D8 The Pursuit of a Stolen Patrol Car

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The goal of this presentation is to illustrate, by way of examples, how physical evidence can be used together with video analysis to determine vehicle collision parameters in an attempted escape.

This presentation will impact the forensic science community by demonstrating how physical evidence created during a vehicle acceleration maneuver can be analyzed to ascertain useful collision parameters.

Law enforcement officers intercepted a trespassing suspect in progress. The suspect was handcuffed during a routine vehicle search. A sweep of the residence revealed no one was home, but a screwdriver was found near the front door and was presumed to have been used to force entry. The suspect was arrested pursuant to penal code 602.5 (criminal trespass) and placed in the rear of a police car. Further investigation revealed a large amount of cash, a laptop, a portable scale, a .22 caliber pistol, and 11 cell phones.

While the officers were inside the residence processing evidence, the suspect moved his hands from behind his back, around his legs, to the front of his body. The tow truck driver, who was called to remove the suspect's vehicle, was alerted to sounds of the suspect kicking the partition in his attempt to escape (Figures 1 and 2). Turning toward the noise, the tow truck driver's flashlight illuminated the suspect squeezing head-first through the partition window and into the driver's compartment.

Figure 1.

Figure 2.

As the tow truck operator attempted to alert the officers to his discovery, the suspect settled into the driver's seat and shifted the transmission into reverse, spinning the rear wheels as he backed out of the gravel driveway toward the entrance.

In pursuit, the law enforcement officers charged from the residence and sprinted approximately 184 feet toward the accelerating vehicle. At the end of the driveway, the suspect turned the steering wheel and the vehicle yawed clockwise. The brakes were jammed and the vehicle heaved to a stop on the asphalt private drive (Figure 3). The suspect discovered the tow truck and second patrol car were blocking his intended escape route.

Figure 3.

It took approximately seven seconds for the officers to reach the suspect, who was now aware that the sergeant had drawn his service pistol. The suspect ignored his repeated commands to stop, and without further hesitation, slammed the transmission into a forward gear and accelerated the vehicle. Fearing for his safety, the sergeant pulled the trigger continuously, pivoting from his standing position as the vehicle passed.

A ballistics analysis later revealed that all five rounds penetrated the vehicle. Bullets #1 and #2 shattered the driver's tempered glass window (Figures 4 and 5). One bullet passed through the suspect's left arm and exited the right front door. The other bullet tore through the suspect's large intestine and both iliac arteries, requiring extensive surgery. Bullets #3 through #5 entered the vehicle behind the driver's position yet apparently missed striking the suspect.

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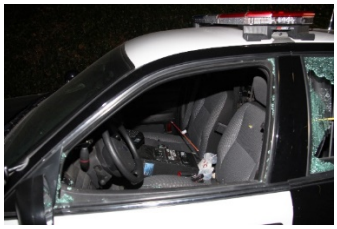

Figure 4.

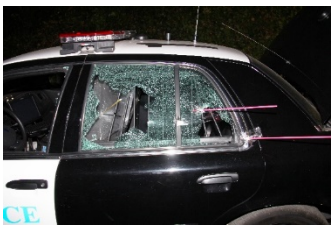

Figure 5.

The vehicle impacted the rear of the parked tow truck, halting his attempted escape (Figure 6). The suspect abandoned his escape attempt and was once again apprehended.

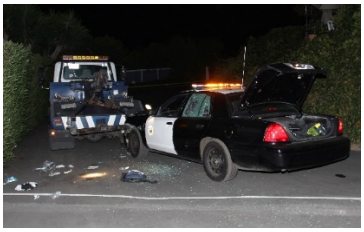

Figure 6.

Analysis: Video from an on-board, forward-facing, dash-mounted video camera, photographs, and an incident scene diagram were used determine the vehicle's time-position history during the escape maneuver. It was determined that the patrol car accelerated to approximately 18mph while backing out of the driveway (77 feet long), and the vehicle impacted the tow truck at approximately 15mph.

The vehicle's Restraint Control Module (RCM) recorded a frontal impact event consistent with the subject incident having an algorithm run time of 376ms and longitudinal velocity change of -11.96mph.

Photographs taken during the investigation of the patrol car's instrument panel were compared to an exemplar vehicle to determine the forward gear selected during the escape attempt. The analysis indicates the transmission had been shifted into first gear (Figure 7).

Figure 7.

The subject patrol car was tested to measure its acceleration characteristics on a gravel surface and to evaluate the restrictions imposed on the driver while operating the vehicle wearing handcuffs (Figure 8). The vehicle was instrumented with a Racelogic VBOX II Lite Global Positioning System (GPS) -based data logger and GoPro® Hero3 video camera. Ten reverse-to-forward gear demonstrations were recorded. The reverse demonstrations revealed an average maximum acceleration of 0.252g over a distance of 43.3 feet with a 15.9mph maximum speed. The forward demonstrations revealed a mean maximum acceleration of 0.256g over a distance of 40.2 feet with a 14.4 mph maximum speed.

Figure 8.

The county law enforcement agency and four involved officers reached a settlement with the custody subject prior to trial.

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