Advancing asset management through collaboration between national railways

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Brief history of the UIC AMWG

• UIC has strong tradition in technical leadership e.g. rolling stock, signalling etc.

• AMWG formed in 2008 to provide a whole system perspective

• Initial focus on sharing good practices and developing a common interpretation of Asset Management

• Current focus is on the practical implementation of Asset Management
AMWG members

- Austria (OBB)
- Belgium (InfraBel)
- Finland (FTA)
- France (SNCF)
- Ireland (Irish Rail)
- Italy (RFI)
- Russia (NIIAS)
- Norway (JBV)
- Spain (ADIF)
- Sweden (Trafikverket)
- UK (Network Rail)
- UIC
European Railways: One of the most dynamic sectors for Asset Management collaboration?

• We can directly compare costs and performance
• Our railways are in close geographical proximity
• Multiple forums for collaboration: EU, UIC, EIM
• Major EU investment in R&D (Shift2Rail, €967m) bringing together railway companies and suppliers
The ways in which we collaborate

1. Comparing Costs and Performance
2. Speaking the Same Language
3. Sharing Good Practices
4. Making Better Decisions

Asset Management Collaboration
1. Comparing Costs and Performance

2. Speaking the Same Language

3. Sharing Good Practices

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Asset Management Collaboration
Comparing costs and performance

• Lasting Infrastructure Cost Benchmarking (LICB) is a UIC group linked to the AMWG

• LICB has been comparing long run M&R costs for 20 years (see Klaus Wittmeier’s presentation)
  – Comparisons take account of key differences between railways e.g. degree of electrification, ratio of single / double track
  – Comparisons recently extended to performance

• The comparisons have had a significant impact on government policy, particularly in the UK
Comparison of normalised M&R costs

LCC fully normalised, 2015
(cost index per main track–km)
[Normalisation methodology: Standard methodology]

Extra information helps the comparison

<table>
<thead>
<tr>
<th>Maintenance &amp; renewal expenditures</th>
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<tr>
<td><strong>LCC fully normalised, 2015</strong></td>
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<tr>
<td>(Cost index per main track-km)</td>
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<td>[Normatisation methodology: Standard methodology]</td>
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<tr>
<td><img src="image1" alt="Graph showing maintenance and renewal expenditures" /></td>
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<tr>
<td><strong>Network utilisation</strong></td>
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<td><strong>Development of train frequency, 2000–2015</strong></td>
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<tr>
<td>($\text{train-km per main track-km}$)</td>
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<td><img src="image2" alt="Graph showing network utilisation" /></td>
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<thead>
<tr>
<th>Key work activities</th>
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<tr>
<td><strong>Renewal rate of rails, 2015</strong></td>
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<tr>
<td>(main track-km renewed per main track-km) in %</td>
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<tr>
<td><img src="image3" alt="Graph showing renewal rate of rails" /></td>
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<thead>
<tr>
<th>Asset performance</th>
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<td><strong>Asset failures, 2015</strong></td>
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<tr>
<td>(Number per m train-km)</td>
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<td><img src="image4" alt="Graph showing asset failures" /></td>
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Asset Management Collaboration
• How we describe and segment our networks: routes, corridors, delivery units

• How we describe our assets e.g. asset hierarchies, functional breakdown structure etc.

• How we define quantifiable parameters: failures, delays, safety

• How we interpret Asset Management: AM System, SAMP, Asset Strategies
Development of AM Guidelines

- General requirements in PAS 55 and ISO 55001 applicable to any asset intensive organisation
- Implementation guidelines need to be sector specific
- Target audience for the guidelines
  - Individual railways
  - Benchmarking groups
  - Research programmes
Objective is to capture the learning so that it’s available to our organisations and other railway stakeholders

Intention is to cover broad range of asset management issues

Case studies explicitly linked to evidence specification in Railway Application Guide for ISO 55001

Case studies will be publicly available (2018)
# AMWG good practice examples

## AM Maturity
- RFI (RETE FERROVIARIA ITALIANA)

## Maintenance Management
- Jernbaneverket

## Asset Management Objectives
- ÖBB

## Application of LEAN
- Iarnród Éireann (Irish Rail)

## Asset Degradation Models
- SNCF

## Lifecycle Costing
- ADIF (Abrimos caminos)

## Stakeholder Requirements
- Liikennevirasto (Finnish Transport Agency)

## Asset Strategies
- Network Rail

## Outsourcing
- Trafiikverket

## Risk Based Decision Making
- P&O
• Project underway to develop good practice guidelines covering e.g.
  – Criteria for what should be outsourced and what should remain in-house
  – Specifying and awarding contracts
  – Identifying and controlling risks
  – Information required to monitor the performance of the contractor

• Good practice guide due for publication early 2018
1. Comparing Costs and Performance
2. Speaking the Same Language
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4. Making Better Decisions
Prerequisites for good decision making

• Understanding the asset lifecycle
  – Design, installation, operation, decommissioning
  – Degradation, Failures, Interventions, Costs

• Understanding how decisions are taken (in practice!)
  – From strategy to implementation
  – Maintenance, Renewal, Operations, Enhancements

• Innovation coming from a Shift2Rail research programme known as In2Smart
  – Focus on better data, better analytics, better decision support
  – Circa €16m in first phase (2016-2019)
Mapping AM Decisions

Decision framework for an Intelligent Asset Management System (see UIC Railway Application Guide: Practical Implementation of Asset Management through ISO 55001)

SAMP

AMP

IAMP

Key:
- Decision Decisions
- Decision Values
- Decision Inputs
- External Interface to Asset Management System

Asset Strategies
Asset Plans
Delivery Plans
Execution & Operation

Strategic Asset Management Plan
Asset Management Plan
Implementation of Asset Management Plan

4–6 October 2017
UIC Railway Asset Management Conference
Applying the decision framework

Drones, Autonomous Vehicles

Robots

Machine Learning, Big Data
Final thoughts

• The UIC AMWG has created a good foundation for asset management in railways

• Majority of our members are implementing asset management regimes in their own organisations

• The outputs from the AMWG work are also providing a framework for research and innovation e.g. Shift2Rail
Thank you