Framework for investigating the effect of different design lives on the design of bridges

Egor Svechnikov, Johan Maljaars, Bert Snijder

Eindhoven University of Technology, Eindhoven, The Netherlands

Johan de Boon, Eize Drenth

Rijkswaterstaat, Ministry of Infrastructure and Water Management, Utrecht, The Netherlands

Contact: e.svechnikov@tue.nl

Abstract

Many developed countries have a national road network including a significant number of bridges in need of renovation or replacement in the coming years. The reason for this is their technical and functional capacity becoming insufficient due to aging and changes in societal demands. Therefore, these bridges need to be adjusted or replaced. National authorities in The Netherlands currently require a design life of 100 years for new bridges, however nowadays it seems reasonable to have a certain flexibility for this parameter. Since the selected design life has its implications on structural solutions and choice of materials, the identification of the optimal design life for bridges seems necessary. This paper gives a summary on the issue regarding the optimum design life of bridges and it highlights the framework of the upcoming research activities.

Keywords: design life, bridges, renovation strategy, functionality

1 Introduction

1.1 General

In Western Europe, a lot of infrastructure has been built 50-70 years ago. The responsible local authorities are facing the challenge of its renovation or replacement in the coming decades. This requires huge investments and therefore it is desired to arrange for the process and take decisions in the most efficient way.

Aging of infrastructure is not the only aspect to be considered. Nowadays, the environmental issues are a worldwide concern. Several countries have set their goals and commitments towards the circular economy [1] and the reduction of the carbon footprint [2]. The construction industry is known as a great contributor to waste generation and environmental pollution, therefore smart solutions in infrastructure management could help in reaching the circularity and carbon footprint goals.

In order to address these issues properly and maintain the balance between economic and environmental aspects, a consistent renovation

https://doi.org/10.2749/ghent.2021.0726
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