

## British Railways Double-Deck Suburban Stock

The two double-deck four-coach train sets for use on the Charing Cross-Dartford of the Southern Region, British Railways, reference to which was made in our issue of May-June 1949, have been completed, and were put into service on November 2. They were built at the Lancing and Eastleigh works of the Southern Region to the design of Mr. O. V. Bulleid, former Chief Mechanical Engineer, Southern Region.

The table gives the comparative dimensions of a normal 4-car unit and a 4-car double-deck unit:

	Normal 4-car set	4-car double-deck
Overall length	257' 4½" (78.5m)	257' 4½" (78.5m)
Height from rail to roof	12' 4½" (3.78m)	12' 9" (3.88m)
Height from rail to floor	4' 2½" (1.28m)	3' 8¼" (1.124m)
Height from floor to roof	8' 2¼" (2.5m)	9' ¾" (2.77m)
Number of seat (normal)	386	508
Occasional tip-up seats	Nil	44
Weight of motor coach	39 tons	39 tons
Weight of trailer	28 tons	28 tons
Total tare weight	134 tons	134 tons
Tare weight per passenger	0.347 tons	0.264 tons
% of total gross weight to load capacity of motors	95%	100%

The bodies are of light-weight all-steel construction to designs based on recent Southern Region suburban electric stock. The inner structure for the upper compartment is built of Alpac aluminium castings, aluminium plate, and sections made from cold rolled strip steel. The lower floors are of laminated plywood and plywood bent to seat form is used for the upper and lower seats, which are upholstered with spring cushions and seat back squabs.

For lighting, 70-volt tubular opalescent lamps are mounted on the plywood seat partitions above the heads of passengers. Because of the loading gauge, the windows in the upper deck cannot be opened, but pressure ventilation has been provided. The fans are contained in each of the plenum chambers situated below the upper compartments and draw supplies of fresh air from the underside of the vehicle. Electric radiators for heating the compartments are also contained in these chambers, making it possible to provide, under control of the guard, an efficient distribution of freshened air in summer and winter.

The underframes, which are trussed, are of rolled-steel sections electrically welded to reduce weight and enhance the strength of the structure. The buffing and drawgear between the vehicles is of usual type. The bogies, motor, and trailer have been designed to suit the new conditions brought about by the introduction of wheels of smaller diameter than usually used for ordinary electric stock. The motor bogies generally conform to those used for suburban electric service,

each bogie carrying two traction motors. The bogies are situated at each end of the unit and the motors are of the lightweight type recently used by the Southern Region for this class of stock. The motors have an output of 180/300HP maximum. Bolster-less trailer bogies have been used, incorporating in the construction laminated springs mounted on the axle boxes, and steel helical springs with auxiliary rubbers, thus maintaining the high standard of springing of the swing bolster bogies.

The trial running tests which were made with the vehicles showed that they ride very steadily laterally, with almost a complete absence of oscillation at all speeds. Another feature of interest is the silent running of the cars.

The new stock has been designed with a view to relieving the congestion which occurs at peak-traffic hours. In the trailer coaches there are six double compartments with eleven seats below and eleven above, in addition to one lower-deck compartment containing twelve seats in the middle of the coach. There are also twelve tip-up seats on the upper deck, giving a total seating capacity of 156 per coach. Each of the four motor coaches can seat 120 passengers. The lines between London and Dartford serve a densely populated area and for many years it has been impossible to provide seating accommodation for all passengers during rush hours. British Railways consider that such an innovation should be tested before being put into full-scale production and it is expected that the reaction of the public in using the upper seats will be a valuable guide. The problem may now become station stopping time.