

Master's Dissertation at the Div. of Engineering Acoustics



Jimmy Claesson

SIMULATION OF THE HUMAN FOOTSTEPS INDUCED FLOOR VIBRATIONS

Presentation

Summer 2008

Report

will be published as report TVBA-5038

Supervisors

Delphine Bard, *PhD*

Div. of Engineering Acoustics, Lund

Julia Sonnerup, *Postgr.Student*

Div. of Structural Mechanics, Lund

Kristian Stålné, *Postgr.Student*

Div. of Structural Mechanics, Lund

Examiner

Göran Sandberg, *Professor*

Div. of Structural Mechanics, Lund

The work is performed at

Div. of Engineering Acoustics,
Faculty of Engineering,
Lund University

Background of this project:

In the traditional prediction calculations for the purpose of building acoustic design, the footsteps induced impact excitations are always simulated in a frequency range under 500 Hz. The trend of the modern building construction strives after simple and functional solutions for the multi-family dwellings. The tenants want to have a quiet living environment as if they are the only family who lives in this building; this demand gives a number of difficulties in the acoustic design.

To be able to estimate an impact excitation of the human footsteps induced in the acoustic calculations with less possible simplification, a statistical investigation of the geometrical walking pattern is needed. The step length and the footfall's angles are the main target. With the help of the measurement values, a comparison test of the deflection will be performed on two different floor structures, the standard concrete floor and the light weight wood floor with the help of a Finite element soft ware, Msc MD Nastran 2006.

Task descriptions

1: Investigate the geometrical human walking pattern with a broad range of the walking objects.

2: Estimate structure vibration pattern for two floor structures, the concrete floor and the light weight wood floor.

3: A general acoustic insulation design guideline of human footsteps induced excitations.



LUND
UNIVERSITY