

Section F

"No fire, no fire"

Quote: Portland, Ma. Police Sniper

History: The "Fails to Fire Malfunction"

October 28, 2010

Portland police drop rifles amid safety concerns

Video of a local training exercise supports claims of faulty triggers in some Remington 700 rifles.

By [David Henchdhench@mainetoday.com](mailto:David.Henchdhench@mainetoday.com)
Staff Writer

PORTLAND - The Portland Police Department's special reaction team has stopped using its Remington 700 sniper rifles, because one of them started firing unpredictably and a network news report said similar problems elsewhere have caused injuries and prompted lawsuits.



[click image to enlarge](#)

Portland Police Chief James Craig, shown at a news conference in May.

Staff file photo

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See the [CNBC story](#).

See the Remington [response](#).

A program on CNBC last week highlighted several reports that Remington 700 rifles -- a mainstay for the U.S. military, law enforcement and gun enthusiasts -- had fired when the trigger had not been pulled.

The program's findings were bolstered by a video taken at a Portland police training exercise. One of the rifles was shown firing when the trigger was not being pulled.

"I don't want to run the risk of having an accidental discharge like this where it puts an officer's or community member's life in danger," Police Chief James Craig said Wednesday.

Remington denies the allegations and, supported by gun rights advocates, criticizes the network's reporting of the story.

"CNBC ignored facts and information provided by Remington and instead relied on allegations, misleading anecdotes, and false claims," said a statement on the company's website. "Over 5 million Model 700s have been safely and reliably used by millions of shooters, military personnel and law enforcement officers for almost fifty years. The Model 700 is the most popular bolt-action rifle in the world."

Remington said that if standard safety rules are followed, such as always pointing the barrel of a gun so that a discharge would not injure anyone, the alleged injuries could not have happened.

One of the most serious cases in which an accidental discharge is alleged occurred in 2000 in Montana, where a woman said she was unloading her rifle with the barrel pointed at an empty horse trailer. The gun fired and the bullet pierced the van's walls and hit her son on the other side, killing him.

It was one of two dozen deaths said to have resulted in part from faulty trigger mechanisms, the report said.

The woman has since sued the company, one of scores of similar suits nationwide, according to the TV report, which said Remington has paid out \$20 million in settlements.

Columnists who criticized the CNBC program said the guns will not misfire if they are properly maintained and if the trigger mechanism is not adjusted.

However, Craig said his department's Remington 700 that misfired had not been altered.

After the first incident, in 2008 during a training exercise at a firing range, the weapon was taken to an armorer. The armorer found nothing wrong with it and could not re-create the misfire, so the gun was put back in service.

During another special reaction team training session, the gun misfired again, and the officers captured video of it on a cell phone. The video, which CNBC obtained, shows an officer prone, the rifle barrel supported by a bipod. The officer removes his finger from the trigger, then reaches forward to touch the bolt. The rifle fires.

The sequence was repeated with the same results.

After the training episode, the gun was again taken out of service. Craig said the department contacted Remington and was told the weapon was not under warranty.

That was in 2009. Only later did Portland officials become aware of the controversy over the weapon.

Craig said his department will no longer use its five Remington 700s, and has grant money to buy a new weapons system, at a cost of \$1,000 to \$1,500.

"We have no evidence that there's other weapons malfunctioning but we don't want to run that risk," he said.

For the time being, the department will use the officers' standard issue M-16 with a scope, he said.

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dhench@pressherald.com

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MODEL 40X FIRE CONTROL INVESTIGATION

INTRODUCTION

Consistent reports and occasional customer complaints from the field, all voicing trouble with the performance of the 40X fire control prompted this investigation. These complaints have been varied in nature from variation in pull weight to complete failure in firing. Since design testing had revealed no justification of these complaints, there has been considerable doubt as to their validity, and if so, what could be done about it. What about the M/721-722 which is of the same basic design?

OBJECTIVE

1. Does the fire control, if properly made, fail at any time?
2. Does the pull weight vary with extended cycling and how much?
3. Determination of causes, if any, which bring about the above.
4. Propose methods of curing these ills.
5. Take a general look at all the factors in good gun function in this model; i.e. Firing Pin, Bolt Lugs, Cocking Piece, Main Spring, Head Space, etc..

SUMMARY & CONCLUSIONS

1. The fire control as now designed will fail to fire properly under continued use if not lubricated consistently. This, in extreme cold climatic conditions, would present a problem in all our present line of bolt action guns.

2. Under present manufacturing and design standards the load-lubrication variable results in a variation in pull weight (average) from 3 lbs. to 6 lbs..
3. Calculations affirm test data that the coefficient of friction of steel on steel between lubricated and dry surface straddles nicely the loads imparted to the connector from some minus value to a max. of 3 lbs. Actual measurements run 0 to 2 lbs. Added to the above is the connector surface variable and spring weight in the pull adjustment spring. This makes test data and theoretical in close agreement. Two out of three tests started dry eventually failed even to fire. The sear being held in the cocked position with the trigger disengaged.
4. The plating of the sears with a low coefficient material to reduce the Mu variable proved realistic. Electroplate went 9600 cycles very satisfactorily before breaking down and reverting to steel on steel characteristics. Nicol lasted 2,000 cycles. Moly sulphide was no better. Chrome plated parts went to 10,000 cycles with no change in wear apparent after 2,000-3,000 cycles. Fired intermittently dry and oiled after 10,000 cycles with less change in overall variation than steel on steel in any one try of 10 cycles.

	<u>Best</u>	<u>Worst</u>
Steel on steel	2 oz.	2#10 oz. - 5#3oz.
Chrome on chrome	1 oz.	2#0 oz. - 2#15 oz.
Chrome dry to chrome lubricated - 10 cycle Avg.	1 1/2 oz.	
Steel dry to steel lubricated	3#3 oz. - 5# 8 oz.	

5. Firing pin indent was maintained at .022 for 50,000 cycles on one sample and for 30,000 on second where both dropped to .020 (satisfactory). Third sample start .022 - 30,000 .018 low.

Headspace developed early when lugs were not lubricated (start 0 -.042; 5000 - .0435; 10,000 - .0475; 15000 - .052) accompanied by galling. Maintains .052 when lubricated to 50,000 cycles. Second sample lubricated every 1,000 cycles changes from .0435 to .0445 at 10,000. Maintained this to 50,000 - no change.

Sear engagement remained at initial setting throughout all testing (production assembly).

Bolt lugs reacted in line with receiver mating surfaces but to a lesser degree. Cooking piece and bolt cam surface were lubricated throughout and were OK.

6. The similarity in design between the 40X and the 721-722 line gives immediate rise to the question of how much of the foregoing is in these bolt action sporters. We believe that these characteristics are very real and under extreme cold-lubrication conditions could fail to fire.

Main spring showed some "set" but not excessive and maintained satisfactory indent to 50,000 cycles.

A longer test would be necessary to established "set rate" beyond the 50,000 cycle period of this test.

FUTURE PROGRAM

1. No further work is anticipated at this time by this department to establish the causes of field complaints.
2. The nature of the plating cycle produces "treeing" and excessive plating on the critical sear surfaces and mating connector, which ruins the parts for further use, resulting in dangerous chipping and pull failure upon assembly. Investigation of this control must be established.
3. No cost picture was considered but a possible reduction in grinding and stoning operations could conceivably be achieved on 40X parts by plating all 40X - 721 - 722 parts in the "as produced" conditions. Tests should verify this before acceptance.
4. Consultation with Electroplate might produce a better, lower cost coating than chrome in its final state. The results on the pilot samples was very discouraging and at this time it is our belief this is the best they have to offer.
5. It is our recommendation that the process be investigated and at least 40X parts be plated satisfactorily on all future guns produced and that this be initiated immediately.
6. For limited firing in 721-722 guns Electroplate could bear this nicely if the cost picture was favorable compared to chrome.

TEST PROCEDURE AND DETAILS

The first 40X dry cycled was set up to investigate the gun in the "as packed" condition. Action and parts oiled with about a 30% load between the bolt and receiver to represent the residual load from the fired case. It was recognized that this load would be

applied on the closing stroke as well as the opening stroke of the bolt. Further, this muzzle load was acting in conjunction with the normal mainspring-sear load. The (Firing Pin) sears were lubricated but, as field practice does not dictate lubrication of the Lug areas, this was omitted. The gun was dry cycled 52,200 cycles. At 1,000 cycle intervals headspace, firing pin indent, protrusion, sear engagement, and a ten cycle weight average taken on trigger pull.

Head space	Start .0435	Finish .048
Indent stayed constant at	.022 - 45,000 cycles	50,000 cycles .020
Firing Pin protrusion	.035 constant	
Sear engagement	.015 constant	
Pull average 10 cycle	Low 3# 6 oz.	High 5# 3 oz.
Pull Lowest Single	2# 10 oz.	Highest 5# 12 oz.

Several times during this test the gun refused to fire. No apparent mechanical reason could be found when dismantled. The gun always continued to function when inspection was under way. Some scouring of the bolt lugs was observed but at 52,000 (end of cycling) the scoured area had not completely covered the lug surfaces.

To verify the foregoing test another gun was run through the same procedure and conditions. This gun followed closely the reaction of the first.

Head space	Start .0435	13,000 .052	30,000 .052
Indent	Start .022	30,000 .0165	
Firing Pin protrusion	OX		
Sear engagement	.010 - Stayed		
Pull average	Low 2# 14 oz.	High 3# 10 oz.	
Pull - Single	Low 2# 13 oz.	High 3# 12 oz.	

This gun did not refuse to fire during the 30,000 cycles. The pull was very consistent at all times which was quite the reverse of #1 sample. However, the lugs of receiver and bolt responded early (10,000 cycles) to the lack of lubrication by galling and fast development of headspace - .052 at 13,000 cycles.

Gun #3 was then started on the above routine test to determine how soon it would refuse to fire. We were fortunate in getting early failures to fire. This gun began failing at 2,000 cycles and test was stopped at 8,000. This model could be set up by carefully moving the trigger back and forth on the connector (not firing). This action resulted in setting up the sears so the trigger could then be pulled fully, leaving the firing pin fully cocked supported only by the sear. A slight jar or pressure on the cocking piece, or movement of bolt handle, would release the firing pin. Had the gun been loaded it would have fired the live round.

This would indicate the friction element to be the big variable in all of our difficulties. Handbooks tell us this can vary between .25 and .74 depending on surface lubrication, finish, loads, etc..

A calculation of the M_u in this assembly seemed fitting. Using model drawing dimensions, spring weights of 17 to 19 pounds on the main spring calculations involving the mean dimensions on moments above the pivot pin and the bearing to be applied at the center of the 27° angle on the rear of the sear (63° as the firing pin sees it), the coefficients to equalize all forces would be .289 to .35.

A fire control was set at the specs of approx. 3# pull weight; a run of 10 cycles was weighed. This fire control varied between 2# 15 oz. to 3# 12 oz.; average 3.32 lbs. All sears were now lubricated carefully and weighed for 10 cycles. Average was 5# 5 oz., min. 5# 1 oz., max. 5# 8 oz.. This seemed to confirm the Mu analogy.

The most logical approach economically was to try a coating having a low coefficient of friction high bearing strength. Three seemed possible; Nicol, Chrome and Electroplate.

Under test Nicol started out fine but at around 2,000 cycles began to fail, chipped off badly and was discarded.

Chrome was next tried. Difficulty was experienced in getting a plate free from excessive build up or "treeing" on the sharp sear edges. Of the two samples tried these were exceptionally good. Of a 10 cycle average run at $\frac{1}{2}$ 1 oz thru 7,000 cycles, no indication of freezing average shifted over the 7,000 cycles from 3# 5 oz. up to 3# 8 oz. This was dry, care being taken to get no oil on the parts. The parts were now oiled and tested pull was then back to 3# 6 oz., and after 6,000 more was still at the 3# 8 oz. setting with no change. The second sample followed in close agreement with the first tolerances and average remained the same as #1. The surprising fact still was the little influence lubrication had on the total pull weight. It would appear there is hope of having the parts such that an adjustment could be made and held for the life of the gun.

Electroplate was next tried. These samples looked very uniform and high hopes for these were entertained, since this would

remove the critical aspect of chrome plating. This test was an exact duplicate of the reaction experienced with the tests on chrome plate. Very uniform pulls, no change in the averages as the test progressed. This was the reaction till we reached 9,600 cycles, at which point the results suddenly changed. The weight looked like steel on steel. Under the microscope it was found that this was indeed what had happened. The Electroplate had worn away and we were again getting steel on steel. No further testing was done with Electroplate.

CHMorse:T
12-12-56

4 *Handwritten initials* DON'T SAY IT / WRITE IT

TO S. M. ALVIS *WORKING*

DATE October 12, 1972

FROM M. H. WALKER

Subject MODEL 700 SEARS

*Fail
Test my*

The sear problem on the 700, 40XB, etc., discovered on the Left Hand pilot test, is one which is probably more serious than the Plant realizes.

Apparently a material change was made without adequate testing. Present sears develop up to 10# trigger pulls, and although none were reported, failures to fire could develop after only 1000 to 5000 dry cycles. Failures to fire are extremely dangerous as a slight lift of the bolt will generally fire the rifle. Present sears will not produce adequate trigger pulls on M/40XB rifles as assembled.

We have threatened to change the sear to wrought material in an attempt to get quick action. Sears of the old material are being fabricated. It is possible they are working as fast as they can. This should be checked again.

Copy sent to

L. J. Doyle
H. 70
by
SMA
10/12/72

MHW/nl

AL 0026805

PURCHASE ORDER

Les Freer

GUN SHOP

FIREARMS DEALER
LICENSE NO. 74-6344

ORDER No. 7476
THIS NO. MUST APPEAR ON
INVOICE, B/L, AND CASES.

DATE

Jan. 28, 1975

1928 SPRING BRANCH DRIVE
HOUSTON, TEXAS 77053
713/667-3016

ISSUED TO

Mr. George Martin
Remington Arms Co.
Ilion, New York # 13357

SHIPPING DATE
VIA

RECEIVED

For prompt payment mail invoice showing order number with bill of lading after shipment is made.
Acknowledge and advise promptly if unable to make immediate shipment.
Goods subject to our inspection, notwithstanding prior payment to obtain cash discount.

FEB 04 1975

QUANTITY

NUMBER

DESCRIPTION

G. W. MARTIN

Dear George:

Subject: Trigger malfunctions

Re our phone conversations, I am forwarding one Model 700BDL, 25/06, serial #6356761 just as we received it from GLOBE STORE #B, 6200 Bellaire Blvd., Houston.

We produced a malfunction in this trigger assembly as follows: cocked the bolt, put the safety on and pulled the trigger - the safety held as it should (did not fire) - then the safety was moved to "fire" position and the trigger pulled again but then the sear failed to trip (did not fire); however a few more pulls on the trigger and it suddenly fired.

Like most trigger malfunctions we have found, this one may be difficult to reproduce, may require several attempts to demonstrate but if you keep trying it will occur.

Although this particular malfunction is not the same as most recent ones it is closely related to the overall problem. Hope it is of some help to you.

SHIPPED UNDER SEPARATE COVER

ON 1-31-75 VIA *Priority Post*
Please acknowledge receipt

Best regards,

Les
Les Freer

PLAINTIFF'S
EXHIBIT

3172

AL 0029694

RECEIVED
FEB 4 1975
ARMS SERVICE

PURCHASE ORDER

Les Freer

GUN SHOP

FIREARMS DEALER
LICENSE NO. 74-6344

ORDER NO. 7477

THIS NO. MUST APPEAR ON
INVOICE, B/L, AND CASES.

DATE

Jan. 29, 1975

8928 SPRING BRANCH DRIVE
HOUSTON, TEXAS 77055
713/467-3016

ISSUED TO

SHIPPING DATE

VIA

Mr. George Martin
Remington Arms Co.
Ilion, New York 13357For prompt payment mail invoice showing order number with bill of lading after shipment is made.
Acknowledge and advise promptly if unable to make immediate shipment.
Goods subject to our inspection, notwithstanding prior payment to obtain cash discount.

QUANTITY

NUMBER

DESCRIPTION

Dear George:

Subject: M/600 Trigger Malfunctionns

Here is another Model 600 trigger problem, serial No. 6651698, cal. 6mm, just as we received it from the owner - we have disturbed nothing on the gun, have not even removed it from its stock for inspection.

Purchased last Saturday from Carter's Country, Houston, the owner fired half dozen rounds on the rifle range when he had a malfunction by simply failing to get a firing pin fall by pulling the trigger with the safety in normal "fire" position. He then removed his finger from the trigger and the gun discharged as he reached for the bolt handle.

The owner assures us that no one has tinkered with any part of the rifle since he purchased it. We failed to produce the same malfunction after several attempts but we find the trigger pulls so creepy and rough we have to believe the owner. Here again we find performance of the trigger erratic and frustrating, but very dangerous for this reason. If we were to repair this one we probably would choose to replace the trigger assembly.

Hope this helps to point up the problem.Owner:
Raymond Osbon
11703 No. Petershan
Houston 77071 Ph 496-8312AL 0029695
124PLAINTIFF'S
EXHIBIT

3173

But required

March 18, 1975

Les Freer Gun Shop
8928 Spring Branch Drive
Houston, Texas 77055

Dear Les:

Thank you for forwarding the Model 600, Serial Number 6651698, and the Model 700, Serial Number 6356761, to us for inspection of the fire control problems.

We could duplicate both conditions which you described, following your sequence of operations. On both guns we found that the firing pin head was binding, holding it back until some motion would free it, and it would come forward. On the Model 600 we also found that the sear safety cam was binding in the housing. On fire control problems of this type, when a new fire control assembly is installed, the freedom of movement of the firing pin head also should be checked.

We appreciate your sending these guns back, and would like you to return any guns of this or the previously discussed type for our inspection. Would you please contact George Martin as you did this time.

Thank you again for your consideration.

Sincerely yours,

John P. Linde, Manager
Manual Firearms Design
Illion Research Division

JPL:T

AL 0031984