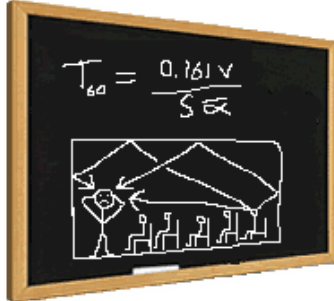




Building Bulletin 93: Acoustic Design of Schools



In July 2003, acoustic design guidance for schools given by Building Bulletin 87 was replaced by the **acoustic design requirements** of Building Bulletin (BB) 93: Acoustic Design of Schools, which is enforced under Requirement E4 of the Building Regulations Approved Document E 2003.

Acoustics has hence become a driver for many elements of new school projects. Therefore, the strict requirements and significant design implications of BB93 should be considered at an early stage.

A BRIEF EXAMINATION OF THE REQUIREMENTS

SECTION ONE Answer ALL parts

Q1. Indoor Ambient Noise Levels

Clear communication of speech between teacher and student, and between students

BB93 contains strict limits for indoor ambient noise levels in teaching spaces, which vary according to the proposed function and hence sensitivity of each room.

The noise level limit for a typical classroom equates to a typical bedroom at night and is based on the noisiest 30 minutes during a school day.

The imposed noise limits could therefore be considered more stringent than those for most residential or office projects.

Q2. Internal Sound Insulation

To attenuate airborne sound transmitted between spaces, via walls and floors, and impact sound transmitted into spaces, via the floor

BB93 uses the likely activity noise and noise tolerance (sensitivity) of the various school room types to specify the level of sound insulation required of separating walls and floors.

The airborne and impact sound insulation requirements may therefore vary significantly throughout a school.

Q3. Reverberation

Suitable reverberation time control for clear communication between teacher and student and for music teaching and performance

BB93 contains mid-frequency reverberation time criteria which differ throughout a school according to the function of the various room types.

Much like Requirement E3 of the Building Regulations Approved Document E 2003, reverberation time control in the common parts of school buildings (corridors and stairwells) is subject to assessment under BB93.

LESSONS LEARNT

The requirement to satisfy BB93 indoor ambient noise level limits while providing sufficient ventilation to teaching areas often makes simple natural ventilation solutions (e.g. open windows) impractical.

A room which generates a "Very High" activity noise located next to a room of "Very Low" noise tolerance leads to an exceptionally stringent sound insulation requirement leading to, for example, an isolated room-within-a-room.

Reverberation time control requirements can usually be achieved in most types of classroom through the use of a suitable acoustic suspended ceiling. However, the exceptionally onerous requirements for large spaces, such as assembly halls and gymnasia, often lead to the incorporation of large amounts of acoustic absorption on the ceiling and wall surfaces.

Rooms for Teaching the Hearing Impaired

All BB93 criteria become **significantly more onerous** for rooms designed specifically for teaching the hearing impaired.

Open Plan Teaching

Good speech intelligibility in open plan teaching spaces is crucial to clear communication between teacher and student, and between students.

BB93 contains stringent speech intelligibility criteria for open plan spaces, dependent on the room reverberation and background noise level. Both of these requirements are affected by the level of acoustic absorption (e.g. suspended ceilings) in the space.

Open plan spaces are generally designed for high flexibility in terms of the layout of teaching and study spaces, making the assessment of speech intelligibility complex.

Rain Noise

In the absence of a current British Standard for rating constructions for rain noise transmission, particularly for lightweight roof structures, the current BB93 presents preliminary guidance for rain noise levels in teaching spaces.

Rain noise levels can reach up to 70dBA internally, which in a classroom with a background noise level of 35dBA is hardly conducive to good speech communication!

The composition of lightweight roof constructions should therefore be considered at an early stage.

Demonstrating Compliance with Building Control

Compliance with BB93 requirements can be demonstrated to the Building Control Body via the submission of a set of plans, construction details, material specifications and acoustic calculations comparing the following with BB93 requirements:

- ◆ predicted internal noise levels in teaching spaces
- ◆ predicted sound insulation values to be achieved between spaces
- ◆ predicted reverberation times in teaching spaces
- ◆ details of proposals for acoustically absorptive finishes in circulation spaces.

Building Bulletin 101: Ventilation

The forthcoming BB101 aims to reduce the conflict between school ventilation requirements and the indoor ambient noise level limits of BB93.

The document is to propose a useful relaxation of the internal noise level limits requirements for teaching spaces that are ventilated in accordance with The Education (School Premises) Regulations 1999.

Environmental Noise Impacts

Consideration should be given to the suitable location of external teaching spaces and noisy teaching rooms (e.g. music rooms), to avoid adverse noise impacts on noise sensitive areas surrounding a school.

DOs & DON'Ts

- ◆ **DO** include a suitable acoustic suspended ceiling and, where possible, carpet in all teaching rooms and circulation areas.
- ◆ **DO** allow for significant areas of acoustic absorption on the walls and ceiling of all large halls and gymnasias.
- ◆ **DO** use ancillary spaces and large halls to screen noise sensitive teaching rooms and school areas from external environmental noise.
- ◆ **DO** consider the implications of BB93 at an early stage.
- ◆ **DON'T** locate noisy rooms adjacent to noise sensitive rooms.
- ◆ **DON'T** naturally ventilate teaching rooms near to roads, railways or airports.
- ◆ **DON'T** incorporate interconnecting doors in walls between teaching spaces.
- ◆ **DON'T** use moveable partitions between music rooms, drama rooms or halls.

Hann Tucker Associates, the leading independent UK acoustic consultancy, can provide all the necessary professional advice and assistance on Building Bulletin 93: Acoustic Design of Schools.

By using the specialist knowledge and expertise Hann Tucker Associates has gained over 30 years of successful acoustic consultancy, suitable cost effective solutions can be provided to ensure satisfactory design solutions are achieved.

Hann Tucker Associates

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