

REMINGTON ARMS COMPANY, INC.

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Ilion, New York
May 12, 1970
Revised 7/13/70

To: A.A. Hugick
From: K.W. Soucy
Subject: Pendulum Drop Test - Progress Report No. 1

Introduction:

The pendulum drop test device was constructed to provide a means of reliably drop testing firearms. The former method of drop testing was felt to be inadequate due to lack of repeatability and undue damage to test guns.

Objective:

In order to design a repeatable drop test, information on the nature and magnitude of the forces involved was needed. Also needed was quantitative data on the effects of different drop heights, different positions and different striking surfaces.

Summary and Conclusions:

The above stated objectives were met fully. We now have a reproducible drop test that has been tested for a range of conditions, including the use of three different materials for a striking surface. A positive correlation between the pendulum drop test and the vertical drop test has also been verified.

Future Work:

Future work will include instrumentation of other models of firearms and possibly further investigation into the effects of different striking surfaces.

Experimental Details:

A M/1100 fire control was instrumented with a Kistler accelerometer to obtain information on deceleration forces. The gun was positioned to strike on each of four positions; muzzle, butt, top and bottom. Striking surfaces used were hard wood, steel plate and concrete. The gun was dropped from 1, 2, 3 and 4 ft. (to 5 ft. on the hard wood surface).

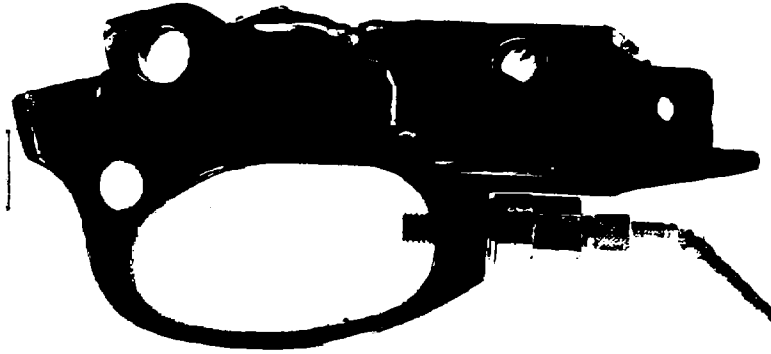
The charge from the Kistler accelerometer was amplified by a Kistler charge amplifier and displayed on a Tektronix Type 565 oscilloscope through a 3A74 display amplifier.

Figures 1 through 10 show the results of drops with various combinations of conditions and are self-explanatory. The maximum deceleration rate encountered was 3300 g's. This took place striking the top of the gun on steel from a 4 ft. height.

Results from drop to drop were reproducible to within approximately 10% at the higher drops and within 5% at the lower drops.

KWS:sp

Transducer location for
butt and muzzle drops



Transducer location for
top and bottom drops



Remington Arms Company, Inc.
Ilion Research Division
Ilion, New York
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CORRELATION OF VERTICAL
AND
PENDULUM DROP TESTS

	<u>Vertical</u>	<u>Pendulum</u>
Top	1 ft. 600 g's	700 g's
	2 ft. 800 g's	850 g's
	3 ft. 1000 g's	950 g's
	4 ft. 1400 g's	1350 g's
Bottom	1 ft. 200 g's	250 g's
	2 ft. 300 g's	400 g's
	3 ft. 300 g's	450 g's
	4 ft. 350 g's	500 g's
Muzzle	1 ft. 600 g's	800 g's
	2 ft. 800 g's	750 g's
	3 ft. 850 g's	900 g's
	4 ft. 950 g's	1100 g's
Butt	1 ft. 400 g's	400 g's
	2 ft. 600 g's	700 g's
	3 ft. 1000 g's	1150 g's
	4 ft. 1300 g's	1475 g's

K.W. Soucy:sp