

Rozelle Interchange
WestConnex

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Diesel Emissions

Understanding Diesel Emissions and
Diesel Particulate Matter in the workplace

Up in smoke

Diesel emissions contain a complex mixture of gases, vapours, liquid aerosols and particulate matter. This mixture includes toxic gases such as carbon monoxide, nitrogen dioxide, nitrous oxide, sulphur dioxide and fine carbon particles known as diesel particulate matter (DPM).

Diesel engine exhaust emissions are a major source of contamination and potential cause of oxygen depletion in tunnels including enclosed cut and cover areas.

Key sources of diesel emissions during works will include generators and diesel powered heavy plant, such as trucks, front-end loaders and excavators.

The potential for the presence of diesel emission needs to be taken

into consideration when selecting, designing, operating and monitoring diesel powered plant and equipment. Similarly, these considerations are important when selecting, designing, operating and monitoring the ventilation systems used on the Rozelle Interchange Project.



Health Effects

Diesel Particulate Matter (DPM)

DPM exposure may give rise to detrimental health effects including:

- acute effects such as respiratory irritation, neurophysiological symptoms, and
- chronic effects such as chronic respiratory inflammation and lung cancer.

Nitrogen dioxide

Exposure can cause ocular, mucous membrane, and respiratory tract irritation.

Nitrogen monoxide (or Nitric Oxide)

Can cause respiratory irritation, hypoxia and cyanosis, although it is spontaneously oxidized in air to form Nitrogen dioxide.

Sulphur dioxide

Over-exposure can cause mild bronchoconstriction, alteration in lung function, and possible bronchospasm.

Carbon monoxide

Hazardous to humans; its inhalation inhibits transport, delivery and utilisation of oxygen.

Carbon dioxide

Toxic at high concentrations and an asphyxiant. Carbon Dioxide can cause headaches, dizziness, nausea, inability to breathe, stupor and a loss of consciousness.

Hydrogen Sulphite

Interferes with the function of oxidation enzymes, which can cause; hypoxia, fatigue, headaches, nausea, coma convulsions and several other short term ill effects.



Above the line

Elimination

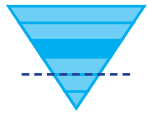
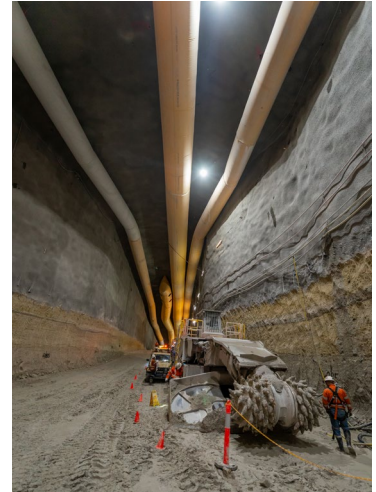
We are unable to effectively eliminate diesel emissions from the workplace, which means we are more dependant than ever on our other above the line controls.



Above the line

Substitution

- Use electric tools/plant where possible
- Use diesel plant with the highest tier of engine possible and maintain the diesel plant with regular servicing
- Use low Sulphur fuel
- When diesel powered scrubbers are necessary (trenching activities/surface miners), use diesel scrubbers that push their own exhaust through the scrubber filters before pushing exhaust out into the air (i.e. self-scrubbing)



Above the line

Isolation

- Restrict use of diesel powered plant to certain areas where adequate controls are in place
- Brattice curtains/walls to section off areas where diesel emissions are being created or to assist with directing air flow to scrubber units



Above the line

Engineering

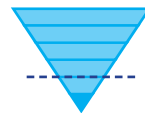
- Take time to plan and setup ventilation correctly prior to beginning work
- Utilise enclosed plant with filtration systems where possible
- Install catalytic converters on diesel plant
- Ventilation to dilute contaminants in air and extraction system (scrubbers) to remove particulate from air



Below the line

Administration

- Do not leave vehicles idling, turn them off
- Restrict the amount of vehicles in enclosed areas to only what is needed to get the job done
- Use Vehicle Management Plans (VMP) to direct vehicle movements and communicate these to workers to ensure they take the most efficient routes in and out of tunnels/cut and covers
- Ensure workers operate plant with doors closed/windows up
- Training to encourage awareness and promote innovation
- Permits to use diesel plant in confined or unventilated spaces
- Use of Diesel powered plant requires supervisor/site approval in certain areas
- Maintain catalytic converters on diesel plant
- Regular servicing/maintenance of diesel plant/equipment
- Emissions testing
- Gas monitoring



Below the line

PPE

Particulate respirators (only protect workers from the particulate component of diesel emissions (i.e. only DPM). Adequate ventilation is key.

