

RIVAS – A European project for developing innovative technologies for sustainable vibration reduction

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Rail is promoted as the most sustainable surface transport mode for regional and international transport both for freight and passenger movements. A specific European Union strategy is to promote rail freight transport as the most sustainable way to increase inter-member state economic activity. However, noise and vibrations, as side-effect of rail transport, are often perceived as weaknesses in rail's environmental credentials. While noise is an issue for all modes of transport, vibration is specific to rail and therefore stands out all the more as a criticism of rail transport.

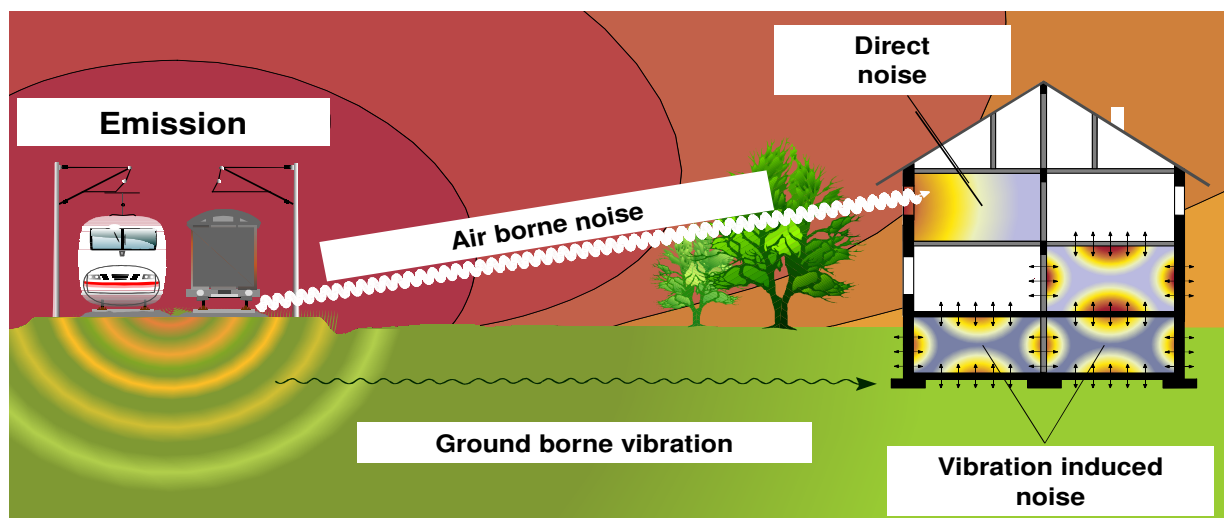


Fig.: General scheme of emission, transmission and reception of air borne noise, vibration and vibration induced noise

RIVAS (Railway Induced Vibration Abatement Solutions) is a three years lasting collaborative rail research project co-funded by the European Commission that aims at reducing the environmental impact of ground-borne vibration from rail traffic while safeguarding the commercial competitiveness of the railway sector. For several areas of concern innovative technologies shall be developed allowing for reduction of vibration in residential areas near railway lines to values to near or even below the threshold of perception. The project's goal is therefore to provide by 2013 the tools to solve vibration problems for surface lines.

26 European partners, among them infrastructure managers, manufacturers, suppliers, universities and research institutes, are led by the International Union of Railways (UIC) in order to contribute to relevant and world leading technologies for efficient control of people's exposure to vibration and vibration-induced noise caused by rail traffic.

RIVAS will focus on low frequency vibration from open lines which is a concern mainly for freight traffic. However, it can be anticipated that **RIVAS** results will also be applicable to suburban, regional and high-speed operations. The work programme of **RIVAS** includes fundamental research, prototype construction, optimisation of already existing solutions and field testing under realistic conditions. It aims to contribute to relevant and world leading technologies for efficient control of people's exposure to vibration and vibration-induced noise caused by rail traffic. These technologies will be applied to vibration 'control at source' (improved maintenance of track and wheel as well as rolling stock and track) and this scope covers propagation measures close to the track. RIVAS will also include effects at the receiver location (i.e. annoyance and exposure of residents to vibrations).

Efficient vibration mitigation requires:

- (1) a toolbox of efficient vibration reduction technologies (rolling stock /track/transmission) for a wide variety of applications
- (2) clear procedures for the assessment of the effect of vibration reduction technologies both in terms of physical parameters and human perception

This enables and simplifies the optimum choice of mitigation measures and therefore considerably decreases costs for railway infrastructure and increases the benefits for residents.

RIVAS reflects this by combining technical innovation with the development of unified measurement and assessment procedures.

Its main objectives are therefore:

- the development of technologies to reduce vibration 'at source'. The focus will be on measures that can be implemented on existing lines (retrofit). They will be applicable to
 - rail vehicle design
 - rolling stock maintenance
 - track design
 - track maintenance
 - sub-grade engineering
 - the transmission path within the railway infrastructure
- the development of cost effective test procedures including a measurement protocol to monitor and control the performance of vibration reduction measures, hence making results comparable throughout Europe
- a 'technology assessment' in terms of cost-effectiveness, safety issues, operation and potential impact on rolling noise emission.

The approach of RIVAS is novel and outstanding compared to previous activities since it integrates all relevant aspects including generation and transmission of vibration, reception of vibration and potential impact of vibration mitigation measures on noise in a single project on European level.