3.4. COMPARISON BETWEEN ANALYTICAL AND EXPERIMENTAL DATA

Many experimental studies verify the results developed by the preceding analysis. One of the first of these studies, performed before the analysis in the present form was presented, was reported by Wistreich [6] in 1955: this work has become a classic example because of its completeness and precision.

Electrolytic copper was drawn through a series of dies of varying cone angle. For each die angle, reductions in area were effected from 5 percent to 45 percent in increments of 5 percent. The drawing force was recorded for each run. The values of friction and the strength of the wire were measured independently for each reduction. In Fig. <19>, the observed drawing stress values have been plotted against die angles for reduction values at even 10 percent intervals, with curves representing corresponding analytical results superimposed on the experimental data. All of the independent variables are reported by Wistreich -reduction, cone angle, friction, and flow strength of the material- together with the dependent drawing stress values. The analytical solution has no 'fudge factor' at all. Figure <19> shows a reasonably good agreement between the experiment results and the analytical upper-bound solution.

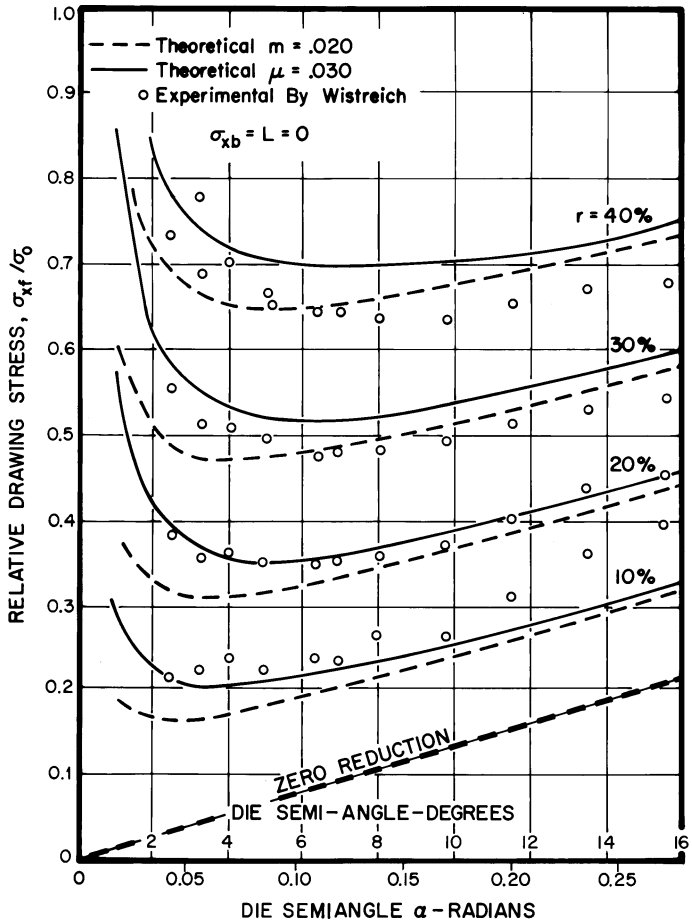

Fig. 19 Variation of relative drawing stress with die angle, from wistreich's paper.

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