

A MEASUREMENT METHOD FOR DETERMINATION OF STRUCTURE-BORNE NOISE SOURCE FOR BUILDING SERVICE EQUIPMENT

Krister Larsson

SP Technical Research Institute of Sweden
Acoustics Laboratory
Box 857, SE-501 15, Sweden
Krister.larsson@sp.se

Christian Simmons

Simmons Akustik & Utveckling AB
Krockslätts fabriker 1,
SE 431 37 Mölndal, Sweden
info@simmons.se

1. INTRODUCTION

Structure-borne sound from building service equipment is today one of the major issues for the development of new products for that. Structure-borne sound is in many cases the source of noise problems indoors in modern buildings. These problems might increase in the future because of the increased use of light-weight wooden structures, where normal sound insulation becomes complicated. Experience shows that additional insulation on light-weight wooden floors may even increase the structure-borne sound transmission to the supporting building structure. The lack of reliable source data and prediction methods has the consequence, that constructions are not optimized but either exaggerated or underperforming. The expense of these linings has been estimated to more than 0,1 million EUR in each of some common dwelling houses built in the last 5 years. This cost can be reduced considerably with improved solutions near the sources, i.e. vibration insulation. However, for practical and safety reasons, such solutions must be developed and integrated by manufacturers and must not be added at the building site.

There are no existing standardised methods to determine structure-borne source strength and to predict the propagation and radiation of sound in nearby rooms, although some drafts exist (prEN 15657-1, prEN 12354-5). This is a major drawback for the manufacturers of building service equipment such as HVAC systems, elevators, laundry machines, sanitary equipment and kitchen furniture.

The goal of this project is to develop a robust method to determine structure borne sound emission of building service equipment with acceptable measurement uncertainty, to be used in the laboratory as well as in the field.

2. MEASUREMENT METHOD

The proposed method is based on a comparison method using the tapping machine as a reference sound source. The vibration response in the floor is measured in positions distributed over the test floor. The idea is to use the vibrational response from the tapping machine to determine the properties of the reception structure. This information is used with the vibrational response from the test object to determine the structure-borne sound power level.

3. PRELIMINARY RESULTS

Figure 1 shows an example of preliminary results from measurements performed at SP.

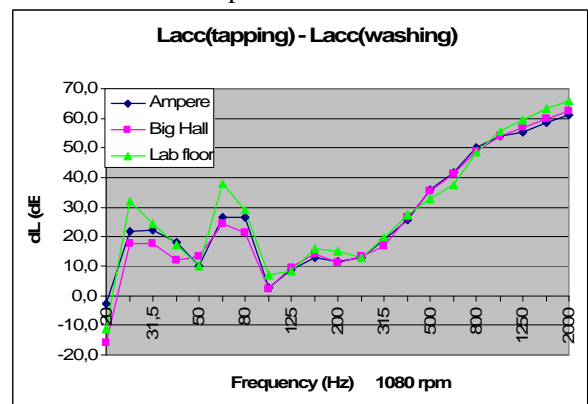


Figure 1. *Difference in acceleration levels between a washing machine and a tapping machine on three different concrete floors at SP.*

Further results will be presented at the conference. The measurement method will be published as a NT method.

4. ACKNOWLEDGEMENT

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