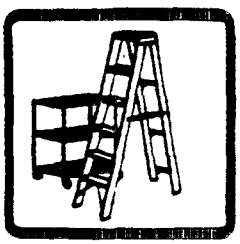
PLAINTIFF'S
EXHIBIT
DUP-2752

APPENDIX B

OSHA LADDER REQUIREMENTS



OSHA

LADDERS & ACCESSORIES

OSHA LADDER REQUIREMENTS

The adequacy of ladders and the work practices followed by employees using them are regulated by OSHA in three sections: Portable Wood (1910.25), Portable Metal (1910.26), and Fixed Ladders (1910.27).

An OSHA study using reports from fatality/catastrophe investigations of ladder accidents analyzed the factors involved to determine the causes of these events and methods of prevention that would be effective. While OSHA intends to use the findings of the study to evaluate and improve its standards, the same information can alert the employer to conditions that have proven particularly hazardous.

More than 50% of the fatal ladder accidents studied happened in the construction industry; another 25% occurred in manufacturing. The specific occupations of the workers involved varied widely, but almost all were using the ladder to perform their ordinary work assignments. Almost all the accidents were falls, usually from a height of over 10 feet and usually taking place while the employee was climbing up or coming down the ladder. Another 30% of the employees fell while working from the ladder. Portable ladders, especially extension ladders, were being used in over half of the cases. Causes of the accidents were grouped into four categories: equipment selection/design; equipment condition; equipment set-up/work layout; and equipment use. Of these, equipment use, including use of the ladder to gain access as well as to perform the work, accounted for 42% of the accidents. Factors involved in these accidents were: attempting to carry supplies by hand rather than using a tag line; losing balance while performing the work, sometimes because the work procedure itself was hazardous; and missing a step, possibly because of haste. Equipment set-up/work layout was the next most common cause of fatalities. Contributing factors in these cases included: no attempt to secure the ladder or inadequate support for it; improper positioning of the ladder or a setup that resulted in an awkward working position; and a work layout which was itself hazardous. Equipment selection/design was designated as the cause of accidents when an inappropriate or poorly designed ladder was the key factor. In some cases the ladder was simply too short to be properly secured or the worker had to stand on the top step. In other situations a scaffold or platform would have been more appropriate. Less frequently, metal ladders were used where contact with electrical conductors was possible or ladders did not conform to standards requiring safety features such as secure locking devices. Equipment condition was cited as the cause of only 6% of these accidents. In these cases, malfunction or structural failure, possibly due to overloading, resulted from use of defective equipment.

For purposes of classification the accidents were attributed to one primary cause; the study noted, however, that multiple factors often contributed to the outcome. Specifically, lack of protective equipment, although not a direct cause of the accident, could have contributed to the outcome. Aside from the accidents which were directly attributed to equipment set-up and work layout, in a number of other cases problems in these areas acted as contributing factors.

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Requirements from the General Industry Standard

Portable Wood Ladders (1910.25)

(a) **Application of requirements.** This section prescribes rules and establishes minimum requirements for the con-

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struction, care, and use of common types of wood ladders in normal use. It does not apply to special types such as fruit-picker's, combination step and extension, stockroom step, aisle-way step, shelf and library ladders.

(b) **Materials.** (1) *Requirements applicable to all wood parts.* (i) All wood parts must be free of sharp edges and splinters; sound and visually inspected to be free of shake, wane, compression failures, decay or other irregularities. Low density wood must not be used.

(c) **Construction requirements.** (2) *Portable stepladders.* Stepladders must not be over 20 feet long. There are three types:

Type I — Industrial Stepladders, three to 20 ft., for heavy duty, such as utilities, contractors and industrial use.

Type II — Commercial Stepladders, three to 12 ft., for medium duty, such as painters, offices, and light industrial use.

Type III — Household Stepladders, three to six ft., for light duty, such as light household use.

(i) General requirements. (b) Steps must be uniformly spaced not more than 12 inches apart. Steps must be parallel and level when the ladder is in use. (c) Side rails must be at least 11½ inches apart at the top and spread at least one inch for each foot of length down to the bottom. (f) Each stepladder must have a metal spreader or locking device capable of holding the front and back sections open. The spreader must have all sharp points covered or removed. For Type III stepladders, the pail shelf and spreader may be combined in one unit.

(3) *Portable rung ladders.* (ii) Single ladder. (a) Single ladders must not be over 30 feet long. (iii) Two- section ladder (a) Two-section extension ladders must not be over 60 feet long These ladders must have two sections, one fitting within the side rails of the other and arranged so the upper section can be raised and lowered. (iv) Sectional ladder. (a) Assembled combinations of sectional ladders must not be longer than the lengths specified. (v) Trestle and extension trestle ladder. (a) Trestle ladders or extension sections or base sections of extension trestle ladders must not be over 20 feet long. (vi) Painter's stepladder. (a) These ladders must not be over 12 feet long. (vii) Mason's ladder These ladders are a special type of single ladder intended for heavy construction work. (a) They must not be over 40 feet long. (5) *Trolley and side-rolling ladders.* (i) Length. These ladders must not be over 20 feet long.

(d) **Care and use of ladders.** (1) *Care.* To insure safety and serviceability: (i) Maintain ladders in good condition at all times, with the joint between steps and side rails tight, all hardware and fittings securely attached, and movable parts operating freely without binding or undue play. (ii) Frequently lubricate the metal bearings of locks, wheels, pulleys, etc. (iii) Replace frayed or badly worn ropes. (iv) Keep safety feet and other auxiliary devices in good condition. (x) Inspect ladders frequently. Those which have developed defects must be withdrawn from service for repair or destruction and tagged or marked: "Dangerous, Do Not Use". (xi) Rungs should be kept free of grease and oil.

(2) *Use.* Take the following precautions when using ladders: (i) Use portable rung and cleat ladders, where possible, at such a pitch that the horizontal ground distance from directly below the top support to the foot of the ladder is one quarter of the working length of the ladder. The ladder must be placed to prevent slipping or lashed or held in position. Never use ladders horizontally as platforms, runways, or scaffolds. (ii) Ladders should not be used by more than one person at a time, nor with ladder jacks and scaffold planks for more than one man. In such cases, specially designed ladders with dimensions larger than those specified in these standards should be procured. (iii) Place portable ladders so they have secure footing. The top rest for portable rung and cleat ladders must be reasonably rigid and have ample strength to support the applied load. (iv) Do not place ladders in front of doors opening toward the ladder unless the door has been blocked open, locked or guarded. (v) Do not place ladders on boxes, barrels, or other unstable bases to obtain additional height. (viii) Do not use any ladder with broken or missing steps, rungs, or cleats, broken side rails or other faulty equipment. Do not make improvised repairs. (ix) Do not splice short ladders together to make long sections. (x) Do not use ladders made by fastening cleats across a single rail. (xi) Do not use ladders as guys, braces, skids, or for any other purpose than as a ladder. (xii) Do not use the tops of ordinary stepladders as steps. (xiii) On two-section extension ladders, those up to and including 36 feet must have a minimum overlap of three feet; ladders 36 to 48 feet long, a four foot overlap; and ladders 48 to 60 feet long, a five foot overlap. (xiv) Portable rung ladders whose side rails are reinforced by a steel wire, rod, or strap must be used with the metal reinforcement on the under side. (xv) Ladders used to get onto a roof should extend at least three feet above the support point at the eave, gutter, or roof line. (xvii) The middle or top sections of a window cleaner's ladder should not be used as the bottom section unless they are equipped with safety shoes. (xix) Portable rung ladders should have nonslip bases when there is a slipping hazard. Nonslip bases are not a substitute for safety in placing, lashing or holding a ladder on oily, metal, concrete or other slippery surfaces. (xx) The bracing on the back legs of stepladders is designed only for increasing stability, not for climbing.

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Portable Metal Ladders (1910.26)

(a) **Requirements.** (1) *General.* Ladders must be designed so there are no structural defects or accident hazards such as sharp edges, burrs, etc. Metal selected must be strong enough to meet the test requirements and must be protected against corrosion unless inherently corrosion-resistant. (iii) Rungs or steps must be spaced on 12-inch centers. (v) Rungs and steps must be corrugated, knurled, dimpled, coated with a skid-resistant material, or otherwise treated to prevent slipping.

(2) *General specifications — straight and extension ladders.* (i) Side rails of a straight ladder or any section of an extension ladder must be at least 12 inches apart. (ii) Single ladders or individual sections of ladders must not be over 30 feet long. Two-section ladders must not be over 48 feet long. Ladders with more than two sections must not be over 60 feet long. (iii) Sections of a multisection ladder must overlap as specified in (1910.25 d.2.xiii). (iv) Extension ladders must have positive stops to insure the specified overlap.

(3) *General specifications — stepladders.* (iii) A standard length ladder must be within ± ½ inch of the specified

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(1910.26—continued)

length. Stepladders must not be over 20 feet long. (The length of the front rail is the length of the stepladder.) (vii) The bottom of the four rails must be insulating nonslip material. (viii) Each stepladder must have a metal spreader or locking device which will hold it securely in the open position. The spreader must have any sharp points or edges covered or removed.

(4) *General specifications — trestles and extension trestle ladders.* (i) Trestle ladders or sections of extension trestle ladders must not be over 20 feet long. (5) *General specifications — platform ladders.* (i) Platform ladders must not be over 20 feet long as measured along the front rail from floor to platform.

(c) Care and maintenance of ladders. (1) *General.* Ladder equipment must be used and cared for according to the following rules:

(2) *Care of ladders* (iv) Maintain ladders in good usable condition. (vi) Immediately inspect any ladder under the following conditions. (a) If a ladder tips over, inspect for dents or bends in side rails or rungs; check rung-to-side-rail connections, hardware connections, and rivets. (d) If exposed to oil and grease, ladders should be cleaned of slippery materials with solvent or steam. (vii) Mark defective ladders and take them out of service until repaired.

(3) *Use of ladders.* (i) Place the base of the ladder so the distance between it and the wall is equal to ¼ the working length of the ladder. (ii) Portable ladders are designed as one-man working ladders based on a 200-pound load. (iii) Place the ladder base with a secure footing. (iv) Place the ladder top with both rails supported unless a single support attachment is used. (v) Face the ladder when going up or down. (vi) Do not tie or fasten ladders together to make longer sections. Proper hardware is necessary if the manufacturer endorses extended uses. (vii) Ladders should not be used for any purpose other than that originally intended or recommended by the manufacturer. (viii) Metal ladders are to be used with caution in areas where there are electric circuits.

Fixed Ladders (1910.27)

(This OSHA standard is based on ANSI A14.3-1956, *Safety Code for Fixed Ladders.* The regulations cover: design requirements; design stresses; rungs and cleats, side rails, fastenings, splices, electrolytic action, welding, protection from deterioration; clearance — climbing side, ladders without cages or wells, ladders with cages or baskets, clearance in back of ladder and back of grab bar, step-across distance, hatch cover; special requirements — cages or wells, landing platforms, ladder extensions, grab bars, ladder safety devices (see the "Fall Protection" section of this Directory); pitch; and maintenance.)

OSHA Instruction (Issued 12-29-78)STD 1-1.9

The design of rungs or steps embedded in the walls or risers or conical top sections of manholes need not comply with the requirements of (1910.27). They must, however, be safe, well constructed and installed in accordance with good engineering practices. The rungs or steps must be uniformly spaced from 12 to 16½ inches apart and designed to prevent the foot from sliding off the end. Steps which have become unsafe due to corrosion must not be used.

SPECIFIC REQUIREMENTS

Overhead & Gantry Cranes (1910.179)

(d.4.i & iii) Gantry cranes must have ladders or stairways from the ground to the footwalk or cab platform. If ladders are used they must be permanently and securely fastened in place and comply with (1910.27).

Telecommunications (1910.268)

(h) Ladders. (See the complete summary of this paragraph in the *Electrical Worker's Clothing & Equipment* section of this Directory.)

(q.2.vii) Ladders, platforms and aerial devices including insulated aerial devices must not contact electrical conductors; do not rely on their dielectric capabilities.

(Editor's note: The proposed Oil & Gas Well Drilling & Servicing standard, 1910.270, would require fixed derrick or mast ladders to be equipped with a ladder safety device.)

Requirements from the Construction Standard

Ladders (1926.450)

(a) General requirements. (1) Where there are no stairways, ramps, or runways, ladders as described in this subpart must be used for safe access to all elevations.

(2) Do not use ladders with broken or missing rungs or steps, broken or split side rails or other defects. Inspection of metal ladders must include checking for corrosion of interiors of open end hollow rungs.

(3) Portable wood ladders must meet the requirements of ANSI A14.1-1968.

(4) Portable metal ladders must be as strong as wood ladders and meet the requirements of ANSI A14.2-1956.

(5) Fixed ladders must meet the requirements of ANSI A14.3-1956.

(6) Portable ladders must be placed on a substantial base and the area around the top and bottom of the ladder must be kept clear.

(7) Place portable ladders at such a pitch that the horizontal distance from the top support to the foot of the ladder is about ¼ the working length of the ladder.

OSHA Instruction (Issued 1-18-77) STD 1-1.3

Employers will not be cited in violation of (1910.27 d.5) or (1926.450 a.5) for using a counterweight device without a friction brake. Neither OSHA standard requires the use of any ladder safety device.

Do not use ladders horizontally as platforms, runways, or scaffolds.

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(8) Do not place ladders in passageways, doorways, driveways or anywhere they may be displaced by activities below unless protected by barricades or guards.

(9) If the side rails do not extend at least 36 inches above the landing, provide grab rails.

(10) Portable ladders must be tied, blocked, or otherwise secured while in use.

(11) Do not use portable metal ladders for electrical work or where they may contact conductors.

(b) **Job-made ladders.** (This paragraph gives specifications for ladders especially constructed for their intended use.)

SPECIFIC CONSTRUCTION REQUIREMENTS

Specific Trenching Requirements (1926.652)

(h) An adequate means of exit such as a ladder or steps must be provided within 25 feet of employees working trenches four feet or more deep.

Stairs, Passageways, & Ladders (Demolition) (1926.851)

(a) Close up all stairways, passageways and ladders except those designated as means of access to the structure.

(b) Periodically inspect all stairs, passageways, ladders and equipment incidental thereto and keep them clean and safe.

Requirements from the Maritime Standards

The Shipyard standard has one specific section on Ladders. The provisions of these standards which apply to most maritime work are summarized below. Other sections of 1915, Subpart E — Scaffolds, Ladders, & Other Working Surfaces include special requirements for ladders, gangways, and ramps used for specific purposes: Access to Vessels (1915.74), Access to & Guarding of Dry Docks & Marine Railways (1915.75,), and Access to Cargo Spaces & Confined Spaces (1915.76).

The Marine Terminals standard includes provisions for both fixed and portable ladders. Section 1917.118 applies to fixed ladders. This section outlines ladder specifications; minimum concentrated loads, width between rungs, rung spacing, side rails and pitch. **Paragraph (e) contains requirements for employee fall protection — landing platforms, cages, wells and ladder safety devices.**

Portable ladders. Section 1917.119, also contains specifications for run spacing, width between side rails and load capacities. Section (c) requires that portable manufactured ladders obtained after October 3, 1983 must meet the appropriate ladder construction requirements of the following standards and be marked accordingly: ANSI A14.1-1981, **Safety Requirements for Portable Wood Ladders**; ANSI 14.2-1982, **Safety Requirements for Portable Metal Ladders**; **ANSI 14.5-1981, Safety Requirements for Portable Reinforced Plastic Ladders.** Paragraphs (e) and (f) cover maintenance and usage and are summarized below as well as two paragraphs on emergency ladders found in 1917.26 and 1917.117.

Ladders (1915.72)

(a) General requirements. (1) See (1926.450a.2).

(2) To splice sections of ladders, abut the ends and use at least two cleats securely nailed or bolted to each rail. The cross secuon of the cleats must be at least as great as the cross sectional area of the side rail.

(3) Lash, block, or otherwise secure portable ladders. The side rails of ladders must extend at least 36 inches above a landing or grab rails must be installed.

(4) See (1926.450a.4).

(5) Do not use portable metal ladders near electrical conductors or for electric arc welding operations.

(6) See (1926.450a.3).

(Paragraphs b and c cover the construction details of portable wood cleated ladders up to 30 feet in length and from 30 to 60 feet long.)

The Longshoring standard has its own section on Ladders — (1918.25) of Subpart C, Means of Access — which is summarized below. Subpart C also includes sections of requirements for gangways and ramps used for specific purposes: Gangways & Other Means of Access (1918.21) and Access to Barges & River Towboats (1918.23).

Portable Ladders (1917.119)

(e) **Maintenance and inspection.** (1) Ladders must be maintained in safe condition. Ladders with the following defects must not be used: (i) Broken, split or missing rungs, cleats or steps; (ii) Broken or split side rails; (iii) Missing or loose bolts, rivets or fastenings; (iv) Defective ropes; or (v) Any other structural defect.

(2) Ladders must be inspected for defects before being used each day, and after any occurrence which could damage the ladder, such as a fall.

(f) **Ladder usage.** (1) Ladders made by fastening rungs to a single rail are prohibited.

(2) Ladders must not be used: (i) As guys, braces or skids; or (ii) As platforms, runways or scaffolds.

(3) Metal and metal containing ladders must not be used when employees on the ladder might contact energized electrical conductors.

(4) Two or more ladders (either single straight ladders or sections from multi-section ladders) must never be fastened together for additional length.

(5) Self-supporting ladders (except combination ladders) must not be used as single straight ladders.

(6) Non self-supporting ladders must not be used to climb above the top support point unless intended for cantilever operation.

(7) If employees are to leave or mount the ladder at the upper support level, ladders shall extend at least 36 inches above the level, unless other equivalent means are used to provide a hand grip, or if extension is impractical.

(8) Ladders must be positioned on a level, firm base.

(9) Ladders must have slip-resistant bases and be secured at the top or bottom to prevent slipping.

(10) Ladders must be placed so that climbing employees are not exposed to hazards from projecting objects or doors that open toward the ladder.

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First Aid & Lifesaving Facilities (1917.26)

(f) A readily available portable or permanent ladder must be provided within 200 feet of waterside work areas.

Manlifts (1917.117)

(i) *Emergency ladder.* A fixed emergency ladder accessible from any position on the manlift and meeting the re-

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(1917.117 — continued)

quirements of 1917.119(d) must be provided for the entire run of the manlift.

Ladders (1918.25)

(a) At least one safe, accessible ladder must be provided for each gang working in a hatch. More than two ladders in a hatch are never required. There must be an adequate handhold at the head of each ladder.

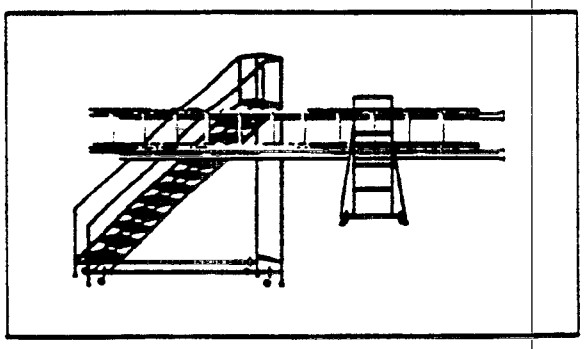
(b) Do not permit the use of visibly unsafe ladders

(c) When fixed hold ladders do not fulfill the requirements of a above, use straight ladders or Jacob's ladders. Straight ladders must be adequately strong, extend at least 36 inches above the coaming and be suitably secured. Jacob's ladders must be of the double rung or flat tread type, well maintained, and properly secured. They must hang without slack from their lashings or be pulled up entirely.

(d) A ladder is unsafe if there is not at least four inches of clearance in back of the rungs.

(e) If no other access to or from stowed cargo is available, use strong, secure ladders or steps. Adequate steps formed by the cargo itself are acceptable depending on the nature of the cargo and the type of stowage.

(f) Portable straight ladders used for any purpose must be strong and properly secured.



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