

# **Working at Height Risk of suspension trauma and rescue plan**



## 1: Working at height

Loading and unloading of trucks for Ineos O&P downstream require people to work on top of trucks.

Collapsible handrails on top of trucks are not considered to provide suitable fall protection.

Although Ineos O&P prefer collective measures to prevent falls (such as guardrails and working platforms), the installation of these systems is not always feasible and therefore the best alternative is a fall arrest system consisting of a shock absorbent, self retracting life line system and a safety harness.

In order to allow safe use of these systems the following must be taken into account:

- The fall arrest block must slide on a guide rail which extends over the full length of the truck so that it is always sited above the head of the user.
- The fall arrest system including the harnesses must be inspected at regular intervals in accordance with applicable legislation.
- A fall arrest system that has been activated must be removed from service for revision. It is recommendable to use a system with load indicator.
- Retractable lifelines should never remain unwinded (under tension) when not in use. (If this is not possible, the proper functioning of the winding mechanism must be regularly checked). At those locations where a harness needs to be hooked up at ground level, a rope should be attached to the lifeline.
- Fall arrest blocks with auto descent function are acceptable but not preferred as, in some circumstances, these can cause additional injuries. It must also be assured that these are not misused as an alternative means to descent from the truck. Each time the device is used to lower a person, it needs to be taken out of service for revision and these systems usually have no load indicator. The advantage of these systems is that they do not create the risk of suspension trauma.
- The fall arrest harness must be in compliance with EN 361
- Fall arrest harnesses must be hooked up to the life line at the back. It is recommended to fit an extension lanyard to the harness to facilitate this.



- The fall arrest harness should not be fitted with a shock absorbing lanyard as this function is already incorporated in the fall arrest block.
- The fall arrest harness must be inspected for damage before each use.
- Users need to receive training. This training must comprise
  - How a harness must be put on and how it must be worn
  - The risks of being suspended after a fall in an incorrect applied harness
  - The risks of suspension trauma (see below)

## 2: Risks of suspension trauma

### 2.1 Suspension trauma

Suspension trauma is a perfect natural reaction caused by the body being held in upright position.

Our blood supply and heart cannot cope very well with standing up. This is no problem if we walk or move our legs as the muscles in our legs will squeeze our veins who have one-way valves in them and this system acts as a pump to pump the blood back upwards. If we are held in upright position without moving our legs, gravity will pull blood into the tissues of our legs and the heart cannot suck it back. This is not a problem if we then fall over right away as the blood circulation will be resumed automatically (e.g. the guard who faints because he has to stand up a long time without moving his legs) but if one is unable to move, the blood pools in the legs, the casualty will faint as the brains have no longer oxygen supply.

### 2.2 How long have we got ?

If our legs are perfectly still, then we can start feeling the first signs of shock in as little as three minutes. The average is between 5 and twenty minutes. We will faint a few minutes after that and if no proper actions are taken we can die a few minutes later.

### 2.3 What can a casualty who is suspended in a harness do ?

- Lift your knees into a sitting position
  - Relax as much as possible. Panic makes things worse
  - If you can, every few minutes swing yourself upside down
- If you're trapped and cannot move:
- Strain your leg muscles as hard as you can every 5 seconds
  - Breathe slowly and deeply

### 2.4 Reflow syndrome

Anyone who has developed suspension trauma is also at risk from reflow syndrome - caused when the pooled blood in their legs is allowed to flow back into their body. It is potentially fatal.

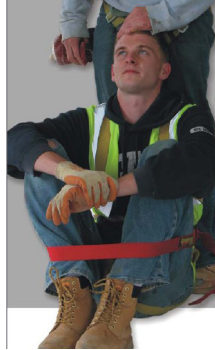
The blood that is pooled in the legs starts off perfectly normal with oxygen and nutrients dissolved in it. Over time, the cells in the legs use up the oxygen and nutrients. When all the oxygen is used up, the cells start to burn fats (anaerobic metabolism). As the blood is not moving, toxic by-products of fat burning start to build up. After a short time, they can reach dangerous levels.

If the blood is allowed to rush back into the rest of the body, these toxins, and the lack of oxygen can cause serious problems. The heart can stop, the liver, kidneys and brain can be damaged and in many cases, the casualty will die. This will happen when, immediately after rescuing a casualty suspended in a harness, this person is allowed to lie flat on the floor as the toxic blood will be pumped immediately to the heart.

## 2.5 First aid

If the victim is FULLY CONSCIOUS and MOBILE:

**Put the victim in a safe position which is, sitting upright with the legs bend at the waist ('W-position') for 30 minutes while medical attention is sought.**



W-position

If the victim is UNCONSCIOUS:

**Put him in an inclined position, with the head at the highest point of the body, at about 20 degrees and steps taken to ensure their airway is open, until the emergency services are in attendance.**



**Any personnel who has been suspended in an arrested fall should be treated as a medical emergency and immediate medical attention sought, even if they feel ok**

## 2.6 System to prevent suspension trauma –Trauma straps

This new innovation is simple yet effective for use in conjunction with fall arrest harnesses. It eases the discomfort to the user whilst suspended from a lanyard after a fall.

The leg straps of a conventional harness do not prevent the webbing straps from cutting into the groin area during suspension, and loss of circulation to the legs and feet is often likely. Standing on the Trauma strap relieves the pressure to the groin, and releases the tension within the webbing. The trauma strap is fitted to the harness prior to use. ([www.ridgegear.com](http://www.ridgegear.com))



## **2.7 Lone workers**

As the response time is important in case a victim is being suspended in a harness, it is important that drivers and operators who are working at height as lone workers, are, as far as possible, monitored on a regular basis.

One of the options could be to install CCTV systems (cameras)

Where applicable, a “lone worker risk assessment” should be done.

### 3: Rescue plan

In order to be prepared to rescue a victim, that is being suspended in a harness, as quickly as possible, each site must have a rescue plan.

The rescue plan must address the following:

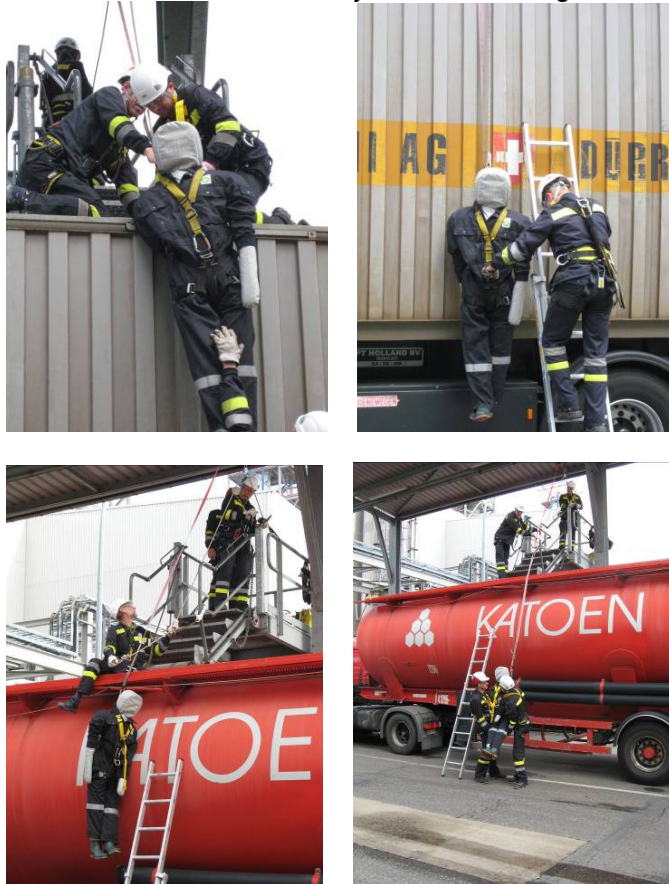
- 1: The rescue method (see below)
- 2: The description of the equipment needed for the rescue
- 3: The availability and maintenance of the equipment
- 4: The rescue team (and availability)
- 5: The safety of persons carrying out or assisting to the rescue (e.g. wear fall arrest harnesses)
- 6: Training of the rescue team
- 7: First aid after the rescue
- 8: Request for medical assistance

### 4: Rescue methods

For rescuing a victim from a truck, 3 rescue methods have been identified:

#### 4.1: using a 2<sup>nd</sup> life line system

An emergency life line system is installed (using lanyards) and hooked up to the victim after which he is slowly lowered to the ground.



As an alternative, the operator descends via the emergency life line and hooks up the victim. Both are lowered to the ground.

In this case, it must be ensured that the equipment, including anchor devices, are suitable to support the weight of two persons.



Both systems require proper equipment (abseil rescue kit) and well trained responders.

#### 4.2: Using a (approved) safety cage on a forklift



This system has some important disadvantages:

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1. The cage / forklift may not always be readily available which will impact on the reaction time.
2. A trained forklift driver may not be available.
3. The rescue personnel may not be capable of lifting the victim into the cage.
4. When raising or lowering the cage it needs to be guided as the forks of the forklift could puncture the side of the tanker or container.
5. There may be access problems if the victim falls from a side of the truck where there is no access for forklifts.

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The system allows to avoid very quickly that the victim is being suspended for a long time (while waiting for the emergency services).

#### 4.3: Using a safety platform

A platform used for lining 20' box containers proved to be suitable for releasing a victim from a harness.

- Enough space for two rescue people to stand
- Adequate height





## **5: Summary**

- Ineos O&P do not want anyone working for their Business, to work at height without adequate protection.
- The life line system proves to be the most efficient way of protection people to fall from height.
- All users of life line systems and people working on Logistics Platforms must be aware of the risks of suspension trauma and what to do in case someone has fallen and is being suspended in a harness.
- Users of fall arrest systems must have received training in the use and the risks of fall arrest systems.
- Fall arrest systems must be properly maintained and tested and must be checked regularly.
- There must be a rescue plan which is exercised on a regular basis.
- Where applicable, a “lone worker risk assessment” should be done and, as far as possible, people working at height as lone workers must be monitored.