

PAST TECHNICAL INFORMATION SHEETS

The following historic Technical Information Sheets come from the archives, courtesy of Chris Holland.

NOTES ON DOOR FAULT DETECTOR LIGHTS ON UNDERGROUND TRAINS DATED MAY 1959

The latest types of London Transport railway rolling stock incorporate a simple device for reducing delays arising from defects in the air-worked door system.

The device consists of a small amber light on each side of each car and is operated in conjunction with the door signal circuit. The circuit passes through interlocks on each door to a pilot lamp in the guard's compartment – open doors interrupt this circuit. When all doors are properly closed, the circuit is complete and the guard's pilot lamp lights and indicates that he can give the starting (bell) signal to the driver. If, however, one of the doors failed to close there was, until the advent of door fault detector lights, no easy means of locating the faulty door and delays occurred whilst each door was examined in turn.

Defective doors are rare, but there is an unavoidable delay when passengers' clothes or other small obstructions prevent a door from fully closing. The detector lights do not, of course, prevent these happenings but they indicate to the guard and station staff the car which has a partly open door (or doors).

The door signal circuit, which also operates the driver's starting bell, passes through a master interlock on each car. This is controlled by the individual interlocks on each door. Should a door remain partly open, the master interlock will not be made and the amber lamp on the outside of the car in question will automatically remain alight until the defective door is closed.

The first type of new rolling stock to be fitted with door fault detector lights throughout was the R Stock, which first entered service in April 1950 on the District Line. Three prototype 'silver' tube trains on the Piccadilly Line also have the device - the 76 trains now on order for that line and all future trains will incorporate it.

The door fault detector lights fitted to the District Line R Stock cars consist of pyramid type blisters projecting from the side of the car at the level of the tops of the doors. When the doors are open or improperly closed, a small amber lamp shines fore and aft. One indicator is provided on each side of each car so that the guard and station staff can see the lamp over the heads of passengers and quickly locate any car with a faulty door.

The indicators provided on the 1956 Tube Stock are mounted on the roofs of the cars – one on each side – in this case the blisters are half-spheres.

It is not intended to equip rolling stock already in service with these detector lights, but three trains of older types were originally fitted experimentally with them – two of these trains were also equipped with circuits permitting the doors of a complete car to be isolated, but this feature was not embodied in new rolling stock because of the complex circuits involved.

The three trains were:

- (a) An 8-car Q Stock train on District Line which entered service on 11 November 1949, fitted with detector lights housed in 'pyramid-type' blisters (one on each side of each car) similar to the type now fitted to R Stock.

This train also had the guard's position at the west end of the 5th car from the west end. The guard's equipment at this position was also of an experimental type. Two special grab poles were installed outside the guard's door on each side of the car. Each grab pole had a brass button in the top of the pole, for closing the passenger doors, and a trigger a few inches from the top, for opening the doors. The button and trigger on the forward pole were for operating the doors on the first four cars in the train and those on the rear grab pole for the last four cars.

A second guard was carried in the rear car of this train to operate the door cut-out switches at appropriate stations.

This train was also equipped with circuits allowing all the doors of a car to be isolated if a fault developed, thus allowing the train to remain in service.

- (b) A 7-car 1938 Tube Stock train was placed in service on the Northern Line on 1 November 1949 fitted with door fault detector lights and also ventilation fans in all cars. The door fault detector lights were blisters in the form of half-spheres in the car roof (one on each side), similar to those now on the 1956 Tube Stock.

This train was likewise equipped with circuits permitting the doors of a whole car to be isolated. The experimental equipment was removed by January 1953.

- (c) A 7-car Pre-1938 Tube Stock train which entered service on 7 November 1949, on the Piccadilly Line.

The circuits on this train were such that, if only one door was causing a fault on a particular car, the detector lamp remained illuminated. However, if two or more faults were occurring on the same car, the lamp went out.

The equipment remained in use for about a year only and was removed by January 1953.

EXPERIMENTAL AIR CIRCULATION FANS IN UNDERGROUND ROLLING STOCK DATED MAY 1959

London Transport made a number of experiments with electric fans in Underground rolling stock in the late-1940s. The object was to improve the circulation of air already in the cars whilst the train was in tunnel sections. The fans were not intended to be used for ventilation purposes while the train was running on open-air sections. The fans were controlled from the guard's position by a switch, so that they could be brought into operation and shut off as required.

The available headroom on London Transport's Surface Line rolling stock allows ceiling fans to be fitted without special difficulty as was demonstrated on prototype cars 17000 (later 17001) and 20000 which ran on the Watford service of the Metropolitan Line for some years from 1947 onwards. On Tube Stock, however, owing to the very restricted, headroom, the problem was more difficult to overcome, and the design of a suitable fan necessitated considerable thought and development work. An arrangement that was considered reasonably satisfactory, however, was produced and four fans were installed on one of London Transport's 1938 type of tube car (No.10320) which first ran thus fitted on the Bakerloo Line late in 1947 and was transferred to the Northern Line early in 1948.

The usual type of ceiling fan having blades beneath the motor could not be adopted owing to the limited headroom and would have been a source of danger to standing passengers. It was, therefore, necessary to invert the fan and allow the rotor to operate in the space between the inner ceiling and the car roof. With this arrangement, a minimum distance of 6' 3" was obtained between the lowest part of the fan and the car floor.

In order to protect standing passengers from possible contact with the moving blades of the fan, a light gauge casing was fitted on the underside which carried air deflector vanes around its periphery. The action of the fan was relatively simple and allowed air to be continuously drawn from the car through a central aperture in the fan casing into the sealed cavity in the roof of the car in which the blades of the fan rotated. The air drawn in was then speeded up and expelled in all directions into the car through the vane control apertures at the edge of the deflector casing.

The rotor consisted of four 16-in. diameter blades, the angle of which was set to ensure a maximum flow of air into the car.

The four fans were arranged along the longitudinal centre line of the car and symmetrically spaced over its length so as to produce a uniform distribution of air over the whole car.

Each fan motor took approximately 30 watts and ran at 520 r.p.m. from a 50v DC circuit which was supplied from a motor generator set used for train lighting and auxiliary control circuits. The fan motors and blades were supplied by Messrs. J. Stone & Co. and the installation was carried out in London Transport's Railway Workshops at Acton.

In November 1949, a 7-car 1938 Tube Stock train was placed in service on the Northern Line fitted with four air circulation fans in each car. (The train was also equipped experimentally with door fault detector lights).

The experimental fans were of three different makes, those in the 3-car unit (10023, 012173, 11023) were Stone's fans operating at 600V; those on the 4-car unit operated at 50V, two cars (10138, 012198)

had G.E.C. fans and the other two cars (12117, 11138) had Patent Lighting fans. There were four fans per car. The fans (and detector lights) were removed by January 1953.