

THE 1920 CAMELL LAIRD TUBE STOCK

by B.J.Prigmore and E.Shaw

INTRODUCTION

It is peculiar that this batch of 40 cars - all trailers - should have shared their main features with the 1967 Victoria Line trailers - being built pretty well right out to the loading gauge, and having all-longitudinal seats. This particular circle has thus been turned in 47 years!

The stock was novel in being the first production type with air-worked doors, and unusual in sharing the last features of gate-stock design (bulgy sides, large windows, and simple bogies with one brake block per wheel) with the first features of succeeding stock (metal-rimmed draught screens and air-worked doors).

In its short working life of 15-18 years the stock led what might be called a gay life, with face lift, change of partners and change of residence; and five of the cars even had a 28-year retirement as the Instruction Train of the Chief Mechanical Engineer's Department, until withdrawal in late 1967. An interesting story can thus be told: we do our best to tell it.

DESCRIPTION: EARLY YEARS

By 1920, the Piccadilly Line, somewhat denuded of stock to keep other lines (mainly the Bakerloo) going, needed re-equipping. Six-car trains were to be operated. To this end 20 of the original Hungarian motor cars were to be converted to have air-worked doors, and 20 new trailers and 20 new control trailers were to be built.

According to the General Specifications for Steel Trailer Cars for London Electric Railway, of July 1919, the cars were to have end platforms, hinged steel gates on the entrance platforms, and swing side doors for passengers' use, with electrically controlled locks. The cars were thus originally envisaged as newer versions of the Leeds Forge Bakerloo trailers of 1914 (q.v. "Tube Stock to 1951")

However, the Specification was re-dated September 1919 in ink, the reference as above crossed out, and reference made to "sliding doors for passengers' use" and "Side Sliding doors will be operated by an Air-engine, and consequently the Door-Runner should be of a sound and strong Construction. Handles and Locks will not be required for these Doors". (Capital letters not ours, but in the original which we here quote literally!) It thus seems

II

that the cars were redesigned in autumn 1919, and that the decision to use air-worked doors was finalised in September.

These cars were ordered from Cammell Laird, of Nottingham, and entered service on the Piccadilly Line (then from Finsbury Park to Hammersmith, with the depot at Lillie Bridge) from January 1921 to December 1923, as numbers 800-19 (trailers) and 700-19 (control trailers). (The accompanying motors converted were numbered 480-99). Detailed dimensions are given in the appended table.

With bulgy sides and large windows, as also with twin sliding train doors (and similar, unglazed, ones between the passenger saloons and the control trailer cabs) the stock showed its kinship with gate-stock. Its novel features were the air-worked doors - two of 2'9" in the centre, with a fat post between them, and one of 2' at each end. The bodies were unusual (but not unique) in having arched roofs - with a suspicion of a clerestory - and oval windows to the driving ends (as also on the contemporary District 'F' stock).

In six-car trains the driving cabs became mere passenger vestibules, the airdoors worked normally: no protective covers were fitted to the controllers and brake handles, and BJP, then a small boy, needed much will power not to see what happens when ?!

The car interiors were very drab, with brown paint below the waist, and brown leather upholstery to all the longitudinal seats. The floors were covered with asbestos cement. There were no straps for standees, but rather horizontal grabrails the length of each half of the saloon, suspended from the roof, and vertical grabrails, four in each half of the car by the seats. Lighting was by pairs of clear bulbs, shaded with wide frosted shades, on twin fittings on the ceiling. The external livery was Derby red: the numbers were shaded.

The airworked doors had a type 'B' door engine, thought to be unique, in which a low height (despite 2'9" throw for the centre doors) was obtained by having a fixed rack, along which an airworked piston rod pushed a pinion to which was attached the door-operating arm. The end of this arm thus swept out a cycloidal rather than a semicircular arc, with a stroke of more than twice the height.

Each door had a mechanical door-open indicator at cantrail level in the form of a yellow flapper arm, which folded along the door when it was fully closed. Platform staff could then, as now on post-1938 stock, tell which car had jammed or sticky doors. These were removed in 1924. Each door had a sensitive edge: the

door re-opened if the edge struck anything. This was soon taken out of service as over-helpful passengers delayed trains by re-opening the doors for the laggards. Each side of each car had a door-control knob near cantrail level on the centre pillar for use by platform staff.

Door control was from the rear vestibule of each motor car, or from the non-driving vestibule of a control trailer when the motor car of a 3-car train was leading. The door control device was composed of a switch (for normal electro-pneumatic door operation) and a valve for direct pneumatic operation of the door at the guards' position when the guard was in possession.

The controller etc. of the control trailers matched the original BTH non-automatic electro-magnetic contactor control of the converted 1906 motor cars. Since, by 1920, many gate-stock control trailers had been converted to trailers, it is possible that the controllers, if not also the brake valves etc., came from the generous stock of spares. The General Specification says that the "Contractor shall equip" (NOT "provide") the cars, hence the supposition. Folding seats were fitted for drivers and guards.

The brake hoses were at waist level, as usual, but the control jumpers were near cantrail level, (a nuisance when splitting trains), possibly because they were under the clerestory brow on gate-stock. A second jumper was needed for door control.

In essentially this state the cars trundled their leisurely way between Hammersmith and Finsbury Park for 8 or 9 years.

About 1926 the control trailers were renumbered 1700-19 to allow for the 1926 Standard stock motors 681-744.

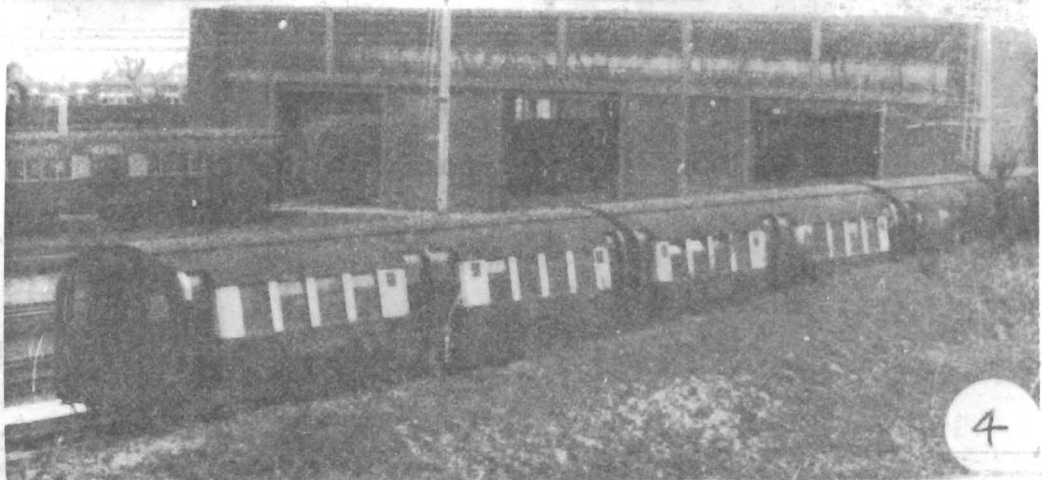
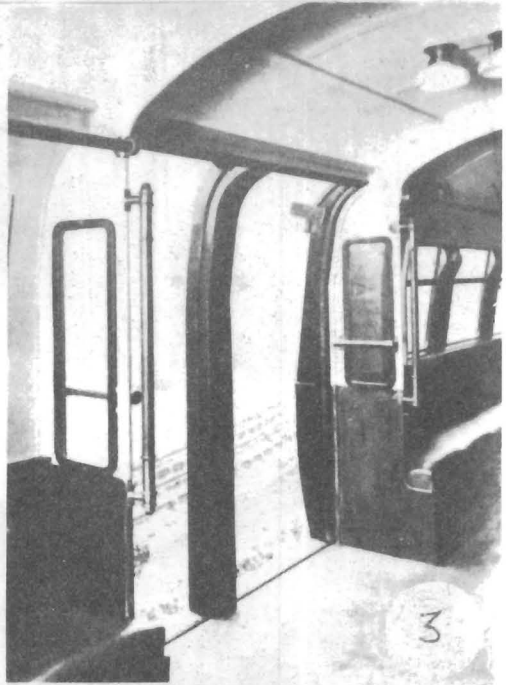
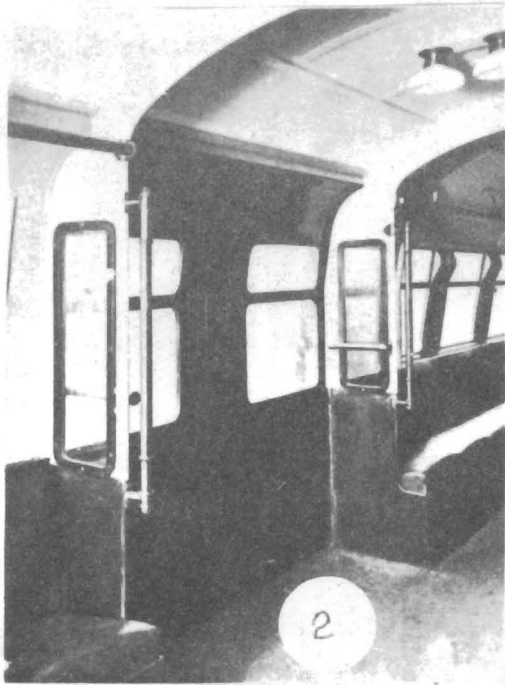
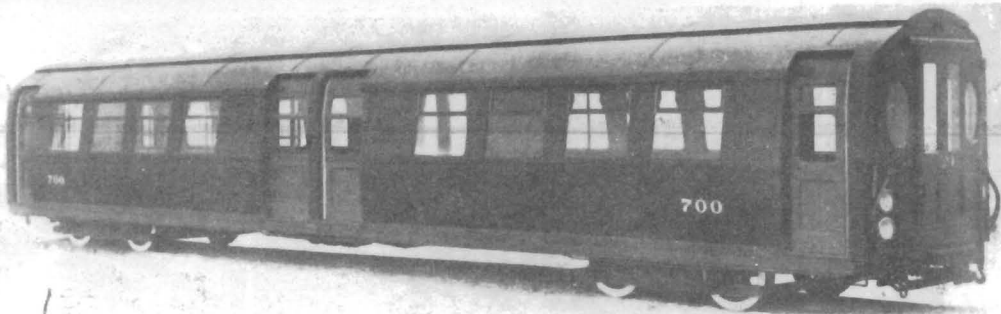
ALTERATIONS AND EXCURSIONS

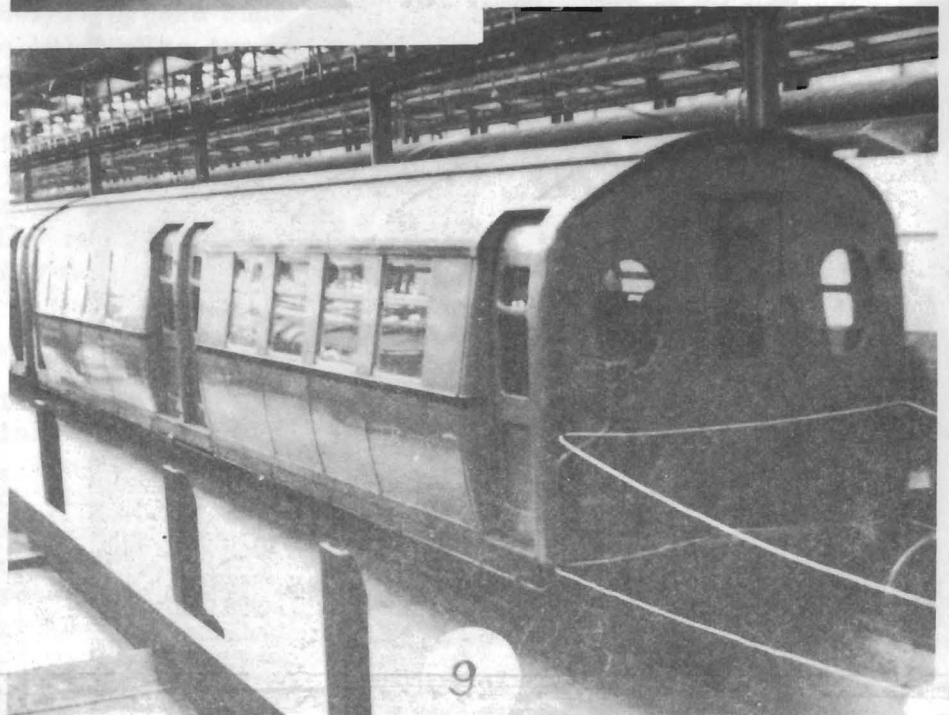
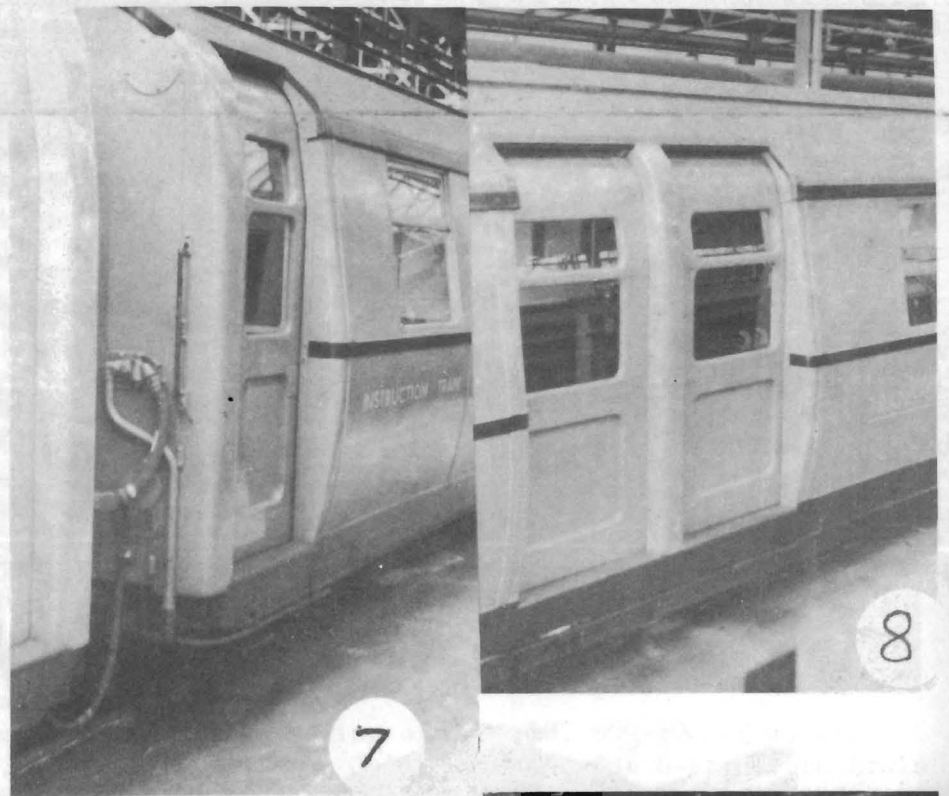
Early in 1923 the vertical grab rails in the saloons were removed. By October 1925 (probably between August and October) one car had been reconstructed to LER standards with a bay of transverse seats in each half, the new 'lozenge' moquette upholstery and better lighting. This will be mentioned in detail later, but between 1924 and 1926 it was decided to modernise the cars (then only 2-3 years old!) but only one was done before the scheme was abandoned, to be taken up again in 1931. This one car (see "Handling London's Underground Traffic" by J.P.Thomas, Fig. 96, page 145) had its cement floor unchanged. The 1931 reconstruction, q.v., included new wooden slat flooring.

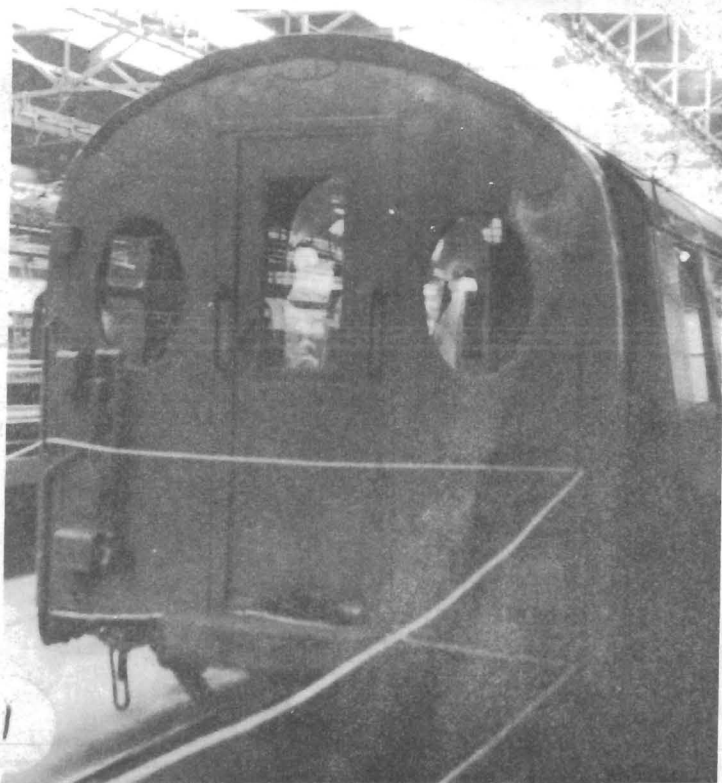
In 1926-27 the Central Line was short of stock because the reconstruction programme on that line, involving modernisation

Captions to PhotographsPlate

- 1 - Pre-service showing oval end windows to driving cab, old-style headlights, and twin sliding train doors allowing passage between one car and the next.
- 2 - Doorway details: doors closed.
- 3 - Doorway detail: doors open. Note extended 'door open' indicator flapper arm.
- 4 - In store at Cockfosters, in red and cream livery, circa 1939. A gross enlargement of an admittedly poor photograph. -B.J.Prigmore.
- 5 - Original interior: note handrails in lieu of straps, vertical grab rails (soon removed) and twin train doors. -Courtesy London Transport.
- 6 - Interior of first reconstructed car showing transverse seats, LER grey 'lozenge' pattern upholstery, and new lighting fittings above the windows. -Courtesy London Transport.
- 7 - Door and end detail from Instruction Train (Neasden 1963) showing blanking plate over original jumper socket and new low-level sockets. -B.J.Prigmore.
- 8 - Centre door detail from Instruction Train. (Neasden 1963) showing 'pimple' replacing original platform door control plunger at cantrail level in door pillar. -B.J.Prigmore.
- 9 - IC1075, ex-control trailer, of Instruction Train (Neasden 1963) showing swing train door set in panel covering larger opening left by removal of sliding doors (q.v. plate 1) and 1930-type jumper socket covers but original (upper only) spectacle covered headlights. -B.J.Prigmore.
- 10 - The Instruction Train, showing car exteriors in their final state, Neasden 1963. -B.J.Prigmore.
- 11 - More end detail (Neasden 1963) showing blanked off original jumper socket openings, swing door set in larger panel, and headlight spectacles. The ropes were to prevent visitors falling into the pit. Jumpers have been left in, and dumped on the buffer in front of the train door. -B.J.Prigmore.







and fitting of airworked doors to all Central stock was at its height. To enable services to be maintained on the Central, two 6-car trains of '1920' stock (with the converted motor cars) were lent to the Central from mid-1926 to summer 1927. This disposes of many arguments about the ability of normal tube stock, almost 9'6" high, to traverse the (then) slightly smaller Central tunnels: Central stock was but 9'4½" high.

It is possible that the 1923 and later tube stocks 8'3" wide at the eaves, would not fit, but with its 7'9" eaves, the 1920 stock would! However, a concession was made. The 1920 stock was 9'5¾" high with new 30" diameter wheels: the wheels were 26½" diameter when regarded as "fully worn". The cars which were sent to the Central were fitted with 28" wheels, hence were 9'4¾" high on the basis of this one-inch reduction in wheel radius!

No other modification was needed to the trailers. On the motors, the only modification necessary was the removal of the positive shoes, and connection of these shoe leads to the bogie frame (or connection of the main positive cable to the car or bogie frame). The stock then worked reverse-polarity with its negative (centre) shoe on the Central positive rail, and track return.

Two 3-car sets, consisting of 1709-10, 809-10 and motors 486/9, were transferred in July 1926; and one 6-car block train with 801/11/4/9 in June (801/11) and September (814/9) 1926, with motors 491/4. The two threes went back to the Piccadilly Line at the end of June 1927, and the block train at the end of August 1927.

Between February and May 1930 the trailers were renumbered 1316-35 and the control trailers 2043-62. They had by then been repainted in the red/yellow Underground livery. These cars were probably renumbered because after the modifications etc. they were far more similar to the Standard stock than the old gate-stock with which they had previously been operating.

MODERNISATION, CONVERSION AND TRANSFER

With their brightly lit green and yellow interiors, with grey lozenge pattern moquette upholstery, and some 2x2 transverse seats, the 1923-29 stock (and 1926 Central conversions) in service elsewhere compared too favourably with the drab and austere 1920 stock.

The revoked 1924-26 decision to modernise the stock was thus reinvoled, in 1931, and supplemented by a decision to convert the stock (technically) to modern standards this had

X

been preceded by a decision of early 1929 to purchase 20 motor cars from UCC to replace the 20 reconstructed cars from 1906. (Though 20 such motors, numbered 187-204 and 183-4, were obtained, the actual cars which replaced the 1906 batch were 1927 MCW, q.v.)

The modernisation consisted of the provision of one bay of transverse seats in the centre of each half of the car, and the addition of armrests to the remaining longitudinal seats, together with an improvement to the lighting. This was done by removing alternate ceiling fittings and putting frosted bulbs and standard LER frosted bowl shades on the remainder; and adding goose-neck lighting fittings of LER pattern to the eaves and draught-screen frames, much as on the 1923-25 stock. Wooden slat flooring was put in.

Technically the conversion consisted of making the cars, in control trailer-trailer pairs, compatible with the Standard stock (1923+) motor cars then in general use. The couplings, etc., between the control trailers and trailers were unchanged, but the outer end buffers and couplings were altered a little to match the pattern of Ward coupler and spring buffer on Standard stock, and the jumper sockets were removed from their cantrail position to the conventional one of just above floor level. The controllers and control wiring were changed to match the automatic electro-magnetic contactor control then standard, and the door control standardised, and the guards' position removed (we think). The sliding train doors on the driving cabs were replaced by a panel containing, in a slightly smaller doorway, a normal swing train door. Door-closing plunger switches were added to the control trailer cab exteriors.

Then, both modernised and converted, the cars were transferred to the Bakerloo from January to October 1932, being replaced by a reverse transfer of trailers 1245-64 and control trailers 1989-2008. On the Bakerloo, motor cars from the 1927 MCW batch (282-311) worked with the 1920 stock: during the few months between conversion and transfer these trains had worked on the Piccadilly.

In this new guise, on the Bakerloo, the trains trundled their next seven years - with even briefer glimpses of the open air than on the Piccadilly! Despite this, in 1933, weather strips were fitted to the sill plates of drivers' doors, and grooves cut and drain holes drilled to suit. The stock was not designed for outdoor use, nor for high speed, and so its use except on

the Bakerloo 'local' service would have been unwise.

In 1934 the trailers were renumbered 7230-49, and the control trailers 5170-89, to fit the overall railway numbering scheme of the LPTB.

THE FUTURE THAT NEVER WAS: EARLY RETIREMENT

From September 1938 to January 1939 the cars were withdrawn from service on the Bakerloo. Sixteen trailers (7234-49) were then fitted with electro-pneumatic brakes. (At withdrawal, these cars and their accompanying motors had, for about four or five years, been the last non-e.p. brake tube stock in public service except for the Aldwych branch cars.)

It was also intended to fit these 16 cars with non-metallic brake blocks so that, with eight or 10 companion motors, they could be transferred to the Northern City Line on its forthcoming modernisation. However, this was not to be, for World War II started in 1939. From September 1938 (car 5171) to mid-November 1939 (cars 7234-49) all 40 cars were returned to the Piccadilly Line for storage, some being kept on the southern side of Cockfosters Depot yard.

In June 1944, cars 5174/85 and 7231/3 were transferred to the Northern Line for storage. From 1946-48, 35 of the cars were sold as scrap, the grey bodies of several being visible from the Midland main line at Chesterfield about that time.

THE FINAL PHASE

The five survivors, originally 700, 809/12/5/7, were converted in 1949 to form the CME's Instruction Train, then being painted light brown with black lining and renumbered IC1075-9 in the service stock fleet. With the conversion was reversion to the ordinary Westinghouse brake, and conversion of all couplers and jumper positions to suit Standard stock. After many wanderings, including exhibition to the public at Neasden in 1963, these five survivors were finally withdrawn in late 1967, and ultimately disposed of in 1968.

ACKNOWLEDGEMENTS

E. Shaw wishes to express his gratitude to certain members of London Transport's staff for the assistance they have given him in respect of several problems which arose during the preparation of this joint article.

XII

LEADING DIMENSIONS.

Unless indicated, measurements are common to both control trailers and trailers alike.

| | | |
|---|-----------|------------------------|
| Maximum height from rails | | 9'5 $\frac{3}{8}$ " |
| Floor height from rails | | 1'11" |
| Width over cant rails | | 7'9" |
| Width over waist rails | | 8'7" |
| Length over headstocks | | 50'0 $\frac{1}{2}$ " |
| Length over coupler faces | | 51'4" |
| Distance between bogie centres | | 33'11" |
| Seating capacity | | 44 |
| Number of side sliding doors | | Double 2 |
| Opening of side sliding doors | * | 6'1 $\frac{5}{8}$ " |
| Number of end side doors | | Sliding 4 |
| Opening of end side doors | | 2'0" |
| Type of air engine | | B |
| Number of electric lights in pass. compt. | | 28(CT)30(TR) |
| Type of electrical equipment | | BTH(CT) |
| Type of brake equipment | | Westinghouse |
| Diameter of brake cylinder | | 10" |
| Total weight (in tons) | 18.25(TR) | 18.75(CT) |
| Trailing end weight (in tons) | | 9.14(CT) |
| Control end weight (in tons) | | 9.61(CT) |
| Weight of body with traction equipment (tons) | | 13.03(CT) |
| Weight of body less traction equipment (tons) | | 12.53(TR) |
| Type of bogies | | P |
| Weight of bogies (tons) | | 2.86 |
| Diameter of new wheels | ** | 2'6" |
| Scrapping diameter of wheels | ** | 2'2 $\frac{1}{2}$ " |
| Size of axle journals | | 7" x 3 $\frac{1}{2}$ " |
| Bogie brake riggings | | Single |
| Bogie brake levers | | 4 to 1 |
| Bogie wheelbases | | 5'0" |
| Centres of journals | | 6'3" |

* Door post in centre of doorway reduces clear opening.

** One trailer 2'5" and 2'2 $\frac{1}{8}$ " respectively.