

The hierarchy of fall protection solutions.

It might be thought that a fall protection salesperson is quick to propose a solution that involves the installation of their products and some may be, but the best approach is a systematic way of reviewing the client's needs and working along the following path of creating a solution. In some cases this means just a change in process for the workers and no "system" solution is necessary. Of course the reverse might be the case and the only solution might be a permanently mounted engineered fall arrest system to protect the workers at height.

These solutions may run from no risk to the worker to a higher risk to the worker. They also run from a low level of training to a very high level of training and expertise. This is the road to follow in reviewing potential solutions for a fall arrest hazard.

1) Engineer out the hazard

- a. Let's use the example of a pipe rack in a chemical plant. Every shift there is a process valve that needs adjustment by an operator and it is mounted 22' up a ladder and over a 14' section of catwalk. One might be quick to install a permanently mounted vertical lifeline system up the ladder and fully guard the catwalk with handrails with midrails and toeboards. The user would also have to be trained to inspect and don a harness and use the vertical system. A better solution would be to engineer out the hazard by moving the process valve down to ground level. The expense of the additional instrument tubing or pipe would easily be less than the cost of a fall protection system, inspection regiment and required training. Problem solved.

2) Guard the fall arrest hazard with a passive type system

- a. In the case of a flat with a compliant parapet wall (42" plus or minus 3") surrounding the roof, we have no need for a fall protection system on the rooftop as long as the workers are not subjected to a fall hazard. What happens if the architect has cutouts or scallops in this wall for design purposes that reduce the height of the wall in some areas below the compliant parapet wall height? A passive type system such a permanently mounted or counterweighted handrail system might just fit the bill. This is also very popular as a retrofit solution around skylights mounted on flat roofs, where the skylights do not meet the OSHA strength or guarding requirements. The great plus to this type of retrofitted system is that the cost is low and the training requirement is minimal.

3) Protect the workers with a restraint system

- a. The best protection from fall hazards is to keep your technicians from even reaching a leading edge and prevent them from exposure to falls. There are some situations that require workers to be up on flat or low slope roofs, such as snow clearing, which just can't be easily engineered out. While there may be a few automatic snow removal solutions on the market, I am not aware of any that is more cost effective to two workers with brooms.



- b. The key to a restraint system is to prevent the workers from reaching the edge of the roof by means of a fixed tether or in this case a restraint lanyard. This design may only be employed if there is no chance of anyone encountering a fall arrest situation and subjecting the system to full fall arrest forces. These systems require some training on use and self inspection of the gear.
- 4) Protect the workers with a fall arrest system where no PPE adjustment is required**
 - a. This type of system is utilized where a maintenance technician must get up to the very edge and sometimes over a leading edge of a building. In cases where building façade maintenance is undertaken, HVAC work or even maintenance on roof mounted surveillance equipment. Usually the worker will use a full body harness with a shock absorbing fall arrest lanyard. The training required is bit more comprehensive and now the issue of rescue from heights must be addressed. If someone could fall over the roof edge and have their fall arrested by a system, we now have to get them back to safety with a rescue plan and system. (No, dialing 911 is not enough.)
- 5) Protect the workers with a fall arrest system where PPE adjustment is required**
 - a. This level of system is very similar to the fall arrest system described above with the large difference being that the technician in the scenario utilizes a rope, rope grab and short shock absorbing lanyard in place of the 6' shock absorbing lanyard used above. This technician must be trained on how to properly inspect, use and manipulate this active system. The training is much more detailed and there is a higher risk to the worker if they are not using the gear properly. Rescue is still considered at this next level and beyond.
- 6) Employ a rope access type system to access the area**
 - a. Rope access is a highly specialized system of work in which a standard craftsman (welder, ironworker, fitter, etc.) uses a dual rope system of work to abseil and access the lower levels of a structure. This system requires two anchors for the user, one for their main line and one for their backup line. This system is often used when conventional access methods are not available. The rope access training is highly specialized and require a high level of fitness and demonstration of technique. A good example of rope access activity is that of the wind farm technicians who must move down their windmill blades for inspection and crack repair of these large blades. Rope access workers generally work in pairs, are highly trained, have very specialized equipment and are proficient in rescue at heights.



