A22 Indentification of Barrel Fingerprints (Striations) of Lead Core and Splinter of Jacket of Bullets

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The goal of this presentation is to inform the attendees of the importance of analyzing the striations on small or likely to be destroyed splinters on the jacket and lead core of the bullet when attemting to ascertain the weapon responsible for firing.

This presentation will impact the forensic science community by discussing the importance of finding the weapon responsible for firing to aid in the detection of crimes.

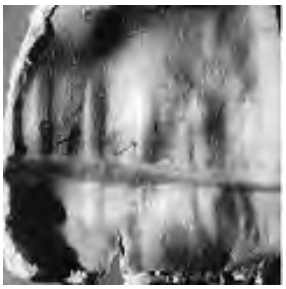
When bullets are fired from high velocity firearms, the jacket of the bullet is often broken into fragments. The degree of fragmentation depends on the velocity of the bullet, the striking energy, the position and angle of travelled path, the hardness of target, etc. Impact of the bullet may lead to the complete separation of the lead core and its fragments. Due to the impact and striking of various objects, the striations on the surface or a portion of the bullet may be missed, obliterated, or interfered with. The jacket pieces (splinters) due to additional rubbing and impact marks may not be identifiable even to the extent of elimination on the basis of class characteristics, although they bore characteristics rifling marks (striations) initially. This presentation also discusses the benefit of utilizing marks other than the usual striations/rifling marks/barrel finger printing to identify the lead core and jacket pieces/splinters.

When a bullet is fired through a rifle, it is engraved with characteristic rifling marks/fingerprint from the inside of the barrel. The depth and nature of imparting depends upon the condition of rifling irregularities of the barrel, diameter of the bullet, the construction material of the bullet, etc. Therefore, these imparting marks, whenever present, can be quite useful when the normal identification procedure is not available

To experimentally study the marks on the under surface of jackets and the lead core, the firings were conducted with high velocity firearms. The jacket of the recovered bullets was cut open and the lead core was removed. A few rounds were fired so that the bullet hit the target thereby causing splintering of the bullet. In addition, bullet fragments from actual cases and controlled unfired bullets were also studied.

Result and Discussion: The examination of the under surface of the jacket and the lead core revealed, in some cases, the presence of identifiable characteristic rifling marks/fingerprint marks on the inside of the barrel. The engraving in most of these was sufficient for the identification of class characteristics like twisting, angle, and width of rifling.

Figure 1:



Class characteristic rifling marks/fingerprint of the barrel under the surface of the jacket.

Figure 2:

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Class characteristic rifling marks/fingerprint of the barrel marks on the inside of the lead core.
Lead Core, Fragment, Bullet

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