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LÄRM FORSCHUNG EISEN BAHN
EXCHANGE of EXPERTS 2|'22

Rail pad for noise reduction

Harald Steger / Markus Heim- Getzner Werkstoffe Gmbh

1 **Test tracks with Getzner prototypes**

2 Summary, conclusion and outlook

Test tracks with Getzner's noise reduced rail pads

Several prototypes

Zw 700 for 60E1
prototype 1
Damping +++

Test track

BLS – Kerzers- Müntschemier

Date of installation
10/2020

Status: Test report available

ZW 700b for 54E2
prototype 2
Damping +
Radius ~275m

Test track

SOB – Samstagern

Date of installation
04/2022

Status: TDR measurements in 06 2022 / report in progress

Test tracks with Getzner's noise reduced rail pads

Several prototypes

1 **Kerzers-Müntschemier**

BLS

Rail pad: **Zw 700 60E1**
prototype 1

2 **Samstagern**

SOB– **narrow curve (~275m)**

Rail pad: **ZW 700b 54E2**
prototype 2

Test tracks with Getzner's noise reduced rail pads

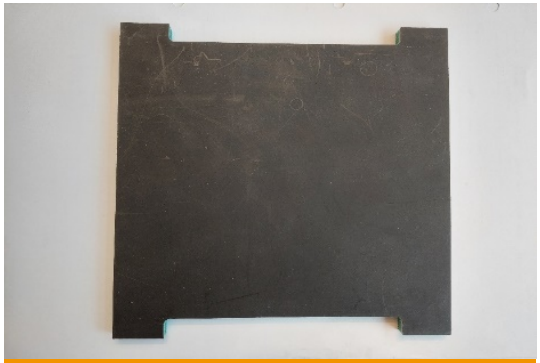
Prototype 1

1

BLS / Kerzers – Müntschemier

BAFU engaged *Kompetenzzentrum Fahrbahn* (KPZ) for the measurements in track (Final report dated November 2020)

Increased loss factor by 6 compared to standard rail pad



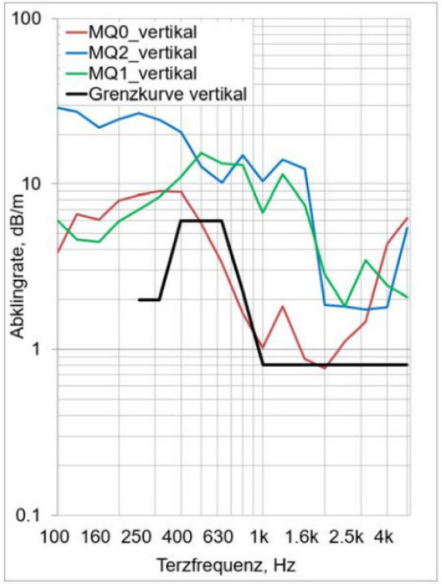
Zw 700a 60E1 Prototype 1

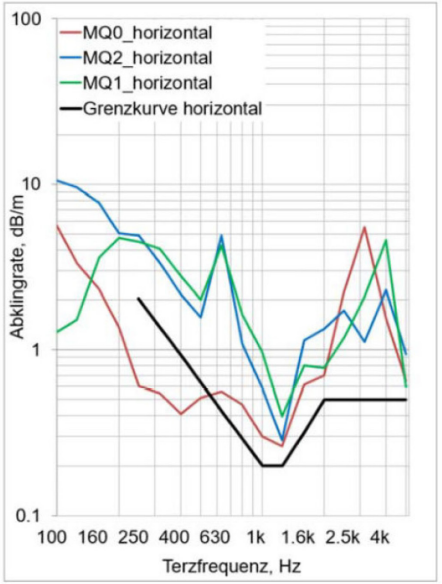
Criteria	Value	Dynamic stiffening	Loss factor
Static stiffness (18 and 68kN)	68.9 kN/mm		
Dynamic stiffness (5Hz)	166 kN/mm	2.4	~0.4

Test tracks with Getzner's noise reduced rail pads

Prototype 1

1





				ammer t point
				0 – 24.660
	MQ2 with hard rail pad	24.638 – 24.476	24.540	24.540 – 24.500
	MQ1 with Getzner rail pad	24.476 – 24.356	24.420	24.420 – 24.380

Source: KPZ

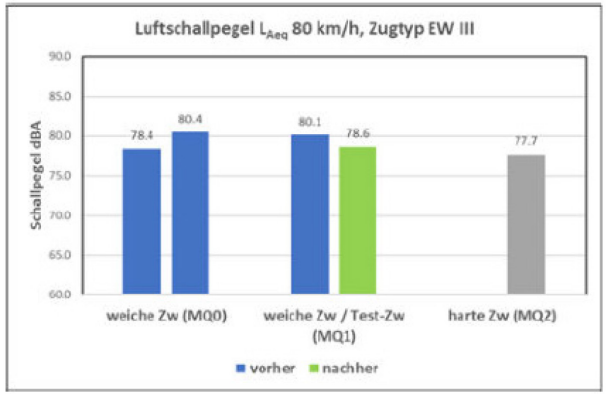
Test tracks with Getzner's noise reduced rail pads

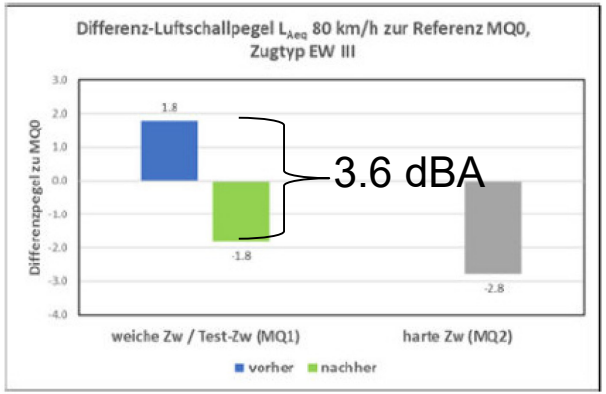
Prototype 1

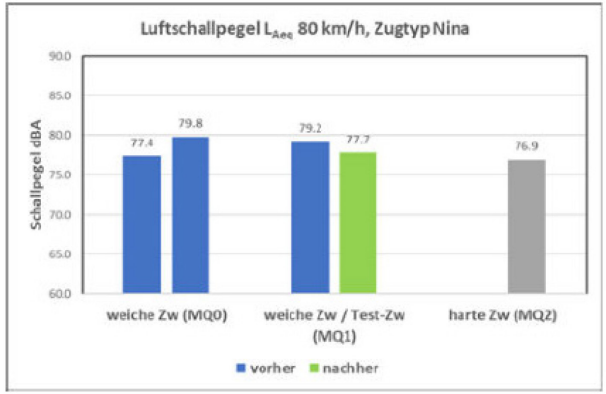
1

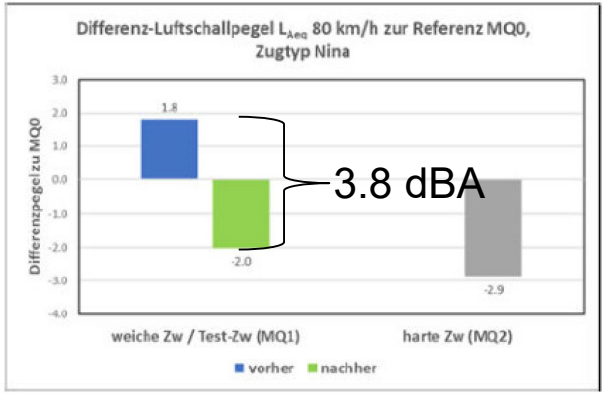
- Noise level measurements

comparison between soft pad and Getzner prototype 1









Source: KPZ

Test tracks with Getzner's noise reduced rail pads

Prototype 2

2

SOB track „Samstagern“

Track geometry: **narrow curve with radius 275m**

Kategorie	Maximale Auslegungsachslast kN	Minimaler Gleisbogenhalbmesser m
A	130	40
B	180	80
C	260	150
D	260	400
E	350	150
ANMERKUNG Die maximale Auslegungsachslast für die Kategorien A und B gilt nicht für Instandhaltungsfahrzeuge.		

Categories according to EN 13481 2:2021+A1:2017

Test tracks with Getzner's noise reduced rail pads

Prototype 2

2

SOB track „Samstagern“

Track geometry:

Narrow curve with radius 275m

Befestigungskategorie	α Grad (°)	X mm	$P_v/\cos\alpha$ kN[a, b]	
			$50 \le k_{LFA} < 200$ MN/m[c, d]	$k_{LFA} \ge 200$ MN/m[c]
A	38,6	25[e]	55	55
B	38,6	25[e]	62	65
C	33	15[e]	75	83
D	26	15[e]	70	76
E	40	75[e]	100	108

a Die Prüflasten gelten nur für Schienenprofile nach EN 13674-1 (außer 49E4) oder EN 13674-4.
b Die Prüflasten bilden die typischen Achslasten und Gleisbogenhalbmesser nach EN 13481-1:2012, 3.1, ab.
c Niederfrequente dynamische Steifigkeit des Befestigungssystems, gemessen bei 5 Hz, in Übereinstimmung mit EN 13146-9.
d Für k_{LFA}-Werte unter 50 MN/m darf die Baugruppe unter Verwendung der Prüflasten und -positionen geprüft werden, die in EN 13481-5:2012+A1:2017, Tabelle 3, aufgeführt sind.
e Bei steggestützten Schienen muss der Abschnitt unverändert bleiben (d. h. $X = 0$).

Categories according to EN 13481 2:2021+A1:2017

Test tracks with Getzner's noise reduced rail pads

Prototype 2

2

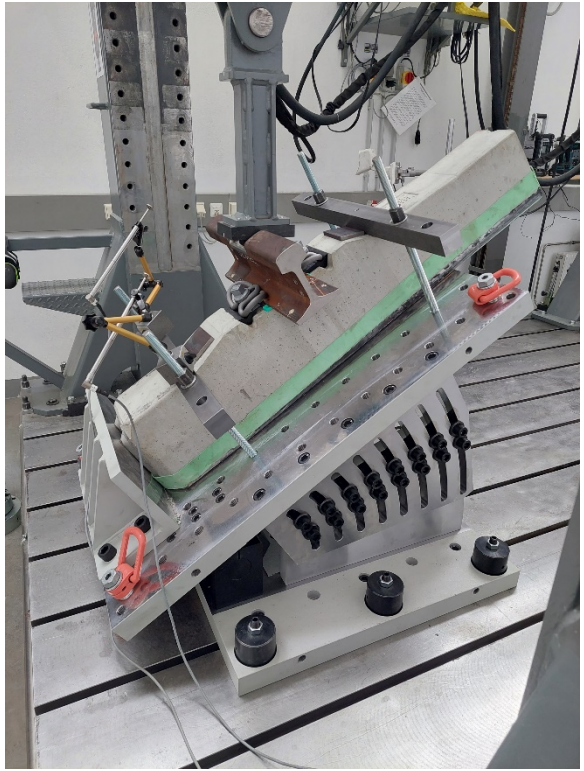
SOB track „Samstagern“
Preliminary fatigue test:
according to EN 13481-2;
interpolation between category C and D;
angle 29.6° and vertical load 69 kN

Configuration:

- UIC 54E2 rail
- Skl SL-1
- Wfp 14K
- Zw 700

Loss factor twice compared to standard rail pad

ZW 700b for 54E2
Prototype 4
Radius ~275m



Test tracks with Getzner's noise reduced rail pads

Prototype 2

2

SOB track „Samstagern“

ZW 700b for 54E2
Prototype 4
Radius ~275m

Criteria	Value	Dynamic stiffening	Loss factor
Static stiffness (18 and 68kN)	131.2 kN/mm		
Dynamic stiffness (5Hz)	165.2 kN/mm	1.25	~0.18

Loss factor twice compared to standard rail pad

Test tracks with Getzner's noise reduced rail pads

Prototype 2

2

SOB track „Samstagern“ installation of Zw 700 on 16th June 2022

Test tracks with Getzner's noise reduced rail pads

Summary, conclusion and outlook

Overview about prototypes and properties

Criteria	Prototype 1 BLS Kerzers	Prototype 2 SOB Samstagern
Static stiffness (18 and 68kN) [kN/mm]	68.9	131.2
Dynamic stiffness (5Hz) [kN/mm]	166	165.2
Dynamic stiffeni		
Loss factor		

best compromise of conflicting criteria to be found in further development steps

Test tracks with Getzner's noise reduced rail pads
Outlook

- **Evaluation of current test tracks at BLS/SOB**
- **Discussions with operators & finding best compromise for conflicting rail pad properties**
- **Definition of rail pad approval specifications**
- **Next development loops at Getzner based on learnings**
- **Next test track with optimized rail pad solution**

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Rail pad for noise reduction

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