



**IMAGINE Rail Noise Sources (WP6) Workshop
1 December 2005
Notes of the discussion session**

Part I: Questions from the audience to the Imagine WP6 members.

Part II: Questions from Imagine to the audience.

Part I: Questions from the audience to the Imagine WP6 members

Q1: What level of confidence would be valid if the Imagine default values for rolling stock are used in the UK?

A1: The level of confidence is different for each situation. It depends on the differences between the track and rolling stock characteristics of the Member State, and the characteristics of the location where the default data was measured.

A2: The default data is rather global in its nature. It is based on what we have available. We cannot tell exactly how it compares with the UK situation.

A3: There will be example measured data from the UK (West Coast Main Line).

Q2: There are 3 user entry levels of expertise for the database. What's the influence of these levels on the accuracy?

A: Inaccuracy is caused by the decision of the user to choose certain default values from level 0 or 1. For every track-vehicle combination the accuracy of default values will be different.

See also Q1.

Remark 1: The level of inaccuracy is less important for the definition of hot spots, but Level 2 accuracy is preferable for action planning

Remark 2 (D Delcampe, European Commission): It is important to clarify the way appropriate accuracy is chosen and how these levels are used, in the guidelines

Q3: Trans-European vehicles should be in the database so every MS uses the same data for the same vehicle. How will databases be maintained?

A: (later in the proceedings). Imagine will deliver the database framework, example data and default data to the Commission. It is the Commission's decision as to how these will be managed subsequently.

Q4: Is track gauge being taken into account?

A: The rolling noise model would be similar for all track gauges, but no we have no default data yet for gauges other than standard European.

Q5: Are default values given for mitigation measures?

A: The current transfer functions are defined for most common track types. There are no default values for mitigation measures, but the structure of the model is such that mitigation measures can easily be included.



Q6: How do you deal with bridges and viaducts?

A: Bridges and viaducts can be included as special track types in the database, but there no bridge default or example values yet. Imagine may be able to incorporate some default values for standard bridge types, but this could be dangerous as every bridge is different.

Q7: How do you include roughness variations over time?

A: This is a modeller's choice. Roughness depends on local factors (maintenance, rolling stock, brake types, etc.). The guidelines should help with this question. For large mapped areas average levels could be used. For local action planning purposes more accurate data is necessary.

Q8: If we would like to judge if the default data is good for our situation, we need detailed default data. Will this be part of the database?

A1: You can tune the data. If you want to validate it, you have to carry out measurements. eg. performing pass-by measurements.

A2: You cannot expect everybody to measure everything very accurately, so you can start right away with mapping using the Imagine database, and later on you can refine it with measured data.

Q9: If I use the default values, what are the errors that will arise?

A: A good estimate of the roughness is important. It can cause more than 5 dB error. For traction noise the defaults give very rough examples.

Q: Will this info be included in the guidelines?

A: Yes.

Comment: The conditions under which default data has been generated must be clear in the database. If you don't come up with detailed info on how the default data were assessed, ie under what conditions and with what error, the data will not be useable.

Q10: How to handle a tunnel-exit?

A: It is a propagation issue, not included in Imagine WP6.

Q: OK, but guidance is needed.

A: Agreed, but it's not the task of WP6 to come up with full guidelines for mapping.

Q11: Has the method to measure rail roughness been improved?

A: Ways to measure wheel and rail roughness were described in Harmonoise. The methods are practical so it can be measured in one day. AEA UK has a system for network-wide roughness quantification, while TNO apply an indirect roughness measurement system based on track vibration to acquire local roughness.

Q12: Will it be possible to estimate source data of new train types?

A1: That is one of the benefits of the model: You can build a train from its elements by picking out different elements of the complete train from the database.

A2: This is Level 1 in the database.



Q13: Squeal other than that from curves can be of relevance.

A1: In some countries curve squeal is included as a factor in the prediction model.

A2: Squeal is a very difficult phenomenon to model with confidence at a specific site, because it is a function of many different parameters. Its generation has been modelled in theoretical studies, but this does not help in providing robust predictions as to when it will occur and with what spectral and temporal characteristics. One important factor influencing its occurrence is the presence or otherwise of water acting as a lubricant, either through the humidity of the air or from rainfall. Squeal is much more likely to arise in warm, dry, conditions. Default values will be provided by the Work Package for different curve radii, but these are, of necessity, very generic and simplified in character. It is therefore preferable to measure the level and character at the site in question, whenever possible.

A3: The solution that we suggest for dealing with the intermittent nature of the occurrence of squeal is to consider its level when it does arise, and then provide a statistical probability of that occurrence. We propose a default probability of 50% of the time, hence a reduction in 3dB compared with measured or predicted values.

Q14: What length of track produces the squeal?

A: The experience of the modeller is needed because the relevant length of the track depends on the curve.

Q15: You must ensure that all Imagine's good ideas are implemented well in the software. Software developers should be involved.

A (D Delcampe): The Imagine Consortium should carry out consultation with the end users, especially regarding software design and input data. We need to understand the factors that drive the system and the quality of the end results. Clear questions need to be asked and views need to be sought to help the Commission develop its guidelines.

Q16: Are the differences in braking noise for very high speed trains and normal high speed trains taken into account?

A: Two basic models for braking noise are included at different speeds. If it's different the noise has to be measured. Modelling this source will hopefully encourage manufacturers to address the problem.

Q17: Is the trailing load for freight trains taken into account?

A: 5 x locomotive weight is required to carry out accelerating noise measurements

Q18: Are there any provisions to carry on the dialogue with the rail operators?

A: We certainly intend for it to continue.

A (David Delcampe): The Commission could help in the process. My suggestion is that Imagine people attend a future meeting of the Noise Steering Group where Member States, CER and UIC are represented, in order to seek their support for the consultation. In many Member States, authorities responsible for making railway noise maps are known now – they should have been designated by June 2005 - and should of course be the first targets of the consultation.



Part 2 - Questions from Imagine WP6 to the audience

Q1: We have included many sources. Some of them are only relevant for local situations. What does the audience think of the inclusion of all these sources.?

A: We should be careful about when we include multiple sources. For long freight trains the rolling noise is more important than traction, so then traction noise can be ignored.

A: The more info you ask people to acquire, the more people will go for the default values. Therefore it is important that the default values are robust.

A: It can be too costly to include all parameters. Default values are then important. Levels on lightly used lines will probably be determined less accurately. Too much reliance on default data can give difficulties in the action planning process.

Q: Will the guidelines give strategies on modelling choices? How do you keep track of the modelling choices so different modellers make the same assumptions?

A: Agreement at a national level is needed for this.

A: The software developers would be expected to address this.

A (D Delcampe): Software developers could ensure that the capture of metadata is possible and saved while using their software. Imagine could provide guidance on which metadata should be captured.

A: Considering the costs of all this, how much measurement do we need to have results that are accurate enough? What is the balance between using default data and acquiring your own. You should be more pragmatic.

A: One of the big tasks after Imagine is finished is to identify the most important factors in noise mapping. What are the factors that we should get right, and what are those that are not so important? It might be a problem for software manufacturers.

A (D Delcampe): ~~We should look to~~ WP1 of Imagine ~~to~~ should address this issue.

Q2: With this IMAGINE model, do you expect any improvement over your national calculation methods?

A: Complexity will lead to more potential errors which is a risk. But complexity must be understood before you can understand which simplified approach is right.

A: Models get more complex when they are developed (e.g. in the Netherlands), as improved accuracy is sought.

Q: The database is complex and too comprehensive for us. There are too many track kilometres in Germany. And what do we do with legislation? How do we solve this?



A: In NL we assume an average national track roughness. Maybe this could be applied in Germany also.

A: If you provide more parameters, we have to include more descriptions on how to use them.

A: Different modellers will often produce different results from the same model. The question is whether this can be controlled.

A (D Delcampe): Imagine could provide (input/output) data sets allowing software developers to check whether their software calculate the same results as those from the data sets.

Q3: Is there anyone who currently uses the interim methods?

From the audience only Wölfel said that they use these, but they do so widely across Europe.

Q4: What would you like to see in the final legal version of the database/ guidelines?

A: Strong guidance is needed for input data. And segmentation is a difficult subject. This needs to be discussed with WP1.

Q5: When would you like to start using Imagine? What would be the obstacles?

A: Imagine will not only be used in Sweden for mapping but also for identification of bottlenecks / hot spots. Preferably soon in Sweden.

A: It depends on national guidelines. But for Denmark the sooner the better.