



**Fire Cadet
Training Module**

Vehicle Extrication - Stabilization

**Fire Cadet Program
Calgary Fire Department**

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OBJECTIVES

After you have completed this module, you will be able to:

- Define the Golden Hour and the Platinum Ten
- Understand the roles and responsibilities of every member on scene
- Understand the basics of stabilization:
 - Stabilize the scene
 - Stabilize the vehicle
 - Stabilize the patient

INTRODUCTION

This module provides information on the Calgary Fire Department methods of hazard identification and scene management at vehicle accidents. It explains the methods of stabilization from scene safety, to vehicle stabilization, to caring for the patient.

CRITICAL RESPONSE TIMES

The Golden Hour

The Golden Hour is used to describe the critical period that exists for the patient from the time of the incident until the patient is delivered to physicians at the hospital. In just one hour, the patient must be located, extricated, transported, medically stabilized in the emergency department, and delivered to a surgical team. This means that the time allotted to pre-hospital care workers is very short.

The Platinum Ten

Ideally, the patient should be en route to the hospital within 10 to 15 minutes of the arrival of the first rescue. This 10-minute time frame is called the Platinum Ten.

Proper scene size-up and extrication techniques will help rescue crews to work within these critical time frames. The combination of time, established procedures, and overall scene safety is critical to the patient's chances for survival and recovery.

ROLES AND RESPONSIBILITIES

To facilitate the efficient use of manpower and equipment, crews attending extrication incidents should know specifically what tasks they are responsible for performing. When used properly, the Incident Command System adapts well to technical rescues or vehicle extrications and results in a better managed incident.

Accidents vary greatly. By standardizing an approach to extrication scenes, our efforts will be simplified, no matter how complicated the specific scene. Maintaining solid extrication protocols saves time and assures the safety of everyone involved.

The roles and responsibilities outlined in this section will be explained in detail under the Stabilization heading of this manual.

Engine Crew Responsibilities

When the Calgary Fire Department responds to a motor vehicle collision, it is often the Engine crew that arrives first at the scene, which makes them responsible for the initial assessment. Once on scene, the Rescue crew joins the rescue effort, but in many cases the Engine crew does most of the initial work on their own.

The responsibilities of the Engine crew during extrication have been expanded to enhance the efficiency of the overall extrication. It is expected that crews are capable and familiar with the operation of the tools and equipment used at a motor vehicle accident (MVA). The Engine crews responding to a MVA will have various responsibilities depending on their arrival time.

Tool use and associated skills must be practiced regularly to maintain a high level of competence.

First on Scene

- Provide initial radio report to Dispatch and incoming apparatus.
- **Stabilize the scene.**
 - ◆ Carry out inner and outer circle surveys.
 - ◆ Perform hazard management.
 - ◆ Set up and maintain traffic control (pylons, strobes, directing traffic flow).
 - ◆ Initiate initial patient contact.
 - ◆ Determine and initiate a plan of action.
- **Stabilize the vehicle(s).**
 - ◆ Set up blocking or step blocks.
 - ◆ Start glass management.
 - ◆ Determine purchase points.
 - ◆ Begin cutting posts if necessary.
- **Stabilize patient(s).**
 - ◆ Create patient access.
 - ◆ Perform inside rescuer duties.

Rescue on Scene

- Assist first crew on scene with extrication (Rescue Officer is extrication sector command).
- Stage tools.
- Ensure proper application of hydraulic, electrical, and hand tools
- Help clean up after extrication.

Rescue Driver Responsibilities

When arriving on the scene, Rescue crews will often find that the Engine crew has already established vehicle stabilization and as well as a purchase point. In a scenario such as this, the Rescue driver should focus on the following tasks:

- Communicate effectively with Rescue Officer and spot rig appropriately
- Continue size-up on approach and assess the scene and vehicle
- Initiate tool staging while officer continues assessment and directs the extrication operation.
- Stage all the required tools as Engine crew begins scene and vehicle stabilization
- When tool staging is complete, report to Rescue Officer

Officer Responsibilities

Officers have a number of responsibilities when arriving at the scene of an accident, and proper Incident Command guidelines must be followed.

Engine Officer

The following is a list of officer duties at a MVA scene:

- Conduct initial assessment of the scene.
- Spot Engine in a visible area but provide access for incoming rigs.
- Keep Dispatch and incoming apparatus updated on scene (assume command).
- Conduct an effective assessment of the scene (formulate a plan).
- Read the wreck.
- Identify and manage hazards.
- Sector the scene when necessary (e.g. SSV or Traffic Control Sector, Extrication Sector).
- Ensure proper scene, vehicle, and patient stabilization is initiated by Engine crew.
- Maintain incident command throughout the call.
- Communicate with other agencies that are on scene.
- Keep dispatch updated to the progress of the extrication. Are any more resources or agencies required?
- Terminate command.

Extrications coordinated by one incident commander will evolve smoothly.

Rescue Officer

- Take command of the extrication sector.
- Help formulate a plan and inform Incident Command.
- Co-ordinate simultaneous tasks pertaining to the extrication (plan ahead).
- Maintain highly visible location (be seen by the crew).
- Assure a safe work area and safe procedures within this sector.
- Update incident command as extrication proceeds.
- Be a valuable resource (know your rig and extrication procedures).

Personal Safety

The personal safety of the patient and the rescuers is always the top priority. Flying glass, sharp metal, plastics, hazardous chemicals and combustible petroleum products are present at vehicle extrication scenes.

Always wear full duty gear:

- Helmet for head and eye protection.
- Protective coat, pants, gloves, and footwear.

Since many accidents scenes are managed in the presence of traffic, high visibility outer wear should be considered part of the personal protective equipment.

Plastic parts of vehicles have rapid, violent burning potential. When a fire burns, it creates a mixture of hydrogen-sulphide gas which is absorbed through the skin and not through the lungs. Because of deadly gasses and dense smoke, use self-contained breathing apparatus, when fighting vehicle fires.

Rescuers without the proper protection are taking unnecessary risks, and can be a liability, rather than an asset, to the situation.

STABILIZATION

The process of stabilization encompasses not only the vehicle, but the entire extrication process from arrival to termination. A systems approach to extrication has been developed around the stabilization theory. Stabilization, in this broader sense, is considered to have three phases:

1. **Scene stabilization.**
2. **Vehicle stabilization.**
3. **Patient stabilization.**

The tools and techniques used in vehicle extrication are applied to any situation where a patient must be removed from an area of entrapment. Although there are an infinite variety of situations, for most extrication operations, scene-vehicle-patient is the logical sequence. Particular elements of each phase may overlap or occur at the same time. In some exceptional situations, the order of phases may change.



Rescue Crews Must Stabilize the Scene and the Vehicle at This MVA before Treating the Patient

Stabilize the scene

Scene stabilization actually begins upon receipt of the call as crews begin to visualize and assess the situation and will continue throughout the entire extrication process.

Dispatch

Dispatch is actually the first element of size-up. Because reports of auto accidents are often received from cell phone callers, critical information may not be available to responding crews upon receipt of the call.

As much information as possible should be obtained from Dispatch:

The number of vehicles involved

- The number of patients.
- Location.
- Direction of lane.
- The best roadway access.
- Special hazards.
- The need for additional resources.

Do not overlook any information received during dispatch.

From this information, responding crews can begin to form a mental image of the incident and can prepare tentative plans subject to additional information gathered en route as well as any prior knowledge of the roadway or area.

The size-up initiated on receipt of the call will be enhanced as it moves into the second phase of size-up after the “point of perception.”

All crew members should arrive in full turnout gear including latex gloves (usually worn underneath the leather gloves). If there are multiple patients, consider double gloving.

Initial Visual Contact (Point of Perception)

The first arriving crew to a MVA should commence a visual assessment of the scene. This second-phase of the initial size-up will provide the officer with information to include in the arrival report.

More information to complete the assessment will later be provided by crews and allow the officer to formulate a plan.

Arrival

The Incident Commander should always spot the apparatus according to requirements of the incident, making certain to leave room for other incoming apparatus (the Rescue, ambulance, police vehicles, and other fire department apparatus).

Spotting Apparatus

Listed below are a few additional considerations for spotting the apparatus:

- ♦ Park the apparatus in fend off position as described in the Rescue traffic management manual to protect the crew and the scene
- ♦ Consider the level of the ground (spills can flow towards the apparatus depending on the direction of the slope).

Apparatus spotting and traffic control should be done in accordance with Calgary Fire Department Emergency Traffic Management protocol.



Emergency Traffic Management at MVA Scene

Follow the Calgary Fire Department's Emergency Traffic Management guidelines when positioning apparatus and for traffic management during the extrication.

Assuming Command

The following sequence is the protocol followed by the Calgary Fire Department:

- ◆ The officer of the first arriving crew must assume command and remain in a highly visible location.
- ◆ The officer will provide an initial radio report to Dispatch and incoming apparatus, be it an Rescue or another Engine crew. The officer's arrival report should include the following details:
 - Unit identification
 - Location of incident
 - Brief description of incident
 - Confirmation of command

The officer will maintain control of the scene, assign and control additional incoming apparatus and resources (as per fire ground command), and appropriately reassign crew members as required.

Continuing Size-Up

Along with establishing command at the scene, the incident commander should complete a proper size-up by looking for obvious hazards before leaving the apparatus:

- ◆ Fuel
- ◆ Electricity
- ◆ Hazardous materials
- ◆ Fire
- ◆ Traffic

Rescuers must continue to assess the entire scene before approaching the vehicle or vehicles. The tendency to immediately focus on victims of a crash can result in rescuers overlooking dangerous conditions. When assessing the scene, the big picture must be observed:

- ◆ Hazards associated with the ground:
 - leaks, slopes, terrain, traffic, skid marks, other vehicles, downed power lines
- ◆ The vehicle
 - (read the wreck, smoke or fire, victims, unstable conditions)
- ◆ The area above the vehicle
 - Power lines or poles, trees, debris.
- ◆ Read the wreck.
 - The type of vehicle, type and severity of crash determines mechanisms of injury. Nature and severity of injuries will direct rescue tactics.

The incident commander should assess the need for more assistance. This is to be done according to the number of patients, vehicles and other circumstances and as soon as possible.

Use your senses; sight, smell, and hearing to aid in your assessment of the scene.

Establishing a Perimeter

The commander and the crew must establish a perimeter around the scene to keep the working area clear of bystanders, media, and others not directly involved in the incident. The size of the perimeter will depend on the area involved.

Initial Set Up

During the initial set-up at an incident, a hose line and/or dry chemical extinguishers should be in place (and manned if possible) in case a fuel or fume hazard is identified. This is for the safety of both the patient and the working team members. The potential of fire caused by shorted electrical systems, leaking fuel, hot parts of the car, or a careless bystander is always present.

Crew members not involved in the inner and outer circle surveys should determine an action circle and a staging area in order to begin staging the tools that may be required in the extrication.

Determining an Action Circle

Once extrication efforts begin, the rescuers will be working within the "action circle." The action circle is a working area around the extrication scene that is kept clear of all non-essential items:

- ◆ The action circle should involve an area extending outward 10 to 15 feet in every direction around the entrapment area (it may be larger, depending on hazards or the number of vehicles).
- ◆ Keep the action circle as clear as possible of non-essential personnel, any tools that are not in use, and any parts that have been removed from the vehicle(s).

Securing an action circle prior to staging tools and beginning the extrication will enhance efficiency and safety.

Staging Tools

The tool staging area is a strategically located work area for all of the crew members working at the scene. It provides a recognizable spot where tools and cribbing can be found when needed:

- ◆ Designate a spot outside of the action circle where tools can be found when needed.
- ◆ Clear the area of debris if it represents a hazard.
- ◆ Layout a staging tarp on which to place the tools.
- ◆ Place tools back on a staging tarp when not in use.
- ◆ First aid kits, stretchers, and backboards should remain out of the action circle until the team is ready to use them.
- ◆ Oil or other slick surfaces found within the action circle should be covered

with absorbent material (X-orb) only if they are a hazard.

- ◆ Blood and other body fluids should not be covered.

As incoming units arrive, they can stage their tools on the same tarp. This makes it easy for everyone to find the tools, especially if it's a multi-vehicle accident.

Scene Surveys

While tools are being staged, the crew can begin the inner and outer circle surveys. These crucial assessments will enable the crew to determine potential hazards, the number of patients involved, and the degree of entrapment.

Outer Circle Survey

In the outer circle survey, one or two rescuers will do a complete walk around the vehicles to determine the overall conditions at the extrication scene:

- ◆ Make a wide sweep around the vehicles.
- ◆ Look toward the vehicles and out around the perimeter of the scene.
- ◆ Check for victims that may have walked away or have been thrown from the wreckage.
- ◆ Check for hazards, and any potential problems.
- ◆ Ask bystanders what happened, and what they saw.

The size of the outer circle will be determined by the speed of the roadway, the type of crash, the time of day, the terrain of the crash area, or any evidence of missing patients.

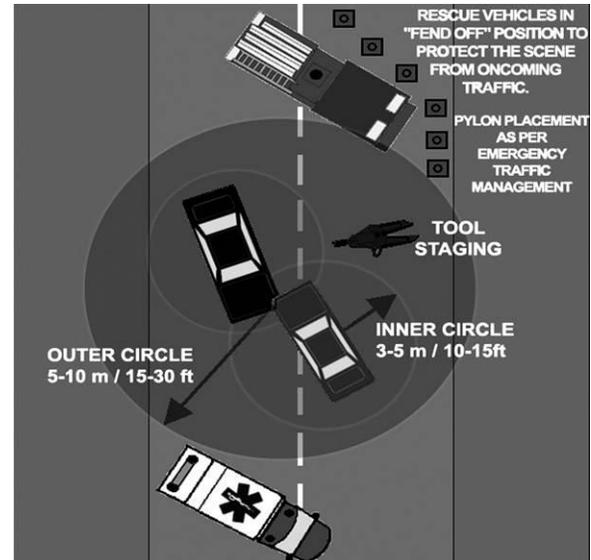
Always remember to do a full search for other possible patients.

Inner Circle Survey

At the same time as the outer circle survey is being performed, one or two rescuers will perform an “inner circle survey” to determine the specifics of the extrication scene.

- ◆ Approach vehicle from the front and make verbal contact with patient or patients. If manpower permits, maintain contact with the patient. If you must leave the patient, reassure him or her that help has arrived and all will be well.
- ◆ Approach burning vehicles from corners with SCBA and a charged line. Be aware of explosion hazards in burning vehicles such as airbags, magnesium components, and gas struts.
- ◆ Walk immediately next to the vehicle(s), looking for trapped patients, hazards underneath the car, or on the ground next to the vehicle.
- ◆ After ensuring the vehicle is not energized, check the doors, and also determine the number of patients, the degree of entrapment, the presence of occupant safety devices (deployed or not), and the type of vehicle fuel.
- ◆ If practical, place stabilization blocking close to the vehicle but do not begin to stabilize until the inner circle is complete, or on direction from the officer.

It should take about 30 seconds from the time the team leaves the apparatus to the time the vehicle situation is evaluated and reported to the officer.



Scene Stabilization – Inner and Outer Circles, Tool Staging Area and Emergency Traffic Management

As soon as the vehicle is determined to be free of hazards, management of the vehicle and the patient can begin. Never touch a vehicle unless you are certain that the vehicle is not energized by downed wires, underground electrical feeds, or other sources.

Hazard Management

Identifying and managing hazards at an extrication scene is the responsibility of all personnel involved. Hazard awareness and management continues throughout the call and the termination phase.

Existing and potential hazards are managed in one of the following ways:

- ◆ Hazard is rectified, e.g., the fire is extinguished or oil is covered with X-orb.
- ◆ Hazard is monitored and all personnel are made aware, e.g., undeployed airbags or electrical hazards in hybrid vehicle.
- ◆ A sector is assigned to manage the hazard, e.g., a SSV is assigned to traffic management.



Scene Stabilization Entails Managing or Monitoring Hazards

Hazards associated with the vehicle (or area of entrapment) may include the following:

- ◆ Unstable vehicle, equipment or parts.
- ◆ Energized vehicle from on-board or external source.
- ◆ Unstable or hazardous cargo.
- ◆ Fuel leaks (including propane, natural gas, electrical, gasoline).
- ◆ Vehicle or equipment debris.
- ◆ Loaded bumpers or body panels.
- ◆ most cars built from 1973 to the mid 1980's have shock absorbing bumper mounts that can be compressed and held in place by twisted metal, which can spring out and cause injuries.
- ◆ Occupant safety devices not deployed in crash.
- ◆ Beware of other hazards such as jagged metal, loaded bumpers, etc.

Hazards associated with the terrain or environment may include the following:

- ◆ Traffic (refer to Emergency Traffic Management).
- ◆ Slippery or steep terrain.
- ◆ Ice, snow, rain, extreme temperatures.
- ◆ Inadequate lighting.

Make everyone aware of the hazards upon discovery.

When both the outer and inner circle surveys have been completed, size-up has been enhanced, and the scene has been assessed for hazards, the second phase of size-up is considered complete. The final phase of size-up is ongoing throughout the extrication operation and consists of managing or monitoring hazards which have been identified and continuing to identify hazards that may develop.

The purpose of establishing command, completing the surveys and establishing the tool staging area and action circle, is to render the scene as safe and efficient as possible.

Stabilize the Vehicle

Stabilization, as it relates to the vehicle, is the creation of a solid platform that will prevent the vehicle from shifting (or possibly rolling) during the extrication process.

Whenever patient care is initiated by Calgary Fire Department personnel, basic stabilization must be in place first. This applies to any incident that requires extrication:

- Building or structural collapse.
- Industrial and agricultural equipment.
- Technical rescues.

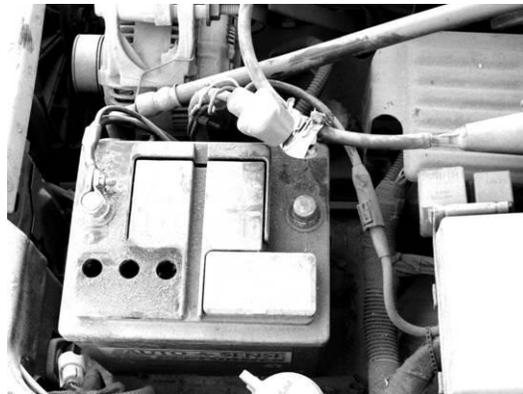
Stabilization of the scene and vehicle (or machine) must always be addressed before any attempt is made to free trapped individuals. Even patient care, which is our ultimate objective, cannot obscure the need for assuring rescuer safety.

Initial Stabilization

Initial stabilization may simply involve blocking the wheels to stop the vehicle from rolling in either a forward or backward direction; however, in some circumstances more aggressive stabilization may be required prior to making it possible for the rescuer to safely reach the patient.

- For initial stabilization of the vehicle, bring the appropriate cribbing with you from your apparatus or staging area.
- Depending on the situation, the next step of vehicle stabilization may be as simple as placing the car in park, turning it off, and removing the keys.
 - ◆ This should be done even in situations where patients are out of the car when rescuers arrive.
 - ◆ Due to the possibility of fire, the battery(s) of the vehicle(s) involved in the crash must also be disconnected as soon as possible.

Wrap the Clamp with Tape to Prevent Contact with the Battery Post



Generally, vehicles involved in crashes will be found in the following positions:

- On the wheels.
- Up-side-down.
- On the side.
- In contact with structures or other vehicles.

When considering where to place initial stabilization, consider the most likely direction of potential motion and stabilize that area first. Possible directions of motion in a vehicle on its wheels are listed below:

- Determine the most likely direction of motion.
- Forward or reverse rolling on wheels.
- Lateral or longitudinal rocking on suspension.
- Up and down bouncing on suspension.

The most common method of stabilizing a vehicle is by using step chocks and wedges. When placing stabilization devices, consider the following:

- Always stabilize and maintain the car in the position it is found. The method should be simple and quick
- Stabilization should be checked throughout extrication (every 3 to 5 minutes or whenever metal is displaced)
- Avoid placing stabilization devices where they will interfere with subsequent displacement of metal.
- If not already done, disconnect the battery as soon as access can be gained.



Place Cribbing Under Vehicle to Prevent Movement

Vehicle Positions

Upright

Vehicles can be found in an infinite variety of positions. Ninety percent (90%), however, will be found with their wheels down. Techniques for stabilizing vehicles on their wheels are simple and quick but, regardless of how insignificant the stabilization it may appear, it must be done to ensure the safety of all rescuers on scene.

Techniques

Ideal stabilization of an upright vehicle is achieved by supporting four locations using step blocks. Insert step blocks under the side of the car (two on each side) until they begin to touch the underside of the car:

- ◆ Placing stabilization on one side of the vehicle, then the other, is the most effective method.
- ◆ A wedge under each step block will tighten the block against the underside of the vehicle and provide a means of adjusting or tightening the stabilization later.
- ◆ Larger vehicles, vehicles with high suspension or equipment may require the use of 2x4 and 4x4 cribbing or "box cribs".



A Wedge under Each Step Block Will Tighten the Block against the Underside of the Vehicle

Other cribbing methods can also be utilized to stabilize the vehicle. Improvised methods involving jacks, lifting bags, and improvised cribbing may be necessary in special situations.

Valve Stems

When vehicle design, crash severity, or terrain result in situations where these methods are not effective, it is acceptable to pull the valve stems from the tires so that the vehicle settles on the cribbing. The technique of pulling valve stems is considered a last resort and when used, police attending the scene should be notified.

After inserting a step chock under the vehicle, pliers can be used to remove the valve stems and deflate the tires. It takes about 10 to 15 seconds for the tire to deflate, and the car to settle onto the support.

Never cut a tire. This may cause it to deflate too rapidly and cause motion to your patient.



The Tools and Methods Used For Stabilizing Vehicles on Their Wheels Are Simple yet Effective

Crews should practice the basic techniques on vehicles in the fire hall. Proper vehicle stabilization is a coordinated effort that results in an efficient and effective evolution.

On Side

The increase in the number of minivans, SUV's and pickup trucks involved in crashes has resulted in a corresponding increase in the number of wrecks that result in vehicles coming to rest on their sides. This is due to the flat sides and box-like shape of these vehicles. Vehicles which come to rest on their sides can be the most challenging to stabilize. This type of crash results in specific difficulties that crews must be prepared to address.

Some of the things to consider when stabilizing a vehicle on its side are listed below:

- ◆ Discomfort of the patient.
- ◆ Likelihood of vehicle fluid leakage.
- ◆ Difficulty of patient handling and removal.

Techniques

When approaching any vehicle that is not on its wheels, rescuers should expect fluid leaks. Fuel, oil, or coolant should be managed as soon as possible and monitored as extrication takes place.

The rescuer assigned to the inner circle survey should approach from the front of the vehicle, make patient contact, and then carefully assess the stability of the vehicle. After determining stabilization points, initial cribbing can be inserted:

- ◆ Consider the most likely direction of motion and place blocking there first. An officer or firefighter should remain at the front of the vehicle and monitor it for any motion while maintaining patient contact.
- ◆ Use wedges, step blocks or cribbing prevent the car from rolling onto the hood or back on its wheels and try to work on one side of the car at a time.
- ◆ Place cribbing tightly under "hard points" such as pillars, bumpers, firewall or headlight bezel.

To prevent injury from shifting loads, always assess the stability of the vehicle before placing initial cribbing.

Because minivans and SUV's (sport utility vehicles) generally have flat side panels, simply placing wedges or blocks against hard points on both sides of the vehicle may be sufficient for stabilization. Passenger cars, however, may require more stabilization to broaden the base of contact.



A Jack-All, 4x4 Posts, Straps and Wedges Have Been Used To Stabilize This Vehicle from the Undercarriage

Once vehicle stabilization is complete, it must be checked frequently to ensure that all contact points are snug. Patients are often removed by flapping or removing the roof. Manipulating the roof can cause stabilization points to weaken, so ensure all stabilization points are secure before removal or displacement of any body parts. Rescuer safety must be considered on approach, establishing stabilization and also removing stabilization.

On Roof

Over 20% of traffic collision fatalities are the result of rollovers. The increasing popularity of SUV's, which have a higher centre of gravity, may be partially responsible for these numbers.

When a vehicle is resting on its roof, the following must be considered:

- ◆ Fluid leaks.
- ◆ Patient discomfort.
- ◆ Difficulties in patient handling.

Techniques

When assigned to the inner circle survey, again, try to approach from the front of the vehicle, make patient contact and assess the area for leaks or any obvious hazards. Immediate stabilization hazards should be addressed as soon as possible.

- ◆ Cribbing should be placed in a manner that will protect the patients from a possible roof collapse. Often this will involve wedging or cribbing beneath the firewall area to prevent a failure of the “A” pillar
- ◆ Do not attempt to open doors or manage glass until cribbing is in place.
- ◆ Opening a door could trigger the failure of the rollover protection resulting in a roof collapse.
- ◆ Before considering patient access, at least 4 solid points must be established.
- ◆ Place cribbing under other hard points until they have been blocked.
- ◆ Initial access may often be gained through the rear window or hatch.



Cribbing Should Be Placed In a Manner That Will Protect the Patients from a Possible Roof Collapse

Similar to a vehicle on its side, this type of crash presents specific, predictable hazards to patients and rescuers. Crews must train to expect and manage these types of challenges.

Vehicle stabilization rules of thumb

- ◆ Stabilize the scene before stabilizing the vehicle.
- ◆ Consider the most likely direction of motion and address this first by using the appropriate method of stabilization, stabilization should be quick and simple.
- ◆ Create a solid platform prior to accessing the patient.
- ◆ Stabilize the vehicle in the position found.
- ◆ Continually check stabilization throughout extrication, checking that cribbing is

snug. Use a dead blow hammer, do not kick cribbing. Check every 3 to 5 minutes or whenever metal is displaced.

- ◆ Attempt to place cribbing so that it does not interfere with subsequent operations.

Although there are infinite crash configurations, the basic techniques discussed in this and the previous sections may be applied to most situations. The rescuer should use these techniques, along with common sense, as a foundation for extrication evolutions. It is the crew's responsibility to maintain the high level of training required to accomplish these evolutions.

On-Going Stabilization

On-going stabilization is still required even though initial stabilization has been done. Cribbing should be checked every 3 to 5 minutes or whenever metal has been displaced. As vehicle parts and patients are removed from the vehicle, the suspension will push the vehicle off the cribbing. On going stabilization is essential throughout the extrication process. Once vehicle stabilization is complete, it must be checked frequently to ensure that all contact points are snug. Patients are often removed by flapping or removing the roof. Manipulating the roof can cause stabilization points to weaken, so ensure all stabilization points are secure before removal or displacement of any body parts.

Stabilize the Patient

Patient care is the ultimate objective at any scene requiring extrication. Victims of motor vehicle collisions become our patients upon our arrival. Any mechanism of injury which could indicate spinal damage requires vehicle stabilization. Even when EMS is on scene and doing patient care in the vehicle, the Calgary Fire Department is still responsible for securing a safe scene and a stable vehicle.

Initial Approach and Contact

After patient contact has been made and if manpower permits (assuming there are not multiple patients), the rescuer must maintain contact with the patient and instruct the patient not to move until told otherwise. Once the vehicle has been stabilized, rescuers can begin to focus on patient access.

Do not put weight on the car or cause it to move it in any way until it has been properly stabilized.

Once patient contact has been made and while attempting to gain access, the rescuer should perform the following tasks:

- Speak to the patient continually, trying to provide as much reassurance as possible
 - ◆ Not only will this help to calm the patient but it will also help to establish the level of consciousness
- Begin the primary survey
- Provide critical intervention as required
- Stabilize the cervical spine

As a rescuer, you should be able to categorize or triage the patient at the scene. Try to determine the mechanism of injury as it is a good indicator as to the type and degree of injuries to expect.

Circumstances that will help determine the severity and the amount of physical trauma are listed below:

- The speed of travel when the crash occurred.
- The surface area of contact.
- The degree of force that has been applied to the patient.

A high the speed of collision usually indicates a higher degree of injury to the patient.



The Mechanism of Injury Is a Good Indicator as To the Type and Degree of Injuries to Expect

Patient Access

Any patient who is in a vehicle that has enough damage to require extrication may have suffered spinal injuries. While we as rescuers may want to enter the car immediately, our weight can cause motion to the car and patient.

Prior to using any extrication tools, explore the possibility that doors might readily open without a great deal of effort. Valuable time can be wasted attempting to gain entry into a vehicle when another door will open readily or access can be gained through an open window.

Try before you pry.

It is important to properly select the appropriate access point, to keep the patient as safe as possible. The access point can be an operating door, or a remote window.

A Rescuer Can Often Gain Entry through the Rear Window



The inside rescuer should wear full protective gear and be equipped with the following:

- Trauma bag.
- Patient hard protection (plywood or polyurethane board).
- Patient soft protection (patient protection tarp or blanket).

Once an access point has been made, and stabilization is confirmed, the interior rescuer can enter the vehicle:

- If there is broken glass in the way, such as on the rear seat deck, it can be covered with a tarp for the rescuer to crawl over
- Bring a second tarp or disposable blanket to cover the patient
 - ◆ Do not cover the patient with the same tarp that was used to cover the glass
- If necessary, remove your helmet to enter the vehicle and replace it once inside

A good rule of thumb for patient access in vehicle collisions is to use the largest opening that is farthest from the patient. In many instances, this will be the rear window or hatch.

In-Line Stabilization

There is a high probability that the trapped patient will have suffered spinal trauma and severe internal injuries. Wherever possible, the window closest to the patient should be opened (by whatever means necessary) to allow a rescuer from the outside to provide in-line stabilization while the interior rescuer performs the following:

- A quick initial patient assessment.
- Unlocks all doors.
- Opens the hood and trunk.
- Rolls down all windows when possible.
- Removes the keys (after you are finished with all electrics) and hand them outside to the officer.
- Cuts or unbuckles all necessary seat belts unless they are providing patient support.
- Covers the patient with a tarp and provides additional protection if required until all glass is removed.
- Reassures the patient.

After all glass has been removed from the vehicle, the interior rescuer can take over c-spine and monitor both the patient and the effects of the extrication procedure on the patient from inside the vehicle and keep Command updated on the patient's condition.

Patient Assessment and Treatment

Emphasis must be placed on the order of treatment for any patient who is unconscious or who has an altered level of consciousness. Patients with altered levels of consciousness may have distorted perceptions of pain. They may be unaware of their injuries or unable to direct attention to them.

- If you are the only rescuer that has gained access to the patient, complete the primary survey first.
- Next deal with the ABCs and provide any necessary life-saving critical intervention.
- If manpower permits, take c-spine.
- If possible, apply a hard collar to aid in c-spine immobilization.
- If you are the only rescuer, first provide interventions for life-threatening conditions and then provide c-spine.
 - ◆ If you focus on c-spine too soon or prior to completion of the ABCs, your patient may not receive the care he or she may urgently require.
- Continuously monitor the airway and provide supplemental oxygen if needed.

During your assessment of the patient, try to determine the following:

- Patient's name.
- If the patient can take a deep breath.
- If the patient can remember what happened.
- The patient's chief complaint as well as additional injuries.

The sudden noises from extrication equipment and people on the scene may cause extreme fear. The interior rescuer should remain under the tarp with the patient to monitor the physical condition and provide the patient with emotional support.

Reassure the patient by explaining procedures as they happen.

Patient Packaging/Handling

When considering patient removal, conventional extrication techniques may be applied but vehicle stabilization must be monitored at all times.

- Try to warn the patient of any impending sudden movements or loud noises before they happen.
- Protect the patient as much as possible from any cutting or aggressive actions in the extrication process using a patient protection board (hard protection) and covering the patient with a disposable blanket (soft protection).
- Keep command informed of the patient's condition.
- If possible, attempt to redo the primary survey as per protocol, as well as a set of vitals.
- If possible, perform secondary survey.
- Utilize trained personnel around you to aid in patient care, i.e. maintaining c-spine, administering oxygen, control of bleeding, application of a hard collar, vitals, etc.

Often the steering wheel may have to be removed when managing a patient in the driver's seat. Cutting the spokes or rim is advised but be cautious with driver's side airbags.

Dealing with Seat Belts

Patient removal is challenging and may require additional personnel inside the vehicle, particularly when the patient is hanging in the seat belt.

- Be aware of seat belts that are under tension. Sudden release of the belt may cause movement and further aggravate the injuries to the patient.
- To gradually release tension on the seatbelt, try cutting the belt diagonally at mid-point along the cloth, between the catches and the anchor points.
- Note the general condition of the seat belt prior to cutting it.

If you have unbuckled or cut seat belts, the police must be notified. This information is important to the CPS during accident reconstruction.

Never cut seat belts at the D-rings or anchor points.

Reporting to Medical Personnel

Collect and report to medical personnel circumstances surrounding the crash and potential internal injuries. Rescuers should look for, and include the following in their report:

- Steering wheel deformation.
 - ◆ Lift the air bag and look for a bent steering wheel rim which could indicate internal injuries.
- Damage to windshields.
 - ◆ Upon deployment, airbag covers may damage the windshield and cause a “spider” formation in the glass.
- Close proximity of the driver to the steering wheel.
 - ◆ Occupants of small stature or large girth sitting close to the steering wheel are at greater risk of internal injuries.
- Energy of the crash – 20 or more inches of vehicle crush indicate high crash forces that can cause serious internal injuries.
- Non-use of seat belts.
 - ◆ Non-use of lap or lap/shoulder belts could result in multiple impacts and greater probability of internal injuries.
- Burns and abrasions can be caused by airbag deployment, particularly if crash victims attempt to push deploying airbags toward the source of deployment.
- Knee, leg and hip injuries.
 - ◆ Occupants who do not wear a seat belt but whose vehicle has an air bag will “submarine” under the air bag until their knees hit the knee bolster.
- Forearm bruising and fractures.
 - ◆ Passenger’s arms may have been caught between the deploying air bag and their forehead or rear view mirror.
- Eyewitness reports.
 - ◆ Verbal reports, photos and video images of the interior and exterior of the crash vehicle graphically convey the severity of the crash and can indicate the probability and type of internal trauma.