# Focus on reduced maintenance costs and increased safety for bridges and other engineering structures.

*Danish sensor pioneering company ElastiSense has found the key to efficient structural health monitoring of bridges and other engineering structures*

Structural health monitoring of bridges and other engineering structures

AABENRAA, DENMARK, March 29, 2022 /EINPresswire.com/ -- The main purpose of structural health monitoring of engineering structures is safety and economy. It is all about damage detection and building a characterization strategy. The condition of civil infrastructure systems changes over their life cycle for different reasons such as damage, overloading, severe environmental inputs, and aging due to normal continued use. The structural performance often decreases as a result of the change in condition. By monitoring the structures, predictive maintenance becomes an option, thus preventing damage or collapse.

It is quite simple! If you can continuously monitor the structure on a bridge and know in exactly what state it is, you are in complete control of the maintenance costs and, more importantly, able to be proactive on maintenance and safety issues. Poor maintenance of bridges has historically led to catastrophic bridge collapses. One of the latest examples is the Ponte Morandi motorway bridge collapse in Genoa, Italy, killing 43 people.

Even though the value of structural monitoring is clear, objective condition assessment and performance evaluation are challenging activities since they require some type of monitoring to track the response over longer periods of time. Some of the challenges which prevent structural

health monitoring on a larger scale include the costs of monitoring systems, where many existing systems are relatively expensive. They also include questions regarding what type of sensors to use where the issue of finding sensors capable of performing reliably in all types of weather is dominant. Finally, the installation of the systems can be time-consuming, labor-intensive, and therefore expensive.

DS-Series sensors for structural health monitoring

ElastiSense

ElastiSense Sensor Pioneer

DS-Series Displacement sensors from ElastiSense are the keys to increased safety and decreased maintenance costs in engineering structures such as bridges. DS-Series sensors are developed especially for harsh environments, including outdoor settings where they inevitably will be exposed to rough weather.

On a bridge, DS-Series sensors can, for example, measure the movement of joints, bearings, suspension, the relative distance between the abutments and the seat of the bridge, or cracks in the structure.

DS-Series displacement sensors are superior to alternative sensor solutions when it comes to structural monitoring of bridges, because they consist of an innovative, extremely strong, durable, and very efficient stretch sensor, fully encapsulated in high-grade silicone rubber and with embedded electronics. This makes them extremely durable and completely resistant to external influences such as rain, snow, dust, heat, cold, dirt, and other environmental and weather-related obstacles. Furthermore, the stretch sensor technology combined with the silicone rubber encapsulation, makes them bendable in all directions and tolerant to over-stroke and misalignment. The technology is unique for ElastiSense products and provides a superior alternative to non-contact or cylinder-based sensors, which have traditionally been used for engineering structures. Installation is easy and the sensors require no maintenance. They can just sit there for years and continuously deliver data about the status of the bridge.

ElastiSense has had great success in several cases with structural monitoring of bridges. The Norwegian Road Directory (Statens Vegvesen) has, for example, mounted two DS-Series sensors

on a bridge in Norway. They measure the relative displacement between the abutments and the seat of the bridge. In bridges like the one in Norway, displacement is typically caused by changes in temperature and load variations. Precise data about the displacement is essential to be able to foresee wear and tear, fatigue, and potential crack generation on the bridge. The overall purpose is to enable preventive measures and perform predictive maintenance on the bridge.

In Southern Denmark, another bridge monitoring case has shown the value of DS-Series sensors. In this case, Rambøll, KI Consulting Engineers, and Sønderborg Municipality have joined forces and installed sensors on the “Munkemølle Bridge” dating back to 1935. The purpose of this project is to determine what state the bridge is in, and based on that, decide which maintenance initiatives to engage in. In essence, Sønderborg Municipality needs data to essentially make the best decisions regarding economy and safety. Instead of doing expensive difficult service checks several times a year, it makes perfect sense to continuously monitor the bridge with sensors.

Both the abovementioned cases are examples of the new sensor technology from ElastiSense, being used to increase safety for bridges and reduce maintenance costs. It appears that ElastiSense, with the DS-Series displacement sensors, has cracked the code to efficient and valuable structural health monitoring of bridges and other engineering structures.

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