

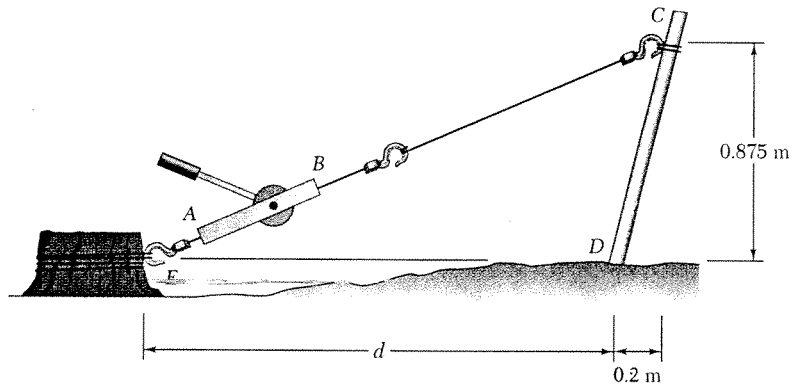
## CIV100 – MECHANICS – SECTION 5

### Assignment No. 2 – Thursday, September 19, 2013

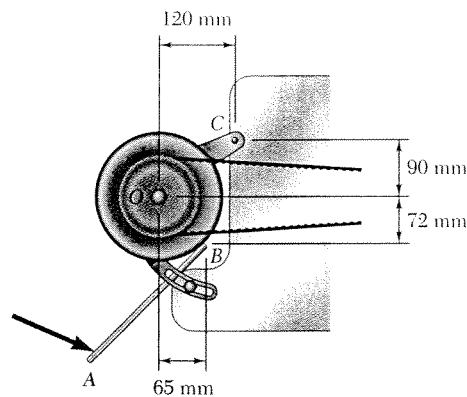
Due: 11:10 a.m., Tuesday, September 24, 2013, stapled and on correct “engineering paper”.

#### Topic: Moments and Components in 2D and 3D

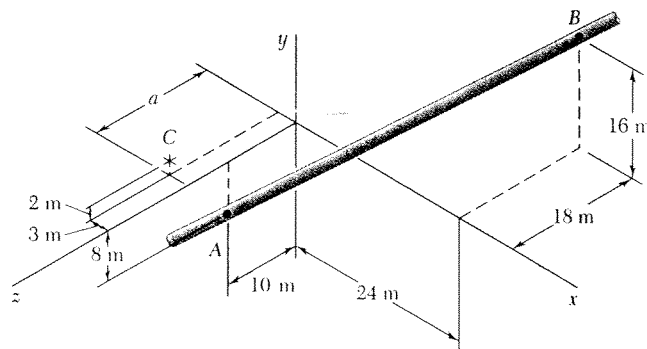
1. It is known that a force producing a moment of 960 Nm about D is required to straighten the fence post CD. If the capacity of winch puller AB is 2400 N, determine the minimum value of distance  $d$  to create the specified moment about point D.



2. A mechanic uses a piece of pipe AB as a lever when tightening an alternator belt. When he pushes down at A, a force of 485 N is exerted on the alternator belt at B. Determine the moment of that force about bolt C, if its line of action passes through O.

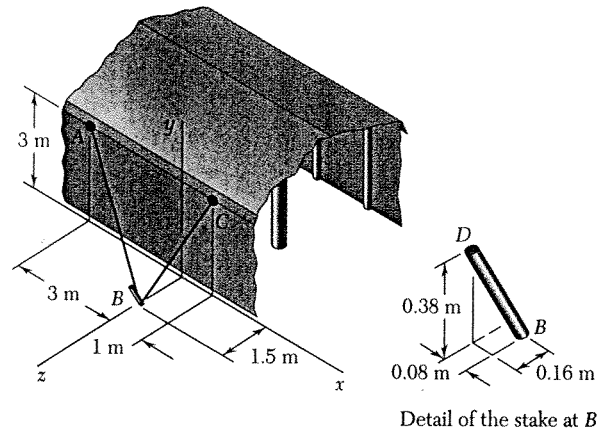


3. Determine the value of  $a$  which minimises the perpendicular distance from point C to a section of the pipeline that passes through points A and B.



4. Ropes AB and BC are two of the ropes used to support a tent. The two ropes are attached to a stake at B. If the tension in rope AB is 540 N, determine:

- The angle between rope AB and the stake, and
- The projection on the stake of the force exerted by rope AB at point B.



5. When a force  $\vec{F}$  is applied to the handle of the valve shown, its moments about the  $x$  and  $z$  axes are  $M_x = -77 \text{ Nm}$  and  $M_z = -81 \text{ Nm}$ , respectively. For  $d = 0.675 \text{ m}$ , determine the moment  $M_y$  of  $\vec{F}$  about the  $y$  axis.

