



POWERING THE BOSTON BARRIER ...with specialist engineering

IMH was engaged by BAM Nuttall and Mott MacDonald (BMMJV) to support in engineering a solution for The Environment Agency (EA) to resolve flooding issues facing Boston, Lincolnshire.

In December 2013, the town was hit by a large tidal surge flood. The incident saw 18,500 severe flood warnings issued to properties. 100 businesses and more than 700 homes were affected by the flooding, with more than 200 people being evacuated from homes.

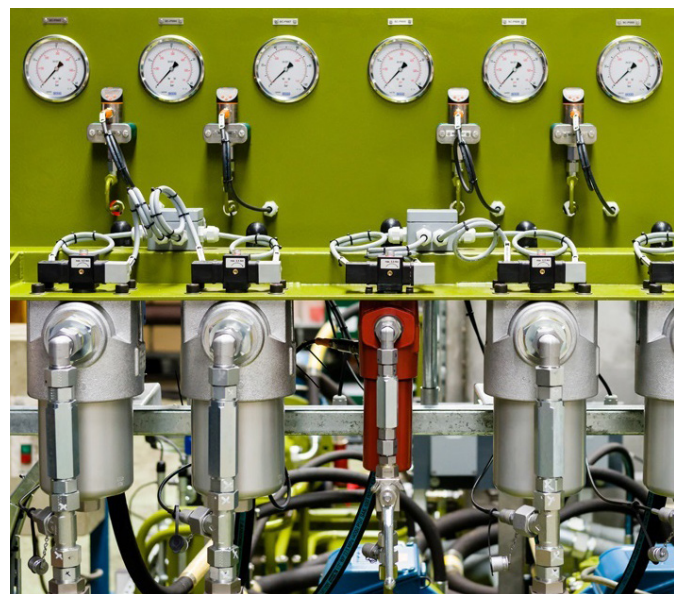
The engineered solution presented by BMMJV entailed halving the size of the river and implementing a single horizontal sector gate.

IMH developed a solution to lift the gate, made from carbon steel and weighing around 330 tonnes, increasing to 730 tonnes when full of water. The gate and lifting solution are able to operate in a range of temperatures from -20°C to +50°C and the system is designed to DIN 19704:201.

Our team of specialist engineers designed and developed a solution that included the manufacture of one main hydraulic power unit (HPU) and two emergency HPUs. Each emergency HPU has a single pump which is driven by a diesel engine. The unit requires no mains power to operate the barrier in the event of an emergency and can even operate from one cylinder/EHPU.

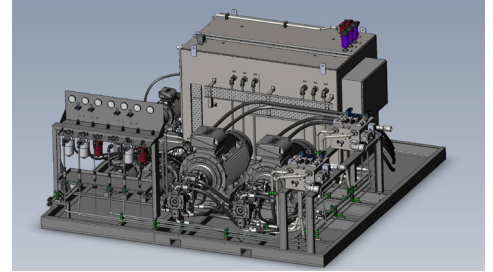
The main hydraulic pump was designed to provide 182 l/min via two pumps per cylinder. In total, there were three hydraulic cylinders; two for the barrier operation and a spare, which were designed and built by Hunger. Each cylinder includes an IMH hydraulic control manifold block weighing in excess of 1000kg and containing over 40 hydraulic components.

The oil used in the system is PANOLIN HLP SYNTH 22, a biodegradable hydraulic fluid. Chosen for its high-performance and environmentally friendly characteristics.



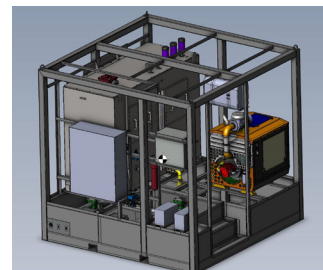
1 x MHPU (Main Hydraulic Power Unit):

- 3250 litre stainless steel reservoir
- 11 hydraulic pumps
- 5 electric motors
- Over 170kW of installed electrical power
- Total weight of unit exceeding 9000kg and containing over 3000kg of fluid



2 x EHPU (Emergency Hydraulic Power Unit):

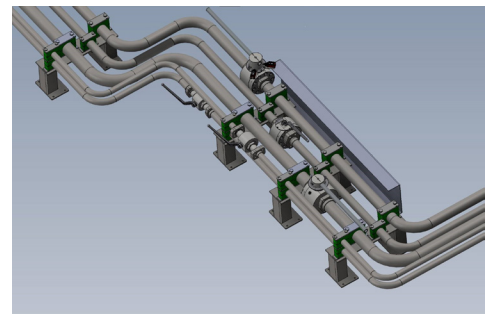
- 3050 litre stainless steel reservoir
- Emergency diesel engine 45kW power source
- Self-enclosed system protected by a bespoke GRP (glass reinforced plastic) kiosk



Fabrication and installation of stainless-steel socket weld pipework

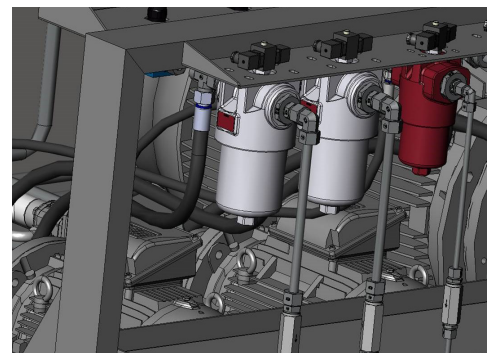
Fabrication and installation of stainless-steel socket weld pipework

- 800m of 316L stainless steel pipe prefabricated on Teesside
- Pipework manufactured offsite and in parallel to civil works, using IMH SolidWorks drawings, reducing the amount of work required at the end of the project by several months
- Installed pipework ranges in sizes from 25mm to 88.9mm diameter
- Pipework high-pressure tested to 1.5 times the MWP (maximum working pressure), with the maximum being recorded as 420 Bar to ensure mechanical integrity
- The pipework was flushed using turbulent flow, the maximum flushing flow recorded was 480 l/min



A pipe crossing was required from the main HPU to the opposite side cylinder. The significant fabricated structure incorporated the pipework of two service pipes and two additional spares running side by side.

A special lifting beam was constructed to lift and lower the assembly into position. The base is covered with removeable blocks enabling a full replacement in one piece should this ever be required.



IMH is a leading hydraulic engineering company with 40 years' experience on global projects in a range of sectors. We offer a turnkey solution incorporating services across design, manufacture, installation, commissioning, maintenance and repairs, component supplies and training.