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RESPONSIBLE DEPT.	CONTENT CUSTODIAN	APPROVED BY	LEGACY NUMBER:	
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REVISION APPROVAL DATE: 02/07/2024		NEXT REVIEW DATE: 04/29/2025		MOC: N
REVISION: 2				

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1.0 INTRODUCTION

1.1 Purpose

Falls from elevated work areas or into holes or pits are a leading cause of industrial injury and death. This document outlines systems and procedures used at the Anacortes Marathon Petroleum Company to control fall hazards and to prevent injuries, as required by WAC 296-155-245. The Safety Group and/or the person in charge of the work to be performed should provide additional, job specific, information and guidance.

1.2 Scope

This document applies to Marathon Anacortes employees and contractors. All personnel working on Marathon property must comply with this document.

Fall protection requirements for crane inspection, maintenance, assembly and disassembly are governed by and can be found in R-11-008.

2.0 REFERENCES

2.1 Marathon Standards, Policies & Procedures

- TSHS-013 Fall Protection

2.2 Government Regulations

- OSHA 29 CFR 1910.23, Guarding floor and wall openings and holes
- OSHA 29 CFR 1910.67, Vehicle-mounted Elevating and Rotating Work Platforms
- OSHA 29 CFR 1910.132, General Requirements for PPE
- OSHA 29 CFR 1917.112, Guarding of Edges
- OSHA 29 CFR 1926.106, Working Over or Near Water
- OSHA 29 CFR 1926.453, Aerial Lifts
- OSHA 29 CFR 1926 Subpart L, Scaffolds
- OSHA 29 CFR 1926 Subpart M, Fall Protection
- OSHA 29 CFR 1926 Subpart P, Excavations
- WA L&I Chapter 296-155
- WA L&I Chapter 296-869, Elevating Work Platforms

3.0 DEFINITIONS

The following definitions are applicable to this procedure.

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Table 1 Definitions

Term	Description
Aerial Lift Device	Equipment such as powered platforms, vehicle-mounted elevated and rotating work platforms, extensible boom platforms, aerial ladders, articulating boom platforms, scissor lifts and powered industrial truck platforms.
Anchorage	A secure connecting point or a terminating component of a fall protection system or rescue system capable of safely supporting the impact forces applied by a fall protection system or anchorage subsystem.
Arrest Distance	The total vertical distance required to arrest a fall. The arrest distance includes the deceleration distance and activation distance.
Buckle	Any device for holding the body harness closed around the employee's body.
Clearance	The distance required to prevent the employee from striking the next level or any other obstruction below. The distance from a specified reference point, such as the working platform or anchorage of a fall arrest system, to the lower level that a worker might encounter during a fall.
Competent Person	An individual designated by the employer to be responsible for the immediate supervision, implementation, and monitoring of the managed fall protection program who, through training and knowledge, is capable of identifying, evaluating, and addressing existing and potential fall hazards, and who has the authority to take prompt corrective action with regard to such hazards.
Continuous Fall Protection or 100% Fall Protection	One or more fall protection systems that provide fall protection without interruption. An example is a full-body harness with a double lanyard.
Controlled Access Zone (CAZ)	An area in which certain work may be performed without the use of guardrail systems or personal fall arrest systems. Access to the zone is controlled and the work within the controlled access zone is to be performed by using a warning line system.
Dangerous Equipment	Equipment (such as machinery, electrical equipment, rotating equipment and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment
Deceleration Device	Any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest
Deceleration Distance	The additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop
Energy (Shock) Absorber	A component whose primary function is to dissipate energy and limit deceleration forces which the fall imposes on the body during fall arrest.



Table 1 Definitions

Term	Description
Equivalent	Alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.
Fall Arrest	The action or event of stopping a free fall or the instant where the downward free fall has been stopped.
Fall Arrest System	The collection of equipment components that are configured to arrest a free fall. A fall arrest system is typically comprised of components such as full-body harnesses, lanyards, deceleration devices, horizontal lifelines, vertical lifelines, anchorages and anchorage connectors.
Fall Arrester	A device that travels on a lifeline and will automatically engage or lock onto the lifeline in the event of a fall. A fall arrester usually employs the principle of inertial locking, cam lever locking, or both. A rope grab is one example of a fall arrester.
Fall Hazard	Any location where a person is exposed to a potential free fall
Fall Protection	Any equipment, device or system that prevents an accidental fall from elevation or that mitigates the effect of such a fall. Fall protection includes eliminating or controlling hazards, passive fall protection, travel restraint, fall arrest and administrative controls.
Fall Protection System	Any secondary system that prevents workers from falling or, if a fall occurs, arrests the fall.
Fall Restraint System	A fall prevention system that prevents the user from falling any distance. The system is comprised of a full-body harness, along with an anchorage, connectors, and other necessary equipment. The system prevents and/or restrains the user from reaching the open edge of the structure or platform
Fixed Roof Tank	A tank that contains a fixed or static roof. Also known as a Cone Roof or Flat Roof Tank.
Floor Hole	An opening measuring less than 12 inches but more than 1 inch in its least dimension, in any floor, platform, pavement, or yard, through which materials but not persons may fall; such as a belt hole, pipe opening, or slot opening.
Floor Opening	An opening measuring 12 inches or more in its least dimension, in any floor, platform, pavement, or yard through which persons may fall; such as a hatchway, stair or ladder opening, pit, or large manhole.
Free Fall	The act of falling before a personal fall arrest system begins to arrest the fall.
Free Fall Distance	The vertical distance traveled during a fall, measured from the onset of a fall from a walking working surface to the point at which the fall protection system begins to arrest the fall.
A Full Body Harness	A body support designed to contain the torso and distribute the fall arrest forces over at least the upper thighs, pelvis, chest and shoulders.
Guardrail System	A barrier erected to prevent employees from falling to lower levels. This system includes a toe board, mid-rail, and top rail able to withstand 200 pounds of force applied in any direction.

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Table 1 Definitions

Term	Description
Handrail	A single bar, pipe or rail supported on brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping.
Horizontal Lifeline (catenary line or static line)	A flexible line with connectors or other coupling means at both ends for securing it horizontally between two anchorages or anchorage connectors.
Lanyard	A component consisting of a flexible rope, wire rope, or strap, which typically has a connector at each end for connecting to the body support and to a fall arrester, energy absorber, anchorage connector, or anchorage.
Leading Edge	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.
Lifeline	A component consisting of a flexible line for connection to an anchorage at one end to hang vertically (vertical lifeline), or for connection to anchorages 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.
Lower Levels	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.
Low Slope Roof	A roof having a slope less than or equal to 4 to 12 (vertical to horizontal).
Passive Fall Protection System	Fall protection that does not require the wearing or use of personal fall protection equipment.
Personal Fall Arrest System (PFAS)	A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, full body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these
Platform	A working space for persons, elevated above the surrounding floor or ground; such as a balcony or platform for the operation of machinery and equipment
Positioning Device System	A body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.
Qualified Person	A person with a recognized degree or professional certificate and with extensive knowledge, training, and experience in the fall protection and rescue field who is capable of designing, analyzing, evaluating and specifying fall protection and rescue systems to the extent required by the standards
Restraint	The technique of securing an authorized person to an anchorage using a lanyard short enough to prevent the person's center of gravity from reaching the fall hazard.
Rope Grab	A type of fall arrester, a rope grab is a deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

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Table 1 Definitions

Term	Description
Runway	A passageway for persons, elevated above the surrounding floor or ground level, such as a foot walk along shafting or a walkway between buildings.
Safety Monitoring System	A safety system in which a Competent Person is responsible for recognizing and warning employees of fall hazards. All other fall protection systems must be deemed "infeasible" (through a study or review) before selecting or using a safety monitoring system.
Self-Retracting Lanyard (SRL)	A deceleration device containing a drum-wound line that automatically locks at the onset of a fall to arrest the user, but that automatically pays out from and retracts onto the drum during normal movement of the person to whom the line is attached. After onset of a fall, the device automatically locks the drum and arrests the fall.
Snap Hook	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. Snap hooks must be self-closing with a self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection, thus preventing the opportunity for the object to "rollout" of the snap hook.
Stair Railing	A horizontal or vertical barrier erected along exposed sides of a stairway to prevent falls of persons.
Standard Railing	A horizontal or vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.
Step Roof	A roof having a slope greater than 4 in 12 (vertical to horizontal).
Suspension Trauma Strap	Suspension trauma safety strap allows the suspended worker to stand up in the harness to relieve the pressure being applied to the arteries and veins around the top of the legs.
Toe Board	A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent falls of materials, usually 3.5" inches or greater in height.
Total Fall Distance (TFD)	The total vertical distance a person falls, measured from the onset of a fall to the point where the person comes to rest after the fall is arrested
Unprotected Sides and Edges	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.
Walking Working Surface	Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.
Warning Line System	A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, personal fall arrest systems to protect employees in the area.

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4.0 ROLES AND RESPONSIBILITIES

4.1 Employees

All employees or workers who may be subject to fall hazards shall:

- Be able to identify situations where fall protection is needed.
- Know the uses and limitations of fall protection equipment.
- Properly use, inspect, maintain, store and care for their fall protection equipment and systems.
- Prior to each use, inspect fall protection equipment for defects or damage. If a defect or damage is found, then equipment shall be taken out of service permanently.
- Immediately report any incident involving a fall to supervision.

4.2 Supervisors

Supervisors shall:

- Ensure that workers have received proper training on fall hazard recognition, fall prevention measures, and the use of fall protection equipment.
- Ensure workers follow requirements of this standard including inspection of fall protection equipment.
- Assure that provisions for prompt rescue of fallen employees are available.
- Assure that fall protection equipment is used in compliance with this standard including manufacturer and regulatory requirements.

4.3 Competent Person

The Competent Person shall:

- Be responsible for the immediate supervision, implementation and monitoring of the managed fall protection program.
- Be knowledgeable through experience and training of applicable fall protection regulations, standards, equipment and systems.
- Conduct a fall hazard survey to identify fall hazards before employees are exposed to those fall hazards.
- Identify, evaluate and impose limits on the workplace activities to control fall hazard exposures and swing falls.
- Have the authority to stop the work immediately if it is determined that it is unsafe to proceed with the work-place activities.
- Verify that fall protection systems have been installed and inspected.
- Ensure that a prompt rescue can be accomplished by implementing and monitoring the rescue procedures.

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4.4 Qualified Person

The Qualified Person shall:

- Use their experience and educational background to design fall arrest systems.
- Be responsible for the design of permanent anchorage points and for providing personnel with assistance regarding setting up temporary anchorage points.
- Maintain requirements as a Qualified Person in accordance with the definition in section 3.

4.5 Contractor

All contractors who may be subject to fall hazards shall:

- Ensure their workers understand and comply with the requirements of the facility's fall protection program.
- Ensure that their workers have received proper training on fall hazard recognition, fall prevention measures, and the use of fall protection equipment.
- Supply and maintain fall protection equipment for the job.
- Ensure that they designate a trained Competent Person(s) to manage fall protection for their workers.

5.0 REQUIREMENTS

Falls from even short distances can cause serious injuries. All employees and contractors must use an approved form of fall protection when exposed to the following situations:

- Performing maintenance or construction activities (including truck unloading) 6 feet or higher and are on a designed working surface or platform.
- On elevated working surfaces (e.g., unit platform, loading dock, etc.) 4 or more feet above grade and not protected with guardrails or other equally effective systems.
- Within 6 feet of an unguarded edge.
- On a yellow tag scaffold which requires fall protection.

5.1 Eliminating Hazards and Reducing Exposure

When possible, fall hazards should be eliminated by covering or filling pits or holes in the walking or working area, constructing vertical walls, moving the job site to a safer location, etc. When eliminating hazards is not feasible, every effort should be made to reduce exposure, i.e., decrease time in the area and/or increase distance from the hazard.

5.2 Controlling Hazards

When eliminating the hazard is not feasible, controls (Fall Protection Systems) must be developed to prevent a fall and/or to prevent injury as a result of a fall. Fall Protection Systems are divided into two categories: Fall Restraint and Fall Arrest. Fall Restraint systems are approved devices that restrict movement, thereby preventing a fall. Fall Arrest systems are approved devices that stop a free fall before a worker is injured.

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5.3 Floors, Platforms, Unprotected Side and Leading Edges

Every open-sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by guardrails on all open sides except where there is entrance to a ramp, stairway, or fixed ladder with a swing gate.

Workers reaching more than 10 inches below the level of the walking/working surface where there is a fall exposure hazard on which they are working shall be protected from falling by a personal fall arrest system.

*Fall protection is not required for workers or drivers who are on flatbed vehicles and/or flatbed trailers when the worker must be on the flatbed vehicle or flatbed trailer to perform his or her duties.

5.4 Tanker Trucks or Rail Cars

Employees performing work on top of tanker trucks or rail cars must be protected from fall by guardrail systems on all sides or personal fall arrest systems.

5.5 Working Above Dangerous Equipment

Employees positioned six feet or less above dangerous equipment must be protected from falling into or onto the equipment by guardrails or equipment guards. Employees positioned six feet or more above dangerous equipment shall be protected from fall hazards by guardrail systems or personal fall arrest systems.

5.6 Wall Openings

Employees who are positioned on, at, above, or near wall openings, with an opening at least 30 inches high and 18 inches wide, where the outside bottom edge of the wall opening is six feet or more above lower levels (and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface) must be protected from falls by guardrails or personal fall arrest systems.

5.7 Other Walking and Working Surfaces

Employees on walking/working surfaces that are not otherwise addressed above must be protected from falls by guardrails and swing gates or personal fall arrest systems.

5.8 Protection from Falling Objects

Employees that are exposed to falling objects shall wear a hard hat and must also implement one of the following measures:

- Erect toe boards, screens or guardrail systems to prevent objects from falling from higher levels.
- Erect a canopy structure strong enough to prevent penetration by any object that might fall into the canopy and keep objects that may fall away from the edge of the higher level.
- Barricade the area where objects could fall, prohibit employees from entering the barricaded area and keep objects that may fall away from the edge of the higher level.

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6.0 OTHER AREAS OR ACTIVITIES THAT REQUIRE FALL PROTECTION

6.1 Aerial Lift Devices

A fall restraint system must be used and properly anchored when employees are working from aerial lifts, suspended work platforms, and similar equipment. If a person must transfer themselves from the aerial platform to an elevated surface, 100% tie off is required.

6.2 Ladders

When working from a ladder that requires the use of both hands above 6 feet, a personal fall arrest system shall be used.

Ladders shall be secured or tied-off whenever possible to prevent accidental displacement. Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways or driveways, shall be secured or a barricade or other means shall be used to keep activities or traffic away from the ladder.

6.2.1 Step Ladders

When working on a step or A-frame ladder, if a worker's feet are on or above the sixth rung of a stepladder, the ladder shall be secured, tied off or held by at least one other person.

6.2.2 Extension Ladders

Another worker shall hold all extension ladders until the ladder can be secured or tied off.

6.2.3 Fixed Ladders

Existing installations that do not meet the criteria below shall require employees to be protected by personal fall arrest systems.

6.2.4 Cages or wells

- Cages or wells shall be provided on ladders of more than 20 feet to a maximum unbroken length of 30 feet.
- Cages shall extend a minimum of 42 inches above the top of landing, unless other acceptable protection is provided.
- Cages shall extend down the ladder to a point not less than 7 feet and no more than 8 feet above the base of the ladder, with bottom flared not less than 4 inches, or portion of cage opposite ladder shall be carried to the base.
- Cages at elevated locations shall extend to the handrail of the platform when the platform width is 4 feet or less.

6.2.5 Platforms

- Landing platform every 30 feet or fraction thereof for ladders with cages or in wells.
- Landing platform every 20 feet or fraction thereof if no cage, well, or ladder climb safety device is provided.

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- All landing platforms shall be equipped with standard railings and toe boards, so arranged as to give safe access to the ladder. Platforms shall be not less than 24 inches in width and 30 inches in length.
- Each ladder section shall be offset from adjacent sections. Where installation conditions (even for a short, unbroken length) require that adjacent sections be offset, landing platforms shall be provided at each offset.
- Ladder Climb Safety Devices
- Ladder climb safety devices can be used on ladders without platforms on towers, water tanks, and chimney ladders over 20 feet but not more than 150 feet in unbroken length.
- Ladder climb safety device shall be used with a harness, a connector that is no more than 9 inches in length between the attachment point on the harness and the point of attachment to the grab device, and a grab device compatible to the wire rope or rail used or with a harness and a self-retracting lanyard anchored above the ladder.

6.3 Scaffolding

Personal fall arrest system must be used while working on incomplete scaffold, during erection or dismantling, or as directed by scaffold inspection tag. In addition:

- Employers must provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of fall protection is feasible and doesn't result in a greater hazard to the workers.
- Completed scaffolds shall have a tag that specifies any modifications to the scaffolds that requires personal fall arrest systems.
- Completed affixed scaffold ladders that have a fall hazard greater than 20 feet shall:
 - Require workers to attach their personal fall arrest system to a self-retracting lanyard anchored to the top of the ladder, or
 - Require workers to attach their personal fall arrest system to the ladder rung as they ascend or descend the ladder, or
 - Have a ladder cage, or
 - Other acceptable means of fall protection as described within this standard.

7.0 RESCUE

Fall protection programs shall include requirements to ensure that personnel can be promptly rescued or perform self-rescue should a fall occur.

The use of suspension trauma straps is required and must be affixed to all Marathon Employee fall arrest safety harness. Trauma straps are recommended for contractors, but not required.

The availability of rescue personnel, aerial lifts, ladders, other rescue equipment or rescue services and response time should be evaluated prior to elevated work taking place.

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8.0 INSPECTIONS

8.1 Inspections

8.1.1 Frequency

- Fall protection equipment shall be inspected by the user prior to each use.
- Facilities shall designate a Competent Person to conduct documented inspections of fall protection equipment. Inspections should be conducted at least semi-annually.
- Other Inspections as dictated by the manufacture’s recommendations.
- Fall Arrest Equipment must be approved by the Safety Department and purchased through the Marathon Purchasing Group.

8.1.2 Scope - Before Use Inspection

- Cuts, tears, abrasions, mold, or undue stretching
- Alterations or additions which might affect its efficiency
- Damage due to deterioration from contact with high heat, acids, or corrosives
- Distorted hooks or faulty hook springs
- Tongues unfitted to shoulder of buckles
- Loose or damaged mountings
- Nonfunctioning parts

8.1.3 Periodic Evaluations

Safety Equipment room personnel inspect each harness and lanyard when returned.

Safety Equipment room personnel perform more extensive inspection and testing of each harness and lanyard every six months. A tag attached to each harness and lanyard shows the expiration date of the equipment.

Fall protection equipment with tags past their expiration date must be returned to the Safety Equipment Room for inspection and testing before use.

8.1.4 Inspections Identification

Fall protection equipment, which has been satisfactorily inspected, should be marked and/or color-coded with vinyl tape or some other secure means to designate current inspection.

Care should be used not to cover any equipment feature/component vital to inspection or performance, such as stitching, grommets, adjusting mechanisms, labels, etc., with the tape or marking means.

8.1.5 Removal from Service

Any component of a fall protection system must be immediately removed from service or recertified by a Competent Person (or manufacturer) if it has been subjected to fall forces.

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8.2 Competent Person

The Safety Department will ensure individuals performing periodic evaluations, purchasing new or replacement equipment and establishing inspection guidelines meet the criteria of a Competent Person.

9.0 EQUIPMENT STORAGE

Fall protection equipment must be stored in a clean dry location away from exposure to abrasive materials, cutting tools, equipment or materials, excessive heat, direct sunlight and chemicals.

10.0 FALL PREVENTION SYSTEMS

10.1 Guardrail Systems

Every ladder way floor opening, or platform shall be guarded by a standard guardrail system including toe boards on all exposed sides, except at the entrance to the opening. The passage through the railing shall either be provided with a swing gate or barrier or offset such that a person cannot walk directly into the opening.

Guardrails consist of top rail, mid-rails, posts (stanchions) and toe boards.

10.2 Covers and Openings for Holes

- Install covers on any hole, 2 inches or more in its least dimension.
- 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.
- Covers shall be secured to prevent accidental displacement.
- Immediately replace covers, which have been removed or damaged.
- Covers shall not project more than one inch above the floor level and all edges shall be chamfered to an angle with the horizontal of not over 30 degrees. All hinges, handles, bolts or other parts shall set flush with the floor or cover surface.

10.3 Fall Restraint Systems

A fall restraint system is a fall prevention system that prevents the user from falling any distance. The system is comprised of a full-body harness, along with an anchorage, connectors, and other necessary equipment. The system prevents and/or restrains the user from reaching the open edge of the structure or platform.

- Anchorage points used for fall restraint shall be capable of supporting 4 times the intended load.
- Restraint systems shall be rigged to allow the movement only as far as the sides and edges of the walking/working surfaces.
- Fall arrestors and self-retracting lanyards are not to be used as part of restraint system unless they are permitted by the manufacturer.

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10.4 Warning Line Systems

A warning line system is a barrier erected on a walking and working surface to warn employees of unprotected fall hazard. When work is performed on low pitched roofs or tank roofs, a warning line system may be used in place of a safety harness or guardrails.

Warning line system shall:

- Be erected around all sides of the work area.
- Be erected not less than 6 feet from the edge of all unprotected sides and edges of the roof. When mechanical equipment is used, the warning line shall be 10 feet from the edge that is perpendicular to the direction of mechanical equipment operation.
- Consist of rope, wire or chain and supporting stanchions.
 - The rope, wire, or chain shall be flagged at not more than 6-foot intervals with high visibility material.
 - The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 36 inches from the roof surface and its highest point is no more than 42 inches from the roof surface.
 - The stanchions shall be able to resist, without tipping over, a force of 16 pounds applied horizontally against the stanchion, 30 inches above the roof surface, in the direction of the roof edge.
 - The rope, wire, or chain shall have a minimum tensile strength of 500 pounds and after being attached to the stanchions, able to support the load applied to the stanchions.
 - The line shall be attached to each stanchion so that pulling on one section of the line will not result in slack being taken up in adjacent sections before the stanchion tips over.
- Have access paths connected to work area by a clear path formed by two warning lines. When the path is not in use, a rope, wire, or chain, equal in strength and height to the warning line, shall be placed across the path where it meets the warning line erected around the work area.

10.5 Safety Monitoring Systems

A safety monitoring system is a warning system where a person, having no other duties, monitors the proximity of workers to the leading edge of a low-pitched roof or walking/working surface.

- The safety monitoring system shall not be used by itself as a fall protection method. Safety monitoring system shall be used in conjunction with other fall protection system.
- The safety monitor shall not be used when weather creates additional hazards.
- The safety monitor shall be trained in the both the safety monitoring system and warning line systems and shall:
 - Be capable of identifying existing and potential fall hazards.
 - Have authority over the work as it relates to fall protection.

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- Be instantly distinguishable from the other workers such as by wearing an orange standby vest.
- Engage in no other duties while acting as safety monitor.
- Be positioned in relation to the workers, so as to have a clear, unobstructed view and be able to maintain voice communication.
- Not monitor more than eight exposed workers at one time.

11.0 FALL ARREST SYSTEMS

The primary function of a fall arrest system is to minimize the consequences of a fall rather than prevent its occurrence. Fall arrest systems provide complete and continuous fall protection while accessing and working at elevation.

A complete fall arrest system includes:

- the proper anchorage,
- body support (full-body harness),
- connecting device (lanyards/lifelines) interconnected and properly rigged to arrest a free fall, and
- training to include self-rescue (trauma straps) and rescue squad awareness.

11.1 General Requirements

Any equipment that is used as part of a fall protection system, but could also be used for other activities, such as slings, chokers, carabiners, etc., must be tagged, identified, or otherwise controlled and used only as part of a fall protection system. This equipment must be evaluated and approved by a Qualified Person before incorporating them as part of a fall protection system.

Fall Distance – The fall arrest system must be used and secured in a fashion so that the user cannot free fall more than 6 feet or contact the next lower level should a fall occur. This requires an evaluation of a clearance distance that includes:

- free fall distance,
- system elongation, e.g., vertical lifeline or in-line energy absorber,
- deceleration distance of shock absorbers,
- worker height and weight,
- deflection in horizontal life line (HLL) system, and
- a minimum safety factor of 2 feet

11.2 Equipment

11.2.1 Anchorage

- Strength – Capable of supporting 5,000 pounds per employee or twice the anticipated force and designed by a Qualified Person.
 - Pipe should be at least 6" schedule, spanning from 10' to 20'.



- Electrical conduits are not to be used under any circumstances unless approved by a qualified person.
- Lifelines should be a minimum of 1/2" diameter galvanized or stainless-steel cable.
- Guardrails are not to be used as anchorage points.
- Independence – Anchorages shall be independent of any anchorage being used to support or suspend platforms unless it has been evaluated by a competent person.
- Location – Anchorages should be located overhead to minimize free fall distance. Minimum height for most lanyard anchorage should be at shoulder level and overhead anchorage locations for both retractable devices and rope grab lifelines. When anchorage is below shoulder level, changes to the fall arrest system should be considered, such as shorter lanyards, additional shock absorbing capability, etc.
- Sufficient fall clearance – Calculate the total fall distance to ensure anchorage height is sufficient to prevent collision with the ground. Also, ensure lateral movement from fixed anchorage does not create a swing fall hazard.
- Identification – Anchorage points should be identified and selected using location requirements.

11.2.2 Full Body Harness

- Must fit and be worn properly with the straps tucked so as not to be caught on equipment or otherwise cause a hazard. Chest straps must be worn between the chest and collarbone and the rear D-ring being worn between the shoulder blades.
- Shall have permanently attached labels indicating manufacturer's name, serial number/lot number, manufacture date, capacity, semi-annual competent person inspection and that it meets OSHA & ANSI Z359.1 requirements.

11.2.3 Snap Hooks and Carabiners

- Shall have engraved or embossed approvals stating that it meets OSHA and/or ANSI Z359.1 standards.
- Shall be sized to be compatible with the connectors to which they are connected to prevent unintentional disengagement.
- Shall be self-closing and self-locking requiring at least two consecutive deliberate actions to open. The non-locking types are prohibited.

11.2.4 Deceleration Devices

- Are a required component of an overall fall arrest system and minimize loads experienced by anchorage and personnel?
- Shall have permanently attached labels indicating the manufacturer's name, serial number/lot number, manufacture date, maximum elongation force, maximum free fall distance, capacity, and that it meets OSHA and ANSI Z359.1 standards.

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11.2.5 Lanyards

Lanyards shall be anchored at a location to limit the free fall distance to no more than six feet.

- Lanyards must be used with a shock absorber.
- No more than one person may be attached to the same lanyard.
- Dual or “Y” lanyards shall be required to achieve 100% fall protection.
- A lanyard strap shall not be wrapped around a tie-off point and then attached back to itself unless it is a tieback lanyard where the lanyard straps have been designed accordingly.
- Flexible steel cable lanyards shall not be used by personnel performing work on or in close proximity to electrical equipment. A non-conductive lanyard must be used.
- Lanyards shall have permanently attached labels indicating the manufacturer’s name, serial number/lot number, manufacture date, capacity, and that it meets OSHA and ANSI Z359.1 standards.

11.2.6 Self-Retracting Lanyards

- Retractable devices are designed to arrest a fall within 2 feet and shall withstand a minimum tensile load of 3,000 pounds.
- Only retractable devices bearing current manufacturer’s certification shall be used.
- Locking mechanism shall be tested before each use.
- Retractable device cables or straps shall be pulled out and inspected for cuts, fraying, or other signs of damage before use.
- Retractable devices should only be attached to overhead anchorage.
- Retractable devices attached to fixed anchorage must be used with the wearer at less than a 45-degree angle or manufacturer’s requirement from the device to reduce the hazards of a swing fall.

11.3 Other Fall Arrest Systems – Lifelines

11.3.1 Vertical Lifelines

- May only be used by one person at a time. Each worker requires their own independent vertical lifeline.
- Should be protected from sharp, abrasive edges.
- Should be attached at the lower end to a second anchor point or weighted to provide stability and tension.
- Rope grab devices must be compatible with the type and size of rope or cable used and should remain above the shoulders of the user. Only non-trailing type rope grab devices shall be used for vertical lifelines constructed of steel cable.
- Manufacturers will specify maximum lanyard length for use on their vertical lifelines – usually 3 feet.

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- Used on rope grab systems require additional clearance distance considerations that include lifeline stretch.
- Shall have a minimum breaking strength of 5,000 pounds.
- Connected to an overhead anchorage that can withstand a force of 5,000 pounds.

11.3.2 Horizontal Lifelines

- A qualified person for fall protection must design the system. The competent person for fall protection will review and only approve the installation.
- Maintains a safety factor of at least two
- HLL systems require additional clearance distance considerations that include the lifeline deflection and elongation associated with cable sag during loading and the use of an in-line energy absorber when used.
- Lifelines should be located overhead to minimize the fall distance and to provide sufficient fall clearance distance.
- In-line energy absorbers should be considered to minimize arresting forces on anchor points.
- HLL's should be properly anchored and tensioned to designers' and manufacturers' specifications.
- Only permit use by the number of employees designated by the design.
- Retractable devices are preferred over lanyards to minimize fall distance.

12.0 REMOVING GRATING, PLATFORMS, STRUCTURAL STEEL, AND HANDRAILS

All areas where Grating, Platforms, Structural Steel, and or handrails are to be removed must have a hard barricade surrounding 100% of the hole prior to removal and throughout the tasks requiring the removal. All holes should be covered when crews are not working on them.

12.1 Grating, Platforms, Structural Steel and Handrail Removal Procedure

- Any hole in grating or railing that has a potential fall of greater than 4 feet requires a Grating, Structural Steel & Platform Removal Form to be completed and approved.
- The Grating, Structural Steel & Platform Removal form R-11-033-F01 (Attachment 1) must be at the jobsite throughout the job while the Grating, Platforms, Structural Steel and or Handrails are missing.
- The Tier 1 Grating and Platform Survey R-11-033-F02 (Attachment 2) can help audit work areas where Grating has been removed and or replaced. This survey can also help with new installations to ensure all Grating and Platforms are installed correctly.
- All structural steel members that are part of the engineered design for a structure must have engineering approval to be removed. Approval is to be documented on the Grating, Structural Steel & Platform Removal form R-11-033-F01. Engineering

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Approval via form R-11-003 F01 is not required for only grating, handrail, and platform removal.

- Marked up drawings and/or pictures must be accompanied to the form for approval when removing a structural member.
- All modifications made to a single structure must be tracked with the same approval form. Additional modifications made after the initial approval must be documented and the signoff revalidated.
- The engineer approving the structural modifications must be competent about the items being changed.
- Any non-like kind or permanent structural changes to the original design require the MOC process.

13.0 TRAINING

All employees working at heights, exposed to fall hazards and using fall protection equipment or other personnel involved in the fall protection program shall be trained to recognize the hazards of falling in the workplace and how to minimize such hazards.

- Training shall be conducted by a Competent Person.
- Training must, at a minimum, address the following:
 - Facility fall protection procedures
 - How to evaluate fall hazards
 - Fall prevention measures
 - Equipment use, care, and limitations
 - Proper fitting and wearing of fall protection equipment
 - Requirements and proper use of anchor points
 - Inspection
 - Calculating clearance distances
 - Self-Rescue (Trauma Straps)
 - Brief Awareness of Rescue Squad

The responsibility for training contractor employees on the requirements of the fall protection program lies with the contractor employer.

14.0 REVIEW AND REVISION HISTORY

Revision #	Preparer	Date	Description
0	Mark Willand	12/19/2021	Reformatted and Numbered per Document Control Policy, R-63-001.
1	Brady Emmons	3/10/23	Revised Section 12.0 to add structural steel requirements.
2	David Levine	2/7/2024	Added Section 15.0 Appendix A – Interim Guidance for Rope Access

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15.0 APPENDIX A – INTERIM GUIDANCE FOR ROPE ACCESS

Rope Access Work

1. Rope access work will only be performed by members covered under the Society of Professional Rope Access Technicians (SPRAT) or the Industrial Rope Access Trade Association (IRATA).
 - a. SPRAT/IRATA Levels of Training are:
 - i. Level 1 – A certified technician trained to perform standard rope access operations and limited rescues from rope access systems under the direct supervision of a Rope Access Level 2, or Level 3 Supervisor.
 - ii. Level 2 – A certified technician trained to perform all rope access rigging and work under the direction of a Rope Access Level 3 Supervisor, with the skills necessary to perform standard rescues from rope access systems.
 - iii. Level 3 – (Rope Access Supervisor): A person with the training, skills, experience, and certification necessary to assume responsibility for the entire rope access work site, including management and guidance of other Rope Access Technicians. One who is capable of designing, analyzing, evaluating, and specifying rope access systems, and who has the knowledge and experience to direct rescue operations from rope access systems, as well as the skills necessary to perform advanced rescue from rope access systems.
2. All persons conducting rope access work shall be trained and competent to perform self-rescue. All rope access workers shall be properly supervised and self-supporting. Rope access work teams shall consist of a minimum of 3 members, this fulfills the requirement to ensure that shall anyone require help they can quickly perform a rescue. One member of the work team shall be qualified as a Level 3 Rope Access Supervisor. The Rope Access Supervisor shall ensure that the provisions for rescue are adequate. Sufficient personnel shall be readily available to provide assistance in the event of an emergency.
3. Prior to permitting Rope Access work with the Owning Department, a Joint Job Site Visit (JJSV) shall include at a minimum the Authorized Employee (Level 1 / 2) and APIC (Level 3).
4. A Job Safety Analysis (JSA) shall be completed before beginning rope access work. JSA shall include, but not limited to, the following information:
 - a. Identified anchor points.
 - i. If identified anchor points exceed 400 degrees additional safety precautions (such as high temperature anchor connectors etc.) shall be discussed and put in place for work to commence.
 - ii. For rope access work multi-anchor load sharing can be used, but only if approved by a Level 3 Technician. Multi-anchor load sharing is defined as several anchors connected together to make a single anchor that will meet the strength required for rope access work.
 - b. Rigging Diagram
 - c. Rigging Equipment List
 - d. Plans for Self-Rescue
 - e. Names and Technical Level of each team member must be verified.
 - f. Emergency contact information for the company performing the work.

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- g. Current weather conditions and wind speed
 - h. Assess the need for continuous atmospheric monitoring, and respiratory protection if needed. Fresh air work not allowed.
 - i. Barricading requirements
 - j. Drop Tool prevention tactics and techniques.
 - k. The JSA and Rope Access company documentation will stay with the Safe Work Permit while the work is being performed. (One copy at the jobsite, one copy with the operator)
5. Permitting Rope Access work will follow the Anacortes Safe Work Permit Document R-11-005 and is classified in the Work Classification Table as a Medium Risk task (p.51 of R-11-005).

Fall Protection / Rope Access: Heights using rope access methods (IRATA-certified only)	MED	R-11-033	Unit Operator, Competent Person, Craft APIC; Notification / Approval: Safety
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- a. Level 1 or Level 2 Technician signs as **Authorized Employee**
- b. Level 3 Technician signs as **APIC**
- c. A copy of the Rope Access and Rescue Plan shall be included with the permit when the job is complete and permit is closed out.

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16.0 ATTACHMENT 1 – GRATING, PLATFORM, STRUCTURAL STEEL AND HANDRAIL REMOVAL FORM SAMPLE (R-11-033-F01)

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Description of Zone/Area and Equipment of Removal:

Date Grating/Handrail/Structural Steel will be removed: _____

Date Grating/Handrail/Structural Steel will be Re-Installed: _____

Maintenance Coordinator/Supervisor Requesting Removal of Floor/Grating or Handrails:
 _____ Radio Ch.# _____ Phone #: (____) - _____

Type of work/removal to be done (Grating/Platform/Handrail/Structural Steel):

What type of material will be installed as a temporary barricade:

SAMPLE

1. Are rigid barricades installed completely around the hazard area? Yes No N/A
2. Is a Safety Monitor designated and ready to assume position? Yes No N/A
3. Have all affected employees involved with this work, within the hazard zone, been trained in the potential fall hazards and are using appropriate PPE to prevent falls? Yes No N/A
4. Have all affected employees completed a JSA, Joint Jobsite Visit and have supervisor approval? Yes No N/A
5. Has affected work areas above/below proposed hazard zone been appropriately barricaded? Yes No N/A

Unit Operator: _____ **Date:** _____

Area Supervisor (Operations Supervisor): _____ **Date:** _____

Maintenance / Project Coordinator: _____ **Date:** _____

Mech/Structural Engineering (Structural Steel Removal Only): _____ **Date:** _____

Authorized Employee (Craft conducting the work): _____ **Date:** _____

Closeout

Have all components been reinstalled? Yes No N/A

Mech/Structural Engineering (Structural Steel Removal Only): _____ **Date:** _____

Maintenance / Project Coordinator: _____ **Date:** _____

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17.0 ATTACHMENT 2 – TIER 1 GRATING AND PLATFORM SURVEY CHECKLIST SAMPLE (R-11-033-F02)

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Area:	Date:	
Unit:	Comments:	

Checklist Inspection Guidance

The load bearing edges are generally the long ends of the grating where the bearing ends of the bearing bars sit on the support steel or concrete.

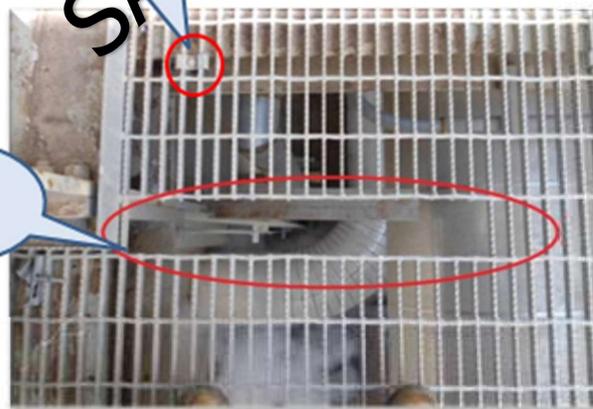
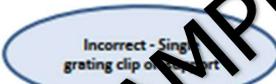
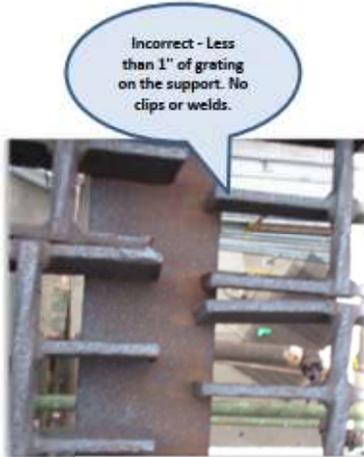
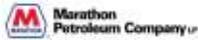
Check for signs of excessive corrosion and physical damage to the grating, supports and grating clips

	Grating - General Conditions	Yes	No	Corrective Actions
1	Is the grating missing?			If yes, hard barricade area immediately, notify supervisor and enter a Safety Work Order
2	Is the grating bent, bowed, not level, or flexes (greater than 1/4") when walked on?			If yes, hard barricade area immediately, notify supervisor and enter a Safety Work Order
3	Is the grating supported on load bearing edges with at least 1" of overlap onto the supports?			If no, hard barricade area immediately, notify supervisor and enter a Safety Work Order
4	Is the grating installed with the serrated-surface facing up?			If no, hard barricade area immediately, notify supervisor and enter a Safety Work Order
5	For penetrations in the grating is a toe-board installed?			If no, hard barricade area immediately, notify supervisor and enter a Safety Work Order
6	Is grating and support system corroded to a point where the integrity of the grating is compromised?			If yes, hard barricade area immediately, notify supervisor and enter a Safety Work Order
7	Is the grating size and/or configuration such that the grating will not fall between the supports?			If no, hard barricade area immediately, notify supervisor and enter a Safety Work Order
Grating - Secured Down with Clips		Yes	No	Corrective Actions
8	Are at least 2 "tie down" clips installed on each support (e.g., 6-8 clips per grating section)?			If no, hard barricade area immediately, notify supervisor and enter a Safety Work Order
9	Are grating clips tightened and secured in place?			If no, hard barricade area immediately, notify supervisor and enter a Safety Work Order
Grating - Welded in Place		Yes	No	Corrective Actions
10	Is the grating welded at a minimum of two places per support?			If no, hard barricade area immediately, notify supervisor and enter a Safety Work Order

EXAMPLES



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Project Maintenance Coordinator: Approved / Denied _____	Date: _____
Area Operator: Approved / Denied _____	Date: _____
Contractor Rep.: Approved / Denied _____	Date: _____

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