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“LSWR Adams 415 class locomotive”

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The 415 class of 4-4-2 tank locomotives was introduced by the London & South Western Railway in 1882, mainly for suburban passenger work on the lines radiating from Waterloo. Designed by William Adams, the class was built over a period of three years and eventually numbered seventy-one engines. At that time, the LSWR's workshops were at Nine Elms in London, the move to Eastleigh being many years in the future. Nine Elms was at full capacity building express 4-4-0 types, so the 415 class was let to external contractors. Robert Stephenson built twenty-eight in two batches, Dübs built twenty in two batches, Beyer Peacock built one batch of twelve, and Neilson built one batch even. There were significant detail differences between each of the six batches, to trap the unwary modeller! They were known as 'radial tanks' on account of the trailing axle, the axleboxes for which moved radially in curved guides to follow the track curvature – an arrangement perhaps unusual for the LSWR, but widely used by other railways.

Withdrawal of the class began with the electrification of the suburban routes from 1913 onwards.



By the time of the grouping in 1923, only twelve engines remained and these too were all withdrawn by 1928, save for two which were retained to work the Lyme Regis branch, no other class being deemed suitable. These two were given new main frames of a different shape, and carried twin slidebars in lieu of the original

single bar. One further engine, which had been sold to the Ministry of Munitions in 1917, and subsequently acquired by the East Kent Railway, was re-purchased by the Southern Railway in 1946. Thus, three engines entered BR service in 1948 and continued working the Lyme Regis branch until 1961, the former EKR example being preserved at the Bluebell Railway.

My 5” gauge model represents a 415 class engine as originally built, being basically to the design by Kelvin Moonie, and carries the Adams pea green livery with stovepipe chimney. It was acquired by me in 2017, basically in running order but in much need of attention. Over a period of two years, it was

dismantled and re-built from the frames upwards, with re-painting as required. Many mechanical parts and fittings, and much pipework were replaced. One driving axle was found to be cracked longitudinally, and this had caused excessive wear to an axlebox, probably due to the crack acting as an oil scraper. All four driving axleboxes were bored out to a larger diameter, which necessitated new axles. All wheels were re-profiled and the driving wheels were keyed onto the new axles, while the incorrect balance weights were replaced by new ones. Much of the motion, including piston and valve rods, slide bars, eccentrics, crankpins, weighshaft and lifting links were re-made, and the rods were re-bushed.



Modifications were made to the regulator, axle pump, clacks and blowdown valve to improve their operation, and a new no. 4 injector was fitted. The water gauge bottom nut had an upward sleeve added to mask the lower end of the glass, due to the boiler bush being too low to ensure water coverage over the firebox crown. The lubricator was redesigned and re-built with a ratchet replacing the roller clutch, which had worn the drive shaft to the point where it no longer gripped. A problem with steam blowing back into the lubricator tank was cured by fitting check valves of an improved design. New soft-pop safety valves, spark arrestor, water valve, bypass valve, water strainers, stainless steel grate and ashpan, all to my own design were fitted. The springing was adjusted to place most of the weight on the driving wheels for adhesion, whilst keeping just enough weight on the bogie and trailing truck

to prevent derailment. The smokebox door was re-profiled to the correct Adams profile and made an airtight fit.

The valve gear was modelled using CAD. This led to a partial re-design, including altering the eccentric advance angle from 30° to 27.5° to reduce the excessive lead towards mid-gear, which is endemic with Stephenson's valve gear. This has resulted in a much smoother-running engine which will happily run with the reverser one notch off of mid-gear. The eccentrics were set with the driving wheelset mounted in the lathe, and an article on how this was done will hopefully appear in the FMES technical library.

Much research has been undertaken, and many have been added for historical authenticity, there is still scope for more. The original Adams cowling was added to the safety valves, and a full LSWR female lamp brackets was fitted at each carry the disc and diamond route indicators in use time. The buffer heads were drilled through for a concealed fixing, as per the original Adams Planked wooden tops were made for the side and dummy sanding gear, vacuum hoses and details added. Is a model ever really finished?

The model has now run for over 300 miles in my ownership, being a regular performer at the City of Oxford club's track at Cutteslowe Park, and it has also visited five other tracks. I initially declined the AALS award at the 2025 Federation rally on the grounds that the engine wasn't 100% my own work, but I suppose that also applies to many of the engines on today's tracks. Eventually, I was persuaded that it was the overall quality of the model that counted, so the judges' decision was final!



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