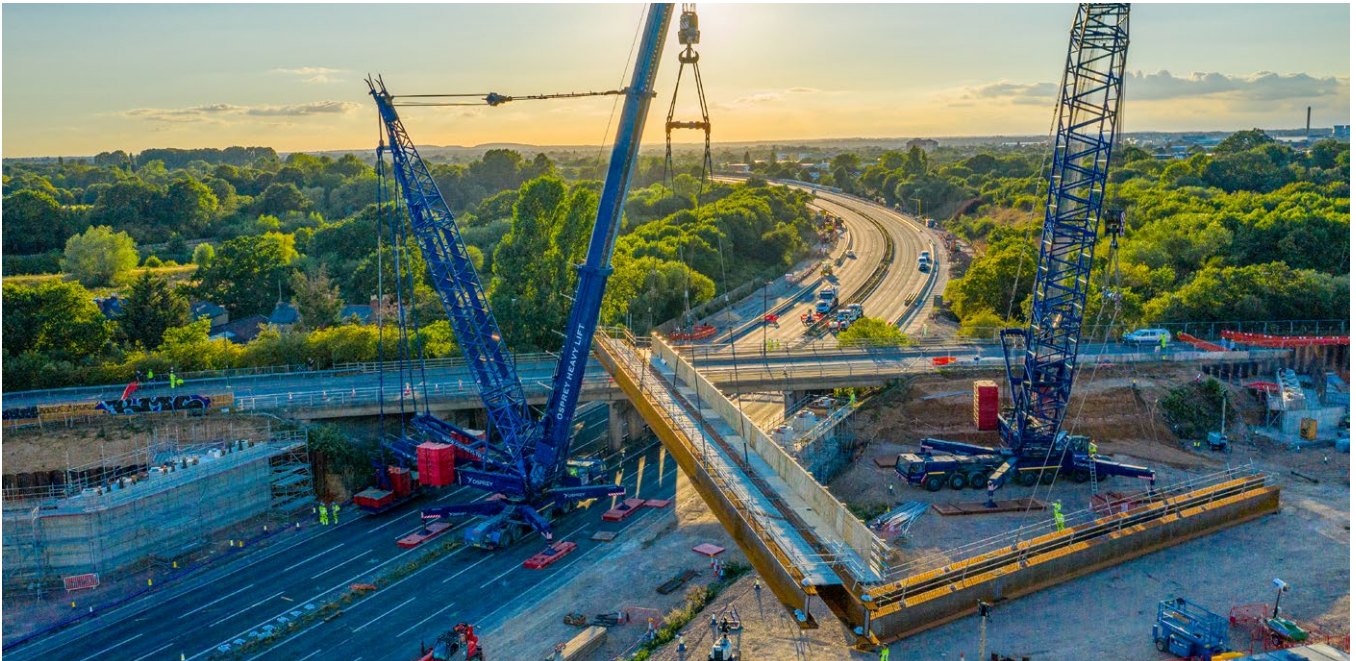


Collaborative supply chains are imperative for successful bridge projects. It's all about making sure that traffic flows, of every kind, are disrupted as little as possible.

We've been involved in one of the UK's most significant highway infrastructure projects recently, involving 12 bridge structures being installed in less than a year. We were delighted to play a key role in this project, for our clients Cleveland Bridge, helping to develop new bridge installation techniques that significantly reduced those all-important possession times.



UPGRADING TO SMART MOTORWAYS

The project took place as part of the upgrade of the M4 motorway, a major arterial route out of London and the main strategic route between London, the West of England and South Wales, which carries, on average, 130,000 vehicles per day.

When Highways England asked Balfour Beatty Vinci Joint Venture (BBV JV) and Cleveland Bridge to help improve the stretch of the highway between Junction 3 at Hayes, Middlesex, and Junction 12 at Theale in Berkshire, we were on hand to help.

The project involved upgrades to a smart motorway, creating extra capacity with an additional lane for traffic, and technology to help smooth vehicle flows. However, as much of the M4 was built as a two-lane dual carriageway, it also meant upgrading 11 bridges to make room for that extra lane. In addition, the bridge over the River Thames at Bray needed to be widened to support the new smart motorway – but every effort had to be made to reduce disruption and delays for road users.

We've worked with Cleveland Bridge UK before, and admire the team's commitment to high quality. With 125 years of bridge building expertise, Cleveland Bridge has a respected track record for its role in large scale infrastructure projects – we've been strengthening our relationship for a number of years and has worked in partnership on a series of major road projects, including the installation of a 1,300te bridge at Kegworth on the M1 motorway.

ENGAGING EARLY WITH OUR PARTNERS

With bridges of varying size, weight and specification in play, it was essential for us to engage early on, planning the extensive programme of logistics involved in the delivery of this unique project. This included several site visits and project meetings to prepare lifting plan and installation programmes.

Nigel Fletcher, our CEO: "Osprey has long held the view that installation methods must be considered early in a project. Too often, the practical logistics around transportation, construction and installation are left too late in the planning process. Cleveland Bridge UK shares this principle. With their team's bridge-building and design expertise and our team's logistics insights, we can ensure value and mitigate the risks around large infrastructure projects such as the M4 upgrade."

Following their fabrication in County Durham, the steel girder structures were transported to site by Collett. Most of the new bridges were built next to existing

structures before they were demolished to limit local disruption. Access to many of the sites was restricted, with limited space for temporary bridge assembly works. Precise planning and careful project management of all follow-on trades was essential to ensure smooth, safe operation in the restricted available space.

REDUCING POSSESSION TIME

The girders were delivered to site in paired sections, where we lifted them onto temporary stillages so that the splice connections could be bolted together. Once connected, we used our Self-Propelled Modular Transporters (SPMTs) to transport the fully paired girders to the bridge site. There, they were craned into place with our Osprey's LTM 1800D, a 1,000te mobile, fast-rigging telescopic crane. We have one of the highest capacity fleet of SPMTs in the UK, with steering capabilities on the transporters that allow precision positioning to +/- 2 mm of heavy loads.

Moving heavy or abnormal critical infrastructure is what we do day-in, day-out, but every project is different. One of the most challenging phases on this project was the installation of the 80-metre, 385 tonne bridge at Monkey Island.

Our joint installation crews had to contend with extremely poor winter weather conditions while working to a very strict deadline. The installation, scheduled for an overnight road possession, included assembly and disassembly of the crane at the side of the road before the road was reopened to the public in the morning. No mean feat. After the completion of the bridge at Monkey Island, the next six had to be installed during an eight-week period between April and June 2020, followed by the final five bridges by mid-August. Among them was the Thames Bray bridge, the only structure in the project that's an extension to an existing bridge. It was designed and fabricated to match the existing haunch girder bridge, and is also the only bridge to carry the M4 while the others carry roads or footpaths over the motorway.





Comprising two back spans, which we assembled in three paired sections per span and weighing in excess of 160te each, the bridge was welded together on site before installation – we've developed a unique system for doing this. The back spans are tied to the abutments with specially tensioned cables, sourced from and installed by a specialist subcontractor from Italy. Once the back spans are installed and stabilised, the central span, weighing approximately 100te, can be put in place. Our work on the Thames Bray bridge was followed by a penultimate installation at Datchet, and a final bridge going in that made good use of our SPMTs.

Jim Mawson, Head of Operational Delivery at Cleveland Bridge UK: "We have worked in close collaboration with our project partners to meet the installation deadlines and fulfil the very challenging programme targets. The frequency of the installations required a tight operational plan, which we developed through a programme of agile working and logistical planning with input from across the project partners. We were very confident in our plans, which always have some margin for unexpected issues. In this case we never thought that would be a global pandemic."

PANDEMIC SAFETY-PRECAUTIONS

Our work at the M4 upgrade project was deemed safe to continue throughout the COVID-19 lockdown, subject to the implementation of social distancing and hygiene measures that we developed – far beyond the highly stringent safety protocols that are usually employed on a site like this. Nigel: "We took many steps on site to ensure that our teams, and our partners' and client' teams, could stay safe onsite during the pandemic. This included enhanced company-wide risk assessments and a significant amount of additional strategic planning. We already had the right PPE on site for crews with plenty of spare stock, but we did have to review some processes, particularly those involving jobs where two people would be in close proximity. For example, we overcame the challenge of two people assembling the SMPTs with the use of mechanical aids."

These enhanced health and safety procedures ensured there were zero incidents or accidents throughout the project.

Jim Mawson: "The close collaboration with the main contractor joint venture, the experience and ingenuity of our engineers and the support and expertise of our sub-contractors were all highly evident throughout this challenging project and we are exceptionally proud to have played a key role in this major upgrade of UK highway infrastructure."

