DIE ASSEMBLY

The correlation between test data and calculated values did not agree as well as that of the punch assembly. Because of this, two final stress distributions are presented, the first being that calculated from given interferences using the same formula and procedures as outlined for the punch assembly (Subsection A and B) and the second, using strain gage data presented in Table A-II and calculating final stress distributions by extrapolating computed values with test values.

From a study of Reference 14 it is not difficult to reason that a slight variation of the interference fit adversely affects our load parameters while slight geometry changes have negligible effects on the final stresses. It is not unreasonable to assume, therefore, that the given interference is slightly lower than recorded. However the overall effect on the magnitude of stresses of the two curves is not critical. This is shown on Figure A-6 (c) and (d).

Presented below are plots of stresses using Reference 14 and extrapolated strain gage data. (See Figures A-6 and A-7.)

ASSEMBLY

It is recommended that the outside surface of the die and punch be strain-gage tested and recordings taken during the use of the punch and die. There are two reasons for this request.

1. Comparison of the strain gage readings with the predicted stress values will provide an estimate of the magnitude of stresses throughout the punch and die assemblies and an impending failure could be predicted.

2. From the total load applied and the stresses recorded, and estimation of Poisson's ratio of the oxide can be computed.

Starting with zero stress reading (at room temperature) on the outside circumferential strain gages, the limiting stresses, during use of the punch and die, should be 2,270 psi for the die and 20,000 psi for the punch.

A summary diagram of the complete assembly together with the material property requirements is shown in Figure A-8. Figure A-9 shows the location of the strain gages applied during assembly and the location of minor scratches observed at that time. Figure A-10 through A-12 show 1) the axial displacement of the rings, prior to assembly, due to the interference required for preloading, and 2) press loads required for assembly.

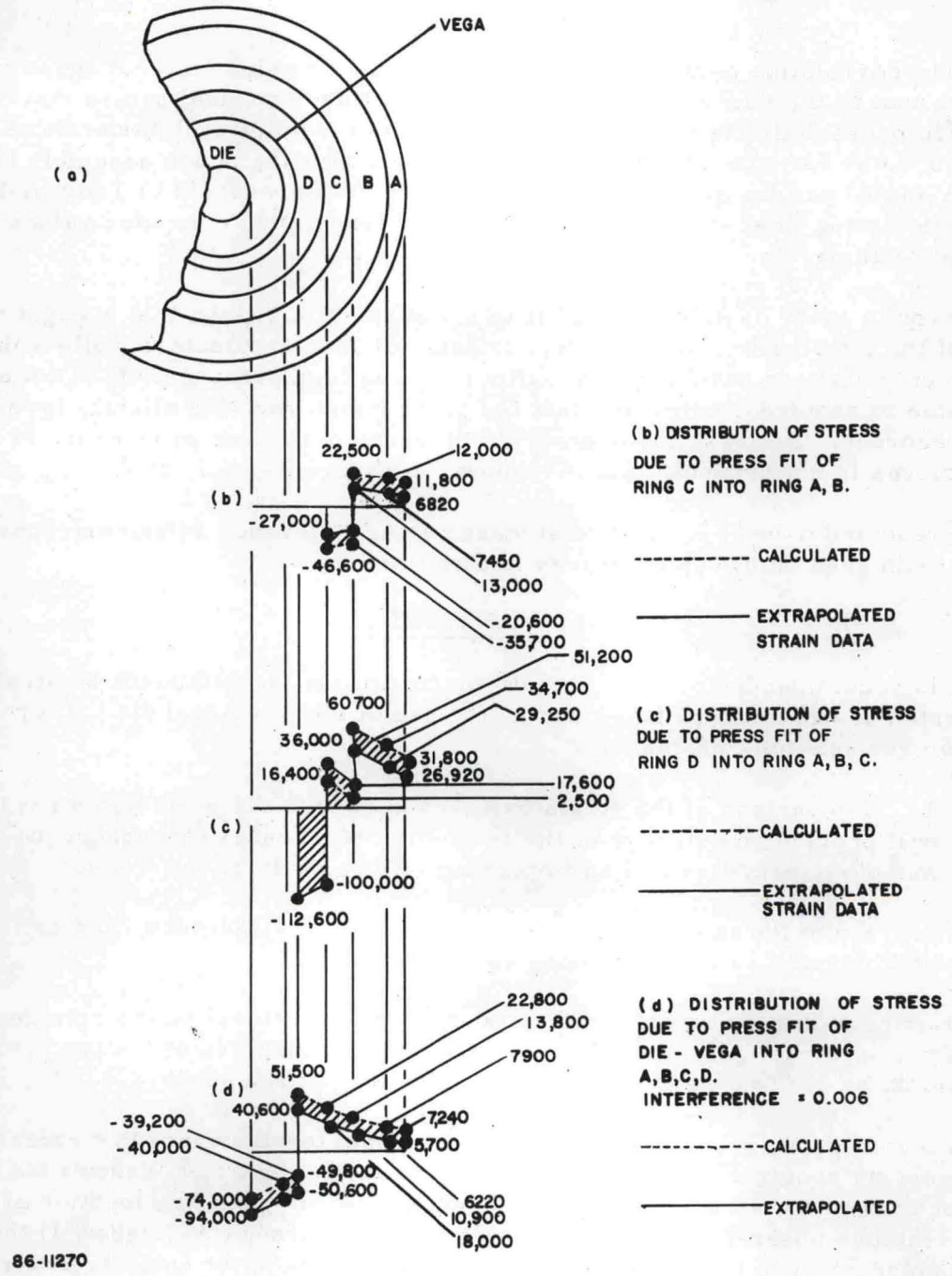

Figure A-6 FINAL STRESS ANALYSIS OF DIE ASSEMBLY