



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

DEPARTMENT OF AEROSPACE ENGINEERING



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, $E = 70 \text{ GPa}$
 $T = 75 \text{ KN-cm}$, poisson's ratio, $\mu =$

Soln:-

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

Cell ② $A_2 = 625$

$$a_1 = \frac{S_1}{t_1} = \frac{25}{0.1} + \frac{25}{0.1} + \frac{25}{0.2} = 625$$
$$a_{12} = \frac{S_{12}}{t_{12}} = \frac{25}{0.1} = 250$$

$$a_2 = \frac{q_2}{t_2} = \frac{25}{0.15} + \frac{25}{0.1} + \frac{25}{0.1} = 666.66$$

$$\theta = \frac{1}{E A t} \int q \frac{ds}{dt}$$

for cell ①,

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

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

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

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

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

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

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

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

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

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

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

$$2Q\theta_2 = \frac{1}{625} [916.66 q_2 - 250 q_1] \quad \frac{2Q}{25} = 20$$

$$2Q\theta_2 = 1.4 q_2 - 0.4 q_1 \quad \frac{1}{25} [916.66 q_2 - 250 q_1] \quad \textcircled{2}$$

$$[100000 - 100000] \frac{1}{14} = 10000$$

$$[100000 - 100000] \frac{1}{25} = 10000$$

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