

# THE SMETHWICK ENGINE

BUILT TO JAMES WATT'S DESIGN IN 1779

Jim Andrew

James Watt's collaboration with Matthew Boulton began in 1774 when Watt brought his ideas and a prototype beam engine to Birmingham. The first commercial engine was designed in 1775 and over three years engines of increasing sophistication were designed, built and used successfully. The Smethwick Engine was the first engine to add expansive use of steam, a further improvement in efficiency, to Watt's designs of separate condenser and valve gear. All successful early steam engines were beam pumping engines and Watt carried out tests on the Smethwick Engine, using it with expansive working. He wrote to his engine installers to fit this new operating system. This became the standard design for Boulton & Watt pumping engines for nearly twenty years.

The Smethwick Engine was built by the Birmingham Canal Company to raise water back up the canal locks in Smethwick and started work in late May 1779. The supply of water to the canal through Smethwick was poor and this engine raised water back up after it had passed down the locks when boats passed along the canal. The engine enabled some two hundred and fifty boats to pass along the canal each week, enough for the trade at that time. As trade increased there was a bottle-neck at the locks in Smethwick and about 1790 a deep cutting was dug, on the line of the canal, which reduced the rise from six locks to three. The water then only needed to be lifted up three locks and the engine was fitted with a larger pump, to lift more water into the summit.

Trade continued to increase and around 1805 a second engine was installed alongside the first engine which itself needed extensively rebuilding. The two engines continued to give good service, up to twenty four hour working when trade was



The Smethwick Engine in action.

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particularly heavy. In about 1850 the Smethwick engine again needed an extensive rebuild but, throughout the refurbishments, the engine retained its timber beam, separate condenser and operating system. Thus to the end of its working life, the Smethwick Engine had the appearance and layout of the 1779 design. When it retired from regular working the engine was thought to be the oldest working Watt engine in the World and the canal company decided to preserve it by relocating it to their engineering depot in Tipton.

The engine was steamed for the centenary of James Watt's death in 1919 when many events were organised in Birmingham. Eventually the engineering depot was to be closed and, after some

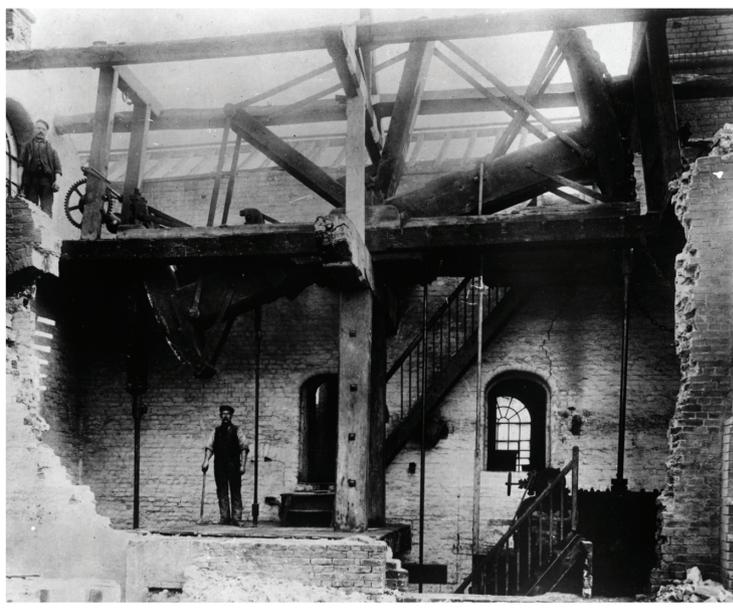
discussion, the engine was presented to Birmingham City Council to be preserved at the Science Museum in Newhall Street. It was slowly erected on the museum site and was successfully steamed in 1979, its bicentenary year, before being housed in a suitable building with regular operation for visitors from 1983. Meanwhile the Museum was able to excavate the engine's original site in Smethwick. A great deal was learnt from the excavation which also proved the established history of the engine.

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When the canal company moved the engine into preservation, there were probably problems with the water table in Tipton and so the engine layout was altered and these alterations were replicated when it moved to Newhall Street. The engine was not entirely happy running with this arrangement and the move to the new museum was an opportunity to put this right and also to build in a hydraulic animation system so that the engine could be demonstrated regularly without imposing the loads of steam operation. The engine was run on steam for special events with the animation available when required, giving a more sympathetic life for this venerable exhibit.

Recently the main pump developed a nasty knocking sound, as the original type of rope packing was wearing out. This meant that the engine could not be run

on steam or animation and it has taken some time to bring the funding and specialist works together to install fresh rope packing around the pump's piston. The opportunity has also been taken to check the general condition of the engine and pump so that it can now be demonstrated either in steam or on animation for visitors. Thus the world's oldest working steam engine can again be seen in operation. It is a fitting tribute to James Watt, Matthew Boulton and all those who have looked after it for some two hundred and forty years.



The Smethwick Engine in the original location, 1980s.

Birmingham Museums Trust



A specialist team worked alongside technicians from Birmingham Museums Trust to restore the engine to working order. The restoration project has been supported by IMI plc and Millennium Point.

See a brief film on the Smethwick Engine at our website [www.historywm.com](http://www.historywm.com) where you will find much more about Matthew Boulton and James Watt and the development of the steam engines which powered the Industrial Revolution in Britain and the world beyond.

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