

Offline Problems - Mika

Physics 4A

Example by Joshua

Due November

1 Hanging Brick Question

Question. Two identical uniform bricks of length L are stacked on top of each other at the edge of a table. Find the maximum overhang length L_{max} that the system can have beyond the edge of the table without toppling. Express your answer in terms of the brick length L , and make sure to clearly justify your answer!

Solution. Two stipulations:

1. Center of Mass needs to be at the very edge for maximum overhang
2. Same force acts on each block, so their positions get the same weight

Mathematically, this means $x_{cm} \geq L_{max}$. So, this becomes a matter of solving for x_{cm} :

$$x_{cm} = \frac{mL/2 + m(x + L/2)}{m + m} = \frac{L + x}{2}$$

At the very least, we understand that $x \leq L/2$ because the top block must not exceed half its length overhanging for it to remain on the structure.

This implies that at its largest, $x_{cm} = \frac{L+L/2}{2} = \frac{3L}{4}$. So, applying our first condition,

$$L_{max} = \frac{3L}{4}$$