The University of Sydney

School of Civil Engineering

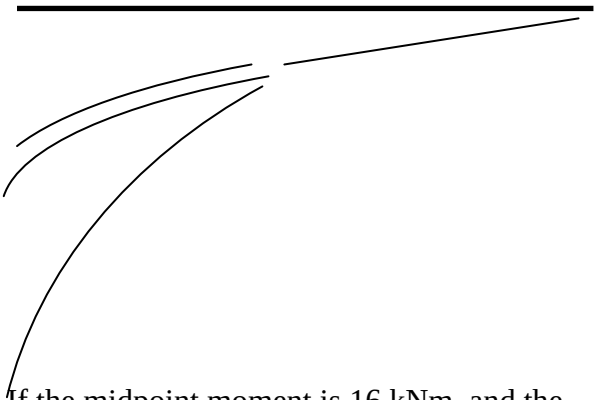
CIVL2201 Structural Mechanics

Assignment 1 – Internal Actions - Feedback

Please see separate file on the website for the actual answers.
Mean 3.50/5, Median 3/5.

Comments

- Overall the presentation was quite good, a marked improvement from some of the "formative" problems submitted. Keep it up.
- **Units, units, units, units, units**!!! A large number of students omitted the units the BMD/SFD. Saying that the BMD has magnitude "7.3125" is insufficient. What are the units for twisting moment, bending moment, and shear force – kN, kNm and/or kN/m.
- **Scale.** BMDs and SFDs should be drawn to as close to scale as possible. They do not need to be perfect, nor are students expected to measure values exactly, but the BMD/SFDs should reflect reasonably accurately the distribution of internal actions, as engineers would tend to look more at the shape of these diagrams rather than at the specific values. Eg for the SFD for Q1 was 20 kN at one end & 4 kN at the other. Hence the magnitude is about half at the right end compared to the left and the SFD should reflect this (but does not need to be perfectly measured).
- **Shape:** See comment on solution on the shape of the BMD, specifically at z = 5 m, and z = 6 m. The SFD is the slope of the BMD – since there is discontinuity of shear at 5 m, there is a "pointy" transition between two different parabola, but at 6 m there is a smooth transition from the parabola to the linear part of the BMD.
- **Size.** BMDs should be drawn a reasonably large size to make them legible – remember a key reason for drawing them is to communicate the distribution of bending moment to another engineer.
- **Final BMD/SFD**: Draw the original structure with the loading, then the BMD and SFD directly below so it is easy to see what is happening to various parts of the structure.



If the midpoint moment is 16 kNm, and the end moment is 80 kNm, which line best represents the scale of the BMD?

An example of scale in a BMD (not specifically related to this year's assignment)

Question 2: Email Question

While this question did have a technical component to identify the errors, the main aim of this question was to assess the students' ability to communicate technical information in a professional manner to a client.

As an example below is an email that has been pieced together from different student responses from the past few years.

Date: Tue, 12 Apr 2005 15:08:54 +1000
From: abcd1234@mail.usyd.edu.au
To: J.Smith@civil.usyd.edu.au
Subject: Crrectness of analysis

in recent review of the calculations you sent me for the beam, it was found
that there is an error in the calculations that carries on to make the SFD
and the BMD also incorrect.
the first page of calculations is correct but on the second page in cut 2
there is an error with the value that you subbed in for the beam, you
subbed in L/2 it should have been 2L/3. thus the SFD should be symmetrical
with the max negative shear = WL/12. also the BMD shape should be parabolic
in the centre third not constant. the max value for bending should be
WL^2/36 not - 7WL^2/18.

This message was sent using IMP, the Internet Messaging Program.

Consider the recipient of this message, Prof Smith. What sort of impression would he get when he receives this email? He is a Professor, a very important person, and is probably very busy, and probably has many jobs to do.

- Who is this email from? Who is abcd1234@mail.usyd.edu.au? This sender has not even put his/her name at the bottom of the email or introduced himself/herself at the top.
- "Dear Professor Smith" – how polite/impolite is it to not greet the recipient?
- Spelling mistake in the subject line.
- What is this email about? Prof Smith is a busy person – a short background to this job might be helpful.
- should a sentence start with a capital letter. and is it usual to have a blank line between paragraphs to make it easy to read.
- Some students listed a large number of minor issues such as "x and y axes not defined", or "you shouldn't have ignored horizontal forces". It was interesting that some students said the calculations were hard to understand yet some said there were many!
    - Making a long list of issues will increase the chances of the client missing some of them. If you have along list of issues consider breaking them into smaller lists – eg "Important technical issues", "formatting mistakes", with the highest priority first.

Email is an important professional communication tool. An email to a lecturer, a client, or a potential employer is different to an email to a close friend or an SMS, and hence different rules of etiquette and politeness apply. Once professional contact is established with someone, then it might be acceptable to be less formal in subsequent email exchanges.

Below is an exact copy of one submission from a student which was a good example of a submission. It is not perfect, there are a couple of spelling mistakes, but it is polite, professional, succinct and to-the-point

Date: Tue, 12 Apr 2005 14:03:02 +1000
From: Ima Student <abcd1234@mail.usyd.edu.au>
To: J.Smith@civil.usyd.edu.au
Subject: CIVL2201 Structural Mechanics-Assignment 1 Question 3

Dear Professor John Smith,
In regards to the calculations in Question 3 of Assignment 1, there are a few calculation problems that i have encountered. Below is a list of the problems encountered and how they should be solved.

1. The initial calculations were incorrect. Actual calculations should have been carried out instead of assuming what the values are (referring to "by inspection and symmetry"). The correct calculations are: R1 = R2 = wL/6

2. A third cut is needed at the location half way in between the end of the distributed load, w, and the end of the beam, R2, because there is a cahnge in the loading condition of the beam.

3. Since all the intial calculations were incorrect, all the calculations for the cuts are incorrect. However, the method you used was correct. Simply just use the value that is stated in point 1 and all the calculations will be correct using the same method.

4. The shear force diagram should be symmetric. The bending moment diagram should have some sort of parabolic curve in it because the moment equations from the cuts are quadratic equations.

I hope my review of these calculations are some sort of guidance for you.

Regards
Ima Student (04******)

This message was sent using IMP, the Internet Messaging Program.

Tim Wilkinson

Tim Wilkinson
Senior Lecturer in Civil Engineering