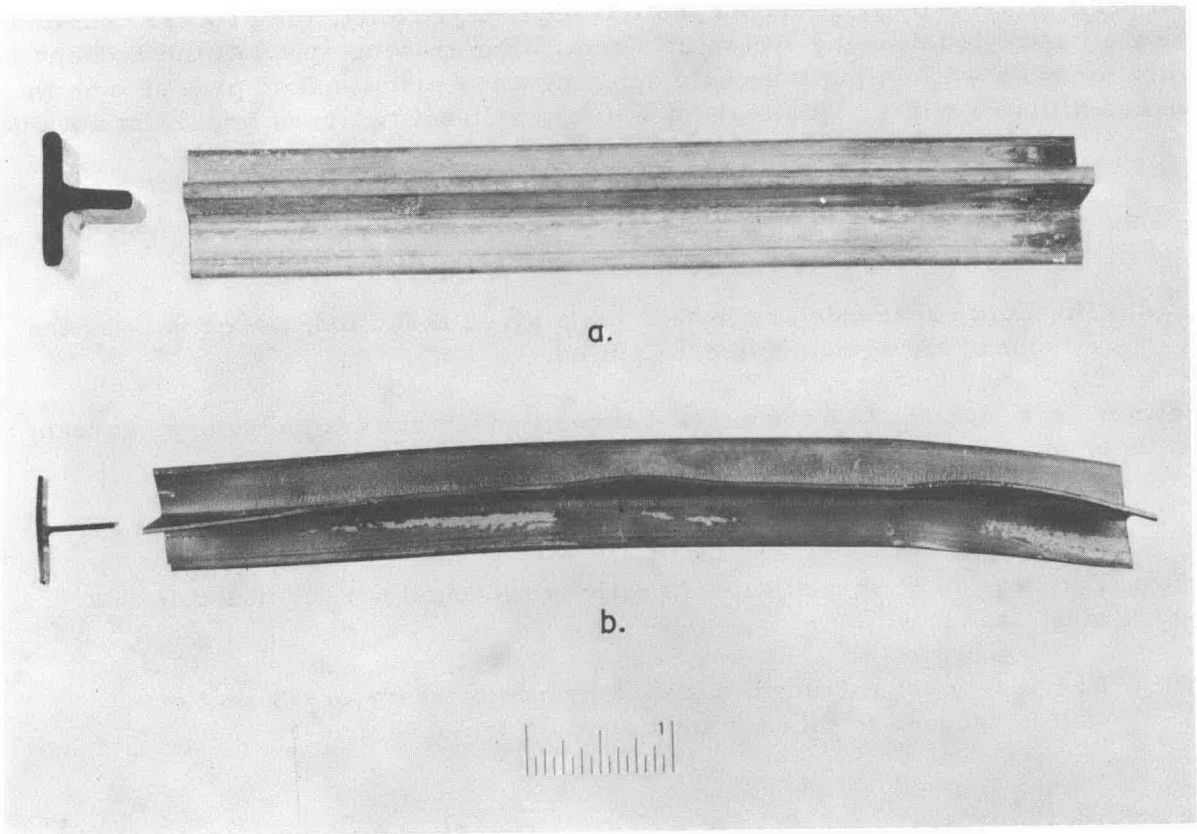

39755

FIGURE 34. T-SECTIONS PRODUCED BY HYDRAW AND RE-EXTRUSION

a. HYDRAW of 7075-0 aluminum
b. Re-extrusion of Cb-752 columbium alloy.

XVII

THE HYDRAW OF WIRE AND SHAPES

The HYDRAW Process

The hydrostatic extrusion-drawing process, called HYDRAW, used in this experimental program is a Battelle-developed technique*. Briefly, the process consists of applying a controlled drawing stress at a controlled drawing speed to the reduced end of the billet or wire while simultaneously applying a hydrostatic fluid pressure on the unreduced billet or wire. This technique offers at least two very important advantages over plain hydrostatic extrusion of shapes or wire:

(1) The applied drawing stress permits close control over the exit speed of the reduced wire or shape

(2) The fluid pressures are lower, for a given reduction, essentially by the amount of the drawing stress applied.

In addition, this technique offers at least three important advantages over current fabrication techniques for making shapes and wire:

(1) Very high single-pass reductions are possible.

(2) Fabrication of shaped wire directly from round wire is possible in a single pass.

(3) Previously hot extruded or rolled shapes of heavy cross section can be reduced to thin sections at room temperature.

HYDRAW Tooling

General details of the tooling assembly for the HYDRAW of wire are shown in Figure 35. The main tooling is the same as that described in the beginning of this report. However, in the experiments with wire, provision is made for the product to exit at right angles to the container axis. This is achieved by aligning the container on a tapered insert which is backed up by a die holder. The die holder was designed to bridge the gap in the horseshoe below and give adequate support without distortion to the high loads imposed on the insert. The horseshoe block and horseshoe base plate were firmly bolted and doweled in position on the bottom base plate which was part of the press tooling.

Draw Control and Draw Load Measurement

A critical feature of the HYDRAW process is the ability to control drawing speed and drawing load independently. This minimizes problems of coiling, wire breakage, and uncontrollably fast wire exit speeds associated with stick-slip and/or with plain hydrostatic extrusion of wire.

*U.S. Patent No. 3,328,998, "High Reduction Drawing", A. M. Sabroff and R. J. Fiorentino, Issued July 4, 1967.