Muddy Card Responses Lecture M6

Can you re-explain why there's a moment now? (see picture)

B

5 m

200 N

A   10 m   C
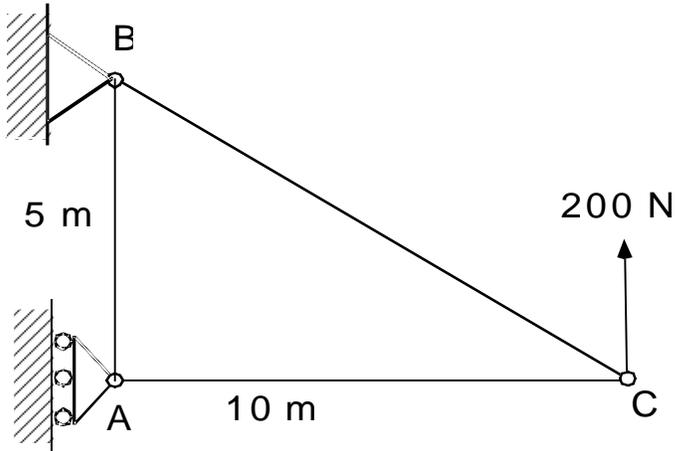
Not sure what the question is. Here are a couple of thoughts. The reaction at A and B are force reactions (but not pure moments). However, the force of 200N has a moment about both points A and B, so the reaction force at A must have a moment about B that is equal and opposite to that due to the load, and similarly for the moment due to the reaction at A and the load about point B.

In the section method, why is the moment arm for F_{ED} L?   See figure below. The moment arm of F_{ED} about B is the height of point E about the bar AB, which is a length L. This represents the perpendicular distance of the line of action of the force F_{ED} from point B.

E F_{ED} D

L

45° F_{AB}

A

B

F_{EB}

2L
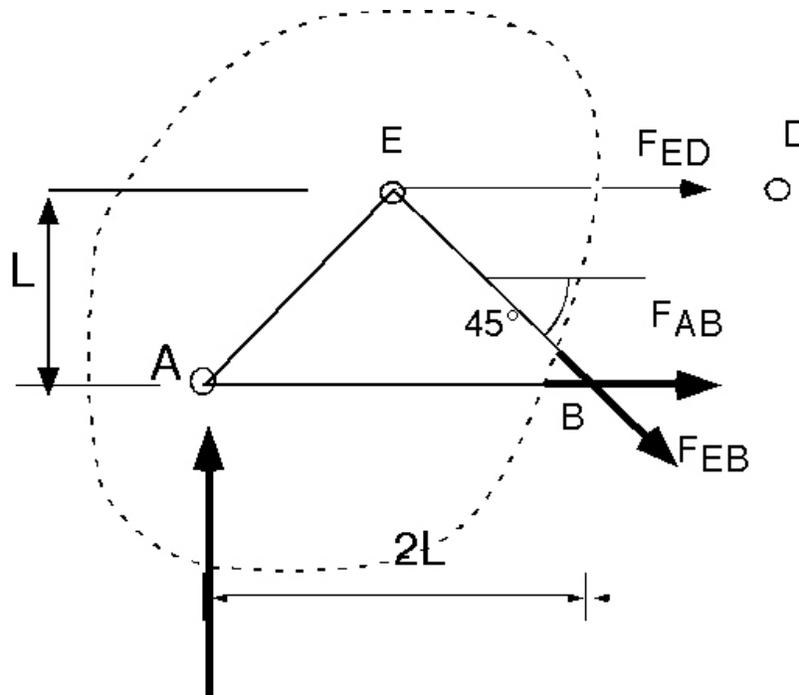
Could you explain which moments you used in the last example? See picture above.
By taking moments about point B, we eliminate F_{EB} and F_{AB}, which both pass through
point B and therefore have no moment arm about it. The only two forces acting on the
section which have a moment about B are F_{ED} (which we want to find) and the reaction at
point A, of P.

**Not quite clear on the end of the last example why are we taking moments around
B?** See explanation above. It makes the analysis easiest, as it eliminates F_{EB} and F_{AB}
from the equilibrium equation.

How do you determine where the cut line should lie in using method of sections?
There are two key considerations: (1) The cut must cut through the bar(s) whose force
you want to determine. (2) We still only have three equilibrium equations to use, so if we
cut more than three bars whose bar forces are not yet determined, then we will not be able
to solve for them.

**Why did you break up the truss like you did. (picture showing more or less the
picture shown above, and then another one with the cut going through the middle of**

joint B)?. See the answer above. In particular putting a cut through the middle of a joint is not a good idea as it becomes ambiguous as to which forces are acting on which side of the cut. Cutting through the bars ensures that we know which bar forces are acting on the section and in which direction they act.

Why does the cut not have to be straight (Arbitrary) when using method of sections? See above for considerations as to where to make the cut. It is a completely free choice which part of the structure we isolate (by "cutting") from the rest of the structure. The choice should be guided by which choices will make the analysis easiest.

In which situations is it better to use method of sections and in which situations should we use method of joints? The two methods are essentially the same - isolating part of the structure and replacing cut bars by the equivalent bar forces. Nevertheless there are some differences and considerations. The method of sections allows you to make use of equilibrium of moments to solve, the method of joints restricts you to two equations for the equilibrium of forces. If you are asked to find a bar force for a bar in the middle of the structure the method of sections will allow you to go straight to that bar. The method of joints will require you to solve for the bar forces joint by joint, which is a more time consuming process.

Method of sections, can we run through more examples? Absolutely, starting with recitation today.

Mud - didn't completely understand.
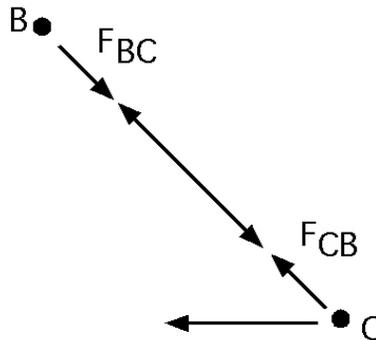
I thought FCB was negative (in first example, of 3-bar truss). Sorry for the confusion. This figure was just for illustration to show why FBC = FCB, and why the force the bar exerts on the joints is the same as the force that the joints exert on the bar. In the actual example FCB was compressive, and this would have just meant that the direction of the arrows would be reversed in this figure.

Can you put up all lecture notes online now? Unfortunately I do not feel able to do this. Although this is my second time through posting notes on the web, the original set of notes is pretty rough and I am improving them before each lecture, as part of my preparation to give the lecture. I would not want to post the notes, have you download them, and then lecture from a different set of notes. I realize that this makes your lives a little more complicated. I hope that after this year I may have a set of notes that I am sufficiently confident in that I can post them at the beginning of the semester.

Maybe a handout outlining the method of joints/sections would be a useful thing. The key steps are outlined in the notes for these lectures (M5/M6). If these are not sufficient, please feel free to ask for further explanation and I will see if I can improve the notes.

Also 26 cards indicating no mud, or even positive comments about the lecture - many thanks.

1 card stating "no mud, Go Juve!" from a philistine in the front row who should know better - Up the Gunners!