Photogrammetry Techniques in Accident Reconstruction

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When reconstructing accidents, I use the latest cutting-edge engineering and visualization technologies to help ensure I get to the root of the accident. This is important so that I can analyze evidence, determine its significance and communicate my findings clearly. Particularly when trying to tell a story in the courtroom to judge and jury.

So, what are the tools and how can they help in accident reconstruction? One is photogrammetry.

The American Society for Photogrammetry and Remote Sensing (ASPRS) has defined photogrammetry as the art, science, and technology of obtaining reliable information about physical objects and the environment through processes of recording, measuring and interpreting photographic images. Though photographs are only two dimensional, they still represent objects that exist in three dimensions. Photogrammetry uses laws of perspective to allow one to measure and analyze the three dimensional location of an object visible in a photograph. For instance, if a photograph, (shown on the left) shows a tire mark on the roadway left by a vehicle yawing, then through photogrammetry the location, size and position of the tire mark can be placed onto a scaled diagram and used to determine a vehicle's speed (shown on the right).

Photographs are very helpful in reconstructing accidents. But, with today’s technology, we can go beyond photographs for reconstructive purposes. Video can also be used, since video is really just a series of still photographs played back at a rate that makes them appear to have motion. Video, such as Drive Cam, surveillance, or other live video recordings can be analyzed frame by frame, and the position and orientation of any object in the video can be tracked, and placed on a scaled diagram for accident reconstruction use.
Photogrammetry using an extracted frame from Drive Cam video footage

The video above depicts a van that swerves and then rolls on the roadway. By photogrammetrically matching frames, the full sequence of events can be placed on a scaled diagram, showing the position and orientation of the vehicle as seen in the video. With the positions and orientation determined on a scaled diagram, accident reconstruction tools can be used to determine the speed of the vehicle and the driver inputs that led to loss of control.

What other benefits can you derive from driver video?

This article is by Alizera Hashimian, M.E., and William Neale. Mr. Neale is the Director of Visualization at Kineticorp, a forensic engineering company that specializes in accident reconstruction, and 3D animation and visualization. He is the Chairman of the Animation Committee for the Accident Reconstruction Session of SAE (Society of Automotive Engineers). Mr. Neale is also a member of the Society of Forensic Engineers and Scientists, and has been practicing in the area of Accident Reconstruction since 2000.

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