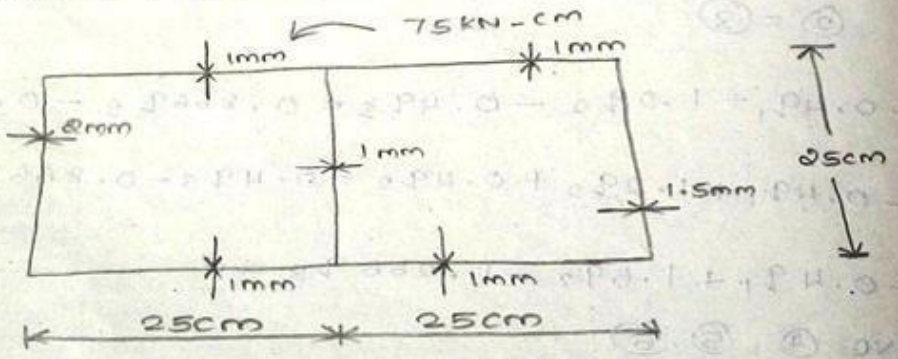
Subject Code & Name**: 19AST203 Aircraft Structural Mechanics**

TOPIC: **Shear flow in single and multicell under bending with walls effective**

2) Find Shearflow and twist per unit length of cell structure is shown in fig. The material used is Aluminium, E = 70 GPa, T = 75 kN-cm, poisson's ratio, μ =



Soln:-

Area of cell ①. $A_1 = 25 \times 25 = 625$

Cell ② $A_2 = 625$

$$q_1 = \frac{S_1}{t_1} = \frac{25}{0.1} + \frac{25}{0.1} + \frac{25}{0.2} = 625$$

$$q_{12} = \frac{S_{12}}{t_{12}} = \frac{25}{0.1} = 250$$

$$a_2 = \frac{s_2}{t_2} = \frac{25}{0.15} + \frac{25}{0.1} + \frac{25}{0.1} = 666.66$$

$$\theta = \frac{1}{2AG} \int q \frac{ds}{dt}$$

for cell ①,

$$2G\theta_1 = \frac{1}{A_1} [q_1 a_1 + (q_1 - q_2) a_{12}]$$

$$2G\theta_1 = \frac{1}{625} [625 q_1 + 666.66 q_1 - 666.66 q_2]$$

$$2G\theta_1 = \frac{1}{625} [1291.66 q_1 - 666.66 q_2]$$

$$2G\theta_1 = 2.06 q_1 - 1.06 q_2 \quad \text{——— ①}$$

$$2G\theta_2 = \frac{1}{A_2} [q_2 a_2 + (q_2 - q_1) a_{12}]$$

$$2G\theta_2 = \frac{1}{625} [$$

$$2G\theta_1 = \frac{1}{625} [625 q_1 + 250 q_1 - 250 q_2]$$

$$2G\theta_1 = \frac{1}{625} [875 q_1 - 250 q_2]$$

$$2G\theta_1 = 1.4 q_1 - 0.4 q_2 \quad \text{——— ①}$$

$$2G\theta_2 = \frac{1}{A_2} [q_2 a_2 + (q_2 - q_1) a_{12}]$$

$$2G\theta_2 = \frac{1}{625} [666.66 q_2 + 250 q_2 - 250 q_1]$$

$$2G\theta_2 = \frac{1}{625}\left[916.66\,q_2 - 250\,q_1\right]$$

$$2G\theta_2 = 1.4\,q_2 - 0.4\,q_1 \quad \text{——— (2)}$$


SEE YOU NEXT
CLASS!