Looking into the Future

OPTRAM
Universal Truisms of Rail

Too much of:  

Infrastructure Problems

Not Enough of:  

Maintenance Budget
Highest Priority Issues

How Do You:

1) Know where to work
2) Know what work to do
3) Prioritize work
4) Monitor work progress, costing and material
5) Extend asset life whilst avoiding run to fail
6) Demonstrate competence to operate
7) Improve safety, reliability and Return on Investment
Integration

Collect  Interpret  Analyze  Disseminate

Condition
- Track Measurements
- Construction & Maintenance
- Inspection
- Assets
- Traffic
- Finance

Work
- Workstation

Inspection
- Web (Java)

Equipment Location & Video
- OBM Viewer
- Field Staff
- Corporate

Usage
- Handheld/Tablet

Finance
- 3rd party software: EAM, Google, GIS, Etc.
Vizualization

- Enterprise or departmental solution
- Present decision support information
- Unified view of infrastructure data such as:
  - Track layout
  - Asset information
  - Corridor assets
  - Work items
  - Condition data
Sample Optram Screen

- Mile/KM Post
- Track Layout
- Designed & Measured Curve
- Work History
- Defect History
- Geometry History
- Roughness History
Rail Geometry

1. Swungout
2. Rail
3. Rail Upright
4. Heel Over
5. CLOQ Vear
6. Rail Deceev
7. Alignmen
8. Track Lamin
9. Allpsoon
Track Geometry with Roughness and OLE
Synchronized Video

Video Synchronisation
Links to Documents and Drawings
Looking into the Future
Analysis and Forecasting

An analytic engine built to *automatically* turn large amounts of railway data into prioritized actions like:

- Prioritize and plan work
- Identify areas of rapid deterioration or instable condition
- Evaluate work effectiveness
- Calculate quantitative measures of condition
- Do preventive maintenance by predicting failures
- Plan quarterly/monthly instead of annually
- Forecast when conditions will go out of tolerance
Optram Analysis and Forecasting

Organized & Correlated Data → Insight

Visualization and Reporting

Unified Database → Optram

Optram Scripts
Measurement Alignment

- Automatic
Measurement Thresholds

- Create event list based on threshold values in measurement data
- Output – event data
Track Tolerance

- Use look up tables for defect thresholds for different track types
- Tables held in database
- Works on event sets

If track type = Class 1 then Gauge Threshold >57.6
If track type = Class 2 then Gauge Threshold >57.2
If track type = Class 3 then Gauge Threshold >56.8

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Script Commands
Example: Forecast Tamping

- Forecasts where and when tamping required
- Optram automates 4 steps:
  - Aligns track measurements
  - Calculates historic quality indexes every 100m
  - Extrapolates when tamping is required
  - Presents results graphically
- Makes prediction over large railways practical
Aligns Track Measurements
Forecast Visualization

Historic
Forecast
Tamping History

Last Measurement
Recommend Tamping

Red = Fix
Green = OK

Tamping History
Example: Work Analysis

- Analyzes where tamping work was effective
- Optram automates 4 steps:
  - Aligns track measurements
  - Calculate a Track Quality Index for each survey
  - Determine where Track Quality improved
  - Compare improved Quality locations with recorded work
- Summarizes amount of
  - Productive and unproductive work
  - Unreported work
Optram Aligns Track Measurements
Optram Forecast Visualization

- Recorded work
- Improved TQI
- No change in TQI
Optram Work Analysis Visualization

- Change in Track Quality
- Recorded Work
- Productive work
- Unproductive work

![Diagram showing work analysis visualization](image-url)
Other Example Scripts Available

• Data Correlation
• Segmentation Creation
• Segmentation Analysis
• Quality Calculation
• Rate of Change
• Prediction
• Alert Limits
• Channel Derivation
• Channel Filtering

Plus whatever the user wants to write
Look into Future Development Roadmap

- Field Data System
- Linking to GIS
- Data upload from Bentley Rail design products
- Display and edit survey routes
- Integration with Bentley Platform
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