

MATERIAL HANDLING N

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437-004-1610 General Requirements.

(1) Material storage.

(a) Storage of material must not create a hazard. Stack, block or interlock stored items and limit their height so that they are stable and secure from sliding or collapse.

(b) Storage areas must be free from accumulated materials that are tripping, fire or explosion hazards.

(c) Pile foundations must support maximum loads without sinking, sagging, or tipping.

(d) Storage of toxic, flammable, radioactive, or irritating substances must comply with other appropriate parts of this standard, Division 4.

(e) Where mechanical handling equipment is in use, there must be safe clearance in aisles, at loading docks, through doorways and where turns are made. Aisles and passageways must be clear and in good repair.

(f) Workers must not be under or near elevated loads and moving material unless they have adequate protection.

(g) Block or crib loads suspended in slings or supported by hoists, jacks, or other devices, before allowing workers to be underneath them.

(h) Do not drop or throw material from an elevation to other people.

(i) Use tag lines or guide ropes when manual control is needed over swinging loads.

(j) Load pallet boards, and trays so that the material is stable.

(k) Stored material must not obstruct lights and fire extinguishing equipment, including sprinklers, aisles, exits, or electrical control panels.

(l) When storing materials that could cause hazardous reactions, segregate and mark them with appropriate warning signs.

(2) Stacks and piles.

(a) All material stacks and piles must be on level and solid supports and be stable.

(b) Use binding strips or cross ties when needed to stabilize stacks and piles.

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(3) Bricks and blocks.

(a) Brick stacks must not be more than 7 feet high. When a loose brick stack reaches a height of 4 feet, cross tie it and taper it back 2 inches for every foot of height more than 4-foot.

(b) When stacking masonry blocks more than 6 feet high, cross tie and taper them back one-half block per tier above the 6-foot level.

(4) Lumber.

(a) Remove all nails from used lumber before stacking it.

(b) Lumber stacks must be made of units that are no more than 1 1/2 times higher than the smallest dimension of their base.

(5) Bagged materials.

(a) Stack bagged materials by stepping back the layers and cross keying the bags at least every 10 bags high.

Note: This requirement does not apply if pallets stabilize the stack of bagged materials.

(b) When removing bags from a pile, keep the pile stable.

(6) **Pipe and bar stock.** Take pipe and bar stock from the ends of unsecured piles, not from the side.

(7) Drums, rolls, cylindrical objects.

(a) Barrels, drums, large pipe, rolls of paper, and other cylindrical objects piled on their sides must have blocks to hold the bottom row. Separators between rows of the pile, must have blocks at each end.

(b) There must be spacing strips between bundles.

(8) Equipment design and construction.

(a) All equipment, structures, and accessories used for handling or storing materials must comply with sound engineering practices and the specifications and recommendations of the manufacturer. They must support the loads acting on them in addition to their own dead loads. Allow for wind, impact, erection and any special loadings that may occur. No combination of these loads may cause a stress on any part that exceeds the allowable stress for that part.

(b) Do not exceed equipment manufacturer's recommended safe load capacities.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

437-004-1630 Conveyors.

(1) Controls.

- (a)** The operator's station must have a way to quickly stop the motor or engine.
- (b)** If the operator's station is remote from the power source, there must be a way to quickly stop the system at the motor or engine and at the operator's station.

(2) Backstops and brakes. Inclined conveyors, where reversing or running away is a hazard, must have anti-runaway backstop devices, or suitable guards.

(3) Loading, transfer and discharge points.

- (a)** Conveyor loading, transfer and discharge points must have a way to guard workers from injury by moving material.
- (b)** The area around all loading and unloading points must be clear of obstructions.

(4) Guards.

- (a)** Screw conveyors must have guards to prevent contact with turning flights.
- (b)** Where a conveyor passes over a work area, aisles or thoroughfares, there must be guards to prevent material from falling.
- (c)** Return sections of conveyors less than 7 feet above passageways and work areas, must have guards.
- (d)** Comply with Subdivision **4/O**, OAR 437-004-1910, Machine Guarding, for guarding conveyor drive mechanisms and power driven parts.
- (e)** Input conveyors for chippers, burners, furnaces, or other dangerous machines must have guards to prevent workers from falling into the conveyor. If the machine operation does not allow complete guarding of the opening, the worker must wear a life belt tied off to a lifeline.
- (f)** Workers must not walk across or step over conveyors except on bridges or walkways.

(5) Portable conveyors.

- (a)** Portable conveyors must be stable at all operating ranges and must have devices or be blocked to prevent unintended movement.
- (b)** Portable electric conveyors must be grounded. Wiring, switches, and electrical connections outside and exposed to the weather must be weatherproof and dustproof.

(6) Riding prohibited. Workers must not ride on a conveyor.

(7) Ramps, skids, rollways. Where the person putting material down a chute, ramp, skid, or rollway does not have a clear view of a lower landing where workers might be, there must be a working automatic warning device.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

437-004-1670 Automotive Hoists.

(1) Automotive hoists elevated with a load to a position that is a hazard, must be supported by a safety device capable of preventing descent if the lift fails.

(2) Use the lifts according to the manufacturer's recommendations and those of ANSI B153.1-1990.

(3) Place vehicles on lifts according to the manufacturer's recommendations.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

437-004-1680 Storage of Hazardous Chemicals.

(1) Store hazardous chemicals:

(a) Separately, to prevent hazardous reactions. Label storage areas by category to prevent the mixing of incompatible types of chemicals. (Examples of categories include: flammable liquids, acids, bases oxidizers.)

(b) In conformance with manufacturer's instructions on the label or Safety Data Sheet (SDS) to prevent conditions that could adversely affect container integrity or product stability.

(c) Separate from food and personal items to prevent contamination.

(d) Separate from sources of ignition. In locations where flammable vapors may be present, take precautions to prevent fires by eliminating or controlling sources of ignition.

NOTES:

Division 4/L, 437-004-1440, requires that signs reading "No Smoking or Open Flame" or "FLAMMABLE – KEEP FIRE AWAY" be posted in areas where flammable liquids are received, stored or dispensed.

Chemical storage areas should comply with appropriate state and local fire codes. Identify chemical storage buildings with a sign in accordance with NFPA 704.

Examples of ignition sources include open flames; smoking; cutting and welding activities; hot surfaces and radiant heat; frictional heat; static, electrical, and mechanical sparks; and, chemical and physical/chemical reactions.

(2) Ventilate storage areas, as needed to keep air contaminants below 25 percent of the lower explosive limit (LEL).

NOTE: Permissible explosive limits (PELs) for substances listed in **4/Z**, OAR 437-004-9000, Air Contaminants, also apply.

(3) Provide natural or artificial lighting equal to 20 foot-candles for safe entry into the storage area and to permit identification of chemical containers.

(4) Storage, handling, and removal of hazardous chemical containers must not cause hazards to workers.

NOTES: Other Division 4 rules with requirements that may apply to chemical storage areas include:

4/H: OAR 437-004-0720 Flammable Liquids.

4/H: OAR 437-004-0950 Hazardous Waste Operations and Emergency Response, when employees are required to cleanup certain emergency chemical spills.

4/K: OAR 437-004-1305(5) Emergency eyewashes and shower equipment, if required for emergency decontamination.

4/L, Fire: OAR 437-004-1430 through 1470, when storing or dispensing flammable liquids.

4/N: OAR 437-004-1610 General Requirements.

4/S, Electricity: OAR 437-004-2810 through 437-004-3075.

(5) The following additional requirements apply where storing Restricted Use Pesticides:

NOTE: Restricted Use Pesticides (RUPs) are a category of pesticide products that pose a higher risk to people, animals, or the environment. They can only be purchased by and used under the supervision of a person with a pesticide license.

(a) Lock the storage area to prevent access by unauthorized persons.

(b) Provide separate sections within the storage area for each category of pesticide product. (Examples include: insecticides, herbicides, fungicides, fumigants.) Label these areas by general category.

NOTE: The goal of separation is to prevent hazards to employees caused by the mixing of incompatible chemicals and the contamination of one type of product, or storage surface with a more toxic product due to a leak or spill.

(c) Floors and shelves must be constructed of a chemically-resistant material; or coated, sealed, or provided with secondary containment that prevents the absorption of the hazardous chemicals.

(d) When the storage area contains enough chemical that a leak or spill could cause the material to leave the confines of the building, there must be sufficient containment or other means to contain any leaks or spills within the storage area.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

OR-OSHA Admin. Order 3-2014, f. 8/8/14, ef. 8/8/14.

437-004-1700 Forklifts and Other Powered Industrial Trucks.

(1) General requirements.

(a) This section has safety requirements for the maintenance and use of fork trucks, forklifts, platform lift trucks, motorized hand trucks, and other specialized industrial trucks used in agriculture. These are considered vehicles and additional standards are found in Division 4/U. This does not apply to compressed air or non-flammable compressed gas-operated industrial trucks, nor to agricultural vehicles defined elsewhere in this standard, nor to vehicles intended primarily for earth moving or over-the-road hauling.

(b) Modifications and additions that affect capacity and safe operation must have the manufacturer's prior written approval. Change the capacity, operation and maintenance instruction plates, tags or decals to reflect any changes to the vehicle.

(c) If the truck has front-end attachments not installed by the factory, the truck markings must identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with the load laterally centered.

(d) Keep nameplates and markings in place and legible.

(2) Safety guards.

(a) Overhead guards.

(A) If a lift truck operator could be struck by falling, or stacked objects, the truck must have an overhead guard. The guard must be strong enough to support impact load tests in Table 1:

Table 1		
Rated Truck Capacity at 24" Load Center	Impact Test (Load X Drop Distance)	Minimum Weight of Test Load
3,000 and under	4,000 ft.-lbs.	750 lbs.
3,001 to 5,000 lbs.	8,000 ft.-lbs.	1,500 lbs.
5,001 to 8,000 lbs.	16,000 ft.-lbs.	3,000 lbs.
8,001 to 14,000 lbs.	24,000 ft.-lbs.	3,000 lbs.
14,001 to 25,000 lbs.	32,000 ft.-lbs.	3,000 lbs.
25,001 and over	36,000 ft.-lbs.	3,000 lbs.

(B) Guards that pass the test must have a metal tag permanently attached to the canopy where reading it from the ground is easy. This tag must show the impact test load, in foot-pounds to which similar guards have been tested.

FORKLIFTS & OTHER POWERED INDUSTRIAL TRUCKS

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Note: Guards required by (2)(a)(A) through (C), or by the following rules, do not have to withstand the impact of a capacity load falling from any height.

(C) Untested guards must be made of material in Table 2 or material of equivalent strength or stronger.

Table 2					
Rated Truck Capacity	Round Pipe		Square Tube (CRS)		
	(Std.)	(X Heavy)	(XX Heavy)	(3/16" Wall)	(1/4" Wall)
3,000 and under	1 1/2"	1 1/4"	-----	1 1/4"	-----
3,001 to 5,000 lbs.	2"	1 1/2"	-----	1 1/2"	-----
5,001 to 8,000 lbs.	2 1/2"	2"	1 1/2"	2"	-----
8,001 to 14,000 lbs.	3"	2 1/2"	2"	2 1/2"	2 1/2"
14,001 to 25,000 lbs.	-----	3 1/2"	3"	3 1/2"	3"
25,001 and over	-----	4"	-----	4"	3 1/2"

(D) The construction of canopy guards built to comply with (C) above presumes four upright members. Guards with less than four upright members must be equally strong.

(i) Canopy type overhead guard frames must have structural rigidity.

(ii) All guard mountings or attaching brackets must provide adequate support to the upright members of the canopy type overhead guard.

(iii) Cantilever overhead guards must be of equivalent strength.

(E) Guards must not interfere with good visibility. Openings in the top must not be more than 6 inches in one of their two dimensions. Guards must be large enough to extend over the operator under all normal circumstances of operation, including forward tilt.

(i) If the mast-tilting mechanism fails, the overhead guard must not injure the operator.

(ii) There must be at least 39 inches of clear vertical space between the operator's seat when depressed and the underside of the guard. There must be at least 74 inches of clear vertical space between the platform for standing operators and the underside of the guard.

Note: Where overall height of truck with forks in lowered position is limited by head room conditions and there is insufficient space for vertical clearance or for the operator to assume a normal driving position, normal overhead guard heights may be reduced, or the overhead guard may be omitted. The height and stability of stacks of piled material, the weight of individual units handled, and the operating space available must provide reasonable safety for the operator if removing the overhead guard is necessary.

(b) **Back rest.** Lift trucks that handle small objects or loose units must have a vertical load back rest.

(A) It must be strong enough to prevent the load or any part of it from falling toward the operator.

(B) It must not interfere with good visibility.

(C) Size of openings must not be more than 6 inches in one dimension.

(c) **Shear point guards.** Shear points on forklift loaders and similar type vehicles must have guards.

(3) Fuel handling and storage.

(a) Store and handle liquid fuels according to 4/H, OAR 437-004-0720.

(b) Store and handle liquefied petroleum gas fuel according to 4/H, OAR 437-004-0780.

(4) Changing and charging storage batteries.

(a) Battery chargers must be in areas that are safe for that purpose.

(b) There must be facilities for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage and for adequate ventilation.

(c) Use a conveyor, overhead hoist or equivalent material handling equipment to handle large batteries that power electric forklifts.

(d) Use only a carboy tilter or siphon to handle electrolyte.

(e) Pour acid into water not water into acid when servicing batteries.

(f) Set truck brakes before changing or charging batteries.

(g) Vent caps must function and the battery compartment cover(s) must be open to dissipate heat.

(h) There must be no smoking in the charging area.

(i) Prevent open flames, sparks, or electric arcs in battery charging areas.

(j) Keep tools and other metallic objects away from the top of uncovered batteries.

(5) Lighting for operating areas. Where general lighting is too dim, the vehicle must have its own directional lighting.

(6) Dockboards (bridge plates). See 4/D, OAR 437-004-0390(1).

(7) Trucks.

(a) Set the brakes on trucks or chock the rear wheels to prevent them from rolling while they are boarded with powered industrial trucks.

(b) Use nose jacks when necessary to support a semitrailer and prevent a nose dive during the loading or unloading.

(8) Operator training.

(a) Develop and use a training program for operators of powered industrial trucks. The employer or an outside training entity may give the training. It must contain at least the following:

(A) A study and test portion covering at least the rules in this standard, the information provided by the manufacturer for operation of the equipment and any special information dictated by the operating environment.

(B) A behind-the-wheel driving portion, supervised by a person competent in the operation of the particular equipment and familiar with the area and circumstances of its use.

(C) Tailor both parts to the specific type of equipment, the material being handled and the location of its use.

(b) Only fully trained workers may operate powered industrial trucks, except those under direct supervision as part of the behind-the-wheel training program.

(c) Conduct refresher training for drivers annually or when their driving record indicates the need for additional training, whichever is more frequent.

(d) Employers may not consider a new worker trained and qualified based on experience from a previous employer unless the previous experience was on the same type of equipment under substantially the same operating circumstances and the worker had a safe operating record acceptable to the new employer.

(9) Truck operations.

(a) Do not drive a powered industrial truck up to anyone standing in front of a fixed object.

(b) Do not stand or pass under the elevated part of a powered industrial truck.

(c) Only the operator may ride on a powered industrial truck unless it has a second seat or area intended for another rider.

(d) Do not put any part of the body between or reach through the uprights of the mast or outside the running lines of the truck.

(e)

(A) Fully lower the forks or platform on an unattended powered industrial truck. Also, neutralize the controls, turn off the power, and set the brakes. Block the wheels if it is on an incline.

(B) Unattended is when the operator is 25 feet or more away but vehicle remains in view or anytime the vehicle is not in view.

(C) When the operator gets off the truck but is within 25 feet and can still see it, the forks or platform must be down, the controls in neutral and the brakes set, unless loading or unloading items to or from the forks or platform.

(f) Keep a safe distance from the edge of ramps or platforms while on an elevated dock, platform or freight car.

(g) Whenever a truck has vertical only, or vertical and horizontal controls that elevate with the lifting carriage or forks for lifting personnel, do the following:

(A) Use a safety platform secured to the lifting carriage and/or forks.

(B) Have a way for people on the platform to shut off power to the truck.

(C) Provide protection from falling objects as necessary by the operating conditions.

(h) When using a forklift to lift people, take the following precautions:

(A) Use a platform with standard guardrails secured to the lifting carriage or forks.

(B) The hydraulic system must not be able to drop faster than 135 feet per minute if any part of the system fails.

(C) Someone must be in the operator's station while workers are on the platform.

(D) Someone must be in the normal operating position while raising or lowering the platform.

(E) Other than very slow inching, do not move the truck from point-to-point with the platform raised more than 4 feet while workers are on it.

(F) There must be a guard on the area between the platform and the mast to prevent contact with chains or other shear points.

(10) Traveling.

(a) Climb or descend grades slowly.

(A) Drive loaded trucks with the load upgrade if the incline is steep enough to spill the load.

(B) Tilt the load back and raise the forks or platform only as far as necessary to clear the road surface.

(b) Drive only as fast as conditions permit, leaving enough time to stop.

(c) Slow down on wet and slippery surfaces.

(d) Do not run over loose objects.

(11) Loading.

(a) Do not handle loads heavier than the rated capacity of the truck.

(b) Treat trucks with attachments as partially loaded trucks when not handling a load.

(c) The forks or platform must be under the load as far as possible and the mast tilted backward to stabilize the load.

(d) Do not tilt forward with forks or platform elevated except to pick up a load. Do not tilt an elevated load forward except when it is in a deposit position over a rack, chute or stack. When stacking or tiering, use only enough backward tilt to stabilize the load.

(12) Maintenance of powered industrial trucks.

(a) If a powered industrial truck needs repair, take it out of service until repairs are done.

(b) Do not add fuel while the engine is running.

(c) Clean up spilled oil or fuel or allow it to completely evaporate before restarting the engine. Do not use the vehicle without the fuel filler cap in place.

(d) Do not use a flame to check the electrolyte level in batteries or the level in fuel tanks.

(e) Only authorized persons may repair powered industrial trucks.

(f) Disconnect the battery before working on the electrical system.

(g) Use only replacement parts that assure equivalent safety as the originals.

(h) Do not change the relative positions of parts from what they were when the vehicle was made. Do not remove parts except as in (i) below. Do not add counter weighting to fork trucks without approval by the manufacturer.

(i) Check powered industrial trucks daily before using them. Do not use them if any condition is found that adversely affects the vehicle's safety.

(j) Remove from service any vehicle that gives off hazardous sparks or flames.

(k) Keep powered industrial trucks clean, free of lint, excess oil, and grease. Clean the trucks with noncombustible cleaners. Do not use low flash point (below 100 degrees F.) solvents. Follow the directions on the cleaner's label.

(l) You may convert powered industrial trucks from gasoline to liquefied petroleum gas fuel if the converted truck complies with the specifications for LP or LPG trucks. Use only approved conversion equipment.

(13) Control of gases and fumes. Take effective measures to keep the concentration levels of carbon monoxide gas created by powered industrial trucks below the levels in 4/Z, OAR 437-004-9000.

(14) ROPS requirements. Rollover protective structures are covered in 4/U, OAR 437-004-3650.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.
OR-OSHA Admin. Order 9-2006, f. 9/22/06, ef. 9/22/06.

437-004-1750 Helicopters.

(1) Scope. This applies to the use of helicopters to harvest ornamental trees.

(2) Briefing. You must hold a briefing before each day's work that covers the safety and communication procedures for the pilot and ground personnel.

(3) Flight path. There must be an established flight path from the pick up point. All employees in the area must know this path before lifting the first load from a new job site or when there is a change in procedures.

(4) Area under the flight path. Equipment or employees must not occupy the area under the flight path during helicopter flight.

(5) Drop zone – where. A pilot and responsible supervisor must establish the location of the drop zone, decking areas, loading areas, and designated safety zones, taking into consideration current operating conditions. Notify all workers on the landing when a change in operating procedures is necessary.

(6) Drop zone – how big. The landing drop zone must be large enough to handle all incoming bundles of trees without crowding the landing crew.

(7) Under the load of helicopter. Workers must never be under the load or the helicopter except one person to hook up or unhook the load. Workers may approach the load to pull the rigging only after the helicopter leaves the area above the landing.

(8) Landing. Landings must have the minimal slope necessary for drainage in the drop zone and decking area to prevent bundles from rolling.

(9) Approach. The approach to the landing must be as clear as possible.

(10) Loads. Loads must be properly slung. Tag lines must be short enough to prevent their being drawn up into the rotors. On freely suspended loads, you must use pressed sleeves, swedged eyes or equivalent means to prevent hand splices from spinning open or cable clamps from loosening.

(11) Electric cargo hooks. All electrically operated cargo hooks must have an electrical activating device that prevents inadvertent operation. They must also have an emergency mechanical control for releasing the load. A competent person must test the hooks before each day's operation to assure that the release functions properly, both electrically and mechanically.

(12) Hardhats. Workers must wear hardhats secured with chin straps, eye protection and other personal protective equipment when in the load receiving area.

NOTE: See Division 4/I for specific requirements about Personal Protective Equipment.

(13) Clothing. Workers must not wear loose-fitting clothing that could flap in rotor downwash and snag on the hoist line.

(14) Flying objects. Take all necessary precautions to protect employees from flying objects in the rotor downwash. Secure or remove all loose gear within 100 feet of the pickup or landing area.

(15) Hook approach. There must be a safe way for employees to reach the hoist line hook and engage or disengage cargo slings.

(16) Rubber gloves. Workers must wear rubber gloves when handling suspended lines or they must use a grounding device to discharge static charges before touching the load.

(17) Weight limit. The weight of lifted loads must not exceed the helicopter manufacturer's rating.

(18) Limited visibility. The employer must ensure that when there is limited visibility because of dust or other conditions workers use special caution to keep clear of main and stabilizing rotors. The employer must also take precautions to eliminate, as far as practical, the dust or other conditions reducing visibility.

(19) Signal systems. The employer must instruct the aircrew and ground personnel on the signal systems in use and must review the system with the employees before flight operations begin. This applies to both radio and hand signal systems.

(20) Approach limit. Do not allow workers to approach within 50 feet of the helicopter when the rotor blades are turning, unless work duties require their presence in that area.

(21) Stay in view. Require employees who must approach the helicopter when blades are rotating to approach or leave in full view of the pilot and stay in a crouched position. Do not allow workers to be in the area from the cockpit or cabin rearward while blades are rotating.

(22) Communication. There must be constant reliable communication between the pilot and a designated member of the ground crew in the pickup and landing area. The designated member must be clearly distinguishable from other ground personnel.

(23) Fire. There must be no open fires where they could be spread by the rotor downwash.

N HELICOPTERS / ROPE, CHAIN, RIGGING, & HOISTS

(24) Fueling. Helicopter fueling areas must be separate from all other operations.

(a) Refueling of any type helicopter with aviation gasoline or Jet B (Turbine) type fuel must never be allowed while the engine is running.

(b) Refuel helicopters that use Jet A (turbine kerosene) type fuel with engines running only if these criteria are met:

(A) No unauthorized employees are within 50 feet of the operation or equipment, and;

(B) Fire extinguishers are available and have a combined rating of at least 16A:160BC.

(c) Train employees in the refueling operation and the use of the available fire extinguishing equipment.

(d) There must be no smoking, open flames, exposed flame heaters, flare pots or open flame lights within 50 feet of the fueling area or fueling equipment. The fueling area must be posted with "NO SMOKING" signs.

EXCEPTION: Aircraft pre-heaters are exempt. However, do not fuel while the heaters are in operation.

(e) Before refueling, ground the fueling equipment and the helicopter and electrically bond the fueling nozzle to the helicopter. Using conductive hose does not accomplish this bonding. All grounding and bonding connections must be electrically and mechanically firm to clean unpainted metal parts.

(f) Pump fuel only by hand or power, do not pour or use gravity flow. Nozzles must be self-closing or have deadman controls and must not be blocked open. Do not drag nozzles on the ground.

(g) In case of a spill, immediately stop fueling until the person in charge determines that it is safe to resume the operation.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, 1/8/28/98, ef. 10/1/98.

437-004-1805 Rope, Chain, Rigging, and Hoists.

(1) Scope. These are standards for the safe use of hoists, rope, chain, and fittings.

(2) Definitions.

Mousing – Using small cordage or wire to prevent unintended separation of rigging components.

Rope – Wire rope unless otherwise specified.

(3) Loading and capacity. Do not load any rigging equipment or hoisting device more than its rated safe working load or capacity.

(4) Inspection. Inspect rigging and hoisting devices before use and as necessary during use to ensure safety. Immediately remove from service defective rigging or hoisting devices.

(5) Operators – handling loads.

(a) Workers must not ride hooks, slings, rigging, or loads. Suspend or elevate a person only when using a safe personnel lift.

(b) Personnel lift must meet these requirements:

(A) The structure must be rigid and strong enough to support loads with a safety factor of four times the intended load.

(B) The personnel lift must be big enough to accommodate all persons without crowding, and to provide sufficient work space so workers will not hinder or obstruct each other.

(C) There must be standard guardrails on all sides of the personnel lift. (See 4/D, OAR 437-004-0320(6) for guardrail design specifications.)

(D) The personnel lift must have supports on all four corners that provide full stability against tipping while occupied.

(E) Secure the load lifting attachment for the personnel lift to the crane or derrick hook in a way that will prevent accidental release.

(c) Only one person will give operating signals during hoisting operations.

EXCEPTION: In an emergency, anyone may give a “stop” signal; such signal must be obeyed.

(d) All persons must be in the clear before a signal is given to move a load or equipment.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, f/8/28/98, ef. 10/1/98.

437-004-1825 Tackle and Hoisting Equipment.

(1) Blocks, sheaves, shackles and drums.

(a) Use only sheaves and drums with diameters recommended by the wire rope manufacturer for the size rope.

(b) Secure all pins, including bearing and yoke pins, of all blocks against accidental displacement.

- (c) Fit all blocks with line guards or design and use them in a way that prevents fouling.
- (d) Sheaves carrying ropes that can be momentarily unloaded must have close-fitting guards or other suitable devices to guide the rope back into the groove when the load is applied again.
- (e) Secure shackle pins used to hang blocks, jacks, or rigging, or that have hoisting chain, with: a bolt, nut and cotter pin (safety-type shackle); a screw pin with cotter pin; or they must be securely moused.
- (f) Shackles used to hang blocks, jacks, or other rigging that can experience stress greater than that imposed by a single part of the pulling line must have a strength equal to but not less than two times the stress imposed by the pulling line.
- (g) All shackles used for joining or attaching lines must have a strength of not less than 1 1/2 times that of the lines they join.
- (h) Use clamps, socketing or other equal ways to securely fasten ends of lines attached to drums. Always keep at least two wraps of lines on drums.
- (i) Do not guide lines onto drums with your hands in direct contact with the line. Use a guide pulley, tool, stick or other mechanical means to guide lines onto drums.

(2) Chains.

- (a) Repair or remove from use hoisting chain when the increase in length (stretch) of the measured section exceeds 5 percent; or when there is a bent, twisted, or otherwise damaged link, or when raised scarfs or defective welds appear.
- (b) Do not tie knots in a chain.
- (c) Do not use lap links, cold shuts, or patent repair links for hoist chains or slings unless they are stronger than the chain.
- (d) End fastenings must be capable of holding sustained loads equal to the breaking strength of the chain.

(3) Hooks and attachment devices.

- (a) Remove from service any distorted or deformed hooks, rings, shackles, and other attachment devices or end fastenings.
- (b) Do not use makeshift hooks, links, or fasteners such as those formed from rods, bolts, etc., or other such devices. Use only approved factory-made attachments or fasteners.
- (c) When necessary to prevent lifting attachments from inadvertently lifting out of the hook, use a safety-type hook or other device.

(4) Wire rope.

- (a) Wire rope and replacement wire rope must be the same size, same or better grade, and same construction as originally furnished by the equipment manufacturer or contemplated in the design, unless otherwise recommended by the equipment or wire rope manufacturer.
- (b) Guard running wire ropes if they are within 7 feet of the floor or platform.
- (c) Prevent friction of ropes with other objects that will cause chafing or breaking of wires. Use thimbles of proper size for the rope in all eye-splices to prevent friction and chafing of the eye.
- (d) Remove from use wire rope used as guys, for hoisting or supporting objects, in cable-operated components, and on winches or drums, when any of the following exist:
 - (A) In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.
 - (B) Corroded, damaged, or improperly aligned end connections.
 - (C) Evidence of any heat damage from any cause.
 - (D) Wear of 1/3 the original diameter of outside individual wires. Kinking, crushing, bird caging, or any other damage resulting in distortion of the rope structure.
 - (E) Reductions from nominal diameter exceeding those in Table 1.

Table 1

Rope Size (inches)	Max Reduction (inches)
Up to 5/16	1/16
3/8 to 1/2	1/32
9/16 to 3/4	3/64
7/8 to 1 1/8	1/16
1 1/4 to 1 1/2	3/32

(5) Cable clips or clamps.

- (a) When using cable clips or clamps for forming eyes, apply the U-bolt so that the "U" section contacts the dead end of the rope.

(b) When using U-bolt rope clips for forming eyes, use Table 2 to figure the number and spacing of clips.

Table 2

Rope Diameter (inches)	Number of Clips		Minimum Spacing (inches)
	Drop Forged	Other Material	
1/8 to 1/4	2	2	1 1/2
5/16 to 3/8	3	3	2 1/4
7/16 to 9/16	3	4	3
5/8	3	4	3 3/4
3/4	4	5	4 1/2
7/8	4	5	5 1/4
1	5	6	6
1 1/8	6	6	6 3/4

(c) The use of cable clips or clamps is acceptable only where they are readily accessible and subject to frequent inspection. Clips and clamps must be the correct size and properly applied. (See (5)(a) and (5)(b) above.)

(d) Do not use cable clips or clamps for joining lines except where transferring slack lines from one place to another.

(e) Do not use knots or combination knots and cable clip or clamp attachments as end connections for any hoisting rope or sling.

EXCEPTION: This rule does not apply to drop hammers of pile drivers.

(6) Fiber rope.

(a) Inspect fiber rope frequently. Do not use rope that shows visual signs of excessive wear, abuse, spots indicating caustic or acid damage, or other defect that would reduce the rated strength below the safe working load.

NOTE: The following procedure is recommended for inspection of rope:

- (1) Examine the entire length of the rope for cuts or severe abrasions.
- (2) Look for spots indicating acid damage.
- (3) If there are acid spots, throw a twist in and out of the rope where the spots are; take a short kink in the rope and put on a strain. If the rope has acid damage, you will notice a weakness of the fibers.

(b) In manila rope, eye splices must have at least three full tucks, and short splices must have at least six full tucks (three on each side of the centerline of the splice).

(c) In layered synthetic fiber rope, eye splices must have at least four full tucks, and short splices at least eight full tucks (four on each side of the centerline of the splice).

(d) In fiber rope splices, do not trim strand end tails short (flush with the surface of the rope) immediately adjacent to the full tucks. This precaution applies to both eye and short splices and all types of fiber rope.

(e) For all eye splices in fiber rope, the eye must be big enough to provide an included angle not more than 60 degrees at the splice when the eye is over the load or support.

(f) Do not use knots instead of splices for joining fiber hoist ropes.

(g) When not in use, store fiber rope under cover in a clean, dry, well-ventilated place, free from excessive heat, and protected against corrosives and acid.

(h) Do not use frozen fiber rope. Do not heat frozen rope to thaw it out.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 4-1998, 1/8/28/98, ef. 10/1/98.

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