

BENDING STRESS

Exercise 1:

Calculate the maximum stress that will be produced in a steel beam of rectangular cross-section when bent into the arc of a circle of radius 5 m. The depth of the beam is 6 mm, the modulus of Elasticity 210 kN/mm^2 . Give your answer in kN/mm^2 .

Exercise 2:

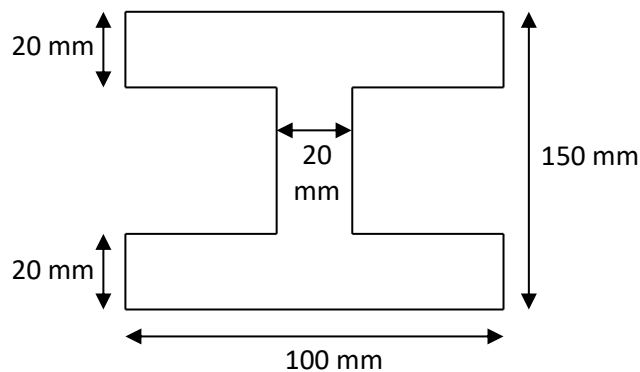
Calculate the radius to which a steel strip of thickness 4 mm can be bent if the maximum stress acting on the material is not to exceed 100 N/mm^2 . The material has a modulus of elasticity of 210 kN/mm^2 .

Example 3:

A beam of rectangular cross-section, $40 \text{ mm} \times 160 \text{ mm}$ deep, is subjected to a bending of 35 kN.m . Determine the maximum bending stress in the beam material.

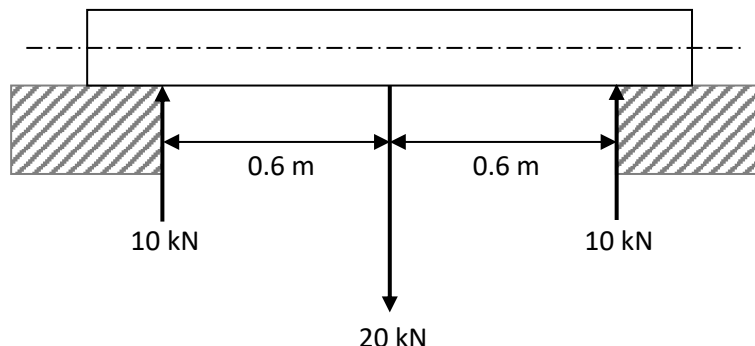
Example 4:

The cross-section of the idealised beam shown in the following figure has overall dimension of $100 \text{ mm} \times 150 \text{ mm}$ deep with a flange and web thickness of 20 mm . Calculate the second moment of area of the section about the neutral axis. If the bending stress in the beam material is not to exceed 180 MN/m^2 , determine the maximum bending moment in the beam.



Example 5:

A steel bar, 100 mm diameter, is used to support a pulley block. If the bar is simply supported over a span of 1.2 m, determine the maximum bending stress in the material when the pulley block is at mid-span supporting a load of 20 kN.



Example 6:

The maximum bending moment and bending stress in a beam of rectangular cross-section must not exceed 25 kN.m and 130 MN/m^2 respectively. What will be the minimum dimensions of the beam cross-section if the width of the beam is $2/3$ of its depth?