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# Railway Asset Condition Monitoring

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# Real-Time Railway Asset Condition Monitoring System

## Introducing the RH-xR Condition Monitoring System

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# A sophisticated blend of advanced signal processing algorithms combined with the prowess of machine learning, AI, and real-time machine operating state analysis with 96.60% accuracy

## Bogie Main Bearing
Outer race
Inner race
Ball damage
Cooked bearing on the shaft
Cooked bearing in the housing
Cage damage
Creeping damage
Radial and axial clearance
Overload

## Coupling
Coupling unbalance
Parallelism in coupling faces
Coupling wear
Coupling misalignment
Locked coupling
Wedge damage

## Main Engine
Broken / cracked rotor bars
Loose rotor bar joints
Stator eccentricity
Eccentric rotor
Thermal rotor bow
Loose rotor on the shaft
Loose stator windings
Shorted laminations
Loose connector phasing
Leakage defects

## The Wheel-Rail Mechanism
Wheel wear
Rail crack or breakage
Rail wear and slippage
Rail joint intricacies
Generator grounding issues

## Gear Boxes
Tooth skiving
Tooth wear
All Gear-mesh frequencies
Overload
Eccentricity
Misalignment
Backlash
Cracked and broken teeth
Hunting tooth frequency

## Compliance and Certifications
IP69K
EN 50155:2007
EMC Directive 2004/108/EC
MIL-STD-461E
MIL-STD-461F
MIL-STD-461G
MIL-STD-810H
EN 61010-1
2006/95/EC Low Voltage

## Real-Time Monitoring:

1. Continuous data collection from the mechanical system in real-time.
2. Sensors for vibration, speed, and temperature offer a holistic system health overview.

## Embeded AI and Machine Learning:

1. AI-driven analysis using embeded Machine Learning algorithms.
2. Enhances anomaly detection for potential issues.

## Mobile App Interface:

1. User-friendly mobile app delivers AI analysis results.
2. Empowers quick decision-making for operators and maintenance personnel.

## Integration of IoT, Big Data, AI, and Telematics:

1. IoT ensures seamless connectivity and data exchange.
2. Big Data analytics extracts actionable insights.
3. AI enables precdictive maintenance for early problem anticipation.

## Has been successfully implemented in;

- TCDD Turkish Railway State
- SBB Cargo AG Swiss Railway
- UZ Ukrainian Railway
- Metro Istanbul
- Metrorex Bucharest Metro (Alstom)
- Transelectrica AG Romania
- BauIN Osterreich GmbH Germany
- Un-Ro.Ro Marine Türkiye
- Tos Çelik A.Ş. Türkiye
- Krom Çelik San. A.Ş. Türkiye
- Mey|Diageo Türkiye