

CHAPTER 32. MATERIALS HANDLING AND STORAGE

3200. PURPOSE. This chapter establishes FAA requirements for handling materials by mechanical means, such as powered industrial trucks and cranes, and for the safe storage of materials before and after handling.

3201. SCOPE. These requirements apply to all FAA employees, contractors and sub-contractors.

3202. GOALS AND OBJECTIVES. The goal of this chapter is to provide information that will ensure the protection of FAA employees, contractors, subcontractors, and visitors from injuries resulting from the improper handling and storage of materials.

3203. STANDARDS. The Federal Occupational Safety and Health Administration (OSHA) has promulgated regulations both for general industry and construction addressing materials handling and storage. The safety regulations address some material handling equipment that is not extensively used at most FAA facilities, e.g., helicopters, rim wheels, slings, elevators and conveyors. This chapter will not address the safety requirements for this comparatively little-used equipment. Where those activities occur, FAA employees should refer to the appropriate OSHA standards for requirements. The OSHA general industry requirements for materials handling and storage are found in 29 CFR 1910, Subpart N, Materials Handling and Storage. The OSHA construction requirements are found in 29 CFR 1926, Subpart H, Materials Handling, Storage, Use and Disposal, and in 29 CFR 1926, Subpart N, Cranes, Derricks, Hoists, Elevators and Conveyors.

3204. PROGRAM REQUIREMENTS. This chapter includes requirements for those materials handling and storage activities most likely to be encountered at FAA facilities. If the activities and equipment included are applicable to the affected FAA organization, further direction should be obtained from the OSHA requirements cited at the end of each section in this chapter.

a. General requirements for storage of materials.

(1) Part of the issue of handling materials is the safe storage of those materials. Storage areas must not create a hazard. Bags, containers, bundles, and other material stored in tiers must be stacked, blocked, interlocked and limited in height so that they are stable and secure against sliding or collapse.

(2) Storage areas must be free from accumulation of materials that constitute hazards from tripping, fire or explosion, or that may attract pests like mice or rats.

(3) Where mechanical handling equipment is used, such as forklifts, sufficient clearance must be allowed for aisles at loading docks, through doorways and wherever turns or passage must be made.

(4) Permanent aisles and passageways must be appropriately marked, and must be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard.

b. Powered industrial trucks. This section contains safety requirements relating to fire protection, design, maintenance, and use by FAA employees of fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks that are powered by electric motors or internal combustion engines. OSHA Standard 29 CFR 1910.178, Powered Industrial Trucks, is very long and detailed, with often varying requirements depending on the type of industrial truck used. The entire standard should be referenced when these powered industrial trucks are used. FAA must comply with OSHA Standard 29 CFR 1910.178, Powered Industrial Trucks, Subpart (a) (2). The standard states: “All new powered industrial trucks acquired and used by an employer must meet the design and construction requirements for powered industrial trucks established in the “American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1 – 1969” which is incorporated by reference as specified in 1910.6, except for vehicles intended primarily for earth moving or over-the-road hauling.”

(1) **Modifications and additions.** The FAA must not perform modifications and additions to powered industrial trucks that affect capacity and safe operation without the manufacturer’s prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals must be changed accordingly. If the truck is equipped with front-end attachments other than factory installed attachments, the user must ensure that the truck is marked to identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with load laterally centered.

(2) **Designated locations.** The atmosphere or location where industrial trucks are to be used at FAA facilities must first have been classified hazardous or non-hazardous before trucks are used therein, and that classification will determine which of the many types of industrial trucks may be used. The OSHA requirements in 29 CFR 1910.178 are very detailed regarding the types of trucks that may be used, and should be referred to in their entirety.

(3) **Safety guards.** High Lift Rider trucks (the ones most commonly used) must be fitted with an overhead guard, unless operating conditions do not permit. If the type of load presents a hazard, the user must equip fork trucks with a vertical load backrest extension.

(4) **Fuel handling and storage.** The storage and handling of liquid fuels such as gasoline and diesel fuel must be in accordance with National Fire Protection Association (NFPA) Flammable and Combustible Liquids Code, NFPA No. 30-current edition. The storage and handling of liquefied petroleum gas fuel must be in accordance with NFPA Storage and Handling of Liquefied Petroleum Gases, NFPA No. 58-current edition.

(5) **Changing and charging storage batteries.** Battery charging installations must be located in areas designated for that purpose. Facilities must be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

(6) Operator training. This is the most recent addition to this standard, and goes into great detail about the type of training that must be given to powered industrial truck operators. Before training is designed or given, this entire section of the standard should be reviewed by the trainer to ensure that all required subjects are addressed.

(a) The employer must ensure that each powered industrial truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this standard, before the employee is permitted to operate a powered industrial truck.

(b) Training must consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, videotape, and written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace. Persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence must conduct all operator training and evaluation.

(c) Refresher training, including an evaluation of the effectiveness of that training, must be conducted as required ensuring that the operator has the knowledge and skills needed to operate the powered industrial truck safely.

(d) If an operator has previously received training in a topic specified in this section, and such training is appropriate to the truck and working conditions encountered, additional training in that topic is not required if the operator has been evaluated and found competent to operate the truck safely.

(e) FAA supervision must certify that each operator has been trained and evaluated as required. The certification must include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

(7) Powered Industrial Truck operations. When a powered industrial truck is left unattended, load-engaging means must be fully lowered, controls must be neutralized, power must be shut off, and brakes set. Wheels must be blocked if the powered industrial truck is parked on an incline. A powered industrial truck is unattended when the operator is 25 ft. or more away from the vehicle that remains in his view, or whenever the operator leaves the vehicle and it is not in his view.

(8) Traveling. All traffic regulations must be observed including authorized speed limits. A safe distance must be maintained approximately three truck lengths from the powered industrial truck ahead, and the powered industrial truck must be kept under control at all times.

(9) Operation of the truck. If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck must be taken out of service until it has been restored to safe operating condition.

c. Overhead and gantry cranes. Cranes are used both for work covered by OSHA's general industry standards and for work covered by OSHA's construction standards. This chapter addresses overhead and gantry cranes, including semi-gantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics. These cranes are grouped because they all have trolleys and similar travel characteristics. FAA personnel operating or maintaining these cranes should refer to 29 CFR 1910.179, Overhead and Gantry Cranes for detailed requirements regarding use. Note the American National Standards Institute (ANSI) Safety Code for Overhead and Gantry Cranes, ANSI B30.2.0-current edition (replaced by ASME B30.2.01-current edition), and ANSI Safety Code for Fixed Ladders, ANSI A14.3-current edition. Following are some of the major requirements that are addressed in both the general industry and construction regulations:

(1) Rated load marking. The rated load of the crane must be plainly marked on each side of the crane, and if the crane has more than one hoisting unit, each hoist must have its rated load marked on it or its load block and this marking must be clearly legible from the ground or floor. This rated load must not be exceeded at any time.

(2) Modifications. Cranes may be modified and re-rated provided a qualified engineer or the equipment manufacturer checks such modifications and the supporting structure thoroughly for the new rated load. The test reports of the new rated load must be readily available.

(3) Obstructions. Where passageways or walkways are provided obstructions must not be placed so that movements of the crane will jeopardize safety of personnel.

(4) Designated personnel. Only designated personnel must be permitted to operate a crane covered by this section

(5) Access to crane. Access to the cab and/or bridge walkway must be by a conveniently placed fixed ladder, stairs, or platform requiring no step over any gap exceeding 12 inches. Fixed ladders must be in conformance with the most recent version of the ANSI Safety Code for Fixed Ladders.

(6) Footwalk. If sufficient headroom is available on cab-operated cranes, a footwalk must be provided on the drive side along the entire length of the bridge of all cranes having the trolley running on the top of the girders. In no case must less than 48 inches of headroom be provided where footwalks are located.

(7) Ladders and stairways. Gantry cranes must be provided with ladders or stairways extending from the ground to the footwalk or cab platform and must be permanently and securely fastened in place. Stairways must be equipped with rigid and substantial metal handrails. Walking surfaces must be of an anti-slip type.

(8) Electrical equipment. Electrical equipment must be so located or enclosed that live parts will not be exposed to accidental contact under normal operating conditions and

protected from dirt, grease, oil, and moisture. Guards for live parts must be substantial and so located that they cannot be accidentally deformed so as to make contact with the live parts.

(9) Work near transmitter towers. Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter must be de-energized or tests must be made to determine if electrical charge is induced on the crane.

(10) Guarding. Exposed moving parts, such as gears, set screws, projecting keys, chains, chain sprockets, and reciprocating components which might constitute a hazard under normal operating conditions must be guarded. Guards must be securely fastened. Each guard must be capable of supporting without permanent distortion the weight of a 200-pound person unless the guard is located where it is impossible for a person to step on it.

(11) Periodic inspection and maintenance. Complete inspections of the crane must be performed at intervals, depending upon its activity, severity of service, and environment. Any deficiencies must be carefully examined and determination made as to whether they constitute a safety hazard. A preventive maintenance program based on the crane manufacturer's recommendations must be established. Documentation of inspection and maintenance records must be maintained.

d. Crawler locomotives and truck cranes. In addition to overhead and gantry cranes, OSHA also has regulations in 29 CFR 1910.180, Crawler, Locomotive and Truck Cranes. All three of these cranes consist of a rotating superstructure with a power plant, operating machinery, and boom, mounted on a base. The function of each is to hoist and swing loads with a varying radius. The difference in the cranes is how they move. A crawler crane moves on crawler treads. A locomotive crane is mounted on a base or car equipped for travel on a railroad track. A truck crane is mounted on an automotive truck equipped with a power plant for travel. FAA personnel operating or maintaining these cranes should refer to 29 CFR 1910.180, Crawler, Locomotive and Truck Cranes for detailed requirements regarding use. Note ANSI Safety Code for Crawler, Locomotive, and Truck Cranes, ANSI B30.5-1968 (replaced by ASME B30.5-current edition), and Crane Load-Stability Test Code, Society of Automotive Engineers (SAE) J765-current edition. Following are some of the major requirements:

(1) Designated personnel. Only designated personnel must be permitted to operate a crane covered by this section.

(2) Load rating chart. A substantial and durable rating chart with clearly legible letters and figures must be provided with each crane and securely fixed to the crane cab in a location easily visible to the operator while seated at his control station.

(3) Initial inspection. Prior to initial use all new and altered cranes must be inspected to ensure compliance with provisions of this section.

(4) Regular inspection. Inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection should be

performed. The intervals in turn are dependent upon the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as "frequent" (daily to monthly intervals) and "periodic" (one to 12 month intervals) or as specifically recommended by the manufacturer. Items that should be inspected for each classification are listed in 1910.180, Crawler, Locomotive and Truck Cranes.

(5) Inspection records. Certification records which include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the crane which was inspected must be made monthly on critical items in use such as brakes, crane hooks, and ropes. This certification record must be kept readily available.

e. Derricks. A derrick is an apparatus consisting of a mast or equivalent member held at the head by guys or braces, with or without a boom, for use with a hoisting mechanism and operating ropes. A derrick is capable of handling loads at variable reaches and powered by hoists through systems of rope reeving, used to perform lifting hook work, single or multiple line bucket work, grab, grapple, and magnet work. Derricks may be permanently installed for temporary use as in construction work. Unlike a crane, it does not have a rotating boom, and cannot lift about a radius. There are several types of derricks regulated by OSHA – the A-frame derrick, the basket derrick, the breast derrick, the Chicago boom derrick, the gin pole derrick, the guy derrick, the shear leg derrick, and the stiff leg derrick. FAA personnel operating or maintaining any derrick should refer to 29 CFR 1910.181, Derricks for detailed requirements regarding use. Note the ANSI Safety Code for Derricks, ANSI B30.6-current edition. Following are some of the major requirements of the OSHA standard:

(1) Designated personnel. Only designated personnel must be permitted to operate a derrick covered by this section.

(2) Load ratings. For permanently installed derricks with fixed lengths of boom, guy, and mast, a substantial, durable, and clearly legible rating chart must be provided with each derrick and securely affixed where it is visible to personnel responsible for the safe operation of the equipment. For nonpermanent installations, the manufacturer must provide sufficient information from which capacity charts can be prepared for the particular installation. The capacity charts must be located at the derricks or the jobsite office.

(3) Inspection. Prior to initial use all new and altered derricks must be inspected to ensure compliance with the provisions of this section. Inspection procedure for derricks in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the derrick and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as frequent and periodic. Frequent inspections must be made at daily to monthly intervals. Periodic inspections must be made at one to 12 month intervals, or as specified by the manufacturer. Those derrick components that must be inspected are listed in 1910.181, Derricks. Documentation of inspection records must be maintained.

(4) Testing. Prior to initial use all new and altered derricks must be tested to ensure proper operation of the following functions: load hoisting and lowering; boom up and down; swing; and operation of clutches and brakes. Documentation of testing records must be maintained.

(5) Preventive maintenance. A preventive maintenance program based on the derrick manufacturer's recommendations must be established. Documentation of maintenance records must be maintained.

(6) Rope inspection. A thorough inspection of all ropes in use must be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection, and an identifier for the ropes which were inspected must be prepared and kept on file where readily available. Any deterioration, resulting in appreciable loss of original strength must be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard.