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PROGRESS IN NAMAS ACCREDITATION OF ACOUSTICAL TESTING LABORATORIES

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INTRODUCTION

Quality control practices have come to be applied formally in recent years in the field of acoustical testing, through the auspices of the National Measurement Accreditation Service (NAMAS). This Service [1] is operated by the Department of Trade and Industry, through the National Physical Laboratory. Its objectives are to assess, accredit and monitor organisations for the conduct of calibrations and tests according to defined specifications. Accredited organisations are authorised to issue formal certificates and reports on the results of their work. There are now thirteen such organisations in the field of acoustical testing, with accreditations covering a range of activities. This paper reviews the general requirements for NAMAS accreditation, describes the progress made in acoustics, and looks forward to possible future developments.

NAMAS REQUIREMENTS AND THE ACCREDITATION PROCESS

The criteria of competence laid down by NAMAS [2], which testing laboratories are called upon to satisfy, are as follows:

1. The organisation must have a clear management structure, with defined lines of responsibility for the test work. A quality-control manager should be included within the structure, having direct access to senior management.

2. The staff employed on the test work should be suitably qualified and trained.

3. The equipment and facilities of the laboratory must be suitable for the work and maintained in good order.

4. Measuring instruments must be calibrated, the calibration being traceable to national standards.

5. Written test procedures must be held and maintained up to date.

6. Record keeping must be adequate, in terms of receipt and labelling of test samples, test results and preparation of reports.

7. The level of uncertainty of the test results shall have been evaluated.

8. Premises and storage facilities must be secure, so as to ensure reasonable provision for maintaining the confidentiality of clients, their products (test samples) and test results.

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In making application for accreditation, an organisation is required to draw up a schedule of the test procedures to be covered, to produce a quality control manual showing how its operations and facilities conform with the defined criteria, and to prepare procedure manuals for each individual test listed. The test procedures have to be fully documented - usually they comprise British or International Standard specifications, but they can be of any authorship, even to the extent of being produced in-house. A procedure manual is meant to show how the organisation implements a basic specification and it should lay down in detail the equipment used, the method followed and the means of presenting the results. Manuals should be written at such a level that a suitably-qualified but otherwise inexperienced test engineer could come in and follow them with no further assistance.

The NAMAS Executive then calls in one or more specialist assessors, who are experienced and acknowledged authorities in their field and who have trained additionally in NAMAS procedures, to study the paperwork produced by the organisation, to advise on any shortcomings and, when the documentation is sufficiently advanced, to visit the premises in order to carry out a detailed study of the organisation's ability to perform the work. So-called "non-conformances" with the requirements are usually then identified, and suitable corrective action has to be taken before accreditation is finally awarded. The organisation is expected, as part of its own quality-control process, to conduct short-term periodic audits of its adherence to the NAMAS requirements. It is part of the responsibility of the quality manager to conduct these audits and to report the findings direct to senior management, at the same time informing the line manager responsible for the test work. In this way self-monitoring takes place, with the results fully recorded and open at yearly intervals to inspection by NAMAS and the appointed assessor. If all continues to be in order the accreditation is renewed, but if serious shortcomings are found it is suspended and if matters are not corrected promptly it is terminated.

ACCREDITATION OF ACOUSTICAL TESTING LABORATORIES

The first question to be addressed upon entering the acoustics field was that of establishing traceability of measuring-instrument calibration, in a way which was practical and economic. The NAMAS requirement for maintenance of calibration leads to calibrations being performed, usually at yearly intervals, in either a suitably accredited laboratory or a national standards laboratory. The basic instrument for much of the sound measuring work concerned is the sound level meter and while the type specifications for different grades of meter are well defined in national and international standards, these are unsuitable for the regular calibrations to be performed in the present context. A relatively inexpensive test of acoustical and electrical compliance with the type specification had to be developed and a British Standard for the verification of vehicle noise meters offered a convenient basis. NAMAS has now issued an Information Sheet [3] detailing the method which evolved, and the National Physical Laboratory includes the compliance test in its measurement services. There is in principle no reason why a test laboratory should not undertake its own calibrations, but they would need to be accredited additionally for this purpose and they would have to demonstrate traceability to national standards.

Assessors are appointed by NAMAS, but the organisation in each case is invited to confirm that they accept the individual nominated. From experience as an assessor, it can be observed generally that the accreditation process places a demand upon the organisation for a substantial investment of staff time and effort in drawing up the necessary documentation. On the other hand, the discipline so imposed is usually found to have wider benefits.

PRESENT ACCREDITATIONS

Applications for accreditation are treated confidentially by the NAMAS Executive, but once they are successful the organisations are listed in the widely-published NAMAS Directory [4]. The organisations which have been accredited so far for different kinds of acoustical testing are as follows:

AIRO	Machinery noise emission; Laboratory testing of acoustical properties (sound transmission and absorption) of building materials
AVTechnology	Machinery noise emission; Traffic noise measurement
British Aerospace Dynamics Div., Hatfield	Laboratory testing of acoustic materials subject to high noise levels
British Gypsum	Laboratory testing of acoustical properties (sound transmission and absorption) of building materials
BSI	Machinery noise emission
INSPEC	Hearing protector performance
Lloyds Register of Shipping	Machinery noise emission
NEL	Fan noise measurement
Northern Ireland Dept of Economic Development, Industrial Science Div.	Machinery noise emission; Industrial noise measurement; Neighbourhood noise measurement; Traffic noise measurement
Ricardo Consulting Engineers	Machinery noise emission
Sound Research Laboratories	Machinery noise emission; Laboratory testing of acoustical properties (sound transmission and absorption) of building materials
Taylor Woodrow Construction	Machinery noise emission

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Wimpey Research Laboratories Machinery noise emission

FUTURE DEVELOPMENTS

The spur for many of these organisations to seek accreditation was the implementation within the UK of legislation [5] to enforce EEC Directives covering noise emission from different types of machinery, and the consequent appointment of "approved bodies" to undertake the necessary type testing. Having thus taken the initial step, assembled a quality control manual, made any necessary organisational changes, and produced the noise emission measurement procedure manuals, the addition of other kinds of tests to their schedules was a logical progression, requiring only the preparation of extra procedure manuals. The momentum of this process is now slackening, however, and it seems likely that a further substantial move forward in acoustical testing accreditations will await a fresh market stimulus. Two possible developments can be foreseen which might serve to bring this about.

A survey has recently been made of the work of local government authorities on noise measurement [6]. Over the country as a whole, much effort is devoted to noise measurements made in pursuance of statutory obligations, yet the regulations themselves have little to say on the technical competence required of the personnel responsible. The survey uncovered a small number of cases of litigation where questions of measurement accuracy or instrument calibration played a significant role. In discussing their results, the authors of the survey report pointed to the introduction of NAMAS accreditation of commercial organisations in acoustics. If in future cases of litigation local authorities find their measurements being challenged by accredited consultants acting for opposing parties, the authorities might find it in their own interests to seek a similar state of recognition. The number of local authority noise measurement teams which might seek accreditation is considerable.

The next major piece of legislation aimed at the control of noise seems likely to be in the area of health and safety at work. The Health and Safety Commission recently issued a consultative document [7] containing draft proposals for regulations on the prevention of damage to hearing from noise at work. An essential element of the regulations is that in work areas where employees are exposed to high levels of noise, employers will have to arrange for a noise assessment, by "a competent person". There is thus the prospect of extensive noise surveys being made and in the Draft Guidance there was some discussion of the degree of competence needed to tackle these. No specific qualifications were suggested, but a requirement could be imposed for noise surveys to be conducted within a quality control regime, either that already operated by the employer in normal business or brought in from outside for the purpose of the noise measurements. In response to the proposals, representations were made to the Commission to define competence in this way. The outcome is awaited, but if the idea finds acceptance, the potential for accreditations is enormous.

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CONCLUSIONS

A quality control approach to acoustical testing and measurement is practical and it has already been adopted by a number of organisations. Initial problems have been overcome and the principle is now finding application in many different kinds of work. Legislation in place to implement EEC Directives imposing limits on the noise emitted by certain kinds of machinery involves a requirement for testing bodies to be NAMAS-accredited, and it would be sensible to devise similar requirements for insertion into other regulations calling for acoustical measurements, in order to define a level of competence necessary for the production of reliable results.

REFERENCES

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