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EXTRICATION (1.1)

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- NFPA 1670
- NFPA 1006

TASK SKILL DESCRIPTION AND DETAIL

Removal of automobile-accident victims is a critical function of Loveland Fire Rescue Authority. Like structure fires, automobile extrication can be quite simple or extremely complicated. As a critical function, it requires individual proficiency in conjunction with teamwork. Good performance during an auto extrication - which is necessary to ensure safe, proper, and rapid removal of the patient or patients - is dependent on preparation and training.

Modern vehicle extrication techniques have transitioned to more cutting and less prying. This is due to the construction materials that are commonly used by automobile manufacturers. It is important to remember the tools available for use on extrication assignments. Don't focus solely on the hydraulic tools.

Safety

Personal Protective Equipment (PPE) shall be worn while working in the Hot Zone or in close proximity to extrication activities. At a minimum, the PPE at an extrication incident shall consist of:

A. Turnout Gear (coat and pants)
B. Safety Glasses
C. Helmet with face shield
D. Extrication or Structural Firefighting Gloves
E. Protective Boots
F. Reflective Vest (if operating on/near a roadway or parking lot)

Precautions shall also be taken to protect the trapped or injured persons from further harm during the extrication. The use of blankets and other devices should be utilized whenever possible to protect the patient(s). In addition, protective measures consistent with Bloodborne Pathogens procedures shall be utilized during an extrication incident.

A charged 1 ¾" hose line shall be in position and staffed by a firefighter in full turnout gear, at the ready, with SCBA, to protect both rescuers and victims

All rescuers shall be aware of surrounding activities, hazards, and the environment. All rescuers shall remain vigilant for safety concerns.

7 Step Approach to Securing a Modern Automobile

Securing a vehicle should not slow the extrication process down but should be done while the extrication is in progress.

1. First tool off to the hood and open with single maneuver
2. Shut off the vehicle and Remove Key FOBs
3. Turn Hazards On (This will identify the presence of a second 12v battery)
4. Disconnect Batteries by cutting a chunk out of the Negative and Positive side of the Batteries
5. Hold the Negative Cable and Ground the Positive cable to the vehicle.
6. Cut the Seatbelts at the point where they come out of the winders
7. Locate the Curtain airbag inflators (if roof removal is a plan of action)

Equipment Handling

- **General**
  - Never place yourself between the tool and the vehicle
  - Avoid dragging the couplings in the dirt
  - Do not drag the pumps/tools by the hoses
  - Never place any body parts between the cutter blades or spreader arms.

- **Spreaders**
  - Try to always use the entire surface of the spreading tips
  - If the tips start to lose their grip, stop and reposition
  - Position the tool so the material is pushed to the outside of the vehicle and not onto the patients.
  - Do not position any part of yourself between the tool and the vehicle
  - Let the tool do the work. Once it starts to spread your job is to support the tool

- **Cutters**
  - Position the cutter blades so they are at a 90 degree angle to the material that you are cutting
  - Always try to position the cutters as far into the blade recess as possible. Avoid cutting at the tips
  - If the cutter starts to twist excessively or the blades start to separate stop and reposition the cutter
  - Do not position any part of yourself between the tool and the vehicle

- Let the tool do the work. Once it starts to spread your job is to support the tool

- **Ram**
  - Always place the ram so the handle is accessible
  - Make the necessary relief cuts before you use the spreader
  - Have a good purchase point for each end of the ram
  - Provide stabilization below the lower purchase point before applying pressure

Tactics

Purchase Point for opening/removing doors

1. **Vertical Crush**- Place the spreader between the bottom of the roof frame and the roof (see Figure 1).

Figure 1 - Vertical Crush

- **Door Pinch-** Pinch the door using the spreaders to create a purchase point. When using this technique be aware of side impact airbags. Pinching more towards one side may gain you a larger purchase point on that side (see Figure 2).

Figure 2 - Door Pinch

- **Fender Pinch-** Using the spreaders to pinch the fender near the door hinge (see Figure 3).

Figure 3 - Fender Pinch

- **Pinch and Pull-** If the purchase point is not large enough for the spreaders you can pinch the metal with the spreaders and pull it back (see Figure 4).

Figure 4 - Pinch and Pull

Door Removal

Hinge side (See Figure 5)

1. Stabilize the vehicle – Refer to the Vehicle Stabilization chapter.
2. Create a purchase point.
3. Insert the spreaders above the top hinge and start spreading. Only attack one hinge at a time.
4. Open the spreader until the top hinge is broken or you are able to get the cutters in to place to cut the hinge.
5. Re-position the spreader just above the bottom hinge and repeat the process.
6. Once the hinges have been disconnected you can use a piece of webbing to pull the door out of the way.
7. Use the cutters to cut the latch and remove the door.

Figure 5 - Hinge Side Door Removal

Nader Pin Side (See Figure 6)

1. Stabilize the vehicle – Refer to the Vehicle Stabilization chapter.
2. Create a purchase point.
3. Insert the spreader tips just above the door lock.
4. Open the spreader until the door pops open or until the sheet metal around the latch begins to tear.
5. If the door has not opened place the cutters into the purchase point and cut the Nader pin.
6. Use a piece of webbing to pull the door towards the front of the vehicle and out of the way.
7. Use the cutters to remove the door from the hinges.

Figure 6 - Nader Pin Side

Dash Operations

Dash Lift

1. Open or remove the door to gain access to the A-post.
2. Place cribbing directly below the A-post.
3. Using the spreaders crush the fender at the highest point of the wheel well.
4. Use the cutters to make a relief cut at the top of the wheel well.
5. Make two (2) relief cuts approximately 5” apart at the base of the A-post (See Figure 7).

Figure 7

6. Use the spreader tips to grab the metal between the two (2) relief cuts and bend it out of the way (see Figure 8).

Figure 8

7. Insert the spreader tips perpendicular to the rocker panel in the A-post cut (See Figure 9).
    a. Lift the dash area slowly to access the victim.
    b. Once the desired height has been reached remove the hose from the tool to ensure that nobody moves the tool. Only lift the dash enough to remove the victim.

Figure 9

Dash Push

1. Place cribbing directly below the A and B-posts.
2. Make a relief cut at the base of the A-post (See Figure 7).
3. Position the ram in the door opening with the controls facing outward. The non-moving part of the ram should be positioned at the bottom of the B-post and the other end of the ram should be positioned at the upper portion of the A-post.
4. Extend the ram until you have displaced the dash enough to remove the victim (See Figure 10).

Figure 10

Miami Dade Steering Column Lift

The Miami Dade method involves pulling the steering column up and away from the patient instead of through the dash.

1. First open a hole in the windshield directly over the steering column where the chain can be dropped straight down to the base of the steering column.
2. Place a 2x4 piece of wood across the room of the vehicle just above the windshield and perpendicular to the steering column.
3. Place a 4x4 piece of wood a minimum of 48 inches in length over the windshield in line with the steering column. Set the one end of the 4x4 onto the hood and the other end across the 2x4 above the windshield.
4. Feed one end of the chain through the hole in the windshield. Wrap the base of the steering column below the knuckle. Bring the ends of the chain back through the windshield and hook them together creating a closed loop (see Figure 11).

Figure 11

5. Place the spreaders on the 4x4 with the tool on its side tips pointed toward the roof. Slide the tips up under the chain and apply tension.
6. Open the tool slowly to take out the slack. Once the slack is taken out continue to open the arms slowly, ensuring the tool remains balanced on top of the 4x4 (see Figure 12).

Figure 12

7. The column should be displaced only enough to extricate the victim.

Roof Operations

Roof Flap

1. Remove the windshield and any other glass that will be affected by this technique.
2. Peal and peak behind the areas you are going to cut looking for curtain airbag inflators, pre-tensioners and reinforced areas.
3. Cut the A and B posts on both sides of the vehicle.
4. Cut the roof on both sides near where you are going to flap the roof. This cut will weaken the structural strength of the roof (see Figure 13).

Figure 13

5. Use a pike pole or similar tool to crease the roof between the two cuts (see Figure 14).

Figure 14

6. Hinge the roof up and back towards the rear of the vehicle, exposing the victims (see Figure 15).

Figure 15

7. Secure the roof to the vehicle so that it does not flop back onto the victims or rescuers.

Roof Removal

1. Remove the windshield and all other glass in the vehicle.
2. Peal and peak behind the areas you are going to cut looking for curtain airbag inflators, pre-tensioners and reinforced areas.
3. On both sides of the vehicle cut the A, B, and C-posts as close to the body that you can.
4. Make sure that the seat belts have been cut.
5. Using several firefighters, lift the entire roof up and move it away from the vehicle to an area where it does not affect the rest of the operation.
6. Make sure that the roof is secured so it does not become an airborne hazard.

Advanced Extrication Techniques

Noah's Ark

This technique is used when you are unable to cut the entire lower portion of the b-post, but need to widen the door beyond the normal range.

1. Stabilize the vehicle – see the Vehicle Stabilization chapter.
2. Peal and peak behind the areas you are going to cut looking for curtain airbag inflators, pre-tensioners and reinforced areas.
3. Make purchase points at both the A-post and the C-post.
4. Remove the front door from the hinges.
5. Remove the rear door from the Nader pin.
6. Cut the b-post where it attaches to the roof.
7. Make a relief cut at the bottom of the B-post.
8. Fold the entire side down making a large opening.

Figure 16

B - Post Blowout

This technique is used to widen the door opening beyond normal range by removing the entire side of a 4-door vehicle (including the B post).

1. Stabilize the vehicle – see the Vehicle Stabilization chapter.
2. Peal and peak behind the areas you are going to cut looking for curtain airbag inflators, pre-tensioners and reinforced areas.
3. Force the rear door starting at the Nader pin (see Figures 17 and 18).

Figure 17

Figure 18

4. Open the door, and cut the B-post as high and as low as you can. Ensure that you cut all the way through the B-post at both point (see Figure 19).

Figure 19

5. Pull the section away from the vehicle and, if necessary, remove the door completely by cutting the remaining hinges (see Figure 20).

Figure 20

3rd Door

This technique is used when there are patients in the back seat of a two (2) door vehicle and are not able to be removed with other methods.

1. First remove the front door
2. Make a deep relief cut at the base of the B-post. In order to get a deeper cut you may have to use the spreaders to pinch the area first (see Figure 21).

Figure 21

3. If applicable, cut the B-Post where it connects to the roof (see Figure 22).

Figure 22

4. Make a vertical relief cut in front of the C-post (see Figure 23).

Figure 23

5. Using the spreader, place the tips into the relief cut that was made at the base of the B-post. Open the spreaders to move the panel out of the way (see Figure 24).

Figure 24

Seat Removal

Removal of the unoccupied seat allows improved access to the occupants trapped elsewhere in the vehicle.

1. Strip the trim or remove upholstery to expose the seat frame and floor mounted track assembly.
2. Cut the front and rear track attachment points at the floor or pry the seat track off the floor with the spreaders.
3. Pry up the seat until the adjustment track separates or the mounting bolts pull free from the floorboard of the vehicle.
4. Cut or pry the opposite side seat track or brackets apart, remove any wires, cables, and/or adjustment springs.

Steering Column Cut

This is done when the steering column must be moved to provide clearance for the patient.

1. Identify if the tilt column is present, and locate the steering column knuckle.
2. Completely remove the bottom half of the steering wheel ring to provide clearance for the patient.
3. Place the cutters either above or below the steering column knuckle.
4. Make sure you tie off the steering wheel so once the cut is made it does not strike the patient.
5. Cut through the column at the weakest point or the steering column knuckle (see Figure 25).

Figure 25

Steering Wheel Cut

This technique is done if you need to remove a portion of the steering wheel to free the patient.

1. Determine if the "tilt" column feature exists. Proper function of the "tilt" feature may provide the necessary clearance.
2. Cut the wheel on the driver's left side.
3. Make a second cut in the steering wheel on the driver's right side. The wheel can be removed once this cut is made.
4. Make sure you tie off the portion that you are going to cut so once the cut is made it does not strike the patient.

Figure 26

Pedal Cut

This technique is done to free the patient's feet. This can be accomplished by using either the pedal cutter or the full size cutter.

1. Determine the location where a tool can operate to cut through the shaft.
2. Secure webbing on the portion being cut so when the cut is made it does not strike the patient.
3. Cut through the shaft and remove the pedal from the patient's trapped leg or foot (see Figure 27).

Figure 27

REFERENCE INFORMATION

This heading includes information about the following:

- NFPA chapter and section reference to this task and professional standards
- Authorship reference for this section
- Instructional materials reference and location for LFR