

13. Construction Noise Assessment



Appendix 13 Construction Noise Assessment

BS 5228 -1:2009 'Code of practice for noise and vibration control on construction and open sites – Part: Noise'

Part 1 of the Code of Practice for Noise and Vibration Control on Construction and Open Sites provides guidance on the methods that can be used to predict and measure noise from construction activities and how to assess the impact on those exposed to it. In particular Annex F sets out the methods of estimating noise from construction sites which take into account distance, ground effects, reflections from surfaces, and screening by obstacles.

Annexes C and D of Part 1 of the Code of Practice provide generic source noise data for various items of plant used on open sites which can be used in the absence of measured data.

Part 1, Annex E 'Significance of noise effects' of BS5228 presents various methods of determining the significance of noise effects due to construction works. In this assessment, the ABC method detailed in Annex E.3.2 has been used as a basis for the assessment. For the appropriate period (night, evening/ weekends or day), the measured ambient noise level is rounded to the nearest 5 dB. This is then compared with the total noise level, including construction. If the total noise level exceeds the appropriate category value, then a significant effect is deemed to occur. The example thresholds for significant effects at dwellings are shown below.

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A	Category B	Category C
Night-time (11.00pm to 7.00am)	45	50	55
Evenings (7.00pm to 11.00pm weekdays). Weekends (1.00pm to 11.00pm Saturdays and 7.00am to 11.00pm Sundays)	55	60	65
Daytime (7.00am to 7.00pm) and Saturdays (7.00am to 1.00pm)	65	70	75

The values in Category A, B and C are the threshold values to be used when ambient noise levels (when rounded to the nearest 5 dB) are less than, equal to, or higher than the values in Category A column, respectively.

The calculation method of BS 5228 takes account of the duration of an activity per hour, the "on-time"; and the attenuation of sound due to the effects of distance, ground attenuation and barrier effects.

At the present time a detailed construction programme is not available, and indeed is unlikely to be available until contractors have been appointed and they have fully devised their methods of working and have decided on what equipment, plant and construction schedule they will use.

In the absence of detailed information the assessment has been based on the following assumed phases, plant items and on-times based on the information provided within BS 5228-1:2009.

Assumed Activity Plant List

Activity	Proposed Plant Details	Estimated	BS 5228 Source Data Table Reference (Noise level @10m in brackets in dB(A))
		On-time	
Site Clearance			
Breaking out Hard materials	Hand-held Pneumatic Breaker x2	10%	C.5 Ref no. 6 (95)
Breaking out Asphalt	Road planer x 2	30%	C.5 Ref no. 7 (82)
For Air tools	Compressor x3	30%	C.5 Ref no. 5 (65)
Excavation	Wheeled Excavator (17t) x2	100%	C.5 Ref no.11 (73)
Tree cutting	Pneumatic Circular Saw	10%	D.7_79 (75)
Removal/Delivery of Materials	Lorry	30%	C.2_34 (80)
Construction of Earthworks (including Drainage)			
Earth moving	Bulldozer (134kW,24t x3 (Cat D6)	70%	C.5_15 (83)
Dumping rubble	Articulated Dump Truck (194kW, 25t) x3	70%	C.5_16 (81)
Dumping rubble	Dumper (75kW) x3	50%	C.4_4 (76)
Excavation	Tracked Excavator x8	70%	C.5_18 (80)
Construction of Road Pavement			
Rolling	Road roller (95kW,22t)	70%	C.5_19 (80)
Compaction	Vibratory Roller (12t)	70%	C.5_21 (80)
Compaction	Vibratory Compactor (Asphalt)	50%	C.5_29 (82)
Paving	Asphalt Paver (+tipper lorry 112kW, 12t hopper) x2	100%	C.5_30 (75)
Road sweeping	Road sweeper	50%	C.4_90 (76)
Removal/Delivery of Materials	Lorry	10%	C.2_34 (80)

Construction Noise Assessment (re: BS 5228 Example ABC Method)

Noise Survey Pos.	Location	Dist.	Phase No.	Activity	Construction Noise Level dB LAeq,1h	Measured Baseline Noise Level dB LAeq,16h	Combined Noise Level	BS 5228 Threshold	Significant?
1	Alvie School	50	1	Site Clearance	76	59	76	65	YES
1	Alvie School	50	2	Construction of Earthworks	78	59	78	65	YES
1	Alvie School	50	3	Construction of Road Pavement	72	59	72	65	YES
2	Hilview Cottage	70	1	Site Clearance	72	59	72	65	YES
2	Hilview Cottage	70	2	Construction of Earthworks	75	59	75	65	YES
2	Hilview Cottage	70	3	Construction of Road Pavement	68	59	68	65	YES
N/A1	Loch Insh	170	1	Site Clearance	63	46	63	65	NO
N/A	Loch Insh	170	2	Construction of Earthworks	65	46	65	65	YES
N/A	Loch Insh	170	3	Construction of Road Pavement	59	46	59	65	NO
7	Kincraig House	400	1	Site Clearance	53	53	56	65	NO

7	Kinraig House	400	2	Construction of Earthworks	56	53	58	65	NO
7	Kinraig House	400	3	Construction of Road Pavement	49	53	55	65	NO
8	Alvie House	265	1	Site Clearance	58	47	58	65	NO
8	Alvie House	265	2	Construction of Earthworks	60	47	60	65	NO
8	Alvie House	265	3	Construction of Road Pavement	54	47	55	65	NO

Notes

- 1) The measurement location at Loch Insh was very close to the railway. The measured ambient noise level was 69 – 72 dB LAeq, 15min at this location with a train pass-by contributing significantly to the noise levels in each measurement. This would not be representative of areas of Loch Insh further from the railway and hence in this case the lower predicted noise level from the noise model has been used (corrected by -2.5dB to estimate the 16 hour LAeq from the 18 hour LA10) however it should be noted that train pass-bys will give rise to higher short term noise levels and raise the 16 hour LAeq from that predicted.
- 2) Measured and predicted noise levels have been converted to facade noise levels by the addition of 2.5dB except at Loch Insh.

Noise Mitigation

The noise impact of the construction phases can be minimised by use of the noise control measures, as suggested in Section 8 of BS 5228-1:2009. General principles for the control of noise during the construction works are presented below.

- Appropriate choice of plant and equipment;
- Regular plant maintenance to keep plant in good working condition and reduce noise from machinery;
- Careful phasing of the proposed operations; and
- Provision of temporary barriers.

Operating Methods of Noise Reduction

Ensure that all staff and operatives are briefed on the requirement to minimise nuisance from site activities.

No equipment shall operate other than at the manufacturers' rated working levels; site staff shall not 'rev' equipment unnecessarily.

Use of rock breakers on site shall be kept to an absolute minimum and only silenced or sound models shall be used.

No plant and equipment shall be left running if not required for immediate use. Where this is not practicable, equipment shall be set to idle in the quietest manner to minimise noise emissions.

Resilient materials should be used where possible to reduce impact noise where materials are being moved or dropped e.g. lining chutes and dumpers. Materials should be lowered whenever practicable and otherwise drop heights should be kept to a minimum.

Noise Reduction of Mobile Plant

The movement of plant onto and around the site should have regard to the normal operating hours of the site and the location of any noise sensitive receptors. Audible reversing alarms should be of a type, which whilst ensuring that they give proper warning, have a minimum noise impact external to the site.

Internal haul routes should be well maintained and avoid steep gradients.

Earth moving plant should be fitted with efficient sound reduction equipment and manufacturers' enclosure panels should be kept closed.

Careful phasing of the works would also aid in minimising their impact. Location of the site compound as far away as possible from noise sensitive locations will assist in minimising sources likely to generate nuisance.

Noise Reduction of Stationary Plant and Tools

Possible noise reduction measures for compressors or generators are as follows:

- Use of electric powered compressors as opposed to diesel or petrol;
- Sound reduced compressor or generator can be used to supply several pieces of plant;
- Use of centralized generator system;
- Efficient sound reduction equipment should be fitted to engines;
- Metal casings should be acoustically dampened;
- Manufacturers' enclosure panels should be kept closed;
- Erection of an acoustic screen between the compressor or generator and noise sensitive locations; or
- Enclosure of compressor or generator in a ventilated acoustic enclosure.

Possible noise reduction measures for tools are as follows:

- Use of hydraulic or electric tools where possible;
- Use of alternative quieter equipment for concrete breaking/cutting;
- Fitting suitably designed sound reduction equipment to reduce noise without impairing efficiency;
- Use of damped tool piece or saw blade;
- Enclose in a suitably designed portable or fixed acoustic enclosure with suitable ventilation
- (with due regard to the health and safety of operatives).

Control of Noise Propagation on Site

Temporary barriers, such as hoardings or mounds when positioned close to the source or the receiver will assist in the reduction of noise levels experienced at nearest receivers. The degree of protection will be limited to 5-10dB(A) and care must be taken to avoid reflecting noise and increasing the problem elsewhere. If practical, consideration should be given to providing an acoustic screen on the edge of the carriageway before any construction activities take place.

Barriers should be:

- A fairly uniform panel, free from holes with no gaps or openings at joints (uneven ground may leave gaps to be filled);
- Stable and robust enough to stand up to site conditions;
- Of a height and width more than enough to completely cut off sight of the source from the receiver, and
- Preferably at right angles to the line of sight of the receiver.