



INTERNATIONAL UNION
OF RAILWAYS

unity, solidarity, universality

Vibration – What next?

Current Issues

19 March 2019



Alf Ekblad, Chairman of the UIC Vibration Expert Network and Trafikverket

Vibration – What next?

Content of presentation

- **General thoughts**
- **Switzerland**
- **Germany**
- **Norway**
- **Sweden**
- **The Netherlands**
- **France**
- **Belgium**
- **International & European projects**
- **Summary**



Vibration – What next?

General thoughts



TSI NOI & CBB could lead to stronger focus on vibration

- Residents along the railways could become more aware of the vibrations if the noise levels are reduced
- Authorities could shift the focus from noise to vibration for example concerning annoyance and/ or sleep disturbance

Vibration – What next?

Switzerland - SBB



Planned and ongoing projects

- ÖBB joint project to reduce noise & vibration in turnouts/ switches: e.g. soft USP & railpads to reduce forces – ends 2021
- CSTB joint project about vibration excitation due to interaction of out of roundness wheels and track/ ground – ends summer 2019
- Holistic new damping material project for low frequency vibration mitigation – starts probably April 2019
- Federal office for the Environment is developing a cost-benefit analysis for vibration mitigation measures – finalizing April 2019

Vibration – What next?

Germany - DB



Planned and ongoing projects

- German Standard 4150 part 2 impact on peoples in buildings, details in this standard particular for vibration from railways – revision started recently and will be ongoing until 2020/ 2021
- Test of wide sleepers with USP for vibration together with other innovative noise mitigation technologies in project I-LENA - 2019
- Troughs with 8 different ballast mats were installed during the last 10 years, these will be analysed and provided in an overview about the experiences and some conclusions on how to improve the techniques in the future - 2019

Vibration – What next?

Norway – Bane NOR



Planned and ongoing projects

- Strict regulations for ground-borne noise will be a challenge for upcoming tunnel projects since there are narrow limits for using soft materials in the track, research project will probably start 2019
- New central coupled freight wagons designed for 30 tons axle load have caused a lot of vibration problems at Dunderlandsbanan and tests with buffer coupled wagons will be tested for lower vibration generation – starts summer 2019

Vibration – What next?

Sweden - Trafikverket



Planned and ongoing projects

- Department of Occupational and Environmental Medicine, University of Gothenburg is working on a project called EpiVib which aims to investigate dose-response relationship between vibration exposure and health outcomes – started 2016 and it ends 2019
- Massive mapping of vibration levels on foundations and/ or floors of dwellings has been ongoing since 2016. So far measurements have been performed on around 1800 buildings along freight lines and more measurements are planned for 2019 and 2020.

Vibration – What next?



The Netherlands - ProRail

Planned and ongoing projects

- Innovation Agenda Vibration with 2 major goals will be proposed to the government, including a validated emission model (4 year study at Delft Technical University) and a lot of different field tests
- A national uniform prediction & calculation model for vibration is developed by the Dutch Health and Environmental Institute (RIVM)
- The government has taken the initiative of a guideline concerning building and construction of vibration sensitive objects (e.g. new houses) near railways. Probable focus will be on vibration annoyance in spatial planning and the construction of houses. The guidance can be used by local authorities and real estate developers

Vibration – What next?

France – SNCF



Planned and ongoing projects

- Regarding vibrations, the main actualities revolve around residents complaints and the fact that this topic is now under discussion in the Parliament
- PHD project for vibration mitigation on trenches filled with heterogeneous materials - started February 2019 and will be ending 2023

Vibration – What next?

Belgium – Infrabel



Planned and ongoing projects

- Instrumentation with microphones and accelerometers of 4 test trains for continuous collection of noise & vibration parameters of the whole network – started 2019 and planned to be up and running 2021

Vibration – What next?

International & European projects



Planned and ongoing projects

- UIC UBM group leaflet 179: Recommendations for the use of Under Ballast Mats, includes a paragraph about vibration mitigation
- CEN group EN 13146-9 “Railway applications - Track - Test methods for fastening systems - Part 9: Determination of stiffness”
- Shift2Rail call for “development of a commonly accepted, practical and validated prediction tool for ground vibration impact studies”

Vibration – What next?



Summary

- A lot of projects on vibration are ongoing in some countries in Europe, although most of them are quite small and performed individually
- The Shift2Rail call for a prediction tool for vibration is the first European project since RIVAS & CargoVibes 2013 – I believe we will need more of those kind of projects to be able to get feasible and cost effective mitigation measures



INTERNATIONAL UNION
OF RAILWAYS

unity, solidarity, universality

Thank You!

Questions?



*Alf Ekblad, Chairman of the UIC Vibration Expert Network and
Trafikverket*