ΕΡΓΟ : **ΕΥΡΩΠΑΪΚΟ ΠΡΟΓΡΑΜΜΑ QUIET-TRACK (QUIET TRACKS FOR SUSTAINABLE RAILWAY INFRASTRUCTRURES), 06/2013-05/2016**

ΦΟΡΕΑΣ : ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ υπό το FP7-SST-2013-RTD-1

ΠΕΡΙΓΡΑΦΗ QUIET-TRACK is an FP7-SST-2013-RTD-1 project, under activity code SST.2013.1-1.: Railway infrastructure optimization and monitoring for further noise reduction.

This project deals with situations where the track noise contribution is important in the global pass-by noise, i.e. surface rail transport with speeds between 20 and 200 km/h. In order to obtain the highest possible impact with the resources available, Quiet-Track will focus on very effective track-based rolling noise mitigating solutions for trams, regional trains, surface metro and trains in an urban environment with direct application possibility to conventional railway tracks outside the city.

QUIET-TRACK

Consortium

AKRON · accon ENVIRONMENTAL CONSULTANTS · LIJN · IMMS · KTH · MTR Stockholm · Trafikförvaltningen STOCKHOLMS LÄNS LANDSTING · Strukton · TBT TUNNELBANAN TEKNIK · TT&E consultants · TYRÉNS

- The European Noise Directive (END) requires noise maps in the cities (including the noise coming from all surface rail transport) and action plans with solutions to reduce the noise hot spots.
- The rolling noise or wheel-rail noise is the most dominant railway noise source for vehicle speeds from 20 to 200 km/h. Below 20 km/h, the vehicle engine and ventilation noise is dominant, above 200 km/h the aerodynamic noise is dominant (high speed trains).
- For normally maintained surface rail transport vehicles (tram, regional trains, conventional trains), the track noise is dominant over the vehicle

noise.

- For most freight trains wheel noise dominates, therefore the rolling noise will not be reduced by track related measures (e.g. rail grinding has no effect on the rolling noise).
- Acoustic rail grinding is by far the most effective track-based method to reduce rolling noise for non-freight surface rail transport, noise reductions of 10 dB(A) are feasible.
- Efficient noise mitigating solutions exist along railway lines but many of these solutions (e.g. noise barriers) cannot be applied in a city (street) environment.
- Most existing noise mitigating track solutions used today (such as rail dampers) have only a small noise reduction performance (average 2 dB(A) reduction).

Concept



For the on-board monitoring of the TDR and rail roughness using sound pressure measurements, new procedures will be developed for the evaluation of an average wheel roughness and for the evaluation of the temperature dependence of the TDR. These procedures will provide more reliable input data for the simulation tools. The existing wheel-rail noise calculation models are enhanced by a better description of the wheel-rail contact behavior, which is influenced by the rail wear and by the position of the contact points (also in curves). A procedure for the low frequency noise calculation will be proposed. Quiet-Track develop strategies for optimal acoustic grinding and rail wear correction. Grinding strategies and maintenance strategies exist for rail defect removal by grinding and for track tamping but not for dedicated acoustic grinding and dedicated acoustical rail wear correction. To reach this objective, the relationship between rail wear types and noise emission will be established and a rail roughness growth model will be selected and updated. Quiet-Track also combines existing solutions for a better global performance, especially for situations where this potential is available such as concrete slab tracks where it is possible to deal independently with measures at the rail (e.g. damping) and at the track surface (e.g. absorption). Quiet-Track focus on new and innovative solutions, which target the most noise sensitive parameters such as rail roughness and rail roughness growth. A procedure will be established for the selection of track components (rail type and hardness) which yields optimal rolling noise behavior resulting from an acoustically positive wear pattern, taking into account the types of rolling stock in the network and the track topology (tangent and straight). Noise management tools were developed to be able to measure correctly the performance of a noise mitigating measure and to select optimally the type of track mitigation measure for use in e.g. actions plans requested by the END in cities (where the use of non-track-based measures is often prohibited or not feasible).