Digging Up Trouble: Construction Pollution in California

Clean Vehicles California

A Fact Sheet of the Union of Concerned Scientists

Diesel engines may conjure up images of big rigs or transit buses, but construction equipment is a leading source of diesel pollution in California. The Union of Concerned Scientists report *Digging Up Trouble* is the first comprehensive analysis of the statewide health and economic impact from construction equipment pollution in California. Our analysis reveals that construction equipment is a serious public health threat throughout California, especially in densely populated areas and those areas undergoing significant population growth. By adopting cost-effective solutions to reduce emissions from construction equipment already in operation, the state can reduce this public health threat and help all Californians breathe easier.

What types of health and economic damage are caused by construction equipment pollution in California?

Construction equipment is one of the largest sources of diesel soot and smog-forming nitrogen oxides in California. It is responsible for an estimated 1,100 premature deaths across the state every year and more than 1,000 hospitalizations for heart and lung disease. Asthma attacks number in the tens of thousands, while days when activity is restricted number over one million. Worker productivity and children's education are also affected, with an estimated 180,000 lost days of work and more than 300,000 days of school absences. The health costs of construction-related diesel emissions are estimated at nine billion dollars per year—a bill footed by everyone in California.

California Construction Pollution Damage

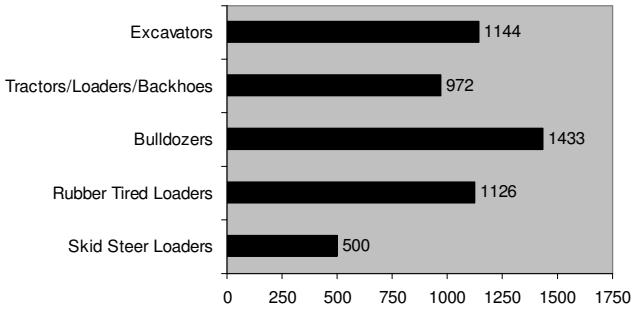
Health Endpoint	Mean Annual Incidences	Annual Costs (in thousands of 2005 dollars)
Premature Deaths	1,132	8,944,256
Respiratory Hospitalizations	669	22,758
Cardiovascular Hospitalizations	417	17,082
Asthma and Other Lower Respiratory Symptoms	30,118	572
Acute Bronchitis	2,494	1,053
Lost Work Days	182,940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

Why is construction equipment so dirty?

The combination of lagging emission standards and long operational life has made construction equipment one of the largest sources of diesel particulate matter in the state. Construction and other off-road equipment did not face new particulate matter (PM) emission standards until 1996, with some engines unregulated as late as 2003. New engine standards will phase in over a seven-year period starting in 2008, but the long life of the equipment will prevent the benefits of these new standards from being fully realized until after 2030.

Excavators represent the category of construction equipment that emits the most annual emissions of toxic diesel PM in California. The average excavator emits as much particulate matter in one hour as a new "big rig" traveling 1,100 miles.

The Five Most Polluting Categories of Construction Equipment Compared with a New "Big Rig"



Miles of Big Rig highway driving equivalent to one hour of equipment operation

What does the mapping of Construction Risk Zones conducted for *Digging Up Trouble* show?

While construction equipment pollution adds to overall regional air pollution, people who live near or work at construction sites have a higher risk of exposure to diesel pollution from construction equipment. Our Construction Risk Zone analysis indicates that risk of exposure to construction activity is widespread throughout populated areas of California, but 90 percent of construction pollution-related health endpoints occur in the five most populated air basins. Higher risk of exposure to operating construction equipment occurs both in population-dense cities and in suburbs where large construction projects are accompanying population growth.

How were health endpoints attributed to construction equipment pollution?

Data from the California Air Resources Board's pollutant emission inventory and air pollution monitoring data were used to estimate construction equipment's contribution to regional air pollution. Peer-reviewed epidemiological studies that establish links between elevated levels of air pollution and increased hospitalizations, premature deaths, and other health conditions were then used to estimate the health damage from construction equipment pollution.

Why not wait for new equipment?

Californians will continue to suffer from increased hospitalizations for heart and lung disease, asthma attacks, acute bronchitis, and premature death for the next two to three decades if we wait for new, cleaner equipment to replace older equipment. For example, if California proceeds on a business-as-usual course, half of all bulldozers purchased new in 1995—before any emission controls for particulate matter existed—will still be operating without pollution controls in 2024.

What can be done to reduce emissions from today's construction equipment?

There are options available today to achieve significant reductions from construction equipment already in use:

- **Repower.** The body or chassis of some equipment can last many decades beyond the life of the original engine. Installing a new low-emission engine in an older chassis can allow the machine to run cleanly for many more years. California's Carl Moyer incentive program is currently funding some repower projects for construction equipment.
- **Retrofit.** Existing engines that can be expected to run for many more years can be retrofitted with emission control technologies that reduce PM more than 90 percent. Some options exist today, while more are expected to be available over the next few years.
- **Replace.** Replacing old equipment with a new lower-emission model ahead of schedule can result in substantial pollution reductions and maintenance and fuel cost savings.

What is the risk of living near construction sites?

Exposure to elevated levels of fine particulate matter has been linked with various adverse health endpoints including exacerbation of asthma attacks, heart and lung disease, and cancer. Living and working in close proximity to a construction site may increase the level of exposure to fine PM; actual exposure levels depend on numerous factors including wind patterns, the amount of equipment operating, the age of the equipment, and how long it operates. Since construction equipment comes and goes from construction sites, pollution levels at or near a site are ever-changing. Statewide action is needed to achieve broad reductions across the entire construction fleet and protect all of California's workers and residents.

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