

Modern

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The ALL TIME
Locomotive Class and
Sub-Class Directory



No. 226

**Class 23 – 'Baby Deltic' &
Class 28 – 'Co-Bo' Fleets**

The UK's Number One Modern Traction Partwork

Modern LOCOMOTIVES ILLUSTRATED

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Above: Painted in the unique livery, only applied to the 'Baby Deltic' fleet when first introduced, No. D5901 hurries south through Oakleigh Park on 21 August 1961 with a London King's Cross bound service. www.colour-rail.com

Cover: A very proud moment for the design and production staff at Metropolitan Vickers Bowsfield Works in Stockton-on-Tees, when the pioneer of the Co-Bo fleet No. D5700 was lined up outside the factory for an official photographic shoot. The loco is seen from its 'Co' or six wheel end. CJM-C

Cover Inset: During one of the many visits of a 'Baby Deltic' to Doncaster Works, who were the experts in 'Deltic' engine maintenance and repairs. No. D5903 poses at the side of the 'Crimpsall' shop on 9 May 1965. www.colour-rail.com / J. B. Hall

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Class 23 'Baby Deltic' & Class 28 'Co-Bo' Fleets

Probably the two least-successful of the diesel locomotives built under the 'Pilot Scheme' of the BTC Modernisation Plan, were the English Electric 'Baby Deltic', later BR Class 23 and the unique-design Metropolitan-Vickers Co-Bo Type 2, later classified as Class 28.




The English Electric product, using a single opposed-piston Napier Deltic prime mover, fell into serious problems soon after delivery, and before the entire fleet of 10 locos were introduced, major faults had been identified, quickly rendering the design to secondary duties and storage. A joint BTC, English Electric and Napier plan was put together to try and salvage something of the design, but even after extensive rebuilding, problems were still prolific, which led to the class being withdrawn from service after just 9-10 years of service.

The most unusual design of diesel-electric loco to operate on the BTC/BR network has to have been the Metropolitan-Vickers Co-Bo fleet of 20 Type 2s, having a four-wheel bogie at one end and a six-wheel bogie at the other. The locos also incorporated a two-stroke Crossley prime mover which was less than reliable in rail application. The Co-Bo fleet as they became known, were in technical trouble from the day they were introduced, spending huge amounts of time out of service, stored and being rebuilt. The fleet remained in traffic for just 9-10 years. Thankfully, one example was kept operational in departmental use long enough for it to be preserved.

Recently a group of enthusiasts have commenced building a 'new' Baby Deltic loco, by rebuilding a withdrawn Class 37 and mounting its structure on Class 20 bogies. Hopefully, this project will allow today's enthusiasts the chance to see one of these fascinating locomotives at work.

Colin J. Marsden
Editor

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The Type 2 'Baby Deltic' Fleet

Probably the least successful, and thus shortest lived of the diesel classes introduced under the BTC 1955 Modernisation Scheme, were the ten Type 2 'Baby Deltic' locos, numbered D5900-D5909, and built by English Electric at Vulcan Foundry, Newton-le-Willows.

The contract was awarded to English Electric as part of an initial 'modern traction' order for 40 main line locomotives - 10 2,000hp Type 'C' (later Class 40), 10 1,100hp Type 'B' ('Baby Deltic' Class 23) and 20 1,000hp Type 'A' (later Class 20) locomotives. The 'Baby Deltic' order was placed as No. CCF0875 on 23 January 1957. The fleet was given the name 'Baby Deltic' having just one prime mover in comparison with the twin-engined 3,300hp big 'Deltic' class.

Soon after the order was placed, the BTC traction classification was revised, with these Type 'B' locos amended to Type 2.

The body shell adopted was of the then typical EE 'bonnet' design and similar to the prototype Deltic, as well as the Type 3 and Type 4 production fleets. The body was of a full width design, with a centrally-mounted power unit and equipment compartment. Full-width driving cabs were provided at each end, with its short 'bonnet' containing some technical equipment, originally incorporating a gangway door for between loco access, a feature which was never used.

Physical assembly, resulting in one of the most robust of locomotives, centred around a common welded underframe, made up of four 'I' section steel longitudinal beams with cross members and end drag-boxes. Body sides were pre-assembled formed of steel beams, plated with medium-gauge steel sheet. The cab ends/bonnet were formed of steel plate.

The roof section over the power unit, generator and boiler compartment was openable and could also be removed for maintenance.

The driving cabs were of standard English Electric design, the driving position was located on the left and a non-driving 'fireman's' position was on the right, the cab was accessed by doors on each side. Access to the between cab compartments was by a hinged door from the rear bulkhead of the cab. A door from the driving compartment led into the 'bonnet' section.

The bogies were similar to those under the Type 'A' D8000 fleet, fabricated of welded and riveted side members formed into box sections with welded cross stays. The main bolster was carried on springs supported by planks and swing links. Suspension between the bogie frame and wheels

was provided by nests of helical springs between the frame and equalising beam. SKF roller-bearing axle boxes were fitted. Traction motors came in the form of four EE533A force-ventilated, axle hung, nose-suspended units, with a single reduction gear-drive. At the design stage English Electric wanted to fit simple shock absorbers between the bogie and body, BR originally agreed, but when a later weight issue arose, these were omitted.

Between the two two-axle bogies were fuel and water tanks together with, on one side, a battery box and air reservoirs.

It was with internal and technical equipment that the 'Baby Deltic' fleet differed from other, more conventional, designs of diesel-electric loco. The centrally-mounted prime mover was a Napier-Deltic T9-29 unit, a nine-cylinder, 18-piston, two-stroke, opposed-piston engine, set to deliver 1,100hp (820.2kW) at 1,600rpm, which provided 768hp (572.6kW) at the wheel. The three-line inverted triangular engine was fitted with a complicated phasing gear at its output end, which linked the three output shafts to a common drive, powering the main generator. Napier turbo blowers were fitted at the engine's free end. The main generator was of type EE835D, being bolted direct to the engine and incorporated a top-mounted auxiliary generator of type EE912. The auxiliary generator was powered by a separate drive from the engine and produced a constant 110V for locomotive non-traction systems.

Power unit, oil and water cooling was achieved by a roof mounted fan and double-bank side radiators. Manually-operated shutters were fitted over the radiator panels on the bodyside, external air sucked into the locomotive passed over oil-wetted filters. Train heating was provided by a Stone Vapor OK4616 boiler, housed behind the cab at the No. 1 end.

Power and control equipment was housed in a main cubicle at the No. 2 end, to the rear of the cab. The control system used the electro-pneumatic (Blue Star) principle. The control system was basic, with the power controller position directly relating to engine speed, which varied between 600 and 1,600rpm, governed by a load regulator.

Some auxiliary equipment was powered directly from the main engine via a power take-off at the free end, which drove an auxiliary gearbox. Drives were taken to operate a Westinghouse air compressor and one traction motor blower. A separate output drove the roof radiator fan. The second traction motor blower was powered from

the auxiliary generator shaft.

Vacuum for train braking was originally to be provided by two Northey exhausters, but these were replaced, prior to delivery, by Beavell exhausters as part of a weight-reduction plan.

Locomotive braking was by air, being proportionally controlled by the vacuum system when working a train. An interesting feature of the brake system was the provision for 'trip cock' installation, a requirement for the locomotives to operate over the London Underground 'widened lines'.

Construction commenced at Vulcan Foundry, Newton-le-Willows in late 1957, with the 10 locos assembled in two batches of five. When the first loco was weighed, it was found to exceed the maximum of 72 tons stipulated in the design contract by three tons, placing the design outside the maximum axle-loading. Remedial action had to be taken before the BTC would accept the design. With this problem identified, the planned delivery dates of between 12 July 1958 and 31 January 1959 were abandoned. The overweight issues were a result of using heavy components, which the designers considered would be needed to compensate for the light-weight 'Deltic' power unit.

The required weight reduction on a complete locomotive was no easy task, and while the problem was being rectified, production of the remaining locomotives was placed on hold. Partial weight reduction came by replacing steel internal doors with glass-fibre units, modifying the train heating boiler, replacing steel components with alloy, removing inner sandboxes, and most of the end gangway equipment. Additionally, holes were cut in some parts of the bogie frames, while light-weight 'Oleo' buffers were fitted.

Much effort was made to reduce the weight to enable the class to enter service on the Eastern Region, powering cross-London freights to the Southern Region, where strict axle-load restrictions were imposed. However, this was not immediately possible.

English Electric and the BTC re-weighed No. D5901 under strict conditions on 2 March 1959. Several further re-weighing sessions followed, culminating in No. D5909 on 7 April. The following day this loco was sent to Doncaster Works for weight-checking. This deemed the loco was still too heavy, and further weight reduction was required. This was carried out by cutting holes in the floor below the engine and fitting lighter air tanks. In the end, the finished loco weighed in at 71 tons 16 cwt, giving an axle-loading of just under 18 tons, which was acceptable to the BTC.

The first locomotive to venture on the main line was No. D5902 on 1 April 1959 between Vulcan Foundry and Chester, with various components removed to reduce weight. Two days later the loco worked north to Penrith and back. Following these tests the fleet was delivered via Doncaster Works to Hornsey depot on the Great Northern section between April and June 1959.

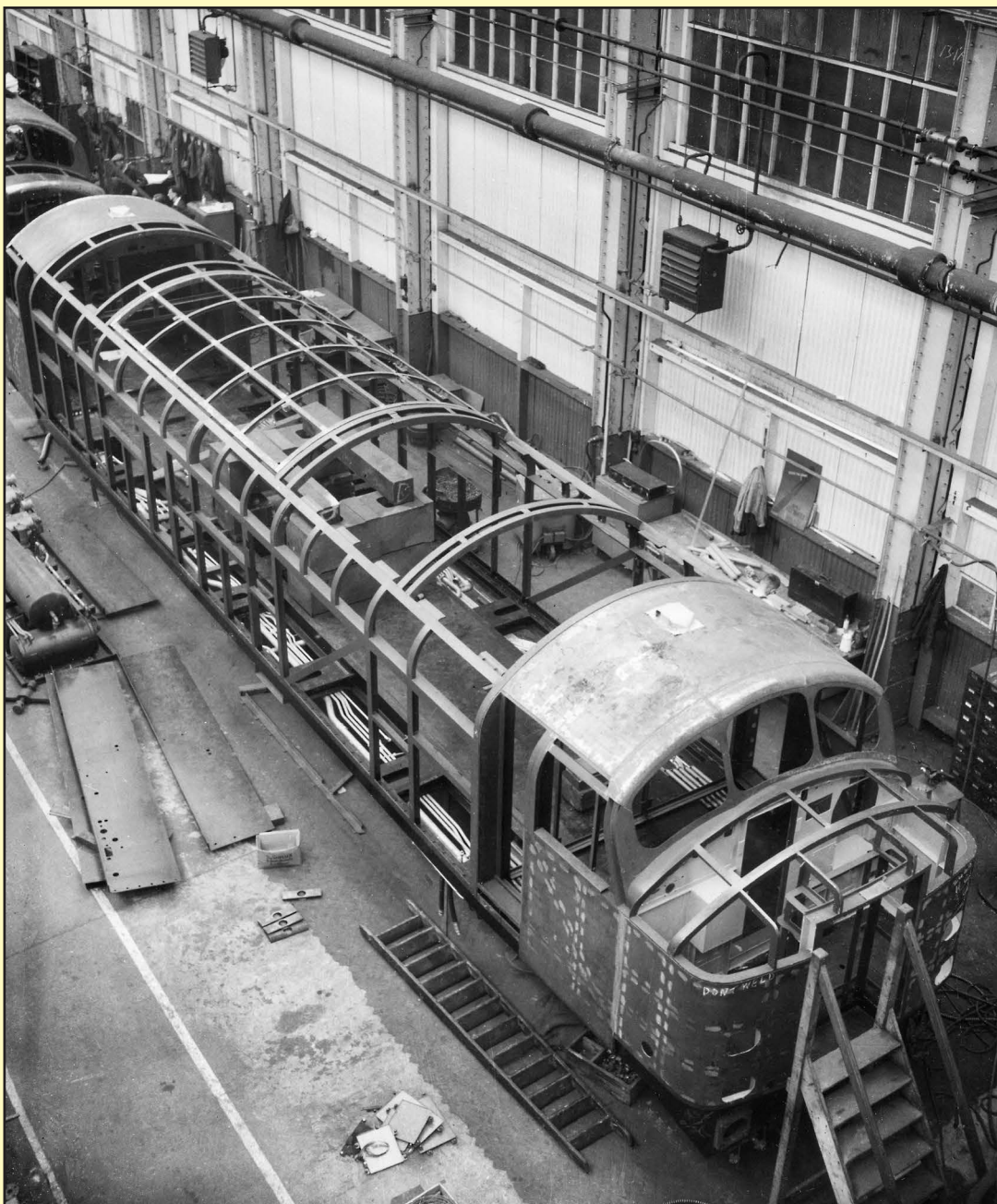
The already troubled 'Baby Deltic' fleet initially proved satisfactory in traffic. Some problems were encountered, included leaking fuel pumps, air systems and defective control equipment, all of which could easily be rectified. Another problem was broken lubricating oil pressure pump quill shafts, and low water levels, causing power units to shut down. Some problems with cracks to cylinder blocks were also identified which required power unit changes. Rectifying these problems was largely made by autumn 1959. By the end of 1959 several power units had been



Right: The English Electric assembly contract for the 10 Type 2 'Baby Deltic' locos was awarded to Vulcan Foundry Newton-le-Willows, where the fleet was assembled in two groups of five. Assembly commenced in late 1957, but due to many issues, many involving the excess weight of the fleet, delivery was a protracted affair which extended through until summer 1959. This view shows the shell of No. D5903 taking shape. **CJM-C**

Left Below: Just a month old at the time, and just before technical issues would befall the loco, No. D5909, the last of the build, is seen at Welwyn North in July 1959. The loco is powering a rake of 'short' Eastern Region suburban stock on a Cambridge to London King's Cross service. www.colour-rail.com

Below: With its number one end, or cooler group end, nearest the camera, No. D5905 is seen new. It is interesting that this design had a front mounted ladder, to enable depot staff and train crew to reach the top of the bonnet section. Two grab handles were provided on the top of the bonnet to ease holding on. Today's Health & Safety might have something to say about such a fitting today. **CJM-C**





replaced, and miles per casualty figures were not encouraging. Also, at the end of 1959, a number of technical failures of proprietary equipment were encountered, in particular the shaft from the auxiliary engine drive to the compressor, traction motor blower and radiator fan were a source of problems.

The major failure of the shaft from engine to the auxiliary gearbox had a knock-on effect as when broken, the shaft rotated and hit the coolant pipe to the engine, this caused power unit seizure in the most serious of occurrences. Meetings were held between the BTC, English Electric and engine manufacturer Napier, as to what to do in both the short and long term.

At the time, repairs to the fleet were usually undertaken at Stratford Works, which by late 1960 had become more than acquainted with power unit changes. Records show that between February 1960 and January 1961, 49 engine changes were made at Stratford, several being attributed to shaft failure. Many other problems had also now been identified, including leaking and overheating oil and water systems, and blocked radiator units.

During 1960, when the new diesel depot opened at Finsbury Park, the locos were transferred to its charge, the problems however continued. By November 1960 individual locomotive mileages were only between 40,000 and 60,000, and by this time with more than 40 power unit changes carried out by Stratford, the BTC was faced with a major problem.

At the end of 1960 a major survey of 'Baby Deltic' problems was made by the BTC, English Electric and Napier, which identified five serious problem areas.

- failure of the shaft from auxiliary drive to gearbox
- fracture of cylinder liners, due to stress caused in manufacture or rectification to loose crankcase bolts

- turbocharger bearing failure - induced by back pressure of the exhaust system
- fractured liners - due to erosion in the injector hole
- seizure of engine pistons - caused through lubricant deficiencies.

Major modification work was put forward by Napier in 1960 to reduce the engine problems of the 16 Napier T9-29 units available (11 owned by the BTC and five owned by Napier).

The ongoing problems with the fleet prompted the BTC to put forward a plan in July 1961 that the entire fleet should be re-engined, using the English Electric 8SVT 8-cylinder V-type unit. However, English Electric was quick to point out that this engine was some eight tons heavier than the Napier prime mover, and would thus put the locomotive well outside stipulated axle limits.

From late 1961 it became almost impossible to roster the fleet for service as the unreliability level was increasing, with many locos being removed from traffic and stored. This unacceptable situation led to the remaining fleet being deployed on local London area freight duties and King's Cross empty stock working. By early 1962, little passenger work remained for the operational locos on the Hertford Branch and Broad Street commuter services.

In early 1962 the talk of re-engineering the 'Baby Deltic' fleet was rife. The BTC favoured using a proven conventional English Electric 1,000hp (746kW) unit, similar to that fitted to the Type 1, later Class 20 design. During February 1962 news broke that English Electric had come up with another option, to rebuild all 10 locos using a single Napier 'Deltic' D18-25 engine of 1,650hp (1,230kW), identical to that fitted into the larger 3,300hp (2,461kW) main line 'Deltic' locos. This option was of course desirable to the BTC, as items would be common to both classes and assist maintenance. It would however, have placed the fleet outside the Type 2 power bracket and into

the Type 3 classification. English Electric tried to lead BR down this path for several months, knowing that refurbishment or major technical upgrading was about to be authorised.

In 1962 other re-engining proposals were put forward by English Electric, using various derivatives of engine and generator, able to provide either steam or electric train heating. In summer 1962, English Electric was developing a new 'U' series of prime mover, and was keen to install one in a loco for test purposes. With the majority of 'Baby Deltic' fleet now out of service, English Electric sought permission from the BTC to use one as a test bed. At first, BR would not agree, as this would have set aside 10% of the fleet for development purposes, and after so many problems, a financial return was sought from its original investment. However, English Electric was persistent, and produced detailed plans of the proposed re-engining, using a 12-cylinder unit set to deliver 1,550hp (1,156kW). Eventually the BTC agreed and No. D5901 was assigned to the project, it was moved to EE Vulcan Foundry on 6 March 1963. It was in a very dilapidated state, as while stored at Stratford, all were de-engined, with many other parts robbed.

To enable the re-engining a lot of work had to be done, including the re positioning of much of the internal equipment and modifying the engine room floor pan, underframe, bogies and control equipment.

It was also agreed between the BTC and English Electric that some up-dating of other equipment and modifications such as soundproofing the cabs would be carried out. To accept the new power unit and provide ventilation, revisions were required to the roof, and new air intakes made at cantrail height. Modifications to the bogies included altering the gear ratio, while the original traction motors were retained.

By May 1963 the loco identified by English Electric as DP3, was the subject of negotiations ➡



1957 BR number range:	D5900-D5909
Former class codes:	D11/1, later 11/3
Built by:	EE Vulcan Foundry
Introduced:	1959
Wheel arrangement:	Bo-Bo
Weight (operational):	74 tonnes
Height:	12ft 8in (3.86m)
Width:	8ft 10 ³ / ₄ in (2.71m)
Length:	52ft 6in (16.00m)
Min curve negotiable:	4 ¹ / ₂ chains (90.49m)
Maximum speed:	75mph (121km/h)
Wheelbase:	40ft 6in (12.34m)
Bogie wheelbase:	8ft 6in (2.59m)
Bogie pivot centres:	32ft (12.34m)
Wheel diameter:	3ft 7in (1.09m)
Brake type:	Vacuum
Sanding equipment:	Pneumatic
Route availability:	5
Heating type:	Steam - Stone OK 4616
Multiple coupling restriction:	Blue Star
Brake force:	36 tonnes
Engine type:	Napier 'Deltic' T9 - 29
Engine horsepower:	1,100hp (820.2kW)
Power at rail:	768hp (572.6kW)
Tractive effort:	47,000lb (20.90kN)
Cylinder bore:	5 ¹ / ₂ in (130.1mm)
Cylinder stroke:	3 ¹ / ₂ in (88.9mm)
Main generator type:	EE 835D
Aux generator type:	EE 912
Number of traction motors:	4
Traction motor type:	EE 533A
Gear ratio:	62:17
Fuel tank capacity:	450gal (2,047lit)
Cooling water capacity:	20gal (91lit)
Lub oil capacity:	28gal (127lit)
Boiler fuel capacity:	100gal (455lit)
Boiler water capacity:	500gal (2,275lit)

between English Electric and the BTC over main line running when it was finished. Both parties agreed that its use on Liverpool Street- Kings Lynn services would be the most desirable.

The DP3 project fell into serious problems in May 1963 when delivery of the 'U' series engine was held up, firstly until August and then November. By October, the bodyshell was all but complete at Vulcan Foundry, and set aside awaiting the engine. The project came to an abrupt end during December, when reorganisation within the traction division of English Electric led to the cancellation of the 'U' series engine project. This came as an absolute bombshell to the DP3 project team, which received instruction on 6 December to re-convert the locomotive back to its original form.

Returning to the other nine locos, during the early summer of 1962 the 'Baby Deltic' problems sank to a new low, and following a spate of major failures, the BTC agreed to their removal from front line service, to be relegated to very local freight and pilot duties. This removal from normal service caused something of a traction shortage on the GN section, resulting in the use of English Electric Type 1s on some main line duties.

Above: Viewed from its No. 2 end, No. D5903 is seen when brand new. The two louvers providing ventilation to the main generator and control cubical. CJM-C

Right: The refurbishment, or more accurately, total rebuild of the 'Baby Deltic' fleet, saw some major structural changes to the design. With the original front end being replaced with a more conventional design incorporating a four-position route display. This was achieved by cutting off the original nose end from just forward of the cab windows and assembling a new unit.

www.colour-rail.com / J. B. Hall

Both the BTC and English Electric made considerable effort to restore the Type 2s to traffic, but progressively most were stored at Stratford. On 4 September 1962 the BTC requested a quotation from English Electric for full refurbishing of the locos to a reliable operational condition. This work was to include re-design of the auxiliary drive and gearbox, but to retain the original T9-29 engine. The original quote was for English Electric, Vulcan Foundry to refurbish one locomotive in full, and supply parts to the BTC for subsequent upgrading. However, it was eventually agreed that English Electric would carry out all work.

After much negotiation the terms of refurbishment project were agreed. This was a major undertaking, with every item having to be removed and repaired. While the technical refurbishing was being carried out, it was agreed to effect some physical modifications to the bodywork, bringing the fleet up to date,

by replacing the redundant and unusable nose end doors with a new front end incorporating a standard four-character alpha/numeric headcode display, and a redesign of the cab controls.

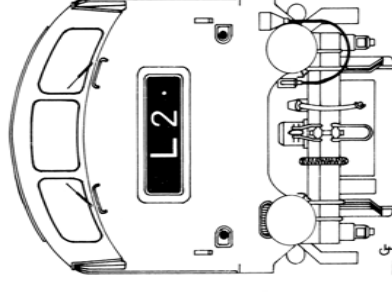
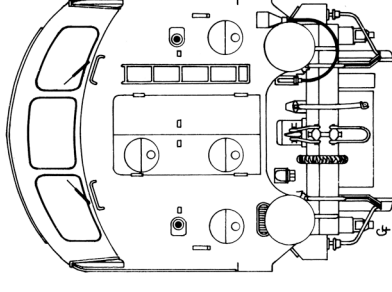
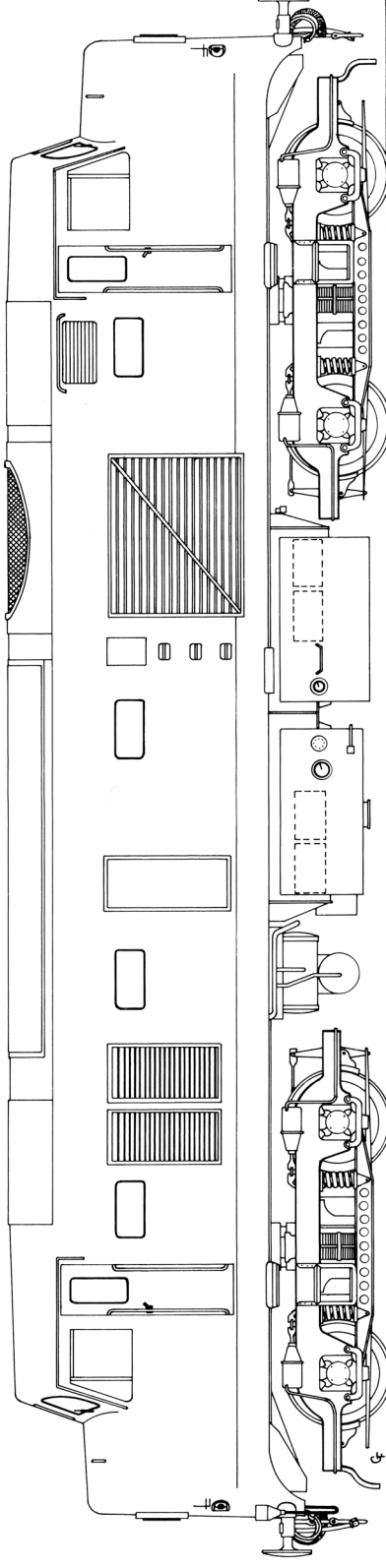
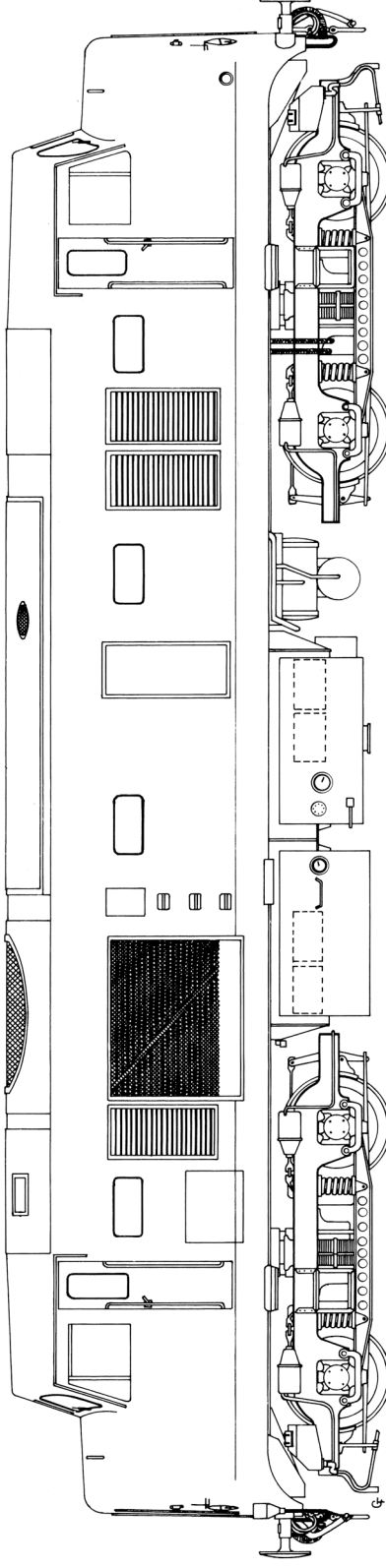
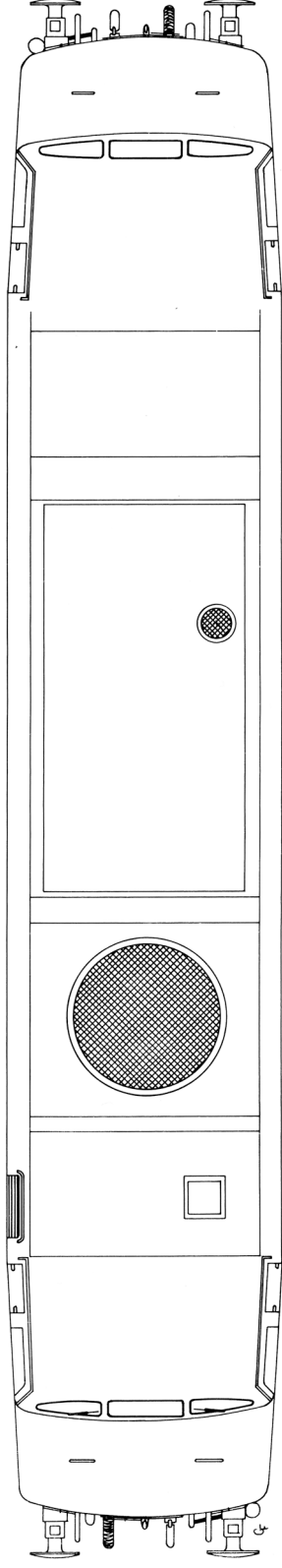
The refurbishing contract took about a year to complete, and included the total rebuilding of the Napier engines to the latest specification.

The locomotives returned to BR as 'new' via BR Doncaster Works for recommissioning. The first locomotive to return was No. D5904 in June 1964, with the final locomotive No. D5901, taking its place at the end of the refurbishing contract because of its involvement in the 'U' series engine tests, not arriving back until April 1965.

When the fleet returned to the Eastern Region, it was once again based at Finsbury Park. Upon re-entering service 'Baby Deltic' performance was vastly improved, with the fleet deployed on King's Cross suburban duties to such points as Cambridge and Peterborough, and on local services →



Class 23



Top: Class 23 'Baby Deltic' roof arrangement, showing as built condition.
 Middle: Class 23 'Baby Deltic' side elevation, showing as built condition, with No. 1 end on left.
 Right Middle: Class 23 'Baby Deltic' front end, showing original condition.
 Above: Class 23 'Baby Deltic' side elevation, showing refurbished condition with No. 1 end on right.
 Right Above: Class 23 'Baby Deltic' front end showing refurbished condition.

Top: Class 23 'Baby Deltic' roof arrangement, showing as built condition.

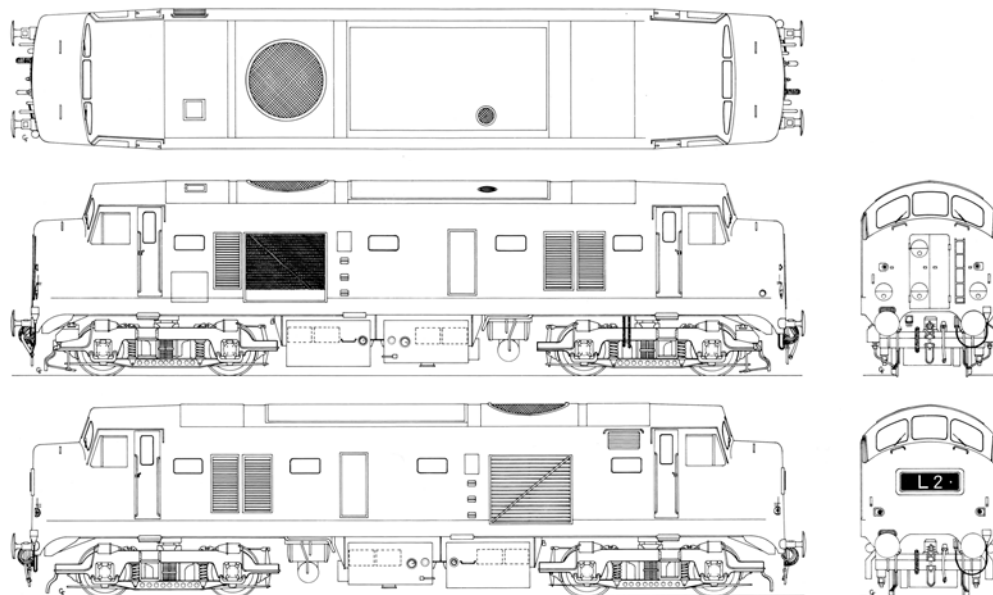
Middle: Class 23 'Baby Deltic' side elevation, showing as built condition, with No. 1 end on left.

Right Middle: Class 23 'Baby Deltic' front end showing original condition.

Below: Class 23 'Baby Deltic' side elevation, showing refurbished condition with No. 1 end on right.

Right Below: Class 23 'Baby Deltic' front end showing refurbished condition.

The drawings are reproduced in exact N gauge 1:148 2.02mm to the foot.



from Broad Street. Problems still occurred, particularly engine room oil leaks, and radiator water leaks. The latter became most serious in 1965/66 when corrosion found in the cooling system was attributed to the type of water treatment used. Problems with radiators came to a head in early 1967 when replacement units were provided for all locomotives.

Between 1964 and 1968 the 10 locos worked from Finsbury Park, being reclassified by BR as Class 23. In the late 1960s, the then BRB introduced its National Traction Plan, this spelt the end for many of the numerically small, non-standard and problematic classes, the writing was thus on the wall for the Class 23 fleet, although it was technically only four to five years old.

The first inroads into the fleet came in September 1968 with the deletion from stock of No. D5906, this loco had been out of service for the previous four months with major technical faults. The next to be withdrawn was No. D5907 the following month. Progressive withdrawals

were made until by December only two locos, Nos. D5905 and D5909 remained in service, continuing in capital stock until early 1971.

It is interesting to record that although the majority of the class was being withdrawn, No. D5909 passed through works in 1968 and received a classified overhaul, emerging repainted in all-over standard rail blue with full yellow warning ends.

At the end of its serviceable life on revenue earning trains, No. D5901 was loaned from 31 August 1969 to the BR Research Division at the Railway Technical Centre, Derby, being officially transferred to its ownership the following December. No. D5901 was used by BR Research to power the wheel/rail interaction 'Tribology' test train on both the main lines and test tracks. The locomotive was subsequently renumbered as 5901 and remained in service at Derby until February 1976 when it was replaced by a withdrawn Class 24. No. 5901 was an ideal candidate for preservation, but regrettably it was moved to BREL Doncaster and disposed of

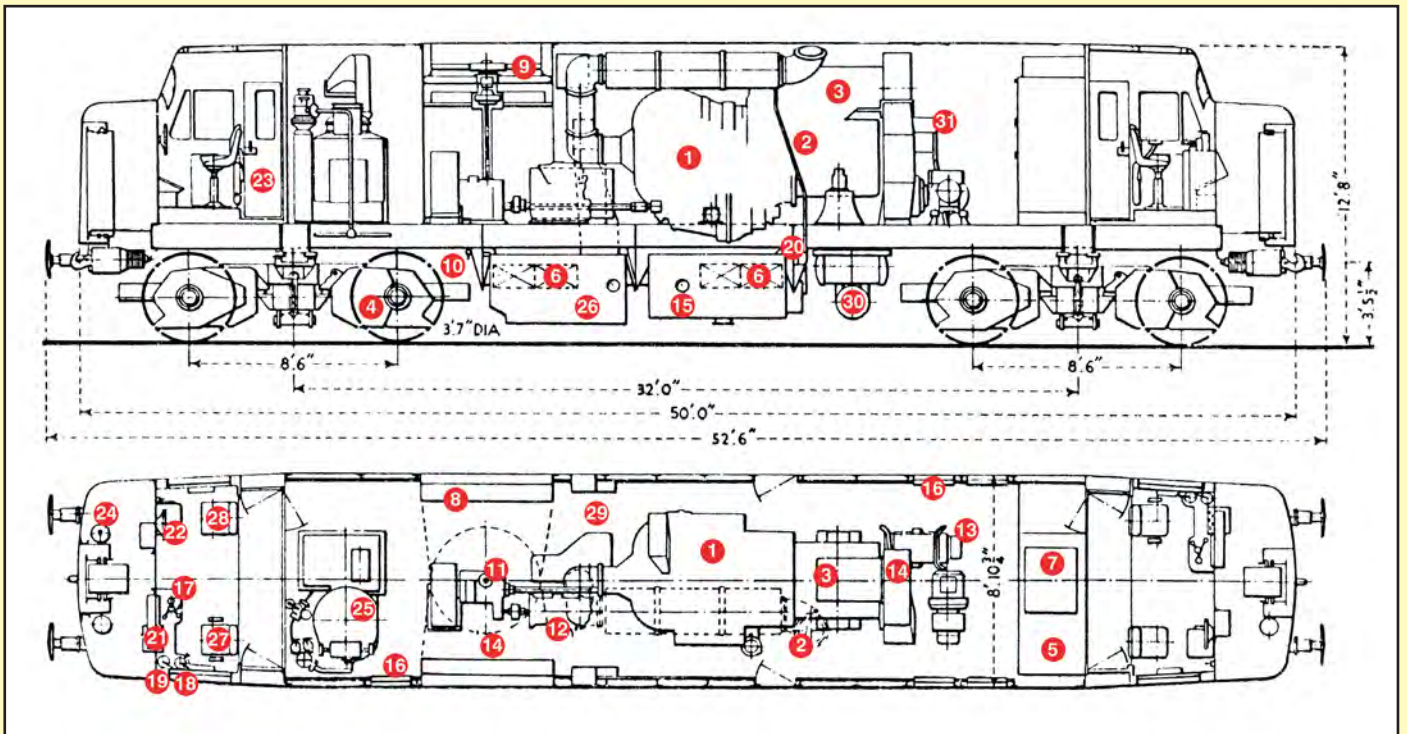
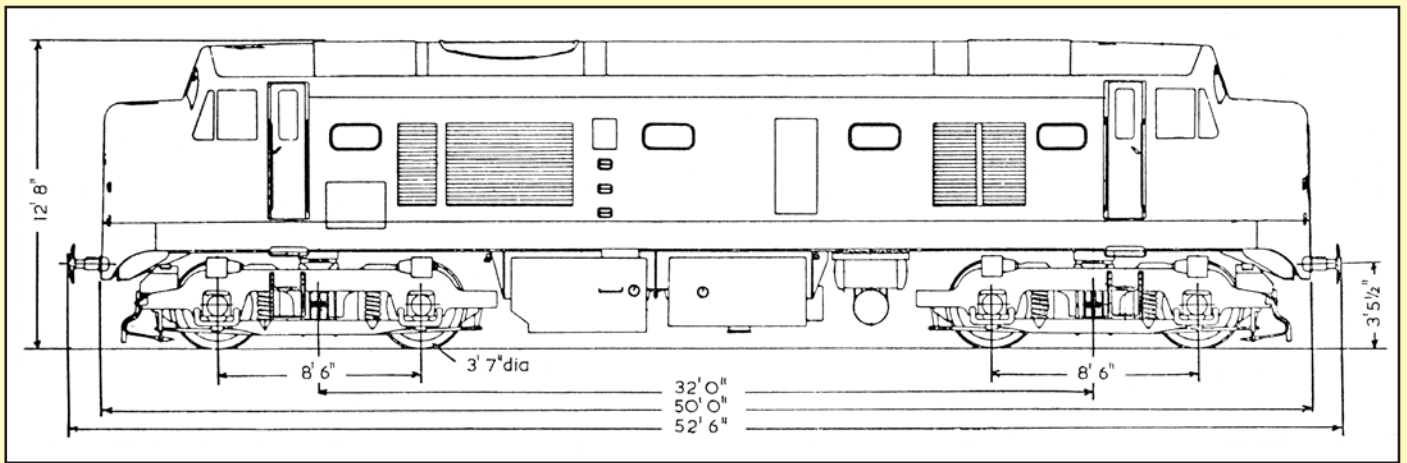
in February 1977.

When the 'Baby Deltic' fleet was constructed, the livery style was selected by E. G. M. Wilkes of Wilkes & Ashmore, and consisted of the upper locomotive body finished in standard BR locomotive green with a light grey base band to the body, changing at the nose end to bright red. No yellow ends were carried, but white hinged reporting discs were fitted, three directly above the buffer beam and one in the middle at the top of the nose. The roof section was finished in mid-grey, the underframe was black and the buffer beam red. White numerals were applied together with a 14 $\frac{3}{4}$ in diameter BR logo.

Following refurbishment, the class emerged in standard BR loco green, with a light green base band to the body. Small, later full yellow ends were applied. The conventional black underframe, grey roof and red buffer beam remained. As previously mentioned, the only loco to sport rail blue was No. D5909, repainted after receiving classified attention in 1968. ■

Below: After completion at EE Vulcan Foundry and agreement on delivery following many over weight issues, the entire fleet operated to Doncaster Works where full commissioning was undertaken, including a further visit to the weight shop. When this work was complete, locos were operated light power to their London home of Hornsey depot. No. D5901 in seen parked up at Doncaster Works on 23 May 1969. **Brian Morrison**

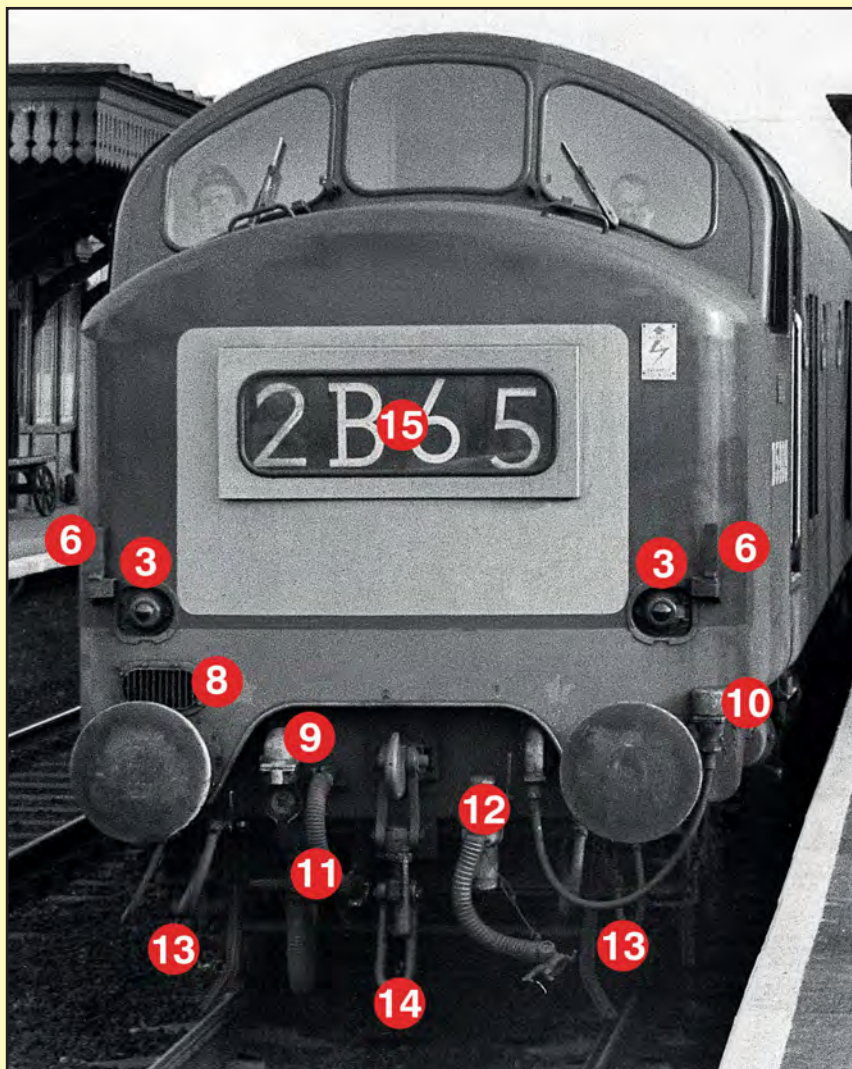
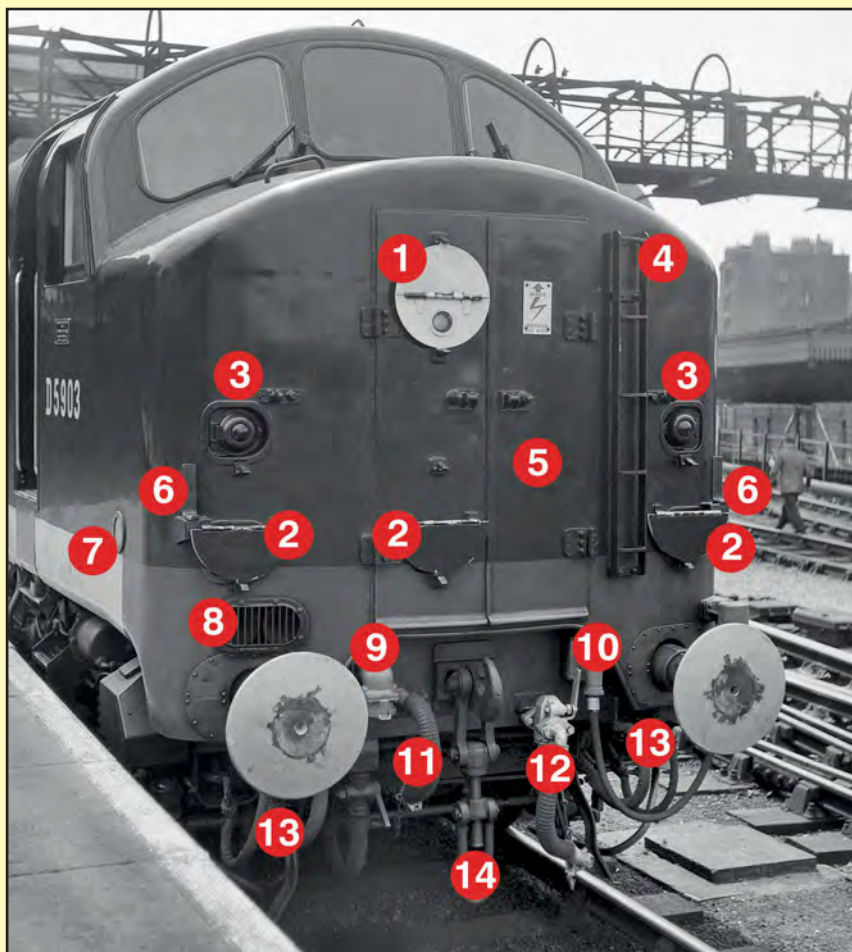




Left: 'Baby Deltic' equipment positions. 1: 'Deltic' power unit, 2: Main generator, 3: Auxiliary generator, 4: Traction motor, 5: Control cubicle, 6: Battery boxes, 7: Resistances, 8: Radiator panels, 9: Roof radiator fan, 10: Water pressure filling point, 11: Auxiliary drive gearbox, 12: Air compressor, 13: Vacuum exhauster, 14: Traction motor blower, 15: Fuel tank, 16: Side air filters, 17: Cab master controller, 18: Loco air brake valve, 19: Vacuum brake valve, 20: Fuel pressure fill point, 21: Drivers instrument panel, 22: Handbrake wheel, 23: Position of fire extinguisher, 24: CO₂ equipment, 25: Train heating boiler, 26: Boiler water tank, 27: Drivers seat, 28: Secondman's seat, 29: Lubricating oil tank, 30: Air reservoirs, 31: Staff cooker. Equipment positions reflect original condition. **CJM-C**

Right Above and Right Below: Front end detail of 'Baby Deltic' design. The upper illustration shows the original 'as delivered' condition and the view below shows the refurbished style. 1: Marker disk (open position), 2: Marker disk (closed position), 3: Red tail light, 4: Front access ladder, 5: Nose communicating door, 6: Lamp bracket, 7: Fire alarm pull handle, 8: Warning horns (behind grille), 9: Blue star multiple control jumper socket, 10: Blue star multiple control jumper cable, 11: Vacuum brake pipe, 12: Steam heat pipe, 13: Air control pipes, 14: Coupling shackle and hook, 15: Four-character headcode box (operated from inside nose of loco). **CJM / Peter Foster**

Below: During its final stages of Eastern Region commissioning at Doncaster Works, No. D5906 is seen stabled in the works yard on 10 May 1959. On paper this loco was allocated to Hornsey depot (34B) two days prior on 8 May. Records from English Electric show it departing from Vulcan Foundry on 6 April. **Norman E. Preedy**





Those Early 'Ill-fated' Days



Above: With a blue haze above the loco, indicating it was under full power, No. D5906 passes Belle Isle, while departing from London King's Cross on 18 March 1961, some 18 months before being taken out of service and overhauled. [Dick Riley](#)



Left: Allocated to Hornsey on 29 May 1959, and still gleaming with hardly a mark on its bodywork, No. D5908 is seen near Hadley Wood on a King's Cross local service. This loco was taken out of service in September 1962 for refurbishment. www.rail-online.co.uk

Below: With Mk1 BSO No. 9330 seating 39 standard class passengers coupled directly behind, No. D5907 awaits departure from Welwyn Garden City station in 1960 bound for London. The station was somewhat different from the huge structure we see today. www.rail-online.co.uk





Above: With a trace of 'Deltic' blue haze above and painted in the unique livery, only applied to the 'Baby Deltic' fleet when first introduced, No. D5901 passes south through Oakleigh Park station on the Great Northern suburban network on 21 August 1961 with a London King's Cross bound service. This loco was the last to remain active in unrefurbished condition, remaining in traffic until June 1963. www.colour-rail.com

Below: Not long after introduction onto King's Cross local services, No. D5903, showing the usual one white open disc in the upper middle position, approaches Finsbury Park station with a southbound service and passes the wonderful Finsbury Park No. 5 and Finsbury Park No. 6 mechanical signalboxes. It appears that the loco has the middle window sun visor in the lowered position. [CJM-C](#)



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Above: It seems that the picturesque Finsbury Park No. 5 signalbox was the prop for a number of illustrations of 'Baby Deltic' locomotives in action. Here, No. D5907 passes the box with a southbound train in summer 1960. Finsbury Park No. 5 signalbox was built around 1888 by the Great Northern Railway and had a McKenzie and Holland full height frame. [CJM-C](#)

Below: The modernisation of the Eastern Region, Great Northern route was well under way in 1960 when in April a new diesel depot was opened at Finsbury Park, replacing previous facilities at Hornsey. In 1961, No. D5900 is seen 'on shed' in the company of a Drewry 0-6-0 diesel-mechanical shunting loco, later classified at Class 04. [Ron Cover](#)





Above: Powering a typical rake of seven Eastern Region short underframe 57ft Mk1s painted in maroon livery, 'Baby Deltic' No. D5903 when just a few months old, on 17 August 1959, is seen passing Wymondley, south of Hitchin forming the 17.10 commuter service from London King's Cross to Baldock. These short underframe cars, were introduced to replace the 'quad-art' LNER stock and operated alongside them for many years. www.colour-rail.com

Below: A few drivers who operated the 'Baby Deltic' fleet are still around, now retired from railway service, most remember the fleet fondly and record that when working well the locos were good runners, this applied to both original and refurbished examples. In July 1959, soon after introduction, No. D5907 is seen departing from Hadley Wood station hauling a double rake of LNER 'quad-art' stock. **CJM-C**





Top: Having been taken into capital stock just two months before, No. D5902 is seen heading north at Woolmer Green, south of Knebworth on 8 July 1959. The train is again formed of a rake of LNER 'quad-art' stock. www.colour-rail.com

Above: The 'Baby Deltic' fleet, together with other ER power, were deployed to operate the 'Cambridge Buffet Express'. The train operated every two hours between King's Cross and Cambridge calling at Stevenage, Hitchin, Letchworth and Royston - covering the journey in just 80 minutes. On 12 July 1961, No. D5901 is seen at Cambridge with one of the 1B66 services. www.rail-online.co.uk

Right: With Alexandra Palace on the skyline left, 'Baby Deltic' No. D5904 heads towards London King's Cross passing Hornsey carriage sidings on 13 July 1959. This loco entered traffic on 24 April the same year, it remained in traffic until mid-1962 when it was stored. **Norman E. Preedy**





Left: Carrying an oil headlamp, rather than using the disc train identification system, one of the very early driver training runs of a 'Baby Deltic' is seen at Finsbury Park on 21 April 1959, powered by No. D5903. The loco was delivered to Hornsey just five days before. For many drivers in the London area, the 'Baby Deltic' fleet were the first diesels they were trained to operate, receiving a full diesel course as well as handling experience. Note the water crane on the station platform. **CJM-C**



Left Middle: In the summer of 1960, No. D5907 awaits departure from Welwyn Garden City station with a service bound for London formed of standard Mk1 stock. The station at Welwyn Garden City has changed out of recognition over the last 57 years. This loco was accepted into stock at Hornsey on 15 May 1959 remained operational until spring 1962 when it was stored with major engine defects, it did not return to traffic until March 1965. www.rail-online.co.uk.



Below: With its number 2 end leading No. D5901 is seen emerging from Gasworks Tunnel and arriving at London King's Cross on 19 September 1959, likely with an empty stock train to form a mainline departure. The 'Baby Deltic' fleet were frequently used for London area stock movements. Their steam heat generators could pre-heat trains, while their increasing technical difficulties saw them close to the maintenance staff. **CJM-C**



Above: The 'Baby Deltic' fleet were frequently to be found at Stratford depot or Stratford works, where repairs and problems that Hornsey or later Finsbury Park depots could not deal with were investigated. Stored awaiting a call for refurbishment, Nos. D5909 and D5907 are recorded at Stratford on 7 April 1963. [CJM-C](#)



Right: In April 1960 the entire 'Baby Deltic' fleet were transferred to the new diesel depot at Finsbury Park, where high-quality purpose-constructed facilities had been built. Two days before Christmas in 1961, No. D5902 is seen on shed in company with a BTH Type 2. [Norman E. Freedy](#)

A picture for the modellers, clearly detailing the bodyside arrangement. The No. 1, or cooler group end is on the right. It details the boiler water and fuel tanks between the bogies with their gauges and filler ports, bodyside foot holds, boiler water inlet door and positions for the 1960 applied overhead power line warning signs. The 'trip-cock' apparatus is seen on the leading end of the front bogie and a cast shed plate is fitted below the non-driving side running number. www.rail-online.co.uk.





Above: With a seven vehicle train, No. D5904 is seen near Welwyn North Tunnel on 28 April 1962, just three months before a major engine failure rendered the loco unusable. Between June 1962 and January 1964 this loco was out of traffic. [CJM-C](#)



Left: In addition to powering King's Cross area passenger services, the 'Baby Deltic' fleet were deployed on freight duties. Here in spring 1963, No. D5901 is seen with a train of four-wheeled vans at Hatfield. www.rail-online.co.uk



Below: Storming over the four-track section of the East Coast Main Line south of Hitchin in 1960, No. D5901 heads towards London with a rake of seven LNER and BR stock. Note the 'C' temporary speed restriction 'commencement' board on the left. www.rail-online.co.uk



Above: Hauling an eight vehicle formation of short frame Mk1 stock, No. D5904 is recorded at Welwyn Garden City in 1960. **Norman E. Preedy**

Right: Dozing under the great overall roof at London King's Cross on 21 June 1960, 'Baby Deltic' No. D5901 had arrived with an eight-car formation of short underframe stock on a service from Royston. www.rail-online.co.uk



Below: In the summer/autumn of 1959 it was common to find the new 'Baby Deltic' fleet used on empty stock duties between Hornsey depot and King's Cross and vice-versa, their deployment was two-fold, to move the stock as well as perform driver training/handling. On 16 June 1959, when just two-months old, No. D5904 is seen passing Holloway with an empty stock move. www.rail-online.co.uk







Above, Left Above and Left: After a protracted introduction in 1959 following over-weight issues which resulted in a number of major internal modifications having to be made, the 'Baby Deltic' fleet were in serious trouble after just weeks in traffic. As early as summer 1959, reports indicated major engine, generator and control problems started to emerge. A huge effort was made by English Electric and engine builder Napier to rectify these issues, but sadly they increased. Relegation to secondary duties and long periods out of use, eventually led the BTC to store all defective locos, this came between April 1962 and June 1963. Out of traffic locos were moved to the yards surrounding Stratford depot and works, some were later transferred to Doncaster Works, but all ultimately went back to their point of assembly - English Electric Vulcan Foundry, Newton-le-Willows. The views on this double page show the sad state of affairs with 80% of the fleet stored in one line at Stratford. After agreement on a terms of refurbishment and a massive 'to do' list produced jointly between the BTC and English Electric the locos returned to traffic at Finsbury Park between July 1964 and March 1965. Regrettably their performance, while improved, was not on par with other locos.

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Above: The subject of the aborted rebuild and development of DP3, using a prototype 'U' series engine in 'Baby Deltic' No. D5901 was one of the most controversial in the history of EE. No. D5901 was totally rebuilt for its DP3 role and then at the last minute the project was abandoned and the loco converted back to a refurbished 'Baby Deltic'. Here, No. D5901 is seen in the main shop at Vulcan Foundry, sharing assembly space with various EE Type 3 Class 37s. [CJM-C](#)

Below: As part of the total rebuild of the 'Baby Deltic' fleet, it was agreed that the original nose end, incorporating a gangway, would be replaced by a more conventional assembly incorporating a solid four-character headcode display. With signs of where the new front end had been attached, No. D5908 is seen stabled with a Brush Type 4 Class 47 at Finsbury Park. www.rail-online.co.uk





Modernised Locos in Traffic



Top: While based at Finsbury Park, many 'Baby Deltic' locos could be found 'on shed' at King's Cross, where a sizeable depot was located adjacent to the station by the portal of Gasworks Tunnel. With an oil lamp on the front, No. D5903, runs off shed on 31 July 1965. **Norman E. Preedy**

Above: With a Cambridge Buffet Express service, No. D5901, the loco which was rebuilt and then returned to 'Baby Deltic' style, is seen at Hitchin on 4 July 1966. **CJM-C**

Left: In addition to Stratford Works undertaking technical attention to the 'Baby Deltic' later Class 23 fleet, Doncaster Locomotive Works effected some repairs, frequently involving the Napier Deltic power unit. With the Doncaster site becoming the established Napier Deltic facility, frequently dealing with the East Coast main line fleet, No. D5903 is seen inside the works 4-bay on 9 January 1966. **N. Skinner**



Above: The pioneer of the fleet, No. D5900 is viewed from its No. 2 end on the suburban side at London King's Cross in May 1965. The platform on the far side was that of the City Widened Line from Farringdon, a steeply graded platform for northbound trains, southbound trains using the King's Cross York Road platform on the other side of the main station. In the far background, St Pancras station can be seen. The suburban terminating platforms at King's Cross operated on a 'turnover loco' basis, with an outgoing train having a fresh loco from shed and the arriving loco, following the departing train along the platform and going 'on shed' www.colour-rail.com / Frank Hornby

Below: With King's Cross loco shed in the background, which in the peak of diesel operation frequently saw up to 15 locos of Classes 23, 31, 37, 40, 45, 46, 47 and 55, receiving service exams, fuel and a look-over between duties. On 23 April 1968, 'Baby Deltic' No. D5905 departs from the King's Cross suburban platform with a rake of BR Rail Blue liveried short underframe coaches forming the 08.40 to Welwyn Garden City. www.dieselmagegallery.com / Jim Binnie





Above: One of the last pair of active 'Baby Deltic' locos No. D5905 is seen on a snowy 13 February 1970 approaching Hitchin and passing Hitchin South mechanical signal box with a northbound freight. With only two locos left operational after the end of 1969, their use on passenger services was over and the sole work was the odd freight or departmental train. [John Cooper-Smith](#)

Below: Not long after refurbishment, No. D5905 is seen stabled with a Class 31 at Hornsey, awaiting to operate empty stock from Hornsey carriage sidings to London King's Cross. Note the cast 34G shed plate below the running number on the cab side. www.rail-online.co.uk





Above: In the quest for the railway to improve the visibility of approaching trains, the adoption of full yellow warning ends was extended to some of the 'Baby Deltic' fleet. The application received mixed reaction from railway staff and enthusiasts as to if it improved the aesthetic appearance of the body. In green livery with a full yellow warning end, No. D5903 is seen from its No. 1 end at Hitchin on 25 May 1967, in company with three other locos of the fleet. www.colour-rail.com

Right: Posed on the fuel road at Finsbury Park in 1969, No. D5900 awaits its turn for refreshment with BR Rail Blue-liveried Class 40 No. D259. www.rail-online.co.uk



Below: Wearing its full yellow warning end, No. D5904 is seen stabilised in Clarence Yard, Finsbury Park on 27 October 1968. This was the first of the fleet to be refurbished returning to service in July 1964. It remained active until 20 January 1969 when it was stored and subsequently withdrawn. **Jim Carter**





RTC Operated No. D5901



Above: The rapidly expanding BR Research function at the Railway Technical Centre, Derby took over Class 23 No. D5901 on 31 August 1969, officially being 'on loan'. It was officially transferred to BR Research on 7 December 1969. It was used to power the rail-wheel 'Tribology' test train until it had a major mechanical fault in November 1975. Not long before being taken out of traffic the loco is seen with the 'Tribology' test train at Bedford Junction on 19 August 1975. www.colour-rail.com



Left: Studying the dynamics of wheel slip/slide and adhesion, a special three-vehicle 'TribTrain' was formed at Derby (vehicles 975046, 999900 and 975078) and operated throughout the main line network. Here, No. D5901 is seen approaching Wolverhampton High Level with the 'Tribology Test Train' from Derby on 6 October 1972. **Geoffrey F. Bannister**

Below: In 1973, the BR Research 'TribTrain' is seen passing Aston near Birmingham, led by No. D5901. www.rail-online.co.uk





Above: Although based at the Railway Technical Centre in London Road, Derby, No. D5901 was frequently found stabled on, or receiving attention at Derby Etches Park depot, which required the interesting loco to run between the two sites via Derby station. Here the loco is seen pulling off of Etches Park depot towards the station while en route to the RTC. **Richard L. Charlson**

Right: Carrying one of its regular test train route indicator displays of 1T25, the 'TribTrain' rests between main line outings at the RTC Derby, not long before it was replaced by a Class 24. www.rail-online.co.uk



Below: On 20 October 1972, No. D5901 takes a rest at Wolverhampton while powering the three vehicle 'TribTrain' on an outing from Derby to Derby via Birmingham, Crewe and Uttoxeter. The wheel-rail interface test train saw considerable work in the autumn months when adhesion was low. **Geoffrey F. Bannister**





Above: Considering that the ill-fated 'Baby Deltic' fleet had a short planned life, it is surprising that in 1968 the BRB authorised No. D5909 to be repainted in corporate BR Rail Blue following attention to mechanical defects. Standard rail blue was applied with full yellow warning ends with white double arrow decals below each cab side windows and running numbers, applied in white directly behind the cab doors. As the last fully operational member of the class, the loco is seen at Hitchin depot in mid 1970 in the company of a pair of Brush Type 2 Class 31s. www.rail-online.co.uk

Below: Awaiting their final journey to the scrap yard at Cohen's of Kettering, Nos. D5909 in Rail Blue and No. D5905 in green still with a small yellow warning panel stand at Stratford depot on 7 March 1973. www.rail-online.co.uk



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Fleet List

1957 number	Built by	Works number	Date introduced	First depot	Date Stored	Date Refurbished	Date withdrawn	Final depot	Status code
D5900	English Electric Vulcan Foundry	2377/D417	22 May 59	34B	April 63	2 October 64	November 68	34G	C
D5901	English Electric Vulcan Foundry	2378/D418	22 May 59	34B	June 63	29 April 65	December 69	34G	D/C
D5902	English Electric Vulcan Foundry	2379/D419	2 May 59	34B	April 62	27 November 64	November 69	34G	C
D5903	English Electric Vulcan Foundry	2380/D420	17 April 59	34B	June 62	4 September 64	November 68	34G	C
D5904	English Electric Vulcan Foundry	2381/D421	24 April 59	34B	July 62	1 July 64	January 69	34G	C
D5905	English Electric Vulcan Foundry	2382/D422	8 May 59	34B	May 63	20 December 64	February 71	34G	C
D5906	English Electric Vulcan Foundry	2383/D423	8 May 59	34B	September 62	29 October 64	September 68	34G	C
D5907	English Electric Vulcan Foundry	2384/D424	15 May 59	34B	June 62	31 March 65	October 68	34G	C
D5908	English Electric Vulcan Foundry	2385/D425	29 May 59	34B	September 62	18 August 64	March 69	34G	C
D5909	English Electric Vulcan Foundry	2386/D426	19 June 59	34B	October 62	16 July 64	March 71	34G	C

Key to above table

34B Hornsey Depot
34G Finsbury Park Depot

C Cut up
D Departmental service



Above: The entire 'Baby Deltic' fleet, with the exception of No. D5901 which entered Departmental service, were sold to G Cohen of Kettering for disposal. No. D5906, withdrawn in September 1968 poses in the yard at Kettering. The cutters torch fell on this loco in July 1969. www.colour-rail.com

Left: From Stratford in East London, the 'Baby Deltic' locos were hauled to Kettering and stabled in the station area before being 'tripped' to G Cohen's yard. In the summer of 1969, Nos. D5900 and D5903 awaits their final move to the cutters yard. www.rail-online.co.uk

Disposal detail	Date cut up	Notes
G Cohen, Kettering	June 69	
BREL Doncaster	February 77	To Departmental Stock - D5901 - December 69 - November 75
G Cohen, Kettering	August 70	
G Cohen, Kettering	June 69	
G Cohen, Kettering	July 69	
G Cohen, Kettering	August 73	
G Cohen, Kettering	July 69	Stored: (U) 06/68
G Cohen, Kettering	July 69	Stored: (U) 04/62, R/I: 07/62
J Cashmore, Great Bridge	January-70	
G Cohen, Kettering	August 73	



Above: After withdrawal Nos. D5906 and D5907 were transferred to Doncaster Works, where the pair are seen stabled alongside the main Crimpsall shop on 15 June 1969. Soon after this image was recorded the pair were transferred to G Cohen's yard in Kettering. www.colour-rail.com / J. B. Hall

Right: No. D5903 is seen dumped in G Cohen's yard at Kettering in May 1969 awaiting the arrival of the cutting gang. www.rail-online.co.uk



The 'Baby Deltic' Project

In 2010 a group announced their intention to construct a full-scale operational replica of a 'Baby Deltic', no small engineering ambition. The group - known as The Baby Deltic Project were based at Barrow Hill, one of the leading establishments of UK rail preservation and already the engineering base of The Deltic Preservation Society.

The Baby Deltic Project team decided the best avenue was rather than built a 'new' locomotive from scratch, was to adapt an existing loco and purchased withdrawn Class 37 No. 37372, the original D6859, later 37159, built in 1963 by EE/Robert Stephenson & Hawthorns. The Project has shortened the body and nose sections, restyled the body to suit the original profile. As the Class 37 was mounted on a Co-Co bogie arrangement and the Baby Deltic was of a Bo-Bo design, the 'new' locomotive will be mounted on a modified pair of Class 20 bogies, enabling as near as possible a reasonably appearance of a Class 23.

To fit Class 20 Bo-Bo bogies to a Class 37 underframe was a major undertaking with modification of the entire centre casting, pivot

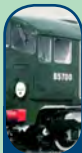
members and side-bearers.

While the body and bogies are the most obvious part of the project, the recreation required an original Napier T9-29 engine. Only one was known to remain and that was held by the National Railway Museum, York. Eventually in support of the project the NRM sold the engine to the group, but it required a total rebuild as it had seized solid. This was a major engineering job in its own right and took over two and a half years to make operational, using the expert skills of the DPS.

The huge engineering operation to recreate a Baby Deltic is still ongoing, but progressing well with much of the major engineering of shortening the body and nose sections now nearing completion.

When complete the locomotive will adopt the identity of D5910 and carry works number 4004/D1281 of 2014. ■

● Further information can be obtained on this project by writing to The Baby Deltic Project, c/o Barrow Hill Roundhouse, Campbell Drive, Staveley, Chesterfield, S43 2PR, or by visiting the groups website at <http://www.thebabydelticproject.co.uk> ■



The Metro-Vickers Co-Bo Story

One of the most unusual diesel-electric designs constructed as a result of the Modernisation Plan of the British Transport Commission, published as part of the 1953 Transport Act, was the Metropolitan Vickers Co-Bo fleet for London Midland Region use.

The 20 locomotives which made up the fleet, were ordered as part of the pilot modernisation scheme, which authorised orders to be placed with various manufacturers for a total of 174 'modern' locomotives, 160 with a diesel-electric transmission and 14 with a diesel-Hydraulic transmission.

The Co-Bo order was allocated 1957 diesel running numbers D5700-D5719, it was placed by the BTC in November 1955 with the Metropolitan Vickers Electrical Co Ltd of Manchester, which awarded mechanical construction to its Bowsfield Works at Stockton-on-Tees. Some internal components were subcontracted to Beyer Peacock of Gorton, Manchester.

The physical locomotive design was also awarded to Metropolitan Vickers, who, with the assistance of design consultant Jack Howe for external features, had to produce a loco of the Type 'B' power output (later amended to Type 2) to a very broad specification. Design was left totally to the builders, as long as it met a 'basic specification' in terms of weight (axle loading), cab visibility and size, and thus the 'odd' appearance of a locomotive having a different wheel arrangement at each end was born.

At first, it was deemed that the design would give improved route availability over conventional Bo-Bo designs, with an extra wheel set to distribute weight. As time proved this was far from the case, and the three-axle bogie actually restricted route availability.

At the planning stage, Metropolitan Vickers decided to enter into a partnership with Crossley Brothers to supply their two-stroke HSTV-8 power unit, set to deliver 1,200hp (895kW). This engine had not previously been used for a rail application in England, but had been used in Western Australia and Ireland. The engine would probably not have been accepted by the BTC, except for the joint venture with Metropolitan Vickers, with which the BTC held much faith. The use of two-stroke engines for a British rail application was, and still is, very restricted, the only other types being the 'Deltic' units fitted to the prototype, 'Baby' and production 'Deltic' fleets and the Electro Motive prime movers used in the Classes 59, 66 and 67 locos.

Construction of the first Co-Bo, No. D5700, commenced at Bowsfield in late 1956. The fabrication was all-steel, with a heavy underframe

and dragboxes being formed as a floor pan, on to which side and end skeleton members were fitted. These in turn were plated in medium-gauge steel. Access to internal equipment was provided by removable roof hatches, which were also hinged, and side inspection doors.

The first complete locomotive emerged in the summer of 1958 and looked most unusual with its odd bogie layout. Delivery of No. D5700 to BR at Derby was made in late summer, and trials were conducted over the Peak Forest route. Some initial proving tests with each new locomotive were carried out in the Stockton area, many of them with the locomotives still in undercoat.

The internal layout followed a more traditional style; both ends had full-width cabs, with the driving position on the left. Entrance into the cab was slightly more diverse however, with the door on the non-driving side located directly to the rear of the cab side window, while the entrance on the driving side was located some 12ft inward, with cab access through part of the equipment room.

At the number one end a cooler group was located, having side radiator elements and a roof-mounted fan. To the rear of this, past a small walkway, was the Crossley HST V-8 engine compartment, with a cab-cab walkway provided along one side. Coupled to the inner end of the engine was the Metropolitan Vickers generator group, which occupied a position approximately in the middle of the body. The generator group provided power for both traction and auxiliary equipment. Continuing towards the number two end, the control equipment, brake frame and Spanner Mk 1 steam train-heating boiler were located. Towards the middle of the locomotive was an electric cooker and a small toilet for use of the footplate staff.

The cab layout was also non-standard. The power controller, located on the driver's right side, was a wheel with a top knob in place of the usual push/pull handle. The power controller had 10 notches, which progressively increased the engine speed, and thus traction output, as it was moved anti-clockwise. In front of the driver were the usual gauges, ammeters and a speedometer, while on the driver's left were two brake controllers, one a straight air brake valve for the locomotive, and the other a proportional valve for the train, which progressively applied the locomotive brakes as well as the trains vacuum brakes. A floor-mounted Driver's Safety Device (DSD) pedal (or deadman's) was also fitted.

In the middle front of the cab end was a communicating door which, if coupled to another like-fitted loco, provided access between the two.

However, it is very unlikely that this was ever used, except for demonstration purposes or on the occasional test train.

The secondman's, or driver's assistant's, side of the cab was sparse with a seat, a horn valve and a DSD hold-over button on the side.

Front end equipment on the Co-Bos consisted of standard drawgear, with a central draw hook and coupling. Vacuum brake, steam heat and air control pipes were also attached to the buffer beam. Air operated warning horns were fitted just below buffer beam height, and were often the subject of damage from track debris. Multiple control equipment, conforming to the then standard electro magnetic (red circle) system was installed, which permitted up to three locos to be driven in multiple by one driver. When the Co-Bos were built, it was planned that the North American style of buck-eye or knuckle couplers would become standard in the UK, and for this reason facilities were incorporated at the build stage to retro-fit auto-couplers. This equipment was never installed.

The bogies were of a cast Commonwealth style, produced by English Steel Castings and supplied ready machined to Metropolitan Vickers at Bowsfield Works for wheeling. Traction motors, one attached to each axle, were supplied by Metropolitan Vickers, with brake equipment manufactured by Davies & Metcalfe.

When finished, the fleet was painted in standard BR green livery, offset by duck-egg blue applied round the side grilles, and on parts of the bogie frames, as well as a six-inch band between the two cab doors just above sole-bar height. Between the bogies, the battery boxes and underframe equipment were finished in mid-grey, while the buffer surrounds were painted signal red. The buffer beams remained green. BR Lion and Wheel logos were applied to the rear of the cab doors at the number two end, while running numbers in white transfer were carried below the driver's cab-side window. Front-end steam-style identification discs were installed, these were hinged mid-way on the horizontal axes. When either open or closed these could show a white light. Two red electric tail lights were positioned on either side of the front communicating doors.

When delivered to the BTC, the fleet was allocated to Derby (17A), from where they were put to work, often in pairs, on the Midland main line, taking the class to St Pancras, Nottingham, Manchester and even as far north as Carlisle. As well as powering express passenger duties, the fleet found work on secondary passenger turns, and numerous freight diagrams.

Regrettably, after only a very short period in service, the power units started to cause major problems, and on many occasions during the late 1950s, several members of the class were out of service for extended maintenance and repair. Engine manufacturers Crossley carried out numerous modifications with the assistance of BTC engineers in an attempt to alleviate problems. Around 1960, when other main line diesels started to appear, the Co-Bo fleet was removed from front line duties, the engine problems now being compounded by excessive power unit noise and fumes entering the cab and passenger stock generating many complaints. The engine problems ⇨



Left: The assembly contract for the unique Co-Bo Type 2 order was awarded to the Metropolitan Vickers Bowsfield Works in Stockton-on-Tees, where metal was first cut at the very end of 1956. Here we see an inverted frame. **CJM-C**

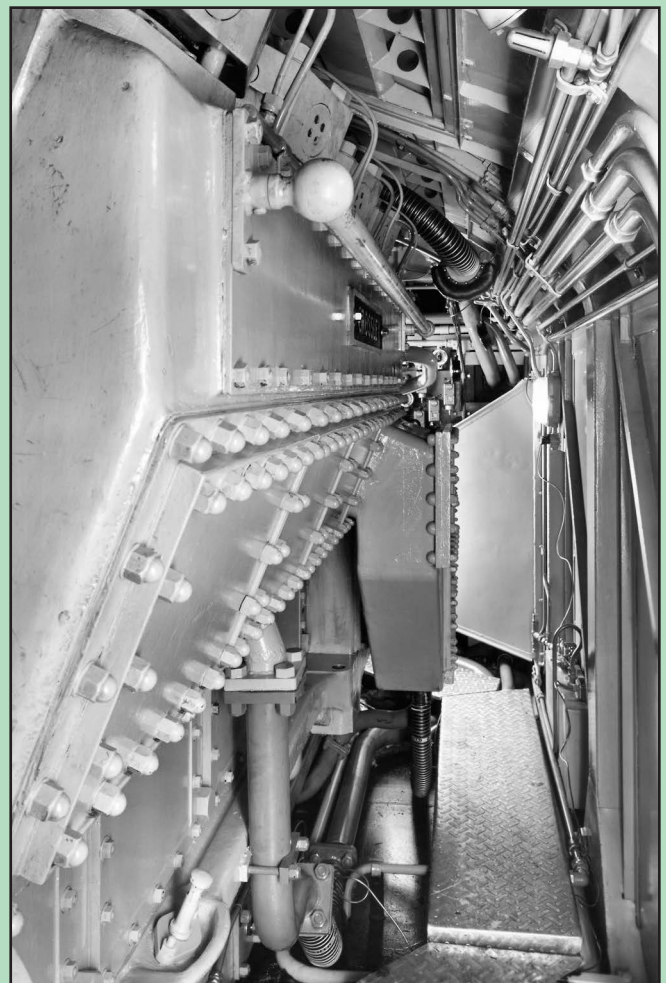


Above: A very proud moment for the design and production staff at Metropolitan Vickers Bowsfield Works in Stockton-on-Tees, when the pioneer of the Co-Bo fleet No. D5700 was lined up outside the factory for an official photographic shoot. The loco is seen from its 'Co' or six wheel end, showing how the cab door on the drivers side was set way back from the front end. **CJM-C**

Below: What the driver saw when walking between cabs using the internal walkway, this is the view alongside the Crossley HSTV 8 power unit. Lots of trip hazards and items to run into, especially if the train was travelling at speed. **CJM-C**

1957 number range:	D5700-D5719
Former class codes:	D12/1, later 12/5
Built by:	Metropolitan Vickers
Introduced:	1958-59
Wheel arrangement:	Co-Bo
Weight (operational):	97 tonnes
Height:	12ft 8½in (3.87m)
Width:	9ft 2½in (2.81m)
Length:	56ft 7½in (17.26m)
Min curve negotiable:	3½ chains (70.35m)
Maximum speed:	75mph (121km/h)
Wheelbase:	42ft 7in (12.98m)
Bogie wheelbase:	Bo - 8ft 6in (2.59m) Co - 12ft 2½in (3.72m)
Bogie pivot centres:	32ft 4in (9.86m)
Wheel diameter:	3ft 3½in (1m)
Brake type:	Vacuum
Sanding equipment:	Pneumatic
Route Availability:	8
Heating type:	Steam - Spanner Mk 1
Multiple coupling restriction:	Red Circle
Brake force:	35 tonnes
Engine type:	Crossley HSTV 8
Engine horsepower:	1,200hp (895kW)
Power at rail:	942hp (702kW)
Tractive effort:	50,000lb (222.4kN)
Cylinder bore:	10½in (266.7mm)
Cylinder stroke:	13½in (342.9mm)
Main generator type:	Met Vic TG4204
Aux generator type:	Met Vic TAG
Number of traction motors:	5
Traction motor type:	Met Vic 137 BZ
Gear ratio:	15:67
Fuel tank capacity:	510gal (2,320lit)
Cooling water capacity:	90gal (409lit)
Lub oil capacity:	30gal (136lit)
Boiler water capacity:	600gal (2,730lit)

Technical Description



were by now serious, many locomotives working only around five days between failures.

Records at the PRO show that No. D5719, only worked for just 29 days out of the first 100 in 1960! The main engine defect was cracks in the crankcase, but others included defective cylinder heads and major oil leaks which left the engine room floors awash with oil and water. Following the introduction of 'Peaks' to Derby shed, the Co-Bos were relegated to other work. One duty for which the class will always be remembered was the 'Condor' (Container door to door) freight service, which the class operated daily between Hendon (London) and Gushetfaulds (Glasgow), covering the 404½ miles in just 10 hours. For this duty, which usually consisted of 27 single-container wagons weighing 550 tons, a pair of locomotives was diagrammed. A slight revision to the fleet allocation took Nos. D5712-D5719 to Cricklewood Shed (14A) in the early part of 1960.

The serious technical problems with the fleet saw the gradual storing of the class from the beginning of 1961, with major refurbishment of numerous components undertaken at the Metropolitan Vickers works at Dukinfield, Manchester. These included the complete renovation of the power units and fitting of new design crankcases with strengthened members.

Upon release from works, the entire fleet was moved to Barrow-in-Furness depot (12E) for use in the Barrow and Workington area at the head of both passenger and freight duties. The class remained at Barrow until 1966, when they were transferred to Carlisle (12A). From there, they still operated over the Cumbrian coast route, but workings over Shap were not uncommon. Even after refurbishment, serious engine problems still occurred if the locos were put on heavy long-distance duties for prolonged periods. Crossley, which was still keen to demonstrate its ability to cope with the problems, again redesigned the crankcase assembly, but this still gave trouble. A demonstration modified crankcase was supplied to BR at Derby and fitted to No. D5705 just a few weeks before authorisation was given for fleet withdrawal. One option considered in the mid-

1960s was re-engineing the entire fleet using an established English Electric prime mover, but this was not progressed on cost grounds.

During the course of the original refurbishment work, the only noticeable structural difference made was the removal of the wrap-round cab-front windows, and their replacement with smaller flat screens mounted in a rubber surround.

Towards the mid-1960s, all Co-Bo's were given yellow panel front panels, later extended to the full cab end. Although several repaints were carried out during their lives, only one locomotive, No. D5701, was outshopped in standard BR rail blue with a full yellow end. This was carried out at BR Crewe Works following classified overhaul in 1966.

During the course of the early-1960s repaints the original duck-egg blue grilles were repainted in off-white or grey.

During 1967-1968 the Co-Bo fleet, by now classified under the BR numerical system as Class 28, was yet again suffering serious failures, mainly concerning the engine and control equipment. With numerous locomotives of other types now available, returning a far better miles per casualty figure, the decision was taken in late 1967 not to authorise any further major expenditure on the fleet, and withdrawal was authorised for out-of-service examples. Six locomotives were withdrawn in December 1967, with the remainder deleted from stock in 1968. During the 1960s all major repairs were undertaken at Crewe Works, where by late 1967 several members could be found being cannibalised to keep others running.

One locomotive, No. D5705, was transferred to departmental stock during December 1968 at the Railway Technical Centre, Derby, where it was renumbered to S15705 and used for test train haulage under the control of BR Research. This locomotive was the example fitted with a re-designed Crossley crankcase, which during use on test trains proved very successful!

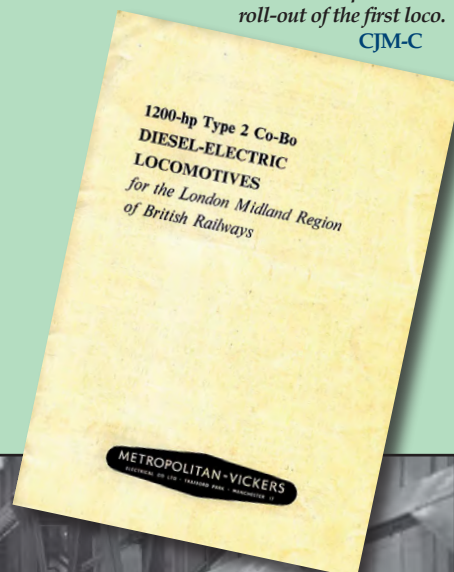
After a period working test trains, the loco was replaced by a spare 'Baby Deltic'. The Co-Bo was then allocated for carriage pre-heating duties at various sites including Landore, Bristol and Derby. For these duties it was

again renumbered to TDB968006. Following final withdrawal from BR in 1977, No. TDB968006 lay at various locations until it was saved for preservation by a small group, which at first stored it at Swindon, and later moved it to the PeakRail line at Matlock in Derbyshire. In more recent years the loco has been under restoration at the East Lancs Railway, Bury. Restoration is progressing well, and the locomotive should be in an operational condition in the next few years.

The Co-Bos are one of the most unsuccessful of any of the 'pilot' order types. They were in service for under 10 years, and during this time spent over a year stored. However, the class introduced diesel-traction to the Midland main line and was one of the most interesting early diesel classes. ■

Below: The Co-Bo design was based on a fabricated frame onto which a bodyside skeleton frame was assembled, the latter then being plated with medium gauge steel plate. The top deck of the base frame formed the floor pan and was also plated in a contour to suit internal fittings. This picture shows two welders placing and fitting some of the cross members, onto which the roof sections would be applied. CJM-C

Inset: The Metropolitan-Vickers produced brochure handed out to the press at the roll-out of the first loco. CJM-C



Modern LOCOMOTIVES ILLUSTRATED

The **ALL TIME** Locomotive Class and Sub-Class Directory

Right back from when railways began, a classification system was adopted for locomotives, and later multiple unit stock. In terms of 'modern traction' a system of classification coding was introduced in 1948 under the British Transport Commission, to identify the growing number of locomotives and thus providing a means of staff knowing power output and thus use of a specific locomotive. Frequently these codes would be shown on driver's rosters, helping to make sure the correct type of locomotive was allocated to specific trains.

1948 British Transport Commission system

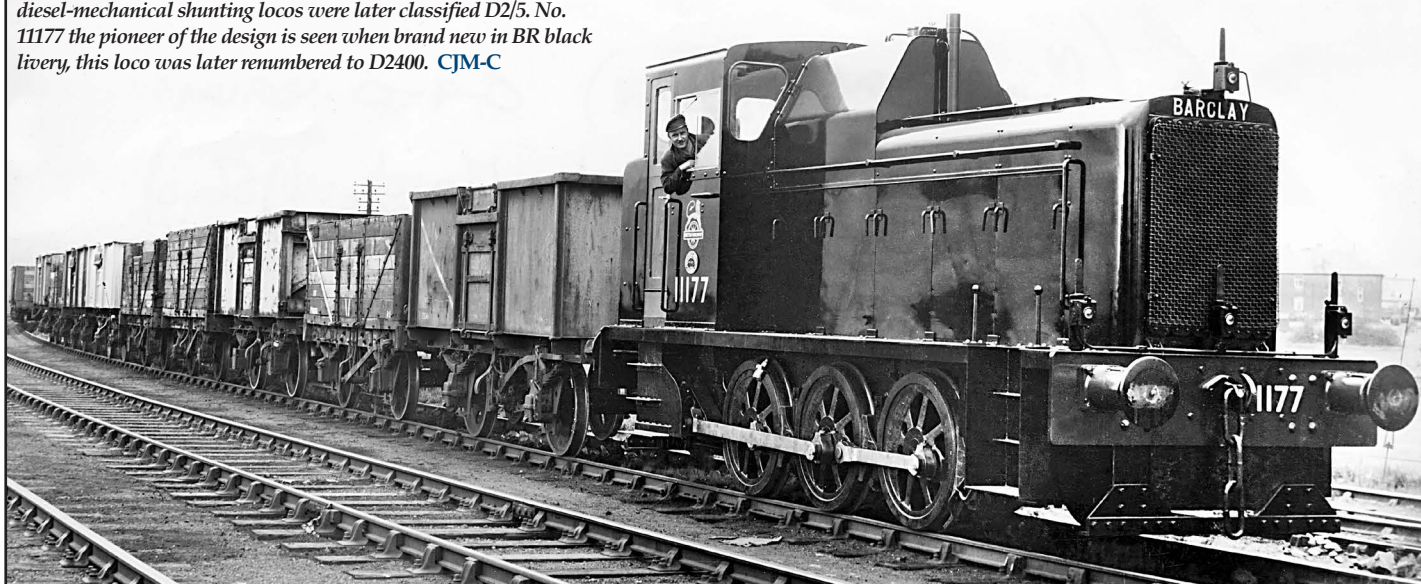
Diesel

DEJ1	0-6-0 shunters 15000-15003 - amended to D3/9
DEJ2	0-6-0 shunter 15004 - amended to D3/14
DEJ3	0-6-0 LMS/BR shunters 12033-12138 (LMS 7120-7138) - amended to D3/8
DEJ4	0-6-0 standard shunter D3000-D4192 - amended to D3/2
DEJ5	0-6-0 standard shunters D3xxx series with Blackstone engine - amended to D3/4
DEJ7	BR standard 0-6-0 shunters 13152-13166 (D3152-D3166) - amended to D3/5
DJ12/1	RSH 0-6-0 shunters 11100-11115 (D2200-D2214) - amended to D2/3
DJ12/2	RSH 0-6-0 shunters 11116-11229 (D2215-D2340) - amended to D2/13
DJ13	Hunslet 0-6-0 shunters 11136-11143, 11161-11176 (D2550-D2573) - amended to D2/8
DJ13/2	Hunslet 0-6-0 shunters D2574-D2618 - amended to D2/9
DJ14	Andrew Barclay 0-6-0 shunters 11177-11186 (D2400-D2409) - amended to D2/5
DJ15	BR Standard 0-6-0 shunters 11187-11211 (D2000 D2199/D2370-D2399) - amended to D2/2
DMS1	RSH 0-6-0 shunters 11100-11229 (D2200-D2341) - amended to DJ12/1 and DJ12/2
DY1	Hunslet 0-4-0 shunters 11500-11502 (D2950-D2952) - amended to D1/1
DY2	Andrew Barclay shunters 11503-11506 (D2953-D2956) - amended to D1/2
DY5	Ruston & Hornsby 0-4-0 shunters 11507-11508 (D2957 D2958) - amended to D1/3
DY11	NBL 0-4-0 shunters 11700-11707 (D2700-D2707) - amended to D2/1
DY11	NBL 0-4-0 shunters 11708-11719 (D2708-D2780) - amended to D2/10

Electric

EB1	1914 built Bo-Bo electric locos for Shildon electrification
EE1	1922 built 2-Co-2 electric loco for NER main-line electrification
EM1	BR Doncaster/Gorton Bo-Bo electric locos for Manchester Sheffield line - amended to BR TOPS Class 76
EM2	BR Gorton Co-Co electric locos for Manchester-Sheffield line - amended to BR TOPS Class 77
ES1	1905 built Bo-Bo electric locos for Newcastle

Classified by the BTC as DJ14, the Andrew-Barclay built 0-6-0 diesel-mechanical shunting locos were later classified D2/5. No. 11177 the pioneer of the design is seen when brand new in BR black livery, this loco was later renumbered to D2400. CJM-C



1955 British Transport Commission/BR system

D1/1	Hunslet 0-4-0 shunters 11500-11502 (D2950-D2952) - amended to 1/15
D1/2	Andrew Barclay shunters 11503-11506 (D2953-D2956) - amended to 1/12
D1/3	Ruston & Hornsby 0-4-0 shunters 11507-11508 (D2957-D2958) - amended to 1/16
D1/4	Yorkshire Engine 0-4-0 shunters D2850-D2869 (02001-02004) - amended to 1/17
D2/1	NBL 0-4-0 shunters 11700-11707 (D2700-D2707) - amended to 2/4A
D2/2	BR Standard 0-6-0 shunters 11187-11211 (D2000 D2199/D2370-D2399) - amended to 2/1
D2/3	RSH 0-6-0 shunters 11100-11115 (D2200-D2214)
D2/4	RSH 0-6-0 shunters 11121-35/149-160/212-229 (D2215-D2273) small wheels - amended to 2/13
D2/5	Andrew Barclay 0-6-0 shunters 11177-11186 (D2400-D2409) - amended to 2/12A
D2/6	Andrew Barclay 0-4-0 shunters D2410-D2444 - amended to 2/12
D2/7	Hudswell Clarke 0-6-0 shunters 11116-11120/11144-11148 (D2500-D2509) - amended to 2/14
D2/8	Hunslet 0-6-0 shunters 11136-11143, 11161-11176 (D2550-D2573) - amended to 2/15A
D2/9	Hunslet 0-6-0 shunters D2574-D2618 - amended to 2/15
D2/10	NBL 0-4-0 shunters 11708-11719 (D2708-D2780) - amended to 2/4 and 2/4B
D2/11	Brush prototype 0-4-0 shunter D2999
D2/12	Hudswell Clarke 0-6-0 shunters D2510-D2519 - amended to 2/14A
D2/13	RSH 0-6-0 shunters D2274-D2340 - amended to 2/13
D3/1	NBL 0-4-0 shunters D2900-D2913 - amended to 3/4
D3/2	0-6-0 standard shunter D3000-D4192 - amended to 3/1
D3/3	BR standard 0-6-0 13117-13126 (D3117-D3126) - amended to 3/1B
D3/4	0-6-0 standard shunter D3xxx series with Blackstone engine - amended to 3/1C
D3/5	BR standard 0-6-0 shunters 13152-13166 (D3152-D3166) - amended to 3/1D
D3/6	0-6-0 LMS shunters 12000-12002
D3/7	0-6-0 LMS shunters 12003-12032 - amended to 2/8
D3/8	0-6-0 LMS/BR shunter 12033-12138 (LMS 7120-7138) - amended to 3/8A
D3/9	LNER design 0-6-0 shunters 15000-15003 - amended to 3/10
D3/10	GWR design 0-6-0 shunter 15100 - amended to 3/11A
D3/11	GWR design 0-6-0 shunters 15101-15106 - amended to 3/11
D3/12	SR design 0-6-0 shunters 15201-15203 - amended to 3/9A
D3/13	BR(SR) design 0-6-0 shunters 15211-15236 - amended to 3/9
D3/14	LNER design 0-6-0 shunter 15004 - amended to 3/2
D8/1	BTH Type 1 Bo-Bo D8200-D8243 - amended to 8/5
D8/2	NBL Type 1 Bo-Bo D8400-D8409 - amended to 8/4
D10/1	NBL Type 2 D6100-D6157 with 1,000hp output - amended to 10/4
D10/2A	NBL Type 2 D6300-D6305 - amended to 10/4A
D10/3	English Electric Type 1 Bo-Bo D8000-D8199/D8300-D8327 - amended to 10/3
D11/1	BR Type 2 Bo-Bo D5000-D5049 - amended to 11/1
D11/1	English Electric Type 2 Bo-Bo D5900-D5909 - amended to 11/3
D11/2	NBL Type 2 D6100-D6157 with 1,100hp output - amended to 11/4
D11/3	BR Type 2 Bo-Bo D5050-D5150 - amended to 11/1A
D11/4	BRCW Type 2 Bo-Bo D5300-D5319 - amended to 11/6
D11/5	NBL Type 2 B-B D6306-D6357 - amended to 11/4A
D12/1	BR Type 2 Bo-Bo D5151-D7677 - amended to 12/1
D12/1	Metro-Vickers Type 2 Co-Bo D5700-D5719 - amended to 12/5
D12/2	Brush Type 2 A1A-A1A D5500-D5519 (with original engines) - amended to D14/2, 14/2
D12/3	BRCW Type 2 Bo-Bo D5347-D5415 - amended to 12/6
D13/1	Brush Type 2 A1A-A1A D5520-D5862 (with original engines)
D14/2	Brush Type 2 A1A-A1A D5500-D5519 (re-engined) - amended to 14/2
D14/2	Brush Type 2 A1A-A1A D5520-D5862 (re-engined) - amended to 14/2
D15/1	BRCW Type 3 Bo-Bo D6500-D6585 (Standard) - amended to 15/6
D15/2	BRCW Type 3 Bo-Bo D6586-D6597 (Hastings) - amended to 15/6A
D16/1	LMS Prototype Co-Co 10000-10001 - amended to 16/8



Left: Two generations of diesel loco meet on the turntable at Old Oak Common depot. In the foreground is Beyer-Peacock 'Hymek' No. D7022, originally given the numeric classification of D17/2, under TOPS the locos were given the Class 35 identity. In the background we see English Electric Type 4 No. 50001, this design emerged as part of the 1962 BTC classification as class 27/3 which was amended under the TOPS system to Class 50. **CJM**

D16/2	SR Prototype 1Co-Co1 10201-10203 - amended to 16/9
D16/3	Brush Type 2 A1A-A1A D5545, D5655-D5670 (1,600hp modified) - amended to 16/2
D17/1	English Electric Type 3 Co-Co D6600-D6999 - amended to 17/3
D17/2	Beyer-Peacock Type 3 B-B 'Hymek' D7000-D7100 - amended to 17/7
D20/1	English Electric Type 4 1Co-Co1 D200-D399 - amended to 20/3
D20/1	BR Swindon Type 4 B-B 'Warship' D803-D832/D866-D870 - amended to 20/1
D20/2	North British Type 4 A1A-A1A 'Warship' D600-D604 - amended to 20/4
D22/1	BR Swindon Type 4 B-B 'Warship' D800-D802 - amended to 22/1
D22/2	NBL Type 4 B-B 'Warship' D833-D865 - amended to 22/2
D23/1	BR Type 4 1Co-Co1 'Peak' D1-D10 - amended to 23/1
D25/1	BR Type 4 1Co-Co1 D11-D137 - amended to 25/1
D27/1	BR Swindon Type 4 C-C 'Western' D1000-D1073 - amended to 27/1
D33/1	English Electric 'Deltic' Type 5 Co-Co D9000-D9021 - amended to 33/3

Right: Although always identified by staff and enthusiasts as the 'Western' class, the BR Swindon/Crewe-built Type 4 2,700hp diesel-hydraulic locos were given the classification of D27/1 when introduced, this later changed to just 27/1 and under the TOPS system, Class 52 was allocated. The locos were however not renumbered into the five-digit class prefix number system. No. D1009 is seen at Plymouth. If all members of the 'Western' design had been renumbered this loco would have been No. 52009. CJM



1962 British Transport Commission/BR system

Diesel

1/12	Andrew Barclay shunters 11503-11506 (D2953-D2956) - amended to TOPS Class 01
1/15	Hunslet 0-4-0 shunters 11500-11502 (D2950-D2952)
1/16	Ruston & Hornsby 0-4-0 shunters 11507-11508 (D2957-D2958)
1/17	Yorkshire Engine 0-4-0 shunters D2850-D2869 (02001-02004) - amended to TOPS Class 02
2/1	BR Standard 0-6-0 shunters 11187-11211 (D2000-D2199/D2370-D2399) - amended to TOPS Class 03
2/2	Brush 0-4-0 shunter D2999
2/4	NBL 0-4-0 shunters 11708-11719 (D2708-D2719)
2/4A	NBL 0-4-0 shunters 11700-11707 (D2700-D2707)
2/4B	NBL 0-4-0 shunters D2720-D2780
2/12	Andrew Barclay 0-4-0 shunters D2410-D2444 - amended to TOPS Class 06
2/12A	Andrew Barclay 0-6-0 shunters 11177-11186 (D2400-D2409)
2/13	RSH 0-6-0 shunters D2215-D2340 - amended to TOPS Class 04
2/13A	RSH 0-6-0 shunters D2200-D2214 - amended to TOPS Class 04
2/14	Hudswell Clarke 0-6-0 shunters 11116-11120/11144-11148 (D2500-D2509)
2/14A	Hudswell Clarke 0-6-0 shunters D2510-D2519
2/15	Hunslet 0-6-0 shunters D2574-D2618
2/15A	Hunslet 0-6-0 shunters 11136-11143, 11161-11176 (D2550-D2573) - amended to TOPS Class 05
2/16	Ruston & Hornsby 0-6-0 shunters D2985-D2998 - amended to TOPS Class 07
3/1	GWR design 0-6-0 shunters 15101-15106
3/1	0-6-0 standard shunter D3000-D4192 - amended to TOPS Class 08/09
3/1B	BR standard 0-6-0 13117-13126 (D3117-D3126)
3/1C	0-6-0 standard shunter D3xxx series with Blackstone engine - amended to TOPS Class 10
3/1D	BR standard 0-6-0 shunters 13152-13166 (D3152-D3166)
3/2	LNER design 0-6-0 shunter 15004
3/4	NBL 0-4-0 shunters D2900-D2913
3/8	LMS 0-6-0 shunters 12003-12032
3/8A	0-6-0 LMS/BR shunter 12033-12138 (LMS 7120-7138) - amended to TOPS Class 11
3/9	BR(SR) design 0-6-0 shunters 15211-15236 - amended to TOPS Class 12
3/9A	SR design 0-6-0 shunters 15201-15203
3/10	LNER design 0-6-0 shunters 15000-15003
3/11A	GWR design 0-6-0 shunter 15100
6/1	BR Swindon 0-6-0 transfer locos D9500-D9555 - amended to TOPS Class 14
7/1	BR standard 0-6-0+0-6-0 master/slave units D4500-D4502 - amended to TOPS Class 13
8/4	NBL Type 1 Bo-Bo D8400-D8409 - amended to TOPS Class 16
8/5	BTH Type 1 Bo-Bo D8200-D8243 - amended to TOPS Class 15
9/18	Clayton Type 1 Bo-Bo D8500-D8587 - amended to TOPS Class 17
9/19	Clayton Type 1 Bo-Bo D8588-D8616 - amended to TOPS Class 17



Above: The first generation AC electric locomotives for the London Midland West Coast electrification were classified in the AL (Ac Locomotive) system. The Beyer-Peacock built fleet Nos. E3046-E3055 were classified as AL2, which was later changed under the TOPS system to Class 82. Devoid of any branding. No. E3046 is seen when brand new and undergoing test running. This locomotive was withdrawn prior to the TOPS system being introduced and broken up in 1971. CJM-C

10/3	English Electric Type 1 Bo-Bo D8000-D8199/D8300-D8327 - amended to TOPS Class 20
10/4	NBL Type 2 D6100-D6157 with 1,000hp output - amended to TOPS Class 21
10/4A	NBL Type 2 D6300-D6305 - amended to TOPS Class 22
11/1	BR Type 2 Bo-Bo D5000-D5049 - amended to TOPS Class 24/0
11/1A	BR Type 2 Bo-Bo D5050-D5150 - amended to TOPS Class 24/1
11/3	English Electric Type 2 'Baby Deltic' D5900-D5909 - amended to TOPS Class 23
11/4	NBL Type 2 D6100-D6157 with 1,100hp output - amended to TOPS Class 21
11/4A	NBL Type 2 D6306-D6357 - amended to TOPS Class 22
11/6	BRCW Type 2 Bo-Bo D5300-D5319 - amended to TOPS Class 26/0
11/6A	BRCW Type 2 Bo-Bo D5320-D5346 - amended to TOPS Class 26/1
12/1 BR	Type 2 Bo-Bo D5151-D7677 - amended to TOPS Class 25
12/2	Brush Type 2 A1A-A1A D5500-D5519 (with original engines) - amended to Class 14/2
12/5	Metro-Vickers Type 2 Co-Bo D5700-D5719 - amended to TOPS Class 28
12/6	BRCW Type 2 Bo-Bo D5347-D5415 - amended to TOPS Class 27
13/4	NBL Type 2 from D61xx fleet rebuilt - amended to TOPS Class 29
14/2	Brush Type 2 A1A-A1A D5500-D5519 (re-engined) - amended to TOPS Code 31/0
14/2	Brush Type 2 A1A-A1A D5520-D5862 (re-engined) - amended to TOPS Class 31/1 and 31/4 etc
15/6	BRCW Type 3 Bo-Bo D6500-D6585 (standard) - amended to TOPS Class 33/0 (33/1)
15/6A	BRCW Type 3 Bo-Bo D6586-D6597 (Hastings) - amended to TOPS Class 33/2
16/2	Brush Type 2 A1A-A1A D5545, D5655-70 (1,600hp) - amended to Class 31/1
16/8	LMS Prototype Co-Co 10000-10001
16/9	SR Prototype 1Co-Co1 10201-10203
17/3	English Electric Type 3 Co-Co D6600-D6999 - amended to TOPS Class 37
17/7	Beyer-Peacock Type 3 B-B 'Hymek' D7000-D7100 - amended to TOPS Class 35
20/1	BR Swindon Type 4 B-B 'Warship' D803-D832/D866-D870 - amended to TOPS Class 42
20/3	English Electric Type 4 1Co-Co1 D200-D399 - amended to TOPS Class 40
20/4	North British Type 4 A1A-A1A 'Warship' D600-D604 - amended to TOPS Class 41
22/1	BR Swindon Type 4 B-B 'Warship' D800-D802 - amended to TOPS Class 42
22/2	NBL Type 4 B-B 'Warship' D833-D865 - amended to TOPS Class 43
23/1	BR Type 4 1Co-Co1 'Peak' D1-D10 - amended to TOPS Class 44
25/1	BR Type 4 1Co-Co1 D11-D137 - amended to TOPS Class 45
25/1A	BR Type 4 1Co-Co1 D138-D193 - amended to TOPS Class 46
26/2	Brush Type 4 Co-Co D1702-D1706 - amended to TOPS Class 48
27/1	BR Swindon Type 4 C-C 'Western' D1000-D1073 - amended to TOPS Class 52
27/2	BR/Brush Type 4 Co-Co D1100-D1999 - amended to TOPS Class 47
27/3	English Electric Type 4 Co-Co D400-D449 - amended to TOPS Class 50
33/3	English Electric 'Deltic' Type 5 Co-Co D9000-D9021 - amended to TOPS Class 55

Electric

AL1	BRCW Bo-Bo E3001-E3023, E3096-E3097 - amended to TOPS Class 81
AL2	Beyer Peacock Bo-Bo E3046-E3055 - amended to TOPS Class 82
AL3	English Electric Bo-Bo E3024-E3035, E3098-E3100 - amended to TOPS Class 83
AL4	NBL Bo-Bo E3036-E3045 - amended to TOPS Class 84
AL5	BR Doncaster Bo-Bo E3056-E3095 - amended to TOPS Class 85
AL6	BR/English Electric Bo-Bo E3101-E3200 - amended to TOPS Class 86

1973 TOPS Classification

Class 01	Andrew Barclay 0-4-0DM, 11503-11506* (D2953-D2956), (01001-01002). * Also Departmental No. 81 Industrial 0-4-0 and 0-6-0 locomotives authorised for Network Rail operation
Class 02	Yorkshire Engine Co 0-4-0DH, D2850-D2869 (02001-02004)
Class 03	BR 0-6-0DM, D2000-D2199, D2370-D2300 (03004-03399), Nos. 11187-11211 allocated not carried
Class 04	Drewry 0-4-0DM, 11100-11229 (D2200-D2341)
Class 05	Hunslet 0-6-0DM, 11136-11143, 11161-11176, 05001 (D2550-D2618)
Class 06	Andrew Barclay 0-4-0DM, D2410-D2444 (06001-06010)
Class 07	Ruston & Hornsby 0-6-0DE, D2985-D2998 (07001-07014)
Class 08	BR 'Standard' 0-6-0DE, 13000-13116/13127-13136/13167-13366, (D3000-D3116/D3127-D3136/D3167-D3438/D3454-D3472/D3503-D3511/D3652-D3664/D3672-D4048/D4095-D4098/D4115-D4192), 08001-08958/08991-08995 Class 08/0 - Basic locomotive Class 08/9 - Modified with reduced height cab for BPGV line operation
Class 09	BR 'Standard' 0-6-0DE with increased speed D3665-D3671/D3719-D3721/D4099-D4114, (09001-09026) Also covers conversion of Class 08s to higher-speed locos Class 09/0 - Basic locomotive Class 09/1 - 09101-09107 - modified Class 08 with 110V electric system Class 09/2 - 09201-09205 - modified Class 08 with 90V electric system
Class 10	BR 'Standard' 0-6-0DE fitted with Lister-Blackstone/GEC equipment D3137-D3151/D3439-D3453/D3473-D3502/D3512-D3651/D4049-D4094
Class 11	LMSR/BR 0-6-0DE, 12033-12138
Class 12	SR/BR 0-6-0DE, 15211-15236
Class 13	BR 'Master-Slave' 0-6-0+0-6-0, D4500-D4502 (13001-13003)
Class 14	BR 0-6-0DH Type 1, D9500-D9555
Class 15	British Thomson Houston Bo-Bo Type 1, D8200-D8243
Class 16	North British Bo-Bo Type 1, D8400-D8409
Class 17	Clayton Bo-Bo Type 1, D8500-D8616 Class 17/1 - Standard locomotive with GEC equipment Class 17/2 - Modified locomotives with GEC equipment Class 17/3 - Standard locomotives with Crompton equipment
Class 18	Allocated to planned 'new generation' Type 1 for Railfreight trip working in 1985 - project abandoned
Class 19	Not issued/allocated
Class 20	English Electric Bo-Bo Type 1 DE, D8000-D8199/D8300-D8327 (20001-20228) Class 20/0 - Standard locomotive Class 20/3 - Modified 20/0s for Peak District aggregate workings Class 20/3 - Modified 20/0s for Direct Rail Services, some now in private sector Class 20/9 - Modified 20/0s for Hunslet Barclay, later sold to private sector
Class 21	North British Bo-Bo Type 2 DE, D6100-D6157 (some modified to Class 29) EWS-Euro Cargo Rail (DB-C) Vossloh Bo-Bo, used in Europe authorised to operate to Dollands Moor
Class 22	North British B-B Type 2 DH, D6300-D6357 SNCF Class 222xx electric locos authorised to operate through Channel Tunnel
Class 23	English Electric Bo-Bo Type 2 DE, D5900-D5909
Class 24	BR Bo-Bo Type 2 DE, D5000-D5150 (24001-24150) Class 24/0 - Standard locomotives [Originally classified 24/1, altered to 24/0] Class 24/1 - Locomotives with modified electrical equipment [Originally classified as 24/2, altered to 24/1]
Class 25	BR Bo-Bo Type 2 DE, D5151-D5299/D7500-D7677 (25001-25327) Class 25/0 - Original design of electrical equipment Class 25/1 - Locomotives fitted with revised traction motors and control equipment Class 25/2 - Locomotives fitted with revised control equipment Class 25/3 - Locomotives fitted with revised control equipment Class 25/9 - Locomotives modified by BR Railfreight sector for chemical and industrial mineral duties
Class 26	Birmingham RCW Bo-Bo Type 2 DE, D5300-D5346 (26001-26046) Class 26/0 - Original design locomotives Class 26/1 - Fitted with revised electrical control equipment

Right: When the standard English Electric single-cab Type 1 fleet was introduced, the classification allocated was D10/3, this was later amended to just 10/3. Under the 1973 Total Operations processing System (TOPS) two-digit classification system the fleet became Class 20. As with many designs over the following years many sub-classes have been introduced to identity different equipment or use. During its period of preservation, No. D8110 (20110) is seen in immaculate 1960s BR green livery at Buckfastleigh on the South Devon Railway. **CJM**





Above: The Birmingham Carriage & Wagon-built Type 3s for the Southern Region were originally classified as D15 and later 15/6 for 'standard' locos and 15/6A for narrow profile locos for the Hastings line. Under the TOPS system the fleet became Class 33, and following introduction of push-pull locos and the evolution of the TOPS numeric system, the 19 push-pull locos were given the Class 33/1 sub-class. No. 33119 is illustrated. **CJM**

Class 27	Birmingham RCW Bo-Bo Type 2 DE, D5347-D5415 (27001-27066 / 27101-27124 / 27201-27212) Class 27/0 - Basic locomotive Class 27/1 - Modified for push-pull working fitted with steam heat Class 27/2 - Modified for push-pull working, fitted with electric train heat
Class 28	Metropolitan Vickers Co-Bo Type 2 DE, D5700-D5719
Class 29	North British Bo-Bo Type 2 DE, D61xx series
Class 30	Brush A1A-A1A Type 2 DE, D5500-D5519 - original design, later reclassified as 31/0
Class 31	Brush A1A-A1A Type 2 DE, D5500-D5699 / D5800-D5862 (31001-31019, 31101-31602) Class 31/0 - Original loco fitted with electro-magnetic control, originally classified as Class 30 Class 31/1 - Standard locomotives Class 31/4 - Locomotives modified with electric train heat equipment Class 31/5 - Class 31/4 locomotives with ETH equipment isolated Class 31/6 - Class 31/1s fitted with through ETH wiring and jumpers Class 31/9 - Departmental operated locomotives
Class 32	Not issued / allocated
Class 33	Birmingham RCW Type 3 DE, D6500-D6597 (33001-33065 / 33101-33119 / 33201-33212) Class 33/0 - Basic locomotive Class 33/1 - Modified for push-pull working Class 33/2 - Built to narrower body profile for Hastings route operations Class 33/3 - Class 33/2s modified for 'Linkspan' duties at Dover Docks
Class 34	Proposed classification for push-pull modified Class 33s, later classified as 33/1
Class 35	Beyer Peacock Type 3 DH, D7000 - D7100
Class 36	Proposed for new build of Railfreight locomotive - project abandoned
Class 37	English Electric Co-Co Type 3 DE D6600-D6608, D6700-D6999 (37001-37906) Class 37/0 - Basic locomotive Class 37/3 - Locomotives modified with CP7 bogies Class 37/4 - Locomotives modified with electric train heat Class 37/5 - Locomotives with revised gearing for freight operations Class 37/6 - Locomotives modified for European Passenger Services 'NightStar' operations Class 37/7 - Locomotives with revised gearing and extra weight for increased adhesion for freight operations Class 37/9 - Locomotives modified with prototype power units
Class 38	Proposed for new build of Railfreight locomotive - project abandoned in favour of Class 60
Class 39	Not issued / allocated
Class 40	English Electric 1Co-Co1 Type 4 DE, D200-D399 (40001-40199)
Class 41	North British C-C Type 4 DH, D600-D604 'Warship' BR Prototype HST power cars 41001-41002 (43000-43001) Proposed for new build 2500hp Railfreight locomotive - project abandoned
Class 42	BR B-B Type 4 DH 'Warship' D800-D832 / D866-D870
Class 43	North British Type 4 DH 'Warship' D833-D865 BR prototype / production HST power cars 43000-43001 / 43002-43198 Class 43/0 - Original prototype power cars Class 43/1 - Production power cars Class 43/2 & 43/3 - Re-engineered power cars operated by CrossCountry and East Coast Class 43/4 - Re-engineered power cars operated by Great Central

Class 44	BR 1Co-Co1 Type 4 DE 'Peak', D1-D10 (44001-44010)
Class 45	BR 1Co-Co1 Type 4 DE 'Peak' D11-D137 (45001-45077 / 45101-45150) Class 45/0 - Locomotives fitted with steam train heating Class 45/1 - Locomotives fitted with electric train heat
Class 46	BR 1Co-Co1 Type 4 DE 'Peak' D138-D193 (46001-46056)
Class 47	BR/Brush Co-Co Type 4 Co-Co D1100-D1999 (47001-47976) Class 47/0 - Basic locomotive Class 47/2 - Modified Class 47/0 or 47/3 fitted with 'green spot' multiple control system Class 47/3 - Basic locomotive not fitted with a provision for steam heat Class 47/4 - Loco fitted with electric train heat or dual heat equipment Class 47/6 - 47601 Development loco for Class 56 equipment Class 47/6 - Nos. 47671-47677 fitted with enhanced electric train supply Class 47/7 - 47701-47717 modified for Scottish push-pull operation with Mk3 stock Class 47/7 - 47721-47799 modified for Res duties Class 47/8 - Class 47/4 fitted with long-range fuel tanks (officially still classified as 47/4) Class 47/9 - 47901 Development loco for Class 58 equipment Class 47/9 - 47971-47976 operated by Central Services sector
Class 48	Class 47 fitted with Sulzer LVA engine D1702-D1706 (47114-47118) Classification put forward for proposed new Type 4 build in 1984-85
Class 49	Not issued / allocated
Class 50	English Electric Co-Co Type 4, D400-D449 (50001-50050)
Class 51	Allocated to 'Super Deltic' project
Class 52	BR Type 4 C-C DH 'Western' D1000-D1073
Class 53	Brush prototype Type 4 Co-Co D0280 (D1200)
Class 54	Not issued / allocated
Class 55	English Electric Type 5 Co-Co 'Deltic' D9000-D9021 (55001-55022)
Class 56	BR/Brush Type 5 Co-Co 56001-56135 Class 56/0 - Basic locomotive Class 56/2 - Brush development loco Class 56/3 - Refurbished locos
Class 57	Brush/Porterbrook rebuilt of Class 47 with General Motors prime mover, 57001-57012, 57301-57316, 57601-57605 Class 57/0 - Basic loco modified originally for Freightliner Class 57/3 - Electric train supply fitted locos originally for Virgin Trains, now with private operators Class 57/6 - Electric train supply fitted locos for Great Western, one now with WCRC
Class 58	BR Type 5 Co-Co 58001-58050
Class 59	General Motors EMD Type 5 Co-Co freight locos built in the USA / Canada, 59001-59005, 59101-59104, 59201-59206 Class 59/0 - Original locos built for Foster Yeoman Class 59/1 - Locomotives built for ARC Class 59/2 - Locomotives built for National Power, now part of DB-Cargo fleet
Class 60	Brush Type 5 Co-Co, 60001-60100, 60500
Class 61	Not issued / allocated
Class 62	Allocated to a proposed General Motors Co-Co Type 5 for Railfreight
Class 63	Not issued / allocated
Class 64	Not issued / allocated
Class 65	Allocated to a proposed 4000hp Co-Co Type 5 using a Mirrlees V-16 prime mover
Class 66	General Motors EMD Co-Co Type 5 DE freight loco 66001-66957 Class 66/0 - EWS order Class 66/3 - Order for Fastline-Jarvis, later transferred to DRS Class 66/4 - Direct Rail Services original order, some locos now transferred to Freightliner Class 66/5 - Freightliner 'standard' order Class 66/6 - Freightliner "increased tractive effort" order Class 66/7 - GBRf Order Class 66/8 - Advenza Rail Freight (Cotswold Rail) locos, later covers Colas Rail Freight Class 66/9 - Freightliner locos
Class 67	Alstom/EMB Bo-Bo Type 5 DE, 67001 - 67030
Class 68	Vossloh/Stadler Bo-Bo Type 5 DE, 68001 - 68034
Class 69	Not issued / allocated
Class 70	SR/BR Raworth Co-Co electric locos, CC1-CC2. 20001-20003 General Electric Co-Co DE 70001-70020 / 70801-70817 Class 70/0 - Original order operated by Freightliner Class 70/8 - Operated by Colas Rail Freight

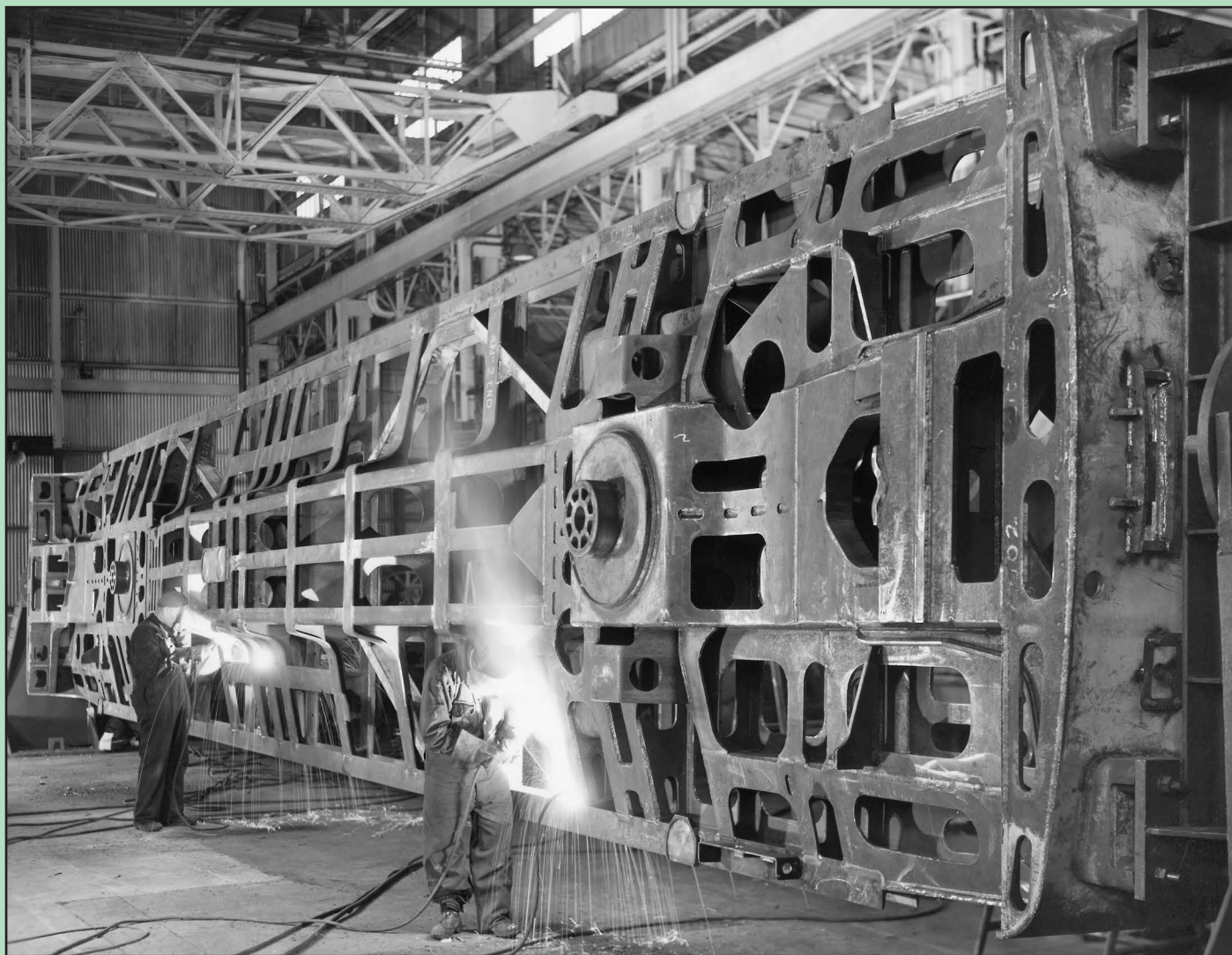
Right: When new traction was introduced following the original allocation of TOPS classifications, a new or unused numeric slot has to be issued. Even today, the old basis of higher the number the higher the power output remains. When the original American-built Foster Yeoman Type 5s emerged, they were given the Class 59 identity and as more locos under different ownership emerged, so various sub-classes were introduced, the original Foster Yeoman locos becoming Class 59/0 while the following ARC locos became Class 59/1 and the National Power (Now DB-C) locos were allocated the identity Class 59/2. No. 59004 is seen at Bishops Lydeard on the West Somerset Railway. **CJM**



Class 71	BR 750V dc 'booster' electric locos, Bo-Bo E5000-E5024 (71001-71014), classified HA by Southern Region
Class 72	Proposed original TOPS classification for the six prototype Eastleigh-built Class 73s
Class 73	BR 750V dc/Diesel Bo-Bo electro-diesel, E6001-E6049 (73001-73006/73101-73142/73201-73235/73801/73951-73952/73961-73971) Class 73/0 - Original Eastleigh built electro-diesels, classified by SR as JA Class 73/1 - Production English Electric-built locos, classified by SR as JB Class 73/2 - Locomotives modified for Gatwick Express operation Class 73/8 - Allocated to Civil Engineers locos in July 1989, not adopted Class 73/9 - Locomotives operated by MerseyRail Class 73/9 (73951-73952) RVEL rebuild for Network Rail Class 73/9 (73961-73971) Brush/Wabtec rebuild for GBRf/Caledonian Sleepers
Class 74	BR 750V dc/Diesel 'large' electro-diesel, E6101-E6110 (74001-74010)
Class 75	Not issued/allocated
Class 76	LNER/BR 1500V dc Bo-Bo electric locos E26000-E26057 (76001-76057)
Class 77	BR 1500V dc Co-Co electric locos E27000-E27006
Class 78	Not issued/allocated
Class 79	Not issued/allocated
Class 80	Metropolitan Vickers 'prototype' A1A-A1A electric loco, rebuilt from gas-turbine prototype, E1000 (E2001)
Class 81	Birmingham RCW, 25kV ac Bo-Bo electric, E3001-E3023/E3096-E3097 (81001-81022)
Class 82	Beyer Peacock, 25kV ac Bo-Bo electric, E3046-E3055 (82001-82008)
Class 83	English Electric, 25kV ac Bo-Bo electric, E3024-E3035/E3098-E3100 (83001-83015)
Class 84	North British, 25kV ac Bo-Bo electric, E3036-E3045 (84001-84010)
Class 85	BR, 25kV ac Bo-Bo electric, E3056-E3095 (85001-85040/85101-85114) Class 85/0 - Basic locomotive Class 85/1 - Modified for Railfreight operations
Class 86	BR/English Electric, 25kV ac electric, E3101-E3200 (86001-86901) Class 86/0 - Basic locomotive Class 86/1 - Modified with Class 87 style traction equipment Class 86/2 - Modified locomotives with Flexicoil suspension Class 86/3 - Modified with SAB resilient wheels Class 86/4 - Modified for Rail express systems use Class 86/5 - Modified for Freightliner and block train operation Class 86/6 - Modified for Railfreight Distribution, later Freightliner operation Class 86/7 - Modified for Electric Traction Ltd operation Class 86/9 - Modified for Load Bank/Network Rail use
Class 87	BR, 25kV ac electric, 87001-87035/87101 Class 87/0 - Basic locomotive Class 87/1 - Modified loco with thyristor control Class 87/2 - Originally allocated in 1988 to what became the Class 90 fleet
Class 88	Vossloh/Stadler ac electric/diesel electro-diesel 88001-88010
Class 89	Brush/BR 25kV ac electric, prototype, 89001
Class 90	Originally allocated to modified HST power car conversion for operating tilting trains on the East Coast BR, 25kV ac electric, 90001-90150 Class 90/0 - Basic locomotive Class 90/1 - Modified locomotives for RfD Class 90/2 - Modified locomotives with altered ETS for overnight passenger operations
Class 91	BR, 25kV ac electric, 91001-91031 (91101-91132) Class 91/0 - Basic locomotives Class 91/1 - Refurbished locomotives
Class 92	BR/Brush 25kV ac/750V dc electric, 92001-92046
Class 93	Allocated to power cars for West Coast Main Line replacement stock - project abandoned
Class 94	Not issued/allocated
Class 95	Not issued/allocated
Class 96	Not issued/allocated
Class 97	Allocated to Departmental motive power, either electric or diesel powered
Class 98	Vale of Rheidol 2-6-2T steam locomotives
Class 99	BR/Sealink ship fleet

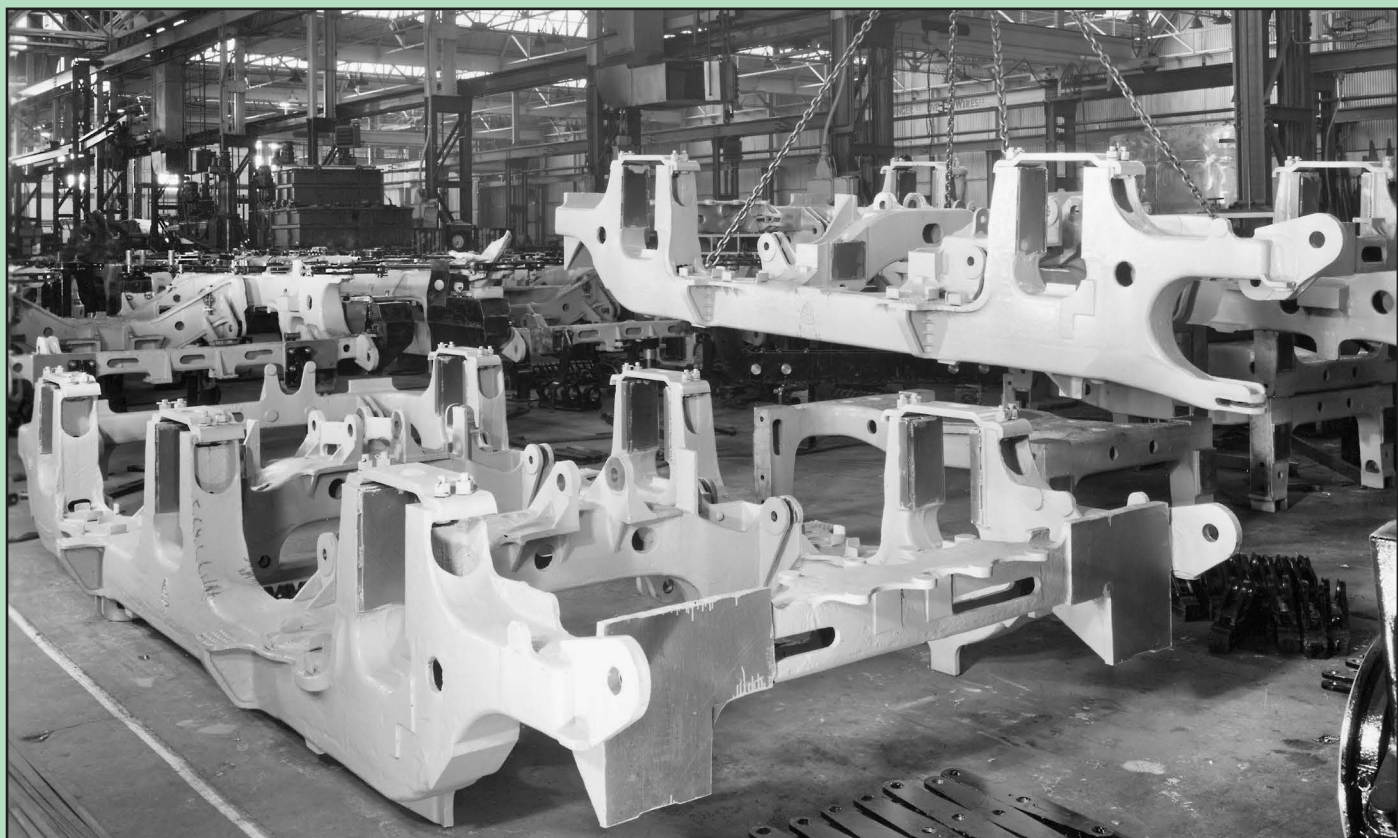


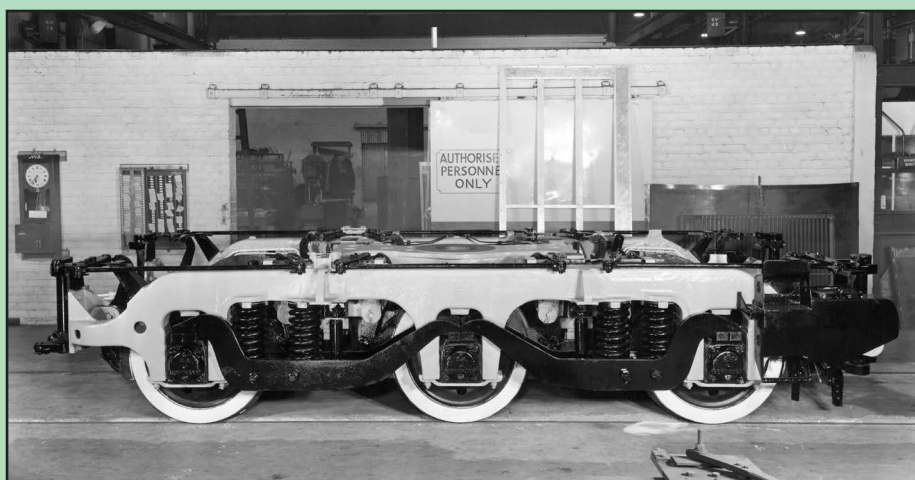
Left: On the Southern Region, a local letter classification system was used for locomotive identity, especially on staff rosters. The Class 71s were classified HA, the Class 74 electro-diesels HB, the Class 33/0s KA, Class 33/1s KB and the narrow-bodied 'Hastings' locos KA-4C. On the electro diesel front, the Class 73/0s were JA and the English Electric production locos JB. Brand new Class 74 (SR identity HB) No. E6101 is illustrated. CJM



Above: To facilitate frame welding, the frame assembly was positioned in a rotatable jig, enabling men to work on the underside in safety. A frame is seen at 45deg on its side, with welders working on the underside. **CJM-C**

Below: The two and three axle bogies were produced by English Steel Castings and supplied ready machined to Metropolitan Vickers at Bowsfield Works for wheeling. A bogie of each design is seen upside down on the workshop floor awaiting fitting out and wheels. **CJM-C**



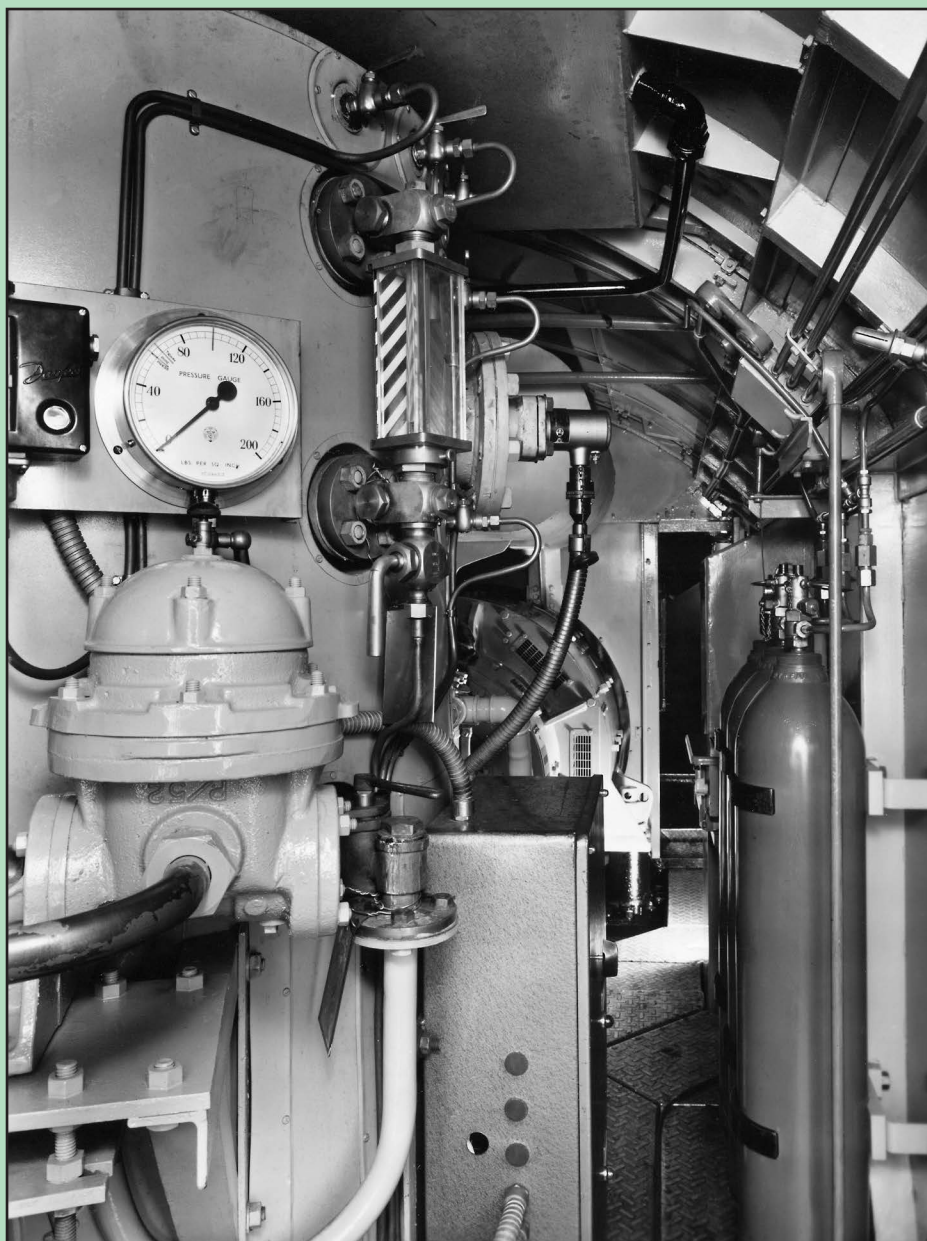


Above and Left: After arrival from English Steel Castings, the bogies were fitted out in the main shop at Bowsfield. This including plumbing, electrical installation including the fitting of the traction motors, wheeling and setting up the brake equipment. In these two views bogies are seen in a complete pre-painted state ready for installation. Interestingly, the bogies on the Co-Bo design saw the castings painted silver grey. Both: **CJM-C**

Below: Completion of the first Co-Bo was in the first week of July 1958 when a number of visits were made by the BTC to inspect this somewhat unusual loco, before it was moved south to the Derby area for trials and early training which was on the Churnet Valley Line. As built, No. D5700 is seen from its No. 1 (Co) or cooler group end. **CJM-C**

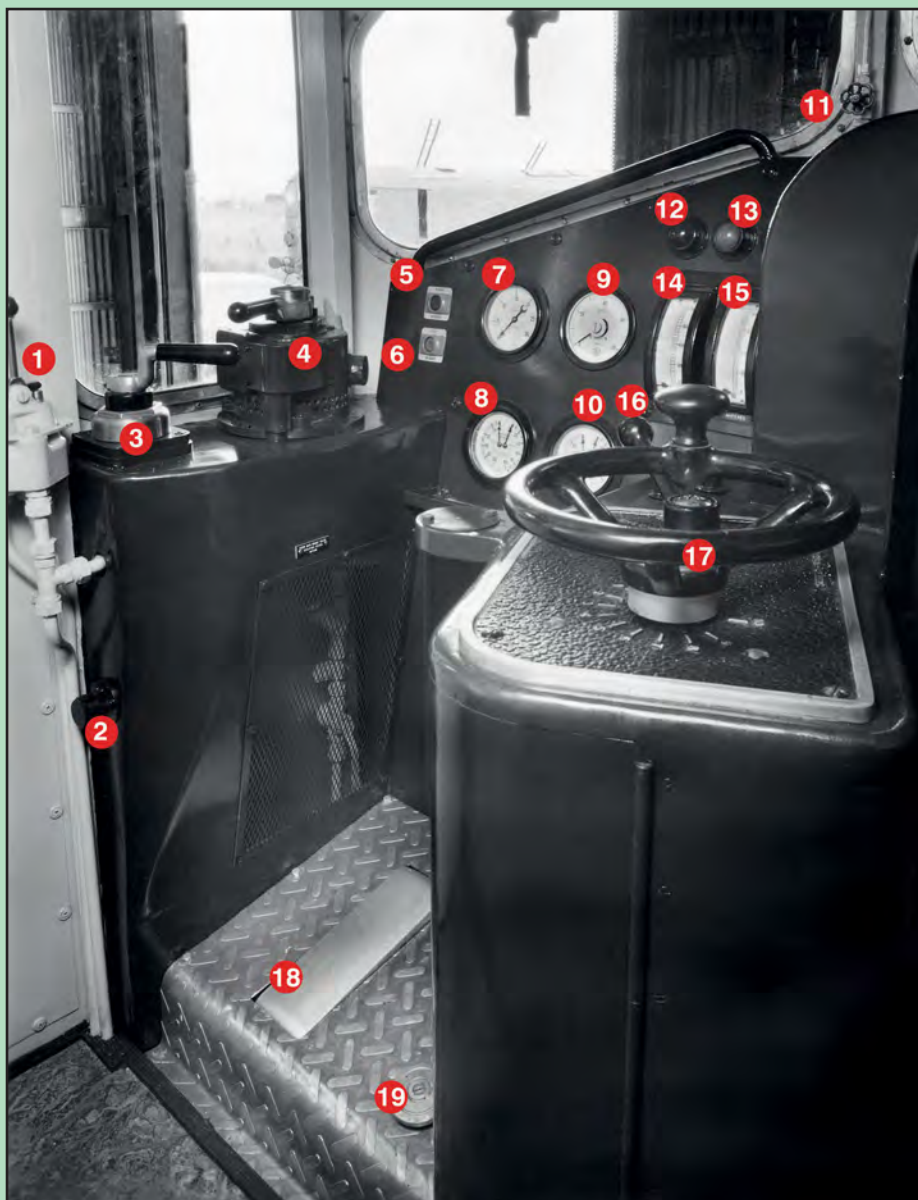


Right: As the Co-Bo fleet were designed to operate both passenger and freight services, a train heating boiler was installed. This came in the form of a Spanner Mk1, located towards the No. 2 end of the loco body, roughly above the inner end of the two-axle (Bo) bogie. Controls for the switching on/off of steam heat was provided on the non-driving or secondmans side of the cab, but firing up and operation of the boiler required the secondman to have frequent access to the boiler bay. This is a view of the boiler looking towards the engine compartment from the No. 2 end. **CJM-C**



Below: Early dynamic testing of the first loco of the Co-Bo fleet was undertaken under the control of the BTC and builders in the Stockton-on-Tees area, powering a rake of pre-nationalisation and BTC stock. Records show a number of test runs were conducted, not all without problems. By the look of the bodywork this run was not without its troubles. No. D5700, painted in undercoat and using two oil headlamps for front identity, a test train is seen near Wetherby in early July 1958. **CJM-C**



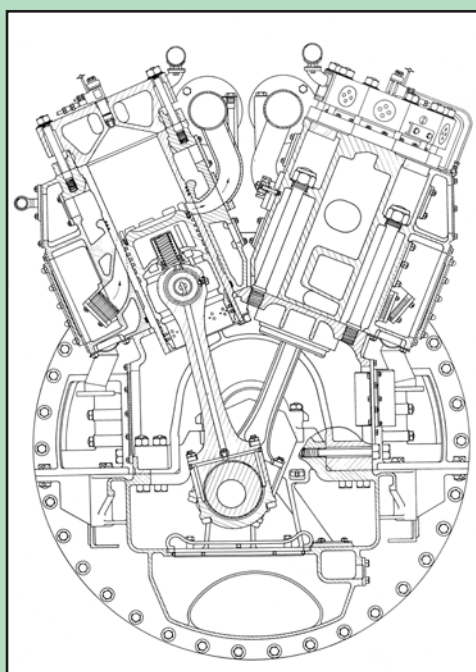


Left: Metropolitan-Vickers Co-Bo driving cab layout. 1: Sanding valve, 2: Inspection light socket, 3: Locomotive straight air brake valve, 4: Train brake valve (vacuum) with proportional application on locomotive, 5: Engine start button, 6: Engine stop button, 7: Train pipe pressure gauge, 8: Bogie brake cylinder pressure gauge, 9: Speedometer, 10: Main reservoir air/direct air brake pressure gauge, 11: Windscreen wiper air control valve, 12: Engine stop warning light, 13: Wheelslip warning light, 14: Generator volt meter, 15: Generator ammeter, 16: Master switch, 17: Rotary power controller, 18: Driver's Safety Device (DSD) pedal, 19: Horn button. **CJM-C**

Right: Cross-section of Crossley HSTV 8 two-stroke engine **CJM-C**

Below: Taken on 7 April 1959, loco No. D5716 stands in the yard at Bowsfield, Stockton-on-Tees awaiting load-bank testing before delivery to Derby for acceptance, which was completed on either 16 or 19 May 1959, two dates are shown on the official paperwork held at the Public Records Office. The loco is seen from the non-driving side at No. 1 end. **CJM-C**

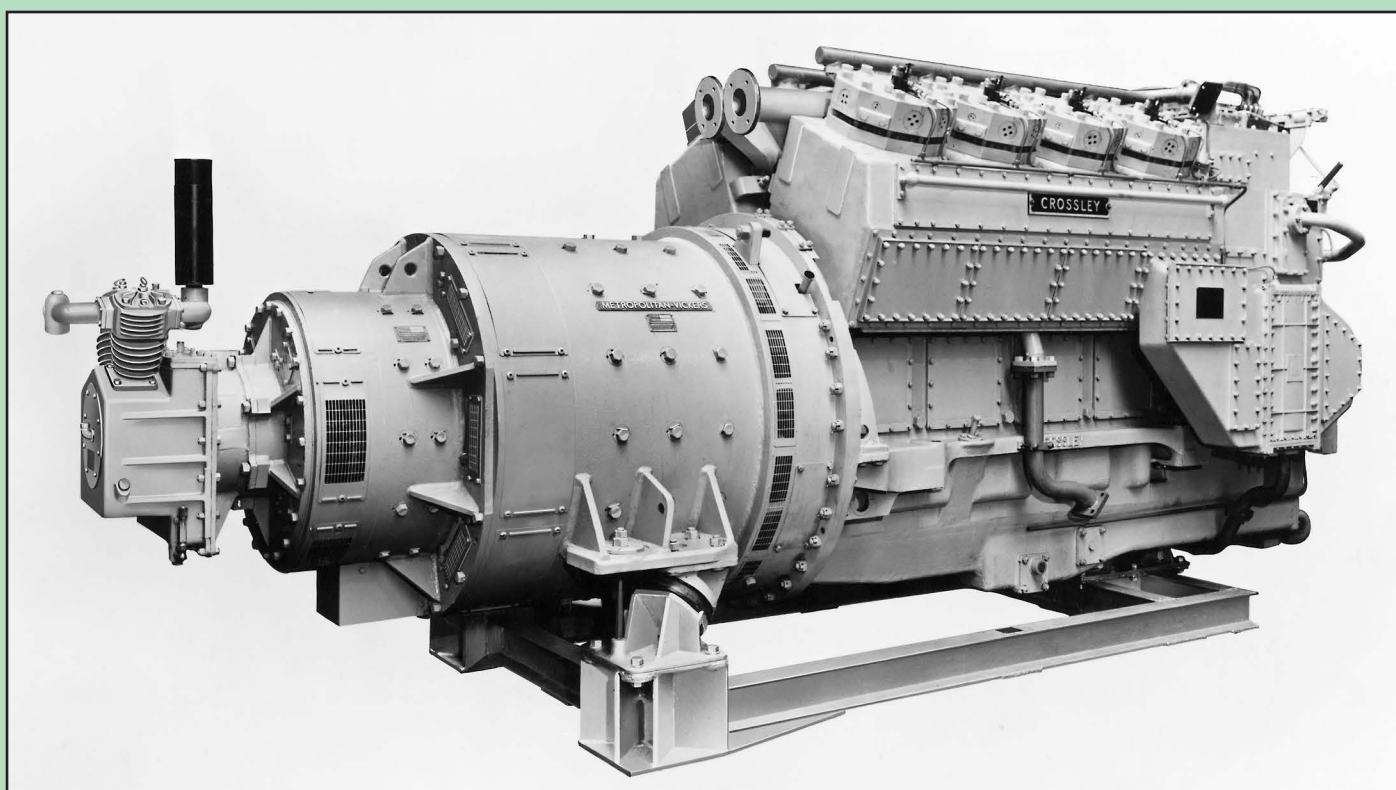




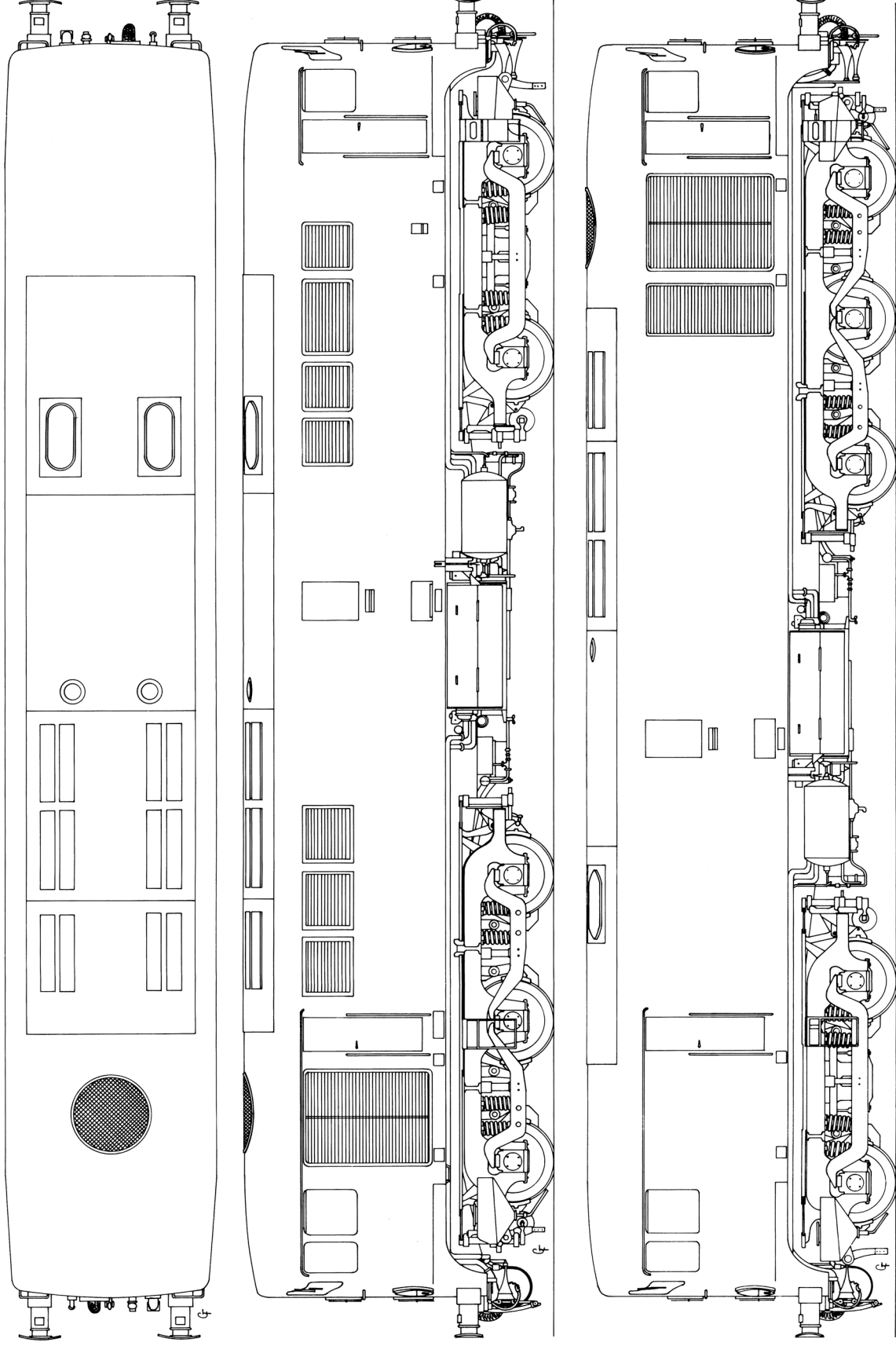
Top: Viewed from its No. 2 end, No. D5715 is seen 'on shed' at Derby on 30 April 1960, at the time the loco was allocated to Cricklewood. www.colour-rail.com / D. Forsyth

Above: Showing its No. 2 end furthest from the camera, No. D5718 is seen looking very tatty at Derby on 30 April 1960, only just nine months after delivery. www.colour-rail.com / D. Forsyth

Below: A Crossley HSTV 8 engine attached to a Metropolitan-Vickers TG4204 generator group. CJM-C



Class 28



Top: Class 28 'Co-Bo' roof arrangement, showing No. 1 end on left.

Middle: Class 28 'Co-Bo' side elevation, showing as built condition, with No. 1 end on left.

Above: Class 28 'Co-Bo' side elevation, showing original condition with No. 1 end on right.

Right Above: Class 28 'Co-Bo' front end layout showing as built condition.

The drawings are reproduced in exact OO gauge 1:76 4mm to the foot.

All: © Graham B. Fenn. Additional line drawings of the class can be found in the Oxford Publishing Co book *British Rail Main Line Diesel Locomotives* ISBN 0-86093-544-2

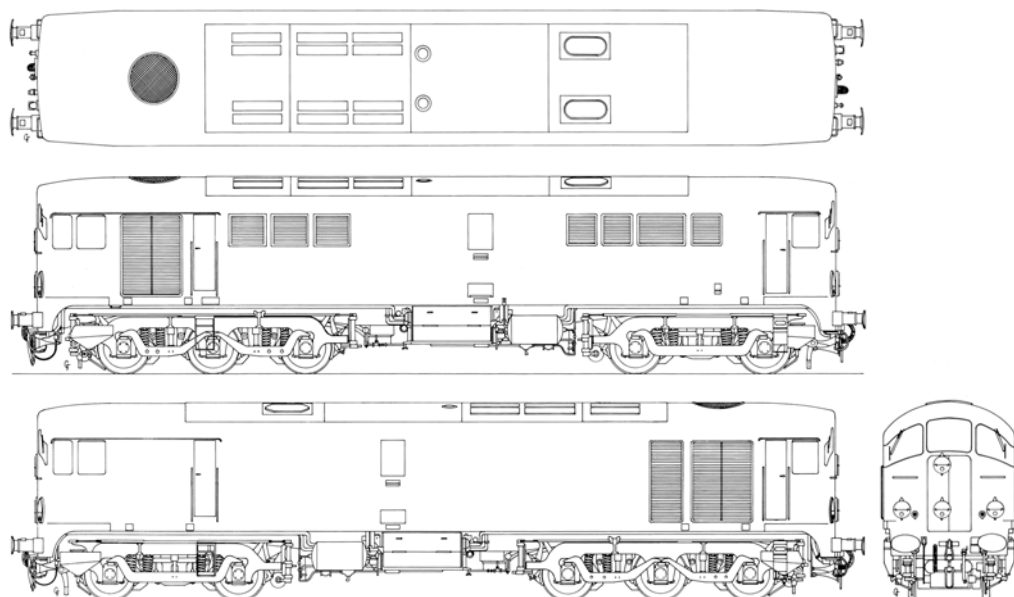
Right Top: Class 28 'Co-Bo' roof arrangement, showing No. 1 end on left.

Right Middle: Class 28 'Co-Bo' side elevation, showing as built condition, with No. 1 end on left.

Right Below: Class 28 'Co-Bo' side elevation, showing original condition with No. 1 end on right.

Far Right: Class 28 'Co-Bo' front end layout showing as built condition.

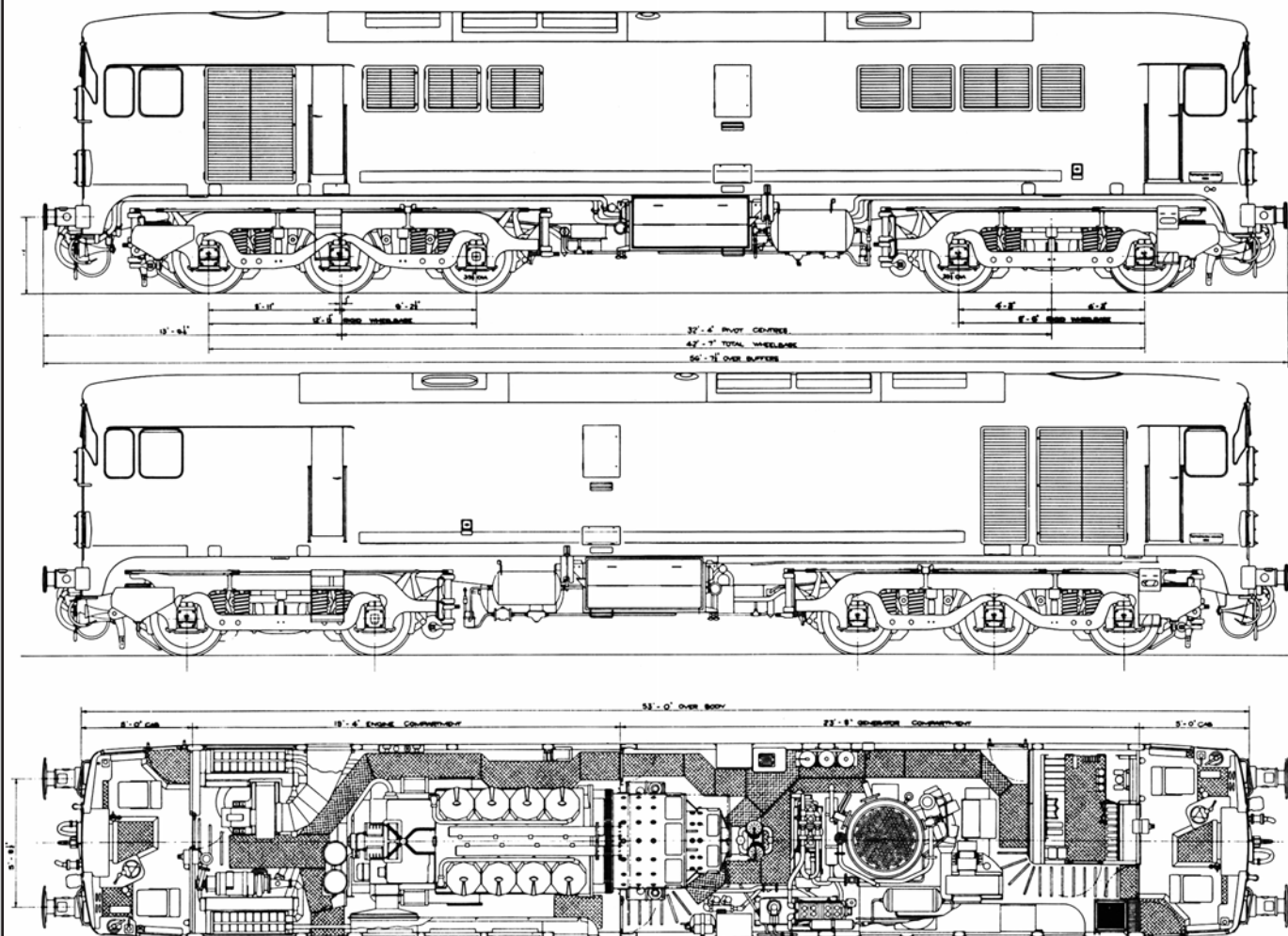
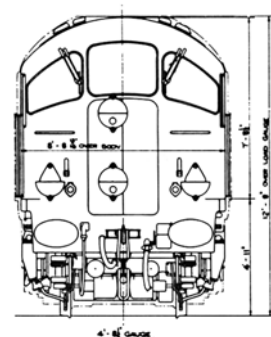
The drawings are reproduced in exact N gauge 1:148 2.02mm to the foot.

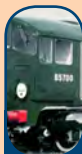


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Official Metropolitan-Vickers Co-Bo equipment positions and sales illustration. CJM-C





Co-Bo Testing and Introduction



Above: With a wonderful array of vintage rolling stock behind, the first of the Co-Bo build, No. D5700 rounds the curve at Wetherby West Junction during one of a series of pre-delivery test runs. The loco is still in undercoat and carries two oil lamps as frontal indication. [CJM-C](#)

Below: Many of the early driver training and test runs with the Co-Bo fleet were undertaken over the Peak Forest route via Chinley, where in autumn 1959 No. D5708 is recorded with a train of LMS-design stock. On the right is Fowler 2P 4-4-0 No. 40632 with a local passenger service. [CJM-C](#)





Above and Below: Prior to the introduction of the new British Rail container based 'Condor' [Container Door to Door] service running five days each week between Hendon in north London and Gushetfaulds in Glasgow in 1959, several test runs were operated in early October 1958. The short wheelbase four-wheel vacuum-brake fitted wagons, each carrying a single container which could easily be transferred from rail to road vehicle, were to travel at speeds of up to 75mph (121km/h) and vehicle stability was a major concern. To confirm performance of a pair of Co-Bo diesel locos on the service trial runs were undertaken, some of which included an ex LMS-dynamometer car, this gauged and recorded the acceleration and braking efficiency of the train and also monitored the ride performance of some vehicles in the formation. The test running was carried out over the entire route on three separate days and involved Co-Bo Nos. D5701 and D5700 powering a full 27-vehicle rake, plus the test car. In the view above we see the train at Hendon, while in the view below the formation is recorded at Skipton. Note the hard wiring from the rear cab of the second loco to the test car. Both: **CJM-C**



Right: In 1959 BR launched the 'Condor' service between Hendon in London and Gushetfaulds in Glasgow formed of up to 27 four-wheel container flats offering a 10 hour journey between the two points. Pairs of new 'Co-Bos' were usually rostered to the train. Frequently the service would carry a cast headboard. After a few months of running, the load was reduced to 13 vehicles with a single loco operating the service. In May 1960, the train is seen powered by No. D5718 at Silkstream Junction. www.colour-rail.com





Above: After their introduction the Co-Bo fleet were regularly deployed on the London St Pancras to Manchester Central services arriving/departing from Manchester via the Chinley and Peak Forest route to gain the Midland Main Line to Derby and the south. On 26 September 1960, No. D5704 is seen at Cheadle Heath station with a Manchester-London service. This station on the outskirts of Stockport was on the Midland Railway line between New Mills and Heaton Mersey, built in 1901 to give the Midland Railway a better and quicker route into Manchester. www.colour-rail.com / D. F. Forsyth

Below: A display of 'state-of-the art' traction was held in Liverpool in mid-1959 organised by a railway trade group. Two of the main displays were a BR standard 0-6-0 diesel-electric shunting loco, painted in then standard green livery and a brand new Co-Bo, with number D5715 attending direct from the Metropolitan Vickers factory. www.colour-rail.com





Above: During the Glasgow lay-over of the 'Condor' Co-Bo, the loco was maintained at Polmadie depot, where No. D5702 is seen in August 1959 still carrying the cast headboard. It was not uncommon for one or both the 'Condor' locos to operate a fill in service between the arriving and departing 'Condor' working trains to, for example, Gourrock. **Norman E. Preedy**



Right: Another view of the Condor' test train, this time at Glasgow Gushetfaulds depot, during the three days of testing in October 1958. On 2 October, Nos. D5700 and D5701, running a train number M975 await departure from Glasgow Gushetfaulds. **CJM-C**

In Scotland the mixed steam and diesel depot at Polmadie, just south of Glasgow dealt with the Co-Bo fleet operating either normal freight or the 'Condor' service. Looking very tatty and in need of attention, No. D5704 is seen on shed at Polmadie on 26 April 1960. By this time reliability of the fleet was reducing and it was only some 10 months before this loco was withdrawn from service and stored pending rectification. **Norman E. Preedy**





Above: With a Locomotive Inspector wearing his trilby hat and sitting on the non-driving side of the cab, Co-Bo No. D5715 awaits departure from Chinley with a local service from Manchester to Derby in late 1959. Note the painted 17A (Derby) shed code on the buffer beam. **CJM-C**



Left Middle: Rounding the curve into Chinley station on 21 April 1960 and catching the evening light, the 16.00 Derby to Manchester Central is led by No. D5719, the final member of the fleet, which entered traffic just six months earlier. **CJM-C**



Left Below: When the Metro-Vic Co-Bo locos took over the operation of the London St Pancras to Manchester Central service, the locos were booked to operate in pairs, usually powering 10-12 vehicle passenger formations made up of LMS or BR Mk1 stock. The locos were noisy and frequently emitted vast plumes of exhaust, which with opening window stock entered the passenger saloons, and a number of complaints were received by the BTC. On 27 December 1958, No. D5700 working in multiple with D5705 arrives at St Pancras with an early morning service from Manchester Central. **CJM-C**



Above: In immaculate condition after having been released from the builders works just two days earlier, No. D5716 is seen at Bedford 18 May 1959 with a St Pancras to Manchester express, complete with train identity number M850 hanging on the front. www.colour-rail.com

Right: With a huge plume of exhaust hanging above the locos, Nos. D5710 and D5711 storm through Harpenden on 24 September 1960 in charge of the 10.25 Manchester Central to St Pancras express. By the look of the northbound platform, a number of enthusiasts had come to witness the train. **CJM-C**



Below: Again with a cloud of exhaust above, a pair of Co-Bo locos race through Flitwick in 1959 with a Manchester Central to London St Pancras express. **Martin Welch**





The days of Yellow Panels



Above: Due to very poor performance of the Co-Bo fleet, the BTC started to take members out of traffic from as early as May 1960 and place them in store. The bulk of the fleet were removed from traffic and stored at various locations from February 1961. The entire fleet was rebuilt at either the Metro-Vickers plant at Stockton or at the Dukinfield plant of Crossley Engine. Sporting a yellow warning panel, No. D5716 is seen outside the paint shop at Crewe Works on 8 November 1964, while the loco was the subject on an evaluation for a further refurbishment. It did not return to traffic until March 1966. [Richard Davis](#)

Below: With a 1X79 route indicator on a board in the middle window, No. D5703 is seen under full power climbing Shap incline at Shap Wells on 28 July 1962 while powering a troop special from Millom to Bridgeton in Glasgow. By this time, the loco had received major engine and technical repairs at the Crossley factory in Dukinfield, Manchester and was performing slightly better than when originally delivered. At this time the loco was allocated to 12E Barrow-in-Furness shed. [Derek Cross](#)





Above: Looking very weather worn, No. D5715 passes Camforth No. 1 Junction signalbox on 15 August 1964 powering a Workington to Manchester stopping service, formed of seven Mk1 coaches. This loco was taken out of service in May 1965 and parked at Crewe Works pending a further refurbishment. However this never materialised and the loco was returned to traffic in December 1966. **Derek Cross**

Below: After its return to traffic in early 1962, No. D5700 was allocated to Barrow-in-Furness depot. In June 1963 it was loaned to Trafford Park depot, from where it undertook trial running on the ICI limestone hopper trains from Tunstead to Northwich. Complete with an oil loco headlight, No. D5700 is seen with a rake of ICI vacuum braked hoppers in August 1963. The trials were not conclusive and in September 1963 the loco was returned to Barrow. **CJM-C**





Above: Passing over the 503yd (460m) water trough at Hest Bank, located between 3m 18ch and 3m 41ch on the West Coast Main Line, Co-Bo No. D5701 with its No. 1 end leading powers a local passenger service in 1963. This image clearly shows the smaller front windows installed after the original wrap-around windows were replaced during refurbishment. **Norman E. Preedy**

Below: It was not uncommon in the mid 1960s to find Co-Bo and steam combinations on passenger services working north of Preston on either the West Coast Main Line or the Cumbrian Coast route. Here we see a Co-Bo piloting an LMS Class 5 on Hest Bank. It is highly likely that the steam loco was inserted in the formation to provide train heat. **Norman E. Preedy**





Above: In 1967, No. D5715 is seen in one of the south facing bay platforms at Carlisle station with a stopping service bound for Workington and Barrow-in-Furness. The loco was looking quite 'weathered' by this time, with the route indicator discs covered in rust and a patch of green paint on the buffer beam covering up an old shed allocation. It is interesting to note this example, at least at the No. 2 end had two overhead live wire signs. D5715 operated throughout 1967 based at 12B Carlisle Upperby. www.colour-rail.com



Right Middle: A pair of Co-Bo locos Nos. D5718 and D5709 cross over Greenodd Viaduct in June 1963 with the 19.10 Lakeside to Barrow-in-Furness service. This viaduct, demolished in the 1970s to make way for road development took the railway over the estuary of the River Leven. www.colour-rail.com / R. Herbert



Right Below: In stunning evening light in June 1966, No. D5716 pulls away from Lindall Tunnel between Ulverston and Dalton with a van train, complete with a goods brake van marshalled as the third vehicle. www.colour-rail.com / R. Cope



Above and Below: One of the few uses of a Metropolitan Vickers Co-Bo on a railtour took place on 26 May 1968, right at the end of the locos being in service. That day, The Midlands section of the Stephenson Locomotive Society (SLS) operated the Ravensglass and Eskdale charter from Birmingham to Ravensglass for a trip over the narrow gauge railway to Dalegarth. The train was powered by an ac electric as far as Stockport, where 'Black 5' No. 44949 took over to Carnforth. The train was then rostered for EE Type 4 No. D316 to work forward, but this failed at Ulverston and Co-Bo No. D5717 was drafted in to power the train from Carnforth shed. The return working appears to have involved the same traction. In these two views the train is seen awaiting to depart from Ravensglass in the upper view, while in the image below the train is seen arriving at the station. It is pleasing to see the SLS headboard carried, with the train reporting 'slat' either in the middle cab window or hanging on the front end. [Norman E. Freedy / www.colour-rail.com](http://www.colour-rail.com)





Above: A truly wonderful picture of a Co-Bo in the snow. After heavy overnight snow, on 2 April 1966, Co-Bo No. D5707 departs from Carlisle yard with a coke train bound for Workington. **Derek Cross**

Below: Again looking very dirty and tatty, and sporting some cab side damage where it looks to have been involved in a 'side swipe' collision, No. D5702 is seen with a Mk1 passenger rake on Hest Bank near Lancaster. **Norman E. Preedy**





Above: In late 1966 and early 1967, a number of Co-Bo locos went through Crewe Works for classified attention. Some locos were repainted in BR green and surprisingly many retained their small yellow warning panel, rather than having a full yellow end added. Here No. D5711 stands in the works yard on 15 January 1967 repainted with a white bodyside steam pipe and black bogies. **Norman E. Preedy**

Below: Passing through Hest Bank station between Carnforth and Lancaster in the mid 1960s, powering a rake of six LMS and BR design coaches, Co-Bo No. D5714 powers a Blackpool to Manchester service. Hest Bank station, opened in 1846, being built by the Lancaster and Carlisle Railway. It remained open until February 1969. **Norman E. Preedy**





Above: A wonderful picture of a Co-Bo on a local passenger working. With its 'Bo' bogie leading, Co-Bo No. D5716 pulls away from the Bolton-le-Sands station stop in April 1963 while forming a Barrow-in-Furness to Lancaster local. The train being formed of a mix of BR Mk1 and LMS-design stock. As can be seen the loco was not in the best of exterior condition. www.colour-rail.com / R. Cope

Below: Obviously relegated to secondary duties, powering a train of just three coaches. Co-Bo No. D5700, the pioneer of the fleet and looking relatively clean by Co-Bo standard arrives at Ravenglass on 6 June 1964 with a Cumbrian coast service. www.colour-rail.com



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Above: Due to problems with the steam heating boiler on Co-Bo No. D5701, an unidentified Newton Heath Black 5 was attached between loco and train to provide heating for the afternoon Manchester Victoria to Blackpool train in the summer of 1964. The train is seen pulling away from Preston. It clearly looks as if the Co-Bo is emitting more exhaust than the steam locomotive.
[Jim Carter](#)



Left Middle: Steam and diesel traction share depot space at Carnforth in this mid 1964 view showing Co-Bo No. D5716 basking in the sun.
www.colour-rail.com



Left Below: With an extension pipe attached to the nose end steam pipe, lifting steam above working height while the boiler was under test, No. D5706 is seen at Crewe Works on 8 November 1964. In the background one of the Bo-Bo 'Woodhead' electric locos, later classified as Class 76 can be seen.
www.colour-rail.com



Above: A wonderful evocative diesel-steam combination of Co-Bo No. D5707 piloting BR 'Standard' Class 7 No. 70041 are seen in the Carlisle area on 12 August 1966. Little exhaust is seen coming from the diesel, but the 'Britannia' looks to be working hard. www.colour-rail.com / D. Forsyth

Below: The Co-Bo fleet were fitted with a non-standard electro-magnetic or red circle multiple control system, which, in their operating area, only allowed the class to operate in multiple with like class members. Working in multiple, Nos. D5708 and D5702 are seen departing from one of the many yards in the Carlisle area on 23 March 1967. www.colour-rail.com / D. Forsyth

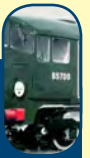




Above: For many years the massive engineering plant of Cowans Sheldon and Co dominated the skyline in London Road, Carlisle. The company being responsible for the construction of hundreds of rail and dock cranes as well as railway turntables used throughout the world. On 8 July 1966, Co-Bo No. D5701 passes below the London Road Bridge powering a sand train. www.colour-rail.com / D. Forsyth

Below: Between 1872 and 1965, trains served Lakeside station at the foot of Lake Windermere, where a connection existed to lake steamers. In the diesel era, Co-Bos were frequently used to power the remaining trains until route closure. On 6 July 1963, No. D5717 is seen on the right and No. D5702 on the left, both awaiting departure with passenger services. www.colour-rail.com





Class 28s with Full Yellow ends



Top and Above: In keeping with the BTC directive to improve frontal visibility of locomotives, the early 1960s applied small yellow warning panels were expanded to full yellow ends by the middle of the decade. Not all locos were given the full end treatment, but one loco which did receive the modification was No. D5707, seen in these two illustrations from both ends at Carnforth shed on 22 June 1968, just days before it was sidelined and withdrawn. Both: **Norman E. Preedy**

Right: Towards the end of Co-Bo days in 1968, this unusual light loco move was recorded near Lancaster, and shows No. D5709, complete with full yellow end, hauling BR Type 2 No. D7673 (later Class 25 No. 25323) and a further Co-Bo, which still sported small yellow warning ends. **Jim Carter**





Metro-Vic Type 2s On Shed



Above: With the large number of photographs seen of Metro-Vic Co-Bo locomotives 'on shed' it seems the class did not venture onto the main line on a frequent basis. Looking in a dreadful condition, with an oil stain all down the bodyside, indicating a serious problem with the Crossley power unit, No. D5716 is seen in company with another Co-Bo at Barrow-in-Furness shed in 1965. In the 1960s, cleanliness of diesel locomotives was of secondary importance and many examples of most classes could be found 'dirty'. www.rail-online.co.uk



Left Middle: A shed, where in the 1960s several members of the Co-Bo fleet could frequently be found was Carlisle Upperby. In this view a grubby looking No. D5717 is seen 'on shed' displaying its green with small yellow panel livery. www.rail-online.co.uk



Left Below: In the early 1960s when engine and control problems were seeing the class out of traffic for prolonged periods. Derby-allocated No. D5714 is seen 'on shed' at Cricklewood. At this time the original wrap-around cab windows were still fitted and the livery had not received its yellow addition on the front end. www.rail-online.co.uk



Above: When the Co-Bo fleet were deployed on the 'Condor' freight service from Hendon to Scotland and when they were used on the Manchester Central to St Pancras passenger services, London end maintenance was undertaken at Cricklewood. On 4 October 1959, No. D5717 shares depot space with a Class 08. [Norman E. Preedy](#)



Right: In terms of major workshops, Crewe and Derby were the two locations which got involved with Co-Bo operations, with Derby only seeing a very small number of locos. In the mid-1960s, No. D5702 is seen stabled in the works yard at Crewe, seen from its No. 2 end. Note the battery box flap is open, indicating the batteries had been disconnected. www.colour-rail.com

Stabled on its home shed of Derby, No. D5710 awaits its next turn of duty in 1960, around a year after being taken into stock. A perfect view for modellers, showing clearly the bogie and underframe equipment. The locos No. 1 end is on the left. www.colour-rail.com





Left Above: Many photographers and enthusiasts took part in organised depot visits in the early 1960s to record the final years of steam and for many this gave the chance to capture some of the new diesel locos, many at the time had little interest in these new box-like machines, but thankfully they turned their cameras towards them. In clean condition, No. D5704 is seen 'on shed' at Derby on 9 May 1959 when just six months old. www.colour-rail.com / D. Forsyth



Left Middle: Seen from its No. 2 or two-axle end, No. D5711 is seen 'on shed' at Derby in 1960, the light coloured bogies were now becoming very discoloured. www.colour-rail.com



Below: With the cab doors looking to have lost nearly all their paint, and the bodywork very marked, No. D5712 is seen stabled around the turntable at Carnforth shed on 16 September 1967. In the background is Type 2 No. D7638, a product of the Beyer Peacock factory in Gorton, and was later renumbered as 25288. www.colour-rail.com

Right Above: With the wonderful steam-era coaling stage towering above, a pair of Co-Bo locos, with No. D5700 nearest the camera, are seen at Derby shed on 9 May 1959. At this time the loco was less than a year old, but the bogies show little sign of their original silver/grey colour.
www.colour-rail.com



Right Middle: No. D5704 is seen stabled in one of the stalls of Camforth turntable in autumn 1960, sharing depot space with the them dominant steam fleet operating in the area. **CJM-C**



Below: Looking a little sidelined and out of use, No. D5707 poses at Derby shed in May 1960. This loco was delivered to Derby on 19 December 1958 and only operated for 17 months before being sidelined with serious technical issues. Restoration was not made to an operational condition until February 1962. www.colour-rail.com





Above: With an eight car train formed of LMS and BR design stock, a Blackpool line train passes Farington Junction, south of Preston on 17 July 1962, soon after returning to traffic following a year out of service. www.rail-online.co.uk



Left: This stunning period picture, shows a Co-Bo led passenger train pulling away from Manchester Victoria in the mid-1960s with a passenger service bound for Blackpool via Preston. Power is provided by No. D5717. www.rail-online.co.uk

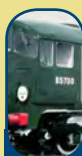
Below: With LMS Stanier Class 4P2-6-4T looking on, Co-Bo No. D5708 departs from Manchester Victoria on 18 August 1962 with the 09.55 service to Barrow and Workington. [John Whiteley](#)





Above and Below: Although several repaints were carried out during the operational lives of the Co-Bo fleet, only one locomotive, No. D5701, was outshopped in standard BR Rail Blue with full yellow warning ends. This repaint was carried out at BR Crewe Works following a classified overhaul in 1966. Although repaired and fit for main line use, the loco was still frequently in trouble being recorded in and out of Crewe Works in 1967 several times. When it failed on 5 September 1968 it was agreed to withdraw it and withdrawal came on 7 September. In the above view the loco is seen on shed at Carnforth in August 1968, while the view below sees the loco near Hest Bank in June 1968 at the head of a rake of four-wheel Fina petrol tanks. Both: www.colour-rail.com





Fleet List and Demise

1957 number	Built by	Works number	Date introduced	First depot	Date withdrawn	Final depot	Status code
D5700	Metropolitan Vickers, Stockton	-	July 58	17A	December 67	12B	C
D5701	Metropolitan Vickers, Stockton	-	August 58	17A	September 68	D10	C
D5702	Metropolitan Vickers, Stockton	-	September 58	17A	September 68	D10	C
D5703	Metropolitan Vickers, Stockton	-	October 58	17A	December 67	12B	C
D5704	Metropolitan Vickers, Stockton	-	November 58	17A	December 67	12B	C
D5705	Metropolitan Vickers, Stockton	-	December 58	17A	September 68	D10	D/P
D5706	Metropolitan Vickers, Stockton	-	December 58	17A	September 68	D10	C
D5707	Metropolitan Vickers, Stockton	-	December 58	17A	September 68	D10	C
D5708	Metropolitan Vickers, Stockton	-	January 59	17A	September 68	D10	C
D5709	Metropolitan Vickers, Stockton	-	January 59	17A	December 67	12B	C
D5710	Metropolitan Vickers, Stockton	-	February 59	17A	December 67	12B	C
D5711	Metropolitan Vickers, Stockton	-	February 59	17A	September 68	D10	C
D5712	Metropolitan Vickers, Stockton	-	February 59	17A	September 68	D10	C
D5713	Metropolitan Vickers, Stockton	-	March 59	17A	December 67	12B	C
D5714	Metropolitan Vickers, Stockton	-	March 59	17A	September 68	D10	C
D5715	Metropolitan Vickers, Stockton	-	April 59	17A	May 68	12B	C
D5716	Metropolitan Vickers, Stockton	-	May 59	17A	September 68	D10	C
D5717	Metropolitan Vickers, Stockton	-	June 59	17A	September 68	D10	C
D5718	Metropolitan Vickers, Stockton	-	July 59	17A	April 68	12B	C
D5719	Metropolitan Vickers, Stockton	-	October 59	17A	September 68	D10	C



Left: No. D5705, was transferred to departmental stock in December 1968 and taken over by the Railway Technical Centre, Derby, it was renumbered as S15705 and used for test train haulage. This loco was the example fitted with a re-designed Crossley crankcase, and during use on test trains proved successful! After a period on test trains, the loco was replaced by a Class 23. The Co-Bo was then used for carriage pre-heating duties at various sites including Landore, Bristol and Derby. For these duties it was again renumbered to TDB968006. The loco is seen at Derby during its test train period, note the communication jumper socket on the front end. www.colour-rail.com

Below: For its carriage pre-heating role, the loco saw little modification, it was hauled to various sites around the railway, mainly on the London Midland and Western Regions. Renumbered to TDB968006 the loco is seen in green livery still with a small yellow warning panel at Danygraig, Swansea on 19 July 1975. **David Percival**



Disposal detail/present owner	Date cut up	Notes
J McWilliam, Shettleston	September 68	Stored: (S) 01/61, R/I: 02/62
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J McWilliam, Shettleston	June 68	Stored: (S) 02/61, R/I: 02/62
J McWilliam, Shettleston	August 68	Stored: (S) 02/61, R/I: 02/62, Stored: (U) 04/66, R/I: 12/66
East Lancs Railway by Co-Bo Loco Group	-	Stored: (S) 02/61, R/I: 02/62. To Departmental stock - S15705
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J Cashmore, Geeat Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J McWilliam, Shettleston	October 68	Stored: (S) 01/61, R/I: 02/62, Stored: (U) 11/65, R/I: 12/66
J McWilliam, Shettleston	September 68	Stored: (S) 02/61, R/I: 02/62, Stored: (U) 04/66, R/I: 12/66
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J Cashmore, Great Bridge	December 69	Stored: (S) 02/61, R/I: 02/62
J McWilliam, Shettleston	October 68	Stored: (S) 01/61, R/I: 02/62, Stored: (U) 01/66, R/I: 12/66
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J McWilliam, Shettleston	September 68	Stored: (S) 02/61, R/I: 02/62, Stored: (U) 07/66, R/I: 02/68
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 02/62, Stored: (U) 02/64, R/I: 12/66
J McWilliam, Shettleston	September 68	Stored: (S) 02/61, R/I: 02/62
J Cashmore, Great Bridge	September 69	Stored: (S) 02/61, R/I: 12/61, Stored: (U) 04/64, R/I: 12/66

Ket to Table

12B - Carlisle Upperby
17A - Derby
D10 - LM Preston Division

C - Cut up
D - Departmental service
P - Preserved



Left: After use as a coach pre-heater, the Co-Bo was stored and taken to Swindon Works for disposal. Due to the time taken in arranging disposal, a group of enthusiasts was formed to save and rebuild it in an operational state. In this view it is seen awaiting disposal at BREL Swindon. **Gary Stroud**



Below: Firstly preserved at Peak Rail, Matlock and more recently at the East Lancs Railway, Bury, No. D5705 is on target to return to use in the next couple of years. Here it is seen at BREL Crewe Works during an open day on 9 September 2005, where it was a static exhibit. **Antony Christie**

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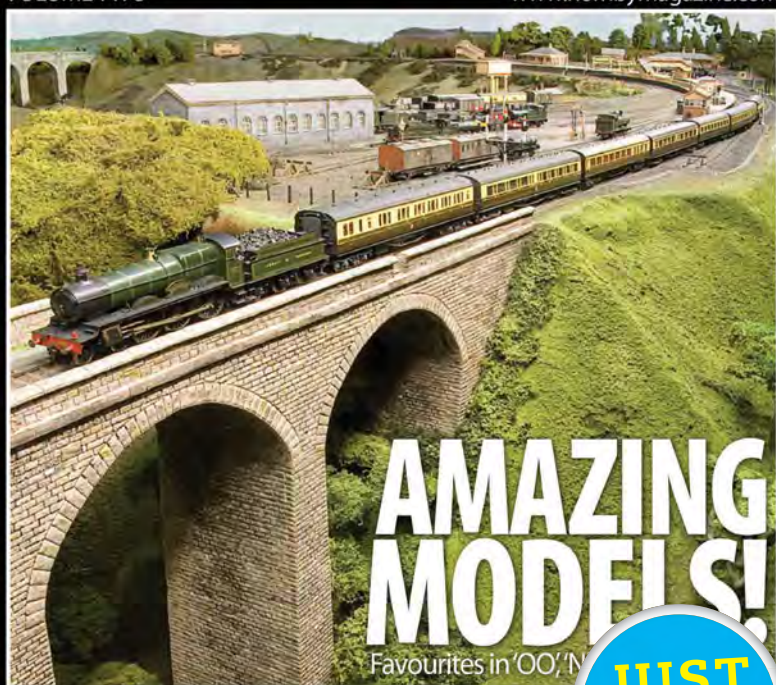
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