ECS installs UK's first moulded FRP lock gates

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ECS Engineering Services has installed the UK's first ever set of moulded fibre **reinforced polymer (FRP) lock gates on the River Thames at Sunbury Dry Dock. The new gates, fitted on behalf of the Environment Agency, offer significantly reduced maintenance requirements and whole life costs, compared to steel or timber alternatives.**

Choosing new gates

The mitred lock gates are a critical part of the dry dock facility; enabling the Environment Agency to maintain its vessels adjacent to the navigable River Thames.

The gates retain a large volume of water upstream, and with personnel often working in the dry dock area behind the gates, maintenance of the gates and the surrounding civil structure is crucial for both functionality and safety. Environment Agency surveys determined that the previous timber gates had reached the end of their service life and needed to be replaced to maintain safe usage of the dry dock facility. ECS Engineering Services were then contracted to carry out the gate replacement work.

ECS is a leading provider of electromechanical services to the water sector across government agencies, local authorities and private companies. Steve Crapper,

Precontract Director at ECS, explained that: “We are experts in lock gate installation. Our completed projects include large-scale work from the south of England right up to Scotland. When assessing the Sunbury site, we saw an opportunity to use the latest material technology to replace the lock gates and provide the Environment Agency with a low-maintenance solution with exceptional service life and value.”

Material gains

FRP technology and its core materials have been proven over decades of industrial use across Europe. However, the specialised ‘InfraCore® Inside’ manufacturing process, patented by FiberCore Europe, combines strength and integrity in an affordable material solution.

Consisting of glass-fibre-reinforced polymers and a special thermosetting resin, FRP is layered for exceptional strength, durability and lightweight construction. ECS installed an FRP bridge for the Environment Agency at Mapledurham Lock in 2016 and has been a leading user of the technology since. With FRP used already for large lock gates in the Netherlands, ECS took the opportunity to apply the technology to lock gates for the first time in the UK.

“FRP has a leading edge over other materials,” Steve explains. “Thanks to tremendous longevity, FRP lock gates are essentially maintenance free - the lifespan of an FRP panel is at least 100 years. Timber gates would need structural maintenance within 10-15 years, while steel gates require a full repaint with an anti-corrosion coating every 15-20 years. This excludes any ad-hoc repairs that may be needed.

“The maintenance of lock gates involves a significant amount of temporary works. Dewatering the channel using extra equipment not only poses additional challenges

for maintenance engineers, but also impacts on the use of the lock and disturbs the surrounding environment. Considering this, FRP lock gates provide a great value advantage in terms of both maintenance costs and service life."

FRP is stronger than steel, wood and concrete. Furthermore, FRP offers a lower CO2 footprint due to improved material sustainability - an important factor for all infrastructure development projects. Each FRP lock gate is prefabricated, which speeds up the installation process and minimises work on-site. The material is also inherently fire resistant.

Lighter gates

Each of the two replacement FRP gates measures 4m high x 4.5m wide and has a mass of approximately 10 tonnes.

David Searle, Operations Manager at ECS, said: "FRP gates can be designed to be lighter than timber and significantly lighter than steel alternatives. This lightness means that operating forces to open and close gates are reduced, which results in less energy consumption. Another benefit is less wear on components such as bearings, along with reduced strain on the surrounding dock chamber structure. The Sunbury gate design also enabled the existing hydraulic control system to be retained."

Low maintenance by design

All steel components below the water line were manufactured in stainless steel, with the brackets supporting the walkway produced from more economical galvanised steel. The use of stainless steel extended to the hydraulically operated sluice gate and mounting frame, with low maintenance modern bearing materials deployed on

the bottom pintle and top hinge. The civil infrastructure at the site has also been comprehensively overhauled. Every aspect of the design has been optimised to deliver maximum possible service life of the dry dock.

“FRP is a highly advanced and beneficial material for use in lock gates for the UK’s inland waterways. As the maintenance of existing structures becomes a bigger portion of their overall cost and environmental impact, a low maintenance, durable material solution, such as FRP, offers great advantages,” Steve concludes.

With the gates now installed and operational at Sunbury, for the foreseeable future, it’s likely the only maintenance work at the site will be on the boats that enter its dry dock.

Image captions:

Image 1: ECS has installed the UK's first ever set of FRP lock gates on the River Thames at Sunbury Dry Dock

Image 2: The new gates were fitted on behalf of the Environment Agency

Image 3: The civil infrastructure at the site has also been comprehensively overhauled

Image 4: ECS organised dive teams to support the project

Image 5: All steel components below the water line were manufactured in stainless steel

Image 6: FRP lock gates are essentially maintenance free, with the lifespan of an FRP panel at least 100 years

About ECS Engineering Services

ECS Engineering Services has over 30 years experience in delivering high quality, reliable and cost effective engineering solutions, specialising in bespoke design and construction of water, energy and environmental processing and management projects.

In conjunction with key supply partners, ECS has the expertise and capacity to design and install a wide range of water control engineering projects. With in-house fabrication services, which have CE Marking approval to EXC4, well equipped and highly skilled engineers can also complete structural steelwork, bespoke fabrication work and access metalwork to the highest standard.

With a complete range of site services available, ECS offers a full turnkey project managed service for mechanical and electrical installations including managing civils contractors and supplying pipework, control and automation work to ensure that every installation is installed and commissioned to the highest standard. Existing clients include the majority of the UK Water Utility companies, Government Agencies and Internal Drainage Boards.

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