WRITER'S SEMINAR

In past years, at these seminars it has been the responsibility of the Research Department to tell you about the engineering features of the new products ~~that~~ we are about to announce. This year our job is a little different. We have ~~chosen to~~ been asked to concentrate on ~~safety~~ some of the work we do to ensure that our products meet the highest performance standards. The video tape you are about to see was made in the Firearms Research Laboratory and will show you some of the test procedures we use, ~~to determine a product's fitness for use.~~ If you have any questions, I will try to answer them for you after you have seen the tape.

The development of any product goes through ~~three~~ eight basic stages. As this ~~simplified~~ diagram shows, ~~many different stages~~ a failure at any of these stages could ~~can~~ send ~~you~~ me back to the Test Lab or back to the drawing board. Starting with the idea, the ~~activities~~ development of new products progress through to the design stage, followed by prototypes, laboratory test, field evaluation, release to production, pilot production models, and finally announcement to the trade. ~~At~~ This is the point you normally get your first exposure to a new product at ~~this~~ meetings.

To take you through all of the stages of this diagram would take more time than any of us would want to spend at one sitting. So today we are going to concentrate on the Laboratory Test Phase. More specifically, we are going to cover several of the test procedures we use to determine the performance of the ~~if a~~ product. ~~can be safely used by the customer.~~ Today, then, we will concentrate on these items. ~~The ultimate strength of the Model 700,~~ our drop test procedures, ~~and~~ the common Fire Control, and the ultimate strength of the Model 700.

For the sake of brevity, ~~we will~~ let's discuss the drop test procedure using products with the common FireControl, combining the ~~last~~ first two items. We will save the discussion of the 700 ultimate strength until last.

DROP TEST

One of the most important ~~safety~~ considerations in designing a firearm is prevention of accidental discharge. ~~What~~ For example, what happens if someone accidentally drops his rifle, ~~for example~~. In order to be able to test effectively for accidental jar off conditions we have developed a pendulum drop test procedure that enables us to consistently repeat a given set of impact conditions. This next sequence shows how the drop test procedure is applied.

Six different drop ~~orientations~~ situations are tested. Muzzle, butt, top, bottom, left side and right side. This subjects the internal gun mechanism to shock loads from all directions. A copper crusher is placed in an adapter and put into the chamber to check for firing pin indent. The drop test height is determined to be equivalent of a vertical drop. The impact surface is a two inch maple plank bolted to a brick wall. After each impact, the action is checked to see if the firing pin marked the primer and if the hammer was released by the sear.

Remington uses the same basic fire control in the 1100, 870, 552, 572, 7400, 7600 Model Four and Model Six. We feel that this fire control could serve as a standard against which other similar action types are measured.

The series of drop tests you are seeing has been repeated countless times, all with the same results; no accidental discharge. This pendulum will test drop heights up to 7 feet. How high should ~~we~~ they go? At Ilion the Research Design Section is located on the fourth floor. As an extreme test of this fire control's safety margin we decided to throw it off the roof onto a macadam roadway. An 870 shotgun and a Model Four rifle were taken to the roof. Empty primed cartridge cases were loaded into the chamber. The safety switch was put into the off position. The guns were then thrown off the roof. First the 870. Now the Model Four. As you can see, neither gun accidentally discharged.

MODEL 700

In 1971, a book titled "Bolt Action Rifles" was printed, written by Frank de Haas and edited by John Amber. On page 249, this is what he had to say:

> "The Model 721 Remington high powered bolt action rifle was introduced in 1948. In describing this new rifle and action in the March, 1948 issue of THE AMERICAN RIFLEMAN, the late Julian S. Hatcher flatly stated that it was by far the strongest and safest bolt action produced up to that time. Indeed it was! In this report General Hatcher describes the torture tests to which the Model 721 was subjected. At the time the same tests were made on a high numbered 1903 Springfield, 1917 Enfield and a military 1898 Mauser. The 721 was still going strong long after the Springfield, Mauser and Enfield gave up, in that order. Time has proven Hatcher to have been right for in the more than 20 years following his statement Remington actions based on the Model 721 design are still considered by many firearms experts as being the safest, if not the strongest, actions made today."

In the Research Department we are proud of that testimonial and now, 33 years later, we believe that General Hatcher's statement is still accurate. In a few minutes we will show you why we feel that way.

All of you are familiar with Remington's three rings of steel. To refresh your memory, this schematic diagram shows you what it means. The breech bolt extends forward beyond the leading edge of the locking lugs. This permits the bolt to nest inside of a counterbore in the face of the barrel. The benefits of a counterbored bolt are not fully realized without this projection. Its importance will be seen later. Around these two rings of steel is a third ring, the receiver. Nested neatly inside the bolt head is the extractor. While all of these features, as you see them here, play an important role in the strength of the rifle, this extractor is the least understood of all the elements. Everyone seems to want to apologize for it. We do not. Later we will show you why.

It is generally understood that the most important objective in preventing a rifle from coming apart is to prevent the high pressure gases from getting back into the action. In the 700 this is accomplished in two important ways --

1. Precision, close tolerance fits between the elements of the system,
and
2. Complete unbroken encirclement of the cartridge head by the bolt counterbore.

When a high pressure round is inadvertently fired, the cartridge brass flows into any opening or recess and squirts through like a thick syrup. When it fails, the high pressure gases follow through any available opening, destroying the action. The 700 bolt shroud prevents this from happening by acting like the Dallas Cowboy's flex defense -- it bends but does not break. As pressure is applied inside the shroud by the brass, the shroud ~~obturates~~ and seals against the counterbore in the barrel before a major portion of the gas can leak by.

Here you see examples of various types of breech bolts in use today. Each of them, compared to the Model 700, has one or more basic differences in their breech design from the standpoint of maximum strength:

1. No counterbore
2. No mating counterbore in the barrel
3. Slotted shroud for the extractor

And, speaking of extractors, let's take a look at a typical cross section of modern extractors. These range in shape and size from the current Remington Extractor, that appears to be small and weak, to the Extractor designed by Paul Mauser back in the 1800s that appears to be big and strong. These two extractors shown side by side look almost like David and Goliath.

What is needed, is a way to show the relative extracting capabilities of one versus the other. After a lot of headscratching one of our engineers suggested a tug-o-war between David and Goliath. The best way to demonstrate the pull strength of the various extractors was to pit one directly against the other. The vehicle chosen for this test was the tensile machine in the Plant Metallurgical Lab. This machine is used routinely to test samples of the steel we use to manufacture our rifles and shotguns. It has a large dial that records, in pounds, the amount of force necessary to pull on a sample until it fails.

A two headed steel rod was made with an extractor groove in each end. The rod is the same diameter as a 30'06 cartridge head. Adapters were screwed into the bolt plug recess in each bolt so that the bolts could be clamped into the tensile machine. The two headed rod was then inserted into the face of each breech bolt and the whole assembly was put into the tensile machine. This procedure gives a direct relationship between the pulling power of each type of extractor. As you can see the Remington extractor was the fatal witness everytime.

Now that we have shown you the Remington extractor ~~isn't really such a weak sister~~ and have refreshed your memory on 3 rings of steel, we ~~must settle demonstrate~~ how effective the 700 action is in protecting the unsuspecting shooter from high pressure failure. To do this a series of high pressure tests were conducted. A super proof load of 52.4 grains of 4198 powder in a 30'06 cartridge behind a 220 grain bullet was loaded and tested. A few rifles failed the test. To build even more pressure, additional bullets were lodged in the bore ahead of the super proof load. A super proof load plus one additional bullet eliminates every action except the 700. We added another, and another, and still another, and the 700 is still intact, but you will never get it open. At this point we gave up. The following high speed motion pictures, taken at 16,000 frames per second, show you what happens when a super proof load plus 4 additional slugs are fired in samples of other bolt action rifles in use today.

Of rifle shown is of foreign manufacture but every bolt action model we tested except the Remington M/700 came apart under these conditions.

Before we end this tape, I want to make perfectly clear ~~to all viewers~~ that we are ~~in~~ not ~~no way~~ trying to say that these * ~~competitive products are not safe. Used intelligently and with common sense they are adequately safe for their intended purpose. But, when you get right down to cases, there is no question about which action provides the widest margin of ultimate strength -- The Model 700 Remington.~~

*other rifle actions are unsafe under normal conditions. Used intelligently and without the presence of a highly abnormal situation, they are more than strong enough for their intended purpose. What we're talking about is a degree of safety margin under abnormal conditions. Here, there's no question about which action provides the widest margin of ultimate strength -- the Model 700 Remington.

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Herb
CBC Single
870 SC
700 BDL 6MM
1100 Skeet
Refurbished 870

This scale model is here today for you to examine after the meeting.

This is A 5 to 1 Functional SCALE MODEL of ONE VERSION of The COMMON FIRE CONTROL being Used in The drop TEST. We use The SAME BASIC FIRE CONTROL in The 870, 1100, 552, 572, 7400, 7600, model 4, [redacted] AND Model 6. We Feel That This FIRE CONTROL COULD SERVE AS A STANDARD AGAINST Which OTHER SIMILAR ACTION TYPES ARE MEASURED.