

To: T. C. Douglas

July 2, 1993

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JUNE PROGRESS REPORT

SHOT CHARGER DEVELOPMENT

A purchase order has been issued for a prototype Duplex steel shot charger. Delivery is scheduled for mid September. Installation will require station re-arrangement of a Duplex Loader. Extent of machine modifications need to be finalized with the plant. A meeting with Production, Process Engineering and Maintenance will be scheduled in July.

ROTARY CAM BODY FORMER - 410 & 28 GA.

R/C 410 -

Two new R/C 410 smooth body configurations designed to improve reloadability were tested this month. Three major concerns with previous LVTW R/C shell were addressed; sticking on the MEC primer seat pin, body-burn-thru (BBT) and body buckling (BB). Tests show reload durability to be better than the LVTW R/C shell but worse than our current 3pc shell because of body buckling. A review of previous data suggests the buckling problem surfaced in early April. Tensile samples of R/C bodies from six different runs between 4/92 and 6/93 were compared to the current 3pc shell. Preliminary tests show various degrees of increased strength longitudinally in all R/C samples but decreased radial strength in all except one that is equal. Additional tests will be made to determine cause. The MEC primer seat pin sticking problem was resolved by increasing the R/C bridge thickness approximately .040. This prevents the MEC pin from encapsulating plastic around the primer. The primer seating force was also reduced. Minor battery cup leaks on earlier test samples were eliminated thru redesign of the heading pin.

The first new type R/C shell tested was a .001 thicker (.021) wall, .210 bridge, large volume (LV) design capable of holding 227 grain of #9 shot. First-fire ballistic performance comparable to our current 3pc target shell was obtained by using a different powder (HM90). Of fourteen samples tested, one failed for "BBT" after the fifth reload and eleven for "BB" at the; seventh (2), eighth (5), ninth (3) and tenth (2). Another failed for 3/4 body cut-off after nine reloads.

The second new type R/C shell tested was A .003 thicker (.023) wall and .205 bridge design. This shell, with 220 grain #9 shot load capacity (comparable to Winchester) is close to the most durable R/C 410 configuration we can make. However, of twenty samples tested, all failed for "BB" at

the; fifth (1), seventh (4), eighth (13) and tenth (3) reload. None of the Winchester shells tested to date have buckled. A comparison of wall thickness at point of buckle shows theirs to be 33% thicker at .0305.

MEC and P-W type Reloaders were both used for these tests. Both types of the R/C samples were difficult to insert and eject with the P-W beginning at the fifth and sixth reload. This was because of the plastic body sticking in the support/sizing die. The plastic appears to lose memory after several firings then conforms to the gun chamber size. Five 3pc shells were reloaded seven times for comparison without a problem. The above mentioned tensile test may explain the reason. New plastic slugs will be run if necessary. Our continuing goal is to develop the strongest reloadable body possible with internal volume for a 227g shot load equable to our current shell.

#### R/C 28 GA. -

Reloading tests conducted 6/3 and 6/4/93 indicate hull life of the R/C shell to be slightly more durable than our current 3pc shell. Five samples each of Remington 3pc, R/C and Winchester shells were tested using both P-W and MEC handloaders. Body buckling occurred in the P-W with both Remington 3pc and R/C shells. All of the five 3pc shells loaded with the P-W failed for "EB" at the fourth reload. The five R/C shells buckled at the; fifth (1), seventh (3) and eighth (1). Four of five Winchester shells failed for torn mouths, one each at the fifth, sixth, eighth and ninth reload. The remaining shell was reloaded ten times and the test stopped. All of the shells reloaded ten times with the MEC but one 3pc shell buckled slightly. Also, when preparing shells for first reload, one Winchester was scrapped for a body split. Major blow backs at first firing were visual on all R/C and current shells but deemed objectionable on the smooth R/C shells. Three different skiving cutters are being tested to correct this problem. Battery cup leaks appeared sixteen times on the R/C shells, twice on the 3pc and once on Winchester. Initial testing of samples hand assembled using a new design heading pin indicate the primer set-back problem at +150F and battery cup leaks have been eliminated. A large quantity (100+) of R/C shells will be hand assembled for more extensive testing beginning the week of 7/5/93. The existing AM&P R/C 28 pins will be altered after confirming the initial test results.