

DYNAMOMETER TESTING OF A 475MM DIAMETER DISC BRAKED SOLID WHEEL MARCH TO MAY 1987

A small wheel bogie freight vehicle is under consideration by Speedlink for carrying large containers in service at 120 km/h with a braking rate of 6.35%g. The vehicle is expected to complete 700 miles per day, 6 days a week; a rough estimate of the number of brake applications to be made from full speed suggests there could be 8 per day. The proposed wheel diameter is 500mm when new. Separate brake discs would be smaller still, and it is evident that the only conceivable friction brake must make use of the wheel as the heat sink.

Initial finite element analysis work had shown that tread braking would either cause loss of interference between the hub and axle or produce unacceptably high stresses in the wheel web. Therefore a solid parallel-sided wheel was designed so that pads could brake on to the side faces of the wheel. The heat flux into the wheel and the thermal stresses produced from a uniform heat input were still predicted to be very high compared with stresses predicted in other wheels, and the risk of cracking to be considerable when subjected to the non-uniform heat input from actual pads in service. This memorandum describes tests on the APT dynamometer to assess the risk of cracking the wheel with a full service repeated stopping duty and the frictional performance of the proposed pad, Becorit 918.

The report concludes:

- No thermal cracking was observed over the equivalent of 2 years of the proposed service life of this wheel when Becorit 918 brake pads were used. The total absence of hotspotting gives a very uniform thermal input and suggests that this life could be extended several times.
- The friction coefficient for 918 is above the maximum of the preferred band of 0.39 at speeds of less than 90 km/h.
- All the other friction characteristics for 918 are as good as or better than other service pads tested on the dynamometer.