

Addendum to Introduction to Fall Protection 3<sup>rd</sup> Edition

**ANSI Z359.0 - .4 – 2007 Fall Protection Code**

Applicable October 15 2007

The Fall Protection Code provides more protection to workers exposed to fall hazards and applies to General Industry and not directly Construction which has the A10.32 to rely on currently and the OSHA 1926.500 regulations. However, if an owner organization adopts the Z359 standards and then hires a contractor, most often the contractor will typically follow the standards of the owner, hence the contractor companies have a stake in these standards too.

The Code relies on proper advance preparation beginning with a Fall Hazard Survey to identify fall hazards and then choices of solutions and selection of equipment systems that can be provided to provide hazard controls.

The standard is composed of five parts as follows:

- Z359.0 (new) Definitions and Nomenclature used for fall protection and fall arrest
- Z359.1 (Revised) Safety Requirements for Personal Fall Arrest Systems, subsystems and components
- Z359.2 (New) Minimum Requirements for a Comprehensive Managed Fall Protection Program
- Z359.3 (New) Safety Requirements for (Work) Positioning and Travel Restraint Systems
- Z359.4 (New) Safety Requirements for Assisted Rescue and Self-Rescue Systems, Subsystems and Components

Although the Fall Protection Code comes as a package, some details on each standard are as follows:

Z359.0 - 2007 assembles all the key terms of the Code in one place and defines those 150 terms

Z359.1 - 2007 adds a few changes to the 1992 standard (which was re-issued 1999):

1. The key provision is the snaphook gate has been raised to 3600 lbs in all directions from the long-standing 220 lbs nose/350 lbs edge test.
2. Also the Y or twin leg lanyard (new entry) must have a 5000 lbs connection between the two remote lanyard legs. Warnings must be supplied with that product to only attach the unused leg to the harness according to manufacturer requirements
3. The frontal D-ring is introduced for falls up to two feet free fall and where force is limited to 900 lbs. This is intended for climbers and rope access workers

Z359.2 - 2007 At the heart of the Fall Protection Code is the managed fall protection standard which introduces the reader to the positions responsible for a Fall Protection Program particularly the Program Administrator, Competent Person, Qualified Person, Competent Person Trainer, Qualified Person Trainer and besides their experience and capacity to train, inspect and observe, the on-going CEU point training recommendations annually for trainers and updates in training for all annually or at least biannually by position.

Competent or Qualified Person Trainers train Program Administrators and Authorized Persons (workers) on a periodic basis

Of particular importance is the responsibility for rescue and the appointment of a Competent Rescuer who appoints and trains Authorized Rescuer personnel in the requirements for being prepared for any recognized rescue scenario. Evaluations of performance and competence are made every 1-2 years depending on title and responsibility. Fall protection plans must be in writing after a Fall Hazard Survey (assessment) is conducted to identify hazards and their locations and recommend a range of solutions based on the Fall Protection Hierarchy: Elimination or substitution, passive protection, Fall Restraint, Fall Arrest, Administrative Controls (procedures and adequate warnings). Design requirements for new facilities are pointed to engineering the hazard out for architects and engineers using Qualified Persons.

Anchor Points are discussed in new construction including the following:

- a. Certified anchors must be tested or analyzed using a nationally accepted engineering method under the supervision of a Qualified Person. Typically, a Qualified Person will be a registered structural engineer.  
Certified anchors must be tested or analyzed using a nationally accepted engineering method under the supervision of a Qualified Person. Typically, a Qualified Person will be a registered structural engineer.
- b. Non-certified anchors are those that can be skillfully judged by an authorized Competent Person. They must be limited to potential free fall of 6 ft and attached with an energy absorber in the system. Non-certified anchors are those that can be skillfully judged by an authorized Competent Person. They must be limited to potential free fall of 6 ft and attached with an energy absorber in the system.
- c. Anchor Systems must meet minimum requirements for application:
  1. Fall Arrest: Certified anchors with engineered interfaces such as 2:1 static to dynamic force ratio by a Qualified Person responsible for design, selection and installation. Non-Certified anchors with 5,000 lbs strength per person by a Competent Person are permitted.
  2. Work Positioning: Certified anchors with 2:1 safety factor by a Qualified Person. Non-certified anchor is 3000 lbs minimum static strength.
  3. Restraint and Travel Restriction: Certified anchors are twice the dynamic force produced in a specified drop test. Non-certified anchors are 1000 lbs minimum static strength.
  4. Rescue systems: Certified anchors must be 5x the foreseeable static load. Non-certified anchors must be 3000 lbs static load minimum.

The Z359.2 also requires proper reporting and documentation beyond the hierarchy of fall protection controls including:

a. Incident Investigation: Requirements are provided for properly conducting and reporting an investigation including witness interviews relating to accidental falls resulting in near-misses, injury, death and/or property damage

b. Program Effectiveness evaluation: Annual or post-incident evaluation of the fall protection program is conducted under the direction of the Program Administrator to determine if it has met its objectives and for purpose of correcting deficiencies and strengthening the procedures and reporting and training already in place.

Z359.3 – 2007 has requirements for work positioning systems (leaning with hands free to work), and also equipment that limits travel to the edge of a fall hazard zone (where no portion of body weight is permitted except in an emergency). When exposed to a fall hazard, a fall arrest system must be used additionally.

Both work positioning and restraint lanyards must be 5000 lbs minimum strength

Z359.4 – 2007 provides means of Retrieval for fallen workers who are suspended in harnesses meeting Z359.1. The Competent Person selects the Competent Rescuer who selects Authorized Rescuers. Authorized rescuers are responsible for choosing the correct equipment system for a particular need and trained by practicing scenarios for rescue techniques. Several types of components and/or methods are recognized for possible rescue use:

a. Rope Access recognition: this two rope line system method for high work e.g. inspection and maintenance on dams and offshore rigs, is used extensively in other countries and relies on competent rescuer presence on a work team exposed to fall hazards. The multi-person work crew therefore has the training and capacity for self-rescue under most foreseeable conditions using the rescuer who can manipulate the victim rope controls which are in front of the worker to bring both to a lower level.

b. Rescue Procedures: Prompt rescue within six minutes access time to a fall victim takes planning and organization. The use of 911 calls is discussed with proper advanced planning for public or volunteer fire departments to determine the degree of reliability of outside services. An in-house rescue team must be trained and equipped for any foreseeable event including simulations and documented results of such training put into action sometimes including outside personnel team members.

c. Evacuation Harnesses: for rescue use only, not fall arrest; they must securely hold the torso whether the victim is conscious or unconscious, using straps around the shoulders and thighs.

e. Rescue lanyards and anchorage connectors must meet the fall arrest requirements of Z359.1.

e. SRL with Integral Rescue Feature: must be able to engage retrieval mode at any time but not accidentally, and hold victim still. If powered, a manual back up exists. Capacity for 125% maximum load and 75% of minimum load.

f. Block & Tackle with synthetic rope: 4500 lbs line strength minimum and overall system strength of 3100 lbs. Can withstand a 220 lbs/2 ft free fall drop and continue to function, can raise, hold and lower a load. Has a secondary brake to prevent inadvertent lowering. Minimum mechanical advantage of 3:1

g. Descent Devices: can be single or multiple use devices, must be automatic controlled or manual operation with descent speed 1.6 – 6.6 ft/sec. at a controlled rate. Minimum break

strength 2700 lbs, can pass 220 lbs/2 ft free fall and continue descent. Manual devices must stop if manual control is released or held open under panic conditions.

h. Personnel hoists: must meet safety requirements: manual or independently powered. Powered units have a manual back-up crank. Max. force to operate is 30 lbs. Drum cable connection withstands 3100 lbs at termination. Hoists must stop and hold a load and there must be a back-up brake system.

Note: This summary of the new Fall Protection Code effective 15 October 2007 has been drawn in part from Professional Safety, September 2007 by Joseph Feldstein and expanded as needed by J. Nigel Ellis, a member of the ANSI Z359 committee since its inception in 1987. This set of standards including the revision of the Personal Fall Arrest Systems Standard has taken over 16 years to produce and 34 meetings. The committee is still hard at work to produce a set of component standards which are easier to amend or add to, and these will be ready in a few years to provide more guidance. There will be further changes of far-reaching nature including a change upwards of the test torso weight for example from 220 lbs to approx. 280 lbs and the research work behind this change is described in an extensive article in the ASSE Engineering Practice Specialty, August 2007. Changes as they become public will be shown in the national trade press and also on the [www.FallSafety.com](http://www.FallSafety.com) educational website.

**Summary of Anchor Points for fall protection systems are as follows:**

	<u>Certified</u>	<u>Non-certified</u>
Fall Arrest	2:1	5,000 lbs
Horizontal Lifelines	2:1	not permitted
Work Positioning	2:1	3,000 lbs
Restraint	2:1	1,000 lbs
Rescue	5x applied load	3,000 lbs
Rope Access	not specified	not specified