Development of the Future Rail Freight System to Reduce the Occurrences and Impact of Derailment

D-RAIL

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Scientific and technical review by acknowledged scientists and railway experts

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Dissemination Level		
PU	Public	√
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)	

D-RAIL consortium

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Executive Summary

Throughout the D-Rail project, a thorough quality assurance has been applied to certify that deliverables maintain a high scientific and technical standard. The framework for this is described in the deliverable D9.1.

The current deliverable contrast the quality assurance plans towards actual implementation throughout the project. This can be summarized in the observation that the adopted quality assurance is far more thorough than what was indicated in D9.1. In particular all essential deliverables have been subjected to an extra two-stage internal review in addition to the internal quality assurance in the working group. Further, relevant bodies such as the ERA and the UIC-TEG have been given the opportunity to comment upon deliverables related to their fields.

Finally it can be noted that the work of D-Rail is now being introduced in scientific journals and working groups for future operational recommendations and codes. In this process further reviewing will result.

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Glossary

ERA European Railway Agency

DoW Description of Work

TEG UIC Track Expert Group

TTIG UIC Train Track Interaction Group

UIC International union of railways

HRMS UIC project Harmonization – Running behaviour and noise Measurement Sites

1 Introduction

In deliverable D9.1 “Project management plan and quality assurance” the layout and contents of deliverables are specified. Further, the process towards quality assurance is briefly described. In short:

The lead participant is responsible for the quality of the deliverable.

An internal technical validation is performed by the work package leaders and supervised by the scientific & technical coordinator.

An additional external review on selected deliverables will be carried out as and when these are deemed to represent key results from the project.

On occasion the external review may result in a new version of the deliverable being submitted to the commission.

During the review process, deliverables are stored and available on the Extranet.

2 Review actions

The deliverables in the D-Rail project are listed in the D-rail Description of Work (DoW). In total there are 25 deliverables in the D-Rail project. All of the deliverables have been subjected to an internal review within the work package. One should here note that the work package groups include participation of infrastructure managers, industry and academia. In general this provides for a broad evaluation of the reports.

The deliverable reports have also been subjected to a review by the project office before approval by the steering committee.

In addition many of the deliverables have been subjected to additional reviewing, as outlined below:

Work package 1: Two deliverables. These were both subjected to additional reviewing by the scientific and technical coordinator. In addition, they were circulated externally, mainly within the UIC, to obtain further input data and comments on interpretations.

Work package 2: Three deliverables. These where all subjected to additional reviewing: two by the scientific and technical coordinator, and one by parts of the steering committee.

Work package 3: Three deliverables. These where all subjected to additional reviewing by the scientific and technical coordinator. In addition deliverables D3.2 and D3.3 were considered an essential input for future standards and were distributed to the UIC-TEG to solicit comments.

Work package 4: Two deliverables, which were all subjected to additional reviewing by the scientific and technical coordinator.

Work package 5: Two deliverables, which were all subjected to additional reviewing by the scientific and technical coordinator.

Work package 6: Three deliverables, which were all subjected to additional reviewing by the scientific and technical coordinator.

Work package 7: Five deliverables, of which four (excluding this deliverable) were subjected to additional reviewing by the scientific and technical coordinator. In addition the ERA has been especially involved in this work package and provided additional comments.

Work package 8: Four deliverables, of which one has been subjected to additional reviewing by the scientific and technical coordinator. The other three deliverables have been considered as “working documents” where there is no need for an additional assurance of the scientific and technical level.

Work package 9: One deliverable, which is to be considered as a “working document” with no need for additional assurance of the scientific and technical level.

As a result of the additional review, there were smaller or larger parts revised / rewritten in several of the deliverable reports.

3 Additional future quality assurance

The work of D-Rail is now being implemented in operational use both at a technical and a scientific level. This results in additional reviewing / quality assurance, but also in extension of the work and in additional applications.

This report will not provide a full list of implementations and related quality assurance measures for two reasons: Firstly, it is too early to see the full extent of implementation, which means that any list that claims to be complete will soon be out-dated. Secondly, the implementation is so broad and to such a varying degrees (ranging from implementation of large segments of results to comparison towards few selected parts) that it is difficult (not to say impossible) to collect all cases of implementation.

Instead the examples below give typical implementation examples and highlights how this relates to the review process and additional quality assurance.

More information of scientific and technical implementation can be obtained from the project reports of the D-Rail partners.

3.1 Technical implementation and quality assurance – Development of alarm limits together with the HRMS project

The investigations in work package 3 identified key operational parameters related to several causes of derailments. The sensitivity to these parameters was quantified and derailment critical states of operation were defined. These findings are summarized in deliverable D7.3 as 29 critical parameters and 37 potential modifications to decrease the risk of derailment.

From this analysis, the investigation of derailment critical states of operation was taken further within the UIC funded project HRMS. Here alarm limits were established based on the findings from D-Rail. These limits needed to condense the broad knowledge obtained within D-Rail to an alarm limit that was easy to evaluate, but also highly precise in arresting derailment prone vehicles, while allowing non-derailment prone vehicles to continue.

The derived limits related to the risk of flange climbing and rail breaks, were extended by non-derailment related alarm limits such as the limits related to sleeper fracture and limits on general overloading.

The report of the HRMS project is now finalized and will be a basis for a UIC Leaflet on alarm limits. This Leaflet will be drafted by the UIC-TEG and TTI. In addition to the additional quality assurance that was carried out in HRMS, this will most certainly lead to that the results from D-Rail will be subjected to further scrutiny, and even further be contrasted to operational demands, political considerations etc.

In short, this is a typical example of a technical implementation where it can be noted that – from a quality assurance perspective – the results from D-Rail are

- adopted by partners in D-Rail, but also by external parties
- modified to suit implementation needs
- extended to account for factors outside the scope of D-Rail
- subjected to further reviews often from a different perspective than the internal and external review within D-Rail

3.2 Scientific implementation and quality assurance – Publication in scientific journals

A number of papers for scientific journals based on work in D-Rail are in preparation. In many of these cases the work from D-Rail has here been combined with research results from other projects. There is no need to go into detail on the specific papers. Instead the focus here is how they aid in the quality assurance process.

In general a paper submitted to a scientific journal needs to be condensed scope-wise. This means that compared to a deliverable report the scientific paper needs to be much more concise. Presumptions and in-data need to be specified in detailed. Analysis methods and conclusions need to be further motivated and put in context of the current state-of-the-art.

It can be noted that in contrast to the technical implementation, in the scientific implementation – from a quality assurance perspective – the results from D-Rail are

- published to allow for adoption by anyone
- modified to be more precisely expressed
- condensed to focus on aspects where there is a solid scientific backing
- subjected to further reviews from scientific peers that focus on scientific level and forwarding of the state-of-the-art, and less on “applicability” in a certain operational context

Note that these are very different objectives, but that they are complementary. As an example the extension of the results in the technical coordination is balanced by the deep validation of key results in the scientific implementation.

4 Conclusions

The work in D-Rail regarding quality assurance in general, and review of deliverables in particular is presented.

It is noted that the outlined quality assurance plan (with a minimum of a two-stage review) has been followed and extended with a high proportion of three-stage reviewing (internally in the work package, additional reviewing by the scientific & technical coordinator, and final review by the project office and steering committee). In addition identified key deliverables have been submitted for external reviewing.

Finally it is noted that the quality assurance is an on-going work: As work and results from D-Rail are introduced, they will be subjected to additional quality assurance processes.
Examples of such processes in a technical implementation and in a scientific implementation were contrasted. The major differences between these forms of implementations were shown, but it was noted that these processes for quality assurance are also complementary.