



Engineering Sciences Section - 2015

D48 Reconstruction of a Seven-Car Pileup: A Case Study

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After attending this presentation, attendees will understand the principles and techniques of reconstructing an accident with compound collisions and multiple vehicles, including momentum and energy analysis, restitution, and crush analysis. Other visual cues such as paint transfer and overlaid impacts were used to guide and confirm the results. These techniques were used to determine the closing speeds, time separating collisions, and change in velocity for a number of vehicles in a series of impacts.

This presentation will impact the forensic science community by showing how proper application of common techniques can yield valuable information to a reconstructionist and, when combined with readily available documents, can be used to analyze highly complex collisions. These same techniques can be used to determine vehicle-closing velocity and change in velocity, which will enable the reconstructionist to assign liability across a wide range of collision configurations.

The provided documents were typical of those in investigations with a legal component and included photographs of the vehicles and scene, accident reports for each set of collisions, and depositions of drivers and occupants. Combined with CARFAX® data, vehicle specification data, and scene and vehicle inspections, these documents provided the raw data for the reconstruction.

In this case study, a grass fire burned out of control resulting in thick smoke crossing a major highway. As a result, seven vehicles were involved in eleven discrete collisions. The involved vehicles were two tractor trailers, one pickup truck, two passenger vans, one Sport Utility Vehicle (SUV), and one car. Several vehicles were struck multiple times and moved from their resting positions in each collision. Reconstructing the event required analyzing not only the movement of each vehicle, but also the timing of the collisions relative to one another. As is often the case, many of the involved parties gave contradictory testimony, which was further complicated by the on-scene deaths of the two occupants in one of the vehicles. All but one of the vehicles was towed to the same storage lot, allowing the Highway Patrol to align the vehicles using a tow truck and compare crush profiles.

Each of the collisions was analyzed separately as a two- or three-vehicle event. After some collisions, the vehicles would come to rest before being impacted again, whereas others sustained multiple impacts without stopping. Passenger vehicles of several varieties and tractor semi-trailers were involved in these collisions. The reconstruction methodology presented can be used successfully in each of these situations.

Multi-Car, Accident Reconstruction, Passenger Vehicle