Assessment of your current asset management practices: presentation of the UIC's self-assessment tool

Andy Kirwan & GianPirero Pavirani
WG AM UIC

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• Scope of asset management

• Eight key steps defining an AM system for railway infrastructure asset

• Definition of an AM Framework components

• Cross Reference to PAS 55
The members of the AMWG agreed to assess the AM activities of their own organizations within the scope of framework stated on guidelines by means of a self-assessment questionnaire.

The AMWG has analyzed a number of self-assessment approaches but realized that are not sufficiently address the specific needs of rail Infrastructure Managers.

Subsequently, it was decided, that a tailor-made questionnaire would best serve the needs.

- Enable a self-assessment of the management of rail infrastructure assets in order to identify the level of maturity of the processes applied within the UIC asset management framework.
- Enable the rail Infrastructure Managers to optimize its processes and activities to deliver the performances requested by its customers, funders and other stakeholders.
- Facilitate to benchmark against others
- Improve comparability between the execution of core activities as defined by the asset management framework, and enable Infrastructure Managers to Improve their own approach by learning from other Infrastructure providers.
The road map for the AM Maturity self assessment questionnaire

The methodology to fill in the questionnaire is based on the following 4 steps:

1. definition of framework components;
2. definition of core processes for each component; with description;
3. definition of assessor questions;
4. definition of possible answers, fine tuned on 6 maturity level of Asset management.

At the last has been introduced the concept of maturity to evaluate the growth and development of framework components and their activities or actions.
1. **Definition of framework components**

- **Components** of framework are macro elements of analysis.
- The framework reference is defined on Guidelines published by UIC.
- Framework components have a logical order as numbered in the graphical chart.

**ENABLING MECHANISMS**

- Asset information
  - Risk management
  - LCC tools
  - Business processes
- Competencies
  - Supply chain management

**Operational component**

1. Network objectives
2. Route strategies
3. Operational strategy
4. Asset strategy
5. Route operational plans
6. Route asset plans
7. Route delivery plans
8. Timetable and access planning
9. Execution of work
10. Network operation

**REVIEWING MECHANISMS**

- Audits
- KPIs
- Management reviews
- Corrective actions
2. Definition of main processes for each component with description

The main process characteristics for each component are defined. The specified processes are micro analyzed. The processes addressed applying the following principles:

• Component definition given on the UIC AM guide line;
• Based on own organization experience.
• Based on customization derived from logical order of each component (e.g.)
  • Fix starting Point;
  • Define referring targets;
  • develop alternative strategic approaches and evaluate them
  • decide on strategic approach to pursue;
  • derive action.
2. **Definition of main processes for each component with description**

The process is described through its relevant characteristics. For that, it is useful to compare every single process with each review/enabling mechanism.

<table>
<thead>
<tr>
<th>ASSET STRATEGY PROCESS</th>
<th>REVIEWING / ENABLING MECHANISMS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Asset information</td>
</tr>
<tr>
<td>Fix starting point</td>
<td>Data on asset condition available?</td>
</tr>
<tr>
<td>Define strategic targets</td>
<td>Decision taken on target # of incidents, level of punctuality etc.?</td>
</tr>
<tr>
<td>Develop alternative strategic approaches and evaluate approaches</td>
<td>Do you have the capability to simulate effects on lifecycle (costs) of asset, if one or the other decision should be taken?</td>
</tr>
<tr>
<td>Decide on strategic approach to pursue</td>
<td>Do you measure target achievement and how?</td>
</tr>
<tr>
<td>Derive actions</td>
<td>Do you derive concrete actions based on strategy and do you monitor the execution?</td>
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</tbody>
</table>
1. Network Objectives

Fix what sort of railway does the country want and is prepared to pay for

Inside there are 5 processes:

1.1 Engagement with customers and other stakeholders

Establishes whether there is agreement between stakeholders on future requirements for network capacity and performance, whether there is a strong business case and whether there is a confirmed source of funding. (Program contract with government shareholder)

1.2 Infrastructure safety, punctuality, capability and environmental sustainability

Establishes whether the safety, punctuality, capability and sustainability requirements have been specified, linked to the future demand for freight and passenger train services, e.g. maximum axle load, track gauge.

3 questions

2 questions
1. Network Objectives

1.3 Network capacity
Establishes whether the capacity requirements have been specified, linked to the future demand for freight and passenger train services.

1.4 Network segmentation
Differentiate network according to train service characteristics (high speed, passenger, high density, commuter line, freight)

1.5 Financial objectives
Establish indicative budgets from funder linked to infrastructure output objectives.
2. Route Strategy

**technical and economic performances per route: capacity, traffic density, budget**

Inside there are 6 processes:

2.1 Establish Route Capability

Establish whether the capability requirements of the route have been specified, linked to the future demand for freight and passenger train services, e.g. tunnels clearance, length of platforms in the station, max admissible train length, permissible axle load, line speed and uniform load per m on bridges on tracks, kinematic design of lines.

2.2 Define Route capacity

Establish whether the capacity requirements of the route have been specified, linked to the future demand for freight and passenger train services e.g. establish number of train.

2.4 Establish Route performances.

Set of route targets

Establishes route performances (e.g. availability, punctuality, safety, environmental impact: key Performance Indicators). Localization of the critical sub-routes where the organization has to dedicate more sources and effort to achieve the objectives.
2. Route Strategy

2.5 Gather data from Train Operator

Gather the characteristics of vehicle (e.g. brake weight, acceleration etc. and passenger flows).

2.6 External factors e.g. 3rd party activities

Gather and manage data of particular activities near the line e.g. 3rd party activities which potentially could affect trains service (road crosses, over pass, buried services etc.).

2.7 Funding resource

Funding for maintenance and renewal of the route based on long term planning at least 10 years.
3. Operational strategy

**Operations and control of the network.**

**Network access optimization for Trains Operators**

Inside there are 3 processes:

3.1 Future configuration of the infrastructure, e.g. the number of signaling centers and the degree of automation.

Define the present and future general requirements for network operation, based on traffic development (scenarios), technology targets

2 questions

3.2 Develop approaches for providing access to the network in order to allow maintenance, renewal and improvements works to be undertaken.

Establishes the network capacity and the timetabling process and optimized implementation of time slots for lines possession to be used for maintenance, renewal and improvements of infrastructures, based on the network performances requirements.

2 questions

3.3 Derive actions to implement and facilitate train operator access regime

Establish process for facilitating network access for train services e.g. new freight services, interoperability

3 questions
4. Asset Strategy

• definition of the maintenance optimization parameters (optimization between maintenance and renewals)
• technical choices on components
• definition of the inspections frequencies

Inside there are 7 processes:

4.1 Compile asset register (static data)

Collation of asset data from potentially diverse sources, including asset types, technology, asset volumes, location, configuration and interfaces (with other assets and the operational railway).

4.2 Define asset hierarchy and assign criticality to sub-asset types

Construct asset hierarchy showing parent-child relationships of sub-asset types e.g. track circuits as a sub-asset type of the signalling asset. Assign criticality to sub-asset types based on their impact on safety, train performance and cost. The criticality will depend on both the function the asset performs and its location on the network e.g. if it is on a high speed, high density route.

4.3 Analyze current and historical asset costs, risks and performance

Develop understanding of current asset state based on historical trends in key performance indicators e.g. age, condition, duty, reliability, impact on safety and train performance, maintenance history etc. Establish baseline against which improvements can be measured.
4. Asset Strategy

4.4. Determine future asset requirements
Define how the assets need to perform in the future to meet the requirements defined under network objectives and route strategies, e.g. targets for safety, capability, capacity, reliability, availability, maintainability, etc.

4.5. Identify life-cycle management options for delivering future requirements
Specification of different ways of maintaining, renewing and enhancing the assets. Includes the current approach and alternatives that maybe have lower costs or improved performance.

4.6. Evaluate the costs, performance and risks at asset portfolio and whole system level
For the life-cycle management option with the lowest whole life costs, determine its cost of implementation, the level of infrastructure performance and risks. Ensure that decisions made on one asset type have acceptable impact on other assets.

4.7. Understand implications and uncertainties associated with implementation of the asset strategy
Develop the interface between the asset strategies and the route asset plans. Includes assignment of accountabilities, specification of competence requirements, assessment of supply chain capability etc. Also includes assessment of uncertainties and risks associated with implementation of the asset strategies.
5. Route Operational plans

Taking into account Train Operators needs (number of slots, trains frequency) and maintenance possessions needs.

Inside there are 3 processes:

5.1 Translate demand of train operators (passenger, cargo) for running service into detailed capacity plans for number and type of train paths per route.

Figure out medium term and long term demand for running services of train operators per route incl. details about train types, service types etc., marshalling yards (number of trains and wagons per day) and service facilities.

5.2 Carry out detailed capacity planning per route, per station, etc. (medium and long term).

Derive detailed capacity plans per route for the medium term and long term.

5.3 Consider possession for maintenance and renewal in capacity planning per route.

Evaluate the need for possession to undertake maintenance and renewal work on the infrastructure and evaluate alternatives for these timeslots regarding impact on scheduled traffic, cost, punctuality etc. Adjust the need for possession to undertake maintenance and renewal work on the infrastructure with route assets plans.
6. Route Asset Plans

**Definition of route performance**
- Definition of the number of maintenance and renewal operations and their costs
- Planning of renewal operation, important maintenance and enhancement work

Inside there are 4 processes:

6.1 Overview of the route section

- Acquiring and management of all the necessary data of the process for long-term planning: the historical works (installation and modifications), the status of the asset (faults, diagnostics etc.), costs (WO and NTW), any change of use (changes performance of use).

6.2 Long term planning

- Asset Plans localize the specific location renewal work banks e.g. replacement of a life-expired section of track, and the maintenance regime e.g. typology and frequency of maintenance task. The work banks and maintenance regime are specified as the tactical component of a strategic plan, in which the longer-term elements are typically derived from modeling tools. Define and gather data on: 1-route condition (the characteristics of an effective route asset plans are renewal work and enhancements specified for a long term period), 2-performance targets, 3-work history (definition of data flow and work data base update - on the route) establish condition and performance trend (define, document, implement & maintain a process of planning all extraordinary maintenance activities, and continually improve its effectiveness).
6. Route Asset Plans

6.3 Maintenance and renewal work prioritizes. Define the need of track possession and slow-down action, volumes and costs resulting from application of the asset strategy based on funding availability.

Optimize the delivery of maintenance, renewal and enhancements, grouping work spatially and combining work to be delivered at the same time. Assessment of the risks to the plan delivering its objectives.

6.4 Investment & Upgrade Planning

Optimize the delivery of maintenance, renewal and enhancements, grouping work spatially and combining work to be delivered at the same time. Assessment of the risks to the plan delivering its objectives.
7. Route Delivery Plans

Optimization of operation organization (M&R)  
Confirmation of work condition (possessions, budget, assessed detailed projects)

Inside there are 7 processes:

7.1 Make or buy

Should be considered at more strategic level (one of enabling components)

7.2 Planning of equipments and materials

Define the supplier and material and verify the availability of yellow machines and tools.

7.3 Management of Suppliers & Contractors

Manage the qualification of contractors, suppliers and contracts.

7.4 Medium-Term maintenance works Planning

Optimize the delivery of maintenance, renewal and enhancements, grouping work spatially and combining work to be delivered at the same time.
7. Route Delivery Plans

7.5 Medium-Term investments and enhancement works Planning

Optimize the delivery of investments and upgrade and enhancements, grouping work spatially and combining work to be delivered at the same time.

7.6 Resource Supply Management

Provide a detailed design for construction projects. Confirm the availability and source of founding.

7.7 Supply Chain & Spare Parts Management

Align the delivery program with the local track access regime and the delivery capability of suppliers.
8. Timetable and access planning

Manage the impact of track possession with the slots demand, time table constructions

Inside there are 4 processes:

8.1 Prepare track access arrangements and possessions

- Plan the capacity which is needed for M&R activities and investments, upgrades.

1. Gather all data necessary for timetabling e.g.:
   - headway times,
   - speed profile,
   - axle load,
   - type of allowed rolling stock;

2. Describe the process of timetable;

3. Define basic frame;

4. Define exception driven train services.

8.2 Draft timetable

1. Finalize timetable;

2. Manage conflicts between demand and offer;

3. Check timetable robustness and quality.

8.3 Timetable refining phase

8.4 Short term timetable adjustments

Manage risks linked to route capability

5 questions
9. Execution of work

Realization of operation, planning execution, supply chain, realizations of the works, tests, acceptance of works start the service

Inside there are 7 processes:

9.1 Project management and work scheduling
Assign project manager. Provide briefing of the project. Scheduling of resource, booking of possessions and define detailed steps of work.

9.2 Facilities management
The provision of yellow machines, equipment and tools.

9.3 Management of staff: skills & competencies.
Management of competencies, aptitudes and behaviors required by individuals and teams. Ongoing training and certification

9.4 Construction
Standard of typical work application.
9. Execution of work

9.5 Certification of regular execution work

Management of methodology applied to verify and certify regular work execution (assessment and testing). Feedback of the execution works about improvement activity.

2 questions

9.6 Operation enabling (risk analyze NS 352, compliance with TSI, certification)

Management of third part certification.

1 question

9.7 Update the asset registers and cost management systems as a result of changes to the infrastructure

Management and analysis of data to change in the infrastructure register and monitoring the costs and performance benefit produced by infrastructure change.

2 questions
10. Network operation

Real time

Inside there are 4 processes:

10.1 Real Time traffic Management

Manage the traffic and set the route for trains.

3 questions

10.2 Real Time Capacity Allocation

Allocate capacity and timetable for unplanned journey.

1 question

10.3 Track Possession Management

Manage the track possession for planned works.

1 question

10.4 Contingency management

Manage the traffic and the track possession / degraded mode during incidents and urgent works

3 questions
4. Definition of possible answers characteristics, fine tuned on 6 maturity level of AM

At this step we formulate the appropriate questions related to the each item.

For every question are defined 6 different answers for each maturity level most compliant with railways organization.

In the Chart a guide to find the right answers are described the adopted structure for maturity levels.

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<th>Proposed structure and definition for maturity levels</th>
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<tr>
<td>1 Immature / Unpredictable</td>
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<tr>
<td>Awareness for process definition</td>
</tr>
<tr>
<td>Process definition</td>
</tr>
<tr>
<td>Process guidance</td>
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<tr>
<td>Target setting &amp; monitoring</td>
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<tr>
<td>Definition of roles and fields of responsibility</td>
</tr>
<tr>
<td>Process-relevant competences &amp; know-how</td>
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<tr>
<td>Quantitative scoring</td>
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</table>
The Excel Tool
A form to manage input and output data
A form multipage for read the questionnaire and evaluate your answers.
Network H "analysis from macro to micro"
Output for macro benchmark