

Technical note No 40

Sound environment behind a building envelope

This Technical Note is one of four on building envelope acoustics. The series comprises:

- TN 37 Introduction to building envelope acoustics*
- TN 38 Acoustic performance of windows*
- TN 39 Sound transmission through building envelopes*
- TN40 Sound environment behind a building envelope*

This Technical Note is not a guide to the acoustic design of rooms. It provides guidance on the influence of the room on the envelope performance.

Introduction

This Technical note deals with the sound environment in a room behind a façade. It considers sources of sound external to the room, sound sources within the room and sound absorption within a room.

Sound may also be transmitted into a room from an adjacent or remote room as structure borne sound, for instance the sound of tapping on a mullion or transom in another room.

The reader should be familiar with Technical Notes 37, 38 and 39 in order to apply the advice given in this Technical Note.

Principles

The sound environment in a room will depend on:

- Sound sources external to the room,
- Sound sources within the room,
- Sound absorption within the room

The façade will contribute to the acoustic quality of the room by:

- Limiting direct airborne sound transmission from the external environment,

- Limiting air flanking transmission between the room and adjacent rooms,
- Modifying the sound absorption of the room.

Glass screens and lightweight walls are generally more flexible, and absorb more sound than heavy and rigid surfaces such as concrete floors or walls covered with a dense plaster.

Glass screens and lightweight walls are lighter than other forms of construction and having less mass transmit more sound than heavier constructions.

The acoustic performance of a façade and the acoustic environment within a room depend on the frequency content of the sound sources involved. Analysis of either should be undertaken by considering the performance at each octave (or preferably third octave) band (TN 37).

External noise

Transmission of sound through the building envelope is described in TN 39. One way of reducing the sound levels due to external sound is to improve the apparent sound reduction index of the facade.