

Don't Let Exposure to Diesel Exhaust Leave You Breathless

Lucien has been working as a dump truck driver for a few months and is noticing that he's been coughing and his eyes and throat are sore. When he is away from work, his health improves. Little does he realize that his exposure to harmful diesel exhaust at work is causing his symptoms. Controlling worker exposure to diesel exhaust can help improve the working environment and reduce the risk of illness.

Diesel engines power a wide variety of machinery, vehicles, and heavy equipment serving a wide variety of industries and occupations. As a result, exposure to diesel exhaust, namely through inhalation, is an occupational hazard that can affect many workers.

Short term exposure to diesel exhaust can cause coughing and the irritation of the eyes, nose, throat, and respiratory tract. Breathing in the exhaust can irritate your lungs, bring on an allergic reaction causing asthma, or aggravate pre-existing breathing conditions. Very high levels can lead to carbon monoxide poisoning and suffocation from lack of oxygen. The International Agency for Research on Cancer (IARC), has classified diesel exhaust as carcinogenic to humans (Group 1), determining that exposure to diesel exhaust emissions increases the risk for lung cancer and possibly bladder cancer, both of which can be fatal.

Diesel exhaust comes from the burning of diesel fuel and is a complex mixture of particulate, gases and hydrocarbon vapours. Diesel exhaust contains diesel particulate matter (DPM). It is that puff of black smoke that you may see when a diesel engine is started or revved.

Occupations at risk

Most heavy- and medium-duty trucks have diesel engines. Diesel also fuels equipment used in mines; buses, locomotives and ships; heavy equipment such as bulldozers and tractors; and generators. Anyone working in environments where there is a high risk of exposure to diesel exhaust and particulates are at increased risk of related illness. These may include miners; oil and gas workers; farm workers; truck, taxi and bus drivers; and construction workers, to name just a few.

Workers can be exposed to diesel particulate matter wherever there is diesel exhaust. In situations where there is poor engine maintenance, a bypass of diesel exhaust emission controls such as filters or tailpipe exhaust ventilation, or you are simply working close to an exhaust pipe, there is the opportunity to breathe in harmful diesel particulate.

Protecting worker health

There are engineering and administrative controls that can be put in place as well as steps that you can take to help reduce worker exposure and prevent illness.

- Ensure all preventative maintenance is conducted on diesel engines
- Ensure that diesel exhaust engineering controls, such as filters and local exhaust ventilation, are present and functioning in accordance with the manufacturer's recommendations
- Conduct filter regeneration burns in accordance with the manufacturer in a safe location away from potential flammable atmospheres and materials (the regeneration process may generate hot embers released from the exhaust pipe)
- Assess worksites for exposure risks that may put workers close to diesel exhaust

Engineering controls can help minimize worker exposure to diesel particulate matter. A combination of controls is often required. Examples include performing routine preventative maintenance of diesel engines to minimize emissions as well as installing engine exhaust filters, cleaner burning engines, and diesel oxidation catalysts. Use special fuels or fuel additives (e.g., biodiesel). Provide equipment cabs with filtered air, and install or upgrade ventilation systems, such as tailpipe or stack exhaust vents to capture and remove emissions in maintenance shops or other indoor locations.

Administrative controls refer to changes in the way work tasks are performed to reduce or eliminate the hazard. Examples include limiting speeds, using one-way travel routes to minimize traffic congestion, and restricting unnecessary idling or lugging of engines. Other administrative controls could include restricting the amount of diesel-powered equipment and ensuring that the total engine horsepower and the number of vehicles operating in a given area don't exceed the capacity of the ventilation system. Designating areas that are off-limits for diesel engine operation and/or personnel travel is also an administrative control that may be put in place.

Steps workers can take

- Raise issues or concerns about engine performance, such as unusual amounts of soot exhausted from diesel engines
- Use emission controls as indicated by manufacturer and never bypass emission controls
- Turn off engines whenever possible
- Tell their supervisor about hazardous situations such as exhaust pipes venting directly at workers, and look out for signs of direct exposure such as soot on their face
- Limit their time in work environments where diesel particulate is present and use all available controls as mandated by your supervisor or employer

Workplace policies and practices

Eliminating diesel exhaust is not always possible but safe work practices and policies can help limit emissions in the workplace. It's critical to train workers, supervisors, joint health and safety committee members and representatives to understand the hazardous potential of diesel exhaust and safe work practices and policies.

Employers need to conduct a risk assessment to determine the health risks from exposure and to identify the necessary steps needed to control these risks. The OSH Answers [Risk Assessment](https://www.ccohs.ca/oshanswers/hsprograms/risk_assessment.html) (https://www.ccohs.ca/oshanswers/hsprograms/risk_assessment.html) fact sheet has more information.

Resources:

- [Diesel Exhaust](https://www.ccohs.ca/oshanswers/chemicals/diesel_exhaust.html) (https://www.ccohs.ca/oshanswers/chemicals/diesel_exhaust.html) fact sheet, CCOHS
- [Diesel Engine Exhaust: Burden of Occupational Cancer Fact Sheet](https://www.carexcanada.ca/cdn/CAREX_OCRC_Burden_of_Occupational_Cancer_Diesel_factsheet.pdf) (https://www.carexcanada.ca/cdn/CAREX_OCRC_Burden_of_Occupational_Cancer_Diesel_factsheet.pdf) PDF, CAREX Canada
- [Diesel Engine Exhaust – Substance Profile](https://www.carexcanada.ca/en/diesel_engine_exhaust/) (https://www.carexcanada.ca/en/diesel_engine_exhaust/), CAREX Canada
- [Diesel Particulate Exposure - Safety Bulletin](http://www.enform.ca/files/Safety_Bulletins/Safety_Bulletin_-_Diesel_Part particulate_Matter_03-2018.pdf) (http://www.enform.ca/files/Safety_Bulletins/Safety_Bulletin_-_Diesel_Part particulate_Matter_03-2018.pdf) PDF, Energy Safety Canada
- [Diesel Exhaust: It takes your breath away](https://www.whsc.on.ca/files/resources/hazard-resource-lines/diesel-exhaust-whsc-resource-line.aspx) (<https://www.whsc.on.ca/files/resources/hazard-resource-lines/diesel-exhaust-whsc-resource-line.aspx>) PDF, Workers Health and Safety Centre

(WHSC)

- CAREX Mining Sector: Occupational Exposure Summary Package (https://www.carexcanada.ca/CAREX_Mining_Package_July-16-2015.pdf) PDF, CAREX Canada
- Control Measures: For Diesel Engine Exhaust Emissions in the Work Place (<https://www.canada.ca/en/employment-social-development/services/health-safety/reports/control-diesel-emissions.html>), Employment and Social Development Canada
- OSHA Diesel Exhaust/Diesel Particulate Matter (https://www.osha.gov/dts/hazardalerts/diesel_exhaust_hazard_alert.html) Hazard Alert, Occupational Safety and Health Administration (OSHA)

The Health and Safety Report (<http://www.ccohs.ca/newsletters/hsreport/>), a free monthly newsletter produced by the Canadian Centre for Occupational Health and Safety (<http://www.ccohs.ca>) (CCOHS), provides information, advice, and resources that help support a safe and healthy work environment and the total well being of workers.

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