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REMINGTON ARMS COMPANY, INC.

RESEARCH DEPARTMENT

HIGHLIGHTS REPORT

APRIL 1983

DISTRIBUTION

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FIREARMS RESEARCH

Model 1100 Special Shotgun

Pilot line acceptance testing has begun for both the 20 and 12 ga. Specials. Problems with cracking of the 12 ga. forends and mismatch between parts of the two piece butt plate are being worked on.

Model 870 Special Field Shotgun

Prototype samples of the 12 ga. and 20 ga. Specials have been approved by Marketing. Five 12 ga. Specials have been tested to 5,000 rounds each with no problems. Five 20's are currently in test. Drawings have been transmitted to Production.

Model 870 Riot Shotgun

Three test guns with the new slide block and carrier are being endurance tested to 50,000 rounds. Engineering drawings have been turned over to Process for cost evaluation. Alternative designs are being considered to facilitate disassembly.

A prototype has been completed of the 12 ga. Magnum Police Shotgun with an 18" full choke barrel. Prototype barrels are being tested for point of impact.

Model XP-100 in .223 and 7mm-08 Caliber

Three XP-100 prototypes in .308 caliber were tested to determine the strength of current nylon production stocks. The stocks failed (cracked). Fiberglass stocks are being considered.

Model 700 Classic in .338 Win. Mag. and 250-3000 Savage

Work on the .338 Win. Mag. caliber has been stopped until a New Product Development Request is approved. New barrel mandrels are required.

Prototypes in 250-3000 Savage use current 25 caliber barrels. Accuracy with 100 grain bullets was less than 2.0 inches. They will not be tested with 87 grain bullets. Function testing is in progress.

Injection Molding Metal and Ceramic Components

Development of the Model 700 magazine follower is proceeding towards implementation by August. A process for the continuous sintering of a Remington Fe-2% Ni feedstock has been developed. Samples made by this process were carburized and ex-

Injection Molding Metal and Ceramic Components - Cont'd

hibited a good, controlled, case depth. Black oxide treatment of both the as-sintered and as-carburized followers resulted in a good, even, finish.

Cut Checkering Machine Development

A decision on the purchase of a CO.RE.MA. machine will be made by the end of May. The fixture and capsule for the Bostomatic machine are being fabricated. Renovation of Building 72-1, for installation of the Bostomatic, will be completed by June 15.

Testing and Inspection

EPL has concluded that two flexible inspection systems could be developed to 100% inspect most of the parts purchased or produced by Remington. Annual savings are estimated to be at least $520M plus savings on purchased parts and product litigation. Conceptual systems designed will be funded jointly with the Firearms Modernization Group.

Form-Rolling

Purchasing has been requested to begin preliminary negotiations with Rol-Flo Engineering, Inc. for a contract to develop a form rolled shotgun firing pin.

Testing and Certification of Magnetic Powder Metal Components

Problems with the magnetic properties of some production samples have been traced to poor sintering as a result of unsuitable furnace conditions. Different furnaces and modifications to the sintering procedure are being planned.

Four-Slide Manufacturing

Tooling quotes have been received for eight firearms components presently manufactured by H&P Die and Stamping. Industrial Engineering should complete economic evaluation by mid-May, after which plant-orders will be requested.

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FIREARMS MODERNIZATION

Receiver Flexible Manufacturing System

Authorization of the $1.6MM R&D project is expected during the week of May 1.

Recent test results on Model 870 receivers at Wilmington shops indicate that cycle times required for the FMS are obtainable, however, machined part tolerance and tool life need to be verified.

GFM Automation

Most of the detailed design is complete. All components are scheduled to be ordered by mid-May.

During the recent scheduled maintenance overhaul of the #4 GFM, instrumentation for the automated system was installed to provide information concerning final system operation. Instrument modifications were also completed to simplify the existing GFM controls for increased reliability.

Flexible Manufacturing System of Small Components

Recent Ilion machining tests on shotgun breech bolt blanks showed that:

- The loading fixture will adequately perform in the final production system.
- Machine cycle times were 50% better than originally estimated and should significantly affect the capital requirements.

Wood Finishing Automation

DeVilbiss service representatives were on plant on 4/15/83 to inspect the problems encountered with the rotary atomizer control system. It was discovered that compressor oil had bypassed existing filters in the air lines and entered the controls. A new filtration system is being installed.

AMMUNITION RESEARCH

New Unibody Shotshell Process

The Plant pilot machine reassembly remains on schedule with initial test runs and startup scheduled for mid-May.

Tensile strength of the .410 body is up to 19,885 psi compared with 17,200 psi for the SP shell and 20,600 for Winchester. Straight bodies are being produced and no body cutoffs have occurred. Some body buckling has occurred; however, this should be minimized via deep skiving. A small increase in shell volume is still necesssary.

"Premier" Shotshell

Plant assembled and loaded 12 gauge 3" 1-7/8 oz. product was produced with acceptable ballistics and patterns. Primer casualties were encountered in the LV body in hot tests. The basewad has been redesigned with a collar over the primer. Samples produced in semi-works are being evaluated with good results to date on hand loaded shotshells.

20 gauge 2-11/16" and 2-7/8" hand loads using SP bodies with the load developed for the Rotary Cam body did not achieve acceptable ballistics. Load fit was too tight for acceptable loading on Plant equipment.

1 oz. Target Load

Velocity has been increased and an experimental run has been completed at Lonoke with a control velocity of 1200 ±20 fps. Testing is in progress.

ABC Primer

Thorough examination of the progressive forming strip shows that the stress riser, which may be contributing to battery cup failures, is formed in the third anvil coning station. Experimental tooling will be tried in an effort to eliminate this flaw and allow its impact on primer failures to be assessed.

TLX

Evaluation of cellulose, as a replacement for NC, in a Rim Fire TLX mixture produced acceptable ballistic results. Misfire performance was superior and priming defect rate comparable to 6005 but the mixture continues to be difficult to process.

A TLX version of fuelless mixture containing cellulose was charged into shotshell primers. This mixture processed well but ballistic results at -20°F were substantially lower than control.

Center Fire Case Fundamentals

During compilation of dimensional data at ETL, indications of corrosion and corrosion cracking were found in the Bridgeport and Lonoke product. Diffraction analysis showed the presence of oxygen, chlorine and sulphur, suggesting pickling solution residue. Copies of process records and samples of pickling solution have been requested from Lonoke.

ETL has submitted samples of chemically polished cases that have a significant appearance improvement. The process is being evaluated as a potential retrofit into the existing pickling operation. Environmental aspects will also be studied.

Center Fire Modernization

A preliminary implementation strategy was reviewed with Corporate Management on April 13, 1982. Each functional operation within the Modernization Plan was prioritized relative to its potential contribution to significant quality improvements and/or maximizing early positive cash flow. Priorities are:

Case Burnishing
Bullet Jacket Draw
Bullet Assembly
Bullet Burnishing
Automated Packing
Duplex Loading (plate loaded P&R)
Case Draw

The order of the first four items is predicated primarily on significant quality improvements and potential for increased market share while the remaining items are ranked relative to potential ROI.

The Committee's next objective is to refine the economic analysis of each area and zero in on those operations which meet corporate justification criteria.

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RESEARCH PERSONNEL

REMINGTON ROLL

	Actual 3-31-83	Actual 4-30-83	Forecast 12-31-83
Exempt			
Ammunition Research	17	17	16
Firearms Research	39	39	40
Firearms Modernization	7	7	9
Other	1	1	1
Total Exempt	64	64	66
Nonexempt			
Ammunition Research	12	12	12
Firearms Research	12	12	11
Firearms Modernization	1	1	1
ER&DD	1	1	1
Other	1	1	1
Total Nonexempt	27	27	26
Wage Roll			
Firearms Research	19	19	19
Firearms Modernization	2	2	2
Total Wage Roll	21	21	21
Total Research Department	112	112	113

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