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TO: T. C. DOUGLAS
FROM: G. E. FLETCHER *H.E.F.*
DATE: MAY 1, 1990
SUBJECT: APRIL ACTIVITY REPORT

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PROJECT: M700 CLASSIC 25-06 REM - 1990 INTRODUCTION
 ENGINEER: FORO (STAFFORD)
 DESCRIPTION: ADDITION OF THE 25-06 CALIBER TO THE M700 CLASSIC LINE.
 CAP:

OFFER:
 UPGRADED: 04/25/90

KEY EVENTS	SCHEDULED		ACTUAL COMPLT	STATUS
	START	COMPLT		
WRITE PROCESS RECORDS (RLS)	09/25/89	11/17/89		COMPLETED.
WRITE PROCESS RECORDS (ELF)	09/25/89	11/17/89	11/30/89	COMPLETED.
WRITE MRP STRUCTURES (RLS)	09/25/89	11/17/89		COMPLETED.
WRITE MRP STRUCTURES (ELF)	09/25/89	11/17/89		COMPLETED.
CONDUCT TRIAL AND PILOT	12/04/89	01/12/90	04/23/90	COMPLETED.
REVISE PROCESS RECORDS (RLS)	01/15/90	01/19/90	04/24/90	NOT NECESSARY.
REVISE PROCESS RECORDS (ELF)	01/15/90	01/19/90	04/24/90	NOT NECESSARY.
SAMPLE FOR RESEARCH TESTING	01/15/90	01/17/90	04/24/90	NOT NECESSARY.
SELECT PRODUCTION SAMPLE	02/12/90	02/17/90	04/24/90	NOT NECESSARY.
RELEASE TO PRODUCTION	03/05/90		04/23/90	

COMMENTS: THE 50 CAL TRIAL AND PILOT WAS SUCCESSFUL AND THEREFORE NO PROCESS RECORD REVISIONS WERE NECESSARY. A PRODUCTION SAMPLE AND THE RESEARCH SAMPLE WERE NOT SELECTED BECAUSE THE 25-06 CALIBER IS CURRENTLY OFFERED IN THE BIL LINE. THE WAREHOUSE WAS RELEASED ON 04/23/90. PROJECT IS COMPLETE AND WILL BE DROPPED AFTER THIS MONTH.

PROJECT: N/700 BEL 300 SAVAGE - 1990 INTRODUCTION
 ENGINEER: FORD (STAFF/90)
 DESCRIPTION: ADDITION OF THE 300 SAVAGE CALIBER TO THE BEL LINE.
 CAP:

OPER:
 UPDATED: 04/25/90

KEY EVENTS	SCHEDULED START	COMPLT	ACTUAL COMPLT	STATUS
WRITE PROCESS RECORDS (RLS)	02/12/90	03/02/90	02/20/90	COMPLETED.
WRITE PROCESS RECORDS (R/P)	02/12/90	03/02/90	02/20/90	COMPLETED.
WRITE MRP STRUCTURES (RLS)	02/12/90	03/02/90	02/20/90	COMPLETED.
WRITE MRP STRUCTURES (R/P)	02/12/90	03/02/90	02/20/90	COMPLETED.
CONDUCT TRIAL AND PILOT	04/02/90	05/04/90		IN PROGRESS.
REVISE PROCESS RECORDS (RLS)	05/07/90	05/25/90		
REVISE PROCESS RECORDS (R/P)	05/07/90	05/25/90		
SAMPLE FOR RESEARCH TESTING	05/04/90	06/04/90		
SELECT PRODUCTION SAMPLE	05/04/90	06/04/90		
RELEASE TO PRODUCTION	06/04/90			

COMMENTS: 200 BARRELS ARE AT THE CHAMBER OPERATION. PRODUCTION IS WAITING TO RUN THIS OPERATION UNTIL THE SET MASTER FOR THE DEPTH OF THROAT IS ALTERED. SET MASTER WAS RECEIVED 04/25/90 AND IS IN TOOL INSPECTION. UPON ACCEPTANCE OF THE SET MASTER, TRIAL AND PILOT WILL CONTINUE.

PROJECT: M700 BOLT BODY PROJECT
 ENGINEER: FORD (SMITH)
 DESCRIPTION: DEVELOP A PROCESS TO MANUFACTURE M700 BOLT BODIES ON THE MIZANO LATHES. THE EXISTING MACHINES ARE A MAINTENANCE PROBLEM RESULTING IN EXCESSIVE DOWN TIME.

CAP: :
 OFFR: :
 UPDATED: 04/25/90

KEY EVENTS	SCHEDULED		ACTUAL		STATUS
	START	COMPLT	START	COMPLT	
FEASIBILITY	02/08/89	02/27/89			COMPLETED.
TOL. SELECTION	02/13/89	03/17/89	04/07/89		COMPLETED.
PROGRAMING	02/14/89	03/17/89	04/07/89		COMPLETED.
MACHINE CAPABILITY	03/20/89	03/31/89	09/12/89		COMPLETED.
TRIAL AND PILOT	04/03/89	04/17/89	10/13/89		COMPLETED.
WRITE S.O.P.	04/03/89	04/10/89	10/20/89		COMPLETED.
REVISE PROCESS RECORD	04/03/89	04/10/89	02/09/90		COMPLETED.
A-5 AUDIT	04/17/89	04/24/89	04/02/90		COMPLETED.
ALTER EXISTING TOOLS	04/03/89	05/01/89			
RELEASE TO PRODUCTION		04/24/89	03/05/90		COMPLETED.

COMMENTS: THE NEW PROCESS HAS BEEN RUNNING SUCCESSFULLY FOR TWO MONTHS. THE ON-HAND QUANTITY OF GINORILLS AND GINORILL BUSHINGS FROM THE ALTERNATE OPERATION WILL BE ALTERED FOR THE NEW OPERATION AFTER IT HAS BEEN RUNNING SUCCESSFULLY FOR THREE MONTHS. A COPY OF THE RECOMMENDED SPARE PARTS LIST FOR THE MIZANO LATHES WAS GIVEN TO JOE INSERRA ON 03/27/90 FOR HIM TO REVIEW AND STOCK THE NECESSARY PARTS IN STOCK.

PROJECT: REPLACE W/700 TEST AND TARGET DEVICE

ENGINEER: FORD (SMITH)

DESCRIPTION: PURCHASE A NEW DEVICE TO REPLACE EXISTING DEVICE #24128.

THE EXISTING DEVICE IS 41 YEARS OLD AND IS A QUALITY PROBLEM (HARS STOCKS, BREAKS TRUCKS, ETC.).

CAP:

OFFER:

UPDATED: 04/25/90

KEY EVENT	SCHEDULED		ACTUAL		STATUS
	START	COMPLT	START	COMPLT	
REQUEST QUOTES	04/24/90	05/18/90			IN PROGRESS.
SELECT VENDOR	05/21/90	05/25/90			
WRITE PROJECT REQUEST	05/28/90	06/01/90			
PROJECT APPROVAL	05/04/90	06/29/90			
RELEASE P.O.	07/02/90	07/06/90			
REMOVE OLD DEVICE	10/01/90	10/05/90			
INSTALL NEW DEVICE	10/08/90	10/19/90			
TRAIN OPERATORS	10/22/90	10/26/90			
WRITE PROCESS	10/22/90	10/26/90			
A-5 AUDIT	10/29/90	10/31/90			
RUN T & P	11/01/90	11/16/90			
PRODUCTION RELEASE		11/26/90			
CLOSE PROJECT		12/14/90			

COMMENTS: THREE SETS OF PRINTS FOR THE NEW DEVICE WERE GIVEN TO GEORGE JACKSON ON 04/24/90. HE SELECTED THREE VENDORS AND HAS FORWARDED ONE SET OF PRINTS TO EACH VENDOR.

M/700 BOLT PLUG: (Ed Ford, Jim Smith)

The M/700 bolt plug threads are currently chased after supersheen. There are three conflicting beliefs as to "why" this operation is necessary. The first belief was the vibratory media used during supersheen damaged the bolt plug threads. The second belief was the firing pin was misaligned with the firing pin hole in the bolt head. The third belief was that the bolt plug caused a "heavy bolt lift" condition at final assembly. Due to the recent process change which moved the gundrilling operation to the Miyano lathes, a test was conducted to determine if this rethread operation is still necessary. Fifty unchased bolt plugs were assembled and the bolt lift measured. Eight of the fifty guns tested had a bolt lift greater than 10 lbs. Further investigation of these eight guns showed that the threads in the bolt bodies shrunk during heat treat. Six over-size taps were ordered on 04/24/90 and the expected date of delivery is 05/11/90.

M/700 RECEIVER - TRIORDINATES: (Ed Ford, Jim Smith)

There are two groups of two tri-ordinate machines used to manufacture the M/700 receiver. Head #1 on the first tri-ordinate of each group uses an arbor saw to cut the fire control slot. The operators noticed that the cutter life on one tri-ordinate was considerably lower than on the other. The spindle speed was checked on both machines and a difference of 100 rpms was found. Ed designed and ordered a pulley and belt combination to slow the one spindle down to the same speed as the other. The cutter life has improved on this machine and now both machines have the same cutter life.

M/700 FINAL ASSEMBLY - PACKAGING MATERIALS: (Ed Ford)

The packaging material structures for all M/700 and M/7 calibers were updated according to the current parts list.

M/700 RECEIVER - GUNDRILL ON MIYANO LATHE: (Ed Ford)

An 8000 lb quantity of 1 3/8" diameter, hot rolled, turned and polished bar stock was ordered on 04/20/90 to determine the feasibility of drilling, counterboring, and tapping the M/700, M/7 and M/XP-100 receiver on the Miyano lathes.

M/700 RECEIVER LINE - PROCESS RECORDS: (Jim Smith)

Process records for the M/700 receiver line are being verified. Assistance from the area machine setter is needed to complete the remaining processes.

PROJECT: REPLACE M/700 BOLT BODY GRINDER
ENGINEER: KEENEY
DESCRIPTION: EVALUATE THE REPLACEMENT OF THE CINCINNATI PLUNGE GRINDER WITH A CNC TURNING CENTER.
CAP:
OPER:
UPDATED: 04/19/90

KEY EVENT	SCHEDULED		ACTUAL	STATUS
	START	COMPLT	COMPLT	
FEASIBILITY STUDY	10/01/89	2/23/90	04/03/90	
WRITE SCOPE	2/26/90	3/02/90	04/19/90	
REQUEST QUOTES	3/05/90	3/16/90	04/05/90	
SELECT VENDOR	3/19/90	3/23/90		
WRITE PROJECT REQUEST	3/26/90	4/27/90		
RELEASE P. O.	4/30/90	8/10/90		
INSTALL NEW MACHINE	8/13/90	8/17/90		
TRAIN OPERATORS	8/20/90	8/24/90		
RUN T & P	8/27/90	9/07/90		
RELEASE TO PRODUCTION	9/10/90			

QUOTES ARE TO BE SUBMITTED BY 04/20/90, VENDOR SELECTION WILL FOLLOW.
CURRENTLY IN PROGRESS

COMMENTS: (02/08/90) During November of 1988 a suggestion (#17873) was submitted requesting that the possibility of replacing the M/700 bolt body grinder (machine #32340) with a CNC turning center be investigated. The suggestion was initiated due to the amount of down time incurred by the grinder and the short life of the grinding wheel which is approximately one and one half to two months at a cost of \$1200 a wheel. It has been determined through testing that a turning center is capable of producing a surface finish of approximately 20-25 RMS on bolt bodies, which conforms to the Remington specifications of 16-32 RMS. The major difference between the ground surface and the turned surface is the uniform feed marks resulting from the turning operation. The feed marks produce a harmonic vibration when operated in a receiver. To eliminate the feed marks, a special adapter is required as a follow up cycle to the turning cycle to lightly buff the surface to remove the feed marks. The adapter is to be designed and built in house (TOR #WK-0029). The Cincinnati grinder is running a cycle time of approximately 45 seconds, the bolt body program for a CNC turning center is approximately 30 seconds for the turn and an estimated 10 to 15 seconds for the light buff. Once the adapter is tested and proven, formal quotes for machines will be requested.

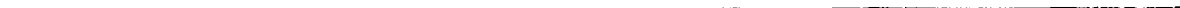
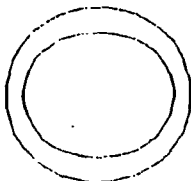
(03/06/90) To experiment with a buffing process, I had a machine representative run a dozen bolt body assemblies on the machine that he would quote, for this process. I have received the bolts and are in the process of experimenting with different buffing applications.

(03/29/90) Due to other projects, I was not able to experiment with different buffing applications. I expect to have the buffing applications and the feasibility study finalized by 4/23/90. I have received machine capability studies for two of the three machines that I was interested in. Of the two machines, only one could produce the part to our tolerance specifications. Therefore, I expect to request quotes from the two vendors by 4/29/90.

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(04/19/90) I decided to run six of the twelve sample bolts through the normal process to determine if and to what degree the bolts would "vibrate" when fully processed. Upon testing of the six bolts in receivers, I could not distinguish any abnormal vibrations, therefore the need for a special buffing adapter could be eliminated. The results of this testing has determined that it will be possible to replace the grinder with a CNC Turning Center. Once the machine is purchased and a larger trial and pilot run can be completed, I will be able to make a final determination of whether a buffing adapter will be required. I am currently waiting for the vendor quotes to complete the capital request, I expect to have the capital request completed and submitted for approval by 04/27/90.

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ASSISTANCE TO OPERATIONS

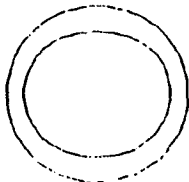
M/700 BOLT HANDLE: (KEENEY)

(02/08/90) The vendor that currently produces the M/700 bolt handle investment casting has requested that a redesign of the intersection of the oval and the neck be investigated. Due to the geometry of the neck and oval intersection, an inherent problem arises in the investment casting process. There has been a documented problem of stress fractures in this region due to the small cross section. Mike has been working with the vendor to achieve a design that will eliminate the stress fractures as well as provide the strength and appearance characteristics required by Remington. The vendor is supplying samples of bolt handles that would eliminate the stress fractures for our inspection, they are expected the week of Feb. 12, 1990. Also, Joe Meade and Mike are working with the vendor to improve the surface finish of the bolt handle blank to eliminate costly polishing operations. A trip is scheduled for Joe and Mike to visit the vendor and discuss the above mentioned topics the week of March 02, 1990.

(03/06/90) On 02/26/90 I traveled to Vestshell Vermont, the bolt handle supplier, to discuss our M/700 bolt handle geometry and finish. I presented a redesign of the bolt handle to Vestshell for their evaluation. The redesign was approved by their engineering staff and is expected to alleviate the stress cracking condition. The vendor estimated that it would require four weeks to alter an existing die to produce sample parts. The vendor is going to supply two hundred bolt handles by 04/06/90, produced to the altered design for our evaluation. The sample should determine if the redesign will alleviate the stress cracking condition, and whether the redesign is visually acceptable. If the redesign is acceptable, the die used for producing the current bolt handles will be altered.

(03/29/90) The vendor has finished the alteration of the die to produce bolt handles to the new geometry. The sample lot of bolt handles is expected by 04/16/90. To improve the finish of the gate area on the incoming bolt handles, the vendor is going to experiment with a finer grit grinding wheel to remove the excess gate. This will reduce the amount of buffing required to produce an acceptable finish. Samples from the new grinding wheel are expected by 04/18/90.

(04/25/90) Due to complications, the vendor will not be shipping the sample bolt handles until 04/27/90.



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PROJECT: NEW CASTING DRAWINGS FOR W/700 BEL LONG AND SHORT TRIGGER GUNNERS AND FLOOR PLATES.
ENGINEER: WZAD

DESCRIPTION: DEVELOP DRAWINGS FOR THE W/700 BEL LONG AND SHORT TRIGGER GUNNERS AND FLOOR PLATES. FOR CASTING AND MACHINE LEVEL.

CAP:

OFFER:

UPON: 04/25/90

KEY MARKS
CV HOTEL

REVISE AND CORRECT
DRAWING APPROVAL

W/700 BEL LONG

W/700 BEL SHORT

RELEASE TO VENDORS

FINAL TRANSMITTAL

CLOSE PROJECT

SCHEDULED		ACTUAL	
START	COMPL	START	COMPL
03/06/89	04/31/89	07/25/89	
04/31/89	06/15/89	08/20/89	
05/30/89	06/20/89	09/20/89	
06/16/89	06/23/89	09/25/89	
06/16/89	09/28/89	01/05/90	
06/23/89	06/26/89	09/26/89	
06/26/89	12/20/89	03/01/90	
07/01/89	07/07/89	03/05/90	

RELEASED UNDER EXP PRINT NUMBER.

WILL RELEASE NEW DRAWINGS UNDER OLD PART NUMBERS. AFTER DIE APPROVAL.

COMMENTS: THE TRIGGER GUNNERS AND FLOOR PLATES ARE IN TAP CURRENTLY, IF NO PROBLEMS ARE FOUND, THE DRAWINGS WILL BE TRANSMITTED UNDER THE OLD NUMBERS BY 05/15/90.

PROJECT: DIE CAST TOOLING FOR M/700 BEL LONG AND SHORT TRIGGER GUARDS AND FLOOR PLATES.

ENGINEER: HEAD

DESCRIPTION: DESIGN AND BUILD ALUMINUM DIE CAST TOOLING TO BE USED BY TOOL PRODUCTS INC. TO CAST THE M/700 BEL LONG AND SHORT TRIGGER GUARDS AND FLOOR PLATES. 3 BR. I.R.R. IN EXCESS OF 50K.

CAP:

OFFER:

WORKING: 06/25/90

KEY EVENTS	SCHEDULED	ACTUAL	STATUS
QUOTE VENDOR	03/12/89	05/25/89	05/10/89
DEVELOP DIMENSIONS	06/01/89	06/10/89	05/15/89
WRITE DRAFT	06/10/89	06/15/89	06/10/89
RELEASE PURCHASE ORDER	07/12/89	07/13/89	07/10/89
MURPHY IN-HOUSE TOOLING	07/12/89	10/20/89	
WRITE PROCESS	10/20/89	12/15/89	
RUN FIRST ARTICLE	11/27/89	12/15/89	
RELEASE DIE FOR PRODUCTION	12/16/89	12/22/89	03/01/90
RUN TAP	12/22/89	01/03/90	
RELEASE TO PRODUCTION	01/05/90	01/15/90	
CLOSE PROJECT	01/25/90	01/30/90	

PROJECT APPROVAL RECEIVED 4/3/90 P.O.'S AND V.O. HAVE BEEN SUBMITTED.

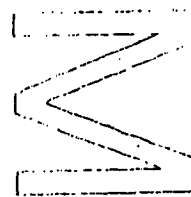
LONG FLOOR PLATES ARE APPROVED. LONG ACTION GUARD IS IN T&P.

LONG FLOOR PLATE APPROVED FOR PRODUCTION.

RUNNING A SMALL TRIAL AND PILOT FOR RED TEST.

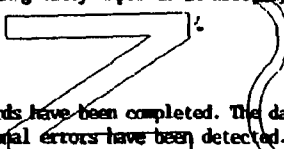
FLOOR PLATES RELEASED TO PRODUCTION ON 04/05/90.

COMMENTS: DIE CAST TOOLING FOR M/700 BEL LONG FLOOR PLATE HAS BEEN APPROVED. FIXTURES HAVE BEEN MODIFIED, AND THE PARTS ARE BEING RUN IN PRODUCTION. MOLD TRY, AND FIRST ARTICLE INSPECTION, FOR THE M/700 BEL LONG TRIGGER GUARD IS COMPLETE, A SMALL TRIAL AND PILOT LOT IS BEING PROCESSED PRIOR TO DIE APPROVAL. PARTS WILL BE TESTED IN-R&D.



N/700 LONG FLOOR PLATE FIXTURE REDSIGN AND PROCESS REVISION: HEAD / CHOOTINI

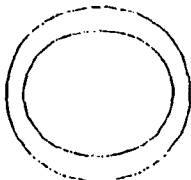
A T&P lot of N/700 long Floor Plates have been machined and assembled utilizing the new fixture modifications. The new Long Floor Plate castings have been released to production. One of the gages is in the Tool Room for modification, in the interim we are controlling length with dial calipers. Yields have been greatly improved at Assembly due to the new Floor Plate.



N/700 LONG TRIGGER GUARD: HEAD

First Article inspection of the N/700 long Trigger Guards have been completed. The data that we generated is being compared to the measurements taken by Tool Products. No major dimensional errors have been detected. The initial measurement sample of 8 parts is being processed so that functional testing can be completed prior to die approval. Trigger Guard Assemblies with the new castings, reduced polish, and powder coat, will be ready for testing by 04/30/90. A modification to the drill jig for the take down holes in the Trigger Guard is in design now. Still anticipate full production release by the end of the second quarter.

Two weeks of this month were spent on vacation.



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TECHNICAL SUPPORT TO OPERATIONS (continued)

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- o Repetitive Trauma: (DICK STAFFORD)
M/700 "Assemble Receiver to Barrel", Dick issued a TDR to replace the Impact Wrench with an Air Cylinder on 2/19/90.

On 3/9/90 Tool Design completed the TDR. One Casting with an Air Cylinder has been done by the Tool Room. A Work Order has been issued to the Machine Shop to hook up the Circuit.

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- o M/700 Receiver Blank: (DICK STAFFORD, GARY CIOCH)
On 3/29/90 Issued Work Orders to Tool Room to make Length Gages .010 longer at Cenomatic. The purpose is to allow Material in the C'bore and Face Operation in the Receiver Process.

On 4/24/90 the Length Gages were completed by the Tool Room and back on the Job. The Process Record have been changes have been completed.