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The ANSI/ASSE Z359 Fall Protection Code Grows: How Will New Standards Impact You?

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Introduction

Because falls from heights make up a significant portion of workplace fatalities and injuries, the creation of an authoritative document for workers at height and their employers is essential. For that reason, the ANSI Z359, *Fall Protection Code,* is one of the most important safety-related voluntary national consensus standards in the last 20 years. As the chairman of the ANSI Z359 Accredited Standard Committee, Mr. Randall Wingfield has the expertise and experience to discuss and address the future of the Fall Protection Code. This paper will:

- Increase awareness about the ANSI Z359, *Fall Protection Code* and future standards
- Provide participants with an overview of recently released ANSI Z359 standards and their significance and impact on the fall protection industry
- Discuss new research and testing in the fall protection industry and how this science will influence ANSI Z359 standards currently in draft form
- Discuss when to retire equipment that does not meet the current Fall Protection Code

A Little History

The Code evolved from a single standard released in 1992 when standards for common fall protection equipment and methods in the workplace did not exist. ANSI Z359.1-1992, *Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components,* remained nearly unchanged for 15 years while fatal falls in the workplace steadily increased. In 2007, ANSI Z359.1 underwent revisions and three new standards were adopted. A single standard that was once less than 100 pages, quadrupled in length (Figure 1).

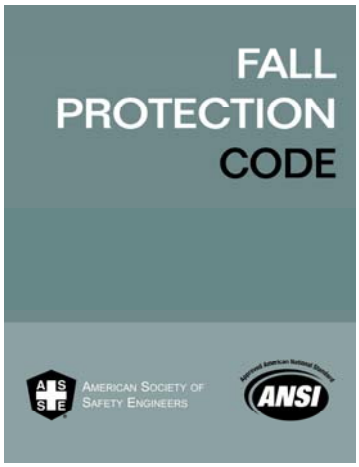

Figure 1. The ANSI Z359 Fall Protection Code is a series of voluntary national consensus standards.

What Do New Z359 Standards Mean for Consumers?

Consumers often have questions about recently completed standards as well as future standards. For example, the fall protection industry is witnessing a major shift in the design and application of energy absorbers with the release of ANSI Z359.13, *Personal Energy Absorbers and Energy Absorbing Lanyards*. Now, two classes of personal energy absorbers exist, those designed for free falls up to 6' and those that allow up to a 12' free fall when a 6' free fall is infeasible. A related standard, ANSI Z359.12, *Connecting Components for Personal Fall Arrest Systems*, deals with components of personal fall arrest systems and will help ensure the durability and reliability of connectors. It's our experience that consumers are eager to be ANSI-compliant, but are unsure about how and when to transition to new fall protection equipment or change practices. The paper will discuss when users should immediately integrate new equipment and in what situations existing equipment can continue being used and replaced on an as-needed basis, as well as what these new standards mean for equipment designed after 2007 when the ANSI Z359 Fall Protection Code debuted.

The fall protection industry has lacked clarity about OSHA's mandate that certain fall protection systems be designed, installed and used under the supervision of a Qualified Person. ANSI Z359.6 Specifications and Design Requirements for Active Fall Protection Systems will make strides toward remedying this issue. The standard provides employers with more information to ensure the proper design and documenting of fall protection systems. While ANSI Z359.6 does not address individual components of a personal fall arrest system, it does provide design engineers with formulas and practices to predict the performance of the system. From there, an engineer can safely integrate those loads into existing structures and compare the systems clearance requirements to the work environment.

A Growing Code

The Code has continued to grow with the completion of three more standards in the fall of 2009. New research and testing has provided a better understanding of how fall protection and rescue

equipment and systems are used. New science necessitated the development of the each of these standards and new science will continue to feed the remainder of the Code's development.

Z359.6, *Specifications and Design Requirements for Active Fall Protection Systems:* This newly released standard (2009 is the first standard to provide engineers with information regarding fall protection systems design. There were no consistent guidelines for engineers to calculate fall arrest loads and clearances to safely integrate those loads into existing structure. This standard provides engineers guidance on calculation of loads (lumped mass analysis vs. sequential falls), clearance requirements, factors of safety, and documentation for active fall arrest systems.

Z359.12, *Connecting Components for Personal Fall Arrest Systems:* This standard outlines the requirements for the design, performance, qualification and marking of connectors used in fall protection systems. The standard carries forward the high gate strength requirement introduced in 2007 (Figure 2). This increased gate strength is approximately ten times greater than any other standard in the world. The standard also has added a dynamic load test (drop testing) to simulate what the connector would realize during an actual fall situation, providing the manufacturer and end-user more realistic results.

Figure 2. This is an example of a Z359.12 connector used on the end of an energy absorbing lanyard.

Z359.13, *Personal Energy Absorbers and Energy Absorbing Lanyards:* This newly released standard provides design and performance requirements for energy absorbers and lanyards (Figure 3). It recognizes energy absorbers and lanyards that were not previously addressed by any ANSI standard, namely y-lanyards, energy absorbers with a 12' free fall capacity and lanyards that are designed to wrap around structure. This standard is also the first to recognize a more accurate conversion factor by using a 282-pound test weight for performance tests.

Figure 3. Examples of a y-lanyard (left) and an energy absorbing lanyard (right) are shown above.

More Standards on the Way

The release of these three new standards will mark considerable progress toward the completion of the Code, but there are nine more standards currently being drafted by Z359 sub-committees. Many of these draft standards expand on topics discussed only briefly in ANSI Z359.1-2007. ANSI Z359.1-2007 will eventually be replaced by new, comprehensive standards listed below and slated for release in the next two years.

Z359.5, *Safety Requirements for Personal Fall Arrest Systems:* This standard will address issues on the performance of fall arrest systems. Still under development with the subcommittee, this standard will look to address fall protection system issues and provide guidance to competent persons who are selecting systems for use.

Z359.7, *Certification of Fall Protection Products and Components:* This standard establishes requirements for manufacturers to certify equipment to individual requirements within the code. Through this standard, fall protection equipment manufacturers will be able to provide consumers an increased level of confidence in the equipment by having a recognized process to certify their products (Figure 4). Many consumers are surprised to hear that a nationwide certification process for fall protection safety equipment does not exist. Several manufacturers have been conducting independent certifications and many have not. This standard provides options to manufacturers to certify product through an independent testing facility, witness testing, or use a professional engineer. This standard will likely be released towards the end of 2010.

Figure 4. Z359.7 will increase consumer confidence in the testing of fall protection equipment.

Z359.8, *Rope Access Systems*: This standard will introduce and define rope access as an emerging practice of working at heights. Workers have been working suspended by ropes for decades, and now the practices have been refined and developed to provide employers with guidance as to how is should be done. This standard will include information and requirements for redundant rope systems (primary and secondary ropes), anchoring methods, work permits, and equipment when workers are suspended from rope to access a work area.

Z359.11, *Safety Requirements for Full Body Harness for Personal Fall Arrest Systems:* This standard establishes the design, performance, testing, and marking of full body harnesses (Figure 5). Similar to other equipment standards within the Code, this standard carries forward more accurate testing requirements for full body harnesses than what has previously been available. It catches up with current industry practices in regards to full body harnesses and introduces new requirements for current issues including; fall indicators, lanyard storage locations, connectors, and soft loop attachments. Full body harnesses have been getting larger and heavier over the years because testing and manufacturing requirements focused on individual component strength, not performance as a complete harness. This standard will assist manufacturers in making full body harnesses more user friendly through innovative design and performance testing.

Figure 5. Z359.11 includes requirements for the design, testing, and marking of full body harnesses

Z359.14, *Safety Requirements for Self-Retracting Devices for Personal Fall Arrest Systems:* This standard establishes the design, performance, testing and marking for self-retracting lifelines (Figure 6). Historically, self-retracting lifelines underwent tests including strength, performance, and spring tension. This standard still tests self-retracting lifelines in this manner, but also addresses self-retracting lifelines that are designed to arrest falls over edges and those used in extreme environments. The standard will also reflect new technology and recognize "fast acting" self-retracting lifelines by having two categories of self-retracting lifelines. Like other equipment standards, this standard will keep pace with new products and advanced testing requirements.

Z359.15, *Safety Requirements for Single Anchor Lifelines & Fall Arrestors for Personal Fall Arrest Systems:* This standard addresses the design, testing and marking of vertical lifelines and fall arrestors. This standard deals with issues related to fall distances, activation distances, automatic and manual arrestors, lifeline diameters, and breaking strengths. Vertical lifelines are one of the more dynamic fall arrest systems considering the elongation of the rope and the activation distance of the fall arrestor. Many new products have entered the market including fall arrestors that trail above workers while descending and multiple lanyard options.

Figure 6. The design, testing and marking requirements of self-retracting lifelines will be detailed in Z359.14

Z359.16, *Safety Requirements for Lifelines, Rails & Fall Arrestors for Fixed Ladder Fall Arrest Systems:* This standard is the first of its kind, specifically addressing fall arrest systems designed for fixed ladders. Historically, fall arrest systems for fixed ladders where a subsection of a larger standard for fixed ladders. This standard will fully address the design, performance, testing and marking of ladder safety systems as part of the Fall Protection Code.

Z359.17, *Safety Requirements for Horizontal Lifelines for Personal Fall Arrest Systems:* The intent of Z359.17 standard is to provide minimum requirements for the design, installation and use of horizontal lifeline systems. Although OSHA continues to be the governing regulatory authority, the Z359.17 standard will include and expand on these regulations and provide guidance to both installers and end users of horizontal lifelines.

Advances in the field of fall protection enable horizontal lifeline systems to provide versatile fall protection for workers at height. The complexity of these systems, however, complicates their design, installation and use. This complexity is partially addressed by OSHA regulations, which require horizontal lifeline systems to be designed, installed and used under the supervision of a qualified person. OSHA, however, provides little useful guidance to installers and end users of these systems. The lack of regulatory guidance often leads to problems encountered by end users. These problems include misunderstanding of the purpose and limitations of these systems and inadequate training on their use and inspection. The standard addresses the documentation of the design, installation and use of horizontal lifeline systems and will place certain responsibilities on both the purchaser and supplier of the system.

Z359.18, *Safety Requirements for Anchorage Connectors for Personal Fall Arrest Systems:* This standard will include the design, testing and marking requirements of anchorage connectors (Figure 7). This standard is challenging because all anchorage connectors attach to some type of anchorage (structural element) and the design requirements of the anchorage connector changes since its design is dependent on the anchorage. In the same manner as the other equipment standards are keeping pace with equipment technology, this standard will address many anchorage connectors including those designed to deform and those that use friction to provide support.

Figure 7. This anchorage connector is designed to wrap around an anchorage.

Summary

Fall protection standards are no longer documents specific to manufacturers. The Fall Protection Code has applications for employers, supervisors, workers, as well as equipment manufacturers. Employers need to educate themselves and identify people within their organization who can take the time to understand the Fall Protection Code and apply it to the workplace.

The initial writing and development will be complete in the next couple of years and the Code will be maintained through regular updates. Given the size and complexity of document, it will be necessary for errata documents to keep pace with new technology and industry changes. History has shown that innovative products and practices in the fall protection industry have improved fall protection programs and worker safety. It is necessary that the Fall Protection Code keeps pace and provides standards that are current, effective and functional.