EXAMENSARBETARE SÖKES!

DEVELOPMENT OF FINITE-ELEMENT MODELS TO PREDICT IMPACT SOUND INSULATION

BACKGROUND

Dissatisfaction of dwellers due to impact noise is a common problem often encountered in wooden multi-storey buildings nowadays. Such problems could be lessened by addressing vibroacoustic issues during the design phase of buildings if proper prediction tools were available for the engineer. Unfortunately, product development nowadays is still carried out in the aftermath of the construction based on engineers' experience and measurements performed on already existent buildings; due to the difficulties involved in predicting vibroacoustic behaviour of such constructions. The substitution of measurements by easy-to-use numerical predictive models, however, must take place only after those have proven to possess enough accuracy for the predictions carried out. Along those lines, proper modelling of the excitation sources, the structural element involved (e.g. floor) as well as accurate modelling of the rooms is needed.

AIM

The objective of this master thesis is to investigate and develop improvements for numerical tools (using the finite element method) for purposes of prognosis. More specifically, focus is put into description of the loads involved (e.g. walking loads, the standardised ISO tapping machine used as impact excitation source for evaluating step sound insulation according to the ISO standards, etc.) as well as on the description of the sound pressure field of the receiving room (i.e. absorption, etc).

General simplified guidelines for creating finite element prediction tools are to be proposed. Ultimately, a prediction tool combining the knowledge stemming from the investigations performed will enable the determination of the standardised single number acoustic ratings obtained from measurements. By use of them, acoustic comfort could be address during the design phase of buildings without having to spend that much money and time in performing measurements and building mock-ups.

SUPERVISOR

JUAN NEGREIRA *PhD*
Div. of Engineering Acoustics, LTH

EXAMINOR

DELPHINE BARD *Associate Prof.*
Div. of Engineering Acoustics, LTH

CONTACT

JUAN NEGREIRA
juan.negreira@construction.lth.se

DIVISION OF
ENGINEERING ACOUSTICS
Lund University, PO Box 118,
SE-221 00 Lund, Sweden

www.akustik.lth.se