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REMINGTON ARMS COMPANY, INC.

NEW PRODUCTS RESEARCH

MONTHLY PROGRESS REPORT - APRIL, 1984

REMINGTON ARMS CO.
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APR 27 1984

FIREARMS RESEARCH DIVISION

Distribution

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FIREARMS

New Product Development - Shotgun

Model 1100 Special Field - 12 Gauge

Testing of the 12 gauge Trial and Pilot sample for fore-end strain and breakage was acceptable. No fore-end cracking occurred in 22,481 rounds fired in five guns.

However, the Trial and Pilot sample was rejected, based on the failure of a separate part in one gun from the five gun endurance sample. In this one gun, the forward, threaded section of the magazine tube separated at 2,481 rounds. Part failure is believed to have started from a crack in the swaged detents which hold the magazine spring retainer. Examination of the Trial and Pilot sample, as well as parts in production, indicated that a high percentage had cracks in this area.

The design of the detent has been revised to eliminate sharp corners, and Production has likewise changed their tooling. This will allow Production, at least on an interim basis, to make acceptable product. Research and Production are reviewing other possible changes in the design and/or process to assure continued acceptable product.

Production has been requested to replace all magazine tubes that have cracked detents. They have further been requested to supply an additional Trial and Pilot sample.

Models 870 and 1100 Waterfowl

At the April 19 meeting, the Operations Committee approved the economics and prototype samples of these new guns. The parts list and drawings package will be transmitted to the Plant by May 1.

Model 1100 Functional Improvement Program

Research into performance of the Model 1100 is complete. Nine priority items covering four major design deficiency areas will be included in this program:

<u>Design Area</u>	<u>Design</u>
• Gas System	Friction Brake Manual Selectors
• Action Smoothness	Fire Control Modifications Other Areas

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Model 1100 Functional Improvement Program (Cont'd.)

<u>Design Area</u>	<u>Design</u>
• Feeding	Carrier Assembly
• Endurance Life	Magnum Action Spring "O"-Ring Piston/Piston Seal Extractor

New Product Development - Centerfire

Model 700 Mountain Rifle

At the April 19 meeting, the Operations Committee approved this item, pending a review by the Firearms Strategy Team to determine appropriate timing. The parts list and drawings package is ready for transmittal.

CAD modeling of the stock is progressing. Research is working closely with Production to assure that the modeling is complete in time to begin building of the stock former.

Model Seven - .308 Caliber

Research has received a preliminary sample from Production. Verification testing of the aluminum floor plate design is progressing. No deficiencies resulting from this design have been detected.

Current Products

Model 870P Riot Gun

Design confirmation testing of the "flexi-tab" carrier is complete. Field functioning and endurance testing were both satisfactory. The drawings package will be transmitted for all Model 870's, based on the April 19 approval of the Operations Committee.

The "flexi-tab" design will be included as part of the Model 870 Restyle, scheduled for Production in 3Q-84.

Model 700 BDL Magazine Follower

The model drawing transmittal for an injection molded magazine follower was made on April 16. Powder Metal has begun production.

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AMMUNITION"Premier" Shotshell

Acceptable average ballistics at the extreme storage conditions has been achieved and confirmed in a designed test using a Hercules 35% NG powder with Remington's new 209 primer. Predicted max and min individual pressures at extreme temperature conditions fall slightly outside ARD goals of 15,000 psi max and 5,000 psi min. These ballistics are significantly better than those obtained using 259 powder and the 119 primer. No ignition problems were observed at any condition. Additional work with the Federal 209 primer has shown a further reduction in ballistics sensitivity to storage conditions and more uniform ballistics at a given condition. We plan to investigate this further following completion of the "Premier" shotshell load development.

A 10,000 pound lot of powder has been ordered from Hercules. They expect to ship an initial 1000 pound powder blend the week of May 7th. Bridgeport Production plans to make 1MM+ primers for this load in time for powder arrival.

12 ga. 1-5/8 oz. and 20 ga. 1-1/8 oz. and 1-1/4 oz. "Premier" magnum shotshell load development will begin in May. We anticipate using the same base and coated grains and 209 primer. Powder blends will be developed as required and ordered from Hercules.

Rotary Cam8 Gauge

Testing of the redesigned 8 ga. heading stem has been completed. Nearly 500 rounds of hand headed, hand loaded 8 ga. magnum product has been tested in the most severe gun available at the Bridgeport facility. No casualties have been observed at any temperature and gas leakage through the primer bore has been eliminated with the new stem.

A full set of heading stems for the Simplex AH&P machine are currently being fabricated in-house. Body former tooling has been trimmed in. The Trial and Pilot run will be scheduled by Lonoke pending the development status of the two-piece body.

12 Ga. 2-3/4" Target

Samples of smooth 2-3/4" 12 ga. bodies have been made on the Production body former without the "suck-in" that was evident previously. This improvement was accomplished by

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12 Ga. 2-3/4" Target (Cont'd.)

reducing volume in the head section of the prehead die. A .013 reduction in bridge height was observed which may require a reduction in the prehead punch length. Additionally to accommodate this change some material was removed from the taper on the sizing punch (approximately .004 on the dia.).

Testing of machine and hand headed product in SMAG and target specifications is scheduled to be complete by May 19th.

20 Gauge

20 ga. #3 buck load has been submitted for product acceptance by Production. During test in an oversized chamber, excess headspaced gun on product stored at 150°F, a low frequency (about 2%) of complete head pull-offs were observed. This was also observed in the SP control product. This product showed no such problem in other loads (20 target, 20RS and 20 SMAG). Additional testing is being performed to assess the potential risk of using 200M headed bodies. We believe, however, the heading stem and/or cavity punch at AH&P may need a slight modification to reduce sensitivity to process variables. ARD will review and establish the design revisions in May.

28 Gauge

Tool trim-in on one station is complete and product has been successfully run through the heatset unit. Product from this limited run is currently being hand headed and loaded for function and casualty testing. Tools and gripper bars to fit the other two stations are being reworked for the full 28 ga. quadrant operation by May 4th. ARD will transmit technical data in May assuming successful test results.

.410 Bore

Acceptable function and casualty and reloading life (10-12) have been achieved on the 2-1/2" body using brass caps. Based on these results, tools are being hardened and ground for use on the Research experimental run (Semi-works body former).

Remington Target Loads

The Remington Target Load is planned for introduction in all target gauges during the summer of 1985. The Rotary Cam body (without the "suck-in") is expected to be demonstrated in

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Remington Target Loads (Cont'd.)

May. The 209 primer Technical Data Package has been transmitted to Lonoke. The critical item in the overall program is the new RTL wad with a straight fin shot pouch for ease of factory loading. The current design component wad cannot be fed on existing feed bowls. Molding tools for the modified wad are now being fabricated for the Bridgeport Semi-works molding machine.

Research Consolidation

Construction details and bid packages have been completed and submitted to Purchasing for bid. Removal of chemicals and other potentially hazardous materials, removed from evacuated ARD work areas, is in progress. Details for specific equipment and furniture transfers are being prepared. All office files (except the Test Lab) have been consolidated and are in compliance with Du Pont's Records Control Schedule.

.410 Brass Cap

Approximately 1000 .410 2-1/2 shells assembled with brass caps were shot for F&C using five different M1100's. The only problem observed was a 3.6% frequency of cap splits. The observed cap split frequency is the same as the cup mouth split frequency observed at cupping. Modifications to the experimental cap press tooling will be made in preparation for another experimental run at cupping.

C.F. "Premier"

Initial testing of secant ogive bullet tooling on the modified bullet assembly machine resulted in bullets with meplats of .080" versus a goal of .050". Modified dies (smaller meplats) should be completed the week of April 30th. Mush performance of bullets with .080" dia. meplats into gelatin at simulated muzzle and 250 yd. velocities was inconsistent. Design concepts to provide nose cuts at bullet assembly or jacket draw are being developed. Carl Morin will be contacted to provide input on designing a tapered wall jacket.

Rifled Slugs

A preliminary hand load using 3" Rotary Cam large volume shells and 1-1/4 oz. slugs has been established with velocities nearly equivalent to our current 1 oz. load and 2% above Federal's published 2-3/4" 1-1/4 oz. load. Ballistics and function and casualty in M1100's was satisfactory at all temperatures. Accuracy with a prototype 3" M1100 slug barrel from the bench was comparable to control.

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Rifled Slugs (Cont'd.)

The next step will be to choose the slug weight and design for optimum muzzle energy and downrange ballistics. A computer program is being developed to aid in the design of slugs similar to the Centerfire Bullet Program. Assuming successful results, this would provide Remington with an opportunity to introduce a 3" 12 ga. rifled slug gun/ammo system.

Centerfire Modernization

The construction project for bullet assembly and jacket draw has been drafted. The supporting economics are currently being evaluated. The draft of this project will subsequently be reviewed by Corp. Engineering.

W.H. Coleman II / WKT
W.H. Coleman, II:mf

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NEW PRODUCTS RESEARCH

PERSONNELREMINGTON ROLL

	<u>Actual</u> <u>3/31/84</u>	<u>Actual</u> <u>4/30/84</u>	<u>Forecast</u> <u>12/31/84</u>
<u>Exempt</u>			
Ammunition Research	9	9	8
Firearms Research	<u>28</u>	<u>28</u>	<u>33</u>
Total Exempt	37	37	41
<u>Non-Exempt</u>			
Ammunition Research	10	9	6
Firearms Research	<u>11</u>	<u>12</u>	<u>12</u>
Total Non-Exempt	21	21	18
<u>Wage Roll</u>			
Firearms Research	<u>16</u>	<u>16</u>	<u>17</u>
Total Wage Roll	16	16	17
<u>Total New Products</u>	<u>74</u>	<u>74</u>	<u>76</u>

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RESEARCH PERSONNEL AS OF APRIL 30, 1984ILION DIVISION

Exempt 28
 Balaska, Robert J.
 Bauman, Thomas G.
 Bower, James W.
 Calkins, Kevin L.
 Coleman, Wm.H., II
 Curry, Wm. M
 Eddy, Albert
 Findlay, David S.
 Franz, Scott R.
 Hand, Charles J.
 Hennings, James H.
 Hugick, Adam H.
 Hutton, James C.
 Kast, Jack L.
 Lawrence, Jeffrey A.
 Martin, Fred E.
 Murphy, Randall A.
 Nightingale, Richard E.
 Plunkett, Thomas J.
 Powers, Thomas P.
 Rankins, Edwin D.
 Rowlands, Kenneth
 Sanzo, Robert J.
 Sassone, Richard L.
 Saunders, Eugene L.
 Smith, Robert
 Snedeker, James R.
 Yetter, Edward W., Jr.

Non-Exempt 12
 Eskoff, Sophie S.
 Jones, Raymond A.
 Martin, James S., Jr.
 Pickett, Wm. F.
 Schuster, Joyce M.
 Scram, Wendy L.
 Smith, Floyd H.
 Smithson, Ronald
 Stephens, Charles
 Supry, Fred
 Urtz, Donald
 Weaver, Harold E.

Wage Roll 16
 Baggetta, Joseph A.
 Beader, Robert W.
 Bedworth, Gary R.
 Butler, Richard G.
 Fiorentino, D.J.
 Harter, James D.
 Howe, Robert W.
 Jennings, Dale E.
 Kozakowski, Rbt. J.
 Paslak, Wm. F.
 Sohns, Wm. A.
 Storne, Ramon
 Truax, Irving E., Jr.
 Williams, Clifford
 Williams, Donald
 Williams, Ronald R.

TOTAL ILION PERSONNEL: 56

BRIDGEPORT DIVISION

Exempt 9
 Cole, Wm. T.
 desJardins, Chas.F., Jr.
 Dwyer, John M., Jr.
 Garrett, Thelma B.
 McDonald, A. Daniel
 Peterkin, Vinton A.
 Simpson, Wm. R.
 Sroka, Lee R.
 Tomek, Warren L.

Non-Exempt 9
 Alexander, Bruce R.
 Buccitti, Dominick C.
 Champine, Barry M.
 Frauenberger, Marion O.
 Green, Jeffrey R.
 Montefusco, Stanley, III
 Raimundo, John A.
 Stine, Cindy A.
 Suhy, Frederick A.

Wage Roll 0

TOTAL BRIDGEPORT PERSONNEL: 18

Note: W.F. Pickett (Ilion) Non-Exempt transferred as a draftsman
 C.L. Jackson (Bpt.) Non-Exempt transferred to Sorvall, Newtown, CT.
 as of 4/16/84