**FQM LIMITED**

**Working at Height Rescue Plan**

1. **Scope**

This rescue plan is intended to reduce risks to an employee’s health after a fall arrest event. The rescue plan should also minimize the risks to the rescuer during the rescue attempt, and help to ensure that the rescue is conducted promptly in a safe and professional manner. This procedure will help fully understand the implications of an operative falling, being arrested and then suspended by a harness, which initially saves them, but minutes later may kill them due to suspension trauma. More than just helping to understand why this happens, this procedure will show what action should be taken to prevent a fallen operative dying from suspension trauma.

1. **Introduction**

When operatives are suspended in mid-air after a fall, their lives hang in the balance, even if they have survived the fall without a scratch. Every second counts.

Time for Rescue

Harnesses can become deadly whenever an operative is suspended for durations of over five minutes in an upright posture with the legs relaxed straight beneath the body. After five minutes they are highly likely to be unconscious, but operatives attending the scene may not realise the seriousness of the situation and, 15 minutes later a dead body could be hauled up. The cause of this problem is called 'suspension trauma'.

Suspension Trauma

Unless the operative is rescued promptly using established safe procedures, suspension trauma could occur and result in serious or fatal injury as the brain, kidneys and other organs are deprived of oxygen.

Venous pooling

Death from suspension trauma is the result of venous pooling. This can occur any time a person is required to stand still for prolonged periods and may be worsened by heat and dehydration. Major blood vessels pass through the muscles in the legs. The movement of these muscles assists circulation by squeezing the blood back up towards the heart. If the muscles stop moving, gravity pulls the blood down into the legs.

Eventually, enough blood accumulates (venous pooling) so that return blood flow to the right chamber of the heart is reduced as the heart can only pump the blood available, so its output begins to fall. The heart then speeds up to maintain sufficient blood flow to the brain but, if the blood supply to the heart is restricted enough, the higher pulse and faster breathing is ineffective and the body abruptly slows the heart. The result is fainting.

The moment a person loses consciousness they collapse and become horizontal so the time spent in a vertical position while unconscious is minimal and, as blood flow improves, the result of being horizontal, the person returns to consciousness and recovery is likely to be rapid.

When a person is suspended in a harness in which their legs are immobile, unlike fainting, the person does not or cannot naturally move into a horizontal position, then gravity pulls blood into the lower legs. In a harness, the operative can't fall into a horizontal posture, so the reduced heart rate causes the brain's blood supply to fall below the critical level. During excessive venous pooling, cardiac output and arterial pressure fall to levels, which can critically reduce the quantity and/or the quality of oxygenated blood flowing to the brain.

1. **Application**

This rescue plan applies to all locations where personnel are employed to work at height.

The requirements of this rescue plan must be observed by all personnel involved in working at heights.

This rescue plan must be reviewed or included in any job safety analysis or pre-task planning for activities that require working at heights.

1. **Definitions**

Rescue plan

A strategy or procedure, planned in advance, to safely retrieve a person who has fallen from an elevated work surface and is suspended in a full body harness. This includes self-rescue or mechanically aided rescue.

Self-rescue

An act or instance of an employee using his fall protection equipment to rescue him or herself.

Mechanically aide rescue

A strategy or procedure, planned in advance, to safely retrieve a person who has fallen from an elevated work surface using mechanical means.

Suspension trauma

A serious medical condition that can lead to unconsciousness, injury or death, which can occur when a worker is suspended in a harness for too long after a fall.

Prompt rescue

The recommended goal for rescue of a suspended person is less than six minutes.

1. **Critical Phases of Rescue**

There are four critical phases of rescuing a suspended operative:

1. Before the fall

2. At fall arrest

3. Suspension

4. Post-fall rescue

Each phase presents unique safety challenges. Suspension trauma can be influenced by all aspects of the fall, so they are all equally important. As with many aspects of safety, increasing the safety in one phase can compromise safety in the others. Whatever training operatives have received will determine how they respond to different phases.

Before the fall

The key issue of fall protection prior to a fall is compliance. If a harness is too uncomfortable, too inconvenient or interferes too much with task completion, operatives may not use the equipment or may modify it (illegally) to make it more tolerable.

A second major point is how far an operative falls before his fall is arrested. The greater the fall, the greater the stress on the body when the fall is arrested. The longer the lanyard the longer the fall distance, however, the shorter the lanyard, the more often it will have to be repositioned when operatives are mobile.

At fall arrest

The whole concept of fall protection is that operatives who fall will be stopped by a tethering system. Unfortunately, the posture of the falling operative is unpredictable. Depending on the harness attachment point and the position of the operative's body at fall arrest, different harness attachments offer different advantages. An attachment near the shoulders means that any drag from the lanyard will serve to position the operative's body in an upright position so the forces are distributed from head to foot. The head is somewhat protected if the legs and body precede it in the fall, but this offers some disadvantages after the fall arrest is completed

Suspension

It is natural to assume that once a fall has been arrested then the fall protection system has successfully completed its job. Unfortunately, this is not the case. An operative suspended in an upright position with the legs dangling in a harness of any type is subject to suspension trauma. Fall victims can slow the onset of suspension trauma by pushing down vigorously with the legs, by positioning their body in a slight leg-high position or, by standing up. Harness design and fall injuries may prevent these actions.

Rescue

Rescue must come rapidly to minimise the dangers of suspension trauma. The circumstances together with the lanyard attachment point will determine the possibility of self-rescue. In situations where self-rescue is not possible, operatives must be supervised at all times. Regardless of whether an operative can self-rescue or must rely on others, time is of the essence because an operative may lose consciousness in only a few minutes. For conscious casualties it is recommended (where possible) that the suspended person keep their legs moving to keep the blood pumping and reduce the risk of venous pooling.

1. **First Aid**

On site first aiders should be summoned immediately in the event of a fall from height and resultant suspension. Should the suspended person be found to be unconscious then the emergency services should be contacted by the quickest means possible.

Signs and symptoms of suspension trauma can start to be seen in 2/3 minutes and can include:

* Faintness
* Nausea
* Breathlessness
* Dizziness
* Sweating
* Unusually low heart rate
* Unusually low blood pressure
* Paleness
* Hot flushes
* Skin tone may appear grey in colour
* Loss of vision
* Increased heart rate

Owing to the possibility of damage to vital organs, the result of suspension trauma, it is recommended that all recovered casualties should be taken to their nearest Accident & Emergency Unit for examination and observation.

1. **Procedure**

This rescue plan procedure must form part of the Job Safety Analysis for any job that requires work at height. The rescue plan must include consideration of the following rescue types and circumstances:

Self-rescue

If the person working at height has properly selected and used his or her fall protection equipment, 90% of workers will be able to perform a Self-Rescue, which should include these steps:

1. Climbing back up to the level from which he fell (from a few inches to 2-3 feet).
2. Returning to the floor or ground to be evaluated for possible medical attention.
3. Immediately report the fall to the on-site HSE Advisor for investigation.
4. Removing all components of fall arrest system impacted by the fall event from service and documenting (bag and tag) the components with name, date and activity at time of fall and giving the equipment to HSE Advisor.

Assisted self-rescue with mechanically aided hauling rope system

If self-rescue is not possible, than an assisted self-rescue will be needed. The following guidelines should be used during a mechanically aided rescue:

1. Hauling rope system will be secured to an anchor that is rated for at least 3,000 lbs.
2. The haul line may be swung over or lowered to the fallen worker, who will grab the rescue lifeline snap hook and secure it to the appropriate D-ring on his body support. A positive connection to the D-ring must be verified by one of the rescue team members.
3. The rescue team will raise or lower the fallen employee to the appropriate work platform or ground level and provide medical aid as required.
4. Immediately report the fall to the on-site HSE Advisor for investigation.
5. Removing all components of fall arrest system impacted by the fall event from service and documenting (bag and tag) the components with name, date and activity at time of fall and giving the equipment to HSE Advisor.

Mechanically aided with hauling rope system (unconscious person)

If the worker’s injuries prevent the worker from attaching to the rescue system, both self-rescue and assisted self-rescue are not options, and a fully assisted rescue is necessary:

1. Hauling rope system will be secured to an anchor that is rated for at least 3,000 lbs.
2. A rescue team member must attach the haul line to the worker’s fall arrest system. This can be performed by accessing the fallen worker and then attaching the rescue system directly to a D-ring on the worker’s harness.
3. The rescue team will raise or lower the fallen employee to the appropriate work platform or ground level and provide medical aid as required.
4. Immediately report the fall to the on-site HSE Advisor for investigation.
5. Removing all components of fall arrest system impacted by the fall event from service and documenting (bag and tag) the components with name, date and activity at time of fall and giving the equipment to HSE Advisor.

Assisted rescue with mechanically aided aerial lift

Another means of performing a fully assisted rescue is to use an aerial lift, mobile crane or forklift with man riding basket or MEWP, under the following guidelines:

1. A rescuer will get into the aerial lift and make sure there is a second fall protection device, such as a shock absorbing lanyard or self-retracting lifeline available for the fallen worker.
2. The aerial lift must be manoeuvred into position (raised up underneath the fallen worker) so that the rescuer can perform the rescue.
3. Attach the second lanyard or self-retracting lifeline in the aerial lift to the fallen worker.
4. Disconnect the rescued worker from the impacted fall arrest equipment.
5. Lower the worker to the ground and provide medical aid as required.
6. Immediately report the fall to the on-site HSE Advisor for investigation.
7. Removing all components of fall arrest system impacted by the fall event from service and documenting (bag and tag) the components with name, date and activity at time of fall and giving the equipment to HSE Advisor.

***Remember***

***Whichever rescue option is chosen, the target time should be to rescue the casualty in under five minutes.***

1. **Emergency Contacts**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Site | Site | Site |
| **Position** | **Name** | **Name** | **Name** |
| Site Phone Number | xxx | xxx | xxx |
| Mobile Number | xxx | xxx | xxx |
| **Position** | **Name** | **Name** | **Name** |
| Site Phone Number | xxx | xxx | xxx |
| Mobile Number | xxx | xxx | xxx |
| **Position** | **Name** | **Name** | **Name** |
| Site Phone Number | xxx | xxx | xxx |
| Mobile Number | xxx | xxx | xxx |

1. **REVIEW**

This procedure will be reviewed regularly, at a minimum on a yearly basis. Additional review maybe required due to changes in legislation, operations, technology, personnel etc.