Robert Stephenson : a profile

Robert Stephenson (1803-59) was recognised by contemporaries as a leading engineer of his generation. The only child of George Stephenson (1781-1848) the railway pioneer and industrialist, he was born at Willington Quay Northumberland on 16 October 1803. Revealing a mechanical aptitude at an early age, Robert was educated first at Longbenton and then Bruce's Academy in Newcastle upon Tyne 1815-19. After leaving school he assisted his father and uncle Robert Stephenson (1788-1837) with the survey and construction of the Hetton Railway which ran from Hetton colliery to the staithes at Sunderland. From April 1821 he was employed by his father to help survey the Stockton & Darlington Railway. For six months from October 1822 Robert had a break from railway engineering and became a student at Edinburgh University. Then together with his father, Michael Longridge (1785-1858) Edward Pease (1767-1858) and Thomas Richardson (1771-1853), Robert co-founded 'the business of Engine Builders, Mill Wrights, etc at Newcastle upon Tyne'[1] on 23 June 1823. As managing partner, the nineteen year old described Robert Stephenson & Company as being founded 'for me'[2]. The intention was to produce locomotives.

For the three years from July 1824 Robert was a mining engineer in Colombia, South America. He returned via Carthegena and New York. From there he spent a short time travelling inland to Montréal and back, finally sailing to Liverpool. After spending Christmas 1827 in London, Robert had 'an interview with the Directors of the Colombia Mining Association, who received him with gratifying expression of respect… he was quickly immersed in business… entering into contracts for Robert Stephenson & Co.'[3]

During his absence in Colombia, the Robert Stephenson & Company partners founded George Stephenson & Son on 31 December 1824, with Robert being named as joint chief engineer together with his father; the purpose of this firm being to provide an integrated service for prospective railway companies from surveying to completion.[1] On 1 January 1828, Robert Stephenson wrote to Michael Longridge of his locomotive design intention to 'reduce the size and ugliness'…& 'applying the engine [cylinder] on either side of the boiler or beneath it entirely'.[3] Robert also stated how he had just returned from a ride along a seven miles stretch of the Liverpool & Manchester Railway. He then assisted his father with the completion of this public passenger line.

On Wednesday 17 June 1829 Robert Stephenson married Frances Sanderson at St. Botolph, Bishopsgate, London: their home became 5 Greenfield Place, Newcastle upon Tyne. He spent the summer of 1829 in Newcastle designing and directing the construction of *Rocket*, winner of the locomotive trials held at Rainhill, Lancashire during October 1829. He wrote: 'I think it personally needless to go into the absurd and ridiculous stories some writers have hatched up about my father's conduct with the Rocket at Liverpool - I had charge personally of the Engine myself… and whatever was done to the Engine was done under my own eye and direction.'[4]

The outside cylinder locomotive *Rocket* was a prototype, Robert Stephenson's formula did not break down upon the introduction of new ideas. Deriving inspiration from discussions with Richard Trevithick (1771-1833) whilst in Carthegena, August 1827, Robert constructed the inside cylinder locomotive *Planet* in 1830. On 7 October 1833 Robert Stephenson took out Patent No.6468 and built the six wheeled locomotive *Patentee* to his design. [5]

Then Robert Stephenson moved to London and became renowned as a civil engineer with the construction of many national railway networks in Great Britain and abroad, his reputation being made with the London & Birmingham Railway 1833-8 which included many innovative bridges such as the tied-arch at Long Buckby. In 1838, the London & Birmingham Railway's historian Thomas Roscoe wrote 'Assuredly the name of Robert Stephenson, will in after years, be recorded as one of the greatest men of the age.'[6] During the time of his wife's terminal illness, Robert devoted this period to locomotive design resulting in the 'Long Boiler' Patent No. 8998, 23 June 1841.[7] His intention was to increase the locomotive's power and efficiency. Frances died on 4 October 1842. In March 1848 Robert stated that 'The London & Birmingham was the first great work which I had executed; afterwards the continuous lines of railways up to Berwick, including the North Midland; the Birmingham to Derby; the York & North Midland; the Newcastle & Darlington and the Berwick & Newcastle'.[8]

Monuments to Robert Stephenson's skill remain along the East Coast mainline and include the High Level Bridge 1849 over the river Tyne, the first combined road and railway structure in the world. Spanning the Menai Straits and completed in 1850, the Britannia Bridge was of an unprecedented scale and another magnificent achievement. Robert continued to design wrought-iron box girders, such as the Victoria Bridge 1853 over the St Lawrence River in Canada, then the longest bridge in the world.[9]

Robert Stephenson was President of the Institution of Civil Engineers from 1855-57. He died at his home 34 Gloucester Square, London on 12 October 1859 and is buried in the nave of Westminster Abbey.

Notes & References

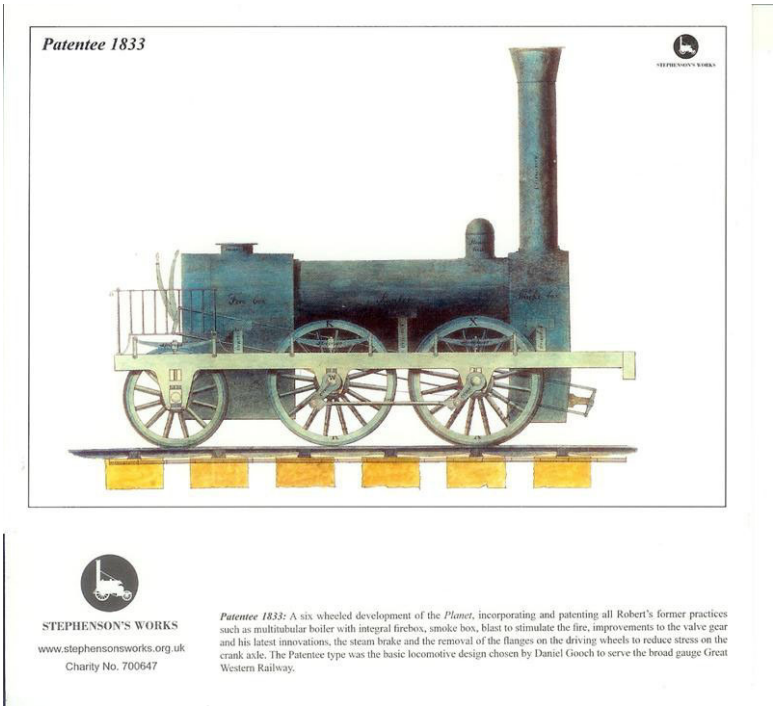
1 Warren, J.G.H., *A Century of Robert Stephenson & Company 1823-1923*, 1923, pp. 52-68.

2 Smiles, Samuel, *Lives of the Engineers*, Vol. 3, 1862, p.249.
Letter from Robert Stephenson to R.S.Illingworth 24 March 1824 … 'in laying the foundations of an establishment for me'… that is Robert Stephenson & Co.

3 Jeaffreson, J.C., *The Life of Robert Stephenson,* Vol. 1, 1864, pp.114-5.

4 Notes in Robert Stephenson's hand and sent to Samuel Smiles, pp.10-12. Document held in Devon County Record Office, ref. 1119M/E 11-19.
Refer also: Haworth, Victoria, *Robert Stephenson : Engineer & Scientist, The Making of a Prodigy,* 2004, pp. 46-51, 69.
Sent from 24 Great George Street, Westminster
"Dear Smiles, I have made a few more notes for you on the blast pipes and I will send them tomorrow if you cannot ……."

5 Warren, J.G.H., *A Century of Robert Stephenson & Company 1823-1923,* 1923, pp.79, 261-2, 310-325.
The *Patentee* was a six-wheeled development of the *Planet* incorporating and patenting all Robert's former practices such as multitubular boiler with integral firebox, smokebox, blast to stimulate the fire, improvements to the valve gear and his latest innovations, the steam brake and the removal of the flanges on the driving wheels to reduce stress on the crank axle. The Patentee type was the basic locomotive design chosen by Daniel Gooch to serve the broad gauge Great Western Railway.



6 Roscoe, Thomas, *The London and Birmingham Railway,* 1838, p. 69.

7 Warren, J.G.H., *A Century of Robert Stephenson & Company 1823-1923,* 1923, pp.95, 346-357.

8 *Inquiry into the Application of Iron to Railway Structures,* 16 March 1848. Published 1849.

Cross-examining counsel to Robert Stephenson: 'In all those cases did you act as Chief Engineer, or in some of these cases did you act as assistant engineer?'

Reply by Robert Stephenson: 'Always as Engineer-in-Chief'.

9 For further information about the High Level Bridge, the Britannia Bridge and Victoria Bridge refer: Addyman, J. & Haworth, V. , *Robert Stephenson : Railway Engineer,* 2005, pp. 89-97, 102-117, 129-135.