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## The Need For Speed

In the late 1820s there were just four options when it came to motive power for railways:

- Horses
- Self-acting inclines where gravity did the work
- Rope haulage by stationary engines
- Locomotives

Often a combination of more than one of these options was used.

By 1821, despite there being some 200 miles of tramways and railways in use in Britain, horses remained as the most common choice for motive power.

Until as late as 1825 probably only 18 locomotives were gainfully employed, and those were typically slow and used for hauling coal. The Stockton and Darlington Railway relied upon locomotives to work the level and more easily graded sections of its links, with stationary engines to operate the more steeply-inclined parts, but the locomotives proved so troublesome they considered abandoning them and changing to stationary engines throughout.

Whilst the construction for the L & M line began almost immediately after the Bill was obtained, it was some two years before the Railway obtained its first locomotive. This was largely due to the Board's division of opinion regarding what type of motive power to employ.

Whilst the Act passed suggested a move towards locomotive power in its prohibition of the emission of smoke, the *raison d'être* of the Railway was to provide speedy transport – this clearly ruled out horses but was also some thing which the locomotives of the day remained unable to deliver.

The argument for stationary engines seemed strong – they had proven advantages on steeper inclines and had already been employed on the rise from Liverpool terminus to Edge Hill. They were also highly developed as they had been used more widely than locomotives, and they were deemed to be more reliable – that in itself a major concern in running a successful railway

On the downside, stationary engines simply could not move trains as fast as the locomotive as on longer journeys power had to change en route to a number of haulage engines. Engine failure meant more or less shutting down a part of the railway that could take weeks to restore.

Recognising the need for speed, the Board set about conducting research to fuel their decision on what form of motive power would give the railways the speed and reliability needed. On 29<sup>th</sup> September 1828 two of its members, Cropper and Booth, were appointed to visit Darlington and compare uses of action horses, locomotives

and fixed engines – their resulting report to George Stephenson favoured fixed engines.

Next, in 1829 James Walker and John Rastrick were sent to Darlington to make a straight comparison between locomotive and fixed engines – but finding little distinction in the Board's main area of interest, speed, they were no closer to their decision. The most important decision reached from the findings was that it was the locomotive that was capable of greater development.

Locomotives of the period remained crude in design – 'Rattling, wheezing and leaking steam in every pore', in the words of Dendy Marshall. There were also quite justified safety concerns with boiler explosions being commonplace before and after the Rainhill Trials. Walker and Rastrick's report even recommended using return-flue boilers with the firehole remote from the train to enhance safety.

In fact it was fortunate for the L & MR R that the tragic accident to Huskisson occurred at the opening of the line and not at the Rainhill Trials. Had this not been the case, it would have terminated the trials and could have set back the cause of the locomotive considerably.

In conclusion in their report, Walker and Rastrick recommended use of fixed engines in the short term, then a combination of locomotives alongside stationary engines on the steep Whiston and Sutton inclines in the long term. They sowed the seed of the Rainhill Trials by suggesting that should locomotives be adopted, a prize should be offered for the best.

The need for speed was become more urgent and the Directors agreed to offer a £500 prize for the locomotive "which shall be a decided improvement on those now in use, as respects the consumption of smoke, increased speed, adequate power and more weight."

The contest, later to be known as the Rainhill trials, was advertised in the Liverpool Mercury of 1<sup>st</sup> May 1829.

**The advertisement read:** To Engineer and Iron Founders. The Directors of the Liverpool and Manchester Railway hereby offer a premium of £500 over and above the cost price) for a Locomotive Engine which shall be an improvement on any hitherto constructed, subject to certain Stipulations and Conditions a copy of which may be had at the Railway Office, or will be forwarded, as may be directed, on application for the same, if by letter, post paid. Henry Booth, Treasurer, Railway Office, Liverpool. April 25th 1829.

The would-be entrants were numerous and had some challenges ahead – only five months to devise and build a new engine solution, but also to get it to Liverpool when it was complete.

Have you watched? Check out the expert's point of view on the need for speed in the virtual museum.