



Fig. 221 Elastic-plastic analysis of the **optimized unstiffened equivalent ellipsoidal shell with the thick apex with  $t(\text{apex}) = 0.47183$  inch; Wimp=0.1 inch**, half the amplitude, Wimp = 0.2 inch, that pertains to the results in Figs. 145 – 200 and Tables 78 – 88; **the optimum design is listed in Table 89**. State of the shell at load set B (PB) at the end of Run 5. This is the **residual dent** at the end of Run 5. (See Fig. 216). Load set B consists of a number of concentrated inward-directed normal **loads** applied along Row 2 of Shell Segment 5 (Figs. 2, 169, 205) distributed as  $\cos(\theta)$  from  $\theta = 0$  to  $90$  degrees in the circumferential coordinate. This load distribution is used because it generates a dent that **locally** resembles the negative of the deformation in Fig. 205, that is, the negative of the linear buckling modal imperfection with  $n = 1$  circumferential wave. Note the unusual situation that the maximum depth of the **residual dent** lies above the line of symmetry even though the maximum applied “ $\cos(\theta)$ ” load lies on the line of symmetry. This unexpected state is related to the non-monotonic nature of the unloading curve in Fig. 216 labeled “Run 5”. There is a bifurcation on or near this unloading curve. Compare this figure with Fig. 219.