Shoe μ Lab

Objective: Students will use known dynamic relationships to evaluate the static friction coefficient of multiple shoes.

Procedure:

* Students will use a spring scale (used to measure force) and their understanding of dynamics to find both the μs and μk­ of their shoes.
  1. Mass each shoe
  2. Place a 500g masses inside each shoe and record new mass in the table
  3. Attach the spring scale (via paperclip, or tape) to the *front* of the shoe.
  4. Pull the shoe until it *just* starts to move. Record the reading on the spring scale and repeat 2x more. Record the average force in the table. This is the *maximum longitudinal static friction force*.
  5. Pull the shoe at a constant speed. Record the reading on the spring scale and repeat 2x more. Record the average force on the table. This is the *longitudinal kinetic friction force*
  6. Attach the paperclip to the side of the shoe (by the instep)
  7. Pull the shoe until it *just* starts to move. Record the reading on the spring scale and repeat 2x more. Record the average force in the table. This is the *maximum lateral static friction force*.
  8. Pull the shoe at a constant speed. Record the reading on the spring scale and repeat 2x more. Record the average force on the table. This is the *lateral kinetic friction force*
  9. Repeat 4-8 for a different surface
  10. Repeat 3-9 for a different shoe

To be answered on a separate sheet of paper:

* Do you think it would be most beneficial to have a higher longitudinal or lateral μ?
* What types of shoes tested had higher μ’s? Lower? Is this what you would expect?
* What issues did you find in this lab?

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| Shoe 1  Description:  Mass: | | | | | | | | Shoe 2  Description:  Mass: | | | | | | | |
| Surface 1: | | | | Surface 2: | | | | Surface 1: | | | | Surface 2: | | | |
| Lateral | | Longitudinal | | Lateral | | Longitudinal | | Lateral | | Longitudinal | | Lateral | | Longitudinal | |
| Max Static  Force | Kinetic Force | Max Static  Force | Kinetic Force | Max Static  Force | Kinetic Force | Max Static  Force | Kinetic Force | Max Static  Force | Kinetic Force | Max Static  Force | Kinetic Force | Max Static  Force | Kinetic Force | Max Static  Force | Kinetic Force |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Static μ | Kinetic μ | Static μ | Kinetic μ | Static μ | Kinetic μ | Static μ | Kinetic μ | Static μ | Kinetic μ | Static μ | Kinetic μ | Static μ | Kinetic μ | Static μ | Kinetic μ |
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