To: Mike Keeney

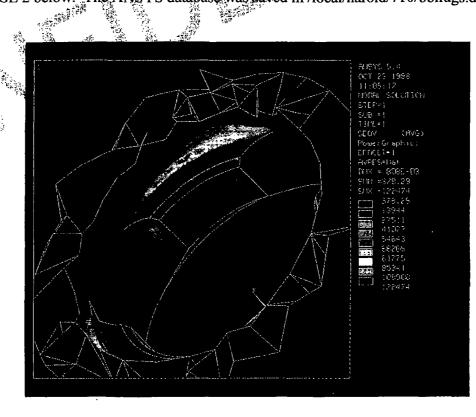CC: Dale Danner, Danny Diaz

From: Harold Davidson

A 710 barrel lug stress analysis has been performed to determine stress patterns and stress magnitudes using proof chamber pressures. This analysis was performed using ANSYS. All loading conditions were static.
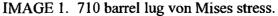
Modeling and Constraints:
The barrel lugs were modeled using 10-node tetrahedral solid elements. Assuming a chamber pressure of 90,000 psi and a 0.30 diameter bore, the contact pressure acting between each of the three barrel lugs and the bolthead was 66,335 psi. The barrel was fixed from any movement approximately 1 inch forward of the lug contact surfaces.

Results:
The von Mises stress and first principal stress are shown in IMAGE 1 and IMAGE 2 below. The ANSYS database was saved in /local/harold/710/bbllugs.db.
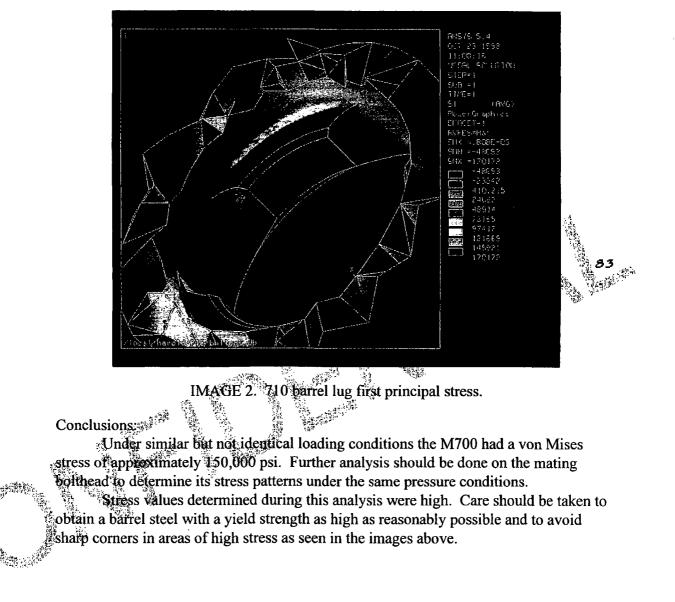

IMAGE 1. 710 barrel lug von Mises stress.

C:\WINDOWS\TEMP\BBLLUG.DOC

ET36337

IMAGE 2. 710 barrel lug first principal stress.

Conclusions:

Under similar but not identical loading conditions the M700 had a von Mises stress of approximately 150,000 psi. Further analysis should be done on the mating bolthead to determine its stress patterns under the same pressure conditions.

Stress values determined during this analysis were high. Care should be taken to obtain a barrel steel with a yield strength as high as reasonably possible and to avoid sharp corners in areas of high stress as seen in the images above.

C:\WINDOWS\TEMP\BBLLUG.DOC

ET36338