Rail Asset Information Systems

Optimizing Asset Performance

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1. IT Company for Asset Management Information Systems
2. Focused on the Rail Industry, for > 20 years
3. Working European wide, with a wink to the rest of the world
4. IAM Certified for Asset Management training
5. Located in the Netherlands, which is in the middle of Europe
Asset Management

- Align Assets with Strategic Business Plan
- Manage Assets over their lifetime against:
  - Value
  - Risk
  - Cost
- Continuous Improvement
What do you want to know?

- What Assets do you need
- How do they deteriorate
- How / When to maintain the Assets
- How to optimize your organizations performance
Asset Characteristics

- Linear Assets
What Assets do you need

- Define and maintain your requirements
- Amount of traffic
- Speed
- Load
- Safety
- Power
- External requirements
Asset Data

- Vibration
- Wear
- Temperature
- Electricity usage
- Technical status
  - Grinding
  - Temping
  - Ballast Cleaning
How do your Assets behave?

- Deterioration
- Extensive use
- Technical developments
- Economical developments
How to maintain your Assets

- Enterprise Asset Management
  - Who
  - Does What
  - When
  - Where
  - Why
  - What does it cost
  - How long does it take
But: How to optimize your finances?

- What spend is needed
  - Capex + Opex = Totex
- What alternatives exist
- What risk are you willing to take
- How much flexibility to you have in time

- Asset Investment Optimization
Asset Investment Optimization in Railway Networks

Suzan van Ginkel
Strategical goals of asset investment planning

- Minimize costs
- Maximize capacity
- Maximize condition
- Minimize risk
Identify possible investments

- 7000 km track
- 2500 level crossings
- 7000 switches
- 12000 railway signals

This could lead to thousands of possible investments!

Source: https://www.prorail.nl/over-prorail/wat-doet-prorail/prorail-in-cijfers
Planning

Include time dependencies for realistic solutions

Number of possible solutions increases

What is the best possible solution?
Optimization model

Problem: Minimize Costs
Minimize Risk

• All possible portfolio plans
Optimization model

Problem: Minimize Costs
Minimize Risk

- All possible portfolio plans
- Optimal portfolio plans
Optimization model

Mathematical algorithms to find these optimal solutions:

- Multi-objective genetic algorithms
- Repeated Epsilon-constraint algorithm
• Decision support tool provides advice
• Decision makers are still in control
• Interaction with the tool is used to include expert knowledge
• The interaction process provides insight in the effects of decisions
• The suggested solutions are the basis for decision making
Conclusion

Make **well-founded decisions**, and enable **effective** asset management, by **optimizing** multiple strategical goals in the planning of railway asset investments!