Fall Protection

INCIDENT

An Edmonton Alberta manufacturing company will pay a fine and fund a new fall prevention program after a veteran welder died on the job three years ago.

Cessco Fabrication and Engineering Ltd. pleaded guilty in Edmonton Alberta provincial court to a single charge of failing to ensure a worker used a fall protection system for the Jan. 19, 2016, death of Barry Maitland.

Maitland, a pressure welder for 29 years, was fatally injured after falling more than five metres (17 feet) from the top of a liquified natural gas storage vessel on which he was preforming a weld. He later died in hospital.

“We miss him,” Linda Maitland, his widow, said outside court. “The kids still talk about him today. My granddaughter especially – ‘I miss papa, I wish he was here.’ Because you don’t say goodbye.”

Maitland had just started a night shift in a fabrication shop at Cessco’s Edmonton facility at 7310 99 St. on the day of the accident.

Maitland, 52, was setting up to perform a weld on top of the LNG equipment, which measured 28 metres long and just over four metres in diameter. At some point, he stepped off an aerial work platform used to hold his welding equipment.

An agreed statement of facts states Maitland did not anchor the lanyard on his fall protection harness before stepping off the platform. A short time later, the night shift supervisor and another worker heard Maitland hit the concrete floor, though no one witnessed the fall itself.

Maitland was rushed to the University of Alberta Hospital, where he died.

His son Steven Maitland, who also works at Cessco, was on the earlier shift and rushed back to site to find police officers everywhere, Linda Maitland said. He then went to the hospital.

“Steven found out his dad had died, and he told the doctor out in the hall that he wanted to tell me and not the doctor,” she said.

The parties agreed that while Cessco's fall protection plan complied with occupational health and safety legislation, it did not specifically cover welding work on the LNG vessels.

Under a joint submission on sentencing, Cessco will pay a $5,000 fine and pay the Manufacturer's Health and Safety Association $170,000 to create an enhanced fall protection program.

Defence lawyer Christopher Spasoff said the sentence was not an attempt to "put a dollar value on the life of Mr. Maitland," but rather to apply the law.

An autopsy found Maitland's cause of death was blunt cranial trauma, according to the agreed facts. It also found evidence of alcohol in his system and severe heart disease, including an enlarged heart.

A medical examiner said it was possible Maitland experienced symptoms of angina or irregular heartbeat, which could have contributed to the fall.

Court heard Maitland was known as a very safety conscious worker who regularly raised issues during safety meetings. His family described him as "anal retentive when it came to safety."

He loved to cook, and was famous within his family for his homemade pizzas. He also mentored family members entering the welding trade.

"The boys were constantly trying to upstage their dad – 'I'm a better welder, I can do this better than you can,'" Linda Maitland recalled. "Barry would be like, 'Yeah, no, I don't think so, let's go try.'"

Linda Maitland said that while she received compensation from Occupational Health and Safety for her husband's death, she will end up having to sell her home.

As for the sentence, "I'm OK with it," she said. "They're looking into becoming more safe, and I know they're remorseful. The right guys that should have heard my victim impact statement aren't here."

Cessco president Dave Hummel, who was not president at the time of the accident, was visibly shaken as he addressed the court. He said the day of Maitland's death is "forever etched in our history."

NEED TO KNOW

Falls are one of the oldest causes of injuries and death in the workplace.

A worker is most at risk if working at heights of four feet or more; above running machinery, water and hazardous liquids, or exposed to an opening in a work surface. Fall protection equipment can mean the difference between life and death.

Working at heights is any work where a person could fall a distance and be injured. This event might include, for example, falling from a step ladder, off of a roof, or through an unguarded hole in the ground or floor. Fall protection may also be required when working above an open-top tank, bin, hopper, or vat.

Personal Fall Arrest System (PFAS) are designed to prevent workers from falling

off communication towers, scaffolds at high rise construction sites, or the roof of a house.

Many workers receive little no fall protection training, use the wrong fall protection, or, use the equipment improperly, and, sometimes do not use fall protection at all.

OSHA requires employers to provide employees for fall protection according to the fall hazards that exist on the job.

All hazards are to be addressed by using the following hierarchy of controls:

1. Eliminate the hazard
2. Substitutions
3. Engineering Controls
4. Administration controls, and
5. Personal Protective Equipment

This, if the first (1) to (4) controls are not adequate to protect against the fall hazard, then PFAS must be used.

If it has been determined that the employee must wear a harness and lanyard, there must **be training in the hazards present** when working at heights and at what heights fall protection is required. **Then the employee must be trained to use and inspect** this critical piece of personal safety equipment.

BUSINESS/REGULATORY

Falls are among the most common causes of serious work-related injuries and deaths. Employers must set up the work place to prevent employees from falling off of overhead platforms, elevated work stations or into holes in the floor and walls.

Employers must set up the work place to prevent employees from falling off of overhead platforms, elevated work stations or into holes in the floor and walls. **OSHA** requires that fall protection be provided at elevations of four feet in general industry workplaces, five and six feet in shipyards, six feet in the construction industry and eight feet in longshoring operations. In addition, **OSHA** requires that fall protection be provided when working over dangerous equipment and machinery, regardless of the fall distance. In Canada the minimum standard for construction is 10 feet or 3 meters.

To prevent employees from being injured from falls, employers must:

- Guard every floor hole into which a worker can accidentally walk (using a railing and toe-board or a floor hole cover).
- Provide a guard rail and toe-board around every elevated open sided platform, floor or runway.
- Regardless of height, if a worker can fall into or onto dangerous machines or equipment (such as a vat of acid or a conveyor belt) employers must provide guardrails and toe-boards to prevent workers from falling and getting injured.
- Other means of fall protection that may be required on certain jobs include safety harness and line, safety nets, stair railings and hand rails.

OSHA requires employers to:

- Provide working conditions that are free of known dangers.
- Keep floors in work areas in a clean and, so far as possible, a dry condition.
- Select and provide required personal protective equipment at no cost to workers.
- Train workers about job hazards in a language that they can understand.

STATISTICS

According to the **Center for Construction Re-search** and training (CPWR) in a 33yr period from 1982 to 2015, falls accounted for nearly half of all construction workers deaths. More than half of the workers killed lacked access to fall protection.

NIOSH Fatality and Control Evaluation program researches found fatality reports for 768 construction industry fatalities.

Researchers after analyzing the incidents concluded that between 1982 and 2015 that:

- 42 percent (325) of the fatalities involved falls.
- 54 percent of the workers killed had no access to a personal fall arrest system and 23 percent had access to a PFAS but did not use it.
- Most of the workers with no access to PFAS worked for residential building contractors and contractors in the roofing, siding and sheet metal sectors.
- 107 of the 325 falls were from 30 feet or higher.
- 20 percent of the 768 deaths occurred in the victims first two months on the job.

In **2016**, 697 workers died in falls to a lower level, and 48,060 were injured badly enough to require days off of work. A worker doesn’t have fall from a high level to suffer fatal injuries; 134 workers were killed in falls on the same level in **2016**, according to *Injury Facts*. Construction workers are most at risk for fatal falls from height – more than seven times the rate of other industries – but falls can happen anywhere, even at a “desk job.”

NSC data for 2016 includes falls from height and falls on the same level, by industry:

- Construction: 24,700 injuries, 384 deaths
- Manufacturing: 22,040 injuries, 49 deaths
- Wholesale trade: 10,250 injuries, 21 deaths
- Retail trade: 29,830 injuries, 29 deaths
- Transportation and Warehousing: 23,490 injuries, 46 deaths
- Professional and business services: 22,090 injuries, 111 deaths
- Education and health services: 43,660 injuries, 18 deaths
- Government: 63,350 injuries, 44 deaths

PREVENTION

Personal Fall Arrest System (PFAS)

In the incident with Mr. Maitland, had he anchored the lanyard and his fall protection harness before he stepped off the platform, he may have survived.

When working at height, danger of a fall is obvious; however, many workers receive little or no fall protection training, use the wrong fall protection equipment (or use their equipment improperly) or, in some cases, fail to use fall protection equipment at all. It is every company's responsibility to prepare their employees for safely working at heights, and that preparation must include understanding the fall protection challenges of the job and how the challenges can be mitigated to get the job done safely.

Towers serve multiple functions, including supporting telecommunications networks. Each year, thousands of new towers are erected, mostly for cell phones, and as workers climb to build or maintain them, they are at risk of a fall. The tallest towers that have licensed construction permits in the United States now are over 2,000 feet tall. Tower work often requires employees to climb and move from one area of the tower to another, increasing the risk of falling at significant heights.

Personal fall arrest system is one way to protect workers from falls. They consist of a body harness anchorage and connector. When using PFASs, workers must ensure they are using components from the same manufacturer to ensure the system works as it should. If not, any substitution or change must be evaluated and tested to ensure it meets the standard.

Osha requires fall protection be provided at elevations of four feet in general industry workplaces, five and six feet in the construction industry. In Canada, the minimum standard for construction is 10 feet or 3 meters.

The procedures for implementation of (PFASs) is set out as follows:

Fall clearance

A common fall protection challenge involves calculating required fall clearance and choosing the correct equipment. The importance of knowing what the required clearance for a particular fall arrest system is obvious. If you know what the required clearance distance is and you allow for it, you help minimize the potential for injury in the event of a fall. But if you do not know what the required clearance is or you miscalculate, the results of a fall can result in serious injury and may require a rescue operation.

Choosing equipment

To start, there are four essential pieces of fall protection equipment tower workers should have in their **"Tool Box": Anchorage Connectors, Body Support, Connecting Components and Rescue Systems.**

Although many workers use a system that incorporates a shock absorbing lanyard, these systems typically require approximately 18 feet of fall clearance. Some ladder safety systems and self-retracting lifelines can reduce this number significantly and therefore are much safer and are preferred.

One example is a tie-back, self-retracting lifeline attached directly to the worker's dorsal D-ring. A tie-back, self-retracting lifeline (SRL) features unique snap hooks with high gate strength designed specifically for tie-back

use. With this type of hook, the end of the lifeline can be wrapped around the structure and tied back into itself, eliminating the need for a separate anchorage connector. These systems feature inertia-activated brakes, which lock quickly and stop a falling worker within a matter of inches. With a tie-back SRL, it still is important to consider fall clearance, but it is recommended that workers account for approximately 6 feet, compared to the more restrictive 18 feet that is recommended for 6-foot, shock-absorbing lanyards.

Mobile rope grabs and static wire rope grabs are temporary devices and can be installed or removed at any point along the lifeline. The rope grab utilizes a cam lever as well as a friction-sensitive brake to lock the rope grab onto the lifeline in the event of a fall. A static wire rope grab employs a wedging action that grips and locks onto the cable if the worker slips. For fixed connection work, a scaffold choker or tie-off adapter provides a safe and easy anchor point.

When selecting a body support harness, consider comfort, quality and durability. Since tower workers likely will be wearing the harness for long periods of time, harnesses with hip padding, mesh lining and soft edging features will help keep workers comfortable while working at height. Further, there now are harnesses specifically made for tower climbing with built-in work seats and other specialized features.

There are many different types and options for connecting components, so think about the level of mobility the worker will need and the logistics of the work environment. Shock-absorbing lanyards and self-retracting lifelines both provide excellent protection in the event of a fall. Look for connectors that provide 100 percent tie-off capability, allowing the worker to stay protected while they move from one location to another. When work positioning is required, a rebar assembly limiting free fall distance to 2 feet or less can provide a safe connection to many kinds of structures.

For work requiring vertical mobility, the choice of anchorage connector could be a ladder safety system, a mobile rope grab or a static wire rope grab. Ladder safety systems attach to permanent, fixed ladders and provide optimal fall protection and freedom of movement for workers. A tensioned cable runs the length of the entire climbing structure, with a top and bottom bracket serving as fixed anchors for the cable. To climb, a worker connects the front D-ring of his harness to a safety sleeve on the cable, which automatically follows his movements up the fixed ladder. If the climber slips, the sleeve locks onto the cable and prevents the worker from falling.