



Optimized thick-apex unstiffened equivalent ellipsoidal shell with inward $\cos(\theta)$ line load from $\theta=0$ to 90 deg.
 PA= 0.0; PB= 2025.96; 480 finite elements are used; crude model Θx -0.00
 step 40 displacement w contours at maximum PB Θy 0.00
 nonlinear w; $\cos(\theta)$ point loads at junction between Shell Segments 3 and 4 (see Fig.2) Θz -0.00
 subroutine usfab.soccerball.plastic.src is used with NGCP = 1 $\left| \begin{array}{c} 9.900E+00 \\ \hline \end{array} \right|$ x

Fig. 185 Elastic-plastic analysis of the **optimized unstiffened equivalent ellipsoidal shell with the thick apex with $t(\text{apex}) = 0.4$ inch; $W_{imp}=0.2$ inch; the optimum design is listed in Table 78.** State of the shell at load set B (PB) step no. 40 at the end of Run 7. (See Fig. 180). Load set B consists of a number of concentrated inward directed normal loads applied along the junction of Shell segments 3 and 4 (Figs. 2, 169, 181, 190) distributed as $\cos(\theta)$ from $\theta = 0$ to 90 degrees in the circumferential coordinate along Row no. 5 in Shell Units 11 and 12. (See Table a40, except the input datum LT is +1 instead of -1). This load distribution is used because it generates a dent that locally resembles the negative of the deformation in Fig. 179, that is, the linear buckling modal imperfection with $n = 1$ circumferential wave. Compare with Fig. 196, for which the loading that produces the residual dent is by “ $\cos(\theta)$ ” imposed normal inward displacements rather than by “ $\cos(\theta)$ ” imposed normal inward-directed concentrated loads, as is the case here.