

# SOUND REDUCTION IN BUILDINGS: MODELS AND MEANS TO REALIZE REQUIRED ACOUSTIC QUALITY

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## 1. INTRODUCTION

Protection against noise in and around buildings is one of the important aspects of a healthy living environment. During the last 50 years annoyance by noise from neighbours has been an important item, while the last 30 years the increasing traffic noise has become at least as important. After a historic overview of the developments along a Dutch time-scale and the relevant acoustic requirements for buildings, the focus will be on the available design models for building acoustics and the various tools and means needed to realize a required quality.

## 2. ASSESSMENT OF QUALITY

The acoustic quality is determined by the received sounds from sound sources in and around buildings, after transmission through the building. Focusing just on the transmission is logical, since it is the only part that can be influenced by designers and builders, but it misses the goal of protecting people from the noises in their (living) environment if it is not embedded in a total concept. A global model for the subjective assessment of sound levels in the living and working environment in a building will be described, using also the results of social surveys, from which concrete requirements for all relevant aspects can be derived:

airborne sound, impact sound, sound reduction by facades and sound levels due to service equipment.

## 3. DESIGN MODELS

Since buildings are less and less just a copy of an already realized one, experience is insufficient and an adequate design and building process is required to realize quality. So we need at least design models to estimate the performance of new building designs and construction changes. The activities following from the European Directive on Building products,

CPD, within CEN lead to further cooperation in the field and eventually to the EN 12354 series of European standards describing the basis for such design tools. Five parts have been published already and during this year a draft for the last part on sound due to service equipment has been published. In various countries research is going on, focused on the application of EN 12354 or extending its field of application, for instance to more lightweight structures. Background and applications of these models will be discussed and illustrated

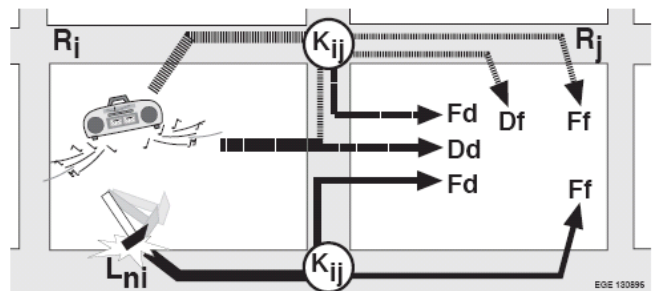


Figure 1. Transmission paths between rooms for airborne and impact sound transmission.

## 4. TOOLS TO REALIZE QUALITY

Modelling is one thing but to realize the quality more is needed, like adequate product information and practical guidelines for builders and designers. Also example projects are useful to demonstrate that a certain acoustic level can be realized or a newer technique can do the job. Besides predictions to improve the design, measurements to verify the building process and to illustrate and educate are needed. Finally, it would be a good thing if at the end the builder not only promises quality but actually guarantees it. And that of course can only be done if the builders can trust the design and its own process. Acoustic labeling of dwellings is than a logical next step to improve the information to consumers.