

A

REMINGTON ARMS CO.
RECEIVED

MAR 16 1982

225 E. Edgewood Dr. Apt. 98
Lakeland, Florida 33803
Mar. 12, 1982

Mr. Clark Workman FIREARMS RESEARCH DIVISION
Remington Arms Co.
Illion, N. Y.

Dear Clark:

Jim was here today and we went over the bolt actions from A to 2.

These are some of the things I propose:

1. Please don't bring out a new bolt action, without a fool proof safety which is capable of locking the bolt. Make it at least as good as the present M70, better if possible.

2. Suggest you push for a complete line of bolt action rifles that cover the price gamut from lowest to highest. I feel the Carbine should be as simple and plain as you can make it with a price to match.

3. Forget pressed checkering!

4. I feel the idea of a hex cross section for a new receiver will increase cost. I also feel that indexing barrels and receivers will also increase cost. Since I feel that present volume is low because of price structure, increasing cost is a no no!

5. I didn't mention this to Jim, but we should make a large effort to capitalize on the fact that the benchrest shooters think our present 700 - 600 - XP100 - 40X actions are the most accurate production actions available and use them when they can get them for bench rest competition.

6. I am personally not in favor of the "as hammered" finish on barrels.

7. I do not think that Ruger is making more than 50,000 rifles per year. Anyone who says he is, is trying to mislead you.

8. The .243 has cost Win. and Sav. some fairly costly law suits due to its tendency to wear barrels quickly and cause high pressures due to excessive fouling. We have not had this problem because we use 6 MM barrel interiors for the .243, plus the fact that 700s do not come apart due to high pressure. To let the 6 MM die by taking it out of production in 700 is asinine. It's a better cartridge all the way than the .243 and we should make an effort to tell the customers. Letting the customers tell us in this instance, could get us into trouble.

PLAINTIFF'S
EXHIBIT
3316

AL 0029957

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9. We obviously have some production or design problems with M/700 magazine feed. We need to get busy on this. Magazines too narrow or receiver openings too wide can cause the problem you are experiencing.

10. Jim mentioned that some one is pushing for a Mauser type extractor. Do they understand that the rifle will come apart same as the present competition with excessive pressure if we go to any extractor which breaks the bolt shroud?

11. Has anyone tried a floating wedge in the front of the present 700 trigger as an additional element to the safety? It would be operated and governed in position by a relatively long slot in the present safety arm on the exterior of the housing. The wedging action would hold it in position until the very last movement of the safety to the "off" position. It might be pushed to the "on" position by a light spring or by the final movement of the safety arm to the "on" position.

If I think of anything more I will call.

Sincerely,

M. H. Walker
M. H. Walker

272
AL 0029958

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington

REMINGTON

Pettus

PETTUS

Distribution: C.B. Workman
C.E. Ritchie

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

RESEARCH TEST and MEASUREMENT REPORT - Report No. 82 0331

Lubricant Evaluation: M700 Cock and Fire Simulation

Prepared by: Fred Supry

Date Prepared: 3-22-82

Processed and Cleared By:

J.H. Hennings, / R.E. Nightingale,
Foreman-Test Lab / Foreman-Measurement Lab

James H. Hennings 4-14-82
Signature Date

C.E. Ritchie,
Sr. Supervisor - Testing,
Mees. & Mech. Analysis Lab

C. E. Ritchie 4-14-82
Signature Date

TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 82 0331
REPORT TITLE: Lubricant Evaluation: M700 Cock and Fire Simulation
MODEL(S): 700
GAUGE OR CALIBER: 30.06
DATE: 3-22-82
WORK ORDER NO.: C-1803-000
PART NAME:
DESIGNER/ENGINEER:

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST - NO. OF GUNS TESTED _____
3. FUNCTION TEST - NO. OF GUNS TESTED _____
4. ACCURACY TEST - NO. OF GUNS TESTED _____
5. MEASUREMENTS - TYPE: Static
6. ENVIRONMENTAL TEST
7. AMMUNITION TESTING & EVALUATION - TYPE: _____
8. VISUAL EVALUATION - _____ OUT OF _____ GUN SAMPLE
9. ENDURANCE - NO. OF GUNS TESTED: _____
NO. OF ROUNDS PER GUN: _____
TOTAL ROUNDS FIRED IN TEST: _____
AMMO TYPE: MAGS. _____; TARGET: _____
RIM FIRE _____ CENTER FIRE _____
10. DRY CYCLE - NO. OF SAMPLES TESTED 5 - each lubricant
MAX. NO. OF CYCLES 25000

REMINGTON ARMS COMPANY, INC.
Firearms Research Division

April 13, 1982

TO: J.H. Hennings

FROM: F.L. Supry

REPORT TITLE: Evaluation of Lubricants on Firearms M700 Cock and Fire Simulation

ABSTRACT

C.E. Ritchie requested that the Test Lab conduct a cock and fire evaluation on five spray lubricants.

1. Du Pont - Synthetic Diester
2. Krylon - Ten - 4
3. Sprayon - 711
4. CRC - 3-36
5. Houghton - HLP

These five lubricants were selected for evaluation from the results of a preliminary evaluation conducted by A.B. Hughes, Senior Consultant, ESD Maintenance Engineering Group, Du Pont. A copy of his evaluation for each of the five lubricants is located in Appendix "C".

Engineering Dept.

SCOPE OF TEST

To compare the five lubricants in a Model 700 cock and fire simulation test.

TEST RESULTS

In their order of finish, from the best performing lubricant to the poorest performing lubricant, the following results were obtained.

<u>LUBRICANT</u>	<u>AVERAGE CYCLE LIFE (5 Samples)</u>
1. Du Pont - Synthetic Diester	21,181 cys.
2. Sprayon - 711	17,646 cys.
3. CRC - 3-36	14,382 cys.
4. Houghton - HLP	8,333 cys.
5. Krylon - Ten-4	2,830 cys.

REPORT TEXT

- A. Trigger pull, sear lift, sear engagement, safe on, safe off, and bolt lift measurements were taken on each test vehicle at the start of the test, and at 5000 cycle intervals. Remington specifications for the M700 components used are:

• Trigger Pull	3½ lbs. — 6¼ lbs.
• Sear Lift	.005" — .018"
• Sear Engagement	.015" — .020"
• Safe "On" — "Off"	None Established
• Bolt Lift	None Established

Refer to Appendix "A", data sheets No. 1 through No. 5, for individual results.

The Rc hardness was measured, at the cocking cam area, on each M700 bolt. Remington specifications Rc 37-46.

Refer to Appendix "A", data sheet No. 6, for individual hardness, lubricant used, simulator used and cycles completed.

A graphical analysis comparing the lubricants tested to their cycle life, and their cycle life to the simulator used is found in Appendix "B".

TEST PROCEDURE

A. Measurements

1. Trigger Pull
Trigger Pull measurements were conducted using a Chatillon Model IN-10 pull scale.
2. Sear Lift and Sear Engagement
Sear lift and sear engagement measurements were conducted using a Model FC-14 optical comparator and measuring machine.
3. Safe "ON" and "OFF" Forces.
Safe On and Off forces were taken using a Chatillon Model DPP-25, push-pull scale.
4. Bolt Lift
Bolt lift forces, both cocked and fired, were taken utilizing a Chatillon Model 80D pull scale mounted on a machine designed to be used for bolt lift measurements.
5. Rc Hardness
The Rc hardness measurements were taken by George Catta, a production inspector, utilizing a Wilson Rockwell Hardness Tester.

B. Lubrication - (Pictorial presentation - Appendix "D")

1. Lubrication Points

- a. Receiver: Locking lug area.
Track on receiver tang.
- b. Bolt: Cocking cam
Locking lugs
- c. Firing Pin: Threads
Striker radius and track.
- d. Trigger Assembly: Sear safety cam face.
Interior of trigger assembly, through sear inspection hole.

2. Lubrication procedure

- a. Components to be lubricated were completely degreased, using the solvent degreasing tanks located in our Heat Treat Department.
- b. The interior of the trigger assembly was lubricated by holding the spray can to direct the spray into the sear inspection hole. Duration of spray approximately 1 second.

NOTE: The two position nozzle on Du Pont aerosol can was more difficult to control for pin point application, than the standard plastic tubes on the other samples. (Pictorial example included.)

2. Lubrication Procedure - continued

- c. All other lubrication points were lubricated by holding the aerosol can approximately six inches away from the area to be lubricated and covering the area until a thin layer of lubricant forms on the surface. Duration of spray; approximately 1 second.

C. Pictorial Presentation

- 1. Lubrication points and procedures.
- 2. Cocking cam, sear face, and striker radius and track areas were photographed at the start and completion of the test and are available on request.

APPENDIX A

(Data Sheets)

FIRST SAMPLE OF EACH LUBRICANT

		1	2	3	4	5	6
		TRIGGER	SEAR	SEAR	SAFE	SAFE	BOLT + LIFT
		PULL	LIFT	ENGAGEMENT	ON	OFF	LOCKED
REM	SPECS	3 1/2 - 6 1/2 lbs	.005" - .008"	.015" - .020"	(lbs)	(lbs)	(lbs)
1	1 - DUPONT	(AVG OF 3)			(AVG OF 3)	(AVG OF 3)	(AVG OF 3)
2	2 - 711						
3	3 - CRC						
4	4 - HLP						
5	5 - Ten 4						
6	1	6.25	.005	.020	7.5	6.50	3.00
7	2	6.50	.006	.015	6.75	4.25	2.00
8	cycles 3	5.50	.005	.016	5.25	4.25	3.00
9	4	6.00	.008	.017	7.00	5.75	3.00
10	5	6.50	.008	.016	6.75	4.50	4.50
11	1	6.00	.0055	.020	5.50	4.00	2.50
12	5000 2	6.00	.0065	.0175	6.00	5.50	2.50
13	cycles 3	6.00	.006	.020	6.00	4.50	2.00
14	4	5.75	.010	.017	7.50	5.00	3.00
15	* 5	6.50	.010	.020	7.25	5.50	5.00
16	1	5.75	.008	.020	5.75	4.0	2.25
17	10,000 * 2	5.75	.008	.018	5.25	3.75	2.50
18	cycles 3	5.25	.008	.022	4.50	3.75	2.0
19	4	6.25	.0095	.019	7.25	4.75	3.0
20	5	—	—	—	—	—	—
21	1	6.00	.009	.0205	6.00	4.00	2.00
22	15,000 2	—	—	—	—	—	—
23	cycles 3	5.50	.009	.024	5.00	5.50	2.00
24	* 4	6.00	.0105	.019	6.50	4.50	3.00
25	5	—	—	—	—	—	—
26	* 1	6.00	.0095	.021	6.00	4.00	2.00
27	20,000 2	—	—	—	—	—	—
28	cycles * 3	5.50	.0105	.027	4.50	4.00	2.00
29	4	—	—	—	—	—	—
30	5	—	—	—	—	—	—
31	1	—	—	—	—	—	—
32	25,000 2	—	—	—	—	—	—
33	cycles 3	—	—	—	—	—	—
34	4	—	—	—	—	—	—
35	5	—	—	—	—	—	—
36	* 1	FAILED	15,594	cycles			
37	* 2	FAILED	6,226	cycles			
38	* 3	FAILED	16,359	cycles			
39	* 4	FAILED	10,400	cycles			
40	* 5	FAILED	1990	cycles			
							DATA SHEET 1

LUBRICANT EVALUATION

3-8-82

SECOND SAMPLE OF EACH LUBRICANT

		1	2	3	4	5	6
		TRIGGER	SEAR	SEAR	SAFE	SAFE	BOLT - LIFT
		PULL	LIFT	ENGAGEMENT	ON	OFF	COCKED
		3 1/2 - 6 1/2 lbs	.005" - .018"	.015" - .020"	(1bs)	(1bs)	(1bs)
	REM SPERS	(AVG. OF 3)			(AVG. OF 3)	(AVG. OF 3)	(AVG. OF 3)
1	1 DULPONT						
2	2 711						
3	3 CRG						
4	4 HLP						
5	5 TEN 4						
6	1	6.00	.009	.0185	6.00	4.50	4.00
7	2	5.00	.006	.018	7.50	4.75	3.00
8	3	6.00	.012	.012	7.00	4.50	3.00
9	4	6.75	.0095	.016	7.50	6.75	2.50
10	5	5.50	.008	.016	7.50	5.50	3.50
11	5000	5.25	.0095	.0215	6.00	4.50	3.50
12	cycles	2	5.00	.0065	.019	5.75	4.00
13	3	5.75	.013	.020	5.00	4.00	3.00
14	4	6.25	.0095	.020	6.75	6.25	2.50
15	* 5	5.00	.009	.020	5.75	4.00	3.50
16	10,000	5.50	.011	.025	5.75	4.25	3.50
17	cycles	2	4.75	.0065	.019	5.25	4.00
18	* 3	6.00	.013	.023	6.25	3.75	3.00
19	* 4	6.00	.0095	.021	6.50	5.75	3.00
20	5	—	—	—	—	—	—
21	15,000	5.50	.011	.026	5.50	4.25	4.00
22	cycles	2	4.75	.0075	.019	5.00	4.00
23	3	—	—	—	—	—	—
24	4	—	—	—	—	—	—
25	5	—	—	—	—	—	—
26	20,000	5.50	.011	.0265	5.50	4.00	4.00
27	cycles	2	4.75	.009	.019	5.25	4.50
28	3	—	—	—	—	—	—
29	4	—	—	—	—	—	—
30	5	—	—	—	—	—	—
31	25,000	5.25	.011	.0285	5.50	3.75	4.00
32	cycles	* 2	4.50	.0095	.021	5.25	4.00
33	3	—	—	—	—	—	—
34	4	—	—	—	—	—	—
35	5	—	—	—	—	—	—
36	* 1	COMPLETED	25,000	cycles			
37	* 2	COMPLETED	25,000	cycles			
38	* 3	FAILED	8317	cycles			
39	* 4	FAILED	6115	cycles			
40	* 5	FAILED	2788	cycles			

DATA SHEET 2

		1	2	3	4	5	6
		TRIGGER	SEAR	REAR	SAFE	SAFE	BOLT - LIST
		PULL	LIFT	ENGAGEMENT	ON	OFF	COCKED FIRED
		94-641b	.005-.018"	.015-.020"	(lbs)	(lbs)	(lbs) (lbs)
1	1	DUFONT	(AVG OF 3)		(AVG OF 3)	(AVG OF 3)	(AVG OF 3)
2	2	T11					
3	3	CRC					
4	4	HLP					
5	5	TEN 4					
6	1	5.75	.007	.015	7.25	4.50	2.50 6.50
7	2	6.00	.008	.015	7.50	7.50	2.50 8.25
8	3	6.25	.008	.017	6.75	5.50	3.00 7.00
9	4	5.75	.0125	.0195	8.00	5.50	3.00 7.00
10	5	5.50	.008	.015	8.00	5.00	2.50 6.00
11	5000	1	6.25	.009	.019	6.50	4.25 2.00 6.00
12	cycles	2	5.25	.009	.021	5.25	7.50 3.50 6.50
13	3	6.25	.0105	.0175	7.25	4.00	3.00 9.00
14	4	5.75	.0125	.021	7.00	5.00	3.00 10.00
15	*5	5.50	.013	.021	6.00	3.75	2.50 18.00
16	10000	1	6.00	.010	.020	6.00	3.75 2.00 5.50
17	cycles	2	5.25	.009	.021	7.00	6.00 3.50 7.00
18	3	6.00	.015	.0195	6.75	4.75	3.00 10.00
19	*4	5.75	.0125	.0225	6.50	4.50	3.50 51.00
20	5	—	—	—	—	—	—
21	15000	1	5.25	.0115	.020	5.75	4.00 2.00 6.50
22	cycles	*2	5.50	.0095	.022	6.50	5.50 4.00 14.00
23	*3	6.50	.015	.0195	6.75	4.00	3.00 15.00
24	4	—	—	—	—	—	—
25	5	—	—	—	—	—	—
26	20000	1	5.75	.0115	.020	6.00	4.00 2.00 6.00
27	cycles	2	—	—	—	—	—
28	3	—	—	—	—	—	—
29	4	—	—	—	—	—	—
30	5	—	—	—	—	—	—
31	25000	*1	6.00	.0115	.021	6.25	3.75 2.00 12.00
32	cycles	2	—	—	—	—	—
33	3	—	—	—	—	—	—
34	4	—	—	—	—	—	—
35	5	—	—	—	—	—	—
36	*1	COMPLETED	25,000	cycles			
37	*2	FAILED	15,140	cycles			
38	*3	FAILED	10,140	cycles			
39	*4	FAILED	6,788	cycles			
40	*5	FAILED	2,484	cycles			

DATA SHEET 3

LUBRICANT EVALUATION

3-8-92

FOURTH SAMPLE OF EACH LUBRICANT

		TRIGGER	SEAR		SAFE		BOLT - LIFT	
			PULL	ENGAGEMENT	ON	OFF	SAVED	Fixed
			34-6 1/2 lbs	.005" - .018"	.05" - .020"	(lbs)	(lbs)	(lbs)
	1	DUPOINT (AVG. OF 3)			(AVG. OF 3)	(AVG. OF 3)	(AVG. OF 3)	(AVG. OF 3)
	2	711						
	3	CRC						
	4	HLP						
	5	TEN 4						
	1	6.50	.0095	.019	6.75	4.25	4.00	8.00
	2	6.50	.008	.019	8.50	5.25	3.50	7.00
	3	5.50	.008	.016	7.25	4.75	3.00	9.00
	4	5.75	.009	.019	8.25	5.50	4.00	7.50
	5	5.50	.005	.017	9.00	6.75	3.00	7.50
	1	6.25	.010	.023	6.25	3.25	3.00	8.00
	2	6.00	.011	.020	7.50	4.25	3.50	7.00
	3	5.50	.0085	.021	7.00	4.50	3.00	8.00
	4	6.00	.010	.019	7.25	5.00	4.00	10.00
	* 5	5.75	.010	.0185	7.00	4.75	3.00	16.00
	1	5.75	.010	.023	5.75	3.50	4.00	8.00
	2	6.00	.012	.022	7.00	4.00	3.00	8.00
	3	5.50	.0085	.021	6.50	4.25	3.00	8.00
	* 4	6.00	.010	.021	7.00	5.25	4.00	29.00
	5	—	—	—	—	—	—	—
	1	6.25	.0105	.024	5.25	3.00	3.50	9.00
	2	6.25	.013	.0225	7.50	4.00	3.50	9.00
	* 3	5.50	.0105	.0215	6.75	4.50	3.25	22.00
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
	* 1	5.75	.0115	.026	5.75	3.00	3.00	24.00
	* 2	5.75	.0135	.024	6.50	4.00	4.00	24.00
	3	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
	1	—	—	—	—	—	—	—
	2	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
	* 1	FAILED	19,520 cycles					
	* 2	FAILED	16,865 cycles					
	* 3	FAILED	11,800 cycles					
	* 4	FAILED	8,576 cycles					
	* 5	FAILED	3,667 cycles					

DATA SHEET 4

M700 LOCK & FIRE SIMULATION

F.L.S.

LUBRICANT EVALUATION

3-9-82

FIFTH SAMPLE OF EACH LUBRICANT

		1	2	3	4	5	6
		TRIGGER	SEAR	SEAR	SAFE	SAFE	BOLT - LIFT
		PULL	LIFT	ENGAGEMENT	ON	OFF	COCKED FIRED
		3 1/2 - 6 1/2 lbs	.005" - .018"	.015" - .020"	(lbs)	(lbs)	(lbs) (lbs)
1	1 DuPont	(AVG OF 3)			(AVG OF 3)	(AVG OF 3)	(AVG OF 3) (AVG OF 3)
2	2 711						
3	3 CRC						
4	4 HLP						
5	5 TEN 4						
6	1	6.00	.0095	.0117	7.00	4.75	2.00 7.00
7	2	5.75	.0085	.0155	6.75	5.00	3.50 7.00
8	3 cycles	5.75	.0105	.0215	6.50	5.00	3.00 9.00
9	4	6.25	.012	.016	7.00	4.50	3.00 8.00
10	5	6.25	.008	.018	7.25	3.50	3.00 6.50
11	5000	5.50	.0110	.0205	7.50	4.50	2.50 7.00
12	cycles	6.00	.0085	.016	5.75	4.00	4.00 8.00
13	3	5.75	.0105	.0215	5.50	4.25	3.00 8.00
14	4	6.25	.013	.019	6.50	4.25	4.00 7.50
15	*5	6.25	.010	.020	5.75	4.00	3.50 18.00
16	10000	5.25	.010	.0211	7.50	4.00	3.00 8.00
17	cycles	5.50	.010	.018	5.75	3.75	4.00 7.50
18	3	5.75	.0105	.0215	5.50	4.25	3.00 7.50
19	*4	6.25	.0135	.025	7.25	3.75	4.00 27.00
20	5	-	-	-	-	-	-
21	15000	5.50	.0105	.021	6.50	4.00	3.00 8.00
22	cycles	5.75	.010	.018	5.75	4.00	3.50 7.50
23	3	6.00	.0105	.0215	5.50	4.50	3.00 7.00
24	4	-	-	-	-	-	-
25	5	-	-	-	-	-	-
26	20000	5.50	.0105	.021	7.00	3.75	3.50 14.00
27	cycles	6.25	.010	.019	5.50	4.00	3.50 9.00
28	3	5.75	.0105	.022	5.50	4.25	3.00 11.00
29	4	-	-	-	-	-	-
30	5	-	-	-	-	-	-
31	25000	*1 5.00	.0111	.022	7.00	4.00	3.00 28.00
32	cycles	*2 5.75	.011	.020	5.75	3.75	4.00 12.00
33		*3 6.25	.0115	.023	5.25	4.00	4.00 15.00
34	4	-	-	-	-	-	-
35	5	-	-	-	-	-	-
36	*1	FAILED	20790	cycles			
37	*2	COMPLETED	25000	cycles			
38	*3	COMPLETED	25000	cycles			
39	*4	FAILED	9797	cycles			
40	*5	FAILED	3226	cycles			DATA SHEET 5

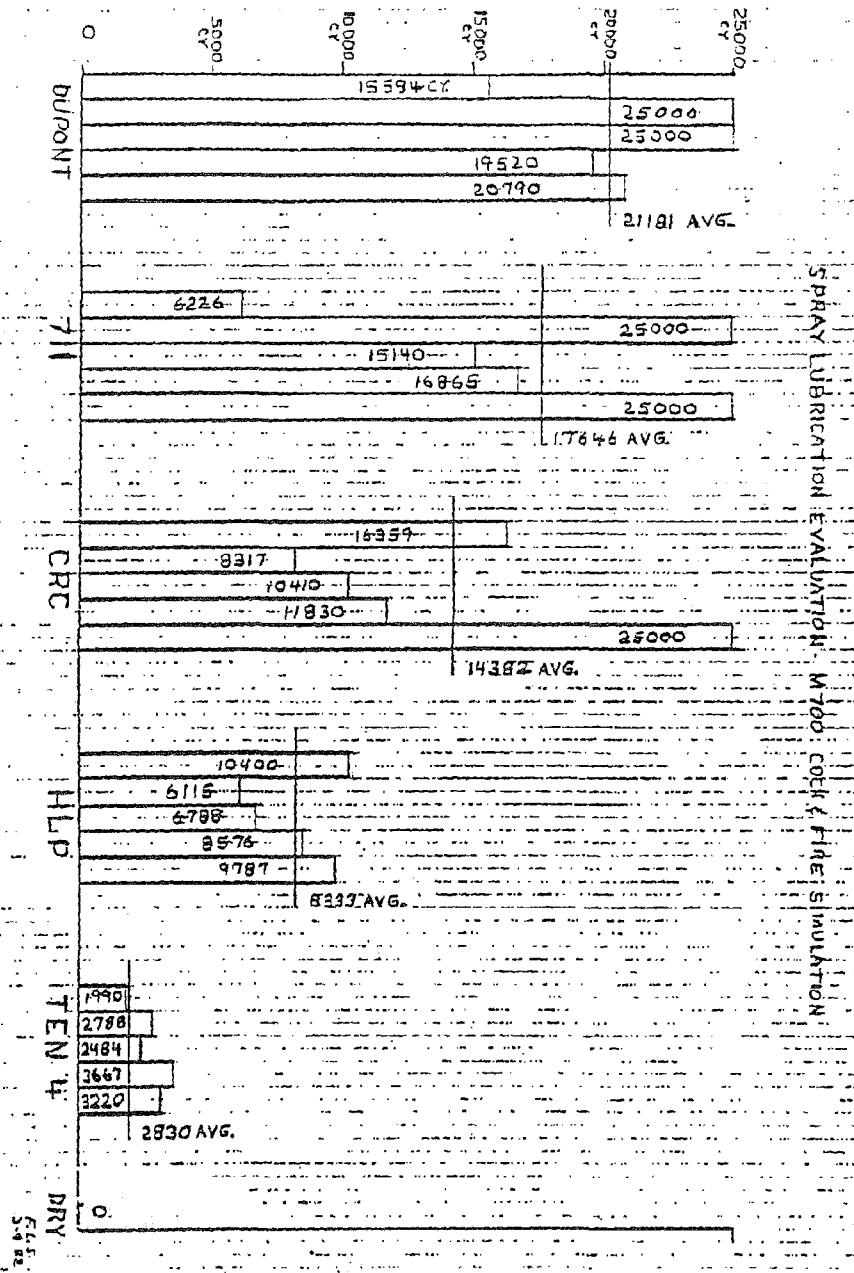
LUBRICANT EVALUATION

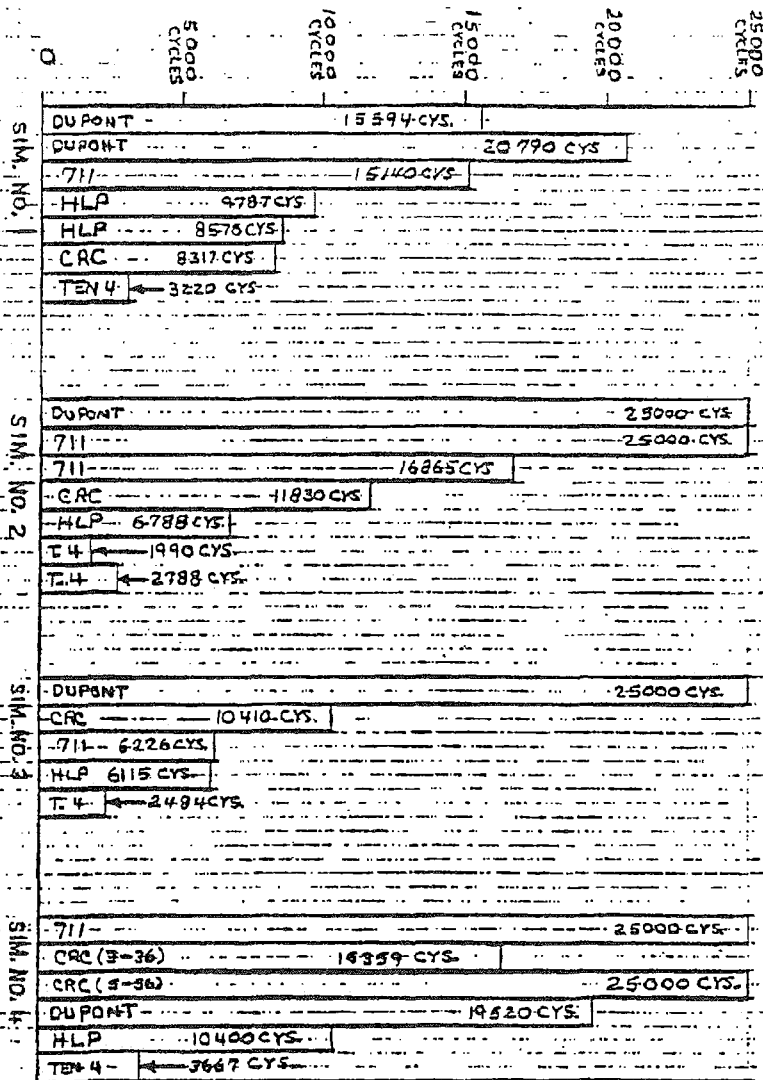
3-10-92

Rc HARDNESS: M700 BOLT COCKING CAM AREA

1	2	3	4	5	6
REM. SPEC.	Rc	LUBRICANT	SIMULATOR	CYCLES	
Rc 37-46	HARDNESS	USED	USED	COMPLETED	
+ BOLT NO. +					
1					
2					
3	C1	39	DUPONT	1	15 594
4	C9	40	DUPONT	3	25 000
5	C12	40	DUPONT	2	25 000
6	C19	38	DUPONT	4	19 5120
7	C20	37	DUPONT	1	20 790
8					
9					
10	C3	38	711	3	6 226
11	C7	39	711	2	25 000
12	C16	39	711	1	15 140
13	C27	38	711	2	16 865
14	C29	39	711	4	25 000
15					
16					
17	C4	39	CRC 3-36	4	16 359
18	C10	39	CRC 3-36	1	8 317
19	C17	40	CRC 3-36	3	10 410
20	C21	39	CRC 3-36	2	11 830
21	C25	39	CRC 5-56	4	25 000
22					
23					
24	C11	39	HLP	4	10 400
25	C18	39	HLP	3	6 115
26	C24	39	HLP	2	6 788
27	C26	39	HLP	1	8 576
28	C28	38	HLP	1	9 787
29					
30					
31	C2	38	TEN-4	2	1 990
32	C5	38	TEN-4	2	2 788
33	C6	39	TEN-4	3	2 484
34	C8	38	TEN-4	4	3 667
35	C13	39	TEN-4	1	3 220
36					
37					
38	C22	39	DRY		0
39					
40					DATA SHEET 6

APPENDIX B
(Graphic Presentation)





SPRAY LUBRICATION EVALUATION - 4700 COCK/ FINE SIMULATION

5-9-88

APPENDIX C

(Previous Evaluation)

Test # 20

Product: Du Pont - Synthetic Diester - 20%

Function: Multipurpose, prevents rust
Displaces moisture, dirt and lubricates

Evaluation Notes

1. Odor: Synthetic chemical oily smell, not lasting
2. Feel: Light oily feel
3. Drying Rate: Slow drying
4. Penetration: Rapid penetration and spreading, clear color
5. Surface Wetting: Local wetting, removes oxidation, good cleanup
6. Grease Displacement: Rapid spreading, no dissolving, good cleanup
7. Type Container: 4 oz aerosol, nozzle with straw
8. Liquid Appearance: Watery, light tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Wet look, no rust within 24 hours
11. Rust Removal: Most rust removed
12. Displace Moisture: Excellent
13. Displace Solids: Excellent
14. Gun Barrel: Excellent
15. Wood Stock: Excellent
16. Rust Prevention:
 - Test 1 - 7
 - Test 2 - 7
 - Avg - 7.0
17. Reason for Elimination: Continue testing

Test # 14

Product: Soravon #711 Penetrant/Lube/Demoisturize

Function: Multipurpose, prevents rust
Displaces moisture and lubricates

Evaluation Notes

1. Odor: Strong fly spray, lasting
2. Feel: Very oily feel
3. Drying Rate: Medium drying rate
4. Penetration: Slow spreading, but continuous, clear color
5. Surface Wetting: Minimum spreading, removes oxidation, bright
6. Grease Displacement: Rapid spread, no dissolving, good cleanup
7. Type Container: 12 oz aerosol, nozzle with straw
8. Liquid Appearance: Very watery, light tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Oily look, no rust within 24 hours
11. Rust Removal: Some rust removed
12. Displace Moisture: Excellent
13. Displace Solids: Good
14. Gun Barrel: Excellent
15. Wood Stock: Excellent
16. Rust Prevention:
 - Test 1 - 6
 - Test 2 - 5
 - Avg - 5.5
17. Reason for Elimination: Continue testing

Test # 15

Product: CRC - 3-36

Function: Multipurpose, prevents rust
Displaces moisture and lubricates

Evaluation Notes

1. Odor: Pleasant peppermint smell, lasting
2. Feel: Light oily feel
3. Drying Rate: Medium drying rate
4. Penetration: Medium penetrating and spreading, tan color
5. Surface Wetting: Slow spread, removes oxidation, good cleanup
6. Grease Displacement: Rapid spreading, some dissolving, easy cleanup
7. Type Container: 1 oz aerosol, nozzle
8. Liquid Appearance: Watery, light tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Oily look, no rust within 24 hours
11. Rust Removal: Some rust removed
12. Displace Moisture: Excellent
13. Displace Solids: Good
14. Gun Barrel: Excellent
15. Wood Stock: Excellent
16. Rust Prevention:
 - Test 1 - 4
 - Test 2 - 5
 - Avg - 4.5
17. Reason for Elimination: Continue testing

Test # 11

Product: E. F. Houghton - ELP All Purpose

Function: Multipurpose, prevents rust
Displaces moisture, dirt and lubricates.

Evaluation Notes

1. Odor: Fly spray smell, not lasting
2. Feel: Oily feel
3. Drying Rate: Rapid drying
4. Penetration: Rapid spreading, med. spreading, tan stain
5. Surface Wetting: Slow spreading, rapid dry to oily film, hard to clean
6. Grease Displacement: Rapid spread, no dissolving, good cleanup
7. Type Container: 12 oz aerosol, nozzle with straw
8. Liquid Appearance: Waxy, dark tan
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Oil look, no rust within 24 hours
11. Rust Removal: No rust removal
12. Displace Moisture: Poor
13. Displace Solids: Fair
14. Gun Barrel: Good
15. Wood Stock: Good
16. Rust Prevention:
 - Test 1 - 8
 - Test 2 - 5
 - Avg - 6.5
17. Reason for Elimination: Continue testing

Test # 13

Product: Krylon - Tan 4

Function: Multipurpose, prevents rust
Displaces moisture, gums, dirt and lubricates

Evaluation Notes

1. Odor: Strong fly spray, lasting
2. Feel: Light oily feel
3. Drying Rate: Medium drying rate
4. Penetration: Rapid absorption and spreading, dark tan stain
5. Surface Wetting: Slow spreading, oily appearance, good cleanup
6. Grease Displacement: Rapid spread, no dissolving, good cleanup
7. Type Container: 11 oz aerosol, nozzle with straw
8. Liquid Appearance: Dark tan, watery
9. Wood-Open Pore: Damp look, no damage
10. Metal Surface: Damp Look, no rust within 24 hours
11. Rust Removal: Most rust removed
12. Displace Moisture: Good
13. Displace Solids: Good
14. Gun Barrel: Good
15. Wood Stock: Good
16. Rust Prevention:
 - Test 1 - 8
 - Test 2 - 5
 - Avy - 6.5
17. Reason for Elimination: Continue testing

APPENDIX D

(Pictorial Presentation)

1. Lubrication procedures.
2. Individual components at the start and completion of test.
(Available upon request.)