G-48

DON'T SAY IT — WRITE IT

To A.A. HUGICK

Date 1-5-79

From C.J. SWEET

M/700 CLASSIC PILOT LINE FIELD CYCLE TEST (243 CAL.)

SUBJECT: BOLT LUBRICATION
WEATHER: 9° F - WINDY - LIGHT SNOW

Extremely hard bolt lift was experienced during Field Cycle Testing of the M/700 Classic Pilot Rifles. After one quarter of the test was shot (50 rds.), shooters found it difficult to lift the bolt handle to unlock the bolt. One gun was so severe, the bolt handle could not be lifted unless the gun was held between the legs, and the bolt handle was lifted by using both hands. (One hand on the stock pulling down on the gun, and one hand on the bolt handle pulling up) Hard bolt lift was experienced after every fired round. A check was made by dry firing the guns. Hard bolt lift was evident, but not as severe as it was in live fire.

The bolts were then removed and inspected. The bolts had been lubricated with Molykote G-N Paste before testing. Small metal particles were noticed in the paste caused by the failure of the lubricant. The bolts were then cleaned and sprayed with WD-40 lubricant. The areas sprayed were the Cam Surface and the locking lugs. The bolts were then reassembled in the bolts and the test was completed (150 rds.). The bolts function well after lubrication with the WD-40.

The Molykote G-N Paste had hardened in the cold, which gummed up the bolt causing hard bolt lift.

THIS WAS APPLIED IN THE LAB JUST PRIOR TO THE FIELD TEST TO A.

CJS:js

PLAINTIFF'S EXHIBIT 3156

1023

DON'T BE SORRY — BE SAFE

AL 0028926

REMINGTON ARMS COMPANY, INC.

INTER-DEPARTMENTAL CORRESPONDENCE

Remington PETERS

"CONFINE YOUR LETTER TO ONE SUBJECT ONLY"

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

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. Hemmings, Foreman-Test Lab / R.E. Nightingale, Foreman-Measurement Lab

Signature Date 4-14-82

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

Signature Date 4-14-82

2223

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: 3static
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

3923

AL 0029380

Report No. 82 0331

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.

LUBRICANT	AVERAGE CYCLE LIFE (5 Samples)
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.

4/23

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 simluator used is found in Appendix "B".

5 of 23

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.

ALEKSIC

APPENDIX A

(Data Sheets)

7923

M 700 COCK & FIRE SIMULATION — FLS

LUBRICANT EVALUATION — 3-5-92

FIRST SAMPLE of EACH LUBRICANT

REM	SPEC'S →	TRIGGER PULL 3½-6½ lbs	SEAR LIFT .005"-.068"	SEAR ENGAGEMENT .015"-.020"	SAFE ON (lbs)	SAFE OFF (lbs)	BOLT LIFT LOCKED (lbs)	BOLT LIFT FIRED (lbs)
1 = DUPONT		(AVG. OF 3)			(AVG. OF 3)	(AVG. OF 3)	(AVG. OF 3)	(AVG. OF 3)
2 = 7/11								
3 = QRC								
4 = HLP								
5 = TEM 4								
	1	6.75	.005	.020	7.5	6.50	3.00	7.00
0	2	6.50	.0046	.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	2.01	7.00
	4	6.25	.0095	.029	7.25	4.75	3.01	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	13.00
	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	15594	CYCLES				
	* 2	FAILED	6228	cycles				
	* 3	FAILED	16359	cycles				
	* 4	FAILED	10400	cycles				
	* 5	FAILED	1990	cycles			DATA SHEET 1	

8 of 23

M700 COCK & FIRE SIMULATION F.L.S.

LUBRICANT EVALUATION 3-8-92

SECOND SAMPLE OF EACH LUBRICANT

			1 TRIGGER PULL	2 SEAR LIFT	3 SEAR ENGAGEMENT	4 SAFE ON	5 SAFE OFF	6 BOLT LIFT COCKED	6 BOLT LIFT FIRED
		REMINGTON	3½-6½ 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	1RR							
4	4	HLP							
5	5	TEN 4							
	1		6.00	.009	.0185	6.00	4.50	4.00	8.00
0	2		5.00	.006	.018	7.50	4.75	3.00	6.00
cycles	3		6.00	.012	.012	7.00	4.50	3.00	7.00
	4		6.75	.0095	.016	7.50	6.25	2.50	7.00
	5		5.50	.008	.016	7.50	5.50	3.50	7.00
5000	1		5.25	.0095	.0215	6.00	4.50	3.50	7.00
cycles	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	4.25	2.50	8.00
	* 5		5.00	.009	.020	5.75	4.00	3.50	13.00
10,000	1		5.50	.0111	.025	5.75	4.25	3.50	7.00
cycles	2		4.75	.0065	.019	5.25	4.00	2.50	6.50
	* 3		6.00	.0131	.023	6.25	3.75	3.00	15.00
	* 4		6.00	.0095	.021	6.50	3.75	3.00	25.00
	5		—	—	—	—	—	—	—
15,000	1		5.50	.011	.026	5.50	4.25	4.00	7.25
cycles	2		4.75	.0075	.019	5.00	4.00	3.00	7.00
	3		—	—	—	—	—	—	—
	4		—	—	—	—	—	—	—
	5		—	—	—	—	—	—	—
20,000	1		5.50	.011	.0265	5.50	4.00	4.00	9.25
cycles	2		4.75	.009	.019	5.25	4.50	3.00	6.50
	3		—	—	—	—	—	—	—
	4		—	—	—	—	—	—	—
	5		—	—	—	—	—	—	—
25,000	* 1		5.25	.011	.0285	5.50	3.75	4.00	14.00
cycles	* 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	8317	cycles					
	* 4	FAILED	6115	cycles					
	* 5	FAILED	2788	cycles				DATA SHEET 2	

9/23

M700 COCK & FIRE SIMULATION — F.L.S.

LUBRICANT EVALUATION — 3-8-82

THIRD SAMPLE OF EACH LUBRICANT

		1	2	3	4	5	6
		TRIGGER PULL 2½-6½ lbs	SEAR LIFT .005"-.018"	SEAR ENGAGEMENT .015"-.020"	SAFE ON (lbs)	SAFE OFF (lbs)	BOLT LIFT COCKED (lbs)	BOLT LIFT FIRED (lbs)
1	DUPONT	(AVG OF 3)			(AVG. OF 3)	(AVG OF 3)	(AVG OF 3)	(AVG OF 3)
2	TIL							
3	CRC							
4	HLP							
5	TEN 4							
	1	5.75	.007	.015	7.25	4.50	2.50	6.50
0	2	6.00	.0098	.0115	7.50	7.50	2.50	8.25
cycles	3	6.25	.009	.017	6.75	5.50	3.00	7.00
	4	5.75	.0125	.0195	8.00	5.50	3.00	7.00
	5	5.50	.008	.015	8.00	5.00	2.50	6.00
5000	1	6.25	.009	.019	6.50	4.25	2.00	6.00
cycles	2	5.25	.009	.021	5.25	7.50	3.50	6.50
	3	6.25	.0105	.0175	7.25	4.00	3.00	9.00
	4	5.75	.0125	.021	7.00	5.00	3.00	10.00
	*5	5.50	.013	.021	6.00	3.75	2.50	18.00
10000	1	6.00	.0110	.020	6.00	3.75	2.00	5.50
cycles	2	5.25	.009	.021	7.00	6.00	3.50	7.00
	3	6.00	.015	.0195	6.75	4.75	3.00	10.00
	*4	5.75	.0125	.0225	6.50	4.50	3.50	51.00
	5	—	—	—	—	—	—	—
15000	1	5.25	.0115	.020	5.75	4.00	2.00	6.50
cycles	*2	5.50	.0095	.022	6.50	5.50	4.00	14.00
	*3	6.50	.015	.0195	6.75	4.00	3.00	15.00
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
20000	1	5.75	.0115	.020	6.00	4.00	2.00	6.00
cycles	2	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
25000	*1	6.00	.0115	.021	6.25	3.75	2.00	12.00
cycles	2	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—
	4	—	—	—	—	—	—	—
	5	—	—	—	—	—	—	—
	*1	COMPLETED	25,000	cycles				
	*2	FAILED	15,140	cycles				
	*3	FAILED	10,410	cycles				
	*4	FAILED	6788	cycles				
	*5	FAILED	2484	cycles			DATA SHEET 3	

10/23

M700 LOCK & FIRE SIMULATION — F.L.S.

LUBRICANT EVALUATION — 3-8-82

FOURTH SAMPLE OF EACH LUBRICANT

			1 TRIGGER PULL 3½ - 6½ lbs	2 SEAR LIFT .005" - .018"	3 SEAR ENGAGEMENT .015" - .020"	4 SAFE ON (lbs)	5 SAFE OFF (lbs)	6 BOLT LIFT Locked (lbs)	BOLT LIFT Fired (lbs)
1		DuPont	(AVG. OF 3)			(AVG. OF 3)	(AVG. OF 3)	(AVG. OF 3)	(AVG. OF 3)
2		711							
3		CAC							
4		HLP							
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	.0068	.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	.0170	.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	.0179	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	.0085	.021	6.50	4.25	3.00	8.00
19		* 4	6.00	.0110	.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	5.00	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	11830 cycles					
39		* 4	FAILED	8576 cycles					
40		* 5	FAILED	3667 cycles				DATA SHEET 4	

11823

AL 0029389

M700 LOCK & FIRE SIMULATION F.L.S.

LUBRICANT EVALUATION 3-9-92

FIFTH SAMPLE OF EACH LUBRICANT

			TRIGGER PULL 3½-6½ lbs	SEAR LIFT .005"-.018"	SEAR ENGAGEMENT .015"-.020"	SAFE ON (lbs)	SAFE OFF (lbs)	BOLT — LIFT COCKED (lbs)	BOLT — LIFT FIRED (lbs)	
1		D.P.M.T	(AVG OF 3)			(AVG OF 3)	(AVG OF 3)	(AVG OF 3)	(AVG OF 3)	1
2		711								2
3		CRC								3
4		H&R								4
5		TEN 4								5
6		1	6.00	.0095	.017	7.00	4.75	2.00	7.00	6
7	0	2	5.75	.0085	.0155	6.75	5.00	3.50	7.00	7
8	cycles	3	5.75	.0105	.0215	6.50	5.00	3.00	9.00	8
9		4	6.25	.012	.016	7.00	4.50	3.00	8.00	9
10		5	6.25	.008	.016	7.25	5.50	3.00	6.50	10
11	5000	1	5.50	.010	.0205	7.50	4.50	2.50	7.00	11
12	cycles	2	6.00	.0085	.016	5.75	4.00	4.00	8.00	12
13		3	5.75	.0105	.0215	5.50	4.25	3.00	8.00	13
14		4	6.25	.013	.019	6.50	4.25	4.00	7.50	14
15		*5	6.25	.010	.020	5.75	4.00	3.50	18.00	15
16	10,000	1	5.25	.0110	.021	7.50	4.00	3.00	8.00	16
17	cycles	2	5.50	.0110	.018	5.75	3.75	4.00	7.50	17
18		3	5.75	.0105	.0215	5.50	4.25	3.00	7.50	18
19		*4	6.25	.0135	.025	7.25	3.75	4.00	27.00	19
20		5	—	—	—	—	—	—	—	20
21	15000	1	5.50	.0105	.021	6.50	4.00	3.00	8.00	21
22	cycles	2	5.75	.010	.018	5.75	4.00	3.50	7.50	22
23		3	6.00	.0105	.0215	5.50	4.50	3.00	7.00	23
24		4	—	—	—	—	—	—	—	24
25		5	—	—	—	—	—	—	—	25
26	20 000	1	5.50	.0105	.021	7.00	3.75	3.50	14.00	26
27	cycles	2	6.25	.010	.019	5.50	4.00	3.50	9.00	27
28		3	5.75	.0105	.022	5.50	4.25	3.00	11.00	28
29		4	—	—	—	—	—	—	—	29
30		5	—	—	—	—	—	—	—	30
31	25000	*1	5.00	.0111	.0122	7.00	4.00	3.00	28.00	31
32	cycles	*2	5.75	.011	.0120	5.75	3.75	4.00	12.00	32
33		*3	6.25	.011	.0123	5.25	4.00	4.00	15.00	33
34		4	—	—	—	—	—	—	—	34
35		5	—	—	—	—	—	—	—	35
36		*1	FAILED	20790	cycles					36
37		*2	COMPLETED	25000	cycles					37
38		*3	COMPLETED	25000	cycles					38
39		*4	FAILED	9787	cycles					39
40		*5	FAILED	3220	cycles			DATA SHEET 5		40

12/23

M 700 COCK & FIRE SIMULATION — F.L.S.

LUBRICANT EVALUATION — 3-10-82

R_c HARDNESS: M700 BOLT COCKING CAM AREA

	REM. SPECS. R_c 37-46	R_c HARDNESS	LUBRICANT USED	SIMULATOR USED	CYCLES COMPLETED
	↓ BOLT NO. ↓				
	C1	39	DUPONT	1	15 594
	C9	40	DUPONT	3	25 000
	C12	40	DUPONT	2	25 000
	C19	38	DUPONT	4	19 520
	C20	37	DUPONT	1	20 790
	C3	38	711	3	6 226
	C7	39	711	2	25 000
	C16	39	711	1	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	1	9 787
	C2	38	TEN-4	2	1 440
	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

13923

AL 0029391

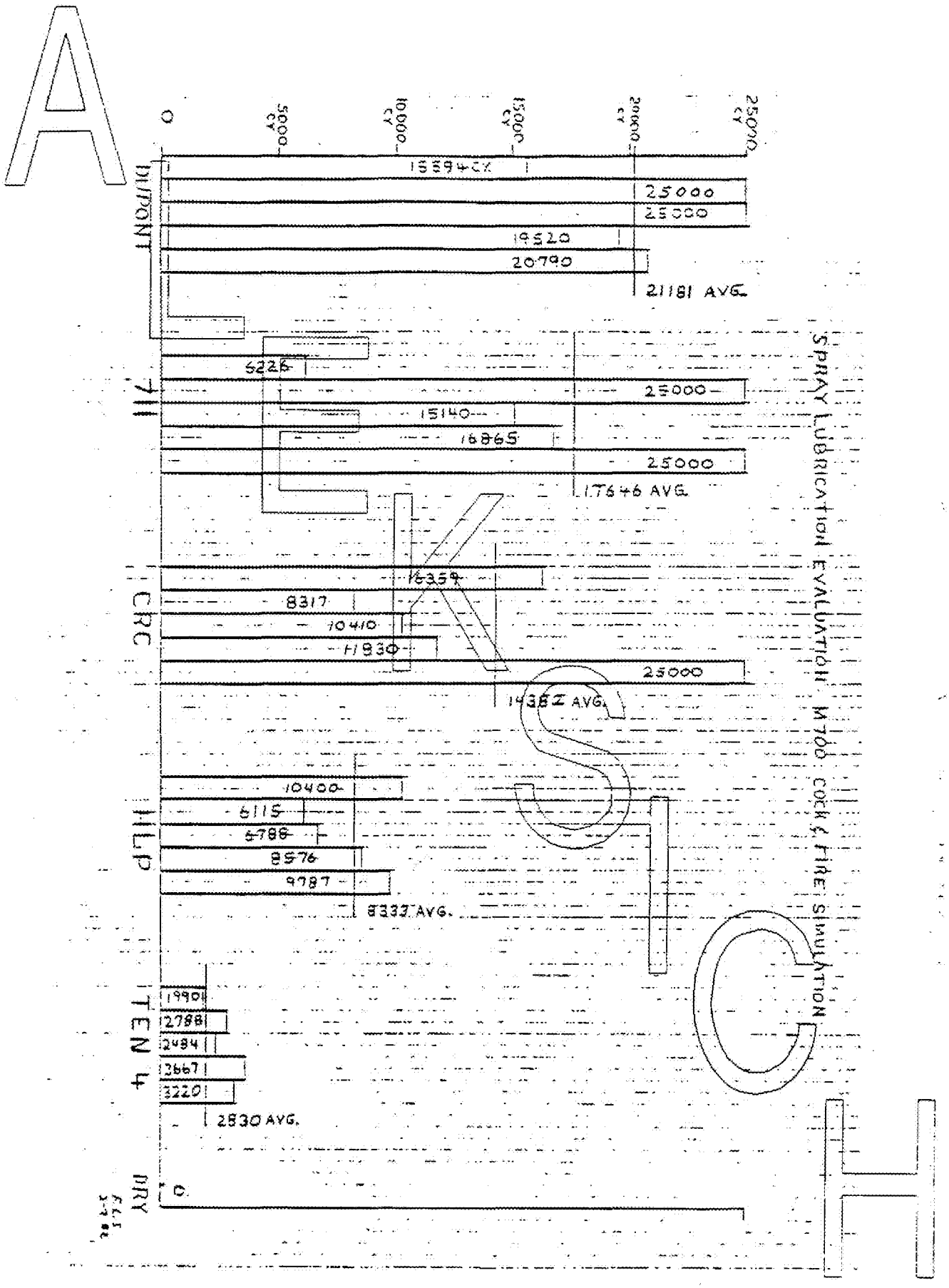
ALEKSICH

APPENDIX B

(Graphic Presentation)

14/23

AL 0029392


A
0
5000 CY
10000 CY
15000 CY
20000 CY
25000 CY
DUPONT
15594 CY
25000
25000
19520
20790
21181 AVG.
SPRAY LUBRICATION EVALUATION M700 COCK & FIRE SIMULATION
6226
25000
15140
16865
25000
17646 AVG.
CRC
16359
8317
10410
11930
25000
14382 AVG.
HLP
10400
6115
5788
8576
9787
8332 AVG.
TEN 4
1990
2788
2484
3667
3220
2830 AVG.
IRY
0
A
15923
AL 0029393

SPRAY LUBRICATION EVALUATION – M 700 COCKPIT FIRE SIMULATION
SIM. NO. 1
SIM. NO. 2
SIM. NO. 3
SIM. NO. 4
DUPONT
711
HLP
CRC
TEN 4
T 4
711
CRC (3-36)
CRC (5-56)
DUPONT
HLP
T 4
0
5000 CYCLES
10000 CYCLES
15000 CYCLES
20000 CYCLES
25000 CYCLES

ALEKSICH

APPENDIX C

(Previous Evaluation)

17g23

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

18223

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

20323

AL 0029398

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

2+7 23

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 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

22323

APPENDIX D

(Pictorial Presentation)

1. Lubrication procedures.

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