



Possibilities of Using Sensing Technology For Railroad Bridges Maintenance and Repair

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Summary

This paper describes possible applications of sensing technology for railroad bridges maintenance, repair and replacement, and identifies potential areas of development of sensing technology towards applications which could be used today by railroad bridge engineers. The novel experience carried out on the field under railroad traffic brings to the table areas of improvement and development. Ideas and suggestions are included on how to develop this potential ready-to-be tool for bridge maintenance and replacement.

Keywords: Bridge; railroads; wireless sensors; smart sensors; maintenance; repair; monitoring; measurements; short-medium spans.

1. Introduction

Railroad transportation in the US has become a critical element of society development from its early beginning. Today's railroads maintain not only their large tradition of excellence, but also enjoy the brightness of their present development, and look forward a very promising future. Within the most important critical elements of the railroad systems, railroads infrastructure become key to guarantee a solid reliable network for owners and clients. Within the entire network system, railroad bridges represent a key factor which enlightens the significance of structural systems to maintain the impeccable performance of this transportation system.

During the last 50 years, loads and railcar capacities have been increased rapidly whether the bridges carrying them have not. Being the railroad systems a private enterprise in the US, bridges need to be replaced obeying a discriminatory policy led by bridge engineers. These engineers are in charge of the entire system maintenance from both an economic and efficiency standpoint. Railroad engineers need to determine which bridges within the network need to be replaced first, and which of those can last longer, based on their actual performance.

The evolution of new techniques such as the sensor monitoring of structures might become a reliable source to determine which bridges of the system are structurally requiring a more urgent repair or replacement and to quantify (and select) these needs for improvement accordingly.