

THE DEVELOPMENT AND TESTING OF STITCHED MKIIIB OVERHEAD EQUIPMENT

The present standard overhead equipment for installation of BR is known as MkIIIB. This is of sagged simple construction, with copper contact wire and steel reinforced aluminium catenary, both tensioned to 11kN. This equipment was originally designed for a maximum speed of 160km/h, but by development of an improved pantograph it is now possible to run on it at up to 200km/h. The further speed increase to be obtained by this means is however thought to be limited.

While there is no present requirement for speeds above 200km/h, this may well arise within the working life of the equipment presently being installed. It was therefore considered advisable to investigate potential methods of upgrading rating the present design. High contact force, uplift problems and initial loss of contact generally take place in the vicinity of the structures, and are due in part to the large variation in compliance between end and mid span. One way of reducing this variation is to introduce a stitch wire at the structures, a method which is widely used on the continent for speeds of 120km/h upwards. Preliminary investigation showed that this seemed feasible for MkIIIB equipment, and it was therefore decided to proceed with detailed design and testing.

With stitched MkIIIB overhead equipment a substantial reduction in arcing and pantograph contact force variation has been achieved. Maximum speed has been increased by about 25% for a similar current collection performance to that of standard equipment. Conversion was not difficult and after two years of service the mechanical condition of the two test tension lengths is satisfactory. Some relaxation of stitch tension has taken place and slight arcing has occurred at the connections to the stitch droppers.

As expected, the uplift of stitched equipment is greater than that of simple equipment. The problem has been exacerbated by excessive pantograph mean uplift force at high speed and with a head wind.

Further work is required to produce a generally acceptable stitched equipment, but with design optimisation satisfactory current collection up to at least 250km/h should be attained at comparatively small additional cost. Retrospective modification of standard MkIIIB equipment is feasible.