

Environmental Noise and Acoustic Design in Power Plants

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Company Overview

- Established 1980
- Industrial and Environmental Noise Solutions Company working with our customers to assist with compliance of:
 - Control of Noise At Work Regulations 2005
 - Environmental Noise Legislation
- Complete range of services and products:
 - Noise Surveys, Noise Audits
 - Design, Manufacture and Installation of Noise Control Products including Acoustic Enclosures, Attenuators, Acoustic Screens and Louvres



Environmental Noise: BS4142 Assessments

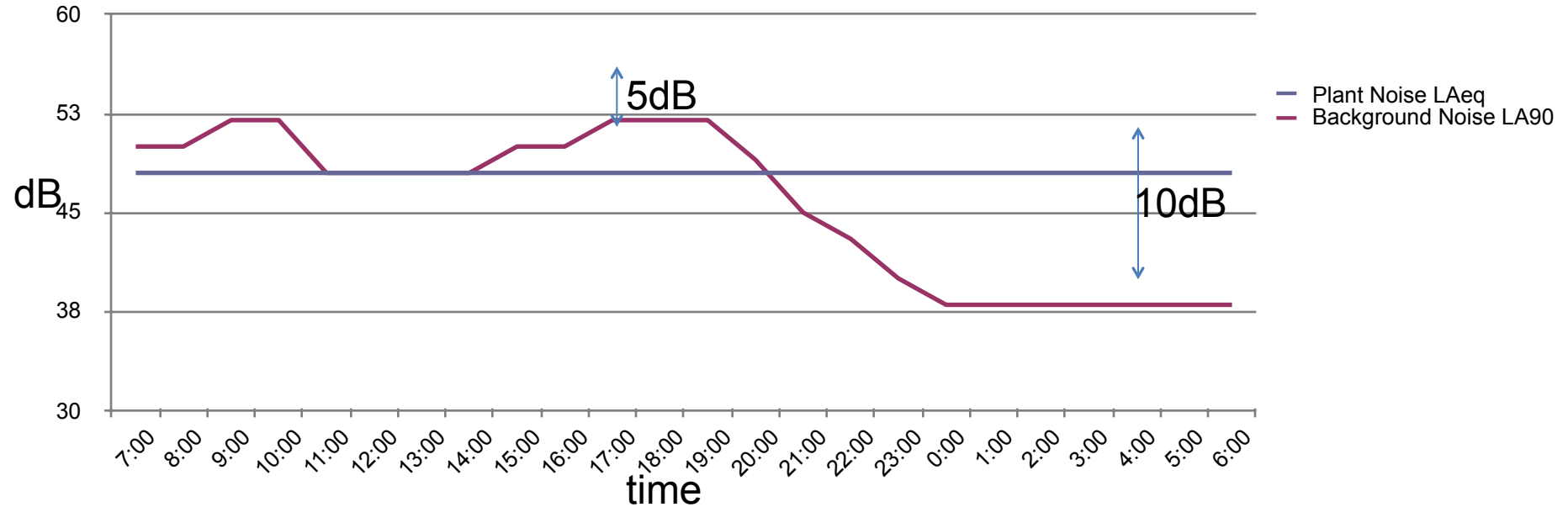
- Assessment of noise from existing or proposed installations in line with BS4142:2014 'Methods for rating and Assessing Industrial and Commercial Sound' (covers noise from fixed plant installations)
- Assessment generally undertaken at nearest noise sensitive property, or at a location pre-determined by planning authorities / EHO's



- Plant noise assessed against underlying background noise levels
- Standard takes into account impulsivity, tonal noise content and intermittency

Environmental Noise

BS4142 Plant Noise Assessment



Assessment outcomes:

A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

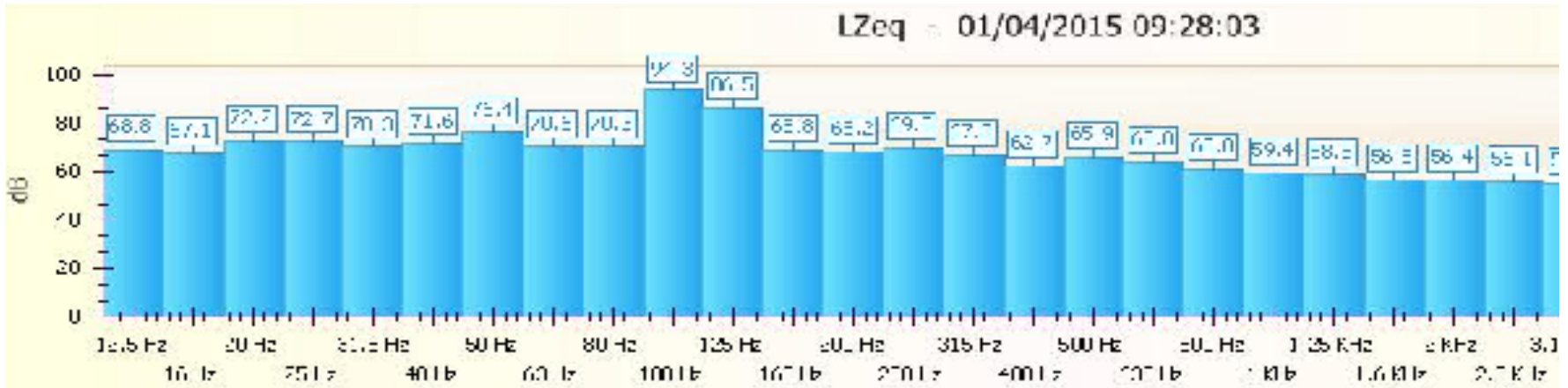
A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

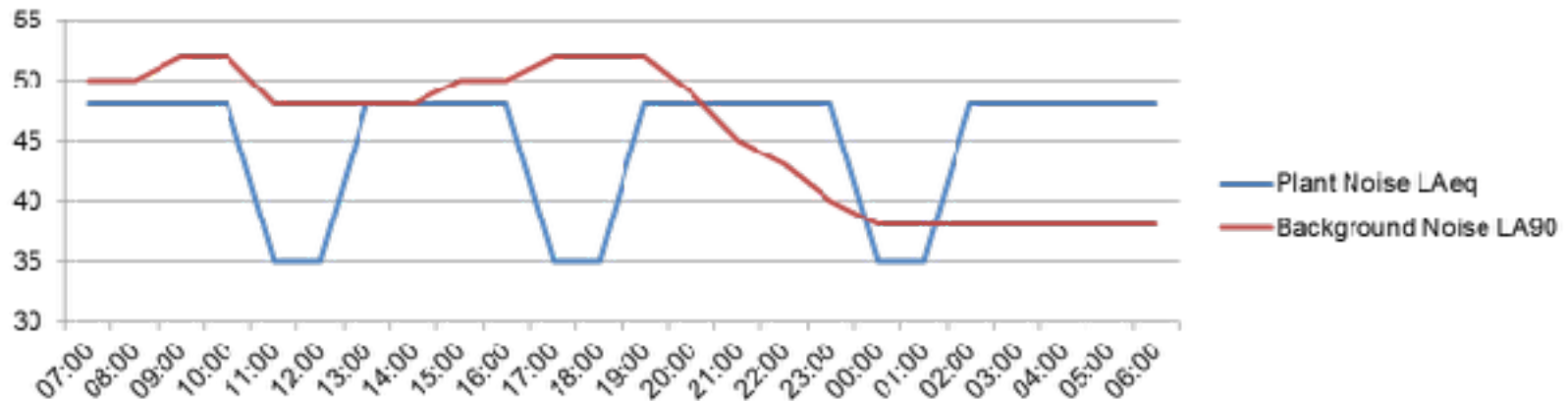
Environmental Noise

Additional factors to be considered according to BS4142

- Frequency Content



- Impulsivity / Intermittency



Example BS4142 Assessment

Measurements undertaken at Noise Assessment Location

Noise Level with plant operating L_{Aeq} 48.6 dB

Noise Level with plant switched off L_{Aeq} 41.2 dB

Background Corrected L_{Aeq} 47.7 dB (Specific Sound Level)

Acoustic feature correction +4dB (Perceptible Tone)

Rating Level 51.7 dB

Background Sound Level L_{A90} 38.5 dB

Excess of Rating above Background +13.2 dB

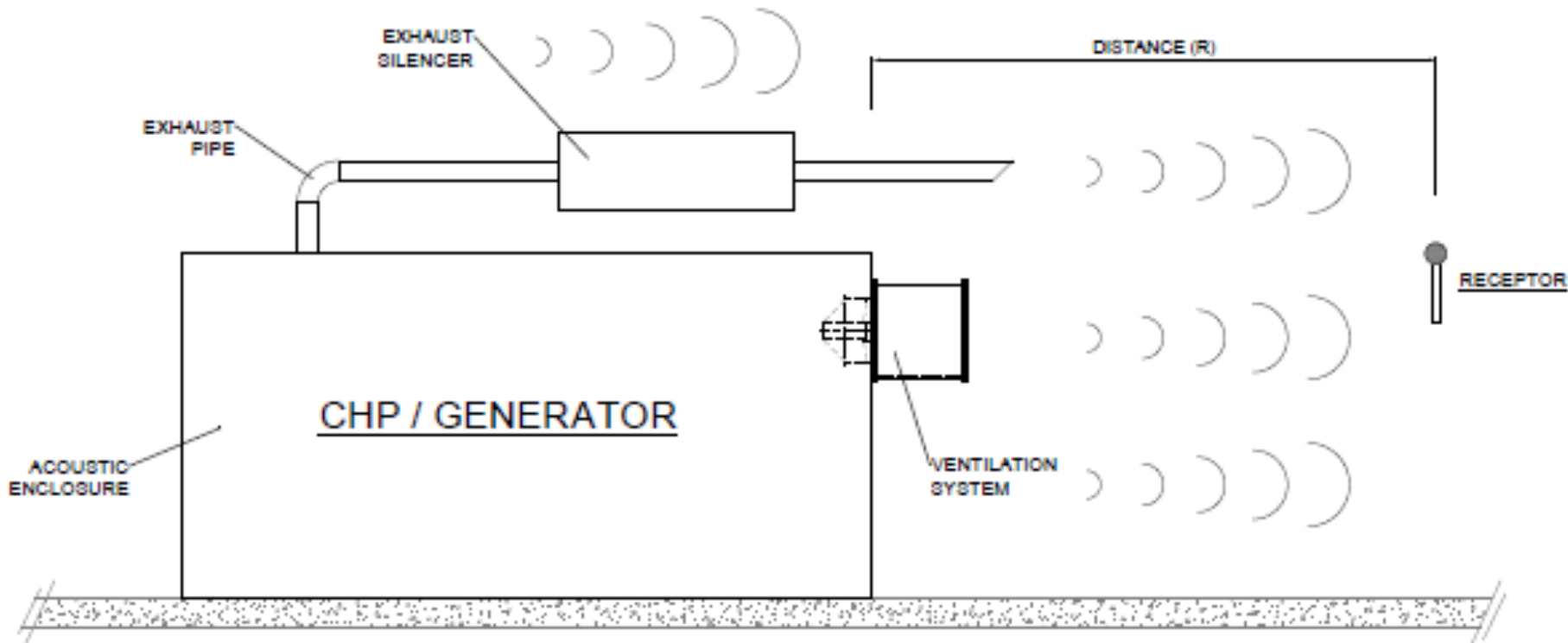
Outcome according to BS4142: Indication of a significant adverse impact depending upon the context

Note – BS4142 outcomes are given as an indication of the effects. Noise sensitivity can vary significantly between individuals

Acoustic Design Considerations

Noise Impact Calculations

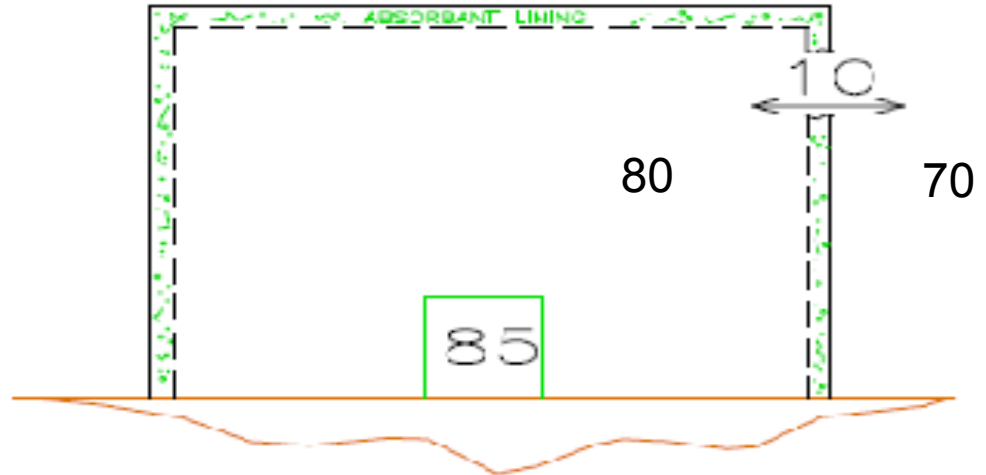
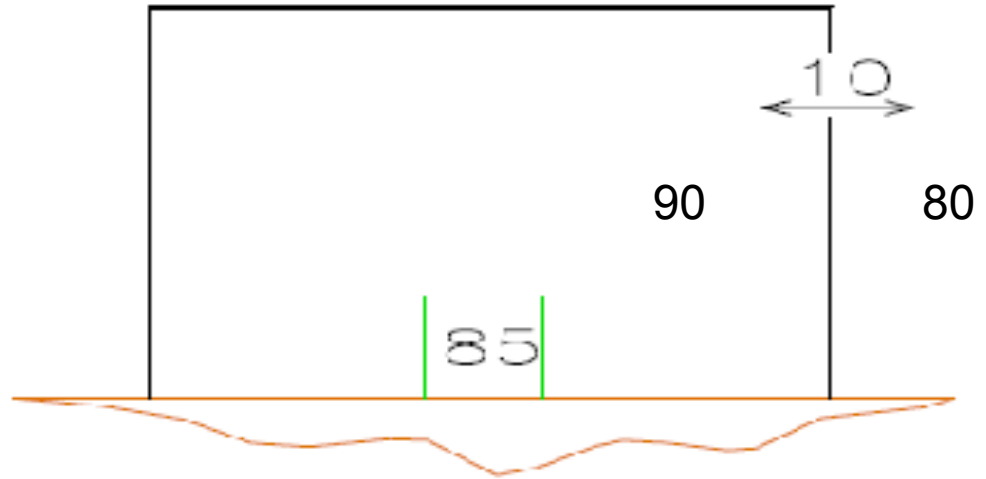
- Source noise profile including frequency data and impulsivity / interittency
- Proximity of Plant to Noise Sensitive Receptor
- Cumulative Sources
- Project requirements / specifications, or existing background noise levels



Methods of Noise Reduction

Acoustic Enclosures

- Outer mass layer (steel / concrete)
- Absorptive internal surface to reduce internal reverberant noise level



Methods of Noise Reduction

Acoustic Enclosures

Acoustic Performances from 15-45dBA depending on requirement

Typical level of noise reduction for a standard 75mm thick acoustic panel:

Freq. (Hz)	63	125	250	500	1k	2k	4k	8k
Panel Sound Reduction / Insertion Loss (dB)	5	12	21	27	32	37	43	42

Example Noise Reductions

Freq. (Hz)	63	125	250	500	1k	2k	4k	8k	O'all dBA
Source Noise Level (dB)	96	100	94	90	88	85	87	90	95.5
Panel Sound Reduction / Insertion Loss (dB)	5	12	21	27	32	37	43	42	
Resultant Noise Level (source noise less panel IL) – (dB)	91	88	73	63	56	48	44	48	73.6

Acoustic Enclosure Examples

- Fully ventilated enclosure for transformer tanks
- Integral support frame
- Demountable front wall
- Quick access to reduce down time on site



- Drop-over acoustic canopy for skid mounted power generation equipment
- Bolt-on ventilation air inlet
- Maintenance access panels / doors

Methods of Noise Reduction

Acoustic Screens

-Noise reduction up to 12-15dBA in free field conditions

-Reduction achieved depends upon:

Source sound spectrum

Relative heights of source, barrier and receiver

Distances between source, barrier and receiver



- Noise from fixed plant installations is normally assessed in line with BS4142:2014
- Complaints relating to existing installations require detailed acoustic surveys to determine the extent and source of the excessive noise in line with the above standard
- New installations normally require a BS4142 noise impact assessment to be undertaken
- Depending upon the outcome of a noise assessment, noise control measures may need to be implemented including bespoke acoustic enclosures, screens or silencers