



# Coefficient of Friction SOP-LANE-3

**STANDARD OPERATING PROCEDURES**

Coefficient of Friction

SOP-LANE-3  
SOP CODE



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## PURPOSE

To determine the coefficient of friction of lane panels.

## MATERIALS

1. Lane panel or overlay sample to be tested, measuring 6" x 36".
2. CoF sled with 80 hardness urethane feet.
3. Bowling ball.
4. Towel.
5. Isopropyl alcohol.
6. Mineral Oil.
7. Disposable pipette.
8. Kim wipes.
9. Lane Cleaner.
10. Computer that has the WinDaq700USBO recording software and WWB analysis software.
11. Electric motor assembly that will pull the bowling ball and CoF sled.
12. Force transducer.
13. 2 - Slide Clamps.
14. Guide or piece of material to use as a guide.
15. Scale

## EQUIPMENT / SET UP PROCEDURE

### Sled and Force Gauge Set Up

1. Remove the ball sled and rails from the lane panel surface if not already removed.
2. Unwind the belt containing the force transducer from around the wheel on the motor assembly and extend the sled so the length of the belt is lying straight across the standard lane sample.
3. Remove the force transducer from the CoF sled and the motor assembly and set it on the lane sample so there is no force being applied to either end.
4. Press the "Tare" button on the display for the force transducer so the display reads zero.
5. While the sled is detached, place the sled and ball on a scale to gather the total combined weight of both items. Enter that weight into the lane surface test sheet.
6. Re-connect the force transducer to the CoF sled and to the motor assembly.

### Folder Set Up

1. On the COF computer desktop, select the "Shortcut to HardwareManager.exe" program.
2. In this DATAQ Hardware Manager screen, wait for "5293BDFD" to come up, then select "Start Windaq".
3. Select the File > Record.
4. Open the manufacturer folder for the lane surface being tested P:\Specs and Certs\Approvals and Certification\Lane Surfaces\1. Panel COF. Create a folder using the following naming convention ['Lab Log ID' 'Year' 'Brand' 'Surface Name' 'Permit Number (if surface is for renewal)'],

## TESTING PROCEDURE

### Lane Surface Preparation

1. Lay out all the lane surface samples flat on a table.
2. Use the disposable pipette to dispense a thin line of mineral oil down the center of each lane surface sample.
3. Use Kim Wipe to spread the mineral oil across the entire surface of the lane samples in a circular motion.
4. Once all samples are coated in mineral oil, let the samples sit overnight.
5. The next day, wipe all lane samples clean with lane cleaner and paper towels.
6. Clean panels again with isopropyl alcohol and a hand towel.

### Testing Set Up

1. Place lane surface on the testing table next to electric motor assembly.
2. Place guide on edge of sample lane surface nearest the front of the table, and secure guide and lane surface sample to the testing tabletop with the two slide clamps.
3. Ensure that electric motor assembly is in line with the lane panel. You may need to move the assembly closer to the edge of the table.
4. Place the CoF Sled on the lane surface sample with the urethane feet in contact with the lane surface sample and extend the belt by pulling the sled away from the motor and wheel.
5. Place the bowling ball on the sled with CG marking of the bowling ball facing upwards toward the ceiling.



### Data Collection

1. From the Dataq software, select File/Record
2. Locate the folder for the samples being tested and create a file using the following naming convention ['Lab Log ID' 'Year' 'Brand' 'Surface Name' 'Permit Number (if surface is for renewal)'], and add which sample you are testing (Common, Dot, Arrow, or Marker).
3. Select "Open" and select "OK".
4. Flip the switch beside the motor to energize the motor.
5. De-energize the motor once the CoF sled has been pulled across the lane sample, just before the belt would wrap around the wheel of the motor assembly.

6. Unwind the belt from around the wheel on the motor assembly and extend the CoF sled so the length of the belt is lying straight across the lane sample, still connected to the CoF sled, but not taught.
7. Repeat Steps 4-6 in this section for a total of ten measurements recorded by the computer.
8. Select File > "Close". The data for this lane surface has been saved.

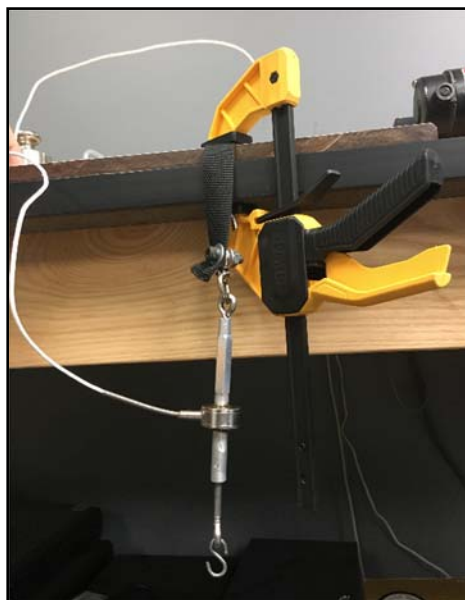
### Data Analysis

1. To read the data, access the .WDQ files for the lane surface tested and double click to bring up the graphs.
2. The zero-baseline reading can be seen at the beginning of the recording where no force was applied. Examine each of the ten peaks using the grid on the screen, and the zero-baseline reading. Each of the ten runs will have a peak followed by a plateau. Record the median value from each of the ten individual plateaus into the test sheet for that surface.
3. The average COF and the standard deviation of the COF are automatically calculated within the lane surface test sheet.
4. Close the windaq files when done and select "Exit with no Save".

## OUT OF SPECIFICATION

### If COF Measured Outside Specifications

1. Test that the load cell is operating correctly.
2. Remove load cell from the CoF sled and secure the end attached to the motor to the table with a clamp as shown in the picture below. Hang a known **5 Lb.** weight from the hook on the other end and record the value from the digital display.



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- 3. If tested values are within  $\pm 0.005$  of the expected values, the load cell is operating correctly.
- 4. If tested values are not within  $\pm 0.005$  of the expected values, schedule an appointment with Mettler Toledo for professional calibration.

