

A BRIDGE BETWEEN SYSTEMS

TO MANAGE THE VAST AMOUNTS OF DATA THAT NEEDED TO BE COLLECTED AT THREE ICONIC BRIDGES IN FRANCE TO MONITOR THEIR STRUCTURAL HEALTH, DIFFERENT HARDWARE AND SOFTWARE NEEDED TO BE COMBINED. *GEOCONNEXION INTERNATIONAL* REPORTS ON THE INTEGRATION PROJECT AND HOW THE SYSTEM WORKS IN PRACTICE

Maintaining the structural health of three iconic bridges in Normandy, France, including what was formerly the world's longest cable-stayed span structure, is not without its challenges. But with legacy equipment requiring structural, acoustic and weather factors to be monitored on separate systems and the validity of collected data becoming questionable, La Chambre de commerce et d'industrie Seine Estuaire (CCISE) began to explore new options.

CCISE asked structural health monitoring specialist James Fisher Testing Services (JFTS) to develop an integrated GPS-based system that would enable vast amounts of data

to be collected, presented and interpreted in a single user interface across its three bridge sites: the iconic cable-stayed Pont de Normandie and Pont de Tancarville; and rigid steel-framed Pont sur le Grand Canal du Havre.

"With almost 5km of bridge to monitor in real-time, CCISE needed a truly intelligent solution," says Julian Allen, director of structural health monitoring at JFTS.

"We put forward our BridgeWatch system for its ability to analyse a huge volume of raw data and provide meaningful insights for CCISE to improve safety, manage traffic flow and minimise bridge closures. Yet for BridgeWatch and the accompanying Smart Asset Management System interface

to work effectively, we needed to be able to gather quality data at scale."

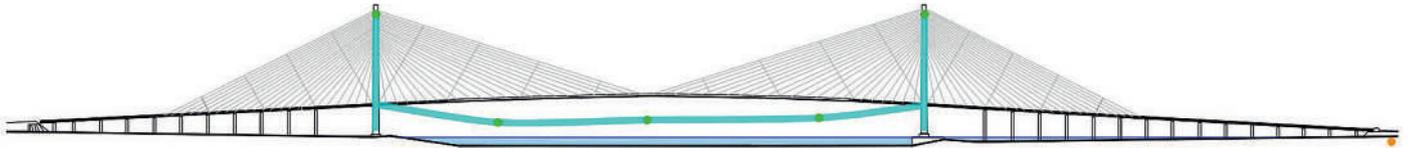
Working with Topcon, JFTS developed a unique solution for CCISE. "We were able to put forward a successful bid for CCISE and then deliver a highly intelligent, automated and intuitive monitoring system that was also cost-effective."

As part of the €1.9m contract, 21 Topcon MR-2 GNSS Modular Receivers were installed across the three bridges, to give full constellation tracking with HD2/Heading capabilities and a comprehensive set of communication interfaces. The MR-2 can also track all present and upcoming GNSS constellations and satellite signals and has 8GB of internal storage.

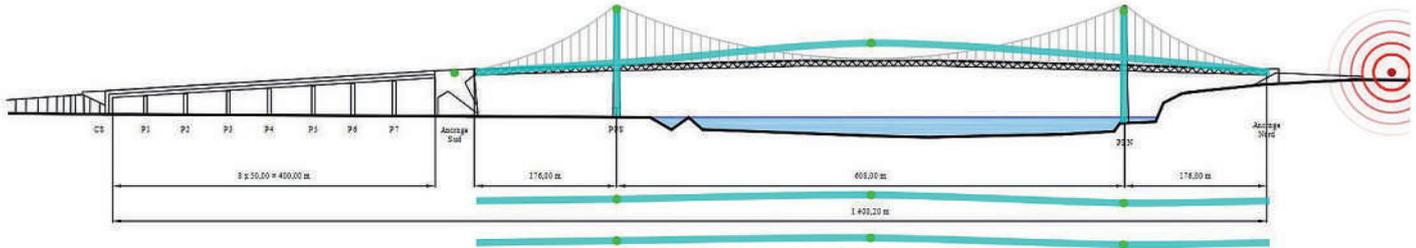
The MR-2 receivers were installed with Topcon G5-A1, a lower cost, full-wave GNSS antenna that ensures high-quality tracking of all constellations and signals. The G5-A1 antennae have been installed high on the bridges to give good exposure to the sky and create a coordinate value for the antennae position. This then feeds into Topcon's TopNet software, allowing movement to be monitored on an ongoing basis. Tilt sensors on the bridge also combine with antennae data to provide an accurate picture of movement.



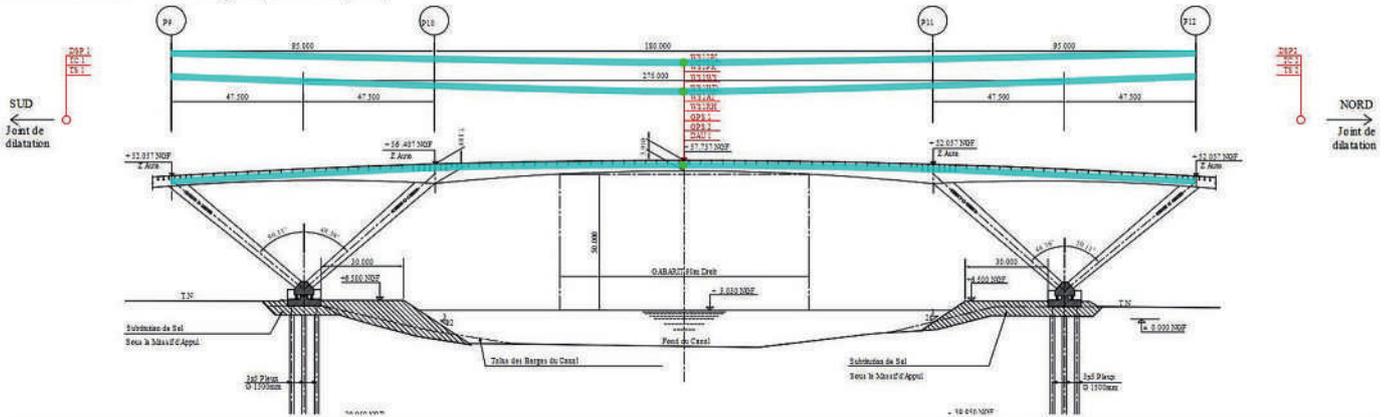
KPD - Normandy Bridge - Bridge Displacements (GPS)



KPD - Tancarville Bridge - Bridge Displacements (GPS)



KPD - Grand Canal Viaduct - Bridge Displacements (GPS)



Dealing with scale

“The span of the bridges means there’s a huge area to measure and monitor,” says Simon Crowhen, national sales manager for Topcon Positioning. “And to do that accurately requires numerous positions to be measured simultaneously. For that reason, we recommended a GPS-led system as opposed to total stations. A total station needs to have a line of sight to the prisms and require a routine of measuring, whereas with GPS, the antenna just needs a view of the sky to give a constant position, plus you can measure numerous rovers at the same time.”

As well as consulting on the most effective GNSS technology for the three Normandy bridges, Topcon also worked with JFTS to integrate its equipment into the BridgeWatch system. “Combined, our hardware and JFTS’ software takes 145 million individual data points per hour across 15 DAUs and turns it into meaningful and powerful insights for CCISE,” adds Simon. “The JFTS system is very visual in its presentation so it’s easy for the client to identify bridge movement and any points for concern. It’s a huge step up from their previous system.”



Following a short one-month installation period, the system went live in September 2019, much to the delight of CCISE.

“This is a pioneering system unlike any other in France,” says Clément Fasquel, director at CCISE. “The system is a joy to use, adds so much value to our bridges, and beyond that, Topcon and JFTS were impeccable to work with. They were incredibly supportive and answered all our questions and challenges along the way. We look forward to building a long-term partnership with them.”

