



## Three Case Studies of Construction History Applied to the Assessment of Engineering Heritage Structures

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### Abstract

The paper will illustrate the contribution of research into Construction History in condition assessment or residual carrying capacity situations for three old types of concrete constructions. We will address:

- the problem of assessing the actual carrying capacity of "Hennebique" reinforced concrete type beams with their characteristic reinforcement system, widespread in many countries before the First World War.
- the replacement of the external post-tensioning tendons within a hollow box girder railway bridge built in the early 1960s with the "Blaton-Magnel" anchorage system developed in Belgium from 1941 onwards, and used until the early 1960s, in Belgium and abroad.
- the structural assessment of thin concrete hyperbolic paraboloid shells, which were highly popular with architects and engineers in 1950s-1960s.

**Keywords:** reinforced concrete, prestressed concrete, post-tensioning, bridges, thin concrete shells, hyperbolic paraboloid, assessment, engineering heritage.

### 1 Introduction

When a structural engineer has to evaluate the carrying capacity of an old concrete structure in view of extending its service life, or even a change of function, he is first faced with the issue of documentation on the structure studied, in

particular looking for information about the materials used (type of cement, concrete composition, type of reinforcement, ...) and all the construction layouts. While formwork and reinforcement drawings can sometimes be found, these data should be clarified by the results of research into construction history and by the