

Harmonized EIA-Guidelines for German Railways Projects

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Abstract

After establishing the EIA(Environmental Impact Assessment) act in the Federal Republic of Germany there still remain methodical and substantial deficits. So nearly every environmental impact study went to be a matter of experiments. The requirement for standardization of data sampling and evaluation has permanently been increasing. This is meant to ensure quality standards for the assessment of environmental impacts as well as to maintain reliability required by the projecting company. Such a harmonization is of special importance because of the strongly accelerated expansion of traffic infrastructure caused by the reunification of Germany. That is why the guideline "EIA carried out" for the German Railways company is in process of development.

This guideline, focussing on practical demands, comprises impacts of railways, adequate sets of indicators, feasible tools for the prognosis and evaluation of environmental reactions. "EIA carried out" will be introduced not only as a manual but also through workshops and pilot studies.

keywords: EIA-guideline, harmonization, quality standards

I. Introduction

After establishing the act of Environmental Impact Assessment (EIA) in the Federal Republic of Germany there still remain methodical and substantial deficits. So nearly every Environmental Impact Study went to be a matter of experiments.

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II. Environmental Effects of Railways

Out of construction as well as from operation there arise several impacts in the natural resources:

First of all railways under construction cause

temporary environmental effects such as the installation of roads to reach the construction sites as well as depots or recycling places of ballast to make foundations for the rails.

Furthermore, there are impacts involved by earth works or the regulation of ground water layers constructing subways and tunnels.

There are special impacts on soils by compression respectively there remain impervious areas. Contaminated ballast needs to be exchanged when existing railways are reconstructed especially in the eastern parts of Germany. Noise pollution arising from the construction sites as well as the transport of loads by lorries may disturb wildlife (e.g. breeding birds) and, in consequence, a break of construction might be required.

Furthermore, the installation of railways including cuttings, embankments, and bridges causes effects on the surface water system. So the construction of bridges may divide the migration areas of mammals e.g. otters or beavers along creeks or rivers. Protected biotopes and reserves sometimes are split up in the same way; storks or ducks are highly endangered crossing

the overhead lines of the railways. Socio-economic relationships also are concerned, for example, in case of rail lines crossing streets.

Finally, there remain effects, caused by passing trains, like noise pollution, vibrations, or air gusts during the continuous operation of railways. Effects like these might endanger historical buildings.

Abrased particles from wheels and rails as well as the use of herbicides (to remove upcoming weeds between the rails) might contaminate soils, ground water, and surface water gusts influence the specific micro-climate of edges of forests.

Elaborating an Environmental Impact Study there should be considered both biotic and abiotic parameters - both of them are equally important.

The current status of the natural resources needs to be described and evaluated for an adequately wide corridor along the planned rail line. In order to find out such suitable corridors without conflicts caused by sensitive locations of

natural resources (location alternatives) methods of remote sensing and Geographic Information System (GIS) are not used in Germany as often as they could be. There is also a great lack of long-term ecological monitoring projects to document the very environmental effects of railways - although we need these results to enable better prognoses in Environmental Impact Studies.

III. EIA - Carried Out

The guideline EIA - Carried Out encloses technical standards characterizing relevant impacts of railways, adequate sets of indicators, feasible tools for the prognosis and evaluation of environmental reactions - focussing on practical demands for construction or enlargement of railways.

Therefore projects are specified as particular elements (like rails, towers for radio service,

		Man	Fauna	Flora	Soil	Ground water	Surface water	Air	Climate	Land scape	Cultural goods
Effects caused by the proceedings of construction	Impervious areas	■	■	■	■	■	■				■
	Emission of exhaust fumes and dust	■	■	■	■	■	■	■			
	Emission of noise	■	■								
	Vibration	■	■								■
	Potential of danger		■								
	Change of ground water level				■	■	■				■
	Change of river-bed and flow characteristics						■				
Effects caused by the installation	Impervious areas	■	■	■	■	■	■		■	■	■
	Division of living space	■	■							■	
	Change of surface morphology	■	■							■	
	Change of ground water level		■	■	■	■					■
	Change of river-bed and flow characteristics		■	■		■	■				
Effects while operation	Emission of noise	■	■								
	Vibration	■	■								■
	Collision		■								

Figure 1. Exemplary table of (environmental) relevance for impacts from cuttings during the construction

buildings, signal boxes etc.). The guideline includes tables describing the environmental relevance of each element (Figure 1). Such tables are useful for the Scoping Process.

Carefully adapted to a given project they can be used to determine how detailed the study needs to be as well as to check all environmental sectors which might be concerned. To ensure practicability in the study the resources need to be described as indicators (Figure 2).

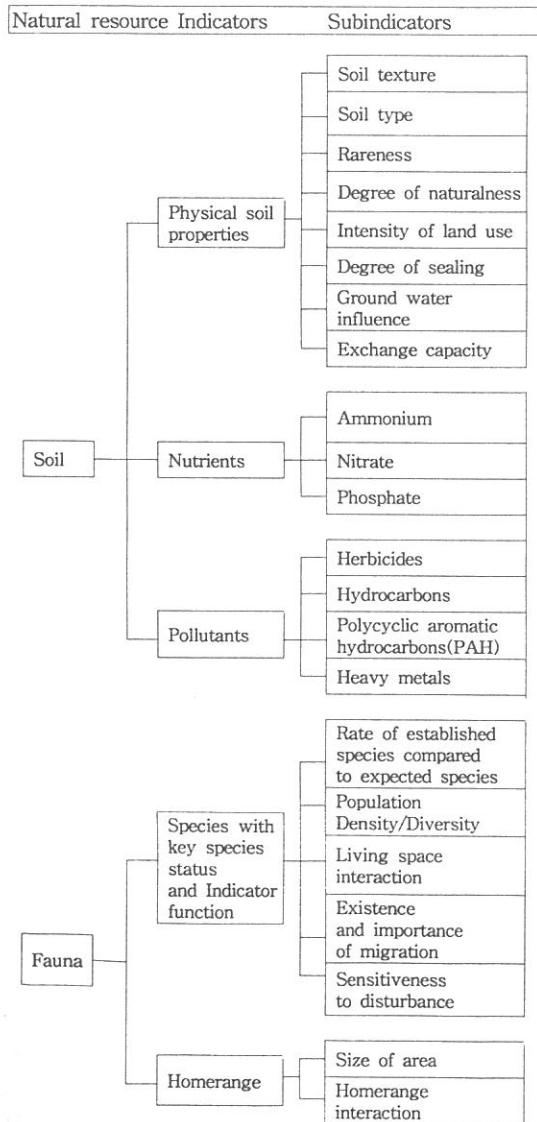


Figure 2. Exemplary set of indicators for the resources soil and fauna

Therefore each resource is subdivided into an arborescent structure. The indicators and subindicators characterize the corresponding resource. Figure 2 shows examples for the resources fauna and soil. So the assessment of environmental impacts can as well be facilitated and made transparent.

In order to carry out evaluations from a neutral point of view it is important to look for suitable environmental quality standards which can be used as a reference to assess the state of natural resources before and after the establishment of a planned project.

Environmental quality standards normally will not coincide with the ecological optimum. But most the times the quality standard will above the given state of the environment.

This relationship is demonstrated in Figure 3.

Standards can be derived from acts as for nature conservation, for purity of atmosphere or for quality of water.

Using such a standard as the high value and a threshold as the low one a scale to classify the given and prognosed state of the environment is fixed. Thus the specific values of different indicators can be compared with each other. Such assessments e.g are necessary to find out corridors where there are least environmental. They also make it possible to compare different alternatives of the very project.

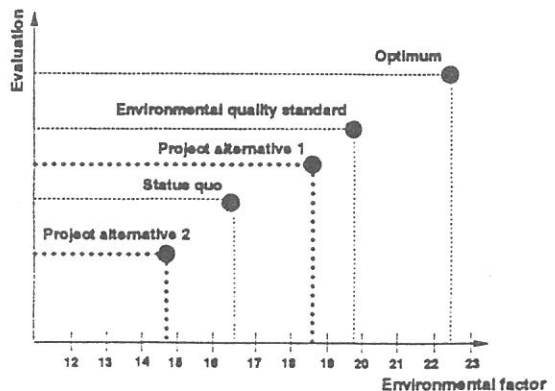


Figure 3. Relation between environmental quality standard, condition of the environment before and after establishment of a project

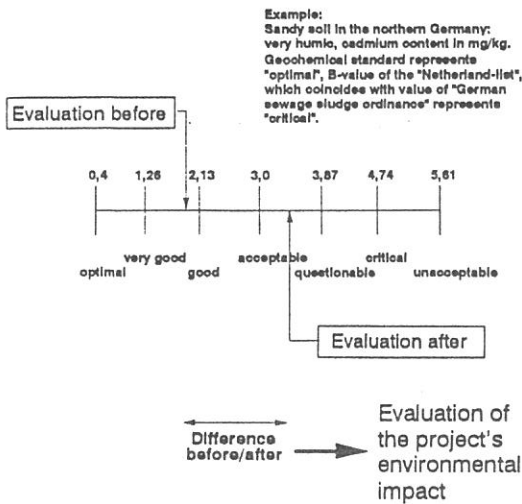


Figure 4. Scales of evaluation for the indicator Cadmium concentration in a sandy soil

This way the EIA (Environmental Impact Assessment) can meet the demands for precaution instrument.

It is necessary to provide a scale for each indicator. Figure 4 shows an example of a scale to estimate the concentration of cadmium in a sandy soil. An increase of concentration after the

construction e.g. is estimated of the use of corrosion inhibitors and abrasion (see above). The difference between the environmental conditions before and after the impact indicates the need for compensation of deteriorated soil quality. "EIA carried out" demonstrates such a standardization of scale which then needs to be adapted to the very region of interest.

Corresponding to the kind of available information, there exist different types to carry out the prognosis in the EIA:

It should be possible to determine noise pollution ranges or levels of ground water layers by application of computer models.

More inexact, but still appropriate, conclusions of analogy also can be applied—derived from comparable projects, where changes of natural resources have been documented, e.g. the decrease of breeding birds caused by splitting their homerange to peaces.

More vague, visual simulations can be applied, above all to assess the change of a scenery.

Last not least the guideline points out the way how to achieve a synopsis as a summary of an Environmental Impact Study.

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