1. Stresses

At o. d. of Ring A:

$$f_t = \frac{b^2 p}{c^2 - b^2}\left(1 + \frac{c^2}{r^2}\right)$$

$$= \frac{0.658^2\,(128{,}000)}{(\overline{3.50}^2 - \overline{0.658}^2)}\left(1 + \frac{\overline{3.50}^2}{\overline{3.50}^2}\right)$$

$= 9340$ psi

At A-B Interface: $f_t = 11{,}000$ psi

At B-C Interface: $f_t = 17{,}050$ psi

At C-D Interface: $f_t = 34{,}000$ psi

At D-Center Assembly Interface:

$f_t = 137{,}000$ psi

$$f_c = \frac{p\,b^2}{b^2 - a^2}\left(1 + \frac{a^2}{r^2}\right)$$

$= 128{,}000$ psi

At Center of Assembly:

$f_c = 2p = 256{,}000$ psi

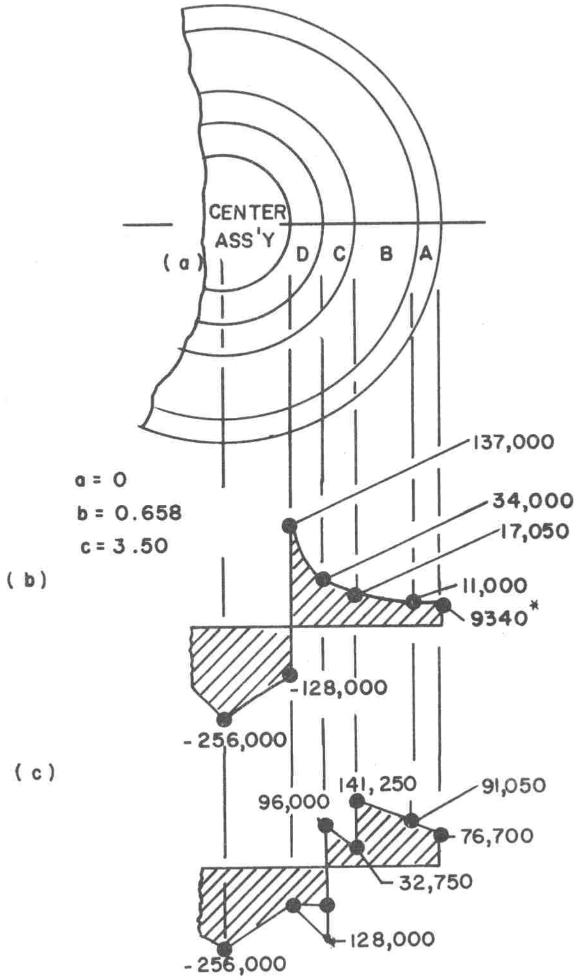

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Figure A-4 STRESSES ENCOUNTERED DURING INSTALLATION OF CENTER ASSEMBLY INTO A, B, C AND D

*From the test data, there was a scatter of this value varying from 8120 to 9860 psi. Therefore, based on this test data, it is reasonable to assume that the calculated value closely approximates the test data.

Assuming Poisson's Ratio of 0.30 and a downward developed pressure of 1 x 10^6 psi, the internal radial pressure is calculated by p = 0.30 (1,000,000) = 300,000 psi. This yields Figure A-5 (a) which is $\frac{300}{128}$ times Figure A-4 (b).

The final stress distribution is shown by Figure A-5 (b). The effect of the taper is negligible as compared to stresses caused by the interference fits.

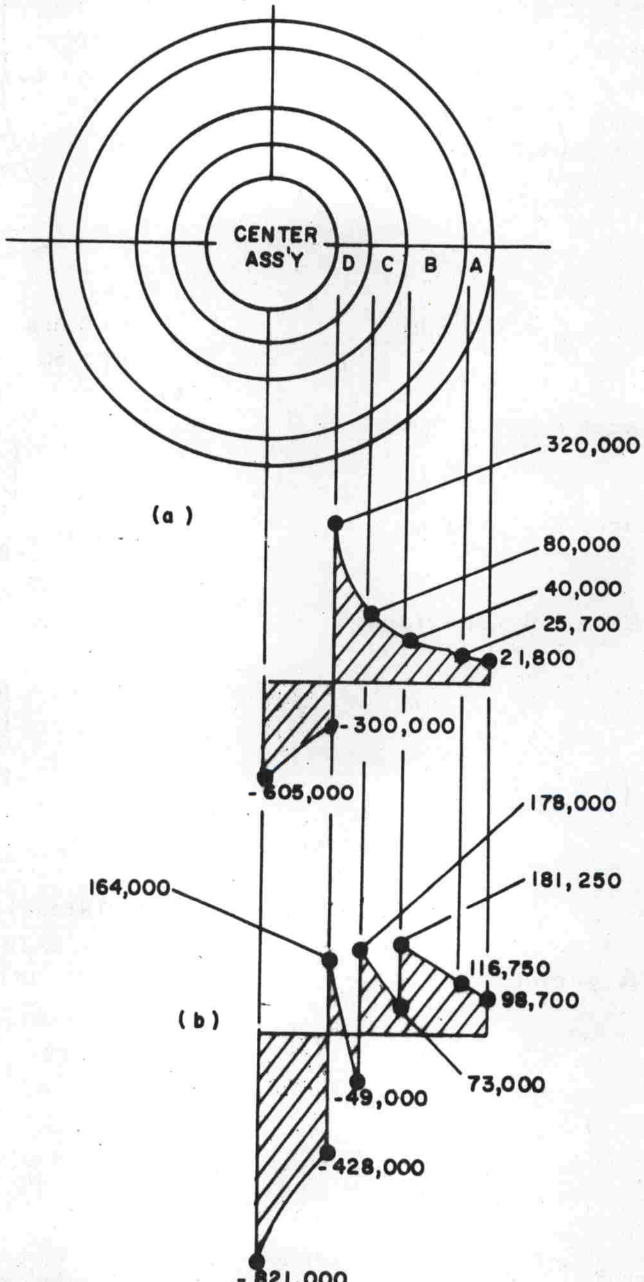

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Figure A-5 (a) STRESS DISTRIBUTION DUE TO 300,000 psi INTERNAL RADIAL PRESSURE; (b) FINAL STRESS DISTRIBUTION