

**OCCUPATIONAL SAFETY  
AND HEALTH STANDARDS BOARD**

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NOTICE OF PROPOSED MODIFICATIONS TO  
CALIFORNIA CODE OF REGULATIONS  
TITLE 8: Division 1, Chapter 4, Subchapter 4, Article 2,  
Sections 1504, 1591, and 1597 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 regulations in which further modifications are being considered as a result of public comments and/or Board staff evaluation.

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 oral and written comments on the proposed amendments. The proposed regulations have been modified as a result of these comments.

A copy of the full text with the modifications clearly indicated is attached for your information. In addition, a summary of all oral and written comments regarding the original proposal and responses is included.

Any written comments must be related to these modifications and be received by 5:00 p.m. on April 25, 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

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Marley Hart, Executive Officer

Date: April 5, 2011

## Proposed Modifications

(Modifications for new language are shown in **bold** and double underscored 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 installed on a vehicle after the vehicle's manufacture, including, but not limited to, modified sections of the vehicle's exhaust pipes.~~

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.**

\* \* \*

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

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

(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.

(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.

~~(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;~~

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

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

~~(F) 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.

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

Attachment No. 1  
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PROPOSED STATE STANDARD,  
TITLE 8, DIVISION 1, CHAPTER 4

**(6) If an exhaust stack is relocated, the new location shall not create a greater impairment to the driver's operational vision.**

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~~**

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

\* \* \*

**§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).**

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

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

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.~~

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

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~~Article 93. Boom Type Mobile Cranes~~

~~\*\*\*~~

STANDARDS PRESENTATION  
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CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

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PROPOSED STATE STANDARD,  
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~~§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.~~

~~\*\*\*~~

~~(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.~~

**SUMMARY AND RESPONSES TO  
ORAL AND WRITTEN COMMENTS**



## **SUMMARY AND REPOSES TO ORAL AND WRITTEN COMMENTS**

**Mr. Van Howell, Area Director, Region IX, OSHA, U.S. Department of Labor, by letter dated January 21, 2011.**

VH1: Mr. Howell stated that the proposal does not ensure the manufacturer's approval, in writing, prior to any retrofit (modifications or additions) which affect the capacity or safe operation of industrial trucks (equipment) as required in 1926.602(c)(1)(ii), 1910.178(a)(4) and GISO 3663(g) which provide commensurate protection with each other. In addition, the proposal does not require the capacity, operation, and maintenance instructions plates, tags, or decals be changed according to the manufacturer's written approval.

Response: The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not alter existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to comply with the existing industrial truck standards, including Section 3650(e) which provides that: 1) the manufacturer's approval, in writing, prior to any modifications or additions which affect the capacity or safe operation of industrial trucks, and 2) the capacity, operation, and maintenance instructions plates, tags, or decals be changed according to the manufacturer's written approval.

VH2: Mr. Howell stated that the proposal does not ensure that crane or derrick modifications and/or additions (retrofits) are prohibited unless they are reviewed and approved in writing prior to the modification/addition with the manufacturer's load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary as required in federal Section 1926.1434.

Response: The proposal was modified to remove proposed Section 4925.1 which would have required that modifications made to a mobile crane to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not alter existing standards pertaining to cranes or derricks; therefore, modification made to a crane or derrick to install an exhaust retrofit would need to comply with the crane and derrick standards which are currently being amended to ensure equivalency with the recently adopted federal crane and derrick standards.

VH3: Mr. Howell stated that the proposal does not ensure haulage vehicle equipment and accessories are arranged so as to avoid impairing the operator's vision to the front and sides as required in Section 1591(b).

Response: The proposed provision in Section 1591(m)(5) which would have allowed an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591, was modified and Appendix A was removed. The proposed modification to Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle. This performance based provision is more protective than Section 1591(b).

VH4: Mr. Howell stated that the proposal does not ensure all industrial trucks meet the applicable requirements of design, construction, stability, inspection, testing, maintenance, and operation as defined in ANSI B56.1-1969 outlined in 1926.602(c)(1)(vi) and 1910.178(a)(2). Also, the proposal conflicts with, and is less protective than, federal Sections 1910.178(a)(2) and 1910.178(a)(3) which require that approved industrial trucks bear a label or some other identifying mark indicating approval by a nationally recognized testing laboratory. In addition, the applicable ANSI and national testing laboratory requirements cannot be superseded with Appendix A requirements, and no detailed side by side showing how the Appendix A is at least as effective as the requirements in the ANSI and nationally recognized testing laboratory has been submitted as required by the OSH Act.

Response: The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not amend existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to comply with the existing industrial truck standards which provide equivalent protection to 1926.602(c)(1)(vi), 1910.178(a)(2), and 1910.178(a)(3).

VH5: Mr. Howell stated that the proposal does not provide an equivalent level of protection as exists in other CSO and GISO standards that must take precedence on the equipment over the proposed section to be considered commensurate protection.

Response: See responses to comments VH1, VH2, VH3, and VH4. The Board believes the proposal, as modified, is at least as effective as the counterpart federal standards and thanks Mr. Howell for his comments.

**Mr. Dave Harrison, Director of Safety, Operating Engineers, Local Union No. 3, by letter dated February 1, 2011, and oral comments received at the February 17, 2011 Public Hearing in Oakland, California.**

DH1: Mr. Harrison stated that the proposal is flawed in that it only refers to exhaust retrofits whereas Petition No. 507 called to amend Section 1591(b), Equipment and accessories.

Response: Petition No. 507 stated that modifications made to haulage and other off-road vehicles to comply with new California Air Resources Board (ARB) requirements create safety hazards due to placing bulky exhaust purifiers (exhaust retrofits) on equipment. In response to directions from the Governor's Office, ARB and Board staff evaluated a representative sample of vehicles subject to the ARB retrofit requirements to measure masking created by exhaust retrofits when installed on the vehicles in a manner that minimizes masking. The field study provided information used to determine the effect and estimated cost impact of the proposed provision in Section 1591(m)(5) which would allow an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591.

In response to comments that the proposed visibility criteria and testing procedure would allow an unsafe level of masking and are too complex, Section 1591(m)(5) was modified and Appendix A was removed. The proposed modification to Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle. The proposed modification is an objective, performance based standard and because it applies only to

exhaust retrofits, information gathered in the development of the initial rulemaking proposal can be used to determine the effect and estimated cost impact of the proposed modification.

It would be problematic if the scope of the proposed provisions regarding operator visibility were expanded beyond exhaust retrofits to include equipment and accessories installed on vehicles. The Board does not have information on the effect, feasibility or estimated cost impacts related to visibility requirements that would place restrictions on equipment and accessories installed on vehicles. The terms “equipment” and “accessories” are not currently defined in Title 8 and defining the terms may have unintended consequences. Some objects which might be considered “equipment” or “accessories” are essential for the vehicle to work as designed and cannot be installed out of the operator’s sight. For example, it would not be practicable to prohibit booms, buckets or blades that increase masking.

At this time, modifying the proposal to address the obstruction of the operator’s view by objects other than exhaust retrofits would exceed the scope of the notice of rulemaking that pertains to this proposal. The Board believes that the proposal is properly limited to exhaust retrofits in view of the following: 1) In response to new ARB off-road diesel requirements, it is expected that exhaust retrofits will be installed on thousands of vehicles over the next several years; 2) A standard is urgently needed to provide guidance to employers so that retrofits are installed in a manner that does not expose employees to an increased risk of being struck by equipment; and 3) In light of the challenges associated with regulating vehicle modifications that affect operator visibility, limiting this rulemaking to one type of modification will avoid the delays and complications inherent in a broader regulatory approach.

DH2: Mr. Harrison opposes relying on the ISO 5006 standard in the development of the Visibility Testing Procedure in Appendix A to Section 1591.

Response: The proposed amendments to Section 1591 were modified to remove Appendix A and replace it with the performance based provisions in modified subsections (m)(5) and (m)(6).

DH3: Mr. Harrison states that the provisions in Appendix A related to the use of a 5 foot railing and a 40 inch rectangular perimeter should be removed.

Response: The proposed amendments to Section 1591 were modified to remove Appendix A and replace it with the performance based provisions in modified subsections (m)(5) and (m)(6) which do not incorporate the use of a 5 foot railing or 40 inch rectangular perimeter.

DH4: Mr. Harrison stated that the light spacing used in proposed Appendix A should be changed from 8 inches to 2.5 inches.

Response: The proposed amendments to Section 1591 were modified to remove Appendix A and replace it with the performance based provisions in modified subsections (m)(5) and (m)(6) which do not incorporate the use lights.

DH5: Mr. Harrison requested that proposed Section 1591(m)(2) which states “An exhaust retrofit shall not reduce the operator’s ability to access or egress a vehicle” be amended to replace “the operator’s” with “an employee’s” and add “or maintain” after “ability to access or egress”. Mr. Harrison states that employees who maintain equipment are exposed to slip, trip

and fall hazards because retrofits have been place over access areas used by maintenance personnel.

Response: Proposed Section 1591(m)(2) was modified to replace “ the operator’s” with “an employee’s”. The modified provision would prevent placing retrofits over access areas used by employees to maintain a vehicle; therefore, it is not necessary to add “or maintain” as suggested.

DH6: Mr. Harrison requested that proposed Section 1591(m)(4) which states “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, contacting exhaust system surfaces having a temperature of 140 degrees F (60 degrees C) or higher” be amended to replace “the operator’s” with “an employee’s” and delete “during the performance of normal duties”. He asserts that “during the performance of normal duties” is too vague and unenforceable, and that maintenance personnel should also be protected from burns.

Response: Proposed Section 1591(m)(4) was modified as suggested by Mr. Harrison.

DH7: Mr. Harrison opposes the addition of proposed new Section 3663(i) which he contends: 1) weakens the existing standard making it less protective than federal standards, 2) creates a conflict between proposed Appendix A and ANSI B56 standards pertaining to the evaluation of visibility from industrial trucks, and 3) does not account for unsafe weight and balance changes.

Response: See response to VH1.

DH8: Mr. Harrison opposes the addition of new Section 4925.1 which he contends: 1) weakens the existing crane standards making them less protective than federal standards, 2) conflicts with federal Section 1926.134 which requires manufacturer review and approval for modifications or additions that affect the capacity or safe operation of equipment, and 3) does not account for unsafe weight and balance changes.

Response: See response to VH2.

DH9: Mr. Harrison stated that proposed new Section 7016(m) must be removed because it conflicts with the provision in Section 7016 which requires that every haulage vehicle comply with the California Motor Vehicle Code, and Section 26708(a)(2) of that code states, “a person shall not drive any motor vehicle with any object or material placed, displayed, installed, affixed, or applied in or upon the vehicle that obstructs or reduces the driver’s clear view through the windshield or side windows”.

Response: The proposal was modified to remove proposed Section 7016(m).

DH10: Mr. Harrison opposes the inclusion of Industrial Trucks, Cranes, and Haulage Vehicles in the proposal because this equipment was not part of Petition No. 507 and because end users of this equipment have been afforded the opportunity to participate in the rulemaking process.

Response: The proposal was modified to remove amendments to Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operations, respectively.

DH11: Mr. Harrison states that zero additional obstruction of view is the only acceptable method.

Response: The proposed provision in Section 1591(m)(5), which would have allowed an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591, was modified, and Appendix A was removed. The proposed performance standard in modified Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle, thereby prohibiting additional obstruction of view as Mr. Harrison recommends.

DH12: Mr. Harrison requested that the language submitted in Petition No. 507 be adopted if the Board does not make the changes to the proposal that he suggested in his comments.

Response: As discussed in response to DH1, the Board declines to modify the proposal to adopt the specific language suggested in Mr. Harrison's comments or submitted in Petition No. 507. The Board thanks Mr. Harrison for his comments.

**Mr. Skip Brown, Owner, Delta Construction Company, Inc., by letter dated February 17, 2011, and oral comments received at the February 17, 2011 Public Hearing in Oakland, California.**

SB1: Mr. Brown stated that the proposal uses a guideline that is not recognized or readily available in the United States.

Response: See response to DH2 pertaining to ISO 5006, which the Board assumes is the guideline that Mr. Brown is referring to in his comment.

SB1: Mr. Brown stated that the proposed standard conflicts with Section 26708 of the California Motor Vehicle Code.

Response: See response to DH9.

SB3: Mr. Brown stated words to the effect that no hazardous retrofits should be allowed until conclusive evidence is provided that this exhaust causes premature death.

Response: Proposed Section 1591(m) and subsections (m)(1) through (m)(6), as modified in the 15-Day Notice, would prohibit an exhaust retrofit that creates an additional hazard on equipment.

SB4: Mr. Brown's remaining comments address the ARB off-road diesel regulation and not this Standards Board proposal.

Response: The Standards Board does not have the authority to amend ambient air quality standards adopted by the ARB. The Board thanks Mr. Brown for his comments.

**Ms. Kate Smiley, Safety, Health and Regulatory Services, Associated General Contractors of California, by letter dated February 15, 2011, and oral comments received at the February 17, 2011, Public Hearing in Oakland, California.**

KS1: Ms. Smiley stated that Appendix A is overly complicated and should be revised to simplify. She also agreed with the Operating Engineers Local 3 comments regarding the elimination of the 5 foot railing and reducing the spacing on the light source position to 2.5 inches in Appendix A.

Response: See responses to DH3 and DH4.

KS2: Ms. Smiley stated that the proposal should maintain the overarching principle of the Interim policy, that of “Zero Additional Obstruction of View”.

Response: See response to DH11.

KS3: Ms. Smiley agreed with the comments made by the Operating Engineers Local 3, that the wording of Section 1591(m)(2) and (m)(4) should be revised to protect all employees, not just operators.

Response: See responses to DH5 and DH6.

KS4: Ms. Smiley stated that users with industrial trucks, mobile cranes, and haulage vehicles need the opportunity to participate in the rulemaking process.

Response: See response to DH10. The Board thanks Ms. Smiley for her comments.

**Mr. Bill Davis, Executive Vice President, Southern California Contractors Association, by letter received February 17, 2011, and oral comments received at the February 17, 2011 Public Hearing in Oakland, California.**

BD1: Mr. Davis states there is urgency to dealing with this extreme safety issue because some jurisdictions such as the ports of Los Angeles and Long Beach have made exhaust retrofits mandatory.

Response: The Board recognizes the urgency of this issue and is proceeding as expeditiously as possible.

BD2: Mr. Davis suggested that rather than implementing the complex testing procedures in Appendix A, ARB or OSHSB could establish a database listing those systems that have been approved and disapproved due to visibility issues.

Response: The proposal was modified to remove the testing procedures in Appendix A and replace it with performance based requirements in modified Section 1591(m)(5) and (m)(6). There is too much variability among vehicles, retrofit systems and installation methods to make the commenter’s proposed database a practicable alternative. The Board thanks Mr. Davis for his comments.

**Mr. Mitch Seaman, Legislative Advocate, California Labor Federation, in a letter dated February 16, 2011, and oral comments received February 17, 2011, at the Public Hearing in Oakland, California.**

MS1: Mr. Seaman stated that the AFL-CIO shares the concerns of affiliated unions regarding the rulemaking proposal developed in response to Petition No. 507, and he repeated the written comments the Board received from Mr. Dave Harrison.

Response: See responses to comments from Mr. Harrison. The Board thanks Mr. Seaman for his comments.

**Mr. Rasto Brezny, Deputy Director, Manufacturers of Emission Controls Association, in a written statement received February 18, 2011, and oral comments received at the February 17, 2011, Public Hearing in Oakland, California.**

RB1: Mr. Brezny stated that exhaust retrofits are a cost effective option for meeting ARB's off-road diesel regulations and help to protect equipment operators and construction workers from harmful concentrations of diesel particulate and harmful exhaust gases.

Response: The modifications to proposed Section 1591(m)(1) through (m)(6) would allow the use of exhaust retrofits on haulage vehicles and earthmoving equipment, provided that the retrofit installation does not expose employees to an increased risk of injury. In addition, the proposal was modified to remove proposed Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operations, respectively; consequently, the proposal would allow exhaust retrofits that comply with the existing standards for industrial trucks, cranes, and haulage vehicles used in mining operations.

RB2: Mr. Brezny stated that exhaust retrofits are one type of engineering control recognized by Sections 1533 and 5141 as a means of reducing employee exposure to exhaust emissions from internal combustion engine powered industrial trucks used indoors and in other confined spaces.

Response: The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not amend existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to continue to comply with the existing industrial truck standards.

RB3: Mr. Brezny asserts that: 1) the 50 vehicle study overestimates the percentage of vehicles that could be retrofit in compliance with the proposed visibility standard, because the specific models studied only represent 20,000 to 25,000 of the roughly 150,000 vehicles in the State and the study did not rely on detailed engineering of the complete retrofit exhaust system, 2) Board staff likely underestimated the cost effectiveness of retrofits, 3) for larger vehicles the actual cost of equipment replacement versus retrofit installation will be higher than the estimated \$8,052 per vehicle, and 4) ARBs cost analysis for its off-road regulation provides a more rigorous analysis of equipment replacement costs.

Response: The Board believes that the 50 vehicles examined in the study are representative of the population of off-road vehicle types and models in the State, and the vehicles studied are

sufficient to provide an estimate of the percentage of vehicles that could be retrofit in compliance with the proposed visibility standard. The estimated cost of engineering a complete retrofit exhaust system was obtained from a survey of retrofit manufactures and installers. It is possible that the actual cost of equipment replacement versus retrofit installation could be higher than \$8,052. The \$8,052 represents an estimate of the average cost difference between retrofitting and replacing a vehicle. The estimated cost could be higher for large vehicles than small vehicles. The equipment replacement costs used in the Board's cost analysis were obtained from the ARB. It should also be noted that, according to the Department of Finance, it is appropriate that all of the costs related to retrofitting or replacing a vehicle to comply with the ARB off-road diesel regulation, be attributed to that regulation.

RB4: Mr. Brezny states that: 1) most of the cost increase of installing a retrofit under-hood or out of sight is due to the cost of eliminating the last few inches of masking caused by exhaust piping, 2) Section 26708 of the Motor Vehicle Code provides a precedent for allowing additional de minimus masking which the Board should also consider, 3) Appendix A of the proposal should allow approximately 12 inches of additional masking similar to the ISO 5006 guideline.

Response: The proposed provision in Section 1591(m)(5) which would have allowed an exhaust retrofit to block a limited amount of the operator's vision, as determined by the visibility testing procedures in proposed Appendix A to Section 1591, was modified, and Appendix A was removed. The proposed performance standard in modified Section 1591(m)(5) would prohibit an exhaust retrofit from reducing the driver's view of the ground surrounding the vehicle; therefore, it would prohibit any additional obstruction of view. The consensus expressed in the comments received from employer and employee representatives was that the proposal should be modified to prohibit exhaust retrofits that create any additional masking, because employees working in the area surrounding a vehicle where the operator's view is obstructed by the vehicle are already at risk of being struck by the vehicle and allowing additional masking will result in an unacceptable increase in injuries.

RB5: Mr. Brezny stated that Appendix A, subsection E(3)(c), appears to conflict with subsection B(3)(d) which allows flexibility as to the stack location as long as it does not create additional masking relative to the OEM exhaust stack. He requests that these sections be harmonized to allow flexibility in exhaust stack location within the limitation of no additional masking.

Response: The proposal was modified to remove Appendix A and amend Section 1591(m)(5) and (m)(6). Modified subsections (m)(5) and (m)(6) would allow an exhaust stack to be relocated, provided that it did not create additional masking and the new location did not create a greater impairment to the driver's operational vision.

RB6: Mr. Brezny requested that exhaust retrofits (see Appendix A, Section E.3.c) and other add-on devices (see Section 1591(b)) be treated the same with respect to masking.

Response: See responses to RB5 and DH1.

RB7: Mr. Brezny states that original equipment manufacturers rely on ISO 5006 as a guide, some OEM equipment fails the proposed visibility test, and OEM equipment that blocks the driver's view has been implicated in accidents. He assert that the staff report fails to justify why a safety standard specific to exhaust retrofits is needed or why the installation of exhaust



retrofits should be treated differently from the installation of other aftermarket parts on off-road equipment, or differently from the design of OEM vehicles.

Response: See response to DH1. In addition, the design of OEM vehicles is outside the scope of this rulemaking proposal.

RB8: Mr. Brezny states that mirrors are recommended and effective visibility aids on equipment and the use of mirrors should be allowed when assessing masking. He further states that not allowing the use of mirrors as a means of compliance with the proposed visibility standard conflicts with ARB's policy for granting a safety exemption for its off-road diesel regulation.

Response: Modified Section 1591(m)(5) which replaces proposed Section 1591(m)(5) and Appendix A does not allow the use of mirrors or cameras when evaluating the driver's view. Mirrors are not as safe as providing a direct, unobstructed view, because the view in the mirror can be obscured by vibration, dirt, fog, rain, or snow. Also, mirrors are often missing, damaged or out of alignment. With respect to mirrors, ARB's policy for granting safety exemptions conflicts with the Joint ARB/CalOSHA Interim Visibility Policy which does not allow the use of mirrors when evaluating the driver's view. With respect to retrofit visibility hazards, it was intended that the Joint Interim Visibility Policy would supersede ARB'S off-road diesel requirements pertaining to the granting of safety exemptions.

RB9: Mr. Brezny asserts that the proposal is inconsistent, in that it specifies a 140 degree F surface temperature for retrofits with no criteria as to the surface temperature of an OEM installed exhaust system. He agrees that thermal hazards must be addressed to prevent burns but this should be addressed consistently for all hot exhaust components.

Response: Modified Section 1591(m)(4) does not treat retrofit and OEM systems differently. It says, in effect, that the retrofit cannot increase the risk of contacting surfaces having a temperature of 140 degrees F (60 degrees C) or higher. The design of OEM equipment is outside the scope of this rulemaking.

RB10: Mr. Brezny asserts that proposed Section 1591(m)(3) does nothing to reduce the occurrence of engine fires caused by existing hot surfaces on OEM exhaust components but rather holds retrofits to a higher standard.

Response: Proposed Section 1591(m)(3) provides that an exhaust retrofit shall be located or shielded such that the risk of fire from accidental contact with fuel or hydraulic fluid shall be no greater for retrofit exhaust systems than it is for OEM exhaust system. The proposed performance standard does not provide specifications for the location or shielding of retrofit or OEM exhaust systems, and it does not hold retrofit exhaust systems to a higher standard than OEM exhaust systems. The design of OEM equipment is outside the scope of this rulemaking.

RB11: Mr. Brezny states that the proposal establishes a number of inconsistent and conflicting regulations for retrofit devices that are not required of OEM or other third-party aftermarket parts installed on construction equipment. He requests that the proposal be modified to eliminate the inconsistencies and consider additional flexibility in the level of allowed masking and the use of OEM installed mirrors.

Response: See responses to RB5 through RB10. The Board thanks Mr. Brezny for his comments.

**Mr. Gary Cross, Attorney, Representing the Industrial Truck Association by letter received February 11, 2011.**

GC1: Mr. Cross states that modifications to diesel forklifts, including exhaust retrofits, must continue to be subject to the prior written approval of the manufacturer. He states that ITA members routinely evaluate customer requests to modify trucks. He notes that 29 CFR 1910.178, Title 8, CCR, Section 3650, and ANSI B56.1 all provide for the manufacturer's written approval of modifications to industrial trucks. He requests that the proposal be modified to clarify that nothing in the proposal is intended to alter existing law concerning the need to obtain the manufacturer's prior written approval before modifying a forklift.

Response: See response to VH1.

GC2: Mr. Cross states that the proposed visibility test procedures conflict with Section 3650 which requires that industrial trucks meet the applicable ANSI B56 standard, and ANSI/ITSDF B56.1 requires that industrial trucks meet the visibility criteria of ANSI/ITSDF B56.11.6. Mr. Cross notes that there is no evidence that the proposed visibility test provides protection for employees that is equivalent to that provided by B56.11.6. He asserts that this problem is another reason why the proposal should be modified to emphasize that it does not eliminate the user's obligation to seek prior written approval from the manufacturer before modifying the forklift.

Response: See response to VH1.

GC3: Mr. Cross states that proposed Section 1591(m)(3) and (m)(4), which address the risk of fires and burns, conflict with UL 558 which Section 3650 incorporates by reference. He asserts that these existing regulatory requirements for ensuring the fire safety of industrial trucks far exceed the proposed "does not increase the risk" standard. He notes that compliance with UL 558 entitles the manufacturer to a UL "listing" which allows the manufacturer to affix the UL label to the forklift, but changes to the exhaust system can void the listing. He maintains that this is another example of why the proposal should not disturb the requirement for prior written approval from the manufacturer before modifications are made.

Response: See response to VH1.

GC4: Mr. Cross states that the proposal appropriately identifies issues such as capacity, structural integrity, safe performance and safe ingress and egress that can arise when equipment is retrofitted, but the proposal inappropriately leaves it to forklift owners to evaluate these technical engineering issues which should be evaluated by the manufacturer as required by existing CalOSHA standards.

Response: See response to VH1. The Board thanks Mr. Cross for his comments.

**Mr. Bruce Wick, Director of Risk Management, California Professional Association of Specialty Contractors (CALPASC) by email sent February 15, 2011, and oral comments received at the February 17, 2011, Public Hearing in Oakland, California.**

BW1: Mr. Wick agreed with the Operating Engineers Local 3 comments that proposed Section 1591(m)(2) and (m)(4) should be modified to protect all “employees”, not just operators.

Response: See responses to DH5 and DH6.

BW2: Mr. Wick stated that proposed Appendix A is too complicated and needs to be postponed now that the delay of the ARB off-road diesel emissions regulation provides ample time to make a test that is a practical and workable solution. The interim policy of “zero additional obstruction of view” needs to be maintained.

Response: See responses to DH2 and DH11.

BW3: Mr. Wick states that if parts of Appendix A do survive, he agrees with Operating Engineers Local 3 comments regarding the elimination of the 5 foot railing and reducing the spacing on the light source position to 2.5 inches.

Response: See responses to DH3 and DH4.

BW4: Mr. Wick states that the industries affected by the proposed regulations involving industrial trucks, mobile cranes, and haulage vehicles need to have an opportunity to work with OSHSB staff to make sure those changes comport with other regulations.

Response: See response to DH10. The Board thanks Mr. Wick for his comments.

**Mr. Michael Lewis, Senior Vice President, Construction Industry Air Quality Coalition, by letter dated February 15, 2011.**

ML1: Mr. Lewis stated that the specific recommendations enumerated by the Operating Engineers, Local Union #3 should be adopted.

Response: See responses to DH1 through DH12. The Board thanks Mr. Lewis for his comments.

**Mr. Charles Call, CEO and Director, Clean Diesel Technologies, Inc., by letter dated February 17, 2011.**

CC1: Mr. Call stated that no justification has been provided as to why retrofits are held to a higher visibility standard than other aftermarket parts installed on vehicles, or why retrofits are held to a higher visibility and safety standard than that of equipment manufacturers. He requested that the Board treat masking (Appendix A, Section E.3.c and 1591(b)), visibility and safety equivalently for retrofits, other add-on devices and original equipment.

Response: See responses to DH1, RB5, RB6, RB7, RB9, and RB10.

CC2: Mr. Call stated that diesel emission control systems are installed on vehicles used indoors or in confined spaces to reduce exposures to harmful exhaust emissions in cargo handling, tunneling, mining, and construction industries.

Response: See response to RB1.

CC3: Mr. Call stated that the Board should be developing visibility requirements for all equipment modifications. To support his argument, Mr. Call provided pictures which he asserts show examples of add-on devices and OEM vehicles that obstruct the operator's view, including: 1) devices on skid steer loaders, industrial tractors, and a loader, and 2) an OEM Tier IVi excavator with reduced visibility due to a higher deck height to accommodate an OEM diesel particulate filter. He also provided an example of an excavator with an operator cab that can elevate to improve visibility. He states that OEM's have the ability to alter visibility significantly which implies that the proposal holds exhaust retrofits to a higher standard. He asserts that far greater consistency of the current proposal is now warranted with regard to visibility impacts associated with exhaust retrofits, OEM equipment and third party add-on parts and other modifications commonly made to off-road equipment.

Response: See responses to DH1, RB5, RB6, RB7, RB9, and RB10.

CC4: Mr. Call stated that allowance should be made for the installation of exhaust retrofits with respect to rearward visibility impairments for machines such as excavators that have the ability to rotate and allow the operator forward visibility in any direction.

Response: Excavators are sometimes used in locations where the clearance between the excavator and an object such as a building or tree is not sufficient to allow the excavator to be rotated before moving in a backwards direction so that the operator can face the direction of travel.

CC5: Mr. Call stated that exhaust retrofits are one type of engineering control recognized by Section 1533 and 5141 as a means of reducing employee exposure to exhaust emissions from internal combustion engine powered industrial trucks used indoors and in other confined spaces.

Response: See response to RB2.

CC6: Mr. Call states that many industrial trucks used in materials handling and cargo handling will not be able to be retrofit in compliance with the proposed visibility requirements and recommends that approximately 12 inches of additional masking be allowed, consistent with ISO 5006 guidelines. He also provided pictures to show that LPG powered industrial trucks and diesel powered trucks with exhaust retrofits provide nearly identical visibility for the operator.

Response: See responses to RB2 and RB4.

CC7: Mr. Call asserted that exhaust retrofits provide the most cost effective option in meeting specific OSHA regulations to protect workers from the emissions of internal combustion engines operating in confined spaces in various industries, and that mirrors, cameras, remote control equipment, and designated separate pathways for machines and workers are strategies that are used to deal with visibility issues.

Response: Mr. Call's comments imply that the proposed provision pertaining to visibility should provide some allowance or exception for exhaust retrofits on equipment operated indoors or in confined spaces. Industrial trucks are probably the most common type of vehicle operated in these conditions. The proposal was modified to remove proposed amendments to Section 3663(g) and new Section 3663(i) which would have required that modifications made to an industrial truck to install an exhaust retrofit comply with proposed Section 1591(m). The proposal, as modified, would not alter existing standards pertaining to industrial trucks; therefore, modifications made to an industrial truck to install an exhaust retrofit would need to continue to comply with the existing industrial truck standards. Modified Section 1591(m)(5), which replaces proposed Section 1591(m)(5) and Appendix A, does not allow the use of mirrors or cameras when evaluating the driver's view. Mirrors are not as safe as providing a direct, unobstructed view because the view in the mirror can be obscured by vibration, dirt, fog, rain, or snow. Also, mirrors are often missing, damaged or out of alignment. Cameras are also subject to these same problems. The Board has not been provided information that shows the proposed visibility requirements would negatively impact remotely operated vehicles. Administrative controls, such as operator training and providing separate pathways for machine travel and workers on foot, are not as effective as engineering controls, such as arranging equipment so that it does not impair the driver's view. For the reasons stated above, the Board declines to modify the proposal to allow an exhaust retrofit to block the operator's view where controls are implemented to mitigate the hazard as suggested in the comment.

CC8: Although ISO 5006 is an appropriate standard for new production earthmoving equipment, the recognized visibility standard for lift trucks is ANSI/ITSDF B56.11.6. It is not appropriate to apply a standard intended for earthmoving equipment to all diesel powered off-road vehicles.

Response: See responses to VH1, VH3, and DH10.

CC9: Mr. Call requested that the proposal be amended to make it clear that the proposed amendments apply only to equipment used in above ground outdoor construction activities. If the Board declines to modify the proposal as suggested, then Mr. Call recommended two other options. The first option is to allow other industries to apply for waivers where other strategies exist to mitigate visibility issues. He asserts that this option is necessary to avoid a substantial negative financial impact on these industries. The second option is to delay implementation of the proposed rule in industries outside of construction until sufficient outreach and review and these industries needs have been addressed.

Response: The proposal was modified to remove proposed Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operation, respectively. The modified proposal would only apply to haulage vehicles and earthmoving equipment used in the construction industry. Employers performing underground or indoor construction activities may apply for a variance from the proposed standards pertaining to exhaust retrofits. A variance is granted only if the Board determines that the employer's proposed safety measures for protecting employees provide a level of protection that is equivalent to compliance with the standard. Information about the variance process is posted on the Board's website.

CC10: Mr. Call requests that the proposal be modified to eliminate the inconsistencies and consider additional flexibilities in the level of allowed de minimus masking and the use of OEM installed mirrors.

Response: See responses to RB5 through RB10. The Board thanks Mr. Call for his comments.

**Mr. Kevin Bland, Attorney, Representing the California Framing Contractors Association and the Residential Contractors Association, by oral comments received at the February 17, 2011, Public Hearing in Oakland, California.**

KB1: Mr. Bland expressed support for the comments submitted by Operating Engineers Local 3 and AGC. He also stated that the use of cameras and mirrors as advocated by MECA is not practicable because of the vibrations of the equipment and dirt and mud that smudge camera lenses and mirrors.

Response: See response to Mr. Dave Harrison, Operating Engineers, Local Union No. 3. The Board thanks Mr. Bland for his comments.

**Mr. Guy Prescott, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.**

GP1: Mr. Prescott stated that the original petition was not just about diesel retrofits, that was just the catalyst that brought the problem to a head. It was about any blockage of visibility, such as by welding toolboxes onto equipment, but it has been narrowed down to exhaust retrofits.

Response: See response to DH1.

GP2: Mr. Prescott stated that zero additional blockage is the only acceptable thing. Manufacturers have changed and shaped equipment to increase visibility; this is not a time to go backwards. He stated that Appendix A is next to impossible to follow and allows so much additional blockage that it is virtually useless. People do not get hit by equipment when they are 40 or 50 feet away; they get hit when they are very close. The operator's view to the ground cannot have any additional blockage without creating the possibility of additional fatalities.

Response: See response to DH11.

GP3: Mr. Prescott stated that moving the exhaust is not an acceptable option.

Response: See response to RB5.

GP4: Mr. Prescott recommended removing cranes and mining equipment from the proposal, as the original petition was from management and labor in only the construction industry. General industry, the mining industry, and crane people have not been involved in development of the proposal. In addition, federal standards are more restrictive than the proposal and MSHA has stated that it will cite any additional blockage of visibility.

Response: See response to DH10.

**Mr. Jack Kastorff, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.**

JK1: Mr. Kastorff stated that he agreed with Mr. Prescott's comments.

Response: See responses to Mr. Prescott, GP1 – GP4.

**Mr. David Thomas, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.**

DT1: Mr. Thomas stated that one of the commenters mentioned that no deaths have been attributed to particulate matter, but there will be deaths if there is less visibility. It is too much of a risk to try to retrofit equipment when there is going to be even the slightest blockage of visibility.

Response: See response to DH11.

**Mr. Bill Jackson, Board Member, by oral comments made at the February 17, 2011, Business Meeting in Oakland, California.**

BJ1: Mr. Jackson stated that Section 1591(m) should be amended to clarify that the provision does not require the installation of retrofits.

Response: Proposed Section 1591(m) was modified to clarify that the subsection only applies “If an exhaust retrofit is installed on a vehicle”.

BJ2: Mr. Jackson stated that he wants to ensure that the proposal does not conflict with federal regulations and put employers in a Catch-22 position between Federal and CalOSHA regulations.

Response: The proposal was modified to remove proposed Sections 3663(g), 4925.1, and 7016(m) which pertain to industrial trucks, cranes, and haulage vehicles used in mining operations, respectively. This modification greatly reduces the potential for creating an unintentional conflict between State and federal standards, particularly at sites under dual jurisdiction. Board staff believes that the proposal, as modified, will not create a conflict between State and federal standards.