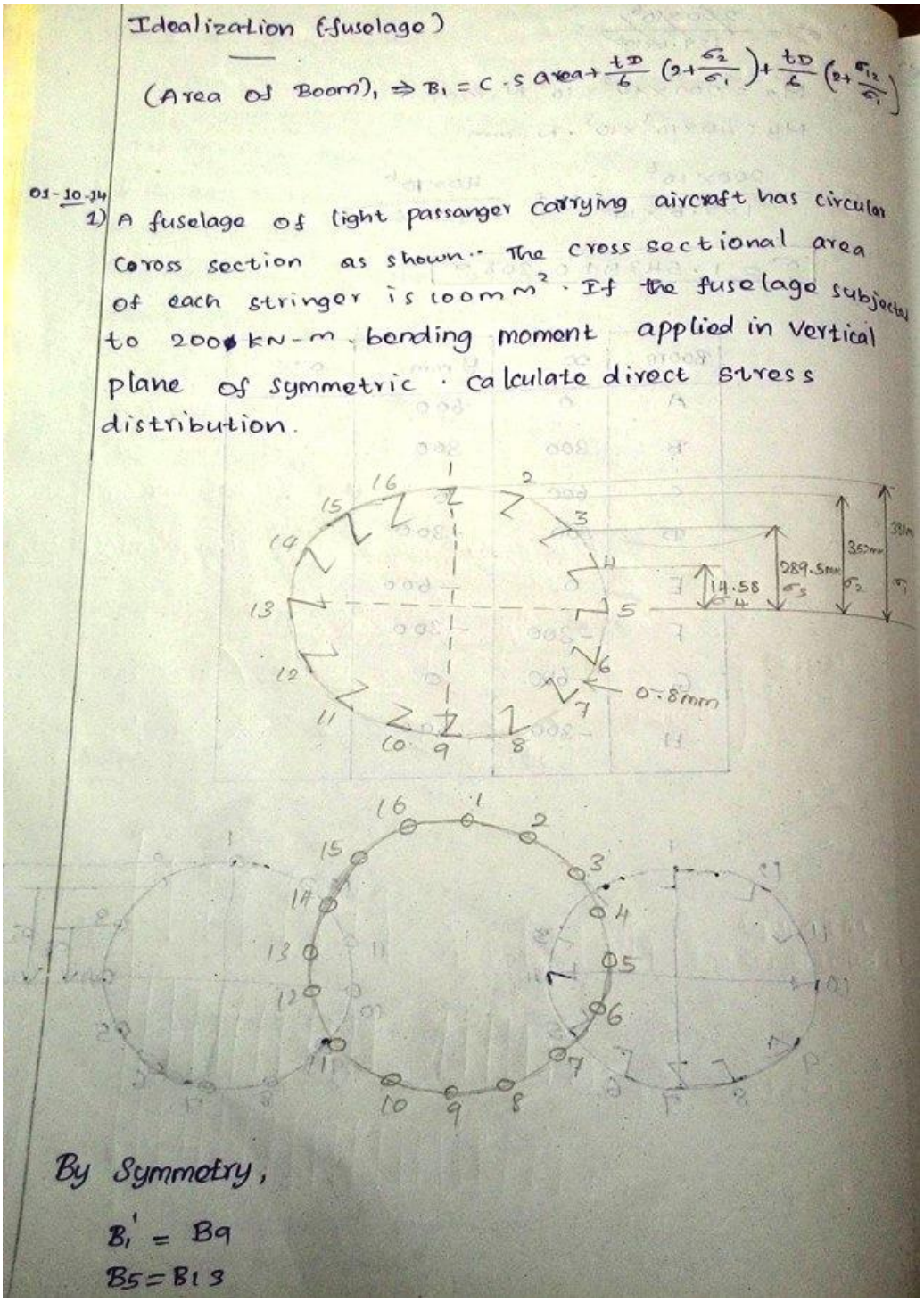
SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

DEPARTMENT OF AEROSPACE ENGINEERING

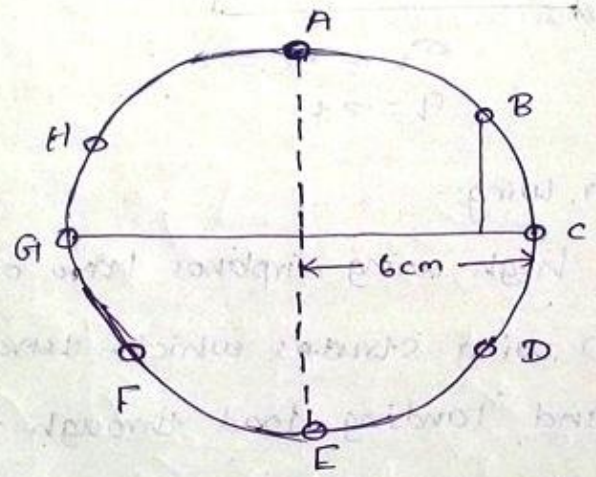
Subject Code & Name**:** 19AST203 Aircraft Structural Mechanics

TOPIC**: Shear force and bending moment distribution over the aircraft fuselage**



29-09-21

1) Following figure indicates idealized having no of Stringers which are placed equal placing placed around with circumference of fusolage. each stringer has cross sectional area 120 section radius 60 cm. wall thickness 1.9mm. Section is subject to bonding moment in vertical plane of symmetry 200 kNm and bending moment in horizontal 40 kN of m. calculate direct stress in Stringers.



Soln:-

$$\sigma = \frac{\bar{M}x}{Ixx} y + \frac{\bar{M}y}{Iyy} x$$

$$Ixx = \Sigma Icx + \Sigma Ay^2 - \Sigma Ay^2$$

$$= [1200 \times (300)^2 + 120(600)^2 + 120(300)^2] \times 2$$

$$= 129.6 \times 10^4 \text{ mm}^4$$

$$Iyy = \Sigma ICy + \Sigma Ax^2 - \Sigma Ax^2$$

$$= [120 \times (300)^2 + 120(600)^2 + 120(300)^2] \times 2$$

$$= 129.6 \times 10^6 \text{ mm}^4$$

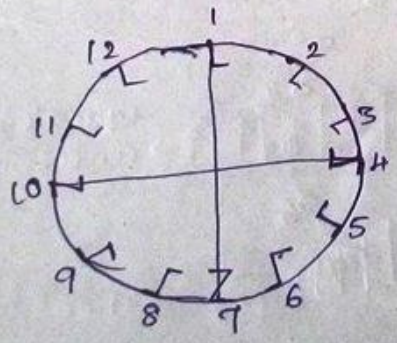
$M_x = 200 \times 10^3 \times 10^3$ N.mm

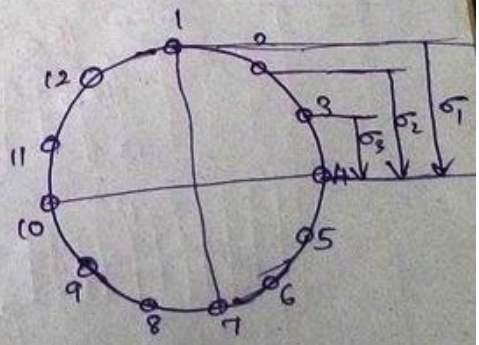
$M_y = 40 \times 10^3 \times 10^3$ N.mm

$$\sigma = \frac{200 \times 10^6}{129.6 \times 10^6} y + \frac{40 \times 10^6}{129.6 \times 10^6} x$$

$$\boxed{\sigma = 1.543 y + 0.308 x}$$

Boom	x	y mm	σ
A	0	600	
B	300	300	
C	600	0	
D	800	-300	
E	0	-600	
F	-300	-300	
G	-600	0	
H	-300	300	



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