

Latest Technology in Accident Scene Documentation

By Tom Long, Senior Technologist, ITC Experts.

In the past 30 years of accident investigation, I can't say I've always left an accident scene or vehicle inspection with everything I needed. There are so many contributing factors that limit the ability to gather the desired information necessary in any investigation. Cost, time available, cost, accessibility, cost, cost, and cost are but a few of the hurdles to overcome to properly do your job safely and satisfy your clients needs. It's wonderful when an extra body can accompany you on an investigation, but that is not an option in most investigations today, again because of cost restraints. How does one take photos, measurements, notes, and whatever else needed when there are other interested parties and everyone has 2 hours to get it done? This is where I've turned to technology to provide the extra edge to supply the necessary documentation in an accurate, timely, and cost effective manner.

Everyone who has been in this business long enough has relied on tape measures, walking sticks, and film cameras to document accident scenes. Just as digital media has revolutionized photography, electronic measuring devices have done the same to pocket rods. The Total Station was the first to start in the early 90's with the ability to record points in 3 dimensional space. These instruments were slow, cumbersome, and needed a second person to hold a rod with a prism attached to obtain measurements, but were far superior in terms of accuracy and distance. Current Total Stations are smaller, lighter, faster, and can be used without the prism at distances up to 600 feet. Measurements are now able to be completed in a safer manner since a person doesn't have to be in harm's way when a roadway can't be shut down. But even though the Total Station is a marvelous tool, it still has its short comings. Single point measurements are still slow and time consuming which translates to costs, and often missed measurements due to time constraints. The latest tool is the Laser Scanner.

Laser Scanners are 3 dimensional mapping/measurements devices that can acquire points as fast as 1,000,000 individual measurements per second. I no longer worry as much as I used to about which points to record because I tend to measure everything. By capturing everything within the line of sight and range of the laser scanner, I can build a 3 dimensional world of the accident scene, vehicle, or artifact in a relative short amount of time back at the lab. I've worked on cases where we didn't know what direction the other experts were headed in their analysis, so including as much information as possible is essential. I have worked on many cases where trees and bushes had obscured visibility and were a major contributory factor in the accident causation. It is almost impossible to measure the envelope of a tree with any measuring device other than a Laser Scanner. Line of sight issues cannot be accurately analyzed

in a 2D drafting program. It is now possible to import laser scan data (point clouds) directly into computer aided drafting packages to visualize and quantify line of sight issues.

We've used the Laser Scanner in many other types of investigations where accuracy, detail, and speed were needed. I've laser scanned in limestone and coal mines where the condition of the tunnel surface, the grade, and room volumes were critical to understanding the sequence of events that led to serious injuries. We've also used it to document a building collapse that was under construction. The Laser Scanner proved to be an essential tool in not only knowing the position of many failed supports, but also their angle in 3 dimensional space without physically being in an unsafe situation. I've also documented many fire scenes. Most Laser Scanners have the ability to measure the reflectivity of the beam and to assign a color to the surface point. This gives the physical appearance of a photograph when viewing a point cloud and allows for easy identification of artifacts such as skid marks and burn patterns. In all of these examples, I had a very limited amount of time to complete the documentation due to shutting down operations during the investigation. The Laser Scanner was the only tool I know of that provided the detail necessary in the time allowed.

ITC Experts has made financial investments in laser scanning equipment and coupled staff training and development to build the experience and skill sets to maximize the utilization of this state of the art technology. Check the link below to watch videos of some fly throughs showing how the laser scanner enables the precise capture and preservation of scene details:

<http://www.itcexperts.com/practice-areas/accident-investigation-failure-analysis/>

Mr. Long is currently serving ITC Experts as a Sr. Engineering Technologist. He has over 30 years of experience in automotive, aviation, fire, structural, manufacturing, and heavy equipment accident investigations. His areas of expertise include scene documentation, laser scanning, surveying, CAD based drafting, 3D modeling, animations, simulations, graphics mechanical evaluations, failure analysis and component testing, test fixture design, data acquisition, and instrumentation. He is also skilled as a mechanic, machinist, welder, designer, fabricator, and has extensive knowledge in the area of firearms. E-mail Tom at tlong@itcexperts.com.