

§ 1926.752

not limited to, steel joists, joist girders, purlins, columns, beams, trusses, splices, seats, metal decking, girts, and all bridging, and cold formed metal framing which is integrated with the structural steel framing of a building.

Systems-engineered metal building means a metal, field-assembled building system consisting of framing, roof and wall coverings. Typically, many of these components are cold-formed shapes. These individual parts are fabricated in one or more manufacturing facilities and shipped to the job site for assembly into the final structure. The engineering design of the system is normally the responsibility of the systems-engineered metal building manufacturer.

Tank means a container for holding gases, liquids or solids.

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

§ 1926.752 Site layout, site-specific erection plan and construction sequence.

(a) *Approval to begin steel erection.* Before authorizing the commencement of steel erection, the controlling contractor shall ensure that the steel erector is provided with the following written notifications:

(1) The concrete in the footings, piers and walls and the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.

(2) Any repairs, replacements and modifications to the anchor bolts were conducted in accordance with § 1926.755(b).

(b) *Commencement of steel erection.* A steel erection contractor shall not erect steel unless it has received written notification that the concrete in the footings, piers and walls or the mortar in the masonry piers and walls has attained, on the basis of an appro-

29 CFR Ch. XVII (7-1-06 Edition)

appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.

(c) *Site layout.* The controlling contractor shall ensure that the following is provided and maintained:

(1) Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected and means and methods for pedestrian and vehicular control. Exception: this requirement does not apply to roads outside of the construction site.

(2) A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment.

(d) *Pre-planning of overhead hoisting operations.* All hoisting operations in steel erection shall be pre-planned to ensure that the requirements of § 1926.753(d) are met.

(e) *Site-specific erection plan.* Where employers elect, due to conditions specific to the site, to develop alternate means and methods that provide employee protection in accordance with § 1926.753(c)(5), § 1926.757(a)(4) or § 1926.757(e)(4), a site-specific erection plan shall be developed by a qualified person and be available at the work site. Guidelines for establishing a site-specific erection plan are contained in Appendix A to this subpart.

§ 1926.753 Hoisting and rigging.

(a) All the provisions of § 1926.550 apply to hoisting and rigging with the exception of § 1926.550(g)(2).

(b) In addition, paragraphs (c) through (e) of this section apply regarding the hazards associated with hoisting and rigging.

(c) *General.* (1) Pre-shift visual inspection of cranes.

(i) Cranes being used in steel erection activities shall be visually inspected prior to each shift by a competent person; the inspection shall include observation for deficiencies during operation. At a minimum this inspection shall include the following:

(A) All control mechanisms for maladjustments;

(B) Control and drive mechanism for excessive wear of components and contamination by lubricants, water or other foreign matter;

(C) Safety devices, including but not limited to boom angle indicators, boom stops, boom kick out devices, anti-two block devices, and load moment indicators where required;

(D) Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation;

(E) Hooks and latches for deformation, chemical damage, cracks, or wear;

(F) Wire rope reeving for compliance with hoisting equipment manufacturer's specifications;

(G) Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation;

(H) Hydraulic system for proper fluid level;

(I) Tires for proper inflation and condition;

(J) Ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions;

(K) The hoisting equipment for level position; and

(L) The hoisting equipment for level position after each move and setup.

(i) If any deficiency is identified, an immediate determination shall be made by the competent person as to whether the deficiency constitutes a hazard.

(iii) If the deficiency is determined to constitute a hazard, the hoisting equipment shall be removed from service until the deficiency has been corrected.

(iv) The operator shall be responsible for those operations under the operator's direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.

(2) A qualified rigger (a rigger who is also a qualified person) shall inspect the rigging prior to each shift in accordance with §1926.251.

(3) The headache ball, hook or load shall not be used to transport per-

sonnel except as provided in paragraph (c)(4) of this section.

(4) Cranes or derricks may be used to hoist employees on a personnel platform when work under this subpart is being conducted, provided that all provisions of §1926.550 (except for §1926.550(g)(2)) are met.

(5) Safety latches on hooks shall not be deactivated or made inoperable except:

(i) When a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so; or

(ii) When equivalent protection is provided in a site-specific erection plan.

(d) *Working under loads.* (1) Routes for suspended loads shall be pre-planned to ensure that no employee is required to work directly below a suspended load except for:

(i) Employees engaged in the initial connection of the steel; or

(ii) Employees necessary for the hooking or unhooking of the load.

(2) When working under suspended loads, the following criteria shall be met:

(i) Materials being hoisted shall be rigged to prevent unintentional displacement;

(ii) Hooks with self-closing safety latches or their equivalent shall be used to prevent components from slipping out of the hook; and

(iii) All loads shall be rigged by a qualified rigger

(e) *Multiple lift rigging procedure.* (1) A multiple lift shall only be performed if the following criteria are met:

(i) A multiple lift rigging assembly is used;

(ii) A maximum of five members are hoisted per lift;

(iii) Only beams and similar structural members are lifted; and

(iv) All employees engaged in the multiple lift have been trained in these procedures in accordance with §1926.761(c)(1).

(v) No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations.

(2) Components of the multiple lift rigging assembly shall be specifically

§ 1926.754

29 CFR Ch. XVII (7-1-06 Edition)

designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, shall be based on the manufacturer's specifications with a 5 to 1 safety factor for all components.

(3) The total load shall not exceed:

(i) The rated capacity of the hoisting equipment specified in the hoisting equipment load charts;

(ii) The rigging capacity specified in the rigging rating chart.

(4) The multiple lift rigging assembly shall be rigged with members:

(i) Attached at their center of gravity and maintained reasonably level;

(ii) Rigged from top down; and

(iii) Rigged at least 7 feet (2.1 m) apart.

(5) The members on the multiple lift rigging assembly shall be set from the bottom up.

(6) Controlled load lowering shall be used whenever the load is over the connectors.

§ 1926.754 **Structural steel assembly.**

(a) Structural stability shall be maintained at all times during the erection process.

(b) The following additional requirements shall apply for multi-story structures:

(1) The permanent floors shall be installed as the erection of structural members progresses, and there shall be not more than eight stories between the erection floor and the upper-most permanent floor, except where the structural integrity is maintained as a result of the design.

(2) At no time shall there be more than four floors or 48 feet (14.6 m), whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor, except where the structural integrity is maintained as a result of the design.

(3) A fully planked or decked floor or nets shall be maintained within two stories or 30 feet (9.1 m), whichever is less, directly under any erection work being performed.

(c) *Walking/working surfaces—shear connectors and other similar devices.* (1) *Tripping hazards.* Shear connectors (such as headed steel studs, steel bars

or steel lugs), reinforcing bars, deformed anchors or threaded studs shall not be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed.

(2) *Installation of shear connectors on composite floors, roofs and bridge decks.* When shear connectors are used in construction of composite floors, roofs and bridge decks, employees shall lay out and install the shear connectors after the metal decking has been installed, using the metal decking as a working platform. Shear connectors shall not be installed from within a controlled decking zone (CDZ), as specified in § 1926.760(c)(8).

(d) *Plumbing-up.* (1) When deemed necessary by a competent person, plumbing-up equipment shall be installed in conjunction with the steel erection process to ensure the stability of the structure.

(2) When used, plumbing-up equipment shall be in place and properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking or bundles of bridging.

(3) Plumbing-up equipment shall be removed only with the approval of a competent person.

(e) *Metal decking—(1) Hoisting, landing and placing of metal decking bundles.* (i) Bundle packaging and strapping shall not be used for hoisting unless specifically designed for that purpose.

(ii) If loose items such as dunnage, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items shall be secured to the bundles.

(iii) Bundles of metal decking on joists shall be landed in accordance with § 1926.757(e)(4).

(iv) Metal decking bundles shall be landed on framing members so that enough support is provided to allow the bundles to be unbanded without dislodging the bundles from the supports.

(v) At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement.