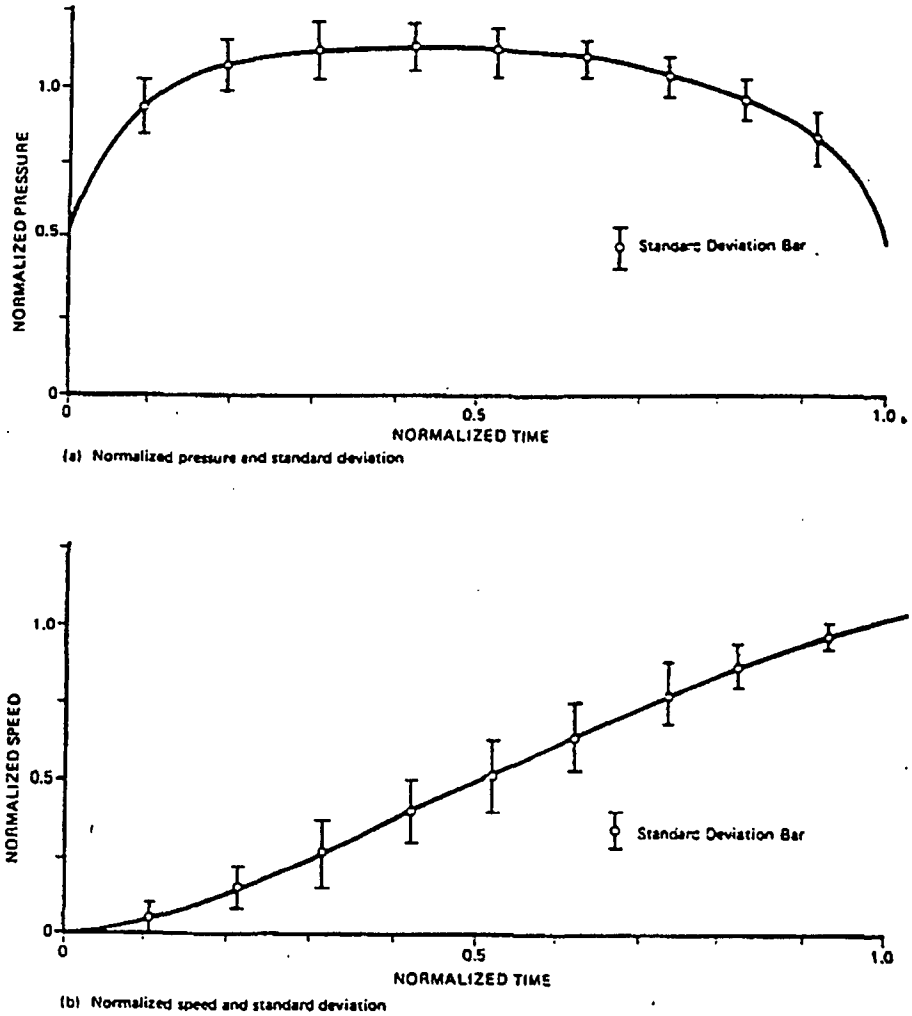


Figure 1. Representative normalized braking cycles (cycle duration: 0 - 15 s).

TEST FACILITIES AND GENERAL OPERATION CONDITIONS - An engine dynamometer was equipped with a full-scale brake system, since Preston and Forthofer (7) have shown that only full-scale duel-brake inertia dynamometers are sufficiently correlated to test vehicles. Small sample friction machines cannot duplicate the vehicle brake duty cycle. The experimental setup to test the RBC's consists of a driving mechanism, brake assembly, electronic control system, and sample collection system. The electronic control system receives the instructions for speed and brake pressure, compares them with measured values, then actuates the engine or dynamometer and brake master cylinder to achieve the desired braking conditions. Figure 4 is a schematic diagram of the setup used in this study.

The RBC's punched on paper tapes were read by a tape reader and the information was converted into dc voltage by the analog function generators. The dc output for speed was compared with the speed by the speed controller, which was measured by a tachometer attached to the dynamometer shaft. For acceleration and deceleration, the engine throttle was driven by a servomotor. During deceleration, the engine throttle was controlled first and the excessive deceleration, which could not be handled by the brake and engine, was compensated for by the eddy current dynamometer.

For the brake pressure control, a master cylinder was actuated by the piston of a diaphragm air cylinder. The pressure in the air cylinder was controlled by comparing the