

ELECTRICAL DESIGN OF A PERMANENT MAGNET BRAKE FOR HIGH SPEED TRAINS

This report details a proposal for a permanent magnet dynamic brake. It follows a preliminary design study to establish the general size and shape of the machine and to estimate the cost of the permanent magnets required to meet the specification.

The proposal was felt necessary due to major problems with the disc brakes on Inter-City 125 trains. The pads need replacing at three-monthly intervals while the discs have to be replaced every two years or so. Maintenance at this frequency costs a lot in terms of man-days and train downtime. Also, the discs tend to overheat and crack occasionally. Various alternative systems have been tried – the French TGVs have extra discs fitted on each axle and the hydrokinetic brake has been used on the Advanced Passenger Train, however, both have their own drawbacks and an alternative proposal was felt necessary.