

AMERICAN NATIONAL STANDARD

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

Part of the Fall Protection Code



AMERICAN SOCIETY OF
SAFETY ENGINEERS



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American National Standard

**Definitions and Nomenclature Used
for Fall Protection and Fall Arrest**

Secretariat

American Society of Safety Engineers
1800 East Oakton Street
Des Plaines, Illinois 60018-2187

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Foreword (This Foreword is not a part of American National Standard Z359.0-2007.)

This standard, national in scope, was developed by an Accredited Standards Committee functioning under the procedures of the American National Standards Institute, with the American Society of Safety Engineers (ASSE) as secretariat.

It is intended that every employer whose operations fall within the scope and purpose of the standard will adopt the guidelines and requirements detailed in this standard.

The need for this standards activity grew out of the continuing development of a series of fall protection related standards. The focus is to tie the elements of those standards together and provide the tools with which employers may develop the programs that incorporate those elements. This standard also brings together the administrative requirements of those fall protection standards. It should be noted, as in all Z359-series standards, that this standard applies to all occupational and non-occupational activities except those in SIC Division C (construction). It also is not intended to apply to sports activities such as mountaineering.

Neither the standards committee, nor the secretariat, states that this standard is perfect or in its ultimate form. It is recognized that new developments are to be expected, and that revisions of the standard will be necessary as the state-of-the-art progresses and further experience is gained. It is felt, however, that uniform guidelines for fall protection programs are very much needed and that the standard in its present form provides for 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. Designs which eliminate fall hazards through the proper application of the hierarchy of safety controls are the preferred method for fall protection. Design deficiencies often increase the risk for employees who may be exposed to fall hazards: examples are (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 are anticipated; (3) no provision for safe access to elevated work areas; (4) installation of machines or equipment at heights, rather than floor/ground level to preclude access to elevated areas; (5) failure to plan for the use of travel restriction or work positioning devices. To that end, this series of standards also provides guidance for design considerations for new buildings and facilities.

Basic fall safety principles have been incorporated into these standards, including hazard survey, hazard elimination and control, and education and training. The primary intent is to ensure a proactive approach to fall protection. However, the reactive process of accident investigation is also addressed to ensure that adequate attention is given to causation of falls.

The Z359 Committee solicits public input that may suggest the need for revisions to this standard. Such input should be sent to the Secretariat, ASC Z359, American Society of Safety Engineers, 1800 E. Oakton Street, Des Plaines, IL 60018-2187.

This standard was developed and approved for submittal to ANSI by the American National Standards Committee on Standards for Fall Protection, Z359. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the Z359 Committee had the following members:

Randall Wingfield, Chairman
Basil Tominna, P.E., Vice Chairman
Robert Aguiluz, Esq., CSP, Z359.0 Subgroup Chair
Timothy R. Fisher, CSP, ARM, CPEA, Secretary
Jennie Dalesandro, Administrative Technical Support

Organization Represented

Name of Representative

American Society of Safety Engineers	Daniel Paine Carl Griffith, CSHM, CPSM, CHCM, CUSA, CPEA
Bashlin Industries, Inc.	Bradley S. McGill Roderick A. Paul
Buckingham Mfg. Co., Inc.	Jim Rullo Chris Delavera
Canadian Standards Association	Andrew C. Sulowksi, P.E. Ron Meyers
Capital Safety Group	J. Thomas Wolner, P.E. Brad Rohlf
Elk River, Inc.	Mark C. Conover Paul Doepel
Ellis Fall Safety Solutions	Dr. J. Nigel Ellis, P.E., CSP, CPE John T. Whitty, P.E.
Gravitec Systems, Inc.	Randall Wingfield Dave Lough
Hartford Steam Boiler Inspection & Insurance Co.	Timothy Healey Jerome Kucharski
ISEA – International Safety Equipment Association	Russell Goldmann, II Janice C. Bradley, CSP
Indianapolis Power and Light LJB Inc.	David H. Pate, CUSA Thomas Kramer, P.E., CSP Tracey Riepenhoff, P.E., CSP, CPE
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Western Area Power Administration

Loui McCurley
Jim Frank
Steve Sanders
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Mark H. Stemmer, P.E., CSP
Mark Monson
Daniel Zarletti
Scott Billish
Chris Johnson
John H. Addington
Nick Andreescu, P.E.
Jimmy D. Schilling, P.E.
Nicholas Jones
Cliff Theve
Thomas Pazell
Arvie E. Scott
Sherman Williamson
John Newquist
Basil Tominna, P.E.
Douglas L. Craddock
Jeff Wild
Ralph Armstrong

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STANDARD REQUIREMENTS

1. SCOPE, PURPOSE, APPLICATION, EXCEPTIONS, AND INTERPRETATIONS

1.1 Scope. This standard establishes the definitions and nomenclature used for the Z359 Fall Protection Code.

1.2 Purpose and Application.

1.2.1 This standard addresses definitions and nomenclature for the Z359 Fall Protection Code.

1.3 Exceptions.

1.3.1 The scope of this standard does not include the construction industry (SIC Division C), window cleaner belts, or sports related activities.

1.3.2 Body belts, window cleaner belts, chest-waist harnesses, and chest harnesses, even when referred to as body supports, are not addressed by the provisions of this standard.

1.3.3 Systems that incorporate horizontal lifelines and personal protective systems for activities such as climbing, man riding, travel restriction, work positioning, rescue, and evacuation may suitably incorporate components or subsystems specified herein. When incorporated into such systems, however, those systems, subsystems, and components are not within the scope of this standard.

1.3.4 Variance from the requirements of this standard is permissible in isolated instances of practical difficulties when applying it at the user level, but only when it is clearly evident that an equivalent degree of protection is implemented.

1.4 Interpretations. Requests for interpretations of this standard shall be in writing and addressed to the Secretariat of this standard.

2. DEFINITIONS

2.1 Activation Distance. The distance traveled by a fall arrester or the amount of line payed out by a self-retracting lanyard (SRL) from the point of on-

EXPLANATORY INFORMATION

(Not part of American National Standard Z359.0)

E1.3.2 Chest-waist harnesses refer to harnesses consisting of separate waist and chest components that are not integral as defined by this standard and that form a full body harness when combined.

E1.3.3 This paragraph recognizes that some fall protection equipment meeting the requirements of this standard may have multiple uses, making the equipment suitable for other uses. In such cases, the equipment must be evaluated according to its use, and the requirements of this standard are not applicable.

E2.1 Activation distance is part of the free fall distance. The activation point is the point where the fall arrester engages the lifeline or, in the case of an

set of a fall to the point where the fall arrester or self-retracting lifeline begins to apply a braking or stopping force.

2.2 Active Fall Protection Systems. A fall protection system that requires authorized persons to wear or use fall protection equipment and that requires fall protection training.

2.3 Adjuster. A component that provides a means to vary the length of a strap, webbing or rope.

2.4 Administrative Controls. Employer mandated safe work practices or procedures that are designed to prevent exposure to a fall by signaling or warning an authorized person to avoid approaching a fall hazard.

2.5 Anchorage. The terminating component of a fall protection system or rescue system that is intended to support any forces applied to the system.

2.6 Anchorage Connector. A component or subsystem that functions as an interface between the anchorage and a fall protection, work positioning, rope access, or rescue system for the purpose of coupling the system to the anchorage.

SRL, where an internal brake begins to engage.

E2.2 Active fall protection systems include any fall restraint, fall arrest, travel restriction, or administrative controls used to protect authorized persons at height.

E2.3 Adjusters may be used in lanyards made of rope and strap to provide means of varying the length to suit the user's needs. Webbing adjusters may be used in lieu of buckles in harnesses to adjust the harness fit if the webbing adjuster meets the requirements for buckles set forth in this standard.

E2.4 Administrative controls can include training, warning signs, lights, audible alarms, or other methods that warn an authorized person to avoid approaching a fall hazard. Administrative controls are distinguished from work procedures implemented for the purpose of protecting a person who is already located near the fall hazard. Work procedures implemented to protect a person who is near the fall hazard are not covered by this standard.

E2.5 An anchorage meeting the requirements of this standard can safely withstand the foreseeable forces that might be exerted on the fall protection or rescue system. Care must be taken to distinguish between an anchorage and an anchorage connector as those terms are used in this standard. An anchorage is typically a fixed structural member required for the stability and other purposes of the structure itself. Examples include a beam, girder, column or floor. An anchorage connector, on the other hand, is a component that provides an interface to which the fall protection or rescue subsystem may be attached when the anchorage itself does not have a compatible connection point. Window cleaner anchors are outside the scope of this standard.

E2.6 Anchorage connectors are typically installed temporarily or permanently on anchorages such as a beam, girder, column or floor. An anchorage connector may be moveable or portable, such as a tripod or davit arm. An anchorage connector meeting

the requirements of this standard can safely withstand the foreseeable forces that might be exerted on the fall protection or rescue system.

2.7 Arrest Distance. The total vertical distance required to arrest a fall. The arrest distance includes the deceleration distance and activation distance.

2.8 Assisted Rescue. A rescue requiring the assistance of others.

2.9 Attachment Element. A connector integral to the body support that provides a point on the body harness to which other components or connecting subsystems may be attached.

2.10 Authorized Person. For purposes of this standard, a person assigned by the employer to perform duties at a location where the person will be exposed to a fall hazard.

2.11 Authorized Rescuer. A person assigned by the employer to perform rescue from fall protection.

2.12 Automatic Descent Control Device. A load lowering device or mechanism that automatically controls pay-out speed of line or descent speed under load once it has been engaged.

2.13 Available Clearance. The distance from a reference point, such as the working platform, to the nearest obstruction that an authorized person might contact during a fall which, if struck, could cause injury.

2.14 Belt, Body. A body support comprised of a strap with means for securing it about the waist.

E2.9 The D-Ring is the most common attachment element. Attachment elements are typically incorporated into the body support for purposes such as fall arrest, work positioning travel restriction, lifting, lowering and controlled descent.

E2.10 A person is authorized under this standard if granted the authority by the employer to perform duties at a location where the person is exposed to a fall hazard. Any employee with proper authority to be at a location where they are exposed to one or more fall hazards is considered an authorized person. To comply with this standard, an authorized person is required to receive training and to periodically demonstrate the ability to safely use the appropriate fall protection equipment. An authorized person may also be qualified for other positions, such as a competent person, qualified person, or authorized rescuer.

E2.11 To comply with this standard, an authorized rescuer is required to receive training and to periodically demonstrate the ability to perform rescue from fall protection.

E2.14 A body belt is sometimes referred to as a waist belt or safety belt. Body belts are not suitable

for fall arrest and therefore shall be rigged such that a user cannot free fall more than two feet (.9m). Body belts are not intended for use as a body support in the arrest of a worker's fall. Window cleaner belts are addressed in ANSI/ASSE Z359.1.

2.15 Body Support. An assembly of webbing arranged to support the human body for fall protection purposes, including during and after fall arrest.

E2.15 *The term "body support" is generally used to refer to a full body harness, chest harness, chest-waist harness, or a body belt. It generally includes adjustable means for fastening it about the body and attachment points suitable for fall protection applications.*

2.16 Buckle. A connector for attaching a strap or webbing segment to either another strap or webbing segment or back to itself.

2.17 Capacity. The maximum weight that a component, system, or subsystem is designed to hold.

E2.17 *The combined weight of the user and all clothing, tools, and other objects borne or carried by the user is considered in determining whether the capacity has been exceeded.*

2.18 Carabiner. A connector generally comprised of a trapezoidal or oval shaped body with a closed gate or similar arrangement that may be opened to attach another object and, when released, automatically closes to retain the object.

E2.18 *In addition, carabiner may also be spelled karabiner. There are generally three types of carabiners: (i) the automatic or self-locking type (required by this standard) with a self-closing, self-locking gate that remains closed and locked until intentionally unlocked and opened for connection or disconnection; (ii) the manual locking type (not permitted by this standard) with a self-closing gate that must be manually locked by the user, and that remains closed and locked until intentionally unlocked and opened by the user for connection or disconnection; or (iii) the non-locking type (not permitted by this standard) with a self-closing gate that cannot be locked.*

2.19 Certification. The act of attesting in writing that the criteria established by this standard or some other designated standard have been met.

2.20 Certified. An act or process resulting in documentation that determines and attests to criteria that meet the requirement of an American National Standard. Such act or process may be carried out by testing or applying proven analytical methods, or both, under the supervision of a qualified person or entity.

2.21 Certified Anchorage. An anchorage for fall arrest, positioning, restraint, or rescue systems that a qualified person certifies to be capable of supporting the potential fall forces that could be encountered during a fall or that meet the criteria for a certified anchorage prescribed in this standard.

2.22 Chest Harness. See “Harness, Chest”.

2.23 Chest-Waist Harness. See “Harness, Chest-Waist”.

2.24 Clearance Requirement. The distance below an authorized person that must remain clear of obstructions in order to ensure that the authorized person does not make contact with any objects that would cause injury in the event of a fall.

2.25 Compatibility. The quality or power of being compatible.

2.26 Compatible. Capable of orderly, efficient integration and operation with other elements or components in a system, without the need of special modification or conversion, such that the connection will not fail when used in the manner intended.

2.27 Competent Person. An individual designated by the employer to be responsible for the immediate supervision, implementation, and monitoring of the employer’s managed fall protection program who, through training and knowledge, is capable of identifying, evaluating, and addressing existing and poten-

E2.24 The clearance requirement includes total fall distance; the deflection of anchorage and anchorage connectors, the length and elongation of the full body harness and the body; the vertical component of any swing fall; and a clearance safety factor. The clearance requirement accounts for performance of the system, the number of authorized persons allowed on the system and their body position (kneeling or standing).

E2.25 See “Compatible”. It is possible to have compatibility between or among components or elements when used in a prescribed manner, but for those same elements or components to be incompatible when configured and/or used in a different manner.

E2.26 Determining whether two or more pieces of equipment are compatible requires consideration of the configuration in which the resulting system or subsystem will be used. It is possible for two components to be compatible with each other when properly configured and used, but to be incompatible when configured and/or used in a different manner. For example, certain connectors may be compatible with a particular anchorage connector if the anchorage connector is located overhead, but not if the anchorage connector is located at the user’s feet.

E2.27 The knowledge and training requirements for an individual to be considered a “Competent Person” are provided in various sections of the ANSI/ASSE Z359 standards. An individual who does not possess training and knowledge in the areas required by this standard is not considered to

tial fall hazards, and who has the employer's authority to take prompt corrective action with regard to such hazards.

2.28 Competent Person Trainer. An individual who by training, knowledge and experience is capable of conducting competent person training.

2.29 Competent Rescuer. An individual designated by the employer who by training, knowledge, and experience is capable of the implementation, supervision, and monitoring of the employer's fall protection rescue program

2.30 Competent Rescue Trainer. An individual who by training, knowledge and experience specific to fall protection rescue is capable of conducting rescue training.

2.31 Component. An element or integral assembly of interconnected elements intended to perform one function in the system.

2.32 Connecting Subsystem. An assembly, including the necessary connectors, comprised of all components, subsystems, or both, between the anchorage or anchorage connector and the harness attachment point.

2.33 Connector. A component or element that is used to couple parts of the system together.

be capable of identifying, evaluating, and addressing existing and potential fall hazards nor capable of taking the necessary corrective measures.

E2.28 The requirements for a person to be considered a Competent Person Trainer are provided in ANSI/ASSE Z359.2.

E2.29 The requirements for a person to be considered a Competent Rescuer are provided in ANSI/ASSE Z359.2.

E2.30 The requirements for a person to be considered a Competent Rescue Trainer are provided in ANSI/ASSE Z359.2.

E2.31 Components may be acquired from different sources as long as the components as assembled and used are compatible and the resulting system meets the requirements of this standard.

Some examples of what is meant by the phrase "intended to perform one function in the system" are as follows: A full body harness (FBH) performs a body supporting function; a lanyard (L) performs a tethering function; a carabiner (CAR) performs a connecting function; a fall arrester (FA) performs a stopping function; and an energy absorber (EA) performs a braking function.

E2.32 Connecting subsystems serve to prevent or arrest a fall. In the case of personal fall arrest systems, connecting subsystems serve to maintain forces on the body below required levels (absorb free-fall energy) and provide the means of post-fall suspension of the fallen person.

E2.33 A connector may be an independent component (such as a carabiner) of a system or it may be an integral element of a component, hybrid component, subsystem or system (such as a buckle or D-Ring sewn into a body support or a snaphook spliced or sewn into a lanyard or self-retracting lanyard). Connectors are sometimes referred to as hardware.

2.34 Constituent. An integral component of a larger assembly.

E2.34 A component is said to be a constituent if it is integral to its next higher level of assembly (component, subsystem, or system).

For example, a snaphook is a constituent of the lifeline that pays out from and retracts into a Self Retracting Lanyard (SRL) because the snaphook is a component that cannot be removed from the line without the use of special tools. The lifeline is a constituent of the SRL because it is a component (i.e. assembly of wire rope, swaged fittings, thimble and snaphook) that cannot be removed from the SRL without the aid of special tools.

2.35 Continuous Fall Protection. One or more fall protection systems that provide fall protection without interruption

E2.35 Providing continuous fall protection may require more than one fall protection system or a combination of prevention or protection measures.

2.36 Deceleration Distance. The vertical distance between the user's fall arrest attachment at the onset of fall arrest forces during a fall, and after the fall arrest attachment comes to a complete stop.

E2.36 Deceleration distance does not include the dynamic elongation of the system. This dynamic elongation is proportional to the length of the connecting subsystem or lifeline and temporarily reaches maximum elongation when maximum arresting force is applied.

2.37 D-Ring. An integral "D" shaped connector typically used in harnesses, lanyards, energy absorbers, lifelines, and anchorage connectors as an integral connector as an attachment point.

2.38 Element. An integral part of a constituent, component, hybrid component, subsystem, or system.

E2.38 Examples include rope, strap, thread, thimble, buckle, D-Ring or snaphook.

2.39 Employer. Any corporation, partnership, proprietorship, government agency, or other organization that has employees.

2.40 Energy (Shock) Absorber. A component whose primary function is to dissipate energy and limit deceleration forces which the system imposes on the body during fall arrest.

E2.40 Such devices may employ various principles such as deformation, friction, tearing of materials or breaking of stitches to accomplish energy absorption. An energy absorber causes an increase in the deceleration distance. An energy absorber may be borne by the user (personal) or be a part of a horizontal lifeline subsystem or a vertical lifeline subsystem.

2.41 Energy (Shock) Absorber. A component whose primary function is to dissipate energy and

limit deceleration forces imposed on the body during fall arrest.

2.42 Energy Absorber, Horizontal Lifeline. An energy absorber that is attached to one of the end anchorages or anchorage connectors of a horizontal lifeline subsystem.

2.43 Energy Absorber, Personal. An energy absorber that is attached to a harness.

2.44 Energy Absorber, Vertical Lifeline. An energy absorber that is attached to the top anchorage or anchorage connector of a vertical lifeline subsystem.

2.45 Equipment. A general term referring to components, subsystems or systems, in any combination, singular or plural.

2.46 Evacuation. Self-rescue affected by the rescue subject alone.

2.47 Eye, Formed. A loop or eye, with or without a thimble, formed in the end of a rope, wire rope, or strap and secured by means of a splice, swaged fitting or stitched joint.

2.48 Eye, Return. A loop or eye in the end of a rope or wire rope formed by lapping the rope or wire rope back on itself and securing it by using swaged fittings.

2.49 Eye, Spliced. A loop or eye in the end of a rope or a wire rope formed by tucking the strand ends into the rope or wire rope.

E2.49 Spliced eyes may include swaged fittings.

2.50 Eye, Stitched. A loop or eye in the end of a strap formed by lapping the strap back on itself and securing it by means of a stitched joint.

2.51 Fall Arrest. The action or event of stopping a free fall or the instant where the downward free fall has been stopped.

2.52 Fall Arrest Attachment. A connector integral to the body support specifically designated as a point for connecting the fall arrest system.

2.53 Fall Arrest System. The collection of equipment components that are configured to arrest a free fall.

2.54 Fall Arrester. A device that travels on a lifeline and will automatically engage or lock onto the lifeline in the event of a fall.

2.55 Fall Arrester Connecting Subsystem. The portion of a vertical lifeline fall protection system that is attached between the anchorage or anchorage connector and the fall arrest attachment on the harness.

2.56 Fall Edge. The unprotected edge of a walking/working surface or an unprotected opening from which a person could fall to a lower surface or into a hazard.

2.57 Fall Hazard. Any location where a person is exposed to a potential free fall.

2.58 Fall Hazard Survey Report. A written document that contains information about existing or potential fall hazards and a method or methods for eliminating or controlling those hazards.

2.59 Fall Hazard Zone. An area of fall exposure

E2.53 A fall arrest system is typically comprised of components such as full body harnesses, lanyards, deceleration devices, horizontal lifelines, vertical lifelines, anchorages and anchorage connectors. Configured and used properly, a free fall will be arrested without exceeding the strength requirements of this standard.

E2.54 A fall arrester usually employs the principle of inertial locking, cam lever locking, or both. A rope grab is one example of a fall arrester.

E2.55 A fall arrester connecting subsystem may incorporate integral subsystems or may be comprised of independent components. The term refers to the entire assembly, including the necessary connectors, and is typically comprised of either: (i) a fall arrester and vertical lifeline or fall arrester and vertical lifeline subsystem; (ii) a fall arrester, lanyard, and vertical lifeline or vertical lifeline subsystem; (iii) a fall arrester, energy absorber, and vertical lifeline or vertical lifeline subsystem; or (iv) a fall arrester, lanyard, energy absorber and vertical lifeline or vertical lifeline subsystem.

E2.56 A fall edge is also known as an unprotected edge or an exposed edge.

E2.57 In addition to a fall to a lower level, a fall hazard may exist, even on the same level, where the fall results in exposure to a hazard, such as contact with a high temperature process, unguarded machinery, or a hazardous liquid in an open tank. Such hazards may be eliminated by guardrails or other fall protection techniques. The elevation at which a potential fall becomes a fall hazard is often prescribed by laws or regulations and may depend upon the type of work being performed or the work environment.

E2.59 Fall hazard zones for different surfaces are

on a roof or slope.

2.60 Fallout. The action of a person or test torso being unintentionally separated from the body support component during or after fall arrest.

2.61 Fall Protection. Any equipment, device or system that prevents an accidental fall from elevation or that mitigates the effect of such a fall.

2.62 Fall Protection Procedure. A written series of logical steps that describes in detail the specific practices, equipment and methods to be used to protect authorized persons from falling when exposed to fall hazards.

2.63 Fall Restraint. The technique of securing an authorized person to an anchorage using a lanyard short enough to prevent the person's center of gravity from reaching the fall hazard.

2.64 Fall Restraint System. A device or devices, including any necessary components, that prevents an authorized person from reaching a fall hazard.

2.65 Free Fall. The act of falling before a fall protection system begins to apply forces to arrest the fall.

2.66 Free Fall Distance. The vertical distance traveled during a fall, measured from the onset of a fall from a walking working surface to the point at which the fall protection system begins to arrest the fall.

2.67 Frontal D-Ring Attachment. An attachment element affixed to the full body harness within the vertical seven-inch sternum (breastbone) area that is designed to withstand dynamic fall arrest, re-

specified within this standard.

E2.61 *Fall protection includes eliminating or controlling hazards, passive fall protection, fall restraint, fall arrest and administrative controls.*

E2.62 *Also see the definition for "Procedure".*

E2.66 *This distance excludes deceleration distance and the elongation of a lifeline or lanyard, but includes any distance that a deceleration device slides before engaging or the distance that a self-retracting lifeline or lanyard extends before fall arrest forces are applied.*

The distance is measured using a common reference point, typically the fall arrest attachment.

The term "free fall distance" has applicability beyond just personal fall arrest systems. For example, as used in the context of a positioning system, free fall distance refers to the slack in the system, which will convert to travel distance during a fall event.

E2.67 *The sternum is a flat, dagger shaped vertical bone located in the middle of the chest. Along with the ribs, the sternum forms the rib cage that protects the heart, lungs, and major blood vessels*

straint, and post-fall suspension forces.

2.68 Full Body Harness. See “Harness, Full Body”.

2.69 Gate. The element of a connector that opens to receive an object and closes when released to retain the object.

2.70 Guardrail System. A passive system of horizontal rails and vertical posts that prevent a person from reaching a fall edge.

2.71 Hardware. A rigid component or element that is used to couple parts of the system together.

2.72 Harness, Chest. A component comprised of chest and shoulder straps with means for fastening it about the torso and for attaching it to other components or subsystems.

2.73 Harness, Chest-Waist. A body support consisting of separate chest and waist components that can be combined to form a full body harness. Chest-waist harnesses are excluded from this standard for purposes of fall arrest.

2.74 Harness, Evacuation. A body support designed and constructed so the rescue subject is securely held and suspended during the rescue process.

2.75 Harness, Full Body. A body support designed to contain the torso and distribute the fall arrest forces over at least the upper thighs, pelvis, chest and shoulders.

2.76 Harness, Positioning. A body support that encircles and closes around the waist and legs with attachment elements appropriate for positioning.

2.77 Hazard Elimination. Changing the task, pro-

from damage.

E2.69 *Formerly known as a keeper. The performance and design specifications for connector gates are found within this standard.*

E2.70 *Guardrail systems typically have a top rail, a mid rail and posts. See ANSI/ASSE A1264.1, Safety Requirements For Workplace Floor And Wall Openings, Stair and Railing Systems.*

E2.71 *The term “hardware” may refer to an independent component of the system, such as a carabiner. It may also refer to an integral element of a component, hybrid component, subsystem or system (such as a buckle or D-Ring sewn into a body support or a snaphook spliced or sewn into a lanyard). The term “hardware” sometimes refers to connectors.*

E2.72 *Systems and subsystems incorporating chest-harnesses are excluded from this standard.*

E2.73 *According to the requirements of this standard, a chest-waist harness does not meet the requirements of this standard for fall arrest because the chest and waist components are not integral. See definition of “Integral.”*

E2.75 *Wherever the word harness is used alone in this standard it refers to full body harness.*

cess, controls, or other means so as to remove the need for an authorized person to be exposed to a fall hazard.

2.78 Horizontal Lifeline. A component of a horizontal lifeline subsystem, consisting of a flexible line with connectors or other coupling means at both ends for securing it horizontally between two anchorages or anchorage connectors.

2.79 Horizontal Lifeline Subsystem. An assembly, including the necessary connectors, comprised of a horizontal lifeline component and, optionally, of: (a) an energy absorber component or, (b) a lifeline tensioner component, or both. This subsystem is normally attached at each end to an anchorage or anchorage connector and may also contain one or more intermediate anchorages. The end anchorages have the same elevation.

2.80 Hybrid Component. An integral assembly of elements or components, or both, intended to perform more than one function in the system.

2.81 Inspection. An examination of equipment or systems to assess conformance to particular standard.

2.82 Instructions, Manufacturer. Printed informational documents supplied with equipment.

2.83 Integral. Not removable from the component, subsystem or system without destroying or mutilating any element or without use of a special tool.

2.84 Lanyard. A component consisting of a flexible rope, wire rope, or strap, which typically has a connector at each end for connecting to the body support and to a fall arrester, energy absorber, anchorage connector, or anchorage.

2.85 Lanyard Connecting Subsystem. An as-

E2.78 A horizontal lifeline is a means to which one or more connecting subsystems may be attached. It is sometimes referred to as a horizontal anchorage line, monkey line, static line, or trolley line.

E2.80 Hybrid components may usually be acquired from many sources and may be interchangeably incorporated into a system according to the manufacturer's instructions provided that the resulting system meets the requirements of this standard. A hybrid component may also be referred to as an integral subsystem. Examples include a self-retracting lanyard, or a lanyard with energy absorber, or a lanyard with energy absorber and fall arrester.

E2.84 Lanyards; perform a tethering function that restricts movement and can arrest a fall.

E2.85 A lanyard connecting subsystem is normally

sembly, including the necessary connectors, comprised of a lanyard only, or a lanyard and energy absorber.

2.86 Lifeline. A component of a fall protection system consisting of a flexible line designed to hang either vertically (vertical lifeline), or for connection to anchorages or anchorage connectors at both ends to span horizontally (horizontal lifeline).

2.87 Lifeline Subsystem. An assembly, including the necessary connectors, comprised of at least a lifeline, and which may also have means for pre-tensioning the lifeline or for energy absorption, or both.

2.88 Lifeline Tensioner. A device, such as a turnbuckle, to tauten a horizontal lifeline or a weight to tension a vertical lifeline.

2.89 Maintenance. A process for keeping the product, component or system usable and safe from degradation.

2.90 Manual Descent Control Device. A load lowering device or mechanism that, once engaged, requires manual attention to control pay-out speed of line or descent speed under load.

2.91 Manufacturer. Any producer of fall protection equipment with written product labels and instructions meeting the requirements of this standard.

2.92 Marking. Any sign, label, stencil, plate or the like containing information or guidance.

2.93 Maximum Arrest Force. The peak force measured by the test instrumentation during arrest of the test weight in the dynamic tests set forth in this standard.

attached between an anchorage or anchorage connector and the fall arrest attachment and may be an integral subsystem or may be comprised of independent components.

E2.86 A lifeline serves to extend the range of the user through the slideable connection of a fall arrester in the case of a vertical lifeline or a connector or other device in the case of a horizontal lifeline.

E2.88 The lifeline tensioner of a horizontal lifeline subsystem is usually placed between an anchorage or anchorage connector at one end of the horizontal lifeline and the horizontal lifeline itself. The lifeline tensioner of a vertical lifeline subsystem is usually placed near the bottom of the vertical lifeline.

E2.91 If a positioning or travel restraint system is produced by the authorized person's employer representative or the authorized person himself or herself, then professional labels and instructions are essential to be provided for proper use, inspection and maintenance.

2.94 Non-Certified Fall Arrest Anchorage.

A fall arrest anchorage that a competent person can judge to be capable of supporting the predetermined anchorage forces as prescribed in this standard.

2.95 O-Ring. A circular shaped ring.

2.96 Oval Ring. An oval shaped ring.

2.97 Passive Fall Protection System. Fall protection that does not require the wearing or use of personal fall protection equipment.

2.98 Personal Fall Arrest System (PFAS).

An assembly of components and subsystems used to arrest a person in a free fall.

2.99 Plan. An orderly arrangement of parts of an overall design or objective; A systematic arrangement of elements or important parts.

2.100 Positioning. The act of supporting the body with a positioning system for the purpose of working with hands free.

2.101 Positioning Lanyard. A lanyard used to transfer forces from a body support to an anchorage or anchorage connector in a positioning system.

E2.94 Non-certified anchorages are an exception to the requirement that anchorages are designed, certified, specified and selected by a qualified person. If the requirements within this standard for a non-certified anchorage are met, the selection and use of a non-certified anchorage may be supervised by a competent person. Non-certified anchorages typically consist of unquestionably strong elements of a structure.

E2.97 Examples of passive fall protection systems include safety nets, guardrail systems, or other means that protect an authorized person from a fall hazard.

E2.98 A system must always include a full body harness and connecting means between the harness and an anchorage or anchorage connector. Such connecting means may consist of a lanyard, energy absorber, fall arrester, lifeline, self-retracting, lanyard or suitable combinations of these. This standard deals only with PFAS incorporating a full body harness. Whenever the term "system" is used in this standard it refers to a personal fall arrest system.

E2.99 A plan may vary in its level of specificity, but is more general than detailed. A plan differs from a procedure in that a plan sets out a general course of action but does not provide the specific steps by which an action is initiated, performed, controlled, and/or finalized. See "Procedure". A plan is more specific than a program, and more general than a procedure.

E2.101 A positioning system can enable an authorized person to have both hands free for work.

2.102 Positioning Line. A vertical, horizontal, or angled rope or wire rope used to transfer forces from a body support to an anchorage or anchorage connector in a positioning system.

2.103 Positioning System. A body belt or full body harness system configured to allow an authorized person to be supported on an elevated vertical or inclined surface, such as a wall, and work with both hands free from body support.

2.104 Procedure. A series of logical steps by which all repetitive action is initiated, performed, controlled, and finalized. A procedure establishes the specific step-by-step action that is required, who is required to act, and when the action is to take place.

2.105 Product. A component, subsystem or system inclusive of all packaging, markings and instructions at the point of sale by the manufacturer.

2.106 Program. An organized, directed effort that uses specified resources to achieve desired objectives. A broad framework of goals to be achieved, serving as a basis to define and plan more specific requirements for meeting those goals.

2.107 Program Administrator. A person authorized by their employer to be responsible for managing the employer's fall protection program.

2.108 Proof Load Testing. A type of verification testing performed on equipment or elements thereof by applying to the specimen a static load of a specified amount below the design breaking strength of the specimen.

2.109 Qualified Person. A person with a recognized degree or professional certificate and with extensive knowledge, training, and experience in the fall protection and rescue field who is capable

E2.103 Although positioning systems may use the same equipment as a fall protection system (such as a harness), a positioning system used alone does not constitute fall protection. While positioning, a person is exposed to a fall hazard and is required under this standard to use a separate system that provides backup protection from a fall.

E2.104 A procedure differs from a plan in that a procedure provides specific steps to be followed in performing a task or addressing a particular situation, while a plan sets out a general course of action.

E2.108 Proof load testing is performed to assure the strength of critical parts, which may have weaknesses which are not detectable by visual inspection and which may be caused by manufacturing processes. Proof load testing may be performed on all (100%) of the parts in a production lot or on a lesser percentage according to a sampling plan. This standard requires that all D-Rings, O-Rings, carabiners and snaphooks be subjected to 100% proof load testing.

E2.109 Many jurisdictions require that individuals who design or evaluate physical structures be registered with the jurisdiction as a professional engineer.

of designing, analyzing, evaluating and specifying fall protection and rescue systems to the extent required by this standard.

2.110 Qualified Person Trainer. A qualified person who meets the requirements of this standard and who is also qualified to provide fall protection training.

2.111 Rated Working Load. The manufacturer's specified maximum and minimum loads for which the component is designed to be used.

2.112 Rescue. The process of removing a person from danger, harm, or confinement to a safe location.

2.113 Rescue Plan. A written process that describes in a general manner how rescue is to be approached under the specified parameters, such as location or circumstances.

2.114 Rescue Procedure. A written series of logical steps that describes the specific manner in which rescue is to be accomplished.

2.115 Rescue Subject. The person being rescued or in need of rescue.

2.116 Rescue System. An assembly of components and subsystems used for rescue.

2.117 Rescue System, One Person. A rescue system intended to bear only the weight of a single person at one time.

2.118 Rescue System, Two Person. A rescue system intended to bear the weight of up to two persons simultaneously.

The extent to which qualified persons are required to have specific knowledge, training, and experience is governed by the substantive requirements of this standard as they apply to the duties and responsibilities of various personnel. For example, this definition does not imply that a qualified person is required to design, evaluate, and/or specify rescue equipment, systems, or procedures for emergency response teams and rescuers meeting the requirements of this standard.

***E2.114** A rescue procedure establishes the specific step-by-step action that is required to be followed to accomplish rescue, including who is required to act and when the action is to take place.*

***E2.116** A rescue system typically consists of components, which are addressed in ANSI/ASSE Z359.4.*

2.119 Rescuer. Person or persons other than the rescue subject acting to perform an assisted-rescue by operation of a rescue system.

2.120 Restraint. See “Travel Restraint”.

2.121 Rigging. The process of building a system to move or stabilize a load or the system itself.

2.122 Ring. A generally hoop-shaped connector (hardware) element or component.

2.123 Rollout. A process by which a snaphook or carabiner unintentionally disengages from another connector or object to which it is coupled.

2.124 Rope Access. A technique using safety ropes, normally incorporating two separately secured systems, one as a means of access and the other as a secondary system, used with a harness in combination with other devices, for access to and from as well as suspension at the place of work.

2.125 Rope (or Strap) Adjuster. A mechanical means of readily moving a vertical line attachment or changing the position of an intermediate anchorage device between an anchorage (connector) and a body support while loaded with the authorized person’s weight or partial weight while leaning.

2.126 Rope, Synthetic. A construction of bundled manmade yarns, fibers, or filaments forming a strong flexible line.

2.127 Rope, Wire. A plurality of drawn wires forming strands laid helically over an axis or core.

2.128 Routine. Of a commonplace or repetitious character or of, relating to, or being in accordance with established procedure.

2.129 Secondary Fall Protection System. One or more means of fall protection, as defined by this standard, configured as a supplement or backup to

***E2.124** Rope access is different from fall arrest, fall restraint and other fall protection techniques in that the authorized person is generally fully suspended by the rope system during work. The safe use of rope access systems requires specific competence in rope access techniques acquired by training and experience, confirmed with independent assessment and certification by one competent to assess and certify rope access skills and knowledge.*

***E2.125** A rope adjuster may be a manual rope grab type device or a descent control device, which provides an adjustment feature. An automatic rope grab is typically used as a fall arrester for a vertical lifeline, which can act as back-up fall protection to a work positioning system or travel restraint system in fall hazard zone.*

***E2.129** Fall protection is defined in this standard as “any equipment, device or system that prevents an accidental fall from elevation or that mitigates the ef-*

a positioning system for the purpose of providing protection from a potential fall.

2.130 Self-Retracting Lanyard (SRL). A device containing a drumwound line that automatically locks at the onset of a fall to arrest the user, but that automatically pays out from and retracts onto the drum during normal movement of the person to whom the line is attached. After onset of a fall, the device automatically locks the drum and arrests the fall.

2.131 Self-Retracting Lanyard Connecting Subsystem (SRLCSS). An assembly, including the necessary connectors, comprised of a self-retracting lanyard or a self-retracting lanyard/energy absorber combination.

2.132 Self-Retracting Lanyard With Integral Rescue Capability. A self-retracting lanyard (SRL) that includes an integral means for assisted-rescue via raising or lowering the rescue subject.

2.133 Shall. The word “shall” is to be understood as denoting a mandatory requirement.

2.134 Shock Absorber. See definition of energy absorber.

2.135 Should. The word “should” denotes a recommendation.

2.136 Snaphook. A connector comprised of a hook-shaped body with a normally closed gate or similar arrangement that may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object.

2.137 Splice. A means of terminating a rope or wire rope by an appropriate tucking of the strand ends into the rope.

2.138 Stable Surface. A walking working surface that has the strength and structural integrity to sup-

port of such a fall.” See “Fall Protection”. A frontal D-Ring attachment providing limited fall arrest meets this requirement.

E2.130 The device may have integral means for energy absorption.

E2.131 This connecting subsystem is attached between an anchorage or anchorage connector and the fall arrest attachment of the body support.

E2.136 Snaphooks are generally one of two types, namely: (i) Automatic-locking type (required by this standard) with a self-closing and self-locking gate which remains closed and locked until intentionally unlocked and opened for connection or disconnection. (ii) Non-locking type (not permitted by this standard) with a self-closing gate which remains closed, but not locked, until intentionally opened for connection or disconnection.

E2.137 Two rope or wire rope segments should not be spliced together to, for example, lengthen or repair the line.

port an authorized person(s).

2.139 Stitch Pattern. The particular configuration of threads used to form terminations or joints of webbing.

2.140 Strap. A length of webbing that may be incorporated in a harness, lanyard or other component or subsystem.

2.141 Strap, Chest. A harness strap passing generally horizontally across the chest or around the body at chest level with adjustable means for fastening.

2.142 Strap, Shoulder. A harness strap that passes from the waist, up the chest, over the shoulder and down the back to the waist. It is connected to the waist strap or thigh straps or sub-pelvic strap or combinations thereof.

2.143 Strap, Shoulder Retainer. A means of connecting the harness shoulder straps for the purpose of retaining them on the shoulders.

2.144 Strap, Sub-Pelvic. A full body harness strap, which passes under the buttocks without passing through the crotch and is designed to transmit, to the sub-pelvic part of the body, forces applied during fall arrest and post-fall suspension.

2.145 Strap, Thigh. A full body harness strap with adjustable means for fastening it about the thigh.

2.146 Strap, Waist. A harness strap passing around the body at the waist with adjustable fastening means.

2.147 Subsystem. A multi-function assembly comprised of either: (a) independent components, including the necessary connectors, interconnected by the user; or (b) integrally interconnected components (also referred to as hybrid components or integral subsystems).

2.148 Subsystem Assembly. An assembly of components used as part of a system.

2.149 Supporting Subsystem. An integral assem-

E2.140 Also see definition of "Webbing".

E2.149 Examples include a full body harness with

bly of a body support component with another component or connecting subsystem.

2.150 Suspension. The act of supporting 100% of a user's body weight, including equipment, for the purpose of accessing a work location with one or two points of contact.

2.151 Suspension Seat. An arrangement of straps in a harness used to provide a body support and permit leaning or sitting while working.

2.152 Swaged Fitting. A mechanically pressed sleeve at the termination of a rope or wire rope used to form a loop or terminate a line.

2.153 Swing Fall. A pendulum like motion that occurs during and/or after a vertical fall. A swing fall results when an authorized person begins a fall from a position that is located horizontally away from a fixed anchorage.

2.154 Synthetic Rope Tackle Block. A load lifting and/or lowering device that does not include a winding or traction drum but uses pulleys to achieve a mechanical lifting advantage.

2.155 System. See definition of "Personal Fall Arrest System (PFAS)".

2.156 Testing. The controlled application of test conditions to a product (system, subsystem, component or element) and the recording of observed effects. When the terms "testing" or "tests" are used in this standard, those terms shall denote qualification testing or qualification test(s), not developmental or verification testing or test(s), unless otherwise specified.

2.157 Testing, Developmental. The controlled application of test conditions to a pre-production prototype of a product in the developmental stage, and the recording of observed effects, for the purpose of determining and evaluating the developmental product's performance and design characteristics.

2.158 Testing, Qualification. The controlled application of test conditions to a product specimen

integral lanyard or integral energy absorber, or both.

E2.150 This definition is outside the scope of the Z359 standards, but has been included as guidance for users with interest in this issue.

E2.151 This standard does not cover boatswain chairs that incorporate rigid boards or chair seats as defined in ANSI/ASSE A10.8, Scaffolding Safety Requirements.

E2.152 Also see definition of "Eye, Formed".

randomly selected from the initial production lot, and the recording of observed effects, for the purpose of determining the product's compliance with the requirements of this standard. When the terms "testing" or "tests" are used in the Z359 standards, those terms shall denote qualification testing or qualification test(s), not developmental or verification testing or test(s) unless otherwise specified.

2.159 Testing, Verification. The controlled application of test conditions to a product specimen sampled from ongoing production lots (after qualification testing), and the recording of observed effects, for the purpose of confirming the product's continuing compliance with the requirements of this standard. Proof load testing is a type of verification testing.

2.160 Thimble. A grooved metal or plastic piece about which a rope is bent and spliced or swaged to the main body of the rope to form an eye.

2.161 Thread. A group of synthetic filaments twisted together to form a strong strand.

2.162 Total Fall Distance. The total vertical distance a person falls, measured from the onset of a fall to the point where the person comes to rest after the fall is stopped.

2.163 Travel Restraint Lanyard. A lanyard used to transfer forces from a body support to an anchorage or anchorage connector in a travel restraint system.

2.164 Travel Restraint Line. A rope, or wire rope, used to transfer forces from a body support to an anchorage or anchorage connector in a travel restraint system.

2.165 Travel Restraint System. A combination of anchorage, anchorage connector, lanyard (or other means of connection), and body support that limits travel in such a manner that the user is not exposed to a fall hazard.

2.166 User. A person who performs activities at heights while protected by a personal fall protection system.

E2.161 Thread is used to sew stitch patterns into webbing.

E2.162 Total fall distance includes free fall distance and deceleration distance, but excludes dynamic elongation.

E2.164 The purpose of a travel restraint line is to prevent an authorized user from reaching a fall hazard.

E2.165 A travel restraint system allows a person to approach the edge, but eliminates the possibility of going over the edge.

E.2.166 A user is sometimes referred to as an employee or worker in other documents dealing with fall protection.

2.167 Vertical Lifeline. A component, element or constituent of a lifeline subsystem consisting of a vertically suspended flexible line and along which a fall arrester travels.

2.168 Vertical Lifeline Subsystem. An assembly, including the necessary connectors, comprised of a vertical lifeline component and, optionally, an energy absorber and a lifeline tensioner component.

2.169 Webbing. A narrow woven fabric with selvedge edges and continuous filament yarns made from light and heat resistant fibers.

2.170 Winch/Hoist. A load lifting and/or lowering device that incorporates a traction drum and a means for controlling pay-out and take-up of the line from the drum. Device relies on reduction gearing and/or lever principals to achieve a mechanical lifting advantage.

2.171 Wire. A single, continuous length of metal with a circular cross-section that is cold-drawn from rod.

2.172 Wire Rope. See "Rope, Wire".

2.173 Work Positioning. See "Positioning".

2.174 Work Positioning System. See: "Positioning System".

2.175 Work Restraint System. See "Travel Restraint System".

2.176 Working Line. A flexible line used for positioning or travel restraint.

E2.167 A vertical lifeline is also referred to as vertical anchorage line or dropline.

E2.168 This subsystem is normally attached at one end to an overhead anchorage or anchorage connector and may also be attached to a bottom anchorage.

E2.169 Also see definition of "Strap".

3. LIST OF ACRONYMS

ACRONYM	TERM
A	Anchorage
AC	Anchorage Connector
ACTD	Activation Distance
AD	Arrest Distance
AE	Attachment Element
AJ	Adjuster
BB	Body Belt
BSU	Body Support
BU	Buckle
CAP	Capacity
CAR	Carabiner
CH	Chest Harness
COM	Component
CON	Connector
CSS	Connecting Subsystem
CST	Constituent
CWH	Chest-Waist Harness
DD	Deceleration Distance
DDV	Deceleration Device
DR	D-Ring
EA	Energy Absorber
EAHLL	Horizontal Lifeline Energy Absorber
EAP	Personal Energy Absorber
EAVLL	Vertical Lifeline Energy Absorber
EF	Formed Eye
EL	Element
ER	Return Eye
ESPL	Spliced Eye
EST	Stitched Eye
F	Fitting
FA	Fall Arrester
FAA	Fall Arrest Attachment
FACSS	Fall Arrester Connecting Subsystem
FAS	Fall Arrest System
FBH	Full Body Harness
FF	Free Fall
FFD	Free Fall Distance
HC	Hybrid Component
HLL	Horizontal Lifeline
HLLSS	Horizontal Lifeline Subsystem
HW	Hardware
I	Integral
ISS	Integral Subsystem
L	Lanyard
LCSS	Lanyard Connecting Subsystem

ACRONYM	TERM
LL	Lifeline
LLSS	Lifeline Subsystem
LT	Lifeline Tensioner
M	Marking
MAF	Maximum Arrest Force
MAL	Maximum Arrest Load
OR	O-Ring
OVR	Oval Ring
P	Personal
PFAS	Personal Fall Arrest System
PLT	Proof Load Testing
PPE	Personal Protective Equipment
R	Rope
RG	Rope Grab
RS	Synthetic Rope
RW	Wire Rope
S	System
SA	Shock Absorber
SF	Swaged Fitting
SH	Snaphook
SP	Stitch Pattern
SPL	Splice
SRL	Self-Retracting Lanyard
SRLCSS	Self-Retracting Lanyard Connecting Subsystem
SS	Subsystem
SUSS	Supporting Subsystem
STR	Strap
TBL	Thimble
TD	Developmental Testing
TFD	Total Fall Distance
TH	Thread
TQ	Qualification Testing
TRS	Travel Restriction System
TV	Verification Testing
U	User
VLL	Vertical Lifeline
VLLSS	Vertical Lifeline Subsystem
W	Webbing
WPS	Work Positioning System