

NON-STANDARD DIESEL SHUNTERS OF BRITISH RAILWAYS

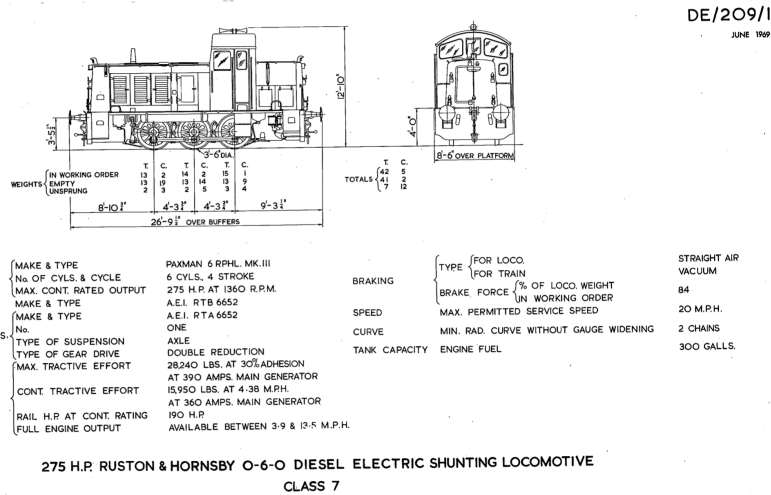
PART III

[Yorkshire Engine Co. - Ruston & Hornsby - Brush Traction]



Looking like a powerful diesel shunter, these were produced by Ruston & Hornsby in 1960, and intended for use as the principal shunter for use at Southampton Docks. Later classified as '07' under the British Rail 'TOPS' scheme, they were less than successful, but certainly looked the part. © Rodger P. Bradley Collection

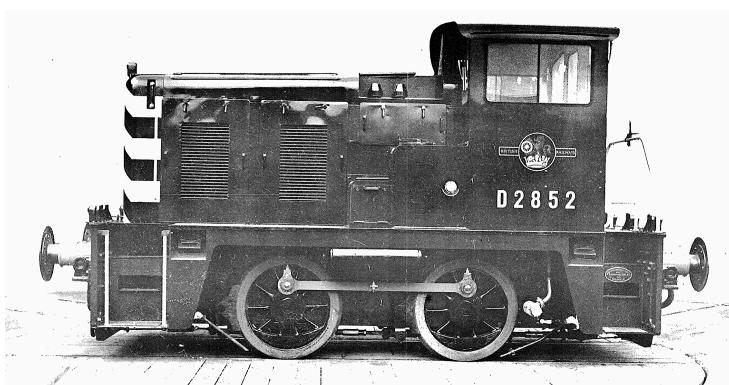
Rodger Bradley



The final selection of builders provided the least number of diesel shunters to BR in the 1950s and early 1960s, but a number of these have survived - including examples of the Rolls Royce powered shunters from Yorkshire Engine Co. Brush Traction on the other hand supplied only one diesel-electric prototype, which has long since disappeared, whilst many of the departmental varieties, included samples from John Fowler, Hibberd and even an aeroplane manufacturer from Bristol. Some of these were curious shunting types indeed for a nationalised railway, but were nonetheless an essential part of the organisation, whether on standard or narrow gauge tracks.

Yorkshire Engine Co., in addition to North British was the only company to supply British Railways with diesel-hydraulic shunters. By comparison with existing designs they were a curious looking machines and unlike even the North British locomotives, were not fitted with the almost universal jackshaft and flycrank drive to the coupled wheels.

Twenty locomotives of 0-4-0 wheel arrangement were delivered to the London Midland Region in 1960/61, numbered between D2850 and D2869, they were powered by a 179bhp Rolls Royce C6NFL engine. This in turn was connected to a Rolls Royce twin disc transmission, directly connected to the rear coupled axle's reduction gearbox through a Layrub shaft. In order to accommodate this direct drive, the engine and transmission were mounted in the frame at a slight angle. The engine casing tapered slightly from the cab spectacle plate forwards to the radiator/nose end.



Although the cab itself was the full width of the footplate, it was quite short, with access from a rear door, instead of the more conventional side doors. A platform and steps were provided behind the cab.

Throughout their working life, D2850-69 were allocated almost entirely to depots in Lancashire - at Bank Hall, Fleetwood and Newton Heath. In 1968 they were reclassified as O2 and the four that remained in service in 1972/3, they were renumbered as O2001-O2003 (D2851-3) and O2004 (D2856). With a wheelbase of no more than 6ft 0ins, they were still not the smallest 0-4-0s in service, that particular honour befell the Hunslet locomotives (D2950-2) and Barclay shunters (D2953-6), each of which had a wheelbase of a mere 5ft 6ins. On the Yorkshire Engine 0-4-0s, the wheels were 3ft 6ins in diameter, with a maximum tractive effort of 15,000lbs available for an all up weight of 28 tons.

Leading Dimensions

Builders	Yorkshire Engine Co
No. Series	D2850-2869
Wheel arrangement	0-4-0
Length over buffers	21ft 11 1/2 ins
Overall width	8ft 6ins
Overall height	11ft 5 1/4 ins
Wheelbase	6ft 0ins
Wheel diameter	3ft 6ins
Weight (w.o.)	28 tons
Max tractive effort	15,000 lbs
Braking equipment	Air for locomotive, vacuum for train
Diesel engine	Rolls Royce C6NFL, 170 bhp at 1,800 rpm
Transmission	Hydraulic with Rolls Royce 3-stage torque converter, series 10,000
Final drive	Yorkshire Engine Co. axle hung, double reduction final drive with reversing mechanism.



Ruston & Hornsby and its predecessors have a key place in the development of diesel traction, with the East Anglian company boasting one Richard Akroyd - a contemporary of Rudolf Diesel amongst its number. However, Ruston & Hornsby's contributions to British Rail never fully extended beyond the shunting and service locomotive stock. PWM650 is seen here sporting the earliest BR livery style - used on running department stock too. This example was the first to appear in 1953 and, in common with the Brush design, an electric motor provided the drive to the wheels. (c) *Lens of Sutton*



One of the two Ruston & Hornsby 165hp 0-4-0 diesel shunters built for BR in 1956 - No.D2958 (ex-No.11508) in BR green livery at Stratford MPD in July 1967.

Photo: Hugh Llewelyn - D2958 Uploaded by *Oxyman*, CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=24383181>

Ruston & Hornsby

Down in agricultural country, Ruston & Hornsby, throughout BR's dieselisation phase in the 1950s had supplied only two locomotives for normal shunting duties - although a number had been built for service stock with an 0-4-0 wheel arrangement. At 28 tons they were the same weight as the Yorkshire Engine Co.'s diesel-hydraulic design, but carried on 3ft 4ins coupled wheels, they provided a tractive effort of 14,350lbs. Power was provided by a Ruston six-cylinder 6VPHL engine of 165 bhp, driving the coupled wheels through a jackshaft, SLM clutch and Ruston gearbox. What might be considered a conventional, low profile engine casing, with removable panels, was fitted, together with a full width cab at the trailing end. Both of these locomotives were allocated to, and spent their working lives at Stratford on the Eastern Region. Considering that Ruston & Hornsby evolved from the pioneering days of non-steam traction in the 19th century, it is perhaps curious that their development of oil-engines for main line rail service was never fully exploited.

In 1962, no less than 14 locomotives with an 0-6-0 wheel arrangement were delivered by Rustons for use in Southampton docks, based at Eastleigh. In this design though an electric transmission was used, with power supplied from a Paxman 6RPHL engine. The single AEI RTA6652 traction motor was mounted on a spigot from a double reduction gearbox, suspended from the trailing coupled axle.

These were the most powerful diesel shunters in service on BR and could develop a maximum tractive effort of 28,240 lbs, although keeping broadly the same arrangement as the other types, they had a more distinctive appearance.

The cab provided much greater visibility, certainly by comparison with the earlier Ruston & Hornsby designs, with a high arc roof, much more commodious accommodation was provided. The engine casing had sides that tapered inwards slightly from bottom to top, whereas the majority of previous designs had vertical sides.

Leading Dimensions

Builders	Ruston & Hornsby
No. Series	D2957-2958 (0-4-0) (originally 11507-8) D2985-2998 (0-6-0)
Wheel arrangement	0-4-0 D2957-2958 0-6-0 D2985-2998
Length over buffers	26ft 9 1/2 ins (0-6-0)
Overall width	8ft 6ins (0-6-0)
Overall height	12ft 10ins (0-6-0)
Wheelbase	8ft 7 1/2 ins (0-6-0)
Wheel diameter	0-4-0: 3ft 4ins 0-6-0: 3ft 6ins
Weight (w.o.)	28 tons (0-4-0) 42 tons 5 cwt (0-6-0)
Max tractive effort	14,350 lbs (04-0) 28,240 lbs (0-6-0)
Braking equipment	Air for locomotive, vacuum for train
Diesel engine	0-4-0s: Ruston type 6VPHL, 165 bhp at 1,250 rpm 0-6-0s: Paxman 6-cyl RPHL, 275 bhp
Transmission	0-4-0s: Mechanical with Ruston constant mesh gearbox, with SLM friction clutches. 0-6-0s: Thee AEI type RTA 6652 traction motors.
Final drive	0-4-0s: Reverse gear and final drive unit through bevel gears, dig clutches and final drive. 0-6-0s: Traction motors spigot mounted on double reduction final drive gearbox.

Another Ruston 0-6-0 shunter - D2998 - the last of the 1962 order for 14 locomotives for Southampton docks, powered by a Paxman engine and a single traction motor. Along with the later Hudswell-Clarke locomotives, this design gave probably the best all round visibility for the crew. Although they were apparently not very reliable as shunters around Southampton Docks.

(c) Lens of Sutton



Under the 1968 classification scheme these locomotives became Class 07. In 1972 and 1973 they were renumbered as 07001-14, having previously carried numbers D2985 - D2998. Later still, a number of the class were fitted with air-brake equipment.

Brush Traction's association with BR has been based largely on the design of main line types and the provision of electrical power equipment. The highly successful and numerous Class 47 being the most obvious example. In 1960 a solitary 0-4-0 diesel shunter entered service as No. D2999. The mechanical parts of this had been constructed for Brush by Beyer-Peacock of Manchester, fitted with a six-cylinder 180 bhp Petter-MacLaren type LE6 engine, running at 1800 rpm. As with the Ruston locomotives a single traction motor provided the drive to the wheels through reduction gearing. With a wheelbase of 6ft 0ins, wheel diameter of 3ft 6ins and an all up weight of 30 tons, a maximum tractive effort of 19,200lbs was available.

Externally the appearance of D2999 was similar to the general layout of other small diesel shunters, with a cab at one end and a simple casing over the power unit, fitted into the main frames. In this case, the wheels were actually inside the frames, with coupling rods and cranks outside, with overhung leaf springs providing the suspension. Like all diesel shunters, steam technology formed the basis of the design of the mechanical parts, especially the full-length frames, in mild steel plate. The Brush design bore an uncanny resemblance below the running plate, to an outside-framed steam engine. Access to the cab was through a door in the rear, from a narrow platform, in exactly the same way as the Yorkshire Engine Co.'s design. In British Railways service this locomotive was based at Stratford, before being sold by BR for industrial use in the late 1960s - wonder what happened to it then?



The unique Brush Traction D2999, a rugged looking machine, capitalising on Brush experience in the diesel-electric traction field. With its late entry into the field - the number of yards for which this type of shunter was suited were already disappearing by 1960 - this was perhaps always destined to be a one off. The mechanical parts were built by Beyer-Peacock, whilst Petter-MacLaren engines were not common in railway use. The style and general details were more commonly seen on industrial lines at home and abroad.

(c) Lens of Sutton

Service Locomotives

Of the 24 service locomotives in operation on British Railways a quarter a century ago and more, 22 had been constructed especially for departmental use. A number of others were transferred from capital stock and two were of narrow gauge design. The majority of the standard gauge shunters came from Ruston & Hornsby (9) and Andrew Barclay (8), with the former supplying the narrow gauge types for use at Horwich Works and Beeston.

Most numerous of the Ruston designs were the 0-6-0 diesel-electrics, the first of which appeared in 1953, to carry the number PWM650. Power was supplied by a six-cylinder Ruston & Hornsby engine, developing 165 bhp and driving the 3ft 2ins coupled wheels through a single axle hung traction motor. The weight in working order was 30 tons, with a maximum tractive effort of 17,000 lbs. A further four locomotives to this design were delivered in 1959, numbered PWM651- 654, all of which were allocated to various sites and depots on the Western region. Two 0-4-0 diesel-mechanical locomotives were built by Rustons in 1956 and 1957 - one going to Reading Signal Works and the other, the first to arrive, was despatched for use by the Civil Engineer's Department at Hull. Both of these shunters were fitted with an 88 bhp 4-cylinder Ruston Mk.4V engine, with a chain drive to the 3ft 0ins diameter wheels, exerting a maximum tractive effort of 9,500 lbs. The Eastern Region locomotive was given the number 56 and the Western carried number 20 and was still at work in and around Reading Signal Works in the early 1980s.

The two narrow gauge shunters introduced in 1958, included No. ED10 for the Beeston 3ft 0ins gauge lines, with a Ruston 4YCL engine and 2ft 6ins wheels, this example weighed in at a mere 8tons 4cwt. The second, carrying number ZM32, was sent to the 18ins gauge Horwich Works lines, with a 20bhp engine, 3.5 tons all up weight, provided a maximum tractive effort 1,890lbs. This latter was company for the famous Horwich Works 0-4-0 steam locomotive, surviving in BR stock as the unnumbered 'Wren'. Its new partner, ZM32, lasted only 6 years and was withdrawn in 1964.

The Andrew Barclay locomotives were basically the same diesel-mechanical shunters as the D2954-6 series described earlier, including the same engine transmission and other details. The service locomotives carried numbers 81 to 87, with 81 appearing in 1958, Nos. 82 - 85 in 1959 and the last two, Nos. 86/7 in 1961. The first of these was transferred to running stock in 1967 to replace, for a short time, the withdrawn D2956. All of the Andrew Barclay shunters were allocated to the Eastern region and put to work at various depots, from Cambridge and York engineering depots, to the Dinsdale rail welding plant.



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(c) Lens of Sutton

Two other service locomotives based on running stock designs, were the 0-6-0 diesel-mechanical shunters 91 and 92. These two were built by Swindon Works to the Class 03 (D2000) design in 1958 and allocated to Cambridge Engineer's depot. Curiously perhaps, they were the only departmental locomotives built with the 204 bhp Gardner-Wilson-Drewry engine and transmission, but in 1967 they were transferred to capital stock and became Nos. D2370 and D2371.

Although there were a number of 0-4-0s in service use from the Leeds works of John Fowler & Co., almost all of these were of LMS origin, dating from the 1930s. The only Fowler design for BR appeared in 1955 as ED7 and was assigned to Fazakerley for 10 years, until 1964. The engine was a 4-cylinder Fowler type 4C, developing 150 bhp at 1,000 rpm, driving the 3ft 3ins wheels through a manually operated, multiple dry plate clutch and 4-speed synchromesh gearbox. The Fowler design was one of the few centre cab types operating on BR - Hudswell-Clarke and Ruston & Hornsby providing the other examples.

Non-Standard Diesel Shunters on BR

Finally, another of the chain driven curiosities was employed on the Eastern Region in the shape of a 52 hp 0-4-0 supplied by Hibberd & Co. in 1950. Weighing a meagre 11 tons, this particular design was powered by a National 4-cylinder gas type engine, driving the wheels through a 3-speed gearbox. On delivery it was allocated the number 11104, but a new numbering system for departmental stock, introduced in 1952, provided this example with No. 52, which it carried until being sold in 1967. It had been allocated to the Civil Engineer's Dept. at West Hartlepool and York on the Eastern Region, but in later years was reported at work on Southern Region metals, especially in the Woking area.

By the 1980s, only a handful of the departmental shunters were at work, including, oddly, that chain driven curiosity from Ruston & Hornsby, 0-4-0 No.20, together with five diesel-electric 0-6-0s, Nos. PWM650 - PWM654. These were given new TOPS numbers as 97020 (No.20) and 97650-07654 (PWM650 - PWM654).



Nowadays, none of these shunting types exist, except on preserved lines or as museum exhibits, since as a result of major changes in the 1960s, the disappearance of many smaller yards spelled the death knell for this type of locomotive. There are 58, possibly more if anyone has any additional information, at a variety of locations around the UK. By far the largest group are the former BR Class O3 shunters, with 45 examples, many of which are operational. There are several examples from Andrew Barclay, Hunslet, Yorkshire Engine Co. and a solitary Hudswell-Clarke.

Any additional information on the current operational or preserved status of these often overlooked, but very important locomotives would be very welcome. Some of the more obscure examples have clearly long since departed, but of those that remain, many perform key tasks on these preserved lines, akin to supporting actors and actresses in film, stage and television. High time they were accorded the Oscars they deserve.

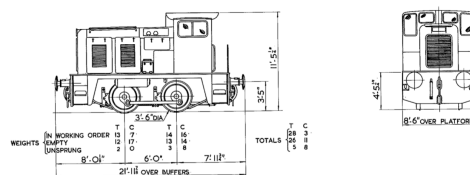
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Almost looks like a toy, this view of Yorkshire Engine Co diesel hydraulic 0-4-0 Class O2 D2868, in post 1956 BR green livery.

Photo: Gillett's Crossing from Bristol

<https://commons.wikimedia.org/w/index.php?curid=31980465>

DH/208/1
JUNE 1969



ENGINE:	{ MAKE & TYPE: No. OF CYLS. & CYCLE.	ROLLS ROYCE C.A. N.E.L. SERIES 176: 6 CYLS. 4 STROKE.	BRAKING:	{ TYPE: { FOR LOCO. FOR TRAIN.	AIR VACUUM.
TRANSMISSION:	{ MAX. CONT. RATED OUTPUT NAME & TYPE. FINAL DRIVE.	170 HP AT 1800 RPM. ROLLS ROYCE TORQUE CONVERTER. "YORKSHIRE" DOUBLE REDUCTION REVERSING GEARBOX.	SPEED:	{ BRAKE FORCE: { % OF LOCO WEIGHT IN WORKING ORDER.	75%.
PERFORMANCE:	{ MAX. TRACTIVE EFFORT: CONT. TRACTIVE EFFORT: RAL. H.P.	15,000 LB. AT 23 2/3% ADHESION. 13,700 LB. AT 14 MPH. 100 HP AVAILABLE BETWEEN 4 & 18 MPH.	CURVE:	{ MAX. PERMITTED SERVICE SPEED: MIN. RAD. CURVE. { WITHOUT GAUGE WIDENING. AT DEAD SLOW SPEED.	19.5 MPH. 60 FEET.
			TANK CAPACITY:	FUEL:	300 GALLS.

170H.P. YORKSHIRE ENGINE 0-4-0 DIESEL HYDRAULIC SHUNTING LOCOMOTIVE.
CLASS O2

Non-Standard Diesel Shunters on BR