

12. The forces exerted horizontally by the obstruction and vertically (upward) by the floor are applied at the bottom front corner C of the crate, as it verges on tipping. The center of the crate, which is where we locate the gravity force of magnitude $mg = 500\text{ N}$, is a horizontal distance $\ell = 0.375\text{ m}$ from C . The applied force of magnitude $F = 350\text{ N}$ is a vertical distance h from C . Taking torques about C , we obtain

$$h = \frac{mg\ell}{F} = \frac{(500\text{ N})(0.375\text{ m})}{350\text{ N}} = 0.536\text{ m} .$$