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A Special Issue on the new ANSI/ASSE Z359 Fall Protection Code

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ANSI/ASSE Z359 FALL PROTECTION CODE
Revisions Strengthen Benchmark Consensus Standard

By Joseph Feldstein

ANSI/ASSE Z359, the national voluntary consensus fall protection equipment standard for general industry, is considered a benchmark standard, one that has been incorporated into many industrial fall protection programs. It was last updated in 1999, and then only with minor editorial revisions. The five new standards—which will be available soon as the ANSI/ASSE Z359 fall protection code—contain many important new requirements. This article highlights those changes and additions, which will affect many U.S. employers, workers, SH&E professionals, manufacturers and other stakeholders.

ANSI/ASSE Z359: A Family of Standards

The scope of ANSI/ASSE Z359 has expanded beyond fall arrest into other work applications. The five standards encompassed by the new code continue to adhere to the "systems approach" of the original 1992 edition:

•Z359.0: Definitions and Nomenclature Used for Fall Protection and Fall Arrest

•Z359.1: Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

•Z359.2: Minimum Requirements for a Comprehensive Managed Fall Protection Program

•Z359.3: Safety Requirements for Positioning and Travel Restraint Systems

•Z359.4: Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components

Z359.0: Definitions & Nomenclature

This standard functions as a dictionary of specialized terms compiled from the other four standards. It defines each of nearly 150 terms used throughout the code, from "activation distance" to "working line."

Z359.1: Safety Requirements for Personal Fall Arrest Systems, Subsystems & Components

This standard contains product design criteria and test procedures for fall arrest components, subsystems and systems.

Key Changes

Several key changes have been made to Z359.1.

1) **Gate strength requirements have increased for snaphooks and carabin-**

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Falls remain one of the leading causes of on-the-job injuries and fatalities. According to the U.S. Bureau of Labor Statistics, in 2005, there were 255,750 non-fatal injuries involving falls in private industry and 735 fatalities. The new standards included in the code provide organizations with a comprehensive resource for protecting workers at height.

The code, which applies to anyone working at height, includes the following new standards:

•ANSI/ASSE Z359.0-2007: Definitions and Nomenclature Used for Fall Protection and Fall Arrest

•ANSI/ASSE Z359.1-2007: Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

•ANSI/ASSE Z359.2-2007: Minimum Requirements for a Comprehensive Managed Fall Protection Program

•ANSI/ASSE Z359.3-2007: Safety Requirements for Positioning and Travel Restraint Systems

•ANSI/ASSE Z359.4-2007: Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components

The package also includes a copy of ANSI/ASSE Z359.1-1992 (R1999).

We would like to thank ASSE for its work as secretariat of the Z359 ASC, and we commend the entire Z359 ASC for its efforts in bringing the Z359 Fall Protection Code to fruition.We wish you success in using this code as part of your comprehensive managed fall protection program.

Randall Wingfield, Chair, Z359 ASC

Basil Tominna, Vice Chair, Z359 ASC

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ers. The 1999 standard requires a test for 220 lb force against the gate face and 350 lb force against the side of the gate. The gate mechanism may not disengage from the nose of the snaphook or carabiner. The new standard increases the strength requirement to 3,600 lb in all directions of potential loading to the gate. Test procedures will change to exert static loads on the gate face, gate side and from inside the gate outward, forcing the gate away from the nose of the device.

2) **The standard includes a front attachment element for fall arrest.** The old standard states that only the dorsal (back) D-ring may be used for attachment of a personal fall arrest system. The revised standard includes attachment of the fall arrest system to a front-mounted D-ring, located approximately in the area of the sternum. However, connection at the front D-ring is limited to systems that restrict free fall distance to 2 ft or less and limit the maximum fall arrest loads on the front D-ring to 900 lb of force or less. This will be particularly useful in products selected by climbers and rope access workers.

3) **The standard includes additional testing and warnings for twin-leg shock-absorbing lanyards.** Concerns over potential misuse of twin-leg shock-absorbing lanyards prompted additional test requirements and warnings for these products, which were not mentioned in the 1999 version. The new standard includes a 5,000 lb static test of the joint between the two lanyard legs.

The standard also requires that the product label include a warning to attach only the center snaphook to the back D-ring of the harness. More warnings will be included in user instructions, such as a warning not to attach the unused leg of the lanyard to any point on the harness except attachment points specifically approved by the harness manufacturer for that purpose.

Z359.2: Minimum Requirements for a Comprehensive Managed Fall Protection Program

This entirely new standard is directed at employers and SH&E professionals rather than product manufacturers. The new program standard contains detailed requirements for a comprehensive fall protection program.

The scope of this new comprehensive fall protection program standard identifies the standard as a guideline for employers with new or existing fall protection programs. The purpose of a comprehensive program is to:

- identify, evaluate and eliminate (or control) fall hazards through planning;
- ensure proper training of personnel;
- ensure proper installation and use of fall protection and rescue equipment;
- implement safe fall protection and rescue procedures.

Z359.2 does not apply to the construction industry (SIC Division C), which is served by ANSI/ASSE A10.32-2004.

The standard emphasizes endorsement of the employer's fall protection program by company management. Its sets out clear, unambiguous duties and responsibilities for each program participant, including employers, program administrator, qualified person, competent person, authorized person, competent rescuer, authorized rescuer and trainers. Training also is defined for each role in the organization, as are the requirements for the trainers themselves.

Training & Evaluations

Training—from administrators, safety engineers and supervisors to at-risk workers and rescue personnel—is addressed extensively in this standard. This focus is based on years of experience among the Z359 Committee members and their firmly held belief that without proper training fall protection equipment and procedures are inadequate to the task of reducing worker injury and death.

To that end, Z359.2 sets goals for achieving improved training practices throughout the industry. It incorporates by reference ANSI/ASSE Z490.1, Criteria for Accepted Practices in Safety, Health and Environmental Training. Z359.2 and Z490.1 provide employers with a comprehensive roadmap to enhanced fall protection training.

Fall Protection Procedures

This section details general and specific requirements for fall protection procedures. The procedural scheme is based around the fall hazard survey report, which is to be written by a trained safety professional at the qualified person or competent person level. The report will identify each fall hazard at the work location, then recommend appropriate controls for each identified fall hazard.

Engineering Practice Specialty

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OFFICERS

Administrator
Bruce L. Rottner
201.287.1766
brucel1@verizon.net

Assistant Administrator
J. Nigel Ellis
302.571.8470
dsc@fallsafety.com

Newsletter Editor
J. Nigel Ellis
dsc@fallsafety.com

COMMITTEES

Awards & Honors
Open

Body of Knowledge
Dennis Neitzel
dennis.neitzel@avotraining.com

Conferences & Seminars
Open

Membership Development
Gina Mayer-Costa
gmayerco@ramapo.edu

Nominations
John W. Mroszczyk
nceno1@tiac.net

Website Development
Magdy Akladios
akladios@uhcl.edu

Staff Liaison
Rennie Heath
847.768.3436
rheath@asse.org

Newsletter Design & Production
Susan Carlson
ASSE headquarters staff
scarlson@asse.org

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Fall Protection Hierarchy

In descending order of preference, the hierarchy is as follows:

•**Elimination or substitution.** For example, eliminate a hazard by lowering the work surface to ground level, or substitute a process, sequence or procedure so that workers no longer approach a fall hazard.

•**Passive fall protection.** Isolate or separate the hazard or work practice from workers through the use of guardrails or by covering exposed floor openings.

•**Fall restraint.** Secure the worker to an anchor using a lanyard short enough to prevent the worker's center of mass from reaching the fall hazard.

•**Fall arrest.** This includes systems designed to stop a worker's fall after a fall has begun.

•**Administrative controls.** These work practices or procedures signal or warn a worker to avoid approaching a fall hazard.

Design Requirements for Fall Protection Systems in New Facilities

This section addresses concerns for the control of fall hazards in new facilities by going upstream—to the architects and engineers who design new plants, factories and other buildings. The standard provides guidelines for designers to eliminate or control fall hazards during the facilities planning stage, when the cost of doing so is the least burdensome to building owners and occupants. This is a concept widely taught yet rarely practiced in the building industry. ANSI/ASSE Z359.2 enters into the record a practical, cost-effective method to reduce fall hazards in new buildings that will influence safety practices for the next generation.

Anchor Systems

Z359.2 establishes strength criteria for various fall protection anchors, simplifying in one standard the design requirements for fall arrest, horizontal lifelines, work positioning, travel restraint and rescue systems.

Fall Arrest

•Noncertified anchor: 5,000 lbf static strength.

•Certified anchor: designed, selected and installed by qualified person; static strength two times maximum arresting force.

Work Positioning

•Noncertified anchor: 3,000 lbf static strength.

•Certified anchor: static strength two times foreseeable force.

Restraint & Travel Restriction

•Noncertified anchor: 1,000 lbf static strength.

•Certified anchor: static strength two times foreseeable force.

Rescue Systems

•Noncertified anchor: 3,000 lbf static strength.

•Certified anchor: static strength five times the applied load.

In each case, anchors are divided into two categories—certified and noncertified. Certified anchors are those that have been selected under the supervision of a qualified person who documents—by a process of testing or analysis by a nationally accepted engineering methodology—and attests to their capacity.

Noncertified anchors are those that a competent person can judge to be capable of supporting the predetermined anchor forces prescribed by the standard. Fall protection systems connected to noncertified anchors must, in all cases, limit potential free fall distance to 6 ft or less and be equipped with an energy-absorbing device that limits maximum arrest forces to 900 lb or less.

Rope Access

Z359.2 addresses—for the first time in a national consensus standard—the system of work referred to as rope access. Rope access is a growing practice involving skilled rope techniques to access work while suspended vertically. The standard recognizes and codifies basic principles for this work practice, including the use of two rope lines and the need to operate as a multiworker team. Thus, the standard breaks new ground, bringing rope access within the fall protection community and adding national recognition to this important practice.

Rescue Procedures

No fall protection program would be complete without provisions for prompt rescue after a worker has fallen and remains suspended, unable to evacuate him/herself to a safe working level. Planning for prompt rescue means getting to the rescue subject within 6 minutes after an accidental fall. This takes planning and coordination.

If the rescue plan calls for assistance by professional rescue services, such as the fire department or local search-and-rescue teams, then advance planning is needed. Involvement of outside services logically must occur before an actual emergency, and should include a documented plan and written confirmation by the rescue agency.

If an in-house rescue team is in the plan, then team members must be trained and equipped for the task, including regularly scheduled simulations and documented plans and instructions for their use.

Incident Investigations

A comprehensive managed fall protection program also should include requirements for incident investigation in the event of accidental death, injury or property damage. To be effective, these investigations must be conducted promptly, with well-established reporting procedures and documented results.

Evaluating Program Effectiveness

Regular evaluation of the effectiveness of the managed fall protection program is a critical component in eliminating and controlling fall hazards. This involves a continuous process of building on program strengths and correcting deficiencies. The evaluations should examine the program to determine whether it has accomplished its objectives and whether they have been achieved according to the written program. Part of continuous improvement includes regularly scheduled program reviews and drills, such as rescue drills.

Z359.3: Safety Requirements for Positioning & Travel Restraint Systems

This is another all-new standard. It establishes minimum design and test requirements for equipment used in work positioning and travel restraint.

Before examining the product requirements, let's review what these terms mean:

•**Work positioning** is defined as "supporting a worker on a vertical surface while working with hands free." Work positioning systems are designed to prevent a fall from occurring. When a fall hazard is present, positioning systems must be used in conjunction with a separate and independent personal fall arrest system.

•**Travel restraint** is defined as "limiting a worker's travel in such a manner that s/he cannot reach a fall hazard zone." Restraint systems do not support a por-

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Fall Protection: Systematic Approach Is Key

Falls continue to be a leading cause of work-related injuries and fatalities.

Like many other hazards, addressing falls in the workplace requires a multidisciplinary strategy. "Fall protection is very complex," explains Tracey Riepenhoff, managing principal of LJB Inc. in Lima, OH. "A big part of the challenge is getting all of the people who need to be involved involved to address the issues."

It's further complicated by the fact that people often think just in terms of anchorages. "The reality of putting together an overall effective program is more than just putting up anchorages," she says. "You also have to make sure that your workers are adequately trained. You have to make sure you have the proper policy in place. And with respect to fall arrest, you have to address rescue, something that often gets overlooked."

Terminology is another area where confusion can enter the equation. It's best to use fall protection as an all-encompassing term, Riepenhoff says. "Essentially, it's 'how are we protecting our employees from a fall.'" Fall restraint, she continues, is about keeping the worker from reaching the edge so that s/he never goes through a fall. "To help people visualize this concept, we sometimes talk in terms of a dog leash—it holds you back from the edge," she says.

"Fall arrest/anchorage is about protecting the worker should a fall occur," she explains. "S/he would experience forces through the whole body and then be hanging there waiting for rescue. People also need to keep in mind that there are two elements of a rescue: There's the fall itself and the 'rescue' by the anchorage—meaning it held the worker. But then you have to rescue the worker down to safety."

Look for Hazards & Involve, Train Employees

Like most safety efforts, risk identification and assessment play a crucial role in fall protection. According to Riepenhoff, prioritizing the hazards identified is a key element of that process. "We can look at equipment and facilities and know where a typical worker needs to get to, but it's always important as you are assessing the hazards to understand, for example, whether the worker has to get up there monthly, every 5 years, every day. So it's not just about identifying the hazards, but also about prioritizing them."

Prioritizing also helps keep the task manageable. "Fall protection can be overwhelming when you begin to identify all of the hazards," Riepenhoff cautions. "So the message has to be that you can't fix every hazard overnight. But if you identify them and prioritize them, then you can systematically work through that list toward making the workplace safer."

Involving the at-risk employees is also important, she says. "If you can involve them not just in identification but also in the process of determining the best solution, they will accept it more willingly."

You also have to be sure they know how to recognize and respond to fall hazards. "It really comes down to training," Riepenhoff says. "Employees need to know how to recognize and acknowledge when they are in a situation of risk. If they are properly trained to identify the risk and know that an overall program is in place, they will systematically know what to do when they encounter a fall hazard."

Selecting the Best System

So what questions should be asked by an SH&E practitioner addressing a fall protection project? Riepenhoff offers these as good starting points: 1) Do we have the right people in the organization properly trained at all levels? 2) Do we have a policy in place that addresses how we are going to deal with fall hazards? 3) Have we identified the fall hazards that exist at our facility? 4) Are we systematically abating those hazards in a prioritized way?

Riepenhoff also points to the new ANSI/ASSE Z359.2 standard as a key resource. "The standard is about a comprehensive managed fall protection program," she explains. "It provides a guidance tool to help those involved understand what goes into an effective program. It addresses all of the elements, from policy to training to hazard identification and abatement, to rescue—the whole gamut of things that you need to be thinking about to develop an effective program."

Understanding Anchorages

At ASSE's Safety 2007 conference, Tracey Riepenhoff delivered a session titled "Fall Protection: Certified vs. Noncertified Anchorages." During the session, she explained the limitations and risks involved with using both certified and noncertified anchorages.

When considering how to protect an employee from a fall, Riepenhoff said it is important to understand the differences in the five types of anchorages: fall arrest, work positioning, travel restraint, horizontal lifeline and rescue. (ANSI/ASSE Z359 defines each type and provides distinct loading requirements for each.) In all cases, Riepenhoff noted, "if a solution with anchorages and PPE is chosen, it is critical to fully understand the requirements for and differences between certified and noncertified anchorages of all types."

According to ANSI/ASSE Z359, a certified anchorage is one where there is documentation that the system meets the requirements of the standard and where the anchorage is identified and the system designed by a qualified person. A noncertified anchorage is one that a competent person can judge to be capable of supporting the predetermined anchorage forces and that incorporates an energy-absorbing device.

Riepenhoff explained that a competent person is one who identifies existing, foreseeable and predictable hazards and has the authority to take prompt corrective measures to eliminate such hazards. Other responsibilities include supervision of work at heights, inspection of equipment and training of authorized persons. She explained that with ANSI/ASSE Z359's definition of noncertified anchorages, competent persons will be asked to take on the added responsibility of "judging" what is capable of supporting specific loading criteria.

Beyond the type of anchorage and whether you are using the certified or noncertified anchorage approach, Riepenhoff noted that many factors must be considered when evaluating a structure for anchorage loading. These include vertical and horizontal loads, predetermined fixed loads and variable loads. In addition, one must consider the "bad day" scenario—what would happen if the competent person selected a noncertified anchorage that could not support the required load? What is the mode of failure of the structure? Is it a steel structure that might show some yielding first before complete collapse? What might be hit in the path of the fall that could cause additional injury to the worker? What about a failure that causes the release of hazardous materials—as in the case of an attachment to a filled pipe? What kind of downtime would be involved to repair the structure and how would that affect production or deadlines? Given all these factors, she advised that serious consideration must be given to the training, tools and responsibilities given to the competent person in the use of a noncertified anchorage.

"When abatement includes anchorages and PPE, a full understanding of the requirements is critical," Riepenhoff concluded. "These requirements are not only about structural capacity of the anchorages and their supports, but include other important issues such as total fall distance, equipment inspection and compatibility, training and procedures. While it may not be possible to have all anchorages certified by a qualified person, it is important to enlist a qualified person to prepare documentation and provide guidance to competent persons."

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tion of the worker's weight. They are used only on walking/working surfaces with a slope between 0 and 18.4 degrees.

Full-Body Harnesses

Full-body harnesses must meet the requirements of ANSI/ASSE Z359.1 for fall arrest. In addition, the work positioning and travel restraint attachment elements (D-rings) must withstand a dynamic strength test consisting of a 3.3 ft free fall with a 220 lb test weight.

Work Positioning & Travel Restraint Lanyards

Lanyards under this section must be designed and tested to withstand a static load of 5,000 lbf without breaking.

Z359.4: Safety Requirements for Assisted-Rescue & Self-Rescue Systems, Subsystems & Components

Another entirely new standard, this document includes minimum design and test requirements for equipment used in rescue and retrieval of workers after a fall.

This new standard establishes requirements for design, performance, marking, qualification, instruction, training, use, maintenance and removal from service of products used in rescue and evacuation. Equipment covered includes connectors, harnesses, lanyards, anchorage connectors, winches/hoists, descent control devices, rope tackle blocks and self-retracting lanyards with integral rescue capability.

The standard is directed at rescue systems used in preplanned rescue applications for one to two persons at a time where a fall hazard exists. Exceptions include construction, sports-related activities, rope access rescue techniques used by certified rescue technicians or other tasks that already have established national consensus standards. A competent person must determine suitability of equipment in this standard for activities conducted in hazardous atmospheres.

The standard does not preclude trained rescue professionals, such as fire service rescue teams, from using the equipment when desired. However, the standard is not specifically intended for products to be used in emergency rescue situations where equipment is covered by other standards, such as NFPA 1983 Standard for Life Safety Equipment.

As far as system requirements, for a one-person rescue system, capacity is 130 to 310 lb; for a two-person rescue system, capacity is 160 to 600 lb. In addition, connectors must meet the requirements of ANSI/ASSE Z359.1.

Full-Body Harnesses

Harnesses under this section must meet all requirements of ANSI/ASSE Z359.1 for full-body harnesses. The dorsal (back) D-ring is suitable for rescue applications unless otherwise prohibited by the manufacturer. Other rescue/retrieval attachments must meet the following criteria:

- 3,600 lb static load test;
- dynamic test with a 2.0 ft free fall distance with a 220-lb test weight.

Evacuation Harnesses

Evacuation harnesses are for rescue only, not for fall arrest. They must securely hold the body whether the person is conscious or unconscious. Body support must be accomplished by a combination of webbing straps supporting the body around the shoulders and thighs.

Rescue Lanyards & Anchorage Connectors

These components of the rescue system must meet the applicable requirements for lanyards and anchorage connecting devices in ANSI/ASSE Z359.1.

Self-Retracting Lanyard Component with Integral Rescue Capability

These devices must meet several criteria:

- engage in rescue mode at any time;
- not possible to inadvertently change to or from rescue mode;
- raise or lower with minimum 3:1 mechanical advantage;
- in rescue mode, automatically stops and holds a load if rescuer relinquishes control;
- features a means to stabilize device during use in rescue mode;
- may be manually operated or powered with speed control and manual back-up;
- static strength of 3,100 lbf;
- must raise, lower and hold the load while carrying 125% of maximum capacity and 75% of minimum capacity.

Synthetic Rope Tackle Block

Several criteria must be met:

- synthetic rope with minimum breaking strength of 4,500 lb tensile;
- static strength of 3,100 lbf;
- able to withstand a 2 ft free-fall with a 220-lb weight and continue to function;
- can raise, lower and hold a load;
- features a secondary brake to prevent uncontrolled lowering;
- has a minimum mechanical advantage of 3:1.

Descent Devices

The standard contains several criteria for these devices as well:

- single and multiple-use devices;
- automatic and manually controlled;
- descent speed between 1.6 ft/sec and 6.6 ft/sec;
- static strength of 2,700 lbf;
- able to withstand a 2 ft free-fall with a 220-lb test weight and continue to function;
- must be able to lower at a controlled rate;
- manually controlled devices must stop descent if control is released or if excessive pressure is applied (panic grab).

Traditional sports-climbing descenders, such as figures-of-eight and racks are outside the scope of this standard.

Personnel Hoists

These hoists must meet several criteria:

- manually operated or powered by an external power source;
- powered units must have manual back-up cranking capability;
- raise and lower with a maximum force to operate of 30 lb;
- static strength of 3,100 lb exerted at termination of the line on the drum.

Functional criteria include 1) the ability to stop and hold a load; and 2) a back-up brake system.

Value of the Fall Protection Code

The ANSI/ASSE Z359 Fall Protection Code addresses a critical need for guidance in creating fall protection programs. Delineation of clear lines of authority and responsibility, detailed job planning and expanded training requirements are key among its guidance. The scope of the standards has expanded as well to include additional work tasks and equipment types. Lastly, the ANSI/ASSE Z359 Fall Protection Code improves strength and performance of products intended to protect worker safety and health. ■

Joseph Feldstein is manager of technical services for MSA. He is a member of ASSE's Colorado Chapter and a member of the Society's Engineering Practice Specialty. Feldstein is a member of the ANSI/ASSE Z359 Accredited Standards Committee and chair of the U.S. Technical Advisory Group to the ISO Fall Protection Technical Committee (ISO TC94/SC4).

ANSI/ASSE Z359 Fall Protection Code Approved

On April 23, 2007, the Z359.2 standard for managed fall protection received final ANSI approval. On May 31, 2007, ANSI approved Z359.0, Z359.1, Z359.3 and Z359.4. These standards will be available soon and will have an effective date of October 15, 2007. Many members have asked how the standards will impact the public and private sectors. Use of national consensus standards will be of increased importance as the U.S. economy becomes more global.

National consensus standards reflect the insights of the final end users and the opinions of professionals who work at all levels of public and private sectors in technology development, safety and health, manufacturing, training, financial analysis, personnel and academia. This balanced perspective enables standards to be crafted in a manner that benefits and protects standard users.

ASSE historically supports the increased use of national consensus standards in the formulation of occupational safety and health legislation. Government agencies such as OSHA, MSHA, CPSC and NHTSA should be encouraged to use these standards in accordance with Public Law 104-113, "The National Technology Transfer and Advancement Act of 1995," and the Office of Management and Budget in its Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities," as they provide an efficient and effective alternative to traditional public sector rulemaking.

Background

Before ANSI approves an American National Standard, it must verify that the standards developer has met the requirements for due process and consensus. In the judgment of the ANSI Board of Standards Review, consensus is established when directly and materially affected interests reach substantial agreement, which means more than a simple majority but not necessarily unanimity. Consensus also requires that all views and objections be considered and that a concerted effort be made toward their resolution.

Use of American national standards is completely voluntary. Their existence does not in any respect preclude anyone whether s/he has approved the standards or not, from manufacturing, marketing, purchasing or using products, processes or procedures not in conformance to the standards.

It should also be noted that ANSI does not develop standards and will under no circumstances give an interpretation of any American national standard.

The ANSI/ASSE Z359 Fall Protection Code evolved from the continuing development of a fall protection standard series. These standards tie the elements of the series together and provide tools that employers may use to develop programs that incorporate such elements. They also address administrative requirements and apply to all occupational and non-occupational activities except those in SIC Division C (construction). They do not apply to sports activities.

Neither the Z359 Committee nor the Secretariat states that these standards are perfect or in their ultimate form. New developments are to be expected, and revision of the standards will be necessary as state-of-the-art technology progresses and further experience is gained. However, it is felt that uniform guidelines for fall protection programs are needed and that the standards in their present form provide the minimum criteria necessary to develop and implement a comprehensive managed fall protection program.

The Z359 Committee acknowledges the critical role of design in influencing the use of proper fall protection equipment. Design deficiencies often increase the risk for employees who may be exposed to fall hazards. Examples include:

1) lack of rail systems to prevent falls from machines, equipment and structures;

2) failure to provide engineered anchorages where use of personal fall arrest systems is anticipated;

3) no provision for safe access to elevated work areas;

4) installation of machines or equipment at heights rather than at floor/ground level to preclude access to elevated areas;

5) failure to plan for the use of travel restriction or work positioning devices.

The standards also offer guidance on design considerations for new buildings and facilities.

The standards incorporate basic fall safety principles, including hazard survey, hazard elimination and control, and education and training. They intend to ensure a proactive approach to fall protection. However, they also address the reactive process of accident investigation to ensure that fall causation receives adequate attention.

The code encompasses the following standards:

•**ANSI/ASSE Z359.0-2007: Definitions and Nomenclature Used for Fall Protection and Fall Arrest.** Establishes the definitions and nomenclature used for the Z359 Fall Protection Code.

•A**NSI/ASSE Z359.1-2007: Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components.** Establishes requirements for the performance, design, marking, qualification, instruction, training, inspection, use, maintenance and removal from service of connectors, full-body harnesses, lanyards, energy absorbers, anchorage connectors, fall arresters, vertical lifelines and self-retracting lanyards comprising personal fall arrest systems for users within the capacity range of 130 to 310 lb (59 to 140 kg).

•**ANSI/ASSE Z359.2-2007: Minimum Requirements for a Comprehensive Managed Fall Protection Program.** Establishes guidelines and requirements for an employer's managed fall protection program, including policies, duties and training, fall protection procedures, eliminating and controlling fall hazards, rescue procedures, incident investigations and evaluating program effectiveness.

•**ANSI/ASSE Z359.3-2007: Safety Requirements for Positioning and Travel Restraint Systems.** Establishes requirements for the performance, design, marking, qualification, test methods and instructions of lanyards and harnesses comprising personal positioning and travel restraint systems for authorized persons within the capacity range of 130 lg to 310 lg (59 kg to 140 kg).

•**ANSI/ASSE Z359.4-2007: Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components.** Establishes requirements for the performance, design, marking, qualification, instruction, training, use, maintenance and removal from service of connectors, harnesses, lanyards, anchorage connectors, winches/hoists, descent control devices, rope tackle blocks and self-retracting lanyards with integral rescue capability comprising rescue systems used in pre-planned self-rescue and assisted-rescue applications for one to two persons.

Z359 ASC Chair's Perspective on ANSI/ASSE Z359.1

EPS: What does the revised ANSI/ASSE Z359.1 standard include?

RW: The Z359.1 standard includes information on the design and testing of specific fall equipment items and additional specifications for fall protection program development, fall hazard assessment, key person responsibility, training and program maintenance. It also includes information on work-positioning systems and rescue systems, and features new sections such as a comprehensive guide for the development of a managed fall protection program.

The revised standard is designed to be a living document that will change as industry and technology advance. It will offer those interested in fall protection a comprehensive document that will facilitate the generation of a new fall protection program or will augment an existing one.

EPS: How is third-party certification of fall arrest and protection equipment performed? Why do you believe it is of value to SH&E professionals?

RW: Third-party certification of equipment requires that each item of equipment be tested and sent to an independent, unbiased outside testing organization to determine whether the equipment meets the design and performance requirements given in the standard.

Historically, ANSI has not required third-party testing for fall protection equipment. Therefore, manufacturers have performed their own testing and have attested to the equipment's compliance with the standard. Since the testing methods and standards may allow some interpretation, combined with the variation in testing abilities from one manufacturer to another, inconsistencies have resulted. The lack of unbiased third-party testing has allowed items to be labeled as meeting the ANSI standard when, in fact, they do not.

Most large equipment manufacturers have conducted third-party certification for years because their product lines are sold in other countries or in specific industries that require it. This creates a market that can be confusing for consumers because it is difficult to determine which items have been independently tested and which have not. Third-party testing is beneficial, not only for SH&E professionals, but also for the entire industry, as it standardizes testing and increases equipment quality. If an independent organization has tested equipment according to a set standard, consumer confidence will increase.

EPS: What measures will the ASC take to ensure that state and federal governments recognize the revised Z359.1 standard? Do you anticipate any challenges?

RW: OSHA has participated in the development of Z359.1 since its conception. Governing bodies recognize advancements in the industry, and recognition and acceptance of the standard by federal and state governments will occur over time.

EPS: Do you believe the revised Z359.1 standard should be recognized in other areas?

RW: The Z359.1 standard was not written with a specific industry in mind. We believe the standard has something to offer every organization that encounters fall hazards. For example, the construction industry could use the standard's hazard assessment sections, and the communications industry could benefit from the training sections.

Randall Wingfield *is founder, president and CEO of Gravitec Systems Inc., a Bainbridge Island, WA-based firm that offers fall protection education and training; engineering systems design; industrial rescue; design and development of courses; training and engineering; and consulting in systems design and equipment purchases. He has been involved in the continuing development of national and international standards for fall protection equipment and training, and is president of the International Society for Fall Protection, chair of the ANSI Z359 Committee, and past vice chair of the Canadian Standards Association Z259 Committee. Wingfield is a member of ASSE's Puget Sound Chapter.*

EPS: What other projects does the Z359 ASC have in development?

RW: The Z359.1 committee is proud of the commitment that everyone has given to the revision of this standard during the past four years. Although this standard is quite comprehensive, the committee plans to develop additional information for engineered systems (horizontal lifelines), hardware compatibility, rope access and rescue. These issues are scheduled as future projects for the committee.

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