C6 The Importance of Proof Marks in Vehicle Accident Reconstruction

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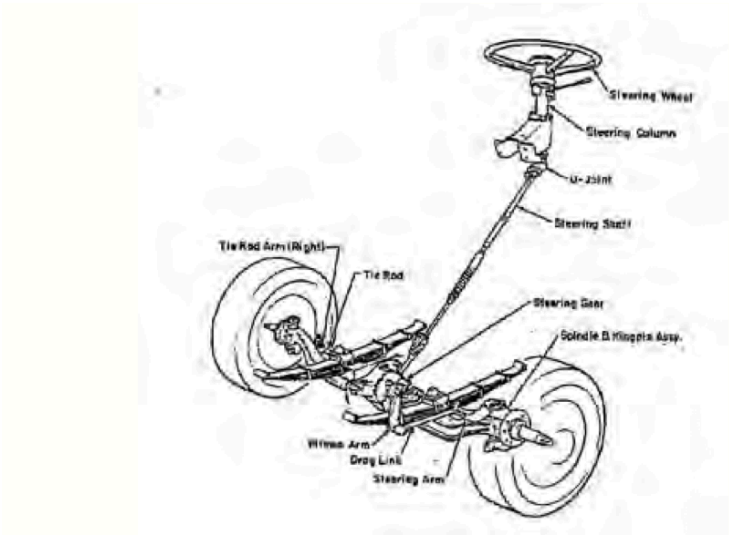
After attending this presentation, attendees will gain an understanding of the physical architecture and function of the steering system components, including the steering axle, as commonly used in heavy duty commercial vehicles, e.g., trucks, intended for use on paved and unpaved roads. Scientifically accurate reconstruction of vehicle accidents may require detailed examination of the internal mechanisms of components. Attendees will learn how impact forces that are generated by tire-to-road contact can create internal witness marks in other interconnected components.



This presentation will impact the forensic science community by emphasizing the necessity to consider multiple pieces of evidence from the roadway and vehicle(s) along with detailed evidence that is not visible in a macro examination.

A rural highway frontal collision occurred between a tractor-trailer combination (semi) and a pickup truck, resulting in significant physical damage to both vehicles and personal injury to the two occupants of the pickup truck. On-scene photographs depicted the vehicles in their post collision, at-rest positions. Investigators–including engineers, generally concluded that the driver of the (semi) had failed to control his vehicle while crossing a dual set of angled railroad tracks resulting in his (semi) then crossing the highway centerline and subsequently colliding with the approaching pickup truck, whose driver had already begun taking evasive action. Visual examination and photographs of the (semi tractor) revealed a component of the (semi's) steering linkage (the pitman arm) was fractured into two pieces and no longer provided an integral mechanical connection between the driver's steering wheel and the road wheels.

The collision between the two vehicles was slightly oblique, with the driver side frontal area of the (semi) contacting the frontal area of the pickup truck. The driver's side front-end of the (semi), being the initial contact area on the (semi), seemed to support a conclusion that the steering gear pitman arm was fractured during the collision sequence. Subsequent reports by investigators and a consulting engineering firm, so-stated this theory, and their conclusion and opinion was that the steering (pitman arm) fractured upon impact with the pickup truck. A

pictorial representation of a typical heavy duty commercial vehicle steering system is presented in Fig. 1 for reference.

A further, detailed examination of the on-scene photographs and details related to the highway conditions at the railroad crossing, presented an additional option for further scientific investigation. An engineering report that had previously been prepared by a professional metallurgical engineer regarding the fracture of the steering gear pitman arm and was included in the litigation discovery documents was also important in the ensuing, additional analysis.

The attendees will be guided through a photographic inspection and analysis of the inner workings of the (semi's) steering gear and steering linkage. The results of this new portion of the investigation will be

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combined with other previously established evidence, and a resulting and different conclusion will be presented.
Steering Gear, Proof Marks, Impact Force

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