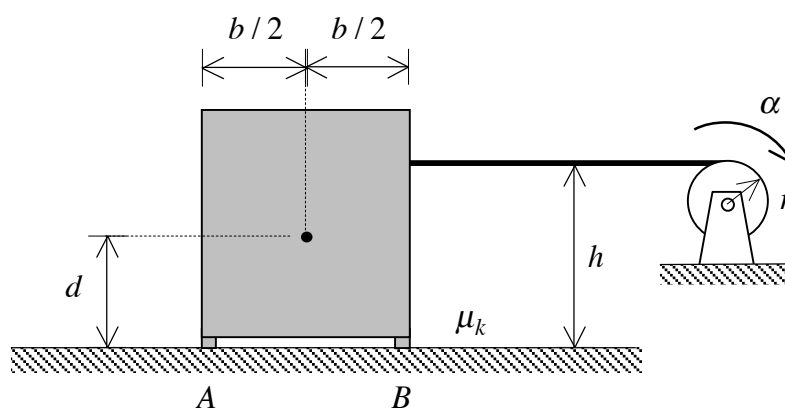


Homework H.5.A

Given: A crate of mass m is being pulled to the right by a cable attached to a winch. The winch is pulling in the cable with the angular acceleration of the winch pulley being α . The crate moves along a rough, horizontal surface with the coefficient of kinetic friction between this surface and the crate being μ_k . Assume that the crate slides without tipping.

Find:

- Determine the maximum angular acceleration α of the winch pulley such that the crate does not tip; and
- Determine the tension in the cable corresponding to the value of α found above in (a).



Use the following parameters in your analysis: $r = 0.6$ ft, $mg = 120$ lb, $d = 2.5$ ft, $h = 3$ ft, $b = 4$ ft and $\mu_k = 0.2$.