Ricardo Rail

InfraMonitoring

Monitoring the geometric track quality on high speed lines using in service passenger trains

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Project: Rail Tech 2017

Content

1. Introduction to InfraMonitoring
2. Implementation on HSL-Zuid

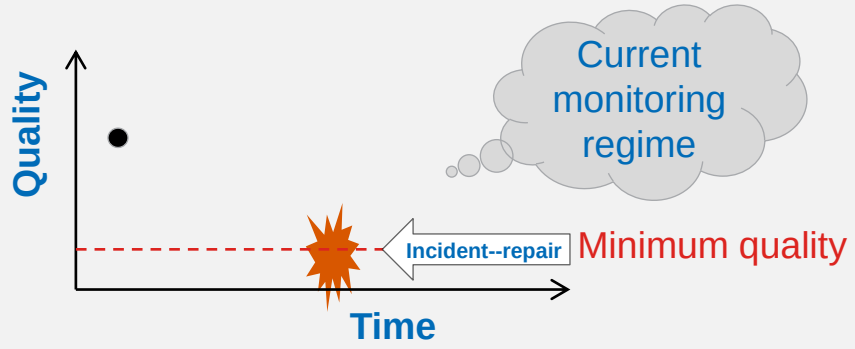
To increase maintenance performance, change is required

Improve performance: Availability and reliablity of the track system needs to increase at equal or lower costs

Nowadays

'Find and Fix'

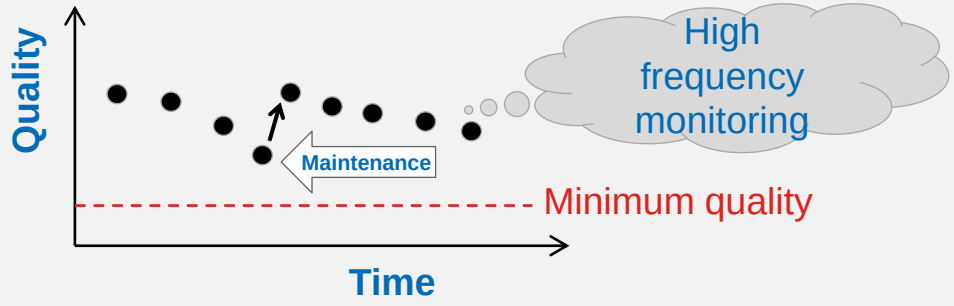
- Focus on measuring of **defects**
- Too late > incidents, disruption of service
- Not automated, long lead time



Future

'Predict and Prevent'

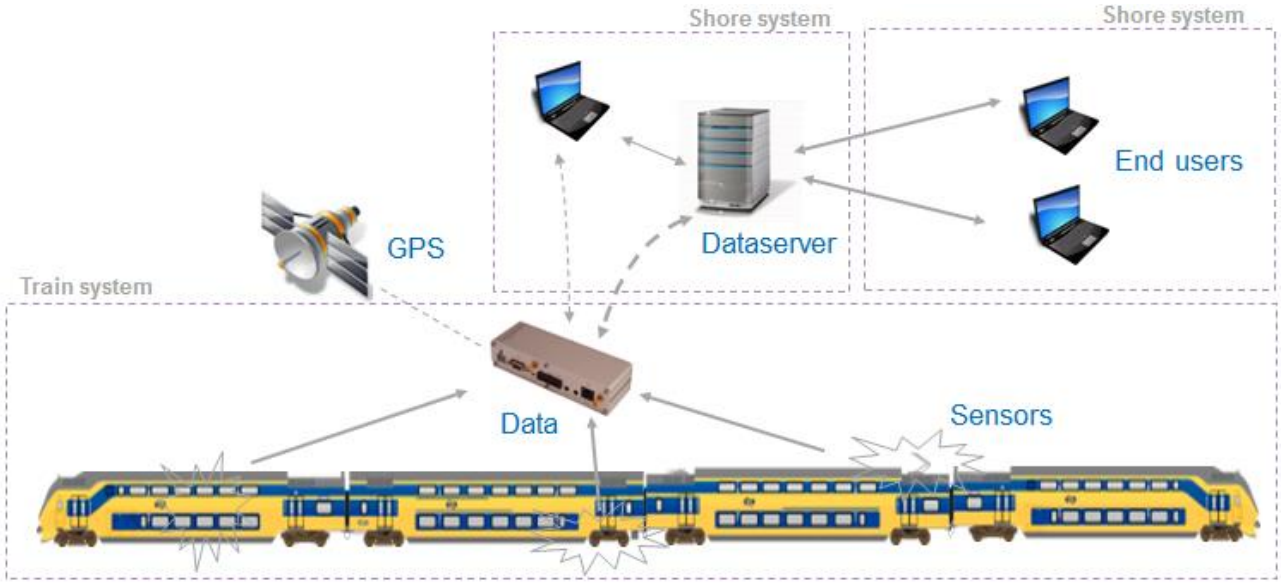
- Focus on monitoring **quality**
- Recognition of degradation
- Avoid incidents by means of preventive maintenance
- Fully automated, real time insights



Corrective → **Preventive**

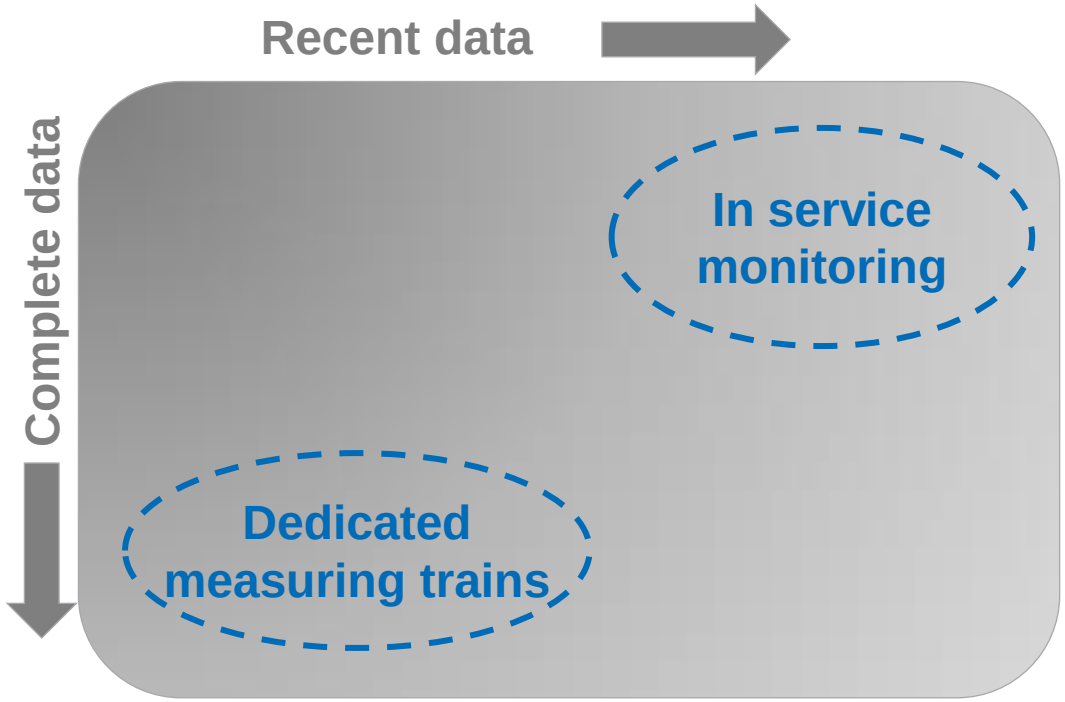
High frequency monitoring with InfraMonitoring – How does is work?

- Permanent monitoring of the infrastructure using in-service trains;
- Automatic and unmanned data collection during normal train service;
- Generic measuring module with GPS and communication;
- Easy extension with plugins;



Available plug ins

Finding the right monitoring mix



Measuring train

Current

time

Measuring train

Monitoring mix

time

In service monitoring

Search for best monitoring mix:

- Parameter which tend to change fast > In service monitoring
- Parameter which remain more or less stable > Dedicated measuring train

‘Force based’

‘Geometry based’

Implementation at HSL-Zuid – Requirements for rail and track geometry

Requirements:

Corrugation (25mm – 300mm)	Horizontal and vertical alignment (3m - 150m) (D1, D2, D3)

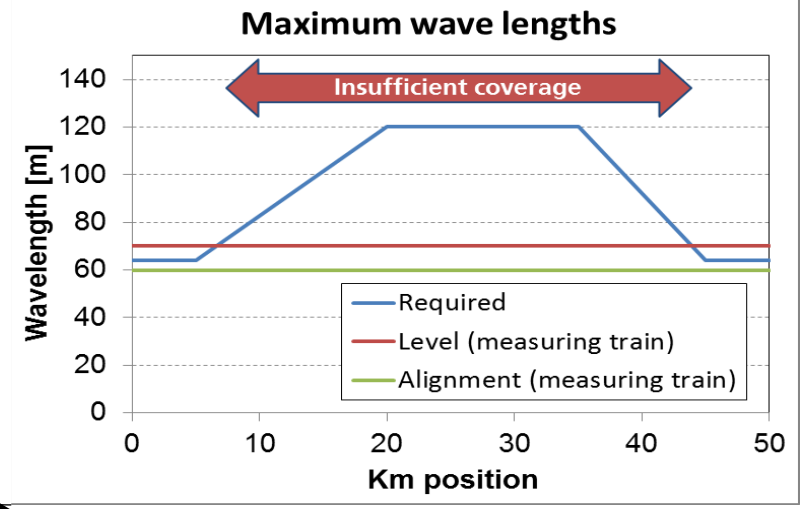
1cm | 10cm | 1m | 10m | 100m

Current coverage

Visual inspection / manual measurement	Traditional measuring train (3m – 70m

!

InfraMonitoring (1cm – 150m)

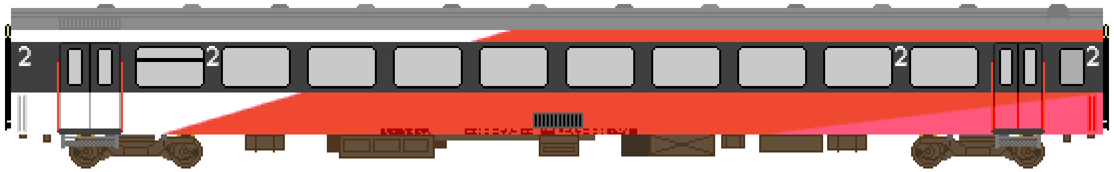


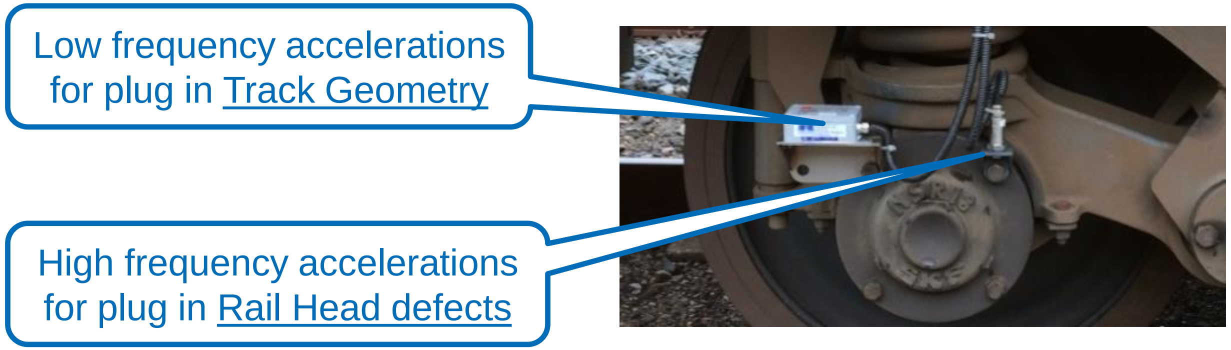
Required range fully covered by InfraMonitoring

! D3 [70m – 150m] is not provided by traditional measuring train

Implementation at HSL-Zuid - Configuration

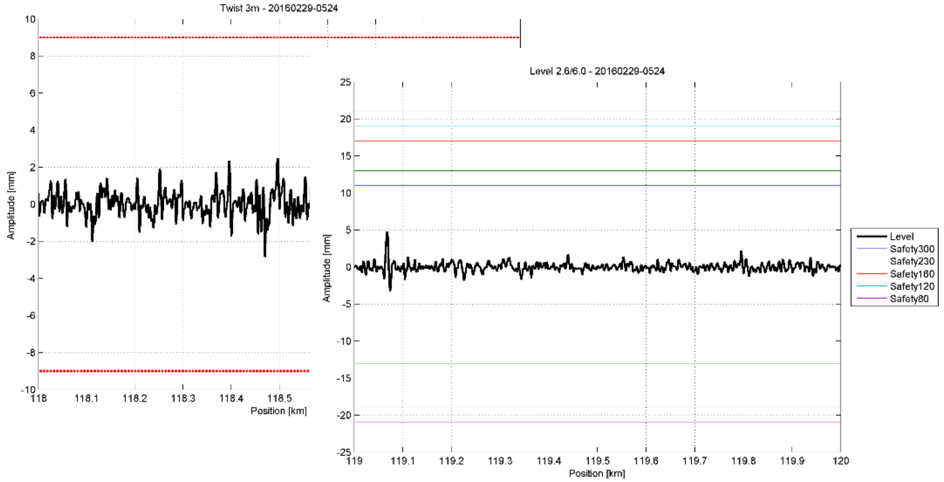
- InfraMonitoring installed on an intercity train
- Generic module combined with 2 plug ins:
  1. Track Geometry (Level, Alignment, Twist)
  2. Rail Head Defects
- Periodic reporting based on
  – Listing of exceedances
  – Measured quantities on the complete line





2	Date: 20160919											
3	nAlarms = 29											
4												
5	overschrijdingen RHEDA 300 & ballast 160											
6												
7												
8	Track	Speed	Date	KmStart	KmEnd	KmMax	Length	MaxValue	Threshold	Exceedan	Threshold	Parameter
9	west	160	20160919	146.9028	146.9003	146.9015	2.5	-9.49544	7	2.495438	Limiting 1	Alignment 9
10	west	160	20160919	146.9028	146.9003	146.9015	2.5	-9.49544	7	2.495438	Limiting 1	Alignment 9
11	west	160	20160919	146.9028	146.9003	146.9015	2.5	-9.49544	7	2.495438	Limiting 1	Alignment 9
12	west	160	20160919	146.9028	146.9003	146.9015	2.5	-9.49544	7	2.495438	Limiting 1	Alignment 9
13	west	160	20160919	147.0823	147.0808	147.0815	1.5	18.03272	14	4.032724	Limiting 1	Level 10
14	west	160	20160919	147.082	147.081	147.0815	1	18.03272	16	2.032724	Limiting 1	Level 10
15	west	160	20160919	147.0815	147.0815	147.0815	0	18.03272	18	0.032724	Limiting 1	Level 10
16	west	160	20160919	147.0815	147.0815	147.0815	0	18.03272	18	0.032724	Limiting 1	Level 10
17	west	160	20160919	147.0815	147.0815	147.0815	0	18.03272	18	0.032724	Limiting 8	Level 10
18	west	160	20160919	147.0815	147.0815	147.0815	0	18.03272	18	0.032724	Safety 160	Level 10
19	west	160	20160919	147.0828	147.0808	147.0818	2	9.442661	7	2.442661	Limiting 1	Alignment 9
20	west	160	20160919	147.0828	147.0808	147.0818	2	9.442661	7	2.442661	Limiting 1	Alignment 9

List of exceedances



Measured quantities

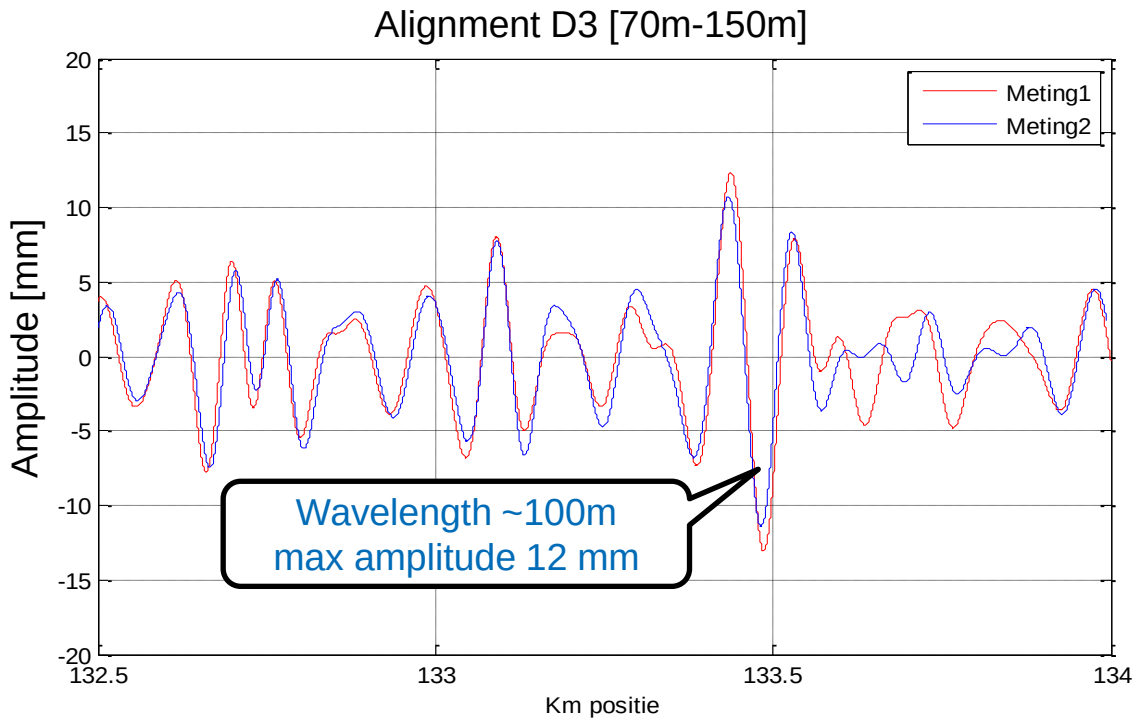
Implementation at HSL-Zuid - Example

- Track at location ‘’Rijpwetering’ was slowly shifting on its foundation;
- Degradation of geometry in D3 was not detected with the traditional measuring train;
- This can now be monitored with InfraMonitoring

Hogesnelheidslijn bij Rijpwetering schuift weg van fundering

RIJPWETERING - Het spoor van de Hogesnelheidslijn-Zuid (HSL) schuift bij Rijpwetering langzaam weg van de fundering. Dat schrijft staatssecretaris Wilma Mansveld (PvdA) aan de Tweede Kamer.

omroepwest.nl



Summary

- Moving from corrective to preventive maintenance requires more frequent information on the condition of the infrastructure;
- High frequent information on Track geometry, Rail head defects and Ride Comfort can be provided by using InfraMonitoring;
- Finding the right monitoring mix is key to succes.

Questions

Visit us at our Ricardo stand

Hal 3-3.112

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