FARO 3D SCANNER FINDS THE **BIG PICTURE**

A TRUCKING ACCIDENT HOTSPOT INVESTIGATION

It all started on the busiest highway in North America. Ontario's Highway 401 is active 24 hours a day, seven days a week, so when trucks started going off the road near Napanee, experts at Pario Engineering & Environmental Sciences knew they faced a formidable situation when they were contacted to find out why. The 'corridor' from the Detroit-Windsor border to Quebec is home to one of the busiest truck traffic in the world. The team had investigated many incidents involving commercial vehicles and well knew the importance of driver and fleet safety.

After arriving on site, it became clear to the Pario team why the FARO 3D Scanner was necessary to complete this job. Pario Forensic Engineers use the FARO 3D Scanner routinely in their work to accurately assess a site's conditions without taking in-person measurements. The team of engineers had to determine whether this location's ongoing construction was impacting driver safety. The layout of any construction site, including the placement of equipment and signage, and lane modifications, can affect the flow of traffic through an area, and can raise the potential for accidents. As accidents continued to plague that area, Pario had to quickly determine if the construction layout complied with *Ontario Traffic Manual (OTM)* and *RTAC (Road and Traffic Association of Canada)* guidelines without further impeding traffic, or the construction itself.

Using the FARO 3D Scanner and common mapping software, Pario's team assessed the construction layout, faster, and with greater accuracy than by traditional means. Like taking a picture, the FARO 3D Scanner captures an image, but in three dimensions. The 3D rendering of the area captured millions of measurable data points in just minutes. These data points created a point cloud that preserved the scene digitally, allowing investigators to examine and re-examine findings as necessary. Using this data, the team was able to accurately determine road geometry, alignments, widths, elevation changes, the distance between structures, and the height and width of signage. Importantly in this case, there was a downslope and curve and the lanes had been shifted during construction so that the paved shoulder widths were reduced. The team was able to scan the construction layout, overlay it with the original road layout, and assess the differences.

Without the FARO 3D Scanner, an investigative team would have to close down a highway temporarily to measure road lane markings and determine the location and size of construction signage. Even with Total Station survey equipment, which would more easily perform manual measuring wheel and tape measurements, this task would be labour intensive, with fewer data points collected. It also would have been less safe. Further, obtaining road closure would be very difficult. The Ministry of Transportation and Ontario Provincial Police would have had to both agree on the closure, and the purchase of General Liability Insurance and additional fees would be involved.

Between assessment and analysis, a project such as this would have taken weeks to complete. This is because two dimensional (2D) diagrams and photographs can only show a fraction of a given scene. A 2D rendering cannot accurately provide measurements of height or depth relative to structures in the same space; 3D simply gives engineers more data and information. With the FARO 3D Scanner, based on the point cloud data, the user can generate plan and profile views, as well as Isometric views (a combination of angle, plan, and profile together). The point cloud data obtained allows the user the ability to have a 'fly through' animation performed without having to create a 3D environment. Further, if something is not picked up visually at the scene of an incident (for example, a specific measurement) it is nonetheless collected by the scanner. This data can be documented and measured later with specialized scene software. This wealth of data becomes critical when dealing with witness statements, police reports, and related findings that must be defensible. Engineers and adjusters require this information to confirm the accuracy of findings—this is essential to their decision-making.

With more detail than a picture and taking less time than in-person measurements, the FARO 3D Scanner helped determine liability in this case with indisputable accuracy.

Thanks to the results collected, there was also opportunity to reduce accidents in the area. By identifying issues with the site layout, Pario was able to recommend corrective action and help prevent further incidents. Using the FARO 3D scanner also meant that the complete scan was done in just a few hours (about 10 minutes per scan, with several scans at repositioned locations to guarantee total coverage) as compared to the extensive time and expense of a road closure. Personnel safety of onsite engineers was also a consideration. Using the FARO 3D scanner, the team scanned from the side of the highway versus having to go out into the road with a Total Station survey rod to measure points.

This is one example of how digital technology has changed the nature of forensic investigation. Today's forensic testing technology minimizes disruption, expediates reconstruction and hence, supports a reduced file cycle time in analysis and reporting. It reduces costs, the number and frequency of required on-scene personnel, and hours worked. It also supports comprehensive, unchallengeable reports for legal proceedings as an outcome of the level of detail and quality of information gathered.