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Stay Cables for the Kemijoki River Bridge at Rovaniemi

Câbles haubanés pour le pont sur Kemijoki à Rovaniemi

Schrägseilkabel für die Kemijoki Brücke in Rovaniemi

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1. INTRODUCTION

Cable-stayed bridges have extensively gained in popularity for spans between approximately 100 m and 500 m all over the world. They are not only economic to build but also very favourable in the impression they create.

VSL has adapted its well-known post-tensioning system for the specific requirements such stay cables demand. In particular, this comprised a relatively high fatigue strength of the cables, adjustability and replaceability, good corrosion protection, economic installation and stressing and durability.

The cable consists of:
- a bundle of parallel strands
- a tubing for the strand bundle
- an anchorage at both ends
- a grouting compound.

VSL has successfully used this stay cable system in several projects, such as the Sunshine Skyway Bridge in Florida, USA. Some five projects to be provided with these cables are under construction.

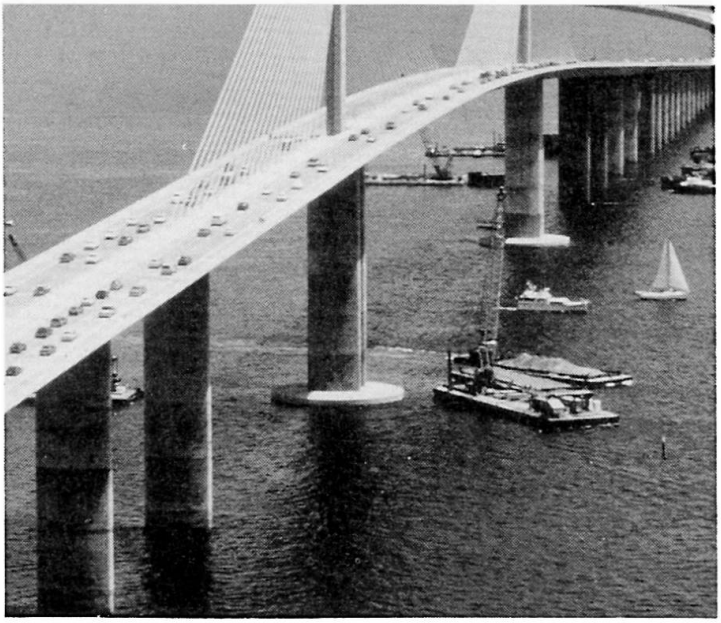

Fig. 1 : Sunshine Skyway Bridge

2. KEMIJOKI RIVER BRIDGE CABLES

The stay cables for the Kemijoki River Bridge at Rovaniemi, Finland, contain 16 mm diameter strand bundles with ultimate capacities ranging from 8480 kN to 14575 kN. For optimum corrosion protection and full mobility, the strands are individually greased and polyethylene coated. An additional thick-walled polyethylene pipe sheathes the bundle. The adjustable anchorages are injected with a

specially suited, petroleum based corrosion preventive compound and the cables themselves are grouted with cement mortar. The main cables will be stressed in the pylon head. The back stays provide a special stressing chamber in the abutment for tensioning of the cables.

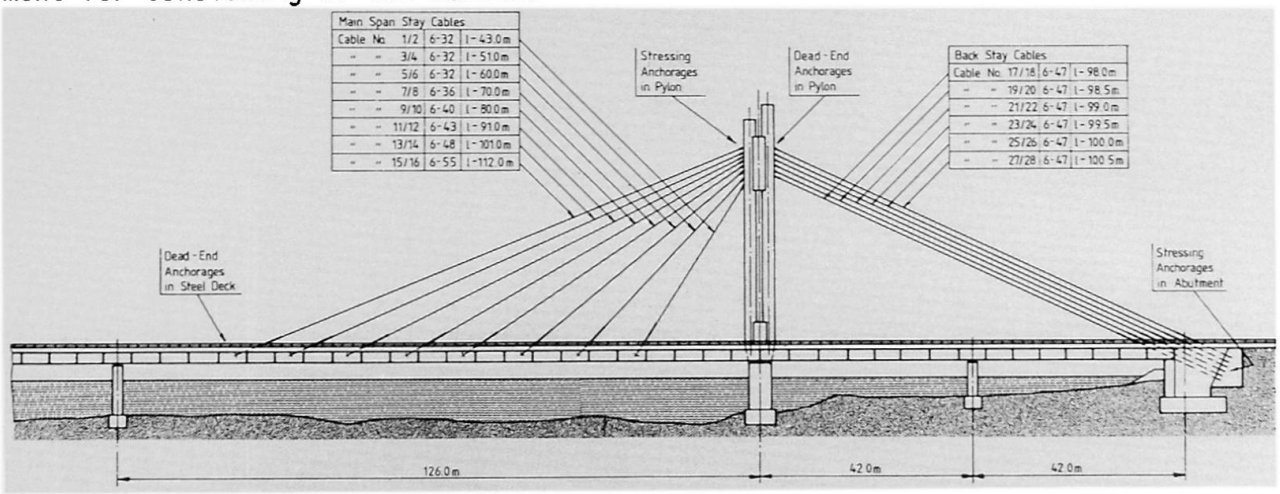

Fig. 2 : Principal cable lay-out

3. TESTING

Several tests are foreseen to prove the reliability of the cables and their components for this bridge:

- A low temperature test (-50° C) to check on the behaviour of the corrosion protective compound in the Nordic climate.
- An injection test for the grouting procedure.
- A dynamic test over 2 million load cycles with a cable of 32 strands at a stress amplitude of 185 N/mm2 with a subsequent static loading to 95 % of the capacity of the cable.
- A flexure test with a cable simulating dynamic angle variations in the bridge.

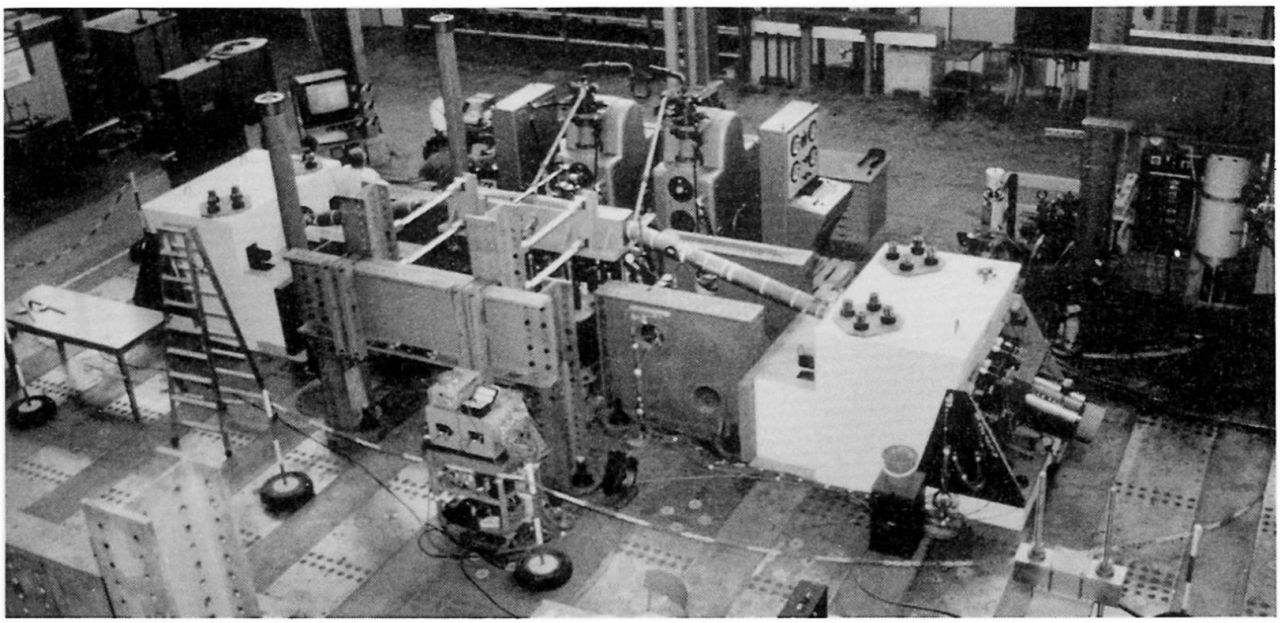

Fig. 3 : VSL stay cable testing at EMPA in Dübendorf, Switzerland

For more information on this bridge also refer to the presentation by the Roads and Waterways Administration, Helsinki and Suunnitelukortes Consulting Engineers Ltd., Oulu, Finland.

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