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## Maintaining air quality in enclosed cabins – for PCBUs

This quick guide is for persons conducting a business or undertaking (PCBU). It explains some factors to consider when managing risks from poor quality air in mobile plant cabins, fixed plant control rooms, and enclosed truck cabins.

Many work activities generate harmful dust, vapours, gases and debris that contaminate the air. These can enter the cabins of plant and trucks, and circulate in the air. Particles may or may not be able to be seen.

When workers breathe, these contaminants are inhaled and tiny particles can settle deep in their lungs.

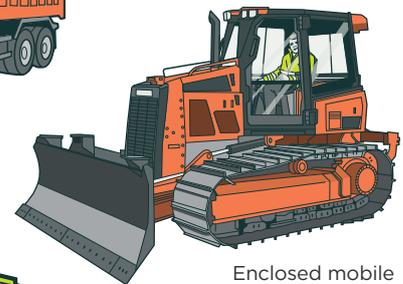
Plant and trucks operating in environments where there are dusts or vapours in the air may expose workers to health risks.

These kinds of environments can include:

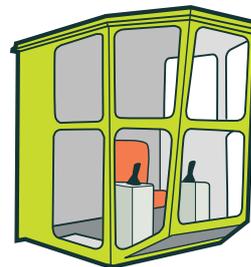
- land remediation sites
- waste disposal areas
- composting facilities
- mines or quarries
- ports or sites where loose materials are loaded or shifted, releasing dust into the air
- areas of agricultural spraying and spreading
- worksites that contain known hazardous contaminants that may become airborne (for example, silica dust, diesel exhaust fumes, organic materials, biological materials, dusts or asbestos fibres).



Enclosed truck cabin



Enclosed mobile plant cabin



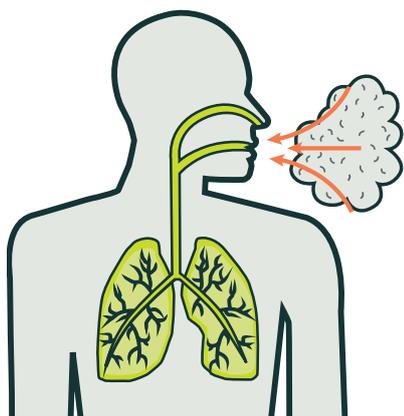
Fixed plant control room

**FIGURE 1:** Enclosed cabins and fixed plant control rooms are used widely across trucking, mining and construction industries to protect workers from excessive dust and noise

## How can poor quality air affect workers?

The following are health risks of breathing poor quality air.

- Exposure to poor quality air over a long period of time can lead to lung illness. Lung conditions include wheezing, asthma, allergic inflammation, bronchitis, pneumonia, emphysema and chronic obstructive pulmonary disease (COPD).
- Diesel engine exhaust exposure is a known cause of lung cancer.
- Carbon monoxide and nitrogen dioxide are combustion engine exhaust gases that can build up in enclosed spaces (for example, mines or tunnels). Exposure to [carbon monoxide](#) can be fatal, and exposure to nitrogen dioxide can cause lung disease.
- Exposure to [pesticides and herbicides](#) can cause skin rashes, asthma and long-term damage to your nervous system. The most poisonous chemicals can cause unconsciousness and even heart failure. Some farm chemicals may cause cancer.
- [Silica dust](#) exposure is a known cause of lung cancer and silicosis.
- Materials containing [asbestos](#) can release hazardous fibres when disturbed, which can cause lung disease or cancer.
- Bagged or bulk organic material such as garden soil, compost, mulch or potting mix may contain fungi or bacteria. *Legionella* bacteria commonly found in compost causes a type of pneumonia called [Legionnaires' disease](#)
- Poor quality air can cause general discomfort, fatigue or distraction. This can reduce workers' ability to perform work safely and effectively.



**FIGURE 2:** When workers breathe, contaminants are inhaled and tiny particles can settle deep in their lungs

## Keeping workers safe

### You have a duty to manage work-related health risks

As a PCBU you must ensure so far as reasonably practicable the health and safety of workers, and that others are not put at risk from your work. You must eliminate risks so far as is reasonably practicable, and where this is not possible, you must minimise the risks so far as reasonably practicable.

You must ensure, so far as is reasonably practicable, that you monitor workplace conditions for the purposes of preventing illness. Depending on your circumstances, this may include exposure monitoring or health monitoring. You should engage with workers, and talk to a suitably qualified, trained and experienced health and safety professional to confirm if monitoring is appropriate or required for you (and if so, what type).

For more information, see our guidance:

[Primary duty of care](#)

### Involve workers in decisions about their health and safety at work

You must, so far as is reasonably practicable, engage with workers on health and safety matters that directly affect them.

So far as reasonably practicable, involve your workers when selecting equipment or coming up with solutions. Get their views, ask them what they think the risks are from poor air quality, and what procedures, equipment and facilities they think are needed to make it safe. Provide opportunities for them to have a say about health and safety matters, to make improvement suggestions, or to raise concerns. Consider their views when decisions are being made.

For more information and detail, see our guidance:

[Worker engagement and participation](#)

### Support and train your workers in the benefits of good air quality

Train and support your workers to understand the importance of good quality air and climate control, why control measures may be needed, and how to operate and maintain their equipment.

For more information, see our guidance: [Training and supervision for workers](#)

## How can you tell if your workers are being exposed to poor quality air?

Signs of poor quality air inside the cab include:

- significant dust build up around vents, on floors or on seats inside the cab
- unpleasant odours
- mildew or mould build up
- high humidity
- workers feeling unwell during or after working in the cab.

### Exposure monitoring

The air inside the enclosed cab can be tested using exposure monitoring. Exposure monitoring allows you to measure what the air quality is like inside the cab, identify which control measures need to be applied, or check whether the measures you have put in place are working.

To check whether monitoring is appropriate or required for your situation, talk to a suitably qualified, trained and experienced health and safety professional.

For more information on exposure monitoring, see our [guidance: Work related health - monitoring](#)

For a register of health and safety professionals, see: <https://register.hasanz.org.nz>

**If your workers are at risk from poor air quality, control measures should be in place to eliminate or minimise their exposure (see next section).**

## Managing risk

Eliminating the risk by getting rid of the source of harm is always the most effective option. If elimination is not reasonably practicable, then you must minimise the risk so far as is reasonably practicable.

When deciding what is reasonably practicable for your situation, consider:

- what possible actions can be taken to ensure health and safety
- of these possible actions, at a particular time, what is reasonable to do.

For more information, see our [guidance How to manage work risks](#) and [Reasonably practicable](#)

### Working with other PCBUs to manage risks

More than one PCBU can have a duty in relation to the same matter. These PCBUs have overlapping duties - this means that the duties are shared between them.

Duties regularly overlap:

- in a shared workplace (for example, a building site or a port) where more than one business has control and influence over the work on site
- in a contracting chain, where contractors and subcontractors provide services to a head contractor or client and do not necessarily share the same workplace.

A PCBU must, so far as is reasonably practicable, consult, cooperate and coordinate activities with all other PCBUs they share duties with so that all PCBUs can meet their joint responsibilities.

A PCBU cannot transfer or contract out of their duties, or pass liability to another person.

However a PCBU can make an agreement with another PCBU to fulfil specific duties. Even if this occurs, all PCBUs are still responsible for meeting their legal duties.

For more information, see our [guidance: Overlapping duties](#)

## Control measures

The following control measures will help to minimise the health risks of poor quality air. Choose measures that are appropriate for your circumstances, and are reasonably practicable.

### Minimise airborne dust in the worksite

By putting in place site management controls, airborne dust and contaminants in the worksite can be minimised. This will reduce the health risks to all workers and visitors.

Where reasonably practicable, the following control measures can be used:

- seal high traffic roads
- regularly apply water to suppress dust
- minimise movement and speed of vehicles.

## Minimise dust in the enclosed cabin

Where site management controls to suppress dust have not been sufficient to minimise the health risks, the following control measures can be considered:

### 1 Provide a HVAC system

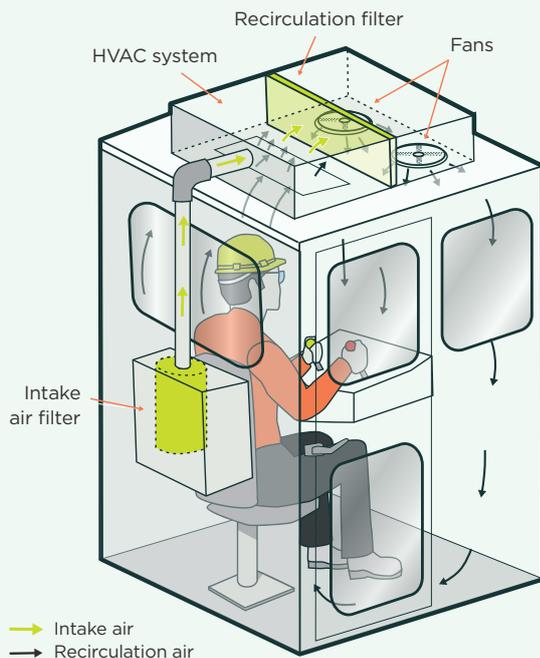
#### How do HVAC systems work?

Heating, ventilation and air conditioning (HVAC) systems work by passing air from outside the cabin through an air intake filter. Clean, climate controlled air is provided into the sealed cabin.

Some systems filter air from inside the cabin through a second recirculation filter. This process removes contaminants that may have entered the cabin such as on the boots of the worker or when the doors open.

HVAC systems have the following benefits:

- incoming air is filtered and particles are removed and reduced
- the incoming air creates a positive pressure within the cabin that keeps outside dust from entering
- workers can operate at comfortable temperature levels and avoid opening windows to get cool air.



Provide HVAC in the vehicle cabin or control room, or when the time comes to buy a replacement, consider getting one that has HVAC. HVAC can also be retrofitted to existing vehicles or plant.

If you already have an HVAC system, consider upgrading it. This could include:

- upgrading the original HVAC system filters to filter out smaller particles
- installing an aftermarket cabin air filtration system with High Efficiency Particulate Filter (HEPA) for removal of small particulates, or a carbon filter for removal of gases and vapours.

Seek advice from the HVAC manufacturers or a specialist to ensure the appropriate systems are selected and correctly installed.

If you are spraying insecticides or herbicides check the products safety data sheet, or talk with the supplier to determine the correct filter needed in the HVAC system. Some products will require the use of a filter with activated carbon.

### 2 Inspect and maintain filters

Filters work by passing air through a media that catches particles. A clogged or damaged filter will lessen the effectiveness of the system. Regularly inspect and replace cabin air filters. If there are air intake and cabin recirculation filters, maintain both. Follow the manufacturer's guidelines.

Consider replacing filters instead of blowing or banging them out. These methods do not fully clean the filter and can cause damage.

### 3 Inspect and maintain seals

Regularly inspect and maintain door and window seals and latches to ensure the integrity of the cabin seal. Any gaps will let unfiltered air into the cab and work against a positive cabin pressure. Consider using smoke testing and pressure testing to find leaks that need to be repaired.

### 4 Provide radio communication and consider using electronic load dockets

Provide radio communication devices so workers do not need to open the cab window or doors to communicate. Consider using electronic load systems instead of paper dockets. This will reduce the number of times doors and windows need to be opened to hand over paper dockets.

### 5 Keep cabins clean, inside and out

Engage with workers to establish good housekeeping practices that include:

- cleaning the inside of the vehicle cabin or control room regularly. Remove dust that has settled on the seats and floor as it can easily vibrate loose and recirculate
- cleaning the outside of the vehicle or control room regularly. Dust that has settled can easily dislodge and become airborne again
- periodically cleaning inside the fan housings where dust can settle over time. Build up could be blown directly at the operator if fan settings are increased.

Provide cleaning equipment and processes for workers to use.

- Consider providing a HEPA filtered vacuum cleaner as it will help reduce dust being recirculated during cleaning.
- Consider providing removable scooped rubber floor mats that can be lifted out of the cab and cleaned to remove mud or dust build up.
- Consider providing a low-pressure hose with a gentle spray to remove any dust that lands on the vehicle. Low pressure spray minimises the risk of the dust being lifted in the hose mist and inhaled.
- Consider using disinfectant for cleaning surfaces inside the cabin.

**Avoid using compressed air for cleaning.**

**6 Provide a way for workers to remove mud from boots and clothing**

Provide a way for workers to remove mud and debris from footwear or clothing before entering the cab or control room.

**7 Maintain vehicle engine. Consider upgrading plant to one that has lower emissions**

Regularly maintain the vehicle engine to ensure it operates at optimal performance. This will reduce the exhaust fumes being created in the work area.

Consider upgrading to plant with a more efficient and lower emission engine.

**8 Provide safe parking zones away from other activities**

Consider providing safe parking zones for vehicles to wait away from areas with airborne contaminants (for example, upwind of organic material loading areas, or outside of enclosed spaces or tunnels where fumes exist).

Consider providing powered truck stops, or separate power units for plant. Where appropriate, encourage drivers who wait in their vehicles to stop their engine rather than leaving it to idle, to reduce exhaust fumes.

**9 Provide facilities for workers**

You must ensure, so far as is reasonably practicable, adequate facilities are provided for workers. Facilities include toilets, drinking water, hand-washing facilities, and eating and break facilities. Ideally these facilities should be away from their cab and work activities.

Agree with other PCBUs onsite how these will be provided for workers.

## Minimising risk for worksites that contain hazardous contaminants

There are **additional** control measures to consider if your worksite has a risk of exposure to hazardous contaminants. Example environments are land remediation sites, mines, quarries, waste disposal areas, or sites where there is airborne silica dust, diesel exhaust fumes, *Legionella* bacteria or asbestos fibres.

Advice should be sought from a specialist to ensure the appropriate systems are selected and correctly installed.

Work at contaminated sites being remediated will likely have further control measures in place to decontaminate vehicles and plant in order to minimise the risk of cross contamination. It is expected that they will have an approved control plan in place, for example, an [Asbestos removal control plan](#)

**10 Install cabin pressure display units**

Installing a cabin pressure display unit allows monitoring of pressure inside the cabin. This can help to make sure the pressure stays constant and positive. Alarms can be set on the units to alert workers if the cabin pressure drops below recommended levels.

When cabin pressure levels drop and are no longer positive (higher pressure than the air outside) this is usually because there are holes in the cabin or splits in the seals. This means unfiltered air from outside can enter the cabin. Consider using smoke testing to find leaks that need to be repaired.

**11 Install recirculation air filtration systems**

Consider installing recirculation air filtration systems to work with the HVAC and remove hazardous contaminants that may have been carried into the cabin.

**12 Install double door systems in control rooms**

Look at the design of entrances and exits to fixed plant control rooms, and consider installing a double door system to maintain air pressure in the room.

## What should you look for when purchasing or leasing trucks and mobile plant?

When you are purchasing, leasing or upgrading trucks, mobile plant or fixed plant control rooms consider the following features:



### **Air filtering and circulation systems are appropriate**

- A HVAC system will supply filtered and air conditioned air into the cabin.
- An air recirculation and filtration system provides a second filter to remove dust that has got into the cabin.
- Cabin air should be able to be pressurised and if appropriate monitored.
- The location of air blowers and vents should be so that minimal dust is disturbed from the floor and recirculated in the cabin.



### **The cabin design minimises dust entering**

- Good cabin design minimises the need for the operator to get in and out of the cabin. Tasks should be able to be completed without having to open the door or windows for better visibility or access (for example, when attaching or de-coupling implements).
- Seats and floor coverings made from less porous materials minimise dust.
- Cabin doors and windows that have shrouding help to minimise the build up of dust.
- Cabin doors that are designed to stay closed (for example, the cabin doors are self-closing) help to keep dust out.



### **The vehicle engine minimises emissions**

- Vehicles that have Euro5 or Euro6 standard compliant engines have fewer emissions.

Businesses who are in the supply chain (upstream) also have a duty to make sure, so far as reasonably practicable, that the plant, substances, and structures designed, manufactured, imported or supplied (as relevant) are without health and safety risks when they are used for their intended purpose in a workplace.

For more information, see our guidance:  
[Upstream duties](#)

## More information

### WorkSafe guidelines

[Air quality in the extractives industry](#)

[Carbon monoxide](#)

[Silica dust](#)

[Legionnaires-disease](#)

[Asbestos](#)

[Health monitoring and exposure monitoring](#)

### Other references

[NZ Transport Agency - Exhaust emissions standards](#)