



Lifting the fog about diesel exhaust

Many workers in IHSA's member industries are exposed to diesel exhaust daily. Drivers of diesel-powered trucks and buses, as well as operators of diesel-fueled heavy equipment such as bulldozers and tractors, are especially at risk. However, these workers and their employers may not fully understand the danger of inhaling diesel exhaust.

Health effects

Diesel exhaust is a mixture of harmful gases and fine particulates. The exhaust from diesel fuel can cause a range of health issues such as

- Coughing
- Eye, nose, and throat irritation
- Headaches
- Nausea
- Dizziness.

When inhaled deep into the lungs, these gases and particulates can cause more serious health problems such as respiratory illness, heart disease, and cancer.

In 2012, the International Agency for Research on Cancer (IARC), a specialized cancer agency of the World Health Organization, concluded that diesel engine exhaust can cause lung cancer. The Canadian Cancer Society estimates that 186 cases of lung

cancer each year in Ontario are caused by exposure to diesel engine exhaust in the workplace.*

Exposure

Of the many cancer-causing agents Ontario workers are exposed to, diesel exhaust is one of the most common. Exposure may occur not only among workers who operate diesel-fueled vehicles but also those working in close proximity to the following equipment:

- Welding machines
- Generators
- Compressors
- Rough-terrain lift trucks
- Concrete trucks
- Packers
- Bobcats
- Cranes
- Front-end loaders
- Powered elevating work platforms
- Bucket trucks and aerial devices.

*These initial estimates are part of the Burden of Occupational Cancer Study, funded by the Canadian Cancer Society, which seeks to estimate the total number of work-related cancers in Canada. For more information about the project, visit www.occupationalcancer.ca



The risk of exposure is more severe when the equipment is operated in enclosed or indoor areas such as garages, bus barns, trenches, warehouses, mines, tunnels, and bridges.

Prevention

Diesel fuel composition has improved over the years to ensure that diesel burns cleaner. This is expected to lower the risk of lung cancer from exposure. However, the cancer-causing components of diesel exhaust still exist and there is no legal limit for diesel exhaust in the air.

Here are some precautions that should be taken to minimize exposure for workers.

- Inform workers about the possible health effects associated with diesel exhaust, the procedures that have been put in place by the company to minimize exposure, and how to inspect diesel-powered equipment. For instance, workers and operators should be told not to idle engines unnecessarily. Doing so can waste fuel and cause higher emission levels. Operators should also avoid “lugging” the engine. Putting strain on the engine at low RPMs decreases the engine’s ability to burn fuel efficiently. This releases more contaminants from the exhaust into the air.
- An established preventive maintenance program should be in place for diesel engines. For example, black smoke coming from the exhaust indicates that maintenance is required. Making sure that diesel engines run properly will not only keep them running cleaner but also prolong their life.
 - Wherever possible, operate diesel engine equipment outdoors or in well-ventilated areas.
- If diesel engines must be operated indoors or in poorly ventilated areas, install tailpipe or exhaust stack hoses to direct exhausts away from the work area.



Always direct exhausts away from the equipment operator or nearby workers.

- Heavy equipment cabs should be climate controlled, under positive pressure (so that air moves from inside to outside), and equipped with a high-efficiency particulate air (HEPA) filter to reduce the operator’s exposure. Operators should keep the cab door closed whenever possible.
- Inspect vehicles and equipment for potential holes that could allow exhaust into the cab. Also inspect the exhaust system for leaks.
- Consider after-treatment devices, such as exhaust filters, which are available for many models of diesel engines to reduce the diesel particles emitted. Catalytic converters may also be available to reduce harmful gas components of diesel exhaust.
- Use specialized fuels, fuel additives, or alternative fuels to minimize emissions. For example, low-sulphur diesel fuel or fuel additives can minimize the amount of diesel particulate matter emitted. Fuel alternatives such as biodiesel are also gaining popularity and can reduce emissions.

How IHSA can help

IHSA has several resources to help employers reduce the hazards of exposure to diesel exhaust. They can be downloaded for free by visiting the Occupational Health web page (ihsa.ca/Occupational-Health) and clicking Chemical Hazards.

- Occupational Health Risks: Operating Engineers and Heavy Equipment Operators (W114)
- Occupational Health Risks Booklet (W120) for all trades
- Vehicle Inspection Report (RF028)
- Preventive Maintenance Checklist

For more resources, refer to the article on carbon monoxide exposure on pages 20-21.