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Summary:

Assessment of annoyance caused by vibrations in dwellings

While a range of international standards defining noise, vibration and other environmental measures have been established, standards or methods for measuring people's reactions to these same environmental effects are lacking. This lack of standards and common methods reduces the comparability of prevalence statistics and exposure-effect relationships developed by different researchers and in different countries.

It is therefore difficult to assess from results obtained elsewhere what effect vibrations in dwellings from passing trucks, trams, subways and trains have on people and what limits and guidelines for vibration exposure should be. This again results in inferior tools for deciding when to allow new infrastructure or dwellings to be built, and when not, what impact different efforts to reduce vibrations will have etc.

In connection of the development of a new Norwegian Standard NS 8176 defining a new vibration exposure measure, The Institute of Transport Economics in co-operation with the University of Gothenburg, Department of Environmental Medicine was also given the task of suggesting at new Nordic Method for assessing vibration annoyance. The Nordic countries have a common interests and outlook. This is a good basis for establishing a common Nordic Method and the work with the proposal has indeed shown that researchers from the Nordic countries think alike with respect to the methodological issues involved. This has produced a good foundation for a Nordtest Method and inspires confidence in that it will be applied for future socio-vibrational surveys.

Part I of this report describes the work that has preceded the proposed Nordic Method. It consists of three chapters. The first chapter describes the background for the project. The second chapter describes the results of a comparative study of two socio-vibrational studies, while the third chapter describes some of the choices that lie behind this proposal for a new Nordic Method.

The Nordic Method presented in Part II of this report, is an effort to establish a standard way of assessing people's annoyance with vibrations in dwellings from road and rail traffic by means of socio-vibrational and social surveys. It draws heavily on concurrent efforts within the ICBEN and Internoise communities for standardising the measurement of environmental noise annoyance in residential areas. Many researchers and research group working with socio-acoustic surveys have made substantial contributions towards the establishment of national and international standards. Many of the issues of importance in noise annoyance assessment are also of importance when conducting socio-vibrational research.

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There are also reasons for not going to far with respect to the degree of standardisation. The countries are culturally different, utilise different annoyance concepts and different languages. The organisation of research and survey practices also vary between the countries. Established practises and compatibility issues with respect to previous local research are thus important counter arguments against too detailed standardising of socio-vibrational surveys.

This Nordic Method deals therefore only with the most important elements that are necessary for results from a socio-vibrational study to be compatible with results from others. The issues that are important are

The sampling considerations, that will vary depending on whether the survey in question is for developing exposure-effect relationships or before-after studies.

The annoyance questions, where only a verbal annoyance question is required. Both a version utilising a filter question and an unfiltered question is allowed. In addition the proposal contains an optional question utilising a numeric 11 point scale from 0 to 10. "Do not notice the vibrations" is the low anchoring point for both the verbal and the numeric annoyance question. The proposal also contains a question about changes in the vibration load for use in before-after surveys..

The survey description, that is to be produced in the form of a textfile and not a report. The report describes the survey, survey procedures, the questionnaire, the survey sites, and other information.

The specification of a survey data file output: When possible the data material can be made directly available for the interested researcher. When this is difficult the researcher in charge of the survey data may accept requests for the results of specific coding and statistical analyses from fellow researchers. The specified format will make such requests easier to define and easier to comply with.

Other parts of the design, conduct, content and reporting are left to the researchers discretion.