EARLY PROBLEMS WITH THE M14 RIFLE

In addition to the inevitable public debate that the M1 Garand's successor faced as a follow-on military rifle, its designers were kept busy solving some little-known but nagging faults.

BY ALBERT A. COLE, JR.

WHENEVER a product, be it a rifle or some other item, makes the transition from research and development to mass production, aggravating problems always crop up. Some of these are serious enough to require immediate correction.

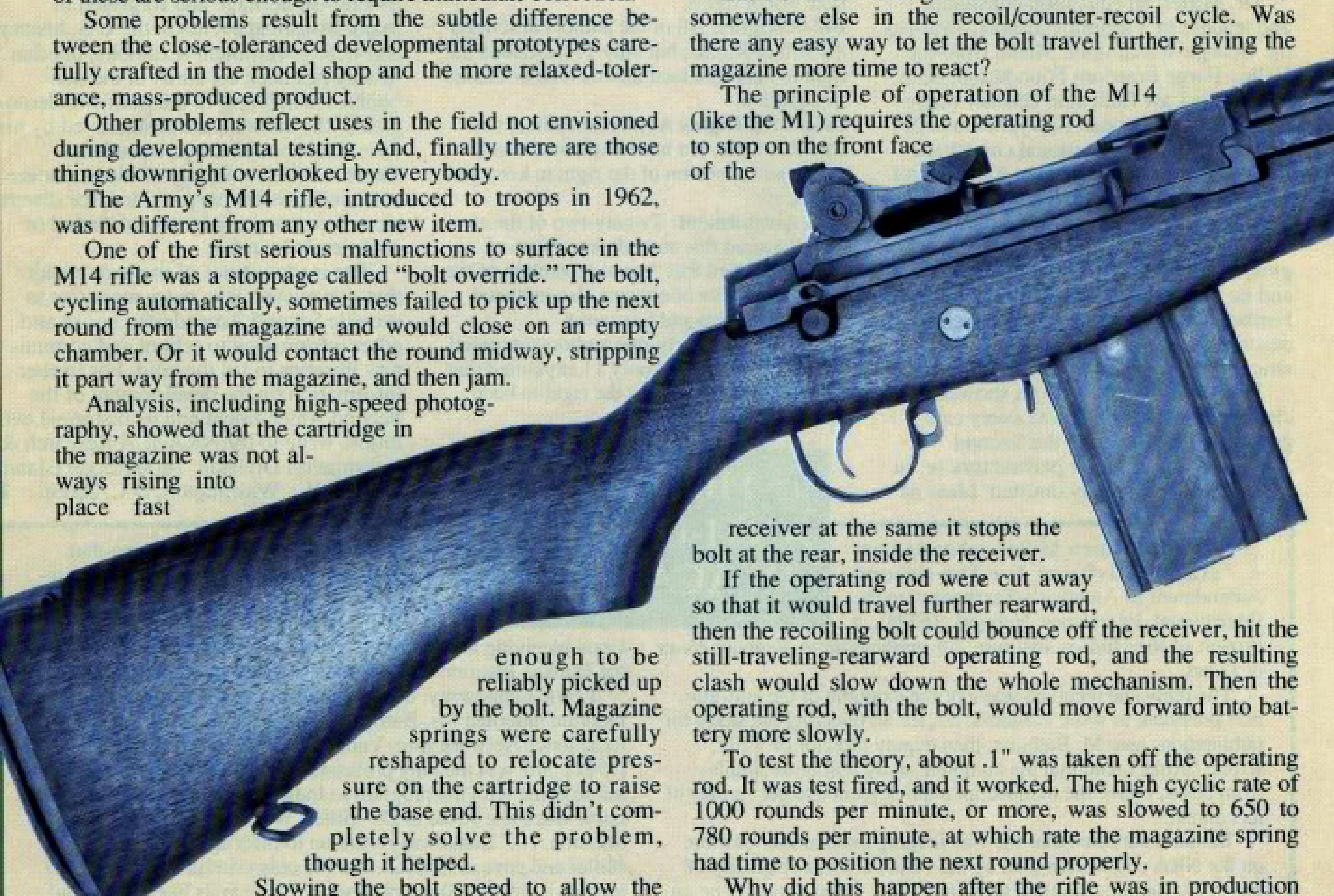
Some problems result from the subtle difference between the close-toleranced developmental prototypes carefully crafted in the model shop and the more relaxed-tolerance, mass-produced product.

Other problems reflect uses in the field not envisioned during developmental testing. And, finally there are those things downright overlooked by everybody.

The Army's M14 rifle, introduced to troops in 1962, was no different from any other new item.

One of the first serious malfunctions to surface in the M14 rifle was a stoppage called "bolt override." The bolt, cycling automatically, sometimes failed to pick up the next round from the magazine and would close on an empty chamber. Or it would contact the round midway, stripping it part way from the magazine, and then jam.

Analysis, including high-speed photography, showed that the cartridge in the magazine was not always rising into place fast enough to be reliably picked up by the bolt. Magazine springs were carefully reshaped to relocate pressure on the cartridge to raise the base end. This didn't completely solve the problem, though it helped.



Slowing the bolt speed to allow the round more time to rise out of the magazine and into place ahead of the bolt seemed a realistic approach. How to do it? A stronger driving spring? A heavier bolt? A smaller barrel port?

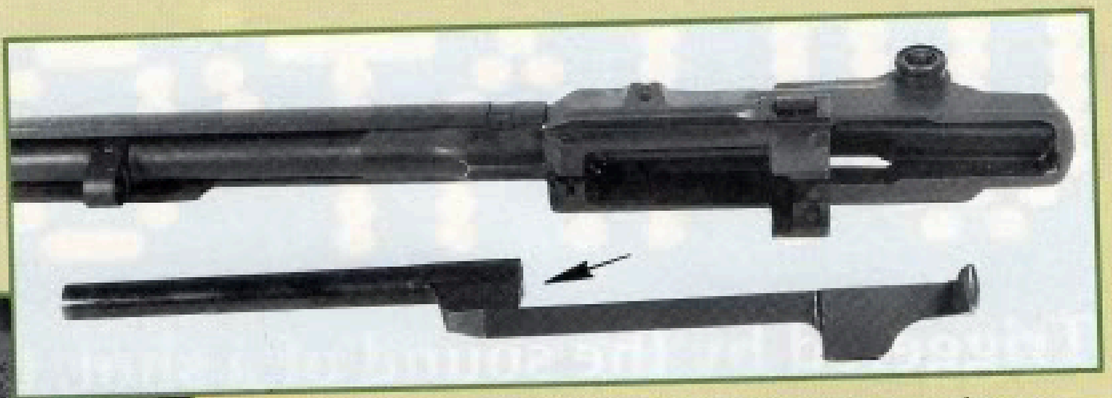
Each of these changes would have an adverse reaction somewhere else in the recoil/counter-recoil cycle. Was there any easy way to let the bolt travel further, giving the magazine more time to react?

The principle of operation of the M14 (like the M1) requires the operating rod to stop on the front face of the receiver at the same it stops the bolt at the rear, inside the receiver.

If the operating rod were cut away so that it would travel further rearward, then the recoiling bolt could bounce off the receiver, hit the still-traveling-rearward operating rod, and the resulting clash would slow down the whole mechanism. Then the operating rod, with the bolt, would move forward into battery more slowly.

To test the theory, about .1" was taken off the operating rod. It was test fired, and it worked. The high cyclic rate of 1000 rounds per minute, or more, was slowed to 650 to 780 rounds per minute, at which rate the magazine spring had time to position the next round properly.

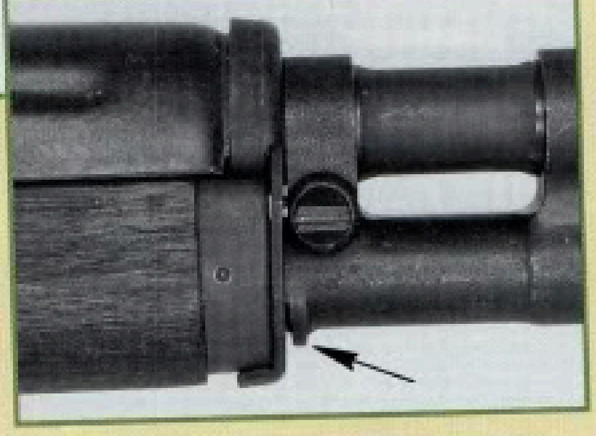
Why did this happen after the rifle was in production



Springfield Armory's experts solved a feeding problem by taking .1" off the operating rod stop face, reducing the gun's cyclic rate.

A National Match M14 illustrates the unvented handguard that replaced the vented version pulverized by drilling Marines.

A simple flange at the rear of the gas cylinder stopped the M14's tendency to disassemble itself during Marine bayonet and wire-breaching exercises.



and not during prototype testing? Ball powder was added as an alternative to the extruded type of propellant to increase the availability of propellant for making cartridges. This faster-burning powder changed the bolt speed. The same scenario was repeated in the introduction of the M16 a few years later.

In the category of field usage, the design and redesign of the handguard was an unanticipated problem. The first plastic handguards contained elongated slots on the top side to allow barrel heat to dissipate.

This was fine until the rifles got into the hands of the gung-ho Marine trainees. Marines are taught to slap their rifles smartly as they execute the manual of arms, and the weak, slotted handguard succumbed pretty rapidly to repeated blows.

The slots were relatively easy to remove by minor changes in the die used to make the handguards, and replacement handguards were soon in the hands of the eager recruits. They immediately proceeded to pulverize the modified handguards, though perhaps not as quickly as the slotted version.

The next step was to thicken the material in the handguard. This was a more costly and time-consuming die change, and it was a while before the Marines saw the new version. But, when they got it, they found it had solved their problem. The handguard thickness had been increased from an average of .070" to .090".

Another common training maneuver that stressed the then-new M14 was the vertical bayonet slash. In this aggressive maneuver, the rifle, with the bayonet attached, was held by the pistol grip and the fore-end and slashed downward at a dummy representing an enemy soldier. Whoops! The barrel was sprung upward, the stock popped out of engagement with the front band, and the rifle looked like it had its back broken. The stock, disengaged from the front band, locked the barrel in a bowed configuration.

The Marines created the same catastrophe in another way, too. They used the rifle as a step to get over barbed wire. Two Marines would hold a rifle, one at each end, next to a barbed

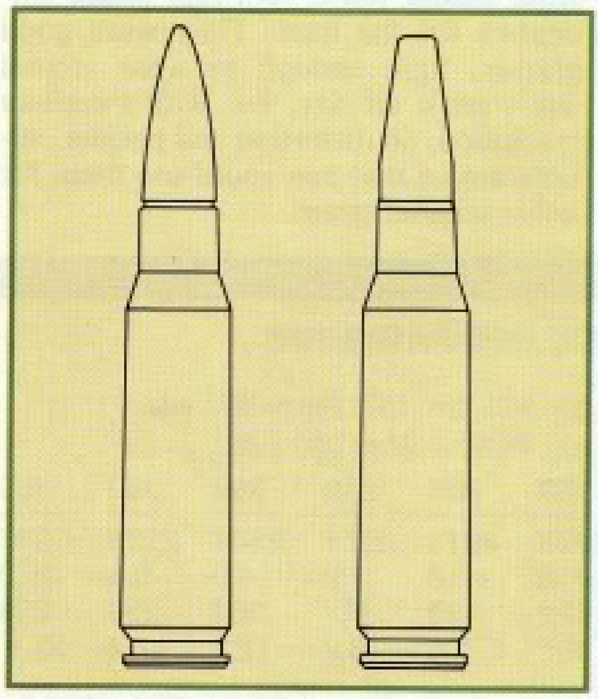
continued on p. 79

Problems With The M14 Rifle

continued from p. 35

wire entanglement and about 2 ft. above the ground. The rest of the squad would use the middle of the rifle as the first step in jumping over the barbed wire. Whoops! The stock would disengage in the same way.

The simple solution was to put a supporting flange on the gas cylinder to back up the barrel band and thus keep the front end of the stock in place. The flange is small, only .095" wide and .112" high.



The M82 blank's (r.) case base sometimes cammed the M14's extractor out of the bolt. A slight clearance cut fixed it.

Since the gas cylinder is a forging, a change to the forging die was required to add the material in the appropriate place. With the flange on the gas cylinder, the barrel still bends, but it returns to its proper position as soon as the bending force is removed.

Another surprising malfunction was the occasional disassembly of the bolt when firing the M14 Rifle with the M12 Blank Firing Attachment and M82 Blank Ammunition. Like the M1 bolt assembly, the M14 bolt assembly parts are held in place by the spring-loaded extractor. If the extractor is pried out, all the other bolt assembly parts—firing pin, ejector, ejector spring—are no longer retained in position.

The M82 Blank Cartridge roughly resembles a standard ball round with the "bullet" portion formed as a continuation of the brass cartridge case. It does not, however, have the gently curving ogive of the normal 7.62 mm bullet, so the contour of the tip is a more abrupt transition than the ball round.

The malfunction that occurred consisted of a stoppage in the middle of a burst of fire. An object could be seen flying vertically into the air, and then the rifle would stop firing, its bolt jammed part way into battery.

Examination would show that the flying object had been the extractor, and the loose ejector and spring, moving forward out of the bolt, had jammed the bolt out of battery.

It took high-speed movies of the feeding cycle to solve this one, too, but the solution was very obvious when the film was examined. The M14 magazine contains a double stack of cartridges, so that when the bolt strips a round from the magazine, the round must shift to center as it chambers. The bolt would strip the right-hand cartridge part way out of the magazine and start to insert the "bullet" end into the chamber.

When the blunt end of the blank round contacted the chamber wall, the base of the round was abruptly snapped to the left across the underside of the extractor. This did a beautiful job of camming the extractor up and out of its recess in the bolt, disassembling the bolt and bringing functioning to an abrupt halt.

The solution required some careful scrutiny of the feeding cycle, but it turned out to be relatively simple. A small clearance flat was milled at the lower front right-hand edge of the extractor at a 30° angle to allow the blank cartridge base to swing past. This cut in no way changed the normal extractor function, and it cured an unusual malfunction.

Since the change did not affect military reliability, but only solved a training problem, rifles were not retrofitted with modified extractors. The change was, however, made on the extractor drawing for future manufacture.

Hundreds of other changes were made in the M14 in the course of its short production period of about six years. As these examples show, some changes had to be made, but most of the changes were minor ones intended to reduce the manufacturing costs. This is true of any complicated item. Refinement goes on continually. ■

About The Author

An ordnance engineer at the government-owned Springfield Armory, the author worked primarily in preparation and maintenance of the M14's production drawings. After Springfield Armory's closing, NRA Life Member Albert A. Cole, Jr., worked at Picatinny and Rock Island Arsenals and finally as a gun designer with Sturm, Ruger & Co., retiring in 1988. His article on the Ml4 National Match prototypes appeared here in August 1990, p. 32.