D19 A Rollover Off a Cliff With No Witnesses, No Vehicle, and Nothing But Unreliable Information: The Use of Forensic Evidence, Vehicle Crashworthiness, and Human Factors Testing to Prove Driver Identity

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The goal of this presentation is to demonstrate how accurate driver identification can be determined despite a paucity of physical evidence and gross misinterpretation of facts by law enforcement and other key personnel.

This presentation will impact the forensic science community by demonstrating how a complex real-world rollover collision case was solved by the methodical and thorough application of forensic science principles. This presentation will help those involved in forensic engineering sciences, forensic pathology, law enforcement, and jurisprudence gain insight into the correct manner in which to approach difficult cases, such as the case presented.

This case involves an unmodified (since manufacture) two-door compact pickup truck that ran off a highway, travelled over a cliff, and struck a tree as it rolled over on its way to the bottom of a deep canyon. Both occupants were ejected and killed. No witnesses saw the actual crash. The police investigation resulted in multiple misinterpretations of physical evidence and facts, plus gross over-reliance on unreliable statements from others at the scene. The insurance company destroyed the vehicle immediately upon its release by the police, before any investigation of the physical evidence contained within the pickup could be conducted. The insurance company hired well-known, seemingly qualified forensic engineers to determine driver identity. These engineers never went to the crash scene to examine available forensic evidence and facts, take measurements, or perform any of the other typical scientific investigative efforts that are typically made in such cases.

The lack of witnesses, destruction of the subject vehicle, and gross misinterpretation of facts and evidence by others were all difficulties that had to be overcome. Detailed measurements of evidence remaining at the scene, comparison with exemplar vehicles, analysis of available crash and static tests, proper mapping of the involved human trauma, accurate measurement of the crash site and related physical evidence, and consideration of the entire trip history of the two vehicle occupants were all critical factors that had been overlooked or ignored by the police and seemingly qualified forensic engineers hired by the insurance company.

A wide range of forensic investigation and analysis techniques were employed in this investigation, including 3D land surveying, accurate measurement of vehicle horizontal and vertical trajectories, determination of all significant points of vehicle impact to external objects and the ground, photogrammetry permitting accurate replication of vehicle position, correct interpretation of vehicle crush and crashworthiness performance data relative to occupant ejection, trace evidence recovery, and human factors testing.

In conclusion, thorough, methodical, rigorous forensic examination of the crash site, all physical evidence and photographs, coupled with a thorough understanding of crash dynamics and human factors, as well as application of vehicle crashworthiness knowledge, can allow accurate conclusions to be obtained despite the unavailability or misinterpretation of critical evidence.

Driver Identity, Vehicle Occupant Ejection, Vehicle Crashworthiness

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