



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

DEPARTMENT OF AEROSPACE ENGINEERING



Subject Code & Name: 23AST205 AEROSPACE STRUCTURES

UNIT: 5. STRESS ANALYSIS IN WING AND FUSELAGE

TOPIC: 9. Semi-tension field beam theory

Incomplete Tension field Beam:-

In modern aircraft structures, beams having extremely thin web or rare. They retain after buckling, and some of them have ability to support loads, so that even near failure they are in state of stress somewhere in between that of diagonal tension and buckling stress. Such beam is called incomplete tension field beam.

Tapered wing Spar:-

web shear flow force

$$S_{y,w} = S_y - P_{z,1} \frac{\delta y_1}{8z} - P_{z,2} \frac{\delta y_2}{8z}$$

Shear flow

$$q_s = - \frac{S_{y,w}}{I_{xx}} \left(\int t y ds + B_1 y_1 \right)$$

$B_1 \rightarrow$ Area of Boom 1

$t \rightarrow$ thickness of web

