

HIT PEDESTRIAN COLLISION

ENGINEER'S REPORT

January 26, 2010

1. INTRODUCTION

This hit-pedestrian collision occurred Tuesday, at about 7:45 *p.m.* The crash involved a 2000 Toyota Avalon, four-door sedan, operated by Driver and Pedestrian. Pedestrian died as a result of this crash.

This investigation was performed to determine if Driver's actions were improper in a manner that was a cause of the crash.

2. AVAILABLE INFORMATION

1. Police Accident Report, including death report, vehicle examination, diagram and statements.
2. Photos:
 - 2.1 Forty-four 8.5 x 11" glossy color photos of the crash scene and Pedestrian's clothing.
 - 2.2 Twenty 4 x 6" color photos of the crash site, date unknown.
 - 2.3 CD with surveillance video from a nearby 7-11 convenience store.
3. Supplemental Verified Bill of Particulars.
4. Transcripts of EBTs:
 - 4.1 Driver July 21, 2009
5. My site inspection of December 3, 2009.

3. DESCRIPTION OF THE SITE and the COLLISION

The collision occurred on Merrick Road at its intersection with Grand Central Avenue, Amityville, Suffolk County.

Merrick Road is a rural arterial, also designated as Route 27A, and also known as Montauk Highway. The area is generally level, with a speed limit of 30 mph. Merrick Road is 48 feet wide. The pavement is marked for two moving lanes, eastbound and westbound, and a two-way-left-turn center lane (TWLTL). The two moving travel lanes are 18 feet wide, and the center lane is 12 feet wide.

Grand Central Avenue is a local road which forms a tee intersection with Merrick Road. The tee is slightly off perpendicular, as Grand Central Avenue enters at a slight angle.

Surrounding land use is residential with strip commercial. There is a 7-11 convenience store, on the north side of Merrick Road, opposite Grand Central Ave. There are curbs on all legs of the intersection and sidewalks along most legs. There is overhead street lighting.

The police report:

Veh #1 [Driver] while W/B on Merrick Rd. struck the pedestrian [Pedestrian] who was walking across Merrick Rd. from southbound to northbound in front of 282 Merrick Rd.

Visibility conditions were dark-road lighted, the road was dry, and the weather was cloudy. As seen on the surveillance video and scene photos the area of impact was dark.

Pedestrian was wearing a white shirt; otherwise his clothing was black. Pedestrian was 58 years of age, 6 feet tall and weighed 185 pounds. Driver was 68 years of age.

4. WITNESS STATEMENTS.

In addition to Driver, there were three witnesses to the collision.

Witness No. 1 was driving east on Montauk Highway.

...I noticed a person walking across the street wearing a white shirt. When I noticed the person they were in the middle of the roadway. There were also two gray cars traveling west on Montauk Highway. The car in the middle of the road looked like it slowed down. The person walking across the street continued to walk across the street with their head down. I didn't see the person look up. The other gray car that was closest to the curb hit the person walking across the street...

Witness No. 2 was driving west on Montauk Highway.

...While I was driving I noticed something blocking the lights moving across the street. When I noticed the person they were already in the westbound lane of Montauk Highway. I slowed down and moved to the left into the turning lane. The person was walking toward 7-11 with their head down. They never looked up once. As I slow down and pull to the left there was another four door sedan to my right going west. The car hit the person crossing the street....

Witness No. 3 was driving west on Montauk Highway.

...While I'm driving I notice one of the cars in front of me braking and moving to the left. The other car in front of me continued to go straight passing the car moving to the left. Then for a split second I see a person with a white shirt walking towards 7-11 in between the two cars. Then I see the car going straight hit the person in the street....

Driver was driving west on Montauk Highway.

As I was approaching the 7-11 in the westbound lane, I saw a red truck going westbound in front of me and I saw a silver vehicle also traveling westbound in front of me, but was in the left turning lane, waiting to make a left turn onto Grand Central Ave. As the red truck passed the silver car on the right, still in the westbound lane, I approached the silver car that was waiting to turn. I heard a loud thud on my car. My windshield came crashing in on me. I saw a body hit my hood. I never saw anyone standing in the roadway. I then realized that I just hit someone and immediately pulled my car over to the right side of the road. I think that the person that I hit...walked in front of the silver car right after the red truck passed the silver car, so I never even saw him in the road. It was very dark out and I was only driving around 30 miles per hour...the lighting was not good and I never saw anyone.

Driver's deposition confirmed the above and provided the following additional information:

- The collision was not in the intersection.
- The vehicle in front of her was "a little before me", 1-1/2 car lengths.
- The car in the left lane was a SUV.
- Her speed was 25 to 30 mph at the collision.

5. ANALYSIS.

The damage to Driver's Toyota shows that impact was about front center and that Pedestrian then moved across the hood at an angle striking the right side of the windshield and the roof. Pedestrian's movement across the hood shows that he was moving across the front of the car, from left to right, at impact.

Pedestrian's glasses and left sneaker were found east of the end of the TWLTL marks. The police located the Place Where Accident Occurred as 20 feet east of Grand Central Avenue, which is consistent with the location of Pedestrian's glasses and sneaker and Driver's testimony. The collision occurred outside of the intersection.

Based on the police report to-scale diagram, Pedestrian's final rest position was about 40 feet from where he was struck. This distance is called the "throw distance". For a throw distance of 40 feet, research¹ shows that for a center collision the impact velocity for this throw distance ranges between 24 and 31, mph, consistent with Driver's testimony that her speed was 25 to 30 mph.

An analysis was then performed to determine the time at which Pedestrian should have become visually available to Driver. The analysis was based on the following assumptions:

- Driver' speed was 25 to 30 mph, as she testified and in accordance with the throw distance.

¹ Schneider, H., and Beier, G., *Experiment and Accident: Comparison of Dummy Test Results and Real Pedestrian Accidents*. SAE 741177

- Pedestrian was moving across the street at impact as shown by the damage to the car.
- Pedestrian's speed as he crossed the street was 5 feet per second. This is based on the three witness statements that he was either "walking" or "crossing" and published walking speeds^{2,3}.
- Witness No. 2's SUV was positioned in the middle of the turn lane.
- Driver approached with the left side of her car 3 feet from the turn lane.
- Driver's eyes are 7 feet back from the front of her car.
- Pedestrian walked 3 feet in front of the SUV.

All of these assumptions are considered median or normal. For example, in the absence of testimony or evidence car placement was determined based on where cars normally drive on Merrick Road.

This analysis was performed graphically (the positions of Pedestrian, Driver and the blocking vehicle were laid out on graph paper at successive times) for both 25 and 30 mph. This analysis revealed that Pedestrian became visually available to Driver at 1.6 seconds prior to impact.

This collision was an unexpected event for Driver. She did not have any reason to expect a pedestrian to be crossing where Pedestrian did, in the dark and in the middle of the street from in front of a left-turning car.

The median brake reaction time for a reasonably attentive driver confronted with an unexpected roadway obstacle is 1.5 seconds⁴ and can be as long as 2.5 seconds for the 95th percentile driver.

Brake reaction time is the interval from the instant that the driver recognizes the existence of an obstacle on the roadway ahead that necessitates braking to the instant that the driver actually applies the brakes. (AASHTO page 110)

The brake reaction time increases the more unexpected the object is and when the object is difficult to detect and with observer age.

Pedestrian walked out in front of Driver within Driver's reasonable perception reaction time. Driver did not have enough time or distance to avoid collision. The cause of this collision was Pedestrian's walking out in front of Driver. Driver's actions were not improper in a manner that was a cause of the crash.

² Pedestrian Accident Reconstruction, Eubanks, Jerry, Lawyers and Judges Publishing Company, 1994, Appendix 5, page 47. The 50th percentile walking speed for a 50 to 59 year old male is 5.0 feet per second.

³ Knoblauch, et al, Field Studies of Pedestrian Walking Speed and Start-Up Time, TRR 1538. These studies show a median walking speed for male pedestrians over 65 of 4.31 feet per second, consistent with the 4.1 feet per second shown by Eubanks for 60+ males.

⁴ AASHTO (2004). A Policy on geometric design of Highway and Streets (4th Edition). American Association of State Highway and Transportation Officials. Page 110.

6. FINDINGS

Within the bounds of reasonable engineering certainty, and subject to change if additional information becomes available, my professional opinions are as follows:

1. Pedestrian was moving across the front of the car, from left to right, at impact.
2. The collision occurred outside of the intersection.
3. Driver was traveling at a speed of 25 to 30 mph at impact.
4. Pedestrian became visually available to Driver at 1.6 seconds prior to impact.
5. Pedestrian walked out in front of Driver within Driver's reasonable perception reaction time.
6. Driver did not have enough time or distance to avoid collision.
7. The cause of this collision was Pedestrian's walking out in front of Driver.
8. Driver's actions were not improper in a manner that was a cause of the crash.



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