

All Monitoring Data in One Platform

Case Study – Normandy Bridges

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Management of three major bridges is simplified into one common data platform and made accessible through SAMS™ for complex analysis and enabling actionable decision making

Faced with the management of three long span bridges, The Chambre de Commerce et d'Industrie Territoriale Seine Estuaire (CCITSE) struggled with the control of six separate user interfaces for monitoring systems and needed to further expand their data collection.

The most prestigious bridge being the northern France landmark Pont de Normandie, stretching 2.1km across the Seine. At time of construction, the 856m main span was the world's longest cable-stayed bridge span.

Basic structural health monitoring systems were historically fitted on each bridge, along with high-precision GPS monitoring systems, acoustic emission monitoring and meteorological stations. But CCITSE was dissatisfied with the ageing sensors and output of data without analysis, held on different servers and with different software for each system.

23 years after construction, many of the sensors originally installed were no longer functioning and a tender requirement was developed for a bridge consultant to provide actionable maintenance information from the data for all three bridges: Pont de Normandie (cable-stayed, opened 1995), Pont de Tancarville (suspension bridge, opened 1959) and Viaduc du Grand Canal (steel-composite viaduct, opened 1994).

JFTS and specialist consultant COWI formed a collaborative relationship with CCITSE to deliver the optimal solution. Alongside COWI's worldwide experience in cable supported bridges, JFTS, as one of the world's leading long-span bridge monitoring specialists, proposed our Smart Asset Management System, SAMS™.

SAMS™ now collects data from multiple systems throughout the three bridges, in an array of formats, at different sample rates, collating into a single user interface. The bridge managers and their consultants can view results in real-time and compare results for correlation.

- Extensive monitoring on three big bridges with multiple data styles
- JFTS contribute to a collaborative delivery team with bridge owner and their consultant engineers
- SAMS™ software platform brings together all information for ease of visualisation and analysis
- Automation of periodic data reports
- Cloud Interface for real-time data access
- Threshold alerts by SMS or email
- Active part in the bridge management strategy for extended life of the structures





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Data incoming includes:

1. Structural health monitoring; temperatures, displacement, inclines, strains and cable vibration
2. Acoustic emission wire-break monitoring; for stay cables and in future Phase Two* will collect also for ducted post-tensioning system
3. Global navigation satellite system; using GPS positioning at selected positions
4. Meteorological stations; for wind speed and direction, rainfall, visibility and is prepared for future Phase Three* with ice detection

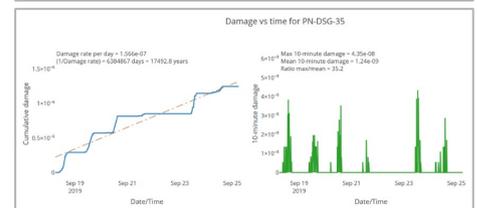
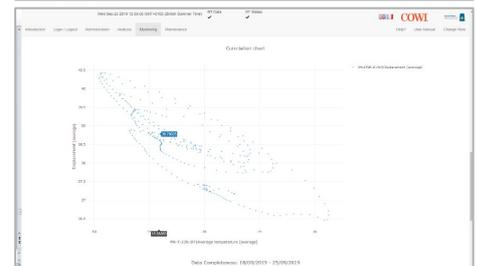
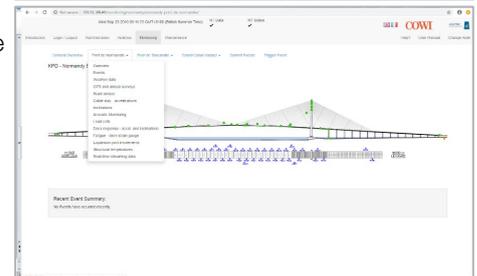
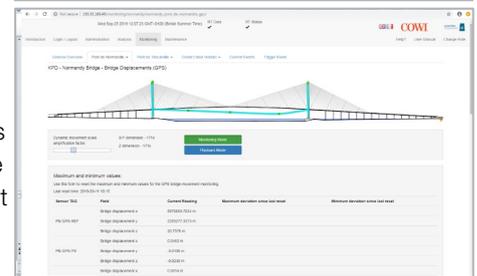
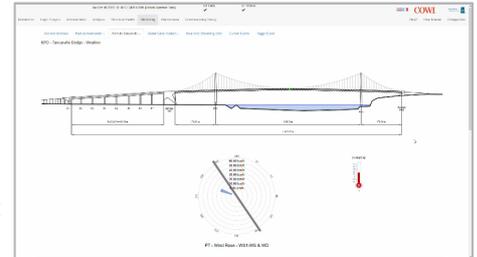
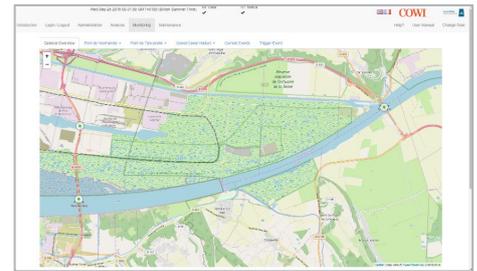
*SAMS™ is designed with capacity for additional monitoring elements to be added at a later date, integrating for consolidated management through the same single user interface, with the ability to analyse and correlate data from all sources.

Complex automated reports are generating monthly, quarterly and annually, issued direct to CCITSE and COWI.

Further additions to the continuing project include a fourth bridge, OA1, which is a smaller railway bridge and retaining walls on the approach to Pont de Normandie.

Developed specifically for the needs of these bridges, JFTS added strain gauges in arrays to extrapolate readings in weld toe positions which are not possible to gauge directly. We can therefore measure strain ranges experienced at the fatigue critical interface and count rainfall cycles, predicting future fatigue life performance.

Wire-break monitoring systems inform of the frequency and position of tensioned wire failures within cables. Mapping the positions and intensity, data is building a picture of the deterioration and hotspots for closer investigation. Intrusive investigations can be minimised, avoiding creating unwanted further damage.



Comprehensive monitoring of three bridges using several data acquisition system forms, all displaying their data for combined analysis in a single user interface.