



Fall Protection and Training

How to Mitigate Suspension Trauma and Boost Worker Fall Safety

Matt Morgan | Feb 29, 2024

Once a fall protection harness stops a worker's fall from a dangerous height, it might look like the danger's over. It's not. When a worker is left in a hanging position, it can lead to suspension trauma, which can be life-threatening.

"The leg straps on the harness start to tighten up around the legs, almost immediately, starting to cut off the blood circulation to the rest of the body," says MSC Industrial Safety Consultant Michelle Diamond. "Blood oxygen levels will start to suffer, and that includes the blood to the brain and the heart. What can happen pretty quickly is that there's a possibility that the victim will pass out. They can suffer cardiac arrest. They can suffer brain damage and even death."

Diamond says that preventing a worker from hitting the ground is crucial for saving lives, but the focus must immediately shift to getting the person out of the suspended position as quickly as possible.

"As part of a comprehensive fall protection plan, a company should have a rescue plan in place."

Michelle Diamond
MSC Direct

"Even when you do get that person down, you're not totally in the clear yet," says Mark Cangemi, senior technical training specialist at *Honeywell Miller*. "Priority No. 1 is to get oxygen to the brain, because with a lack of oxygen, brain cells start to die, and that's irreversible."

The Occupational Safety and Health Administration's requirements for construction (*29 CFR 1926.502*) are wise words for the manufacturing industry: "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."

There is good reason for this. Prolonged suspension can lead to orthostatic intolerance, which is inadequate regulation of blood pressure and circulation. As Diamond explains, blood can pool in the

legs, called venous pooling, resulting in the accumulation of lactic acid in the blood.

“When the individual is left suspended, they need to buy time, get comfortable and do whatever they can to continue to get oxygen and blood to the brain,” Cangemi says.

Read more: Workplace Falls: 3 Critical Points to Prevent OSHA's Top Violation

OSHA says the situation can be made worse by other factors related to the fall, such as the fit and positioning of the harness, environmental conditions, shock and physical injuries from the fall, and the worker's psychological state.

OSHA outlines the following rescue procedures:

- In situations where self-rescue is not feasible or prompt rescue is unavailable, workers should be trained to regularly move their legs to activate muscles and reduce the risk of venous pooling. The use of footholds can help alleviate pressure, delay symptoms and provide support for leg movement.
- Maintain ongoing observation of the suspended worker to detect any signs or symptoms of orthostatic intolerance and suspension trauma, which include lightheadedness, dizziness, fainting, blurred vision, weakness and fatigue.
- Upon rescue, ensure that the worker receives standard trauma resuscitation procedures.
- If the worker is found to be unconscious, keep the airways clear and administer appropriate first aid.
- After rescue, continue to monitor the worker's condition and arrange for evaluation by a healthcare professional. Hospitalization may be necessary.

Added Safety Features of Harnesses

One tool that manufacturing companies can use to prevent suspension trauma is relief straps, which are designed to alleviate pressure on a suspended worker's legs by providing temporary support while awaiting rescue.

These straps sit in pouches on each side of the harness at the worker's hips. While hanging after a fall, the worker unzips each pouch, pulls out the straps and connects them in the middle. Then the worker steps into the strap, one foot after the other, and stands up, relieving the stress off the pressure points on the legs.

Diamond says that many brands, including **3M**, **Honeywell Miller** and **Werner**, have aftermarket suspension straps that can be added to harnesses, and some harnesses are sold with suspension straps included. She also points out that Werner has patented technology called “Chair in the Air” in **all of its harnesses**, which allows suspended workers to slide the straps and enter a seated position, improving circulation until they are rescued. “That's a really nice piece of technology,” she says.

Barring a specialized strap, suspended workers can use the other leg of their lanyard or any kind of rope or unplugged extension cord that can be lowered down—“anything to give that person essentially a swing or a seat or a strap, something to step into, to prevent the constriction or tourniquet-like effect of the leg straps around the femoral arteries,” Cangemi says.

Training to Protect Against Suspension Trauma

The proper use of relief straps, like the harnesses themselves, should be covered in a comprehensive fall protection plan. Workers should be trained on how to use the straps and remain calm while doing so.

Employers are required by OSHA to provide **training for workers on the correct usage of personal protective equipment** (PPE) including fall arrest systems as they carry out their duties, as outlined in standards **29 CFR 1910.132** (Personal Protective Equipment).

Read more: Workplace Fall Protection: How to Use a Safety Harness and Lanyard

In a **bulletin on suspension trauma**, OSHA says that workers who use fall arrest devices should receive training on the following:

- Assessment of the **proper fit and wear of safety harnesses** to ensure their effective performance.
- How suspension trauma and orthostatic intolerance may occur.
- Identifying factors that could heighten a worker's susceptibility to suspension trauma risks.
- How to recognize the signs and symptoms of suspension trauma and orthostatic intolerance.
- The appropriate rescue procedures and methods to mitigate risks when suspended.

"As part of a comprehensive fall protection plan, a company should have a rescue plan in place," Diamond says.

Cangemi recommends that companies follow the rescue hierarchy: "Keep yourself safe, keep your co-workers safe, keep the scene safe, then look to resolve the issue of the fall victim," he says.

"We want to make sure that we have training, equipment, facilities and personnel to facilitate rescue as soon as possible, which can be the difference of that person being in suspension moments versus minutes or maybe even hours," he adds.

Ultimately, Diamond says, the best plan to protect against falls and suspension trauma is to see that these kinds of accidents don't happen in the first place.

"The biggest thing is to prevent those falls," she says. "Prevention is the key."

Employers must prioritize fall prevention measures, including thorough safety training, regular **equipment inspections** and adherence to safety regulations. By investing in preventive measures, manufacturing companies can significantly reduce the likelihood of falls and mitigate the risks associated with suspension trauma.

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