

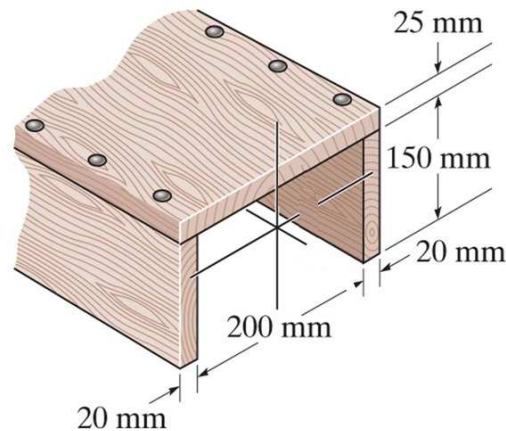
HOMEWORK NO. 12

- **Textbook Sections Covered:** 7.3 (Shear flow in Beams), 8.1 (Pressure Vessels)
- **DUE DATE:** Monday 30 - April - 2012

1 – The given cross section is subjected to a downward vertical shear V .

a) If the shear capacity of each nail is 6 kN , and their spacing is 80 mm, determine the maximum value of V that can be applied .

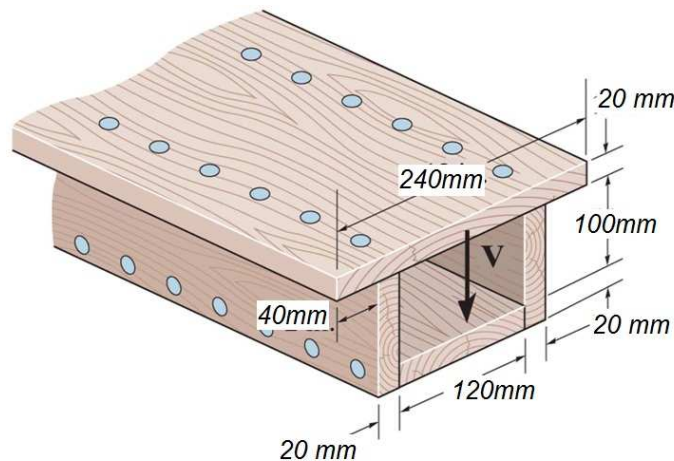
b) If the nails are replaced by two lines of glue (each is 20 mm wide) , and the glue allowable strength is 2 MPa, determine the maximum value of V that can be applied.



2 – The cross section is made of 4 boards nailed together using 4 rows of vertical and horizontal nails. The cross section is subjected to a vertical shear $V= 3$ kN.

a- If the spacing of the **vertical** nails is 50 mm, determine the required capacity of each nail.

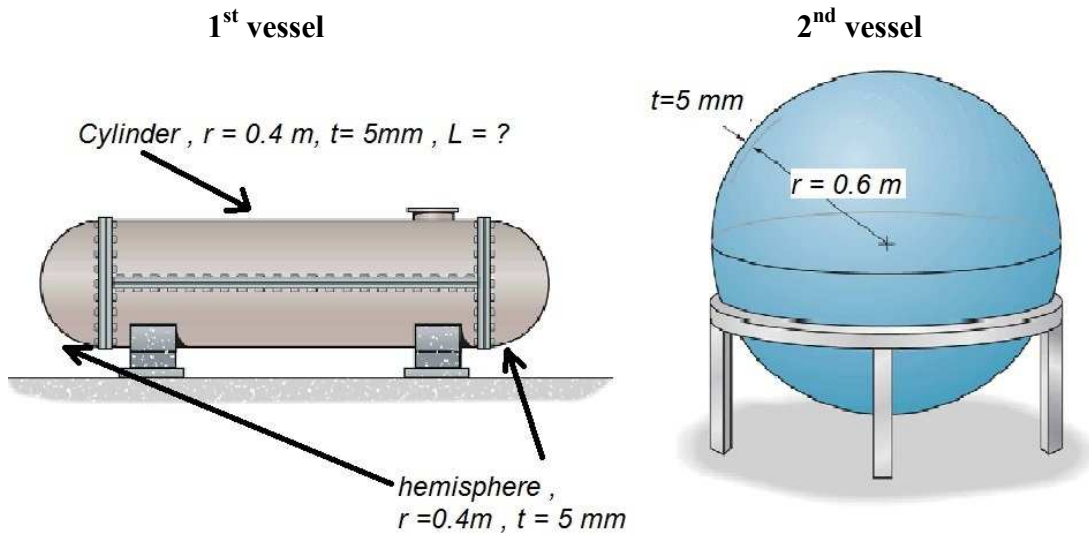
b- If the spacing of the **horizontal** nails is 55 mm, determine the required capacity of each nail.



3 - Solve problem 8.3 in the textbook, but change the thickness from 6 mm to 5 mm, and the inner diameter from 200mm to 250 mm.

4 – The given two pressure vessels are subjected to internal pressure $p = 0.1$ MPa.

- a- Determine the length of the cylinder, if the total volume of the first vessel is to be the same as the second vessel.
- b- Determine the stress in the longitudinal and circumferential directions of the cylinder in the first vessel
- c- Determine the maximum stress in the second vessel



(Ignore the effect of the shown supports)