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Ballast Protection For The Superstructure

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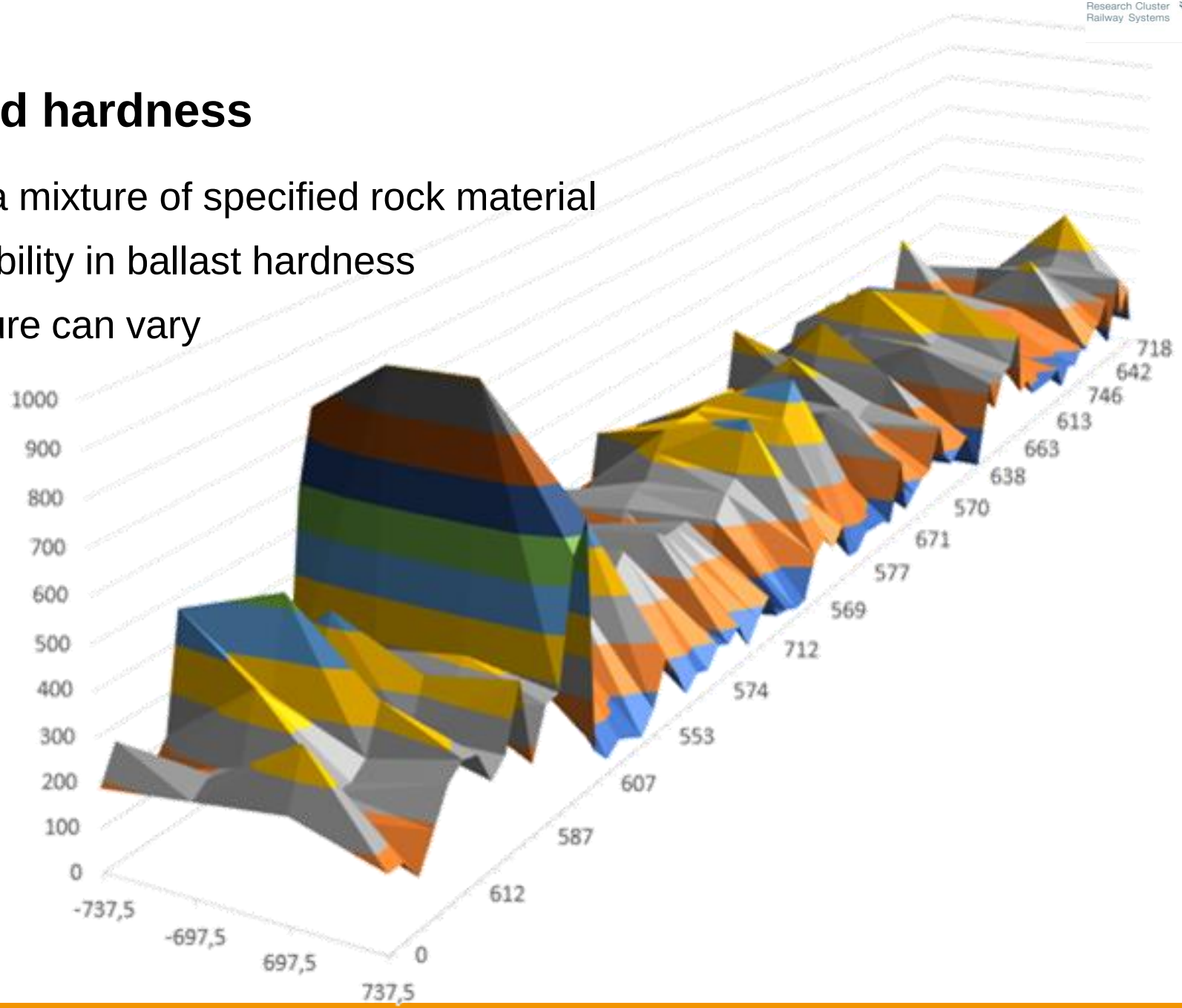
Ballast Stones are the

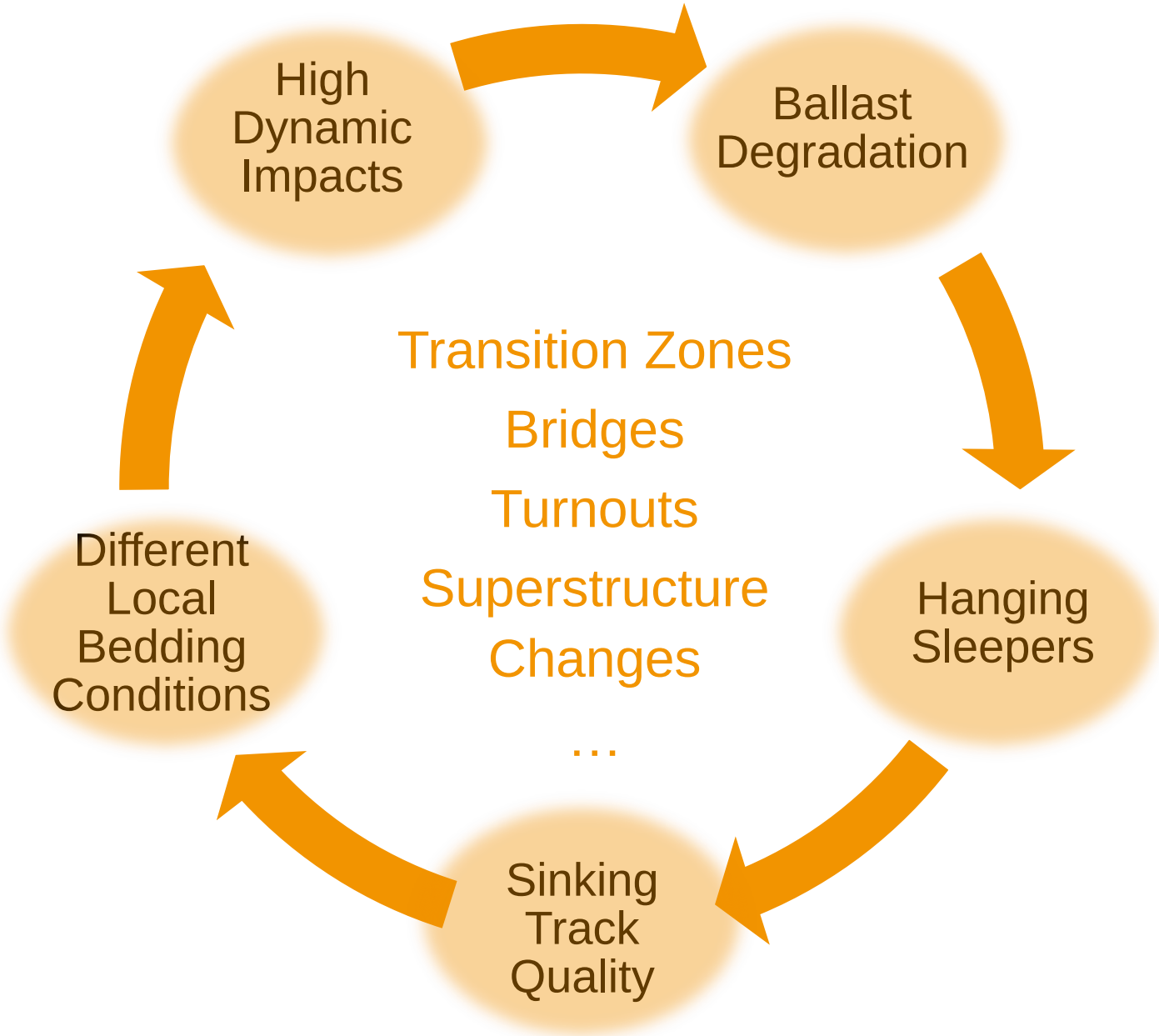
Weakest Component in Ballasted Track

Getzner Werkstoffe GmbH - Michael Pümpel

Ballastbed hardness

- Ballast is a mixture of specified rock material
- High variability in ballast hardness
- Substructure can vary



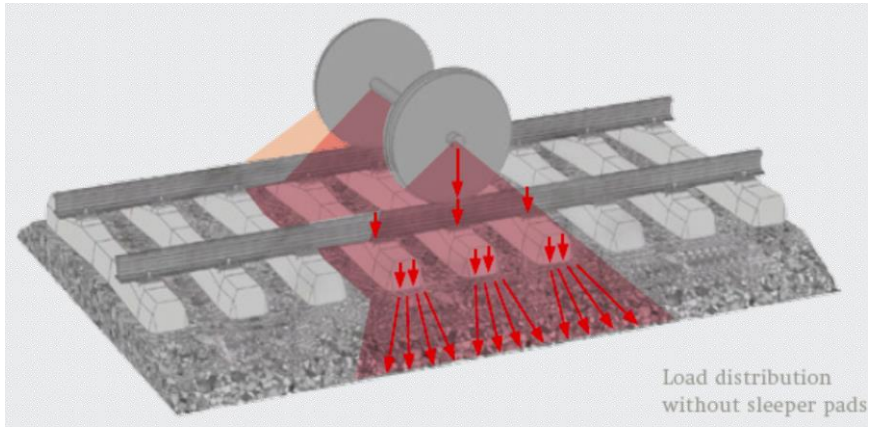

High Dynamic Impacts
Ballast Degradation
Hanging Sleepers
Sinking Track Quality
Different Local Bedding Conditions
Transition Zones
Bridges
Turnouts
Superstructure Changes
…

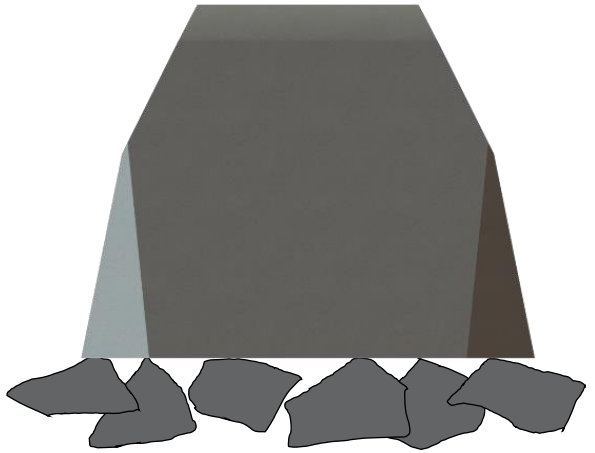
What can be done?

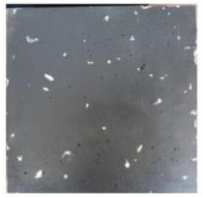
Homogenizing the Superstructure: Under Sleeper Pads

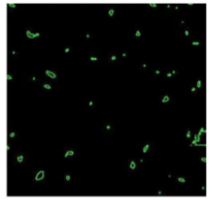
UNPADDED SLEEPERS

few load bearing „shoulders“





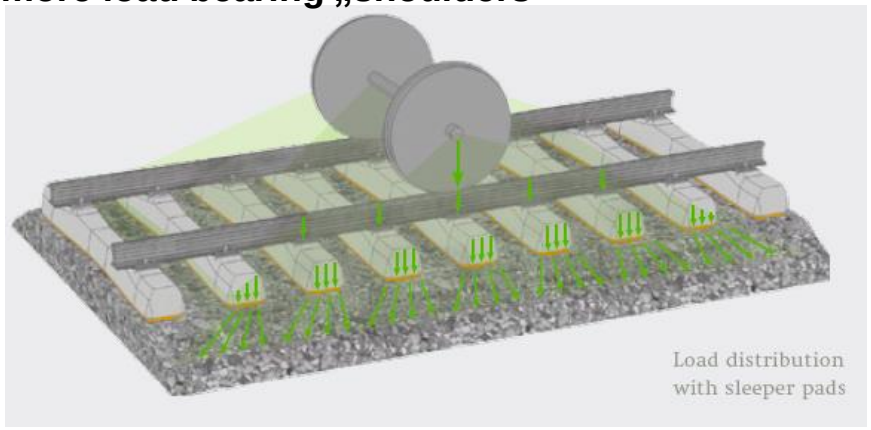


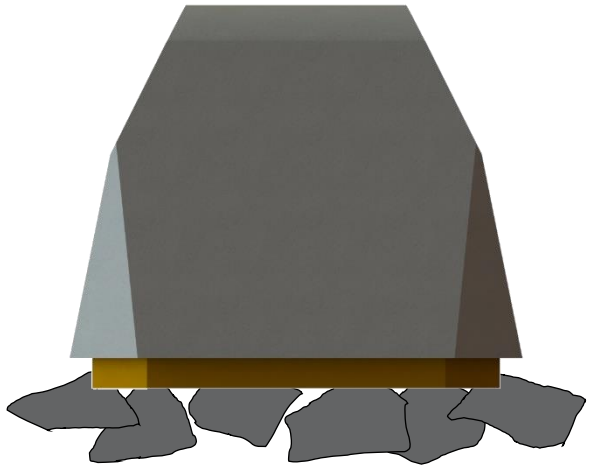


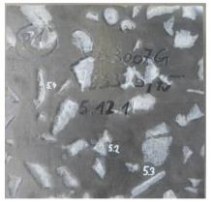
contact area:3-5%

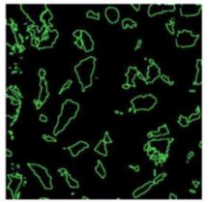
PADDED SLEEPERS

more load bearing „shoulders“









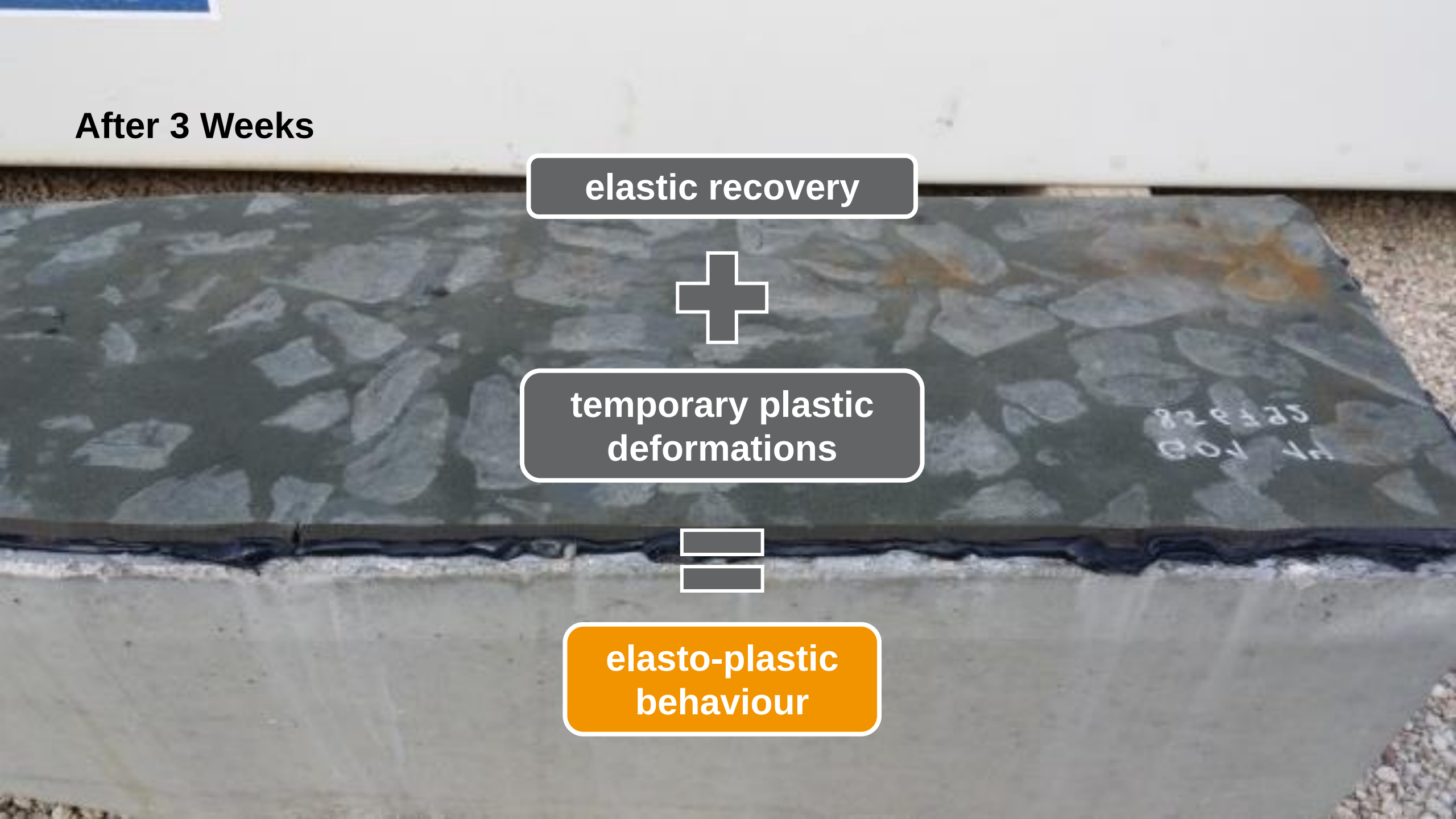
15-35%

Ballast Embedding

SLB 1510 after TC4 fatigue test

temporary plastic deformations

After 3 Weeks



In The Track: State of the ballast

In The Track: Radius 280m, 100 MGT

Long Term Investigation: USP Effect on Track Quality

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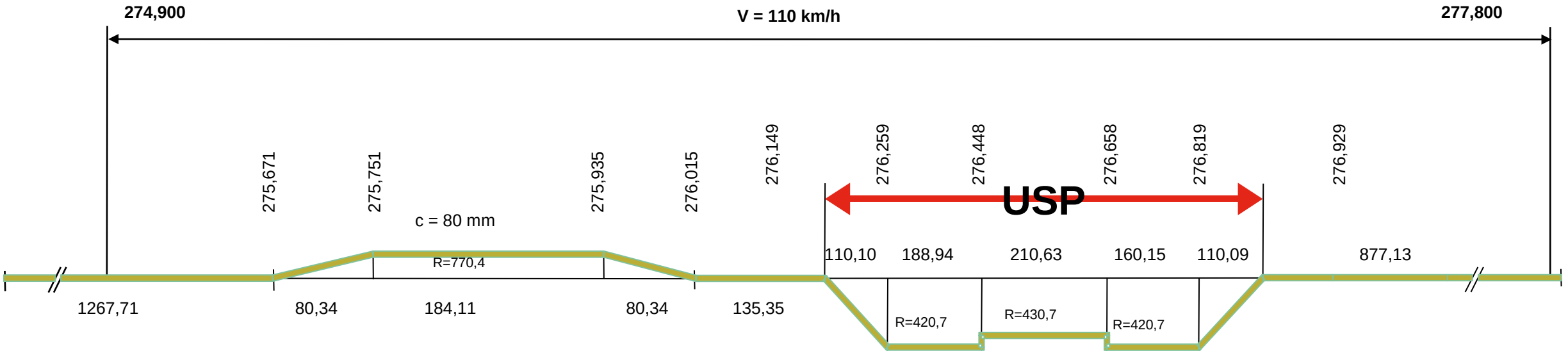
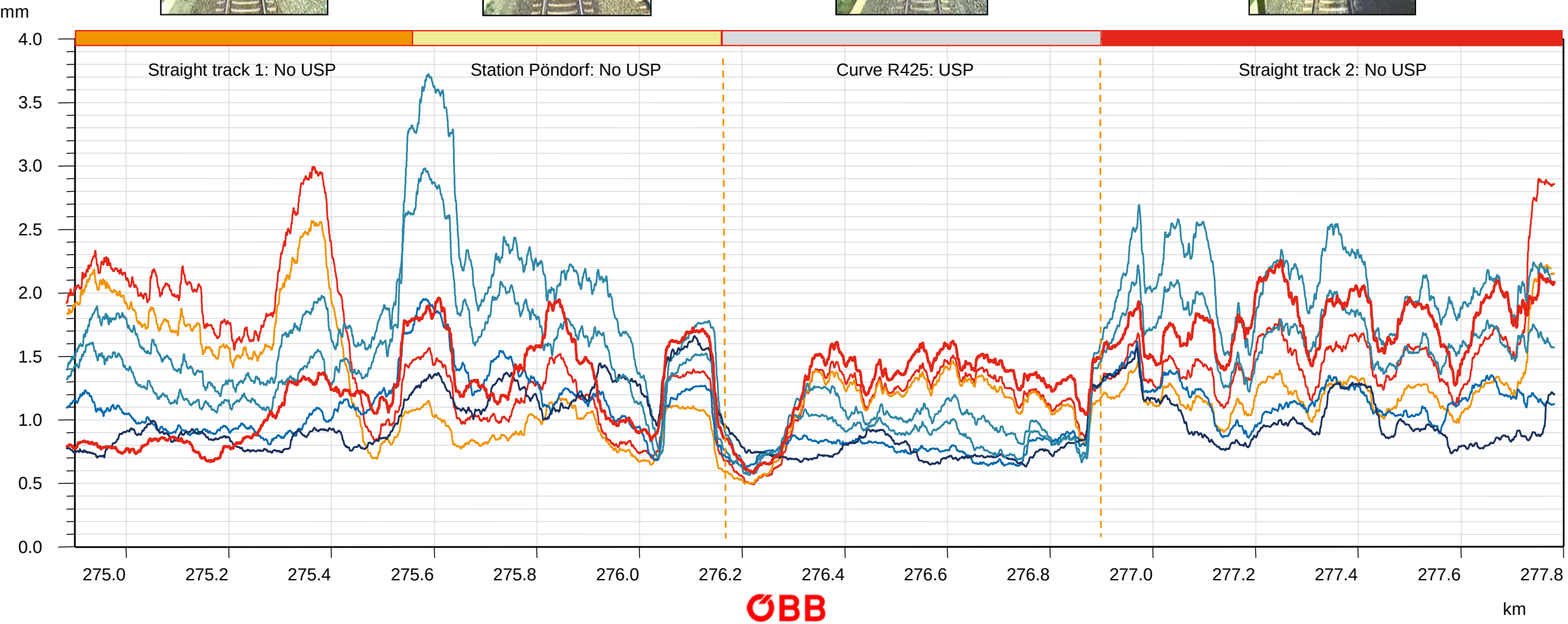


Frankenmarkt, 4014: Track 1



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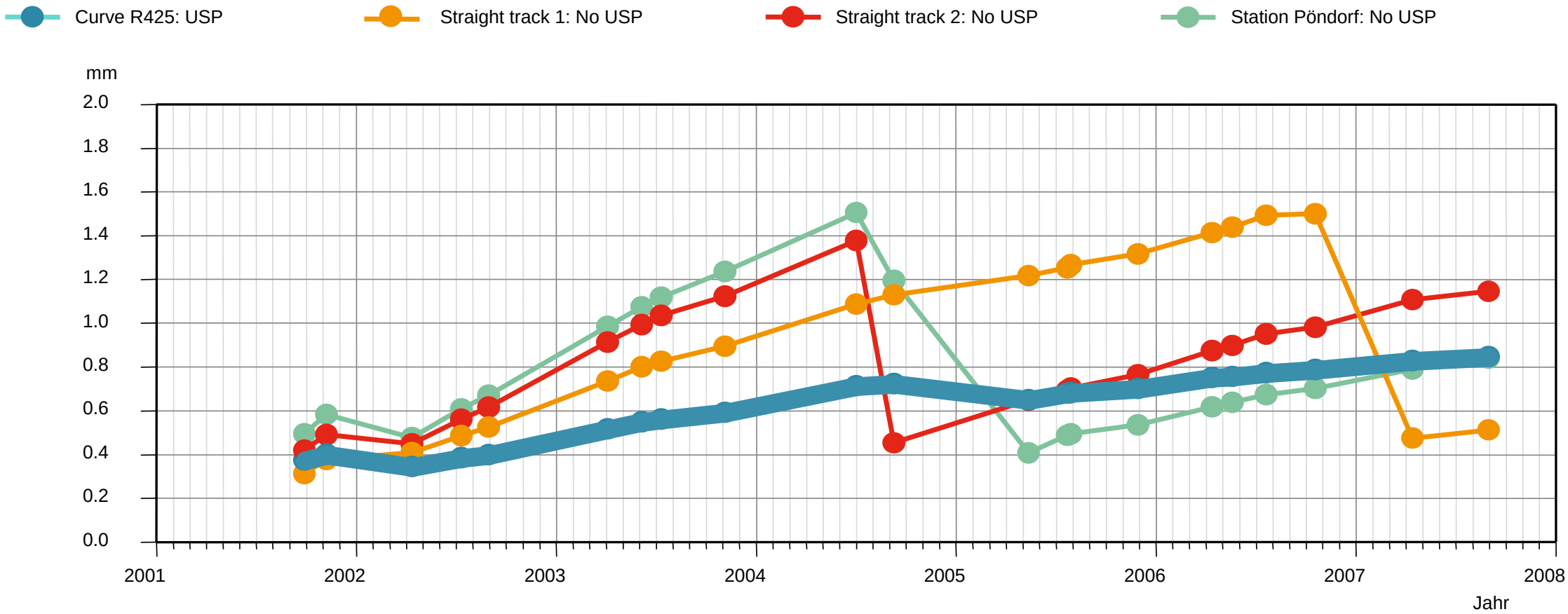
Frankenmarkt, 4014: Long Term Settlement



Frankenmarkt, 4014 Gleis 1

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USP Effect on Tamping Intervals

Evaluation of over 1,500 tracks in Austria
with Getzner USP type SLB 3007G

Bt/day, track	R > 600	600 > R > 400	400 > R > 250
80.000	2,5 → 5,5	2,0 → 4,5	1,0 → 2,5
55.000	3,0 → 6,5	3,0 → 6,5	2,5 → 5,5
70.000	2,5 → 5,5	2,0 → 4,5	1,0 → 2,5
35.000	6,0 → 13,5	5,0 → 11,0	4,0 → 9,0
18.000	8,0 → 18,0	6,0 → 13,5	5,0 → 11,0

Increase of Tamping Intervalls
By Factor 2,75

Change of tamping intervals [from → to years]

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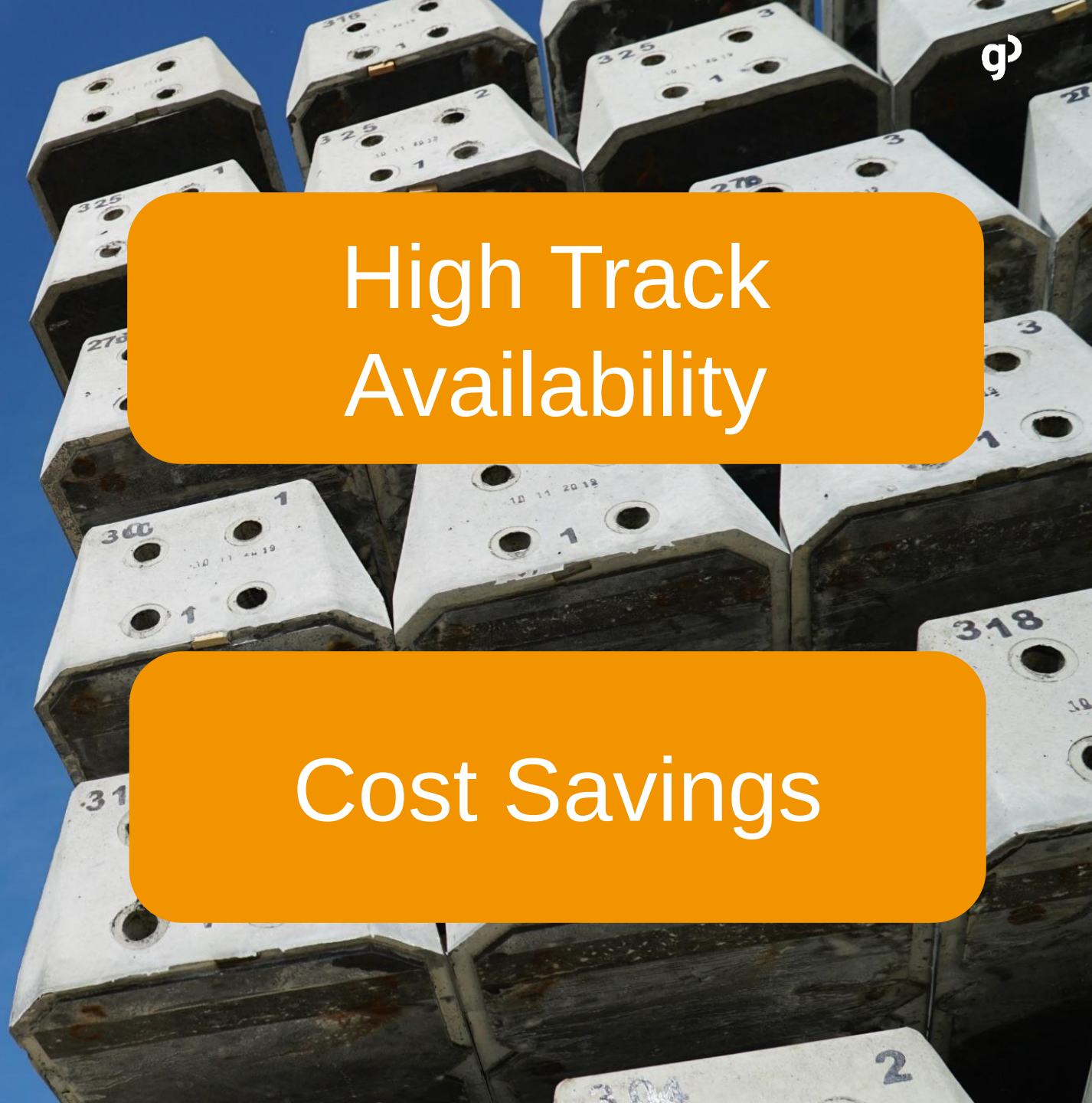
- **Less Maintenance**
- **Better Track Stability**
- **Better Track Quality**
- **Longer Lifetime**



High Track Availability

Cost Savings

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Thank you for your attention!