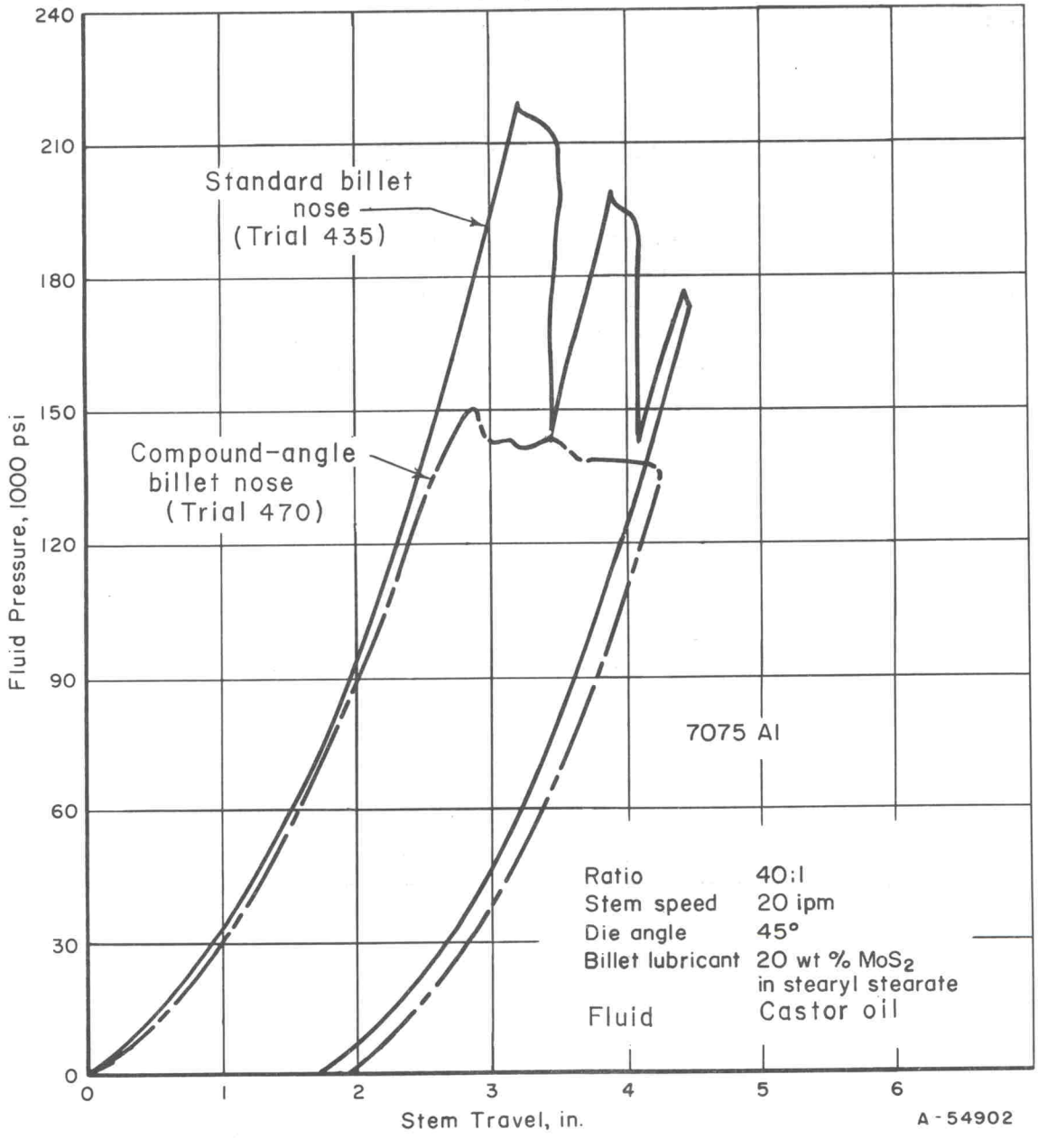


FIGURE 16. EFFECT OF BILLET NOSE SHAPE ON PRESSURE-DISPLACEMENT CURVES OBTAINED IN THE HYDROSTATIC EXTRUSION OF 7075-0 ALUMINUM AT A RATIO OF 40:1

billet lubricant. Of the four lubricants evaluated, Lubricant L53 again provided the lowest pressures. The various billet surface finishes evaluated at this stem speed did not appear to effect the pressure levels appreciably.

In every case, the surface finish on the runout part of the extrusion was excellent. However, shallow cracks formed at the leading end of the extrusions these were probably due to the high exit speed during the slip portion of stick-slip where adiabatic heating may have been excessive.

## Tensile Properties of 7075-0 Aluminum Hydrostatic Extrusions

Tensile data for 7075-0 aluminum extrusions produced at extrusion ratios of 20:1, 40:1, and 60:1 are listed in Table VIII. The tensile and yield strengths of the material in the annealed condition were almost doubled and tripled, respectively, by extrusion at ratios up to 60:1 without any appreciable sacrifice in ductility. Exit speed does not appear to have influenced mechanical properties at an extrusion ratio of 20:1.

TABLE VIII. ROOM-TEMPERATURE TENSILE PROPERTIES OF 7075 ALUMINUM ROUNDS PRODUCED BY HYDROSTATIC EXTRUSION

| Extrusion, Ratio | Reduction in Area of Extrusion, percent | Trial | Speed, ipm | | Ultimate Tensile Strength, 1000 psi | Yield Strength (0.2 percent Offset), 1000 psi | Reduction in Area, percent | Elongation in 2 Inches, percent |
|---|---|---|---|---|---|---|---|---|
| | | | Stem | Exit | | | | |
| 20 | 95.0 | 311 | 20 | 740 | 56.3 | 40.9 | 20.8 | 21.0 |
| 40 | 97.5 | 318 | 20 | 1480 | 60.2 | 41.4 | 39.5 | 26.0 |
| 60 | 98.3 | 324 | 20 | 2220 | 61.3 | 35.0 | 38.7 | 24.0 |
| 20 | 95.0 | 310 | 80 | 2960 | 55.2 | 40.6 | 22.9 | 21.0 |
| 1 | 0 | As-annealed bar stock | | | 33.8 | 15.5 | 45.2 | 23.3 |