

Marathon Petroleum Company LP

Fall Protection	Document No.: <b>RSW-SAF-066-DT</b>	Approval Date: <b>1-24-20</b>	Page 1 of 24
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**1.0 PURPOSE**

1.1 The purpose of this program is to ensure that fall hazards are assessed, personnel are protected from injury, and proper precautions are taken to minimize the potential for injuries that result from falls from elevated work locations such as scaffolding, ladders, fixed industrial stairs, unguarded edges, floor openings, pipe racks, and aerial lifts.

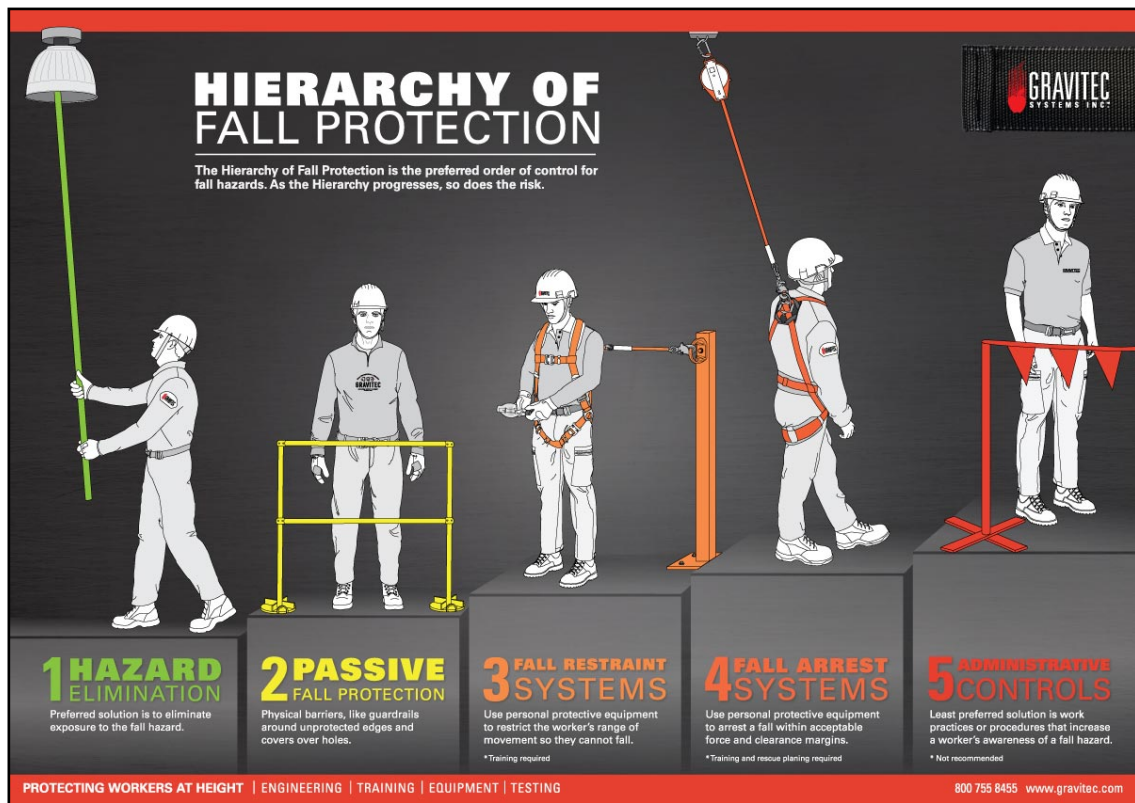
**2.0 SCOPE**

2.1 This program applies to all Michigan Refining Division (MRD) employees, contractors, visitors, and vendors that are exposed to fall hazards at MRD.

**3.0 PROCEDURE**

**3.1 Hierarchy of Control for Assessing Fall Hazards**

3.1.1 When determining the best method to protect employees from a fall hazard, refer to the diagram below for the Hierarchy of Control for Assessing Fall Hazards:



**3.2 Fall Hazard Assessment**

3.2.1 Fall Protection Qualified Personnel, MRD Safety, and Owing Department Designees conduct a plant-wide fall hazard assessment to determine locations of existing fall hazards, performing additional assessments as needed.

- 3.2.2 After determining the locations of hazards, develop a strategy for correcting the hazards based on level of severity using the Hierarchy of Control for addressing the Assessing Fall Hazards.

### 3.3 Training

- 3.3.1 Training is required for employees whose work operations may involve working on an elevated working surface.
- 3.3.2 A written training program is provided to each employee who might be exposed to fall hazards. The program provides instructions to employees, enables employees to recognize when fall hazards exist, and instructs employees in the procedures to be followed to minimize these hazards.
- 3.3.3 Competent Person training should be made available to personnel selected to fulfill this role and provided as deemed appropriate to assist with the selection and safe use of personal fall arrest systems (PFAs).
- 3.3.4 Retraining shall be provided when periodic reviews reveal inadequacies in employees' knowledge or use of this procedure. Retraining shall also be provided when a change in an employees' assignment introduces them to new fall hazards and/or new equipment presents new hazards.
- 3.3.5 The training department will maintain all training records according to corporate record retention requirements.

### 3.4 Unprotected Edges, Sides, and Wall Openings

- 3.4.1 Every open-sided fixed floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toe board wherever there is exposure to falling materials beneath the open sides. See Michigan Occupational Safety and Health Administration (MIOSHA) Part 2. Floor and Wall Openings, Stairways, and Skylights for additional requirements.
- 3.4.2 Fall protection is required when workers are exposed to a fall distance of 6ft or more. Examples of fall protection include, but are not limited to a guardrail system, fall restraint system, Personal Fall Arrest System (PFAS), and/or safety net system.
- 3.4.3 Fall protection shall be in place prior to an employee beginning a work task that necessitates the need for fall protection. Every effort shall be made to set up the fall protection system without be exposed to a fall hazard. However, if it is infeasible for the fall protection system to be set up in such a manner, then an employee may be required to be temporarily unprotected while setting up the required fall protection system.
  - 3.4.3.1 *Examples* - Establishing a fall protection anchor point at the center of a tank roof where there are incomplete guardrails or climbing a ladder to establish an anchor point.
  - 3.4.3.2 For other scenarios other than those listed above, a MPC Safety Professional should be consulted.

### 3.5 Personal Fall Arrest System (PFAS) – Components and Design

- 3.5.1 PFAS include, but are not limited to anchorage points, harnesses, lanyards, rope grab systems, deceleration devices, connecting devices, self retracting lanyards (SRLs) and buckles.
- 3.5.2 Anchorage points used for attachment of fall protection components shall be independent of any anchorage being used to support or suspend platforms and capable of supporting 5,000 pounds per employee attached to it. (See [Appendix A](#): Guidelines for Suitable Anchorage Points for more information)  
**NOTE:** Questions concerning the stability of an anchorage point shall be directed to a Qualified Person.
- 3.5.3 Dee-rings and snap hooks shall have a minimum tensile strength of at least 5,000 pounds. They shall be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent deformation.
- 3.5.4 Fall protection equipment, including lanyards, vertical lifelines, and body harnesses shall meet ANSI Standard Z359.1-2007. This number shall be imprinted or otherwise permanently attached to the equipment to certify that it meets the minimum requirements of the standard.
- 3.5.5 Snap-hooks shall be a locking type to prevent unintentional disengagement due to rollout of the snap-hook. **Non-locking snap-hooks are prohibited.**
- 3.5.6 Connectors shall meet ANSI Standard Z359.1-2007. They shall have corrosion resistant finish, and all surfaces and edges should be smooth to prevent damage to interfacing parts of the system.
- 3.5.7 Rope grabs on vertical lifelines can be used when it is impractical to use a lanyard. When vertical lifelines are used, each worker shall be attached to a separate lifeline.
- 3.5.8 Self-retracting lifelines and lanyards which automatically limit free fall distance to 2 feet or less shall be capable of sustaining a minimum tensile load of 3,000 pounds applied to the device with the lifeline or lanyard in the fully extended position. Those that do not limit free fall to two feet or less shall be capable of sustaining a minimum tensile load of 5,000 pounds applied to it in the fully extended position.
- 3.5.9 Pre-engineered horizontal and vertical lifelines shall be installed and used under the supervision of a Competent Person as part of a complete PFAS. Horizontal and vertical lifelines that are not pre-engineered shall be designed by and installed under the supervision of a Qualified Person. Before designing a horizontal or vertical lifeline contact the HESS department.
- 3.5.10 Ropes and straps used in lanyards, lifelines, and strength components of harnesses shall be made of synthetic fibers or wire rope.
- 3.5.11 Fall protection equipment shall only be used for personnel protection and not for the movement of materials.
- 3.5.12 PFAS and components subjected to a fall or full load shall be immediately removed from service and turned into the Safety Department.

3.5.13 Positioning devices, including ladder-climbing devices, shall be rigged so as not to permit a free-fall of more than 2 feet.

### 3.6 Personal Fall Arrest Systems (PFAS) – Safe Usage

3.6.1 Any time a worker is working in an area where there is a potential to fall 6 feet or more, (unless working off of a stairway, ramp, run or other walk way above 4 feet, see section 3.4.1), approved types of fall protection equipment shall be used. This includes, but is not limited to: harness and lifeline, lanyard, self-retracting lifeline, and deceleration device.

**NOTE:** Positioning devices (e.g. body belts) shall not be used for fall protection.

**NOTE:** When working outside of railings or are within 5 feet of water where no railings are present, a personal floatation device shall be worn.

3.6.2 Free fall distance shall never exceed 6 feet, unless equipment has been specifically designed for a greater free fall distance. This shall be used only when all other options are infeasible. (See [Appendix B](#): Calculation of Fall Distance for guidance on determining connection points and fall distances.)

3.6.3 Personnel using a PFAS shall practice 100% tie off.

**NOTE:** Retractable lifelines or lanyards shall not be used where they create a swing hazard. In these situations, a horizontal lifeline system or other acceptable means shall be utilized.

3.6.4 A lanyard can be tied back to itself only if specifically designed to do so. Only shock absorbing lanyards should be used.

**NOTE:** Shock absorbing lanyards cannot be used with SRLs.

3.6.5 Knots in lifelines or lanyards can reduce its strength by up to 50% and shall not be permitted.

3.6.6 Lanyards shall never be lengthened by connecting two or more together.

3.6.7 Rigging components shall never be used in any part of a fall protection system.

3.6.8 Unless snap hooks are designed for the following connections, they must not be engaged to: each other, directly to webbing or wire rope, to a D-ring to which another snap hook or other connector is attached, or to any object that is incompatibly shaped, such that unintentional disengagement could occur by the connection.

3.6.9 Tie-offs where the line passes over or around sharp edges can damage or reduce the strength of a lanyard or lifeline and must be avoided. A tie-off adapter strap (i.e. anchor strap) should be utilized as an anchorage point when anchoring to structural members or piping.

### 3.7 Personal Fall Arrest Systems (PFAS) – Inspections

3.7.1 PFAS (e.g. harnesses, lanyards, connectors, SRLs, retrieval devices etc.) shall be visually inspected by the person using it, prior to each use, see [Appendix D](#). Any defective PFAS components must be immediately removed from service, red

tagged, and turned into the Safety Department. Replacement PFAS components should be ordered through the employee's Supervisor in consultation with the HES&S department.

- 3.7.2 PFAS and like equipment must have a documented inspection conducted on an annual basis. The inspection must be done by a Competent Person.
  - 3.7.3 MRD uses a software tracking system to track fall protection equipment annual inspections. When the annual inspection is completed, a colored zip tie will be attached to the piece of equipment. Any piece of fall protection equipment that does not have the most current colored zip tie is non-compliant and shall not be used. The color of zip tie will be communicated upon inspection.
  - 3.7.4 The Safety Department will coordinate the annual inspections. Any piece of fall protection equipment that is not inspected within 30 days of the annual inspection date will be listed as retired in the tracking system.
- 3.8 Guardrails – This section is to assist personnel with the ability to recognize appropriate use for guardrails. If personnel identify a potential need for guardrails needed, they should contact the HES&S department and their Supervisor.
- 3.8.1 Standard guardrails consist of a top rail, mid-rail, and posts and must have a vertical height of approximately 42 inches (plus or minus 3 inches) from the walking/working surface. The mid-rail shall be positioned approximately halfway between the top rail and the walking/working surface (no more than a 19 inch gap between the top and mid rail or mid rail and toe board).
  - 3.8.2 Guardrails shall be capable of withstanding at least 200 pounds in any direction on any point of the top rail.
  - 3.8.3 Where there is a possibility of falling materials to a lower level, toe boards shall be installed. Toe boards shall be at least 4 inches tall and installed with a ¼ inch maximum clearance from the walking/working surface.
  - 3.8.4 If vertical members are used in place of mid-rails, they shall be spaced no more than 19 inches apart.
  - 3.8.5 Guardrails shall be surfaced to prevent injury to an employee from punctures or lacerations and to prevent the snagging of clothing.
  - 3.8.6 When installing new mid-rails, steel banding, or plastic banding should not be used.
  - 3.8.7 The ends of all top rails and mid-rails shall not overhang the terminal posts, except where such overhang does not constitute a projection hazard.
  - 3.8.8 When a guardrail has been temporarily removed, chains or wire rope capable of withstanding a load of at least 200 pounds in any direction. The chain or wire rope should be taught and flagged at 6 foot intervals with high-visibility material.
  - 3.8.9 When guardrails are used at a hoisting area or any other area that would require periodic removal of the guardrail to allow for work to be completed, a removable guardrail shall be placed across the opening when work is not taking place.

- 3.8.10 When guardrails are used around floor openings used for the passage of materials, the opening shall be guarded on two sides by permanent guardrails. Two sides may have removable guardrails to allow for the passage of materials.
- 3.8.11 When guardrail systems are used around holes (i.e. excavations) used as points of access (such as ladder ways), they shall be provided with a gate, or be so offset that a person cannot walk directly into the hole.
- 3.9 Nets – Not used frequently within the refinery. Safety nets require planning and consultation with the HES&S department prior to the use of nets.
- 3.10 Guardrail/Grating/Decking/Floor Removal
  - 3.10.1 Prior to the removal of any part of guardrail, grating, decking, flooring, fixed ladder, or any object that creates a hole/opening in a walking/working surface, a [Guardrail/Grating/Decking/Floor Removal Form](#) shall be completed and approved by the individuals indicated on the form.
  - 3.10.2 A Job Safety Analysis (JSA) shall be completed and signed by the Supervisor with considerations made for the prevention of tool drops, adverse weather conditions, emergency evacuation, etc.
  - 3.10.3 Guarding of Holes – A hole is any gap in a walking/work surface that is more than 2 inches, but less than 12 inches in its least dimension.
    - 3.10.3.1 If a hole is created in a walking/working surface, then a guardrail that meets the requirements in section 3.8 with barricade tags attached shall be erected on all sides of the hazard and/or a cover that meets the requirements listed below.
      - 3.10.3.1.1 All covers shall be capable of supporting at least twice the weight of employees, equipment and material that may be imposed on the cover at any one time.
      - 3.10.3.1.2 Covers shall be installed and secured so as to prevent them from being removed or displaced. This means they shall be nailed, bolted or otherwise fastened immediately. Covers shall be marked with the words “hole” or “cover” to provide a warning to the hazard.
      - 3.10.3.1.3 If a cover needs to be temporarily removed, then danger tape with tags shall be erected on all sides of the hazard and/or an attendant shall remain on duty until the cover is reinstalled in order to prevent personnel from accessing the hazardous area.
      - 3.10.3.1.4 A PFAS does not need to be used when temporarily accessing a hole to fill or cover it with the equipment for which it was originally intended.
  - 3.10.4 Guarding of Openings – An opening is any gap in a walking/work surface that is at least 12 inches in its least dimension OR a leading edge that is created by the removal of guardrail.
    - 3.10.4.1 If an opening is created, then a guardrail that meets the requirements in section 3.8 with barricade tags attached shall be erected on all sides of the hazard.

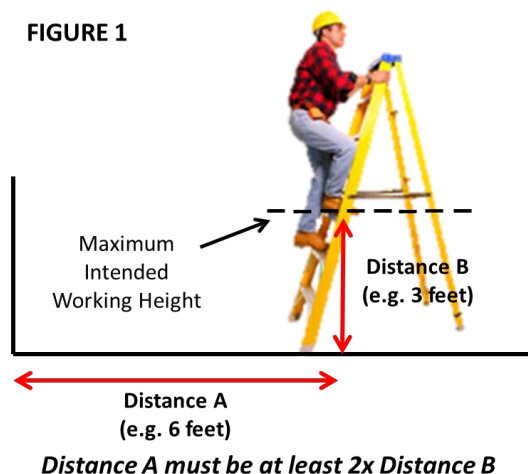
- 3.10.4.1.1 If the fall hazard created is less than 6ft, then a PFAS does not need to be used when temporarily accessing the opening. However, a hazard assessment should be performed to ensure that all appropriate safeguards are in place.
- 3.10.4.1.2 If the fall hazard created is 6ft or greater, then a PFAS shall be utilized when temporarily accessing the opening. Additionally, "100% Fall Protection Required Beyond This Point" signs ([Appendix F](#)) shall be hung at any access points.
- 3.10.5 If necessary, an individual will be assigned as the attendant while work is being conducted and is responsible for keeping individuals unassociated with the work tasks from the work area. The determination for a required attendant will be made in the job planning/JJSV.
- 3.10.6 The area below the opening that may be affected by overhead hazards shall be barricaded, attended, and/or signs-posted to prevent access.
- 3.10.7 At the end of each shift, the Owning Department shall conduct the Post JJSV with the work group to verify area is secured.
- 3.10.8 The Guardrail/Grating/Decking/Flooring Removal Form is good for up to 7 work days.
  - 3.10.8.1 For ongoing work, the Guardrail/Grating/Decking/Floor Removal Form should be kept with the Owning Department in between shifts.
- 3.10.9 All guardrail, grating, decking, and/or flooring shall be reinstalled by or under the supervision of a Qualified Person.
- 3.10.10 After the reinstallation of any guardrail, grating, decking, and/or flooring an MPC Inspector shall inspect the walking/working surface to ensure the reinstallation was performed correctly and sign off on the Guardrail/Grating/Decking/Floor Removal Form.
  - 3.10.10.1 The MPC Inspections department shall retain a copy of the completed form for their records.
- 3.10.11 The original Guardrail/Grating/Decking/Floor Removal Form shall be turned in with the Safe Work Permit at the end of the job.
- 3.11 Portable Ladders – There are two keys to the safe use of a portable ladder: select the right ladder for the task and use the ladder properly.
  - 3.11.1 Wooden ladders are prohibited. Metal ladders are not to be used in close proximity to electrical lines or within electrical control buildings like substations. Fiberglass ladders may be used in all areas and are the recommended type. It is important to avoid storing fiberglass ladders where there may be prolonged exposure to sunlight.
  - 3.11.2 Determine how much weight the ladder will have to support. The ladder should be selected to be sufficient for your weight plus the weight of any tools and materials. Each ladder has a sticker to indicate the allowable loading. Ladders without this sticker may not be used in the refinery.



<b>Type</b>	<b>Specification</b>
1A	Extra-heavy industrial ladder will support 300 pounds.
1	Heavy-duty industrial ladder will support 250 pounds.
2	Medium-duty commercial ladder will support 225 pounds.
3	Light-duty household ladder will support 200 pounds.

- 3.11.3 Barricade or set up cones at the ladder's base when using a ladder in an aisle or corridor.
- 3.11.4 Always face the ladder while climbing and descending. Use both hands when climbing. If you'll need tools or equipment while you are on the ladder, hoist them up when needed or wear a tool belt.
- 3.11.5 Do not stretch in order to reach something. Climb down and move your ladder. Place the ladder so the work can be done without leaning out more than 12 inches beyond the side rails.
- 3.11.6 Only one person is permitted on a ladder at any time.
- 3.11.7 A PFAS is required if working from a portable ladder 6 feet or more above a lower level.
  - 3.11.7.1 When a portable ladder is used to provide access to and from an elevated location, a PFAS must be used when the distance between the lower level and the level being accessed exceeds 20 feet in height (e.g. using an extension ladder to climb into an excavation that is great than 20 feet deep).
  - 3.11.7.2 A PFAS is not required when accessing a ladder at a leading edge 6 feet or more above a lower level if a gate or offset access is utilized.
- 3.11.8 Fall protection (i.e. PFAS, extended scaffold guardrail, etc.) is required when working from a portable ladder or raised work surface on an elevated fixed platform with a standard guardrail system (does not include scaffold platforms) when the elevated work location is not able to be placed at a distance (measured horizontally from the nearest guardrail) that is at least two times the maximum intended working height (i.e. highest rung that will need to be accessed) of the portable ladder or raised work surface (see Figure 1).

**FIGURE 1**





3.11.9 Step Ladders

3.11.9.1 Fully open step ladders and lock the spreaders before climbing.

3.11.9.2 Do not stand or sit on the top two rungs.

3.11.10 Step Stools

3.11.10.1 Step stools must be rated for commercial or industrial use.

3.11.10.2 Step stools are designed so that the top cap as well as all steps can be climbed on. Use extra care when standing on the top cap.

3.11.10.3 Step stools may be equipped with handrails.

3.11.11 Extension Ladders

3.11.11.1 Secure the foot of the ladder firmly on a level surface before extending it.

3.11.11.2 Do not separate extension ladders into their pieces or use pieces of an extension ladders that have been separated.

3.11.11.3 Place the ladder so that the base is out 1 foot for every 4 feet of height.

3.11.11.4 If you will have to step off of the ladder onto another surface, the ladder shall extend 3 feet above the surface being climbed on to.

3.11.11.5 Secure the ladder at the top to prevent slippage.

3.11.11.6 Overlap each section depending on the ladder's length.

<b>Overlap</b>	<b>Ladder</b>
3 Foot	32 Foot
4 Foot	32 – 36 Foot
5 Foot	36 – 48 Foot
6 Foot	48 Foot

3.11.12 Inspections

3.11.12.1 Portable ladders shall be visually inspected prior to each use. Look for broken rungs, split side rails and loose connections. Any ladders that are in poor condition shall either be repaired or disposed of immediately.

3.11.12.2 Portable ladders shall have a documented inspection performed every quarter or after any event that could affect their safe use, using [Appendix C: Ladder Inspection Checklist](#). If defects are found, the ladder shall be taken out of service and tagged as unusable until the ladder has been repaired. If the ladder is not capable of being repaired, it shall be discarded or destroyed. Completed checklists for Marathon ladders shall be submitted to safety.

3.11.12.3 Each portable ladder shall have an inspection tag/sticker attached and shall be initialed and dated by the inspector every quarter.

### 3.12 Fixed Ladders

- 3.12.1 All fixed ladders installed before January 17, 2017 shall not exceed 30 feet in length (landing to landing). They shall be equipped with cages, a ladder safety climbing device, or PFAS when they exceed 20ft in length. Cages shall also be installed on all fixed ladder sections that are positioned more than 20ft above ground level.
- 3.12.2 All fixed ladders installed after on or after January 17, 2017 shall not exceed 24 feet in length (landing to landing) and have offset landing platforms with self-closing gates at each ladder transition. Cages shall be installed on all fixed ladder sections that are positioned more than 24ft above ground level.
- 3.12.3 Ladder ways must be provided with a gate to protect employees from a fall into them. Personnel working on platforms are responsible for ensuring gates to ladder ways are closed.
- 3.12.4 Fall protection is required if working from a ladder over 6 feet above a lower level.

### 3.13 Fixed Industrial Stairs

- 3.13.1 Generally, fixed stairs shall be provided for access from one structure level to another when operations require regular travel between the two levels, or if the carrying of tools or equipment by hand is normally required.
- 3.13.2 Riser height and tread width shall be reasonably uniform throughout any flight of stairs. All treads shall be reasonably slip resistant.
- 3.13.3 Stairways shall have an angle between 30 and 50 degrees to the horizontal.
- 3.13.4 If any component of a stairway (i.e. a step, guardrail, tread, etc.) is damaged and will prevent safe usage, the top and bottom of the stairway shall be blocked off with hard barricade and signage identifying hazards. The stairway shall not be used until the problem is fixed.
- 3.13.5 Standard railings shall be provided on the open sides of all exposed stairways and stair platforms. For fixed industrial stairs installed before January 17, 2017, stair rails shall be at least 30 inches from the toe of the stairs to the top rail. For fixed industrial stairs installed on or after January 17, 2017, stair rails shall be between 36 and 38 inches from the toe of the stairs to the top rail or be 42 inches from the toe of the stairs to the top rail with a hand rail attached that is between 30 and 38 inches. All stair rails shall have mid rails installed half way between the top rail and the toe of the stairs.
- 3.13.6 When ascending or descending a stairway, the following safety precautions should be used:
  - 3.13.6.1 Always have at least one hand on the guardrail / handrail at all times (3 points of contact),
  - 3.13.6.2 Never carry anything up or down the stairs that obstructs vision or requires both hands, and

3.13.6.3 Never run up or down a stairway.

3.14 Lifting of Personnel – This section includes the fall protection requirements for aerial lifts. Refer to RSW-SAF-011-DT [Aerial Work Platforms](#) for additional information on aerial lifts.

3.14.1 A safety harness and lanyard which is in compliance with this procedure shall be affixed to attachment points provided by the manufacturer.

3.15 Work in Pipe Racks

3.15.1 Safety harnesses with lanyards shall be worn while working in or on pipe racks (100% tie-off). Minimize walking on pipe racks because of the unique potential fall hazard involved. Use ladders, scaffolds, aerial lifts, platforms, etc., to minimize the need to walk on pipe racks.

3.15.2 When able, retractable lanyards are the preferred method of fall protection over double lanyards.

3.16 Work on Roofs

3.16.1 For construction related roofing work on tanks and buildings performed by workers in the roofing trade; workers shall be protected from falling by guardrail system, safety net system, PFAS, or Warning Line System (WLS).

3.16.1.1 The WLS shall be placed not less than 6ft from the roof edge.

3.16.1.2 When working outside of the warning line; a safety net system or PFAS shall be used in conjunction with the warning line.

3.16.1.3 All roofing work shall have an established fall protection plan that follows MIOSHA standards and is approved by the Safety Department before the start of work.

3.16.2 For maintenance and operations related work taking place on the roof of a tank or building, workers shall be protected from falling by a guardrail system, safety net system, PFAS, or a Warning Line System (WLS).

3.16.2.1 For work that is infrequent (not more than once per month) and temporary (task takes less time than setting up a PFAS), the WLS shall be erected not less than 6ft from the roof edge.

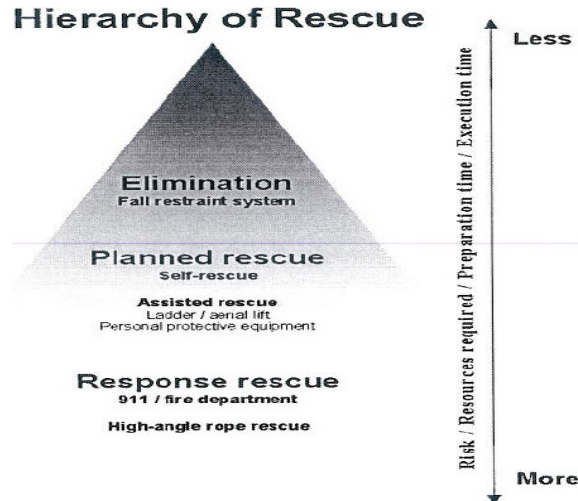
3.16.2.2 For all other work, the WLS shall be erected not less than 15ft from the roof edge.

3.16.2.3 When working outside of the warning line; a safety net system or PFAS shall be used in conjunction with the warning line.

3.17 Specialized Systems

3.17.1 Where conventional fall protection systems (i.e. guardrails, safety nets, PFAS) are infeasible, such as during work on tank roofs and building roofs when anchor points are not available, specialized systems shall be used in conjunction with a Fall Protection Plan. Infeasible means that it is impossible to perform the work using conventional systems or that it is technically impossible to use any one of these systems to adequately provide fall protection.

- 3.17.2 Prior to specialized systems being utilized, a Fall Protection Plan shall be submitted for review to the Safety Department.
  - 3.17.3 At times, workers can be exposed to a fall capable of resulting in significant injury at lower heights (e.g., working off of platform as low as 4 feet without standard guardrail, working close to six feet off of the ground without a suitable overhead anchor point). In these situations, workers will use specialized fall protection systems, other than typical personal fall arrest systems (e.g., harness and six foot lanyard attached to acceptable anchor point). At lower heights, typical PFAS may not be effective in preventing employees from falling onto, and making contact with lower levels. Examples include, but are not limited to:
    - 3.17.3.1 Installing scaffold guardrail and / or platforms,
    - 3.17.3.2 Use of aerial lifts,
    - 3.17.3.3 Self retracting lanyards/“yo-yo” (the maximum arresting limits of many SRLs limit falls to less than 4 feet. One shall check the self retracting lanyard to ensure this before use), and
    - 3.17.3.4 Fall Restraint – often shorter lanyards and self retracting lanyards can be used as fall restraint, so as to prevent an employee from reaching the edge(s) where they would be exposed to a fall.
  - 3.17.4 Unique fall hazards present themselves in the refinery. If the use of the listed suggestions cannot be put to use, consult your Supervisor and/or safety to develop a workable fall protection plan for that particular job.
- 3.18 Rescue
- 3.18.1 Similar to the Hierarchy of Control for Assessing Fall Hazards, the Hierarchy of Rescue informs employees about rescue associated with falls from heights. Whenever employees will be working in elevated areas, considerations shall be given by the work party and the owning department as to how a fall victim would be rescued in the event of a fall.
  - 3.18.2 Elimination – Naturally, the first method of ensuring there are no rescues needed would be to implement and use a fall restraint system (e.g. roof horizontal lifeline system that prevents fall from the roof).
  - 3.18.3 Planned Rescue – Some individuals are trained in self rescue (e.g. confined space rescuers).
  - 3.18.4 Response rescue – 6911 / Melvindale & Detroit Fire Department, and MRD ERT.



#### 4.0 DEFINITIONS

- 4.1 Anchor Point – Refers to a secure point of attachment for lifelines, lanyards, or deceleration devices, capable of supporting 5,000 pounds per worker.
- 4.2 Connector – A device, component or element of a personal fall arrest system that is used to couple parts of the system together.
- 4.3 Competent Person – A person who has been trained to receive this designation. A Competent Person is capable of identifying existing and predictable workplace hazards or working conditions which may be hazardous or dangerous to employees. A Competent Person has the authority to take prompt corrective measures to eliminate these hazards and conditions. Additionally, this person must be trained as a “Fall Protection Competent Person” (course content and proof of completion must be provided to MRD safety upon request).
- 4.4 Deceleration Device – Any mechanism, such as a rope grab, rip stitch lanyard, automatic retracting lanyard/lifeline, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on a worker during fall arrest.
- 4.5 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.
- 4.6 Fall Protection Plan - Option available only to employees engaged in leading edge work who can demonstrate that it is infeasible or it creates a greater hazard to use conventional fall protection equipment. (OSHA 1926.502 (k) incorporated by reference in MIOSHA Construction Standard Part 45)
- 4.7 Floor Hole – An opening, gap, or void measuring less than 12 inches but more than 2 inches in its least dimension in a floor, roof, or other walking/working surface through which persons may trip or step into/through.
- 4.8 Floor Opening – An opening, gap or void measuring 12 or more inches in its least dimension, in any floor, roof, or other walking/working surface through which persons may fall.
- 4.9 Free Fall Distance – The vertical displacement of the fall arrest attachment point on the employee’s 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.
- 4.10 Guardrail – A barrier capable of withstanding a load of at least 200 pounds in any direction erected to prevent workers from falling to a lower level.
  - 4.11 Harness (full body) – A component with a design of straps which is fastened about the person in a manner so as to contain the torso and distribute the fall arrest forces over at least the upper thighs, pelvis, chest and shoulders with means for attaching it to other components of systems (lanyard, lifeline or energy absorber).
  - 4.12 Horizontal Life Line – A component of a horizontal lifeline subsystem, which consists of a flexible line with connectors or other coupling means at both ends for securing it horizontally between two anchors or anchorage connectors.
  - 4.13 Lanyard – A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body harness to a fall arrester, energy absorber, anchorage connector or anchorage.
  - 4.14 Lifeline – A component consisting of a flexible line for connection to an anchorage point at one end to hang vertically (vertical lifeline), or for connection to anchorage points at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.
  - 4.15 Opening – A gap or void 30 inches or more high and 18 or wider, in a wall or partition, through which personnel can fall to a lower level.
  - 4.16 Personal Fall Arrest System PFAS – A system used to arrest a worker in a fall from a working level. It consists of an anchorage point, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combination of these.
  - 4.17 Positioning Device – A body belt or body harness rigged to allow a worker to be supported on an elevated vertical surface, such as a wall, with both hands free while leaning.
  - 4.18 Qualified Person – A person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work and is knowledgeable with the requirements of this procedure and related standards.
  - 4.19 Self-Retracting Lifeline or Lanyard – A deceleration device containing a drum-wound line that can be slowly extracted from, or retracted on to, the drum under slight tension during normal worker movement, and which, after the onset of a fall, automatically locks the drum and arrests the fall.
  - 4.20 Shock Absorbing Lanyard – A specially designed lanyard that elongates during a fall to significantly reduce fall arresting forces.
  - 4.21 Walking/Working Surface – Includes any surface, whether horizontal or vertical, on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, for-work and concrete reinforcing steel but not including ladders, vehicles, or trailers on which workers shall be located in order to perform their job duties.

4.22 Warning Line System – A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge.

## 5.0 REFERENCES

- 5.1 [RSW-SAF-001-DT General Safety Rules](#)
- 5.2 [RSW-SAF-029-DT Rigging and Lifting](#)
- 5.3 [RSW-SAF-011-DT Aerial Work Platforms](#)
- 5.4 MIOSHA General Industry Standards Part 2 Floor & Wall Openings, Stairways & Skylights
- 5.5 MIOSHA General Industry Standards Part 3 Fixed Ladders
- 5.6 MIOSHA General Industry Standards Part 4 Portable Ladders
- 5.7 MIOSHA General Industry Standards Part 58 Aerial Work Platforms
- 5.8 MIOSHA Construction Safety Standards. Part 11, Fixed and Portable Ladders
- 5.9 MIOSHA Construction Safety Standards. Part 32, Aerial Work Platforms
- 5.10 MIOSHA, Construction Safety Standards. Part 45, Fall Protection
- 5.11 ANSI Standard Z359.1 – 1992 – Safety Belts, Harnesses, Lanyards, Lifelines & Drop Lines for Construction and Industry.
- 5.12 OSHA Subpart D – Walking Work Surfaces

## 6.0 APPENDICES

- 6.1 [Appendix A](#) – Guidelines for Suitable Anchor Points
- 6.2 [Appendix B](#) – Calculating Fall Distance
- 6.3 [Appendix C](#) – Ladder Inspection Checklist
- 6.4 [Appendix D](#) – Inspection Procedure for Harnesses, Lanyards, Lifelines, And Miscellaneous Equipment
- 6.5 [Appendix E](#) – Hole/Cover Sign
- 6.6 [Appendix F](#) – 100% Fall Protection Required Beyond This Point Sign

## 7.0 FORMS

- 7.1 [RSW-SAF-066-Form01-DT Guardrail/Grating/Decking/Floor Removal Form](#)

## 8.0 POSTERS AND BULLETINS

- 8.1 [RSW-SAF-066-P001-DT Anchor Straps](#)
- 8.2 [RSW-SAF-066-P002-DT Fall Clearance](#)
- 8.3 [RSW-SAF-066-P003-DT Ladder Safety](#)
- 8.4 [RSW-SAF-066-P004-DT Harness Sizing](#)

## 9.0 REVISION HISTORY

Revision number	Description of change	Written by	Checked by	Effective date
30	Form RSW-SAF-066-Form01-DT (rev11) was updated to include a spot where the Owning Dept. can track the grating removal form by using a blue magnet on their area plot plans and to clarify that the	J. Stefko	J. Rabideau	6/28/18



	Project Coordinator/Supervisor is responsible for ensuring the form is closed out. A close out signature for this individual was also added.			
31	Updated section 3.11.8 to provide guidance on the requirements for using portable ladders on elevated fixed platforms. Added section 3.11.10 to include requirements for step stools.	J. Stefko	J. Rabideau	8/9/18
32	Updated "Ongoing Work" and "Close Out" section of Grating Removal Form (Rev 12). Ongoing Work was updated to require that the Owning Department completes an inspection each shift and the Close Out section was updated to require the Tier 1 Grating and Platform Inspection Checklist to be completed whenever grating is affected.	J. Stefko	ATLs and Day Foremen	1/23/19
33	Removed all content related to "scaffolds" because of the creation of a new scaffold standard.	J. Stefko	Safety Steering Committee	6/6/19
34	Updated Harness Sizing Poster layout (no significant content changes)	W. Wright	A. Morales	1/24/20

**APPENDIX A  
Guidelines for Suitable Anchor Points**

The proper selection of anchor points used in conjunction with personal fall arrest systems (i.e. safety harnesses and lanyards, horizontal lifelines, etc.) is critical to ensuring that workers will be adequately protected in the event of a fall. Good judgment should always be exercised when attaching fall arrest systems to an anchorage point. If there is any doubt whatsoever that an anchor point will adequately support a worker in a fall, then a more suitable anchor point should be selected. The following guidelines should assist the worker with their choice of anchorage points:

- Guardrails, guardrails, conduit, and cable trays are **not** proper anchorage points and shall not be used as such.
- Facility support beams (e.g., I-beams, H-beams, and angle irons) are generally fit for use as anchorage points. However, personal lanyards should not be wrapped directly around beams. The use of ANSI-approved anchor pads with approved D-rings is the preferred method. Moreover, care should be taken to protect lanyards and straps from sharp edges.
- Sound, non-insulated facility piping with appropriate wall thickness and adequate support is generally acceptable for use as an anchorage point. The following table shows the maximum length between supports allowed for the corresponding size pipe to support 5,000 pounds. **Note: The lengths between supports listed in this table were calculated for one person and shall not be used to support more than one person at a time.** The information in the table below is to be used only as a guide to help determine the strength and suitability of piping used as anchor points. Always tie-off to the strongest anchor point possible. The maximum length between supports, as stated in the chart below, should never be exceeded. For added stability, always tie off as closely as possible to the pipe support bracket.

Nominal Pipe Size (Inches)	Outside Diameter (Inches)	SCH40 Wall Thickness (Inches)	Maximum Length Between Supports (Feet)
1	1.315	0.133	Do not use!
2	2.375	0.154	Do not use!
3	3.5	0.216	Do not use!
4	4.5	0.237	6
6	6.625	0.28	15
8	8.625	0.322	31

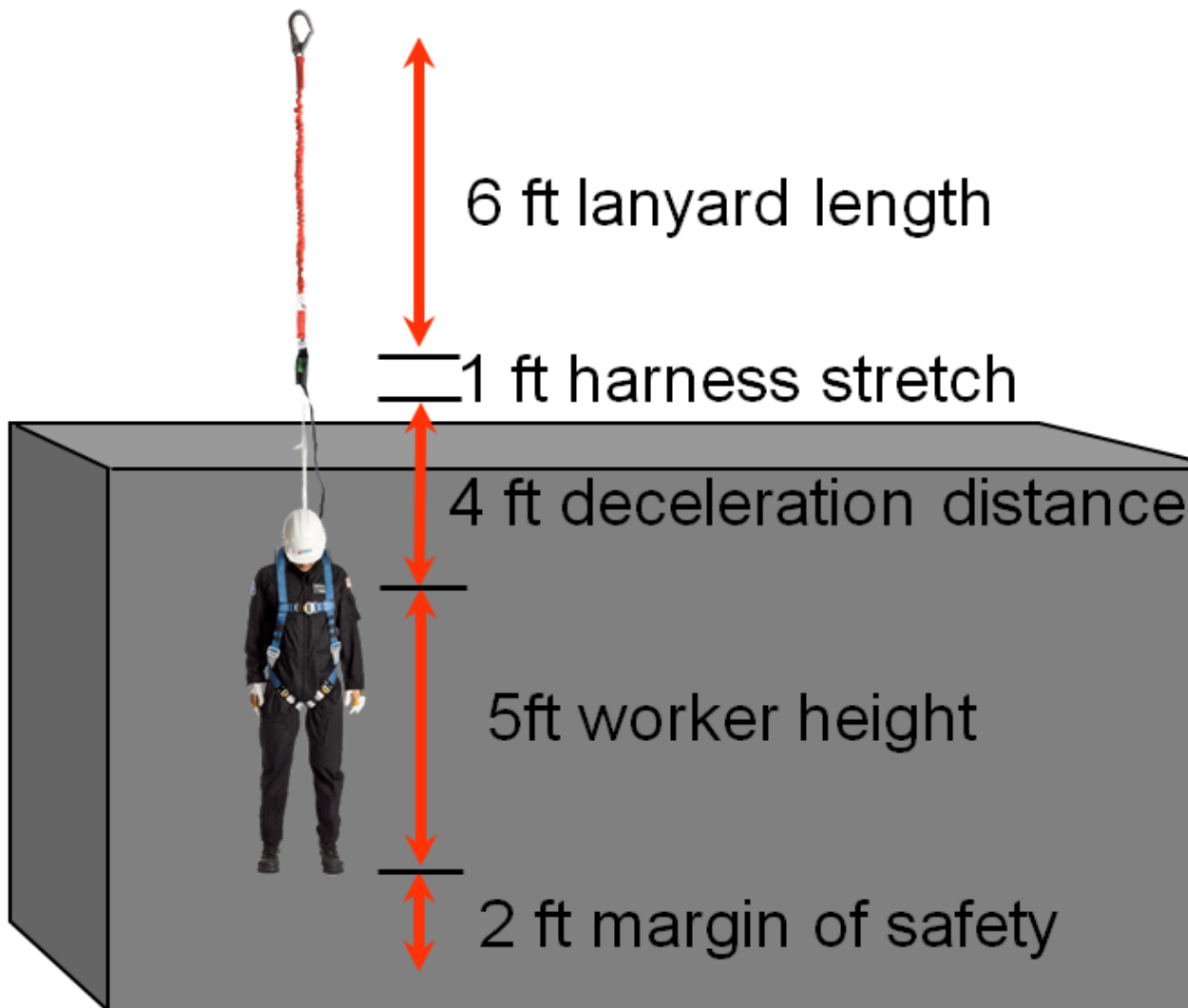
This table assumes the pipe is simply supported, made of low carbon steel and operating at its rated pressure, and that the allowable stress in the pipe is 26 ksi based on an allowable 1/3 increase for temporary loading per ANSI B31.3. Table values are based upon information provided by Jeff Heath, Facilities Engineering-Houston.

**NOTE: Before using piping as anchorage a Qualified Person shall give approval to do so. Otherwise, piping should not be used as anchorage.**

**Qualified Person – A person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work and is knowledgeable with the requirements of this procedure and related standards.**

**APPENDIX B**  
**Calculation of Fall Distance**

*This fall distance calculation has been established for the use of DBI Sala equipment. The fall distance calculation may vary depending on the manufacturer of the equipment.*



- A six-foot worker using a 6' energy absorbing lanyard requires 18' of clearance from the anchorage.



Check appropriate box if item is satisfactory.

INSTRUCTIONS:

If a "NO" is answered for any of the above questions, the ladder should be tagged as unusable and removed from service until the defect is corrected. If the defect cannot be corrected, the ladder should be destroyed or discarded.

If the ladder passes the inspection, then the existing ladder inspection tag should be filled out. If there is no existing tag, one should be filled out and attached tightly around the side rail, between the top two rungs.

The ladder inspection tag should contain the name of the person inspecting the ladder and the date on which the ladder was inspected.

When inspection is complete, the Inspector will sign and date the inspection card. If inspection card does not have a blank space available, the card is to be removed and a new inspection card fastened. See Supervisor or Safety for inspection cards or labels.

**RETURN THE COMPLETED FORM TO THE SAFETY DEPARTMENT.**

EXAMPLE

## Appendix D – Inspection Procedure for Harnesses, Lanyards, Lifelines, And Miscellaneous Equipment

*\* Visual inspection required by user prior to each use.*

### HARNESS INSPECTION PROCEDURE

- **Webbing:** Grasp the webbing with your hands 6 to 8 inches apart. Bend the webbing in an inverted U. The surface tension resulting makes damaged fibers or cuts easier to see. Follow this procedure the entire length of the webbing, inspecting both sides of the strap. Watch for frayed edges, broken fibers, pulled stitches, cuts, burns, and chemical damage.
- **D-rings/Back Pads:** Check D-Rings for distortion, cracks, breaks, and rough or sharp edges. The D-Ring should pivot freely. D-ring back pads should also be inspected for damage.
- **Attachment of Buckles:** Attachments of buckles and D-Rings should be given special attention. Note any unusual wear, frayed or cut fibers, or distortion of the buckles or D-Rings.
- **Tongue/Grommets:** The tongue receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted or broken grommets. Webbing should not have any additional punched holes.
- **Tongue Buckles:** Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on the frame. Check for distortion or sharp edges.
- **Friction and Mating Buckles:** Inspect the buckle for distortion. The outer bars and center bars shall be straight. Pay attention to corners and attachment points of the center bar.
- **Breakaways or Keepers:** Inspect the snaps to make sure they are not deformed, rusted, and that they hold when the lanyard is attached.

### LANYARD INSPECTION PROCEDURE

- **Snaps:** Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks shall prevent the keeper from opening when the keeper closes.
- **Thimbles:** The thimble shall be firmly seated in the eye of the splice, and the splice should have no loose or cut strands. The edges of the thimble shall be free of sharp edges, distortion or cracks.
- **Web Lanyard:** While bending webbing over a pipe or mandrel, observe each side of the webbed lanyard. This will reveal any cuts or breaks. Examine the webbing for swelling, discoloration, cracks, or charring. Observe closely for any breaks in the stitching.
- **Retractable Lanyards:** Should be pulled all of the way out of the protective housing to inspect the entire length, it should retract freely and lock in place when exposed to a sudden jerk.
- **Rope/Cable Lanyard:** Rotation of the rope lanyard will while inspecting from end to end will bring to light any fuzzy, worn, broken, or cut fibers. Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope/cable diameter should be uniform throughout.

- **Shock Absorber:** The outer portion of the pack should be examined for burn holes and tears. Stitching on areas where pack is sewn to D-rings, belts, or lanyards should be examined for loose strands, rips, and deterioration. Examine for the warning flag or signs of deployment. If the flag has been activated, remove lanyard from service.

### **MISCELLANEOUS**

- **Pipe or beam straps:** Check the webbing for cuts, tears or abrasions. D-Rings shall be free of cracks, rough edges distortion or elongation.
- **Carabiners:** Check for cracks, rough edges, distortion or elongation.
- **Beam Gliders:** All pins shall be checked to be certain they are in place and working properly. The D-ring shall be checked for distortion and burrs. All metal parts shall be free of cracks or distortion. The Teflon gliding pads shall be in good condition to allow for smooth movement when attached to a beam.
- **Permanent Life Lines:** Cables shall be inspected for rust, cuts, tears, abrasions and tensions. They shall be inspected semiannually for structural integrity and cable condition by a Competent or Qualified person. Static tests will be performed annually by a Competent or Qualified person.



## APPENDIX E



**HOLE**  
**DO NOT REMOVE**  
**COVER!**

**Appendix G**

APPENDIX F



**100% FALL PROTECTION  
REQUIRED BEYOND THIS POINT**

CU-149221

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