



Case Study

Uncommon phenomenon of fired copper jacketed bullet: A case study

Gauri Vengurlekar*, Mahesh Kadam, Khudbudin Mulani and Chitra Kamat
Directorate of Forensic Science Laboratories, Kalina, Santacruz (E), Mumbai-400098, India
vengurlekar.gouri@gmail.com

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Abstract

In India, cases related to the firearms are increasing significantly and now this rise is about 60-70%. In Ballistic division of directorate of forensic science laboratories, Mumbai around one thousand cases are deposited every year in which firearms are used. In one of such case, standard 9 mm calibre pistol, copper jacket having rifling marks and lead core were received in laboratory. Initially both copper jacket and lead core appears to be two different projectiles and fired from different weapons. During the comparison of copper jacket and lead core, it was observed that lead core perfectly seats inside the copper jacket of bullet, it means that copper jacket and lead core are the parts of single bullet and fired from single weapon.

Keywords: 9 mm pistol, copper jacket, lead core.

Introduction

Ballistic forensics is one of the most important and interesting area among forensic sciences. In last few decades, forensic scientists are attracted towards forensic Ballistics. Hsieh and co-workers studied the methods for identification of two unusual types of homemade ammunition that most closely resembling genuine ammunition¹. When gunpowder explodes and produces gases, an enormous pressure that used to propel bullet from barrel to target. The residue left in the cartridge case is known as gunshot residues (GSRs). There are several methods developed for analysis of gunshot residues²⁻⁷. A comparative study of gunshot residue collection from shooters hand and from fired cartridge case was examined using SEM-EDX described by Zuzanna⁸. The identification of tool marks of the firearm is a crucial task. The tool marks of the weapon includes interior of the barrel, the chamber, firing pin and action parts. Each and every weapon having its own unique characteristic such as firing pin impression, breech face marks, extractor and ejector marks and chamber marks⁹. The fluted, helical annular ring and perforated chambers exists in a modern weapon and assist to identify both class and individual firearm characteristics.¹⁰⁻¹¹ The above characteristic tool marks are used to link suspected weapon with cartridge case and bullet collected from scene and recovered from body. Ballistic experts opinion is very important to know whether exhibit cartridge case/bullet recovered from scene of crime or body of victim have been fired from suspected weapon or not.

The forensic firearm identification and its presentation in court of law have been continued from last several decades. For this purpose, comparison microscope is used for photographic comparison to determine fired cartridge cases and bullets. The fired bullets have striated tool marks on its surface which are generated by rifled bore of the barrel.

In this case study, we received a case containing 9 mm calibre pistol, deformed copper jacket of bullet and lead core. To match the suspected weapon with seized cartridge case and bullet, we need to fire the cartridge from said weapon.

Case report

In 2014, Ballistic division Mumbai received a lead bullet (core) in the contest of a police man aged 33 years who committed suicide at his home using 9 mm calibre service pistol. Later on investigating officer deposited a 9 mm calibre service pistol, deformed copper jacket of bullet and 9 mm pistol empty. The copper jacket and lead core as shown in Figure-1. The physical parameters of 9 mm calibre service pistol were measured. Barrel washing tests were taken for fired ammunition-nitrite and it gave positive, showing that 9 mm calibre service pistol was used for firing prior to its receipt in the laboratory. Physical measurements, chemical tests and test firing proved that the weapon was in working order with normal firing pattern. A Canon EOS 550D (made in Japan) digital camera and Leitz Wefzlar (made in Germany) were used for photographing images.

Discussion

When firearm is fired, the fired bullet travels down the barrel, the soft metal on the sides are engraved by the rifling until bullet leaves barrel. The fired bullet possesses characteristic marks like rifling marks and brushing marks². These characteristic marks play an important role in finding correct weapon.

In this case we received a deformed lead bullet (later on identified as a lead core of a 9 mm copper jacketed bullet) along

with 9 mm pistol empty, two pieces of a copper jacket of a 9 mm copper jacketed bullet and a 9 mm calibre service pistol.

Standard weight of intact 9 mm copper jacketed bullet is 7.45 g. In our case study it was found that weight of copper jacket and lead core were 7.21 g which is equivalent to the weight of fired 9 mm pistol bullet (7.44 g) as shown in Table-1.

Table-1: Weights of 9 mm copper jacketed bullets

Wt. of intact 9mm pistol bullet (g)	Wt. of fired 9mm pistol bullet (g)	Wt. of lead core and two pieces of copper jacket (g)
7.45	7.43	7.21

It was concluded that copper jackets and the lead core are the parts of single fired 9 mm copper jacketed pistol bullet.

In such type of cases matching the lead core(found in the skull portion of the deceased person) is a difficult task as the copper

jacket of a bullet got detached due to hit on hard skull bone was found at the crime scene, leaving the lead core inside the skull of a deceased person.

In this case, a cartridge case having indentation matching with that of test fired cartridge case. The two pieces of a copper jacket having rifling marks were matched with the test fired copper jacketed bullet. Also the photographic match fit of lead core (found in the skull of deceased) and the piece of copper jacket (found on the crime scene) as in Figure-1 was done, showing that the shape and size of lead core perfectly seats in the inner cavity of a piece of copper jacket of a 9 mm copper jacketed bullet from crime scene as shown in Figure-2.

Figure-1 and 2 also shows that fitting of copper jacket on the lead core has left fitting marks on the lead core found in skull, proving that the lead core, before entering the skull was fitted with a copper jacket hence it proved it was a fired 9 mm copper jacketed bullet initially.



Figure-1: Copper jacket and lead core.

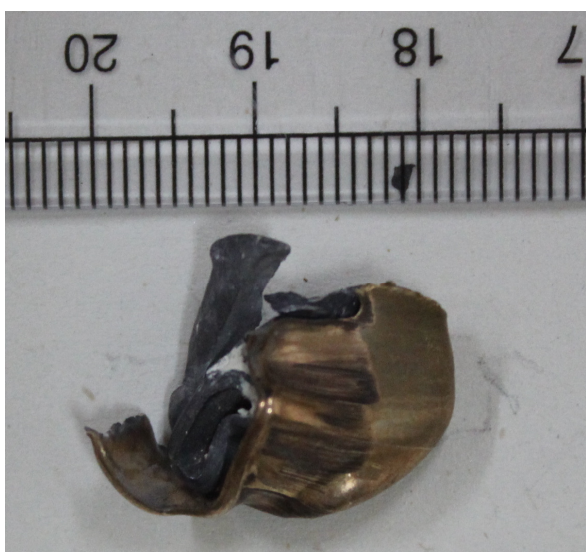


Figure-2: Photographic match fit of lead core and copper jacket.



Conclusion

Though the lead core was separately received in the laboratory as a post mortem lead projectile. Later on copper jacket, 9 mm cartridge case, and 9 mm service pistol deposited by investigating agency. Initially, it seems that lead core and copper jacket were two different fired projectiles but during analysis it was observed that lead core and copper jacket are the parts of fired single 9 mm copper jacketed bullet.

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