

REMINGTON ARMS COMPANY, INC.
Firearms Research Division
September 18, 1981

TO: J. R. SNEDEKER
FROM: C. J. SWEET
SUBJECT: BOLT ACTION COMPETITIVE ARMS TEST

ABSTRACT

A total of twenty-five Competitive and Remington Bolt Action Rifles were subjected to numerous tests and measurements for evaluation purposes. The tests include;

Packaging Evaluation	Preliminary Measurements
Visual Inspection	Lock Time
Price Comparison	Accuracy
Customer Selection	Field Cycle Test
Strength Test	Endurance
Engineering Sample	

The test guns consist of:

- 5 - Browning M-BBR
- 5 - Remington M700
- 5 - Ruger M77
- 5 - Smith & Wesson M1500
- 5 - Winchester M70XTR

Each competitive rifle was purchased from Creekside Gun Shop (Holcumb, New York) and the M700 rifles were selected randomly from the Ilion Plant warehouse.

SCOPE OF TEST

Evaluation of each competitor's model to determine "what sells the rifle" and to compare the differences and/or similarities among the rifles.

TEST RESULTS

A brief synopsis is given for each phase of the test. Refer to the Report Text for more detailed data.

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Packaging

Each carton was reviewed by L.Ferreira, Purchasing Agent in charge of packing materials for Remington Arms. After careful examination of each pack, he rated them in this order:

- | | | |
|----|----------------|---|
| 1. | Browning | Most costly, but offers the best protection |
| 2. | Winchester | Strong pack, reusable |
| 3. | Remington | Certified for shipment, but with outer sleeve |
| 4. | Smith & Wesson | Adequate protection, potential end damage |
| 5. | Ruger | Adequate protection, not reusable. |

Visual Inspection

Major Defects:

- | | | |
|---|-------------------------|--|
| • | Browning BBR | Open grain, and dents in finish. Some rust pits on the barrels. |
| • | Remington M700 | Some bubbles in the finish. Poor color on bolt heads, barrels and sight bases. |
| • | Ruger M77 | One stock was cracked 3" at the fore end tip, others dented and scratched. Polishing marks evident on the barrels, some rust and finish chipping away. |
| • | Smith & Wesson
M1500 | Open grain and ripple in finish. Polishing marks on the barrels and receivers - dull appearance. |
| • | Winchester | Poor color matches between receiver and barrels. The checkering - diamonds are flat - light scratches in wood finish. |

Manufacturers Selling Points

- | | | |
|---|-------------------------|---|
| • | Browning BBR | Short throw 60° bolt, anti-warp fore end and a high grade Monte Carlo stock is standard on all calibers. |
| • | Remington M700 | Strongest action ever designed - 3 rings of steel, and an anti-rust bolt. |
| • | Ruger M77 | Hand checkering, patented bedding and a quick release floor plate. |
| • | Smith & Wesson
M1500 | Bolt body has relief ports to allow gas to escape, receivers are machined from a single piece of forged steel for maximum strength. |
| • | Winchester
M70XTR | A three position safety and high strength and durability from machined steel components. |

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Customers Selection

Thirty one people were individually asked to rate the rifles for visual appearance only. The results (from best to worse) were:

1. Browning BBR
2. Remington M700 ADL
3. Ruger M77
4. Winchester M 70XTR
5. Smith & Wesson M1500

Preliminary Measurements

Every rifle met Remington's standards except for bore & groove measurements. Browning, Smith & Wesson and Winchester had some 4-groove barrels. We were unable to measure this because we can only measure 6-groove barrels with our gages.

Lock Time

Of the five competitors rifles measured (30-06 Cal.) the Remington M700 has the fastest lock time (3.29 ms.)

Accuracy

At different round levels of the accuracy test, some of the competitive rifles failed to meet Remington specs. They include:

- | | <u>Rem.Spec.</u> |
|---|------------------|
| • Winchester M-70XTR-.243 Var. - 1.8" avg. at 500 rd. level | 1.5" |
| • S&W M-1500 -7mm Mag. - 2.9" at "O" rd. level | 2.7" |
| • Ruger M-77 -.243 Var. - 1.6" at "O" rd. level | 1.5" |
| 7mm Mag. - 3.9" at 500 rd.level | 2.7" |

Field Cycle Test

No malfunctions occurred to the Rugers or the Winchester rifles during field testing. Two Remington M700s and one Browning BBR rifle were removed from test because of breakages or malfunction problems.

Endurance

No serious problems were encountered with any of the rifles during endurance testing. The malfunction rates are low and they consist mostly of:

- Stem low malfunctions
- Shell jumps mag. malfunctions

Engineering Sample & Strength Test

These will be covered in separate reports.

CJS:T

REPORT TEXT

I. PACKAGING EVALUATION

This evaluation was conducted by L.Ferreira, Purchasing Agent in charge of packing materials for Remington Arms. All the packages were inspected as received from the gun shop. The three major criteria that Mr. Ferreira based his observations on were:

- How well the rifle is protected in the carton.
- How well the carton is made.
- Reusability of the carton.

This was his report:

Browning BBR Pack

- A full telescope box, with a full styrofoam tray and pad.
- The rifle is protected in a polyethylene liner bag.
- Good molding job on the tray.
- Full protection offered.
- Reusability is adequate, but the pack is without certification.

Estimated Cost: \$2.00 each for box and materials.

Remington M700 Pack

- A five panel folded corrugated box with styrofoam inserts.
- Certified for shipment with a protected outer sleeve.
- Reusability - Excellent.

Estimated Cost: \$.60 each for box and materials.

Ruger M77 Pack

- A fold-up corrugated container with cardboard inserts.
- Protection is adequate, and the carton is certified to ship as is (no outer sleeve required).
- The carton is not reusable for shipment without additional protection.

Estimated Cost: \$.30 to \$.40 each for box and materials.

Smith & Wesson M1500 Pack

- A full styrofoam tray with a cardboard sleeve.
- The rifle is protected in a polyethylene liner bag.
- Protection is adequate but if the end styrofoam breaks away the gun will be exposed.
- The sleeve marks up easily (blue ink comes off).
- The carton is reusable, but must be covered with a corrugated tube.
- The carton is not certified for shipment.

Estimated Cost: \$1.50 each for box and materials.

Winchester M70XTR Pack

- The carton is made of 100 lb. "B" flute cardboard and it is certified for shipping.
- Oil treated paper is used to wrap the rifle to prevent rust.
- There were many loose cardboard pieces in the carton.
- Reusability - Good.

Estimated Cost: \$.90 each for box and materials.

II. VISUAL INSPECTION

The twenty-five rifles were visually inspected in the Test Lab. They were reviewed by four members of the Test & Measurement Lab (J.H.Hennings, R.E.Nightingale, S.R.Franz and C.J.Sweet), and one member from the Quality Control Department (J.Mroz). Each man critiqued the twenty-five rifles, while sharing comments with the other members. Following is a summary of those critiques per manufacturer and model.

Browning BBR

Wood

- The bolt head dents the stock when it is retracted fully.
- Heavy scratches on the stocks.
- Overruns and underruns on the checkering.
- Poor sanding - ripples along the entire stock.
- Traces of yellow crayon on some of the checkering.
- Large knots were repaired; poor job.
- Poor fit of butt plates, on two rifles.
- Finish is chipping away behind the safety switch.
- Some dirt found under the finish around the bolt handle slots.

Metal

- Rust pits found on two receivers.
- Heavy scratches found on two floor plates.
- Bad polishing mark around the lower port area.
- Excellent color match between barrel and receiver.
- Good color and finish on all triggers guards (includes the inside bow of the guard).
- Color mismatch between trigger guards and floor plates (floor plates are darker).
- The inletting is good between barrel and receiver to the wood.

II. Remington M700 (ADL-BDL)

Wood

- All bolt handle cuts are rough, full of debris and poorly finished.
- Crushed checkering on the right side of a pistol grip on one ADL rifle.
- Finish and wood is chipping away on some of the stocks, primarily around the grip caps and where the sling strap screws are located.
- All the brass stock reinforcement pins are eggshaped.
- Small dents and scratches were recorded on three of the rifles (superficial).
- All of the stocks have a nice glossy finish.
- Good inletting of the stocks to the barrels.

Metal

- Poor polish and color on all the bolt plugs.
- Polishing marks are evident on all the barrels.
- Two barrels have traces of GFM hammer marks on them.
- Poor color on all the recoil lugs. They look dull compared to the barrel and receiver finishes.
- Poor color on all the sight bases. They also have a "rough finish" look to them.
- Good polish and color on the floor plates and trigger guards.

Ruger M77

Wood

- The fore end tip of the varmint rifle is cracked 3".
- Heavy scratches were found on three stocks.
- All bolt handle cuts have torn grain, wood burns, and gouging.
- Poor fill and stain on all stocks.
- Two rifles have a white plastic strand hanging out from the insert on the grip cap.
- The recoil pads do not fit tight to the stocks on some of the rifles (gaps).
- Good inletting for barrel fit.

Metal

- Rust pits were found on some of the bolts, barrels and receivers.
- A deep $\frac{1}{4}$ " scratch, 6" from the muzzle end on one rifle.
- The finish is wearing off on two receivers at the tang area near the safety switches.
- Polishing marks are noticeable the full length of the barrels.
- Poor finish on the trigger guards and floor plates - very dull; doesn't match the receiver and barrel.