



SECTION 4. RESCUE

4.1 GROUND-BASED RESCUE SYSTEM – THE PREFERRED METHOD

Carefully plan the procedural steps necessary to facilitate a ground-based rescue from a steel structure before work begins. In a ground-based rescue, the victim is lowered to the ground with the assistance of both employees on the ground and employees on the structure.

For all rescues, use both the primary and the secondary rescue ropes. The **only** allowable exceptions occur either when one of the ropes fails or when one rope is dropped in the installation process. In either of those instances, use the remaining rope to perform the rescue.

Consider the height of the work location to ensure the rope length is adequate to perform a ground-based rescue. All anchor straps used on the structure must have a carabiner.

WARNING

Ground-based rescues require *twice* the rope length as structure-based rescues.

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4.1.A STRUCTURE PROCEDURES FOR GROUND-BASED RESCUE

1. Move to a position above the rescue victim where the primary and secondary anchor straps will be positioned.
2. Attach the straps to the structure around connection points at the leg or cage of the tower. If redirects for the rope are needed they are permissible provided the main connection is connected to a 5000 lb. anchor point. Ensure that there is an adequate distance between the anchor straps to prevent twisting the primary and secondary ropes.
3. Redirect the primary rope by feeding it through the anchor strap carabiner, as shown in Figure 4.1.A.
4. Redirect secondary rope by feeding it through the anchor strap carabiner, as shown in Figure 4.1.A.
5. Attach the end of the primary rescue rope to the victim's sternal D-ring (upper chest).
6. Attach the end of the secondary rescue rope to the victim's central D-ring (lower waist).

NOTE: Rope with different color tracers will be used for the primary and secondary lines.



Figure 4.1.A. Provide Adequate Distance Between Anchor Straps.

4.1.B GROUND PROCEDURES FOR GROUND-BASED RESCUE

1. Find an adequate ground-based anchor point for using the structure rescue system (e.g., vehicle, structure footing, tree).



Figure 4.1.B.1. Ground-Based Anchor Point.

NOTE: Two anchor straps are required but may be attached to either a single- or multiple-ground anchor points. Each jobsite must be evaluated individually to determine the most effective ground-based rescue procedure.

2. Attach the rescue blocks between the anchor point and the descender. See Figure 4.1.B.3.
3. Connect the secondary device to a separate anchor strap. See Figure 4.1.B.3.
4. Connect the descender to the primary rope. Follow the drawing on the face of the tool to wrap the rope correctly. Pull out the slack.

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- a. Petzel ID – Lock the handle after slack is pulled out
- b. DBI No Worries – The device will auto lock after slack is pulled out



Figure 4.1.B.2. Connecting the Primary Rope to the Descender

5. Connect the secondary device to the secondary rope. Ensure that the secondary device is installed correctly.

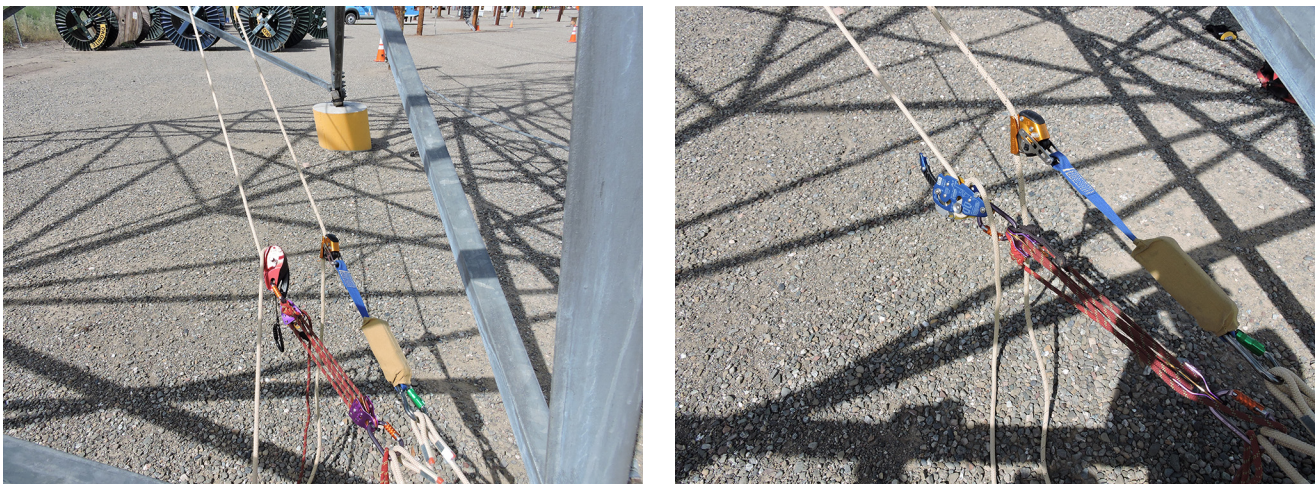


Figure 4.1.B.3. Correctly Connected the Descender and Secondary Device

6. Raise the victim high enough off the structure to clear all obstructions either by pulling on the rescue blocks or by vectoring the rope at ground level. One or more ground-based employees can perform this lifting action by applying pressure to and tightening the rope, thereby, lifting the victim. Again, ensure that the ropes do not become entangled.

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- A red Petzl Griot climbing device is attached to a rope, with a purple Petzl Griot device and a red rope knot below it. The background is a gravel surface.

8. Before lowering the victim, ensure that all of the system components are properly connected.
9. After clearing the victim of all obstacles, begin his or her decent to the ground by controlling the primary decent device. If needed, rescuers in the structure may assist the victim through any obstacles.

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Figure 4.1.B.5. Controlling the Primary and Secondary Decent Devices

NOTE: Ensure that the victim remains clear of any obstructions or hazards during decent by using either a tag line or by other approved methods.



4.2 STRUCTURE-BASED RESCUE SYSTEM

The following information describes the steps necessary to perform a structure-based rescue from a steel structure or pole. In this procedure, the victim is lowered to the ground by the rescuer, who remains on the structure.

For all rescues, use both the primary and the secondary rescue ropes. The **only** allowable exceptions are either when one of the ropes fails or when one rope is dropped in the installation process. In either of those instances, use the remaining rope to perform the rescue.

Follow the procedural steps below when performing a structure-based rescue:

1. The employee performing the structure-based rescue must move to a position above the rescue victim where the rescue assembly is to be positioned (i.e., the primary and secondary anchor straps).
2. The rescuer must get the rescue blocks from the rescue bag.
3. Attach the straps to the structure around the connection points at the leg or cage of the tower. If redirects for the rope are needed they are permissible provided the main connection is connected to a 5000 lb. anchor point.
4. Ensure that there is an adequate distance between anchor straps to prevent twisting the primary and secondary ropes.
5. Redirect the primary rope by feeding it through the anchor strap carabiner.
6. Redirect secondary rope by feeding it through the anchor strap carabiner. Keep the secondary rope bag in the structure.
7. Attach the end of the primary rescue rope to the victim's sternal D-ring (upper chest).
8. Attach the end of the secondary rescue rope to the victim's central D-ring (lower waist).
9. Attach the remaining two anchor straps to the structure's leg or primary member at approximately 45 degrees beneath the primary and secondary redirect.
 - a. Connect the descender to the rescue blocks and then attach it to the anchor strap.
 - b. Connect the secondary device to the last anchor strap.

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Figure 4.2.1. View of a Descender and Secondary Device Connected in a Structure.

10. Connect the descender to the primary rope. Follow the drawing on the face of the tool to wrap the rope correctly. Pull out any slack and lock the handle (if required by device).
11. Connect the secondary device to the secondary rope.
12. Raise the victim high enough off of the structure to clear all obstructions by pulling on the blocks, ensuring the ropes do not tangle. After the victim is clear of any obstructions, tie off the blocks with two half hitches.



Figure 4.2.2. Ropes Tied Off With Two Half Hitches.

13. Before lowering the victim, ensure that all components of the system are connected properly.
14. After the victim is clear of all obstacles, begin the decent to the ground by controlling both the primary and secondary decent devices.

NOTE: Ensure the victim remains clear of any obstructions or hazards during his or her decent by using a tag line or other approved method.



4.3 FIRST AID PROCEDURES

This section provides guidance on performing first aid and/or cardio pulmonary resuscitation (CPR) for victims who are incapacitated while in the structure.

It is impossible to anticipate how a victim will be positioned in an emergency. Unlike an emergency occurring on the ground, a suspended victim will not be lying flat on a hard surface; therefore, performing traditional CPR may not be possible.

When a victim requires first aid/CPR while suspended, **do not react without considering the specific dangers and the procedures discussed before the work began!** Evaluate every aspect of the emergency and ensure that you are able to provide assistance without endangering yourself.

In all instances, the victim will receive the most extensive life-saving treatment after he or she is on the ground; therefore, it is essential that the victim is removed from the structure quickly and safely.

After the victim is on the ground, provide first aid/CPR until emergency medical personnel arrive.

4.4 SUSPENSION TRAUMA

Suspension trauma results when a victim is suspended for a long period of time. Blood pools in the veins of the legs and does not return to the heart and other vital organs, causing specific medical problems or death.



CAUTION

When a victim has been suspended for an extended period of time, do not move him or her to a horizontal position quickly after rescue. Medical advisors recommend elevating the upper body slightly to avoid overloading the heart with returning blood. It is important to monitor a rescued victim continuously until emergency medical personnel arrive.



Below are several health issues of which workers using fall protection must be aware:

1. The risk of suspension trauma only occurs if an employee falls and remains suspended in a fall-protection harness. Routine use of fall protection equipment does not cause suspension trauma.
2. The longer a worker is suspended in a fall-protection harness, the greater the risk for suspension trauma or death. Injured or unconscious workers are at the highest risk. Death has been documented within 30 minutes of the initial accident. As mentioned throughout this handbook, suspended workers must be rescued as quickly as possible to lessen the possibility/severity of suspension trauma.
3. Initial signs and symptoms of suspension trauma include:
 - a. Faintness
 - b. Breathlessness
 - c. Sweating
 - d. Paleness
 - e. Hot flashes
 - f. Nausea
 - g. Dizziness
 - h. Graying or loss of vision

Also, the victim's pulse rate may speed up and then abruptly slow down

4. If rescue procedures cannot be initiated promptly, a conscious victim should pump his or her legs frequently, if possible, to activate leg muscles and reduce the risk of blood pooling. Victims also should be continuously monitored for signs and symptoms of beginning suspension trauma.
5. All accident victims should be monitored by doctors after their rescues, regardless of the severity of the accident. If a victim is unable to speak for him or herself, ensure that the doctor knows the employee was suspended in a harness. This is true regardless of the length of the suspension since some associated health effects are not evident immediately.



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