

Noise and vibration control on construction and open sites

Part 5. Code of practice applicable to surface mineral extraction (except coal) sites

ICS 17.140.20; 17.160; 91.200

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/209, General building codes, to Subcommittee B/209/17, Noise control on open sites, upon which the following bodies were represented:

- Association of Consulting Engineers
- British Aggregate Construction Materials Industries
- British Coal Corporation
- British Compressed Air Society
- Building Employers' Confederation
- Chartered Institute of Environmental Health
- Concrete Society
- Construction Health and Safety Group
- Construction Plant-Hire Association
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Pollution Control and Waste Directorate)
- Federation of Civil Engineering Contractors
- Federation of Dredging Contractors
- Federation of Piling Specialists
- Institution of Civil Engineers
- Sand and Gravel Association Limited

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Foreword

This Part of BS 5228, which has been prepared by Subcommittee B/209/17, covers the control of noise and vibration from surface mineral extraction (except coal) sites, and is a new Part of BS 5228.

The standard refers to the need for the protection of persons living and working in the vicinity of such sites and those working on the sites, from noise and vibration. It recommends procedures for noise and vibration control in respect of surface mineral extraction operations and aims to assist architects, contractors and site operatives, designers, developers, engineers, local authority environmental health officers and planners, regarding the control of noise and vibration.

Noise and vibration can cause disturbance to processes and activities in neighbouring buildings, and in certain extreme circumstances vibration can cause or contribute to building damage.

Noise and vibration can be the cause of serious disturbance and inconvenience to anyone exposed to it and in certain circumstances noise and vibration can be a hazard to health. The Environmental Protection Act 1990 [1] in England and Wales, which has its provisions extended to vehicles and equipment in streets and public open spaces by the Noise and Statutory Nuisance Act 1993 [2], the Control of Pollution Act 1974 [3] in England, Wales and Scotland, and the Pollution Control and Local Government (Northern Ireland) Order 1978 [4] in Northern Ireland, which define 'noise' as including 'vibration' (Section 79(7) of the 1990 Act, Section 73(1) of the 1974 Act and Article 53(1) of the 1978 Order), contain provisions for the abatement of nuisances caused by noise and vibration. Insulation against noise is addressed in the Noise Insulation Regulations 1975 [5] and (Amendment) Regulations 1988 [6], the Noise Insulation (Scotland) Regulations 1975 [7] in Scotland and the Noise Insulation (Northern Ireland) Regulations 1995 [8] in Northern Ireland.

It should be noted that BS 6472 covers the human response to vibration in structures and BS 7385 : Part 1 covers the measurement and evaluation of structural vibration. BS 7385 : Part 2 contains guidance on damage levels from ground borne vibration.

An item dealing with the vibratory loading of structures is being processed within ISO/TC 98/SC/2, *Safety of Structures*. This is being monitored by BSI.

BS 5228 consists of the following Parts.

- Part 1 *Code of practice for basic information and procedures for noise and vibration control*
- Part 2 *Guide to noise and vibration control legislation for construction and demolition, including road construction and maintenance*
- Part 3 *Code of practice applicable to surface coal extraction by opencast methods*
- Part 4 *Code of practice for noise and vibration control applicable to piling operations*
- Part 5 *Code of practice applicable to surface mineral extraction excluding coal*

BS 5228 : Part 1 is common to all the types of work covered by the other Parts of BS 5228, which should be read in conjunction with Part 1.

Other Parts will be published in due course as and when required by industry.

Attention is drawn to the Control of Pollution Act 1974 (Part III) (Noise), the Environmental Protection Act 1990 (Part III) (Statutory Nuisances and Clean Air), the Noise and Statutory Nuisance Act 1993, the Health and Safety at Work etc. Act 1974 (in Northern Ireland, the Pollution Control and Local Government (Northern Ireland) Order 1978 and the Health and Safety at Work (Northern Ireland) Order 1978), the Noise at Work Regulations 1989, Statutory Instrument 1989, No. 1790 and the Noise at Work Regulations (Northern Ireland) 1990, Statutory Rules 1990 No. 147.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

Introduction

Surface mineral extraction sites can present different problems of noise and vibration control compared with most other industrial activity for the following reasons:

- a) operations are to a large extent carried out entirely in the open;
- b) activities are of variable duration, varying from a few months to many decades;
- c) on completion, surface mineral extraction sites are restored either to their original condition or to an appropriate state after use;
- d) a wide variety of activities, employing different types of plant, are carried out on surface mineral extraction sites. The intensity and character of any noise or vibration may vary at different phases of work, at different times and under differing conditions of, for example, topography, geology, climate and methods of operation;
- e) minerals can only be worked where suitable resources exist. Resources may be present in close proximity to premises sensitive to noise and/or vibration. Under these circumstances consideration should be given to the need to protect as far as is practicable such premises from the adverse effects of noise and vibration.

Most of the noise from surface mineral extraction sites is generated by excavating plant, earth-moving plant, blasting activities, processing plant and other heavy traffic. Much of this plant is large and powerful but not necessarily noisy. Vibration is generally only associated with blasting activities. Measures to control noise and/or vibration are generally necessary where sites are located in the vicinity of sensitive premises for the benefit of both the public and the industry.

Blasting only occurs at a proportion of surface mineral extraction sites, generally those producing crushed rock. There are particular characteristics of blasting which require specific consideration of noise and vibration issues. Whilst drilling blast holes is associated with intermittent noise, blasting creates noise and vibration both of which are of very short duration, with a frequency of events varying from a small number per year to several times per day, depending on the nature and size of the extraction operation. The lay person often finds it difficult to differentiate between airborne noise and groundborne vibration. Both effects have more familiar parallels, for example, wind and thunder and pneumatic drills.

A wide variety of different minerals is produced in Britain by surface extraction methods. These include natural and crushed sand, gravel and rock (sedimentary, igneous and metamorphic) produced as aggregates for the construction industry. In addition to some of the foregoing, slate, chalk, china clay, ball clay, fuller's earth, silica sands and various other minerals are essential raw materials to other British industries and world markets. The methods of working of each of these different types of mineral varies greatly according to the type of mineral, its geology and location and the end uses for which the mineral is intended. The nature of any impacts from noise and vibration therefore need to be considered in the context of the relevant site specific factors, bearing in mind the general advice contained in this standard.

Code of practice

1 Scope

This Part of BS 5228 gives recommendations on measures for the control of noise and vibration that should be adopted, where they are practicable and economic, to ensure good practice, in order that the community is subject to minimum disturbance from noise and vibration arising from surface mineral extraction.

NOTE 1. This Part of BS 5228 should be read in conjunction with BS 5228 : Part 1.

NOTE 2. Fixed plant, permanent rail heads and other such facilities may be assessed in accordance with BS 4142.

2 References

2.1 Normative references

This Part of BS 5228 incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on page 14. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this Part of BS 5228 only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This Part of BS 5228 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this Part of BS 5228, the definitions given in BS 5228 : Part 1 apply, together with the following.

3.1 overburden

The material overlying the mineral or minerals to be extracted, including topsoil and subsoil.

3.2 baffle mound

A temporary dump usually formed from topsoil or subsoil, for the purpose of reducing noise from the site and to provide a visual screen.

3.3 air overpressure

Airborne pressure waves generated by blasting, produced over a range of frequencies including those which are audible and those which are below the lower end of the audible spectrum. It can be quantified either as a pressure or as a level in linear (unweighted) decibels (dB).

3.4 vibration dose value (VDV)

The fourth root of the integral of the fourth power of acceleration in $\text{m/s}^{1.75}$ after it has been frequency-weighted, given by the following equation:

$$\text{VDV} = \left(\int_0^T a^4(t) dt \right)^{0.25}$$

where

$a(t)$ is the frequency-weighted acceleration;

T is the total period of the day (in s) during which vibration may occur (see also BS 6472 and BS 6841).

4 Legislative background

4.1 General

The principal legislation controlling the use of land for surface mineral extraction in Great Britain is provided by the Town and Country Planning Act 1990 [1] and the Town and Country Planning (Scotland) Act 1972 [2], both of which have been amended by the Planning and Compensation Act 1991 [3].

The primary planning legislation in Northern Ireland is the Planning (Northern Ireland) Order 1991 [4].

Acts of Parliament, rules and orders which are of relevance include the Environment Act 1995 [5].

There is also separate legislation controlling pollution, waste and statutory nuisance, much of which is now contained in the Environmental Protection Act 1990 [6].

4.2 The winning and working of minerals

The relevant planning authorities are given in the following list:

- a) England: County councils, metropolitan boroughs, unitary authorities and national park planning boards where appropriate;
- b) Wales: The unitary planning authorities and national park planning boards where appropriate;
- c) Scotland: The local authority;
- d) Northern Ireland: Department of the Environment for Northern Ireland.