

HEALTH AND SAFETY ADVISORY

Failure of Lanyards and Lifelines When Working on a Leading Edge

When working at heights, workers often rely on fall protection equipment to keep them safe. However, when working on a leading edge or around sharp work surfaces, the lifeline or lanyard—including a self-retracting lanyard or lifeline (SRL)—can become frayed or cut as it rubs against the edge. This damage can weaken the equipment to the point where, if a worker fell, the force of arresting the fall would likely cause the lanyard, lifeline, or SRL to fail.

Because of recent incidents where this has happened, standards organizations such as CSA and ANSI have recognized that working on a leading edge presents unique hazards that require extra precautions as well as specialized fall protection equipment.

Fall protection systems

A leading edge is the unprotected end of formwork, floors, roofs, decks, or other walking or working surfaces. An unprotected edge is a significant fall hazard.

If it is not practicable to install a guardrail system, a worker who may be exposed to a fall of more than 3 metres (10 feet) off the ground **MUST** use a fall protection system and be trained in its use. **IT'S THE LAW!**

Workers must be “adequately protected by the highest ranked method that is practicable” (O. Reg. 213/91, s.26.1(2)). These methods of fall protection are ranked as follows:

1. A travel restraint system
2. A fall restricting system
3. A fall arrest system
4. A safety net

A travel restraint system prevents a worker from falling over the edge, so it is preferred over a fall restricting system, which limits a worker's fall, or a fall arrest system, which “arrests” (stops) a fall before the worker hits the ground or an object below.



The best way to prevent a fall is to eliminate the fall hazard. Follow the hierarchy of controls for any hazard on a site:

1. **Eliminate** the hazard
2. Control the hazard **at the source**
3. Control the hazard **along the path**
4. Control the hazard **at the worker.**

A fall hazard may be **eliminated** or controlled **at the source** or **along the path** by:

- Relocating the work to a safer location
- Delaying the work until permanent safety features are installed (walls, railings, etc.)
- Putting up guardrails
- Covering roof and floor openings
- Working from an elevating work platform (EWP)

If these controls are not practicable for leading edge work, the fall hazard must be controlled **at the worker** by using a personal fall protection system.

Risks

Lanyards, lifelines, and SRLs are generally designed and tested for falls when the anchor is located overhead. This limits the fall distance and lowers the risk of the worker hitting an object below or beside them. However, when working on a leading edge, the anchor point is usually located at ground level.

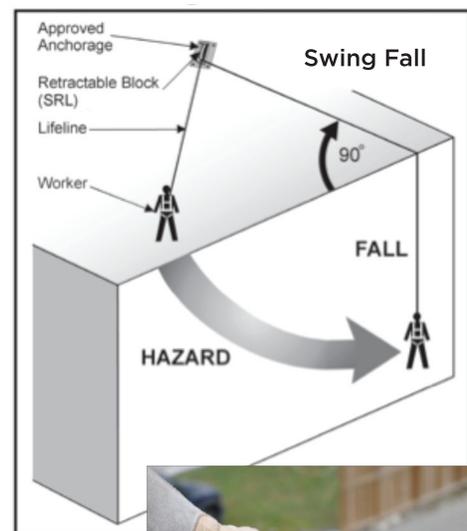
If a lanyard, lifeline, or SRL is attached to an anchor point at ground level and a worker falls over a leading or sharp edge (steel, I-beam, or rough concrete), the equipment may rub against the edge and damage it so much that the lanyard may be cut to immediate failure.

If the anchor point is not directly behind the worker when they fall, they may swing back and forth. This is known as a swing fall. The friction caused by a swing fall makes it even more likely that the lanyard, lifeline, or SRL will be at risk of being cut to failure as it passes over the sharp edge repeatedly in a sawing motion.

Also, an anchor point located at ground level may add to the falling distance, putting more force on the body and on the equipment and increasing the potential for swing fall.

Prevention

- Use a travel restraint system so that workers cannot fall over the edge.
- If a fall arrest system must be used, inspect the equipment before each use.
- Attach the lifeline to an anchor point overhead or as high as possible so the lifeline is vertical rather than horizontal where it can run along the edge.
- Select an anchor point that is directly behind the worker to limit the fall distance as much as possible and prevent the lanyard from running over the edge.
- Ensure that sharp surface edges are covered or protected (e.g., use edge softeners such as rubber bumpers or padding).
- Use SRLs in travel restraint so that workers cannot fall. Make sure that the payout (length) is shorter than the fall hazard (edge). If the line is long enough to go over the edge, the worker is not in travel restraint.
- Use SRLs that are specially designed for leading edge work. They are classified as SRL-LE and certified by ANSI Z359.14 and CSA Z259.2.2-14. The CSA standard was published only recently, so ANSI-certified SRL-LEs will be easier to find. (NOTE: Several employers have decided to remove from service all SRLs that don't meet the criteria for leading edge protection. This way, workers won't use the wrong type of SRL.)



A class SRL-LE device is suitable for applications where:

- It is anchored lower than the elevation of the dorsal D-ring on the user's full-body harness. **OR**
- The extracted lifeline can bear against an edge during fall arrest.

Ensure that sharp surface edges are covered or protected

REMEMBER—Be prepared while working near an edge.

Fall protection takes planning, especially when working near an edge. If there is a possibility that workers can fall, there is a possibility that their fall protection equipment can become damaged and fail. Take precautions to make sure you can't fall!

A publication of the Construction Labour-Management Health and Safety Committees
in partnership with IHSA