

AVOIDING

THE FALLOUT



**PASSIVE VS. ACTIVE FALL
PROTECTION SYSTEMS:
COSTS & COMPARISONS**



SafetyRailCompany

CONTENTS

Abstract 01

Initial and Recurring Direct Costs for Active Fall Protection 02

Direct Project Costs Associated with Active Systems 03 - 04

The Indirect and ‘Hidden’ Costs to Consider 05

 The Cost of Noncompliance 05

 The Cost of an Injury 05 - 06

 The Cost of Litigation 06

Weighing the Options 07

 Passive Systems 08

 Active Systems 09

Where to Get Safety Railing 10

Sources 11

ABSTRACT

Some jobs carry with them inherent dangers. We do the best we can to mitigate those dangers and keep worksites as safe as possible. But safety does come at a cost, and that cost is a concern for facility and project managers.

Budgets are a reality of safety planning, which is why careful consideration should be given to the overall safety plan. It's not always about upfront costs. Oftentimes, passive fall protection can look – on the surface – more expensive than active fall systems.

However, a deeper look into overall costs reveals there's plenty to consider when debating active vs. passive fall protection.

While it's impossible to draw a direct, empirical comparison between active and passive fall protection, this paper will help facility, construction and project managers understand all the angles that should be considered when deciding on a comprehensive fall safety plan.



INITIAL AND RECURRING DIRECT COSTS FOR ACTIVE FALL PROTECTION

Active systems commonly consist of individual harnesses using fixed-point anchors, horizontal lifelines and trolley systems attached to an overhead structure. Passive systems, such as guardrails, don't require special equipment or active participation from the worker and do not move, adapt or change when in or out of use. They also rank higher than active systems in the Hierarchy of Fall Protection.

techniques. Affected employees shall also be trained so that they can demonstrate the proper use, inspection, and storage of their equipment."

In addition to training for users and supervisors, annual inspections of the equipment for re-certification are required. Having a significant number of individual components (harnesses, lanyards, etc.) can run into thousands of dollars for complete re-certification.

“ Passive systems, such as guardrails, don't require special equipment or active participation from the worker ”

The upfront costs of purchasing active fall protections systems are generally lower than the upfront costs of passive systems. In fact, personal protection equipment can seem rather inexpensive per piece when considering harnesses, anchors and lanyards.

However, there are additional initial costs to consider for active systems, such as training. Active fall protection systems require that **each user** complete training from an OSHA-compliant instructor prior to use – and that includes supervisors as well.

OSHA regulations state: "Before using personal fall arrest equipment, each affected employee shall be trained to understand the application limits of the equipment and proper hook-up, anchoring, and tie-off

After the equipment is purchased and people are trained on its proper utilization, the system must be installed at the job site by a certified individual. Active systems must be installed for each specific job and consistently adjusted and reinstalled as work moves to new locations. Passive systems, on the other hand, typically don't require specialized personnel for installation, nor adjusting throughout the lifespan of a project.

And finally, the consistent strain and use of active systems can lead to the need for frequent replacement and/or repair costs.



DIRECT PROJECT COSTS ASSOCIATED WITH ACTIVE SYSTEMS

Following the initial direct costs of purchasing active fall protection and training the requisite employees on its proper use, the direct costs of using active systems on each individual project must be considered.

In many cases, a formal professional engineer (PE) review is necessary. The PE must meticulously examine the structure and existing roofing system in order to determine proper specification and installation of an active fall system.

Following that review, most installations require penetrations to the roof membrane in order to access the roof deck for necessary attachment points. Often, this delicate job requires the services of a roofing subcontractor.

The penetrations to the roof membrane must then be addressed to prevent leakage. This needs to be a meticulous process to ensure the roof membrane manufacturer's warranty remains intact. Some industrial roofs can cost millions of dollars, justifying caution in addressing roof penetrations for anchoring an active fall system.

Costs for the actual penetration can vary widely depending on the roof system. The subroof deck, insulation depth, membrane type – these are all major factors in the ultimate cost of active system installation, and these costs are only determined by an aforementioned PE review. Depending on that review, field welding may be additionally required as part of the active system installation, in order to achieve the necessary structural loading.

Furthermore, an often forgotten or ignored part of project costs is that of a rescue plan. Whenever a fall protection system is in use, a corresponding rescue plan must exist. The ANSI/ASSE Z359.2-2007 standard requires that employers develop written plans to provide a means for rescue from height. This requires a job hazard analysis of the site that includes availability, preparation and training on equipment specific to a rescue at that project location. OSHA also requires a site-specific written rescue plan.

While the initial upfront costs of active fall protection might have been lower than a passive protection plan, the direct project costs for using active fall protection cannot be overlooked. It's difficult to define these project costs ahead of time, requiring the potentially costly expertise of an engineering analysis and roofing specialist. In addition to the costs, roof penetrations

carry further potential risks of leakage and warranty nullification.

Yet there are still additional concerns to be weighed.



Whenever a fall protection system is in use, a corresponding rescue plan must exist.



THE INDIRECT AND ‘HIDDEN’ COSTS TO CONSIDER

When contemplating passive versus active fall protection, it's important to look beyond the initial sticker price.

Indirect costs can include worker downtime, additional training for turnover of employees and staff, accident

investigation and repairing damaged equipment. Hidden costs can come in the form of noncompliance penalties, litigation costs and medical costs.

Let's explore some of these more thoroughly.

The Cost of Noncompliance

Fair or not, liability for a user of active fall protection lands not on the worker himself, but on his or her employer. That requires stringent oversight to ensure employees are up-to-date on training and are appropriately using the requisite equipment. Or, it demands a lot of trust that unsupervised employees aren't cutting corners or altogether skipping the full and proper use of a fall protection system.

This can be at minimum a hassle and at worst an administrative nightmare if you have a large number of

workers or subcontractors needing access to the roof or job site. Furthermore, what happens if employees get caught in noncompliance?

In June 2018, OSHA again increased its penalties for noncompliance. A violation deemed "serious," "other than serious" or "posting requirement" can draw a fine of \$13,260. Bear in mind that is per violation. Failure to abate the violations results in addition fines of \$13,260 per day, and repeated or willful violations carry a maximum fine of over \$132,000!

The Cost of an Injury

Fall injuries account for a large percentage of workers' compensation and medical costs for companies across many industries. The National Safety Council has **approximated** that cost at \$70 billion annually in the United States.

Despite efforts to maintain worker safety, accidents still happen. When they do, they carry a hefty tab.

The Centers for Disease Control and Prevention (CDC) estimates that a fatal injury results in an average cost of almost \$1 million, and that's just for hospital costs. A National Safety Council model estimates the average total cost of a fatality at \$1.42 million.



Furthermore, the NSC **approximates** that every dollar in direct costs results in as much as \$2.12 in indirect costs, including but not limited to loss of workplace productivity, worker replacement, work disruption, increased insurance premiums, additional training and legal/litigation fees. Based on this calculation, one workplace fatality ends up costing in the area of \$3 million.

Other **studies** have found that indirect costs for construction industry injuries can reach 17 times the direct costs, depending on the type of incident. A major factor in that figure stems from legal considerations.

The Cost of Litigation

It's almost impossible to guess what litigating a fall injury or fatality might cost, but it only takes a quick look at some **settlement figures** to understand the potential scale of it.

For example, an ironworker who was left a quadriplegic following a 50-foot fall **received a settlement** of more than \$24 million. Another ironworker settled for **more**

than \$12 million after suffering a brain injury when he fell 18 feet from the roof of a car dealership.

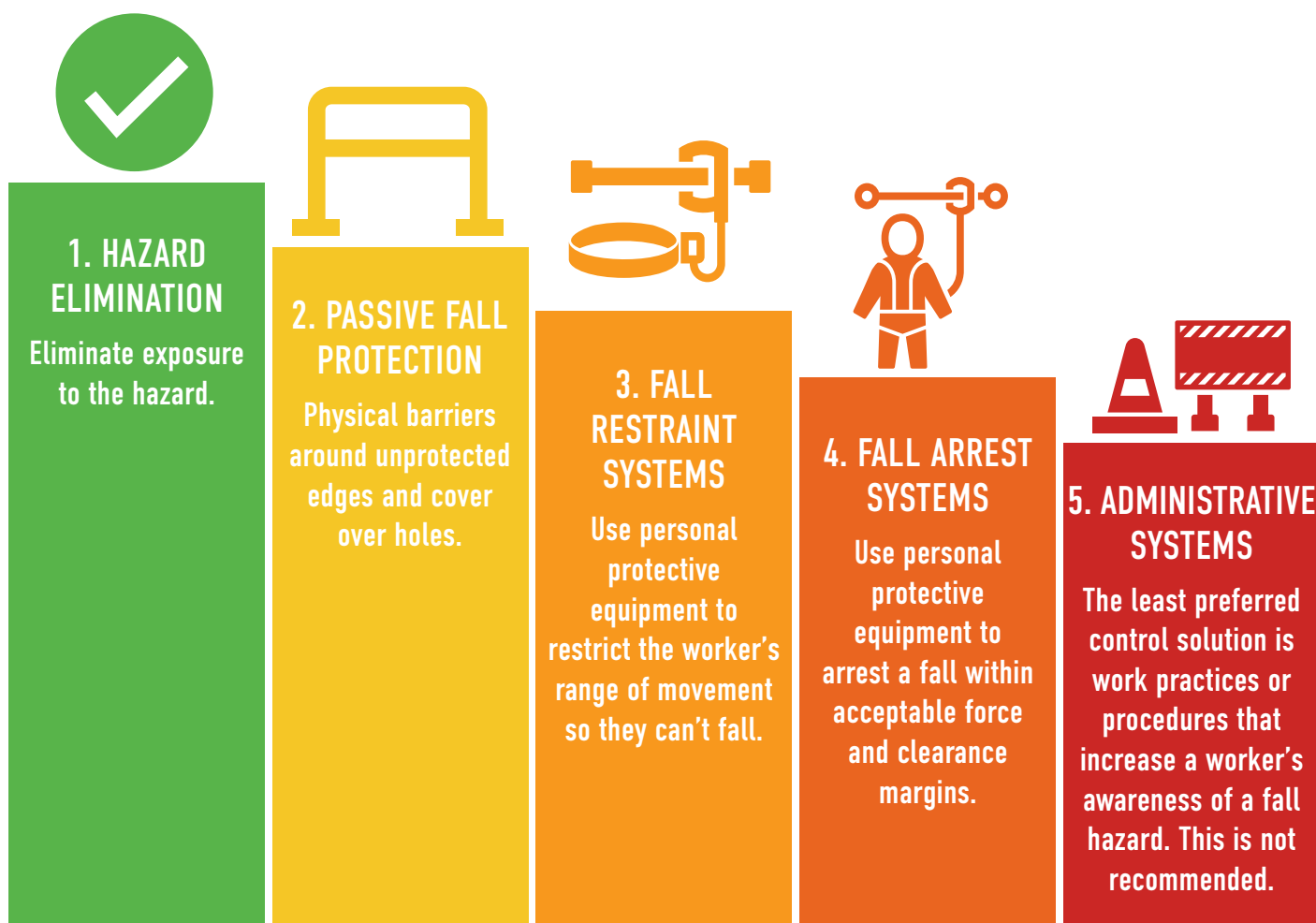
It isn't difficult to find lists of expensive settlements awarded to fall victims. And those amounts don't account for the additional legal fees incurred in reaching the settlement.



WEIGHING THE OPTIONS

With caution, compliance and some degree of good fortune, it's possible to avoid many or even all of the potential hidden and indirect costs related to a breakdown in fall prevention. But it can be a costly wager to lose.

As a result, certain circumstances logically call for passive fall protection. In fact, OSHA's Hierarchy of Controls for fall protection promotes passive fall protection as the best option when the danger cannot be engineered out of the equation.



Despite this preference of passive fall systems, fall restraint and fall arrest systems are often chosen for budgetary reasons. However, those decisions are too often made with only superficial cost considerations. And because of the many factors that make it difficult to directly compare the cost of a passive versus active

approach, it's important to gather and weigh all the relevant information.

To examine active versus passive options from another perspective, consider this quick pros/cons construct:



Passive Systems

MOBILE (NON-PERMANENTLY FIXED) SAFETY RAIL

PROS: Simple installation – no roof penetrations or onsite welding
Easy modification/versatility
Contractors can simply move system from jobsite to jobsite for temporary installations
OSHA compliant
No ongoing maintenance or expensive inspections
Worker freedom of movement
OSHA's preferred control method – Hierarchy of Controls

CONS: Designed for flat/low slope roofs only
Visible from the ground

PERMANENT GUARDRAIL

PROS: Various mounting options provide flexibility
Provides full access to roof foot print (up to the roof edge)
OSHA compliant
No ongoing maintenance or expensive inspections
Worker freedom of movement

CONS: Installation costs
May require engineering review of external wall construction and attachment/anchor detail
Penetrations required for mounting

Active Systems

HORIZONTAL LIFELINE

PROS: More worker mobility than a standard anchor point
Not visible from the ground
OSHA/ANSI compliant when properly installed and trained
Can be installed on steep slope and barrel roofs

CONS: Requires certified installation
Requires OSHA/ANSI compliant training for users
Must be inspected before each use
User must properly wear protection equipment
Limits user mobility to length of horizontal lifeline
Requires official rescue and retrieval plan
Requires ongoing inspection of/replacement of equipment (harnesses, lanyards, etc.)
Requires administrative attention and record keeping for compliance

MOBILE TIE-OFF POINTS

PROS: Non-penetrating (except if fall occurs with some systems)
Portability – ability to move from jobsite to jobsite
OSHA/ANSI compliant when properly installed and trained
Cost-effective

CONS: Requires OSHA/ANSI compliant training to use
Must be inspected before each use
Must be properly re-positioned for use
User must properly wear protection equipment
Limits user mobility
Requires official rescue and retrieval plan
Requires ongoing inspection of/replacement of equipment (harnesses, lanyards, etc.)
Requires administrative attention and record keeping for compliance



As this comparison lays out, there’s far more to consider than the basic costs of equipment. And, it’s an unfortunate reality that employees can’t always be counted on to look out for themselves. Shortcuts and blatant noncompliance are all too common, which makes the indirect and hidden costs a necessary consideration.



WHERE TO GET SAFETY RAILING

After you've carefully examined the options for your facility or job site and determined passive fall protection is right for you, the next question is which company you'll buy that system from. Like any procurement decision, you'll want the best intersection of quality, convenience and affordability.

Safety Rail Company promises 100% made-in-the-USA rail systems that are American Welding Society Certified (AWS D1.1 & D1.3) – a stringent quality control unique to the industry. Not only does Safety Rail's American-made railing support domestic jobs, it also offers convenience and customization not available from companies that import their products.

Safety Rail is able and willing to design and manufacture custom parts. Furthermore, with supply on-hand in the U.S., SRC can offer complete turnkey installation solutions faster and easier than the competition.

Not sure if you'll need custom railing? Safety Rail provides CAD modeling in the quote stage instead of requiring a purchase order or contract prior to producing a model.

Safety Rail understands that keeping your facilities and job sites safe is an investment, which is why we're committed to helping you find exactly the right safety solutions for your needs.

GET STARTED TODAY!

SOURCES

<https://www.osha.gov/laws-regs/regulations/standardnumber/1915/1915.159>

<https://www.ehstoday.com/safety/workplace-falls-pose-danger-economy-well-workers>

<https://www.safetyandhealthmagazine.com/articles/10414-the-roi-of-safety>

<https://www.anesilaw.com/construction-negligence-verdicts-and-settlements/>