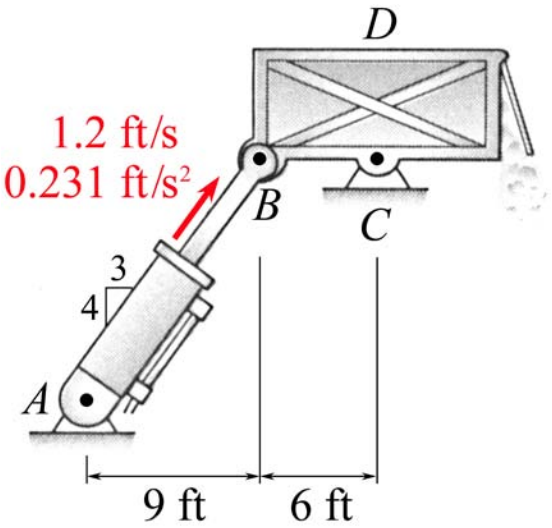
MEEG 4003 Quiz #15.m20.093

1. ⑤ Define the symbols in the acceleration formula:

$$\mathbf{a}_B = \mathbf{a}_{B/Axyz} + \mathbf{a}_{B'} + 2\Omega \times \mathbf{v}_{B/Axyz}$$

2. ⑩ The dumper pivoted at *C* is operated by the hydraulic cylinder *AB*. In the position shown, the piston rod is being extended with a velocity of 1.2 ft/s and an acceleration of 0.231 ft/s^2 relative to the cylinder. For this position, determine $\boldsymbol{\omega}_D$ and $\boldsymbol{\alpha}_D$ of the container *D*.



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1. ⑤

OXYZ: fixed reference frame. *Axyz*: rotating reference frame.

$\mathbf{a}_B$ = acceleration of *B* measured in *OXYZ*

$\mathbf{a}_{B/Axyz}$ = acceleration of *B* measured in *Axyz*

$\mathbf{a}_{B'}$ = acceleration of *B*'measured in *OXYZ*, where *B*'is a point embedded in *Axyz* but coincides with point *B* at the instant under consideration

Ω = angular velocity of *Axyz* measured in *OXYZ*

$\mathbf{v}_{B/Axyz}$ = velocity of *B* measured in *Axyz*

2. ⑩

Let *AXYZ* be fixed to the ground at *C* and *Axyz* be embedded in the cylinder at *A* with the *x* axis coinciding with *AB*.

$\boldsymbol{\omega}_D = 0.25$ rad/s ↻

$\boldsymbol{\alpha}_D = 0.01$ rad/s^2 ↺