



Structural Assessment of Existing Concrete Bridges: A Consulting Engineers' point of view

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Abstract

Germany is located in the centre of Europe and its economy is highly linked with its neighbouring countries. Germany's highway network is - to a high degree - built on concrete bridges, which were mostly constructed and designed between 1965 and 1985. These existing concrete bridges do not per se fulfil the current requirements regarding the used materials or the possible ultimate load. Therefore, the German government has started different programs to verify existing concrete bridges, e.g. regarding: fatigue of coupling joints, stress corrosion cracking and general verification regarding higher traffic loads. The authors of this conference paper describe just the mentioned problems and show examples of their own consulting experience. With these examples they want to show that sometimes not the changed codes are the reason for important differences between the original design and the verification but rather different static models or human errors.

Keywords: Existing bridges, structural assessment, concrete bridges, reinforced concrete, prestressed concrete.

1 Introduction

Germany is located in the centre of Europe. Its economy is highly linked with its neighbouring countries. Therefore, thousands of tons of goods are moved on Germany's highway network every day. This highway network is - to a high degree - built on concrete bridges, which were mostly constructed and designed between 1965 and 1985. These existing concrete bridges do not per se fulfil the current requirements regarding the used materials or the possible ultimate load. Therefore, the German government has started

different programs to verify existing concrete bridges.

The three main programs are: fatigue of coupling joints, stress corrosion cracking and general verification regarding higher traffic loads.

Until the late 1970s most structural engineers were not aware of the low fatigue resistance of coupling joints. Hence, this point was generally neglected during the structural design, so many bridges need to be checked retrospectively.

Stress corrosion cracking is a growth of cracks in a corrosive medium, which lead to a sudden failure