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REMINGTON ARMS COMPANY, INC.
FIREARMS PROCESS RESEARCH DIVISION
MONTHLY REPORT
JANUARY 1984

CBW/KWS

RECEIVER FLEXIBLE MANUFACTURING SYSTEM

o EQUIPMENT

An evaluation of quotes received for an overhead monorail material handling system is complete and a vendor has been selected for the prototype system to be installed at EDL. A decision to purchase the prototype system from P&H (American Monorail) was reached jointly by Design Division and Remington based on best equipment, understanding the requirements and lowest cost.

Cutting tool tests conducted by EDL on four different types of M/1100 latch clearance tee cutters are complete. Results indicate that; 1. Ti.N coated cutters are freer machining and provide significant improvement in tool life over uncoated cutters, 2. CNC ground tools cut freer than conventional ground tools, and 3. New tools as purchased wear faster than reground tools. These different types of tools will now be tested at Remington by Production and results compared. Tests are expected to be complete by mid February 1984.

A visit was made to Snyder Corporation to review construction progress of the prototype four spindle CNC machining center and discuss acceptance test requirements. Initial power up of the machine is scheduled for January 24th and customer runoff in mid April 1984.

o AREA LAYOUT

All machine templates necessary to develop detailed layouts of the Receiver FMS installation have been created on the CV

system. From this data, detailed layouts have been developed to show what steps must be followed in order to install the Receiver FMS in an orderly fashion. These layouts have been based on projected 1988 volumes received from Marketing on 1-9-84 and from capacity studies generated using these volumes.

o ECONOMICS

Tentative updated economics have been developed using volumes received from Marketing on 1-9-84. Two cases were investigated.

The 1st case assumed (7) machines were necessary in the proposed system to run estimated production volumes. 1988 was assumed to be the 1st full year of operation. The overall economics show a 1st (3RD) year gross annual savings of \$2.3MM (\$3.0MM) with a ROI of 20% (17%), based on a total investment of \$13.4MM. The 2nd case assumed (8) machines were necessary in the proposed system to run the estimated production volumes. The economics for this case show a 1st (3RD) year gross annual savings of \$2.2MM (\$2.9MM) with a ROI of 19% (14%), based on a total investment of \$14.4MM.

The IRR for both cases is approximately 26%.

SMALL PARTS FLEXIBLE MANUFACTURING SYSTEM

A prototype project is underway to develop and demonstrate critical components of a Small Parts Flexible Manufacturing System (FMS). Equipment will be purchased to develop machining processes and tooling, evaluate robotic material

handling potential, test automatic deburring techniques, and demonstrate automatic inspection technology.

The evaluation of machine tool type is complete. Seven alternatives were compared based on cost, ROI, Receiver FMS compatibility, and risk. A single spindle horizontal machining center with an automatic pallet exchange mechanism (pallet shuttle) appears to be best suited for small parts manufacturing.

GFM AUTOMATION

All equipment has been installed and is now being debugged. A Cincinnati-Milacron serviceman made final adjustments to the robot January 9-10. F. V. Capanna, EDL, assisted in software debugging and robot programming starting January 16. Robot programming should be completed by 1/25. The next step will be to set up the GFM and forge barrels so that all GFM machine instrumentation can be checked out. The system should be capable of cycling parts automatically by mid-February.

FLEXIBLE ASSEMBLY SYSTEM

EDL has ordered a Puma 560 robot for the project; delivery is expected by early March. They are using an Automatix Vision System for research on flexible feeding systems with gun components. A vision system may be used for this project depending on EDL research findings.

SERIAL NUMBER RECORDING SYSTEM - PHASE II

Computer Identics has received all DEC hardware. They plan to begin writing software in February. System installation is currently expected in mid summer.

WOOD SHOP MODERNIZATION

o PRESS-FORMED STOCKS - ROBOT LOAD

Preliminary data for automating the press-form area has been gathered. EDL will be working with us to define the system parameters. Other systems houses are being contacted that could implement the system.

o PRESS-FORMED LONG STOCKS

A review of the problems previously encountered when pressing long stocks revealed several concerns that should be resolved before continuing with this program. These include support during pressing, open grain after pressing, locating a machining surface, and sealing and finishing post-press machined surfaces. These technical problems will not be pursued until a more economical method of die manufacture is found that provides the flexibility to press lower volume models and reduces investment for new designs. This investigation is currently in progress.

o ROTARY BELL ATOMIZERS

Testing of the DeVilbiss Rotary Atomizers has been delayed pending a solution to prevent arc-outs. Parts are now being fabricated to accomplish this.

o ULTRAVIOLET CURABLE COATINGS

Red Spot finishes have been tested for weatherability and durability. Results showed that improvements in adhesion and blushing are necessary. Red Spot was contacted and expressed optimism in overcoming these problems. Sample stocks have

been sent to allow Red Spot to experiment with different formulations. Industrial Heating and Finishing has offered their lab facilities for any testing. To date no other three dimensional U.V. curing company has been found.

o AUTOMATED SANDING - FORE ENDS

The concept of automatic sanding has been reviewed and it appears that it can be broken into two areas; the sanding of fore ends and the sanding of stocks. Fore end sanding appears to present fewer technical hurdles than stock sanding and will be pursued first. It has yet to be determined if different technologies would apply to stocks and fore ends. Potential economic stakes are being calculated for automating these operations.

Representatives of Foster-Miller Inc. were on plant 1/20/84 to discuss the development of a fore end sanding machine. Sample fore ends were provided to assist in their evaluation. A \$1311 purchase order has been issued to Foster-Miller to fund basic research and initial concept development.

o COMPETITIVE INFORMATION

It has been discovered that Heian Iron Works of Japan has built a NR-12G (The same type of router that we purchased for secondary cuts) for Miroku who is producing stocks for Browning. The machine is being used for top inletting.

o EVALUATION OF COSTS

Canada Spool & Bobbin Company Ltd. of Ontario has been supplied with samples and specifications in anticipation of a

Request For Quotation. We have been working with Canada Spool
& Bobbin on the walnut 11/700 BDL and birch Sportsman 78
stocks.