**Category: Best use of technology to reduce cost/enhance productivity**

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| 1 | **MHA+ member name** |
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|  | Galliford Try Infrastructure |
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| 2 | **other partners involved in the development of this product/project/nomination** |
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|  | Leicestershire County Council, Britons Fabricators |
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| 3 | **Please provide a brief description of what was done.** |
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|  | The MMDR project features 7.5km of new single carriageway road with four bridges. Of those bridges two, the Railway & River Eye structures are composed of steel beams manufactured offsite. These beams feature large sizes, pre-cambered designs, and intricate shapes, making it challenging to verify their dimensions and alignment before delivery and installation. The aim was to ensure these beams conformed to specifications despite the complexity of their shape and size. To address this, we selected the most precise instrumentation, surveying methods, and software to align and visualise laser-scanned data against the design 3D model and as-built site information. Each beam was laser scanned at the manufacturing site using the Leica MS60 instrument. The laser scan and survey data were then processed using Leica Cyclone 3DR software. We compared the combined data to the design 3D model to perform a deviation analysis. A heatmap deviation report was generated for each individual beam, and all reports were merged for a comprehensive view. The final reports and 3D models, aligned to the site grid, were shared with the project team via the Trimble Connect online platform. By utilising laser scanning and surveying methods, we were able to confirm that the overall geometry of the prefabricated elements was within manufacturing tolerances. Identify potential clashes early in the process and take actions during the pre-installation stage prior to their delivery to site. For example, the bearing pockets were increased in size to avoid potential clash with beam bearing dowels. We then discussed these reports with the site team and contractors to pre-emptively address any concerns. Additionally, we merged the actual site-built data with the prefabricated data to highlight potential clashes, allowing us to address any issues before installation. This is added confidence against unsuccessful lifts, avoiding delay while using lifting plant. One challenge we faced was the lack of 3D models for structures from the design team. To overcome this, we converted 2D PDF drawings into simplified models, which were combined with models provided by the fabricators. |
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| 4 | **Please provide a brief overview of what were the benefits of the digital deployment** |
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|  | The proactive approach used allowed for risk reduction and resolution before installation with the knowledge everything would fit. Ensuring control of cost, reduction for the potential for error and assurance against rework. . |
|  | Laser scanning also enabled us to measure hard-to-access areas and complex geometries in a modern, efficient manner providing additional safety benefits |
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| 5 | **Please provide a brief overview of why you should win an award** |
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|  | As a team we were successful, with laser scanning and 3D model comparison giving the team confidence at each stage of the process, ensuring smooth on-site assembly and defect free. A major benefit for this, as well as future projects, was the assurance provided during the pre-delivery stage. The technique is now used on all GT structures and vastly improves identification of error in construction. |
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| 6 | **Please provide any other information that you feel needs to be included in the submission** |
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|  | Access to a design 3D model is critical for the verification process, though not every project has this resource available. It's essential to communicate the benefits of such models to design teams and clients. For future use on projects like MMDR and others, specialist 3D analysis software will be necessary to deliver similar tasks. There are recent industry examples where welds and fabrication dimensions have not been formed to design requirements which has resulted in many hours of rework and validation by impartial observers, this method provides additional assurance against this potential, saving cost, time and potential risk. |
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| 7 | **Please provide contact details** |
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