

SALES
DEPARTMENT

Remington
Rem-O-Gram

Quick Facts About
REMINGTON
PRODUCTS

cc: Micky
Paul
Larry
Bill
Jim Caplan
3-29-82

cc: House Force

Bridgeport, Connecticut
March 22, 1982

TO THE FIELD FORCE

MODEL 700 "CLASSIC" - .375 H&H

RAMAC # 5848

There has been some confusion since an article appeared in the January 1982 American Rifleman, describing a prototype Model 700 made for the NRA. Remington was not consulted prior to publication. As a result, the article did not adequately cover the product or provide the correct order procedure.

There seems to be sufficient interest in this type of product to justify adding it to our line. Product specifications have been determined and estimated delivery information is now available.

The Model 700 "Classic" .375 H&H is a Custom Shop product that will be made on special order. They will not be inventoried in the Ilion warehouse.

The rifle is made up on the basic Model 700 Safari action with a smaller diameter barrel to reduce weight by approximately one pound. The stock is similar to the magnum "Classic" but has two internal steel reinforcement pins that are covered with inlaid rosewood caps. It has the solid magnum recoil pad.

In response to the American Rifleman article, we have received numerous inquiries from consumers, dealers, and distributors. We are in the process of answering these letters to advise them of the correct ordering procedure, pricing, and delivery. Details are as follow:

REMINGTON ARMS COMPANY, INC., BRIDGEPORT 2, CONN.

Form No. RD 451

Printed in U.S.A.

- Product - Model 700 "Classic" .375 H&H,
24" medium weight barrel, no
sights or sight holes.
- RAMAC - #5848
- Order Procedure - Orders accepted only from Remington
distributors. Order from Distribution
Services in Bridgeport, Connecticut.
- Pricing - Same as current Model 700 Safari:
Suggested Retail - \$719.95
Suggested Dealer - \$547.16
Distributor - \$445.94
- Delivery - Estimated six to nine months from
receipt of order.

E. J. Conroy

E. J. Conroy

WHF:b

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington
REMINGTON

PETERS
PETERS

W
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

Proofread 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,
Meas. & 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

R2512834

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. - 6½ 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.

A P P E N D I X A

(Data Sheets)

LUBRICANT EVALUATION

3-8-92

FIRST SAMPLE OF EACH LUBRICANT

		1	2	3	4	5	6	
		TRIGGER	SEAR	SEAR	SAFE	SAFE	BOLT + LIFT	
		PULL	LIFT	ENGAGEMENT	ON	OFF	LOCKED	FIRE
REM - SPECS		3 1/2 - 6 1/2 lbs	.005" - .008"	.015" - .020"	(lbs)	(lbs)	(lbs)	(lbs)
1 - DUPONT	(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		6.25	.005	.020	7.5	6.50	3.00	7.00
2		6.50	.006	.015	6.75	4.25	2.00	6.50
cycles	3	5.50	.005	.016	5.25	4.25	3.00	6.00
	4	6.00	.008	.017	7.00	5.75	3.00	6.50
	5	6.50	.008	.016	6.75	4.50	4.50	7.50
1		6.00	.0055	.020	5.50	4.00	2.50	6.50
5000	2	6.00	.0065	.0175	6.00	5.50	2.50	6.50
cycles	3	6.00	.006	.020	6.00	4.50	2.00	6.00
	4	5.75	.010	.017	7.50	5.00	3.00	7.25
	* 5	6.50	.010	.020	7.25	5.50	5.00	9.00
1		5.75	.008	.020	5.75	4.0	2.25	7.00
10,000	* 2	5.75	.008	.018	5.25	3.75	2.50	10.50
cycles	3	5.25	.008	.022	4.50	3.75	2.0	7.00
	4	6.25	.0095	.019	7.25	4.75	3.0	13.00
	5	—	—	—	—	—	—	—
1		6.00	.009	.0205	6.00	4.00	2.00	8.50
15,000	2	—	—	—	—	—	—	—
cycles	3	5.50	.009	.024	5.00	5.50	2.00	8.50
	* 4	6.00	.0105	.019	6.50	4.50	3.00	18.00
	5	—	—	—	—	—	—	—
	* 1	6.00	.0095	.021	6.00	4.00	2.00	8.00
20,000	2	—	—	—	—	—	—	—
cycles	* 3	5.50	.0105	.027	4.50	4.00	2.00	9.00
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
1		—	—	—	—	—	—	—
25,000	2	—	—	—	—	—	—	—
cycles	3	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
	* 1	FAILED	15.594	cycles				
	* 2	FAILED	6.226	cycles				
	* 3	FAILED	16.359	cycles				
	* 4	FAILED	10.400	cycles				
	* 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
REM	SPEC	3 1/2 - 6 1/2 lbs	.006" - .018"	.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	ARC					
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	* 1	5.25	.011	.0285	5.50	3.75
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	SEAR	SAFE	SAFE	BOLT - LIST
		PULL	LIFT	ENGAGEMENT	ON	OFF	COCKED FIRED
		94-62 lbs	.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 TII						
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	cycles 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 57.00
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	10,410	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

		1		2		3		4		5		6	
		TRIGGER		SEAR		SEAR		SAFE		SAFE		BOLT + LIFT	
		PULL		WFT		ENGAGEMENT		ON		OFF		locked	
		34 - 6 1/2 lbs		005" - .018"		015" - .020"		(lbs)		(lbs)		(lbs)	
1	1	DuPont	(AVG. OF 3)					(AVG. OF 3)	(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	6.50	.0095	.019	6.75	4.25	4.00	8.00				
7	0	2	6.50	.008	.019	8.50	5.25	3.50	7.00				
8	cycles	3	5.50	.008	.016	7.25	4.75	3.00	9.00				
9		4	5.75	.009	.019	8.25	5.50	4.00	7.50				
10		5	5.50	.005	.017	9.00	6.75	3.00	7.50				
11	5000	1	6.25	.019	.023	6.25	3.25	3.00	8.00				
12	cycles	2	6.00	.0111	.020	7.50	4.25	3.50	7.00				
13		3	5.50	.0085	.021	7.00	4.50	3.00	8.00				
14		4	6.00	.010	.019	7.25	5.00	4.00	10.00				
15	*	5	5.75	.010	.0185	7.00	4.75	3.00	16.00				
16	10000	1	5.75	.010	.023	5.75	3.50	4.00	8.00				
17	cycles	2	6.00	.012	.022	7.00	4.00	3.00	8.00				
18		3	5.50	.0095	.021	6.50	4.25	3.00	8.00				
19		* 4	6.00	.010	.021	7.00	5.25	4.00	29.00				
20		5	—	—	—	—	—	—	—				
21	15000	1	6.25	.0105	.024	5.25	3.00	3.50	9.00				
22	cycles	2	6.25	.013	.0225	7.50	4.00	3.50	9.00				
23		* 3	5.50	.0105	.0215	6.75	4.50	3.25	22.00				
24		4	—	—	—	—	—	—	—				
25		5	—	—	—	—	—	—	—				
26	20000	* 1	5.75	.0115	.026	5.75	3.00	3.00	24.00				
27	cycles	* 2	5.75	.0125	.024	6.50	4.00	4.00	24.00				
28		3	—	—	—	—	—	—	—				
29		4	—	—	—	—	—	—	—				
30		5	—	—	—	—	—	—	—				
31	25000	1	—	—	—	—	—	—	—				
32	cycles	2	—	—	—	—	—	—	—				
33		3	—	—	—	—	—	—	—				
34		4	—	—	—	—	—	—	—				
35		5	—	—	—	—	—	—	—				
36		* 1	FAILED		19520 cycles								
37		* 2	FAILED		16865 cycles								
38		* 3	FAILED		11870 cycles								
39		* 4	FAILED		8576 cycles								
40		* 5	FAILED		3667 cycles					DATA SHEET 4			

M700 LOCK & FIRE SIMULATION

FLS

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
		3 1/2 - 6 1/2 lbs	.005" - .048"	.015" - .020"	(lbs)	(lbs)	(lbs)
		(AVG OF 3)			(AVG OF 3)	(AVG OF 3)	(AVG OF 3)
1	1	DuPont					
2	2	711					
3	3	CRC					
4	4	HLP					
5	5	TEN 4					
6	1		6.00	.0095	.0117	7.00	4.75
7	2		5.75	.0085	.0155	6.75	5.00
8	3		5.75	.0105	.0215	6.50	5.00
9	4		6.25	.012	.016	7.00	4.50
10	5		6.25	.008	.018	7.25	5.50
11	1		5.50	.0110	.0205	7.50	4.50
12	2		6.00	.0085	.016	5.75	4.00
13	3		5.75	.0105	.0215	5.50	4.25
14	4		6.25	.013	.019	6.50	4.25
15	*5		6.25	.010	.020	5.75	4.00
16	1		5.25	.0110	.0211	7.50	4.00
17	2		5.50	.0110	.018	5.75	3.75
18	3		5.75	.0105	.0215	5.50	4.25
19	*4		6.25	.0135	.025	7.25	3.75
20	5		-	-	-	-	-
21	1		5.50	.0105	.0211	6.50	4.00
22	2		5.75	.010	.018	5.75	4.00
23	3		6.00	.0105	.0215	5.50	4.50
24	4		-	-	-	-	-
25	5		-	-	-	-	-
26	1		5.50	.0105	.021	7.00	3.75
27	2		6.25	.010	.019	5.50	4.00
28	3		5.75	.0105	.022	5.50	4.25
29	4		-	-	-	-	-
30	5		-	-	-	-	-
31	*1		5.00	.0111	.022	7.00	4.00
32	*2		5.75	.011	.020	5.75	3.75
33	*3		6.25	.0115	.023	5.25	4.00
34	4		-	-	-	-	-
35	5		-	-	-	-	-
36	*1	FAILED	20790	cycles			
37	*2	COMPLETED	25000	cycles			
38	*3	COMPLETED	25000	cycles			
39	*4	FAILED	9787	cycles			
40	*5	FAILED	3220	cycles			

DATA SHEET 5

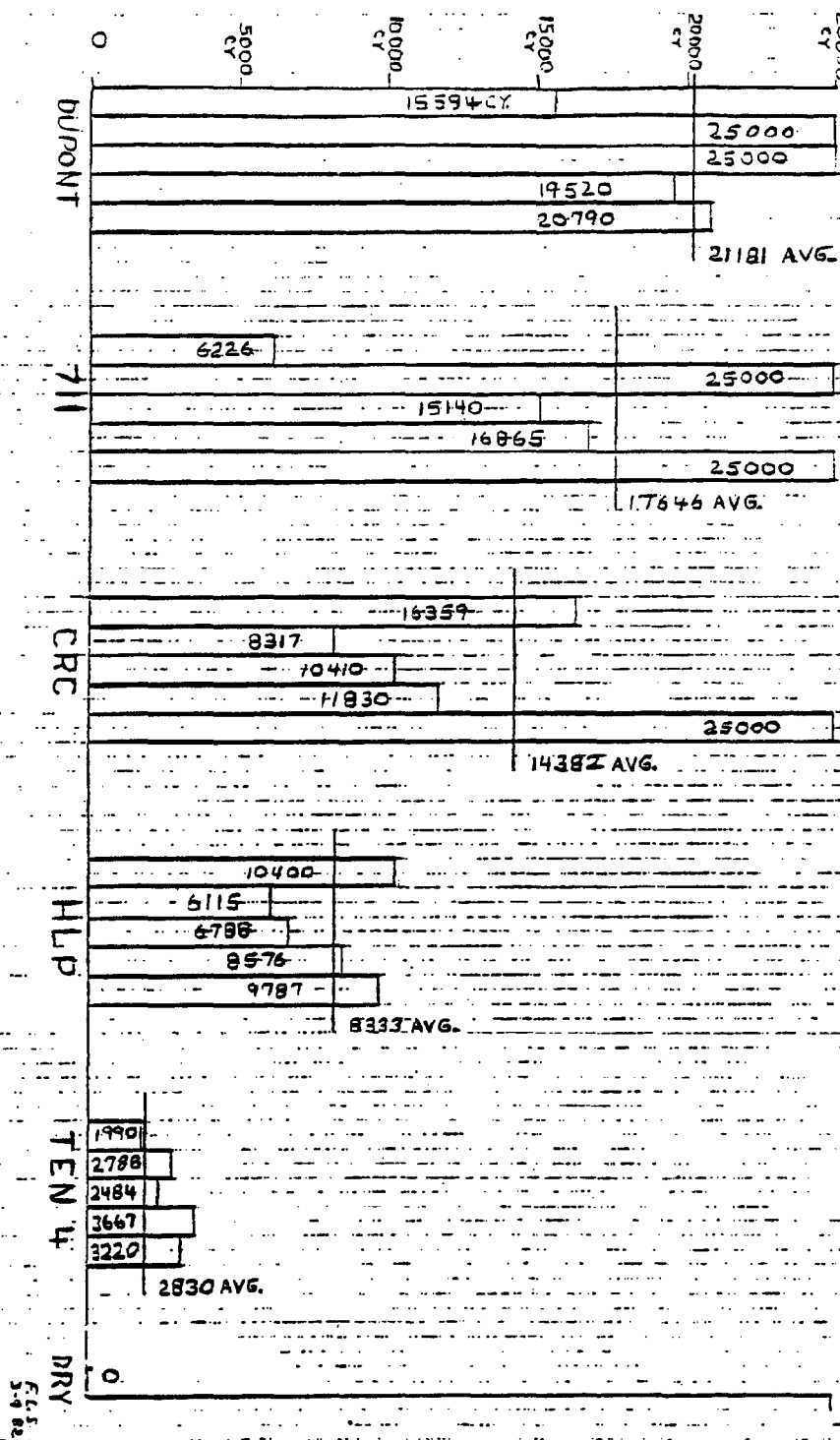
LUBRICANT EVALUATION

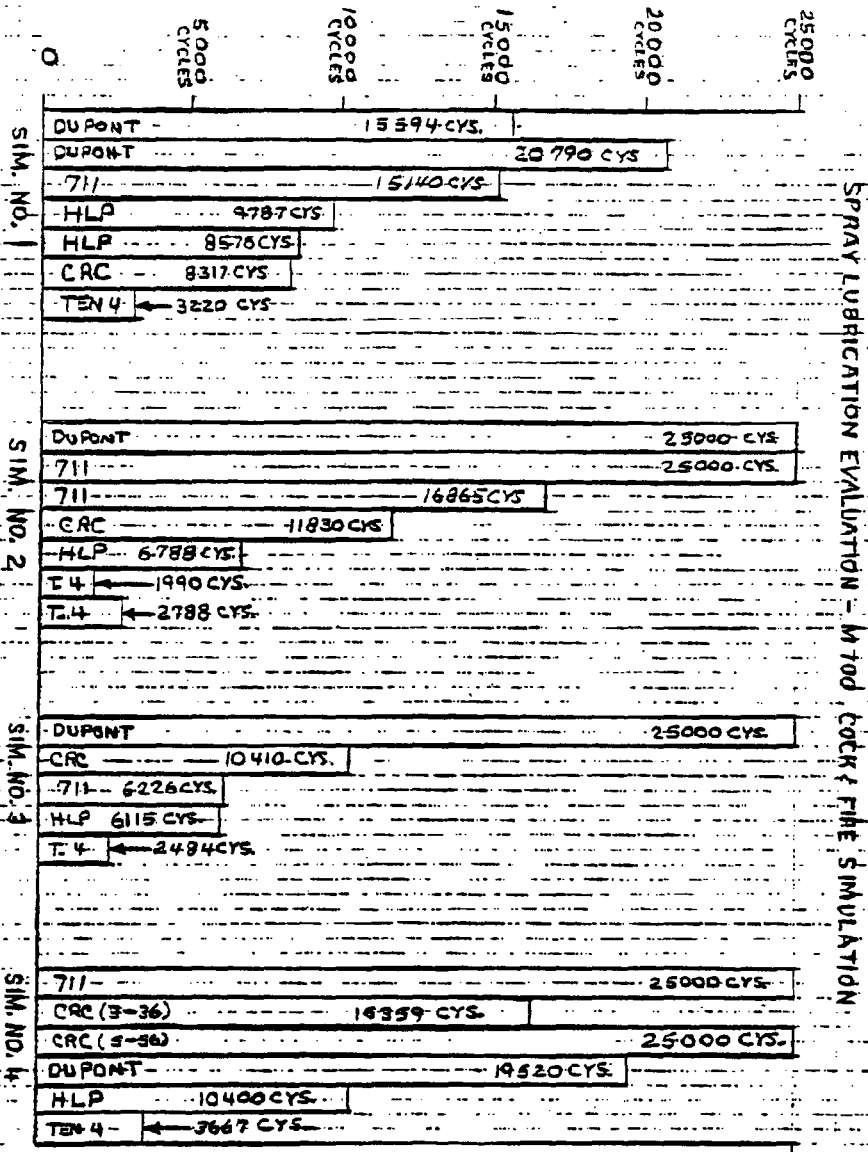
3-10-92

R_a HARDNESS: M700 BOLT COCKING CAM AREA

1	2	3	4	5	6
REM. SPECS.	R _a	LUBRICANT	SIMULATOR	CYCLES	
R _a 37-46	HARDNESS	USED	USED	COMPLETED	
↓ BOLT NO. ↓					
C1	39	DUPONT	1	15 594	
C9	410	DUPONT	3	25 000	
C12	410	DUPONT	2	25 000	
C19	318	DUPONT	4	19 520	
C20	317	DUPONT	1	20 790	
C3	38	711	3	6 226	
C7	39	711	2	25 000	
C16	39	711	11	15 140	
C27	38	711	2	16 865	
C29	39	711	4	25 000	
C4	39	CRC 3-36	4	16 359	
C10	39	CRC 3-36	1	8 317	
C17	40	CRC 3-36	3	10 410	
C21	39	CRC 3-36	2	11 830	
C25	39	CRC 5-56	4	25 000	
C11	39	HLP	4	10 400	
C18	39	HLP	3	6 115	
C24	39	HLP	2	6 788	
C26	39	HLP	1	8 576	
C28	38	HLP	11	9 787	
C2	38	TEN-4	2	1 990	
C5	38	TEN-4	2	2 788	
C6	39	TEN-4	3	2 484	
C8	38	TEN-4	4	3 667	
C13	39	TEN-4	1	3 220	
C22	39	DRY		0	
DATA SHEET 6					

APPENDIX B
(Graphic Presentation)





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: Sprayon #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 - HLP 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 - Ten 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
 Avg - 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.)

REMINGTON ARMS COMPANY, INC.

INTERDEPARTMENTAL CORRESPONDENCE



"CONFINE YOUR LETTER TO ONE SUBJECT ONLY" _____

Distribution: C.B. Workman
C.E. Ritchie
J.P. Linde
J.W. Brooks
R.J. Pohl
Petroleum Lab
Chambers Works
A.B. Hughes
ESD-Louviers

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

Reviewed and Cleared By:

J.H. Eschinger, / R.E. Nigroingale,
Foreman-Test Lab/ Foreman-Measurement Lab

James H. Supry 4-30-82
Signature Date

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

C.E. Ritchie 4/30/82
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: _____
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
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".

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. - 6½ 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.

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)

LUBRICANT EVALUATION

6-5-55

FIRST SAMPLE OF EACH LUBRICANT

[illegible]

3-8-82

		TRIGGER	SEAR	SEAR	SAFE	SAFE	BOIL	FT
		PULL	LIST	DISAGEMENT	ON	OFF	AMKED	FLPD
REMISPEGS		34-62115	005-013	015-020	(105)	(165)	(165)	(165)
1	DUPONT	(AVG. 0.2)			(AVG. 0.3)	(AVG. 0.3)	(AVG. 0.3)	(AVG. 0.3)
2	711							
3	APC							
4	HLP							
5	TEN 4							
1		6.00	.009	.0125	6.00	4.50	4.00	8.00
2		5.00	.006	.018	7.50	4.75	3.00	6.00
3		6.00	.012	.012	7.00	4.50	3.00	7.00
4		6.75	.0095	.016	7.50	6.75	2.50	7.00
5		5.50	.008	.016	7.50	5.50	3.50	7.00
1	5000	5.25	.0095	.0215	6.00	4.50	3.50	7.00
2		5.00	.0065	.019	5.75	4.00	3.50	6.00
3		5.75	.013	.020	5.00	4.00	3.00	8.00
4		6.25	.0095	.020	6.75	6.25	2.50	8.00
5		5.00	.009	.020	5.75	4.00	3.50	13.00
1	10,000	5.50	.011	.025	5.75	4.25	3.50	7.00
2		4.75	.0065	.019	5.25	4.00	2.50	6.50
3		6.00	.013	.023	6.25	3.75	3.00	15.00
4		6.00	.0095	.021	6.50	5.75	3.00	25.00
5		-	-	-	-	-	-	-
1	15,000	5.50	.011	.026	5.50	4.25	4.00	7.25
2		4.75	.0075	.019	5.00	4.00	3.00	7.00
3		-	-	-	-	-	-	-
4		-	-	-	-	-	-	-
5		-	-	-	-	-	-	-
1	20,000	5.50	.011	.0265	5.50	4.00	4.00	9.25
2		4.75	.009	.019	5.25	4.50	3.00	6.50
3		-	-	-	-	-	-	-
4		-	-	-	-	-	-	-
5		-	-	-	-	-	-	-
1	25,000	5.25	.011	.0285	5.50	3.75	4.00	14.00
2		4.50	.0095	.021	5.25	4.00	2.50	7.00
3		-	-	-	-	-	-	-
4		-	-	-	-	-	-	-
5		-	-	-	-	-	-	-
* 1	COMPLETED	25,000	cycles					
* 2	COMPLETED	25,000	cycles					
* 3	FAILED	6317	cycles					
* 4	FAILED	6115	cycles					
* 5	FAILED	2788	cycles					

DATA SHEET 2

THIRD SAMPLE OF EACH LUBRICANT

		TRIGGER	SEAR	SEAR	SAFE	SAFE	BOLT	LIF
		PULL	LIFT	ENGAGEMENT	ON	OFF	COCKED	FIRE
		24-6116	.005-.018	.015-.020	(lbs)	(lbs)	(lbs)	(lbs)
	QUANT	(AVG OF 3)			(AVG OF 3)	(AVG OF 3)	(AVG OF 3)	(AVG OF 3)
1	2	711						
2	3	CRC						
3	4	HLP						
4	5	TEN 4						
5	1	5.75	.007	.015	7.25	4.50	2.50	6.50
6	2	6.00	.008	.015	7.50	7.50	2.50	8.25
7	3	6.25	.008	.017	6.75	5.50	3.00	7.00
8	4	5.75	.0125	.0195	8.00	5.50	3.00	7.00
9	5	5.50	.008	.015	8.00	5.00	2.50	6.00
10	1	6.25	.009	.019	6.50	4.25	2.00	6.00
11	2	5.25	.009	.021	5.25	7.50	3.50	6.50
12	3	6.25	.0105	.0175	7.25	4.00	3.00	9.00
13	4	5.75	.0125	.021	7.00	5.00	3.00	10.00
14	* 5	5.50	.013	.021	6.00	3.75	2.50	18.00
15	1	6.00	.010	.020	6.00	3.75	2.00	5.50
16	2	5.25	.009	.021	7.00	6.00	3.50	7.00
17	3	6.00	.015	.0195	6.75	4.75	3.00	7.00
18	* 4	5.75	.0125	.0225	6.50	4.50	3.50	57.00
19	5	—	—	—	—	—	—	—
20	1	5.25	.0115	.020	5.75	4.00	2.00	6.50
21	* 2	5.50	.0095	.022	6.50	5.50	4.00	14.00
22	* 3	6.50	.015	.0195	6.75	4.00	3.00	15.00
23	4	—	—	—	—	—	—	—
24	5	—	—	—	—	—	—	—
25	1	5.75	.0115	.020	6.00	4.00	2.00	6.00
26	2	—	—	—	—	—	—	—
27	3	—	—	—	—	—	—	—
28	4	—	—	—	—	—	—	—
29	5	—	—	—	—	—	—	—
30	* 1	6.00	.0115	.021	6.25	3.75	2.00	12.00
31	2	—	—	—	—	—	—	—
32	3	—	—	—	—	—	—	—
33	4	—	—	—	—	—	—	—
34	5	—	—	—	—	—	—	—
35	* 1	COMPLETED	35,000	cycles				
36	* 2	FAILED	15,140	cycles				
37	* 3	FAILED	10,410	cycles				
38	* 4	FAILED	6,780	cycles				
39	* 5	FAILED	2,484	cycles				
40								DATA SHEET 3

3-8-92

FOURTH SAMPLE OF EACH WABIGANT

R2512866

3-4-52

LISTED ABOVE IS EACH VARIETY

DATA SHEET

LUBRICANT EVALUATION

3-10-62

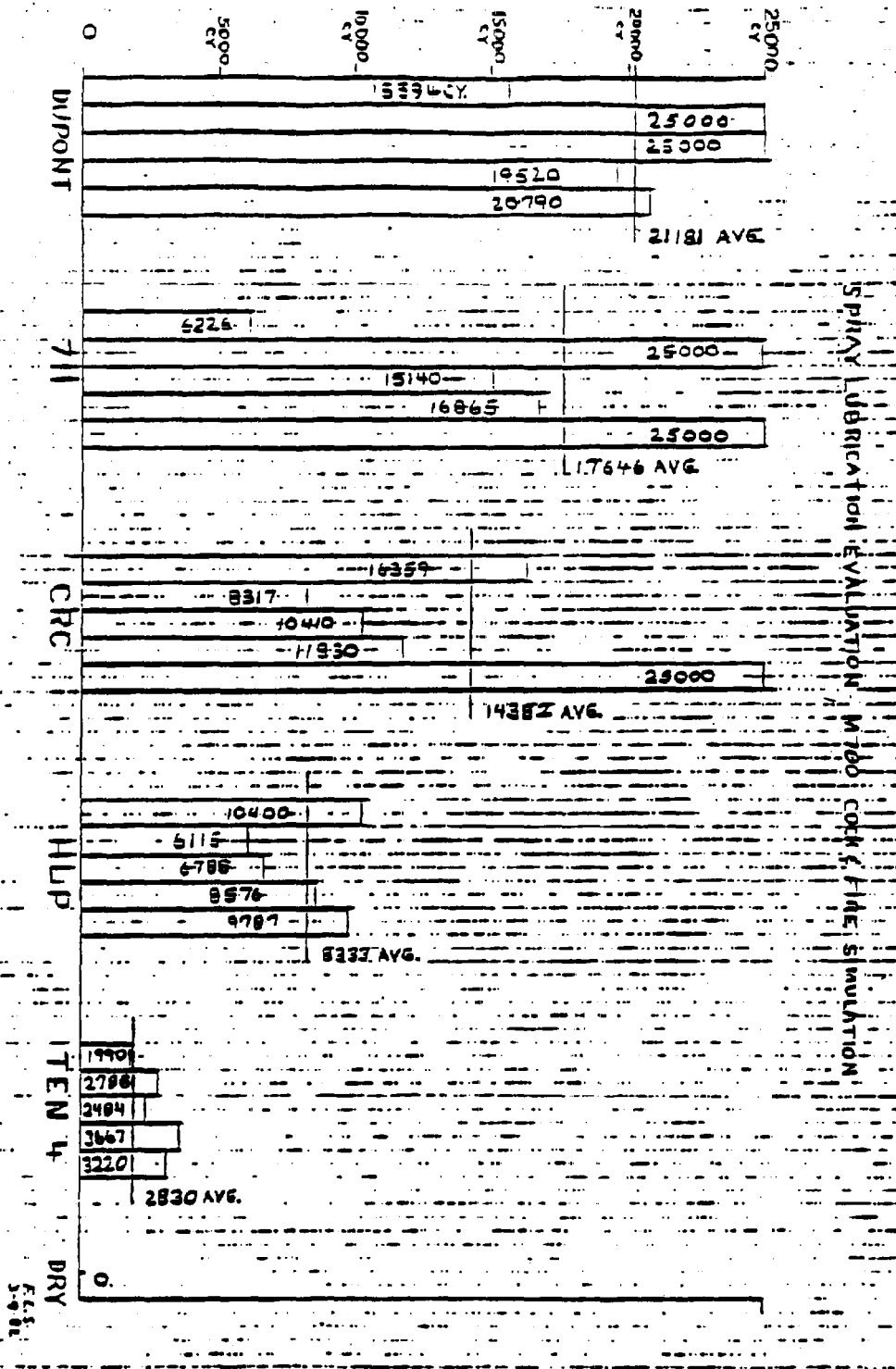
R₁ HARDNESS: M700 BOLT COCKING CAM AREA

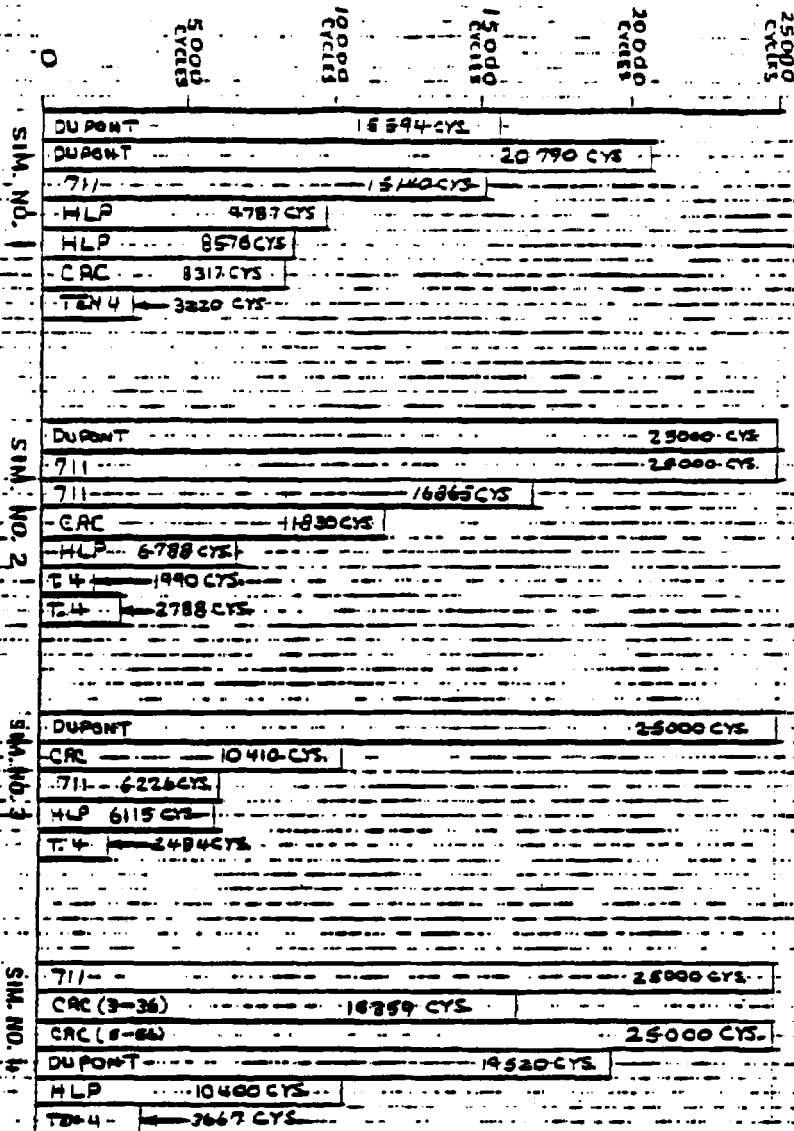
REM. SPEC. R ₁	LUBRICANT	SIMULATOR	CYCLES
R ₁ 37-46 HARDNESS	USED	USED	COMPLETED
+ BOLT NO. +			
C 1	DUPONT	1	15 554
C 9	DUPONT	3	25 000
C 12	DUPONT	2	25 000
C 19	DUPONT	4	19 520
C 20	DUPONT	1	20 790
C 3	711	3	6 226
C 7	711	2	25 000
C 16	711	1	15 140
C 27	711	2	16 845
C 29	711	4	25 000
C 4	CRC 336	4	16 357
C 10	CRC 336	1	8 317
C 17	CRC 336	3	10 410
C 21	CRC 336	2	11 830
C 25	CRC 558	4	25 000
C 11	HLP	4	10 400
C 18	HLP	3	6 115
C 24	HLP	2	6 788
C 26	HLP	1	8 576
C 28	HLP	1	9 787
C 2	TEN-4	2	1 990
C 5	TEN-4	2	2 788
C 6	TEN-4	3	2 484
C 8	TEN-4	4	3 667
C 13	TEN-4	1	3 220
C 22	DRY		0

DATA SHEET 16

APPENDIX B

(Graphic Presentation)





SPRAY LUBRICATION EVALUATION - Method of Control Simulation

APPENDIX C

(Previous Evaluation)

Test # 20

Product: Du Pont - Synthetic Diaster - 204

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: Sprayer 1711 Penetrant/Lube/Demolitive

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: Continuous 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 Stack: Excellent
16. Rust Prevention:
 - Test 1 - 4
 - Test 2 - 5
 - Avg - 4.5
17. Reason for Elimination: Continue testing

Test # 11

Product: W. F. Souderton - F&P 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, can 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 spray
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
 Avg - 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.)