



Learnings from the past to design metallic bridges spanning centuries into the future

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1 Abstract

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Liam is a chartered bridge engineer with experience working in the UK and New Zealand. He has designed and assessed metallic structures and has specialists materials experience with steel.



Since the 20th century, modern bridges have been typically designed for a relatively short design life of either 100 or 120 years. In reality, there are numerous examples of bridges that are over 100 years old that are still in service today. In some cases, these bridges have heritage protection status. In other cases, they are a vital link to their transportation network, for which any disruptions will result in significant economic impact to the local or regional economy.

Over the years, the authors have been involved with the inspection, maintenance, and refurbishment of historic bridges. This paper provides an overview of lessons learnt from examples of historic metallic bridges in New Zealand and the United Kingdom, as well as present the case for a 200-year bridge.

Lessons learned from failures in design and detailing for durability, material selection, and allowance for future access for inspection and maintenance can be used when designing new bridges, with the aim to minimize future maintenance cost and assisting 21st century bridges to span centuries into the future.

Keywords: Service life, metallic, steel, durability, future ready, 200-year bridge, corrosion, asset management.

2 Introduction

The 20th century saw significant strides from economic, social and technological perspectives. This included the design and construction of a numerous bridges, from iconic bridges (such as the Golden Gate Bridge, Sydney Harbour Bridge and the Millau Viaduct) to the simply supported, short span bridges, some of which are in semi-rural and/or lightly populated urban environments.

The post-war years saw a boom in bridge construction worldwide, which over the coming decades these modern bridges will be reaching the end of their (perceived) design life; thus, introducing new challenges to their ongoing management, maintenance and in turn replacement; especially in heavily urbanized areas. Closing a bridge is likely to result in significant traffic disruptions, in some cases, resulting in productivity and traffic disruption losses totaling in the millions