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The anti-noise and anti-wear system for railways

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Curve squeal noise is an environmental pollution problem since its levels can be very high (to 120 dB).



One in five suffers from sleep disorder at night!



One in three individuals is annoyed during the daytime!

The aim of our research was a reduction of curve noise and testing the influence of using material/technology on a rail's wear out.



Lower environmental pollution



Better life

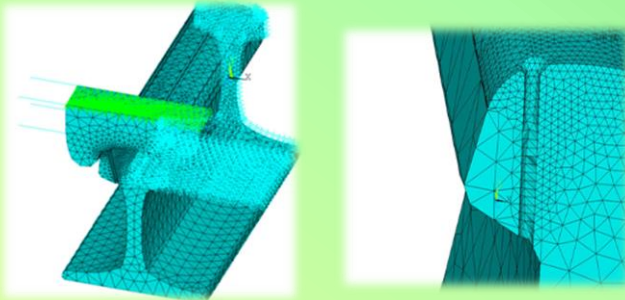
Developed CHFC material used in our research

- contains more than 40 % of solid particles
- is capable of taking over extremely high pressure loads – weld load > 8000 N
- is environmentally friendly

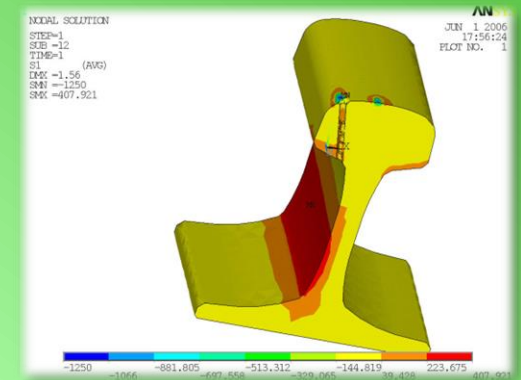
Appearance	Paste
Color	Gray
Odor	Mild
Solubility in water	Negligible
Hazardous reactive properties	None
Consistency – NLGI (DIN 51818, ASTM-D 217)	2
Worked penetration (ISO 2137)	295 mm/10
Density (at 20 °C) (ISO 12185)	1.3 g/cm ³
Viscosity (at 40 °C)(ISO 3104)	26.5 mm ² /s
Viscosity index	136
Flash point	> 300°C
Ignition temperature	> 350°C
Thermal decomposition	> 370°C
Drop point (ISO 2176)	Not applicable
Separation of base oil (40°C, 7 days) (DIN 51817)	2.1 %
Behavior of the product in the presence of water (DIN 51807-1-40)	< 1
Anti – corrosion properties (DIN 51802, ASTM D6138)	Non-corrosive
Weld Load (FOUR BALL TEST) (ASTM D 2596)	> 8000 N
Weld Load (ASTM D 2266)	< 1 mm

Dosing of Material

Part of our research was development of the most appropriate way for applying the newly developed material onto the rail. For this purpose we patented (EP 1 747 134 B1) and verified (TÜV SÜD Rail GmbH) the dosing boring (just $\Phi 4$ mm) made into the rail head, which enabled the expansion of the material onto the precisely defined point on the rail head - top of the rail.



Dosing borings



Rail with borings (certified by TÜV)

- borings doesn't have any negative impact on rail
- the throwing out of the material is reduced considerably
- utilization of material is increased maximally (~ 99.8%)

Dosing of Material

Technology

The anti-noise and anti-wear system CL- E1 included:

1. Aggregate
2. Dosing set
3. Electro part: Solar system (voltage 230V AC)



The aggregate (except the sensor) and solar system were installed at the appropriate distance from the rails in order to ensure safer and easier maintenance and composite compound filling while the dosing set and sensor unit were installed directly onto the rail.

CL-E1 device - advantages

- Outstanding NOISE reduction
- High IRR (internal rate of return)
- Stand alone option
- Effective protection against wear – wheel and rail
- Environmentally friendly materials
- System allows applying the CHFC material on rail
- Optimal dosing volume of CHFC material
- CL-E1 aggregate can be installed also underground
- Reduction of LCC rails (life cycle cost)
- Reduction of LCC wheels (life cycle cost)
- Great flexibility of the system according to user needs
- Simple for assembling and maintaining
- User friendly handling
- Safe and reliable working of the system





CL-E1 - dosing field and trace of the material on track



CL-E1 system



Wear out and noise reduction measurements

1. Measurement of noise reduction was performed at the two measuring points where the railway line makes a long sharp turn, therefore the direction of travel changes by approximately 180° . The radius of curve in this part of the track is 298 meters. Measurements were made at frequencies from 50 to 20 k Hz in two points, according to Standard method (EN ISO 3095, 2005).
2. The degree of wearing out was determined with a wheel/rail profile measuring device (Geismar, model P-110) which had reproduced the actual rail profile to scale and thereby had provided an accurate profile for comparing the wear.



RESULTS

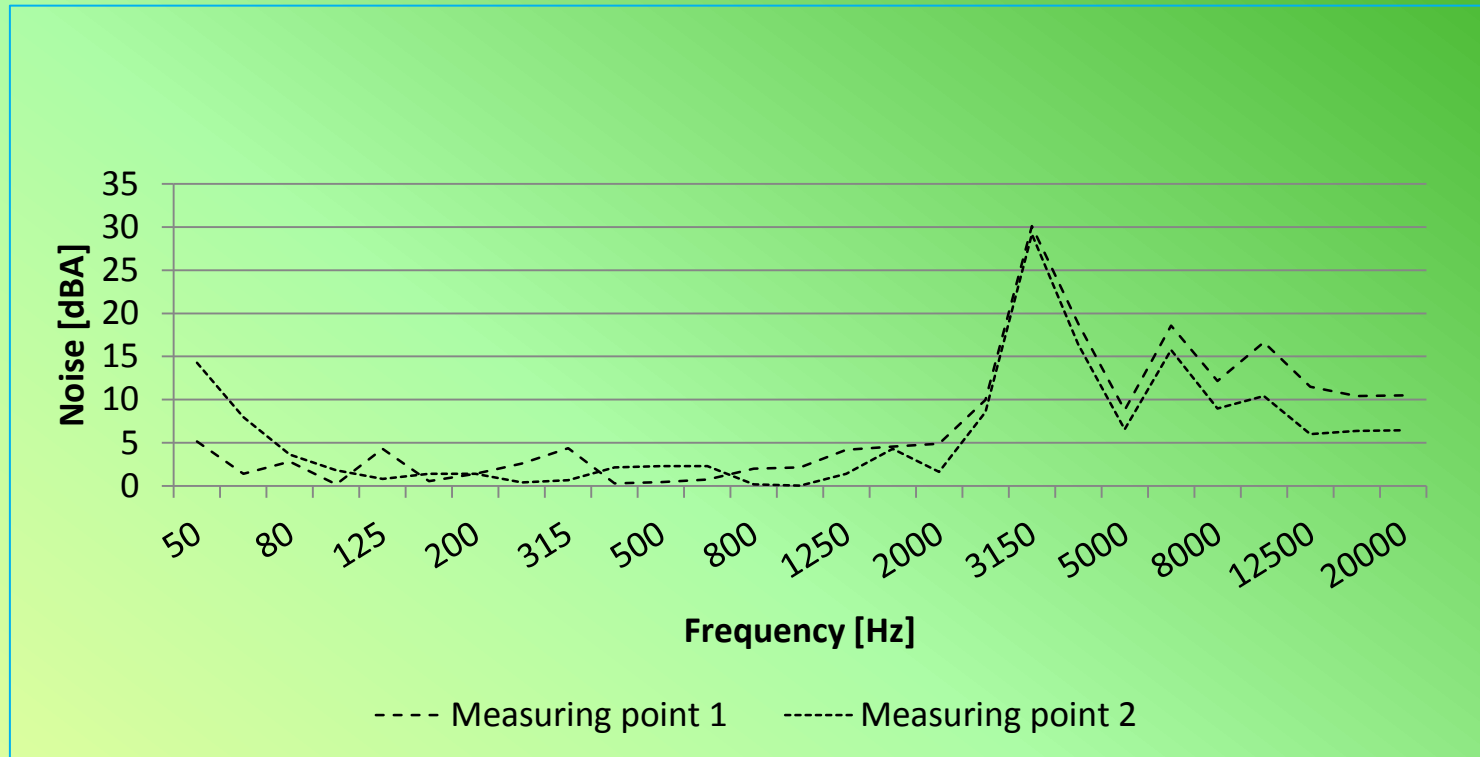
We performed examination of wear and tear of rails on a long-term basis for the CL-E1 device. It arises from our measurements that, after installation of the CL-E1, the annual loss of material due to wear and tear is more than 2.5 times lower.

Measurement was performed every six months. In the last year of the research the wear of tracks practically stopped and, consequently, reduced maintenance costs.

The noise was reduced to 14 dBA at low frequencies.

Further reductions of noise levels had been observed in the area of middle and especially in the area of high frequencies, where the reductions was to 30 dBA.

Noise reduction by using CL-E1 system



CONCLUSIONS

- With our device and material it is possible to significantly reduce the wear out and the noise.
- We achieved more than 2,5 times lower wear out.
- We achieved to 30 dB(A) reduction of noise.
- This solution has positive economic and ecological effect.

**LOWER LIFE CYCLE COSTS AND LOWER
ENVIRONMENTAL POLLUTION**

The anti-noise and anti-wear system for railways

Presentation of CL-E1 system

**Demonstration of
Multi Active Rail Preserver**

**CL-E1 ws
Wayside Application System**

**Wear out and noise reduction on source
(WONROS™ technology)**
in rail curves, caused by friction between
wheels and the rail;
on railways, tramways, metros, ports, etc.

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Certificates:



UIC certificate in 2012:



Prizeman in 2004:



Supported by:



Thank you for your attention !



– enjoy the silence !