

Analysis of Corrugated Core Plates

Objectives

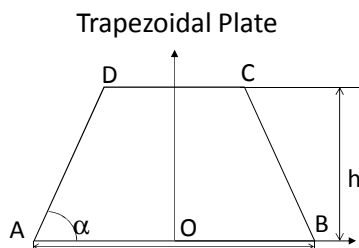
Geometric and material nonlinear analysis of corrugated sandwich plates with various boundary conditions.

Importance

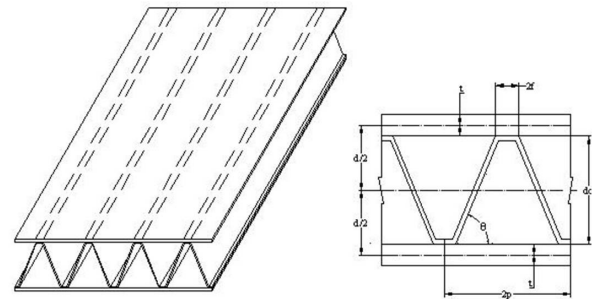
- High stiffness and high strength to weight ratios.
- Application to aviation and aerospace, marine, mechanical, civil, and blast protection.

Approach

Based on the generalized Galerkin method



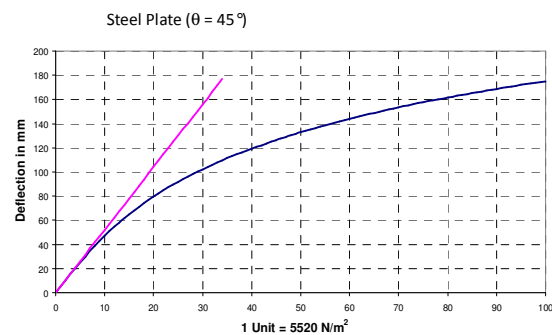
View after three explosive tests using :
30 kg PE4 AT 3.85 m, 15 kg PE4 AT 0.9 m.



Corrugated core sandwich panel and dimensions of panel unit

Comparison of maximum deflection of rectangular plates

	Corrugation Angle	Reference Data	Ritz method	% Error	Galerkin method	% Error
Steel Plate	$\theta = 75^\circ$	5.762	5.329	7.51	5.667	1.61
	$\theta = 45^\circ$	5.286	4.95	6.3	5.206	1.51
Aluminum Plate	$\theta = 60^\circ$	4.15	3.826	7.8	4.095	1.32
	$\theta = 45^\circ$	3.57	3.35	6.1	3.538	0.89



Material properties of the analyzed plates

	Corrugation Angle	Young's Modulus (Gpa)	Bending Stiffnesses		Twisting Stiffness	Transverse Shear Stiffness	
			D _x (N-m)	D _y (N-m)		D _{xy} (N-m)	D _{Qx} (N/m)
Steel Plate	$\theta = 75^\circ$	208	4.2E6	3.99E6	3.04E6	9.99E7	1.4E5
	$\theta = 45^\circ$		4.04E6	3.74E6	2.86E6	6.73E7	2.35E5
Aluminum Plate	$\theta = 60^\circ$	68	5.69E4	5.34E4	4.08E4	1.42E7	6.64E4
	$\theta = 45^\circ$		5.54E4	5.12E4	3.91E4	1.09E7	1.09E5

