

The Identification of Fired 40mm Less Lethal Projectiles

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ABSTRACT

During the course of analysis for an officer involved shooting, a less lethal 40mm launcher was test fired. Two 40mm rubber projectiles were recovered and were able to be identified to each other from rifling marks present on their plastic bases.

A Defense Technology brand less lethal 40mm launcher was submitted to the laboratory for test fire, along with two 40mm A.L.S. (Alternatives to Lethal Systems) Technologies brand R.E.A.C.T. (Radiated Energy Air Cushioned Trajectory) cartridges containing rubber projectiles (**Figure 1 and 2**). The Defense Technology launcher was a single shot, top break, single action, hammer fired firearm, “with a one-piece steel frame and an aluminum rifled barrel” [1]. The barrel had six lands and grooves with a right-hand twist (**Figure 3**). The submitting agency had mounted an EOTech brand Holographic Weapon Sight on the launcher and it proved to be quite accurate when test fired.

The A.L.S. Technologies cartridges were R.E.A.C.T. Impact #ALS4006D rounds designed as a direct fire, behavior modification round [2]. The projectile had a rubber round nose tip, with an attached black plastic base which varied in diameter along its length (**Figure 4**). The heel of the black plastic base was of a smaller diameter to fit inside the case

mouth, while the adjacent area was a narrow driving band slightly larger than 40mm and contained the rifling marks. Moving forward of the driving band along the base, toward the rubber tip, was an area of true bore diameter which had no rifling marks, and lastly the rubber tip itself. The cartridge case was hard plastic and utilized what appeared to be a Starline brass .38 Short Colt caliber cartridge case with nickel primer for ignition (**Figure 5**).

The recovered projectiles were microscopically compared and identified to each other, showing good individual agreement on multiple land impressions (**Figures 6 and 7**). There did not appear to be any individual characteristics on the groove impression area.

There was, however, some agreement of marks on the black plastic base adjacent to the land impressions (groove area) which carried over towards the nose of the projectile on the portion of the base at true bore diameter. These were most



Figure 1: Defense Technology brand less lethal 40mm launcher

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Figure 2: 40mm Radiated Energy Air Cushioned Trajectile cartridge containing rubber projectile

likely extrusion marks from when the plastic projectile was manufactured; however, no remaining unfired cartridges were available for further examination (**Figure 8**).

Conversations with Defense Technology revealed that they outsource the production of their barrels to multiple vendors, one of which was the Lewis Machine and Tool Company (LMT). A representative from Lewis Machine and Tool stated that during the barrel making process for the 40mm launchers, they take solid bar stock, drill it to specification, and use a large broach to cut the rifling with no final finishing or polishing being performed.

Also, as of this writing, A.L.S. Technologies had been sold and at some point in the future will become known as AMTEC Less Lethal System Inc.

References

- [1] Defense Technology Website: <http://www.defense-technology.com/>
- [2] A.L.S. Technologies, Inc. Website: <http://www.lesslethal.com/>



Figure 3: Rifled barrel of 40mm launcher



Figure 4: 40mm projectile



Figure 5: Cartridge Case used for ignition

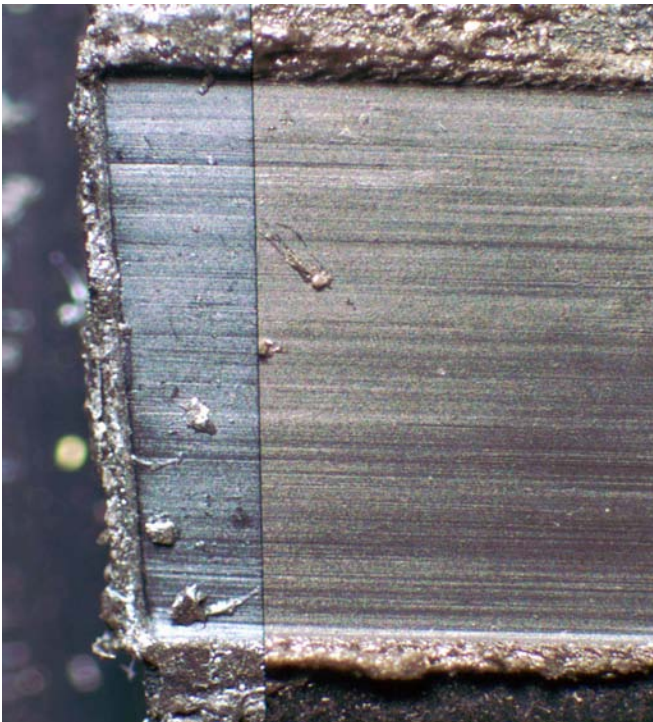


Figure 6: Example of test to test land comparison

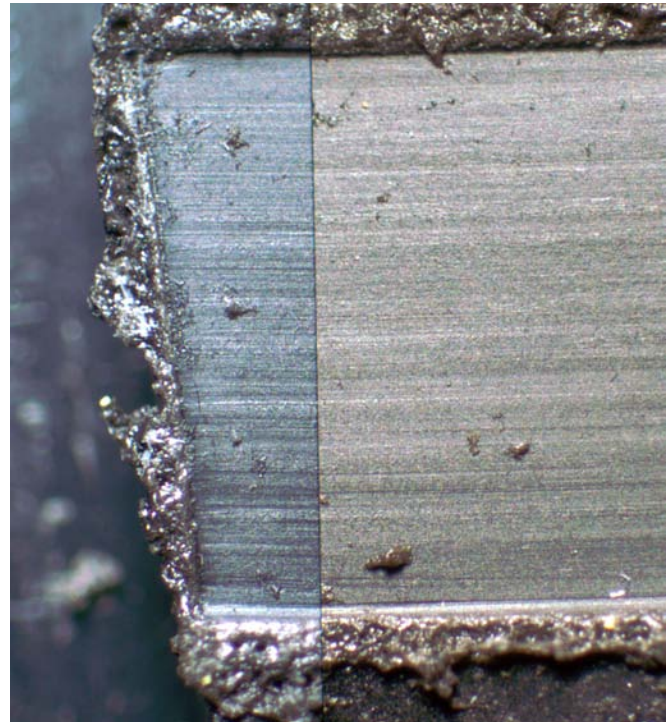


Figure 7: Example of test to test land comparison

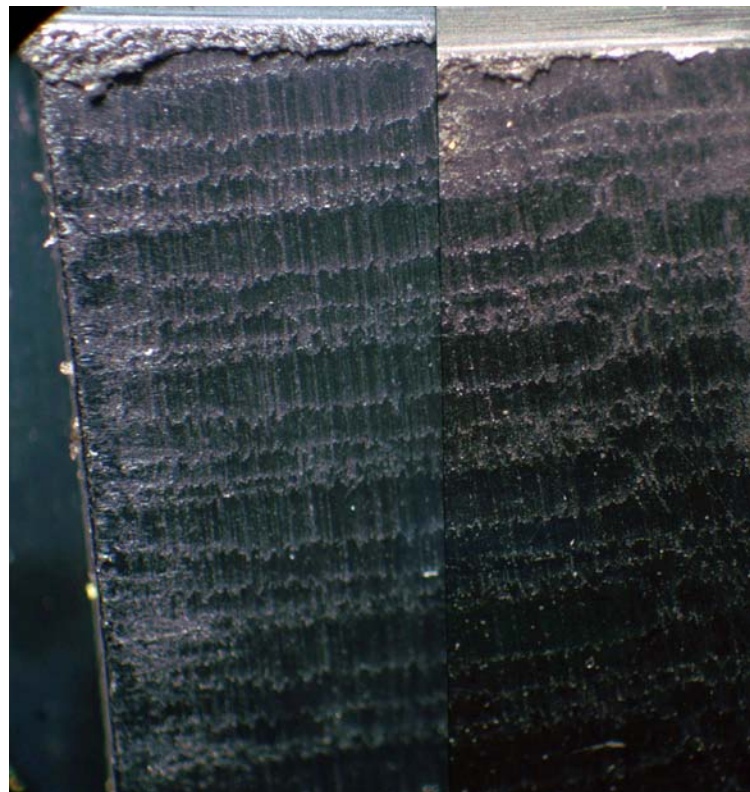


Figure 8: Comparison of extrusion marks