MAIN LINE

Final Workshop

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THE ROLE OF LIFE-CYCLE ASSESSMENT TOOL (LCAT) IN ASSET MANAGEMENT

Content

- What is asset management?
- Why is asset management important?
- What is the LCAT?
- How will the LCAT help me?
- How can the LCAT be used?

WHAT IS ASSET MANAGEMENT?

What is asset management?

- Asset Management is:

« *The coordinated activities of an organisation to realise value from physical assets* »

Definition from International Standard ISO 55000.

What is asset management?

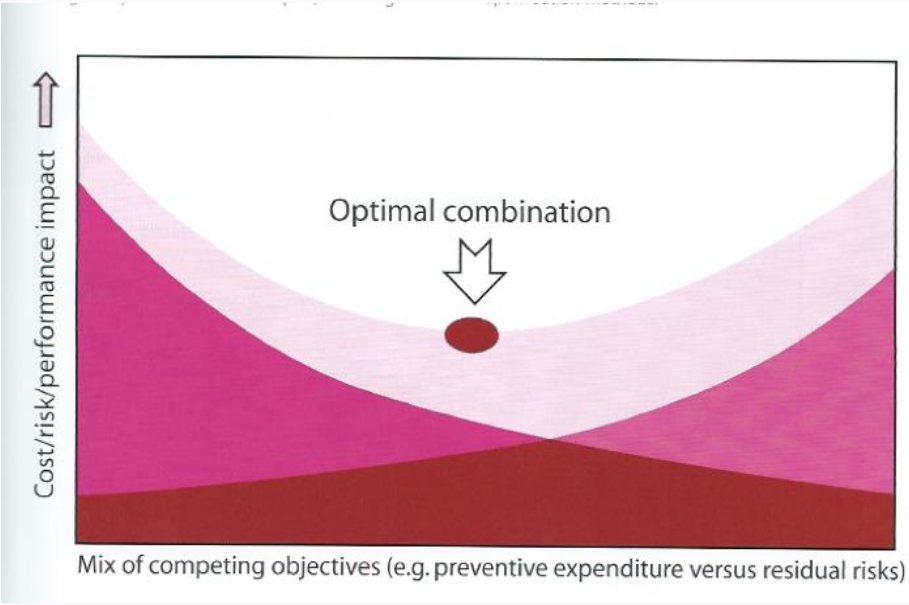
WHY IS ASSET MANAGEMENT IMPORTANT?

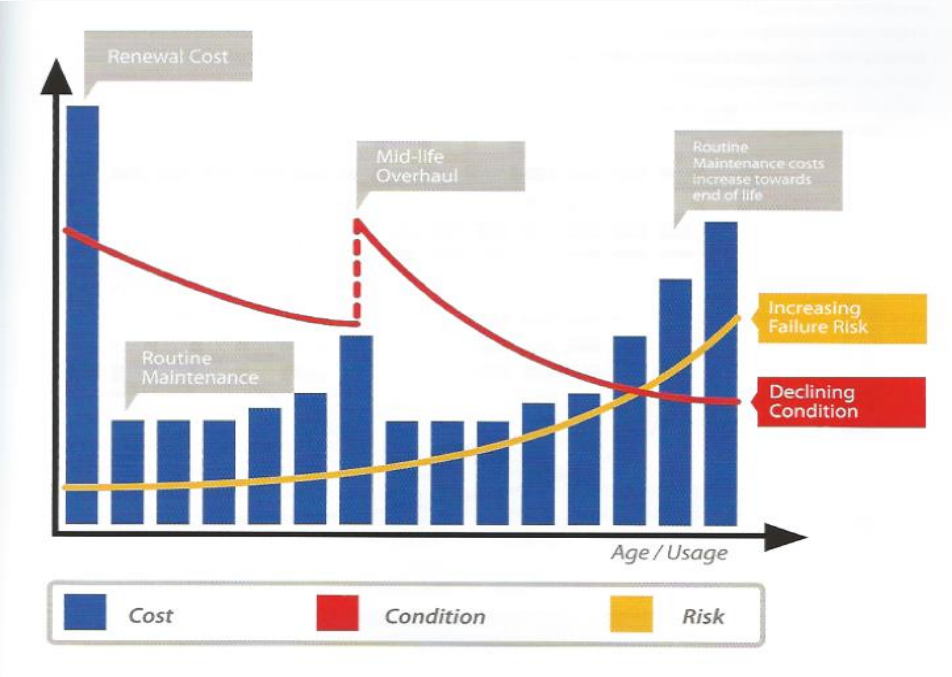
Why is asset management important?

- Less funding is available for railways due to the European recession.
- Asset Management will help Infrastructure Managers to:
  - Prioritise and justify works
  - Spend efficiently
  - Coordinate access/possessions
  - Define levels of safety and service

Why is asset management important?

- Asset management will help to prove:
  - Value for money
  - Financial sustainability





Why is asset management important?

- Asset management helps define minimum condition levels and safety limits based on engineering knowledge and experience

WHAT IS THE LCAT?

What is the LCAT?

The Life Cycle Assessment Tool (LCAT) can compare different maintenance/replacement strategies for railway infrastructure based on a life cycle evaluation.

The evaluation quantifies:

- Direct economic costs
- Availability (delay costs / user cost)
- Environmental impact costs

What is the LCAT?

The LCAT is a series of prototype models that:

- Are written using Microsoft Excel.
- Are flexible to suit different users across Europe.
- Can be adapted by users.

What is the LCAT?

Soil Cuttings

Track

Metal Bridges

HOW WILL THE LCAT HELP ME?

How will the LCAT help me?

Gives evidence / justification to decisions as the LCAT:

- Uses degradation data gathered from across Europe.
- Clearly displays trade-off between condition and financial costs.
- Shows environmental impact of a scheme.

Financial Savings

- If a 5% reduction in whole life cost could be achieved through better decision making by using the LCAT; for metallic bridges alone, a benefit of 250M€ could be realised across Europe.

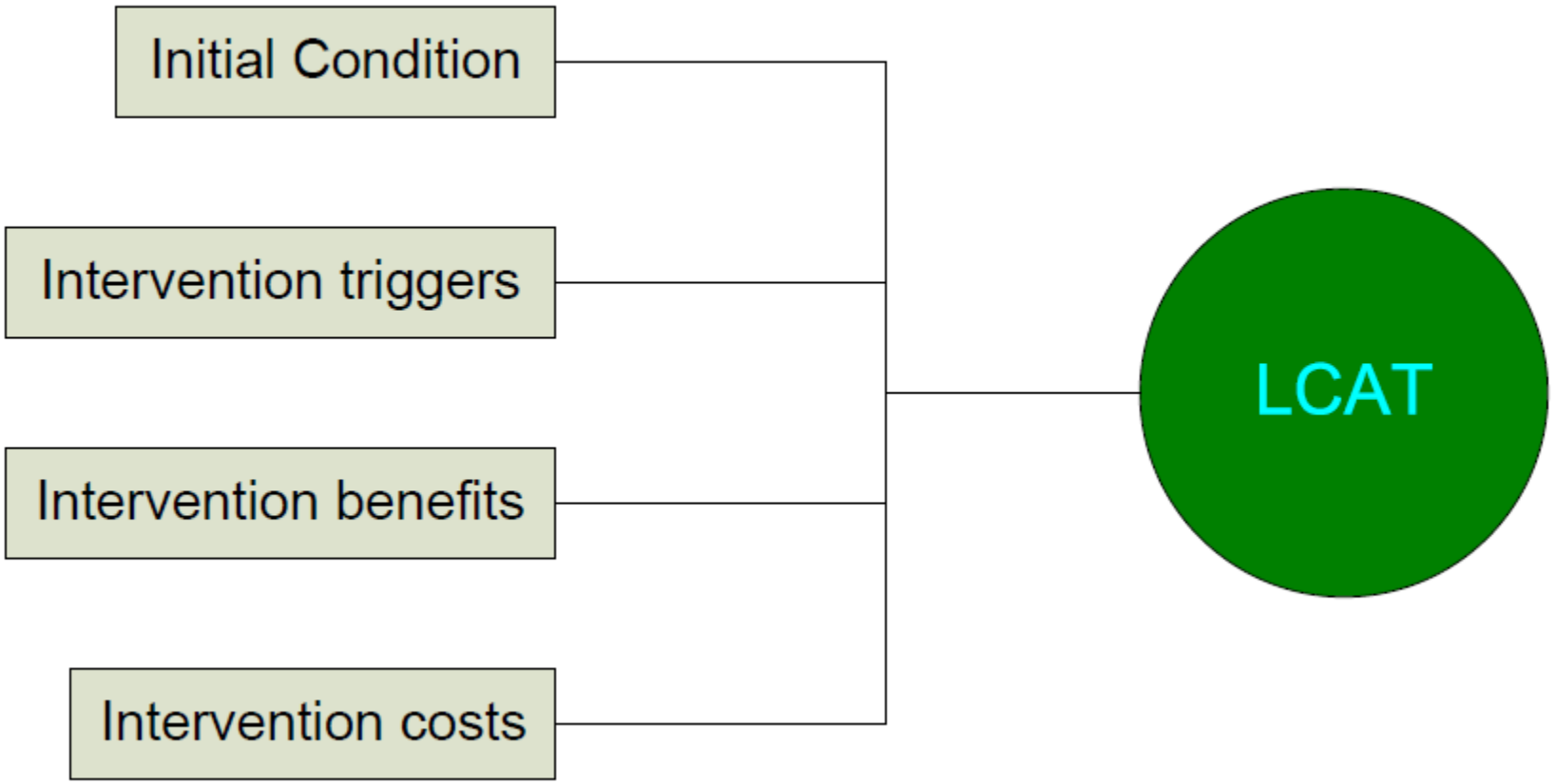
HOW DOES THE LCAT WORK?

How does the LCAT work?

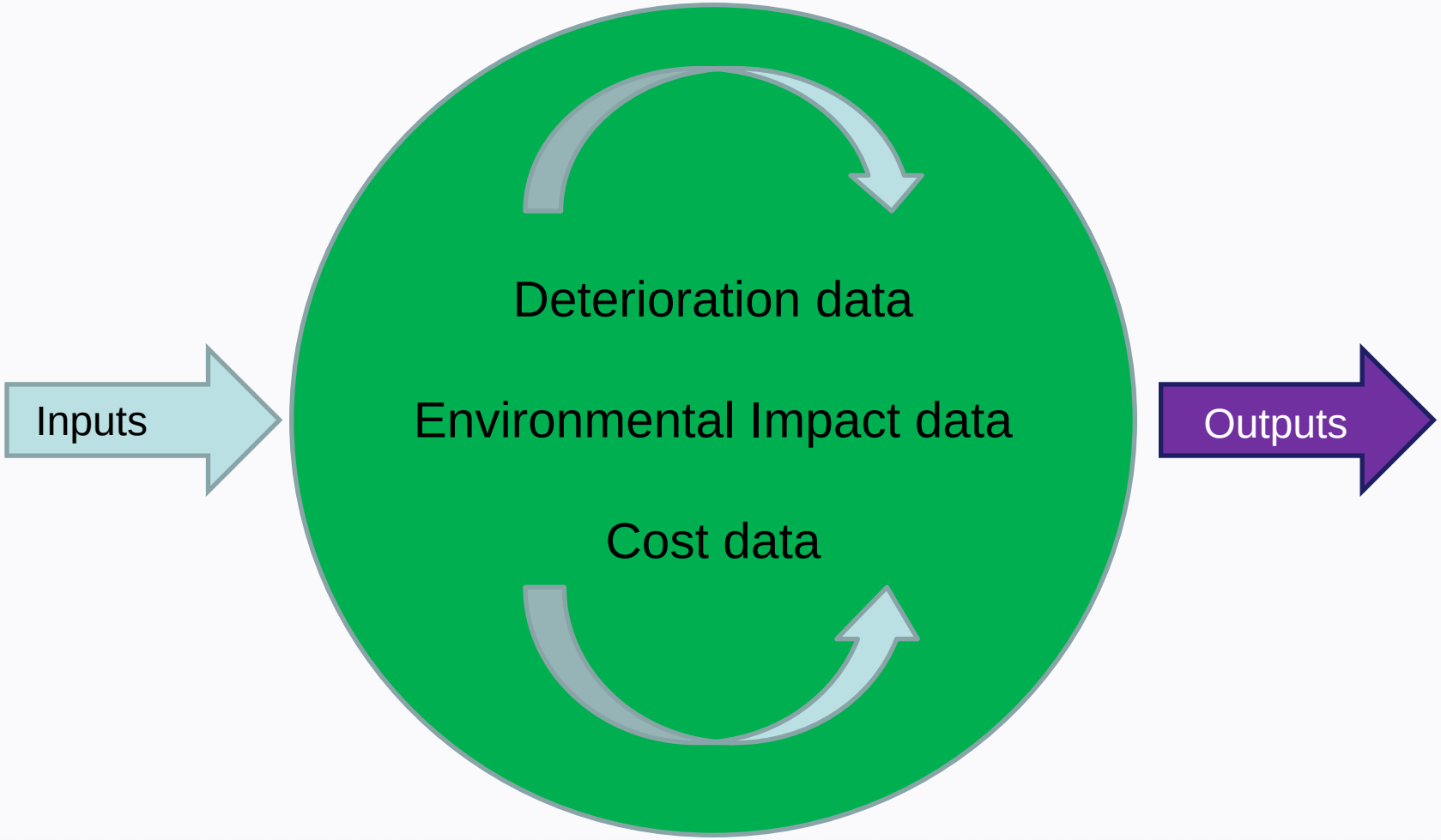
The LCAT uses the outputs from the other MAINLINE work packages and data from Infrastructure Managers. This is essential to validate:

- Degradation rates
- Disruption costs
- Techniques for life extension and monitoring
- Methods for replacement
- Environmental impact

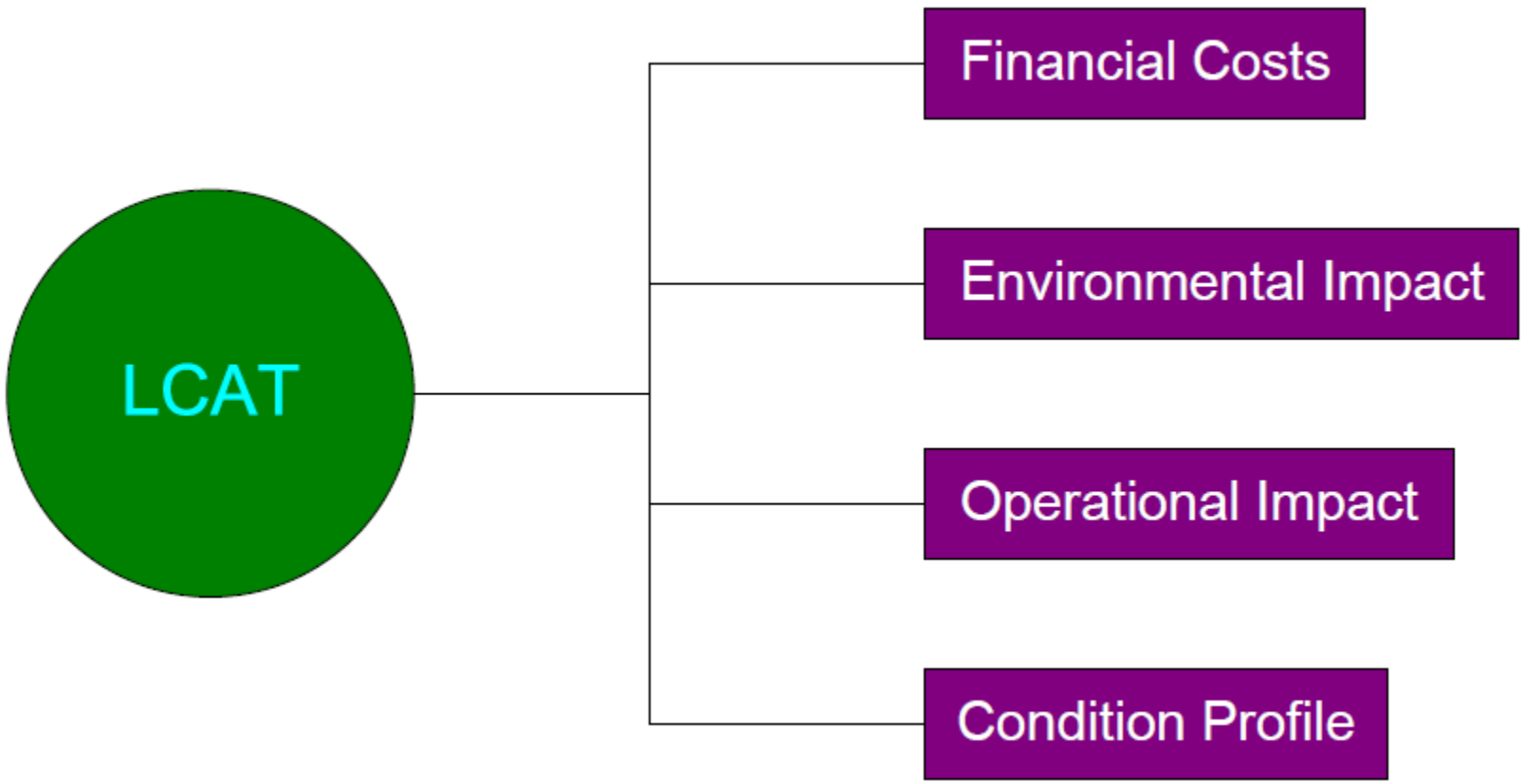
LCAT – Inputs


Initial Condition
Intervention triggers
Intervention benefits
Intervention costs
LCAT

LCAT – Processing



LCAT – Outputs



HOW CAN THE LCAT BE USED?

How can the LCAT be used?

The LCAT can be used to:

- Evaluate individual assets
- Run scenarios to confirm optimum approach for portfolios

Soil Cutting LCAT

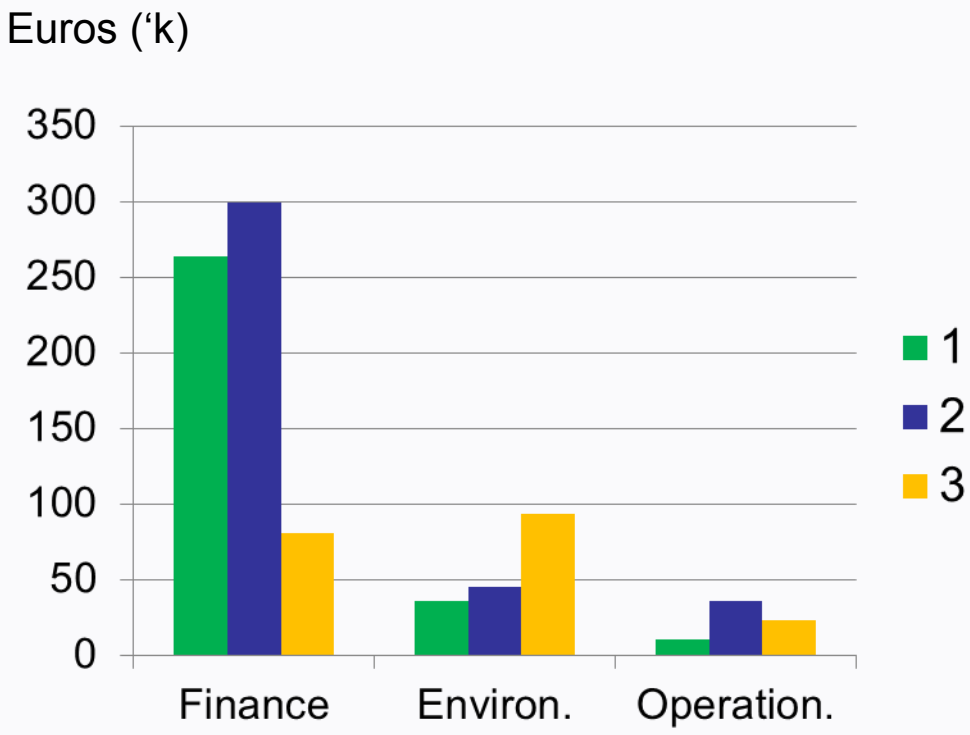
Description of the asset

The example asset comprises of cohesive soil, height of 4 metres and a slope of 25 degrees. It is in good condition with working drainage.

Three scenarios were reviewed:

1. Do nothing until a major intervention is required
2. Perform vegetation management and drainage clearance every 10 years
3. As 2, but also drainage repairs and burrow filling

Outputs



Note: Costs are indicative; not real data.

Conclusions:

1.Doing nothing led to a major earthworks intervention in Year 60.

2.Vegetation management and drainage clearance kept an acceptable condition for longer, but a major earthwork intervention was triggered in Year 80.

3.A strategic plan of asset management works resulted in a third of the lifetime cost compared to scenarios 1 and 2.

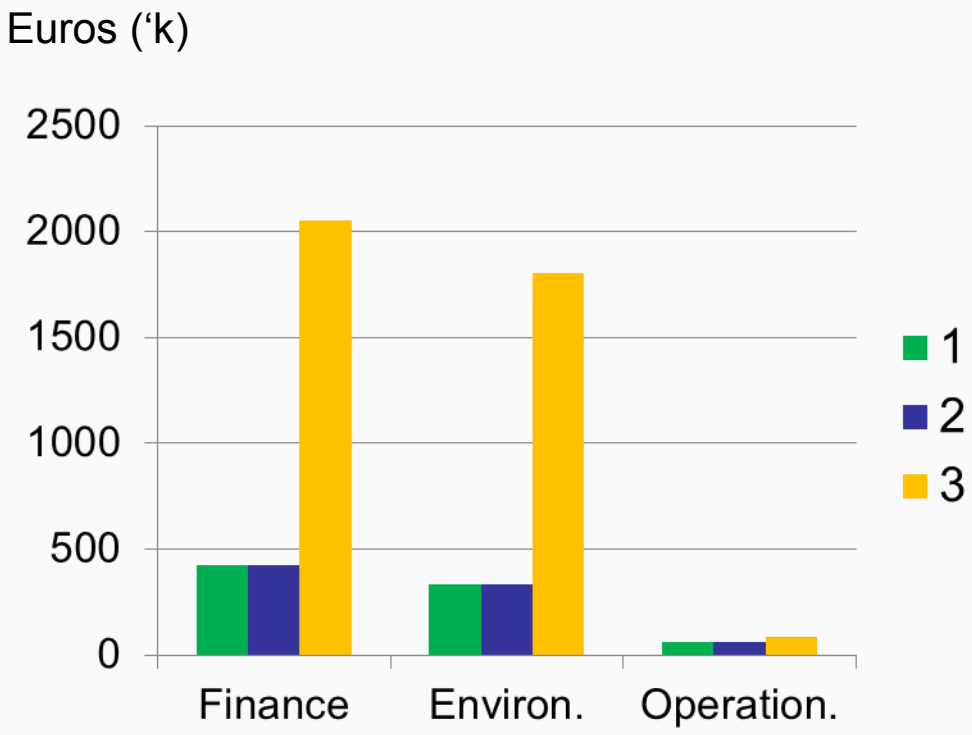
Track LCAT

The example asset has good drainage and sublayer, concrete sleepers, medium hardness ballast and is subject to 65,000t/day.

Three scenarios were reviewed:

1. Tamping triggered by user-defined Q value
2. Tamping set at a two-yearly interval.
3. Tamping set at a three-yearly interval.

Outputs



Note: Costs are indicative; not real data.

Conclusions:

1.Interventions directed by the Q value, resulted in the most efficient outcome (47 tamping runs and 3 renewals).

2.Setting tamping at 2-yearly intervals is very similar to the Q-value led interventions.

3.Increasing the tamping frequency to 3-yearly led to 17 track renewals over the life-cycle and an 400% increase in overall cost.

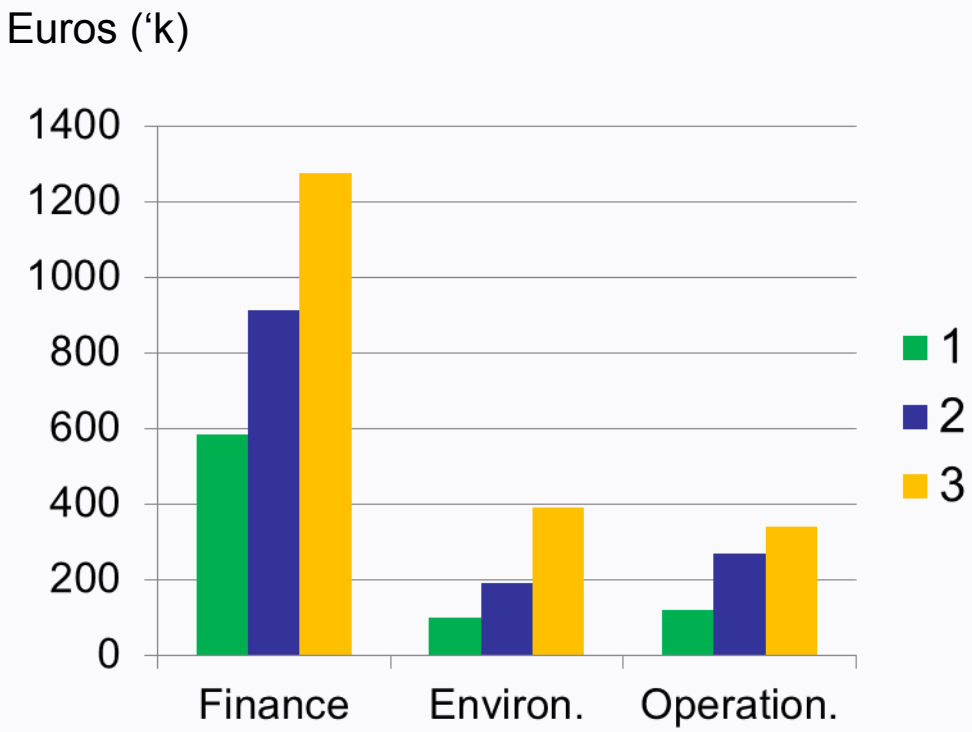
Metallic Bridges LCAT

The example is an I-beam main girder element with full coating. The beam is located in an industrial environment.

Three scenarios were reviewed:

1. Re-coat the beam at 50% loss of coating.
2. No re-coating. Plate at 80% of existing strength.
3. No re-coating. Replacement at 80% of existing strength.

Outputs



Note: Costs are indicative; not real data.

Conclusions:

1.6 regular re-coatings of the element results in the most efficient outcome.

2.5 plating interventions were triggered during the life-cycle.

3.Replacement of the element was triggered 2 times, resulting in twice the financial cost of re-coating.

Conclusions

- The LCAT models can be used to test outcomes of asset management approaches.
- The LCAT model outcomes indicate that regular maintenance of the asset typically results in a lower whole life-cycle cost.
- Environmental and operational costs allow detailed evaluation between similar schemes.
- Asset outputs can be rolled-up to provide a network view of applying a particular strategy.

Thank you !