

“Chris and team, I am so proud of you all. It's been an amazing achievement by you all throughout the build-up to the weekend. I certainly hope you get your well-deserved rest and reflect on the legacy you are leaving behind. Thank you for making my job so worthwhile !!!”

Karen Davies

Highways England
Head of Scheme Delivery South East

Case Study

M27 Romsey Road Bridge Replacement Capability Fuels Creativity

PROJECT	Romsey Road Bridge Replacement
CUSTOMER	National Highways
LOCATION	M27 near Romsey, Southampton
CONTRACT	Collaborative
COMPLETION	2019





Need

Replacing a road bridge over the busy M27 in Hampshire required the conceptual design of a composite steel and concrete deck bridge to become a reality.

Reducing disruption to motorway users was critical. By maximising off-line construction we could achieve this safely, efficiently and with quality assured every step of the way. However the team faced the major technical challenge of moving the composite 1000 tonne bridge without compromising its structural integrity.

Solution

The usual approach for a composite bridge design is to pre-fabricate and install the steel beams and then complete the concrete deck in-situ. But to safeguard road users on the M27 and local routes we proposed to install the bridge complete.

The bridge would be constructed beside the motorway and then driven 250m using self-propelled modular transporters (SPMT's) and landed onto the new abutments.

A wide ranging 'peer review' did a deep dive to fully consider the proposals including potential for the deck to twist during

transportation. The concern was that the elastic steel could accommodate greater movement than the brittle concrete deck potentially leading to excessive cracking. The team had to investigate more.

Analysis by designers WSP determined that to limit the crack width to a conservative 0.15mm the desk twist at the supports should be restricted to 0.46 degrees. The team took control, and their creative solution was to:

- Arrange the SPMT's under the deck to provide three-point lifting (instead of the more usual four-point) to help maintain the deck planar.
- Digital road test the bridge transporters movement to optimise the haul road gradients.
- Real time twist monitoring using inclinometers wirelessly meshed with movement data transmitted continuously to a web browser.
- Prove our technical solution with a 70m trial run well in advance of the motorway closure.

Outcome

The right leadership allows a capable team the space to deliver creative solutions to any technical challenge.

As a result, at Romsey the structural integrity of the deck was maintained throughout the move.

Installation went like clockwork with the motorway opened 36 hours early to road users.



Figure 1 - Bridge in place