AUSTERITY 0-6-0T LOCOMOTIVE
No. 27 NORMAN

The Austerity 0-6-0ST type came about during World War II (WW2) when it was realised a heavy duty shunting loco was required for UK and, ultimately, mainland European service. The design was so successful that many hundreds were built for military and industrial service. The design was based on an amalgam of previous Hunslet Engine Company designs simplified for war time conditions.

This saddle tank was built by Robert Stephenson & Hawthorn Ltd at the Locomotive Works (of the former R. & W. Hawthorn, Leslie and Company Limited) at Newcastle upon Tyne in 1943. It was given works number 7086/43 and was delivered to 154 Railway Operating Company at Long Marston on 24th April 1943 painted in khaki livery, in readiness for the D-Day landings. It gained the War Department number WD5050.

In August 1944 it was moved to the Longmoor Military Railway and renumbered 75050. In December of that year it was shipped to France and travelled to the Société Nationale des Chemins de fer Belges (SNCB) depot at Antwerp Dam. It was utilised for local services over the next six months before being transferred to 155 Railway Workshops Company in May 1945 for wheel turning. It returned to Antwerp, but this time the 'south' sheds.

On 19th February 1946 it was returned to the UK and was bought by Doncaster Amalgamated Colliery Ltd. It remained there, or close by, for 24 years bearing the number 35 for most of the time.

On 5th July 1956 the Government passed the Clean Air Act. In a bid to meet stringent restrictions on smoke emissions, Civil Engineer Livio Dante Porta, who had made a lengthy study into improving steam locomotive efficiency, was commissioned by the Hunslet company to design certain modifications. Hunslet had become aware of Porta's technology when bidding (unsuccessfully) for the contract to build the second batch of 75cm gauge 2-10-2 locomotives for RFIRT in Argentina.

It is possible that converted locos may not have been quite as Porta would have wished and, possibly, something could have been lost 'in the translation' between Argentinian and English. However, despite some shortcomings, they did serve an important purpose in the general development of steam. They were the very first application of Porta's work outside of his native Argentina. Some later locos were built with modifications whilst other locomotives, such as Austerity number 35, were returned for modification or even modified at National Coal Board works using a supply of conversion kits.

As part of these conversions, in the early 1960's, number 35 was fitted with a Gas Producer Combustion System (GPCS) firebox with a Kylpor exhaust. Also installed was an underfeed stoker for use with very fine coal. The GPCS allowed the quantity of "primary" air passing through the grate to be significantly reduced thereby reducing the upward air velocity through the fire bed that caused lifting of unburned coal particles off the fire surface and discharged them through the chimney. The reduction in unburned fuel loss that could be achieved – and consequent increase in thermal efficiency – was significant especially at high steaming rates that approached the fire grate's limit.

Greater quantities of "secondary" air had to be fed into the firebox above the fire bed to

burn off the carbon monoxide produced. A significant proportion of this was fed in through the fire hole door (which had to be left open), but additional quantities were usually required to be fed in through air inlet tubes penetrating the sides and crown of the firebox.

A Kylpor ejector was a type of steam locomotive exhaust system developed by Porta. In a steam locomotive, draught is produced in the firebox by exhausting the steam coming from the cylinders out the chimney thus creating a vacuum effect through the boiler's tubes. The Kylpor exhaust delivered improved draughting capacity over traditional exhaust systems and was a later development of the Kylchap exhaust.

On 6th September 1962 the first locomotive, Hunslet No.2876, was sent to Waterloo Main Colliery in Leeds having been outshopped a short time before. Testing was undertaken to assess performance and allow 'tuning up'. Some of this work was undertaken with Porta in attendance and, by March 1963, No.2876 had acquired the painted-on name '*Jess*'. Porta is known to have been a good friend of Hunslet's Keith and John Alcock, joint Managing Directors at that time.

Another Austerity loco (No. 3883) was sent to BR Swindon in late January 1963 where, from 9th to 16th February, it was utilised as Swindon shed pilot loco. This period allowed experiments to be undertaken with various coal sizes and, on 17th February, the loco was formally handed over to the BR Research Department in Swindon for controlled road tests. Testing was undertaken over the 18 mile stretch of mainline between Yarnton and Kingham on the Oxford - Worcester main line. Most testing is thought to have been undertaken during April although the loco was noted on test as late as June 1963. The normal test load was Swindon's dynamometer car DW150192, thirty eight 4 wheel vans and one brake van at each end of the take. As the locomotive was not fitted with continuous brakes all testing was undertaken loose coupled so an experienced goods guard was essential.

For the next six years number 35 saw little use, being kept as a spare engine despite the conversion work, until it was moved to Askern Main Colliery (also near Doncaster) in 1970. It was repainted in dark green livery in the mid Seventies and, eventually, sold to the Titanic Steamship Company in 1976, who sold it on to the Kent & East Sussex Railway (KESR) in 1979. It was renumbered KESR 27 and put on static display, firstly in red and latterly in Royal Blue, but the KESR's other commitments meant that it was put at the back of the overhaul queue.

In 1995 a future Southern Locomotive Limited shareholder, Norman Taylor, purchased the loco and it was transferred to the Midland Railway Centre at Butterley. The hoped-for help was not forthcoming and Norman exchanged the loco for SLL shares in 1998. At the same time he put up to 50% of the funds required to purchase West Country class Pacific No. 34010 *Sidmouth*. The Austerity was subsequently transferred to Sellindge where it was thought that the minimal facilities available there would still be sufficient to overhaul the locomotive.

The splendid external condition of the boiler gave a false impression of the loco's overall state. On dismantling it was discovered that just about every conceivable part was broken, bent or life expired and that it had obviously been derailed at some point. The cylinder block was the major concern and should have been replaced. Funds were unavailable to do so and, in the circumstances, it was expertly repaired and made ready for use. The

fitment of vacuum braking and steam heating equipment were added to ensure satisfactory operation on heritage railways.

The frames were re-wheeled in November 2006 and the boiler made ready for re-instatement having had a new tube-plate fitted. New tubes were fitted during the Winter of 2006/7 and a new smokebox was rolled and installed. The small team at Sellindge persisted with this locomotive despite it proving to be an extremely difficult restoration. During restoration all 'conversion' works and equipment were removed so that it could be fitted with a conventional exhaust. The loco moved to Herston Works at Swanage in June 2009 for some attention and then, on 7th October 2010, *Norman* moved to the Embsay & Bolton Abbey Steam Railway where its restoration was completed.

It entered passenger service on 13th February 2011 and was been a mainstay of services on that line for many years. In May 2015 it was photographed at Embsay in an NCB lined Black livery, given the number 69 and marked "No. 2 Area Durham". Although, by July 2016, the loco had gained unlined Black NCB livery and was re-numbered to 35.

The loco's boiler insurance 'ticket' expired in January 2018 and, in June, *Norman* was moved to Bryn Engineering in Wigan for a complete overhaul. However, work on the loco was heavily delayed by Covid-19 with the target date to re-enter service being deferred until 2022. Norman may be the smallest in the SLL fleet but has caused a disproportionate amount of problems during it's restorations.

SLL's March 2022 news update mentioned that, because the Austerity tank's overhaul had not progressed, they had terminated the agreement with Bryn Engineering. After a long hiatus, some progress with Norman's overhaul occurred at the end of January 2023. The frames, boiler and all fittings were moved to the East Lancs Railway with plans being made for the overhaul to be completed there.

However, there continues to be an ongoing problem with finding contractors able to undertake various specialist tasks. Those involved with steam loco restoration all seemed to have full order books. When *Norman* was transferred to the East Lancs Railway, SLL were hoping that the restoration could be completed there. However the workshops are still really busy with their own running fleet and no firm schedule could be promised.

Therefore, SLL decided to do the job themselves. The bulk of the work has already been completed and a huge amount of money spent, so SLL doesn't believe *Sidmouth* and *Sir Frederick Pile's* restoration will be seriously compromised. Also, *Norman's* steaming earnings will help considerably with the restorations of various Bulleids. One shareholder has been responsible for nearly all the funding on *Norman*, so SLL decided that it must ensure that the loco is finished as soon as possible especially as it believes they will have no problem hiring it out.

The SLL's September 2023 news update reported that *Norman's* boiler had arrived at Sellindge. First, it was positioned upright to offer good access to replace all the crown stays. Secondly, the copper firebox needs attention on the radius where the tube plate interfaces with the crown sheet. There is extensive cracking along the complete length of the radius, a common fault with Austerities fitted with copper fireboxes. This is due to constant retubing over the years resulting in the radius being pushed upwards hence the cracks.

These locomotives were built purely for WW2 duties anticipating only 5 years' service before withdrawal. *Norman* celebrated it's 80th birthday in 2023! The inner firebox needs

a specialist repair with copper welding. The boiler will also need to be inverted, on a specially constructed frame, to fit new 'skirts' all around the base of the firebox, incorporating a significant number of copper stays. The foundation ring can then be repaired and refitted - a hard riveting job. It is now unlikely to find anyone with space to undertake the balance of the locomotive overhaul so *Norman* will probably have to move to Herston Works for reassembly.

General History of Austerity 0-6-0 Saddle Tanks

They were introduced by the Ministry of Supply in 1943 to a basic design by its Director of Transportation Equipment - R.A. Riddles. During the following three years, 377 of these locomotives were built by a number of independent locomotive manufacturers. These were The Hunslet Engine Co. (120); Andrew Barclay (15); Robert Stephenson (90); Vulcan Foundry (50); Hudswell Clarke (50); and W. G. Bagnell (52).

After the war, 75 of these locomotives were purchased by the LNER in 1946, listed as Class J94 and numbered 68006 – 68080. Two have survived into preservation:- 68077 and 68078. Some of the remaining locomotives were purchased by collieries and steel works for shunting private sidings and continued working well into the 1970s long after steam had ceased on British Railways.

Norman was built at Robert Stephenson, as mentioned earlier, and was never owned by BR so should not be called a J94.

ORIGINAL TECHNICAL DETAILS			
Wheel Arrangement	0-6-0ST	Cylinders (2)	18 ins x 26 ins
Driving Wheel dia.	4 ft 3 ins	Boiler Pressure	170 psi
Tractive Effort	23, 870 lbs ft	Weight	48 tons 5 cwt
Coal Capacity	2 tons 5 cwt	Water Capacity	1,200 Gallons
Power Classification	4F		

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