MANUFACTURING THE LORCIN L380 AND CORRESPONDING CHARACTERISTICS

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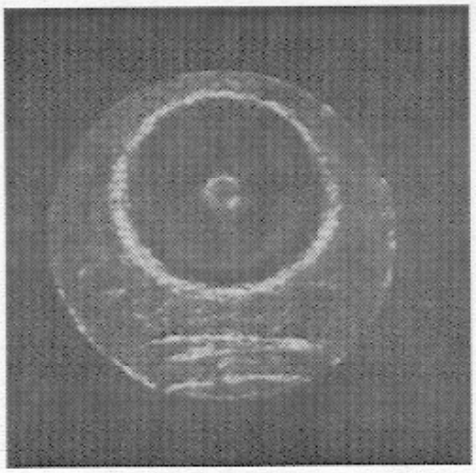
ABSTRACT

The extent to which the Lorcin .380 pistol is represented among evidence guns in select crime laboratories around the country is disproportionately high. This article discusses a study of the Lorcin L380 breech face as well as the manufacturing techniques employed during the construction of this weapon.

INTRODUCTION

One of the first articles discussing the Lorcin L380 pistol (Thompson & Thompson) first appeared in the January 1993 AFTE Journal. It served as an appropriate introduction for a pistol that has seen many a firearms unit since. The bullets and casings of the L380 pistol are easy to characterize. The bullets exhibit slippage and/or extremely shallow land impressions that often make even shoulder location difficult to determine. The breech face marks are either non-existent or change from shot to shot. Moreover, in light of the increased popularity and usage of computer imaging systems, these poor marks bring added frustration, most of which can be attributed to the Lorcin manufacturing process.

Not long ago, examination of cartridge cases fired in Lorcin .380 pistols often revealed characteristic crescent shaped marks immediately underneath the firing pin impression (Photograph A). Observation of these marks revealed that their location corresponded to an area on the breech face that collides with the cartridge head during feeding. It appeared that repeated firing was causing the cartridge heads to peen the surface of the breech face to such a degree that these "crescent" or simi-circular impressions were being imparted to the cartridge primer. In most cases these marks could be observed with the naked eye. However, over the course of the last year it was observed that Lorcin cartridge cases no longer exhibited these marks as they once did. It was decided that a request would be made for Lorcin to send two never-before-fired L-380 pistols so that the condition of the barrel and breech face could be evaluated during a series of test fires. Some curiosity existed as to how many tests would have to be fired before the crescent shaped marks began to appear on the cartridge cases. An informal experiment was conducted to find out.



PHOTOGRAPH A

Methods and Materials

In November of 1996 a phone call was placed to the plant manager of Lorcin Engineering with a request for two Lorcin L380 pistols that would be

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used for testing and returned upon completion. It was understood that the two pistols would not be proof tested for the sake of preserving the original condition of the breech face. The plant manager was more than willing to participate in this project and honored the request.

In January of 1997 a cardboard box was received from Lorcin Engineering containing two consecutively numbered Lorcin L380 pistols: serial # 468050 and 468051. Both weapons appeared to be in excellent condition with no remarkable finish imperfections. Undisturbed Powder-Coat spray residue observed inside the barrel (at the muzzle) as well as the surface of the breech face confirmed that the weapons had not been fired.

Breech Face and Barrel Casting

So that the original condition of the breech face could be recorded prior to test firing, Mikrosil ™ casts were made of each breech face and marked accordingly.

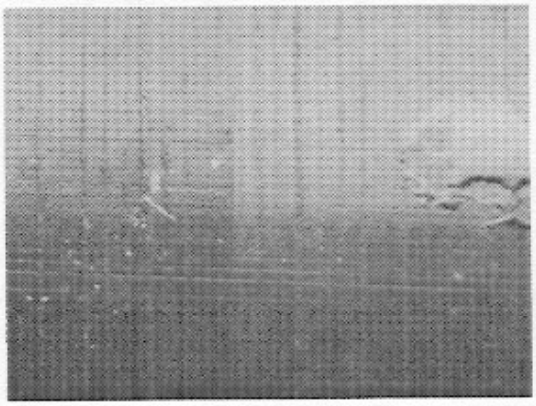
Mikrosil ™ casts were also made of both barrels for the simple reason that consecutive serial numbers suggested the possibility of barrels rifled with the same tool. (Documentation of such an examination benefits AFTE members in wake of the legal challenges gaining popularity at the Federal level.)

Initial Barrel Cast Comparison

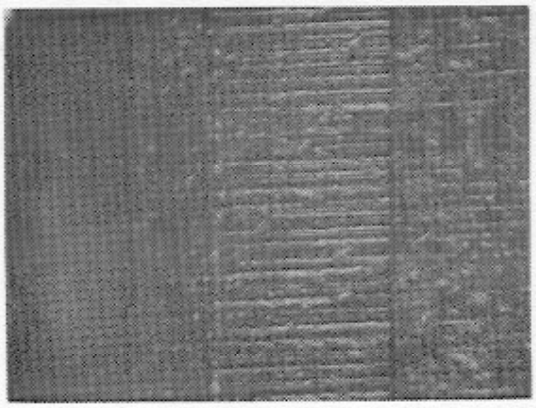
Microscopic examination and comparison of the barrel casts taken from both pistols revealed sufficient evidence to conclude that the two barrels were rifled with the same tool (Photograph B). As expected, the depth of the grooves was remarkably shallow. In addition to the identifiable rifling marks, examination of the barrel casts revealed the presence of concentric reaming marks that could be observed on both the lands and grooves (Photograph C). It seemed surprising that these reaming marks in the grooves survived the rifling process with very little loss of clarity. This will be discussed further.

Initial Breech Face Cast Comparison

Microscopic examination and comparison of the breech face casts taken from both pistols failed to reveal any reproducible individual characteristics



PHOTOGRAPH B



PHOTOGRAPH C

that could be used for identification. This was expected considering the freshly painted breech face.

Phase One: First Single Test Fire

Each pistol was fired once. The bullets and cartridge cases were collected and marked. Photographs were taken of each of the two test cartridge cases for documentation (Photographs D & E). The two test bullets were microscopically compared to each other. *Absolutely no significant similarities were observed despite being fired from barrels rifled with the same tool.*

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After only one test fire, significant chipping and cracking of the paint on the breech face was noted. No remarkable impressions, however, were observed. Also, the Powder-Coat residue observed on the inside of the barrel had essentially been removed.

Each of the two cartridge cases were examined for breech face marks sufficient for identification. As seen in photograph D and E, few significant characteristics were observed.

Phase Two: 50 Test Fires

Both pistols were fired 50 times using standard 95gr .380 auto cartridges. It was estimated that any major disturbances to the breech face would occur in less than 50 shots. All shots were fired in quick succession with the hopes that the repeated cartridge feeding would result in significant changes to the breech face.

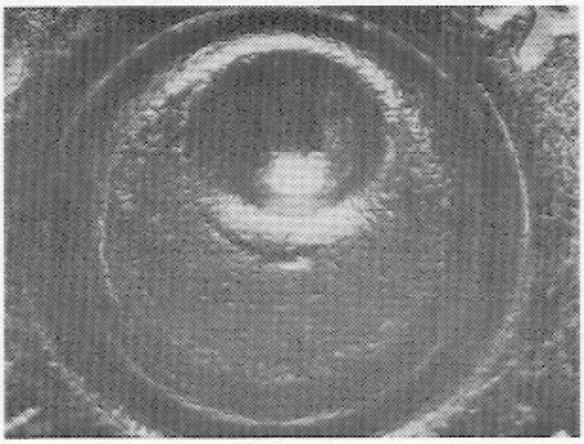
Immediately following these tests, Mikrosil ™ casts were taken of each breech face. Examination of these casts revealed no remarkable disturbances to the metal.

Phase Three: Feeding Test

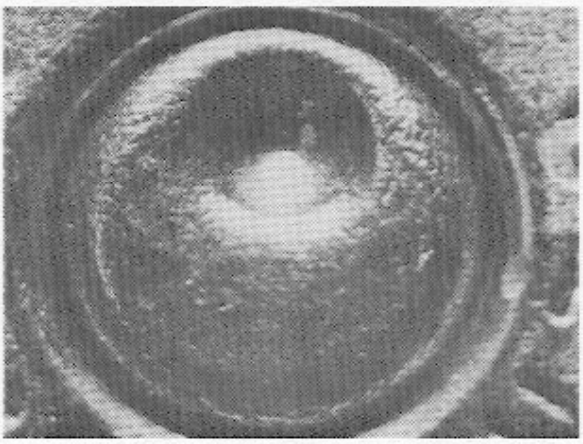
In a last-ditch effort to effect some change to the breech face, one of the pistols (468050) was subject to 300 manual feedings using .380 dummy cartridges. The magazine was loaded, slide pulled rearward and released: 300 times (about 43 magazines). Immediately following this battery of tests five rounds were fired and the cartridge cases examined. Photograph F shows two of these cartridge cases. While some marks were present, the classic crescent shaped marks were not.

VISIT TO LORCIN ENGINEERING MIRA LOMA, CA

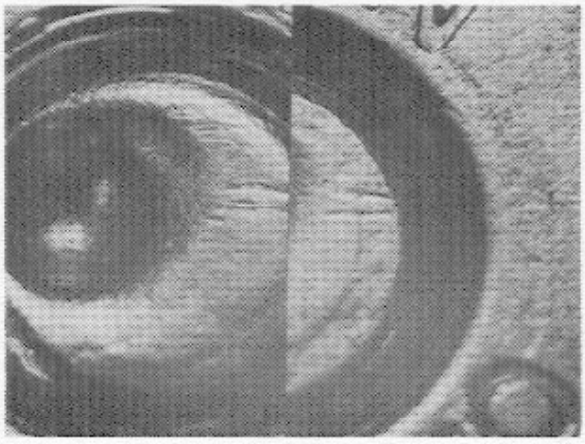
Creation of the classic Lorcin marks was attempted but certainly not expected. Moreover, it became increasingly clear that an understanding of the manufacturing techniques employed during the construction of the Lorcin pistol would be necessary before any conclusions or narratives were written. Considering the high number of Lorcin L380 pistols



PHOTOGRAPH D



PHOTOGRAPH E



PHOTOGRAPH F

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encountered in this region, basic knowledge of the Lorcin manufacturing process was lacking.

In late February another phone call was placed to Lorcin engineering requesting permission to visit their facility. The visit would preferably include a conversation with Lorcin's production manager. The visit took place in May of 1997.

Manufacturing Process

Lorcin Engineering employs 34 persons in a 22,000 sq/ft facility. For the most part, Lorcin is not a manufacturing plant. It is an assembly line. The construction of the parts is completely left to outside vendors. The only non-assembly work done at Lorcin is the rifling of the barrel, and the drilling of the extractor pin hole, grip screw threads, and barrel pin hole. Also, miscellaneous corrections to remove burrs or gross die marks are performed.

The slide, frame, and all internal parts are die-cast. Only one mold is needed for each caliber (.22, .25, and 9mm pistols). Two molds are used for .380 pistols. Several thousand casts can be made in one mold. While the exact number varies, the production manager stated that one mold has the potential to make 350,000 casts.

The barrel is made by a separate vendor and pinned into the die-cast frame.

All serial numbers are stamped by the casting vendor, not Lorcin. The serial numbers are located in the following positions:

.22 pistol - back strap
.25 pistol - front strap
.380 pistol - right frame
9mm pistol - right frame

Barrel

The barrels are rifled with what Lorcin refered to as a "**burnishing broach**." Most examiners would consider this a common rifling button and will be refered to as such for this paper. The button (Figure 1) is approximately an inch and a half long with grooves cut into the outer surface. The barrel is

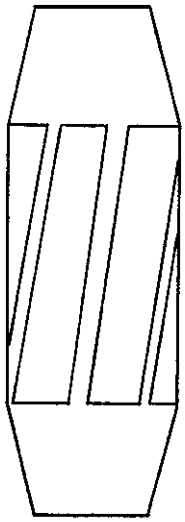

FIGURE 1: Diagram of Lorcin's "burnishing broach." It is attached to the plunger of a hydraulic press and forced into the bore.

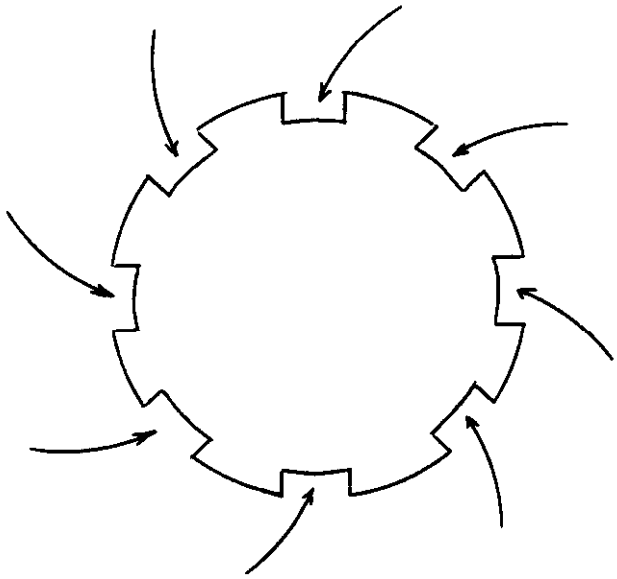

FIGURE 2: A cross-sectional view of the burnishing broach. As it is pressed into the bore of the barrel, metal is forced into the grooves forming the lands of the barrel. With Lorcin, these grooves are quite shallow and do not significantly disturb the existing reaming marks on the inside of the barrel.

clamped into a jig secured to a hydraulic press. The button is attached to the plunger of the press which is mechanically operated. As the button is forced down into the bore, intense pressure forces

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barrel material into the grooves of the button resulting in the lands of the barrel (Figure 2). When it completes its pass, it is pulled upward and out of the bore. As expected, because no material is removed in this process, reaming marks can still be clearly observed after rifling. Also, the shallow grooves of the "burnishing broach" account for Lorcin's shallow land impressions.

NOTE If ever contacting Lorcin in reference to their rifling process, be aware that the rifling tool is refered to by the production manager as a "Burnishing Broach."**

Breech Face

Originally, the Locin breech face was simply an interior surface of the existing slide body through which the firing pin channel passed. Two years ago, Lorcin began incorporating a steel breech face insert into the casting of the slide body. The insert, made of heat-treated case hardened steel, is 80/1000" thick with five indexing fingers that extend over 1/2" into the breech block. The insert is placed directly into the mold during casting. One of the five indexing fingers sits just above the firing pin channel while the other four are situated in pairs on either side of the channel. The fingers reinforce the insert and allow for easier location in mold.

The incorporation of this steel insert significantly increased breech face hardness. While no claims were made that the pistol's function was comprimised without the insert, the increase in hardness might allow for better feeding, eliminate the peening of the metal, and provide for a more polished appearance.

Finish

Lorcin offers three kinds of pistol finish: Bright Chrome, Satin Chrome, and Powder Coat. Satin chrome is considered a simulation of stainless steel.

Lorcin's Powder Coat station occupies a significant portion of their facility. In this process, slides and frames are suspended from hangers secured to a moving track. The parts are first cleaned with soap followed by a chemical rinse, city-water rinse, then deionized water rinse. The moving track guides the parts into an oven where they are dried for 15 minutes at 365F degrees. All parts must be completely dry before powder coat application. The parts are brought into a spray hood for coat application. The hood contains a series of automated sprayers that apply the finish. In addition, there is one manually operated hand-held sprayer that can be used for touch-up work. When the application is complete the parts are cycled back into the 365F degree oven for one hour. This heat treatment cures the application and increases hardness.

Function Testing

All of Lorcin's pistols are function tested using standard factory ammunition. Three shots are fired from each pistol. No high pressure loads are used.

PRODUCTION CORRECTIONS

Over the course of the history of this young company, two major corrections have been made to the L380:

- In the April 1994 AFTE Journal, Miller illustrated the failure of the Lorcin manual safety caused by the wearing of the plastic safety lever. Lorcin replaced this plastic safety mechanism with a metal one.

- Bending was occurring in the takedown button from contact with the frame during repeated firing. A smooth radius was cut on the descending tab of the button to better disperse the energy when contacting the frame.

CONCLUSION

To date Lorcin has manufactured approximately 480,000 pistols. Last year alone they delivered over 80,000. Their .380 pistols represent half of their entire production volume. The opportunity to learn the specifics of the Lorcin manufacturing process greatly enhanced the ability to explain class characteristics that were otherwise taken for granted. Hopefully, this information will be benificial to firearms examiners who regularly encounter the Lorcin .380 pistol in their casework.