



## Defect detection in strand wires within the anchorage area of high tensioned cables

**Marcel de Wit, Gilles Hovhanessian**

*Advitam, Rueil Malmaison, France*

**Contact:** Marcel.dewit@advitam-group.com

### Abstract

Assessment of cables of cable supported structures is complicated there these elements are often difficult to inspect visually. Owners of these kind of structures are facing a lack of information on these key elements of their structures.

This paper presents a new promising technology that can provide a solution for this problem by providing information on the condition of the cables inside the anchorage area.

In general the anchorage areas of cables is the most vulnerable part of cables due to water ingress, lower protection of the wires and fatigue issues. Typical defects in these areas are corrosion, cross section loss and wire breaks.

The development of this technology over the past years in cooperation with the French National Laboratory IFSTTAR has resulted in a fully proven and operational tool that recently demonstrated its value on a full scale application on one of world's largest stay Cable Bridge where it successfully assessed the condition of the cables behind the bottom anchorage. Over 80 000 wires have been inspected for defects on this project. Other structural owners have acknowledged the value of the technology by testing their cable anchorages.

The technology is based on Ultrasonic guided waves principle transmitted along a single wire of a 7 x 5 wire strand. This paper explains the principle of the technology, shows how it can be deployed on site, and provide feedback from lab tests and real measurement on site.

**Keywords:** Cable assessment, stay cable anchorages, pre-stressed cables, Non-destructive testing,.

### 1 Introduction

Authorities and private owners of infrastructure are facing daily the challenge to assure the performance of their structures, increasing confidence and reducing their maintenance costs. They are continuously searching for techniques and methods to provide them with information on

the condition of the structures and the key elements in specific.

One of these key elements are the tensioned wire elements such as pre-stressing cables, stay cables and ground anchorages. These elements are of very high importance to the performance of the structure, but can be vulnerable to corrosion, hydrogen embrittlement or fatigue. To reduce the