Contract Modification for a Track Condition and Wayside Noise Diagnostic System and Database

System Expansion Committee

9/10/2020

Why we are here

- Today we are here to request approval to extend the contract with ATS Consulting for 3 years.

    1. Current Action = $ 2,235,000 (for 2021-2023)
    2. Contract start date Dec 2016
    3. Total Contract duration = up to 15 years

- Demonstrate the status of the custom tool development and plans for the next 3 years.

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Project Scope & Status

What is complete:

- Portable Onboard Noise Tool and Database currently in use.

- Periodic noise & rail wear data for 3 years

- Preliminary rail life estimation & anticipated wheel behavior

Scope for Next 3 Years:

- Provide data-driven guidance to maintenance

- Refine performance metrics such as ride quality for light rail vehicles

- Help Asset Management by advancing tools to estimate Remaining Useful Life of rails & wheels

Primary Goal = Maintain Lower Noise & Vibration at the Source

Maintaining lower noise and vibration levels at the source requires management of the rail and wheel interface. The beneficial effects are:

- Lower noise and vibration levels for the passengers and neighbors

- Improved ride comfort

- Extended life for rails and rail vehicles
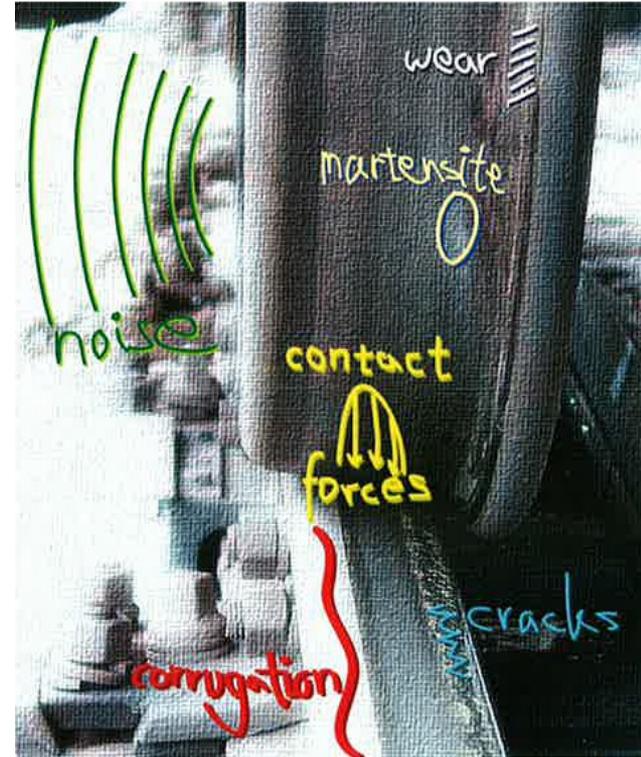
ST's Custom Noise Tool + Database

Mount Noise Tool in LRV trailing cab and collect system-wide data
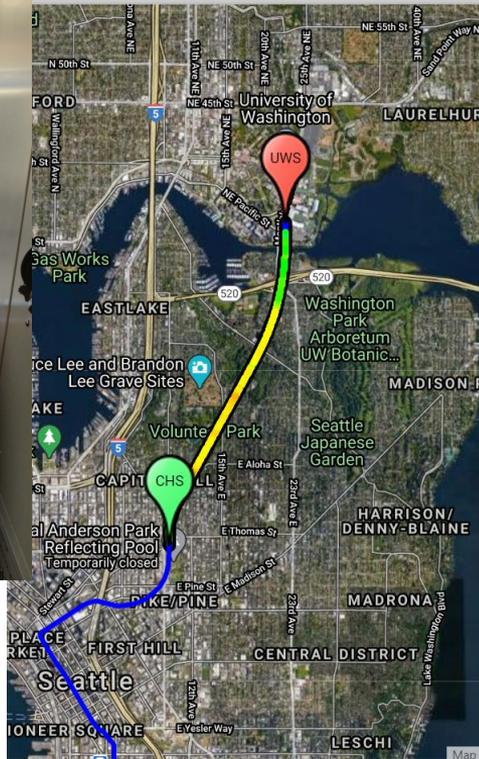
Capitol Hill >> University of Washington

	Date	Route	VEH Type	# of Cars	VEH #	Wheel Profile
	filter column...	filter cc	filt	fi	filt	filter colum
☐	Oct 23, 2019 13:43	LinkNB	KS	2	103B	N/A
☐	Oct 23, 2019 11:22	LinkNB	KS	2	103B	N/A
☑	Oct 22, 2019 11:58	LinkNB	KS	2	149A	N/A
☐	Sep 26, 2019 11:08	LinkNB	KS	2	127A	N/A
☐	Sep 25, 2019 13:20	LinkNB	KS	2	138A	N/A
☐	Sep 25, 2019 11:11	LinkNB	KS	2	138A	N/A
☐	Jul 2, 2019 11:09	LinkNB	Kinki...	2	155A	N/A
☐	Jul 1, 2019 14:02	LinkNB	Kinki...	2	123A	N/A
☐	Jul 1, 2019 11:53	LinkNB	Kinki...	2	123A	N/A
☐	Jan 24, 2019 11:12	LinkNB	Kinki...	2	102B	N/A
☐	Jan 23, 2019 11:57	LinkNB	Kinki...	2	159B	N/A
☐	Dec 19, 2018 12:53	LinkNB	Kinki...	2	112B	N/A
☐	Dec 14, 2018 11:13	LinkNB	Kinki...	2	107A	N/A
☐	Dec 13, 2018 11:01	LinkNB	Kinki...	2	156A	N/A
☐	Dec 6, 2018 11:10	LinkNB	B	2	158	N/A
☐	Dec 5, 2018 11:10	LinkNB	B	2	132	N/A
☐	Nov 7, 2018 13:23	LinkNB	Kinki...	3	106A	N/A
☐	May 16, 2018 11:26	LinkNB	Kinki...	3	121B	N/A
☐	May 15, 2018 13:01	LinkNB	Kinki...	3	149A	N/A

Close History

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Detailed Noise Data Helps Identify Track Sections Needing Maintenance
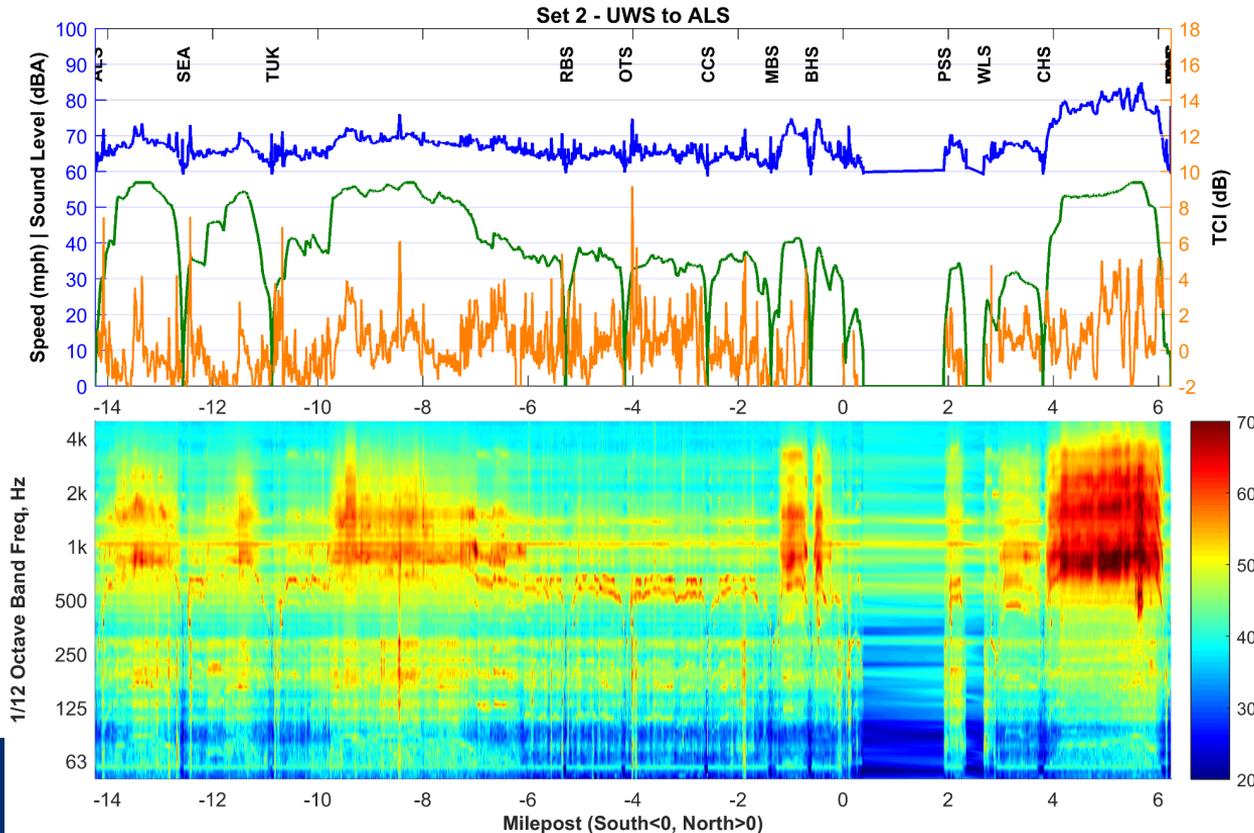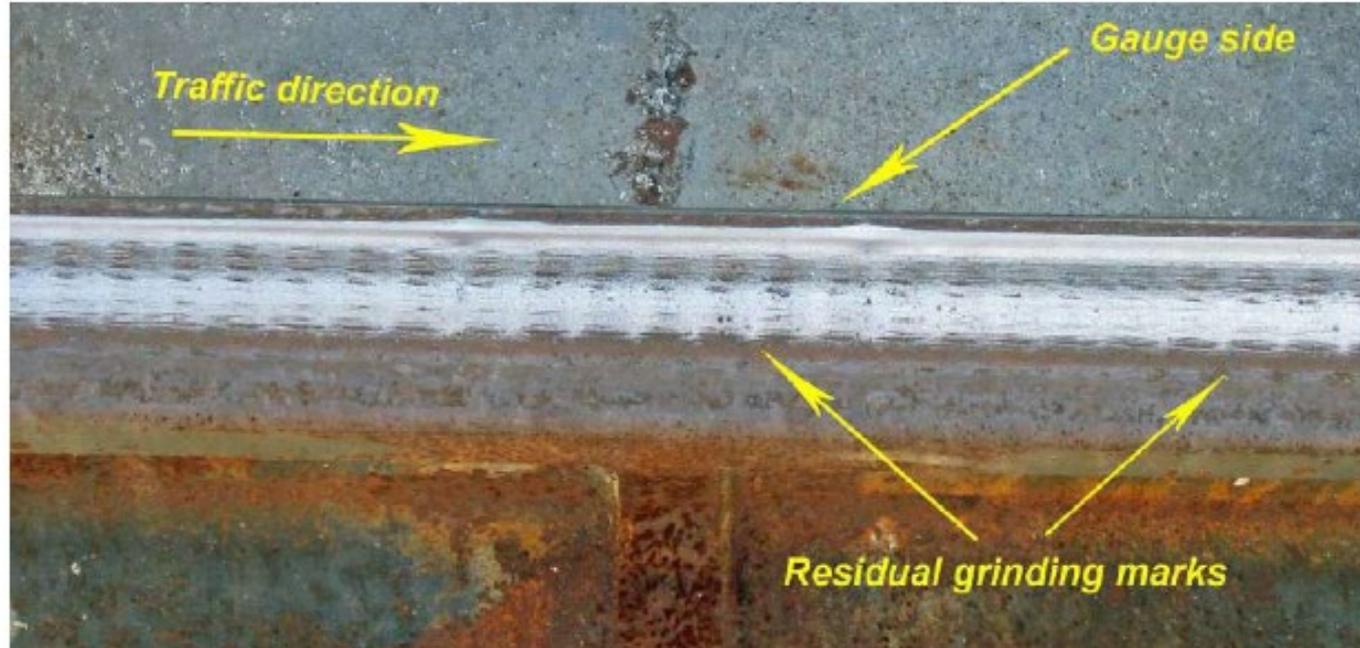

Red indicates maintenance is needed
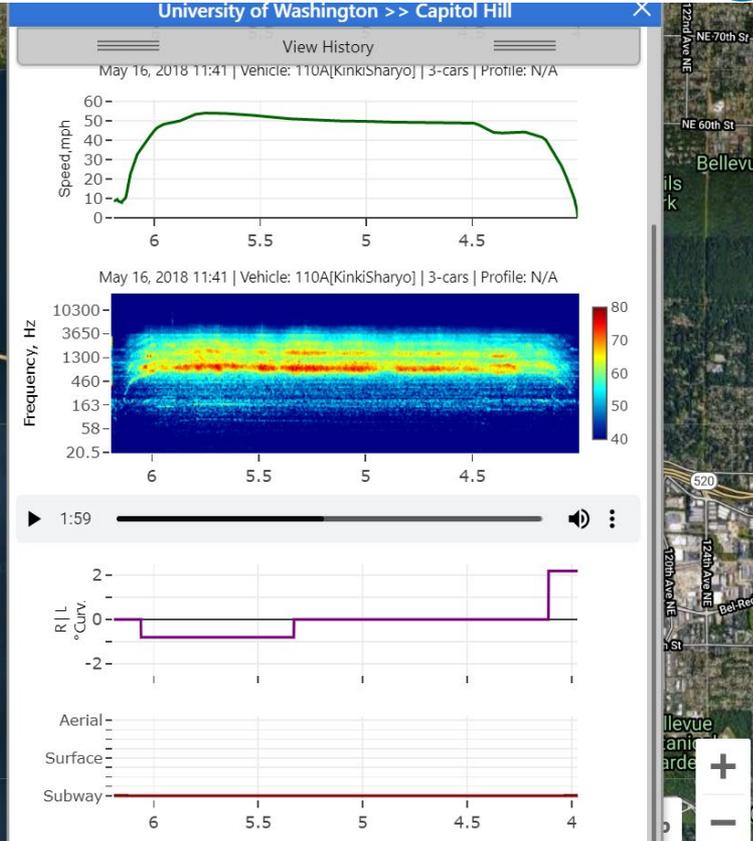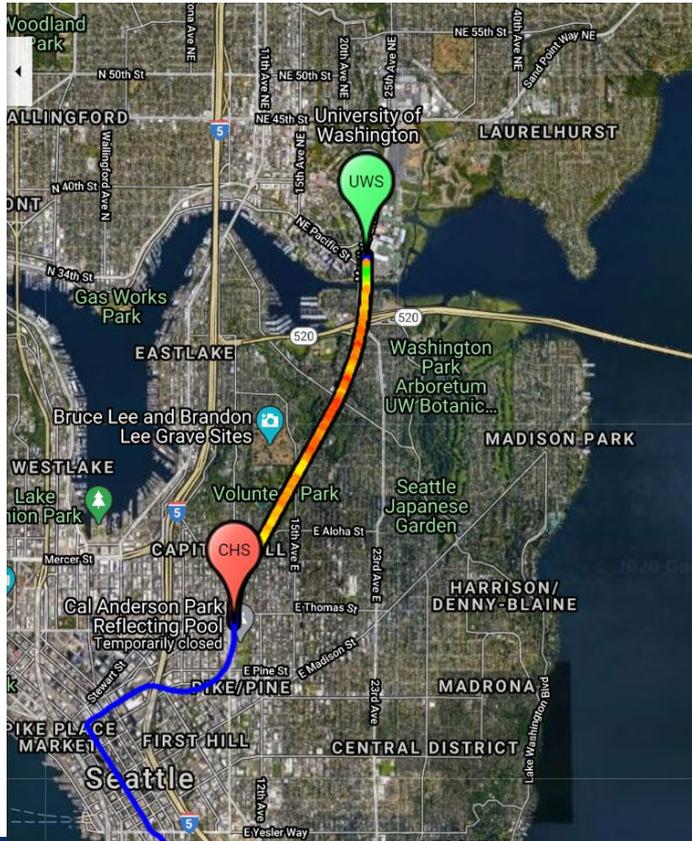
Red Areas of Noise = Rail Surface Needing Attention
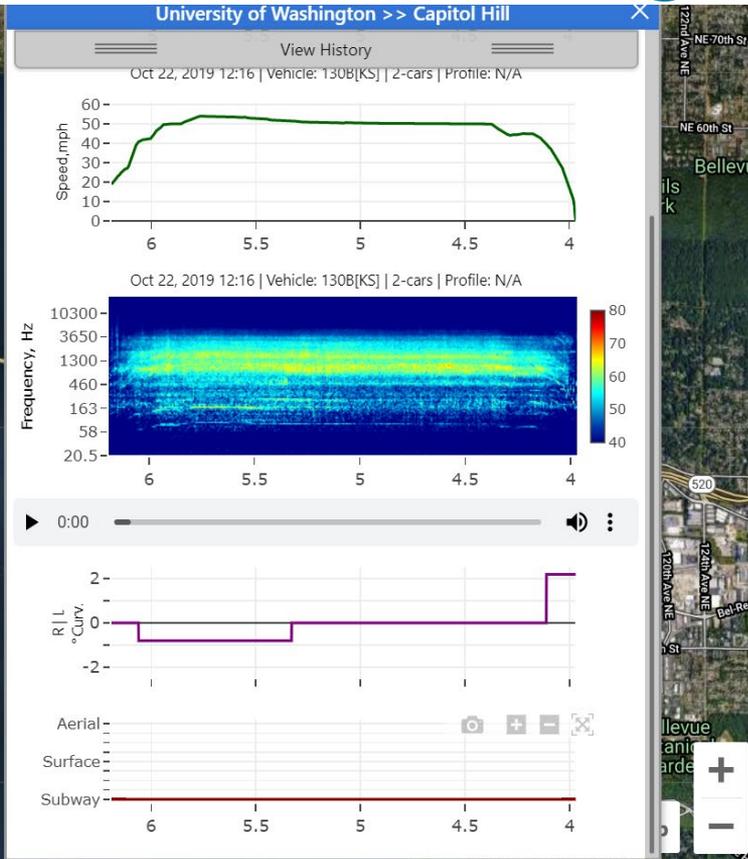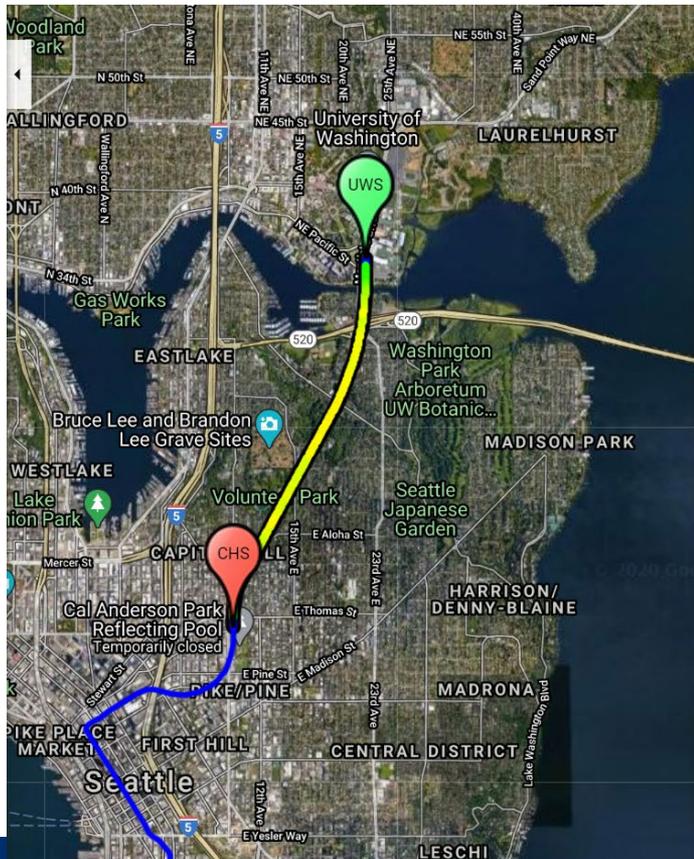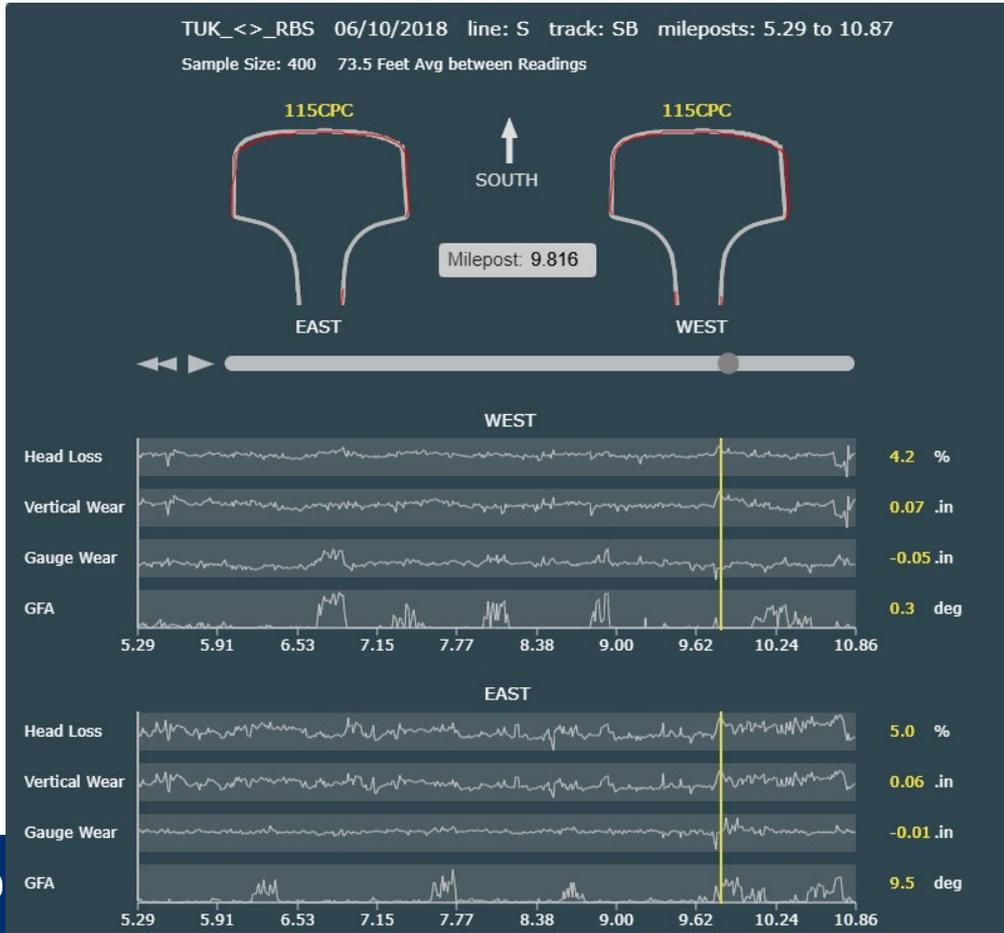

Rail Squat

Rail Corrugation

Onboard Noise – Before Grinding

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Onboard Noise – After Grinding

No red after grinding

6 - 10 dB noise reduction

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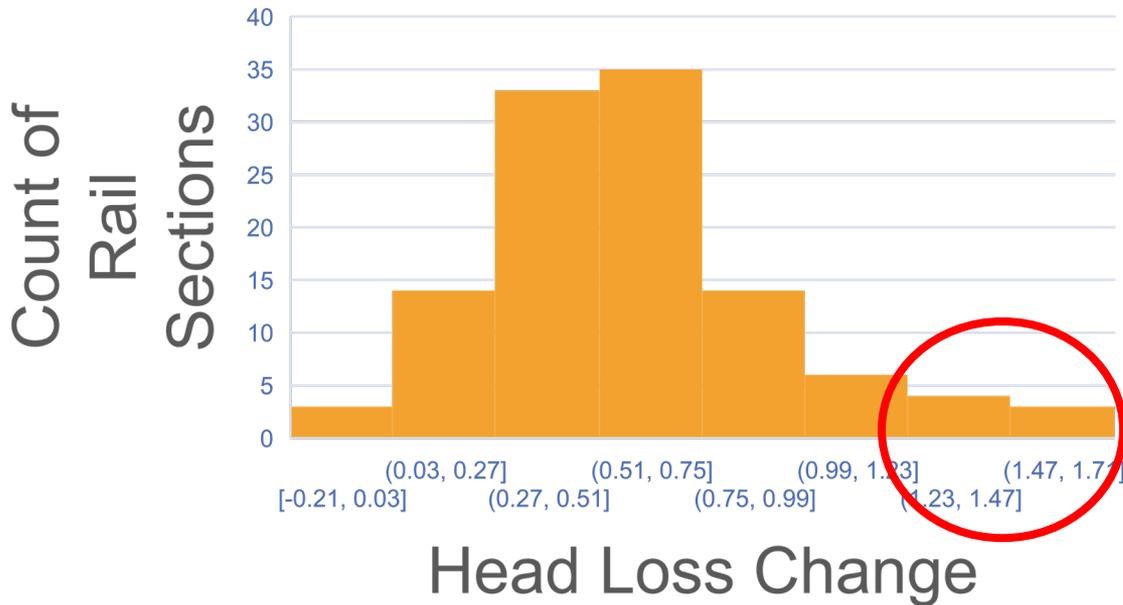# Rail Shape Data Stored in Database

What is it used for:

- Annual rail wear pattern analysis

- Recommendations for maintenance interventions

- Estimation of Remaining Useful Life (RUL) for rails (In Progress)

Rail Wear Change Analysis Tool (Preliminary)

Head Loss % Change, 2017-2018 (no curvature)

- Right side shows # of rail sections wearing at faster rate (rail grinding priorities)

- Expected to help short-term and long-term rail maintenance planning

- RUL estimates to help data-driven decision-making for **rail grinding** vs **rail replacement**

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Understanding the Wheels & Ride Comfort

KinkiSharyo vs Siemens LRVs:

- Influence of wheels on maintenance

- Influence of car ride performance on passengers

Wheel analysis
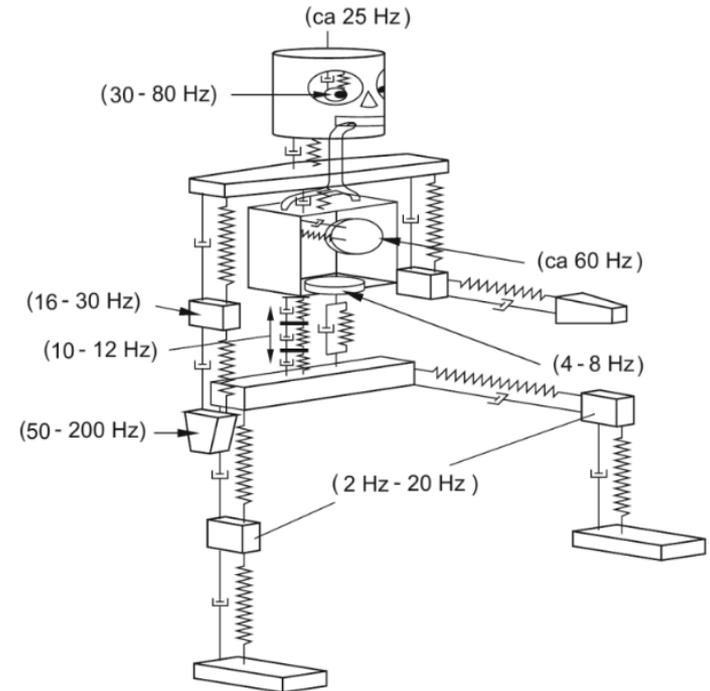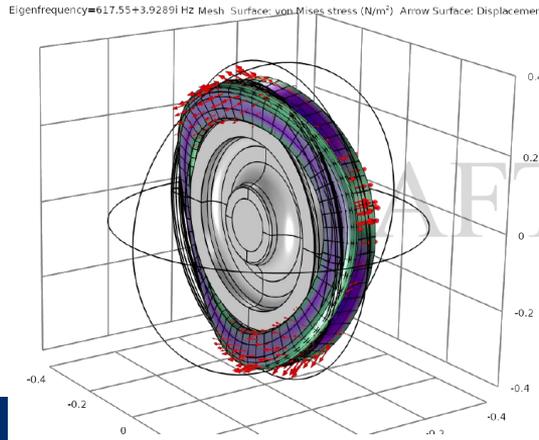
Human body as a system able to vibrate during rides

Thank you.

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