EXAMENSARBETARE SÖKES!

PREDICTING STRUCTURE-BORNE SOUND

BACKGROUND

Since noise exposure can disturb the well-being, acoustical comfort in the built environment is of great importance when constructing new dwellings. Population growth causes densification of cities, which together with space limitation issues, lead to buildings being constructed closer to existing vibration sources such as motorways and railways, and vice versa. At the same time, architectural trends, environmental benefits and cost result in increased use of lighter materials such as wood and hollow-core concrete slabs. Lightweight structures make the achievement of acoustical comfort in dwellings an increasing challenge.

A major issue when designing buildings regarded as acoustically pleasant, especially in the low-frequency range, is the lack of reliable prediction models to be used during the design stage of the building. Predictions of structure-borne noise are nowadays mostly made based on measurements performed on existing buildings and engineers' experience. Hence, it is of interest to develop tools (e.g. computer models) that could adequately predict noise and vibrations. The computer models developed for that purpose could combine and couple different numerical methods, e.g. the Finite Element Method and Statistical Energy Analysis, and they may also use measurement data as input.

AIM

The aim of this Master's Thesis project is to investigate and develop numerical models that could be used in the early design stage of structures (e.g. buildings, tunnels), specially aimed at predicting structure-borne noise in railway tunnels. With such tools, one could address vibration and noise issues as well as undertake mitigation measures before the structure is constructed. The tools will also enable time and cost savings for the building industry in terms of less retrofitting and wiser selection of design solutions.

SUPERVISOR

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

CO-SUPERVISORS

PETER PERSSON *PhD*
Div. of Structural Mechanics, LTH

CRISTIAN SJÖVIND
Sweco AB

EXAMINOR

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

IN COOPERATION WITH

SWECO AB

CONTACT

JUAN NEGREIRA
juan.negreira@construction.lth.se

DIV. OF
STRUCTURAL MECHANICS and
ENGINEERING ACOUSTICS
Lund University, PO Box 118,
SE-221 00 Lund, Sweden

www.byggmek.lth.se

www.akustik.lth.se

TAxs06 (2016)