

# Electric Trolley Buses

## How London's Tramcars Are Being Replaced

ALTHOUGH electric trolley buses have only recently come into prominence in many of our cities, they have been in use for nearly 40 years. The first appeared in 1899, and from 1904 onward successful installations were in operation in various parts of Europe. By 1911 there actually existed in European countries outside the British Isles 33 electric trolley bus systems, on which more than 100 vehicles of this type ran on routes having a total length of about 200 km., or 124 miles.

In this country electric trolley buses were then used chiefly in conjunction with existing tramcar routes, to convey passengers from the termini to outlying districts. Some of the earliest systems were to be seen in Yorkshire, particularly in the rural districts around Bradford and Halifax. There the roads in many places are hilly and winding to provide easier climbing. For this reason they are unsuitable for trams, which require a fairly wide turning range and would have had difficulty in negotiating the sharp turns. Trolley buses were much more satisfactory in these circumstances. Overhead wires could easily be suspended in suitable positions, and the buses themselves could make use of the full width of the road in rounding curves.

Early trolley buses were fitted with solid rubber tyres and could ply over all kinds of road surfaces, mostly stone sets or macadam laid specially for the convenience of horse transport. They resembled tramcars in deriving current from overhead wires, but there was an important practical difference in their electrical circuits. In a tramcar the current flows from the overhead trolley wire to the motor, and thence through the running wheels to the track rails. As there are no rails in the case of the trolley bus, the current at first was made to flow from the motor back to the power station through the earth, the connection between the motor and the ground being made through a flexible cable attached to a metal trailing skate dragged along the road under the rear axle. Where the road surface was particularly rough the skate was inclined to bounce. Its intermittent contact with the ground then caused interruption of the electrical circuit, and sparks were seen between the skate and the ground. This gave rise to electrical difficulties, and in consequence trolley buses rarely ran at a speed above 6 m.p.h.

In spite of their low speed the buses were popular in hilly country districts, and as the demand for them increased their design and

their electrical equipment were continually improved. Earthing and return current difficulties were overcome by using two trolley wires for each track. Thus the current returned from the motor to the

power station by an overhead conductor. This system has proved satisfactory in every way. It provides a smooth electrical drive, and as pneumatic tyres were brought into use at an early date trolley buses can now transport passengers in comfort over most roads at speeds up to the 30 m.p.h. limit. Control of steering by the driver is a great help in this. He can anticipate the turns in the road and make the change of direction more gradually than in the case of a tramcar, which is pushed round curves by the rail on which it travels.

A comparison of trolley buses with tramcars reveals the superiority of the former. Except in special cases where tramcars run on private track, these vehicles are at a disadvantage in having to keep to the rails laid down for them. In busy streets therefore they are seldom given a clear run, and themselves become obstructions owing to their low speed. In addition the cost of relaying worn out track and of carrying out general repairs to the carriageway on each side is very high. Trolley buses require no metal track, and their average speed of running is 12 m.p.h., against that of 9½ m.p.h. for tramcars. They are as capable of moving large crowds as are cars, for they carry practically as many passengers and move more quickly. In addition they are safer, for they draw up at the side of the road to take up or set down passengers, who usually can only board or leave tramcars in the middle of the road, and therefore are subject to considerable risk in busy centres.

There are very few countries in which trolley buses are not now in use. In Great Britain there are 30 systems now at work, and between them these have a total of approximately 2,000 vehicles. The rapid extension of the trolley bus routes of the London Passenger Transport Board is an indication of the value of these vehicles. There it is proposed that all tramcars are to be replaced by trolley buses. There are four zones in which trolley buses are already being used. These include the

districts surrounding Woolwich, Shepherd's Bush, Crystal Palace, Hounslow and Malden, and in the near future it is proposed to substitute trolley buses for tramcars on a further 148 route-miles in different parts of the London area. The changeover is comparatively recent, for in June 1934 there were only 61 trolley buses in London. Now over 900 have been ordered or are in use, and London



An A.E.C.-English Electric trolley bus with front exit, supplied to Newcastle Corporation Transport Department. This photograph and the upper one on the opposite page are reproduced by courtesy of The Associated Equipment Co. Ltd., Southall.



One of 488 Leyland trolley buses supplied to London Passenger Transport Board. Photograph by courtesy of Leyland Motors Ltd., Leyland.