

Dynamic Modeling and Simulation Analysis of Wet Friction Clutch Considering Warping Friction Pair

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SUPPLEMENTARY INFORMATION

Using the MM6000 wet friction material performance tester, engagement tests are conducted on wet clutch friction pairs based on a warped friction pair. The system is transported to the test area via a conveyor belt, clutch assembly, and transmission, with the cylinder providing the engagement pressure, as shown in Fig. S1. The MM6000 wet friction material performance tester is equipped with built-in speed and torque sensors, as well as pressure sensors, enabling it to automatically collect test data such as torque and temperature at the output end of the target friction pair and display it on the terminal.

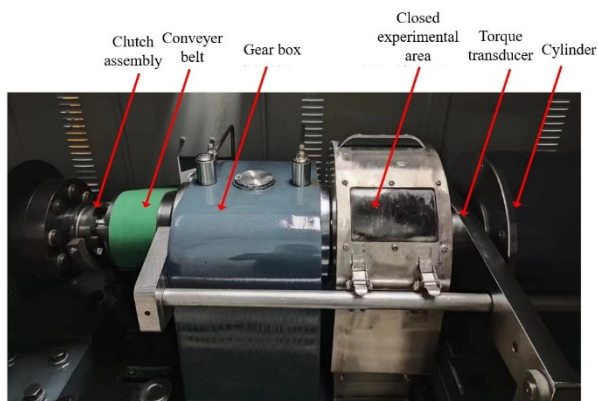


Fig. S1. The main equipment of MM6000 wet friction material performance testing machine

The test bench joint area is shown in Fig. S2. Lubricating oil flows in from the spray port at the inner diameter, passes through the friction pair gap, and then enters the return oil device from the outer edge of the friction pair. After passing through the return oil device, it enters the oil tank for circulation and reuse.

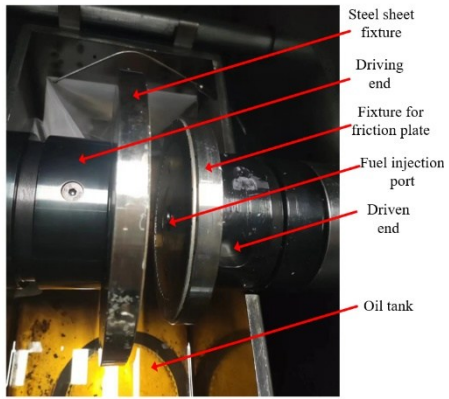


Fig. S2. Test bench joint area

Measurement tests were conducted on the structural parameters of warped dual steel plates. Warped dual steel plates with axial warping amounts of 0.1 mm, 0.2 mm, and 0.5 mm were selected for wet clutch engagement tests and corresponding simulation and theoretical research. The test pieces of the dual steel plates used in the test are shown in Fig. S3, and the friction pair plates are shown in Fig. S4.



Fig. S3. Dual steel plate test piece



Fig. S4. Radial groove friction plate sample