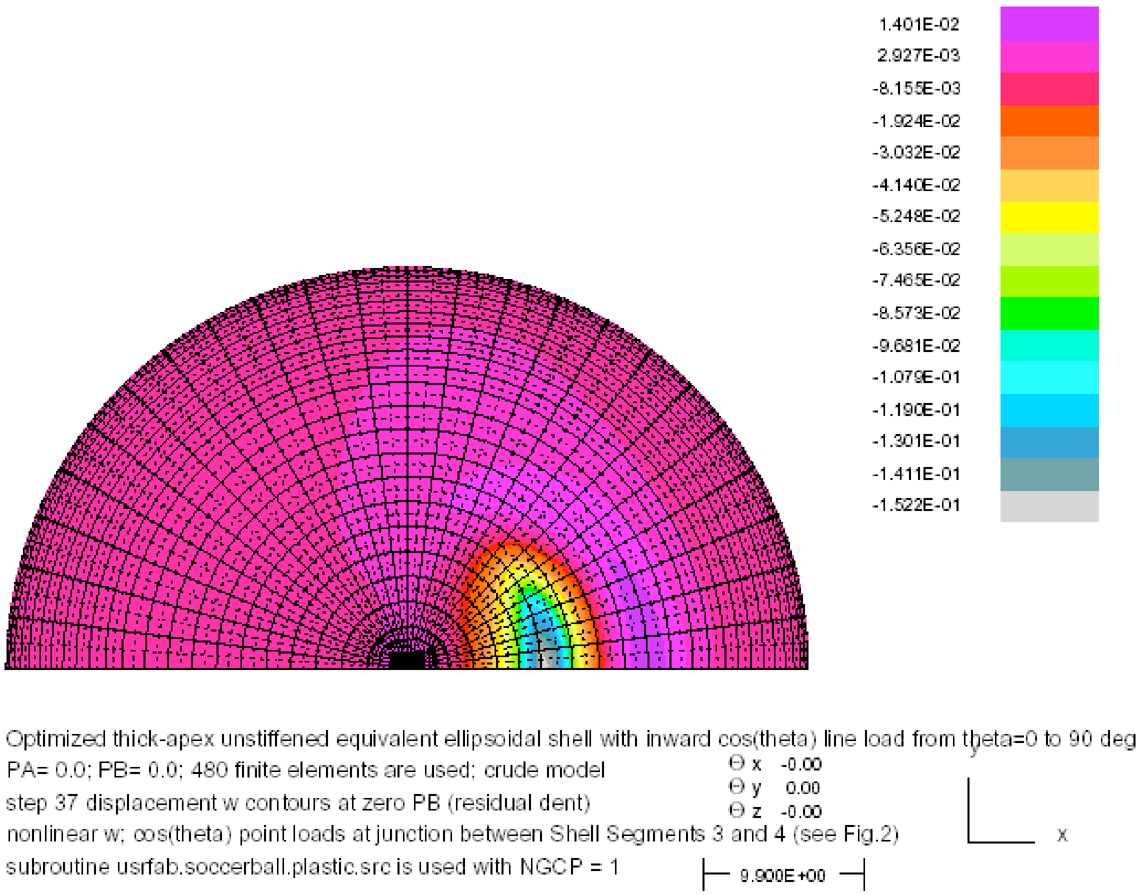

Fig. 182 Elastic-plastic analysis of the **optimized unstiffened equivalent ellipsoidal shell with the thick apex with t(apex) = 0.4 inch; Wimp=0.2 inch; the optimum design is listed in Table 78.** State of the shell at load set B (PB) step no. 37 at the end of Run 4. (See Fig. 180). This is the **residual dent** in the shell that remains after load set B has been removed, that is, when both PA and PB are zero. The depth of the dent, 0.1522 inch, is less than the amplitude, Wimp = 0.2 inch, of the axisymmetric linear buckling modal imperfection in the presence of which the shell was optimized. Therefore, the shell should be loaded under Load Set B further into the plastic regime than is displayed in the previous figure. That is what happens during Run 5. (See Fig. 180). Compare with Fig. 195, for which the loading that produces the residual dent is by “cos(theta)” imposed normal inward-directed displacements rather than by “cos(theta)” imposed normal inward-directed concentrated loads, as is the case here. Also, compare with Fig. 165 for which the residual dent is produced by a single concentrated load applied as normal inward-directed pressure over a single finite element. The shape of the residual dent shown here is more harmful than that shown in Fig. 165 because the “cos(theta)” residual dent more closely resembles **locally** the negative of the linear buckling modal imperfection with n = 1 circumferential wave displayed in Fig. 179.