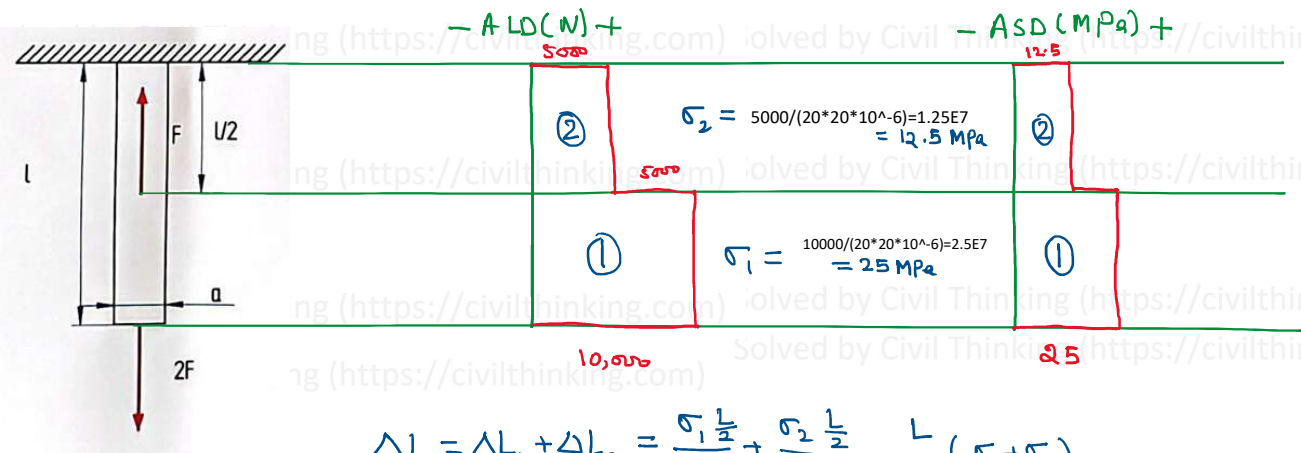
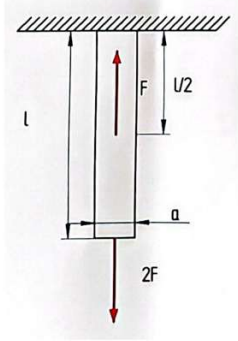


Solid Mechanics: Axial Load Diagram, Axial Stress

Diagram: Problem 2 solution

Draw a graph of tensile or compressive forces and stresses and calculate the total deformation of a square steel bar with the given data $l=4\text{m}$ $b=20\text{mm}$ $F=5000\text{N}$ and $E=210\text{ GPa}$ for the following cases:



$$\Delta L = \Delta L_1 + \Delta L_2 = \frac{\sigma_1 l}{E} + \frac{\sigma_2 l}{E} = \frac{L}{2E} (\sigma_1 + \sigma_2)$$

$$= \frac{(4 / (2 \times 210 \times 10^9)) \times (25 + 12.5) \times 10^6}{1} = 0.000357$$

$$= 0.357 \text{ mm} \approx 0.36 \text{ mm}$$

This problem was solved by Civil Thinking (<https://civilthinking.com>)

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