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RESEARCH DEPARTMENT

HIGHLIGHTS REPORT

MAY 1982

REMINGTON ARMS CO.
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JUN 11 1982

FIREARMS RESEARCH DIVISION

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FIREARMS

XSG/XPG Shotgun Design

The six research prototype autoloading XSG shotguns will be completed as scheduled.

The design/minimum investment analysis has been completed. A model gun to depict proposed design modifications is being fabricated for testing and evaluation.

In addition, major styling revisions are now being identified to provide a significant departure from current product appearance.

Model 7400/7600 Rifles

M/7400 center fire rifles with altered barrel extensions to improve feeding of the 7mm Express Rem have been tested on all available calibers with satisfactory results. Model drawings have been transmitted. The pump Model 7600 series is now being evaluated.

Model 7400 New Calibers

Test results on the 25-06 and 7mm-08 calibers are satisfactory. The 25-250 caliber, requested by Marketing, will require magazine box design work. Models will be ready for testing by September, 1982.

Model Four Limited Edition

The front sight ramp has been altered to fit the Williams sight and the ramp finish has been improved. Marketing has indicated they do not want the Model 700 hooded design and will accept the Williams sight providing the fit is executed properly.

Model Four Carbine

Several new models have been prepared for review by Marketing and Research. Additional models featuring changes in wood finish and barrel configuration are being fabricated.

Models in .223 caliber are in test. Problems encountered with magazine box components (follower and spring) may require redesign.

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Model Seven Lightweight

Accuracy testing of 7mm-08 caliber rifles looks promising. New stocks have been received from Fajen with increased pad height to give more barrel support. Tests with a new barreled action in one of the stocks resulted in a combined average of 1.9 inches for three five-shot groups. Further testing will be conducted using more actions. In tests with five Model 700 7mm-08 rifles, accuracy has been unaffected by cutting off the barrel to 18-1/2 inches or by free floating the barrel. These results confirm those obtained to date with the Model Seven Lightweight design.

No-bind follower samples tested in the 7mm-08, 6mm, .243 and .308 were satisfactory, and prints were transmitted to the plant. However, .222 caliber no-bind follower test results were not satisfactory. There are two items to be investigated; the magazine spring and the follower.

Model 870 Riot Gun - Jam Condition

A large sample (100) of Model 870 Riot guns with modified breech bolts and slides will be completed by the end of May. These will include addition of the Model 1100 cut to the bottom of the breech bolt and a slight chamfer to the right rear corner of the slide. Sample testing for the jam condition will be conducted. Pending acceptable test results, model drawing changes will be transmitted to the plant.

Model 870 Limited Edition

Fountain Plating has been requested to supply costs for sample plates on our present artwork. The artwork may have to be changed because the ejector rivet falls within the present etched area and may produce nonuniform etching and an unacceptable defect in the pattern.

Ducks Unlimited 1982

Commemorative and Special trial and pilot models have been inspected and accepted.

Cut Checkering

The pilot run of the CO.RE.MA. stock machine has been delayed because of difficulties developing an adequate template for the right side of the grip. The pilot run should start by June 1. A.R. Baszczuk, Firearms Modernization Group, will stop at CO.RE.MA. during his visit to Italy and review their latest machines for us.

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Cut Checkering - Cont'd

Kurt Manufacturing is prepared to checker out stocks in their plant during the first half of June.

Bostomatic has been authorized to build a fixture and develop the software for a test run of their machine.

Injection Molding of Metal and Ceramic Components

The molding machine and Witec equipment are operational. Witec 2% Ni-Fe, 50% Ni-Fe, and 316 stainless materials have been processed. Parmatech 2% Ni-Fe has been molded and will be forwarded to either EDL or Parmatech for further processing.

Preliminary testing of electrical connector pins at Bendix-Sidney indicate that injection molded parts are satisfactory. Testing is continuing. Bendix has also requested new quotes, utilizing tooling for the Minijector molding machine, on two other components.

Industrial Engineering has supplied factory costs on approximately 100 firearm components that would be candidates for injection molding. M/700 magazine followers and scope mounts will be worked on first.

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AMMUNITION

New Unibody Shotshell Process

Three production 12 gauge load lines have passed product lot acceptance. Dimensional control and yield were excellent.

An initial run of one quadrant on 20 gauge started on May 31.

Slugs for an experimental run of 16 gauge product in semi-works are being produced.

Polymer Support Program

Production extruder "D" has been equipped with an experimental control system which can control either bubble diameter or wall thickness by adjusting die pressure through feedback to extruder screw speed. Debugging is continuing to eliminate two types of occasional upsets of unknown origin.

Tests have shown that the ultrasonics wall thickness measurement system is less sensitive to polymer variations versus the standard bubble control and is the preferred control method from a product quality standpoint. A water purge system was installed which eliminates vapor bubbles, resulting in a more reliable wall thickness measurement.

Extended Range Shotshell

Initial load recommendations for the SP12SMag, SP20SMag and SP20HMag with the new unibody have been completed. Load fit on the 2-7/8" 20 gauge shell was excessively tight and an increase in length to the SAAMI specification is being considered. Recommendations for the SP12Mag and SP12HMag should be complete in June.

New Product Development - Shotshell

Exploratory work on the development of a one-ounce target load indicates that the "RTL" would give good load fit and ballistic performance. Patterns and pattern density are currently being tested. Material costs for the Linear LDPE polymer required for the "RTL" would may be prohibitively high.

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Primer Improvement Program

A test comprised of 16 primer mixtures was conducted to determine the contribution of each mixture constituent to ballistic performance. Qualitatively, the order of decreasing contribution to ballistic improvement for the fuels is Al NC Sb₂ S₃. Tests at -20°F in both target loads and the SP12Mag indicate that aluminum is mainly responsible for breech flash. One mixture which was high in Polnol (54% vs. the usual 38%) and high aluminum was an exception. This mixture was ballistically superior but may be difficult to charge due to excess moisture.

Integral Anvil Battery Cup

The ABC-202 primed RS-6 promotional loads passed the misfire and pierced primer field tests at Lonoke. Production is preparing to begin their four million round run.

Extended Range Center Fire

This product line is being delayed until 1984.

357 Remington Maximum 158 Grain SJHP

Feedback from Ruger on the cartridge performance has been positive. Tests underway with a new Olin ball powder indicate improved performance under hot extended storage conditions.

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May 1982

FIREARMS MODERNIZATIONAutoload Shotgun GFM - Part I

The construction cost estimate for automating the #4 GFM has been completed. The proposed capital investment required is significantly greater than originally estimated due to the extensive monitoring equipment required for a totally automated system. Remington and EDL personnel are currently re-evaluating this proposal to determine if the capital costs can be reduced through alternate techniques involving a combination of the operator and automation. This revised concept is expected to be complete with new economics in June.

Universal Receiver Manufacturing System

The scope of work for the Part I project has recently been expanded to encompass a demonstration of all critical technology including, the machine, tooling and tooling support, the material handling concept, and the computer communication system.

Remington and EDL personnel visited Yamazaki, Cincinnati Milicron, and Kearney-Trecker in May concerning the feasibility of a flexible manufacturing system (FMS) for rectangular receivers. All three manufacturers expressed interest in pursuing this development and have agreed to provide preliminary budgetary estimates in June or early July.

Long Stock Machining

The appropriation request for a CNC machining center to perform secondary machining and bottom inletting on long stocks has been approved.

Wood Finishing

A technical evaluation has been completed of several commercial rotary bell atomizers, with Devilbiss being selected as the best system and service for both our short and long term wood finishing needs. An appropriation request is being prepared for an anticipated June authorization. Project economics indicate a 1983 gross savings of \$37M and a NROI of 91% based on a capital investment of \$34M.

Automatic Breech Bolt Assembly

Quotations have been received from Gilman Engineering Kingsbury, RWC, and Alliance Tool. The Gilman and RWC proposals meet our requirements. Both machines will require one full time operator which is a reduction of five operators in our current workforce.

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May 1982

Automatic Breech Bolt Assembly - Cont'd

EDL is progressing with its work on a robotics assembly machine to assemble both the breech bolt and trigger subassembly of the fire control. An estimate on the total equipment investment will be available in June. This will allow a decision to be made on whether this assembly program will be pursued through hard automation or robotics assembly.

Shotgun Barrel Automation - Automated Brazing

Two companies have been contacted concerning the automatic brazing of M/1100 gas cylinders and M/870 guide rings to shotgun barrels. A preliminary high sport estimate shows a 89% R.O.I. and \$48M savings on a \$60M investment in 1986.

A development contract has been entered into with Fusion, Inc. to determine the feasibility of automatically loading, brazing, and unloading the barrel assemblies.

WHColeman:jl
Attachment

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May 1982

RESEARCH PERSONNELRemington Roll

| | <u>Actual</u> <u>4/30/82</u> | <u>Actual</u> <u>5/31/82</u> | <u>Forecast</u> <u>12/31/82</u> |
|-----------|---------------------------------|---------------------------------|------------------------------------|
| EXEMPT | 59 | 65 | 69 |
| NONEXEMPT | 21 | 22 | 22 |
| WAGE ROLL | 23 | 25 | 25 |
| | <hr/> | <hr/> | <hr/> |
| Total | 103 | 112 | 116 |

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