Acoustic Health Monitoring

And failure localization of

Suspension bridge cables

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**Initial Abstract**

Currently, there are several methods for analyzing the structural integrity of suspension bridge cables using acoustic monitoring. These methods 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 will be to design a system that utilizes acoustic monitoring to determine breaking locations along and within suspension bridge cables. This is to be achieved using 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 and 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 energy savaging, time synchronized sensor packages will be researched and developed in order to make the system universally applicable across multiple bridge types and platforms. The monitoring results 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.