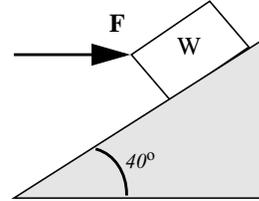


Problem Set #1 1.050 Solid Mechanics Fall 2004

(Due Friday, 17 September)

Problem 1.1

Show that if the coefficient of friction between the block and the plane is 0.35, the force required to just start the block moving **up** the 40° incline is $F = ?? W$ while the force required to hold the block from sliding **down** the plane is $F = ?? W$.

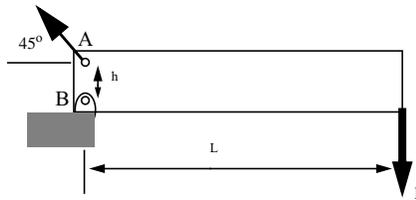


Problem 1.2

Estimate the angle of a hill upon which you can safely park your car under dry road conditions; under icy conditions. (Prob. 2.3 text)

Problem 1.3

The rigid, weight-less, beam carries a load P at its right end and is supported at the left end by two (frictionless pins). The pin at the top is pulled upwards and held in place by a cable inclined at a 45° angle with the horizontal.

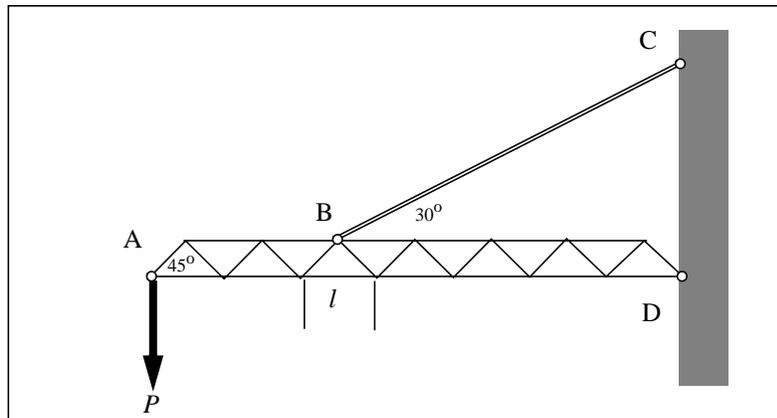


Draw a free body diagram of the beam, isolated from its environment i.e., show all the forces acting on the beam alone; show all relevant dimensions; show a reference cartesian axes system.

Explain how you would go on to determine the magnitude of the cable force acting at pin A and the magnitude and direction of the reaction force at B. (Prob. 2.13 text, amended).

Problem 1.4

The (weight-less) truss structure shown carries a load P and is supported by a cable, BC , and pinned at D to the wall. Determine the force in the cable BC and the reaction force components at D in terms of P .



(Prob. 2.15 text).