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# Standardization in research and innovation projects

## Success story: transport

### ACOUTRAIN :

Virtual certification of acoustic performance for freight and passenger trains is a 3-year FP7 research project, aiming to develop procedures and calculation tools to simplify the present noise Technical Specification for Interoperability (TSI) test procedures.

The project started in 2011, with a number of possible scenarios for which a virtual test procedure could be a good alternative to real testing. ACOUTRAIN has established cooperation with the European Railway Agency to implement the results within the TSI Noise and with CEN/TC 256 for the update of EN15610 (Railway applications – Noise emission – Rail roughness measurement related to rolling noise generation). The main objective of ACOUTRAIN is to reduce time and costs of the TSI Noise conformity assessment by developing procedures for acoustic virtual testing.

[www.acoutrain.eu](http://www.acoutrain.eu)

### THE PROJECT

It is apparent that the emission of greenhouse gases must be reduced considerably to curb climate change. One strategy to reach this target is a significant expansion of the European railway sector and an increase in rail traffic over the coming decades. However, the already strained noise situation for residents living close to strategic railway lines could impede this important development. A way to facilitate the growth of railway traffic, without risking human health because of increased noise levels, is to control and limit the noise emission of railway vehicles. Currently, the Technical Specification for Interoperability (TSI) Noise for conventional rail (Ref: 2006/66/EC) sets limiting values for noise emission of new or upgraded railway rolling stock.

Although TSI Noise is strategically important in ensuring that the railway remains an attractive means of transport in the future and allows the sector to grow, it also means restrictions and increased costs to stakeholders. The conformity assessment required in the current TSI Noise is mainly based on field tests, which is often an expensive and time consuming process.

### STANDARDS: A SOLUTION FOR MARKET UPTAKE

The establishment of a procedure for acoustic virtual testing will help to reduce time and costs of the TSI Noise conformity assessment.

For a new or updated vehicle to be certified it has to be demonstrated that the noise emission conforms to the limit values of the TSI Noise. Today this is done by performing acoustic measurements on real vehicles in the field. ACOUTRAIN aims to develop a virtual test procedure, which is a more flexible and less expensive alternative to field tests. For the new procedure to be equivalent to the established one there are some requirements that should be fulfilled:

- The TSI limit value is set for predefined operational and environmental conditions as well as receiver positions. These conditions should be identical for the new virtual test procedure.
- The output result from both procedures should be equivalent. It is a prerequisite that the choice of test procedure should not affect the decision to accept or reject a vehicle.

The reliability or the standard uncertainty of both procedures should be comparable.

At the end of the ACOUTRAIN project, a noise virtual certification procedure should give rules for a reliable implementation of virtual testing within TSI acoustic certification scope. Research on virtual certification should continue to simplify business processes.

## HOW WAS THE STANDARD DEVELOPED?

Since the beginning of ACOUTRAIN, project partners established the preliminary basis of the use of virtual testing in the TSI certification process by 2 means:

- They worked on giving more clarity to the so-called “simplified method” already mentioned in the current TSI Noise. This method was proposed as an alternative process, for specific cases, compared to the full measurements required in the TSI. ACOUTRAIN partners have proposed 9 flowcharts that clarify the use of a simplified method, again for specific cases, and therefore support its use within the scope of a TSI certification process;
- They defined the first recommendations for the use of virtual testing (VT) within the scope of an acoustic certification process. These recommendations give the framework of a VT process.

The European Railway Agency (ERA) and CEN and CENELEC have been informed of the progress of the project all along during public workshops or during the ACOUTRAIN Advisory Council meetings. The ACOUTRAIN Advisory Council brings together ACOUTRAIN project partners as well as regulation, and standardization bodies such as CEN and CENELEC.

## BENEFITS OF LINKING WITH STANDARDIZATION

Standardization was a key dissemination activity for the project, and is seen as fundamental for the potential long-term use and impact of project results. Moreover the update of the European Standard EN15610 with the introduction of the wheel roughness measurement and analysis protocol developed within ACOUTRAIN represents an important step to get standardized combined measurement protocols for rail and wheel roughness. These are important input parameters to predict rolling noise. The measurement of wheel roughness is not standardized today in the same way that rail roughness is.

ACOUTRAIN project is looking forward to working on the update of the EN15610 and maybe on the establishment of new ENs in the future based on ACOUTRAIN results.

## LONG-TERM EXPECTED IMPACT

The use of ACOUTRAIN results for Railway Acoustic standards should help the railway sector to implement virtual certification and harmonize measurement protocols (e.g. wheel roughness measurement protocol) in order to speed-up the rolling stock certification process and implement faster less noisy rolling stock on the European Railway network.

Cooperation will continue with the European Railway Agency and CEN and CENELEC to implement ACOUTRAIN results:

- The work with ERA will be focused on the TSI Noise and the implementation of the ACOUTRAIN results within the TSI Noise.
- The work with CEN/TC256 WG3 will focus on the revision and update of the EN15610. It has already been agreed that some ACOUTRAIN experts will attend the future CEN meeting dealing with the revision of the EN15610.



□□ The work done within ACOUTRAIN on the wheel roughness measurement will be used by CEN WG3 to update EN standards. ACOUTRAIN partners are proud of their active cooperation with CEN WG3 all along the project life. □□

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Every project is different. The CEN-CENELEC Research Helpdesk can provide you with advice on how to include standardization in your project. Please feel free to contact us!

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