SUESSCO SENSORS

Case Study – Bridge Monitoring

Flood Event Road Bridge

Central Europe

Background

A historic steel bridge with elastomeric bearings, in need of renovation, serves as a vital traffic artery across a major flood-prone river. Conventional analogue measurements at the bridge bearings had yielded unexpected and inconclusive results, making immediate action necessary. To gain a better understanding of the bridge's structural behaviour under natural loading conditions and to support future rehabilitation planning, a reliable and robust data basis needed to be established.

Requirements

The operator required a system capable of delivering precise insights into the structural kinematics while providing digitally accessible measurement data at all times. The objective was to define a so-called "baseline behaviour" from the first year of monitoring in order to immediately detect deviations in subsequent years.

Solution

The steel bridge was equipped with high-precision 6D-Sensors from SuessCo Sensors. The measurement setup included monitoring of the bridge bearings as well as precise gap measurement at the abutment. For long-term monitoring, strategically selected bridge bearings were equipped with sensors to continuously capture movements in all degrees of freedom, as well as inclination and temperature, directly at the structure.

Result

During an extreme flood event, the system transmitted structural data in real time for immediate situational assessment. The sensors registered two days of extreme movements equivalent to many months of normal activity. However, analysis revealed that these were purely thermally induced by a simultaneous temperature drop; as temperatures rose again, the structure returned fully to its original state. The water pressure caused no permanent damage, allowing the operator to avoid a precautionary closure. In the long term, the project delivers valuable insights into the resilience and maintenance cycles of ageing infrastructure, thereby optimising strategic asset management.