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NOISE LEGISLATION AND STANDARDS

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INTRODUCTION

Is there any purpose in having national noise standards or legislation?

Limiting this discussion to the United Kingdom legislation and standards, means that we should be able to concentrate mainly on BS 4142 1967, amended January 1975 and the Control of Pollution Act 1974, Chapter 40, Part III, with a brief look at BS 848 Part II, 1983, "Fan Noise Testing", and BS 4718," Methods of Test for Silencers for Air Distribution Systems".

Wide experience throughout the United Kingdom shows that standards are sometimes used by some Local Authority Environmental Health Officers, but more often than not there is no standard approach to defining what constitutes a noise or noise nuisance. It is considered that this is firmly the fault of the acoustics industry and not due to any shortcomings on behalf of the Environmental Health Officers.

An example will help to illustrate this statement. Everybody involved in Noise Control agrees that the most often used unit of noise, the ubiquitious dB'A', is meaningless when it comes to the control of noise. Yet this unit is being (mis) used more and more often for wider and wider applications. When the true origin of the dB'A' correction is remembered, i.e. it was an attempt to simulate the frequency response of the average human ear to low sound levels, it clearly is a nonsense to have fan sound power levels expressed in dB'A' weighted units, and yet this is the current trend.

Nobody hears dB'A's and consequently design levels should not be based on dB'A's. Appendix A, lines 1 and 2, show two different spectra that expressed in single figure values would both be regarded as 30 dB'A'.

An approach used personally for the last 20 odd years, which has been very successful in achieving results acceptable to residents, is to establish the dB'A' values for the ambient conditions and then relate this to the approximate spectrum for the value obtained on site.

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Appendix A lines 3-9 gives details of dB'A' values and the approximate spectra relating to these values. It is emphasized that this is for traffic noise ambient levels and not for work's noise controlled environment.

Acoustics is a complicated subject and should not be made more complicated by attempting to simplify it. As in all engineering subjects, calculations must be made that are based on the circumstances pertaining and the final result required.

BS 4142 1967, AMENDED JANUARY 1985.

This standard gives a precise procedure for measuring the noise level and correcting the measured noise level and then comparing the corrected noise level to either the measured background level or to a notional background level. All the foregoing measurements are to made in the relevant positions and at the relevant times.

The results obtained can be used to assess whether complaints of noise can be expected from residents adjacent to the measuring position. See Appendices B and C.

This standard, it is believed, is the only national standard applicable to commercial/industrial noise affecting residences which requires the use of a sound pressure level meter and yet in an assessment as to whether or not a noise nuisance is being caused, the procedure described by BS 4142 is quite often used and the results then ignored. See Appendices D and E. This surely raises the question assuming that BS 4142 has shown that complaints are highly likely, "Why are persons likely to complain if a nuisance to them is not being caused?"

The most significant clause of BS 4142 is clause C3. "The noise should be analysed into octave bands....."

In a paper presented to this Institute eight years ago, George Vulkan of the Scientific Branch of the Greater London Council stated "In developing a noise control programme it is necessary firstly to know the extent of the existing or anticipated problem, secondly to know clearly what are acceptable limits of noise in different situations, and thirdly to decide on the most practical and economic means of achieving these limits or guidelines." This has not altered other than being more necessary, in view of economic restraints in not wanting to waste resources, by overdesigning noise control treatment in either the design stage or the remedial stage of a project.

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CONTROL OF POLLUTION ACT 1974

Chapter 40, Part III Section 58 of the Act states "Where a Local Authority is satisfied that noise amounting to a nuisance exists, or is likely to occur or recur....." No mention of how the poor Local Environmental Health Officer is supposed to determine if a noise amounting to a nuisance....etc.

Surely at a time when better, more sophisticated, and more expensive instrumentation is available, it is absurd that the assessment of what constitutes a NOISE NUISANCE is done by:- (a) Old ears, (b) Inexperienced ears, (c) Part time ears/instruments. Points a and b are self explanatory. Point c is when the acoustical engineer visits site to investigate complaints of noise from refrigeration machinery causing a nuisance to a nearby resident, measures the noise, does calculations and reports that there is not a problem. Resident still complains. Sometime later, purely by chance the acoustical engineer is on site when the machine which was given a clean bill of health malfunctions for 30 seconds and then reverts to quiet running. Neither the machine manufacturer nor the refrigeration contractor is able to explain why this has happened. The resident says "I don't give a damn that it is only noisy for 30 seconds a day, it is a NUISANCE." In my opinion it was.

Does it not make sense to require an evaluation of a noise nuisance complaint to incorporate an octave analysis of the noise together with a typical spectrum of the ambient level in which the noise is being experienced.

BS 848 PART II, 1983, FAN NOISE TESTING.

It is accepted that the committee who drew up this standard has put an enormous amount of work into it. When the standard is used and FAN noise creates problems at the commissioning stage of a project due to "The fans not being installed in accordance with BS 848 Part II, or fan casing radiated noise being a problem", this does not help the client, acoustical consultant, building services consultant, building services contractor nor indeed the fan manufacturer.

It is very easy to criticize, but surely there is a need for the test layout to bear some resemblance to a layout which might sometime be encountered on site.

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BS 4718, "METHODS OF TEST FOR SILENCERS FOR AIR DISTRIBUTION SYSTI

In the 17 years since this standard was drafted a great deal of knowledge has been gained. Within a year of its promulgation however, it was the open sesame to abuse when airflow volumes were low or regenerated noise was a problem because "The silencers are not installed in accordance with BS 4718."

The same comments to BS 848 Part II, apply to the test layout for this standard.

In case it is felt that these comments are only critical, the contributor's company states on two leaflets the following:-

"In considering the various potential sources of noise and vibration certain assumptions have been made, these are that all plant and equipment will be installed in accordance with the relevant British Standard or Code of Practice. If this is not the case, it could alter the basis of the calculations by significant amounts."

"It is for the reasons mentioned above that BS 4718, 1971 is worded as it is. Whilst accepting the limitations of the British Standard, until such time that the 'Test Installation' bears some relationship to a layout expected to be found on site, the BS 4718 layouts at least ensure a degree of uniformity of test. This does mean however, that by deviating from the B.S. layout, differences in actual and tested performance will be experienced. These will generally be most noticeable in the 'Total Pressure Loss' and 'Generated Noise Level' figures. Usually this is because the air does not flow uniformly through the unit silencer due to entry and discharge obstructions."

CONCLUSION

Despite the opening question and the subsequent discussion, clearly there must be standards and legislation.

Standards must be written in such a way that they are not open to abuse by the commercially minded manufacturer who relys on the fact that nobody is going to have a silencer or fan removed from site and transported several hundred miles to be tested, leaving the installation without means of ventilation or silencing.

The standards must also be written to take account of the final use.

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Legislation must be written so that it is a requirement to apply the relevant standard when investigating a NOISE NUISANCE. Obviously the results of applying the standard should be made known to both the complainant and the noise producer, and hopefully this would help to avoid unnecessary and costly litigation.

It should not be necessary nor is it desirable for the Local Authority to specify the works to be undertaken, but it should be necessary for the Loacal Authoriy to specify the level to be attained, similar to the Greater London Council approach.

Finally, without wishing to provoke too vigourous a discussion, is there not a case for all standards dealing with, for example, acoustics, to be compiled and issued (and not at a highly inflated price) by the Institute of Acoustics.

Where two or more disciplines overlap e.g. fan noise testing, then the Fan Manufacturers Association would be pleased to liaise pretty much as they do now!

REFERENCES

(1) Greater London Council - Guidelines on Noise and Vibration. G. H. Vulkan.

(2) B.S. 4142, 1967 (AMD 1661) Method of Rating Industrial Noise.

(3) B.S. 4718, 1971 - Silencers for Air Distribution Systems.

(4) B.S. 848 Part II, 1983 - Fan Noise Testing.

(5) Control of Pollution Act, 1974 Chapter 40.

APPENDIX A

TRAFFIC SPECTRA APPROXIMATING TO dB'A' EQUIVALENTS

		Octave Band Centre Frequency (Hz)							
	dB'A'	63	125	250	500	1k	2k	4k	8k
(1)	30	47	37	30	24	21	20	20	22
(2)	30	37	27	39	14	11	10	10	12
(3)	30	47	37	30	24	21	20	20	22
(4)	35	52	42	35	29	26	25	23	20
(5)	40	57	47	40	34	31	30	28	25
(6)	45	62	52	45	39	36	35	33	30
(7)	50	67	57	50	44	41	40	38	35
(8)	55	72	62	55	49	46	45	43	40
(9)	60	77	67	60	54	51	50	48	45

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APPENDIX B	Night-time (new noise) dB'A'
Measured noise level	47
Tonal and impulsive character correction	-
Intermittency and duration correction	-
Corrected noise level	47
Background level (notional)	50
Correction for type of installation	+10
Correction for type of district	+10
Correction for time of day	-5
Corrected noise level minus notional background level	-18
Conclusion	Complaints would not be expected.

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APPENDIX C	Night-time (new noise) dB'A'	Relevant Clause
Measured noise level	47	2.2.5
Tonal and impulsive character correction	-	3.2.1
Intermittency and duration correction	-	3.2.2
Corrected noise level	47	3.2
Background level	41	4.2
Correction for type of installation	-	A.2
Correction for type of district	-	A.3
Correction for time of day	-	A.4
Corrected noise level minus notional background level	6	5.2.2
Conclusion	Marginal complaints may be made especially in the Summertime.	

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APPENDIX D	Day-time (new noise) dB'A'	Relevant Clause
Measured noise level	51	2.2.5
Tonal and impulsive character correction	+5	3.2.1
Intermittency and duration correction	0	3.2.2
Corrected noise level	56	3.2
Background level	40	4.2
Correction for type of installation	0	A.2
Correction for type of district	-5	A.3.1
Correction for time of day	+5	A.4
Corrected noise level minus background level	16	5.2.2
Conclusion	Complaints highly likely.	

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APPENDIX E	Night-time (new noise) dB'A'	Relevant Clause
Measured noise level	45	2.2.5
Tonal and impulsive character correction	+5	3.2.1
Intermittency and duration correction	0	3.2.2
Corrected noise level	50	3.2
Background level	30	4.2
Correction for type of installation	-	A.2
Correction for type of district	-	A.3
Correction for time of day	-	A.4
Corrected noise level minus notional background level	20	5.2.2
Conclusion	Complaints highly likely.	