

SENSING SYSTEMS PREP for HAMPDEN BRIDGE MONITORING

Jianing Wang

Advisor: Tzuyang. Yu

Civil and Environmental Engineering Department,
University of Massachusetts Lowell (UML),

Abstract

Distributed sensors for bridge monitoring provide a better understanding on structural performance and deterioration. A new composite bridge (Hampden, ME) has been selected for the application of recently-developed sensing textiles in this joint effort by UML, Saint-Gobain, UMaine, AIT Bridges, and MaineDOT. In this project, the sensors will be installed on the inside bottom of the girders. Since the girders have a height of about four feet, installers are not able to fully stand up while installing. This poster has demonstrated the sensing systems preparation for the bridge monitoring based on the installation conditions. Three 1.8ft x 72ft integrated sensing textiles for the new Hampden Bridge were designed, manufactured, and tested. An installing schematic has been carried out. During the installation, installers will be sitting on the installer's cart (1.5ft x 3ft) to install the sensors in a backward direction. A supply cart (1.5ft x 1.5ft) is connected to the installer's cart with a pulley and a rope that is long enough so it can reach to the other end of the girder. By pulling one or two ropes at the other side, the supply cart or the installer's cart will move accordingly. An eight feet 1:1 scale bridge girder model has also been created for practicing installing. In the end, integrated sensing textiles for three girders, installation apparatus have been successfully designed, manufactured and tested. And a procedure as well as practicing sensor installation on campus has also been performed.

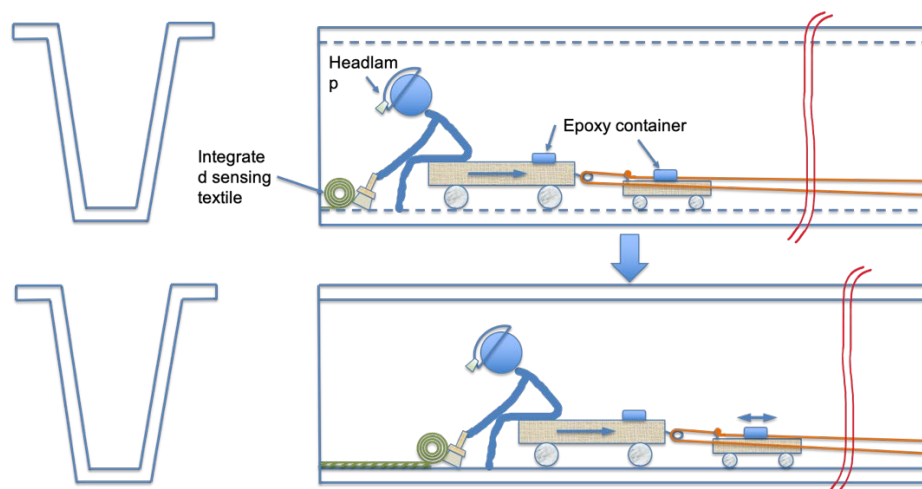


Figure: schematic of sensor installation in a confined space

Acknowledgements: This project was financially sponsored TIDC.