

SG: S. M. Alvis) In
 H. A. Brown) turn
 W. A. Best
 H. E. Faulkner
 R. H. Gress
 H. J. Hackman
 E. E. Leek
 M. H. Walker
 E. E. Wheat

PRELIMINARY PROGRESS REPORT

April 15, 1948

M/722 - 300 Sav. Cal. Rifle
Pilot Line Test

This report is issued to interested individuals so that immediate action can be taken to improve the accuracy and functional rate of the M/722 rifle in the 300 Sav. caliber. Results thus far show that the accuracy and functional performance of the eight (8) Pilot Line Rifles tested is unsatisfactory.

Accuracy

As previously reported, and repeated in this report, the accuracy at 120 rounds of testing of the eight guns is as follows:

<u>Gun No.</u>	<u>Accuracy - Extreme Spread</u>
25297	2.85"
25418	5.3
25361	3.8
25397 (Endurance Gun)	3.4 (120 rounds)
" "	4.6 (1000 rounds)
33998	5.2
24728	3.78
25347	2.94
25412	3.1

The conditions of the accuracy test were as follows:

Ammunition: Lot R16E103, 180 grain, Soft Point.
 Range: 100 yards; 20 Power Scope, Fore-End Support, Bench Rest.
 Shooters: M. H. Walker and W. E. Leek
 3 - 10 shot targets per shooter.
 Weather - clear, no wind.

In several of the targets it was noted that some of the "fliers" were "yawing". Poor accuracy of the guns may be attributed to the following conditions:

1. Shell length of the ammunition used is under min. as compared with a master chamber.
2. Poor bedding of the barrel and action is evident in most of the guns.
3. Dimensions of the bore back of the muzzle section are large, especially the section under the sight ramp. In all cases the barrels are smaller at the muzzle edge, indicating a constriction in this area (about the first 1/4").
4. The ammunition used is of questionable accuracy. Two types have been fired, one of which was standardized at 1.4" extreme spread at 100 yards, the other type being the same lot as used in plant testing. Standardization of the latter is unknown. Every effort is being made to obtain suitable accuracy ammunition before proceeding further with the test.

-2-

The following groove dimensions of the test guns were made with an air gage, the first dimensions being the muzzle section, others following 1", etc. to 21" from the muzzle. These variable dimensions undoubtedly contribute to the poor accuracy indicated at the top of each column.

4.6" (1000 rds.)								
E.S. (120 rds.)- 2.85"	3.3"	3.8"	3.4"	5.2"	3.78"	2.94"	3.1"	
Gun Number -	25297	25418	25361	25397	23998	24728	25347	25412
Muzzle	.3078	.308	.3075	.308	.308	.3077	.3075	.3071
1"	.3082	.3091	.3082	.309	.3089	.3087	.3084	.3085
2	.3083	.3090	.3082	.309	.3092	.3088	.3085	.3086
3	.3083	.3087	.3082	.309	.3093	.3088	.3085	.3086
4	.3080	.3084	.3079	.3088	.3085	.3084	.3081	.3083
5	.3080	.3084	.3079	.3088	.3085	.3084	.3081	.3083
6	.3080	.3084	.3079	.3088	.3085	.3084	.3086	.3083
7	.3080	.3084	.3079	.3087	.3084	.3083	.308	.3083
8	.3080	.3084	.3079	.3087	.3084	.3083	.308	.3083
9	.3079	.3084	.3079	.3087	.3084	.3083	.308	.3082
10	.3079	.3084	.3079	.3087	.3084	.3083	.308	.3082
11	.3079	.3084	.3079	.3086	.3084	.3083	.3081	.3082
12	.3079	.3084	.3079	.3086	.3083	.3083	.3081	.3082
13	.3079	.3084	.3078	.3086	.3083	.3083	.3081	.3082
14	.3079	.3084	.3078	.3086	.3083	.3083	.3081	.3082
15	.3079	.3084	.3078	.3087	.3083	.3084	.3081	.3082
16	.3078	.3084	.3078	.3087	.3082	.3083	.3081	.3082
17	.3078	.3084	.3078	.3087	.3082	.3083	.3081	.3082
18	.3078	.3085	.3078	.3087	.3082	.3084	.3081	.3082
19	.3078	.3085	.3078	.3087	.3082	.3083	.3081	.3082
20	.3078	.3085	.3078	.3087	.3082	.3084	.3081	.3083
21	.3078	.3083	.3078	.3086	.3082	.3084	.3081	.3084
	.0005	.001	.0007	.001	.0013	.0011	.001	.001
Functional	.0005	.0011	.0007	.001	.0013	.0011	.001	.001

All of the guns tested produced failures to eject, most of them occurring when ejection was performed at a slow rate. Some of the guns however, were worse than others and their performance during the first 120 rounds is as follows:

Gun No.	Rounds Fired	Percent Performance	Ejection	Feeding	Remarks
25412	0-120	1.7%		1	Bolt over-rode 5th round.
			1		Failed to Eject (slow).
23998	0-120	10%		6	Bolt over-rode shell (slow) 4
					Shell jumped rails (slow) 2
					Failed to Eject (slow)
25397	0-120	5.8%	7		" " " "
25418	0-120	1.7%	2		" " " "
25361	0-120	2.5%	3		" " " "
25297	0-120	4.2%	5		" " " "
25347	0-120	8.3%	10		" " " "
24728	0-120	5.8%	7		" " " "

-3-

Gun #2397 was chosen for the endurance gun to proceed to 6000 rounds of firing. The first 1000 rounds show a malfunction rate of 5.5%. Fifty-four (54) of the malfunctions were failures to eject. One was a failure to fire. The failure to fire occurred because of burrs on the base of the firing pin binding in the firing pin head, regarding the forward acceleration of the firing pin, resulting in the light indent of the primers. This condition could be serious by causing an occasional hangfire. In the firing of 1000 rounds it was noted that three fired shell cases contained protruded primers and that these protruded primers were entailing on the edge of the ejector in the bolt head, preventing ejection. It is believed that the fail to eject malfunctions were caused directly or indirectly by the following:

1. Incorrect chamber dimensions on the inside section of the recessed bolt head.
- *2. Ejectors - min. length.
3. The overall length of the cartridges are under min. as compared with a master chamber, which could allow the primers to set back and protrude beyond the base of the shell head.

The following analysis was made by H. E. Falkert:

Dimensions of Ejector -	
Actual	Specified
Min. .1228"	.1199"
Max. .1086	.1115
Mean .1197	

Gun No.	Chamber	Ejector Load	Ejector Length
25347	Fair	6 lbs.	.1110"
25397	Poor	5-3/4 lbs.	.113
25412	Fair	6-3/4 lbs.	.1149
24728	Fair	6-3/4 lbs.	.112
25418	Good	6-3/4 "	.115
25397	Poor	6-3/4 "	.111
25361	Good	6-1/2 "	.111
25996	Fair	5-3/4 "	.1085

Recommendations:

It is recommended that before proceeding further with the test, an investigation of the variables contributing to poor accuracy and poor functional performance be made.

H. E. Leek
Engineering Section
Aston Technical Division

WEL:MP