D10 A Forensic Engineering Review of Vision in Automobile Crashes: Part II

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After attending this presentation, attendees will be aware of the general complexity of the human visual system and how fundamental characteristics of this system affect human performance under common conditions, often with fatal results. This second of a two-part presentation examines specific instances of collisions and crashes and incorporates the principles and elements outlined in Part I.

This presentation will impact the forensic science community by helping attendees identify specific characteristics attending the cause of these vision-related incidents and the interaction of potentially causative factors. The ability of attendees to investigate other incidents involving human visual systems will be aided by attending this presentation.

The presentation of these cases will include discussion of the matrix of causative factors that may be reasonably considered in the analysis.

The cases include: (1) the State vs. JT involving an auto pedestrian fatal collision. A driver hit two elderly pedestrians in a crosswalk, despite the fact that he should have clearly seen these two pedestrians. In this case, a medical condition led to a scene-scanning behavior that allowed adequate driving behavior, except when faced with this critical situation; (2) Estate of L vs. CPM, a pedestrian vs. a backing asphalt truck resulting in a fatal collision. The driver should have seen the pedestrian, but did not. Elements to be considered in this case include mirror system design, signaling, night environment, illumination, and attention and illumination issues; (3) B vs. S, a high-speed skier who impacted another skier in a serious injury collision. The skier should have seen the impending cross traffic. Elements include perception reaction time, gradients, visual field, and foveal vision; (4) P vs. CJ, a young female who was assaulted in a complex playground with hidden playground features. The argument was made that the child should have been seen. Elements include line of sight, contrast, conspicuity, masking, and position of viewer; (5) B vs. ICG, an underground mine scoop was moving in a mine passageway and was involved in a fatal collision with another scoop. The impacted scoop was supposedly visible, yet an analysis of the line of sight, contrast, visual field, attention, and perception reaction demonstrated essentially blind driving. (6) H vs. IT, a pedestrian walked into a right-turning truck in a crosswalk collision. The pedestrian should have seen the large moving truck and trailer. Visibility issues were assessed, as well as distraction, and inattentional blindness-related issues. (7) H vs. R, a motorcycle rider on an unfamiliar road approached a modified T intersection and went straight, resulting in a crash. It was deemed that he should have seen the intersection, yet an analysis of the signs, scene, and visibility factors revealed a perceptual illusion (a visual trap); (8) K vs. ST, a pickup struck the back of a semi-truck on a clear road, resulting in multiple fatalities. An analysis considered the looming effect, attention, foveal vision, and perception reaction time as well as other motorists that avoided the hazard.

In these and other similar cases, no single factor fully explains the visual system or cause of mishap nor can the investigator place himself/herself in the eyes of any of the participants or witnesses involved. The matrix of factors presented will assist in developing potential explanations. Furthermore, cameras, whatever their modern features, cannot capture the events as they happened from the involved individual's perceptions. They can only memorialize the observations of the forensic engineer or investigator, who must understand the visual system to render opinions to assist the court.

Attendees will benefit from the identification of specific dominant characteristics of the proximate causes of the incidents and the interaction of other factors. This information may assist them in investigating other visual system cases.

Inattentional Blindness, Distraction, Line of Sight