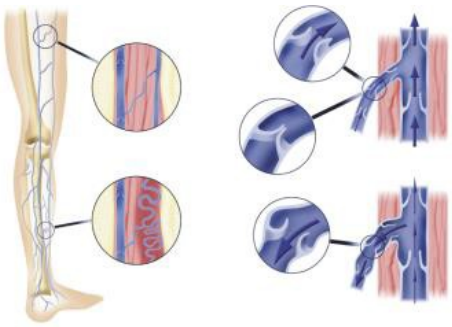
Chapter VIII – Rescue



A personal fall arrest system does no good to save a worker's life if they cannot be reached for proper rescue after their fall. In fact, there are some real dangers for the victim if rescuers cannot get to them in time or where they didn't even know that the worker had fallen in the first place.

Rescue is something that often doesn't get the attention that it deserves until it is time to carry out a rescue in real life. Once the victim has fallen and is waiting to be retrieved is the wrong time to make decisions about how to safely get them down. The unplanned rescue may be quite simple and go off without a hitch. However, sometimes rescuers become victims themselves while working in haste to try to quickly get down a fellow employee in-need, forgetting about their own safety.

The goal of this module is first to bring light to the issue of why a rescue plan must be in-place ***before the worker ever climbs*** above the ground in the first place. This section will then get into such things as the legal requirements for rescue, its different types, the equipment that is available for use in different scenarios, and the overall process that needs to be followed in any situation where another human is going to put themself in harm's way to climb to heights in aid of another.

8.1 Suspension Trauma

It's a normal day out on the jobsite and a worker has taken the time to prep for his job, including inspecting all his personal fall arrest equipment and scoping out a solid anchorage point that he can safely reach while maintaining 100 percent connection. He completes his pre-task prep work and climbs into position where he begins his task. As his time at the workstation continues, he becomes more comfortable and begins to let his guard down just a bit as he moves around his work position. Then, something happens. It may be that he simply loses his balance, he may drop a tool and try to catch it, or he may slip. He enters the first stage of the fall known as "free fall" and transitions into a safe deceleration as his energy absorber activates to bring him to a cushioned stop.

As he assesses his situation, now hanging several feet below the work surface on which he once stood, he takes stock.

- Thankfully he didn't hit anything on the way down.
- Also, his harness was fitted properly, so he is oriented in a vertical position and all the straps seem to have done their job.

He's fine overall and glad that he tied-off as he had been told to do so many times over, but it dawns on him that he really isn't sure how he's going to get down.

He was performing a maintenance task in a remote section of the building and although others knew that he was working there, they aren't immediately nearby. After about 5 minutes someone finally comes close enough to his work position to hear his yells and they indicate that they will go get help along with some equipment to try to get him down. At this point, he notes that he is decidedly more uncomfortable than he was when he first fell. The straps are starting to hurt as they dig into his legs, and he doesn't feel quite as strong as he did at first. Is he in any danger as he waits?

The reality is that there is a real danger as he continues to hang in a vertical position. Since his fall, he has not been putting any pressure on his legs, which normally help pump blood back to his heart due to the intertwining of blood vessels with muscles. When the muscles move and flex, this helps squeeze on the blood vessels, pushing the blood back up to the heart. However, as the worker hangs in suspension, the muscles slacken and the decreased pressure on the veins can cause what is known as "***venous pooling***," where blood starts to settle in the legs.

As less and less blood gets back to the heart due to its pooling in the legs, it will also mean that ***less blood will be making its way to the brain*** where it is vitally needed to carry oxygen necessary for normal functioning.

- The body will recognize this decrease in blood flow and will respond by trying to make the heart pump faster to compensate.
- The worker's pulse will go up as the body tries to stave off the effects of oxygen starvation to the brain, but it will fail to work.
- The fallen worker will faint. This usually causes them to fall over, returning the flow of blood. In fall arrest, however, this cannot happen.

From this comes the name "suspension trauma." The body is put in a state of trauma from which it is incapable of responding. Once the pulse decreases, flow further diminishes to the brain and the victim eventually passes out due to a lack of oxygen, with their head slumping forward. At this point the airway can become blocked with little to no oxygen is getting to the brain.

It is hard to say how long this will take to occur. There is still more to learn about this issue. That said, factors such as physical fitness of the victim, age, and overall wellbeing will influence how long they can hold out before problems begin. Depending on the study, onset may begin in as little as 5 minutes, after 30 minutes, or as much as an hour into suspension.

Suspension trauma is something that ***will*** occur if the victim is left hanging for long enough. The employer must plan to get the worker down as fast as possible so as not to roll the dice and discover that a particular victim could not take the strain for an extended period. The rest of this section will be dedicated to discussing how the employer can do this.

8.2 Rescue Considerations

It helps to begin by briefly discussing what the legal requirements for it are. And in the case of OSHA, it can be said that the requirements are broad in scope and few in words. The actual regulation reads as follows:

"The employer shall provide for ***prompt rescue of employees*** in the event of a fall [or shall assure that employees are able to rescue themselves]." – 1910.140(c)(21) / 1926.502(d)(20)

OSHA's word is "prompt," and they leave it ill-defined. All circumstances will be different, requiring different periods of time to effectuate a rescue. Even when asked through letter of interpretation to pin down a time period, they have declined to do so.

An interpretation that can be made of this is the following. The worker needs to be brought down as quickly as possible after the fall and in as close of a state as possible to what they were in when they first fell.

- Worker hangs for 30 minutes but ***is fine*** – OSHA may not cite if it considers this to be a reasonable time.
- Worker hangs for 30 minutes and ***suffers blood, clotting, fainting, and / or death*** – A citation is likely.

It is best simply to know that one is covered in all fall scenarios before ever starting work to avoid the problem of not being able to quickly get a person down and the possible resultant injuries. So, how is this done?

Job Planning

Prior to ever starting a job, many companies will have workers fill out what has become known as a "pre-task plan for safety." This basically outlines information such as:

- What the job is for the day?
- The ***steps*** to the job and the ***hazards*** associated with each.
- Methods of control (elimination, administration, PPE) to be utilized to deal with the hazards.

Like a pilot's checklist, the goal is to simply make sure that ***the worker thinks through*** the task before ever beginning so as not to forget something obvious.

8.3 Rescue Types

One of the things that should be on any pre-task plan for safety when it comes to fall protection is a section that addresses how the rescue will be carried out if it is needed. This is where the worker and their co-workers analyze the situation to visualize what a possible rescue from the work location would look like. The four types of rescues are:

(1) Self-Rescue –

In self-rescue the fall victim is able to move, unassisted, to a safe place after a fall. An example of it would be one in which a worker is at heights, connected to a fall arrest system on a vertical lifeline and proceeds to fall. They are then able to carry out "self-rescue" by regrasping the ladder rungs / pegs and proceeding to the ground.

This also may be more common when using a PFL, due to its quick stopping distance.

(2) Assisted Self-Rescue

Assisted rescue is one where the worker is in a situation that does not permit them to rescue themselves but with minimal help they can be brought to a safe location. As an example, the worker has fallen, and rescuers are able to drop a line to them. They are able to connect themselves to the rescue line and be raised or lowered to a safe location.

After self-rescue, assisted self-rescue is the **next step down in preferred methods in the hierarchy** of rescue techniques because it may involve some exposure of rescuers to a fall risk themselves (still protected via PFAS) and could possibly take some time to set up.

---------- ***Rescue Utility System (RUS)*** ----------

This device, which is a 4:1 mechanical advantage rescue system with anti-reversing pulleys, can be operated remotely from above the victim utilizing a remote rescue pole that comes as part of the kit simply to realize a connection to the victim, at which point the 4:1 system is used.

The top carabiner of the system is connected to an anchorage above the victim. The lower pulley just to the right of the black bag is lowered to the victim who, if conscious, can connect to a D- ring on their harness.

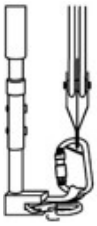
At this point, the rescuer utilizes the green-handled device in the right of the picture to raise the victim slightly so as to be able to put slack in their fall arrest system, disconnecting them if necessary depending on the situation, the rescuer can either raise or lower the victim to a safe position utilizing the green-gripped control handle and the 4:1 "mechanical advantage of the system."

- **"4:1 Mechanical Advantage"** – The rescuer only feels ¼ the weight of the victim.

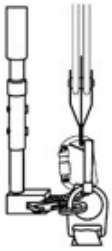
If, on the other hand, they desire to lower the victim, they may push a button on the handle that allows rope to slide through the device to lower the victim in a controlled fashion.

The rescue pole that comes with the device can be used to rescue an unconscious victim. It is simply used as a means of connecting the bottom haul carabiner of the device to the victim.

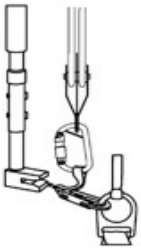
RUS Remote Pole Steps



Attach loop of special carabiner to RUS haul carabiner and it to pole.



Reach to fall victim with pole, connecting special carabiner to their D-ring.



Detach pole from special carabiner.

Lift or lower as normal at this point.

(3) Mechanically Aided Rescue

This type of rescue typically involves the use of an aerial lift to reach a victim who has fallen or who needs medical assistance or is unable to climb down from a work area. The rescuers maneuver the lift below the fallen worker and elevate its basket until reaching the fallen worker, transferring them in.

This type of rescue is second from the bottom in terms of preference when it comes to performing a rescue. Although generally considered to be a relatively safe means of rescue, complications can result if a lift is unavailable or if it is unable to reach the location of the fallen worker. Nevertheless, in many situations, mechanically aided rescue is a very viable method that can be done quickly, safely, and effectively.

(4) Pick-Off Rescue

This is a type of rescue where the rescuer must go to the victim to "pick them off" the structure from which they hang. This involves the active intervention of a rescuer and / or a rescuer team to help a potentially incapacitated or unconscious worker who is unable to help or communicate.

This is the least desirable method in the hierarchy of rescue techniques for a variety of reasons:

- It incorporates rescue devices with a much higher level of training needed to acquire proficiency / competency; and
- It involves the rescuer going out into harm's way to reach the victim and get them down.

The way it works is that the rescuer utilizes some kind of union of components to descend a rope to make a connection to the victim. From there, the rescuer descends with the victim attached to their system until both make it to the ground.

- This type of rescue is ***more complex*** and ***requires additional theory-based and hands-on training*** with the equipment selected before it can become a viable option.

A ***manually operated descent device*** may also be used. When used to rescue an incapacitated person, the device may be rigged to permit lowering by a rescuer stationed aloft or by a rescuer descending to the injured person.

- The Anthron Descender shown to the right can be utilized for the self-evacuation of an injured employee from heights.
- The black Anthron Plus (not pictured here) is specially designed for the type of pick-off rescue described above where the rescuer can descend to the victim, attach, free them from their fall arrest connection and rappel with them to the ground.

8.4 Rescue Performance

In both training exercises and in the event of an actual rescue, there are certain rescue protocols common among professional rescue teams that must be considered and evaluated to assure the smoothest operation of the rescue plan just discussed.

Team Safety

Rescuers should never rush in, even when well trained. There is always a need to plan for how a rescue can be carried out in such a fashion that the safety of the victim is protected while not forgetting about the safety of those who are getting them down. Often, rescuers are taught to ***protect yourself first***, ***protect your team second***, and ***protect your victim third*** simply to not forget about doing the rescue the right way. It is crucial that no one tries to "be a hero" and sidestep the thought-out and established best practice protocols for rescue. When a team assembles, they will ask questions like:

- Is the scene safe?
- What happened?
- In what physical state is the victim?
- What is the identified plan of rescue for the location / job?
- What are the risks involved for the rescuers under the selected plan and how will they be ***eliminated*** or ***controlled***?

Rescuers realize that they sometimes must put themselves in a risky situation to save a life, but in a well-planned rescue procedure all major risks must be eliminated before work ever commences. They must not put themselves in a position where they themselves may require rescue or where they could die while attempting to get someone down.

Keep it Simple

Rescue operations often may be conducted in a variety of ways. The typical "Hollywood-style" rappel rescue, while exciting and adrenaline inducing, can be dangerous and is often not necessary. Rescue personnel can easily sustain many injuries during rescue operations. In the thick of the rescue, potential rescuers have been found to panic and forget important aspects of their training. Pressure can be a great motivator for some but can cause others to fall apart. As a result, the rescue should be as simple and as safe as possible, putting the fewest workers at risk. If a fallen worker can be accessed using a scissor lift, bucket truck, or extension ladder, then one of these methods should be used. When simple and practical procedures are used there is a much larger margin of safety and the requirements for training are reduced, as well as training retention rates increase.

For questions about the proper use and inspection of your fall protection systems or if you require a site assessment to determine the best fall protection solution for your facility, contact Tritech Fall Protection or visit our website:

www.tritechfallprotection.com

USA 1-833-951-9777

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