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Quarterly
Report

REMINGTON ARMS COMPANY, INC.

NEW PRODUCTS RESEARCH

FOURTH QUARTER PROGRESS REPORT -- 1984

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HIGHLIGHTS

FIREARMS RESEARCH

Shotgun Development

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o	A prototype Model 1100 gas compensating system has been demonstrated that improves functioning of a wide range of shotshells.	1
o	Specifications for the Model 1100 Restyle have been provided to Process Engineering.	1
o	Development of a new concept action system and fire control is continuing.	1
o	All Model 870 Restyle (12 gauge) drawings have been transmitted.	2

Rifle Development

o	Completion of six prototype new bolt action rifles is expected by January 15.	2
o	The Custom Shop is heading prototype 350 Rem. Mag. Classics.	3

AMMUNITION RESEARCH

"Premier" Shotshell

o	Handloads have been identified for 12 gauge 3" 1-7/8 oz. RCLV and SPLV and 20 gauge 3" 1-1/4 oz. products. Loading machine confirmation is scheduled for 1Q85.	3

Rotary Cam

o	New unibody product implementation plans have been reviewed with Lonoke. All development is expected to be completed by year end.	3

HIGHLIGHTS

AMMUNITION RESEARCH - CONT'D.

Premium Centerfire

- A "bright dip" process for chemically polishing centerfire rifle cases was successfully demonstrated in Lonoke during October. 3

Firearms Research

Model 1100 Functional Improvements

The introduction of wider ranges of ammunition, plus the continuing improvement of competitive offerings, requires consideration of functional improvements to the Model 1100. Being considered are a compensating gas system to handle all loads of ammunition, improved action smoothness, a new carrier, and improved endurance life. This program, in conjunction with the Model 1100 Restyle program, should maintain or enhance the Model 1100's position in the marketplace until its replacement by the New Concept Shotgun.

A compensating gas system is being developed which utilizes two relief vents from the gas cylinder. The vents are closed with valves retained by a circumferential leaf spring around the perimeter of the gas cylinder. The valves remain closed on light loads, but will vent excessive pressure with heavy loads. Knife edge valves and cone valves have both demonstrated terminal bolt velocity spreads (between 3" - 1 7/8 oz. and 2 - 3/4" - 1 oz. loads) well within the goal of 200 in/sec. System testing is continuing.

Five guns with new carriers have been tested. The malfunction rate, for carrier related problems, was 0.7%, compared with 2.3% with standard Model 1100 carriers.

Research and Production are working closely together to expedite introduction of these functional improvement items.

Model 1100 Restyle Program - 12 Ga.

This cosmetic program is a compliment to the Model 1100 Functional Improvement Program. Specifications include cut checkering, 30-gloss wood finish, two-piece butt plate, screw machine magazine cap, and choke tubes for 1986 introduction. Testing of a 30 gun sample will begin in January and will incorporate the additional specification of a stainless steel magazine tube.

Specifications, drawings, and parts lists have been given to Process Engineering to develop an estimate and economics.

New Concept Shotgun

The Model 1100 was introduced in 1963 and immediately became the industry standard for autoloading shotguns. However, few significant changes have been made since then, while competition has blunted our technological advantage. This program, which is designed to replace the Model 1100, will re-establish Remington as the innovator and technical leader in autoloading shotguns.

New Concept Shotgun - cont'd.

Development of a new action system and new fire control are the critical path items. Assignments have been made to Remington and Du Pont engineers. The two groups are meeting twice a month.

Product Development Services, Inc. (PDS) have been contracted for development of a new fire control and concepts should be complete in 1stQ85.

Model 870 Restyle

This cosmetic program will improve the perceived price/value relationship of the Model 870. Specifications include 30-gloss wood finish, cut checkering, new recoil pad, and choke tubes.

All 12 gauge drawings have been transmitted to Production. Trial and pilot is underway.

A partial drawings package for the 20, 28, and .410 gauges has been sent to Process Engineering for estimating. 20 gauge choke tube samples will be ready for test by the end of January.

New Bolt Action Rifle

A new bolt action rifle is being developed as a potential replacement for the Model 700, possibly in 1988. Technical improvements over the Model 700 include enhanced safety, a detachable magazine, a claw-type extractor, an independent bolt lock, and integral scope mounts.

Completion of six prototype rifles for design evaluation is now expected by January 15. Bolt assemblies and magazine followers are the critical path components. Bolts will go to Production by December 21 for final machining, and then to the Custom Shop for heading with the barrel assemblies. Magazine followers are in process in the N/C Shop.

Five rifles are ready for focus panel reviews of several cosmetic features including receiver, bolt handle, bolt plug, and stock styling. Marketing is scheduling the reviews that may start as early as January.

Model 700 Classic - .350 Rem. Mag.

Remington is continuing the limited run, special caliber offerings in the Classic line by reintroducing the .350 Rem. Mag. for 1985. Research involvement is limited to testing for strength, accuracy, and feeding.

The Custom Shop is assembling the rifles and a test program has been agreed upon.

AMMUNITION

****SHOTSHELL PRODUCTS**

"Premier"

Competitive shotshell products with buffered and/or hard copper plated shot have gained acceptance among upland game and waterfowl hunters. Marketing has requested a similar line of products to maintain our competitive position. Many of these loads are being sourced from our competitors because of the market need. This and the rotary cam are the highest priority Research programs and are being supported by the maximum possible effort.

- 12 Ga. 3" 1-7/8 oz. Rotary Cam Large Volume Body

Extensive handload development has identified three (3) powder candidates that perform acceptably at the test temperature extremes in 16hr. and 120hr. storage. They are Expro 8662 (currently the slowest available from Expro) and two 30% NG Hercules samples, BS526 and BS527. The Expro powder requires some loading restrictions; it must be used with the more compressible RP12 wad and a less dense USI-MN718 "Microthene" polyethylene shot buffer (similar to that used by Federal).

The Hercules samples may be used with the less compressible 12SMAG wad and more dense GULF polypropylene shot buffer. However, ballistics are improved with the RP12 wad and USI shot buffer.

At present we believe the USI shot buffer will not feed satisfactorily on our loading equipment whereas the GULF flows with ease. A test fixture has been installed at Lonoke to determine what will be required to charge the USI buffer.

One hundred pound samples of the Hercules powders have been made and shipped to Lonoke. A 35 lb. sample of the Expro powder is at Lonoke. The loading machine is ready for testing. Primed bodies are expected to be asembled in early January.

Although satisfactory ballistics have been obtained with these handloads, pressure deviations at -20F are considerably greater than Federal's factory loads. This higher deviation has been traced to wad breakup. These wads are made with low density polyethylene. Experimental wads made with linear low density polyethylene showed 2X plus smaller -20F pressure deviations. Ambient deviations were also improved, perhaps due to a longer obturating skirt. We are planning an experimental run of the 12SMAG wad with linear low density polyethylene in December.

The Smokeless Powder Division technical and marketing personnel met with Research to discuss the "Premier" program. They are determining if they have any powder samples that would be useful. Government schedules and limited powder development capabilities at Expro will limit their contribution.

- 12 Ga. 3" 1-7/8 oz. SP (Two Piece) Large Volume Body

As a contingency to the rotary cam body, we are developing a load in the two piece body. Preliminary hand loads with hand headed bodies have indicated a blend of Hercules powders (HM80/HM90) with the RP12 wad and USI shot buffer yields acceptable ballistics. However, larger -20F pressure deviations are present due to wad breakup. Work is underway to determine if this load could be developed using the more free flowing GULF buffer and the liner low density polyethylene wads.

SPLV bodies (38,000) and plastic basewads (60,000) have been fabricated for an experimental run on the simplex AH&P machine. All AH&P tooling has been designed and fabricated and the experimental run will be in December.

- 12 Ga. 3" 1-5/8 oz.

Tests have been outlined and submitted to the lab for evaluation.

- 20 Ga. 3" 1-1/4 oz.

Hand load development has identified four (4) powders that give acceptable ballistics in 16hr. and 120hr. extreme temperature storage tests. They are Expro 8188 and Hercules HM90 and samples BS526 and BS527 (the same as those tested in the 1-7/8 oz. load). BS526 is preferred over BS527 due to lower pressure deviations at -20F.

8198 and HM90 must be used with the lower density USI buffer. The Hercules samples 526 and 527 can be used with either USI or GULF buffer.

- 20 Ga. 2-3/4" 1-1/8 oz.

Tests have been outlined and submitted to the lab for evaluation.

New Unibody Shotshell

The New Unibody Shotshell Process is being developed to provide a single process for all shotshell gauges. It has been designed to substantially increase process tolerances and yields and simultaneously improve product quality.

- Product Implementation Plan

Research and Production have detailed a plan to complete the new unibody shotshell and "Premier", steel shot and buck load developments. This effort is being done concurrently with commitments Production has to Consolidation and a significant increase in schedules.

We are currently estimating the following products to be complete through trial and pilot as the schedule indicates:

8 ga.	2/85	
12 ga. TGT.	5/85	(R209 primer)
12 ga. 3" LV.	5/85	("Premier")
	6/85	(Steel)
	7/85	(Buck)
20 ga.	5/85	("Premier")
20 ga. 3".	6/85	("Premier")
28 ga.	3Q85	
.410 bore.	3Q85	
16 ga.	4Q85	
10 ga.	4Q85	

Remington Target Load

Marketing has determined a need to introduce a new line of target loads (RTL) to enhance our competitive position. This new load would consist of the new unibody shotshell, Remington 209 primer, brass cap in all gauges, and a new wad in 12 Ga.

The critical path item is the new figure "8" wad designed to reduce cost, improve cold temperature performance, and provide the flexibility of loading both 1 oz. and 1-1/8 oz. using the same wad.

Research one cavity mold development was successful in achieving all these goals in the factory (straight shot pouch) and component (flared shot pouch) wads. However, scale up of the component wad to a 24 cavity mold has not achieved the desired cycle time and -20F performance was inconsistent.

Tool modifications and/or machine adjustments will be tried at the vendors shop to see if the original goals can be achieved.

The planned approach for the factory wad called for new molds similar to the component wad mold, with external core pins and full length side pull blocks. However, the scale up problems incurred on the component wad mold have led us to consider another approach. A standard "RXP" mold could be used with only a change to the side pull blocks. This may allow us to significantly reduce investment costs while still providing an improved wad for the target load program. Osley & Whitney will be requested to design the tooling.

CENTERFIRE PRODUCTS

"Premier" Centerfire

Competitive Premium centerfire rifle products with superior down range ballistics, accuracy and appearance have gained acceptance among big game hunters. Marketing has requested a similar line of products to maintain our competitive position.

Case Polishing

A demonstration/experimental run of a chemical case polishing process was completed at Lonoke during the week of 29 October where approximately 20,000 .30-06 cases were used to test three different bright dip solutions for commercial application. The overall test objectives included case finish, process economics, and waste treatment costs. An initial summary of observations and recommendations has been written by F.E. Schmidt and J.M. Williams (ETL) but they have not yet completed their evaluation of all the data generated by the test run. Cartridge geometry and weight loss analysis, process economics, chemical consumption, and waste treatment procedures remain to be completed. Six of the nineteen samples produced by the test runs have been sent to Ilion for ballistics and storage tests to evaluate "bright dipped" cartridge case performance.

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