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O&M of New and Existing Large Cable Supported Bridges

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Abstract

It is a challenge to obtain cost effective operation and maintenance of large cable supported bridges. They do not fit into the O&M framework used for normal highway bridges. At the same time, they represent large investments and are bottlenecks in the infrastructure network. Today it has become common practice in design of new bridges also to focus on durability, access ways, and setting up a system for risk based inspection and focused maintenance. For existing bridges, clients strive towards a modern approach to O&M by retrofit of bridge elements, improved access ways and a specific approach to inspection and maintenance. At the same time, O&M "rules of the game" have changed with the last 5 years of digitalisation resulting in new opportunities for efficient O&M. A similar potential also exists in exploiting accumulated knowledge about exposure and degradation mechanisms and utilize a data driven approach to control bridge criticality.

Keywords: Bridges; Operation and Maintenance; Inspection; Life Cycle Costs; Bridge Management Systems

1 Introduction

A country's bridge infrastructure typically consists of conventional smaller to medium size bridges with only few major or exceptional non-standardized structures such a large cable supported bridges. For instance, in Denmark about 97,5% of structures owned by the national road author, the Danish Road Directorate are conventional highway bridges with spans less than 200 m, [1].

Conventional bridges are typically characterized by being RC or pre-tensioned concrete structures with a design fully covered by past or current design codes and standard rules for O&M.

Typically, large cable supported bridges are characterized by:

- Design is not covered entirely by current National codes as loads and elements

typical are not completely covered by such codes.

- They contain special mechanical and electrical elements, which interact with the structure.
- They are expensive structures as they often represent handling of significant engineering challenges.
- They are typically bottlenecks in the national infrastructure meaning that the risk of disruption of their operation should be kept low.

In total, this means that there is a need for special procedures and instructions for operating and maintaining these bridges. This means also that they need a dedicated operation and maintenance organisation with 365/24/7 surveillance and monitoring of the structure as well as traffic.