Acoustic Health Monitoring

And failure localization of

Suspension bridge cables

Michael Smith

Dylan Morano

Rebecca Cressman

Daniel Baima

Tyler Pickering

**Initial Abstract**

Currently, there are several means of analyzing the structural integrity of suspension bridge cables using acoustic monitoring. These technologies monitor cables for breaks and are capable of determining at what point along a cable they have taken place. These methods however, are not useful in determining which cable member has snapped within the bundle of a main cable. The objective of this study is to design a system that utilizes acoustic monitoring to determine specific breaking locations along and within suspension bridge cable bundles. This is to be achieved using either a passive or active monitoring system, which attaches to the individual anchoring strands of the suspension main cable. This will allow breaks to be localized within the bundle, as well as along the length of the cable. The experimental process will involve the testing and design of a scale system, which will then be implemented on the Claiborne Pell Bridge for testing. Portable low-energy, time synchronized sensor packages will be researched and developed in order to make the system universally applicable across multiple bridge types and platforms. Results from monitoring will be collected in a central database to be analyzed for cable breakage on the fly. This system is intended to be energy independent and applicable across multiple bridges where breakage within a cable bundle must be monitored.