DAY 1 – 12 NOVEMBER 2024 – ADOPTING NEW TECHNOLOGIES

HOW AI & DIGITAL INNOVATIONS ARE TRANSFORMING MAINTENANCE PRACTICES

Solving Maintenance Problems Throughout The Whole Lifecycle Including Different Strategic Approaches and the Practical Application Of AI, Data-Driven & Digital Solutions

0830 Coffee and Registration

0900 Chair's Opening Remarks

***KEYNOTE STRATEGY PANEL* – RESULTS FROM SUCCESSFUL APPROACHES TO MAINTENANCE STRATEGY INCLUDING IMPLEMENTATIONS OF NEW TECHNOLOGY**

0910 – 1030 **Actual Experiences Of Implementing Different Maintenance Strategies Effectively To Solve Real-World Maintenance Problems**

Learning from the experiences of different operators with an emphasis on real-world, actual examples.

0910 **Operationalising Predictive Maintenance at TFL - Strategic Approach and Context, As Well As Achievements/Progress Made So Far**

- Setting the scene - TFLs capital expenditure programme and current overview of the challenges facing the network
- Strategic approach to maintenance at TFL and how this links to cost reduction and operational efficiency in the rail system
- Another year down the line - what are the latest trends and developments in the travelling public's use of the TFL network - What are the practical implications of integrating predictive maintenance and machine learning technologies into TFL's operations?
- Strategising for short-term implementation and long-term gains in predictive maintenance technology - what are the specific issues for TFL?

Ian Rawlings
Head of Profession, Vehicle Engineering
Transport for London

0930 ENGINEERING TRANSFORMATION TO ACHIEVE HIGH MAINTENANCE STANDARDS

How Northern Railway is Delivering A Robust Maintenance Optimisation Strategy Through Engineering Transformation

This case study will demonstrate how Northern Railway, the UK's second largest train operating company, is approaching maintenance optimisation

- Basic building blocks of operational maintenance management and how these are leveraged and executed to deliver Northern's asset maintenance objectives
- Northern's approach to maintenance optimisation through its Engineering Transformation Strategy
- Investment in maintenance facilities, workplace and people to deliver a maintenance system that delivers the best possible outcomes
- Learning and development strategies

Iain Burnett, *Director of Fleet*, **Northern Railway**

0950 INNOVATIONS IN DATA-DRIVEN ASSET OPTIMIZATION & CBM FOR COST REDUCTION

Putting Into Practice The Latest Advancements In Data-Driven Asset Performance Optimization & Unattended Condition Monitoring Utilising AI

Leveraging condition monitoring data for proactive asset management and predictive maintenance.

- Effectuating innovations in unattended condition monitoring
- *Commercial Application of AI:* Understand the commercial advantages of AI in rail asset optimization
- Integrate AI solutions for predictive maintenance to maximize commercial benefits.
- Aligning workflows and processes with maintenance objectives to enhance efficiency.

Martin Runge, *Head of Digital Services*, **Siemens Mobility**

1010 – 1030 Curated Interactive Discussion – Questions Include:

Where does AI adoption in rail maintenance led to significant improvements in operational outcomes, and what were the key drivers of this success?

What are the most effective strategies for upscaling the workforce to adapt to AI and predictive maintenance technologies, considering both technical and soft skills?

How can organizations manage the challenge of integrating legacy maintenance systems with advanced data-driven technologies, ensuring a seamless transition?

In the context of AI and digitalization in maintenance, how do you balance the reliance on human expertise versus automated processes to ensure optimal maintenance outcomes?

1030 – 11 am Morning Networking In The Networking Exhibition Area

Adopting The Latest Predictive Maintenance & Condition-Based Monitoring Technologies
ASSESS TANGIBLE RESULTS, ROI, AND RELIABILITY IMPROVEMENTS

PANEL - IN-DEPTH PREDICTIVE MAINTENANCE AND CONDITION-BASED MONITORING USE CASES

1100 – 1240 **Real-World Success Stories and Challenges in Implementing Predictive Maintenance and Condition-Based Monitoring**

Applying new technology to proactively address potential issues before they lead to failures (predictive). Address specific issues or failures in real-time or near-real-time based on the condition of individual components (CBM).

1100 PREDICTIVE MAINTENANCE EVOLUTION FOR TARGETED OUTCOMES
Evaluating Results & Resolving Challenges When Implementing The Latest Evolution Of Predictive Maintenance Technologies Into Existing Maintenance Frameworks

- Establishing clear metrics to evaluate the effectiveness of predictive maintenance
- Results on implementing predictive maintenance effectively
    - Enhanced operational efficiency
    - Cost savings
    - Extended equipment life and improved safety
- Recognising common hurdles and how they were overcome
- Exploring how predictive maintenance has been effectively integrated into existing systems

1130 CONDITION-BASED MONITORING INNOVATION CASE STUDY
Applying Some Of The Latest Innovations In Condition Based Monitoring & Evaluating Results & Improvements

- *Latest Innovations in Condition-Based Monitoring*: Understanding the newest technologies and innovations
- Quantifying the improvements in efficiency, safety, and cost-effectiveness
- Steps for successfully integrating the latest monitoring innovations
- Methods to assess the effectiveness of these technologies in real-world settings

1200 PERFORMANCE MONITORING BEYOND BEARINGS:
Making A Case For Expanding The Scope Of Performance Monitoring To Drive Systems, Brake Pads & Wheels

Broadening the scope of performance monitoring in rail systems, moving beyond bearings to include critical components like drive system brake pads and wheels . Highlighting the commercial benefits of expansion, addressing the challenges and strategies for effective implementation.

- *Benefits of Expanding Monitoring*: Exploring the advantages of including drive systems in performance monitoring
- *Challenges in Broadening Monitoring Scope*: Identifying the technical and operational challenges in monitoring additional components
- Results on how expanded monitoring can enhance overall rail system efficiency.

1220 – 1240 Curated Interactive Q&A, Questions Include:

How do you establish clear and measurable metrics to evaluate the effectiveness of AI-driven predictive maintenance, and what key performance indicators (KPIs) have shown the most promise in assessing outcomes?

What are the quantifiable cost savings realized through effective predictive maintenance implementation, and how do these savings translate into commercial benefits for rail operators?

Sharing observations on how predictive maintenance has extended the life of critical rail equipment and contributed to improved safety standards?

In the context of rail maintenance, how do you stay updated with the latest technological advancements in AI and predictive maintenance, and how can these developments be practically applied?

1240 – 1340 Networking lunch break

- AI AND MACHINE LEARNING IN ACTION *FOR* PREDICTIVE PRECISION -
"Synthesising Maintenance Histories Into Strategic Insights"

IMPLEMENTING AI AND MACHINE LEARNING IN MAINTENANCE PROCESSES – INTERACTIVE PANEL

1340 – 1530 **Explore How AI & Machine Learning Can Make Sense Of Data From Diverse Sources, Including Predictive, Digital Twins, Maintenance History, And Operational Data**

Hear from a mix of panelists including those who produce AI solutions and operators who use the applications in practice. Gain insights on transitioning AI projects from proof of concept to production, especially in "non-deterministic environments", i.e., variability and unpredictability that may affect the AI system's performance.

1340 EXPLORING THE POTENTIAL OF AI FOR PREDICTIVE MAINTENANCE DECISION-MAKING
AI & Machine Learning For Predictive Maintenance Decision Making - *Scoping Out The Capabilities And Addressing The Scale-Up Challenges*

Schedule repairs proactively, minimising downtime and reducing costs.

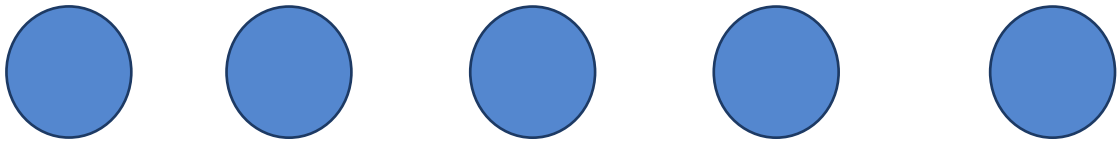
- Assimilating AI's role in predictive maintenance and decision-making processes
- Application of AI algorithms tailored to specific maintenance needs and equipment types

- Identifying the challenges in scaling AI for larger maintenance systems
- Continuously train and update AI models to improve prediction accuracy and reliability

1410 MACHINE LEARNING FOR PREDICTIVE MODELING OF COMPONENT FAILURE, FAULTS & TASKS
Practical Experiences In Utilizing Machine Learning For Predictive Modelling To Identify Trends & Predict Maintenance Needs

- Making sense of the role of machine learning in predicting component failure and faults
- The impact of accurate predictive modelling on maintenance efficiency and cost savings
- Implementing advanced data analytics for more accurate failure prediction models
- Regularly updating and training machine learning models with new data sets
- Establishing cross-functional teams to manage and interpret machine learning outputs

1440 – 1530 * CURATED INTERACTIVE Q&A INCLUDING INTEGRATED AUDIENCE ROUNDTABLES



Share Your Own Experiences With Attendees & The Panel - Questions include:-

What are the key strategies for transitioning AI projects from proof of concept to production in non-deterministic environments where variability and unpredictability are significant factors?

Can you elaborate on the role of AI in making predictive maintenance decisions? How does it compare to traditional decision-making processes in terms of efficiency and accuracy?

What are the challenges in developing AI algorithms that are specifically tailored for different types of maintenance needs and equipment?

What are the key considerations and challenges in scaling AI systems for larger maintenance operations while maintaining efficiency and reliability?

Predictive Modelling in ML: How does machine learning contribute to predictive modelling of component failure and faults, and what are the practical experiences in implementing these models?

1500 – 1530 Refreshment Break

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DIGITAL TWINS TRANSFORMING RAIL MAINTENANCE

Deploy AI-Enhanced Digital Twins for Optimal Rail Maintenance

DIGITAL TWIN UTILIZATION AND CHALLENGES PANEL

1530 – 1620 **Practical Creation And Use Of Digital Twins In Rail Maintenance, Emphasizing Reliability And Integration With Real-Time Data**

1530 APPLICATION AND RELIABILITY OF DIGITAL TWINS IN RAIL MAINTENANCE.
Insights Into Creating A Complete And Accurate Digital Image Of Trains With Real-Time Data For Maintenance Detection And Scheduling

- Challenges of integrating digital twins with existing rail maintenance systems
- The critical importance of data precision in digital twin applications for rail maintenance
- How real-time data feeds into digital twins can transform maintenance strategies
- Developing adaptable digital twin platforms that integrate with various rail systems.
- Establishing stringent data accuracy checks for reliable digital twin modelling

1550 UTILISATION AND NAVIGATION OF INFORMATION THROUGH DIGITAL TWIN TECHNOLOGY
Strategies For Efficiently Managing And Utilizing Data From Digital Twins, Including AI Integration To Process And Analyse Data

Explore the commercial impact of adopting AI-processed digital twins for informed, efficient rail maintenance.

- Handling the intricate data models within digital twins
- Seamlessly integrating AI to interpret complex data sets from digital twins
- Ensuring the workforce is prepared to use advanced digital twin technology effectively
- Employing sophisticated analytics to manage and interpret digital twin data
- *Dynamic Data Visualization*: Implementing visualisation tools to make real-time data actionable

1610 – 1620 Curated Interactive Q&A – Questions include –

What are the most effective strategies for integrating digital twins with legacy rail maintenance systems without causing significant downtime or disruptions?

How do we ensure the precision of data in digital twins, and what are the protocols for verifying and maintaining this accuracy over time?

What techniques or technologies are currently considered best practices for stringent data accuracy checks in digital twin modelling?

How does the integration of AI enhance the processing and analysis of data from digital twins, and what commercial benefits does this integration provide?

What approaches are most effective for preparing the workforce to use advanced digital twin technology and manage the change in maintenance procedures?

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DIGITALISATION UNVEILED: *PRACTICAL CASE STUDIES IN MAINTENANCE EFFICIENCY*
Discover the Impact on Cost and Efficiency

MAINTENANCE LIFECYCLE & SCHEDULING DIGITALIZATION PANEL

1620 – 1655 **Real-World Examples Of How Companies Have Successfully Implemented Digitisation In Maintenance**

1620 STRATEGIC LEVEL CASE STUDY ON DIGITALISATION OF MAINTENANCE PROCESS
Practicalities Of Digitizing Maintenance Processes To Simplify Maintenance Tasks, Improve Instructions, Manage Competencies, And Visualise Operations

- Prioritising technologies that simplify and optimise maintenance workflows
- Utilising digital visualisation for improved maintenance accuracy and oversight
- Creating user-friendly digital guides for maintenance tasks, sign-off processes and data capture
- Structuring training programs to upskill maintenance personnel

1635 DIGITALISATION OF PARTS MAINTENANCE AND SMART SCHEDULING
Optimising Scheduling And Maintenance Processes Through Digitalization, Particularly In Parts Maintenance Such As Brakes And Engines

- *Scope of Digitalization*: Identifying which aspects of parts maintenance can be effectively digitalised
- *Impact on Maintenance Schedules*: Assessing how digitalisation alters scheduling for parts like brakes and engines
- *Tailored Digital Approaches*: Developing custom digital solutions for different types of parts maintenance
- *Integrated Scheduling Systems*: Implementing digital tools for more efficient and accurate maintenance scheduling
- *Overall Cost-Efficiency Analysis:* Evaluating the financial implications of transitioning to digital maintenance process

ADVANCING THE EFFECTIVENESS OF DATA MANAGEMENT FOR UTILISATION
Raise Decision-Making Execution On Maintenance Interventions

INTERACTIVE PANEL DIRECTING THE BENEFICIAL USE OF DATA FOR INFORMED DECISION-MAKING

1655 – 1725 **Developing Data-Driven Approaches For More Impactful Analysis & Decision-Making – *How To Empower Action From Data Insights That Staff Have Confidence In***

- How data is used to inform decisions and optimise maintenance
- Implementing robust data collection and analysis tools for maintenance insights
- Establishing transparent processes for data validation and trust-building
- Deploying tools and methods for decision-making with a workforce that is educated and aligned
- Strategies for data visualisation for diverse individuals within the workforce
- What frameworks are in place to encourage industry-wide collaboration in establishing data format standards, and how can these be improved?
- What are the challenges and solutions for integrating standardised data protocols into legacy systems

1730 Chair's Closing Remarks & Networking VIP Drinks Reception