CALIFORNIA CODE OF REGULATIONS

Chapter 4-Division of Industrial Safety

Subchapter 4-Construction Safety Orders (Sections 1500-1938)

Article 10-Haulage and Earth Moving Equipment (Section 1590-1596)

Section 1596. Roll-Over Protective Structures (ROPS)

(a) Installation Schedule.

ROPS and seat belts (see Section 1596(g)) shall be installed and used on all equipment specified in this section in accordance with the following effective dates for each type or use of equipment listed below:

NOTE: The provisions of this section do not apply to non-rider equipment.

(1) Scrapers, tractors, front-end loaders, bulldozers, motor graders and water wagon prime movers having brake horsepower ratings above 20:

Equipment Manufacture Dates — Effective Date for ROPS and Seat Belts

(A) On or after April 1, 1971..... April 1, 1971

(B) On or after July 1, 1969..... January 1, 1977 and prior to April 1, 1971

(C) On or after January 1, 1960..... July 1, 1977 and prior to July 1, 1969

(D) Prior to January 1, 1960..... July 1, 1977 (If operated under any of the conditions specified in Section 1596 (a)(2)(B), (i) or (ii) or (iii).)

EXCEPTIONS to Section 1596 (a)(1):

(1) Side boom, pipe-laying tractors.

(2) An operator restraining system, acceptable to the Division, shall be permitted to be used in lieu of the required seat belts on motor graders not designed for seated operations.

(3) ROPS or seat belts shall not be required for the equipment identified in Section 1596 (a)(1)(D) when loading/unloading from transportation vehicles on relatively flat surfaces.

(2) Rollers and compactors having a weight greater than 5,950 pounds.

(A) Rollers or compactors having segmented and/or sheepsfoot-type wheels or drums by July 1, 1977.

(B) All rollers and compactors (other than those specified in Section 1596(a)(2)(A)) when operating under any of the following conditions on or after July 1, 1977:

(i) Parallel to and within 3 feet of a down slope steeper than 3 feet horizontal to 1 foot vertical, or

(ii) Within 3 feet of a vertical or nearly vertical drop-off exceeding 1 foot in height, or

(iii) On any grade exceeding 15 percent (10 feet horizontal to 1 1/2 feet vertical).

EXCEPTIONS to Section 1596 (a)(2)(B):

(1) Smooth, steel wheel rollers where the operator stands at the extreme rear of the vehicle.

(2) Rollers and compactors identified in Section 1596 (a)(2)(B) when loading/unloading from transportation vehicles on relatively flat surfaces.

(b) ROPS Approval.

ROPS shall be approved for their intended use as defined in Section 1505 of these Orders.

EXCEPTION: See Section 1596 (i).

(c) Overhead Protection.

ROPS shall provide operator protection against the hazard of falling objects.

(d) Retrofit Design Criteria.

The following items comprise the basic design criteria for retrofit ROPS used on scrapers, tractors, front-end loaders, bulldozers, motor graders and water wagon prime movers manufactured prior to April 1, 1971, and for rollers and compactors manufactured prior to July 1, 1977:

(1) Designs shall be based on one of the following:

(A) SAE Recommended Practice J-1040-a, February, 1975, or

(B) Structural analysis calculations equivalent to SAE J-1040-a, or

(C) Capability to support at least 2 times the gross machine weight applied vertically subsequent to an independently applied side load not less than 1.25 times the gross machine weight applied horizontally at the top of ROPS.

NOTE: 1. Gross vehicle weight includes the ROPS, all fuels and other components required for normal use of the vehicle.2. The structural characteristics of the vehicle frame must be included in the design of the ROPS system.3. The mounting brackets shall be capable of withstanding vibration and the design loads applied to the ROPS.

(2) The inside dimensions of the ROPS shall meet the deflection limiting volume requirements of SAE J-397-a, July, 1973.

(3) The design of the ROPS shall be approved by a registered civil or mechanical engineer.

EXCEPTION: See Section 1596 (i).

(e) Modification or Repair.

ROPS required by Section 1596(a) may be modified or repaired providing such modification or repair complies with the provisions of Section 1596(d) or Federal OSHA standard 1926.1000(c)(2).

(f) Labeling.

Each ROPS shall bear a label with the following information:

(1) Name and address of manufacturer.

(2) Manufacturer's ROPS model number.

(3) Make and model of equipment for which the ROPS is designed.

Labels shall be stamped plates or other permanently attached means of identification, and shall not be obscured, obliterated or changed.

(g) Seat Belts (i.e., lap belts) and Combination Pelvic/Upper Torso Restraint Systems.

Seat belts shall be adequate for the intended service and in good repair. Belts previously approved by the Division and installed prior to January 1, 1971, are acceptable provided they remain serviceable. Belts installed on or after January 1, 1971, shall be labeled as meeting the requirements of the Society of Automotive Engineers (SAE) standard in effect at the time the belt was manufactured. Where installed, combination pelvic/upper torso (Type 2) restraint systems shall be labeled as meeting the requirements of SAE J2292 AUG97, combination Pelvic/Upper Torso (Type 2) Operator Restraint Systems For Off-Road Work Machines.

Note: For the purpose of subsection (g), the term "upper torso restraint" means a portion of a seat belt assembly intended to restrain movement of the chest and shoulder regions.

(1) Adjustment. The seat belts shall be capable of snug adjustment by the employee by a means easily within the employee's reach or shall be provided with an automatic locking or emergency locking retractor.

(2) Marking. Each seat belt and combination pelvic/upper torso restraint system shall be permanently and legibly marked or labeled with year of manufacture, model or style number and name or trademark of manufacturer or distributor, or of the importer if manufactured outside of the United States.

(3) Stiffness. To minimize "roping," the seat belt webbing shall be woven and/or treated to produce a stiffness in the transverse direction equal to or greater than that obtained with a weave of double plain with one up, one down binder,without stuffers. This stiffness shall be effective for the usable life of the webbing. The webbing shall be flexible in the longitudinal direction to permit adjustment to -40°F.

(4) Material. The seat belt webbing material shall have a resistance to acids, alkalis, mildew, aging, moisture and sunlight equal to or better than that of untreated polyester fiber. The webbing shall not be less than three (3) inches in width; its ends shall be protected or treated to prevent unravelling and the breaking strength shall be at least 6,000 pounds.

NOTE: For seat belt requirements for agricultural and industrial tractors, see Section 3653, General Industry Safety Orders.

(5) Release. The seat belt buckle shall be designed so that it can be easily released with a single motion. It shall also be capable of being released with either available mittened hand.

(6) Closure. The seat belt buckle shall be designed so that it can be easily closed with mittened hands.

(7) Location. When a two-piece belt is used, the adjustment means shall be on each half of the belt to allow for the centering of the buckle on the operator.

(8) Operation. Each adjustment shall be capable of being made with the use of one mittened hand.

(9) Tests. A typical complete seat belt assembly, including webbing, straps, buckles, adjustment and attachment hardware, and retractors, shall be capable of passing the following destructive tests:

(A) The assembly loop shall withstand, without failure, a force of not less than 5,000 pounds and each structural component of the assembly a force of not less than 2,500 pounds.

(B) The length of the assembly loop between anchorages shall not increase more than 14 inches and each half of the assembly loop shall not increase more than 7 inches when subjected to a force of 5,000 pounds.

(C) Any webbing cut by the hardware during testing shall have a breaking strength at the cut of not less than 4,200 pounds.

(h) Wheel-type Agricultural or Industrial Tractors.

(1) ROPS and seat belts shall be installed and used on all wheel-type agricultural or industrial tractors used in construction in accordance with the installation schedule in Section 1596(a)(1).

(2) The ROPS specified above shall be approved for their intended use as defined in Section 1505.

(3) Protective enclosures, if used, shall meet be approved for their intended use as defined in Section 1505.

(4) ROPS approvals granted for wheel-type agricultural or industrial tractors will remain effective for the specified models of equipment for which they were granted, unless revoked for cause. These ROPS shall bear a label with their California State Approval Number.

(i) Existing ROPS Approvals.

ROPS and canopies installed prior to July 24, 1976 and having a label with a California approval number on the specific model of construction equipment for which the approval was granted shall be deemed to be in compliance with the provisions of this section relating to ROPS.

NOTE: Authority and reference cited: Section 142.3, Labor Code.

HISTORY

1. Amendment of subsections (a) and (d) filed 5-25-76 as an emergency; effective upon filing (Register 76, No. 22). For prior history, see Register 76, No. 6.

2. Repealer and new section filed 7-21-76; effective thirtieth day thereafter (Register 76, No. 30).

3. Amendment of subsections (b) and (d) and new subsection (i) filed 3-28-78; effective thirtieth day thereafter (Register 78, No. 13).

4. Amendment of subsections (a)(1) and (a)(2)(B) filed 5-6-81; effective thirtieth day thereafter (Register 81, No. 19).

5. Amendment filed 2-7-86; effective thirtieth day thereafter (Register 86, No. 6).

6. Amendment of subsections (g)-(g)(2) filed 3-4-98; operative 4-3-98 (Register 98, No. 10).

7. Amendment of subsections (b), (f)(4), (h)(2) and (h)(3) filed 5-17-99; operative 6-16-99 (Register 99, No. 21).