

Fall Protection: Yesterday, Today and Tomorrow

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Introduction

Fall protection is the broad aspect of safety that focuses on preventing workers from falling, and protecting them when they do fall. In the United States especially, fall protection is often viewed as the methods used to save people from falling. In fact, the term “fall protection” has become synonymous with fall-arrest equipment, such as harnesses and lanyards. Ideally, however, fall protection measures should restrict or prevent workers from falling. This paper will discuss many of the advances made in the fall protection industry throughout the past few decades. Still, one of the most important steps to increasing safety for workers at heights is for employers and workers to take personal responsibility for their own safety, rather than having safety imposed upon them. In addition to the technological advances made in the future, ideally the industry as a whole will focus more on teaching people to work more safely and efficiently—not just about how to employ equipment to catch them if or when they fall.

Concern about workers falling has been expressed since Biblical times, when the first known reference to fall protection is given in the Book of Deuteronomy. Despite that early reference, it wasn't until the more recent past that fall protection measures have consistently advanced safety. Today, regulations, standards, training programs, and modern equipment provide the support employers need to protect workers.

Still, with all the advancements made in the industry, workers are still falling to their deaths in large numbers. The reality is that fall protection is complex. It is a blend between engineering and behavioral safety. To further complicate the issue, fall protection programs must strike a balance between cost efficiency, compliance, safety and usability in order to fit in today's working environments. But, when fall protection issues are properly addressed, the result is increased safety and reduced risk for workers at heights.

To fully understand where the fall protection industry has been and where it's going, this paper will highlight the following core aspects of the industry:

- Injury trends
- Regulations/standards
- Equipment
- Fall protection programs

Each of these aspects will be examined in the categories yesterday, today and tomorrow. For the purposes of this paper, yesterday refers to information before 2000. Today refers to details in the last decade, and tomorrow references predictions about the future. Because of the largely American readership of this paper, the information is addressed from a United States statistical and regulatory viewpoint.

Injury Trends

Despite advances in technology and stricter regulations and standards regarding fall protection, workers are continuing to fall. The information below addresses relevant injury and fatality trends.

Yesterday

The earliest data on occupational injuries and fatalities shown on the U.S. Bureau of Labor Statistics (BLS) website is from 1989, but only data since 2003 is still readily available for review. Recent data from the BLS indicates that the number of fatalities in the United States increased 28% from 1995 to 2007. This time period is especially relevant since OSHA Subpart M (fall protection for construction activities) was released in 1994, with a focus on decreasing fall injuries. For the same time period, the BLS reports that overall workplace fatalities decreased 12%.

Interestingly, market research (*U.S. Fall Protection Markets (5921-15)*), published by Frost & Sullivan also indicates that the money spent on personal protective equipment for fall protection doubled over the same time period. So, when the number of fatalities increases 28% while overall workplace fatalities decrease 12% AND the amount of money spent on PPE doubles, it appears that the regulation is not effective for its purpose of decreasing fatalities and injuries.

Today

In 2008 and 2009, the number of fatal falls decreased from a high of 847 in 2007. Although the data shows a reduction, many attribute the decrease to the nation's economic slowdown—not to a downward trend in fall fatalities. As the economy recovers, and more workers are active in industry, the nature of the statistical decline will become more evident.

Besides the toll these fatalities take on the families affected, the high fatality rate has a significant impact on the financial aspects of business. According to the 2009 Liberty Mutual Workplace Safety Index, falls from heights ranked second in the list of Top 10 causes for disabling injury and third in cost to employers at \$6.2 billion. And, this data only tracks injuries that required workers to miss six or more days of work, so the true financial impact of falls is even greater.

Tomorrow

Of course, the ideal trend moving forward is for injuries and fatalities related to falls to decrease. Specifically, the proposed OSHA 1910 general industry standards include a published goal of preventing 20 workplace fatalities and 3,700 injuries per year. While this is a noble goal, it is only a 10% reduction from current fall fatality statistics. As an industry, more can be done to decrease the number of injuries and fatalities—from education to enforcement to innovation.

Regulations and Standards

Ideally, all organizations proactively implement fall protection measures to protect the health and well being of their workers. Unfortunately, with the consistent budget and schedule pressures organizations face, fall protection cannot always be the first priority. The creation and maintenance of regulations and standards provides organizations with guidance on minimum measures to protect workers, as well as limited information on how to implement those measures. For many organizations, however, this information proves to be challenging to understand and implement—let alone exceed.

Yesterday

In 1971, OSHA published the 1910 regulations, which mention fall protection measures for general industry applications. The next documents that provided guidance on fall protection were published by ANSI/ASSE: A10.14-1991 fall protection standard for construction industries and Z359.1-1992 fall protection standard for general industries.

One of the most significant developments in fall protection regulations occurred in 1994, when OSHA published Subpart M. This document, which provided fall protection regulations for the construction industry, effectively modernized American fall protection regulations. Unfortunately, as mentioned in the injury trends information, the regulation did not cause a decrease in fall fatalities, as expected.

Today

Fall protection is a published focus area for OSHA today, since it is regularly at the top of the organization's list for violations—both in number and penalties. Still, it's no secret that tension often exists between OSHA and employers when it comes to fall protection measures. This tension comes as no surprise, considering that compliance officers are enforcing general industry regulations that do not reflect the advancements made in fall protection industry standards, processes and equipment throughout the past 40 years. Unfortunately, politics, special interests, other safety priorities, and myriad other issues have repeatedly derailed the updating of these regulations since their original release in 1971. While the regulations were originally intended to provide guidance for protecting workers at heights, that well-intended guidance is now largely obsolete for today's workplace. Thankfully, with the release of proposed changes to the 29 CFR 1910 general industry fall protection regulations in May 2010, OSHA is now working to become more relevant for today's industry practices. The industry's collective hope is that this proposed change will reverse the trend of stalled regulations and be made into law in the near future.

Although legal regulations have not been updated, the introduction of the ANSI Z359 family of standards in 2007 provided a groundbreaking step in the area of fall protection standards. This will be discussed more in the area of fall protection programs. Also released in this time frame was ANSI/ASSE A10.32-2004, which replaced A10.14-1991.

Tomorrow

Considering the continual globalization of the world's economy, the creation of an international regulation for fall protection may be the next step toward increasing safety for all workers—no matter where they are working. But, because of crucial differences in the existing regulations from various countries, this may prove difficult to achieve.

Some experts believe that the development of a more safety-conscious culture may stand to have the largest impact on decreasing fatalities. One recent European research project focused on educating children about risk prevention, personal protective equipment and safe behaviors. The results were improved risk awareness and increased knowledge of protective measures. Similar efforts have occurred on smaller scales in the U.S., so this may be one of many approaches taken to improve safety in the future.

Equipment

Fall protection equipment has advanced substantially from the makeshift guardrails and simple body belts that attempted to protect workers in the past. When used correctly, today's equipment can protect workers in even the most precarious situations. And, the innovations of tomorrow will provide even better protection.

Yesterday

Many in the fall protection industry claim that fall protection equipment dates back to Biblical times. But, realistically, equipment designed specifically to protect people from falling while working was not introduced until the 1930s. At that time, all equipment was geared toward window washers on tall buildings in American cities or large infrastructure projects. During the World War II era, testing and development began on the early versions of common equipment—self-retracting devices, rope grabs and body belts—primarily for their application to wartime initiatives.

From post-WWII through 1970, the industry experienced an upsurge in research into the body's tolerance for shock load, as well as the refinement of existing products and development of new products. The next 20 years marked a period of rapid development of a large variety of fall protection equipment and systems by the world's industrialized nations, led by France, Canada, Germany, Japan, the United Kingdom and the United States. By 1990, the introduction of fall protection consensus standards and professional organizations compelled manufacturers to continue the modernization of equipment to protect workers at heights in a variety of work settings.

Today

Recent changes to fall protection standards have focused primarily in two areas: misuse scenarios and equipment testing procedures. First, standard writing bodies have looked at misuse scenarios and have modified existing test procedures or created new ones to address these issues. Some examples of this include the gate loading of snaphooks, for which the load has been increased to 3,600 pounds in both directions from the original 220 pounds to the front and 350 pounds to the side. This was first incorporated into the ANSI Z359.1-2007 standard. Another misuse scenario that is currently being addressed is the use of a self-retracting lanyard/lifeline over an edge. Subsequent to research performed in Germany, test procedures have been created to address these issues in the U.S. Another issue that has recently come to light is a phenomena often referred to as fall-back on a ladder climbing system. This issue is still in infancy and has not been incorporated into a standard yet. Items like this led to further development of the ANSI standards and the release of the Z359-2009 standards.

Second, manufacturers have refined test procedures to address new research in the area of fall protection. Initiated by research performed by Gravitec Systems, Inc. and other manufacturers

from the U.S. and Canada, it was determined that a 220-pound test weight does not replicate a 310-pound worker as previously thought. This is often referred to as the 1.4 factor since 1.4×220 is approximately equal to 310. Current test procedures call for a 282-pound test weight to be used when energy-absorbing equipment is being dynamically tested.

Tomorrow

In addition to the continued refinement of existing technologies, some specific developments related to equipment are likely. First, the ANSI Z359 family of standards will continue to develop new standards from now through 2013 to address issues related to fall protection equipment component testing. Second, it is probable that fit testing, similar to that required for using respirators, will be required for workers wearing full body harnesses. The fitness level of the individual makes a significant difference in their tolerance to trauma from impact and suspension. Another expected innovation is the use of airbag technology for fall protection. This technology, referred to as the “personal airbag,” is already being used for motorcyclists and other fall-prone individuals.

Fall Protection Programs

Because fall protection is a complex aspect of occupational safety, it is not enough to purchase equipment and follow regulations. To properly execute fall protection, a coordinated program needs to be developed and managed—from initial policy development to training workers to program evaluation. Until the publication of the ASSE/ANSI Z359.2 standard (“Minimum requirements for a comprehensive managed fall protection program”) in 2007, organizations had little guidance on the appropriate elements of a program.

Yesterday

Before this century, only the most forward-thinking companies were truly executing managed fall protection programs. In the early 1990s, a GM-UAW Safety Group worked with outside consultants to develop a modern fall protection program. The program, which was implemented throughout GM in 1993, was one of the first of its kind. Although other organizations were applying some program aspects, the GM program was the first large-scale managed program.

Today

With the publication of the ASSE/ANSI Z359.2 standard (2007), organizations now have detailed guidance on creating and maintaining a comprehensive, managed fall protection program. The list below highlights key aspects of a fall protection program that are often overlooked. While many organizations focus on the important tasks of identifying and abating hazards, they neglect these fundamental aspects of a fall protection program.

- Policies, duties and training
- Fall protection procedures
- Rescue
- Incident investigation and program evaluation

The first two items are foundational aspects of a program that are critical for future success. When policies and procedures are thorough, consistent and enforced, chances of increasing safety are improved. And, when each person involved in fall protection understands

their role and associated duties—and has the proper training to go with them—every individual can play an effective part in reducing risk for the organization.

The last two bullets emphasize that protection from falls is not the last step in an effective program. Rescue is a critical, but often overlooked, aspect of fall protection. Workers can be seriously injured or killed if they are not properly and promptly rescued from an arrested fall. Also, a program will only progress if it is evaluated regularly to discover deficiencies or areas for improvement. This is especially important after a fall incident or near-miss. Although incidents can be trying times, they provide opportunity for evaluation and overall program enhancement.

Tomorrow

Although the ASSE/ANSI Z359.2 standard (2007) provides significant guidance, it is only a consensus standard. So, the law does not require adherence to these guidelines. The ANSI committee is determined to maintain and update the standards regularly to provide this essential guidance to the industry. In addition, some program elements are included in the draft OSHA general industry fall protection regulations (1910), which are at the beginning stages of the legislative process. The adoption of even some elements of a managed fall protection program will be beneficial to the safety of workers.

One specific program aspect that will continually evolve is personnel training. While the basic levels of training—authorized person, competent person, qualified person—may not change, the manner in which training is conducted is likely to evolve. Training options that combine computer-based instruction and instructor-led classroom sessions make comprehensive fall protection training easier to schedule and budget. Individuals can complete online training at their convenience, around other work commitments. A Web-based platform ensures content is consistent and lets participants spend the time they need to grasp critical concepts. When participants gain a baseline of important information through online training, classroom time can be minimized, focusing only on topics that require hands-on instruction. This approach saves training time and travel cost, which allows workers to receive proper education in a more digestible format.

Conclusion

All fall protection measures are implemented with a goal of reducing risk and, ultimately, saving a fallen worker from injury or death. Preferably, more falls will be prevented, rather than arrested, to further reduce risk to workers. And, ideally, workers will become more personally responsible for their own safety.

The fall protection industry has evolved significantly from its first reference in the Bible to today's modern equipment and systems. With the continued focus on increasing safety for tomorrow's workers, the evolution of thought and technology related to fall protection is sure to continue. It is unlikely that a fall protection program will ever be easy or self-sustaining. But, by implementing coordinated programs and encouraging personal responsibility, we can work together to save more lives than ever before.