

**Investigation
of the
Tania-Jose Collision**

By:

Steven Becker

October 25, 20**

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Report

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A. INTRODUCTION

This vehicle-pedestrian collision occurred Month 15, 20**, at approximately 5:30 pm, at the intersection of 11111 Street and 22222 Street, Towne, New Jersey.

Jose Jose was northbound on 11111 Street, in a 2000 Ford F350 Super duty crew cab pickup truck. Tania Tania and her daughter were struck by Jose's vehicle while crossing from the northwest corner to the northeast corner.

This investigation was performed to determine if Jose's driving was improper in a manner that caused the collision.

B. MATERIALS AVAILABLE FOR REVIEW

1. New Jersey Police crash investigation report, case #**-*** prepared **/21/**.
2. Transcript of the */30/20** deposition of Tania Tania.
3. Transcript of the */30/20** deposition of Jose Jose.
4. Transcript of the */30/20** deposition of Robert Robert.
5. Transcript of the */14/20** deposition of Dan Dan.
6. 54 Photos of the crash scene.
7. Notice of Motion for Summary Judgment, */28/20**.
8. Defendant's Brief in Opposition to plaintiffs Summary Judgment Motion, */18/20**.
9. Answers to Uniform Interrogatories Form C, Jose Jose.
10. Report from Donald Expert, 5/12/20**.
11. My site visit on 8/19/20**.

C. BACKGROUND NARRATIVE

The intersection is located in an urban area underneath the overpass of Interstate 280. 11111 Street is generally oriented north-south, and 22222 Street is generally oriented east-west. Both streets are level and constructed of asphalt. The speed limit on 11111 Street is 25 mph. South of 22222 Street, 11111 Street northbound consists of three 12 foot wide lanes; a turn right only, a straight only, and a straight or turn left lane; there are two southbound lanes. 11111 Street on the north leg consists of one 15 foot wide southbound lane and two 12 foot wide northbound lanes for 400 feet where they then merge. The two streets are perpendicular to each other and intersect at an angle of about 90 degrees. The north crosswalk is 39 feet in length and 5 feet 10 inches in width. The north crosswalk is 62 feet from the center stop line on the south leg.

Adjacent land use consists of both commercial and residential buildings. There are two schools within 500 feet, three playgrounds within two blocks, and the Towne Light Rail train station is 325 feet east on 22222 Street. There is a pentagon shaped warning sign of a school zone crossing with a fluorescent yellow-green background at the intersection on the south east corner of 11111 Street.

Traffic movement through the intersection is controlled by fixed time signals. At my inspection, the cycle was 1-1/2 minutes, with 65 seconds Red, 20 seconds Green, and 5 seconds Yellow on 11111 Street. Pedestrian traffic across the north leg of 11111 Street is controlled by a fixed time signal. At my inspection, the pedestrian cycle was 60 seconds Red, 16 seconds Green, and 14 seconds of blinking Red.

The police report states that at the time of the collision, there were no adverse weather conditions, the pavement was dry, and it was dark with streetlights. The police report crash description states:

Driver 1 states he was at traffic light on 11111 St. and 22222 St. When the light changed Green, he proceeded across the intersection and when he crossed over he suddenly observed a female with a small child cross in front of his vehicle and he immediately applied the brake in an attempt to avoid striking the mother and child and was unable to avoid striking them.

D. TESTIMONY SUMMARY

Tania Tania stated that she and her daughter waited for the pedestrian signal to turn Green, looked both ways and started crossing 11111 Street in the crosswalk. At about halfway across they had to wait for a vehicle turning right onto 11111 Street northbound from 22222 Street westbound, at which time the light changed to Red. They then proceeded to continue crossing the street and were struck from their right.

Jose Jose stated that he was stopped for a Red light on 11111 Street at the intersection with 22222 Street in the middle northbound lane. When the light changed to Green, he accelerated to the point of the opposite side crosswalk, when he saw a "shadow" come from the left side of his vehicle. He felt an impact with his vehicle and braked to a stop in about 1 second. He next observed that he had struck Tania and her daughter. His vehicle sustained no damage as a result of this collision. In his answer to interrogatories he stated he was traveling at 15 mph when the impact occurred.

Robert Robert, a witness to the collision, stated that he stopped for a Red light on 11111 Street at the intersection with 22222 in the left northbound lane. There was a lot of traffic. The light changed to Green. He started to move forward and observed pedestrians in the middle of the lane of travel in the opposite crosswalk. He stopped in 6-8 feet. He observed a white truck in the lane to his right drive past him, and then collide with the pedestrians. After the collision, Tania was about 10 to 15 feet in front of the stopped Jose vehicle and 4 feet from the curb. Jose stopped his vehicle "on top of the crosswalk".

Dan Dan, a witness to the collision, stated that he stopped for a Red light on 11111 Street at the intersection with 22222 in the left northbound lane. He observed a lady about halfway across the street, when the light changed to Green. He started to move forward and stopped in 5 feet. He observed a vehicle to his right moving faster than the other vehicles northbound, continue and collide with the pedestrians. After the collision, Tania was about 3 to 4 feet from the curb.

E. ANALYSIS

Newton's laws of physics apply to all vehicle crashes. Newton's Three laws are:

- Inertia. A body at rest or in motion with a constant velocity remains so unless acted upon by an external force.
- $F=ma$. A body acted upon by a force moves with constant acceleration proportional to the mass of the body.
- For every action there is an equal and opposite reaction.

The stopline is 62 feet from the crosswalk, the crosswalk is 5.9 feet wide. Jose traveled about 65 feet to impact. Robert testifies that the Jose vehicle stopped on top of the crosswalk. The Ford F350 pickup truck has two models with different total lengths of either 20.5 feet or 21.8 feet¹. His total distance traveled would be the distance to the center of the crosswalk, plus at most, his vehicle length. Jose testified his speed was about 15 mph at the point of impact. Using a 0.7 coefficient of drag²³ of dry asphalt, an initial velocity of 15 mph, an end velocity of 0 mph, and equations of motion⁴, he could stop in about 11 feet taking about 1 second. Jose had to perceive and react to brake at impact in about 1.5 seconds⁵. Using a normal acceleration rate, a time and distance analysis shows if Jose accelerated to 15 mph from a stop that he traveled to impact in about 5.25 seconds. This is still within the distance of about half of the crosswalk width plus his vehicle length.

When a pedestrian adult is struck, he or she will attain some of the velocity of the vehicle. As the person is standing, for a distance after impact, the body will be falling toward the ground. Tania's daughter, being smaller and closer to the ground, would travel a lesser distance. Jose testifies that his vehicle has no damage. In this collision, Jose's F350 pickup can be treated as a flat front vehicle that does not impart a vertical velocity on Tania and creates a full impact. The equations for falling and then sliding from a flat front vehicle are from Collins⁶. Using the center of mass for Tania of 2.5 feet, a body drag factor of 0.55, and the total distance traveled from impact to rest being the 11 feet Jose's vehicle takes to stop plus 12.5 feet - the average of the distance witnesses say she is from the stopped vehicle, yields an impact speed of about 15 mph. Expert's report confirms these values.

Tania states that she was stopped in the middle of the intersection due to vehicles that did not yield to her while they were turning onto 11111 Street from 22222 Street. While I was inspecting the site, I tabulated 9 vehicles in the period of half an hour that while turning, failed to yield to pedestrians crossing 11111 Street (about 20 stop light cycles). Over the same period, I observed 11 vehicles that, while driving north on 11111 Street, went straight from the right only turn lane.

Many of these vehicles accelerated rapidly to cut in front of the vehicles legally going straight.

¹ EXPERT AUTOSTATS 2000MY F350

² Fricke, Traffic Crash Reconstruction, 2010, pg 142

³ EXPERT AUTOSTATS F250 sister vehicle, within the vehicle performance capability. Performance data is not available for F350.

⁴ Fricke, Traffic Crash Reconstruction, 2010, pg 646

⁵ Fricke, Traffic Crash Reconstruction, 2010, pg 200

⁶ Collins, Accident Reconstruction, 1979

The vehicles traveled from a stop at the stopline in the northbound direction to the point of impact on average in 4 to 5 seconds. Vehicles that did not stop at the light required 2 to 3 seconds to go from the stopline to the point of impact.

The police report box 119a indicates that the pedestrian darted across traffic. The police officer writes that "upon his arrival, the mother and child had been transported", indicating that he had no direct opinion as to the actions of the pedestrians and gained this information from Jose's statement. There is no physical evidence of Tania running. From testimony, Tania is lying on the ground about 4 feet from the curb. As the lane is 12 feet wide, and Jose's F350 is about 6.7 feet wide, her position on the ground is consistent with being impacted with the front of Jose's F350 pickup and her not running.

The intersection control for pedestrians is typically designed for a walking speed of 4 ft/sec⁷. Tania would have traveled part-way across 11111 Street before being stopped by turning vehicles. This would require Tania and her daughter to travel the remaining 17 feet in about 4.25 seconds. Tania's statement that she encountered a vehicle that did not yield while turning is consistent with my observations of traffic and pedestrian interactions at the site.

As the area is a busy intersection with many pedestrians and the roadway signage shown Photo 1 is for a school zone crosswalk, Jose should have been looking for pedestrians. The New Jersey driver's manual states:

A motorist must stop for all pedestrians in a crosswalk, even if they began crossing with a proper signal and they are still in the crosswalk when the signal changes. Remember that pedestrians are the most vulnerable roadway users. Motorists will be held responsible for maintaining pedestrian safety.

As Jose has a North Carolina driver's license, the North Carolina driver's manual similarly states:

When crossing with a green signal, pedestrians have the right of way over all vehicles, including those turning across the paths of the pedestrians; and If a traffic signal changes to yellow or red while any pedestrian remains in the street, drivers must allow the pedestrian to complete the crossing safely.

The complete excerpts from the driver's manuals are included in the Appendix.

The following Photos illustrate the conditions at 45 minutes after sunset. The time of the collision was about 5:30 pm in Month. Sunset on that day was 4:53pm⁸. These photos were taken when the light was consistent to the time of the crash. It was dark and vehicles had their headlights on.

There is lighting from four mounted lights underneath the overpass and ambient lighting from pole mounted lights on 11111 Street, pole mounted lights on I-280, and the nearby businesses. With the crosswalk 62 feet from the stopline, pedestrians are both illuminated by the overhead lighting and well within the range of vehicle headlights. Even darkly clothed pedestrians would have been easily seen in the north crosswalk on 11111 Street.

⁷ *Manual on Uniform Traffic Control Devices*, U.S. Department of Transportation, Federal Highway Administration, 2009.

⁸ http://aa.usno.navy.mil/cgi-bin/aa_pap.pl U.S. Naval Observatory, Month 15, 20**



Photo 1 shows the signs viewed northbound on 11111 Street.

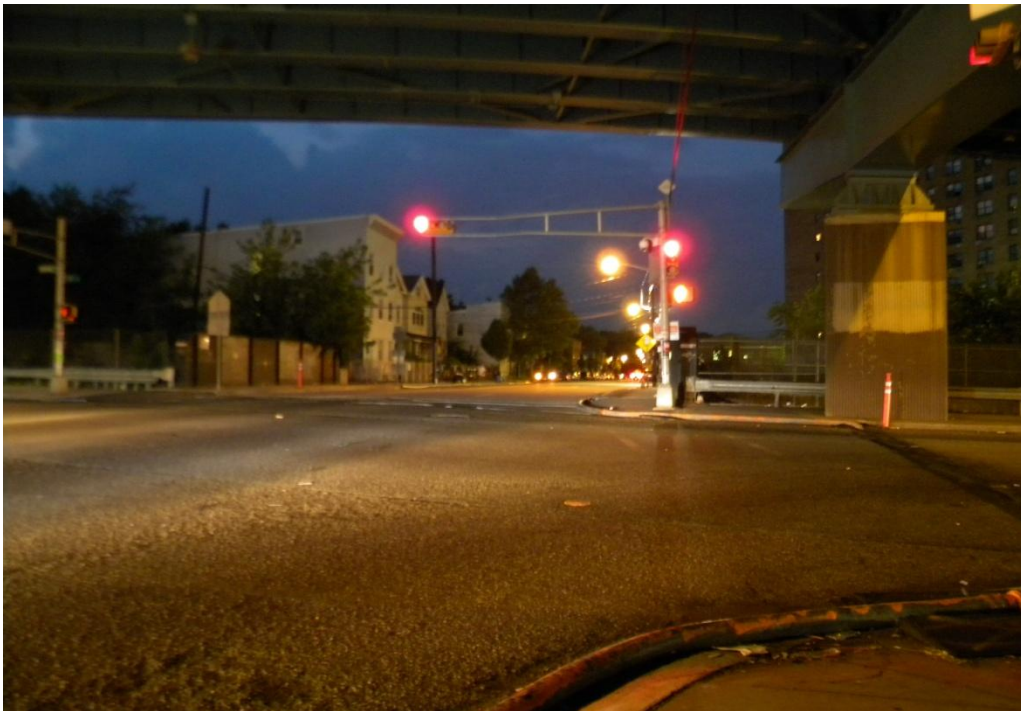


Photo 2 shows the view northbound on 11111 Street.



Photo 3 shows the impact area and crosswalk viewing east.

Tania entered the crosswalk with the Green light. There is a warning sign of a school zone pedestrian crossing in Jose's approach lane to direct motorists to use heightened caution and be aware of pedestrians. Both Robert and Dan observed and reacted to Tania and her daughter in the crosswalk. There was no obstruction to Jose's view of Tania from the time he started moving. Jose should have observed Tania and her daughter in the crosswalk. Jose was moving for about 5 seconds. Jose could stop from 15 mph in about 1 second and have avoided the collision. Jose was not driving attentively and his inattentive driving caused the crash.

F. FINDINGS

Within the bounds of reasonable professional certainty, and subject to change if additional information becomes available it is my opinion that:

1. Tania and her daughter entered the crosswalk with the Green light.
2. Vehicles must yield to Tania while in the crosswalk and she is permitted to complete her crossing even after the light changes.
3. Tania was not running at impact.
4. The visibility from Jose's position to a pedestrian in the crosswalk was good.
5. Jose's speed was about 15 mph at impact.
6. Jose had about 5.25 seconds to observe Tania.
7. Jose could stop in about 11 feet and about 1 second from 15 mph and avoided the collision.
8. Jose's inattentive driving caused the crash.



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APPENDIX

New Jersey Driver's manual states: pg 62.

A motorist must:

- Stop for pedestrians in crosswalks. (Per N.J.S.A 39:4-36, failure to stop carries a fine of up to \$500, up to 25 days in jail, community service, a driving privilege suspension of up to 6 months and 2 points.
- Be alert for pedestrians at all times.
- Be aware of areas where pedestrians are most likely to appear (near schools, town centers, residential neighborhoods, parks).
- Stop for all pedestrians in a crosswalk, even if they began crossing with a proper signal and they are still in the crosswalk when the signal changes.
- Remember that pedestrians are the most vulnerable roadway users. Motorists will be held responsible for maintaining pedestrian safety.

North Carolina Driver's manual states: pg 45.

- At intersections controlled by ordinary traffic signals, pedestrians must obey the same signals as drivers traveling in the same direction. Pedestrians should not start to cross during a red or yellow signal;
- When crossing with a green signal, pedestrians have the right of way over all vehicles, including those turning across the paths of the pedestrians; and
- If a traffic signal changes to yellow or red while any pedestrian remains in the street, drivers must allow the pedestrian to complete the crossing safely.
Failure to yield right of way to pedestrian is pursuant to G.S. 20-158 (b) (2) b.