

# Work at Heights

## 1. Purpose

The purpose of this policy is to establish the minimum requirements to safely work at heights on USPL premises or worksites. Additionally this program is written to meet the requirements in accordance with applicable OSHA regulations as outlined below.

## 2. Scope

This policy applies to all employees and contractors performing work on behalf of USPL where there is a potential to fall six (6) feet or more as defined by OSHA’s construction standard for Fall Protection (29 CFR 1926 Subpart M). BP extends this requirement to all work at elevations of 6 feet or more.

In addition, OSHA’s general industry standard (29 CFR 1910.23) requires that guards or protective measures are in place if there is a drop of 4 feet or more from: holes in walls or floors; chute wall openings; window wall openings at a stairway landing, floor, platform or balcony; temporary wall openings; open-sided floor or platforms; or runways. In cases where work is being conducted above dangerous equipment such as moving parts, sharp edges, and regardless of distance between the worker and the equipment, safeguards shall be in place to protect workers from falls. Refer to the Walking and Working Surfaces policy for more information, including use of ladders.

The following policies are either referenced or are applicable to this policy and should be consulted for specific related requirements and guidance:

- Permit to Work
- Excavation
- Level 2 Hazards Identification and Task Risk Assessments (HITRA)
- Personal Protective Equipment
- Walking and Working Surfaces
- Aerial and Scissor Lifts

## 3. Minimum Requirements

	Minimum Requirements	Supporting Documentation
1.	Anyone exposed to a fall six feet or more while performing work shall be protected by means of appropriate guardrail systems, fall restraint systems, personal fall arrest systems, safety net systems, or other OSHA approved system.	Section 6
2.	A Work at Heights checklist is required anytime an individual's work height is 6 feet or greater where guardrails or a fall restraint system is not in place to prevent a fall.	Section 9
3.	Fall protection is required for scaffold and temporary ladders when the vertical free-fall distance (measured from the employee’s feet down) is more than 10 ft.	Section 6
4.	Personnel shall be protected from objects falling from heights.	Section 10
5.	Personal Fall Arrest Equipment shall be used, maintained, and inspected according to the manufacturers’ specifications.	Section 13

5.	Each worker who will use a personal fall protective system shall be trained to be able to select, inspect, use, store and maintain the equipment according to the requirements of this procedure and the manufacturer's recommendations.	Section 12
6.	Any lifeline, body harness or lanyard used to arrest a fall shall be immediately removed from service and discarded or recertified by the manufacturer.	Section 6
7.	Personnel utilizing personal fall protective equipment shall not work alone and rescue procedures shall be documented.	Section 11

## 4. Definitions

**Anchor Point**—A secure point of attachment of lifelines, lanyards or deceleration devices.

**Body Belt**—Consists of a strap with means both for securing it about the waist and for attaching it to a lanyard or lifeline.

*Note: Body Belts are prohibited when using a Personal Fall Arrest System but may be used for Fall Restraint.*

**Body Harness**—Means straps that may be secured about the employee in a manner that will distribute the full arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching to other components of a personal fall arrest system.

**Deceleration Device**—Any mechanism such as a rope grab, self-retracting lifeline, or shock absorbing lanyard, which serves to dissipate the force of the fall, which would otherwise be imposed on the individual.

**Deceleration Distance**—The vertical distance between the harness attachment point at the activation of the fall arrest equipment and that attachment point once the individual comes to a complete stop.

**Designated area** – a distinct portion of a walking-working surface delineated by a warning line in which employees may perform work without additional fall protection.

**Fall Restraint System** - A system consisting of a body belt or harness, lanyard and anchor. The system is arranged so that the worker is prevented from falling any distance.

**Free Fall**- The act of falling before a personal fall arrest system begins to apply force to arrest the fall

**Free fall distance** means the vertical displacement of the fall arrest attachment point on the employee's body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

**Guardrail System**—A barrier to prevent individuals from falling to lower levels.

**Lanyard**—A flexible line of rope made from synthetic fibers, wire rope, or strap having connectors at each end for connecting the body harness to a deceleration device, lifeline, or anchorage.

**Leading edge** means the edge of a floor, roof, or formwork for a floor or other walking/working surface (such as the deck) which changes location as additional floor, roof, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

**Level 2 Hazard Identification Task Risk Assessment (HITRA)**—Is a structured process to identify the hazards and specify actions to mitigate these hazards for a work activity or task.

*Note: Reference the Level 2 HITRA procedure for additional information.*

**Lifeline**—A flexible vertical or horizontal line connecting the anchor point to the lanyard(s). A lifeline is a vertical line from a fixed anchorage or between two horizontal anchorages to which a lanyard or fall arresting device is secured.

**Low-slope roof** - means a roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

**Lower level** means those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

**Opening**-means a gap or void 30 inches (76 cm) or more high and 18 inches (48 cm) or more wide, in a wall or partition, through which employees can fall to a lower level.

**Personal Fall Arrest System (PFAS)**—Is a system used to protect an individual in a fall from a working level. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or combination of these items.

**Personal Flotation Device (PFD)** – also referred to as a life jacket, life preserver, life belt, Mae West, life vest, life saver, cork jacket, buoyancy aid or flotation suit) is a piece of equipment designed to assist a wearer to keep afloat in water.

**Positioning device system** – a body belt or body harness system rigged to allow an employee to be supported on an elevated surface, such as a wall, and work with both hands free while leaning backwards.

**Rope Grabs** - a rope grab is a deceleration device that travels on a lifeline and automatically engages the lifeline and locks to arrest the fall of the employee.

**Safety-monitoring system** means a safety system in which a competent person (safety monitor) is responsible for recognizing and warning employees of fall hazards. This method is only applicable on low-sloped roofs less than or equal to 4 in 12 (vertically to horizontally), and in combination with a warning line system.

**Self-retracting lifeline / lanyard**—means a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted into, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

**Snap hook** means a connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Only the locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection can be used.

**Steep roof** - means a roof having a slope greater than 4 in 12 (vertical to horizontal).

**Swing Fall**—A pendulum-like motion that occurs during a vertical fall that results from being located horizontally away from a fixed anchorage.

**Toe board** – means a low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

**Unprotected sides and edges**-means any side or edge (except at entrances to points of access) of a walking/working surface, e.g., floor, roof, ramp, or runway where there is no wall or guardrail system at least 39 inches (1.0 m) high.

**Warning line system** – a barrier erected on a roof to warn employees that they are approaching an unprotected roof edge and which designates an area in which roofing work may take place without the use of guardrail, body belt, harness or safety net systems to protect employees in the area.

**Working Height**—The distance from the worker's footing to the next lower working level to which an employee can fall.

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## 5. Roles and Responsibilities

### 5.1. Asset Operator (or designee)

- A. Shall issue the Work at Heights PTW and Checklist, if applicable, (Appendix I) to the Performing Authority or can delegate PTW and Checklist (if applicable) issuance to the AOD.

*Note:* Refer to the Permit to Work policy for additional requirements.

- B. Shall determine if changes can be made to a PTW/Checklist if conditions are exceeded or if the PTW/Checklist should be cancelled and a new PTW/Checklist issued

## 5.2. Performing Authority

- A. Shall receive issued Work at Heights Checklists from the Asset Operator or Asset Operator Designee.
- B. Shall observe the Checklist to verify that the work is performed within the conditions documented on the Work at Heights Checklist.
- C. Shall reassess the job site and revalidate the Checklist before work can resume if Check listed work is interrupted or if the job site is left unattended, or if necessary, cancels the Checklist and returns it to the AO / AOD.
- D. Shall stop work, suspend the Checklist and notify the AO / AOD if Checklist conditions are exceeded.

*Note:* Refer to the Permit to Work policy for additional requirements.

## 5.3. Engineering

- A. Designing or verifying that anchor points and lifeline systems are adequate to handle fall arrest loads as referenced in Section 7.5.B.3

## 5.4. Supervision

- A. Identify employees who may potentially work at heights and assign them applicable training in the My T&L system.
- B. Make fall protection equipment available for use by employees where needed.
- C. Enforce the requirements of this policy.

## 5.5. Personnel using PFAS or Fall Restraint System

- A. Receive training in the requirements of this policy
- B. Visually inspect the fall arrest or restraint PPE prior to use for wear, damage and other deterioration, and remove defective components from service.
- C. Verify that the fall arrest or restraint PPE is rated above the person's combined tool and body weight.

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# 6. General Requirements

- A. Anyone exposed to a fall of 6 feet and greater while performing work shall be protected by means of appropriate guardrail systems, fall restraint system, personal fall arrest system, or a safety net system. See Appendix I for a general description of fall protection systems.
- B. Situations where fall protection is required include, but are not limited to, the following:
  - 1. Aerial Lifts
  - 2. Basket or bucket trucks
  - 3. Ladders when used to work from without three points of contact
  - 4. All scaffold or temporary ladders when the vertical free-fall distance (measured from the employee's feet down) is more than 10 ft.

- a) Exception: propriety scaffold system that has fixed cup heights that result in 10.5 ft deck heights.
- 5. Incomplete structural steel
- 6. Open access ways for hoist area, including the access way of a geodesic dome if there is no platform on the inside.
- 7. Building roofs (e.g. compressor and process buildings) without a 42" continuous parapet (wall) or guardrail on all sides.
- 8. On the top of a truck or trailer (e.g. gasoline transport).
- 9. Performing work on tank roofs where at any point the individual is not protected on all sides by a guardrail.
  - a) Exception: Individuals may perform limited work (i.e. tank gauging activities) in the area where the tank stairs provide entry to the tank roof as long as:
    - There is a guardrail system preventing the individual from falling off the leading edge of the tank where the work is to be performed and,
    - The individual does not access any areas outside of the immediate guardrail system other than to access a tie off prior to performing work (i.e. cross any part of the tank roof which is not protected on all sides by a guardrail).

*Note:* See Appendix III for a general listing of fall hazards and protection methods.

- C. Additional fall protection is not required when working in these situations:
  - 1. Properly constructed scaffolds (completed only, and when standing inside the guardrail system or using the scaffold ladder when vertical free-fall distance (measured from the employee's feet down) is not greater than 10 ft.).
  - 2. Roofs with a 42" high, continuous parapet, or standard guardrail system
  - 3. Stairways with standard railings
  - 4. Caged ladders
  - 5. Elevated walkways protected by guardrails
- D. Personnel working less than 6 feet above dangerous equipment shall be protected from falling into or onto the equipment by guardrail systems, equipment guards, or fall restraint systems.
- E. Any lifeline, body harness or lanyard actually used to arrest a fall shall be immediately removed from service or recertified by the manufacturer.
- F. Safety-monitoring systems can only be used in specific applications when conventional fall protection methods are not possible. Work on low sloped roofs with unprotected sides and edges 6 feet (1.8m) or more above lower levels shall require fall protection such as:
  - 1. Guardrail system
  - 2. Personal fall arrest system
  - 3. Fall restraint system
  - 4. Combination of warning line system and guardrail system, warning line system and personal fall arrest system, or warning line system and a safety-monitoring system
- G. Positioning device systems shall be rigged such that an employee cannot free fall more than 2 feet (0.9m) and be secured to an anchorage capable of supporting at least twice the potential impact load of a fall, or 3000 pounds, whichever is greater.
- H. When working at height over or near water, the risk from falling from height must be balanced against the risk of drowning. See Appendix IV for a risk assessment representation.

*Note: Working over water may require a Level 2 HITRA. Reference the Level 2 HITRA Policy for further information.*

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## 7. Personal Fall Arrest System (PFAS)

Personal fall arrest systems consist of multiple components including full body harness, lanyard, deceleration device, and an anchorage (anchor point). All harnesses, lanyards, snap hooks, anchor points and other PFAS equipment shall meet the material and assembly specifications and testing requirements set forth in ANSI Z-359.2 and OSHA 29 CFR 1926.502. Fall protection devices shall be used and worn as intended by the manufacturer.

### 7.1. General

- A. Personal Fall Arrest Equipment shall be used, maintained, and inspected according to the manufacturers' specifications.
- B. Purchased fall protective equipment shall meet ANSI/ASSE Z359 requirements.
- C. The PFAS shall always be manufacturer assembled and worn as intended.
  - 1. The manufacturer's instructions and limitations for the PFAS shall be adhered to.

*Note: If the combined weight of the individual and any tools and equipment is 310 pounds or more, the employer must appropriately modify the system to provide adequate fall protection or the system will not be in compliance with the protocols contained in Appendix C to Subpart M and 1910.502(d) (16).*
- D. Personnel using a PFAS shall be tied-off at all times when working  $\geq$  6 feet from the ground or next lower level.
  - 1. A dual lanyard system shall be used to confirm that at least one connection point is maintained at all times when the work method requires workers to detach and re-attach at height.
- E. PFAS shall be rigged such that an employee can neither free fall more than 6 feet, nor contact a lower level.
- F. The PFAS shall allow for an unobstructed fall.
- G. The PFAS system shall be rigged to limit a swing fall hazard.
- H. Personal fall arrest systems and components subjected to impact loading shall be removed from service immediately.

### 7.2. Body Harnesses

- A. Only full body harnesses shall be utilized as part of a fall arrest system and shall be rated for the employee's weight.
- B. Body belts shall not be used as part of the PFAS (exemption: this does not apply to belts used as body positioning devices or fall restraint devices).

### 7.3. Lanyards and Lifelines

- A. Wire rope cannot be used for lanyards because it does not stretch, thus it does not have sufficient energy absorbing capability. Wire rope can be used for fall restraint systems, and anchor points.
- B. Lanyards and lifelines shall be kept free of knots or loops. Lanyards shall not be tied back to themselves unless the lanyard is specifically designed and rated by the manufacturer for this configuration.

- C. Horizontal lifelines shall be designed, installed, and used under the supervision of a qualified person as part of a complete personal fall arrest system.
- D. The lanyard shall have a double latch self-locking snap hook at each end for connecting the body harness to a lifeline or anchor point.

#### 7.4. Connectors (Dee-Rings and Snap Hooks)

- A. Only double lock snap hooks shall be used to minimize the potential for “roll out”.

#### 7.5. Anchor Points

- A. When a PFAS is used, these systems shall be tied-off properly to anchorage points, which are capable of supporting a static load of 5000 pounds per person attached; or as part of a complete personal fall arrest system that maintains a safety factor of at least 2 and is operated under the supervision of a qualified person.
- B. Acceptable anchor points shall be determined by one of the following methods:
  - 1. The anchor point is listed in Appendix II.
  - 2. The anchor point installation follows manufacturers’ specifications, such as a tank painter’s hitch.
  - 3. Engineering has documented approval of the anchor point.
- C. If a fall arrest has occurred, Engineering shall be contacted to inspect the anchor point for damage and/or corrective action.
- D. The following shall never be used as fall arrest protection anchor points: fixed platform hand/guard rails, C-clamps, electrical equipment/conduit, cable trays, pipe hangers, piping supported by hangers, or cast iron/riveted/plastic/screwed piping
- E. Anchorage used for the attachment of personal fall protection equipment shall be independent of any anchorage being used to also support or suspend work platforms.

#### 7.6. PFAS Inspection

- A. Personal fall arrest systems shall be visually inspected prior to each use for wear, damage and other deterioration. Inspection considerations include:
  - 1. cuts, tears, abrasions, mold, or undue stretching;
  - 2. alterations or additions which might affect efficiency;
  - 3. damage due to deterioration;
  - 4. contact with fire, molten metal, acids, or other corrosives;
  - 5. distorted hooks or faulty hook springs;
  - 6. tongues unfitted to the shoulder of buckles;
  - 7. loose or damaged mountings;
  - 8. non-functioning parts; or
  - 9. wearing or internal deterioration in the ropes.
- B. The Checklist for Work at Heights shall document that inspection of the PFAS was performed.
- C. Any component with any significant defect shall be tagged or marked as unusable, or destroyed.

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## 8. Fall Restraint Systems

- A. A fall restraint system shall be configured such that an individual is physically prevented from reaching a leading edge and be secured to an anchor point capable of withstanding two times the expected force that is needed to restrain the person from the fall.
- B. Shock absorption is not required for a fall restraint system.
- C. A body belt can be used as a component in a fall restraint system.

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## 9. Warning Systems

- A. A guardrail system, safety net system, travel restraint system, or a personal fall arrest system must be used when work is performed at least 6 feet but less than 15 feet from a leading edge. When performing work that is both infrequent and temporary, a designated area may be identified.
- B. When work is performed 15 feet or more from a leading edge, a guardrail system, safety net system, travel restraint system, or personal fall arrest system or a designated area may be utilized.

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## 10. Work at Heights Checklist Requirements

### 10.1. General Requirements

- A. Work at Heights Checklist is required anytime an individual's work height (when measured from the walking/standing surface at the current working level to next lower level) is 6 feet or greater where guardrails or a fall restraint system is not in place to prevent a fall. A Rescue Plan shall be completed prior to issuing a Work at Heights Checklist.

*Note:* Climbing a ladder (6 feet or greater) does not require a Work at Heights checklist; however working from a ladder where three points of contact are not maintained (at a height of 6 feet or greater) does require a Work at Heights Checklist.

*Note:* A fall restraint system is configured such that an individual is physically prevented from falling over the leading edge, whereas a fall arrest system will stop the fall before the next lower level while minimizing deceleration stresses on the body.

*Note:* Working on structures with systems and safeguards designed to prevent a fall to a lower level by means of guardrails or a fall restraint system shall not require a checklist.

*Note:* Tasks performed on cone roof tanks where the individual is protected from the edge of the tank by guardrails shall not require additional fall protection or a checklist (e.g. tank gauging next to the access platform). If however, the individual is required to cross the tank roof, or perform tasks in a location where the edge of the tank is not protected by a guardrail or fall restraint system, a checklist and fall protection shall be required (e.g. work on high level alarms when they are located on the other side of the tank than the stairway platform or working on the vent in the middle of a cone roof tank).

- B. A Work at Heights Checklist is valid for no more than seven days for the individuals working under the Checklist, or for the duration of the scope of work documented on the Checklist, whichever period is shorter. If the work at heights work requires a Level 2 HITRA, the Checklist is valid for no more than one day, or for the duration of the scope of work documented on the Checklist, whichever period is shorter. See TRCT for specific examples of work that requires a Level 2 HITRA.
- C. The Work at Heights Checklist shall be completed or revalidated each day that a Work at Heights Checklist is required.
- D. The Work at Heights Checklist shall be available at the job site until the work at heights is completed or the Permit To Work expires.



- E. A Work at Heights Checklist is valid for the duration of the scope of work documented on the Permit To Work form.
- F. If PTW conditions are exceeded, work and the PTW shall be suspended until the Asset Operator determines if changes can be made to the PTW or if the PTW should be cancelled and a new PTW issued.
- G. If work at heights is suspended or the job site is left unattended (including normal work breaks) during a shift, the Work at Heights Checklist shall be revalidated before further work can continue; revalidation involves inspecting the excavation for any change in previous conditions.
- H. Expired PTWs and Work at Heights Checklists shall be retained locally for a minimum of one month.

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## 11. Protection from Dropped Objects

- A. Personnel shall be protected from objects falling from heights.
- B. When an individual could be exposed to falling objects, consider the following protective measures:
  - 1. Define a personnel exclusion zone of one foot from the base of the work area for every four feet of height to the work platform (4:1 ratio).
  - 2. Keep objects far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.
  - 3. Erect toeboards, screens, or guardrail systems to prevent objects from falling from higher levels.
  - 4. To the extent possible, tether tools and equipment to prevent them from dropping to ground.

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## 12. Emergency Procedures

Rescue of fallen employees, who are incapable of self-rescue, shall be done using established rescue plans and procedures.

- A. Rescue procedures for retrieval shall be documented as part of the Work at Heights Checklist.
- B. Rescue plans must be written and clearly document the means for rescue. An example of a Work at Heights Rescue Plan is located in Appendix VI.
- C. Individuals utilizing personal fall protective equipment shall not work alone.

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## 13. Training

- A. USPL personnel who might be exposed to fall hazards, or who are responsible for the rescue if a fall occurs shall be trained in the requirements of this policy as identified in the USPL Training and Competency matrix.
- B. Each worker who will use a personal fall protective system shall be trained to be able to select, inspect, use, store and maintain the equipment according to the requirements of this procedure and the manufacturer's recommendations.
- C. Training shall be certified using a written document identifying employee's name, date, and the signature of the trainer. The sign-in sheet is adequate certification and shall be stored in My T&L.

## 14. References

1. 29 CFR Parts 1910.23 and 1926.502 Subpart M
2. ANSI Z359.2 - 2007
3. OSHA Letter of Interpretation 11/2/1995: Fall Restraint System in Lieu of Fall Arrest Systems
4. GDP 4.5-0001, BP Group Defined Practice, Control of Work
5. S&OR Learning Alert RM-LA-42, Working at height over or near water

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## Appendix I

### Fall Protection Categories

#### **Guardrail Systems**

Guardrail systems are the most common form of passive fall protection. Guardrails are used to protect employees from stepping off higher walking/working surfaces. In addition to providing barriers, guardrails also help alert employees to the presence of a fall hazard. The top edge of guardrail systems shall be 42 inches, plus or minus 3 inches above the walking/working surface.

#### **Safety Net Systems**

Safety net systems are another example of a passive fall protection system. Safety nets are placed underneath walking/working surfaces to catch employees, tools and/or materials that could fall to lower levels. Safety nets are made from strong synthetic materials and have no openings larger than 6 inches at their greatest dimension. They should never be installed more than 30 feet below the level they are designed to protect. Safety nets must be tested before use to insure they will provide adequate protection in accordance with CFR 1926.502(c) (2) and must be closely monitored during their use.

#### **Personal Fall Arrest Systems**

A PFAS is an active fall protection system designed to protect workers from falling more than 6 feet as well as protecting workers from contacting any lower level during arrest of a fall. They are designed to bring a worker to a complete stop and limit the deceleration distance that a worker travels to 3.5 feet. They are also designed to have sufficient strength to withstand twice the potential impact energy of a worker free falling a distance of 6 feet, or the free-fall distance permitted by the system, whichever is greater. The components are a full-body harness, lanyard and lifeline; lifelines can be either vertical or horizontal. If a PFAS is used by an employee that has a combined tool and body weight of 310 pounds or more, the employer must appropriately modify the system to provide adequate fall protection or the system will not be in compliance with the protocols contained in Appendix C to Subpart M and 1910.502(d) (16).

#### **Fall Restraint Systems**

A fall restraint system uses a body harness or belt that is rigged to prevent an employee from reaching a leading edge. The body harness or belt must be secured to an anchor point capable of withstanding two times the expected force that is needed to restrain an employee.

#### **Positioning Device Systems**

A positioning system uses a body harness system that is rigged to allow an employee to be supported on an elevated surface and to work with both hands free. The system must be rigged so that employees cannot free-fall more than 2 feet.

#### **Warning Line Systems**

A warning line system uses ropes, wires or chains to keep employees out of areas where there are fall hazards. Warning line systems are often used on low-sloping roofs and around dangerous mechanical equipment. The warning lines must be set up at least 6 feet from the roof edge, and marked at least every 6 feet with a highly visible material.

#### **Safety Monitoring Systems**

A safety monitoring system uses competent employees to actively observe work areas and warn other workers of any possible fall and other safety hazards. Safety monitors must not be assigned other job duties which could distract their attention away from observing the work of other employees, and must be located on the same working level as the workers, close enough to communicate with them and to see them clearly. This method is only applicable on low-sloped roofs in combination with a warning line system.

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## Appendix II

### Anchor Points

#### Notes—Guidelines For Allowable Fall Protection Anchor Points

These notes apply to documents entitled "Guidelines for Allowable Fall Protection Anchor Points - Pipe (1 page), - Loaded WF Beams (1 page) and - Unloaded WF Beams (1 page)" (Dated 1/9/95, by SMR (Steve Rahn, Whiting Refinery, Confirmed March 2013))

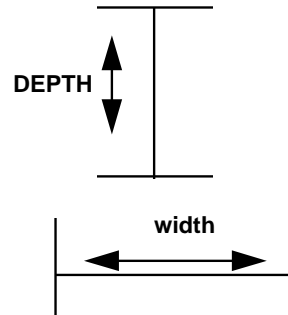
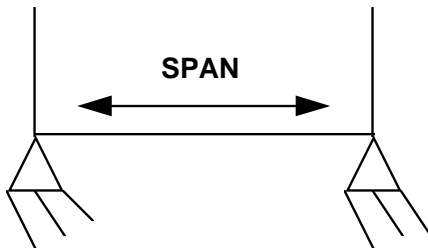
1. Table values must meet or exceed field anchor span length and dimensions.
2. I-Beams and process/utility piping (and their support structures), which are used as anchor points, must be in good condition.
3. Table values are based on a maximum of 6 feet employee free fall, using a maximum of 6-foot long lanyard with a stitched decelerator and a full body harness.
4. Piping flanges should not be in the pipe section where the anchorage point occurs, and up to and including the first pipe stanchion on either side of the anchor point.
5. Piping process temperature should be equal or no greater than 400 degrees Fahrenheit but not less than minus 20 degrees F.
6. Branch piping may be used as an anchor as long as both ends of main piping run and piping branch are supported; branch piping diameter must meet table requirements using a span measurement from the main piping branch to the branch pipe support.
7. If any of the above (items 1-6) conditions are not met, an engineer and/or other knowledgeable person should be contacted for further evaluation and potential approval for use as an anchor point.
8. Anchorage piping is assumed to be at the minimum allowable thickness and to have the tie-off point at mid span; anchorage beams (for the "LOADED" case) are assumed to be a fully loaded pipe support.
9. Adequate structural steel members should always be used before choosing process/utility piping as anchorage points UNLESS the use of a structural member as an anchor should result in a greater hazard posed by swing falls, or if there are no other acceptable fall protection methods available.
10. If a fall arrest has occurred, Engineering shall be contacted to inspect the anchorage pipe or beam to assess condition and determine corrective action.
11. Whenever possible, use anchor points and tie-off methods which minimizes the free fall distance to less than 6 feet while still performing the work safely. The shorter free fall distances significantly reduce your fall arrest force applied to you and your anchor.
12. Never use guard/hand rails; C clamps; electrical equipment or conduits; cable trays; cast iron, riveted, plastic, or screwed piping; bolt, pipe, pipe support, or I-beam ends for anchorage points; or welded pipe hangers or piping section supported by pipe hangers.

### Guidelines for Allowable Fall Protection Anchor Points - Unloaded WF Beam

# of Workers		BEAM SPAN				
		10'	15'	20'	25'	30'
1	Beam Depth	4 1/8"	4 1/8"	4 1/8"	4 1/8"	4 1/8"
	Beam Width	4"	4"	4"	4"	4"
1 or 2	Beam Depth	4 1/8"	4 1/8"	4 1/8"	4 1/8"	5 7/8"
	Beam Width	4"	4"	4"	4"	4"
1, 2, or 3	Beam Depth	4 1/8"	4 1/8"	4 1/8"	4 1/8"	6"
	Beam Width	4"	4"	4"	4"	4"

**Notes:**

1. Beams used must meet minimums listed for beam depth & width.
2. Beams must be in good condition.
3. If beams are fireproofed, user must verify that beams are in good condition & meet minimums listed.
4. See attached "Guidelines for Allowable Fall Protection Anchor Points", dated 1/9/95 for additional information.



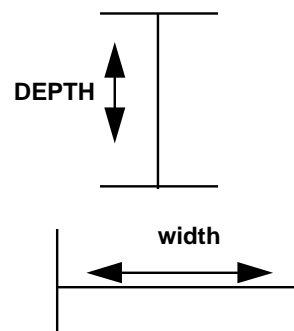
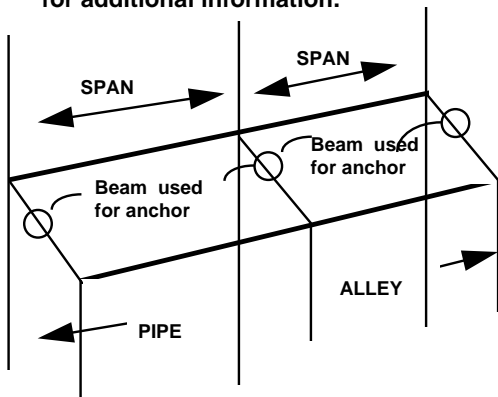
S.M.. Rahn  
1/9/95

### Guidelines for Allowable Fall Protection Anchor Points - Loaded WF Beam

# of Workers		PIPE SPAN				
		10'	15'	20'	25'	30'
1	Beam Depth	6"	6"	6 1/4"	11 7/8"	12"
	Beam Width	4"	6"	6"	4"	4"
1 or 2	Beam Depth	7 7/8"	6 1/4"	6 1/4"	11 7/8"	8 1/4"
	Beam Width	4"	6"	6"	4"	5 1/4"
1, 2, or 3	Beam Depth	5"	9 7/8"	6 1/4"	6 3/8"	8 1/4"
	Beam Width	5"	4"	6"	6 1/8"	5 1/4"

**Notes:**

1. Beams used must meet minimums listed for beam depth and width.
2. Beams must be in good condition.
3. If beams are fireproofed, user must verify that beams are in good condition & meet minimums listed.
4. See attached "Guidelines for Allowable Fall Protection Anchor Points", dated 1/9/95 for additional information.



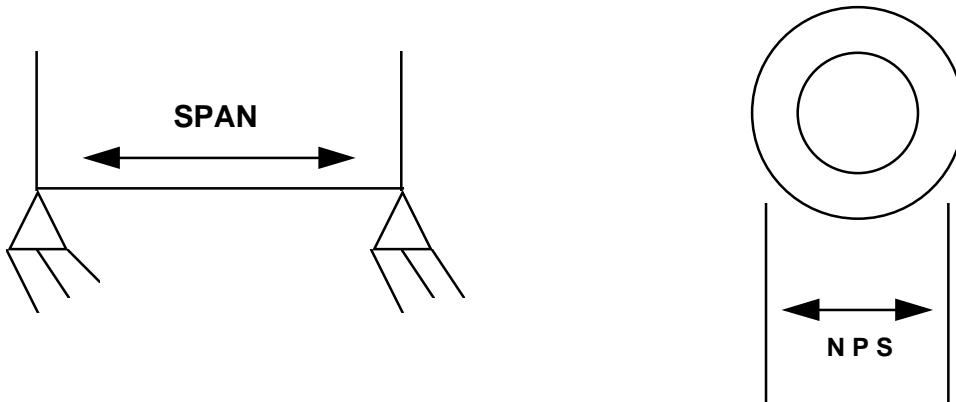
S.M.. Rahn  
1/9/95

### Guidelines for Allowable Fall Protection Anchor Points - Pipe With or Without Pressure

# of Workers	PIPE SPAN				
	10'	15'	20'	25'	30'
1	6"	6"	6"	8"	8"
1 or 2	6"	6"	8"	8"	8"
1, 2 or 3	6"	6"	8"	8"	10"

**Notes:**

1. Pipe used must meet minimum diameter shown. (Minimum NPS diameter)
2. Pipe must be in good condition
3. Pipe temperature is  $\leq 400^\circ$  F.
4. See attached "Guidelines for Allowable Fall Protection Anchor Points, dated 1/9/95 for additional information.



## APPENDIX III

### Fall Hazard Survey and Protection Methods

Fall Hazards	Protection Methods
<p><b>Floors / platforms with openings</b> (measuring 12 inches or more in its least dimension, in any floor, platform, pavement, through which persons may fall)</p>	<p>Use one of the following:</p> <ul style="list-style-type: none"> <li>• Standard guardrails</li> <li>• Covers</li> <li>• Safety Nets</li> <li>• Harness with shock absorbing lanyard</li> </ul>
<p><b>Ladders (extension)</b></p>	<p>Use all of the following:</p> <ul style="list-style-type: none"> <li>• Secure at top and both feet are on stable footing and cannot slip</li> <li>• Full body harness with shock absorbing lanyard when performing work from the ladder over 6 feet where worker cannot maintain three points of contact</li> <li>• Carry tools and materials in pouches or containers while ascending/descending</li> </ul>
<p><b>Ladders (step)</b></p>	<ul style="list-style-type: none"> <li>• Fully opened on stable footing</li> <li>• Full body harness with shock absorbing lanyard when performing work from the ladder over 6 feet where worker cannot maintain three points of contact</li> <li>• Carry tools and materials in pouches or containers while ascending/descending</li> </ul>
<p><b>Aerial Lifts and Boom Trucks</b></p>	<ul style="list-style-type: none"> <li>• Harness with lanyard secured to certified equipment attachment points</li> </ul>
<p><b>Pipe racks</b></p>	<p>NOTE: To avoid potential fall hazards from pipe racks, minimize travel distance by using permanent or temporary ladders or manlifts to access the area closest to the work. Once the work area is accessed, use the following protection methods:</p> <ul style="list-style-type: none"> <li>• Harness with shock absorbing lanyard or retractable lifeline</li> <li>• Secure attachment</li> <li>• Horizontal lifeline</li> </ul>
<p><b>Roofs (open sided)</b></p>	<p>Use one of the following:</p> <ul style="list-style-type: none"> <li>• Harness with shock absorbing lanyard</li> <li>• Safety nets</li> <li>• Leading edge fall restraint system</li> <li>• Warning line/ Safety monitor system</li> </ul>
<p><b>Roofs (Tanks outside of handrails)</b></p>	<ul style="list-style-type: none"> <li>• Harness with lanyard and lifeline attached to secure anchorage point or approved appurtenance such as a painters pick</li> </ul>
<p><b>Scaffolding erection</b></p>	<ul style="list-style-type: none"> <li>• Harness with shock absorbing lanyard</li> </ul>
<p><b>Steel I-Beams Structure</b></p>	<p>Use one of the following:</p> <ul style="list-style-type: none"> <li>• Safety nets</li> <li>• Harness with shock absorbing lanyard or retractable lifeline</li> <li>• Temporary flooring with perimeter edge fall protection</li> </ul>



## Appendix IV

### Fall Protection Risk Assessment for Work on or Near Water

- The following schematic addresses the balance of two risks - falling from height and drowning.



**\*\*All local regulatory requirements must still be followed\*\***

# Appendix V

## Work at Heights Checklist

This example of the Work at Heights Checklist is for reference only. For a downloadable version of the Checklist, go to DRM. The electronic version can be filled out online or printed and completed as hard copy.

WH

Work at Heights Checklist

WH -

(Add initials, date, and job title)

Section A: General	Issue Date <input style="width: 150px;" type="text"/>
	List each task and any asset equipment affected by the task  <div style="border: 1px solid black; height: 40px; width: 100%;"></div>

Section B: Work at Heights	Before working at heights, check the following:	Yes	No	NA
	1) Safety net system is designed in accordance with 1926.502(c). (If 'Yes', skip to Step 3.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2) Personal Fall Arrest System (PFAS) to be utilized. (If 'No', skip to Step 3.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2a) PFAS components are inspected and in proper working order.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2b) 100% tie off at all times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2c) Free fall distance is limited to no more than 6 feet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2d) Deceleration device is limited to no more than 3 1/2 feet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2e) Fall clearance distance will allow a fall without contact to the next lower level of obstruction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2f) The potential for swing falls has been limited.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2g) Verify the fall arrest system anchor points are capable of withstanding 5,000 lbs per individual attached. (Provide the following below.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Identify Anchor Point(s)	Identify Location(s)	Methods of Verification	
	3) The measure is in place to protect personnel from being struck by falling objects. (If 'Yes', describe the measures below.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Measure(s) <div style="border: 1px solid black; height: 40px; width: 100%;"></div>			
	4) Measures are in place to prevent a vertical free-fall of 10 feet or higher on scaffolds or temporary ladders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) The rescue plan is in place if a fall occurs. (Describe or attach the rescue plan.) <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Section C: Permits and Signatures	Additional Documents Required	NA
	List any additional precautions or requirements due to unusual conditions or circumstances. <div style="border: 1px solid black; height: 40px; width: 100%;"></div>	<input type="checkbox"/>
	Performing Authority (PA) Name <input style="width: 150px;" type="text"/> Signature <input style="width: 150px;" type="text"/>	

# Appendix VI

## Work at Heights Rescue Plan

General			
Date:	Location:	Jobsite:	Prepared by:
Rescue Plan			
Rescue By: <input type="checkbox"/> Self Rescue <input type="checkbox"/> Rescue Service Team <input type="checkbox"/> Contractor Team <input type="checkbox"/> Fire Dept. <input type="checkbox"/> BP Team <input type="checkbox"/> Joint Team <input type="checkbox"/>			
Rescue Team Leader:		Contact Method/Number:	
Rescuer:		Contact Method/Number:	
Rescuer:		Contact Method/Number:	
Rescuer:		Contact Method/Number:	
Location of Rescuers on Stand By: <input type="checkbox"/> At Jobsite <input type="checkbox"/> At Site <input type="checkbox"/> Offsite <input type="checkbox"/> NA (self rescue)			
Estimate of time required to affect rescue upon notification:			
Describe detailed rescue scenario(s) including sequence of events, individual duties of team members and communication methods:			
Rescue Equipment Required: (check all that apply)			
Victim Access: <input type="checkbox"/> Ladder <input type="checkbox"/> Man lift <input type="checkbox"/> Fire Truck Ladder <input type="checkbox"/> Fire Truck Boom <input type="checkbox"/> Self Retracting Lifeline <input type="checkbox"/> Hoist/Winch			
Victim Movement: <input type="checkbox"/> Backboard <input type="checkbox"/> Halfback <input type="checkbox"/> SKED Stretcher <input type="checkbox"/> Litter <input type="checkbox"/> Harness			
PPE: <input type="checkbox"/> Gloves <input type="checkbox"/> Boots <input type="checkbox"/> Level A-B-C-D Suits <input type="checkbox"/> Harness <input type="checkbox"/> Other:			
Location of rescue equipment:			
Emergency Medical Services			
EMS Provider:		Contact Number:	