

HS2 adopts hi-tech digital concrete testing

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A successful trial of a ground-breaking digital measuring system for concrete has led to a roll-out across multiple **HS2** sites, cutting carbon and driving efficiencies on the construction project.

VERIFI® is a pioneering technology that enables real-time monitoring, measurement, and management of fresh concrete properties during transportation.

By utilising on-truck sensors linked to proprietary patented algorithms, VERIFI is the first digital solution to replace manual consistence (e.g. slump) and temperature testing of fresh concrete. In simple terms, this means the concrete truck-mixer tracks itself to the point of delivery, tests itself prior to discharge and auto generates pour records for quality assurance purposes.

Over the last two years, HS2's main works contractor Balfour Beatty VINCI (BBV) has worked with supply chain partners Saint Gobain Construction Chemicals who developed VERIFI, and their concrete supply partners Tarmac and Aggregate Industries to test and validate the system.

A full-scale site trial involving over 20,000m³ of concrete demonstrated accuracy and confidence in the

technology, and HS2 Ltd has now approved the roll-out across further sites.

One of the key benefits of the system is the elimination of concrete waste which would have been produced from manual sampling and testing. When the solution is rolled out across BBV's section of the route, this could result in cutting 1,500 tonnes of carbon.

Analysing the entire volume in the truck instead of spot samples results in improved quality control and more accurate readings. Safety is also improved due to less plant-person interface and manual handling on site.

In addition, it enhances productivity and efficiency by delivering clear digital readouts, eliminating delays associated with sampling and testing processes, which allows for better scheduling and reduces potential bottlenecks in the construction timeline.

HS2's Materials and Durability Lead, Jon Knights said:

"This is a fantastic example of how HS2, working collaboratively with supply chain partners, can provide the ideal testbed for cutting-edge technologies. As the UK's largest infrastructure project, it's a great step forward for HS2 Ltd to formally supplement this digital surveillance technology with manual consistence and temperature testing of fresh concrete to reduce waste and increase safety and productivity.

"We have set big ambitions to drastically cut carbon as we build HS2, and digital surveillance solutions support us on this journey, not only bringing multiple benefits to the project, but paving the way for a new era in the construction industry."

Steve Phipps, Head of Materials Engineering at Balfour Beatty VINCI said: "The initial concept of using this technology to reduce manual testing has been developed into a fully integrated digital monitoring and reporting system between producer and customer.

"It's very rewarding to have finally implemented this digital solution after a process of trials, validation and approvals, made possible by great teamwork. Now that implementation is underway across our HS2 sites in the Midlands, we will start to see the significant benefits."

Frederic Guimbal, EVP at Saint Gobain Construction Chemicals said: "We're delighted that the adoption of VERIFI represents a significant step forward for the HS2 project, bringing tangible benefits in terms of quality control, productivity, safety, sustainability, planning, reliability, and digitisation.

"This innovative solution demonstrates the power of collaboration and paves the way for the integration of digital methods in future concrete standards across the construction industry."

Ryan Griffith, HS2 Technical & Quality Manager at Tarmac, said: "The concrete industry is truly modernising. The carbon benefits and transparency from plant to pour are now a reality with the acceptance of VERIFI digital consistency measurements for the concrete we supply for the construction of HS2.

“Having worked closely with BBV and VERIFI on implementing this technology, it is a huge step forward to have a complete digital concrete quality system that is improving outcomes for customers.”

Joseph Hartley, HS2 Technical Manager at Aggregate Industries said: “Working with VERIFI is a monumental step change in supplying quality assured concrete to our customers. The visibility it gives to ourselves and to our clients is unprecedented. The ability to monitor, maintain our product and track vehicle movements allows significant environmental and cost benefits for us and HS2.

“We have been able to work closely to BBV and the VERIFI team to fully understand VERIFI and get the maximum out of the system giving us the opportunity to collaborate with everyone on the project. Having worked in the ready-mixed concrete business for 36 years, VERIFI is one of the most significant upgrades to our operational capability I’ve seen.”

VERIFI optimises planning and coordination through GPS tracking of vehicles equipped with the technology. This real-time tracking capability improves the management of concrete delivery, enhancing logistical processes on-site.

Importantly, after careful calibration, VERIFI ensures reliable outcomes and compliance by providing accurate measurements for acceptance or rejection of concrete loads, maintaining the same standards as traditional testing methods. This guarantees the structural integrity and compliance of the construction materials used in the HS2 project.

Following the technical reviews of the trial data conducted by BBV, VERIFI, and HS2 technical specialists, HS2 Ltd approved the use of the VERIFI Digital Measuring system as a departure from the existing standards. This approval encompasses the monitoring of all in-situ structural concrete supplied by Tarmac and Aggregate Industries on the West Midlands section of HS2’s Phase One route.

Photo credit: HS2 Ltd