

M. Sc. Thesis – psychoacoustic evaluation of noise from metro trains

An increasing part of all transport will have to run on rails in the years and decades to come. The two most important reasons for this are as follows:

- Railbound transport is much more energy efficient than cars and airplanes
- Railbound transport takes up much less valuable space than cars and airplanes

There are, however, some challenges to railbound transport as well. Brekke & Strand akustikk runs a continuous research project about noise and vibrations from metro trains and trams. The M.Sc. thesis assignments we offer are parts of this research project. We now offer a double M. Sc. thesis assignment. Two students can take the whole double assignment together, or one student can select or take either one of the assignments. The M.Sc. assignments are designed to understand our understanding of the relation between:

- The standard parameters for high noise levels in prediction models and regulations, $L_{pAF, \max}$ or L_{A95} AND
- Perceived noise by listening tests (Gothenburg) or by comparison between $L_{pAF, \max}$ and well-known objective psychoacoustic parameters (Oslo)

Part I – listening tests and perceived rating of noise from metro trains

Place: Gothenburg (recommended)

Mentor: Dr. Alice Hoffmann

The assignment starts with making calibrated artificial head recordings of noise from metro trains. The recordings should be made in Oslo, but the rest of the assignment should be carried out in Gothenburg. The student should perform a set of listening tests to analyze the perceptual characteristics of metro train noise to find a set of psychoacoustic parameters that can be used to rate train noise. Further the results of the listening tests should be related to existing calculation models for the tested parameters as far as possible.

Part II – comparison between $L_{pAF, \max}$ and objective psychoacoustic parameters for noise from metro trains

Place: Oslo (recommended)

Mentor: Dr. Sigmund Olafsen

This assignment is based on our large database of measurements of noise from metro trains. We have a number of calibrated recordings of metro train passages. These recordings are made in one or two independent channels intended for noise measurements. It is strongly recommended that the students also makes some recordings to get the feeling of the noise from metro trains.

The main task of this assignment is to compare the rating of events between:

- $L_{pAF, \max}$ on the one hand AND
- Loudness, sharpness and roughness on the other hand

General information

Brekke & Strand has a long tradition of receiving M.Sc. students. We offer all our students:

- A desk in our offices
- Access to required instrumentation
- Free lunch (Oslo only), tea/coffee/soft drinks
- Daily supervision by a person who takes on students because he or she wants to. You can choose between formal mentor meetings, drop in like “my door is always open” or both.
- Computer and software. Most of our students have had their own laptop which they’ve used. For special software or hardware requirements we’ll give you access to our licences as required.

We have so far had students from NTNU, Chalmers and DTU doing most of their M.Sc. thesis work in our offices. We’ve also had some cooperation with LTH, NMBU and Tsinghua. Students from these or any other university are welcome.

Our offices in Oslo and Gothenburg can currently give a complete offer to our students.

You may write your thesis in English or any Scandinavian language. However, some universities require English, and we also recommend using English as the M.Sc thesis may be used as a foundation for later international publication.