin back with spreader tips
  - Spread between roof rail and window line
  - Squeeze door panels together with spreaders
- Place spreader tips above door latch and force open
- Relocate and secure the door in the open position
- If necessary, try spreading above the hinges
  - This puts the spreader in the patient compartment
- Do not attempt to cut the nader safety latch
  - It is a hardened, single ended object, and it may release with a violent force

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Door Removal, Hinge Side

For a door removal, hinge side, use the following guidelines:

- provide patient protection
- Cut door mounted seat belts
- Gain access to the door hinges
  - Use tip of prying tool
  - Fold door skin back with spreader tips
  - Squeeze front fender with spreaders
- Place spreader tips above top hinge and force open
  - This may also force the bottom hinge to open
- Place spreader tips above bottom hinge and force open
  - If door is forced into the ground, relocate the spreader tips to below the bottom hinge and force open
- Attempt to remove the door from the latching device by using the door handle
- If necessary, place the spreader tips above the latching device and force the door open
- If necessary, the door hinges may be cut
  - Use extreme caution
  - Cast hinges may shatter
  - Stamped hinges usually cut uneventfully

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Third Door Conversion

For a third door conversion, use the following guidelines:

- provide patient protection
- Cut door mounted seat belts
- Remove the front door
  - Latch side door removal
  - Hinge side door removal
- Cut b-post at the top
- Remove interior trim from body side panel
- V-cut the bottom of the body side panel
- Cut or crush the body side panel in front of the c-post
- Insert the spreader tips into the v-cut and spread the body side panel away from the rocker panel
  - This technique should tear apart the tack welds
  - That are used in unibody construction
- Fold body side panel back and secure to vehicle
- Watch out for seat belt mounting plates when cutting

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Side Removal, Complete

For a side removal, complete, use the following guidelines:

- Provide patient protection
- Cut front and rear seat belts
- Open / remove the front door using the hinge removal technique
- Open / remove the rear door using the latch removal technique
- Cut b-post at the top
- Cut b-post at the rocker panel
  - It may be necessary to make several cuts, alternating between the b-post and the rocker panel
- Remove the vehicle side to a safe location
- Be sure to support the vehicle side during the cutting process
- Watch out for seat belt mounting plates while cutting

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Side Removal, Fold Down

For a side removal, fold down, use the following guidelines:

- Provide patient protection
- Cut front and rear seat belts
- Open / remove the front door using the latch removal technique
- Secure the door in the open position
- Open / remove the rear door using the latch removal technique
- Cut b-post at the top
- Crush the rocker panel on both sides of the b-post
- Partially close the rear door
- Fold the rear door and b-post down
- Be sure to support the side during the cutting process
- Watch out for seat belt mounting plates when cutting

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Side Removal, Front Hinged

For a side removal, front hinged, use the following guidelines:

- Provide patient protection
- Cut front and rear seat belts
- Open / remove the rear door using the latch removal technique
- Cut b-post at the top
- Cut b-post at the rocker panel
  - In may be necessary to alternate between cutting the b-post and the rocker panel
- Open the rear door, b-post and front door assembly on the front door hinges
- Secure the side assembly to the vehicle
- Be sure to support the side during the cutting process
- Watch for seat belt mounting plates when cutting

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Dash Roll

For a dash roll, use the following guidelines:

- The ram is the tool of choice for a dash roll
- Provide patient protection
- Place additional cribbing in front of both b-posts
- Open / remove the door on one side. Removing both doors and then lifting on only one side could cause the dash to shift.

Note: Depending on patient location and/or number of patients, removing both front doors, cutting both a-posts and ramming both sides of the vehicle may help the operation

- Make relief cuts at the bottom the dashboard on the a-post
- Remove plastic and rubber trim from the ram contact points
- Place a ram support approved by you tool manafacturer againt the b-post
- Position ram with the lower end in the ram support and the upper end against the bend in the a-post
- Make sure that the rams have good metal to metal contact
- Extend the ram in order to roll the dash and steering wheel
- Provide progressive cribbing and wedging in the areas of the relief cuts
    - This provides for a safety margin in case the rams slip out of place during the push
    - This also allows for ram removal at the end of the push to provide additional room for patient removal
    - Cross pulling may also be used

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Dash Lift

For a dash lift, use the following guidelines:

- Provide patient protection
- Place additional cribbing in front of both b-posts
- Remove both front doors
- Make y-cuts at the bottom of the dashboard on the a-posts
- Place spreader tips in the open area of the y-cuts
- Open spreaders in order to lift the dash and steering wheel
- Provide progressive cribbing and wedging in area of relief cuts
  - This provides a safety margin in case the spreaders slip out during the lifting process
  - This also allows the spreaders to be removed in order to provide for additional space for patient removal
  - Cross pulling may also be used

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Interior Components

For interior components, use the following guidelines:

- Trapped by the steering wheel
  - Provide patient protection
  - Do not pull steering wheels in front wheel drive cars or cars equipped with tilt steering wheels
  - Check to see if the steering wheel will tilt
  - Attempt a dash roll or dash lift
  - Cutting spokes is safer than cutting the ring
  - Use caution around undeployed air bags
  - Cutting the steering wheel or column may cause an undeployed air bag to deploy
- Trapped by the pedals
  - Provide patient protection
  - Wrap pedal with a rope or strap
  - Pull rope or strap to side in order to bend pedal arm
  - Wrapping the rope or strap around the door and pulling the door open mat provide additional leverage
  - If necessary, the pedal arms may be cut

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Interior Components (Continued)

- Trapped by the footwell
  - Provide patient protection
  - Use realistic anchor points
  - Provide metal to metal contact for rams by removing rubber and plastic trim, as well as carpeting
  - Operate rams with extreme care
  - Provide additional cribbing and wedging as necessary