ME 481 – H12 **Name** _____

Develop a Working Model (WM) simulation of a stick-slip drag-sled friction testing device. Attach a screen shot of your WM device.

Your device should contain the following –
a) a driver block that translates horizontally at 3.4 cm/sec,
b) a drag-sled with mass 12.5 kg and length 14.9 cm that slides horizontally on a large plate, and
c) a horizontal tension spring with 742.5 N/m stiffness that connects the driver and drag-sled.

1) To simulate dry metal-on-metal contact, use coefficient of static friction $\mu_S = 0.4$ and coefficient of dynamic friction $\mu_D = 0.3$ for both the drag-sled and the plate. Provide MATLAB graphs of drag-sled position, velocity, acceleration and friction force as functions for time.

What is the maximum absolute acceleration ignoring blips? a_{MAX} _____

2) Repeat to simulate Neolite (standard footwear slip testing material) on a tile floor using coefficients of static friction $\mu_S = 0.9$ and dynamic friction $\mu_D = 0.6$. Discuss differences between parts 1) and 2).

What is the maximum absolute acceleration ignoring blips? a_{MAX} _____

3) Experiment with height above the plate at which you attach the spring to the drag-sled to investigate how it might influence your results. **Be certain to keep the spring horizontal.** Provide a brief discussion and plots.

What is the ratio of attachment height (h) divided by drag-sled length (L) that causes tipping expressed as a function of static coefficient of friction μ_S ?

h/L = _____

Are results different if you attach the spring too low? _____