Development of the Future Rail Freight System to Reduce the Occurrences and Impact of Derailments in Europe

A seminar on the results of the EU-funded project D-RAIL
Stockholm, 12 November 2014

Seminar organised by UIC, Newcastle University, and Trafikverket, hosting ERA as “key note” speaker

Presentation by: Dr Björn Paulsson (UIC/Trafikverket)
RESEARCH PROJECT

Funded by the European Commission
(Seventh Framework Programme)

3 Year Project Started October 2011
and ended 30 September 2014
(Total Budget €4,800,000)
Coordinated by UIC and University of Newcastle
European rail freight is of strategic and economic importance

Derailments cause major network disruption and societal impact

Large number (low cost) - Small number (high cost)

ERA initiative to reduce freight train derailments supported by EC

Carried out research indicates potential for major step forward
OBJECTIVES

- Reduce the occurrences of freight train derailments within Europe by between 8 - 12%

- Through understanding and mitigation provide derailment related cost reductions of 10 – 20%

- Improve the competitiveness of freight operation against other transport modes
D- RAIL Partners active in many important EU related projects
PROJECT ARCHITECTURE

WP1-Derailment Impact

WP2-Demand & Operation

WP3-Derailment Analysis

WP4-Inspection & Monitoring

WP5-Integration of Techniques

WP6-Field Testing & Evaluation

WP7-Operational Assessment

WP8-Dissemination
The call from EC was a level 2 project. This means that the call had to be followed in details.

In the DoW it was stated that in D-RAIL the most promising solutions should be tested. We are very glad that several different tests from different suppliers were tested.
Now we carry on with the real agenda
How do we implementation D-RAIL result?
Comment on results
D-Rail provides for key inputs on:

- Future train and infrastructure condition monitoring
- Future harmonisation of safety data exchange
- Potential innovation on electronic derailment detection
## WP1 AND WP2 OUTCOMES

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Exploitation and implementation (current and potential)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data on number and causes of derailments</td>
<td>D-RAIL WPs; Further studies and statistics Input in further developments (industry)</td>
</tr>
<tr>
<td>Data and methodology to assess the impact of derailments</td>
<td>D-RAIL WPs ERA and IMs</td>
</tr>
<tr>
<td>Data and preliminary estimation of costs of derailments</td>
<td>D-RAIL WPs</td>
</tr>
<tr>
<td>Recommendations on regulatory framework and procedures</td>
<td>ERA (and EC) IMs and authorities</td>
</tr>
</tbody>
</table>
• D3.1 – Report on analysis of derailment causes, impact and prevention assessment, 86 pages

• D3.2 – Analysis and mitigation of derailment, assessment and commercial impact, 301 pages (externally reviewed by the UIC-TEG)

• D3.3 – Guidelines on derailment analysis and prevention, 28 pp (externally reviewed by the UIC-TEG)
Critical parameters (WP3)

GAP ANALYSIS

Existing systems features (WP4)

Missing functions / Functions that require further development

Functional specification for system application (Input for WP6)
WP5 and WP7

Let’s start not to D-Rail ...

But what do we do in practically
Short term?
DEVELOPMENT OF THE FUTURE RAIL FREIGHT SYSTEM TO REDUCE THE OCCURRENCES AND IMPACT OF DERAILEMENT

D-RAIL

Grant Agreement No.: 285152 FP7 - THEME [SST.2011.4.1-3]
Project Start Date: 01/10/2011
Duration: 36 Months

D7.4

Summary of the project findings, recommendations and conclusions as input for the guideline for the implementation of monitoring techniques

Due date of deliverable: 31.08.2014
Actual submission date: 22.09.2014

Work Package Number: WP7
Dissemination Level: PU
Status: D1

Leader of this deliverable:
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Rome Schmid
Ben Gilmartin
Wali Nawabi

Verified by: ...
Economic analysis
LCC analyses – overall output

The following Table summarizes the LCC results carried out for the three most promising interventions in terms of the evaluation of additional number of installations to achieve the aimed 20% LCC reduction.

<table>
<thead>
<tr>
<th>Monitoring systems</th>
<th>Scenario</th>
<th>Assumed nr. of additional monitoring sites</th>
<th>Assumed reduction in derailments due to detection reliability [%]</th>
<th>NPV (&quot;status quo&quot;) [Mio €]</th>
<th>NPV (80% reduction=20% LCC reduction) [Mio €]</th>
<th>NPV (up to 2050) [Mio €]</th>
<th>Required nr. of monitoring sites to achieve 20% LCC reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>HABD</td>
<td>High scenario</td>
<td>790</td>
<td>91</td>
<td>1.772</td>
<td>1.418</td>
<td>633</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td>Low scenario</td>
<td>160</td>
<td>9</td>
<td>1.772</td>
<td>1.418</td>
<td>1.707</td>
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<tr>
<td>ALC</td>
<td>High scenario</td>
<td>300</td>
<td>98</td>
<td>1.336</td>
<td>1.069</td>
<td>230</td>
<td>40</td>
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<tr>
<td></td>
<td>Low scenario</td>
<td>120</td>
<td>90</td>
<td>1.336</td>
<td>1.069</td>
<td>448</td>
<td></td>
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<tr>
<td></td>
<td>Low scenario</td>
<td>120</td>
<td>50</td>
<td>1.336</td>
<td>1.069</td>
<td>1.985</td>
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<tr>
<td>TGMS</td>
<td>High scenario</td>
<td>20</td>
<td>60</td>
<td>298</td>
<td>239</td>
<td>552</td>
<td>not possible</td>
</tr>
<tr>
<td></td>
<td>Low scenario</td>
<td>10</td>
<td>45</td>
<td>298</td>
<td>239</td>
<td>685</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High scenario</td>
<td>20</td>
<td>90</td>
<td>298</td>
<td>239</td>
<td>191</td>
<td>20</td>
</tr>
</tbody>
</table>
There are two different sort of questions namely Short and Long term

- Short term
  - HRMS
  - For this I will call together a small meeting of core persons from D-RAIL at UIC asp
  - UIC TTIG or ?
Monitoring has to be developed as a system approach

Today, too many individual monitoring systems operate side by side
Long term?
• Long term
  – Define projects for Shift2Rail and/or Horizon 2020
  – For this I will call together the same small meeting of core persons from D-RAIL at UIC asp
Thank you for your attention!