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By email

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Dear Ms Sturrock

Future Changes to the Building Regulations – Part E

Thank you for your letter of 29 July inviting our views on compliance with Building Regulations. This reply will deal solely with Part E of the Regulations as they affect sound insulation of dwellings (Regulations E1 – E3) and the acoustics of schools (Regulation E4). We will address these issues separately but first it may help if we set out some of the background both to Part E and to the ANC's involvement in compliance issues.

You have requested robust evidence to support our ideas and this reply therefore includes references to supporting documents which are listed in the appendix. We can supply copies of these references and other supporting documents if required.

1 Background information

The Association of Noise Consultants (ANC) is the representative body for firms providing acoustics and noise consultancy in the UK. Founded in 1973, we representing over seven hundred consultants in 114 member organisations, ranging from sole traders to multinational engineering consultancies. Among our aims are to maintain and improve the standards of conduct and competence of acoustics consultants. Our members therefore have to demonstrate certain standards of competence, independence and professionalism, and we believe the growth of the ANC has therefore resulted in a substantial increase in the standard of acoustic consultancy in the UK. A very large proportion of all acoustic design and testing in the UK is undertaken by our members and this includes a significant proportion of work relating to Part E of the Building Regulations.

Before 2003, demonstration of compliance with Part E (Sound insulation of dwellings) was by showing that separating wall and floor designs were capable of providing adequate sound insulation. Unfortunately, this did not address problems of poor workmanship or implementation of designs, and studies undertaken for what was then the ODPM established that a large proportion of new dwellings failed to meet the intended standards. The 2003 Regulations therefore introduced a requirement for pre-completion tests (PCTs) to demonstrate that the sound insulation measured on site met the required standards, and by default required such tests to be carried out by bodies with UKAS or equivalent accreditation for such tests. At the time, only three acoustic consultancies (all members of the ANC) had the necessary UKAS accreditation. A very large increase in accredited testers was needed but there was no organisation to train testers and in any case UKAS did not have the

resources to process a large number of applications in a short time. With the encouragement of the ODPM, therefore, the ANC set up an alternative scheme which received formal ODPM approval and recognition in the 2004 amendment to ADE. Details of the Scheme are summarised in reference [1].

Although this is to all intents and purposes an accreditation scheme, with requirements in some cases more stringent than those required by UKAS, we were requested by ODPM not to use this term as "Accreditation" was seen to be the preserve of UKAS. It is therefore known as the ANC Registration Scheme because as well as setting and monitoring standards for testing, the scheme requires all tests and their results to be registered, both for the purposes of certification (to prevent fraud and misrepresentation) and to provide a database of test results for each wall and floor type. This database is unique to the ANC Scheme and now includes over 200,000 test results. Analysis of the results has proved valuable for purposes ranging from setting standards for sound insulation credits under BREEAM and the Code for Sustainable Homes, to identifying building control bodies which do not appear to require testing.

An unforeseen benefit of the ANC Scheme has been to bring together a body of experienced, practicing acoustics consultants to exchange information, produce guidance and undertake research into sound insulation testing in dwellings. Our work to develop the scheme identified a number of serious discrepancies in the national and international standards as well as a lack of understanding of accuracy and reproducibility of test results. We have taken the lead in research in these fields, working closely with bodies such as Building Research Establishment and the Institute of Acoustics, and some of this research is summarised in the attached references [2,3,4]. As a result of this work we are now represented on the technical committees for the revision of the national and international standards on sound insulation measurement.

An alternative to pre-completion testing for new dwellings is through the Robust Details scheme [2] and development of the RD inspection and monitoring process has to a large extent been informed by our work. RD inspectors are required to be accredited under either UKAS or the ANC Scheme. You will doubtless receive a separate response from Robust Details Ltd, but it is fair to say that we consider the RD scheme to be a successful and cost-effective alternative to Pre-Completion Testing, particularly for large developments.

The ANC Registration Committee brings together a unique combination of knowledge and expertise with testers accredited under UKAS and the ANC Schemes. The Committee also comprises scheme examiners and members of the Robust Details Inspectorate. We consequently believe that we are uniquely placed to comment on the application of Part E and in particular on issues of compliance.

2 Sound Insulation of Dwellings

2.1 Importance of sound insulation

Sound insulation is sometimes regarded as an incidental part of Building Regulations, but noise affects nearly everyone and poor sound insulation is a major cause of stress and in some cases illness [6]. The main reason for including sound insulation in building regulations is, however, quality of life. BRE surveys of householders prior to 2003 consistently found noise from neighbours to be the single largest cause of dissatisfaction with their homes.

The importance of sound insulation as a health and sustainability issue was further underlined by the decisions by CLG and BRE to include it in BREEAM / Ecohomes Assessments and in the Code for Sustainable Homes. It is significant that many local authorities and public housing bodies routinely specify sound insulation standards for social housing to a standard 5 dB higher than the minimum standards set out in Approved Document E, irrespective of BREEAM or CSH requirements.

2.2 Cost of compliance

Design and materials to achieve compliance with ADE should not be a cost issue as the standards to be achieved under Part E 2003 are if anything lower than those required under the previous regulations. The cost of compliance should therefore be limited to the cost of testing. Typically for

large developments where 1 in 10 dwellings may require testing, the cost of testing should be of the order of £30 per dwelling, which is also the cost of registration through the Robust Details scheme. Ecohomes required significantly more tests than this, at considerable added cost, but the number of tests required under the CSH has now been brought in line with the number required under ADE. CSH credits are also achievable through use of Robust Details, with no increase in plot registration fee. The cost of compliance testing whether through PCT or Robust Details is therefore not significant compared with the cost of testing to investigate complaints once dwellings are occupied.

2.3 Compliance issues

It is generally accepted that pre-completion testing of sound insulation has brought about a very significant improvement in the sound insulation achieved in practice for new dwellings, conversions and rooms for residential purposes. This is not because of an improvement in the target standards, but because these standards now have to be met on site. When we first started testing under the new Regulations, analysis of the results database showed that about 10% of new dwellings, and about 20% of conversions, failed to meet the standards. By 2007 that failure figure was down to 3% for both categories [5] and it is now steady at between 2 and 3 %. This is entirely due to designers and contractors taking sound insulation seriously, because they know that their buildings will be tested. In this respect Part E is regarded throughout the housing industry as one of the most successful parts of Building Regulations, and there is no evidence that fundamental changes to the testing regime are required.

The main compliance issues that we have encountered tend to be at a local level with individual Building Control Bodies (BCBs). There are three common problems:

i) Failure in some cases to require evidence of adequate sound insulation before issuing a completion certificate. Even in the most efficient BCBs, this can occur through simple administrative error or through an individual officer not being familiar with the requirements of ADE. We seek to address such issues through education and information, and to this end many of our members provide seminars and CPD workshops to Building Control Officers and Approved Inspectors.

ii) Acceptance of tests by "Cowboy" testers. ADE merely states that tests should be undertaken by UKAS-Accredited or ANC-registered testers. Some BCBs regard this as advisory only, and will accept tests from testers with no accreditation or evidence that they are in fact undertaking the tests properly. Some of the resulting test reports are so badly flawed as to be worthless. Apart from the obvious problems of quality and consistency, this clearly goes against the principle of the Regulations and increases the possibility of corruption.

iii) The most serious problem is the failure of some BCBs to require pre-completion testing (or Robust Details Registration) at all. We have clear evidence of this in a small number of local authorities in England and Wales. We have attempted to address this either directly with the local authorities or through CLG, and the reply that we have consistently received is that local BCBs have the discretion to interpret ADE as they wish. As a result, residents in some local authorities have to cope with sub-standard sound insulation. This "postcode" approach to compliance with national regulations is illogical and unsustainable.

We believe that these issues could easily be resolved by issuing clear guidance from CLG to all building control bodies, of the sort recently issued by the DCSF about the interpretation of Building Regulations applicable to schools.

We would stress that many BCBs are very conscientious and efficient in their approach to ADE, but the failings of a significant minority detract from the overall success of Part E. It is clear that allowing BCBs more power to interpret the regulations locally would result in greater inequality and less consistency, with a resulting cost to residents and to the industry as a whole.

3 Acoustics of Schools

Note - For clarity in this section we will use the term "Acoustics" to include noise levels and sound insulation as well as room acoustics.

3.1 Background

Prior to 2003 there was no building regulation regarding acoustics of schools, and such guidance as had been issued was neither widely known nor enforceable. Following numerous studies such as those by Shield and Dockrell, the DfES Schools Building unit identified that high noise levels, poor sound insulation and inadequate room acoustics had a serious detrimental effect on academic achievement and teachers' health in a large proportion of existing schools [7]. Given the government's commitment to a very large programme of school building and refurbishment, the DfES therefore commissioned and published, in Building Bulletin 93, minimum standards for acoustics of schools, and ODPM introduced a specific building regulation to enforce these minimum standards.

Building Regulation E4 therefore states: "*Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use"*. Part E States *"In the Secretary of State's view the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in Section 1 of Building Bulletin 93 The Acoustic Design of Schools.*"

The usual procedure for compliance is for a building regulations submission to include a report from an acoustics consultant, identifying the acoustic criteria applicable in each room and containing evidence that the proposed design is expected to meet these criteria. The degree of detail required, and the extent to which these requirements are enforced, can vary substantially between Building Control Bodies but in general the need for an acoustics report does at least ensure that acoustic design is considered by the client, contractor and design team. We believe that this requirement should remain, as a review of the building construction at the design stage is the only cost-effective way of ensuring that the design is capable of meeting the acoustic criteria. The cost of such a report is minimal as the acoustic design has to be undertaken anyway.

3.2 The need for testing on site

A design review alone is not, however, adequate in the absence of a requirement for pre-completion or post-construction testing. BB93 recommends that contracts should include provision for PCTs but this is not a requirement. Testing is therefore undertaken only where required under a contract, to obtain optional BREEAM credits or to investigate complaints. Our experience is that many schools do not achieve the regulatory standards due to poor workmanship, late design changes or in some cases a deliberate decision to omit acoustic elements late in the construction process. You will be aware of recent well-publicised cases where prestigious BSF schools and academies have been judged acoustically unfit for purpose by failure to implement the acoustic designs. Recent case studies commissioned by PfS have identified that these are not isolated cases [8,9] and from the available evidence it seems likely that between 30% and 50% of recent large school and academy projects do not meet the minimum standards set out in BB93.

Pre-completion testing is the only demonstrable method of ensuring full value is being gained from the significant investment in capital expenditure on schools. In 2009, the DCSF and CLG jointly undertook and substantial review of BB93 with considerable help from the Association of Noise Consultants and the Institute of Acoustics. A revised version of BB93, including stronger recommendations or requirements for pre-completion testing, was drafted over a year ago but has not yet been published. Shortly before the demise of the BSF programme, however, PfS announced that as a condition of funding, all BSF projects would require acoustic pre-completion testing and remedial works where such tests showed failure to meet the acoustic design standards. We believe that the same condition should be imposed on all construction projects for new schools and academies.

The ANC Schools Committee regularly meets to discuss matters in relation to the practical application of acoustics in schools. Members of the Committee are in regular dialogue with PfS and BRE and take a proactive stance on the continual improvement of school design and implementation. One of the current activities of the Committee is to compile a set of Frequently Asked Questions on the ANC website in relation to the interpretation and application of BB93. We are also preparing a Best Practice Guide for acoustic testing in schools, to enable our membership to have a consistent approach to testing; we would be happy to discuss this guide with your specialists with a view to putting it forward as part of a regime for future mandatory testing.

Good acoustics are imperative in all types of educational buildings including academies and conversions of properties for Free Schools which may be established. We are committed to increasing acoustic standards in schools so that they are an effective and inspirational teaching and learning environment for all stakeholders. We would be pleased to assist with a full technical review of the issues required to achieve the desired standards and our representatives would be willing to meet with you to consider this in more detail. Please do not hesitate to contact us if you would like to set up a meeting to discuss these issues.

Yours sincerely

Adrian James FIOA

Consultation Co-ordinator

References

[1] A James, “Sound insulation testing on site - ISO 140 and the ANC Good Practice Guide” Proc IoA, Vol. 29. Pt.3 2007

[2] I C Critchley, P R Dunbavin “Joint ANC/RDL Round Robin on Uncertainty in Sound Insulation Measurements.” Proc IoA, Vol. 29, Part 3, 2007

[3] P Dunbavin, “Round Robin and ISO 140 technical issues”. Proceedings of ANC Conference on Sound Insulation Measurements in Residential Building, Birmingham, October 2007

[4] I Critchley, “An empirical study of the effect of the presence of the tester when measuring airborne sound insulation – a joint research project by the ANC and BRE”. Proceedings of ANC Conference on Sound Insulation Measurements in Residential Building, Birmingham, October 2007

[5] RICS Building Control, July – August 2008.

[6] Irene van Kamp, Hugh Davies, “Environmental noise and mental health: Five year review and future directions”. 9th International Congress on Noise as a Public Health Problem (ICBEN) 2008.

[7] Mukund Patel, Head of DfES Schools Building and Design Unit, “Acoustics in School Design”, Conference on School design, University of Exeter 2002

[8] “Case study evaluations of the influence of BB93 on the acoustic design of school buildings”. Mike Wood, University of Exeter. Proc IoA, Vol. 32 Pt 3, 2010.

[9] Andrew Parkin, “BB93: past, present and future”. Proc IoA, Vol. 32 Pt 3, 2010.