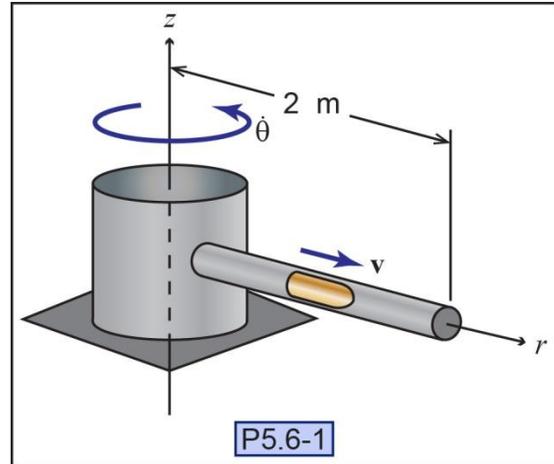


P5.6-1)^{fe} The gun turret shown rotates about its z -axis with a constant angular rate of $\dot{\theta} = 3 \text{ rad/s}$ when a 0.3 kg shell is fired. If the speed of the shell relative to the barrel is 30 m/s as it exits the muzzle, determine the horizontal side-force the barrel exerts on the shell just before it emerges.

Given:



Find:

Solution:

Draw a free-body diagram of the shell.

Note that a 3-D free-body diagram is not necessary. Determine which plane will give you the results that you need.

Determine the side-force that the barrel exerts on the shell.

Write down the equation of motion for the shell.

$F_{side} =$ _____