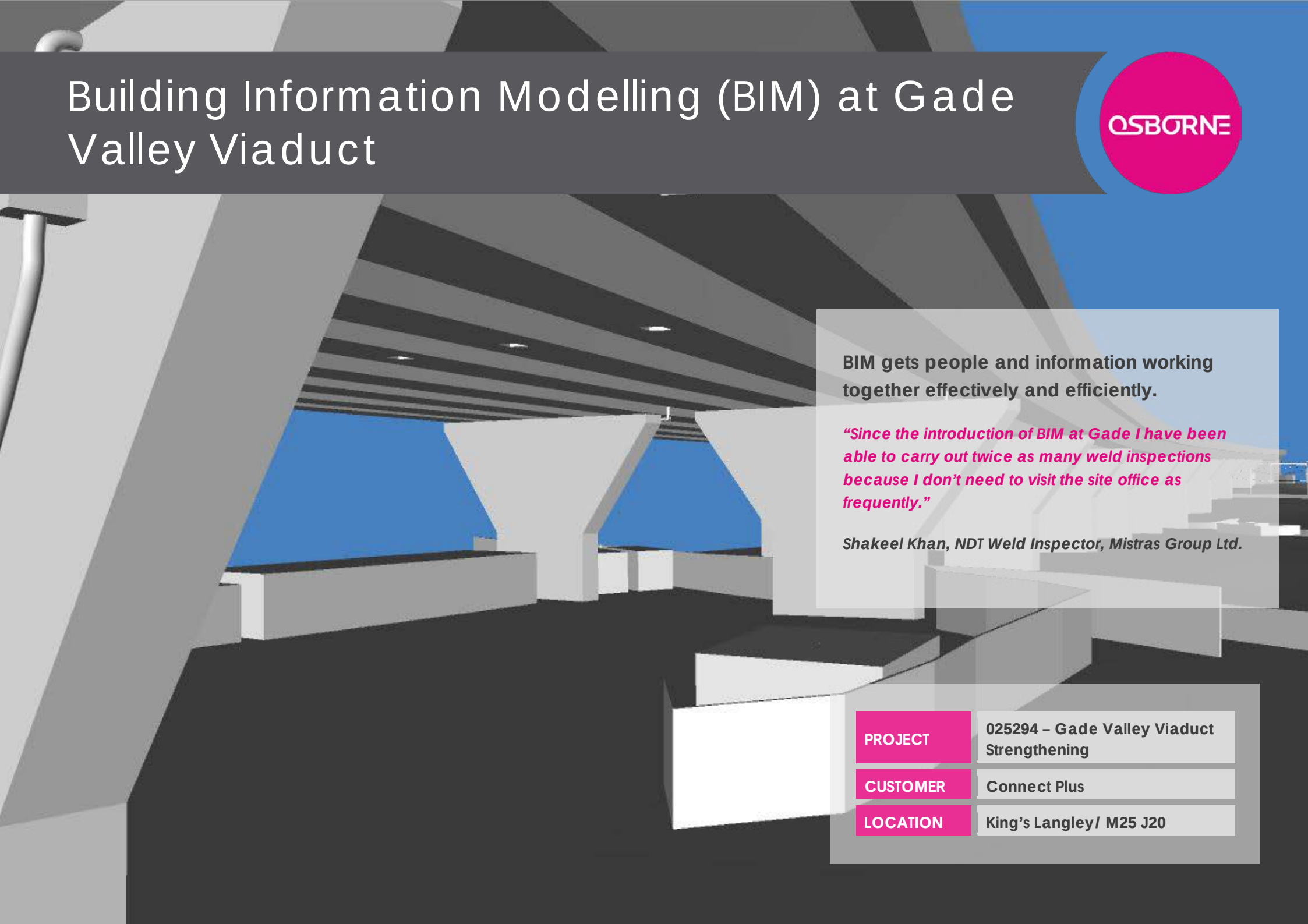
Building Information Modelling (BIM) at Gade Valley Viaduct



BIM gets people and information working together effectively and efficiently.

"Since the introduction of BIM at Gade I have been able to carry out twice as many weld inspections because I don't need to visit the site office as frequently."

Shakeel Khan, NDT Weld Inspector, Mistras Group Ltd.

PROJECT	**025294 – Gade Valley Viaduct Strengthening**
CUSTOMER	**Connect Plus**
LOCATION	**King's Langley/ M25 J20**

Issue

Gade Valley Viaduct is a multi-span composite viaduct carrying the M25 between Junctions 20 and 21. The 450m long viaduct is composed of twin decks, each formed from four open topped steel box girders with an in-situ cast concrete slab.

Due to a lack of fatigue strength in the bottom flange over 50,000 strengthening components are required, each with their individual quality record. This includes:

- 750 weld dressings
- 2500 strengthening plates
- 48000 bolts
- 1000 paint sections

Solution

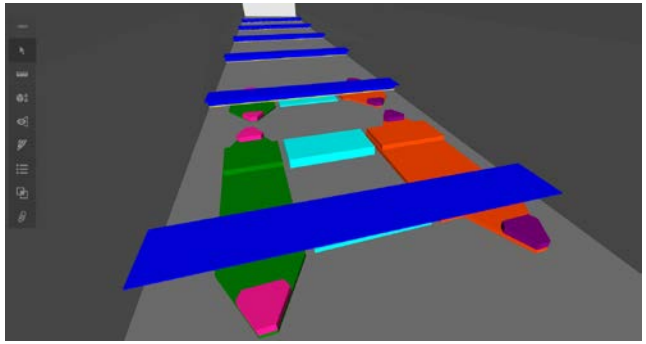
Building Information Modelling (BIM) is a process that involves creating and using an intelligent 3D model to inform and communicate project decisions efficiently during its life-cycle.

The primary use of BIM at Gade is to provide a Quality Assurance database linked to specific elements in a 3D model.

Due to the vast number of repairs and their repetitive nature, we want to ensure an efficient quality control system. However BIM is also used to raise on-site issues, daily diaries and technical queries (directly to designers, for up to date information and efficient decision making).

A Light Detection and Ranging (LIDAR) scan was created to generate a 3-D model of the viaduct before any works began. The method uses the return time of laser pulses to accurately map the structure.

This survey was imported to modelling software (SketchUp Pro© and Autodesk Navisworks Manage©) to add repair details to the existing model.



Modelling inside a Box Girder

Once the model was complete it was uploaded to BIM programmes (Autodesk BIM 360 Glue© and Field©) where information is now shared in' real time' between the Site Team, Client, Designers and other relevant parties.

To add and edit information from site on the model efficiently, suppliers use relevant BIM applications on their iPads. This information can then be accessed from a laptop or desktop back in the office to monitor project progress.

From the customer's (Connect Plus and Highways England) point of view, BIM will prove to be highly beneficial for document hand over. Traditionally, records would be transferred in a paper-based format which is less efficient and environmentally sustainable.

BIM resolves these issues by providing an integrated 3D record for the customer to aid maintenance and to make future asset decisions.

Outcome

Although the strengthening works scope to Gade Valley Viaduct is not fully finalised, BIM is already having a positive effect.

Over the proposed project lifespan we predict BIM will save over 2500 work hours by improving efficiency and aiding collaboration between all parties on-site.