Infrabel Points Design and Maintenance
Summary

• Infrabel Objectives
• Infrabel Turnout Strategy
• New technology
• Turnout inspection strategy
• Investement program
• Expected results
Infrabel network
Some figures

• Main lines: 6.210 km
• Sidings: 2.847 km
• Level crossings: 2.108
• Turnouts in ML: 4.488
• Turnouts in Sidings: 7.519

• Mean track age: 18.4 year
• Mean speed: 112 km/h
• Maximum speed: 200 → 300 km/h
• ‘average’ UIC class: 4.69
1. Infrabel priorities

Strategic priorities of INFRABEL

Safety

Punctuality

Capacity

Financial contrôle

In line with society

RAMS + LCC

21.11.2012

Infrabel Point strategy
Turnout cost analysis

- **Turnouts = main cost driver**
  - 27% of track maintenance cost are related to main line turnouts
  - 10% of track maintenance cost are related to siding turnouts
  - 30% of track investment cost

- **Turnout = important failure source**
  - 50% of track failure = turnouts
  - 150 interruptions/year
  - 40% are diamond crossings
  - 30% are « trailability reducer »

- **Approach to reduce costs & failures:**
  - Modern technology
  - Longer life time
  - Less maintenance/ automation/optimisation
  - Optimum LCC-renewal date
2. Turnout strategy

Turnout Strategy

**LESS TURNOUTS**
Can we reduce the number of turnouts?

**MODERN TURNOUT**
How to get better turnouts?

**UP TO DATE TURNOUT**
Do we guarantee Optimum lifetime

SAFETY ➤ RELIABILITY ➤ COSTS ➤
Less turnouts

- 4488* turnouts on main line
- 7519* turnouts in sidings

Impact:
- Conflict zone: « Danger points »
- Availability reducer
- Network flexibility
- Main cost driver

Approach:
- Projects: get easily 30% less turnouts
- How to get this done out of projects?

(*: figures 1/1/12)
Modern turnout design

- Limited catalogue of new turnouts types
- Only wooden supports
  - Oak: life time 26 year
  - Azobé: tropical wood
- Old point machine S61
  - Robust
  - Difficult to maintain/tamping
  - Maintenance sensitive
- Fasting not robust for heavy bearers

-25% LCC
Up to date turnouts

- The actual turnouts are outdated:
  - 30% in ML is older than 26 years
  - Increased maintenance work load
  - Risk on strongly degraded situations

- Need for catching up in Main Line
- Need for higher production capacity
Logistics optimisation

• Unique assembly in production plant:
  - Optimal quality assurance
  - Plug & Play-principle
  - Quick installation in track
• Transport with tilting wagons
• Efficient handling and laying
  (Under investigation)
  - Pannel handlers
  - Cranes
Updating ‘Bascoup’ Turnout Factory

• Modern production plant
  - Adapt to the new technologie (concrete)
  - Keep machines up to date
  - Improve health and safety for workers

• Realise renewal program:
  - Increase capacity

• Cost contrôlé
  - Improve productivity
New turnout technology

1. Modern ALD-system

- Hollow bearer:
  - Internal design
  - Elastic fastening
  - Adaptable to different point machines
  - Under sleeper pad equipped
  - Standard locking

- New point machine
  - Tender is starting up
  - Permanent ‘trailability reducer’
  - Reliable

- Optimised rodding
- Monitoring system
New turnout technology

2. Concrete bearers

- Approved internal design
  - Longer life time
  - Less maintenance
  - Higher track stability
- Two fastening systems:
  - For 60E1-turnouts: baseplated
    - 1/20 inclined rails
  - For 50E2-turnouts: direct fastening
    - No rail inclination
    - Lower speeds
- Vossloh fastening
- Optional USP’s
New turnout technology

3. Optimised geometry (ie crossing)

• Problematic:
  - Frequent restoration welding
  - Frequent and inefficient tamping
  - Reduced asset life time

• Design modifications:
  • Improved internal quality (X-Ray-verification)
  • Optimised wing rail inclination
  • Optimised point geometry
  • Longer check rails
New turnout technology
3. Optimised geometry

Achieved results:
• Reduced warranty calls
• Transfer length x 3
• Increased track stability
• Decreased crossing failure rate

Further evolutions:
• Optimisation of surveillance and repair procedures
  - Intervention limits
  - Intervention procedures
• Explosion hardened crossing
Turnout Inspection Strategy

• Context:
  - Turnout inspection =11% of maintenance cost
  - A lot of (safety) people in track
  - Up to individual interpretation
  - Often performed by maintenance people

• Objectifs:
  - Automate measurement
  - Independent evaluation

• Prospectifs
  - Update measuring cars for main line
  - Troleys for industrial lines en sidings
Updated measuring car

**Today:**
- 3 Measurement operations:
  - Measuring coach
  - Track safety dimensions
  - ALD-verification
- EM130-measurement in turnout:
  - We only measure straight line
  - We miss basic safety dimensions
  - Turnout positioning is difficult
  - Evaluation is time consuming

**Tomorrow:**
- New measurement trains:
  - Measure both branches
  - Include safety dimensions
  - Residual hand measurement by one team
  - Optimised GPS-localisation
- Centrale evaluatiecel:
  - More efficient and productif
  - Homogeneous decisions
5. Investements in production plant

Investements Bascoup

• Update production plant
  - Adapt to new technology
  - Update plant to actual standards

• New production hall & buffer
  - Safety of handling
    • Handle mounted turnouts
    • Improve logistic facilities

- Logistic optimisation
  • Efficient handeling on limited surface
  • Provide buffer between mounting and transport
Investements Bascoup

- Machine renewal
  - New switch machining tools
    - Improve productivity and output
  - New drilling and cutting machine
    - Adapt to actual designs
- New multifunctional machine
  - Production of different components
- Improve safety and health of workers
  - Reduce handling of weights
  - Reduced impact on human body
## Effects

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6. Expected results
Impact on cost

- Maintenance costs are significantly reduced:
  - First 15% turnout reduction is already planned
  - Progressive impact from modern turnouts
- Productivity in production plant
  - By modernising machines
  - By increasing production
  - Update oude wisselpark
- Reduced investment program within 30 years
  - Modern turnouts
  - Reduced number of turnouts
Conclusions

• Infrabel has a need to upgrade its turnout infrastructure in order to:
  - Reduce safety risk
  - Obtain a more reliable network
  - To get maintenance cost under controle on the short, medium and long term.
• The Infrabel turnout strategy is tending for less, better and up to date turnouts.
• In order to reach this goals, efforts are requested from all parties concerned: R&D, production, logistics, network, …
• The investements and change process have started recently although this is a continuation of efforts over the last years.
Questions?