The 'Return to Steam' project at Twyford

Martin Gregory

When Twyford Waterworks became a Scheduled Ancient Monument in 1974 the remaining steam plant comprised a Hathorn Davey triple expansion steam pumping engine supplied with steam from a row of three Babcock & Wilcox boilers in a boiler room containing two steam boiler feed pumps, a steam powered air compressor and a steam driven DC dynamo. The plant had last been steamed in waterworks service in 1969.

Twyford Waterworks Trust was formed in 1985 and, after a lot of work by volunteers and with the help of a PRISM grant, the Hathorn Davey engine ran again in 1996, steamed by boiler **3**, supplied in 1916. The engine and boiler **3** were in operation in the summer months (the first Sunday of the month) from 1996 to 2003. Changes in the regulations on asbestos caused the suspension of steam working at the end of 2003 and over the next few years, the asbestos was removed by Southern Water Services, the owner of the site. With the completion of this programme the Trust set about raising funds to return the engine and one boiler to steam.

A successful campaign led to the award of £820 000 by the Heritage Lottery Fund for the 'Return to Steam' project at Twyford. This money will see the engine turn again, powered by one of its original boilers, and will also see a new interpretation of the site, upgraded toilets and a new workshop building. All this work is scheduled for completion in 2015.

Babcock & Wilcox were the pre-eminent boiler makers of the twentieth century. The WIF boiler, their classic water tube design, was made in quantity: Lots Road power station in London, alone had 64 WIF boilers. Now, only four remain: the row of three at Twyford and one at Cheddars Lane, Cambridge.

The three boilers at Twyford were supplied in 1903 (boiler **2**), 1906 (boiler **1**) and 1916 (boiler **3**). Boiler **1** was chosen for restoration as it is closest to the pumping engine and released the space alongside boiler **3** for the interpretation of the plant. With boiler **1** restored to operation, boiler **2** has been conserved and surrounded with matching brickwork to replicate its appearance in 1903. Boiler **3** has been left as a skeleton for interpretation.

In the asbestos removal programme all the brickwork surrounding the boilers was removed. Since the boiler is suspended from two portal frames, removal of the brickwork made them unstable and scaffolding was inserted to brace the assembly. The firebox grates, access doors etc were cleaned and conserved for re-use. On boiler **1**, all the water and superheater tubes were replaced as there was no traceability of the steel used over a century ago.

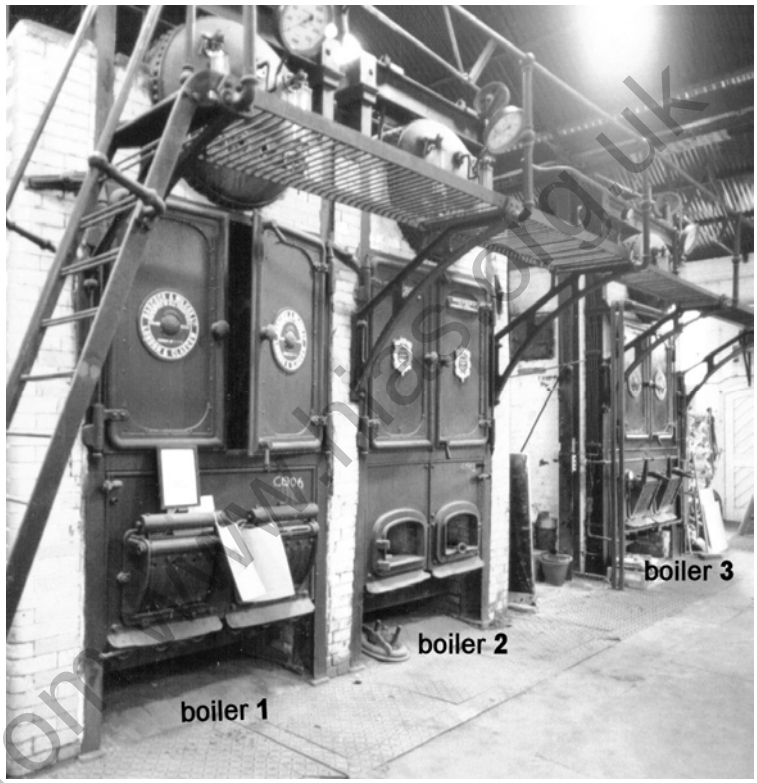


*Figure 49. Twyford boiler house in 2003, showing all three boilers intact. Boiler **3** was then the boiler in service.*

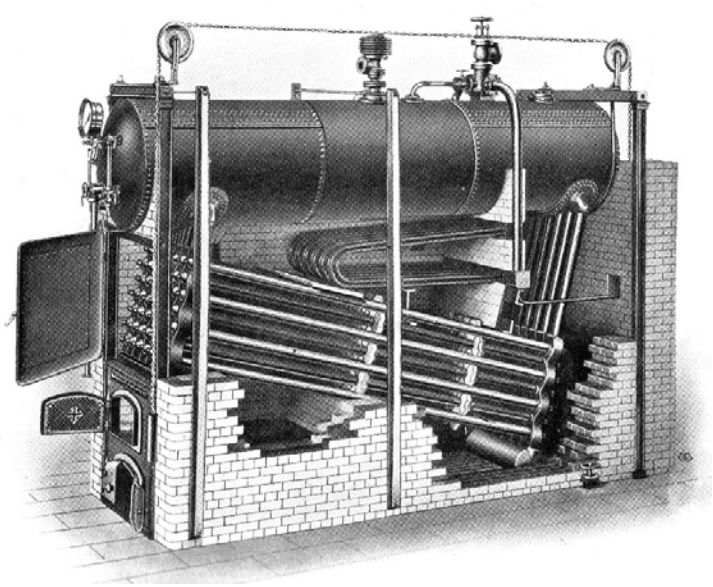
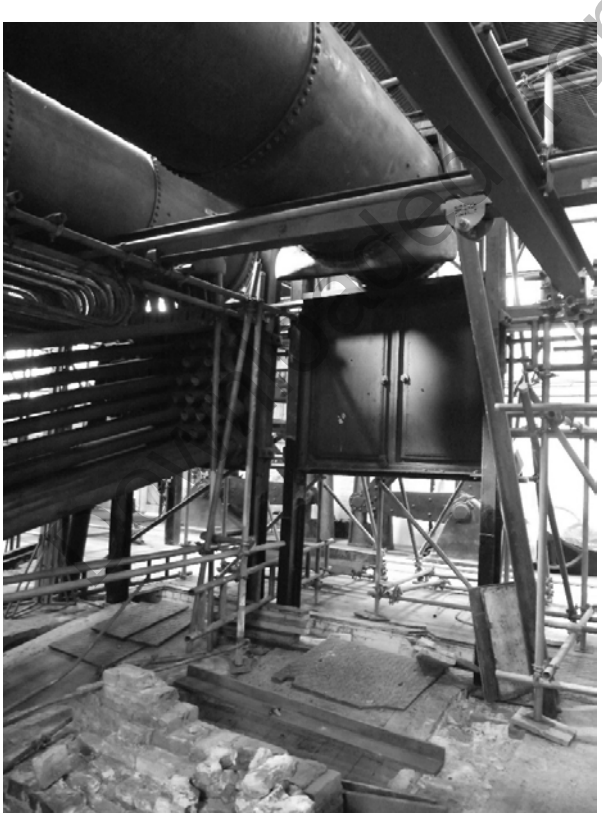


Figure 50. Cut-away drawing of the Babcock & Wilcox WIF boiler showing the inclined water tubes suspended from the steam drum at the top. The small 'hairpin' tubes form the superheater. The firegrate is at the front of the boiler under the inclined water tubes.

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*Figure 51. Boiler **3** with brickwork and asbestos removed, and stabilised by scaffolding, (August 2008)*



Ultrasound non-destructive testing was used to identify possible cracked or mis-shapen rivets and any flaws in the many forgings. This showed the major components to be in good condition, a tribute to the maintenance of the plant during its working life. Only a very few rivets needed replacement. All the work on the boiler pressure vessel components was entrusted to H. A. McEwen (Boiler Repairs) Ltd. They cut out the old tubes and took the headers and other parts to their works in Keighley, returning complete tube banks to be reinstalled at Twyford. The new brickwork around the boilers was carried out by Gregory Havant Ltd.

The photographs show the progress of the restoration to date (May 2015).



*Figure 52. Boiler **1** in September 2014 with all the water tubes removed and foundations of the brickwork cleared. The door to the flue has yet to be reopened. Boiler **2** retains its tubes at the right hand side.*

*Figure 53. Boiler **1** with all water tubes removed and firegrate dismantled. Boiler **2** is on the left and awaits its new brickwork (September 2014)*



Above

*Figure 54. Firebrick wall built between boiler **1** and boiler **2**, November 2014.*

Right

*Figure 55. South wall of boiler **2** under construction showing access doors and dusting holes, February 2015.*

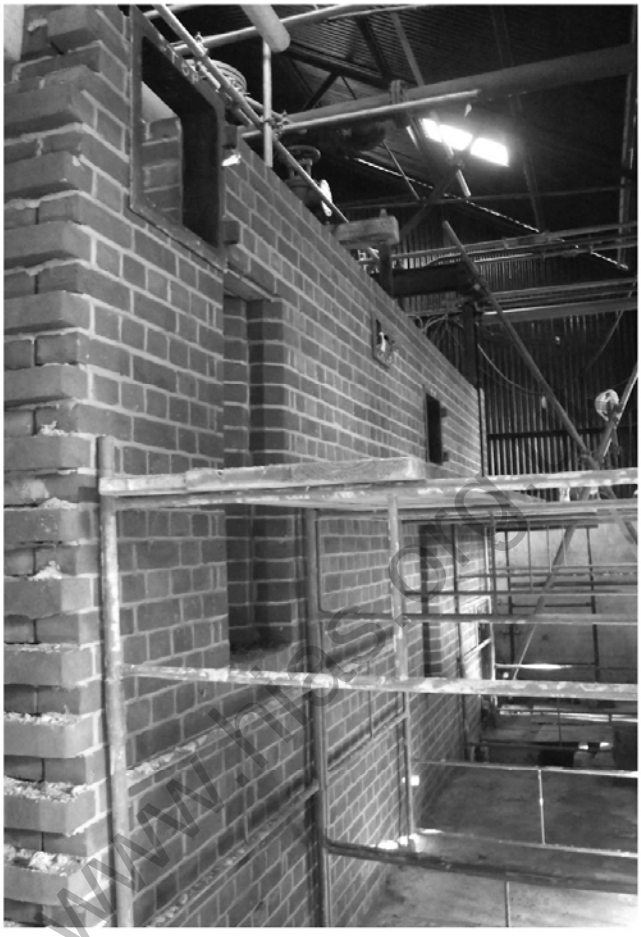




*Figure 56. Dusting holes for boiler **2**, these are for tube cleaning. A steam lance is inserted in each hole in turn to remove ash which collects on the tops of the tubes. February 2015*

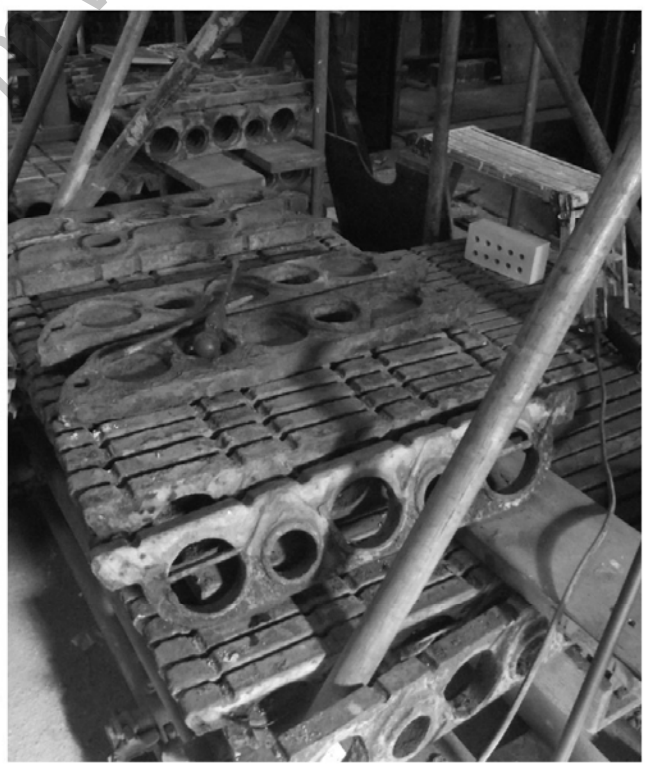


*Figure 57. The firebars were cleaned by the volunteers prior to reinstallation. Those for boiler **1** are shown stacked in front of the boiler. March 2015*

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Figure 59. Hot riveting; replacing a suspect rivet in the steam drum of boiler 1.
March 2015
(Photo courtesy of H. A. McEwen (Boiler Repairs) Ltd.)



Figure 60. New tubes, including superheater, fitted, boiler filled ready for hydraulic test.
May 2015



Figure 61. Tube-cap assembly (above), tube-cap fitted to header (below), May 2015

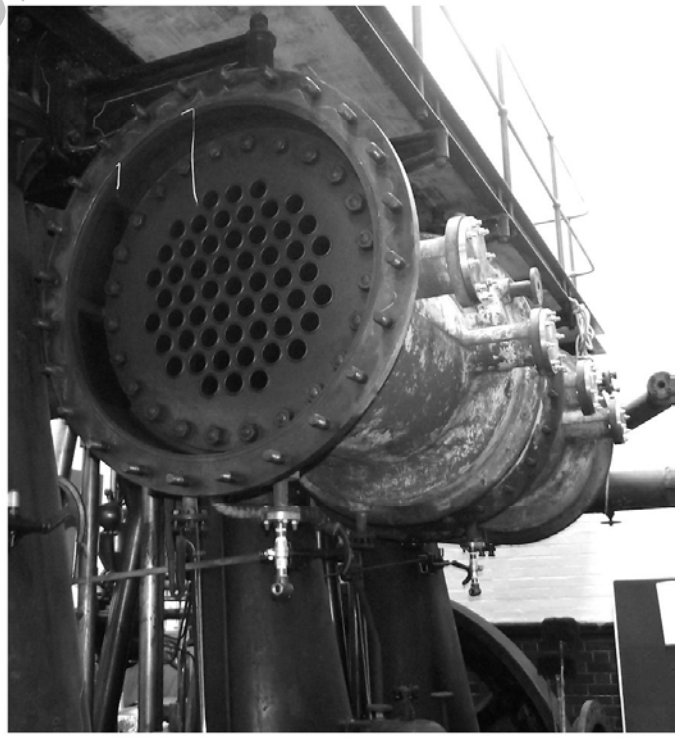


Figure 62. Reheaters on Hathorn Davey engine, blanked off for hydraulic test, May 2015

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