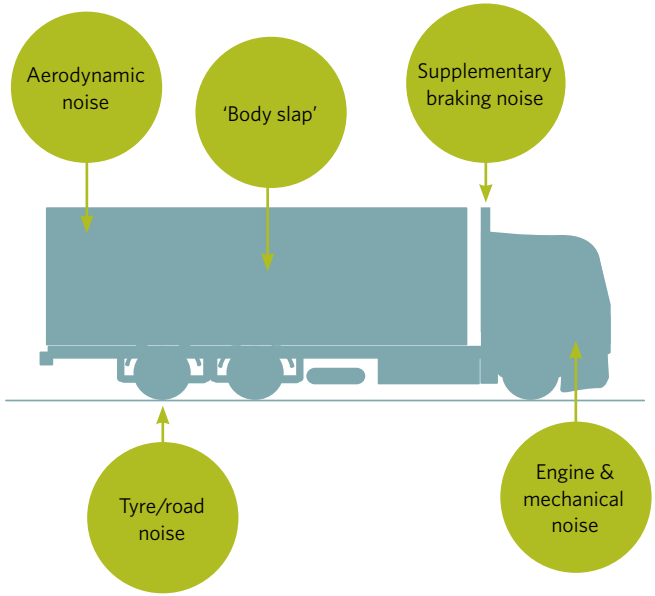
# Heavy vehicle noise

Noise from heavy vehicles comes from several sources, as shown on the diagram below. Supplementary braking systems, such as engine brakes, are only one of the sources of heavy vehicle noise. The loudest source of noise at any particular moment depends on the type of heavy vehicle and the speed it is travelling. Below about 50km/h, the engine noise is usually the loudest component. At higher speeds the noise from the tyres on the road surface becomes louder.




Some types of engine brakes are significantly louder and more disturbing than normal heavy vehicle noise, whereas other types of supplementary brakes cannot be distinguished from the general engine noise. It is therefore important to identify the source of the noise causing disturbance, before taking action.

An exhaust silencer/muffler reduces the sound of engine brakes through a resonant system and does not significantly affect the brake or engine performance. Modified or missing silencers can result in disturbing engine braking noise.

## Further information

NZTA transport noise website
www.acoustics.nzta.govt.nz

Land Transport (Road Safety and Other Matters) Amendment Act 2011
www.legislation.govt.nz/act/public/2011/0013/latest/DLM3231104.html

Land Transport Rule: Vehicle Equipment Amendment 2007. Ministry of Transport.
www.nzta.govt.nz/resources/rules/vehicle-equipment-amendment-2007.html

Traffic note 19: Engine braking controls: Guidelines. NZTA.
www.nzta.govt.nz/resources/traffic-notes/docs/traffic-note-19-rev1.pdf

Review of noise generated by heavy vehicle exhaust/engine brake. Austroads.
www.onlinepublications.austroads.com.au/items/AP-101-93

NZ TRANSPORT AGENCY
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# ENGINE BRAKING NOISE

What are the types of noise from heavy vehicles? Why do heavy vehicles need supplementary brakes? How do we manage noise from engine braking?


NZ TRANSPORT AGENCY
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# Supplementary brakes

## Why do heavy vehicles need supplementary brakes?

Supplementary braking systems are provided on heavy vehicles to assist the normal service brakes in maintaining safe speeds travelling down hills. Service brakes alone must meet stopping requirements. However, many vehicles are operated in a manner such that service brakes used alone may suffer overheating or excessive wear which could lead to failure on long, steep roads.

Heavy vehicle drivers also use supplementary brakes in other situations, particularly at higher speeds, to reduce brake wear. Supplementary brakes are not needed at lower speeds.

## What are supplementary brakes?

There are three main types of supplementary braking systems, namely:

- exhaust brakes: a device intermittently blocking the exhaust to create back pressure on the engine
- engine brakes: a device releasing compressed gases from the engine (often called 'Jake' brakes, although the name comes from the specific brand Jacobs)
- retarders: electric or hydrodynamic devices installed in the driveline.

Engine brakes are typically used on large trucks, whereas exhaust brakes are common on medium trucks.

## Why do engine and exhaust brakes cause noise disturbance?

Engine and exhaust brakes give rise to a series of pulses of noise, which can have a distinctive sound often described as a 'machine gun' or 'barking' noise. For some systems the noise from these pulses is substantially louder than other heavy vehicle noise and can cause significant disturbance.

# Management of engine braking noise

There are engine braking systems available that are not audible above general heavy vehicle noise. These are used for new vehicles but there are some vehicles in the existing fleet that still have noisy engine braking systems. Where disturbance from engine braking noise has been reported, it has generally been found to relate to only a small number of trucks. There are several approaches that can be used to manage engine braking noise:

- Education of heavy vehicle drivers/operators.
- Management of truck routes such as near ports.
- Intersection improvements to avoid braking.
- Prohibition on local (low speed) roads.

The most effective means of managing engine braking noise in a location where it is causing disturbance is to liaise with the heavy vehicle operators. If specific vehicles or operators can be identified then they may be able to take steps to adjust vehicles, driving practices or hours of operation.

A common method to attempt to manage engine braking noise is through local restrictions. Signs such as the one shown on the front of this leaflet can be erected asking drivers not to use engine brakes in a particular location. There are however difficulties with these signs:

- Supplementary brakes are important for safety in some locations (steep long hills, motorways, etc).
- The signs only address engine braking, whereas the actual cause of disturbance may be another noise such as body slap from trucks.
- Indiscriminate use of signs reduces their effectiveness in areas where they are most needed.
- The signs on the state highway network are only advisory.

## Legislation

In locations where there is regular disturbance from engine braking noise, which cannot be resolved through liaison with vehicle operators, legislation enables control by different bodies:

- The Land Transport Act allows all road controlling authorities, including the NZ Transport Agency, to prohibit or restrict engine braking in any area where the permanent speed limit does not exceed 70km/h.
- Land Transport Rules allow the Police to act if noise from any vehicle is excessive.
- The Resource Management Act could allow controls on engine braking noise in situations such as specific trucks using local roads to access a particular quarry.

Safety is an important factor when considering prohibition of engine braking on a section of road. On local roads at lower speeds, prohibition of engine braking should not conflict with safety. On state highways, particularly motorways and expressways, it is more likely that prohibition of engine braking will conflict with safety (also considering most vehicles with engine brakes are not noisy).

The Transport Agency has trialled a 'noise camera' in Tauranga (2013/2014). The system has a microphone to trigger a camera which reads the number plates of trucks with particularly noisy engine brakes.