4D Construction Planning Saves GBP 1 Million on UKâ€™s Largest-ever Water Infrastructure Project

The Thames Tideway Tunnel will capture and store raw sewage and rainwater from London’s 150-year-old sewer network, preventing overflow into the River Thames. It is the largest infrastructure project ever undertaken by the UK’s water industry. Bentley's SYNCHRO 4D workflow was used to streamline construction planning activities and to improve progress tracking and management. This has reduced the overall construction programme by 30 days, achieving GBP 1million in direct and indirect cost savings.

The 25-kilometre-long tunnel is split into 24 construction sites, 11 of which are located along the river’s banks. The project involves 12 design disciplines and numerous supply-chain companies, which makes coordinating and communicating with all project stakeholders vitally important to organize construction successfully, particularly within the constraints of tight scheduling and small, challenging project sites.

The Costain, VINCI Construction Grands Projets & Bachy Soletanche (CVB) joint venture (JV) is pushing the boundaries of conventional construction to deliver value, right-first-time quality, and sustainability, all while leaving a legacy that will benefit Londoners for more than a century. The transformational vision of the Tideway project actively promotes innovation to challenge traditional ways of working and reduce complexity. Along with many other Bentley products, the CVB JV employed SYNCHRO 4D to streamline construction planning activities and to improve progress tracking and management. This new workflow combines 3D models with the construction schedule to produce a 4D plan that shows how the project will develop over time.

Managing highly congested sites

Implementing 4D collaborative planning enabled the Tideway construction teams to effectively manage highly congested sites with multiple, concurrent activities and different subcontractors who need to work together in tight confinement. Regular planning sessions among the disciplines allowed the team to identify and resolve clashes and choose the optimum construction methodology, which reduced delays and field-change requests.

The team reviewed the site conditions at a number of key scheduled milestones and took measurements on the 4D model to identify any asset protection requirements and also explore potential crane locations.

The planning sessions also involve value-engineering activities that consider all design, environmental, health and safety, logistical, cost, and time constraints, and providing the client and specialist subcontractors with the opportunity to influence and improve early decision making.

For example, during a one-hour start-up meeting between CVB and Network Rail, the team discussed a number of key interactions relating to safety and major deliverables. To ensure an optimal solution was achieved, the team reviewed the site conditions at a number of key schedule milestones, and took measurements on the 4D model to identify asset protection requirements and explore potential crane locations. As a result, the work schedule was revised to avoid unnecessary setup and relocation, compressing the time to complete this phase by 50%.

Direct and indirect cost reductions

To date, the combination of 4D with lean construction methodology has reduced the overall construction program by 30 days, achieving GBP 1million in direct and indirect cost reductions. The 4D construction models have also been a particularly useful method to engage local residents, community groups, and councils – individuals unfamiliar with interpreting traditional technical drawings and reports.

“Bentley’s 4D modeling application has resulted in considerable time and cost savings of more than GBP 1 million on Britain’s largest-ever water infrastructure project,” said Sandra Reis, BIM manager at Tideway. “The technology shortened design time, reduced resource hours, made meetings more productive, and eliminated tedious tasks. The collaborative approach achieved through SYNCHRO 4D has been key to involving the client, designers, and fabricators during early decision making.”

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