

APT-E CURVING TESTS ON THE OLD DALBY TEST TRACK DURING FEBRUARY 1974

This experiment had two main aims, firstly to measure the quasi-static lateral curving forces in an experimental Advanced Passenger Train E1 power bogie and E1T trailer bogie, and secondly to ascertain the dynamic lateral forces on the track particularly on Upper Broughton curve. Y forces of 0-30Hz bandwidth are used throughout.

It is shown that linear theory predicts wheel slip for both bogies at any speed on Upper Broughton curve; comparison of theoretical and experimental quasi-statics shows that the lateral force on the bogies is more equally shared between leading and trailing axles than the theory predicts. This indicates that nonlinearities need to be included in the theoretical model. Further experiments are suggested to check, by other methods, the lateral force distribution.

The measured Y forces indicate that peak values at the leading power axle (datum taken from the mean value) were twice those on straight track at the same speed. It was found that the maximum lateral force as given by the Prudhomme formula ($0.85(1 + W/3)$) was exceeded at between 7-8° cant deficiency for the power bogie, but that the trailer bogie exerted forces less than the maximum at up to 9° cant deficiency.