

## The Ballistics Case Study of the Enrica Lexie Incident

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**Abstract :** On February 15, 2012 off the Indian coast of Kerala, in position 091702N-0760180E by the oil tanker Enrica Lexie, flying the Italian flag, bursts of 5.56 x45 caliber shots were fired from assault rifles AR/70 Italian-made Beretta towards the Indian fisher boat St. Anthony. The shots that hit the St. Anthony fishing boat were six, of which two killed the Indian fishermen *Ajesh Pink* and *Valentine Jelestine*. From the analysis concerning the kinematic engagement of the two ships and from the autopsy and ballistic results of the Indian judicial authorities it is possible to reconstruct the trajectories of the six aforementioned shots. This essay reconstructs the trajectories of the six shots that cannot be of direct shooting but have undergone a rebound on the water. The investigation carried out scientifically demonstrates the rebound of the blows on the water, the gyrostatic deviation due to the rebound and the tumbling effect always due to the rebound as regards intermediate ballistics. In consideration of the four shots that directly impacted the fishing vessel, the current examination proves, with scientific value, that the trajectories could not be downwards but upwards. Also, the trajectory of two shots that hit to death the two fishermen could not be downwards but only upwards. In fact, this paper demonstrates, with scientific value: The loss of speed of the projectiles due to the rebound on the water; The tumbling effect in the ballistic medium within the two victims; The permanent cavities subject to the injury ballistics and the related ballistic trauma that prevented homeostasis causing bleeding in one case; The thermo-hardening deformation of the bullet found in Valentine Jelestine's skull; The upward and non-downward trajectories. The paper constitutes a tool in forensic ballistics in that it manages to reconstruct, from the final spot of the projectiles fired, all phases of ballistics like the internal one of the weapons that fired, the intermediate one, the terminal one and the penetrative structural one. In general terms the ballistics reconstruction is based on measurable parameters whose entity is contained with certainty within a lower and upper limit. Therefore, quantities that refer to angles, speed, impact energy and firing position of the shooter can be identified within the aforementioned limits. Finally, the investigation into the internal bullet track, obtained from any autopsy examination, offers a significant "lesson learned" but overall a starting point to contain or mitigate bleeding as a rescue from future gunshot wounds.

**Keywords :** impact physics, intermediate ballistics, terminal ballistics, tumbling effect

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