Chapter

7

Sustainability and Bridges

Andrew J. Martin, Civil Eng.; COWI A/S, Kongens Lyngby, Denmark. **Martin J.D. Kirk,** Civil Eng.; Arup, London, UK. Contact: ajmn@cowi.dk, martin.kirk@arup.com

7.1 Introduction

How should bridges be considered with regard to sustainability? Should it be by maximizing the use of recycled materials and minimizing CO_2 emissions and the use of water? Alternatively, should it be by taking its impacts on local communities during their planning and execution into account? Or, might it be by designing bridges to minimize the need for maintenance and repair during their intended service lives? None of these approaches is necessarily right or wrong, but none on its own sufficiently addresses the breadth and complexity of the challenge posed by sustainability and sustainable thinking to all those involved with bridges—as owners, designers, constructors, maintainers, and users.

This chapter seeks to identify the attributes of a sustainable approach to bridges and how such an approach could be achieved in practice. Firstly, a view of the relevance and importance of sustainability to bridges is presented. Then, the fundamental component aspects of sustainability that relate to bridges will be identified and discussed, under the headings of environment, society, and economics. The life cycle of a bridge is then examined, with the purpose of identifying how and when the competing priorities of these "aspects" can be brought together to give integrated and comprehensive solutions. Three case studies are then presented to illustrate practical examples of sustainability in action in real bridge projects. An annotated selected bibliography of relevant references is presented as Further Reading at the end of this chapter.

The current work does not propose to offer a "one size fits all" template for a sustainability approach to bridges. All bridges are unique and as such—whether small or large—each deserves a proportionate level of individual consideration in terms of sustainability. Also, from a global perspective, it would be highly presumptive to suggest standard solutions to sustainability issues, regardless of location and irrespective of local concerns and priorities. Instead, it is hoped that a unifying theme will emerge, namely the importance of broad-based structured thinking and informed, responsible and accountable decision-making for delivering sustainable solutions to bridge projects.

In this way, bridge engineers and others can make a meaningful, tangible, and accountable response to the challenge of sustainability made 25 years ago in the frequently cited "Brundtland

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