

April 2022

Digital Construction
Project of the Year - Major Project:
The Forge



Sir Robert
McALPINE

 mace

1. The challenge

Client Landsec has the goal of driving industry-leading innovation in all areas of construction at the Forge, a £95m, 150,000ft² high-specification office development in Southwark, London.

Key to this innovation is the use of a standardised “kit of parts”, an approach known as platform-led DfMA (design for manufacture and assembly). The project, which is due to complete in October 2022, has been underpinned throughout by a unique digital network, encompassing everything from lean design and manufacturing of optimised standard parts to repeatable assembly sequences of the kit of parts.

As client Landsec’s appointed MAM (Manufacturing and Assembly Manager) team, main contractors SRM and Mace, working in joint venture, came together with architect Bryden Wood to produce a raft of digital technology proposals to enable Landsec to achieve its innovation targets for the scheme. One such target was better, more efficient collaboration, and the digital tools deployed on the project provided the foundation for that collaboration – not just between Landsec, the MAM and Bryden Wood, but all the various consultants, subcontractors and other stakeholders in terms of design, communication and data.

We created a Tracker to enable the team to evaluate performance of the digital tools against both project and internal main contractor targets. The tracker included descriptions of the software and added value with the project targets in mind, ensuring focus on the end objectives.



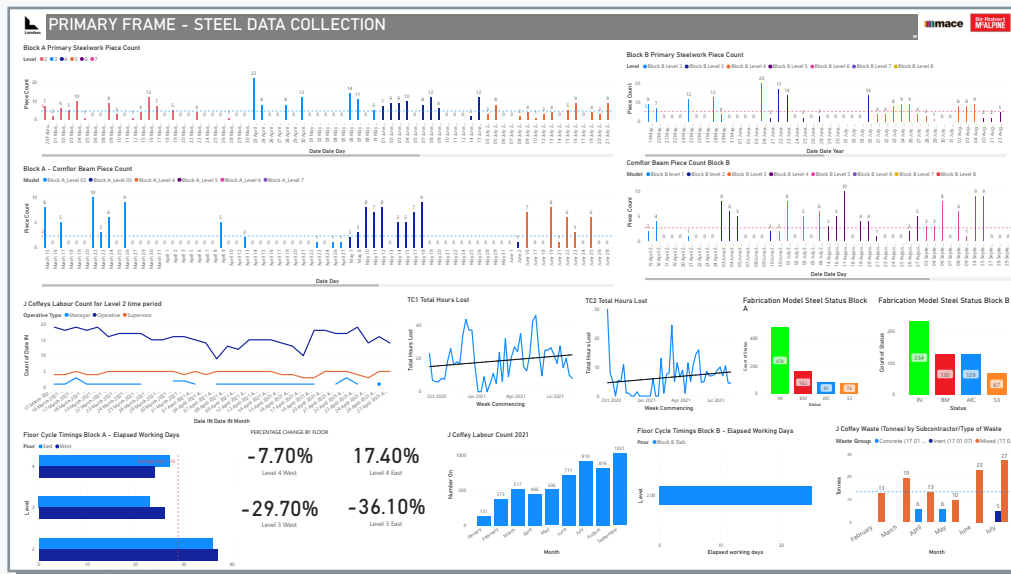
2. Innovative features

Many of these digital tools are already in use in the construction industry. What truly differentiates their use at the Forge is the sheer volume of tools integrated into the various project processes.

Project Dashboards – Power BI

We created a centralised reporting hub using Power BI to combine all the various data streams in 10 dashboards. We held workshops to analyse the data to improve project productivity and efficiency, with that data now being shared as part of a business strategy to improve productivity in the wider construction industry.

Below is an example of the dashboards created by the MAM team, with the support of the Construction Data Trust under their Construction Productivity Taskforce.



Digital Tools

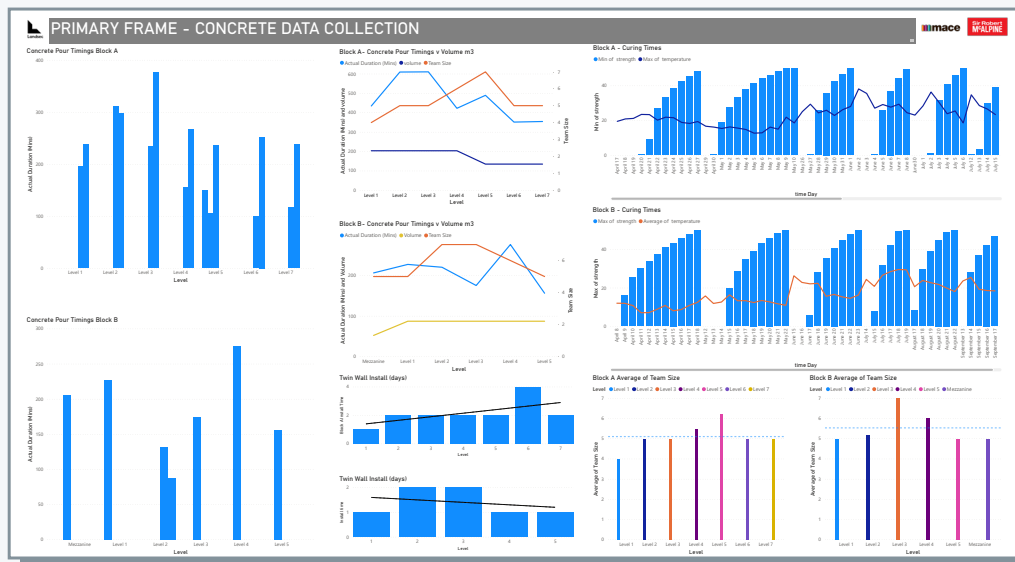
Having stringently assessed a wide range of industry-leading digital tools, we selected 18 to use on the Forge, with the key tools summarised below.

Disperse – 360 photo capture & automated AI progress-reporting

- 360 photo progress capture tool enabling the project team to monitor site progress during the pandemic; photos updated by the Disperse site scanners weekly
- Automated progress-tracking of specific areas, using AI to produce detailed weekly progress reports
- Comprehensive information available backdated to the week of the very first 360 photo scan to protect against claims from trade contractors

Converge – concrete strength monitoring

- Deployed to speed up floor cycle times by allowing access to live strength data and predictive data using AI/machine learning
- Live data from wireless sensors in the concrete pour allowed the team to use the data to detect early strength gain, enabling faster decisions based on live data without cube testing
- Converge sensor data was used to compare to cube test results to prove its accuracy, justifying its use on future projects



Qflow – monitoring of waste & deliveries

- Automated data collection and reporting to detect noncompliance on delivery and waste transfer notes
- Qflow's proactive approach led to integration with other digital platforms such as Datascope and Tracker plus KPI which formed part of our data capture for sustainability and productivity criteria

Material tracking / QR codes

- Comflor beams with varying components were used in construction; the components and beams had to be tracked during the assembly process to ensure the correct parts were associated with the correct beam
- QR codes identifying data associated with particular components were applied to individual Comflor beams as part of the assembly process and used as a final QA
- Labels clearly identified the type and location of each beam, viewable on the Dalux mobile model viewer; prop set drawings were also overlayed with the Comflor 3D model to ensure the correct type of beam was installed in its intended position
- Data could then be displayed in the model using the status data to change the model appearance

iFire – digital fire auditing/sign off

- Fire-stopping monitoring tool to ensure the fire integrity of the building
- Used on site and all fire stopping details
- Clear audit history captures construction works, and can be used for building operation post PC
- Further tasks can be carried out to provide insight to the sign-off status of the builderswork holes in the BIM model

3. People and skills

Our pioneering approach at the Forge set a new benchmark for Landsec, SRM, Mace, Bryden Wood and our key supply chain partners. Collaboration was the watchword for the whole team, who focused on having a digital culture from day one – a culture that was further embedded during the pandemic to connect teams working remotely.

Training was supplied by a mixture of the MAM team and the software vendors. SRM are committed to reaching defined BIM/ digital maturity targets on all our projects, and training / BIM support is key to meeting these metrics. Benefits of the training were felt at every level, from management to engineers/operatives across the supply chain, giving everyone the opportunity to experience first-hand the future of the construction industry.

Training given to trade contractors included:

- QR codes and data entry
- Datascope, Tracker Plus Qflow, including gate staff/ traffic marshals to support sustainability targets
- Dalux BIM model viewer for the partners, FM service providers and trade contractors.
- Disperse viewer and progress reporting – teams were trained how to use this innovative tool in their roles
- Fire-stopping trade contractor for iFire
- Glider BIM asset information model; Glider chaired meetings with trade contractors to set up their model export settings to comply with required COBie outputs, giving them the capability to carry out these tasks in-house

4. Benefits and achievements

Headlines

- First commercial building in the UK to be net zero carbon both in construction and operation (UK Green Building Council)
- 25% reduction in embodied carbon compared to ‘business as usual’ design
- 20% fewer site operatives needed

Specific achievements

- 3D BIM models linked to robotic welding machines to create temporary works kit
- Improved project control from linking the construction programme to the dashboards and Disperse viewer
- Reduced strike times using Converge embedded sensors
- Qflow real-time reporting of waste removal non-conformance
- QR coding used for material status tracking
- M&E services cassette manufactured with the highest off-site element seen to date
- install times recorded to the nearest minute
- Waste and sustainability software tools developed new APIs

The open-source data generated at the Forge, together with the link to researchers at Cambridge University and the Construction Productivity Taskforce, means the challenges and successes of the digital tool suite can be analysed and shared with the wider construction industry.

Uniquely, a digital review team was established with representatives from Landsec, Bryden Wood and SRM to select and train users, and monitor, analyse and hand over each of the tools. This has created a legacy within each organisation for future projects.

This breakthrough project and its digital thread were recognised by Innovate UK, who supported the project, and the UK Government, who recognised the value of digitally-enabled platform construction in their ‘Construction Roadmap 2030’.



Sir Robert M'Alpine
63 St Mary Axe
London
EC3A 8AA

www.srm.com