

Remington Arms Company, Inc.
Ilion Research Division

Ilion, New York
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TO: W.E. LEEK
FROM: K.W. SOUCY
SUBJECT: EFFECTS OF FIRING PIN INERTIA ON SELECTED
REMINGTON PRODUCTS

INTRODUCTION:

In support of and in addition to the review of The 3200 Shotgun firing pin mechanism, testing was conducted on a number of other Remington products to provide background information and a basis for comparison.

OBJECTIVE:

The objective of this test was to determine the propensity of selected Remington products to ignite primers due to the inertia of the firing pin.

SUMMARY AND CONCLUSIONS:

Drop tests were conducted on the M/1100, M/700, M/742, M/788 and M/600 using the Research Pendulum Drop Test. All the guns tested presented a finite, although in some cases small, possibility of igniting a primer due to inertia of the firing pin. The guns were tested in abnormal conditions (follow down, no firing pin return spring, etc.) as well as in normal condition. All drops were from a height of six feet.

The M/742 proved to be the most susceptible (while in normal condition) to igniting a primer because of firing pin inertia. In a normal condition, it produced a .005 - .007 inch copper crusher indent indicating an approximate 10-15% probability of primer ignition. In a follow down position, the M/742 would produce a copper crusher indent of .009 inches indicating an approximate 40% probability of primer ignition.

The M/1100 produced a negligible indent of .002 inches in normal condition, but produced a .005 inch indent when dropped without a firing pin return spring (to simulate a broken spring).

SUMMARY AND CONCLUSIONS (Continued):

The three bolt action guns (M/700, M/600, M/788) were all tested in a follow down position. The M/700 produced .0055 to .007 inches indent with the firing pin spring and .015 to .016 inches without. This indicates a 15% and 100% probability of igniting a primer, respectively. The M/600 produced .0035 inches indent (2%-3% probability) with the firing pin spring in place. The M/788 produced .0025 - .003 inches indent (2% probability) with the firing pin spring in place and .009 inches (40% probability) without the firing pin spring.

The above mentioned figures are based on a six foot drop onto a hardwood striking surface. When using a steel plate for a striking surface all figures are increased although the amount of increase is dependent on the conditions of the drop.

EXPERIMENTAL DETAILS:

PART 1

The following information is based on a six foot drop onto a hardwood striking surface using copper crushers with a hardness of RK 57-58.

MODEL 742

Conditions: 6 Ft. Drop on Hardwood
Hammer Up
With Firing Pin Return Spring

Results: .0050 Inches Indent
.0060 " "
.0050 " "
.0070 " "
.0050 " "

Conditions: 6 Ft. Drop on Hardwood
Hammer Up
No Firing Pin Return Spring
Firing Pin in Rearmost Position

Results: .0070 Inches Indent
.0065 " "
.0065 " "
.0060 " "
.0065 " "

Conditions: 6 Ft. Drop on Hardwood
Hammer Down
With Firing Pin Return Spring

Results: .0090 Inches Indent
.0090 " "
.0090 " "
.0090 " "
.0085 " "

MODEL 742 (Continued):

Conditions: 6 Ft. Drop on Hardwood
Hammer Down
No Firing Pin Return Spring
Firing Pin in Forward Position

Results: .0035 Inches Indent
.0045 " "
.0025 " "
.0040 " "
.0030 " "

Conditions: 6 Ft. Drop on Hardwood
Hammer Up
No Firing Pin Return Spring
Firing Pin in Forward Position

Results: .0055 Inches Indent
.0050 " "
.0055 " "
.0050 " "
.0050 " "

MODEL 1100

Conditions: 6 Ft. Drop on Hardwood
* Hammer Up
With Firing Pin Return Spring

Results: .0020 Inches Indent
.0020 " "
.0020 " "
.0020 " "

* It has been found that the position of the hammer in the M/1100 is immaterial, since the hammer is stopped by the bolt before the firing pin reaches the primer.

MODEL 1100 (Continued):

Conditions: 6 Ft. Drop on Hardwood
Hammer Up
No Firing Pin Return Spring

Results: .0035 Inches Indent
.0050 " "
.0040 " "
.0050 " "

MODEL 700

Conditions: 6 Ft. Drop on Hardwood
Follow Down Position
With Firing Pin Spring

Results: .0055 Inches Indent
.0065 " "
.0050 " "
.0070 " "

Conditions: 6 Ft. Drop on Hardwood
No Firing Pin Spring
Firing Pin Forward

Results: .0045 Inches Indent
.0050 " "
.0050 " "
.0060 " "

Conditions: 6 Ft. Drop on Hardwood
No Firing Pin Spring
Firing Pin in Rearmost Position

Results: .0150 Inches Indent
.0160 " "
.0160 " "
.0155 " "

MODEL 600

Conditions: 6 Ft. Drop on Hardwood
Follow Down Position
With Firing Pin Spring

Results: .0035 Inches Indent
.0030 " "
.0035 " "
.0035 " "

MODEL 788

Conditions: 6 Ft. Drop on Hardwood
Follow Down Position
With Firing Pin Spring

Results: .0025 Inches Indent
.0030 " "
.0025 " "

Conditions: 6 Ft. Drop on Hardwood
No Firing Pin Spring
Firing Pin in Rearmost Position

Results: .0090 Inches Indent
.0090 " "
.0090 " "

Conditions: 6 Ft. Drop on Hardwood
No Firing Pin Spring
Firing Pin Forward

Results: .0025 Inches Indent
.0015 " "
.0015 " "

PART 2

In addition to testing using a hardwood striking surface, a limited amount of testing was done using a steel striking surface. The following information indicates a generally higher copper crusher indent for this condition.

MODEL 742

Conditions: 6 Ft. Drop on Steel
Hammer Up
With Firing Pin Return Spring

Results: .0075 Inches Indent
.0095 " "
.0085 " "

Conditions: 6 Ft. Drop on Steel
Hammer Up
No Firing Pin Return Spring
Firing Pin in Rearmost Position

Results: .0090 Inches Indent
.0090 " "
.0090 " "

Conditions: 6 Ft. Drop on Steel
Hammer Up
No Firing Pin Return Spring
Firing Pin Forward

Results: .0100 Inches Indent
.0100 " "
.0090 " "

MODEL 1100

Conditions: 6 Ft. Drop on Steel
Hammer Up
With Firing Pin Return Spring

Results: .0030 Inches Indent
.0030 " "
.0035 " "

Conditions: 6 Ft. Drop on Steel
Hammer Up
No Firing Pin Return Spring

Results: .0070 Inches Indent
.0060 " "
.0055 " "

MODEL 700

Conditions: 6 Ft. Drop on Steel
Follow Down Position
With Firing Pin Spring

Results: .0150 Inches Indent
.0150 " "
.0160 " "

Conditions: 6 Ft. Drop on Steel
No Firing Pin Spring
Firing Pin Forward

Results: .0135 Inches Indent
.0150 " "
.0135 " "

MODEL 700 (Continued):

Conditions: 6 Ft. Drop on Steel
No Firing Pin Spring
Firing Pin in Rearmost Position

Results: .0210 Inches Indent
.0230 " "
.0215 " "

PART 3

Primed cases were used in some guns to verify results obtained with copper crushers. The following was obtained using a 6 ft. drop and a hardwood striking surface.

MODEL 742

Conditions: 10 Drops
6 Ft. Drop on Hardwood
Hammer Up
With Firing Pin Return Spring

Results: 1 Detonation .

Conditions: 10 Drops
6 Ft. Drop on Hardwood
Hammer Up
No Firing Pin Return Spring
Firing Pin in Rearward Position

Results: No Detonations

Conditions: 10 Drops
6 Ft. Drop on Hardwood
Hammer Down
No Firing Pin Return Spring
Firing Pin in Forward Position

Results: No Detonations

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MODEL 742 (Continued):

Conditions: 10 Drops
6 Ft. Drop on Hardwood
Hammer Down
With Firing Pin Return Spring

Results: 4 Detonations

MODEL 1100

Conditions: 10 Drops
6 Ft. Drop on Hardwood
With Firing Pin Return Spring

Results: No Detonations

Conditions: 10 Drops
6 Ft. Drop on Hardwood
No Firing Pin Return Spring

Results: 1 Detonation

MODEL 700

Conditions: 10 Drops
6 Ft. Drop on Hardwood
Follow Down Position

Results: 2 Detonations

Conditions: 10 Drops
6 Ft. Drop on Hardwood
No Firing Pin Spring
Firing Pin in Forward Position

Results: No Detonations

Conditions: 10 Drops
6 Ft. Drop on Hardwood
No Firing Pin Spring
Firing Pin in Rearmost Position

Results: 10 Detonations

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