



sonRail - Swiss Prediction Model for Railway Noise

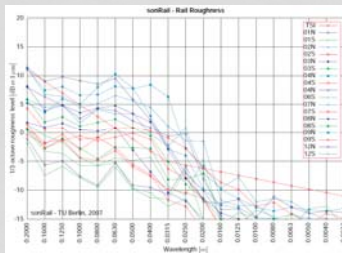
Extensive Measurement of Railway Noise

sonRail – Objective and Structure

- Objective: Developing a new prediction model of railway noise for Switzerland
- Novel features:
 - 4 track and 2 rail types are included, also switches and noise barriers
 - 5 source heights for different train categories
 - including speed and curving
 - works in octave bands
- Principal: Federal Office for the Environment (Switzerland)
- Partners : Empa, TU Berlin, PROSE AG, IFV Bahntechnik e.V., swissinstitute
- Project duration: 2007 - 2009

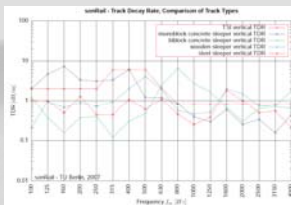
Rail Roughness Measurements

- TSI rail roughness measurement at all measuring points



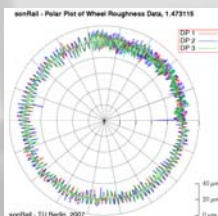
Track Decay Rate Measurements

- TSI direct measurement of vertical and horizontal TDR at all measuring points:
- 9 x monoblock concrete sleeper
- 2 x biblock concrete sleeper
- 2 x wooden sleeper
- 2 x steel sleeper
- UIC54 and UIC60 rail



Wheel Roughness Measurements

- roughness of all 36 freight wagon wheels (*)
- direct TSI measurement



Passby Measurements

- Measurements: 06-08 2007
- 12 measuring points between Lausanne and Freiburg on conventional railway line
- 3 measuring points on high-speed line between Bern and Olten



- on various track types:
 - monoblock sleeper
 - biblock sleeper
 - wooden sleeper
 - steel sleeper

- 2 measuring points with a linear microphone array for source localisation by Sulzer Innotec

- using a 3-D Sound probe for sound intensity measurement by Empa

- data collection for various train types:

IC, IC2000, ICN, ICE, ETR 610, RoLa, commuter trains, freight trains

- over 1'500 measured trains
- special conditions at switches and noise barriers

Specially composed Test Trains

- NINA, BLS EMU train



- specially composed train with:
 - 3 x disc-braked EW IV wagon
 - 4 x composite block-braked RIC Bpm
 - 6 x cast-iron block-braked freight wagons (*)
 - Re 460 and Re 420 at both ends of the train

