



Sustainable Concepts for Concrete Bridges in Germany

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Summary

The aging infrastructure in Germany coupled with limited natural und financial resources has led to the development of a wide range of sustainable strategies and concepts. It wasn't until 2011 that a code for the recalculation of highway bridges, the so called "Nachrechnungsrichtlinie", was introduced. It defines the steps and regulates the procedures to be carried out for existing structures. In this way, a standardization of the sustainability process for highway bridges has been achieved. It facilitates the comparison of different infrastructure projects and improves the cost-efficiency aspects. This procedure is compulsory for every existing highway bridge in Germany.

Keywords: Concrete bridges; sustainability; retrofitting; recalculation.

1. Introduction

For highway and railway bridges high security standards are set concerning their durability. To fulfil these standards, rather restrictive regulations have to be applied for the design of bridges in Germany and regular inspections of these structures have to be carried out. The DIN 1076 code describes the inspection rules for existing highway bridges [1] and the DB-Ril 804, module 8001 for railway bridges [2].

In the past decades much has been undertaken in Germany in the field of sustainable infrastructure due to limited natural und financial resources. However, for a long time there were no fixed criteria, so for every infrastructure project an individual procedure had to be developed. The consequences were that there was no guarantee that all sustainable criteria were being fulfilled.

Although the code DB-Ril 805 [3] for the recalculation of railway bridges exists since 1999, a new code for the recalculation of highway bridges, the so called "Nachrechnungsrichtlinie" [4], was only introduced in 2011. This code, which is based on the code for railway bridges, accurately describes the strategy to be taken. It is a three-block strategy, which begins with calculations of the structure, taking into account the results of the former bridge investigations and the available records of the structure, followed by a feasibility study and ending in a cost-efficiency study. The application of the whole procedure guarantees the sustainability of the infrastructure project. Furthermore, different infrastructure projects can be compared.

For the existing structure under investigation it has to be decided,

- if it fulfils all criteria of durability and does not need to be retrofitted, or
- if a strengthening of the structure is necessary and possible, or
- if the structure has to be renewed.

The decision is mainly based on economic aspects which include the sustainability. If the structure has to be renewed, it has to be checked, if in the meantime - until the new structure is built - compensation