

Curved panel, no edge warping, no axial bending, input data for STAGSUNIT listed in Table 12

PA= 1.00000E+01 PB= 0.00000E+00 PX= 0.00000E+00

step 16 displacement deformed geometry

Fig.32 STAGS nonlinear deformation at the design load; case=allenrings34803

Θ x 0.00
Θ y 90.00
Θ z 0.00

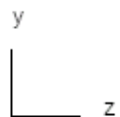


Fig. 32 STAGS prediction for deformation of the curved panel at the design load, PA = 10.0 (Nx = -1000 lb/in). Overall axial bending is NOT permitted and in-plane warping of the panel edges is prevented. The deformations here are the same as those displayed in the previous slide. This is an end view. The end rings have been removed so that one can see the stringers. One can see how much greater the amplitudes of the inward buckles are than those of the outward buckles, typical behavior for curved, stiffened panels under axial compression. Later we will see that the maximum effective stress occurs adjacent to each stringer at the outer skin surface, that is, at the skin surface opposite from that to which the internal stringers are attached. The maximum effective stress occurs where significant axial compression is combined with significant circumferential (hoop) tension in the panel skin. The hoop tension develops adjacent to each stringer and at each axial location where there is an inward buckle that tends to wrap the panel skin around the root of each stringer. A circumferentially very fine finite element mesh is required in the immediate circumferential neighborhood of at least one stringer to capture the stress.