



Construction Equipment Pollution in California

Clean Vehicles California

A Fact Sheet of the Union of Concerned Scientists

Construction equipment is one of the largest sources of diesel pollution in the state of California. This equipment operating in communities throughout California emits high levels of toxic soot and smog-forming pollutants. While new engine standards for this equipment will be fully phased-in by 2014, the full benefits of new engine standards will not be realized until after 2030 because of the long life of this equipment. Faced with this reality and the overwhelming evidence that diesel pollution is a public health threat, California is proposing a regulation to accelerate the clean-up of construction equipment.

Health Impacts

Construction equipment contributes to particulate and ozone pollution that can cause severe cardiovascular and respiratory illnesses, asthma attacks, acute bronchitis, and even premature death. ¹ In addition, the state of California has classified diesel pollution as a toxic air contaminant. Diesel exhaust includes over 40 substances listed by the EPA as hazardous air pollutants and in California as Toxic Air Contaminants.² Exposure to these chemicals can cause cancer, damage to fetuses, and other serious health and reproductive problems.

The Union of Concerned Scientists recent report *Digging Up Trouble: The Health Risks of Construction Pollution in California* found the following:

- In 2005, diesel emissions from construction equipment in California are estimated to have resulted in 183,000 lost work days and 1.5 million days of restricted activity. The direct economic cost of these incidences is estimated at \$126 million³
- In California, the total economic cost of the health impacts and lost productivity from diesel powered construction equipment is estimated at \$9 billion/year⁴
- Operating the average excavator in California for one hour produces particulate emissions equivalent to driving a new big rig more than 1100 miles.⁵

2005 California Construction Pollution Damage Estimates

Health Endpoint	Mean Annual Incidences	Annual Costs (in thousands of 2005 dollars)
Premature Deaths	1,132	8,944,256
Respiratory Hospitalizations	669	22,758
Cardiovascular Hospitalizations	417	17,082
Asthma and Other Lower Respiratory Symptoms	30,118	572
Acute Bronchitis	2,494	1,053
Lost Work Days	182,940	32,929
Minor Restricted Activity Days	1,544,952	92,697
School Absences	331,040	29,131
Total Annual Cost		9,140,480

Occupational Exposure to Diesel Pollution

Construction workers, truck drivers, railroad workers, and others who work close to diesel pollution sources have a higher risk of being exposed to these dangerous pollutants.

- More than 30 epidemiological studies of long-term occupational exposure to diesel exhaust showed an average 40 percent increase in the relative risk of lung cancer.⁶ These studies include heavy equipment operators, railroad workers, truck drivers, and highway workers.

¹ See Exhibit 2. Studies Reviewed for Health Effects to Particulate Matter in *Appendix A: Quantification of the Health Impacts and Economic Valuation of Air Pollution from Ports and Goods Movement in California*. California Air Resources Board. March 2006. A23 - A25.

² Findings of the Scientific Review Panel on The Report on Diesel Exhaust, April 1998

³ Union of Concerned Scientists *Digging Up Trouble: The Health Risks of Construction Pollution in California*. The 95 percent confidence intervals of the estimates are Lost Work Days: 155,000 to 210,000, Minor Restricted Activity Days: 989,000 to 2.15 million, Economic Costs: \$88 million to \$157 million.

⁴ The 95 percent confidence interval for total economic impacts is \$2.5 billion to \$15.5 billion.

⁵ Estimate based on the emissions of the average excavator according to the Air Resources Board Off-Road 2007 model.

- Increased risk of asthma and lung disease among heavy and highway construction workers has been shown.⁷
- In an exposure assessment study, 14 percent of measurement samples exceeded the threshold limit value for diesel exposure recommended by the American Conference of Governmental Industrial Hygienists (ACGIH).⁸ The trades evaluated included laborers, iron workers, carpenters, piledrivers, boilermakers, and operating engineers.
- PM concentrations measured around construction sites in the northeast were 1 to 16 times greater than ambient levels of PM in the surrounding area.⁹
- There is no occupational limit for diesel PM although it has been identified by US EPA as a likely human carcinogen and the California Air Resources Board as a Toxic Air Contaminant.

California's Actions

Recognizing the need to reduce diesel pollution to protect worker and public health, California has implemented incentive and regulatory programs to accelerate the reduction of toxic particulate matter from all diesel sources. Incentive funds to clean up diesel emissions have been significantly increased to over \$140 million annually. In addition, regulations which phase in the adoption of pollution controls or retirement of the oldest diesel engines have been instituted for trash trucks, portable engines, stationary engines, public fleet vehicles, and transit buses. California is currently developing similar measures for highway trucks and off-road equipment, the two largest sources of diesel pollution in the state.

California's Proposed Off-Road Regulation

The Air Resources Board has proposed a regulation, still under development, to reduce emissions from in-use off-road equipment. The proposed regulation would do the following:

- Establish decreasing fleet average emissions targets for off-road construction, mining, industrial, and airport equipment through 2025. The fleet average approach gives owners flexibility in how they can meet the emission reduction target, including retrofitting with emission control devices, repowering old equipment with a newer engine, upgrading to newer equipment, or retiring the oldest, dirtiest equipment.
- Allow more time for smaller fleets to comply, excludes low-use equipment from the fleet average requirements, and provides exemptions for safety concerns.
- Require annual reporting by fleet owners to ensure that all equipment owners are in compliance.
- Reduce diesel PM emissions from off-road equipment 85 percent by 2020 over year 2000 levels.
- Reduce construction workers' exposure to harmful levels of toxic diesel exhaust, creating a healthier work environment and cleaner air.
- Preliminary estimates show a compliance cost of meeting the new regulation to be \$2 to 3 billion over a 12 year period, less than ½ percent of the value of construction estimated over the same time period.¹⁰

The Air Resources Board is still modifying the proposal and is expected release an official draft early in 2007 before the measure is considered for adoption.

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⁶ Findings of the Scientific Review Panel on The Report on Diesel Exhaust. April 1998.

⁷ Oliver, LC, H Miracle-McMahill, AB Littman, JM Oakes, and RR Gaita. 2001. Respiratory symptoms and lung function in workers in heavy and highway construction: a cross-sectional study. *American Journal of Industrial Medicine*, 40:73-86.

Bergdahl IA, Toren K, Eriksson K, Hedlund U, Nilsson T, Flodin R, et al. Increased mortality in COPD among construction workers exposed to inorganic dust. *Eur Respir J*. 2004;23(3):402-406.

⁸ Woskie, Susan R. et. Al. Exposure to Quartz, Diesel, Dust, and Welding Fumes During Heavy and Highway Construction. *American Industrial Hygiene Association Journal* 63:447-457. 2002.

⁹ Northeast States for Coordinated Air Use Management (NESCAUM). 2003. Interim report. Evaluating the environmental and occupational impact of nonroad diesel equipment in the Northeast. Boston. June 9. Online at <http://64.2.134.196/mobile/rpt030609nonroad.pdf>.

¹⁰ As presented by ARB in the December 18, 2006 workshop on the In-Use Off-road Diesel Vehicle Rule.

