

**OCCUPATIONAL SAFETY  
AND HEALTH STANDARDS BOARD**

2520 Venture Oaks Way, Suite 350  
Sacramento, CA 95833  
(916) 274-5721  
FAX (916) 274-5743  
Website address [www.dir.ca.gov/oshsb](http://www.dir.ca.gov/oshsb)



**THIRD NOTICE OF PROPOSED MODIFICATIONS TO  
CALIFORNIA CODE OF REGULATIONS  
TITLE 8: Division 1, Chapter 4, Subchapter 4, Article 2,  
Sections 1504 and 1591 and New Appendix A of the Construction Safety Orders**

**Vehicle Exhaust Retrofits**

Pursuant to Government Code Section 11346.8(c), the Occupational Safety and Health Standards Board (Standards Board) gives notice of the opportunity to submit written comments on the above-named standards in which further modifications are being considered as a result of a Board directive.

On February 17, 2011, the Occupational Safety and Health Standards Board held a Public Hearing to consider revisions to Title 8, Division 1, Chapter 4, Subchapter 4, Article 2, Section 1504, Article 10, Section 1591, New Appendix A; and Article 11, Section 1597 of the Construction Safety Orders; and Subchapter 7, Article 25, Section 3663; and Article 93, New Section 4925.1 of the General Industry Safety Orders; and Subchapter 17, Article 17, Section 7016 of the Mine Safety Orders. The Standards Board received comments on the proposed amendments and the proposal was modified as a result of these comments. On April 5, 2011, a 15-Day Notice of the proposed modifications was issued.

The Standards Board received comments on the proposed amendments and further modifications were proposed for Section 1504; Section 1591– subsections (m)(4), (m)(5), and (m)(6); and Section 1591 – New Appendix A, as a result of these comments. On June 30, 2011, a Second - 15-Day Notice of the proposed modifications was issued.

In response to a directive from Board Members during the Business Meeting portion of the Board Meeting held on October 20, 2011, further modifications are now proposed for Section 1591 to delete Exception No. 1 following subsection (m)(5) and reword and augment the Note that follows subsection (m)(6)(C); the latter changes resulted in the deletion of the term "Note." A copy of the regulation with the further modifications clearly indicated is attached for your information.

Pursuant to Government Code Section 11346.8(d), notice is also given of the opportunity to submit comments concerning the addition to the rulemaking file of the following document relied upon:

Summary Public Meeting/Public Hearing/Business Meeting, held October 20, 2011, in Sacramento, California

Copies of this document are available for review during normal business hours at the Standards Board Office located at the address listed below or at <http://www.dir.ca.gov/oshsb/minutesOct2011.pdf>.

Any written comments on these further modifications must be received by 5:00 p.m. on November 21, 2011, at the Occupational Safety and Health Standards Board's Office, 2520 Venture Oaks Way, Suite 350, Sacramento, California 95833 or submitted by fax at (916) 274-5743 or e-mailed at [oshsb@dir.ca.gov](mailto:oshsb@dir.ca.gov). This proposal will be scheduled for adoption at a future Business Meeting of the Occupational Safety and Health Standards Board.

The Occupational Safety and Health Standards Board's rulemaking file on the proposed action is open to public inspection Monday through Friday, from 8:00 a.m. to 4:30 p.m. at the Standards Board's Office, 2520 Venture Oaks Way, Suite 350, Sacramento, California.

Inquiries concerning the proposed modifications may be directed to the Executive Officer, Marley Hart at (916) 274-5721.

OCCUPATIONAL SAFETY AND HEALTH  
STANDARDS BOARD

*Original signed by*

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Marley Hart, Executive Officer

Date: November 2, 2011

## **Proposed Further Modifications To Third 15-Day Notice**

(Further modifications for new language are shown in *italicize*, **bold**, and single underscore and deleted language are shown in *italicize*, **bold**, and single strike-out)  
All changes are on Page 3 of 10

## **Proposed Further Modifications To Second 15-Day Notice**

(Further modifications for new language are shown in *italicize*, **bold**, and double underscore and deleted language are shown in *italicize*, **bold**, and double strike-out)

## **Proposed Modifications To First 15-Day Notice**

(Modifications for new language are shown in **bold** and double underscore and deleted language are shown in **bold** and double strike-out)

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

Amend Sections 1504, 1591, **and** 1597, ~~3663, and 7016~~; and add new Appendix A to follow Section 1591 and new Section 4925.1, as follows:

**Subchapter 4. Construction Safety Orders**

\* \* \*

**Article 2. Definitions**

\* \* \*

**§1504. Definitions.**

(a) The following definitions shall apply in the application of these Orders.

\* \* \*

Excavation, Trenches, Earthwork.

\* \* \*

(G) Shaft. An excavation under the earth's surface in which the depth is much greater than its cross-sectional dimensions such as those formed to serve as wells, cesspools, certain foundation footings, and under streets, railroads, buildings, etc.

Exhaust Retrofit. ~~Modifications made to a vehicle's existing exhaust system to install an air pollution emission device, including the air pollution control device and all modified sections of the vehicle's exhaust pipes. An emission control system device installed on a vehicle after the vehicle's manufacture, including, but not limited to, modified or added sections of the vehicle's exhaust pipes exhaust pipe that connects the emission control device to the engine.~~

Exit. Exit is a continuous and unobstructed means of egress to a public way, and shall include intervening doors, doorways, corridors, exterior exit balconies, ramps, stairways, smoke-proof enclosures, horizontal exits, exit passageways, exit courts, and yards.

\* \* \*

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**Article 10. Haulage and Earth Moving**

\* \* \*

**§1591. Haulage Vehicles, Equipment-Construction and Maintenance.**

\* \* \*

(m) Exhaust retrofits. If an exhaust retrofit is installed on a vehicle, it shall be installed and maintained in accordance with the following:

(1) An exhaust retrofit shall not reduce the capacity, structural integrity, or safe performance of a vehicle.

(2) An exhaust retrofit shall not reduce ~~the operator's~~ an employee's ability to access or egress a vehicle safely.

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

(3) An exhaust retrofit shall be located or effectively shielded such that it does not increase the risk of a fire due to accidental contact with hydraulic fluid or fuel spilled during transfer or sprayed from a broken hose, pipe, or container.

(4) An exhaust retrofit shall be located or effectively shielded such that it does not increase the risk of ~~the operator, during performance of normal duties, an employee~~ contacting exhaust system surfaces having a temperature of 140 degrees F (60 degrees C) or higher. *Heat shielding is not required on an exhaust retrofit located under the hood of a vehicle if space limitations make shielding impracticable.*

~~(5) Before a vehicle equipped with an exhaust retrofit is placed in use, the effect of the retrofit on the operator's visibility shall be evaluated in accordance with the Visibility Testing Procedures (visibility test) in Appendix A of this Section, and the retrofit shall pass the visibility test, in accordance with Section B of Appendix A.~~

~~(6) Where subsection (m)(5) requires visibility testing be conducted on a vehicle, the employer shall maintain a written record of the visibility testing. The visibility testing record shall be readily available as long as the employer uses the vehicle. The record shall include the following information:~~

~~(A) Type of vehicle, manufacturer, and model number;~~

~~(B) Vehicle identification number;~~

~~(C) Manufacturer and model of the exhaust retrofit;~~

~~(D) If the exhaust stack is modified, diagrams and measurements showing the dimensions and location, with respect to the operator, of the modified exhaust stack and the OEM exhaust stack;~~

~~(E) The pass/fail results of the visibility test;~~

~~(F) The printed name, signature and contact information of the person conducting the visibility test; and~~

~~(G) The test date.~~

~~EXCEPTION: The employer is not required to maintain a record of the visibility testing conducted on a vehicle if all sections of the exhaust retrofit are completely inside the Original Equipment Manufacturer (OEM) engine compartment.~~

~~(5) An exhaust retrofit shall not reduce the driver's view of the ground surrounding the vehicle, as determined without the use of mirrors or cameras. Modifications or additions made to a vehicle to install a retrofit, such as expanding an engine compartment hood or adding a heat shield, shall be considered a part of the exhaust retrofit. An exhaust retrofit, excluding exhaust stacks which are the subject of subsection (6), shall not obstruct the driver's view of an area or object located 40 inches outside of the smallest rectangle that encompasses the perimeter of a vehicle, as determined in accordance with the following:~~

~~(A) A modification or addition made to a vehicle to install a retrofit, such as an expanded engine compartment hood or added heat shield, shall be considered part of the exhaust retrofit.~~

~~(B) If a bucket or blade is attached to a vehicle, it shall be placed in the traveling position and shall be considered a part of the vehicle for the purpose of establishing the perimeter of the vehicle to the front and rear, but not to the sides.~~

~~(C) The driver's view shall be determined without the use of mirrors or cameras, and~~

~~(D) The driver's view shall represent the view that a driver would have under the following conditions:~~

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

1. The driver weighs at least 195 pounds and is less than 70 inches tall,  
2. The driver is sitting upright in the driver's seat and is looking towards the exhaust retrofit,  
and  
3. The driver's seat is positioned in the middle of its adjustable range.
- NOTE: The Visibility Test Procedures in Non-Mandatory Appendix A constitute one method that may be used to demonstrate compliance with this subsection.
- EXCEPTION No. 1: An exhaust retrofit may obstruct the driver's view to the rear of an excavator, provided that the excavator cab rotates so that the driver faces the direction of travel.
- (6) If an exhaust stack is relocated, the new location shall not create a greater impairment to the driver's operational vision. Exhaust stacks on exhaust retrofits, when compared to exhaust stacks on the vehicle as originally manufactured, shall comply with the following conditions:
- (A) Retrofit exhaust stacks shall be located or effectively shielded such that the stacks do not increase the risk of an employee contacting stack surfaces having a temperature of 140 degrees F (60 degrees C) or higher;
- (B) Retrofit exhaust stacks shall not reduce the driver's view of the outside edge of the blade or bucket on earthmoving equipment, as determined without the use of mirrors or cameras; and
- (C) Retrofit exhaust stacks shall not reduce the driver's view to the front, sides, or rear of the vehicle, as determined without the use of mirrors or cameras. A retrofit exhaust stack reduces the driver's view if the area it obstructs from the driver's view is wider than the area obstructed by the original exhaust stack.
- NOTE: Exhaust stack modifications that may shall be considered to reduce the driver's view include, but are not limited to, the following:
- 1.(i) Increasing the diameter of an exhaust stack,  
2.(ii) Moving an exhaust stack closer to the driver, and  
3.(iii) Moving an exhaust stack from a location where it is hidden from the driver's view by a part of the vehicle, such as the cab frame, to a location where it obstructs the driver's view, or  
(iv) Moving an exhaust stack from a location in the driver's peripheral view to a location in the driver's operational view.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

\* \* \*

~~New Appendix A and New Figures 1—11 have been deleted in its entirety.~~

~~Add New Appendix A and New Figures 1—11 as follows:~~

~~Appendix A to Section 1591~~

~~Visibility Testing Procedures (Mandatory)~~

~~\*\*\*~~

~~Figures 1—11~~

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

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Add New Appendix A and New Figures 1 – 3 as follows:

Appendix A to Section 1591

Visibility Test Procedures (Non-Mandatory)

A. General Requirements.

1. Scope and Application. These test procedures may be used to determine compliance with Section 1591(m)(5).

2. Definitions.

a) Exhaust Retrofit. An emission control device installed on a vehicle after the vehicle's manufacture, including, but not limited to, modified or added sections of exhaust pipe that connect the emission control device to the engine. For the purpose of these test procedures, an exhaust retrofit does not include an exhaust stack. A modification or addition made to a vehicle to install an exhaust retrofit, such as an expanded engine compartment hood or added heat shield, shall be considered part of an exhaust retrofit.

3. All sections of the exhaust retrofit shall be evaluated in accordance with the test procedures in Section B. A retrofit passes the visibility test, if all sections of the retrofit meet the criteria for passing the visibility test in subsections B.1.b or B.2.d. It is not necessary for all sections of the exhaust retrofit to pass the same test criteria, but all sections must pass at least one of the test criteria.

B. Visibility Test Procedures and Criteria.

1. Determine which sections of an exhaust retrofit are inside the Original Equipment Manufacturer (OEM) engine compartment as follows:

a) Determine the location of the retrofit section with respect to the OEM engine compartment.

b) The retrofit section passes the visibility test if the section is located inside the boundary of the OEM engine compartment.

2. Evaluate retrofit sections outside the OEM engine compartment as follows:

a) Position the vehicle as instructed in Section D.

b) Draw a rectangular boundary line on the ground 40 inches outside of the smallest rectangle that encompasses the perimeter of the vehicle. If a bucket or blade is attached to a vehicle, it shall be placed in the traveling position and shall be considered a part of the vehicle when drawing the boundary line to the front and rear of the vehicle, but not to the sides.

c) Position a camera as instructed in Section G and photograph the exhaust retrofit from the driver's view.

d) The retrofit section passes the visibility test if photographs taken in accordance with subsection B.2.c. demonstrate that it meets one of the following test criteria:

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

- (i) The retrofit section is below the driver's view to the edge of the vehicle (see Figure 1),  
or  
(ii) The retrofit section does not block the driver's view of the rectangular boundary line drawn according to subsection B.2.b.

C. Test Records.

1. Create a written record for each vehicle that passes the visibility test, unless all sections of the exhaust retrofit(s) are inside the OEM engine compartment. The record shall include the following information:

- a) Type of vehicle, manufacturer, and model number;
- b) Vehicle identification number;
- c) Manufacturer and model of the exhaust retrofit;
- d) The picture(s) demonstrating that the exhaust retrofit passes the visibility test criteria;
- e) A statement to the effect that the vehicle was evaluated in accordance with the visibility test procedures and met the requirements for passing the test;
- f) The printed name and signature of the person conducting the visibility test along with that person's contact information; and
- g) The test date.

D. Vehicle Position.

1. Park the vehicle on an area of compacted earth or paved surface with a gradient of no more than 3% in any direction.

2. Turn off the vehicle engine, set the parking brake, and block the tires. Position attachments, such as buckets and blades, in the traveling position and block them in place. The bucket or blade may be lowered to the ground instead of being blocked in the traveling position, provided that this lowered position does not affect the visibility test results.

E. Seat Reference Point.

1. Locate and mark the seat reference point, as follows:

- a) If the seat pan has a tilt feature, adjust the seat pan so that it is as level as possible.
- b) If the seat can be adjusted forward and backward, adjust the seat so that it is midway between the maximum forward and maximum rearward position.
- c) If the seat height can be adjusted, adjust the seat height so that it is midway between the minimum and maximum height.
- d) If the compression of the seat cushion is adjustable (air suspension seats), adjust the seat compression so that it is midway between its maximum and minimum range.
- e) Use a carpenter's square to locate the seat reference point, as follows (see Figure 2):
  - (i) Rest the edge of one arm of the carpenter's square on the seat cushion such that it is level and bisects the seat from left to right.
  - (ii) Position the other arm of the carpenter's square such that it is vertical and its edge touches the most forward part of the seat backrest.

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

f) Mark a point on the center line of the seat 4 inches in front of the most forward part of the backrest. This point is the seat reference point.

F. Camera Lens Height.

1. The camera lens height represents the eye level of the average height and weight driver when sitting in the driver's seat. For seats that do not sink or compress when occupied, the camera lens height is 30 inches above the seat reference point on the unoccupied seat. If a seat sinks or compresses when occupied, such as an air suspension seat or a seat with a cushion, the average driver's eye level, when sitting in the seat, will be lower than 30 inches above the seat reference point on the unoccupied seat, in which case seat compression is to be determined by following these steps:

a) Select a person weighing at least 195 pounds to represent the driver. The driver shall sit on a hard bench or similar surface that does not compress when sat on. Measure and record the distance from the seat surface to the top of the driver's head. This distance is represented by distance D1 in Figure 3.

b) With the driver seated upright in the driver's seat (with the seat adjusted as described in Section E.) measure and record the distance from the top of the driver's head to an overhead reference point directly above. This distance is represented by distance D2 in Figure 2. If an overhead reference point, such as a cab ceiling or a roll bar, is not available, construct an overhead reference point out of plastic pipe or other material.

c) With the seat unoccupied and adjusted as provided in Section E, measure the distance from the overhead reference point to the seat reference point. This distance is represented by distance D3 in Figure 3.

d) Calculate seat compression as follows:

Seat compression =  $D1 + D2 - D3$ , as illustrated in Figure 3.

2. Calculate the camera lens height as follows:

Camera lens height = 30 inches minus the seat compression.

G. Camera Lens Position.

1. The camera lens position represents the eye position of an average height and weight driver. Position the camera lens such that:

a) It is directly above the seat reference point.

b) The distance between the center of the lens and the seat reference point is equal to the camera lens height calculated in subsection F.2, and

c) It points directly towards the retrofit.

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

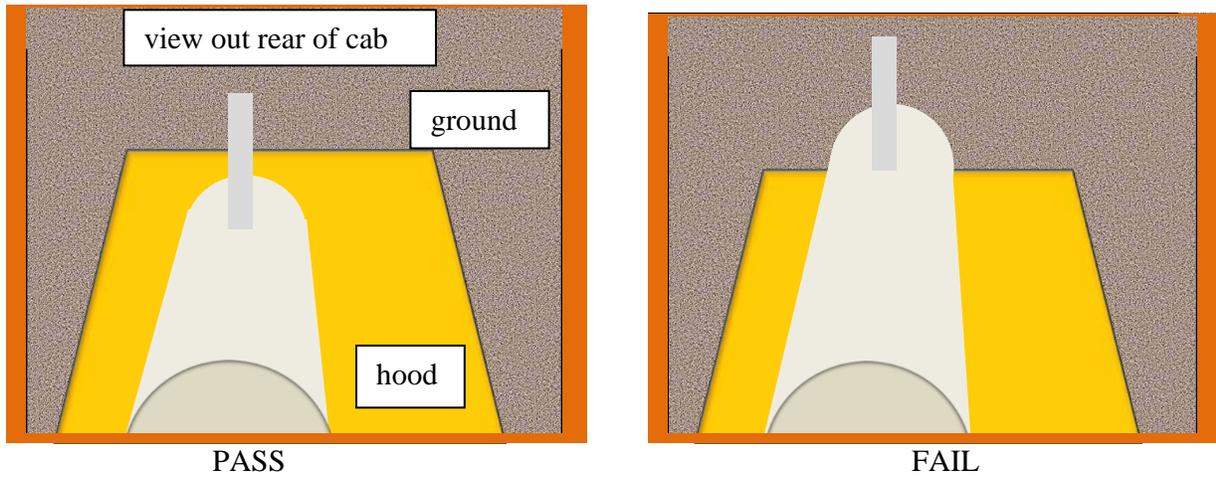


Figure 1

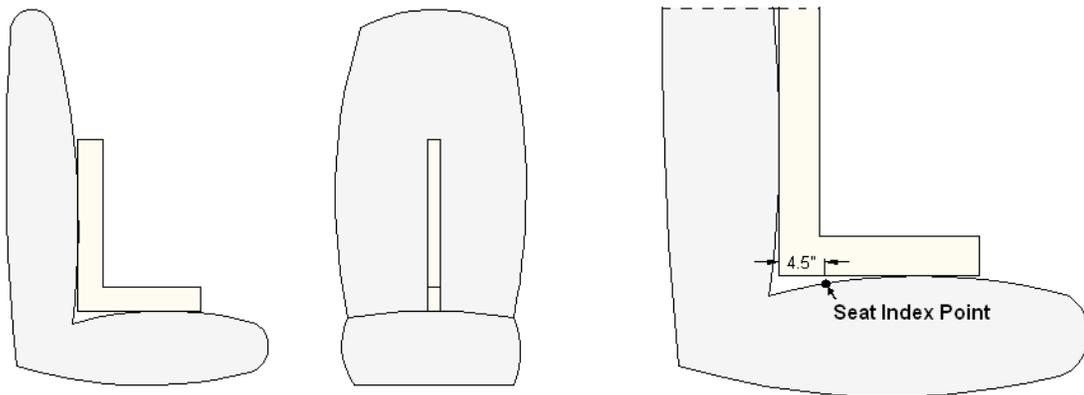


Figure 2

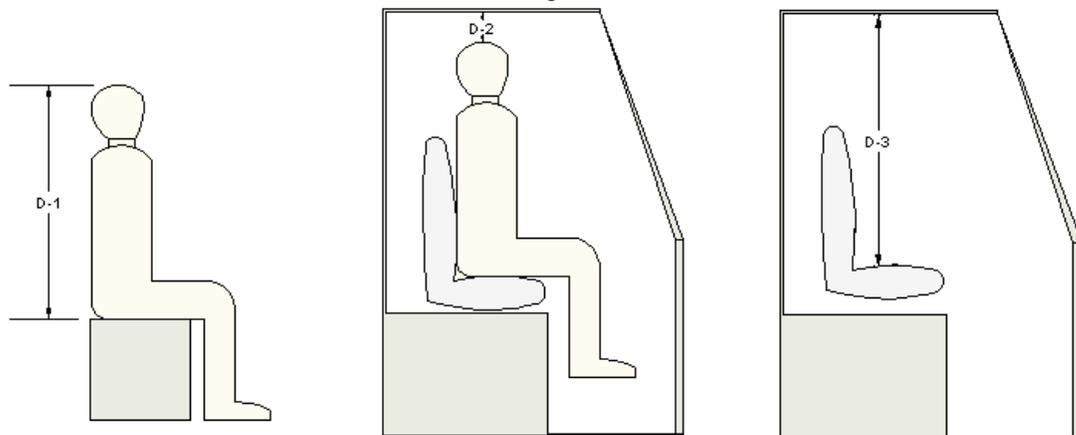


Figure 3

**STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD**

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

**Article 11. Vehicles, Traffic Control, Flaggers, Barricades, and Warning Signs**

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**§1597. Jobsite Vehicles.**

Jobsite vehicles as defined in Section 1504 of these Orders, which are utilized on jobsites exclusively and are, therefore, excluded from the provisions of applicable traffic and vehicular codes shall be equipped and operated in the following manner:

\* \* \*

(l) Exhaust retrofits. Modifications made to a vehicle's existing exhaust system to install an air pollution control device, including the air pollution control device and all modified sections of the vehicle's exhaust pipes, shall comply. If an exhaust retrofit is installed on a vehicle, it shall be installed and maintained in accordance with Section 1591(m).

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

~~**Subchapter 7. General Industry Safety Orders**~~

~~\* \* \*~~

~~**Group 4. General Mobile Equipment and Auxiliaries**~~

~~\* \* \*~~

~~**Article 25. Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment**~~

~~\* \* \*~~

~~**§3663. Maintenance of Industrial Trucks.**~~

~~\* \* \*~~

~~(g) Industrial trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts, except as provided in subsections (h) and (i) of this Section. Additional counterweighting of fork trucks shall not be done unless approved by the truck manufacturer.~~

~~\* \* \*~~

(i) Exhaust retrofits. Modifications made to an industrial truck's existing exhaust system to install an air pollution control device, including the air pollution control device and all modified sections of the vehicle's exhaust pipes, shall comply with Section 1591(m).

~~NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.~~

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

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~~Group 13. Cranes and Other Hoisting Equipment~~

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~~Article 93. Boom Type Mobile Cranes~~

~~\*\*\*~~

~~§4925.1. Exhaust Retrofits.~~

~~Modifications made to a mobile crane's existing exhaust system to install an air pollution control device, including the air pollution control device and all modified sections of the vehicle's exhaust pipes, shall comply with Section 1591(m).~~

~~NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.~~

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~~Subchapter 17. Mine Safety Orders~~

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~~Article 17. Loading, Hauling, and Dumping~~

~~\*\*\*~~

~~§7016. Haulage Vehicle, Construction and Maintenance.~~

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~~(m) Exhaust retrofits. Modifications made to a vehicle's existing exhaust system to install an air pollution control device, including the air pollution control device and all modified sections of the vehicle's exhaust pipes, shall comply with Section 1591(m).~~

~~NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.~~

