CIV100 – MECHANICS – SECTION 5

Assignment No. 3 – Thursday, September 26, 2013

Due: 11:10 a.m., Tuesday, October 1, 2013, stapled and on correct "engineering paper".

Topic: Moments and Couples in 2D and 3D

Reminder: Quiz1 will take place during the Tutorial of October 3, 2013

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1. A worker tries to move a rock by applying a 360-N force to a steel bar as shown. If two workers attempt to move the same rock by applying a force at A and a parallel force at C, determine these two forces so that they will be equivalent to the single 360-N force shown in the figure.
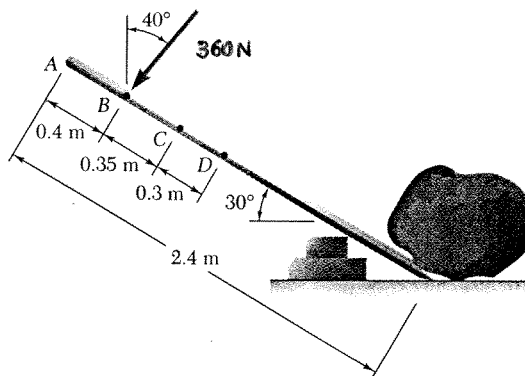

2. A rectangular plate is acted upon by the force and couple shown. This system is to be replaced with a single equivalent force.
(a) For $\alpha = 40°$, specify the magnitude and the line of action of the equivalent force; and
(b) Specify the value of α if the line of action of the equivalent force is to intersect line CD 300 mm to the right of D.
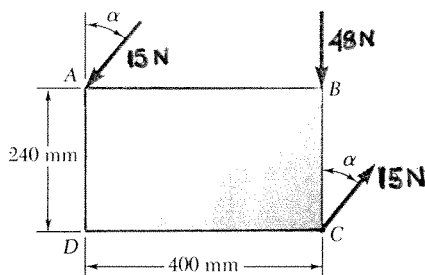
3. A 46-N force $\vec{F}$ and a 2120 mN·m couple $\vec{M}$ are applied to corner A of the block shown. Replace the given force-couple system with an equivalent force-couple system at corner H.
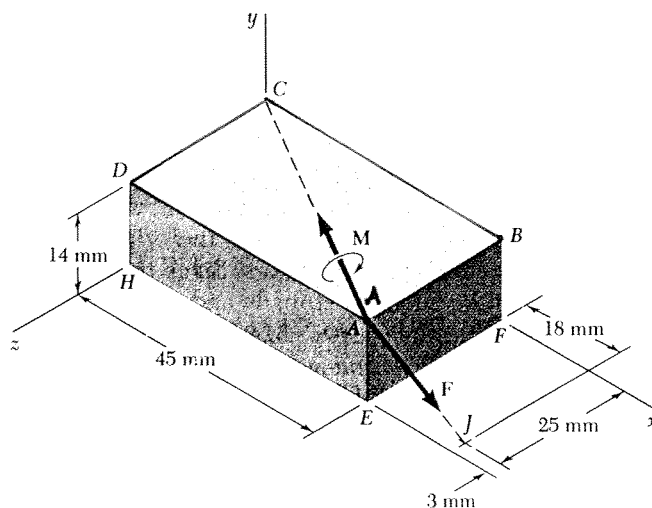
4. A 3.26-kg motor is mounted on the floor. Find the resultant of the weight and the forces exerted on the belt and determine where the line of action of the resultant intersects the floor.
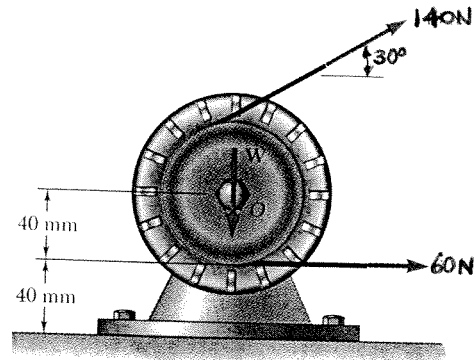
5. Pulleys A and B are mounted on bracket CDEF. The tension on each side of the two belts is as shown. Replace the four forces with a single equivalent force and determine where its line of action intersects the bottom edge of the bracket.