

# UIC NETWORK NOISE & VIBRATION

Together with its members, UIC pursues its efforts to constantly promote and publicise the benefits of the rail transport sector to meet the global challenges of mobility and sustainable development.



## UIC MEMBERS ARE DEVELOPING NOISE CONTROL MECHANISMS WITHOUT REDUCING THE COMPETITIVENESS OF THE RAILWAYS

As one of the greenest transport modes, railways shall be promoted to achieve climate goals.

For this reason, railways shall be acceptable by citizens by becoming quieter and at the same time the competitiveness of the railways shall be insured.

Noise pollution has a heightened sensitivity given recent developments at EU level and the publication of updated noise guidelines by the World Health Organisation.

According to data published by the European Environment Agency in July 2018, over 100 million people in the European Union are exposed to noise levels ( $L_{den}$ ) higher than 55 dB from road transport, over 18 million from rail transport and over 4 million from air transport.

### Noise Indicators

$L_{den}$	day-evening-night noise indicator to assess annoyance
$L_{night}$	night-time noise indicator to assess sleep disturbance

## Main Noise Control Methods



### Protect the most exposed (trackside mitigation) such as

Noise barriers  
Noise insulation of facades



### Mitigation at the sources (track design & maintenance) such as

Acoustic rail grinding  
Track damping  
Low-noise brakes for freight wagons



### Plan and build properly

Infrastructure  
Train and track design for e.g. quieter trains

## Common Noise Sources

- ≧ Rolling noise
- ≧ Equipment noise
- ≧ Aerodynamic noise
- ≧ Curve squeal
- ≧ Brake screech
- ≧ Depots

Most European railways have projects to address these noise sources.



INTERNATIONAL UNION  
OF RAILWAYS

## NATIONAL STRATEGIES & POLICIES



### Reducing noise propagation

- Building noise barriers,
- Installing noise insulated windows.



### Reducing noise at source for the vehicle

- Reduce wheel roughness by retrofitting: replacing cast iron brake blocks,
- Isolating wheel tread from wheel web with resilient layer (resilient wheel),
- Screening-off noise radiated by wheel with wheel shrouds (disc brakes mounted on the wheel to serve as wheel shrouds) or bogie enclosures,
- Optimising wheel size and shape.



### Reducing noise at source for the track

- Reducing rail roughness using regular monitoring and preventive/curative grinding,
- Optimising rail pad stiffness to improve track decay rate,
- Adding rail damper (if applicable),
- Improving track infrastructure.

## EUROPEAN STRATEGIES & POLICIES



Environmental Noise Directive (END)

The END obliges national authorities to draw up strategic noise maps and action plans for major railways lines as well as large agglomerations.



TSI Noise

Quieter routes will be introduced in the EU in December 2024. Only "silent wagons" will be allowed on quieter routes.



Connecting Europe Facility

CEF calls: Since 2014, 132'000 wagons received financial support for retrofitting. By October 2019 a further funding of 20.1 Million € will be provided to successful applicants.



Noise-Differentiated Track Access Charges (NDTAC)

NDTAC schemes can be implemented and managed by infrastructure managers to incentivise further circulation of quieter wagons.



Shift2Rail

Shift2Rail promotes the competitiveness of the European rail industry and meets changing EU transport needs.

## WORLD HEALTH ORGANISATION NOISE GUIDELINES

WHO suggests using the DALY (Disability Adjusted Life Years) method to conduct a "health-oriented analysis" to prioritise sectors and implement action plans. It is a major challenge because:

- There are different legislations in each country.
- Noise mitigation remains a local issue.
- WHO does not assess costs to achieve suggested limit values.
- DALY assessment has a lot of limits, relies on the estimation and requires a number of assumptions.
- "Railway bonus" in the legal limits shall not be neglected.

**Noise assessment should contain cost-benefit analyses including environmental and health impacts, so that railway competitiveness can be fairly evaluated.**

To protect health

### WHO/EUROPE NOISE GUIDELINES

recommend reducing noise levels below:



53 dB (45 dB for night)



54 dB (44 dB for night)



45 dB (40 dB for night)



45 dB



70 dB  
(as a yearly average from all leisure noise sources)



REGIONAL OFFICE FOR EUROPE

### STATE OF THE ART REPORT

- ▶ Railway Noise in Europe
- ▶ Railway Induced Vibration

UIC published an updated report concerning the state of the art for the management of railway noise and vibration in Europe.

**A new state of art report for noise will be published in Autumn 2020.**



### UIC Members share their expertise and knowledge for producing solutions.

See our video:

<https://www.youtube.com/watch?v=sCjCaMrDapc&t=2s>

