

# **Cost and Benefits Assessment for Testing of Bridge Cables Using Acoustic Emission Technology**

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## **ABSTRACT**

Acoustic emission (AE) technique for non-destructive testing (NDT) of highway bridges provides a field proven technology for improved inspection procedures, reduce or eliminate maintenance, reduce uncertainty in decision-making, reduce inspection frequency, extend bridge life, quantify damages and thus predict remaining service life, which can save lives, money and time. This paper reports results of a short term testing of one of the stay cables of the Varina-Enon Bridge. The size of this bridge and position of important bridge features poses a challenge for inspection.. Further, inspection of some of the steel features can be difficult because they are embedded either in concrete or encased in plastic, or in both. With such a sizable and challenging inspection structure, a research study using AE to evaluate a single stay cable and the saddle area that the cable crosses has been conducted. The benefits of this study for Virginia Department of Transportation (VDOT) as part of an overall effort to ensure the continued integrity of the nation's bridges and to disseminate the technology development to potential users have been discussed in this paper. The cost benefit assessment of the research has demonstrated that AE provides a means to determine areas of interest by focusing on components of the structure exhibiting acoustic activity. This provides feedback to inspectors and engineers indicating which areas need inspection that is more detailed, thus reducing the time spent obtaining this information using other methods, which are often slower and can be more destructive in nature.

**Key words: Acoustic Emission, Benefit Assessment, Non-destructive Testing, Varina-Enon Br**