

Structural Health Monitoring

Structural Health Monitoring (SHM) is a set of sensing and computing strategies and methods to measure performance, and possible deterioration, of in-service engineering structures. Comparison of measured versus baseline behavior can provide insight into the ongoing “health” or fitness-for-service of the structure, including suitability for changing service conditions or beyond- design-basis events. Data obtained from such “smart structures” can support asset management decision-making throughout the structure life cycle.

However, simply installing instruments is not enough – the value of SHM is contingent upon prudent identification of quantities to measure, judicious sensor selection and placement, and well-considered data management and reporting strategies. CTLGroup’s SHM engineers have the dual expertise in structural mechanics and emerging technologies to execute successful SHM programs. Furthermore, as independent experts not bound to any particular sensor manufacturer, CTLGroup engineers are free to select optimal sensors and strategies to meet client needs.

Our SHM practice includes the integration of commercial weigh-in-motion systems of critical structures, which provide real time data of possible overload conditions caused by vehicular traffic. This high-quality, long-term data stream is used in local traffic planning, bridge structural management, and research in structural health monitoring and bridge mechanics.

Our practice is not limited to fixed structures. Acoustic emission monitoring is used to locate the possible source of distress or wear on bascule bridges and other large moveable structures. These structures present special engineering challenges as audible noises are extremely difficult to localize by ear. Acoustic emission monitoring is used to accurately determine the location of the source using standard location techniques based on time-of-arrival measurements.

