

## ClareShield WheelPulse

### Overview

A remote condition monitoring system to continuously collect and analyse data to detect early onset of wheel wear and damage including flat spots and polygonization.

The system is installed close to the track infrastructure and collects real-time acoustic and vibration data from passing rolling stock, feeding it back to a web-based server. Smart algorithms analyse these datasets to help identify emerging faults and build long term trends of the fleets wheel condition.



**ClareShield WheelPulse measurement unit located trackside**



**Example WheelPulse dashboard view**

### Features & Benefits

#### Features

- Combines a range of data including sound, vibration, vehicle speed, weather conditions, audio and video recording to indicate wheel condition on passing vehicles
- Sound files for each vehicle can be logged for future review
- Data on individual vehicles can be accessed through interactive dashboards
- Smart alarms can be configured to inform customers when agreed data thresholds are breached

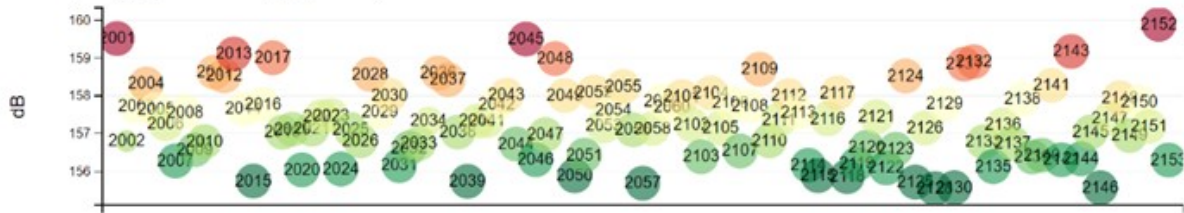
#### Benefits

- Customer has a continuous picture of wheel condition, wear, and damage trends
- Insights allow proactive maintenance intervention where most needed
- Reduced vehicle and infrastructure costs through early damage mitigation
- Improved fleet availability
- Reduced environmental noise
- Improved passenger comfort

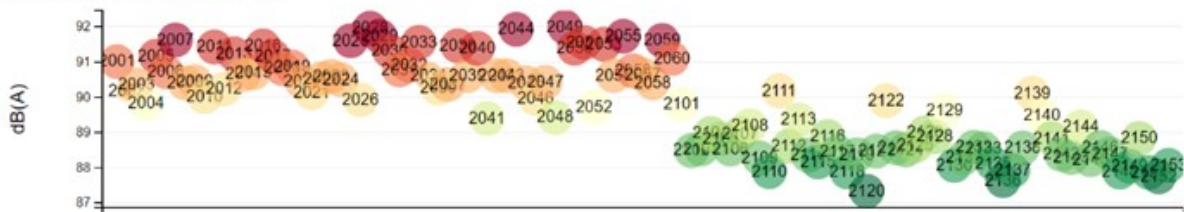


### ClareShield WheelPulse dashboard – Insights by vehicle

**Vibrations (Right) ↔ Vehicle**  
 Average  $V_{top}$  per vehicle (Right Rail)



**Sound ↔ Vehicle**  
 Average  $L_{Amax}$  per vehicle



**Example dashboard views showing vehicles exhibiting excessive noise and vibration characteristics together with comparative fleet data**

Area	Component	ClareShield WheelPulse	
Hardware (standard)	Noise and MP3 data	✓	
	2 x vibration sensor	✓	
	Humidity Sensor	✓	
	Radar	✓	
	Track temperature	✓	
	UMTS without SIM	✓	
	Battery 98 Wh (10-12 h)	✓	
	Voltage 12V-36V or 230V	✓	
	Options	MP3/MPEG3, FLAC Data	✓
		Spectrogram	✓
Dashboard module options	Boxplot	✓	
	Vehicle trends	✓	
	Messages/Limits	✓	
Data	ClareShield WheelPulse data available to Customer for up to 3 months after end of contract		