

Australian and New Zealand Environment Council

TECHNICAL BASIS FOR GUIDELINES TO MINIMISE ANNOYANCE DUE TO BLASTING OVERPRESSURE AND GROUND VIBRATION

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To promote uniform environmental standards throughout Australia, the Council has released a number of Technical Bases relating to noise and other factors. The Technical Bases are intended to be used as the basis for State and Territory environmental control strategies.

Published Technical Bases relating to noise are listed at the back of this document. These documents recommend acceptability criteria for noise and vibration and, where appropriate, describe measurement procedures to be followed.

This document has been prepared by the Environmental Noise Control Committee, which is one of a number of specialist committees established to provide advice to ANZEC, through Standing Committee, on specific areas of environmental concern.

Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration

1. Scope

1.1. This document specifies recommended comfort criteria for:

- Airblast overpressure level
- Ground vibration peak particle velocity
- Time of blasting
- Frequency of blasting.

The intent of these criteria is to minimise annoyance and discomfort to persons at noise sensitive sites (e.g. residences, hospitals, schools etc.) caused by blasting.

1.2. The recommended criteria apply to mining, quarrying, construction and all other operations which involve the use of explosives for fragmenting rock.

1.3. The recommended criteria apply only to the minimisation of annoyance and discomfort arising from blasting. The control of damage from blasting is the responsibility of State/Territory mines authorities and reference should be made to these bodies to ascertain recommended damage criteria.

1.4. The recommended criteria are for guidance only and may be varied if necessary to suit local site conditions.

2. Recommended Criteria

2.1. Airblast Overpressure

2.1.1 The recommended maximum level for airblast overpressure is 115 dB(Lin Peak).

2.1.2 The level of 115 dB may be exceeded on up to 5% of the total number of blasts over a period of 12 months. However, the level should not exceed 120 dB (Lin Peak) at any time.

2.1.3 The airblast overpressure values referred to in 2.1.1 and 2.1.2 apply when the measurements are performed with equipment having a lower cut-off frequency of 2 Hz or less. If the instrumentation has a higher cut off frequency then a correction of 5dB should be added to the measured value.

Equipment with a lower cut-off frequency exceeding 10 Hz should not be used for the purpose of measuring airblast overpressure.

2.2. Ground Vibration

- 2.2.1 The recommended maximum level for ground vibration is 5mm/sec (peak particle velocity (ppv)).
- 2.2.2 The ppv level of 5mm/sec may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 10mm/sec at any time.
- 2.2.3 Experience has shown that for almost all sites a ppv of less than 1mm/sec is generally achieved. It is recognised that it is not practicable to achieve a ppv of this level at all sites and hence a recommended maximum level of 5mm/sec has been selected. However, it is recommended that a level of 2mm/sec (ppv) be considered as the long term regulatory goal for the control of ground vibration.

2.3. Times and Frequency of Blasting

- 2.3.1 Blasting should generally only be permitted during the hours of 9:00am – 5:00pm Monday to Saturday. Blasting should not take place on Sundays or Public Holidays.
- 2.3.2 Blasting should generally take place no more than once per day. (This requirement would not apply to minor blasts such as for clearing crushers, feed chutes, etc.).
- 2.3.3 The restrictions on times and frequency of blasting referred to in 2.3.1 and 2.3.2 do not apply to:
- Those premises where the effects of the blasting are not perceived at noise sensitive sites
 - Major underground metalliferous mining operations.

2.4. Acceptable Variations

It is recognised that under some circumstances or at certain mines blasting that cannot comply with the criteria referred to in 2.1, 2.2 and 2.3 will have to be carried out. Environmental authorities should apply controls for such blasting with appropriate consideration to the circumstances applying.

3. Determination of Airblast Overpressure Level and Peak Particle Velocity

3.1. Instrumentation

- 3.1.1 An Australian Standard laying down specifications for blast monitoring instrumentation is in the process of being prepared. Until this document is published individual environmental authorities will assess and, where appropriate, approve monitoring procedures proposed to be used in their State/Territory.

- 3.1.2 The monitoring equipment should have been calibrated within two years prior to the date of any test.

3.2. Test Procedure

- 3.2.1 An Australian Standard laying down specifications for blast monitoring procedures is in the process of being prepared. Until this document is published individual environmental authorities will assess and, where appropriate, approve monitoring procedures proposed to be used in their State/Territory.
- 3.2.2 It is particularly important in respect of ground vibration measurement that the vibration transducer be coupled to the ground in an approved manner.

3.3. Measurement Location

- 3.3.1 Measurements should be taken within the grounds of, 'noise sensitive sites' (eg. Residences, hospitals, schools, etc.). For the purposes of this document 'noise sensitive sites' includes the land within 30 metres of any building.
- 3.3.2 Airblast overpressure levels may be measured at any point on, 'noise sensitive sites' which is located at least 3.5m away from any building or structure.
- 3.3.3 Ground vibration levels may be measured at any point on 'noise sensitive sites' which is located at least the longest dimension of the foundations of a building or structure away from such building or structure.

4. Weather Effects

- 4.1. When temperature inversion is known to exist blasting should be avoided, if practicable.

ANZEC Technical Bases Relating to Noise

Title	Date
Technical basis for regulations for the control of noise from new motor vehicles, other than motor vehicles, in Australia	May 1979
Technical basis for regulations for the control of noise from in-service trucks and buses in Australia	Feb 1980
Technical basis for the noise labelling of new air conditioners in Australia	Aug 1980
Technical basis for proposed noise control standard for lawnmowers and edgcutters	June 1981
A comparison of methods for measuring the noise of individual motor vehicles	Jan 1984
Technical basis for the regulation of noise-labelling of new air conditioners in Australia	July 1984
Technical basis for the regulation of noise-labelling of new pavement breakers and mobile air compressors in Australia	May 1985
Technical basis for the tonal adjustment of the measured sound pressure level of environmental noise	August 1986
Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration	September 1990