Project no. TIP5-CT-2006-031415

INNOTRACK

Integrated Project (IP)

Thematic Priority 6: Sustainable Development, Global Change and Ecosystems

D7.3.3
Experience from review work

Due date of deliverable: 2009-12-31

Actual submission date: 2009-12-31

Start date of project: 1 September 2006 Duration: 39 months

Organisation name of lead contractor for this deliverable: UIC/Chalmers

Revision: final

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	X
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)	

Table of Contents

Glossary

Please provide a description of all acronyms/abbreviations used in the document.

Abbreviation/acronym	Description
TSI	Technical Specifications Interoperability

1. Executive Summary

Reviewing of deliverables produced in INNOTRACK has been a key element in the quality assurance of the project. It has further paved the way for operational implementation.

Reviewing has been carried out at three levels:

1. Internal reviewing during the drafting of the deliverable report
2. Internal reviewing by an independent project partner
3. External reviewing

All deliverables have been subjected to the first level of reviewing. All except a handful has been subjected to the second level of reviewing. Regarding external reviewing 45 deliverables have been subjected to reviewing of railway experts (resulting in 123 review reports), 25 deliverables have been subjected to scientific reviewing (resulting in 25 review reports), and 7 deliverables have been subjected to reviewing from industry experts (resulting in 7 review reports).

Independent reviewing of the INNOTRACK deliverables was not detailed in the INNOTRACK description of work. However, it was early on recognized that in order to ensure railway relevance and a high quality of the deliverables, independent reviewing would be needed. Furthermore it was realized that reviewing by experts outside the INNOTRACK consortium would have the benefits of broaden both the expert basis scrutinizing reports in an early stage and increase the potential for future implementation.

This report summarizes the review process and the INNOTRACK experiences of reviewing. In summary, a key success factor has been the solid participation from the railway community. By the strong engagement from UIC, UNIFE and the scientific community it has been possible to get a broad and very competent scrutinization of the INNOTRACK deliverables.

The major complication originates from the fact that high-quality (independent internal and external) reviewing takes time. If this is not understood, the project runs the risk of being considered as heavily delayed due to an additional quality assurance work that is carried out outside of the contractual obligations.

In summary it can be stated that the extensive reviewing carried out makes INNOTRACK a unique European research project in the railway sector. This is not only due to the massive amount of external reviews (more than 150 review reports), but also due to carry out review from the perspectives of infrastructure managers, the railway industry and the scientific community. The costs and efforts have been high; the estimated cost of the review efforts is over 100 k€. However, we consider this to be money well spent since the effects of the reviewing is not limited to increasing the relevance and quality of the deliverables. Other effects include raising the level of awareness and knowledge all over Europe and paving the way for implementation. The latter is manifested in the current work of turning deliverables into CEN codes and UIC leaflets and in the implementation of INNOTRACK results into national codes all over Europe.

2. Background

There are more than 140 deliverables produced within the INNOTRACK project. This amounts to roughly 14 000 pages of reports if appendices etc are included. To quality assure and disseminate such a massive body of information is a major challenge. As the project has progressed, peer reviewing has been found to be perhaps the most important tool in this process.

The main motivations for peer reviewing are:

1. Quality assurance
2. Pave the way for dissemination

In addition, reviewing will also raise the general level of awareness and knowledge both among reviewers and authors

One important ingredient slightly outside the scope of the current report is the peer reviewing related to scientific publication in scientific journals and at conferences. Further, much research in INNOTRACK will be included in MSc, and PhD theses etc, and will thereby be further scrutinized by examiners and grading committees.

Peer reviewing of deliverables was not included in the INNOTRACK project description. It was however soon realized that a process for reviewing was needed. This process had to be swift, efficient, simple and transparent. The model that developed and was refined throughout the project consisted of the following three stages:

1. Internal reviewing connected to the drafting of the deliverable report.
2. Internal reviewing by an independent project partner.
3. External reviewing by railway, scientific, industry experts.

These three stages will be described in the following.

It is estimated that the review work carried out in INNOTRACK comprises over 100 k€ worth of work efforts. In our opinion this is a profitable investment towards the ultimate goal: That the INNOTRACK results and reports shall be implemented in the day-to-day operations of infra-managers, industry and research centres.

3. The review process

The INNOTRACK review process is summarized in Figure 1. Details are given in deliverable D7.3.2 [1]. The current report focuses on the quality assurance of the deliverables to the stage where they can be considered as official INNOTRACK deliverables. This corresponds to the left part in Figure 1 (before the deliverables are stored in the "Official documents" folder on the INNOTRACK knowledge management system (KMS)).

After the deliverables have been established as "official" they are further scrutinized by the project office, the steering committee and finally by the European commission reviewers. This process is outside the scope of the current report

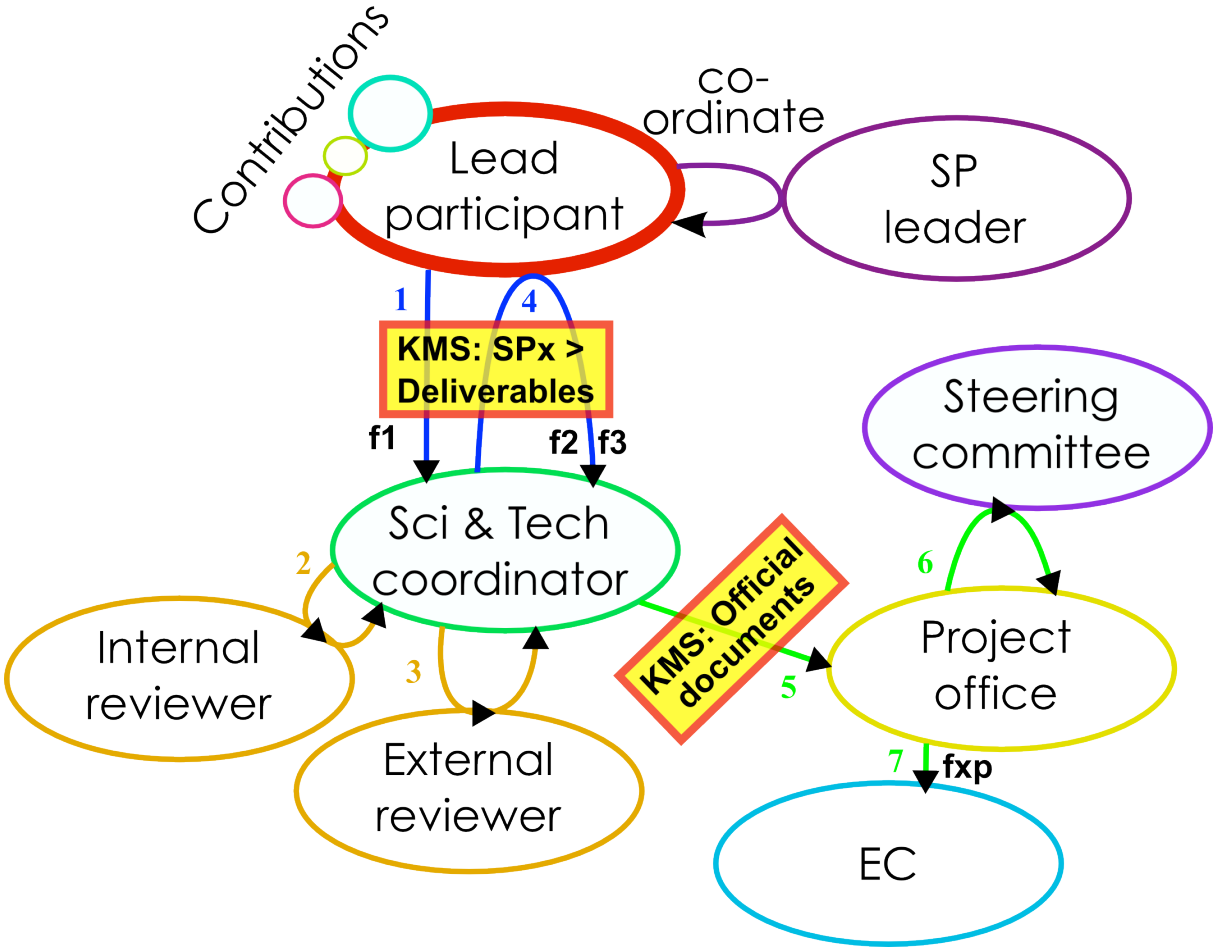

Figure 1 The INNOTRACK review process (from [1]).

3.1 Internal reviewing and approval of deliverables

In INNOTRACK, the aim of the internal reviewing is to **support** the author(s) of the deliverable. The process is therefore kept very informal and it is up to the author(s) how much of the offered advice they wish to employ.

The intended procedure of formal approval from the Steering Committee (6 in Figure 1) did not work in practice. Very soon the amount of document became so large that the steering committee was not able to approve (or rather scrutinize all) deliverables. Therefore this procedure was changed: On the steering committee meetings information replaced the formal approval.

3.1.1 Internal reviewing during the drafting of the deliverable report

As in all report writing, INNOTRACK deliverables are reviewed during the drafting of the report. This can be done by self-assessment by the author(s), by reviewing of colleagues etc. Objectives are to improve the quality of the report, to increase the linguistic level etc.

The INNOTRACK consortium does not regulate this stage of the review process. The deliverable document is "owned" by the partner responsible for the deliverable[1]. Basically the responsible partner can, at this stage, store the document wherever (s)he feels fit. It is however advised that the document is stored on the KMS in the folder "Deliverables" under respective subproject.

At this stage the report passes the first quality threshold. Deliverables that are not considered (by the responsible partner(s) or the sub-project leader(s)) to have a sufficient quality should not be submitted for further internal reviewing.

3.1.2 Internal reviewing by an independent project partner

Once the responsible partner(s) are satisfied with the level and quality of the report it is sent to the scientific & technical coordinator (1 in Figure 1). At this stage basically all reports are subjected to an internal review carried out by a project partner not involved in the drafting of the report. This partner typically has knowledge of the technical scope of the report, but need not be an expert in the field.

The aim of this internal reviewing is to aid in improving the technical, scientific and linguistic level of the report. In particular an "outsider" can give objective advices. With the ability to see the report with "fresh eyes" (s)he can also identify sections that are not fully clear and has a higher probability of seeing linguistic mistakes.

The internal review comments are normally given as handwritten notes in a printout of the report that is scanned and sent to the responsible partner(s), see annex III. In some cases the suggestions for improvements and comments have been typed into the digital version of the report.

Also the internal review by an objective partner is kept very informal and is intended as a support for the author. There is no requirement for feedback on the internal review comments from the responsible partner(s). One reason is to limit the needed efforts of the responsible partner. An equally important reason is to emphasize that the content of the report is at this stage the responsibility of the responsible partner(s). It is therefore up to their judgement what needs to be included/excluded/revised in the report. This judgement will then be further scrutinized in the external review.

It should however be noted that the internal review constitutes a threshold for the deliverable quality. Deliverables that are not considered to have a sufficient quality (by the internal reviewer, or the scientific & technical coordinator, or the project manager) are returned to the responsible partner(s) for revision and are not submitted to external review.

3.2 External reviewing

The external reviewing forms the formal quality assurance of the deliverables. Not all reports are subjected to external review. The INNOTRACK coordination group takes the decisions on which deliverables that should be subjected to external review. Further, they decide which form of external review (railway, scientific, industry) that is to be carried out.

The external reviewing has featured external experts. In the usual case these are experts from organisations not included in the INNOTRACK consortium. In some cases they are from organisations included in the INNOTRACK consortium. In these cases they are usually not involved in INNOTRACK themselves. In the very few cases where this has not been the case (mainly two scientific reviews

[1] Responsible partner(s) and person(s) for every INNOTRACK deliverable are noted in the list of deliverables and milestones, which is maintained by the scientific & technical coordinator.

under time pressure where it was very hard to find the suitable competence outside the consortium), the experts have not been involved in the work related to the deliverable to be reviewed.

The three types of external reviewing that have been carried out in the INNOTRACK project are

1. Railway reviewing

   Here the aim is to ensure that the deliverable is relevant to the development of the railway. This includes that e.g.:

   - that the context of the deliverable is coherent with the operational reality of the European railways,
   - that as many of the influencing factors as possible are accounted for,
   - that the proposed innovative solutions are realistic from a railway perspective,
   - that the solutions are sound from a railway *system* perspective.

2. Scientific reviewing

   The aim with the scientific reviewing is to ensure the scientific level of the deliverable. This includes

   - ensuring that the scientific state-of-the-art is acknowledge,
   - ensuring that conclusions are motivated in a scientifically sound manner,
   - ensuring the scientific level, i.e. that the report furthers the scientific frontier in the field.

It should be noted that there are also a number of scientific papers resulting from INNOTRACK. These are of course peer-reviewed according to established routines, thereby providing an additional quality assurance to the INNOTRACK deliverables.

3. Industry reviewing

   The main aim of the industry reviewing is to establish the industrial relevance of the deliverable. This includes

   - comparison of the technical level to the industrial state-of-the-art,
   - evaluation of the proposed innovation in an industrial context, i.e. how the solutions fits in the regulatory framework.

External review reports are normally in the form of a filled out review template, see annex II. These are handed to the responsible partner(s). The responses to the review comments are given in writing by the responsible partner(s). The responded review reports are stored in the INNOTRACK KMS. They constitute the formal, documented quality assurance of the INNOTRACK deliverables.

It is the responsibility of the responsible partner(s) to respond to the external review report(s) and mitigate the deliverable accordingly. There is no iteration between the responsible partner(s) and the reviewer(s) or the scientific & technical coordinator. The main reason (aside from time and resource limitations) is to have a clear distinction that the responsibility for the content of the deliverable lies at the responsible partner and not at the reviewer or scientific & technical coordinator.

The deliverables are finally approved by the INNOTRACK steering committee before being submitted to the EC.

Finally, one can note that INNOTRACK has designated a number of deliverables as “guidelines”. These have a strong focus on implementation and give clear and operational recommendations. From a reviewing point of view, these have been handled in the same framework as “normal” deliverables. The main difference being that the internal review by an independent project partner has normally been more thorough.

4. Experience of the review work

4.1 Statistics

For the first few deliverables in INNOTRACK, the statistics on internal reviewing are somewhat vague (as elaborated in section 4.2 below). The reason is that the review process was not fully established and internal review feedback was given more on an ad-hoc basis. With the experiences from the first few deliverables, the process was then stabilized and formalized.

As for the external review process, the procedure was, more or less, established already from the first external review. There have only been some minor modifications during the course of the project. One of the more important is that the reviewers have been asked to classify a report in terms of its suitability as a potential guideline.

To this date (2009-12-31) the external review in INNOTRACK consists of

- 123 railway reviews (of 45 deliverables)
- 25 scientific reviews (of 25 deliverables)
- 7 industry reviews (of 7 deliverables)

In addition there have been internal reviews of an independent partner of basically all deliverables. The main exceptions are purely administrative deliverables where the reviewing has been carried out as self-assessment.

Details on external reviewing are available in annex I.

4.2 Establishment of the review process

It should be noted that external reviewing is not common in EC funded projects. It is also something that was not included in the INNOTRACK project description. The external review process was therefore designed at the start of the project, which meant a short (in the order of 6 months) period of some trial-and-error before the routines were established.

At the initial phase of reviewing, an attempt was made to keep the external reviewing anonymous. It was soon obvious that this was not possible. The review has therefore been open. From a traditional academic point of view this is not the optimum. However, from a practical point of view it has not really been a problem: the review reports are very out-spoken.

A second compromise that had to be made was regarding the reviewer's relation to the INNOTRACK project. Ideally, the external reviewers should be completely detached from the INNOTRACK project. To a large extent, this was also the case. However, it was for several reasons decided to also have some reviewers from organisations that are involved in the INNOTRACK project. This will be further described below.

4.2.1 Railway reviewing

The UIC Track Expert Group (TEG) has throughout the project played an extremely important role in INNOTRACK. The group consists of the track experts who will have an important role in implementing results from INNOTRACK. It was therefore very important that members of this group participated in the INNOTRACK reviewing. The INNOTRACK mirror group of the UIC TEG coordinated the railway reviewing. This group consisted of Paul Godart and Kurt Demeersseman from Infrabel (Belgium), László Daczi from MAV (Hungary), Peter Güldenapfel from SBB (Switzerland), Rudolf Schilder from ÖBB (Austria). Also Mojmír Nejezchleb from SŽDC (Czech Republic) and Tomas Ramstedt from BV (Sweden) have participated in the work of the INNOTRACK mirror group.

The INNOTRACK mirror group of the UIC-TEG has had 13 meetings of which 11 tele-meetings and 2 physical meetings. In addition there have been informal discussions in connection to the meetings of the UIC-TEG (semi-annual), and at the INNOTRACK seminars that were held in Brussels 2009-10-14 and in Paris 2009-10-15.

The railway review procedure has been organized as follows:

- When a deliverable is ready for external railway review, it is uploaded to the mirror group's folder on the INNOTRACK KMS together with a review template. An email is then sent to the mirror group notifying them on the available deliverable.
- At the mirror group meetings, the current status regarding finalized, outstanding and upcoming deliverables is reviewed. Preliminary reviewers for the upcoming deliverables are decided.
- The railway review status was documented on a list that was continuously updated.

As the process was stabilized, it became very efficient. The meetings lasted less than an hour, and during the last year most communication could be handled by email and informal telephone contacts.

As seen, some organisations involved in INNOTRACK have also been involved in the railway reviewing. In practice this has not been a problem since no deliverable subjected to external railway reviewing has been reviewed only by a partner involved in INNOTRACK. In fact, **all** deliverables subjected to external railway review have been reviewed by more than one reviewer.

4.2.2 Scientific reviewing

The scientific reviewing has been coordinated by Chalmers University of Technology. The process has been similar to the reviewing of scientific papers: The deliverables have been sent to the reviewer who sends back a written review report. The main difference is (as discussed above) that the review is open.

The choice of scientific reviewers has been very selective. Many of the world leading names in this field have been chosen and agreed to do scientific review in INNOTRACK.

The scientific reviewers have been identified through the personal contacts of project partners. These personal contacts have been a pre-requisite: Since top scientists are usually very occupied it would most likely have been impossible to get credible scientists to review the INNOTRACK deliverables if they would not have had a "personal connection" to the project. In practice much of the reviewing can be considered as an exchange of services: A reviewer gets help in return e.g. in reviewing conference papers. This is a fact that may sound strange to an outsider, but it is actually a general practice in the scientific community: A scientist who publishes in a journal is also expected to help in reviewing for that journal. The difference in the INNOTRACK project is that the reviewing was open. As mentioned above, this has not been a problem in practice. To further underline this, all review reports have been accessible to the EC and the EC reviewers, which means that also the review reports can be scrutinized.

4.2.3 Industry reviewing

The industry reviewing has been coordinated by the UNIFE. The process has been similar as to the scientific reviewing with the difference that the reviewers are asked to focus on the industrial relevance of the deliverables.

The industry review has also taken into account coordination towards existing TSIs.

4.3 Lessons learnt

4.3.1 The involvement of the rail sector

The relevance of the INNOTRACK results lies in their implementation in the railway sector, and in its input to future research and development. It is therefore crucial that the results are *known* by the railway sector, that they are *relevant* for the railway sector, and they create an *added value* for the railway sector. In assuring this, the review work carried out in INNOTRACK is crucial.

It is therefore not an overstatement to say that without the involvement of the UIC Track Expert Group, the UNIFE and the railway researchers and experts that carried out the reviewing, INNOTRACK would, from an implementation point of view, have been a failure.

4.3.2 Official status of the review comments

Early on in the review process there were expressed concerns from the reviewers regarding the official status of the external review comments. This is a very valid concern: If the review comments from a reviewer should be interpreted as the official standpoint of, say, Infrabel, the situation would be much more complicated. The reviewer normally has no mandate to pose such formal statements, which means that the reviewer's comments need to be scrutinized by the reviewer's organisation. This would take time, lead to "bleaker" review comments (since controversial or ambiguous statements need to be removed) and would clearly be overkill as compared to the more technical comments (in contrast to the organisations' opinions) that are sought in the review reports.

It was therefore emphasized that **the review comments only express the personal points of view** of the reviewer. It was further emphasized that the **reviewers should not be held formally responsible for their comments**: In other words, it is perfectly fine (and even encouraged) for a reviewer to exaggerate viewpoints (i.e. playing the "devil's advocate") in order to highlight complex and controversial areas.

4.3.3 The time factor

Reviewing takes time. High-quality reviewing takes even more time. It implies that an expert in the area has to be found. The expert then needs to read the report, which can be several hundred pages long, and formulate a review report.

If this should function in practice the reviewers need to be identified and the time for reviewing planned in advance. For this reason delayed deliverable reports are extremely disrupting: Not only may they cause a delay in the entire process, they also destroy the schedule for the reviewer. The experts carrying out the reviewing are normally very occupied and the reviewing of INNOTRACK deliverables not any of their core work task. Consequently, reviewing of INNOTRACK reports will have a rather low priority also in the normal case. In the case of delays, the risk is that the reviewing ends up deep down in a to-do-pile.

That being said, the reviewer's have generally done a remarkably efficient work. However this brings up the second time issue: The responsible partner has to await the last of the external review reports before the report can be mitigated. This means that even though most review reports are delivered rather swift, the time before the work of mitigating the reports can commence may be significant. In INNOTRACK we have had particular problems with some of the railway organisations being reorganised. Naturally, at times of such massive changes and workloads, reviewing of INNOTRACK reports gets a low priority. One option would then be to ignore late reports. Generally we have avoided this with the motivation that the benefit in obtaining a broad opinion outweighs the drawbacks of a delayed finalization of the report[2].

This brings us to the third time issue: Once the reviewer's opinions are sent to the responsible partner(s), the responsible person(s) have taken up other work tasks. In addition to the difficulty in finding time in the new work schedule to mitigate the review comments, the responsible person(s) also faces a psychological challenge in again taking up a piece of work that has once been finalized and all this means in digging up old documentation etc.

The final time issue is the vacation period. Since the normal time for vacations vary wildly over Europe it can well be that at least one key person regarding a deliverable is on vacation in a time span from May until September. This naturally complicates things…

Due to all these factors, the time from finalized report through reviewing and to revised report and responded review comments, may take everything from three weeks to more than half a year. In the normal case (and not in the vacation period), a reasonable time period is three months. For deliverables that are not externally reviewed, this period can be extensively shortened. Our record in this case is less than a week. However bear in mind that in this case all persons involved were heavily involved in INNOTRACK and had the project as a core work task.

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[2] Note that during the reviewing, the original report (which has been internally reviewed during drafting) is available for the EC and the INNOTRACK consortium.

4.3.4 Language

Today most railway engineers at infrastructure managers throughout Europe carry out their main work in their native language. Even though they may be fluent in English, this means that their knowledge of technical English may not be high enough to digest the INNOTRACK deliverables. In particular they may feel very uncomfortable in writing review reports in English. This fact limits the experts available for reviewing. To overcome this problem, László Daczi of MAV did an impressive contribution in translating many of the INNOTRACK reports to Hungarian, and the corresponding review reports back to English. This importance of this effort for the INNOTRACK reviewing cannot be overrated.

4.3.5 Reimbursement

INNOTRACK offered a small reimbursement for reviewing. Even though the offered reimbursement was limited it is believed that it was important: It could motivate a slightly higher priority for the task both for the reviewer, but perhaps more importantly from the reviewer's management. It can be noted that of all the reports sent out for scientific review, we only had to cancel two due to lack of response from the reviewer. It can of course be questioned this is related to the reimbursement or not (a stronger reason is most likely the personal contacts with the scientific reviewers). However, the fact remains that this is a good response.

It is finally gratefully acknowledged that Infrabel, SBB, ÖBB, SŽDC, BV, DB and RHK did their review work free of charge. This is also an acknowledgement that these organisations considered the INNOTRACK result being of such importance that it motivated the time (and related costs) spent scrutinizing the reports.

5. Conclusions

As a European project in the railway sector INNOTRACK has been unique in that the deliverables have been subjected to a massive external review (more than 150 review reports) and that infrastructure managers (mainly through the UIC Track Expert Group), the railway industry (mainly through UNIFE) and the scientific community have contributed to this reviewing.

As outlined in this report we consider that:

1. INNOTRACK has built up an efficient and rigorous review process with three levels:
    a. Internal reviewing during the drafting of the deliverable report
    b. Internal reviewing by an independent project partner
    c. External reviewing

    Each of these levels contains a threshold to ensure the quality of the deliverables.
2. With this process in operation, the deliverables produced by INNOTRACK has assured as high a level of quality and relevance (from a railway, industrial and scientific perspective) as realistically possible.
3. Through the documented external review comments and pertinent responses, INNOTRACK fulfils the requirement of traceability of a quality assurance system.
4. The reviewing has paved the way for implementation, where much work on implementing results in International, European and national codes are currently undertaken.
5. The reviewing has helped the responsible authors in improving their reports.
6. The key success factor of the review process has been the solid participation from the railway community in general, and the strong engagement from UIC, UNIFE and the railway research community in particular.

6. Bibliography

1. INNOTRACK Deliverable D7.3.2: Technical review platform (revision 2), 10 pp, 2008

6.1 Annexes

Annex I Reviewing carried out within INNOTRACK, 8 pp

Annex II External review template, 4 pp

Annex III Example of internal review comments, 1 pp

Annex I — Reviewing carried out within INNOTRACK

Railway review by the INNOTRACK mirror group of the UIC-Track Expert Group

Deliverable	Reviewed by			
D3.1.1 / D3.1.2 Definition of key parameters and constraints in optimisation of S&C. Definition of key parameters and constraints in optimisation of S&C.	**MAV** Dr. Kiss Tóth	**SŽDC** Chlad	**Infrabel** Mys	
D3.2.2 Functional requirements for hollow sleepers for UIC 60 switches	**MAV** Haraszti, Dr. Kiss Tóth	**SŽDC** Chlad	**SBB** Müller	
D3.3.1 List of key parameters for switch and crossing monitoring	**MAV** Baczoni Tóth	**Infrabel** Mys	**SBB** Brunner	
D4.2.2 Interim report on “Minimum Action” rules for selected defect types	**MAV** Dr. Bollobás	**SŽDC** Kopsa	**ÖBB**	
D4.4.1 Rail inspection technologies	**MAV** Dr. Bollobás, Béli	**SŽDC** Kopsa	**ÖBB**	
D4.6.1 Report on the influence of the working procedures on the formation and shape of the HAZ	**MAV** Dr. Kiss	**Infrabel** Demeersseman	**ÖBB** Auer	
D4.6.2 Aluminothermic welds: Influence of the working procedures and post treatment on static and dynamic fatigue behaviour	**MAV** Dr Kiss	**Infrabel** Demeersseman	**ÖBB** Auer	
D2.3.1 Validation methodology and criteria for evaluations of superstructure innovations	**MAV** Haraszti Türk	**Infrabel** Demeersseman	**ÖBB** Auer	**SBB**
D2.3.2 Optimised design of a steel-	**MAV** Türk	**SBB**		

concrete-steel track form				
D4.1.2 Interim rail degradation algorithms	**MAV** Dr. Bollobás	**Infrabel** Demeersseman	**SBB**	
D4.5.2 Target profiles	**MAV** Dr. Bollobás Haraszti	**Infrabel** Demeersseman	**SBB**	
D4.1.3 Interim guidelines on the selection of rail grades	**MAV** Dr Bollobás Haraszti	**Infrabel** Demeersseman	**ÖBB** Auer & Wöhnhart	**SBB**
D4.4.2 Operational evaluation of a multifunctional inspection equipment (phase 1 : laboratory and static tests)	**MAV** Béli Haraszti	**Infrabel** Demeersseman	**ÖBB** Wöhnhart	
D1.2.5 Track segmentation	**MAV** Béli	**ÖBB** Auer		
D4.6.3 / D4.6.4 Analysis of equipment design and optimisation of parameters for gas pressure welding	**MAV** Dr Kiss	**Infrabel** Demeersseman		
D1.4.6 A report providing detailed analysis of the key railway infrastructure problems and recommendations for cost categories to be used for future data collection	**MAV** Dr Bollobás Tóth Dr Kiss	**SBB**		
D4.5.3 Input for LCC calculations	**MAV** Haraszti Dr Kiss	**Infrabel** Demeersseman		
D1.3.3 Final report on root causes of problem conditions and priorities for innovation	**MAV** Haraszti Dr Bollobás Türk	**Infrabel**	**SBB**	
D3.3.2 Available Sensors for railway environments for condition monitoring	**MAV** Tóth	**Infrabel**		
D3.3.3 Requirements and functional description for S&C monitoring	**MAV** Baczoni Dr Kiss	**Infrabel** Reychler		

	Tóth			
D3.1.4 Summary of results from simulations and optimisation of switches	**MAV** Dr Kiss Tóth	**SBB**		
D3.2.3 Functional Requirements for the open standard interface for electronic interlocking	**MAV** Baczoni Dr Kiss (comments)	**Infrabel**		
D3.2.5 Technical and RAMS requirements/recommendations for the actuation system, the locking and the detection device for UIC 60-300/1200 switches	**MAV** Haraszti Baczoni Kiss Tóth	**Infrabel**	**SBB**	
D6.4.1 Key values for LCC and RAMS	**MAV** Türk Haraszti Dr. Kiss			
D2.2.5 Subgrade reinforcement with columns Part 1 Vertical columns, Part 2 Inclined columns	**MAV** Türk			
D2.2.7 Improvement study of transition zone on conventional line	**MAV** Türk			
D2.1.10 Study of variation of vertical stiffness in transition zone	**MAV** Türk			
D2.2.9 Subgrade reinforcement with geosynthetics	**MAV** Türk			
D4.1.5 Definitive guidelines on the use of different rail grades according to duty conditions and based on RAMS and LCC principles	**MAV** Dr. Bollobás Haraszti Dr. Kiss	**BV** Frick	**Infrabel** Demeersseman	**SBB**
D4.2.6 Recommendation of and scientific basis for minimum action rules and maintenance limits	**MAV** Dr. Bollobás Haraszti Dr. Kiss	**Infrabel** Demeersseman	**SBB**	

D3.1.5 Recommendation of, and scientific basis for, optimisation of switches & crossings - part 1	**MAV** Tóth Dr. Kiss			
D4.4.3 Operational evaluation of a multifunctional inspection equipment (phase 2 : track tests)	**MAV** Haraszti Béli	**Infrabel**	**ÖBB** Auer	
D3.1.6 Recommendation of, and scientific basis for, optimization of switches & crossings – part 2	**MAV** Haraszti Dr. Kiss			
D4.5.5 Concluding grinding recommendations	**MAV** Haraszti Dr. Bollobás Dr. Kiss	**BV** Frick	**Infrabel** Demeersseman	**ÖBB** Auer
D3.3.6 Quantification of benefit available from S&C monitoring	**MAV** Tóth Dr. Kiss			
D4.6.5 Laboratory test results and characterization of weld joints	**MAV** Dr Kiss	**BV** Frick		

Additional railway reviewing

D2.3.4 Testing of the innovative BB ERS trackform	**DB** Missler
D2.3.5 Applications and benefits of a new 2-layers track form for existing tracks	**DB** Missler
D4.2.1 Estimations of the influence of rail/joint degradation on operational loads and subsequent deterioration. Tentative report.	**Spoornet** Dr Fröhling
D5.1.5 Final report on existing states of art for construction, maintenance and renewal activities and assessment of logistic constraints	**RHK** Juha-Heikki Pasanen
D6.2.1 Unique boundary conditions	**ALD** Olga Tzadikov
D6.3.1	**ALD**

Boundary conditions for RAM(S) analysis of railway infrastructure	Olga Tzadikov
D6.3.2 Requirements for RAMS-analysis of railway infrastructure regarding deterioration rates, influence functions, statistical methods, monitoring method, etc.	**ALD** Olga Tzadikov
D7.2.1 Establishment of Training Platform	**ALD** Olga Tzadikov
D2.3.6 Slab track benefits and best value analysis for selection of a track system	**SNCF**

Scientific reviewing

Deliverable	Reviewed by
D1.2.1 Standardised method for converting measured track data into segments for "virtual tracks"	Prof Stefano Bruni, Politecnico di Milano
D1.3.6 Report on the state of the art of the simulation of vehicle track interaction as a method for determining track degradation rates. Part2. High Resolution Models and the Degree of Validation of Models Generally	Dr Martin Li, Banverket
D1.4.5 Prototype linking of multiple tools to aid with an appropriate case study	Mr Ingemar Persson, DEsolver (Gensys)
D2.1.2 Prototype of adapted Portancemeter for track substructure stiffness measurement on existing tracks	Prof Paulo Fonseca Teixeira, Instituto Superior Técnico
D2.1.5 Methodology of geophysical investigation of railway track defects	Prof William Powrie, University of Southampton
D2.1.9 Report on measurements campaign with railway portancemeter	Prof William Powrie, University of Southampton
D2.1.11 Methods of track stiffness measurement	Prof William Powrie, University of Southampton
D2.1.13 Stiffness data processing and classification	Prof William Powrie, University of Southampton

D2.1.16 Final report on the modelling of poor quality sites	Prof William Powrie, University of Southampton
D2.2.1 State of the art report on soil improvement methods and experiences	Mr Göran Holm, SGI
D2.3.2 Optimised design of a steel-concrete-steel track form to provide consistent support for low maintenance operation based on modelling and laboratory testing	Prof Eberhard Hohnecker and Dr Alfons Buchmann, University of Karlsruhe
D2.3.4 Testing of the innovative BB ERS trackform	Prof William Powrie, University of Southampton
D3.1.4 Summary of results from simulations and optimisation of switches	Dr Robert Fröhling, Spoornet
D3.3.4 Algorithms for detection and diagnosis of faults on S&C	Prof Hans Andersson, SP
D4.1.4 Rail Degradation	Mr Dan Larsson, Damill
	Mr André Le Bihan, SNCF
D4.2.3 Improved model for loading and subsequent deterioration of insulated joints	Peer reviewed publication of both appendices
D4.2.4 Improved model for loading and subsequent deterioration due to squats and corrugation	Dr Stuart Grassie, Stuart Grassie Engineering
D4.2.5 Improved model for the influence of vehicle conditions (wheel flats, speed, axle load) on the loading and subsequent deterioration of rails	Dr Robert Fröhling, Spoornet
D4.3.2 Characterisation of microstructural changes in surface and sub-surface layers with traffic	Prof Birger Karlsson, Chalmers
D4.3.4 Calculation of contact stresses and wear	Dr Roger Enblom KTH/Bombardier
D4.3.5 Simulation of material deformation and RCF	Prof Erland Johnson, SP/Chalmers
D4.3.6	Dr Johan Ahlström, Chalmers

Microstructural deformation as a function of rail grade	
D4.3.8 Guideline for laboratory tests of rail steels	Dr Johan Ahlström, Chalmers
D4.5.4 Friction Management Methods	Dr Eric Magel, National Research Council Canada
D6.2.1 Unique Boundary Conditions	Prof Peter Veit, TU Graz

Industry reviewing

D3.2.1 Definition of acceptable RAMS and LCC for DLDs	Knud Møllenbach, Nordivox
D6.3.1 RAMS boundary conditions	Knud Møllenbach, Nordivox
D6.3.2 Requirements for RAMS analysis	Knud Møllenbach, Nordivox
D3.3.2 Available Sensors for railway environments for condition monitoring	Patrizia Sforza. Mermec group
D6.4.1 Key values for LCC and RAMS in contracts	Knud Møllenbach, Nordivox
D3.2.3 Functional Requirements for the open standard interface for electronic interlocking	Marie Vopálenská, Association of the Czech railway industry
D3.2.5 Technical and RAMS requirements/recommendations for the actuation system, the locking and the detection device for UIC 60-300/1200 switches	Marie Vopálenská, Association of the Czech railway industry

Internal reviewing by objective partner

Basically all INNOTRACK deliverables have been reviewed by an objective partner (i.e. a partner that has not been involved in the drafting of the report). The main exceptions are administrative deliverables where the involved partners have carried out the reviewing.

The INNOTRACK scientific & technical coordinator and the project manager have made most of this internal review work. In addition, the following persons are gratefully acknowledged for their internal reviews:

- Prof Bengt Åkesson, Chalmers (D2.1.5, D2.1.7, D2.2.4, D2.3.4, D4.2.6, D4.5.4)
- Dr Arne Nissen, Banverket (D3.2.1,
- Dr Henric Rhedin and Dr Fredrik Blomgren, Chalmers industriteknik (D3.2.5, D5.1.7, D6.4.1)

- Mr André Le Bihan, SNCF (D4.2.1)
- Dr Francis Franklin, University of Newcastle (D4.2.3)
- Mr Richard Stock, voestalpine (D4.2.4)
- Prof Hans Andersson, SP (D4.2.5)
- Prof Bengt Åkesson, Chalmers (D4.2.6)

Annex II — External review template

INNOTRACK – Review of deliverables

First of all on behalf of the INNOTRACK partners I would like to thank you for agreeing to review this deliverable. In order to quality-assure the project we are depending on qualified professionals with a strong integrity like you.

Some things to consider when preparing your review:

- If the Deliverable is classified, please sign the confidentiality agreement and return it
    - by scanning the page and e-mailing to anders.ekberg@chalmers.se
    - or by faxing to
      Anders Ekberg, CHARMEC, Chalmers University of Technology
      +46 31 772 3827
    - or by post to
      Anders Ekberg
      CHARMEC
      Chalmers University of Technology
      SE 412 96 Gothenburg
      SWEDEN
- The review is open in the sense that the reviewer is known to the project partners. If you have any comments that you want to leave more anonymously, please feel free to contact me (anders.ekberg@chalmers.se) or the project manager Björn Paulsson (paulsson@uic.asso.fr) directly.
- We loosely separate between "scientific" and "railway" reviews. The main objective of a "scientific" review is to assure the scientific level. The main objective of a "railway" reviewer is to assure that the content of the deliverable is relevant to the railway sector as a whole. With this in mind, you are of course not limited to purely "scientific" or "railway" comments.
- If you need to leave more than the prepared 30 comments, please cut & paste. The numbering of the comments is automatic.

We look forward to your review report!

Anders Ekberg, PhD
Technical and Scientific Coordinator.

Details on your review

D2.1.10
Study of variation of vertical stiffness in transition zone
MGT

The review is ~~open~~ / classified.
This is a scientific / ~~railway review~~.

Review report expected: 2009-09-15
Please send the completed review report to anders.ekberg@chalmers.se

INNOTRACK www.innotrack.eu	Review of D2.1.10	Reviewed by (name or organisation): MGT	Date 2009-07-28

INNOTRACK – Review of deliverables

As a reviewer I am aware that the content of the deliverable is confidential. I hereby agree not to reveal any content of the deliverable report outside of the INNOTRACK consortium without a written approval from the INNOTRACK project manager.

Date and place

Signature Name

Review report

D2.1.10

Study of variation of vertical stiffness in transition zone

Overall assessment

An assessment of whether the report could be suitable as a guideline.
Rate the questions from 1 (no, definitely not) to 5 (yes definitely). Note that just a few reports are meant to be guidelines. A poor rating does therefore not necessarily imply that the report is poor.

Does the report have a clear target audience? .....

Is the content of interest for practical implementation? .....

Is the report clear and to-the-point? .....

Are the conclusions motivated and relevant?.....

Specific comments

Type of comment (G/T/ST/E): **Section**: **Page**:

Review comment no 1

Action taken / comment by lead participant

Project notes

Type of comment (G/T/ST/E): **Section**: **Page**:

Review comment no 2

Action taken / comment by lead participant

Project notes

G – General comment about the report
T – Technical comment
ST – Serious technical comment
E – Editorial comment (**Optional** - it is not the reviewers job to check editorial errors)

INNOTRACK www.innotrack.eu	Review of D2.1.10	Reviewed by (name or organisation): MGT	Date 2009-07-28

Type of comment (G/T/ST/E): **Section**: **Page**:

Review comment no 3

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Project notes

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Review comment no 4

Action taken / comment by lead participant

Project notes

Type of comment (G/T/ST/E): **Section**: **Page**:

Review comment no 5

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Project notes

Type of comment (G/T/ST/E): **Section**: **Page**:

Review comment no 6

Action taken / comment by lead participant

Project notes

Type of comment (G/T/ST/E): **Section**: **Page**:

Review comment no 7

Action taken / comment by lead participant

Project notes

Annex III — Example of internal review comments

Internal review comments are normally handwritten in the document, the commented report scanned and sent to the responsible partner. Below is just an example of typical questions and comments. Both suggestions for clarifications and linguistic improvements are common.

Recommendation of, and scientific basis for minimum action rules and maintenance limits

as well as results from calibration of the numerical model towards field measurements and FE-simulations are presented in [7.5].

(at $x = l/2$)

In the simulations, the joint dip is introduced as a relative wheel–rail displacement, x_{irr}

$$x_{irr} = \begin{cases} d\left(1 - \cos\frac{\pi x}{l}\right), & 0 < x \le l/2 \\ d\left(1 + \cos\frac{\pi x}{l}\right), & l/2 \le x < l \end{cases} \qquad (7.5)$$

Here d is the maximum depth and l=1 m the total length of the dipped joint.

Results of the simulations are presented in Figure 7-2. It is seen that the contact force magnitude is significantly influenced by joint depth and vehicle speed.