ne central offset
no disturbance
glas corners in
her the motion

s of various thick-
Errors quoted are

Number of data points
7
7
5
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3
4
9
14
5
4
32
4
4
32
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5

n moving across
mechanism. The
ll measurements
ns could occur.
precision meas-

urement on plates thinner than 1 mm difficult by this technique. The shock reverberation time was calculated and was also checked in preliminary experiments using Plexiglas wedges so as to continuously record plate velocity.

The Plexiglas blocks were glued to the plates and shims while clamped together under slight pressure. Extreme care was taken to eliminate all dust particles and prevent glue from getting between the contacting surfaces. In most individual shots several measurements of free-surface velocity were taken; in some shots as many as twelve thicknesses were studied at once. After assembly of the blocks on a plate, a transparent argon-containing box was cemented over the assembly; the slit plate was taped in place on this box.

In all experiments reported here the blocks of explosive to be studied were initiated by plane wave lenses of eight inch aperture. The major component of this type of lens and that component in contact with the

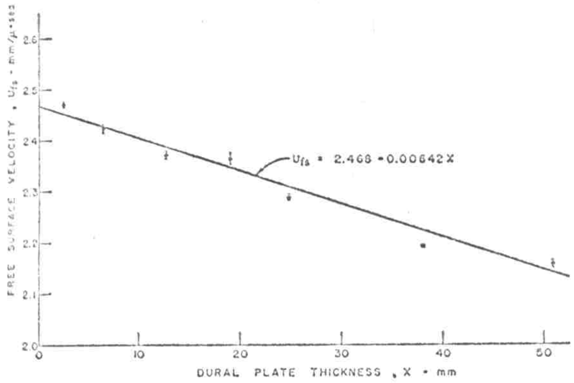

Fig. 8. Experimental values of free-surface velocity imparted to 24ST aluminum plates by pressed high-density TNT as a function of plate thickness. The line shown is the linear least squares fit to the data.

explosive to be studied was barium nitrate loaded TNT of initial density 2.6 g/cc and C-J pressure 140 kilobars. All explosive contacting surfaces were flat planes within ±0.0005 in. Any air gaps at explosive interfaces resulting from these tolerances were eliminated by a thin film of mineral oil. A print of a film record for an assembly with seven slits is shown as Fig. 6.

Such records were read on a comparator and plotted at 100 or more times film time scale; graphical interpolation between the two side reference traces yielded a time of departure of the central free-surface which along with the central trace gave a transit time and hence velocity through the precisely measured depth of the offset. Such velocity data were taken for a variety of plate thicknesses out to 50 mm for each of the explosives studied. No particular effort was made to take data over the entire range of thicknesses on a single shot, since the study is of a type of explosive, not a single piece.

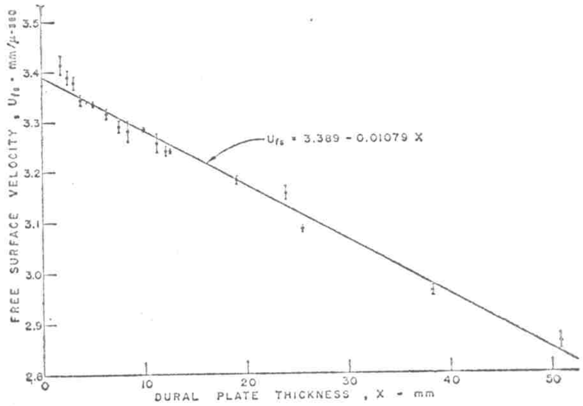

Fig. 9. Experimental values of free-surface velocity imparted to 24ST aluminum plates by 64/36 Composition B as a function of plate thickness. The line shown is the linear least squares fit to the data.

EXPERIMENTAL DATA AND RESULTS

Charges of RDX, TNT, 64/36 Composition B, and 77/23 Cyclotol were studied. The RDX (cyclotrimethylene trinitramine) charges were six inches thick made up of two cylinders six inches in diameter and three inches thick pressed without a binder to 98% of crystal density from a granular RDX of 100 μ median particle size. The TNT (trinitrotoluene) charges were truncated cones eight inches thick of eight inch diameter at the small end and thirteen inch diameter at the large end; these were initiated from the small end. They were pressed without binder to 99% of crystal density from a granular TNT of about 400 μ median particle size. The Composition B and Cyclotol charges were eight inches thick; individual shot charges were made up of two 10×10×4 in. blocks, each of which was machined from a casting. The Composition B was 64.1±0.6% RDX; the Cyclotol was 77.0±1.0% RDX. These compositions were based on samples taken from castings identical to those fired. The other constituent in the latter two explosives was TNT.

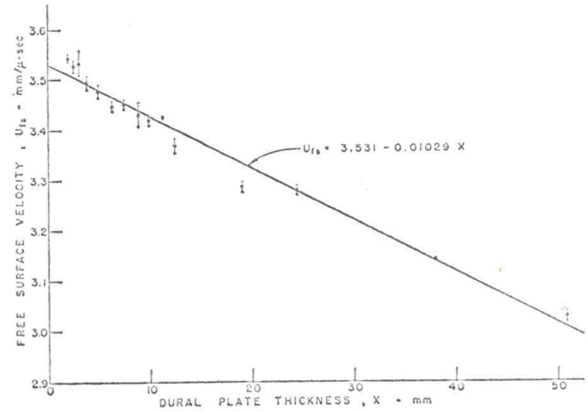

Fig. 10. Experimental values of free-surface velocity imparted to 24ST aluminum plates by 77/23 Cyclotol as a function of plate thickness. The line shown is the linear least squares fit to the data.