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EXCLUSIVE

M14 EBR-RI

HOW TACOM BUILDS AN M14

REPORT

USMC SMAW

INSIDE THE MK153 83MM ROCKET LAUNCHER

TESTED

ARMALITE SPR MOD 1

MEDIUM-RANGE MONOLITHIC 5.56

FIELD TESTED:

BEST TRAINING
> I.T.T.S. URBAN SNIPER
> WARTAC CQC
> VIKING TACTICS

BEST SIDEARMS
> GLOCK 17 GEN4 9mm
> FN FNX .40 S&W
> ED BROWN STEALTH .45

BEST RIFLES
> G.A. PRECISION .308
> LES BAER .308
> FNH SCAR-16 5.56

EXCLUSIVE

HOW THE U.S. ARMY BUILDS THE M14 EBR-RI.

INSIDE ROCK ISLAND

BY ERIC R. POOLE

PHOTOS BY ERIC R. POOLE, JEFF ROSE & DoD

Doug Carlstrom works inside a simple reinforced structure reminiscent of the Cold War. It's subtly located in a corner of the 946-acre island within the historic gates of Rock Island Arsenal. A career U.S. Army veteran with experience brought back from the Vietnam War, Carlstrom has witnessed the military trials of nearly all modern infantry small arms spanning the adoption of the M9 and M11 pistols to more recent variants of the M16. Today Carlstrom and his five-man team continue their service as civilian contractors to TACOM, leading the development, testing and issue of the M14 EBR-RI.

During trips to Iraq and Afghanistan, Doug Carlstrom of TACOM observed soldiers trying to adapt rack-grade M14s and M21s with commercial mounts, rings and optics.

Veterans themselves, members of the five-man team responsible for building and testing the M14 EBR-RI take great pride in their ability to resurrect the M14 and provide SDMs with an out-of-the-box solution.

"I was deployed to Iraq in 2004 and to Afghanistan in 2006 to open a small arms support center," Carlstrom says. "I opened Camp Anaconda in Balad, Iraq, and started learning how soldiers were using their rifles. At that time, units were pulling M14s out of storage and issuing them to marksmen within a squad for more accuracy, range and effectiveness."

The first M14 rifles were fielded to units as they came out of Anniston Army Depot. Those M14s were still wearing wooden or nylon stocks and a brown nylon handguard. They were equipped with only one magazine and had no provisions for optics. Carlstrom observed soldiers trying to attach commercial mounts, rings and optics to these M14s with little consistency or repeatable accuracy. After seeing soldiers trying to adapt the M14 to a modern battlefield, Carlstrom concluded that this situation was unacceptable. When he returned to CONUS, he set out to resolve this problem.

THE TRANSFORMATION

All of the joint services are using some configuration of the M14 EBR. The M14 EBR-RI is built and tested at Rock Island Arsenal by the team that developed it. It was a response to the large number of Operational Need Statements (ONS) submitted for M14 rifles to support the role of a Squad Designated Marksman (SDM). The M14 EBR-RI was designed to standardize the optic among soldiers, offers sustainability in the field and features a chassis constructed from lightweight aircraft aluminum capable of supporting the use of a night vision device in front of the day optic. It also needed to support the use of various combat-related accessories never seen before this age of warfare. It had to be an out-of-the-box system, so when any soldier opens his package, inside he'll find:

1 M14 EBR-RI rifle
1 Leupold Mark 4 LR/T 3.5-10x40mm scope assembly
6 Magazines, 20 rounds
1 Sling
1 Otis 7.62 cleaning kit
1 Harris bipod
1 M14 EBR-RI combination tool
1 Manual

M14s arrive at Rock Island Arsenal in Illinois from storage at Anniston Army Depot in Alabama. Between 1983 and 1984, these vintage M14s were brought up to A code and given a new barrel. After being replaced by the M16, the M14 was mothballed for an expected storage of 26 years.

"The M14s arrive in Code A, which means they are in good or better-than-new condition," says Carlstrom. "Since we started building EBRs, we like the Winchester actions, but we use them all—H&R, Springfield Armory, Winchester and TRW. And I can't see how we'll ever run out of rifles."

The Rock Island team unpacks the rifles from their cardboard shipping boxes, then removes a wooden or nylon stock, plastic handguard, op rod guide block and barrelband. The only major subassembly that remains is the

There are so many M14s still in storage at Anniston Depot, TACOM builders have

barreled action. "We disassemble and use all but five parts," says Carlstrom. "They are very good, MIL-SPEC components. Since the program started, we've only encountered one shot-out barrel on an overhauled receiver."

Moving past pallets and parts bins of leftover components, the rifle advances to an efficient operation that transforms an M14 into an M14 EBR-RI in less than 20 minutes. A pile of EBR aluminum chassis systems from Sage International (sageinternationalltd.com) are piled on a bench, and a builder picks one at random for disassembly. He must remove the top cover and extract the new guide rod block that's largely responsible for the improved accuracy. The shim kits supplied by Sage were difficult to work with, so TACOM conferred with Sage to develop a washer that met all of the tolerance stack-ups they needed in a replacement crush washer.

At another station, another veteran, Dan, pulls a long black box containing a Leupold Mark 4 LR/T 3.5-10x40mm scope from a wall of identical boxes stacked seven feet high. Just one man is responsible for placing this scope in a set of Leupold Mark 4 medium-height tactical rings. He aligns the crosshairs once the rings are mounted to a six-inch Picatinny rail section. The rail section is permanently affixed to an eight-inch square sheet of stainless steel, which is secured in a vice that gets used for nothing else. Peering through the scope as he tightens the screws of the ring cap in a cross pattern, Dan watches to make sure the mil-dot reticle remains perfectly square with a grid he has posted on a wall 10 yards away. He then boresights the optic before removing it from its fixture and placing it back into the box.

With the EBR chassis resting in a wooden fixture, an EBR builder picks an operating rod, guide rod and spring assembly from parts bins just a few feet away. He starts to build up the barreled action and checks for function before moving on to the next step. It's important to the builder that he verifies that the unique Sage op rod guide is properly positioned on the barreled action. The red dot should face the muzzle when installed correctly. He then charges the operating rod to the rear a few times to ensure that the rod isn't binding with the operating rod guide in any way.

The builder then places the barreled action into the tight-fitting aluminum chassis. It usually requires some type of encouragement from a small mallet with a replaceable nylon head. When the action is seated into the chassis, he rolls the rifle over and inserts a trigger assembly that he's obtained from another nearby parts bin.

With the action seated front and rear, he visually checks for the alignment of the chassis' holes to ensure proper alignment of the coarse-thread screws that wear red Loctite on the threads. The fore-end of the chassis is now secured to the operating rod guide at three points, which will effectively free-float the barrel ahead of this guide. At this point, the top cover with integral rail assembly is reinstalled using six 5/32-inch Allen-head screws, a barrel whip control screw is brought down through the top cover until it just barely touches the top of the barrel and a jam screw is run into the side and interrupts the threads. This feature of the Sage International chassis system has shown itself to stop barrel whip. A key point is that no pressure is put on the barrel.

A special stainless steel washer slides over the barrel to properly aid in the piston assembly's function. A new piston assembly then slides over the barrel and is screwed on with a special wrench that helps align the

The transformation from M14 to M14 EBR-RI takes just 20 minutes before the rifle

come to prefer Winchester actions. Of the original rifle, only five subassemblies are discarded.

gas system. The M14's legendary gas system is completed when the builder screws on the gas cylinder plug.

After sliding the front sight assembly across the dovetail of the flash suppressor assembly, the builder tightens it with a pair of pliers designed specifically for the M14 castle nut. Before reaching this stage in the build process, however, the flash hider has had the bore size increased. The standard muzzle device is opened up with a #7 tapered reamer, which helps to prevent a phenomenon called water-drop deflection at the muzzle.

With the stock installed, the builder works on securing a solid platform for the Leupold sighting system. He attaches a cantilever base to the cartridge clip guide and secures the Sage International cantilever base to the chassis' top rail with the help of two tensioning throw levers. Though the cantilever base can be removed, this should only be done in the event that the primary optic fails during battle. You can remove the scope and cantilever mount if the warfighter needs to use the iron sights. Removing the optic by removing the cantilever base has demonstrated that a soldier can expect the same zero repeatability and zero retention within one MOA if it needs to be rolled off the rifle. With the cantilever rail removed, the SDM is free to use the M14's iron sights as a backup sighting system. Even when using just the iron sights, SDMs have been reported to have successfully engaged and defeated targets out to 600 yards.

ACCURACY CHECK

Once the Rock Island team completes a build, each new M14 EBR-RI rifle is placed on a table outside the facility's 100-yard indoor test range to be function fired and checked for TACOM accuracy standards. Each rifle is shot to verify grouping and accuracy, and that target is included with the Leupold box and assigned scope.

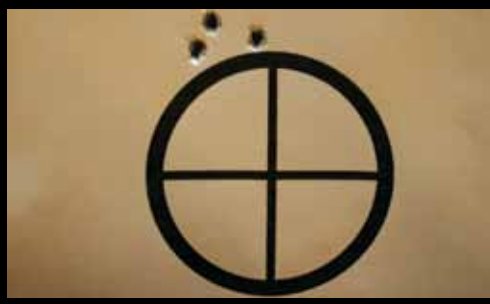
Some end users face situations where they need to use M80 ball. The M14 EBR-RI will shoot this type of 7.62 NATO ammunition with two-MOA results (at best) at 100 yards. An SDM using M118LR will cut that group in half.

For accuracy testing, the Rock Island team pulls from an ample supply of M118LR. The recorded accuracy doesn't take place until the tester observes that the rifle has begun to "like itself." These rifles quickly develop a specific wear pattern under recoil that allows the barreled action to properly

The newest Sage International EBR chassis carries an ERGO pistol grip. The stock can be collapsed while shouldered without injury to the shooting hand. A bullet tip can be used to depress a small detent and adjust the comb height.

moves to the indoor range for testing.

After testing more than 5,000 M14 EBR-RI rifles with M118LR, only one has ever



settle into the aluminum chassis. This is one reason why they highly advise against any operator or second-echelon armorer removing the chassis system from the rifle. Certain rifles settle in right away. At most, EBR testers allow each rifle eight rounds, with an average of three to four bullets walking before stopping and revealing a group.

Only once has a rifle ever been condemned at accuracy testing. Although TACOM won't accept anything that shoots more than 1½ MOA, the average group measures .97 MOA. During my visit, four rifles were tested and the poorest accuracy was .76 MOA. The best rifle produced an incredible .44 MOA. I couldn't help but let my mind wander and think of the reaction at the range that would be elicited from the soldier in Afghanistan who is ultimately issued this rifle.

Accuracy testing hasn't been solely limited to the Rock Island indoor range. Carlstrom has had various opportunities to demo the M14 EBR-RI at other bases. Never having shot anything beyond 300 yards before, one of the TACOM team members, Mike Petersen, was allowed to engage iron maidens during a training exercise at Ft. Lewis prior to a unit's deployment. The EBR proved itself well out to 800.

"We don't lock these rifles in machine rests to get this kind of accuracy," Carlstrom says. "We like to consider the human factor. If we can shoot it well, we know the soldier can do even better. We know that we can never outshoot these guns."

OUT THE DOOR

Once the rifles are tested for accuracy, scopes set in their rings are removed and returned to the Leupold cardboard boxes as the rifles are lined up on another table ready for packaging. The shipping box is formed as an evaluator cuts the measured three-shot group from the target and drops it into the scope's box for verification. The results of that particular test are logged into a database with the rifle's serial number for reference should the rifle ever return for another overhaul.

To meet the needs of the U.S. Army SDM program, TACOM-RI selected key components to assemble a package that enhances the stock M14 weapon system and provides standardized optics and rails for mounting lasers, lights and night vision equipment. A special multitool was created for the M14 EBR-RI that features a half-inch socket for removing the scope from the cantilever base, a carbon reamer for cleaning the gas piston cylinder and various Allen-head wrenches to remove/tighten the number of Allen-head screws through the rifle's chassis.

To that package a Harris bipod, Sage International forward vertical grip, six vintage 20-round magazines, a sling, an Otis 7.62 cleaning kit and a laser filter/anti-reflection device are also included. With the rifle wrapped in VCI protective paper, the box is closed, a label indicating the rifle's accuracy is placed on the outside of its box, and it's added to a stack of rifles already certified on a wooden palette.

MAINTANENCE

The aircraft-aluminum chassis is tight, and the rifle is configured so that the barreled action does not need to be removed from the chassis. Operator disassembly of the M14 EBR-RI is limited to cleaning of the external parts of the stock system, exposed action components and disassembly of the gas system to access the gas piston cylinder assembly. The M14 barreled action and forward rail should not be removed from the stock at the operator level. Any maintenance that requires

Once the rifle has passed final inspection, the Leupold scope is removed with its

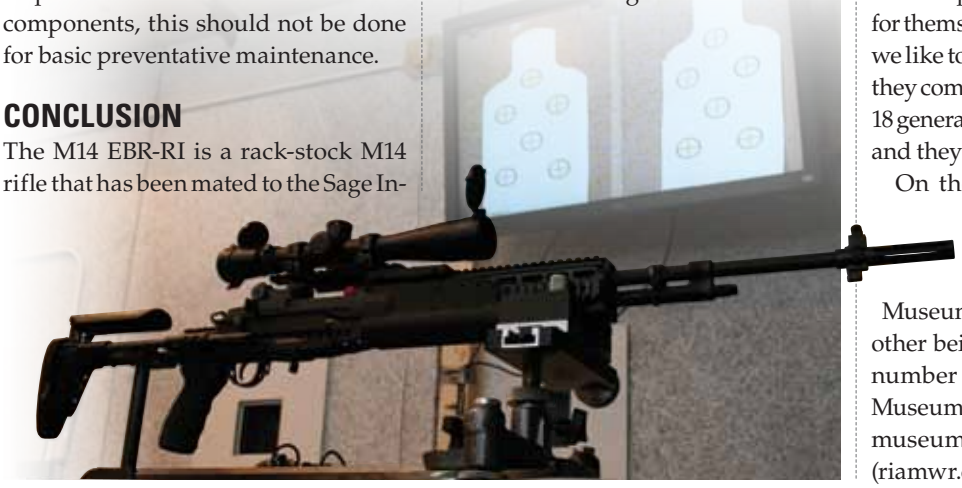
been rejected for failing the accuracy test. Most rifles average sub-MOA groups at 100 yards.

a barreled action to be removed from the stock should be done by an armorer. Cleaning the gas system is accomplished by the removal of the gas plug nut using a 3/8-inch wrench or the M14 combination tool. Remove the gas piston itself, and remove all carbon buildup. The carbon can be taken out using the reamer on the M14 EBR combo tool. Remove the trigger assembly by pulling out on the triggerguard and rotating it to the outward position. Once the triggerguard has been rotated to this position, pull upward on the assembly and lift to remove it from the stock. It can now be cleaned and lubed. To prevent excessive wear of the stock components, this should not be done for basic preventative maintenance.

CONCLUSION

The M14 EBR-RI is a rack-stock M14 rifle that has been mated to the Sage International EBR aluminum-billet stock system. This stock system in conjunction with the Leupold precision optics and Sage International cantilever mount makes the M14 EBR-RI capable of shooting less than one minute of angle in most cases.

TACOM received the call for a "significant quantity" of rifles that could enhance the battlefield effectiveness of a squad designated marksman. This call left the number of rifles that the Army would need delivered open-ended. Most of the fighting that goes on overseas is still a small arms war, and the retired veterans and contractors still working at TACOM Rock Island feel very connected to the end user's mission. To date, there is still no doctrine for an SDM rifle. So at least for the near future, the M14 will have a place on the battlefront.



Officials at the Pentagon considered the M14 EBR-RI an interim solution and indicate that the U.S. Army is still looking for a more permanent solution. Until then, Carlstrom's team proudly shows up to work each day to build and test the newest generation of M14s.

"The solution is months and months away," Carlstrom indicates. "But this is a 90 percent solution today. We have had generals and other VIPs in our government inspect and shoot one of these EBRs for themselves. It's a bit of a circus act, but we like to tape a dime to the target when they come to experience it. Twelve out of 18 generals have shot a dime at 100 yards, and they leave impressed."

On the 5th day of May, this team built the 5,000th rifle, one of only two ever inducted into the Rock Island Arsenal Museum the same day it was built (the other being a M1903 Springfield serial number 1). The Rock Island Arsenal Museum is the second-oldest U.S. Army museum, which is open to the public (riamwr.com/museum). CA

rings and packaged with accessories such as this multitool before final shipment to the end-user.