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INNOTRACK

Integrated Project (IP)

Thematic Priority 6: Sustainable Development, Global Change and Ecosystems

D4.5.1 Overview of existing rail grinding strategies and new and optimised approaches for Europe

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Version 1

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Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Definitions

1) "Maintenance (Grinding) Strategy"

Planned maintenance activity (defined by infrastructure maintainer, in theory independent of available technology, in practice often influenced by available/proposed equipment)

a) Intervention threshold (specified value, measured in regular intervals) (e.g. depth of corrugation, deviation from profile, depth of cracks,….)

b) Cycles (fixed on experience, availability of machine / track / etc.) e.g. x MGT (million gross tons), y months, every summer, between Christmas and New Year,….)

c) Combined with other maintenance activities (e.g. after rail replacement, after tamping, when line is closed for other work,….)

Definition of specifications (situation to be achieved):

- Longitudinal profile (evenness)
- Transversal profile (target and tolerance)
- Surface condition (roughness, facet widths,….)

2) "Maintenance Process"

Technology, developed to achieve purpose of intervention (hardware):

Rotating grinding stones, static abrasive blocks, oscillating grinding stones, Milling, Planing, High-speed-grinding ……

3) "Maintenance (Grinding) Procedure"

Utilisation of equipment in order to produce specified result:

- Positioning of grinding stones and setting of stone pressure ("grinding pattern")
- Grinding speed
- Number of grinding passes
- Side works (stone changes, cleaning…)
- Work documentation (recording, simultaneously or after work, spot-checks)

1. Executive Summary

The work package 4.5 studied the present situation with rail maintenance in order to find out potentials for development of strategies aiming at reduced life-cycle-costs for the rails.

2. Introduction

Four infrastructure managers participate in this work-group. Contributions from two of the remaining four IMs participating in other work packages could be implemented. Further input came from two rail manufacturers and one rail grinding contractor. Thus, the collected data may not be representative for all European railways, but common views on the summary document point to a reasonably well supported result.

3. Overview of existing rail grinding strategies and new and optimised approaches for Europe

3.1 Review of present situation

A questionnaire has been elaborated asking main questions regarding rail grinding practices and intentions for improvements or changes. The collated information is attached in Annexe 1 which comprises the information from all IMs (DB, SNCF, NR, ProRail). In addition, the grinding strategy documents provided by BV and OBB are included as translations in Annexes 2 and 3 for information only.

Discussion on the results of the survey can be summarised as follows:

- Reason for grinding is corrugation, Rolling Cycle Fatigue (RCF) or vehicle stability; they do not overlap usually.
- Each railway has specifications for rail grinding work; target profiles for grinding are specified. Apart from a standard profile special profiles are defined, in particular to deal with gauge corner fatigue.
- Some railways specify grinding cycles.
- In case of RCF gauge corner relief is specified generally.
- Grinding work can be classified in initial (pre-revenue), preventive and corrective work.
- Combination of grinding with other track maintenance work, in particular tamping before grinding is mentioned as preferred procedure.

3.2 Intentions and potential for further developments with a view to optimising maintenance

The represented infrastructure companies believe their practice to be satisfactory; no major requests for changes have been identified. However, a priority list of possible improvements has been elaborated:

1. There is a feeling that at present some gap might occur between theory (specification) and practice (availability of budget and track possession possibilities). A thorough application of existing specs could probably already save money.
2. The impact from the vehicles, including wheel profiles, condition and bogie primary yaw stiffness needs to be minimised. Wheel profiles should be examined and maintained within tight limits in order to optimise rail maintenance. (High impact vehicles should be identified and respective fines should apply.)
3. Grinding cycles should be checked and defined depending on traffic and line characteristics and rail grade.
4. Grinding cycles could be elongated by finding the best mix between metal removal, target profile and intervention period.
5. Improved planning of maintenance work will help to reduce maintenance costs considerably. By better use of shift time (longer track possession intervals, longer working shifts) and higher working speeds within a “slow moving train” grinding approach, site productivity could be increased and costs per meter track reduced.
6. Preventive strategies have to be favoured over corrective ones, metal removal per intervention being in the range between 0.1 and 0.3 mm per intervention.
7. Planning needs to be done in a long-term approach (up to three years in advance).

4. Conclusions

The first project year allowed to collect, discuss and compare valuable information regarding present strategies. It served to define approaches for optimisation and further development, which will be the basis for the following activities aiming at LCC reduction by optimised rail maintenance strategies.

5. Annexes

Annex 1: D4.5.1-D1-Grinding Strategies-Annex1.pdf :

"Compiled information of feed-back from questionnaires regarding present grinding strategies and further development"

Annex 2: D4.5.1-D1-Grinding Strategies-Annex2.pdf

"BVS 524_17 ENG: Technical Specification Grinding Of Rails And S&C – Banverket"

Annex 3: D4.5.1-D1-Grinding Strategies-Annex3.pdf

"Excerpt in English from Work Document 731 - Rail Grinding – ÖBB"