Chaitanya Jagannath Diwan, Electronically controlled inertia for laboratory testing of tractor brakes and clutches, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 2007.

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Abstract - On-road evaluation of tractor brakes and clutches is a time consuming process and has other shortfalls like unsafe riding conditions, less repeatability and limitation of brake input force, requirement of special track etc. In test rigs for laboratory testing of brakes and clutches, tractor and trailer inertia is simulated by using flywheels. In these setups, it is difficult to simulate the variable inertia representing different tractor ballast conditions, and rotating mass of the flywheel can lead to unsafe operating conditions and frequent maintenance of the test rig. The objective of this project is to develop a test rig, with the help of a separately excited dc motor and electronic monitoring and control unit, which simulates variable moment of inertia, damping, and friction for a realistic testing of brakes and clutches. Instantaneous speed is sensed and used for giving control voltage to motor drive to generate the instantaneous value of the torque as required for simulating inertia, damping, and friction. Brake application is controlled through a solenoid. Cumulative energy dissipated in brake is calculated from instantaneous values of speed, torque, and brake application time, and energy dissipated per application can be controlled. Test set up has been developed for endurance and performance testing of brake, using a 746 W (1 H. P.) motor for concept demonstration. The electronic monitoring and control setup can be used, with the help of higher power motor and drive, for testing of tractor brakes and clutches.