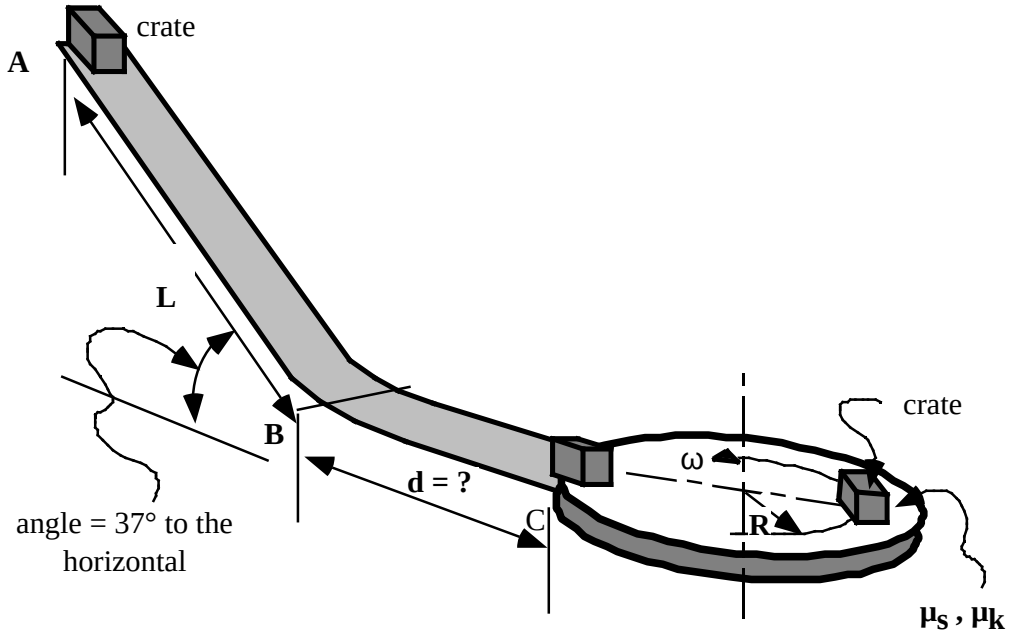
Luggage Handling at airports:

A box of mass M is placed on a chute in an airport luggage handling system and it has to slide down that chute to point **C** as shown. The coefficients of static and kinetic friction between the box and the whole length of the chute are $\mu_S = 0.60$ and $\mu_K = 0.3$. Segment **AB** is an incline at 37º to the horizontal whereas, **BC** is along the horizontal. *The mass of the box is unknown and it is not needed to solve the problem.* Assume acceleration due to gravity $g = 32.2$ ft/s^2.



a. Determine **whether or not the box will slide,** starting from rest, from the position shown at **A**, without someone giving it a push. Substantiate your answer with **a free-body diagram** and appropriate calculations.

b. If its speed at the bottom (B) of the incline is 2.4 ft/s, find the **length "L"** .
Use **work-energy method.**

c. What is the **distance "d"** along **BC,** if it just enters the turntable at **"C"** with a speed 1.5 ft/s? Use **work–energy**.

d. The box enters a large turntable along the tangent of a circle of radius R = 12 ft with the same velocity as the table so that it is instantaneously at rest relative to the table. What is the **minimum coefficient of static friction** between the table and the box so that no slipping occurs?