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RESEARCH TEST and MEASUREMENT REPORT - Report No. 833221

M/700 NEW PROCESS POWDER METAL TRIGGER AND "CONNECTICUT SPRING"
TRIGGER CONNECTOR EVALUATION

Prepared by: R.W. HOWE

Date Prepared: 12-15-83

Proofread and Cleared by:

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

R.E. Nightingale 1-9-84
Signature Date

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

C.E. Ritchie 1-9-84
Signature Date

TEST & MEASUREMENT LAB REPORT

REPORT NUMBER: 833221

REPORT TITLE: M/700 NEW PROCESS POWDER METAL TRIGGER AND
"CONNECTICUT SPRING" TRIGGER CONNECTOR EVALUATION

MODEL(S): M/700

GAUGE OR CALIBER: 30-06

DATE: 12/15/83

WORK ORDER NO.: G-0460-000

PART NAME: TRIGGER AND TRIGGER CONNECTOR

DESIGNER/ENGINEER: J.W. BROOKS

TEST TYPE:

1. PHOTO LAB
2. STRENGTH TEST-NO. OF GUNS TESTED _____
3. FUNCTION TEST-NO. OF GUNS TESTED 12
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. ~~EXPERIENCE~~ NO. OF GUNS TESTED: 12
10. DRY CYCLE - 50,000 CYC. EACH
NO. OF ROUNDS PER GUN 40
TOTAL ROUNDS FIRED IN TEST 480
AMMO TYPE: MAGS. _____ TARGET: _____
RIM FIRE _____ CENTERFIRE X

REMINGTON ARMS CO., INC.
Firearms Research Division

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December 15, 1983

TO: R.E. NIGHTINGALE
FROM: R.W. HOWE
REPORT TITLE: M/700 NEW PROCESS POWDER METAL TRIGGER AND
"CONNECTICUT SPRING" TRIGGER CONNECTOR

ABSTRACT

Recently R & D Test Lab received twelve M/700 Trigger Housing Assemblies, installed in 30-06 Cal. Barreled Actions, containing the New Process Powder Metal Trigger and "Connecticut Spring" Trigger Connectors.

Process Engineering through J.W. Brooks, Supervisor, Current Products Design requested the Test Lab evaluate the above new parts by dry-cycle, pendulum drop testing and live round firing.

SCOPE OF TEST

To determine if the above new parts perform as well as or better than the current production components.

TEST RESULTS

1. All twelve rifles were live round jack fired 20 rounds each. Both before and after dry-cycle testing with no malfunctions.
2. All twelve test vehicles reached 50,000 dry-cycles each without any fire control related malfunctions.
3. During the pendulum drop test "Jar-Off" did occur at various heights and in various drop modes.
4. The twelve fire controls were then checked on an optical comparator for sear engagement. Eleven of the twelve were found to be out of present Remington specs. which are .015" to .020".

All individual results, along with M/700 Drop Test results from previous Report #820391 of 4-6-83 titled M/700 New Design Trigger Screw and Spring Evaluation, for comparison purposes can be found in Appendix "A" Data Sheets of this report.

REMINGTON ARMS CO., INC.
M/700 New Process Powder Metal Trigger
and "Connecticut Spring" Trigger
Connector

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REPORT TEXT

1. The twelve rifles were jack fired 20 live rounds each.
2. All twelve were then dry-cycled to 50,000 cycles each.
3. After dry cycle testing all were refired 20 live rounds each.
4. The twelve rifles were then pendulum drop tested against both Neoprene and hardwood back stops at the 2', 4' and 6' levels in the following modes: muzzle first, butt first, left side, right side, top and bottom, in both Safe "ON" and Safe "OFF" positions.
5. All twelve were then checked for sear engagement on an optical comparator.

Individual results in Appendix "A" Data Sheets.

REMINGTON ARMS CO., INC.
M/700 New Process Powder Metal Trigger
and "Connecticut Spring" Trigger
Connector

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TEST PROCEDURE

A. Measurements

1. Sear Engagement .000"

B. Test Conditions

1. The twelve test actions were assembled in R&D Test Lab M/700 BDL Stocks and jack fired 20 live rounds each, using Federal 185 Gr. P.S.P.B.T. Ammo, in the R & D Test Lab shooting room.
2. All twelve were then dry cycled to 50,000 cycles each. Four at a time on the four bolt action cock and fire dry cycle machines in the R & D Test Lab dry cycle room. Each rifle was lubed liberally every 2,000 to 3,000 cycles with "DuPont Teflon Wet", in and around the bolt cocking cam surface, sear safety cam (top) and in the trigger housing inspection hole.
3. After dry cycle test all rifles were reshot 20 live rounds each, as in Item One above.
4. A Pendulum Drop Test was then conducted using R & D Test Lab facilities on all twelve rifles at the 2', 4' and 6' test levels on both hardwood and Neoprene backstops in the following 6 modes & in both Safe "ON" and Safe "OFF" positions:
 1. Muzzle first, 2. Butt first, 3. Left side, 4. Right side, 5. Top side, and 6. Bottom side.
5. All twelve actions were then removed from the stocks and taken to the R & D Model Shop to check sear engagement in (.000") on the optical comparator.

C. Rifles used in test:

<u>Rifle#</u>	<u>Trig. Housing#</u>	<u>Rifle Serial #</u>
1	10-174	B6519485
2	15-174	B6520704
3	16-174	B6519821
4	12-174	B6520570
5	13-174	B6518850
6	14-174	B6520558
7	2-176	B6519985
8	17-174	B6518869
9	3-176	B6519986
10	11-174	B6520453
11	9-174	B6518193
12	1-176	B6519138

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A P P E N D I X "A"

M-700 30-06

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Drop Test - Neoprene

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GUN #	Muzzle		Butt		Top		Bottom		Left		Right		FIRE CONTROL	
	F	S	F	S	F	S	F	S	F	S	F	S		
1														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#12
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
2														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#15
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
3														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#16
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
4														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#12
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		

F = FIRE POSITION SAFE "OFF"
 S = SAFE POSITION SAFE "ON"
 (F) = FIREING PIN FEEL "JAR OFF" OCCURED

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Drop Test - Wood

GUN #	Muzzle		Butt		Top		Bottom		Left		Right		FIRE CONTROL	
	F	S	F	S	F	S	F	S	F	S	F	S		
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#10
4'	OK	OK	OK	OK	(F)	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	(F)	OK	OK	OK		
GUN #2														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#15
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	(F)	OK		
GUN #3														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#16
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	F	OK	OK	OK	OK	OK	OK		
GUN #4														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#12
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		

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Drop Test - Neoprene

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FIRE CONTROL

GUN #	Muzzle		Butt		Top		Bottom		Left		Right		FIRE CONTROL	
	F	S	F	S	F	S	F	S	F	S	F	S		
5														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#13
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6														
UN #6														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#14
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
UN #7														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	176	#2
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
UN #8														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#17
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		

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Drop Test - Wood

GUN #	Muzzle		Butt		Top		Bottom		Left		Right		FIRE CONTROL #	
	F	S	F	S	F	S	F	S	F	S	F	S		
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#13
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
GUN #6														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#14
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
GUN #7														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	176	#2
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
GUN #8														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#17
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		

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Drop Test - Neoprene

⑤

GUN #	Muzzle		Butt		Top		Bottom		Left		Right		FIRE CONTROL	
	F	S	F	S	F	S	F	S	F	S	F	S		
GUN #9	2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	176	#3
	4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
	6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
GUN #10	2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#11
	4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
	6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
GUN #11	2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	174	#9
	4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
	6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
GUN #12	2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	176	#1
	4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
	6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		

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Drop Test - Wood

(6)

Gun #	Muzzle		Butt		Top		Bottom		Left		Right		Fire Control #	
	F	S	F	S	F	S	F	S	F	S	F	S		
Gun #9														
2'	OK	OK	OK	OK	OK	OK	F	OK	OK	OK	OK	OK	176	#3
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	F	OK	OK	OK	OK	OK	F	OK		
Gun #10														
2'	OK	OK	OK	OK	OK	OK	F	OK	OK	OK	OK	OK	174	#11
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
Gun #11														
2'					OK	OK	OK	OK	OK	OK	OK	OK	174	#9
4'					F	OK	OK	OK	OK	OK	OK	OK		
6'					OK	OK	OK	OK	OK	OK	Safe	Broke	out of Test	
Gun #12														
2'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		
4'	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	176	#1
6'	OK	OK	OK	OK	F	*F	OK	OK	OK	OK	OK	OK		

* Fired when
Safe was ~~pull~~
to pull it off

FOR COMPARISON ONLY

FROM REPORT #820391

REPORT TITLE: M/700 NEW DESIGN TAGGER AND SPRING EVALUATION

4-6-83

PENDULUM DROP TEST RESULTS

(JO = JAR-OFF)

P. HOWE

PAGE #1

FOOT DROP	GUN SERIAL No.	86341922	86350761	A6338848	A6817650	86341922	REM
FIRE CONTR. No.	#6	#7	#8	#9	#6 RETEST	4 SPECS	
ENGAGEMENT	.020	.020	.020	.020	.015	.015-.020	
TRIGGER Pull LBS.							
RESULT OF TIME MEASUREMENTS	4.0	4.0	3.5	4.5	3.0	3.0-5.0	
SAFE POSITION							
S-SAFE F-FIRE	S F	S F	S F	S F	S F	S F	
2' MUZZLE FIRST	OK	OK	OK	OK	OK	OK	
BUTT "	"	"	"	"	"	"	
RIGHT SIDE	"	"	"	"	"	"	
LEFT "	"	"	"	"	"	"	
TOP "	"	"	"	"	"	"	
BOTTOM "	"	"	"	"	"	"	
4' MUZZLE FIRST	"	"	"	"	"	"	
BUTT "	"	"	"	"	"	"	
RIGHT SIDE	"	"	"	"	"	"	
LEFT "	"	"	"	"	"	"	
TOP "	"	"	"	"	"	"	
BOTTOM "	"	"	"	"	"	"	
6' MUZZLE FIRST	"	"	"	"	"	"	
BUTT "	"	"	"	"	"	"	
RIGHT SIDE	"	"	"	"	"	"	
LEFT "	"	"	"	"	"	"	
TOP "	"	JO	"	"	"	"	JO
BOTTOM "	"	OK	"	"	"	"	OK
2' MUZZLE FIRST	OK	OK	OK	OK	OK	OK	
BUTT "	"	"	"	"	"	"	
RIGHT SIDE	"	"	"	"	"	"	
LEFT SIDE	"	"	"	"	"	"	
TOP "	"	"	"	"	"	"	
BOTTOM "	"	"	"	"	"	"	
4' MUZZLE FIRST	"	"	"	"	"	"	
BUTT "	"	"	"	"	"	"	
RIGHT SIDE	"	"	"	"	"	"	
LEFT "	"	"	"	"	"	"	
TOP "	"	"	"	"	"	"	JO
BOTTOM "	"	"	"	"	"	"	JO
6' MUZZLE FIRST	"	"	"	"	"	"	OK
BUTT "	"	"	"	"	"	"	"
RIGHT SIDE	"	"	"	"	"	"	"
LEFT "	"	"	"	"	"	"	"
TOP "	"	JO	"	JO	"	"	JO
BOTTOM "	"	OK	"	OK	"	"	JO

NEOPRENE STOP

HARD WOOD STOP

Report No. 833221

**SEAR ENGAGEMENT DATA
AFTER 50,000 DRY CYCLES AND DROP TEST**

<u>Gun #</u>	<u>F.C. #</u>	<u>Sear Eng.</u>	<u>Drop Test Neoprene</u>	<u>Results J.O. Hardwood</u>
1	10	.0185	OK	(1) 4 Ft. (1) 6 Ft.
2	15	.021	OK	(1) 6 Ft.
3	16	.0276	OK	OK
4	12	.0294	OK	OK
5	13	.0275	(1) 4 Ft.	(1) 4 Ft. (1) 6 Ft.
6	14	.0225	OK	(2) 2 Ft. (1) 4 Ft. (1) 6 Ft.
7	2	.0256	OK	(1) 6 Ft.
8	17	.0265	OK	(1) 6 Ft.
9	3	.0218	OK	(1) 4 Ft. (2) 6 Ft.
10	11	.024	OK	(1) 2 Ft.
11	9	.0225	OK	(1) 4 Ft. Safe Handle Broke
12	1	.0283	OK	(1) 4 Ft., (2) 6 Ft.

Present Rem. Sear Eng.
Specs are .015" to .020"

All above "JAR OFF"
occurred with SAFE in
"OFF" Position

- * Fire Control #1 fired when safe was moved from "ON to "OFF Position after 6' drop against hardwood stop (See Wood Drop Test Sheet Page #6 Gun #12 of this Appendix)

E.L.B. 11-15-83

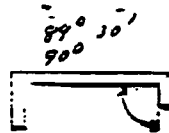
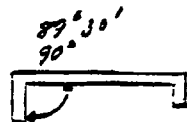
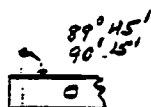
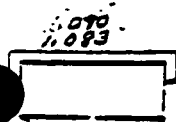
FIRE HOT TREAT

(9)

	1.0813	1.0828	89°50'	89°43'	89°40'	89°40'	89°40'	89°40'	89°40'	89°40'	89°40'	89°40'
1	1.0813	1.0828	89°50'	89°43'	89°40'	89°40'	89°40'	89°40'	89°40'	89°40'	89°40'	89°40'
2	1.0822	1.0826	89°55'	89°45'	89°30'	89°39'	89°40'	89°48'	89°40'	89°48'	89°40'	89°40'
3	1.0827	1.0832	89°42'	89°43'	89°36'	89°36'	89°36'	89°40'	89°40'	89°40'	89°40'	89°40'
4	1.0803	1.0818	89°50'	89°45'	89°15'	89°28'	89°30'	89°37'	89°30'	89°37'	89°30'	89°30'
5	1.0825	1.0827	89°49'	89°50'	89°37'	89°32'	89°40'	89°32'	89°40'	89°32'	89°40'	89°32'
6	1.0825	1.0825	89°38'	90°6'	89°39'	89°45'	89°45'	89°37'	89°45'	89°37'	89°45'	89°37'
7	1.0827	1.0832	89°45'	90°	89°36'	89°45'	89°39'	89°39'	89°45'	89°39'	89°45'	89°39'
8	1.0842	1.0843	89°40'	89°32'	89°40'	89°40'	89°42'	89°50'	89°40'	89°42'	89°50'	89°40'
9	1.0823	1.0828	90°	90°	89°30'	89°45'	89°32'	89°32'	89°45'	89°32'	89°45'	89°32'
10	1.0834	1.0824	89°55'	90°	89°43'	89°45'	89°48'	89°48'	89°48'	89°48'	89°48'	89°48'
11	1.0824	1.084	89°38'	89°37'	89°45'	89°52'	89°35'	89°40'	89°40'	89°40'	89°40'	89°40'
12	1.083	1.0823	89°45'	90°	89°47'	89°43'	89°40'	89°35'	89°40'	89°35'	89°40'	89°35'
13	1.0831	1.0825	89°45'	89°45'	89°26'	89°36'	89°35'	89°32'	89°35'	89°32'	89°35'	89°32'
14	1.083	1.0836	90°6'	89°50'	89°53'	90°4'	89°30'	89°44'	89°30'	89°44'	89°30'	89°44'
15	1.0837	1.0837	89°40'	89°40'	89°45'	89°45'	89°45'	89°45'	89°45'	89°45'	89°45'	89°45'
16	1.0814	1.0841	89°55'	89°39'	89°36'	90°	89°39'	89°43'	89°39'	89°43'	89°39'	89°43'
17	1.0847	1.0834	89°52'	89°40'	90°6'	89°45'	89°40'	89°33'	89°40'	89°33'	89°40'	89°33'
18	1.0833	1.0823	89°39'	89°50'	89°48'	89°37'	89°37'	89°44'	89°37'	89°44'	89°37'	89°44'
19	1.0823	1.0823	89°45'	89°46'	89°50'	90°	89°35'	89°44'	89°44'	89°44'	89°44'	89°44'
20	1.0826	1.0816	89°58'	89°55'	89°39'	89°30'	89°36'	89°50'	89°36'	89°50'	89°36'	89°50'
21	1.0817	1.0823	89°41'	90°30'	89°33'	89°40'	89°48'	89°46'	89°40'	89°48'	89°46'	89°40'
22	1.0833	1.0817	89°40'	89°46'	89°57'	89°26'	89°50'	89°53'	89°50'	89°53'	89°50'	89°53'
23	1.0812	1.0831	89°45'	89°50'	89°26'	89°44'	89°30'	89°31'	89°31'	89°31'	89°31'	89°31'
24	1.0827	1.0821	89°45'	89°53'	89°45'	89°30'	89°38'	89°30'	89°30'	89°30'	89°30'	89°30'
25	1.0832	1.0826	89°55'	89°46'	89°43'	89°30'	89°36'	89°47'	89°36'	89°47'	89°36'	89°47'

CONN. Spring Vendor
TR 1995-1996

نمبر ۱۷۰-۱۱

[illegible]

E.L.B

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**CONFIDENTIAL-SUBJECT TO PROTECTIVE ORDER
KINZER V. REMINGTON**