



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



DEPARTMENT OF AEROSPACE ENGINEERING

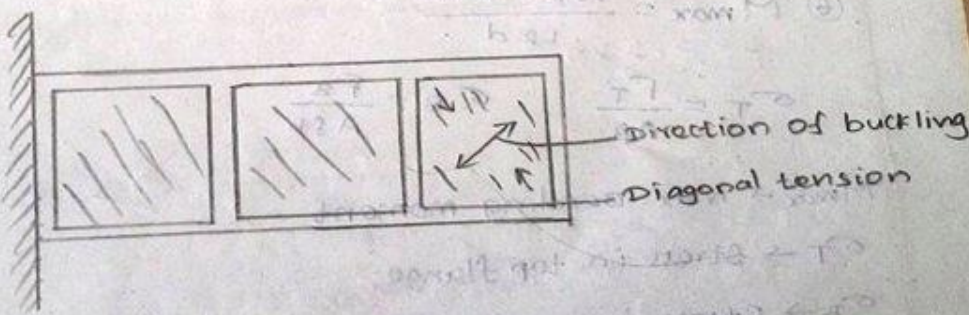
Subject Code & Name: 23AST205 AEROSPACE STRUCTURES

UNIT: 5. STRESS ANALYSIS IN WING AND FUSELAGE

TOPIC: 8. complete tension field beams

Complete tension field beam (Wagner Beam) :-

The parts of aircraft wing usually and upper and lower flange connected by thin stiffened webs. These webs are often of such thickness such that they buckle under the shear stress at a fraction of their ultimate load. The form of buckle is shown in figure where the web of beam buckles under the action of internal diagonal stresses produced by shear, leaving a wrinkled web capable of supporting diagonal tension only in direction \perp to direction of buckling of beam. Then the beam is said to be complete tension field beam.



① $\tan^2 \alpha = \frac{1 + \frac{td}{2A_f}}{1 + \frac{tb}{A_f}}$

$A_f \Rightarrow$ flange Area
 $z \Rightarrow$ total length

② $F_T = \frac{Wz}{d} + \frac{W}{2 \tan \alpha}$

