

How can a Bridge Engineer contribute to a sustainable infrastructure?

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Abstract

As Bridge Engineers we have a significant leverage to influence our built environment, but all too often we choose to stay with established solutions instead of striving for new and better alternatives. When designing for sustainability, we should have the following aspects in mind:

- Environmental impact of our design over its whole life, locally and globally.
- The possibility for our structures to grow with increased traffic – but also to shrink where population is on decline.
- Plan for environmental friendly means of transport and make their use more comfortable, i.e. wide bike lanes, widening for light rail addition.
- Minimize traffic obstruction during construction.
- Design for a long service life.
- Design for dismantling and re-use of structural parts.

This presentation will show examples where a sustainable design could be achieved and explains possibilities how the engineer can convince the client to agree on better than the traditional solutions.

Keywords: sustainability, fast erection schemes, bridges, prefabrication, long service life, new materials, professional ethics

1 Introduction

As Bridge Engineers, we sometimes underestimate the lever we have to shape our built environment. It is in the early design stages where we can not only influence the type and construction material of a bridge but also the whole layout of a highway or railway itself. Though the engineer is typically bound by the paramount goal of an economic design, it showed that there are many options with only minor cost increase but decisive advantages in sustainability. When discussing the options, many

authorities are willing to opt for a more expensive option if they are convinced by the added value.

The only problem is, that these added values aren't easy to be expressed in quantitative terms, at least with no correlation to cost. In order to be able to get a better overview of all contributing factors, a trade-off matrix can help to evaluate all aspects in question.

2 Factors of Sustainability

This is an (incomplete) list of contributing factors in order to evaluate the sustainability of a design.