

INFRAGUIDER for the Eco management of railway infrastructure material

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Purpose

Even though railway is considered more environmentally friendly than other comparable modes of transport there is a concrete opportunity to control and improve the environmental performance of railways. This concerns railway rolling stock and operation as well as railway infrastructure. Railway infrastructure is constituted of large amounts of railway material that is built, operated and maintained to enable railway traffic, such as rails, sleepers and ballast and cables and other construction material (see figure 1). The large amounts of material in railway infrastructure has in itself an environmental significance, because of the mere amount of material masses and because these amounts are geographically distributed throughout the society. Environmental aspects of the geographical distribution are related to transports, to impacts on nature and urban areas, and to managerial difficulties.

The EU Framework Programme 7 Coordinated Action InfraGuidER addresses improvement of environmental performance of railway infrastructure with emphasis on material flows and management. InfraGuidER analyses the environmental performance of railway infrastructure materials by relating these issues to the railway infrastructure environmental management. This has been performed by a first assessment of environmental management system functions of European railway infrastructure managers, by a general analysis of railway infrastructure material flows, and by proposing a railway infrastructure material eco-procurement guideline.

Introduction

InfraGuidER project was initiated by the need to harmonize environmental management of railway infrastructure in general and railway infrastructure material and components in particular. Because railway infrastructure to a large extent is about materials and components, the InfraGuidER project was established on the methodology of material flow analysis and the methodology of environmental impact assessment developed in the rolling stock projects RAVEL, REPID and PROSPER. The UIC leaflet 345 "Environmental specifications for new rolling stock" has worked as inspiration for the project.

InfraGuidER scope

InfraGuidER addresses these issues by mapping the railway infrastructure environmental management, railway infrastructure material flows and railway infrastructure material procurement. Railway infrastructure environmental management has been analyzed from the viewpoint of conformance to ISO 14001, railway infrastructure material flow has been analyzed with material flow analyses (MFA) and railway infrastructure material procurement has been analyzed with regards to how procurement can impact the environmental performance of railway infrastructure, both inside the infrastructure system and from the viewpoint of the life cycle of infrastructure material. For this purpose the methodologies developed in the rolling stock for hardware design and eco procurement has been used to identify and quantify the environmentally significant materials and components.

The environmental impact assessment methodologies are based on life cycle assessment (see figure 2), but produces a very ready to use result, exemplified as a draft eco-procurement guideline for railway infrastructure. Eco -procurement is identified as a very important function of the railway environmental management system, since it can aid to minimize the input of unwanted material, can impact the total life cycle impact of bulk material and can aid with controlling the build-up of

material inside the infrastructure. Five key environmentally strategic functions of the infrastructure organizations have been pointed out, i.e. the board of directors, the planning and implementation of projects, the infrastructure operation, the contracting operators and the material and subcontractor procurement (see figure 2). Each of these functions has a crucial role in the control and improvement of the environmental performance of the railway infrastructure and may make use of environmental performance indicators and the efficient and effective environmental impact assessment methodology used in the project.

Up to date and final Results

InfraGuidER delivers an overview of material flows, an overview of environmental management functions to assess and control the impact from materials and components, as well as a draft eco-procurement guide to control the environmental impacts from the inflow of new materials and components into the railway infrastructure. Currently the project has resulted in

- Systems models, which describe how the different infrastructure managers in the project have implemented some environmental management processes, related to the functions described by the ISO 14001-environmental management system.
- A collection of tools and methods in use for the environmental impact evaluation.
- Material flow models that describe how the major materials and substances are entering the railway infrastructure and leaving as waste or as emissions to air, ground and water.
- A material and component database collecting the data obtained by the InfraGuidER IMs.

All these items allowed to understand clearly the environmental framework of the railway infrastructure (figure 3) and to initiate a constructive process. In fact upcoming results are a compilation of tools to assess and manage the environmental performance of materials and components. The overall result from the project is a combined view of railway infrastructure material flows, railway infrastructure management and railway infrastructure material procurement, which provides clear guidance towards improved environmental performance, both on a global climate scale and on the local and regional scale including waste minimization and reduction of toxic substances

Impact

The added value of this Project is its exploring the not yet exploited potential of railway network assets renewal and planning for positively affecting the environmental performance of the Infrastructure Managers. The carrying-out of this activity from different stakeholders: IMs, Suppliers and Academia reflect in a balanced way what the status is and some future opportunities from both inside and outside the railway companies. This open approach challenging the IMs for enhancing their actual policies, EMS aspirations and the way they make business today with material supplier is indeed ambitious and engages the final users. It is not only raising awareness in the railway community, it is also recommending new urgencies for the agenda of IMs analyzing some existing national single good practices and striving to build-up on them a proposition for a usable European management tool. Resource scarcity, waste management, stronger health standards in material lifecycle regulation, company image are examples of variables/risks affecting business. The tomorrow leadership belongs to those getting prepared today.

InfraGuidER self evaluation

The way to evaluate the InfraguidER activities is to analyse how the InfraguidER output implementation can have a significant impact on the environmental indicators values, to measure or to forecast them for the 2020 railway vision and finally to act and to prove, by well defined EPIs, that railway is reducing the carbon footprint of the infrastructure much better and much before of the road transport, excelling always in the eco impact among all the transport modes.

References

<http://www.infraguidER.eu>



Figure 1 Railway infrastructure is constituted of large amounts of material, such as rails, sleepers, ballast, cables and different construction elements.

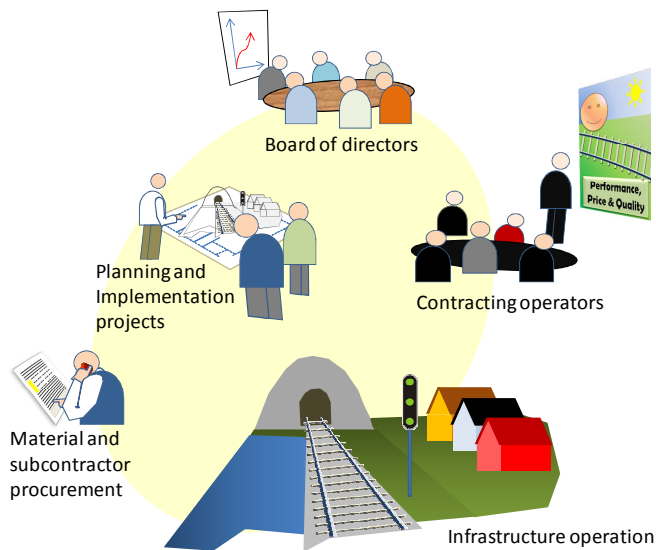


Figure 2 Examples of railway infrastructure organizational functions where environmental performance indicators may have significant influence.

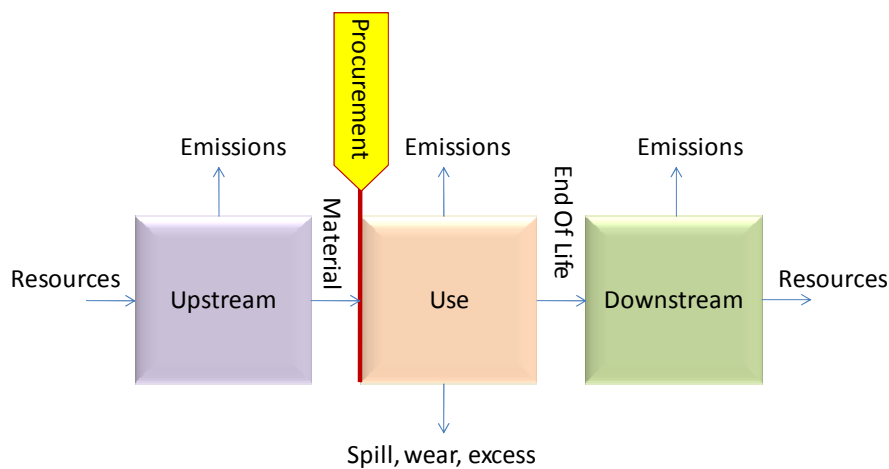


Figure 3 The environmental assessment of materials and components is based on Life Cycle Assessment, and a simple application is the draft eco-procurement guideline.