ISO/TR 21245: Standardizing Railway Project Planning Process

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The ISO/TR 21245 Technical Report, focusing on the planning processes involved in railway projects, was successfully published in November 2018 following fruitful discussions in the document-developing working group, ISO/TC 269/WG 3, of the International Organization for Standardization. This TR is expected to play an important role in preparing appropriate plans for railway projects which take into account factors that can make the project successful. This article outlines the TR, describes its benefits, and gives some background about how the document was developed.

Keywords: ISO/TR 21245, ISO/TC 269, railway project planning, standardization

1. Introduction

The Technical Committee TC 269 “Railway Applications” of the International Organization for Standardization (ISO) has been endeavoring to standardize the processes underpinning railway project planning, in order to make planning and implementation of railway projects smoother and more effective.

As a result of an extensive discussion and thorough drafting and editing of documents, a deliverable was successfully published in November 2018 as the Technical Report ISO/TR 21245 “Railway Applications – Railway Project Planning Process – Guidance on Railway Project Planning” [1] (Fig. 1). As a member of ISO/TC 269/WG 3, tasked with developing ISO/TR 21245, the author of this paper participated in work to gather ideas, develop content and draft the document. This article describes benefits of the document and how readers and users can use it, together with a brief introduction to its contents. The following part of this article explains how the movement to standardize railway project planning processes was established, and also how discussions among participating members evolved.

2. Importance of ISO/TR 21245

2.1 Keys to focus on railway project planning process

Railways are portrayed as being an environmentally friendly mode of transport, capable of carrying large volumes of passengers or freight safely and swiftly. Therefore, it is considered as important part of social infrastructure, which contributes to the sustainable development of regions. On the other hand, one of the key characteristics of the railways is that they are the aggregate of a diverse array of technologies, forming an often large and complex system. In addition, railway projects involve multiple stakeholders each with their own needs and interests, which must be taken into consideration in planning and implementing projects. This is a demanding task which requires rich knowledge and experience. Therefore, it is difficult especially for nations or organizations who are not familiar with railway technologies to procure and to introduce a railway system suitable for them.

One of the keys to accomplish a successful railway project lies on successful project planning. Given the complexity of railway systems, knowledge and experience are critical for careful and deliberate planning. As such, a guidance document drawing on the extensive knowledge and experience accumulated over the long history of railway projects across the world could help planners produce more appropriate plans. The standardization of a railway project planning process therefore sets out to publish guidance, in a form of an international standard, systematically assembling the factors that are vital for planning a railway project.

Here, railway project is not limited to the construction of new railway lines. It also encompasses the building of new rolling stock, installation of new signalling systems, introduction of new services, renewal of stations, or even the abandonment of existing lines. This standardization targets any type of railway project, regardless of scale or geographical coverage.

2.2 Benefits of ISO/TR 21245

Prospective readers or users of this technical report are assumed to be those who are directly engaging in railway
projects, such as contractors, consultants, and supporting
consultants. Especially in developing countries, where im-
portance and needs of railway systems are rapidly growing,
there are often cases where experience, skills and knowl-
edge on railway systems are not tied or balanced among
those parties involved in a contract. In such contexts, plan-
ning and implementation of railway projects with a lack of
mutual understanding can lead to a need to restart a proj-
et because critical factors have been overlooked, prevent-
ing its successful completion, or making the deliverable
unsuitable.

This technical report therefore provides readers with an
extensive, though not exhaustive, list of factors, such as
stakeholders and their needs and interests, and conditions,
which are not to be missed in planning a project. By refer-
ing to this technical report, parties involved in a project
can share common terms, definitions and ideas, which can
help prevent misunderstandings. Misunderstandings or
restarting work can lead to unforeseen extensions to con-
struction periods or increase of costs both at the planning
phase and implementation stage. This technical report
therefore should make a significant contribution to estab-
lishing frameworks that can achieve the success of projects.

The document equips those with no experience of
railway projects, with a common set of terms needed to
express their ideas, and clarifies what they can expect in a
project, which enables them to clearly explain their ideas
to contractors, consultants and/or other stakeholders. On
the other hand, by referring to this technical report which
is an official publication from ISO contractors or consul-
tants who have rich experience and knowledge in their
field can also emphasize and justify the reasonableness of
their plans.

Thus this technical report is expected to be beneficial
in planning a railway project, and related stakeholders
even including wayside residents and local economies can
also enjoy their benefits.

3. Overview of ISO/TR 21245

3.1 Specificities of railway project

There is a well-known international standard for
project management in general, ISO 21500 “Guidance on
Project Management” [2]. The technical report focuses
specifically on railway project planning, made it possible
to highlight those features and characteristics that are
unique to railway projects.

For example, large-scale railway projects often span
long periods of time. After accomplishment of a project, the
following operational phase can be even longer. Railway
systems boast long life spans, and their life cycle extends
over many years. Consequently, after the introduction and
word definitions the technical report explains in Chapter 4
the importance of taking into account the life cycle of rail-
way systems, future railway demand and technological innova-
tion from a long-term perspective. There are, of course, also
smaller-scale projects that require less time to accomplish.
However, even small projects can affect long-term railway
operations. This type of awareness is essential.

Another aspect that should be noted here is that rail-
way systems are an integration of a wide variety of tech-
nologies, and they must be able to interact effectively to
function. Therefore, diverse technical backgrounds and
knowledge are necessary when dealing with railway sys-
tems. In addition, a single project involves multiple stake-
holders. They each have their own needs and interests in
the project, and sometimes these conflict. Chapters 6 and
7 of the technical report highlights the necessity of under-
standing such specificities of railway projects, especially in
the planning phase. Further, it describes that considering
various factors related to a project thoroughly and appro-
priately coordinating them is the key to successful project
planning, which is necessary for successful project imple-
mentation and subsequent exploitation of the expected
benefits.

3.2 Stakeholders and their needs and interests

Chapter 8 of the technical report includes an extensive
list of stakeholders involved in railway projects, and their
needs and interests which may be considered as vital fac-
tors. Listed stakeholders include railway undertakings,
contractors, suppliers, passengers, wayside residents, gov-
ernmental organizations, among others. Their needs and
interests affect the smooth implementation of a project:
taking them properly into consideration will contribute to
the success of a project, while failing to do so may result in
unexpected delays or costs, or unwanted outcomes. There-
fore, full attention should be paid to those involved in or
affected by the project, and what they want (or what they
do not want) at the planning stage of the project.

The list on the technical report is not exhaustive: in
some cases even other local or project-specific stakehold-
ers and their needs and interests that are not on the list
should also be taken into account. Even in such cases, the
utilization of this comprehensive list of stakeholders and
their needs and interests helps planners avoid overlooking
essential factors in effort. From the list, project-by-project
factors that should be considered can be specified, while
coordination of these factors is described later.

3.3 Conditions that affect railway projects

Stakeholders and their needs and interests are not
the only elements to be taken into account: conditions
surrounding project location also need to be considered,
such as natural conditions (e.g., terrain or climate), and
social conditions including extent of urbanization, exist-
ing infrastructure, cultural and historical objects. What is
distinctive here is that these elements exist independently
of railway projects, and are not easily altered or modified.
Therefore, conditions are different to the needs and inter-
est of stakeholders, insofar that striking compromise or
obtaining concessions can be difficult.

Chapter 9 of the technical report has a list of typical
conditions which affect railway projects among the basic
factors to be considered in project planning. These are also
important in the following phase where factors are to be
coordinated.

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Fig. 2 An example of correlation and causality among factors (from ISO/TR 21245 [1], modified)

3.4 Coordinating factors

Listing factors influencing railway projects is not sufficient: knowing how to coordinate them is another important part of the technical report.

Chapter 10 in the report points out that there are correlations and causalities among factors, which need to be considered when planning a railway project. Understanding these relationships among factors is key to better coordination. It is, however, often unrealistic to meet every single need and interest of each stakeholder, since they may be complexly interrelated, and sometimes be conflicting, or subject to surrounding natural or social conditions that cannot be ignored.

Therefore, Chapter 11 suggests prioritizing and weighting of these factors. Factors that are to be prioritized differ project by project: this technical report intends to notify that factors are to be carefully prioritized, together with a table that facilitates prioritizing and weighting of factors, rather than prescribing the order of factors to be prioritized.

Once factors have been prioritized, solutions should be sought, as written on Chapter 12. This involves consensus or compromise among stakeholders. Technical innovation can provide a solution. What is important to note here is that needs and interests, their prioritization, and solution should be clear and shared among stakeholders. Successful communication can contribute to successful planning and implementation of a project, which is crucial for optimizing the project deliverable.

Finally, the Annex to the document illustrates a sample correlation and causality in a hypothetical railway project, to help readers understand the content of the technical report. For example, a project to replace air conditioning units on a train car is assumed, as shown in Fig. 2. A new higher-performance air conditioning unit can optimize in-cabin temperature, but if the air conditioning unit is too large, then the size of the passenger cabin on board the train is negatively affected. From the perspective of cabin comfort, it would be difficult to meet both objectives: optimum cabin temperature whilst maintaining cabin space. The example in the Annex illustrates how a project can result in a conflicting outcome, demonstrating the importance of listing factors affecting a railway project and careful consideration of correlation and causality among them.

4. Standardizing railway project planning

4.1 Establishment of ISO/TC 269 and proposal of “Generic Standards”

ISO covers a wide variety of technical fields and aspects, which are dealt with through the establishment of Technical Committees (TC) and Subcommittees (SC). Initially, there were no TCs specialized in railway technology: different aspects of railway technology were dealt with individually in different TCs, such as ‘rails’ in ISO/TC 17 “Steel,” and ‘noise’ in ISO/TC 43 “Acoustics.” However, following a proposal made by Germany and France, a new committee, ISO/TC 269 “Railway Applications,” was established in 2012 to comprehensively handle standardization work relating to railway technology.

Drawing on the advantage of this new group which had a wider perspective over all railway related technologies, a proposal was made to develop “Generic Standards,” which aimed to develop a cross-disciplinary international technical standard covering a wide variety of aspects of the railway system, rather than focusing on a single specific infrastructure, equipment or service.

During the first meeting of ISO/TC 269 in October 2012, a proposal to discuss the possibility of documenting Generic Standards was approved, and the Ad-Hoc Group ISO/TC 269/AHG 2 “Generic Standards” was established accordingly.

4.2 Discussions in ISO/TC 269/AHG 2 “Generic Standards”

The purpose of discussions in ISO/TC 269/AHG 2 was to determine whether railway project planning processes could be put into the form of an international standard. Once ISO/TC 269/AHG 2 was established, experts were called and group members in Japan visited organizations around the world to explain the goal of the documenting effort and to ask them to join the discussion. At first it was a difficult task. However, several experts, mainly from Europe and Asia, were finally registered as experts and participated in the discussion. Group members included experts from railway undertakings, suppliers, consultants, governmental organizations and research organizations, including Railway Technical Research Institute. The Rapporteur, in charge of coordination discussions, was Mr. Yasunari Nakajima, from East Japan Railway Company.

The initial difficulty in explaining the goal and calling experts stemmed from the fact that standardizing a process as a guideline, was an unusual concept, making it difficult to understand: it does not deal with a single type of product or material; nor does it intend to define its size, weight, color or performance. Rather, it aims to provide users a document which outlines a basic framework of what is to be considered when planning a railway project, and how they can coordinate them, because conflicts can occur. Some of the earliest comments with regards to the project included: “the content seems nonfigurative and it is hard to understand its benefit,” or “it is difficult to imagine how the document can be utilized.”

Therefore, while determining the possibility of standardizing railway project planning process as the main
goal for ISO/TC 269/AHG 2, work also began on a draft standard in an attempt to make the idea more visible and easier to comprehend, as well as to make its content clearer for the sake of better and more constructive discussion. The draft document was made with the help of ISO 21500 “Guidance on Project Management” [2], with railway-specific factors extensively added to its content.

Given the expected large content of the document resulting from the breadth of railway project related issues it was supposed to cover, two key issues that had to be clarified from the outset were how it should be structured and in what format it should be produced as a deliverable. After extensive discussions among experts in several meetings, it was concluded that “factors to consider when planning a railway project” and “how to coordinate them” should be different parts of the document.

One of the factors to consider is needs and interests of stakeholders. As mentioned above, a railway project regularly involves multiple stakeholders each with their own needs and interests in the project. Adequate consideration of such needs and interests leads to a successful project implementation. Other important elements to consider are the natural and social conditions surrounding a project. Conditions can be different from project to project: vital location-specific characteristics cannot be overlooked when planning a project. It was proposed that the needs and interests of stakeholders were to be Part 1 of the document, and conditions surrounding a project to be Part 2. The final part, Part 3, was to set out the guidelines on how to coordinate such needs, interests, and conditions. Finally, a proposal was made to publish this series of documents as a technical report, instead of an international standard.

This proposal was accepted at the second general meeting of ISO/TC 269 in November 2013, and a resolution was adopted to task ISO/TC 269/AHG 2 with the work of developing the first two parts of the document as two technical reports. This paved the way for the standardization of railway project planning processes to move forward. As work progressed, the third general meeting of ISO/TC 269 in the following year resolved to establish a new working group, ISO/TC 269/WG 3 “Rail Project Planning,” to continue the development of the technical reports. ISO/TC 269/AHG 2 disbanded accordingly, and its members were re-registered as members of ISO/TC 269/WG 3. Mr. Nakajima was the convener of the group.

At the proposal stage and in the discussion phase of standardization, the document under consideration was referred to as a “generic standard.” However, this title is abstract and ambiguous, making the effort and the goal of standardization rather hard to comprehend. Therefore, after discussions in ISO/TC 269/AHG 2 gave way to agreement to proceed with the document’s development, its successor, ISO/TC 269/WG 3, was named “Rail Project Planning,” reflecting the title of the document “Railway Project Planning Process” accordingly.

4.3 Document development in ISO/TC 269/WG 3 “Rail Project Planning”

The first meeting of ISO/TC 269/WG 3 was held in February 2015 (Fig. 3). The goal of ISO/TC 269/WG 3 was to publish technical reports on a railway project planning process. Based on the draft ISO/TC 269/AHG 2 produced, the first step was to finalize Part 1 which contained a list of needs and interests of stakeholders that should be considered in planning a railway project, and Part 2 which described conditions surrounding project locations. The first draft of the technical report was prepared by members from Japan, and was discussed and modified according to comments given by other members. Each member of the group, having different backgrounds and experience, contributed to the compilation of an extensive inventory of factors that needed to be included in the technical reports.

The meeting in September 2015 finalized the two technical reports, and following ballot approval, were officially published in November 2016 as ISO/TR 21245-1 “Rail Project Planning Process – Part 1: Stakeholders and Their Needs/Interests,” and ISO/TR 21245-2 “Rail Project Planning Process – Part 2: Conditions.” These were the first official documents to be developed and published by the ISO/TC 269.

The next task of ISO/TC 269/WG 3 was to develop a document that described the coordination of factors listed in Part 1 and Part 2. This was a very important part since a list of factors related to railway project planning alone is not enough: coordination is vital for implementation of a project to be successful. Furthermore, this part heavily relied on knowledge and experience. Therefore, members carefully prepared the document to make it easier for readers to understand, and to include necessary perspectives for appropriate coordination.

Originally, this part of the document was to be published as Part 3 of the technical reports. However, the final decision was that all three parts were to be integrated into one document, containing lists of stakeholders and their needs and interests, conditions surrounding projects, and keys to coordinate such factors.

The integrated technical report was finalized in a final meeting in December 2017, and was approved by ballot in 2018. In November 2018, the technical report ISO/TR 21245 “Railway Project Planning Process – Guidance on Railway Project Planning” was published successfully. Preceding technical reports, namely ISO/TR 21245-1 and ISO/TR 21245-2 were cancelled accordingly.
5. Concluding remarks

This article introduced ISO/TR 21245, a technical report on railway project planning processes, explaining how it was developed, its purpose, what it contains and how readers can benefit from it. In the light of global growth of the railway industry, it is expected that this technical report will further facilitate the planning and implementation of railway projects, thereby helping to ensure better and more suitable railway systems are delivered to those wanting to build them.

References

[1] International Organization for Standardization, ISO/TR 21245: Railway Application – Railway Project Planning Process – Guidance on Railway Project Planning, 2018.

[2] International Organization for Standardization, ISO 21500: Guidance on Project Management, 2012.

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