



Making our World Safer®

You're Killing Me: Certified vs. Non-Certified Anchorages

STE Inc. - Sustainable Safety®
Session 37, October 26, 2009



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You're Killing Me?

- Is there a rule of thumb?
- Anchorage design, selection and use
- Why use different capacity requirements for restraint, arrest and rescue?
- Who decides if a anchorage is certified or noncertified?
- Practical approaches to what work.

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We are...



Professional Engineers
Certified Safety Professionals
Qualified Persons
ANSI Z359
US TAG to ISO



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Sustainable Safety®

- The integration of safety methods throughout the life cycle of buildings, machinery, equipment and processes to protect people from workplace hazards.
- Maximizing the economic, environmental and safety performance of buildings, machinery, equipment and processes.

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Where do you work?

General Industry



Amusement Parks



Commercial



Transportation



Maritime



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What height do you work?

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Do you *always* need to tie off?

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Where do you tie off?



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Possible Anchorage Locations?

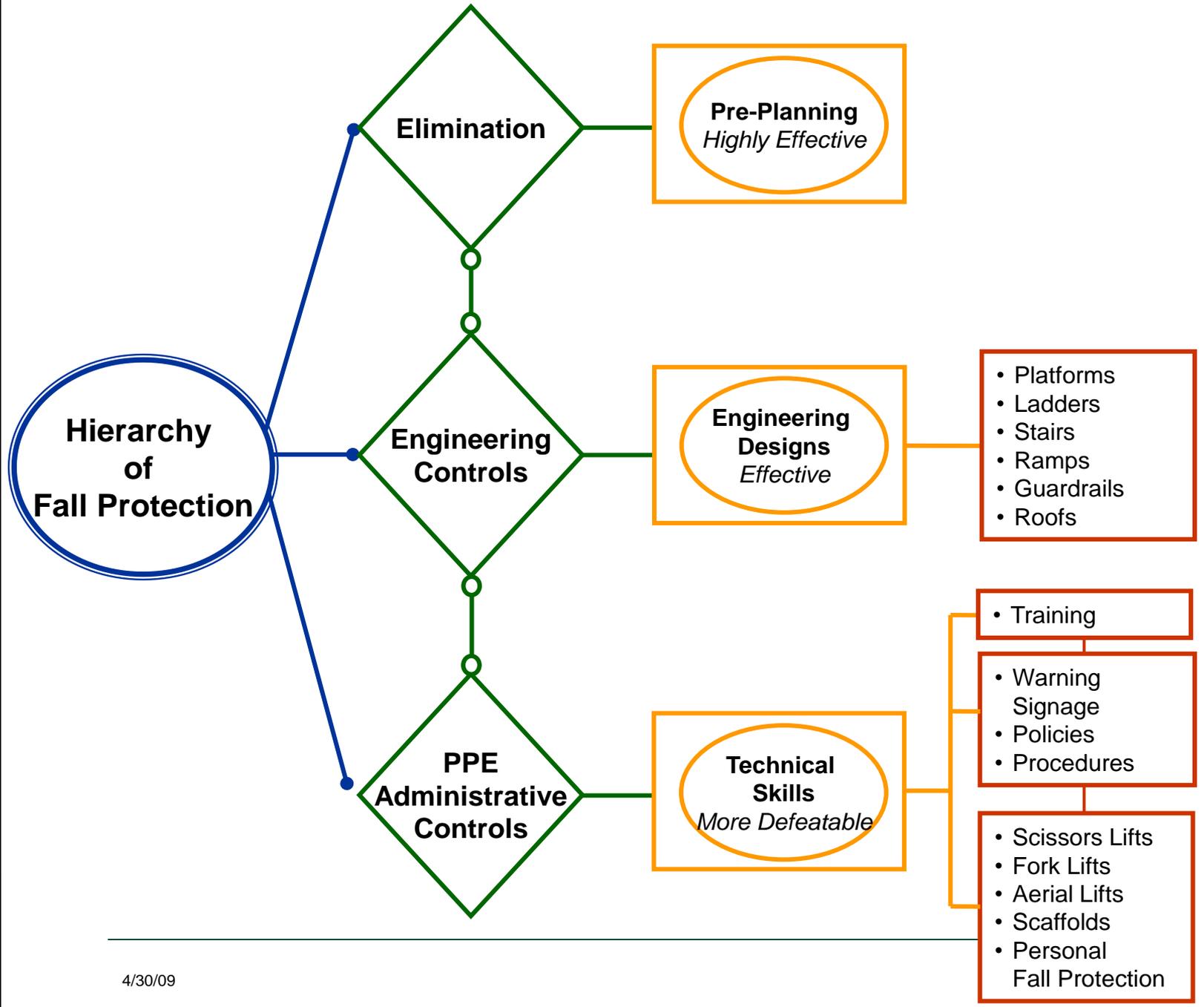


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Where do we go?

- OSHA
- ANSI

Fall Protection Regulations

OSHA

Construction 1926

Subpart C – General Safety
and Health Provisions

Subpart E – Personal Protective
and Life Saving Equipment

Subpart L – Scaffolding

Subpart M - Fall Protection

Subpart N – Cranes, Derricks,
Hoists, Elevators and Conveyors

Subpart R – Steel Erection

Subpart S – Underground
Construction (Tunnels)

Subpart V – Power
Transmission and Distribution

Subpart X - Ladders

General Industry 1910

1910.66 Appendix C

Subpart D – Walking and
Working Surfaces

Subpart F – Powered and Vehicle-
Mounted Work Platforms and Manlifts

Proposed Subpart I – Personal
Protective Fall Equipment

Subpart J – Permit-Required
Confined Spaces

Subpart N – Materials Handling
And Storage

Subpart R – Electric Power
Generation and Telecommunications

ANSI

Construction

Withdrawn
ANSI A10.14

Draft ANSI A10.32

General Industry

ANSI Z359.1

ANSI A14.2, A14.3
A14.4, A14.5

ANSI A1264 and
A92 Series

- What about
 - IBC
 - NFPA
 - Others???



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OSHA 1926.502(d)(15)

- Anchorages used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows:

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1926.502(d)(15)

- (i) as part of a complete personal fall arrest system which maintains a safety factor of at least two; and
- (ii) under the supervision of a qualified person.



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ANSI A10.32

- Shall be capable of supporting at least 5,000 lbs. per user attached, or shall be designed, installed and used under the supervision of a Qualified Person as part of a complete system which maintains a safety factor of at least two.



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OSHA 1910.66 App C

- Anchorages to which personal fall arrest equipment is attached shall be capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as part of a complete personal fall arrest system which maintains a safety factor of at least two, under the supervision of a qualified person.

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Additional Criteria

- **1926.502(d)(16)(v)**
- **1910.129(b)(iv)[Prop Subpart I]**
 - Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of six feet (1.8 m), or the free fall distance permitted by the system, whichever is less.

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1926.502(d)(16)(v) Note:

- If the system is used by an employee having a combined tool and body weight of 310 pounds (140 kg) or more, then the employer ***must appropriately modify the criteria and protocols of the Appendix to provide proper protection for such heavier weights***, or the system will not be deemed to be in compliance with the requirements of paragraph (d)(16) of this section.



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Anchorage

- A secure point of attachment for lifelines, lanyards or deceleration devices, and which is independent of the means of supporting or suspending the employee
- 1910.66 App C



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Qualified Person

- One with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product.
- 1910.66 App C



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Qualified Person

- One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.
- 1926.32(m)
- ANSI A10.32



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Competent Person

- A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as in their application and use with related equipment.
- 1910.66 App C

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Competent Person

- One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- 1926.32(f)
- ANSI A10.32

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LOI 10/14/1999

- “...a scaffold should never be used as an anchorage point for a fall arrest system unless it has been properly evaluated by a **competent person.**”
- “... a **competent person** is able to correctly determine that it can be so used. “



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LOI 10/14/1999

- “... a ‘competent person’....must have had specific training in and be knowledgeable about the structural integrity
- “The competent person must also be able to evaluate the effects of occurrences such as a dropped load, or a truck backing into a support leg that could damage a scaffold.”



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LOI 10/14/1999

- “Manufacturers normally use engineering calculations, testing results and other considerations in preparing their guidelines on procedures and limitations. “
- “[The Competent] person would need to have a very high level of knowledge — a level that would enable him or her to understand the concerns the guidelines are meant to address and to determine that the deviation would not result in a hazardous condition. “



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LOI 10/14/1999

- “Mere "experience" that the scaffold had previously been used in a way that deviates from the guidelines with no apparent failure is not a basis on which a competent person (or an employer) could proceed; such "experience" could be purely a product of luck. “



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LOI 8/28/1995

- “However, if an employer wishes to use a scissor lift as an anchorage for a personal fall arrest system, such as a safety belt and a lanyard or a body harness and a lanyard, they should not do so unless the manufacturer indicates that it can be used as an anchorage or such a usage is approved by a registered engineer.”



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And, there's more

LOI 02/08/2007

- *The employer must:*
 - (i) *Provide a qualified competent person, as specified in paragraphs (f) and (m) of 1926.32, who is responsible for ensuring that the **design**, maintenance, and inspection of the hoist system comply with the conditions of this policy and with the appropriate requirements*
- *The employer must use a qualified competent person to **design** and maintain*

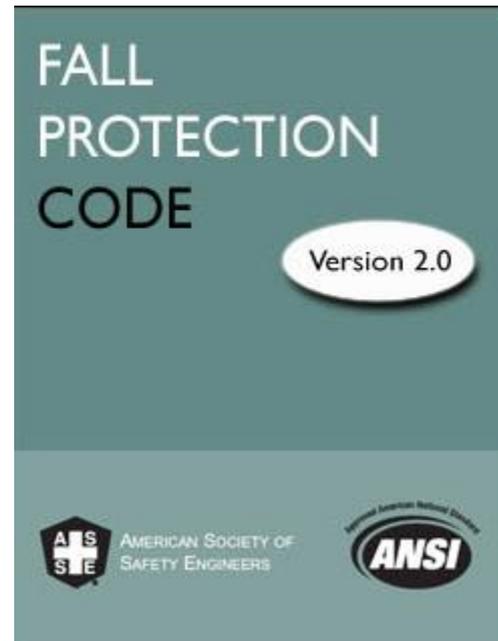
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Clarification Needed

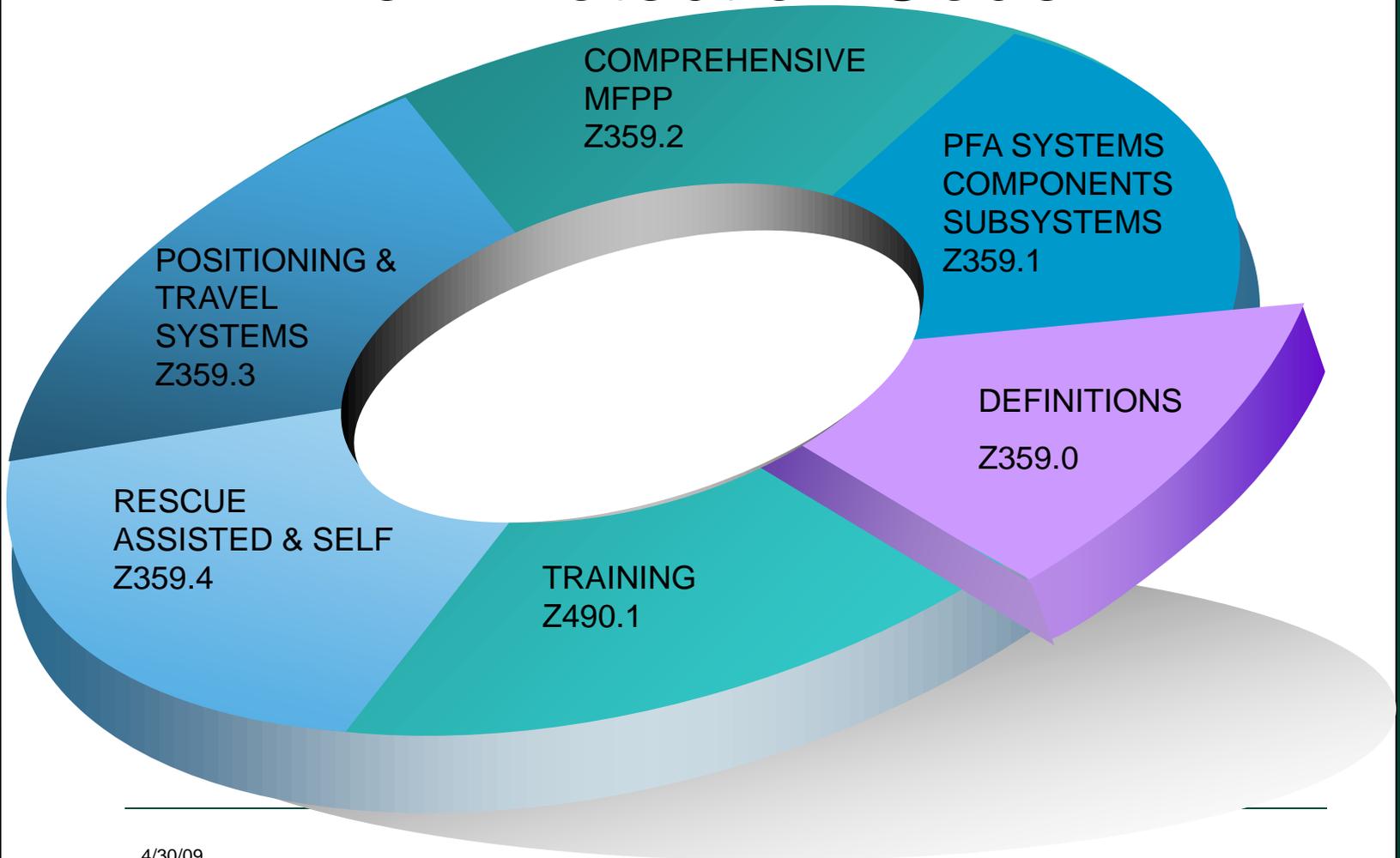
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ANSI Z359 Fall Protection Code



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COMPREHENSIVE

Tackles the Tough Issues

Advances Worker

Protection

Reduces Fall Injuries &

Fatalities

Defines Rescue



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Standardized, Systematic Approach

- Connects existing fall protection standards
- Information contained in one document
- Addresses topics not previously covered
- ANSI format
- Easier to understand and implement

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- Emphasis on incorporating safety in project preplanning
 - Comprehensive Approach
 - Managed Process of Safety
- Reduced reliance on fall protection equipment





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Competent Person

NOT LISTED BEFORE IN ANSI DOCUMENTS. HAS MORE TEETH THAN EXISTING OSHA REGULATIONS.

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

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Competent Person

- Designated by the employer
- Responsible
 - Immediate supervision
 - Implementation
 - Monitoring of the employer's MFPP
- Trained & Knowledgeable
- Capable of identifying, evaluating, and addressing existing and potential fall hazards
- Has employer's authority to take prompt corrective action

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Knowledge & Training

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

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Qualified Person



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



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Professional Engineer

- *Jurisdictions may require that individuals who design or evaluate physical structures be registered with the jurisdiction as a professional engineer.*
- *IBC?*
- *Local building codes?*



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Anchorage

- The terminating component of a fall protection system or rescue system that is intended to support any forces applied to the system.
- Safely withstand the foreseeable forces that might be exerted on system.



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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.

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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.

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Non-Certified Fall Arrest Anchorage

- An exception to the requirement that anchorages are designed, certified, specified and selected by a qualified person.
- Must meet the **requirements** within this standard
- Non-certified anchorages typically consist of unquestionably strong elements of a structure

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Z359.2 Requirements

– Fall Arrest

- Non-Certified Anchor
 - 5,000 lbf static strength
- Certified Anchors & HLL
 - Designed, selected and installed by Qualified Person
 - Static strength two times maximum arresting force

– Work Positioning

- Non-Certified Anchor
 - 3,000 lbf static strength
- Certified Anchor
 - Static strength two times foreseeable force

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Z359.2 Requirements

– Restraint and Travel Restriction

- Non-Certified Anchor
 - 1,000 lbf static strength
- Certified Anchor
 - Static strength two times foreseeable force

– Rescue Systems

- Non-Certified Anchor
 - 3,000 lbf static strength
- Certified Anchor
 - Static strength 5 times the applied load

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Z359.3

- **Work Positioning:**
 - 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:**
 - Do not support a portion of the worker's weight
 - Used only on walking/working surfaces with a slope between zero and 18.4 degrees



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OSHA - Restraint

- OSHA suggested that, at a minimum, a fall restraint system have the capacity to withstand at least 3,000 pounds or twice the maximum expected force that is needed to restrain the person from exposure to the fall hazard.
- Consideration should be given to site-specific factors
 - A person (including his or her tools, equipment and materials) walking, slipping, tripping, leaning, or sliding along the work surface.



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Requirements

- Rules of Thumb?

OR

- Design Guidelines?

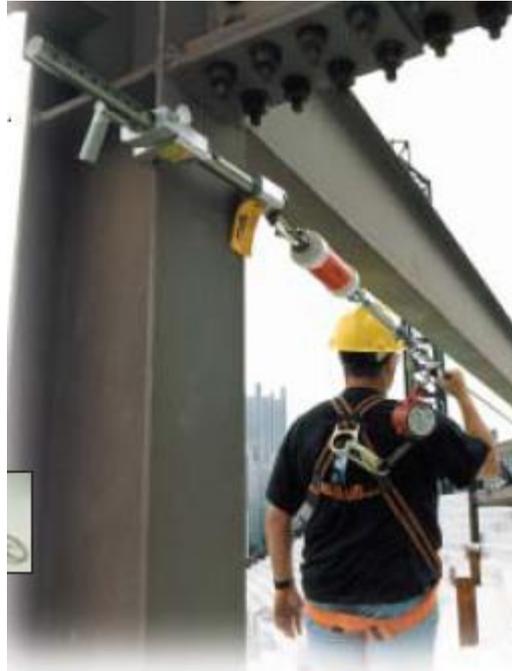




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Design Considerations



- Capacity
- Clearance
- Swing Fall
- Compatibility
- Rescue

ANSI Z359.6

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Design Consideration

Anchorage locations

- Fall arrest equipment types
 - Fixed length lanyard
 - Self-retracting lanyard
- Fall arrest forces based on
 - Specific equipment models
- Clearance
 - Total fall distance
 - Obstructions



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Anchorage Locations

- Use of existing structure for single anchorage
 - Purlins
 - Beams or girders
 - Trusses
 - DO NOT use bar joist



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Anchor Location

- Impact on the structural members where the fall arrest system is attached.



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Anchor Location

- Consider the forces generated by arresting a fall, total existing and anticipated loading, load path, structural member strengths, connection and support strengths, stability, clearance requirements, swing fall, rescue and deflection of the system



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Horizontal Lifeline Anchorage

- Prior to use, anchorages must be certified and designed by a qualified person with experience and training in the design and use of horizontal lifeline systems.



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HLL Anchorage Location

Distance Exceeds 12 Feet

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Bar Joists

Typically, NOT adequate to serve as an anchorage





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Bar Joists

Very lightweight steel angles





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Design Considerations (Trusses)

- Safe attachment locations
 - Truss analysis is necessary to determine which panel points are safe*
 - Truss members between panel points are usually not strong in bending to take the fall arrest loads*

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Design Considerations (Purlins)

- Typically, purlins **nor** bar joists may be used for anchorage

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Scaffolding?



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Anchorage Height

- Locate fall arrest anchorages as high as practical above an authorized person to minimize the free fall and the total fall distance, and to prevent contact with an obstruction or the lower level.





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Restraint and Travel Restraint Systems

Anchorage must have strength capable of sustaining static loads applied in the directions permitted by the system of at least:

- A) 1,000 pounds (4.5kN)
-non-certified anchorages,
- B) Two times the foreseeable force - certified anchorages.





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Rescue Systems

- Anchorages selected must have strength capable of sustaining static loads applied in the directions permitted by the system of at least:
 - 3,000 pounds (13.3kN) -non-certified anchorages, or
 - Five times the applied load -certified anchorages.





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Rescue

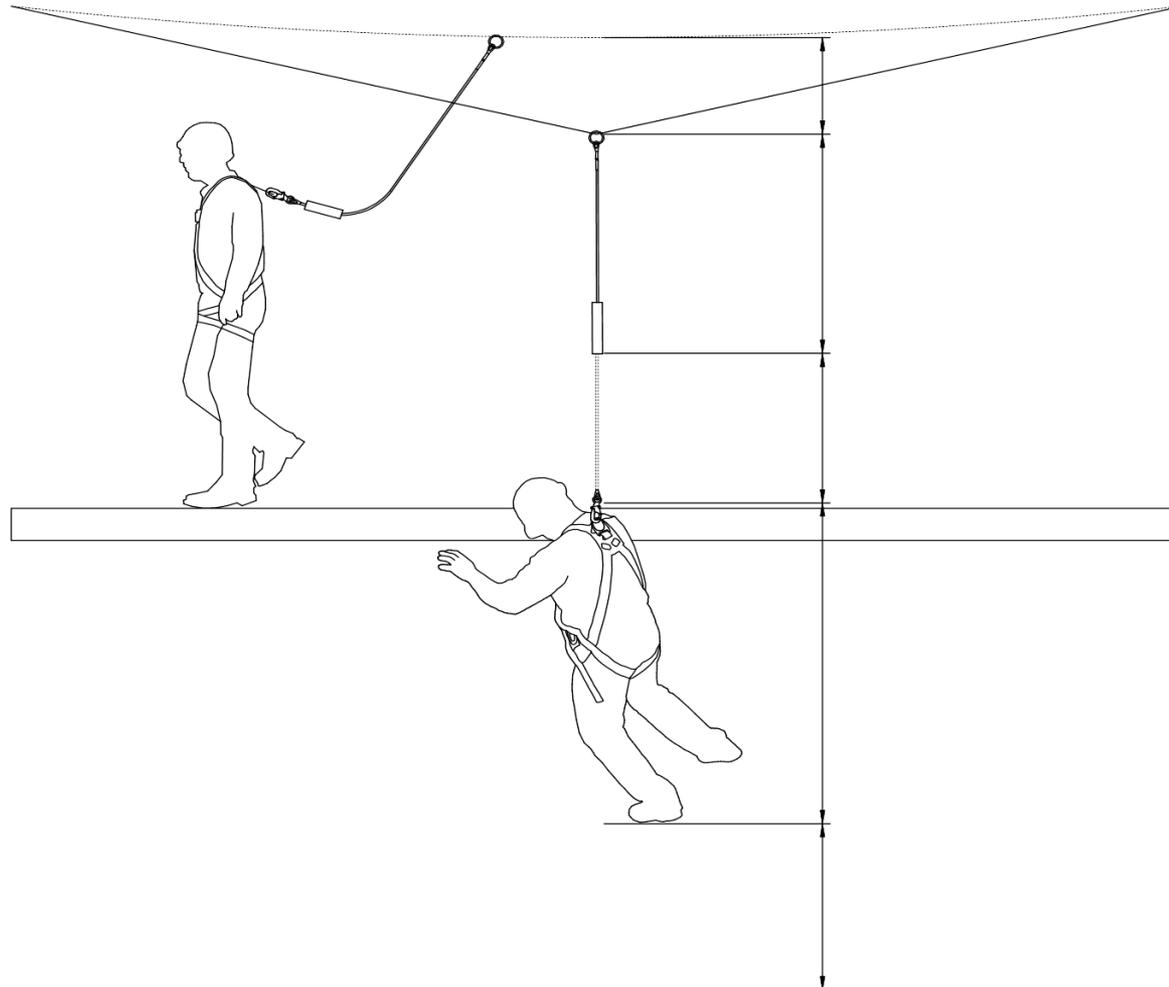
- Pre-plan all procedures
- Provide prompt rescue
- Do not assume that the authorized person can rescue themselves



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Clearance





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Importance

It is necessary to assure that a fall would be arrested **BEFORE** the person strikes the floor or *obstacle!*

OSHA requires that the “Free Fall” is not more than 6 feet



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Clearance





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Total Fall Distance

- Related To:
 - Anchorage Location
 - Anchorage Movement
 - Equipment Characteristics
 - Free Fall Distance

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Inspection

1. Authorized person prior to each use
2. Qualified person or competent person at least annually and in accordance with the manufacturers or qualified person's instructions.





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Z359.2 SAFETY DESIGN

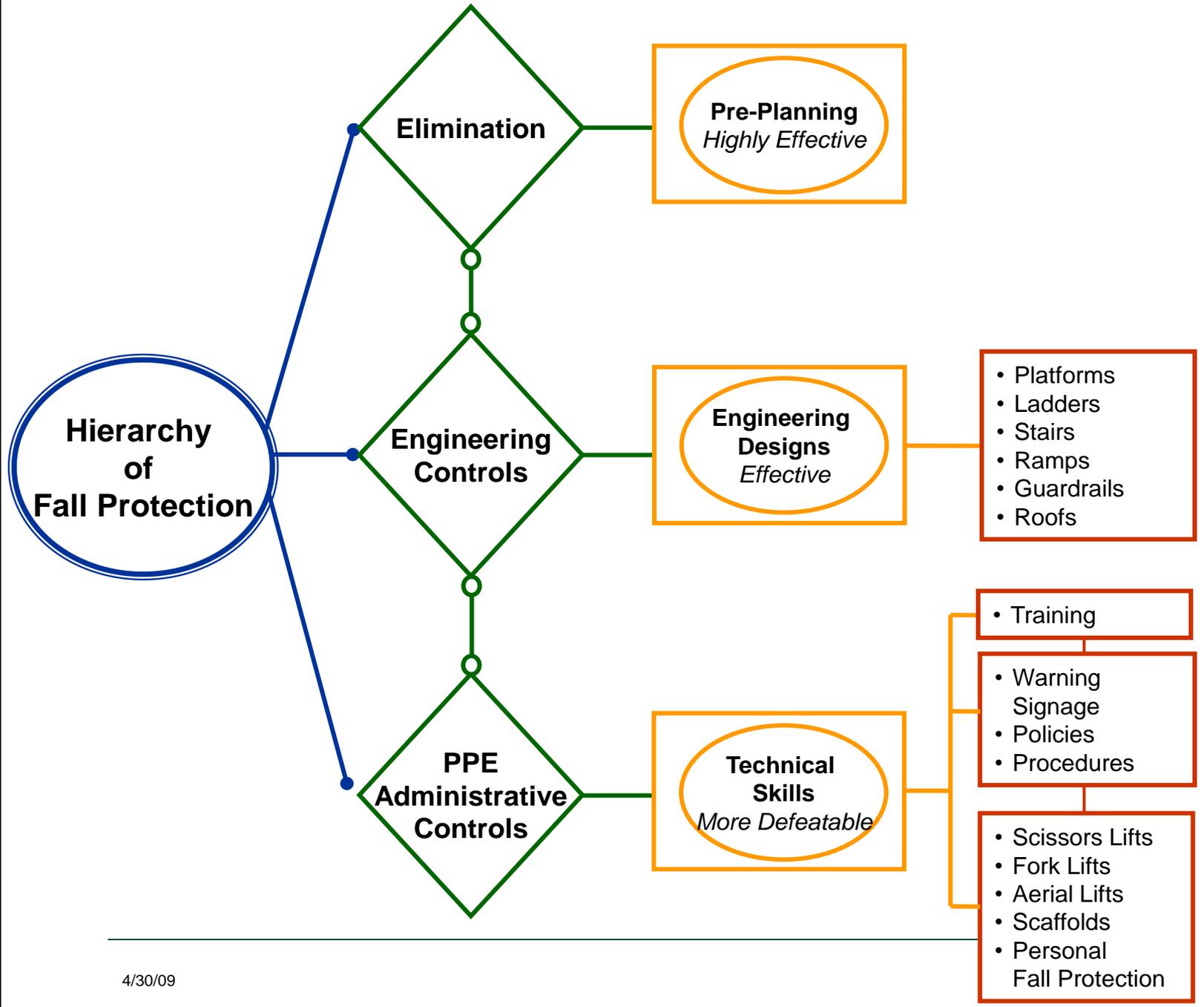
- Design Community address workplace hazards in the preplanning stages to eliminate fall hazard injury or death during construction, maintenance or use of a buildings or machine.

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Preplanning





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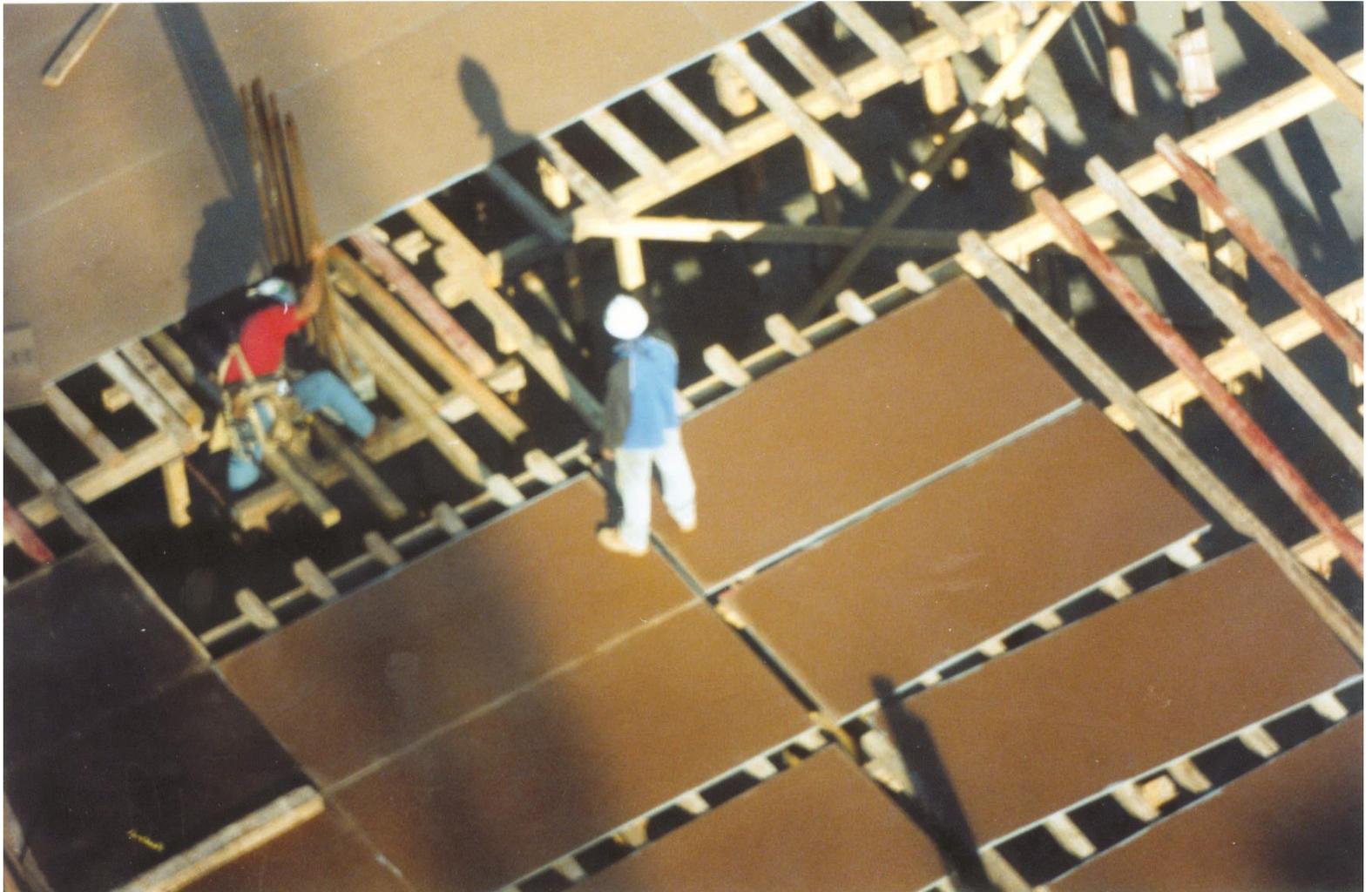
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Summary

- What type of anchorage do you require?
- Who is allowed to determine anchorages?
- What are the requirements?



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Action Plan

- Incorporate ANSI MFPP into safety culture
 - PRE-PLAN
 - Establish criteria & enforce policy
 - Document roles and responsibilities
 - Provide adequate training



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Thank you.

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