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DROP TESTS/JAR-OFF TESTS
LAB PROCEDURE
PENDULUM METHOD

The pendulum method is recommended due to the repeatability with little or no deviation.

Two impact media's are used:

- o Hard Rubber
1" thick hard rubber mounted onto brick wall
- o Maple Plank
2" thick hardwood mounted onto brick wall

Six Drop Positions are utilized:

1. Muzzle
2. Butt
3. Left Side
4. Right Side
5. Top Side - Sight Line
6. Bottom Side - Trigger

The firearm is fastened to plastic coated steel cables at the pistol grip and Barrel areas.

GUIDELINES FOR TESTING

SET-UP

- o One cable per fastening location to be used for:
Topside, bottomside, left and rightside positions
- o Two cables per fastening location to be used for:
Muzzle and Butt positions

Guidelines for Testing - Contd.

Set-up - Contd.

- o Adjust firearm placement so that gun is parallel and square to the impact area.
- o Gun is to be leveled in each position prior to drop.

MEASUREMENTS:

The following measurements should be taken prior to and at the completion of each drop test:

- o Firing pin indent - and protrusion
- o Trigger pull
- o Safe ON/OFF forces
- o Trigger pre-play)
- o Sear engagement) depending on model tested
- o Sear lift)
- o Gun weight
- o Headspace

Note: If a firing occurs during the test it may be beneficial to conduct the above measurements before continuing to record any change in the parts evaluated.

LUBRICATION:

- o Lubrication of the fire control area may influence the results. Follow the prescribed lubrication procedures explained in this text. Lubricate all fire control assemblies prior to the start of test.
- o Control assemblies should be lubricated the same way.

STOCK/WOOD BREAKAGE:

- o Periodically during the drop test the firearm will experience cracks or breakage of the wood due to the severe impact during various positions of drop. When these cracks or breakages occur, the wood should be replaced. Large cracks in the wood may change the harmonics generated during impact.

Guidelines for Testing - Contd.

FIRING PIN INDENT DURING TEST:

- o It is essential to record firing pin indent during a drop test. Indent is very important when evaluating a firearm with an inertia firing pin design.
- o Copper crushers should be used to record indent during the test. If an indent of .005" is obtained a primed case could be substituted to determine if the indent is sufficient to fire a round.
- o Extreme care should be taken when testing using primed cases.
 - Close off drop area to traffic
 - Secure coyne towel around muzzle (make sure it does not affect impact)
 - Point muzzle in safest direction possible (always away from tester!)
- o If the primer becomes indented but does not fire, the case should be replaced before continuing.

DROP TEST PROCEDURE

IDENTIFICATION:

It is essential that the technician provide an accurate description of the type of fire control and firearm being tested.

- o New design, design change, vendor part.
- o Print numbers of changes.
- o Change in material or Heat Treat.
- o Etc.

LUBRICATION:

- o Lubrication of the fire control area may influence the results. Follow the prescribed lubrication procedures explained in this text. Lubricate all fire control assemblies prior to the start of test.

Drop Test Procedure - Contd.

Lubrication - Contd.

- o Control assemblies should be lubricated the same way.
- o Periodically the technician will have to deviate from established lubrication practices to conform with special requests from engineers and supervision.

MEASUREMENTS:

Conduct all measurements as described in Guidelines and also any other measurements as requested by Engineer or Supervision.

SAFETY:

As with all experimental testing, safety is a prime factor in conducting a test. Use care in working with primed cases due to muzzle flash. Watch out for wood splinters and flying parts. Close off drop area so that no one walks in front of firearm during drop.

SET-UP:

Refer to guidelines for use of cables, aligning firearm and adjustments.

The drop height is determined by holding the firearm against the impact area and placing a mark on a measuring stick which indicates the centerline of the action. (Receiver) The actual drop height is then marked off using this line as 0 (zero) height.

ACTUAL DROP STANDARDS:

1. The present setup produces drop heights of 0 to 6 feet.
2. Testing should be conducted in one foot intervals starting at one foot.
3. A minimum of three drops per position should be conducted.
4. The Trigger should be pulled and the action cycled after each drop.
5. All tests should be conducted with safety in ON and OFF positions. When the safety is in the ON position, record when inertia of impact moves the safety to the OFF position.

Drop Test Procedure - Contd.

Actual Drop Standards - Contd.

6. Copper crushers and/or primed cases should be used throughout complete test to determine jar-off or firing pin movement.
- Refer to Indent Guidelines.
7. If a jar-off (firing) occurs, reduce drop height in 6" intervals until the fire/no fire height is determined.
8. Use two handed hold on firearm when releasing. This allows technician to steady firearm and position the gun parallel to impact area before releasing it.
9. The top and bottomside positions should be tested last due to potential for wood failures.

USE OF IMPACT MEDIA

Both impact medias should be used for all drop tests conducted.

The 1" Rubber media would be the primary media for all tests.

The 2" hardwood media would be the extreme test media.

IMPACT MEDIA TEST CRITERIA

All Remington firearms should pass the following tests:

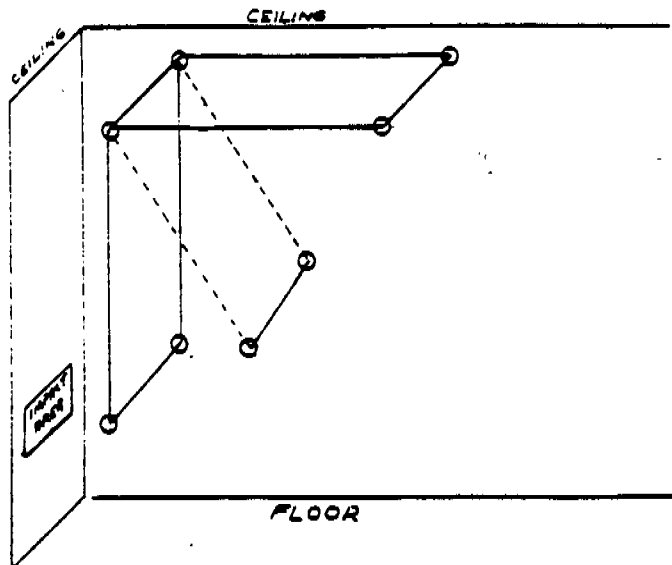
- * - WITH SAFE ON -
 - o Four (4) foot drop onto 1" rubber using all six positions
- * - WITH SAFE OFF -
 - o One (1) Foot drop onto 1" rubber using all six positions

Acceptable limits using hardwood plank media will be determined by management.

- * Per accepted SAAMI Drop Test Criteria dated February 7, 1983 (attached)

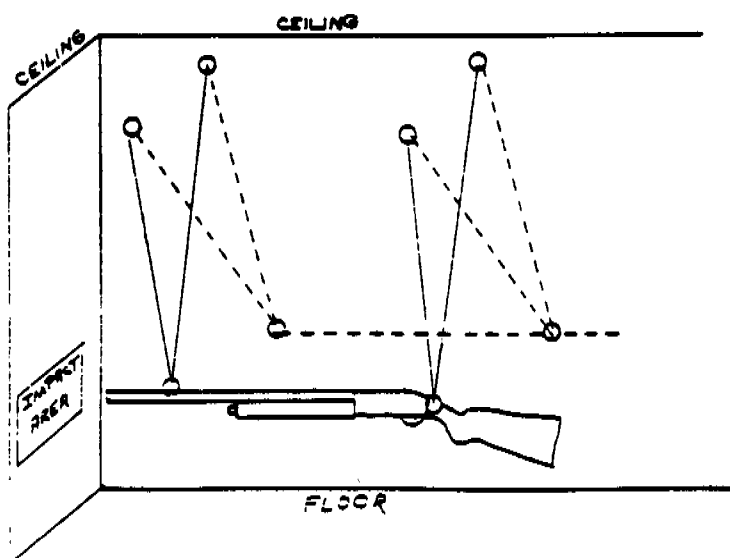
SET-UP ILLUSTRATIONS

- A. One cable per fastening location to be used for:



Top Side
Bottom Side
Right Side
Left Side

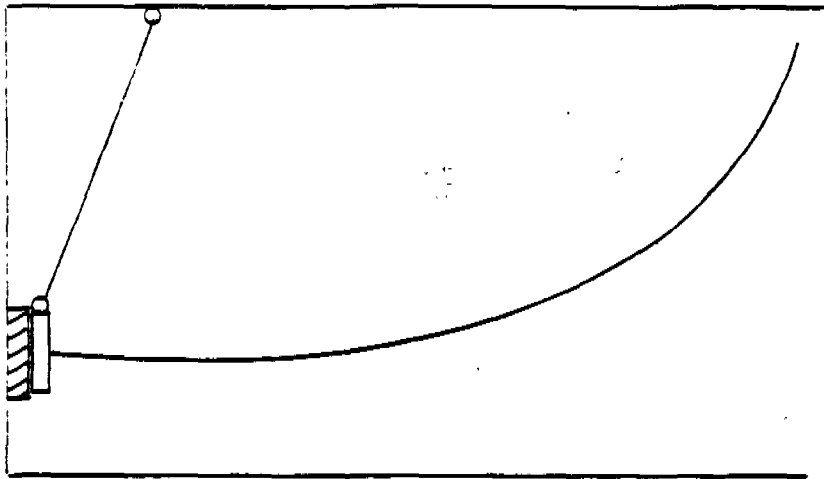
- B. Two cables per fastening location to be used for:



Muzzle
Butt

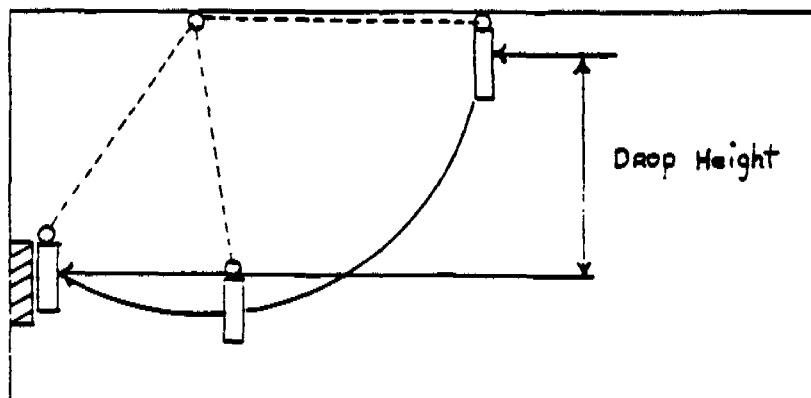
SET-UP ILLUSTRATIONS - Contd.

C. Firearm Placement



Adjust firearm placement so that gun is parallel and square to the impact area. Gun is to be leveled in each position prior to drop.

D. Determining Drop Height



- o Drop height is determined from center line of action at rest against impact area
- o 0 to 7 foot drops can be conducted with present set-up.

DROP TESTS/JAR-OFF TESTS

LUBRICATION PROCEDURE

A. BOLT ACTION FIREARMS:

- o Clean and degrease trigger assembly as a unit using Stoddard Solvent and/or Inhibisol.
- o Blow dry unit with air hose.
- o Spray the four points of the trigger assembly with Du Pont Teflon Wet Lubricant. Let stand for 15 minutes and shake off excess lubricant.
- o Lubrication Points - See Figure 1
 1. Sear Safety Cam
 2. Rearward open area of housing
 3. Bottom open area of housing around trigger
 4. Inspection view hole on side of housing

B. COMMON FIRE CONTROL:

- o Clean and degrease fire control assembly as a unit using Stoddard Solvent and/or Inhibisol.
- o Blow dry unit with air hose.
- o Spray the four points of the fire control assembly with Du Pont Teflon Wet Lubricant.
- o Let stand for 15 minutes and shake off excess lubricant.
- o Lubrication Points - See Figure 2
 1. Remove rear trigger plate bushing and lubricate trigger pivot pin.
 2. Trigger/Connector pin.
 3. Hammer/Sear notch area.
 4. Hammer pivot pin.

C. OTHER FIREARMS AND COMPETITIVE:

- o Clean and degrease fire control assembly as a unit using Stoddard Solvent and/or Inhibisol.
- o Blow dry unit with air hose.
- o Spray the important areas of the fire control assembly with Du Pont Teflon Wet Lubricant. Let stand for 15 minutes and shake off excess lubricant.
- o Important areas -
 - o Trigger pivot
 - o Sear pivot
 - o Hammer pivot) depending
 - o Hammer/sear contact points) on
 - o Connector pivot points) design

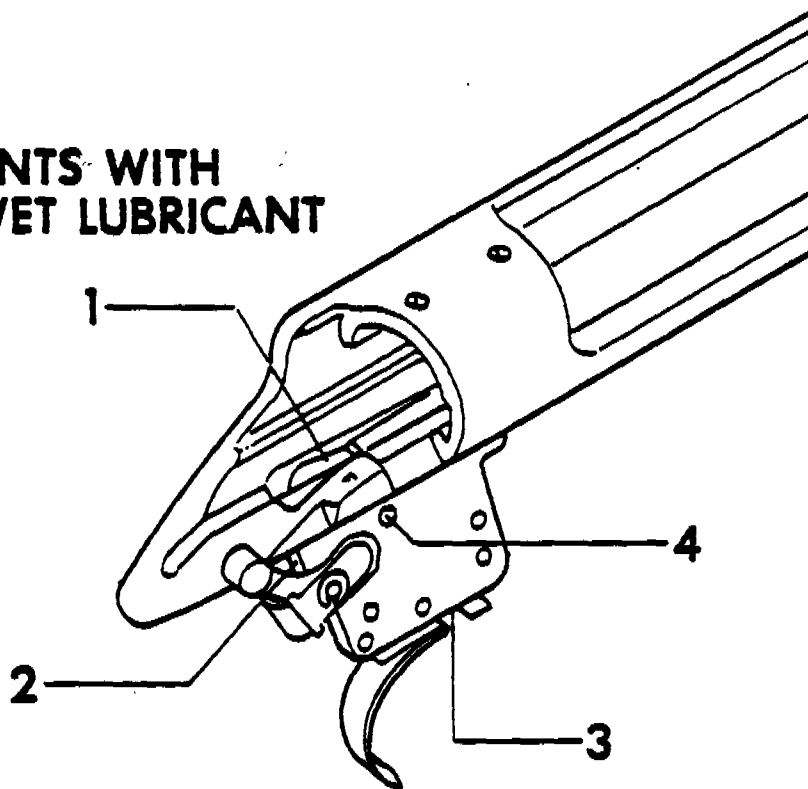
D. SPECIAL LUBRICATION:

Periodically the technician will have to deviate from established lubrication practices to conform with special requests from engineers and supervision.

BOLT ACTION
LUBRICATION POINTS

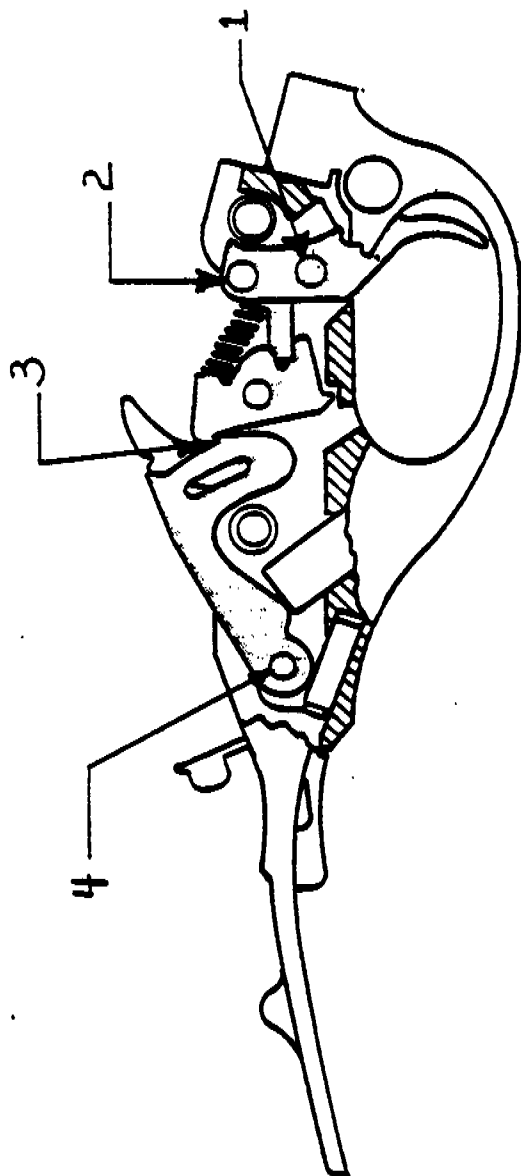
FIGURE - 1

**SPRAY THE 4 POINTS WITH
DuPONT TEFLON WET LUBRICANT**



COMMON FIRE CONTROL
LUBRICATION POINTS

FIGURE 2



DEC 15 1982

DROP TESTS FOR RIFLES AND SHOTGUNS

This test is to simulate abusive dropping of the firearm.

1. Drop Test - With the firearm in the "safe carrying" condition as defined in the Owner's Manual for the firearm being tested, the firearm should be capable of passing the below test criteria for drop testing from a height of four feet (1.22 meters) onto a 30-60 Durometer, Shore A, rubber mat, one-inch thick (2.54 centimeters) backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the mat. The four feet (1.22 meters) shall be measured from the surface of the rubber mat to the center of gravity of the firearm. As an alternate to free dropping, other methods may be substituted if they provide equivalent impact characteristics. The firearm shall be re-cocked and re-set in the "Safe Carrying" condition after each drop or a separate firearm may be used for each drop.
2. Criteria - The firearm shall not fire an empty primed case of its designated cartridge when tested in accordance with this procedure. Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. The firearm will be re-cocked and reset in the "Safe" condition after each drop or a separate firearm may be used for each drop.
3. Test Procedure - The firearm or firearms shall be dropped in such a way as to strike the rubber mat surface in each of the following attitudes:
 - (a) Barrel vertical, muzzle down.
 - (b) Barrel vertical, muzzle up.
 - (c) Barrel horizontal, bottom up.
 - (d) Barrel horizontal, bottom down.
 - (e) Barrel horizontal, left side up.
 - (f) Barrel horizontal, right side up.
4. Testing of firearms which are designed to have a trigger pull force below three pounds (1.36 kg) is not covered by this procedure.

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As approved/adopted 2/1/83 by SAAMI Executive Committee for inclusion in Volumes VI through X, SAAMI TECHNICAL COMMITTEE MANUAL.

Attachment "A" to
Minutes of Meeting
SAAMI Products Standards Task Force -
Shotgun Firearms & Ammunition
Dallas, Texas - January 4, 1983

DEC 1 5 1982

5. Tests shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
6. The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm. It is recommended that firearm weight variations introduced by combinations of accessories catalogued by the gun manufacturer be considered.

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Attachment "A" to
Revision of Meeting
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Volumes VI through X, SAAMI TECHNICAL COMMITTEE MANUAL.

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JAR-OFF TEST FOR RIFLES AND SHOTGUNS

This test is to simulate the abusive impacting (bumping) of the firearms against a hard surface with the firearm in a condition of maximum readiness.

1. Jar-Off Test - With the firearm cocked and in the ready-to-fire condition (Safe "OFF") as defined in the Owner's Manual for the firearm being tested, the firearm should be capable of withstanding jar-off shock equivalent to being dropped from a height of twelve inches (.305 meters) onto a 50-60 Durometer, Shore A, rubber mat, one-inch thick (2.54 centimeters) backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall within the perimeter of the mat striking the mat once. The twelve inches (.305 meters) will be measured from the test surface to the lowest point on the firearm. As an alternate to free dropping, other methods may be substituted if they provide equivalent impact characteristics. The firearm shall be re-cocked and re-set in the ready-to-fire condition after each drop or a separate firearm may be used for each drop.
2. Criteria - The firearm shall not fire an empty primed case of its designated cartridge when tested in accordance with this procedure. Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop. The firearm will be recocked and reset in the "Safe" condition after each drop or a separate firearm may be used for each drop.
3. Test Procedure - The firearm or firearms shall be dropped in such a way as to cause it to strike the rubber mat surface in each of the following attitudes:
 - (a) Barrel vertical, muzzle down.
 - (b) Barrel vertical, muzzle up.
 - (c) Barrel horizontal, bottom up.
 - (d) Barrel horizontal, bottom down.
 - (e) Barrel horizontal, left side up.
 - (f) Barrel horizontal, right side up.
4. Testing of firearms which are designed to have a trigger pull force below three pounds (1.36 kg) is not covered by this procedure.

Attachment "A" to
Minutes of Meeting
SAAMI Firearms Standards Task Force -
Shoulder Firearms & Ammunition
Dallas, Texas - January 4, 1983

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5. Tests shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
6. The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and inserted in the firearm. It is recommended that firearm weight variations introduced by combinations of accessories catalogued by the gun manufacturer be considered.

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Attachment "A" to
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