



G6 Application of Forensic Engineering for the Reconstruction of Manner of Death: A Nautical Accident

Daniele Gibelli, MD, Istituto di Medicina Legale e delle Assicurazioni di Milano, V. Mangiagalli, 37, Milan, ITALY; Angela Cantatore, BE, and Remo Sala, BE, Politecnico di Milano, P.zza Leonardo da Vinci, Milan, ITALY; and Salvatore Andreola, MD, and Cristina Cattaneo, PhD, Istituto di Medicina Legale e delle Assicurazioni di Milano, V. Mangiagalli, 37, Milan, ITALY*

Attendees of this presentation will be presented with a case where the application of forensic engineering helped in reconstructing manner of death and mode of lesion production in a nautical accident.

This presentation will impact the forensic community by showing how the application of forensic engineering to cases may result in obtaining more precise data concerning the reconstruction of events.

In forensic pathology it is sometimes necessary to reconstruct the manner in which a victim fell or was hit, stabbed, or shot in order to verify the compatibility between the pattern of distribution of lesions and the dynamics of the lethal event. Reconstruction aids in acquiring information which may help in determining homicide, accident, or suicide. More and more in these cases, forensic engineering assists the forensic pathologist. This case shows the importance of forensic engineering in the reconstruction of events. The case concerns an unmarried couple on a boating trip. One morning the man woke up to find his partner overboard in the water tied at the waist by a security rope. He later reported that she must have fallen in the water during the night, when it had been her turn to steer and check on the boat. The woman underwent postmortem examination, which showed typical signs of drowning, such as foam in the airways, overinflated lungs, and water in the stomach. Authorities initially classified the death as accidental. The woman's family remained suspicious that the partner was responsible for the death since he had recently been made the sole beneficiary of her will. Their accusations led to the exhumation of the corpse and a new autopsy was performed, which highlighted typical signs of blunt trauma, such as bruises distributed to the head, right thorax, right hand and shoulder, back, and linear abrasions on the abdomen.

Microscopic analysis of the lungs showed signs of drowning, such as oedema and expansion of the alveoli. Unfortunately no diatoms could be found (only fragmentary). The cause of death was identified as mechanical asphyxia by drowning. Although the cutaneous signs of blunt trauma observed during the postmortem examination could not justify death by a traumatic cause, they could have been the signs of an aggression which may have caused the fall of the victim into the water. The main question was: could a simple fall from that boat explain the pattern of lesions (anterior and posterior), or did they indicate an aggression? Initial experiments were performed with a dummy and a boat of the same model. Different manners of precipitation in different positions were then simulated, which provided the first general data concerning the mechanisms of the fall. A more precise analysis was then conducted with computer-simulation software in order to obtain more reliable data concerning the physical characteristics of the boat and dummy model as well as the mutual interactions between the two. After recording every physical characteristic which may have had importance in the reference system and the virtual reconstruction of the environment, different simulations of the fall were reconstructed. The position of skin lesions were considered as points of contact between the body and boat during the fall. Three hypotheses of falling were then considered and simulated. In the first case, the victim was facing the sea, in the second she had the sea to her right, and in the third she had the sea behind her. In the first case, the simulation was concordant with all the lesions described but for the bruise on her back. In the second case the fall could explain only the lesion on her right hand. The third type of fall explained all lesions.

Results showed therefore that the pattern of lesions could be consistent with an accidental fall and may not have necessarily been caused by an aggression. This experience strengthens the importance of forensic engineering in the reconstruction of events.

Forensic Pathology, Forensic Engineering, Nautical Accident