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RESEARCH DEPARTMENT

PROGRESS REPORT

APRIL, 1980

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AMMUNITION

SHOTSHELL

New "RXP" Shotshell Body

50,000 3 inch .410 bodies were made on the body former/ heatset system at about 65 parts per minute. Body former performance was excellent, however, problems were evident in the transfer mechanism and the heatset unit. Causes and remedial measures are being investigated by ER&D and Research.

Product quality coming off the machine was excellent. Preliminary tests under extreme conditions demonstrated the good structural strength of the rotary cam shell.

21mm Seismic

The ammunition production goal for April 1st, was met. A run of 35,000 primer shells was made of which 11,000 were shipped to Ilion. The remaining 24,000 shells will be loaded, as needed. Process improvements are continuing with current emphasis being placed on the primer cup mouth to allow for more uniform insertion of the insulator. Plans are being formulated to increase Semiworks production output to 100,000 rounds per month beginning by September 1, 1980.

3" 12 Gauge "RXP" Shotshell

In early March, it was demonstrated that with minor tool and press adjustments, standard 2-3/4" slugs could be successfully processed into 3" bodies. Delays have been encountered in accessing plant heading equipment; however, these facilities are now scheduled for processing the 3" bodies during the second week in May. This will allow for completion of the experimental run work including product testing by late June.

Asbestos Elimination-Plastic Basewad

The 16 gauge plastic basewad shells successfully completed product acceptance testing and a plant trial and pilot run has been scheduled. Approximately 100,000 shells will be headed and primed with a portion of these to be plant loaded and tested. Completion of the trial and pilot run including product acceptance is expected in early June.

An experimental run of 20 gauge plastic basewad shells is scheduled for AH&P during the week of May 18th with loading to follow immediately. Completion of experimental run product acceptance for this gauge is planned for early July. A detailed schedule for 8 gauge is being developed to insure timely completion of this part of the program.

Shotshell Printing Improvement Program

A production prototype offset printer has been successfully developed for Lonoke's high-speed shotshell loader. The new printer has been shipped to Lonoke for installation. It is estimated the unit could be put into production and debugged in as little as two shifts. Benefits expected are improved print quality, lower printer maintenance, and fewer printer spare parts. The Plant will determine the installation schedule.

CENTER FIRE

Premier Bullet

In an effort to improve accuracy by minimizing wall thickness variation, the feasibility of incorporating the plating process for "POWER LOKT" bullets to jacket the premier bullet is being investigated.

Core swaging and final form tooling for the "POWER LOKT" premium bullet have been designed and are now being fabricated with expected completion in mid-May. When the tools are completed, lead cores will be formed, shipped to Lonoke for plating and returned for finish-forming. Preliminary evaluation of the "POWER LOKT" bullet plating process for application to the conical forebody boattail bullet is expected to be completed by mid-June.

7mm-08, 140 Gr. PSP Bullet (Secant Ogive)

Forming dies and punches designed to produce the secant ogive nose profile were tested at Lonoke on an arbor press with limited success. Sample bullets were very close in overall dimensions to the computer generated design with exception of the point diameter which measured .100" instead of .062" as specified. High forming loads were experienced and point eccentricity exceeded the normal quality control range for 7mm bullets. Bridgeport has been requested to test the samples for down range ballistic performance. New final forming dies have been designed and released for fabrication.

7mm BR Rem

Cost and timing estimates have been prepared for development of this product. Completion of an experimental run could be accomplished within 16 to 21 weeks of project approval.

357 Super Magnum 158 Gr. SJHP

This item was placed on the backlog list of the March, 1980 Semi-Annual Development Schedule. A status report covering progress to date was issued on March 31.

308 Win 55 Gr. PSP "Accelerator"

Research and Lonoke PE&C have been unable to solve the excess sprue problem on sabots through minor mold modifications. Use of Lexan® 141 as a replacement for Lexan® 191 is being considered. Sabots made from this material were successfully processed through bullet assembly and are now being evaluated for ballistic performance. Test criteria and procedures for evaluating long term storage are being prepared. Lexan® 141 was originally disqualified as a sabot material candidate because it was not compatible with double-based powders. "Accelerator" cartridges developed to date do not use these powders.

44 Rem Mag 180 Gr. SJHP

This new cartridge exhibits high muzzle flash characteristics. Experiments with Olin powder containing various amounts of potassium nitrate and potassium sulfate as flash suppressants were conducted. Analysis of the results indicates that WC295 powder treated with .3% potassium nitrate significantly reduces muzzle flash of the subject cartridge without degradation of performance. Tests were expanded to cover 357 Mag 158 gr. and 125 gr. SJHP cartridges with similar results. To gain confidence in these results, more testing using machine loaded cartridges is necessary.

Experimental Center Fire Powder Charger

ER&D is preparing experiments to evaluate suitability of a slide-type charger for use with center fire powders. If successful, this type of charging system could be adapted to existing center fire loaders to increase machine speed and improve charging accuracy. Currently, powder drop time limits loader speed for rifle ammunition. Test results will be communicated to the appropriate people for future action.

PRIMERS

Primer Improvement

The Plant produced 60,000 #117 primers with good on-center and angled off-center sensitivity. Research is testing the primers to confirm ballistic performance in SP12N Mag loads. A target version of the #117 primer where the cup is nickel plated and the primer pellet weight is reduced to approximately .9 grains has given drop test sensitivity. A primer charging plate will be modified to assure the proper pellet weight for this primer for evaluation in the new RTL load.

Integral Anvil Battery Cup

Progress on assembly of the press and die was reviewed with Lachaussee company management. Work continues on schedule. Product

Integral Anvil Battery Cup (Cont'd.)

development experiments related to flash hole covering techniques and priming mixture pellet weight are continuing using battery cups supplied by the equipment vendor.

Paper Covered Flash Hole Shotshell Primer

The interim facility die set for covered flash hole battery cup production has been installed and successfully tested in Bridgeport. This facility will satisfy Bridgeport requirements for the near term.

Engineering of a permanent facility for the Lonoke Plant continues. Design of the paper blanking and insert machine, and anvil setup equipment, is well advanced. Long lead commercial items will be ordered mid-May. The assembly equipment design is complete and quotes are being obtained for order placement. The overall system is scheduled for plant installation in fourth quarter, 1980.

FIREARMS

PRODUCT DEVELOPMENT

Model 870 Competition Trap Gun

Testing is continuing to find a solution to the locking block and vent rib problems. New designs of the locking blocks, vent rib barrels, barrel retaining system and a piston retaining system are currently in test.

Model XSG Shotgun

A gas cut-off system has been designed, prototype parts fabricated and verified for function in a modified Model 1100 shotgun.

Locking system component parts are being detailed for two different style locking systems. One is a rear lock up, the other a frontal lock up system. Both designs lend themselves to simplicity of manufacture and smoothness of operation.

21mm Seismic Gun

Dry cycle tests show that the present concept of firing pin design (wipe across shell model) has acceptable wear. Firing pin redesign is complete and retract firing pin mechanism is in test. The 15 seismic guns are scheduled to be returned to MAPCO on July 30, 1980.

Model 7400 Autoloading & Model 7600 Rlife Action Center Fire Rifles

Testing of the 40 production machine pilot guns is complete. Reports are being complied for each phase of the testing. Performance and measurement data indicate no serious problems with design or manufacturing aspects of the gun.

Model 700 Bolt Lock

Bolt lock design has been completed and reviewed by Marketing and Operations Committee. Approval is required so as to finalize and transmit drawings.

Bolt Action Carbine

A new conventional floor plate latch system has been designed, built and function tested satisfactorily. Models are being fabricated for more extensive functional testing.

Twenty five stocks have been received from Fajan. The stocks will be turned over to Process Engineering for stain and finish.

Integral Ejectors

The 12 ga. pilot run barrels have been satisfactorily field tested and are currently being tested for endurance. One barrel has been fired 15,000 rounds with no ejector problems and negligible wear of the ejection surface.

Rivetless Extractors

Production has been supplied with sufficient quantities of rivetless extractor bolt heads to satisfy their current requirements for Model 700 7mm-08 and Model XP-100 7mm BR production runs.

Premature failure of extractors in the Model 7400 pilot guns during endurance testing has been traced to possible incorrect heat-treatment and/or a die break stress raiser caused by vendors temporary tooling. The vendor has modified the tooling and supplied 24 extractors for endurance testing.

PROCESS DEVELOPMENT

Auto Drill Line

The Albion machine has been installed with peripheral units now being placed. The major wire ducts are in place and the tie in ducts for the chip system is complete. Service wiring is being run to the machine system. Reconnecting of all the operating wiring is scheduled to begin the week of May 5, 1980. Preliminary control debugging is also under way to reconcile the logic with the hard wiring.

Four-Slide Machine

Project has been authorized to purchase a four-slide machine for development of in-house production of precision formed stampings and peripheral equipment. An order has been placed with the Torin Corporation to purchase a model V82 verti-slide machine with delivery scheduled for August 1980. Investigation of support equipment is continuing.

ASEA Manipulator

The ASEA programmable manipulator is not capable of dealing with the receiver tolerances in panel polishing. An LVDT-based system from Schaeirtz Engineering and the ASEA adaptive control package are being considered for receiver repositioning. Selection of the appropriate system will be made by May 15, 1980.

Laser Welding

Sample slide block parts were welded by EDL. The weld appears strong, but has excessive porosity. Strength tests are scheduled to be completed May 15, 1980.

Wood Decorating

Stock and fore-end samples engraved by Lasermation with Remington designed art were received. Samples are currently being finished and will be reviewed with Marketing in May 1980.

JRA:mf