A PROPOSAL OF A MASTER PROJECT IN BUILDING ACOUSTIC AND STRUCTURE DYNAMICS:
STATISTICAL INVESTIGATION OF HUMAN WALKING PATTERN

Introduction to the project
There is a correlation between the weight, the size of the shoes and the height of the human, the walking impact load in both the vertical direction and the transverse direction for a male. The limitation of the gender depends on the fact that there does not exist a female walking load as a function of height and weight, due to the complex mass distribution of female bodies. However a statistical investigation of the human walking pattern in an arbitrary room with a finite size has not yet been done. The statistical investigation can lead to a reliable construction of a Brownian motor that simulates a reliable human walking pattern. Together with the known impact load in three directions, a human walking induced structure vibration prediction model for a lightweight timber floor can be constructed. Two scientific articles have outlined the main essence of the human walking impact load as a function of mass and height [1, 2]. With the help of all the experimental measurement values, a Brownian engine can be constructed [4]. The basic principle of the Markov chain can be found in a number of different literatures in mathematical statistical calculations [3]. This statistical method will give a reliable prediction model of the human walking induced load vector as a function of time, spatial variables and human characters.

Task
- Investigate the human walking time history statistically
- Investigate the human walking angle and the length of steps
- Investigate walking pattern in an arbitrary room
- To calculate the expectation values and the corresponding variance of the human walking steps and step angles with the help of the a statistical calculation code where the basic linear regression analysis is assumed.
- To construct a human walking pattern, with the help of a Brownian motor code.
- To calculate the human walking induced time history with the help of Finite element software, MD Nastran 2006.
- To extract the transverse deflection of the floor structure in the post-processing to be able to calculate the flexure wave sound radiation.

References