

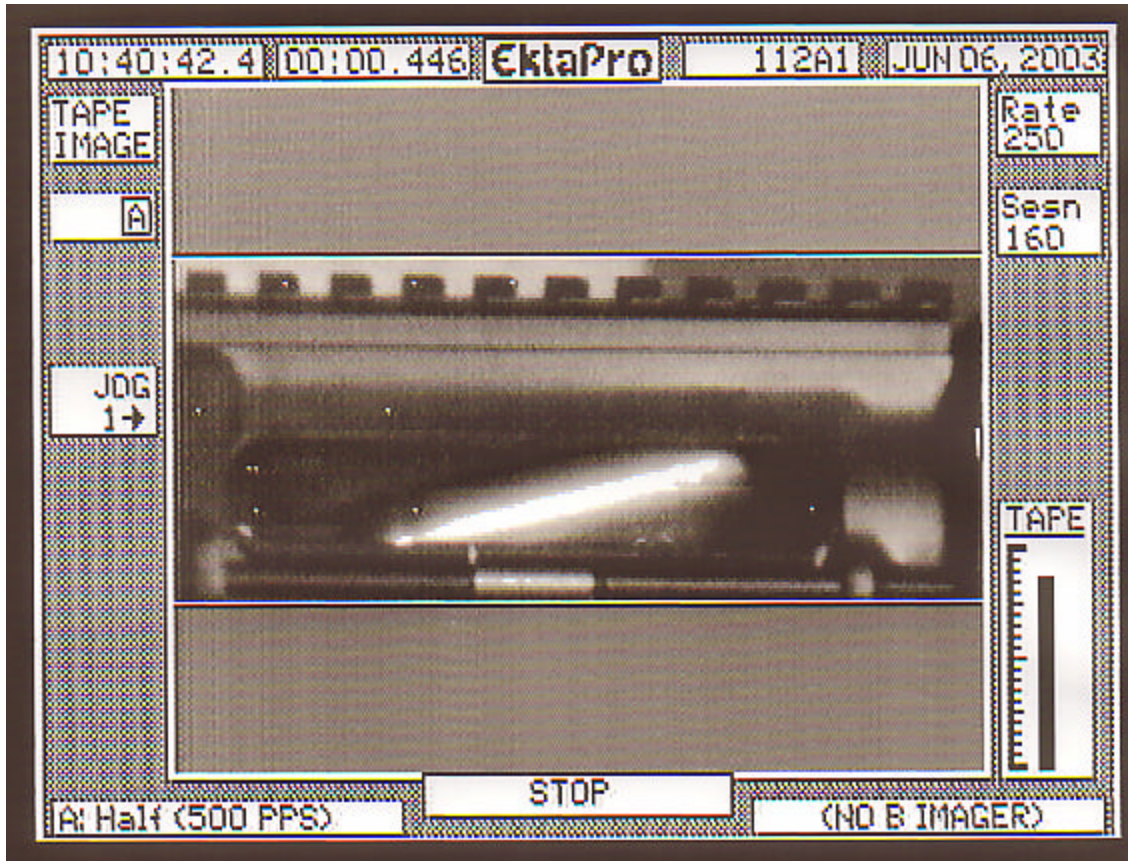


June 8, 2003

## TECHNICAL NOTE 56, EXTRACTOR RELIABILITY

**Background:** ArmaLite has occasionally received rifles from customers that exhibit a mysterious malfunction. Fired cartridge cases are pulled from the chamber with solid extractor marks showing the extractor was engaged, but the cases are not ejected. The next cartridge in the magazine is properly fed to the chamber, confirming that carrier group velocities are sufficient to support normal extraction and ejection.

Instead, the case is not ejected from the action and the following round is fed to the chamber. Forward motion of the bolt stops when the fired round stubs between the barrel and bolt face and the next cartridge stops with the bullet tip just inside the chamber mouth (Figure 1). The problem has proved difficult to diagnose because it is infrequent, incorrectly described, and involves a number of subtle causes.



**Figure 1.** Fired cartridge jammed between barrel extension and bolt. Following round (not visible) is feeding into the barrel extension.

The condition is often labeled a “double feed” or a failure to eject. In fact, it is a complex failure to *extract*.

**Findings:** Extensive testing was required to determine that the bolt loses control of the cartridge case very soon after pulling on it strongly enough to mark the rim, but well before the ejector can function. In other words, extraction starts, but doesn’t finish.



**Figure 2.** Bolt is moving to the rear followed by the fired cartridge. The fired cartridge is moving slower than the bolt, and cannot be ejected. Even at 500 frames per second, the bolt movement is blurred by its speed.

A number of elements conspire to create this malfunction and makes it very hard to diagnose. The issues include microscopic damage to the extractor claw caused during de-burring at a supplier’s factory, extractor location and orientation, small case head diameters, chamber finish or cleanliness, overheating the rifle by excessive firing rates, and the absence of the extractor spring reinforcement (“O-ring”) in some early extractors.

**What to do:** Few shooters will ever see this problem, and they don’t need to do anything. Those without the O-ring extractor spring reinforcement should request one and it will be provided at no charge. Shooters suffering this problem should correct the fouling and heating problems noted above, use NATO standard ammunition, and contact ArmaLite for further instructions if the problem continues.