



FROM DESIGN TO INSTALL

428 TANK FOR ENSUS UK

Ensus UK, one of EFAB's long-term clients, recently identified a significant issue with a key part of their Teesside operational plant. This issue made it necessary to replace an important Caustic Acid storage tank quickly and efficiently.

The storage tank in question is part of a 100% duty process, which means that it needs to be continuously operational in order to prevent a loss in production. The tank replacement was made necessary due to widespread corrosion of their existing tank. As the storage tank is an integral part of a 100% duty process for the client, a quick turnaround was vital, the existing unit needed to be removed and fully replaced before Ensus UK suffered any commercial impact and loss of revenue/production.

Initially, the client went to market looking for competitive bidding options to replace the tank using "traditional" construction philosophies which would have entailed the on-site destruction of the existing tank and in-situ fabrication of the new tank. This process would have resulted in considerable downtime for the client. As part of the competitive bidding process, EFAB's team was engaged by Ensus UK Ltd to tender for the fabrication of a replacement tank which was to be installed at their Teesside plant on the Wilton international site.

During the bidding process EFAB, through our Value-Added Engineering approach carried out a thorough constructability review. Our team identified that the most effective approach would be to treat the replacement tank as a "module". By treating the replacement Caustic Acid storage tank as a module, EFAB would in turn take a significant amount of the work activity and associated risks of construction away from the Wilton International site and into the controlled environment of our facility.

EFAB approached the client to propose offsite manufacturing and identified the significant advantages, not least the significant reduction in downtime for their process unit. Following a successful tender process EFAB were awarded the contract utilising the offsite manufacture approach which was executed as outlined overleaf.

Design

EFAB's in-house design team was tasked with creating a detailed design complete with stability calculations for the replacement tank taking into account the design implications of the offsite build philosophy and the need to "top and tail" the tank, transport it and finally lift it into position.

The stability calculations were based on the original documentation for the existing tank and the new mechanical data sheet provided by the client.

One of the initial activities of the project was to carry out a comprehensive 3D scan of the existing tank and surrounding process equipment to enable the new tank to be adapted to suit the actual site location and its required tie-in points. The data from the 3D scan was uploaded into the EFAB system and formed the basis of the 3D model for the replacement tank.

EFAB's design team prepared full tank fabrication drawings and supplied them for approval by the client. The drawings included lifting points and other details to ensure that the new tank would be able to be lifted safely by cranes and transported from the EFAB module facility to the site.

EFAB's design team also validated the condition of the existing tank for demolition purposes, this would include cutting the tank into three sections on-site and lifting each section, with the aid of additional temporary lifting lugs, from its location to an available laydown area where it would undergo further disassembly and finally removal from site.

Manufacture

EFAB's in-house procurement team were engaged to procure all of the materials required for both the tank and its associated pipework modifications. They also procured all of the subcontractors that were involved with the delivery of the project including but not limited to heavy lifting and transportation, PWHT, NDE, Surface Coatings and Thermal Insulation.

The fabrication took place at EFAB's own facility in Immingham using in-house welders and fabricators. Due to the tight dimensional tolerances required to ensure an accurate set up to the existing process tins, the fabrication was sequenced to allow effective manufacture but also minimise any distortion. All of the assembly, NDT, PWHT, hydro testing and coating were carried out in the controlled conditions of EFAB's Immingham module facility.

Logistics

EFAB was tasked with managing the lifting, transportation and shipping of the new tank from Immingham to Wilton International's site in Teesside.

This was possible as the EFAB modular assembly facility at Immingham has private direct access to the Immingham port, allowing for the transportation of the tank to the quayside where it was loaded onto a coaster ready for shipment to the Teesside facility.

The tank was delivered in one piece, but the challenge was ensuring that it arrived safely at the Ensus' site. EFAB's team worked closely with all parties involved in the logistics of this project, including Ensus, Wilton International and the shipping company.



Install

To facilitate the removal of the existing tank and subsequent installation of the new tank, a number of live processes piping systems were amended by the addition of brake flanges. This was undertaken via agreed isolations of the applicable lines without affecting the operation of the tank and ensuring continued production by the client.

During a pre-planned plant shutdown, the existing tank was drained and isolated by the client prior to the tank being cut into three sections via thermal cutting. Once each section had been cut it was lifted clear of the processing unit, using EFAB-designed temporary lifting lugs and removed to an adjacent laydown area.

When the old tank was fully removed the new tank was lifted into position by crane and positioned onto the existing foundations/supports. The client had stipulated that a previously erected, full encirclement, access scaffold must remain in place during the removal and installation of the tanks. This necessitated the lifting activities to be undertaken with as little as 50mm clearance in some positions. All lifting was completed, in accordance with detailed lifting studies, without incident.

The new tank was installed, located onto the foundations and was found to be within 2mm of all required critical tie-in locations to the existing pipework, allowing for minimal works (including welded pipe connections) required to fully connect the tank to the existing process unit. These works were all completed within the pre-planned 21-day shutdown. The tank was successfully commissioned by the client without issue resulting in minimum downtime for the plant.

Want to see if EFAB can streamline your construction and engineering needs? Contact us today!

Watch our timelapse video efabsolutions.co.uk/ensu