What next?

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What next: focus on....

Railpad 1.0->2.0

- More silent rolling stock -> need for more silent track
- Better “maintenance” grinding is needed
- Higher Track Decay Rate or rail damping is needed
  -> A new type of railpad was developed and is currently installed on the Belgian network

TDL (Track Dynamics logger)

- More silent track -> OK, but where is the track silent or noisy or vibrating so where exactly is action needed
- Depends on a lot of parameter: roughness, TDR, welding's, discontinuities, switches, bridges, tunnels,...
  -> A new 12 channel monitoring systems on 4 measurement trains
Railpad: Requirement for Noise cancelling

WHY FOCUS ON THE RAILPAD?

• Dominant component in contact with rail (+ isolator)
• Unused potential to add damping

GOAL

• Not by extreme stiffening (distribution of forces in ballast)
• Maximum of damping restrict “pin-pin” mode of rail

IDEAL NOISE REDUCTION RAILPAD

• Soft to distribute axle forces at low frequencies (axle passage)
• High damping at high frequency (1000Hz) to damp rail vibration & noise emission
Test locations

- L50A Varsenare (passenger trains)
- L59 Belsele (passenger & freight)
- L27A Antwerp (freight)
- L27A Schaarbeek (TDR qualification site)
- L50C Dilbeek (passenger)
Railpad 2.0: Technical specification L63 (version 2016)

• Beside stiffness also damping is included

• Requirement on damping:
  - TDR EN15461 on standard Infrabe track
  - Protection of forces into sleepers (EN13146/3)
  - Measurement of accelerance in track: modal damping at PIN-PIN mode
Conclusion Railpad 2.0:

• Today a first supplier is qualified
• Qualification of two other suppliers is ongoing (first test = TDR in track)
• Installation of railpad 2.0 ongoing:
  • 2017 about 40km
  • Installed when complete track is renewed
  • Full speed from 2018: 100 - 150 - 200 - ... km/year
  • Trying to change pad also when rail is renewed
TDL (Track dynamics logger)

• Upgrade of a 2011 version: 1 train
  ° 4 accelerometers
  ° 2 microfoons
  ° 1m position precision
  ° Network 2 times a year

Towards

• TDL 2018 version: 4 measurement trains
  ° 8 accelerometers
  ° 4 microfoons
  ° 10cm position precision
  ° Network 8-10 times a year
TDL (Track dynamics loggers)

- **Project ongoing**
  - Development and hardware selection (N&V & Position)
  - Automatic measurement
  - Automatic on-train processing
  - Transfert to fix servers
  - Parameter extraction versus track quality
  - AI & Deep learning techniques
  - Trend analysis /predictive maintenance

- **Input for**
  - Asset management, component detection
  - Wheel railnoise calculation
  - Noise mapping
  - Action plans
Conclusion TDL

• Actual Status
  ° Installed and “auto”- active in 2 trains
  ° Copy/paste by the end of 2019 in 2 others trains

• From 2020 on till ....

Continuous and automated use for
  ° Asset management, component detection
  ° Noise mapping
  ° Action plans
  ° Nearly as-is acoustical status of the tracks for a whole network.
Thank you for your attention!!

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