

## Cable Replacement in North America

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## 1 Abstract

Cable replacement projects are highly specialized as the cables are a critical tension member of the structural system of these type of bridges and often, the traffic on the bridge cannot be disrupted during the cable replacement works. The new cables also need to fit within the existing bridges and the detailing needs to be adapted to the existing situation. Experience of the design of cable supported structures, the knowledge of cables, the methods of installation, the design of specialized temporary works and detailing around anchorages needs to be combined. This article will cover the different aspects of cable replacement, the experience of suspension bridges and cable-stayed bridges and will describe two case studies in North America.

**Keywords:** cable-stayed; bridges; cable replacement; bridge construction; temporary works; construction engineering.

## 2 Introduction

In recent years, we have seen an increase in the demand for cable replacement in civil structures. Cable replacement is needed either to replace the cable stay in a cable-stayed bridge, the suspension cable or hangers of a suspension bridge, the hangers of arch bridges or cables in a building or stadium roof. Cable replacement projects are highly specialized. The work often needs to be carried out without disrupting the traffic on the bridge or the operation of the building. Additionally, the new cables and its anchorages need to fit within the existing bridge and the detailing needs to be adapted to the existing structure. Experience of combining the design of cable-supported structures, the knowledge of cables, the methods of

installation, the design of specialized temporary works and detailing around anchorages is vital to the success of the project.

The reasons for requiring cable replacement can be various:

- Corrosion
- Fatigue
- Changes in loads or design codes
- Accidental loads including fire

Bridges requiring cable replacement have often been constructed more than 40 years ago and have not always been inspected and maintained in accordance with the maintenance plans due to a lack of understanding or funding. Bad detailing around the anchorages can cause water collection