



Design for Manufacture and Assembly (DfMA) saves 25% Project Costs and 90% Programme

Frankley Water Treatment works is a strategic Severn Trent Water site supplying water to 1 million people in Birmingham, UK, including sole provision to 11 hospitals so interruption to supply was not an option. The main contract, run by MWH Treatment, was for the replacement of an unreliable existing Lime Dosing system which was a potential water quality risk for customers.

The project included a new £14m lime batching and dosing plant, largely built within and around existing building infrastructure. EPS provided 5 DFMA packages including pump skids, pipework and integrated structures. The main DFMA package was a 25m x 7m lime manifold pipework assembly complete with access, valves and flowmetres.



PROJECT COST
£14 Million



PROJECT START DATE
Oct 2014



CAPACITY
480 MLD



CONSTRUCTION PERIOD
8 Months

CASE STUDY

Frankley WTW



The Challenge & Need for Change

The project included a new £14m lime batching and dosing plant, largely built within and around existing building infrastructure. EPS provided 5 DFMA packages including pump skids, pipework and integrated structures. The main DFMA package was a 25m x 7m lime manifold pipework assembly complete with access, valves and flowmetres.

Severn Trent Water's regulatory efficiency targets reflect those typical of the water industry:

- 30% capital
- 20% productivity
- 30% programme

- Lime batching & dosing plant
- Lime storage tanks
- Chemical dosing for pH control
- Pumps & pipework
- Water conditioning - degasser package
- All ICA & asset integration

Adopting the DfMA Approach

Severn Trent were targetting 70% off-site construction and are driving towards a digital environment with their 'Go Digital' agenda using digital engineering in design and whole life asset management. The project aspirations are in line with the Government's 2025 Construction Strategy targeting 33% cost reductions and 60% faster construction.

Off-site fabrication, was identified at the project outset as the means to achieve these targets safely with less carbon and to a higher quality. Key to the success of the project was meps' early engagement at design feasibility stage to unlock off site engineering opportunities.

Autodesk BIM360 provided the centralised design platform ('one source of truth') for effective supply chain collaboration, communication and design review. 4D Synchro provided the facility to digitally rehearse the installation sequence and methodology before shipment and plan in detail the required temporary works.

meps attended collaborative planning sessions, designed the Lime Manifold in 4D and provided manufacture, full assembly, factory testing, client inspection and safe delivery from our in house manufacturing facility.



Key aspects of the different way of delivering were:

1

Procure Engineer Assemble (PEA) – early engagement and appointment of the supply chain gained commitment and timely progress of design development

2

Collaborative planning sessions with the supply chain fostered commitment, relationship building, trust, best for task idea sharing, detailed interface checking through a forum of open discussion using 4D visuals sequences

3

4D Digital Rehearsals were used for pre-site checking and communication of delivery methodology, off-loading and installation sequencing including lifting and temporary works planning

4

Pre-slung factory assemblies delivered with QA packs accompanying each load

5

meps managed the interfaces with other Tier 2s within our battery limits of supply

6

Laser scanning and clash detection was used to scan the existing building structure

Added value through DfMA

- 1 Improved health and safety with minimal working at height and manufacture in factory conditions
- 2 Programme and quality assurance - no surprises
- 3 80% reduction in site time from 3 months to 4 days
- 4 50% reduction in overall labour time
- 5 80% reduction in indirect costs (prelims and site costs)
- 6 Cost certainty - less risk for main contractor
- 7 10% reduction in unit cost due to manufacturing and design repeatability
- 8 20% improvement in quality due to factory type conditions
- 9 15% reduction in carbon
- 10 20% increase in product robustness

meps Capability

- › In-house design
- › Digital installation rehearsal
- › In-house assembly and factory test
- Collaborative behaviours



- › Achieved Severn Trent target of 70% off-site constructions
- › Met Severn Trent's "Go Digital" agenda
- › The client recognised best practice
- › Best in class safety thinking
- › Customer care - reduced vehicle movements & deliveries