Motor Calculations

Moment due to motor: $M = 22\text{ ozin}$

Weight lifted: $W = 16\text{ oz}$

Counterweight: $CW = 2\text{ oz}$

$M_A \implies M + 6.75\text{ in} \cdot CW = 2.75\text{ in} \cdot W$

To lift the weight

$\frac{M + 6.75\text{ in} \cdot CW}{2.75\text{ in}} > W \implies \frac{72 + 13.5\text{ in}}{2.75\text{ in}} = 31.1\text{ oz} > 16\text{ oz}$

$\implies$ Factor of safety $= \frac{31.1}{16} \approx 2$

Starting case

End case

Min load

Load $= W_\cos \theta = W$

$\theta$ is large $\implies$ load is small

Max load

Load $= W_\cos \theta = W$

$\theta = 0^\circ \implies$ load is max