

**Virginia Commonwealth University**  
**Transportation Safety Training Center**  
**Virginia Multi-disciplinary Crash Investigation Team**

Report Number 214 – February 2011

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**ABSTRACT**

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This report contains investigations of two distinct but related crashes, each resulting in a fatality.

In the first crash, an impaired driver in a car was being pursued by police. While operating her vehicle at a high rate of speed, the driver failed to negotiate a curve. The car crossed the opposing lane of travel, left the roadway and struck a tree, killing the driver.

This case study illustrates the dangers of driving while under the influence of alcohol. It also addresses the issue of habitual offenders and the importance of friends, family and peers in assuring that impaired individuals do not get behind the wheel of a vehicle. In addition, police pursuits are discussed.

In the second crash, two relatives of the above deceased driver stopped to place flowers at the crash site as a roadside memorial. They parked partially in the roadway and were walking beside their vehicle when they were struck by a car. An elderly female was killed and the other pedestrian, an elderly male, suffered serious injuries. The car swerved into the opposing travel lane and struck an oncoming sport utility vehicle in an offset head-on collision, incurring property damage but no injuries to the occupants of either vehicle.

The second case study addresses the issue of roadside memorials, especially with regard to exposure of individuals who are creating makeshift displays. It illustrates the critical importance of parking only where occupants can move about safely, as well as the necessity for both drivers and pedestrians to maintain vigilance.

**Virginia Commonwealth University  
Transportation Safety Training Center  
Virginia Multi-disciplinary Crash Investigation Team**

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**CASE STUDY ONE: SYNOPSIS**

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**Day, Time, Season:** Saturday, 11:32 p.m., autumn

**Road/Weather:** Two lane primary road; dry and clear conditions

**Vehicles Involved:** 2000 Acura TL four door sedan

**Individuals Involved:** 25 year old female driver

**Summary:** While being pursued by police, the vehicle failed to negotiate a curve, running off the road to the left and striking guy wires and a tree.

**Severity:** One fatality; extensive vehicle damage; damage to utility pole and tree

**Probable Cause:** Driver was under the influence of alcohol and failed to maintain control while speeding.

**Significant Points:** Driving while under the influence of alcohol; repeat offenders; preventing impaired driving; police pursuits

Police Vehicle

Acura

**VIRGINIA MULTI-DISCIPLINARY  
CRASH INVESTIGATION TEAM  
REPORT 214**

2000 Acura TL

Private Drive



NOT TO SCALE

## CRASH DESCRIPTION

At 11:32 p.m. on a clear, dry Saturday evening in autumn, a 25 year old female was driving her 2000 Acura TL four door sedan north at a high rate of speed on a two lane primary road through a suburban/residential area. She was alone in her vehicle and she was not wearing her lap/shoulder belt. She was being pursued by a local law enforcement officer who had observed her run a red light while speeding.

The road is a north-south route. The pavement is asphalt and was observed to be in good condition. Each lane is approximately 12 feet wide. The shoulder adjacent to the northbound lane is fairly level and is a combination of grass and pavement: approximately one foot is paved with 20 feet 7 inches of adjacent grass. The shoulder adjacent to the southbound lane is paved for approximately one foot and then has an adjacent two feet of grass. The slope of the shoulder drop-off on the southbound side is steep, approximately 24 percent, dropping over four feet vertically from the road surface to a level grassy area that had been cleared for a utility easement that bordered a wooded area. Utility poles are erected in a parallel sequence about 22 feet from the edge of the road and they are anchored with guy wires to provide stability. In the northbound direction, the road curves to the right approximately 33 degrees and is on a slight upgrade. The superelevation of the curve is approximately eight percent. The road is controlled by signs and pavement markings, including white edge lines and double solid yellow centerlines, with a posted speed limit of 45 miles per hour (MPH). The pavement markings were in fair condition. A horizontal alignment sign erected prior to the crash site includes a curve ahead graphic with an advisory speed plaque ("35 MPH") installed beneath it. The sign was in good condition. There is no overhead lighting.

As the two vehicles approached an "S" curve, the officer slowed his cruiser. He observed the Acura pass the street which forms the leg of a "T" intersection at the beginning of the curve. The Acura then crossed over the double solid yellow centerlines and into the opposing lane of travel. It continued across the road, running onto the left shoulder as the road curved to the right. The car then travelled down the drop-off and into the easement area for approximately 208 feet, and headed toward the wood line. It struck the guy wires of a utility pole, causing the upper portion of the pole to break and lean away from the road. The Acura continued forward another 3 feet 5 inches, striking a tree with its left front corner.



*Photo #1: View looking northbound, approaching “S” curve.*

As the Acura impacted the tree, its forward movement was abruptly halted. The unbelted driver continued to move forward and struck the deploying airbag. The interior components of the vehicle crushed inward, pushing her seat rearward and pinning her between the seat and the steering column. She suffered blunt force injuries to her chest which would prove fatal.

The officer in pursuit immediately called to report the crash. Other law enforcement officers, fire and emergency medical personnel arrived. The victim was removed from the Acura and transported to the nearest trauma center; she died about two hours after the crash occurred. Police then notified family members of the young woman’s death. At the scene, investigators photographed, marked and measured physical evidence. A wrecker service removed the Acura from the scene, transporting it to the county police impound lot. The local power company dispatched workers to provide a temporary repair to the utility pole. The scene was cleared and normal traffic flow restored about four hours after the crash occurred.

## REMARKS

This crash received media attention because it involved a police pursuit and because the driver had a history of driving under the influence of alcohol. The 25 year old driver's record with the Virginia Department of Motor Vehicles (DMV) shows that she had a poor driving history, with a driver point balance of -16. She received her original license in Virginia in April, 2004, after having been licensed in another state. Between then and the night of this crash, she was convicted of 14 separate offenses, including:

- one conviction for driving under the influence of alcohol
- one conviction of reckless driving by speed in excess of 80 MPH, a Class 1 misdemeanor,
- five convictions for speeding 15 to 19 MPH over the speed limit,
- two additional speeding convictions, one for 1- 9 miles above the limit and one for 10-14 above the limit,
- two convictions for failing to obey highway signs,
- one conviction for an improper turn,
- two convictions for failure to carry a license or registration, both related to traffic stops for other offenses.

Due to the habitual nature of her offenses, and at times because she failed to pay fines and court costs, this driver's license had been suspended on several occasions. Her most recent speeding conviction, which was charged in January, 2009, was paired with the conviction for driving while under the influence of alcohol (DUI). This resulted in another suspension, for a length of 12 months, although she was allowed to drive to and from work and Alcohol Safety Action Program (ASAP) meetings. Three weeks before the crash, she was stopped by a police officer and charged with driving outside her restrictions. Her car was automatically impounded for 30 days (per Code of Virginia §46.2-301.1). However, she petitioned the court a few days later and her car was released back to her after less than a week of being impounded. Her suspension status, with restrictions on driving, remained. She died just two weeks later.

On the night of the crash, this young woman spent much of her evening at various local restaurants and bars, where she was observed drinking alcoholic beverages. She was with a group and rode with another person from one location to the next. After her death, her brother

reported to the media that he knew she was impaired and had asked friends to make sure she didn't drive. He did not stay with her group, however, and a friend reportedly drove her back to the lot where her car was originally parked so that she could drive home. The woman got into her Acura and then apparently drove west on a major primary road that runs east/west through this urban section of the county. Shortly thereafter, the driver called a friend and told her that she was lost. She then indicated that she had figured out where she was and ended the call. At some point, she turned her vehicle around and began travelling east.

A local police officer was stopped at a traffic signal, sitting in the left turn lane of the eastbound primary road. The streets are lined with shopping centers, which house retail stores and restaurants. The officer observed the Acura run the red light at the intersection, estimating that the sedan was travelling in excess of 100 MPH. He immediately turned on his flashing lights and siren and gave pursuit, clocking speeds of 100 to 110 MPH. He observed the Acura strike another vehicle at an intersection about 2.5 miles further east. The Acura did not stop, however, and the officer continued to pursue it. Less than a half mile further, at the next intersection, the Acura abruptly turned left, heading north on the two lane primary road. He followed, noting that the Acura was now travelling at 80 to 90 MPH. The Acura continued at these speeds for about 2 miles, before entering the curve where it ran off the road and struck the tree.

Being unbelted, the driver was thrown into the deploying airbag. The collapsing dash and floorboard areas pinned her behind the wheel. She suffered head injuries, including facial fractures and brain injuries, as well as lacerations and fractures to her lower extremities. In the autopsy report, the Medical Examiner noted that she suffered fatal blunt force injuries to her chest, including transection of the thoracic aorta. These injuries resulted in her death at a hospital less than two hours after the crash. In addition to the autopsy, toxicological analysis indicated that she had a blood alcohol content (BAC) of .14%, well above the legal limit (.08%) and consistent with reports of her drinking earlier in the evening. The vitreous humor from one of her eyes was also tested and the ethanol content was .15%. This finding is consistent with the alcohol level found in her blood—the slight difference may be an indicator of dropping levels in the blood after consumption has stopped and the body begins to clear the toxic substance (see Virginia Multi-disciplinary Crash Investigation Team *Report Number 204: Underage Drinking Crash—Four Fatalities*). Toxicological analyses revealed no evidence of other drugs in the driver's blood.

Members of the Virginia Multi-disciplinary Crash Investigation Team (VMCIT) examined the Acura at a police storage facility. This vehicle was registered to the driver and had current inspection and registration stickers. The odometer was not readable after the crash, but the car had 135,544 miles reported at its last inspection, about ten months prior. The tread on the tires was in good condition, although the left front and right rear tires were deflated as a result of the crash. The Acura's front end was extensively damaged when it struck the tree. The left side of the hood, grill and engine compartment collapsed toward the occupant compartment, deforming the front end of the frame.



*Photo #2: Front/Side view of Acura, showing collision damage from impact with the tree.*

Measurements of the Acura post crash found the wheelbase to be 85 inches on the left side and 107 inches on the right side, compared to the manufacturer's specifications of 108.1 inches. The overall length of the vehicle post crash measured 172 inches on the left side and 174 inches on the right side versus the vehicle specifications of 192.9 inches. The width of the vehicle was also measured post crash: 61 inches at the front and 64 inches at the rear, compared to specifications of 70.3 inches. The left front axle was damaged as the left front tire folded toward the center of the vehicle. The right side of the hood buckled upward. As the left "A"

pillar was forced back and upward, the left side of the roof buckled upwards as well, in the area above the driver's head, peaking approximately half the distance between the "A" and "B" pillars. This in turn induced the roof area just behind the peak to buckle downward, several inches below the normal line of the roof. The front windshield shattered and glass fell into the vehicle interior. Inside the occupant compartment, the floor pan and dash areas intruded into the driver's space, leaving only 10 inches between the steering wheel and the front of the driver's seat. The entire driver's seat was also pushed rearward until the left side of the seat back came into contact with the bottom front portion of the rear bench seat.



***Photo #3: Side view of Acura, showing the upward buckling of the "A" pillar and occupant compartment damage/intrusion.***

The front airbags for both the driver and front passenger seats had deployed. Since this make of vehicle is not supported by Crash Data Recorder (CDR) software, VMCIT members were unable to image information from either the event data recorder in the airbag control module or the power train control module. Due to the lack of yaw marks or skid marks, there is no physical evidence on the roadway to corroborate the reported speeds; however, the severe crush damage that resulted from the impact with the tree is consistent with a high speed crash.

Over the last several years, crashes related to police pursuits have received media attention across the nation and within the Commonwealth. High speed pursuits have an inherent risk and are consequently something of a dilemma for officers, who must balance law enforcement and public safety concerns. If police do not pursue, they may allow a felon or an impaired driver to put others in harm's way; if they do pursue there is some risk that innocent individuals will be harmed during the process, in addition to those involved in the pursuit. The DMV reports that in Virginia, over the past three years, police pursuits have resulted in 34 fatal crashes. The number of injury crashes has increased for each of the three years: 173 reported in 2007, 197 in 2008 and 264 pursuit-related injury crashes reported for 2009. In 2007 and 2008, there were 259 and 256 property damage only crashes reported, respectively. The number of property damage crashes related to pursuits rose to 332 in 2009. Research on police pursuit crashes is limited, although significant emphasis has been placed on (1) developing a variety of alternative tactics to employ to end such pursuits more quickly and safely, (2) improving training for law enforcement officers to better manage pursuits, and (3) communication during this high stress and high risk activity (Hill, 2002).

In 2009, Senate Bill 847 was introduced to the General Assembly to amend the Code of Virginia §46.2-920, to further specify actions required by officers responding to emergencies, including those involved in pursuits (see Appendix I). The changes referred to actions at intersections: officers would be required to either stop before entering a traffic controlled intersection, or have sirens and lights running as they traversed an intersection after taking into account due regard for safety (which is currently a standard set in this Code section). Although not directly relevant to this crash, this legislation was referred to the Virginia State Crime Commission (VSCC) for more study, and the group's findings provided additional information on the pursuit policies for law enforcement agencies across the state. The VSCC surveyed police departments and sheriff's offices, in addition to the Virginia State Police (VSP) and 81% of the agencies responded. Ninety-five percent of the respondents reported having written policies and procedures that must be followed when a pursuit is in progress. These agencies often work in concerted effort with adjacent localities to coordinate resources when pursued vehicles cross jurisdictional boundaries. In addition, the Virginia Department of Criminal Justice Services (DCJS) requires that all law enforcement officers complete training related to emergency vehicle operation and pursuits.

The VSCC studied data on vehicular pursuits reported for 2009 by 104 law enforcement agencies that participated in its survey. A total of 1,227 pursuit cases were reported, and most but not all contained information about time of day, traffic conditions, road and weather conditions, and factors such as duration and distance travelled. A majority of the pursuits occurred at night (52%) in light traffic conditions (77%) and on dry roadways (88%). Since some pursuits for long distances skewed statistical representations of the data, both median (50<sup>th</sup> percentile score) and average values were reported for maximum speeds achieved, duration of pursuit and distance travelled.

	<i>MEDIAN</i>	<i>AVERAGE</i>
<b>Maximum Speed Achieved</b>	67 MPH	72 MPH
<b>Duration of Pursuit</b>	3 minutes	5 minutes
<b>Distance Travelled</b>	1.9 miles	4 miles

*Table 1: Summary of Pursuit Case Statistics from 2009 VSSC Study.*

In 47% of the cases with relevant data, the initial violation was a traffic violation; 40% involved a criminal misdemeanor, usually reckless driving or suspected DUI offenses, and 13% involved a criminal felony. At least 22% of the pursuits involved a violator who was impaired, typically by alcohol, although a small percentage were impaired due to drugs and/or mental illness (alone or combined with alcohol and/or drugs).

In this pursuit related crash, the driver typified many of the common characteristics identified in the VSCC study: she was impaired by alcohol and was driving while suspended for DUI. She was travelling at night in clear, dry weather and posed an obvious safety risk when she travelled at high speeds (well above the average maximum pursuit speeds of the study) through a busy urban area. She ran a red light and struck another vehicle. The pursuit spanned a distance of just over four miles before she ran off the road and struck the tree, although the VMCIT was not able to identify the exact duration of the pursuit.

The police officer who pursued this woman followed the protocol for his department, calling to notify officials of the pursuit and provide additional information. Noting that the Acura was still moving at 80 to 90 MPH after turning onto the northbound primary road, the officer slowed and backed off the pursuit as they approached the curved section of road. His

actions further highlight the critical importance of a police officer's knowledge and judgment during a pursuit. A pursuing officer must assess multiple factors, including his or her personal level of familiarity with the roadway. In this case, the officer was very familiar with the area and this road in particular. As a consequence, he anticipated the upcoming curve and slowed his vehicle. If he had continued to pursue the vehicle at the higher rate of speed, the officer may have been unable to negotiate the curve. An officer who is not familiar with a roadway during a pursuit must take this into consideration and allow more time and distance for adjusting to roadway geometrics such as curves, hills, and intersections.

This pursuit ended with the violator crashing the vehicle, which is the most common event terminating pursuits in urban areas (National Highway Safety Traffic Administration, 2000). The 2009 VSCC survey found that violator crashes ended pursuits at least 21% of the time, with an additional 13% ending in drivers running away on foot after stopping or crashing their vehicles. The study did not differentiate the locale type (urban vs. rural) in these categories.

It should be noted that the VSCC also voted in the December 2010 meeting to endorse an amendment to §46.2-817 of the Code of Virginia, which relates to penalties for the felony of eluding police. The Commission endorsed the inclusion of vehicle forfeiture for convictions in cases where a violator is the registered owner of the vehicle (see Appendix II).

After this crash, nearby residents expressed concerns to the media that this road was dangerous and needed to be improved. However, a check of the crash history revealed that no crashes had been reported in this curved segment during the previous three years. Some crashes had been reported further away, near the entrance to a park, but they were not related to this section of the road. The average daily traffic is 5,600 vehicles for this section of roadway (Virginia Department of Transportation, 2009). An evaluation of the roadway did not reveal any defects that would have contributed to the cause of this crash. However, a roadway review may indicate that additional signage would be potentially beneficial.

## **RECOMMENDATIONS**

1. The Virginia Department of State Police (VSP) and local law enforcement agencies should continue to strictly enforce statutes related to driving under the influence of alcohol and/or drugs through the course of normal law enforcement activities as well as specialized programs such as “Checkpoint Strikeforce.” Members of the judiciary are encouraged to continue applying appropriate consequences in cases where individuals have violated these statutes and placed others, as well as themselves, at risk.
2. The Virginia Department of Motor Vehicles, the Virginia Department of Health, VSP, other agencies that promote highway safety and the media should continue to stress the importance of family and friends preventing drivers from getting behind the wheel while impaired.
3. The National Highway Safety Traffic Administration, the Virginia Association of Chiefs of Police and/or other agencies concerned with highway safety should consider ways to expand understanding of police pursuits, how to decrease their likelihood of occurring and how to reduce the likelihood of pursuit related injuries or deaths.
4. The Virginia Department of Transportation should conduct a review of this section of road to determine if additional traffic control devices are warranted; e.g., delineators, chevron alignment signs, horizontal alignment signs/advisory speed signs.

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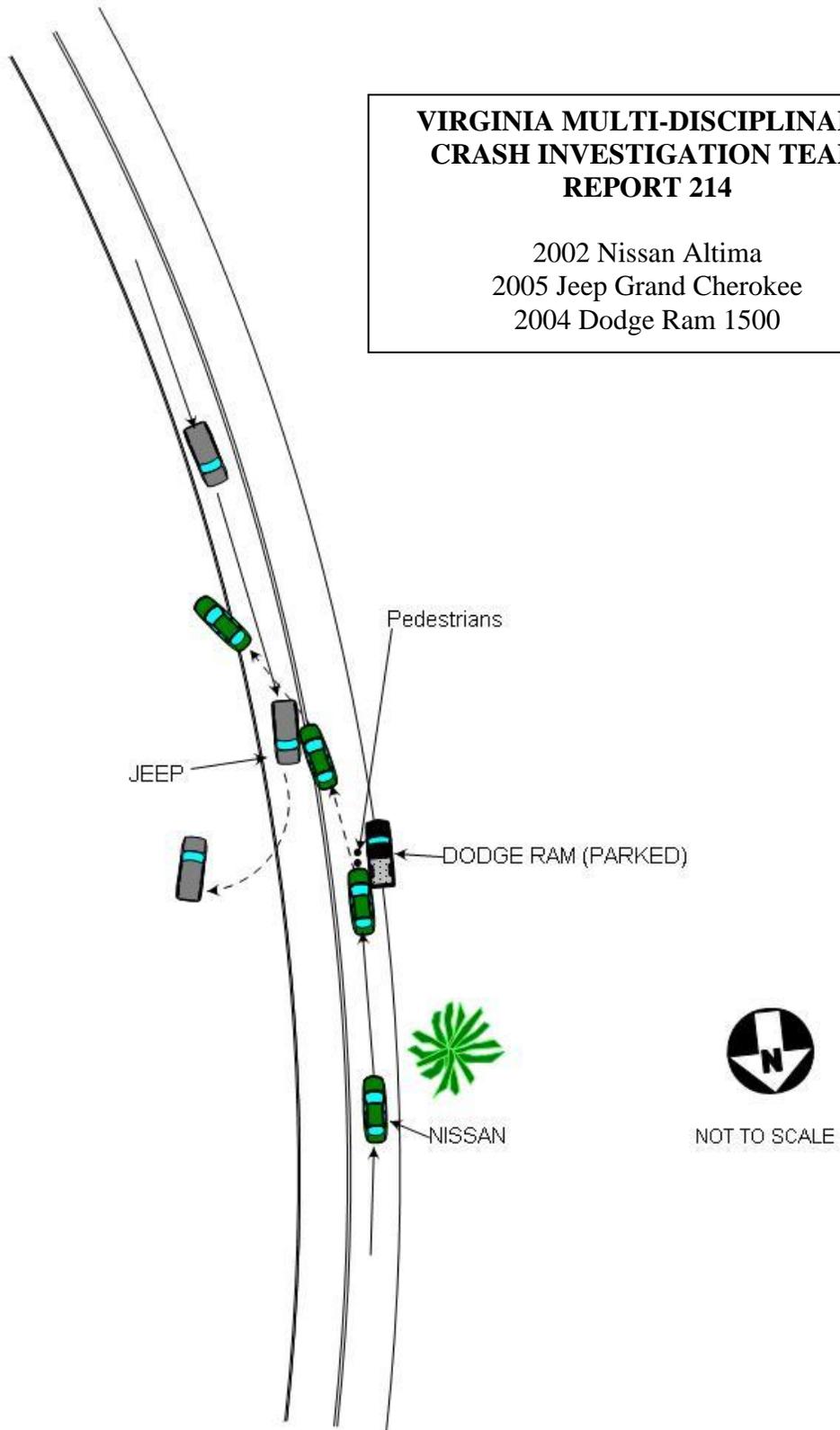
**CASE STUDY 2: SYNOPSIS**

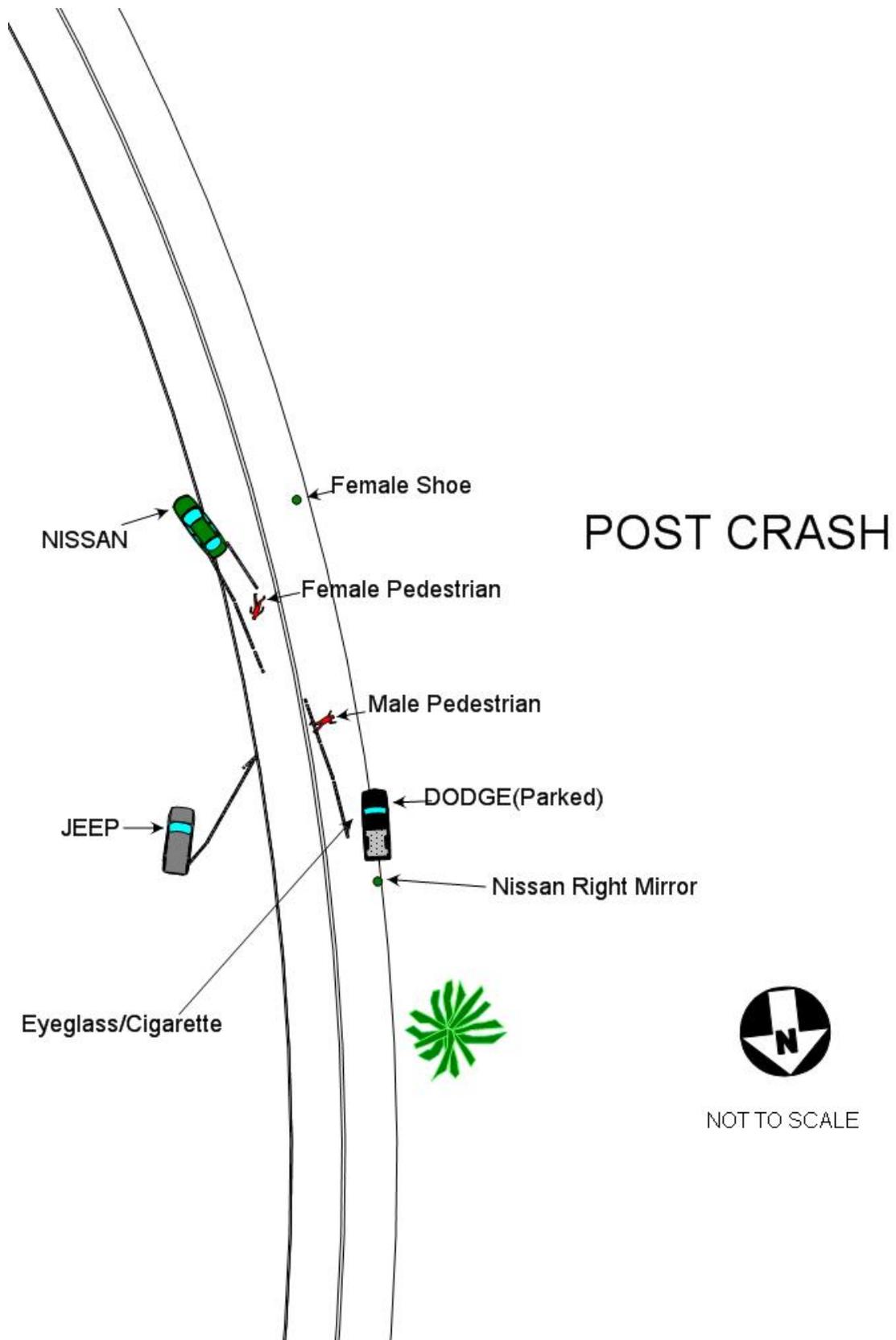
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<b><u>Day, Time, Season:</u></b>	Saturday, 3:39 p.m., autumn
<b><u>Road/Weather:</u></b>	Two lane primary road; dry and clear conditions
<b><u>Vehicles Involved:</u></b>	2002 Nissan Altima 4 door sedan 2005 Jeep Grand Cherokee Sport Utility Vehicle 2004 Dodge Ram 1500 pickup (parked)
<b><u>Individuals Involved:</u></b>	Nissan: 46 year old male driver Jeep: 42 year old female driver Pedestrian: 74 year old female, fatality Pedestrian: 78 year old male, serious injury
<b><u>Summary:</u></b>	The Altima struck an illegally parked pickup and two pedestrians walking in the road beside it. It then crossed into the opposing travel lane, striking the Jeep.
<b><u>Severity:</u></b>	One fatality; one serious injury, two vehicles with minor damage, one vehicle extensively damaged
<b><u>Probable Cause:</u></b>	Pedestrians in roadway, illegally parked vehicle, driver inattention
<b><u>Significant Points:</u></b>	Safety issues with roadside memorials; unsafe parking; pedestrian actions; visibility and glare; driver and pedestrian inattention

**VIRGINIA MULTI-DISCIPLINARY  
CRASH INVESTIGATION TEAM  
REPORT 214**

2002 Nissan Altima  
2005 Jeep Grand Cherokee  
2004 Dodge Ram 1500





## CRASH DESCRIPTION

At 3:39 p.m. on a sunny and dry Saturday in autumn, one week after the crash in Case Study One, a 78 year old man parked his 2004 Dodge Ram 1500 pickup partially in the southbound lane of a two lane primary road. The road is a north-south route located in a residential area. The pavement is asphalt and was found to be in good condition. Each lane is approximately 12 feet wide. The shoulder adjacent to the northbound lane is a combination of grass and pavement: approximately one foot is paved with 20 feet 7 inches of adjacent grass. The shoulder adjacent to the southbound lane is paved for approximately one foot and then has an adjacent two feet of grass. The slope of the shoulder drop off on the southbound side is steep, approximately 24 percent, dropping over four feet from the road surface to a level wooded area. Utility poles are erected in a parallel sequence about 22 feet from the edge of the road and they are anchored with guy wires to provide stability. In the southbound direction, the road curves to the left approximately 33 degrees and is on a slight downgrade. The superelevation of the curve is approximately eight percent. The road is controlled by signs and pavement markings, including white edge lines and double solid yellow centerlines, with a posted speed limit of 45 miles per hour (MPH). The signs are in good condition and the pavement markings are in fair condition. There is no overhead lighting.

The driver of the pickup was accompanied by his 74 year old wife. The couple had stopped to lay flowers at the site of the earlier crash, in which their granddaughter had been killed. Because the shoulder was narrow and dropped off steeply down the embankment, the driver was not able to pull his pickup completely off the road to park. He stopped it with the right wheels just off the pavement and the left wheels in the southbound travel lane approximately 3.5 feet from the edge line. As he exited on the driver's side, his wife exited the pickup on the passenger side and fell down the sloping embankment. He went and helped her back up the slope. They walked around the back of the pickup and then beside it in the southbound travel lane, with the husband walking in front of his wife.

A 46 year old male was driving south in his 2002 Nissan Altima, approaching the parked pickup. He was wearing his lap/shoulder belt. The Nissan driver entered the curve and failed to observe the pickup or the pedestrians walking beside it in his lane of travel. There were no skid marks or evidence of evasive movement from the Nissan. The right front corner of the Nissan struck the pickup in the left rear corner. The Nissan continued forward and to the left, striking

first the female pedestrian and then the male with the front of the vehicle, slightly offset to the car's right hood area. The female pedestrian's head and upper shoulders struck the right side of the windshield, shattering it. As the car slowed, the male pedestrian separated first from the vehicle, falling forward and to the right, striking the pavement. He suffered a concussion, a broken left ankle, and lacerations to his right forearm, the right side of his face and his right ear. The female pedestrian then separated from the car and was thrown forward until she struck the pavement. She died at the scene from blunt force trauma to the head, trunk and extremities.

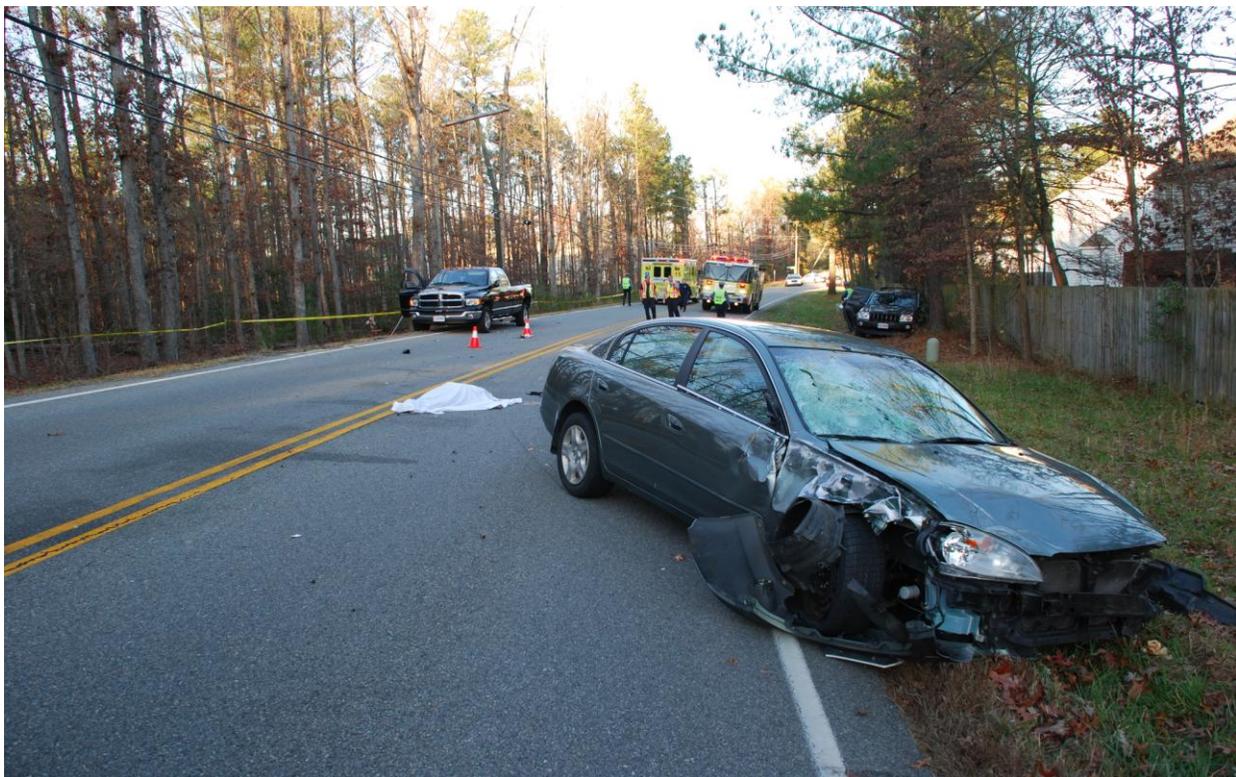
The exact point of impact for each pedestrian could not be accurately determined. Two sets of measurements were used to determine estimates of the distance they were thrown. The first distances measured were taken from the left rear tire of the pickup to each pedestrian's final resting position on the roadway. The second distances measured, which were shorter, were taken from the location of one of the pedestrian's personal effects (eye glasses) lying in the roadway, near the pickup's left rear door. The male pedestrian struck the pavement approximately 25 feet from the left rear tire of the pickup, 16.4 feet from the area of personal effects. The female pedestrian's final rest was 57.5 feet from the pickup's left rear tire, 44.8 feet from the area of personal effects.

After striking the pedestrians, the Nissan continued forward and to its left, crossing the double solid yellow centerlines. A 2005 Jeep Grand Cherokee Sport Utility Vehicle (SUV), driven by a 42 year old female, was approaching the same area from the south, travelling in the northbound lane. This driver, who also wore her lap/shoulder belt, saw the Nissan moving into her lane of travel. She steered her SUV to her right, toward the shoulder, but could not avoid the collision. The two vehicles impacted. The left front side of the Nissan side swiped the left side of the Jeep, initially making contact on the Jeep's fender between the left front wheel well and the "A" pillar. The collision stopped the forward motion of the Jeep's left wheel and, as the center of mass continued with its forward momentum, the Jeep rotated 180 degrees counter-clockwise as it ran off the right shoulder. It travelled approximately 44.8 feet to final rest. The Jeep sustained contact damage over a relatively small area of the left front fender and it came to rest next to a fence and shrubbery, 14.2 feet off the road, facing south. The Nissan sustained more damage in this second collision: the entire left front fender was sheared off to the driver's side door, the left front axle was broken, and the left side mirror was torn from the door. The Nissan pivoted counter-clockwise slightly during the impact and continued forward approximately 39.6 feet. It came to rest facing southeast, with the left front tire on the grassy

shoulder, while the right front tire rested on the edge line. Both rear wheels remained in the southbound travel lane.

Neither the Nissan driver nor the Jeep driver was injured during the collisions. As soon as their vehicles ceased to move, they called for emergency assistance. Others drove into the area and stopped after realizing a crash had occurred. Police and rescue personnel responded shortly thereafter, taking control of the scene and closing the road in both directions. They determined that the female pedestrian was deceased, so her body was covered and the Medical Examiner was notified. Emergency medical personnel assessed the injuries to the male pedestrian and transported him to a nearby hospital. Due to his age, he sustained what were potentially life threatening injuries, but he survived after a lengthy hospitalization.

Police investigators measured the scene and gathered evidence, and then wreckers towed the vehicles from the site. The deceased pedestrian's body was transported to the nearest Office of the Chief Medical Examiner for evaluation. Once debris was removed from the roadway, it was re-opened to traffic and the scene was cleared, approximately 3-1/2 hours after the crash occurred.



***Photo #4: Vehicles and victim at final rest.***

## REMARKS

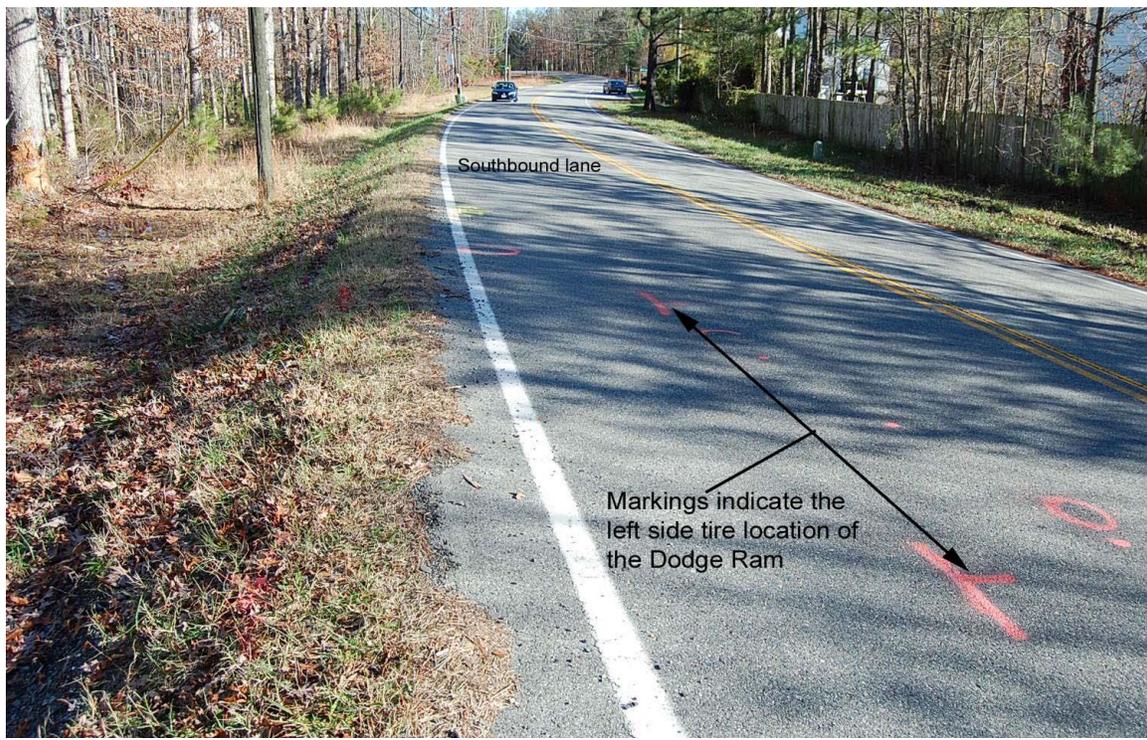
Over the past 35 years, members of the VMCIT have observed makeshift memorials at crash sites across the Commonwealth, from narrow rural roads to high speed interstate highways. These usually consist of flowers, stuffed animals, crosses or plaques bearing the names of lost loved ones, as well as ribbons and notes. While such memorials are a testament to the grief experienced by friends and family, VMCIT members have been concerned about the safety of the individuals who create them, especially since crash locations are often in areas where stopping and walking about would expose individuals to the hazards of traffic. This crash is a tragic illustration of the worst that could occur.

The family of the victim in Case Study One was distraught about the death of this young woman and spoke with the media about their memories and their feelings. The 74 year old woman killed in this second crash was the younger victim's grandmother, and she had played an active role in raising her. After attending the funeral the day before, she wanted to place the flowers at the site where her granddaughter had died. Her husband reported that he drove her to the location. Instead of parking off the northbound side of the road, where the shoulder is wider and fairly level, they parked closer to the actual crash site. On the southbound side, there was inadequate room to pull the pickup completely out of the travel lane, and the shoulder drops off steeply.

The male pedestrian involved in this crash was about 5 feet 11 inches tall and weighed 170 pounds, according to his Virginia driver's license, which was valid at the time of the crash. His driver history from the DMV revealed that he had been involved in a property damage crash about 14 months earlier and he had been convicted of failure to stop or yield related to the incident. The woman killed in this crash was 4 feet 11 inches tall and weighed approximately 170 pounds. Both pedestrians appeared to have been in good health and were not reported to be impaired in any way prior to the crash (toxicology tests were not requested on the fatal victim).

When the female passenger stepped out of the pickup, she fell down the steep slope. Her husband exited the pickup, walked to her side and assisted her back up the slope. According to statements he made to investigating officers, he told his wife to wait behind the pickup while he walked around to the driver's door and got in to move it. He reported that he had intended to move the truck off the roadway and into a more protected area approximately 220 feet away, near the intersection with a private road. As he walked alongside his pickup toward the driver's

door, his wife apparently followed him. As the Nissan came around the curve, both pedestrians had their backs to it. They did not have ample time or space to make any evasive movements.



***Photo # 5: Area where the Dodge pickup parked.  
View of southbound lane, the Nissan direction of travel.***

The Nissan, which was registered to its driver, did not leave any skid marks prior to its initial contact with the pickup, and it struck both the pedestrians, as well as another vehicle before coming to final rest. Consequently, the crash dynamics were complicated, with several sources of energy loss occurring, making it difficult to determine a pre-impact speed. Additionally, Nissan does not make information commercially available to image data from the airbag control module or powertrain control module.

Since all three vehicles in this crash were released to their owners or the owners' families, members of the VMCIT were not able to personally examine them. According to crash reconstructionists with the local police department who were at the scene, none of the vehicles had defects prior to the collisions. The tires and brakes on all three appeared to be in good working order and the inspection stickers were current.

The right front corner of the light green, 4 door 2002 Nissan Altima struck the pickup in the left rear corner. Photographic evidence shows that this first collision damaged the car's right

headlamp, right front fender and sheared off the right side mirror. The right front tire was deflated. Damage to the black, 4 door 2004 Dodge Ram 1500 pickup, which was registered to the male pedestrian, consisted of slight crushing to the left corner of the rear bumper and cracking in the area under the left tail light. The left rear tire was deflated. Photographs showed that the left rear tail light cover was not damaged.



***Photo #6: Damage to the Dodge Ram.***

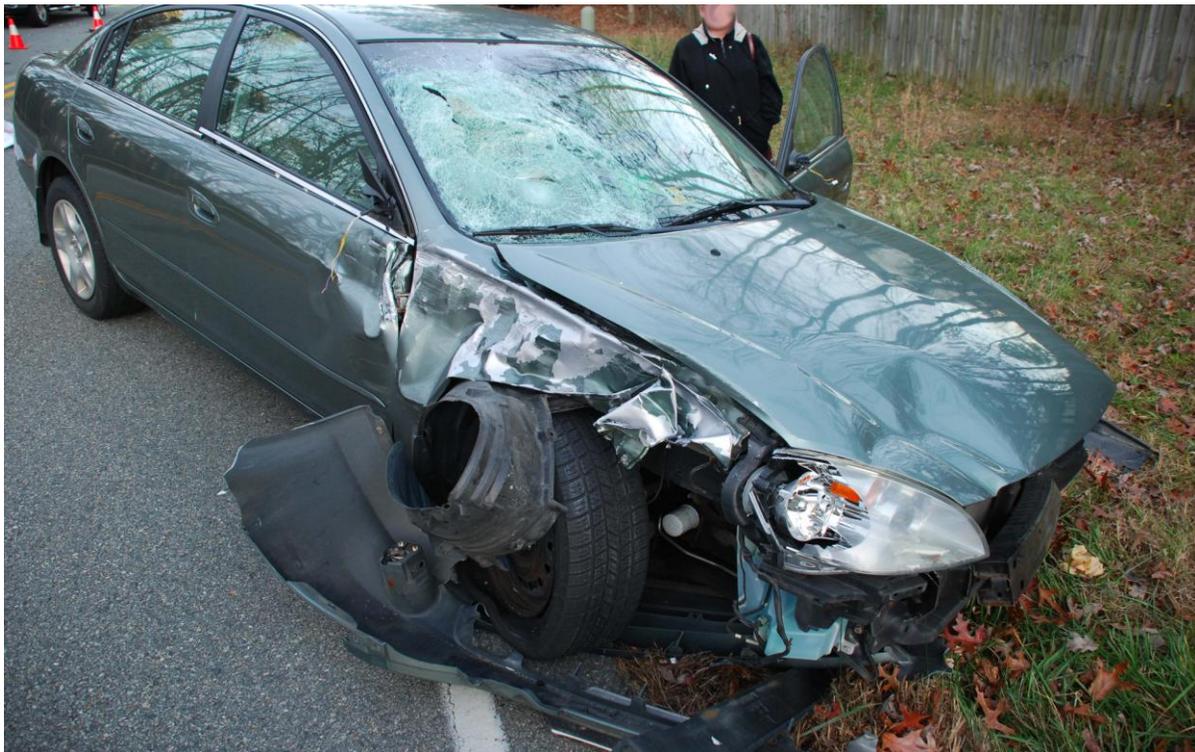
The Nissan continued forward and slightly to the left, striking first the female pedestrian and then the male with the front of the vehicle, slightly offset to the car's right hood area. The leading edge of the Nissan struck the female pedestrian on her right side, in the lower legs, likely causing the severe lacerations and abrasions, as well as an ankle fracture. The female pedestrian "wrapped" onto the front of the Altima, her hips causing an indentation in the hood just above the grill, and her head and upper shoulders struck the right side of the windshield, shattering it. These impacts resulted in injuries to her torso and fatal head trauma, which the Medical Examiner listed as her cause of death. The Nissan continued forward and also struck the male pedestrian; however, his wife's body likely prevented him from making much direct contact with

the vehicle and cushioned some of the effects of the collision. Although he appears to have also “wrapped” onto the hood of the vehicle, the car’s slightly angled path and his wife’s body between him and the car led to his vaulting the fender. Consequently, he did not strike the windshield or “A” pillar and he was not subjected to as much of the acceleration force from the vehicle. He was thrown forward and to the side, landing approximately 16.4 feet from the area where some of the couple’s personal effects were located near the pickup’s left rear passenger door, and 25 feet from the left rear tire of the pickup. As the car slowed, the female pedestrian also separated from it and was thrown forward. Her final rest was 57.5 feet from the pickup’s left rear tire, 46.7 feet from the area where the personal effects were found next to the pickup.

There are many formulas utilized for speed estimations in pedestrian crashes. In this case VMCIT members utilized Searle’s minimum velocity equation (Searle, 1983) which requires total throw distance of the pedestrian. The Searle paper suggests a coefficient of friction for a pedestrian of 0.66 on asphalt and 0.79 on grass. Another Searle paper (Searle, 1993) recommends using a drag factor of 0.7, which was used by the VMCIT. Calculations using the two different throw distances result in a minimum speed of 25 MPH to 28 MPH using the female pedestrian throw distances of 44.8 feet and 57.50 feet. Speed calculations using the distance of the male pedestrian of 16.4 feet and 25 feet resulted in speed estimates ranging from 15 MPH to 18 MPH. It should be noted again that the two pedestrians struck not only the vehicle but each other, which could have altered the throw distance of one or both pedestrians. Therefore, the accuracy of the speed estimates may have been affected.

The Nissan driver had claimed that he had difficulty seeing the pickup or the pedestrians as he maneuvered his way through the curves. The crash occurred mid-afternoon in late fall and the sun was low in the sky, creating a glare within his field of vision. VMCIT members later returned to the crash scene to observe the sunlight conditions at a time when weather and light conditions were consistent with those of the crash date. The purpose was to determine if the sun glare or shadows on the roadway could have affected the Nissan driver’s vision. The sun’s position was low in the sky, just above the tops of tall, mature hardwoods that are prevalent on the west side of the road. However, although the pickup was in shadow while officers were on scene investigating and taking measurements, it appears that the area where the pickup was parked was still in sunlight at the time of the crash. Additionally, while the position of the sun was low enough to cause some glare, it was not enough to blind a driver travelling south down the slight grade through the curves toward the site.

The Nissan driver's point of possible perception for the pickup was identified over 528 feet from the crash site. A driver travelling at the posted speed limit of 45 MPH (65.97 feet per second) would have had eight seconds from the point of possible perception to react to the vehicle and pedestrians in the roadway. The estimated speeds calculated from the pedestrian throw distances were much lower, so it is likely the Nissan driver had more than eight seconds to perceive and respond. There was no evidence that the Nissan driver braked before striking the parked Dodge and he reported that he did not see the pickup or the pedestrians prior to impact. However, even with the slight glare, he had sufficient time to perceive and respond to the parked vehicle in his path. This leaves open the question of what the Nissan driver was doing during those eight seconds. Investigators were able to verify his report that he was not using a cell phone at the time, but it is unclear if he was distracted in another way or simply inattentive.

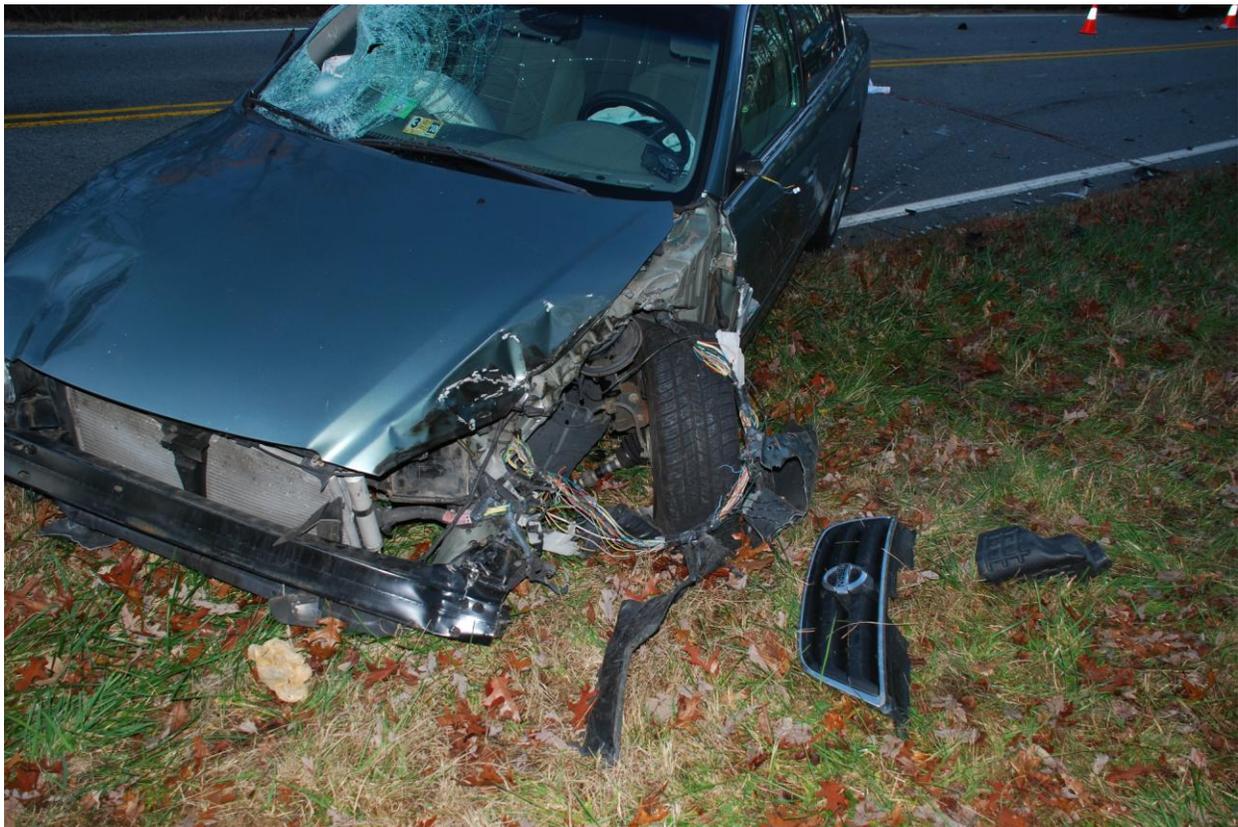


*Photo # 7: Damage to right side of the Nissan.*

The 46 year old Nissan driver had not been drinking and was not reported to be impaired in any way prior to this crash. He had been licensed to drive in Virginia since 2001 and was licensed in another state prior to that. His driving record showed no previous convictions or

accidents and he had a driver point balance of +5, the maximum. He was not charged with any offenses related to this crash and he was not injured.

After the pedestrians had separated from the Nissan, it continued across the roadway into the northbound travel lanes, where it struck the Jeep in a small overlap head-on/sideswipe configuration. During this collision, the Nissan sustained damage to its left front fender, from the front of the bumper to the driver's door. The left front axle was severely damaged and the tire was turned outward. Less photographic evidence was available for the black 2005 Jeep Grand Cherokee Sport Utility Vehicle (SUV), although it appeared that the damage was of a sideswipe nature along the left side, from the left front wheel well to the driver's door. This vehicle was registered to a person with the same last name, but not the same address, as the driver.



*Photo #8: Damage to left side of the Nissan.*

The 42 year old Jeep driver also had a driver point balance of +5. She had been licensed in the Commonwealth before 2002 (original date of licensure not given) and she had no record of convictions or accidents. However, five months prior to the crash, she had been charged with speeding 40 MPH in a 25 MPH zone. According to the DMV record, she was referred by the courts to a driver improvement clinic, which she had completed three weeks prior to this crash. The charges were dismissed several months later. A month prior to the crash, she was charged with defective equipment, but this charge was later dismissed. The Jeep driver was not suspected of drinking prior to the crash and was not considered impaired in any way; nor was she charged with any offenses related to it. She also was not injured.

The pedestrians had stopped at this location to create a memorial for their granddaughter. They had a wreath of flowers in the bed of the pickup that they had planned to leave near the site of her fatal collision. § 33.1-206.1 of the Code of Virginia addresses roadside memorials:

The Commonwealth Transportation Board shall establish regulations regarding size, distance from the roadway, and other safety concerns, to govern the installation, maintenance, and removal of roadside memorials, plaques, and other devices placed within the right-of-way that commemorate the memory of persons killed in vehicle crashes within the right-of-way of any state highway.

Based on this section of the Code, the Virginia Department of Transportation (VDOT) has established a set of procedures to approve and install roadside memorials. This includes meeting with the requester to review and approve the proposed location of the sign. Signs must be fabricated in compliance with specifications and the requestor bears all costs for fabricating the sign, its installation and its eventual removal. VDOT issues the permit for the sign, at no cost to the requestor, for a two year period, unless an extension is requested in writing and granted. All signs are required to be placed on the right side of the highway and cannot be installed in a “clear zone”. A “clear zone” is generally defined as the total roadside border area, starting at the edge of the travelled way, which is available for an errant driver to stop or regain control of a vehicle.

The Code also prohibits installation of roadside memorials that are not approved through the above procedures:

Any person who installs any plaque, device, sign, object, material, or other memorial within the right-of-way of any highway controlled by the Department except in accordance with criteria established as provided in this section may be assessed a civil penalty of no more than \$100. Each occurrence shall be subject to a separate penalty.

Since members of the VMCIT typically examine crash scenes days after the crash occurred, they have often seen makeshift memorials at the sites. It is not unusual for crashes to occur in areas where roads are curvy, hilly, and have restricted sight distance. This makes it difficult for drivers to see pedestrians laying wreaths, flowers, candles, stuffed animals, etc. near where a crash occurred. While it is easy to be empathetic with the desire to honor the memory of a loved one, members of the Team have often expressed concern for the safety of those grieving individuals. They often put themselves in harm's way by parking in unsafe areas and then by walking close to or in the roadway, exposing them to traffic. In an emotional state, they are likely to be distracted and not paying attention to their surroundings. It is critical, therefore, that people use reason, caution, and observe the law when they feel the need to memorialize their lost family and friends, so as to avoid adding tragedy to tragedy.



*Photo # 9: View of safer parking area.*

## RECOMMENDATIONS

1. The Virginia Department of Transportation and the Virginia Department of Motor Vehicles (DMV) should consider creating a joint public education program about roadside memorials, especially the proper procedures for attaining permission to erect a memorial and the procedures for attaining and installing the signs in accordance with the Code of Virginia. This program could emphasize safety as well as legal issues.
  
2. The DMV, the Department of Health (DOH), the Virginia Department of State Police (VSP), local law enforcement agencies and educators should continue to stress the importance of pedestrian safety.
  - a. Pedestrians should be encouraged to maintain vigilance when walking near any roadway. They also should be encouraged to wear light or reflective clothing and cross roads at designated locations in accordance with traffic laws and regulations.
  - b. Drivers should always be vigilant to the potential of pedestrian traffic, especially in residential and/or urban areas.
  
3. The DMV, the DOH, the VSP, and other agencies that promote highway safety should continue to stress the importance of drivers focusing on the driving task, adjusting their speeds for driving conditions and being vigilant for unexpected situations. While public media currently emphasize problems with cell phone distraction, other distractions and simple inattention may also play a critical role in the failure to identify and respond to hazardous situations. Additionally, drivers must adjust their driving to weather and light conditions, slowing their vehicles when visibility is limited due to glare, fog, or other factors.

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# APPENDIX I

## SENATE BILL NO. 762

Offered January 12, 2011

Prefiled December 7, 2010

*A BILL to amend and reenact § 46.2-920 of the Code of Virginia, relating to emergency vehicles proceeding past steady or flashing red signals, traffic lights, stop signs, or other devices indicating moving traffic shall stop.*

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Patron-- Puller  
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Referred to Committee on Transportation  
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Be it enacted by the General Assembly of Virginia:

1. That § 46.2-920 of the Code of Virginia is amended and reenacted as follows:

§ 46.2-920. Certain vehicles exempt from regulations in certain situations; exceptions and additional requirements.

A. The driver of any emergency vehicle, when such vehicle is being used in the performance of public services, and when such vehicle is operated under emergency conditions, may, without subjecting himself to criminal prosecution:

1. Disregard speed limits, while having due regard for safety of persons and property;
2. Proceed past any steady or flashing red signal, traffic light, stop sign, or device indicating moving traffic shall stop if the speed of the vehicle is sufficiently reduced to enable it to pass a signal, traffic light, or device with due regard to the safety of persons and property;
3. Park or stop notwithstanding the other provisions of this chapter;
4. Disregard regulations governing a direction of movement of vehicles turning in specified directions so long as the operator does not endanger life or property;
5. Pass or overtake, with due regard to the safety of persons and property, another vehicle at any intersection;
6. Pass or overtake with due regard to the safety of persons and property, while en route to an emergency, stopped or slow-moving vehicles, by going to the left of the stopped or slow-moving vehicle either in a no-passing zone or by crossing the highway centerline; or
7. Pass or overtake with due regard to the safety of persons and property, while en route to an emergency, stopped or slow-moving vehicles, by going off the paved or main traveled portion of the roadway on the right. Notwithstanding other provisions of this section, vehicles exempted in this instance will not be required to sound a siren or any device to give automatically intermittent signals.

B. The exemptions granted to emergency vehicles by subsection A ~~of this section~~ shall apply only when the operator of such vehicle displays a flashing, blinking, or alternating emergency light or lights as provided in §§ 46.2-1022 and 46.2-1023 and sounds a siren, exhaust whistle, or air horn designed to give automatically intermittent signals, as may be reasonably necessary, ~~and~~. *However, the exemption granted under subdivision A 2 shall apply only when the operator of such emergency vehicle sounds a siren, exhaust whistle, or air horn designed to give automatically intermittent signals or, alternatively, brings the vehicle to a complete stop before proceeding with due regard to the safety of persons and property. All of the exemptions granted to emergency vehicles by subsection A shall apply only when there is in force and effect for such vehicle either (i) standard motor vehicle liability insurance covering injury or death to any person in the sum of at least \$100,000 because of bodily injury to or death of one person in any one accident and, subject to the limit for one person, to a limit of \$300,000 because of bodily injury to or death of two or more persons in any one accident, and to a limit of \$20,000 because of injury to or destruction of property of others in any one accident or (ii) a certificate of self-insurance issued pursuant to § 46.2-368. Such exemptions shall not, however, protect the operator of any such vehicle from criminal prosecution for conduct constituting reckless*

disregard of the safety of persons and property. Nothing in this section shall release the operator of any such vehicle from civil liability for failure to use reasonable care in such operation.

C. For the purposes of this section, the term "emergency vehicle" shall mean:

1. Any law-enforcement vehicle operated by or under the direction of a federal, state, or local law-enforcement officer (i) in the chase or apprehension of violators of the law or persons charged with or suspected of any such violation or (ii) in response to an emergency call;
2. Any regional detention center vehicle operated by or under the direction of a correctional officer responding to an emergency call or operating in an emergency situation;
3. Any vehicle used to fight fire, including publicly owned state forest warden vehicles, when traveling in response to a fire alarm or emergency call;
4. Any ambulance, rescue, or life-saving vehicle designed or used for the principal purpose of supplying resuscitation or emergency relief where human life is endangered;
5. Any Department of Emergency Management vehicle or Office of Emergency Medical Services vehicle, when responding to an emergency call or operating in an emergency situation;
6. Any Department of Corrections vehicle designated by the Director of the Department of Corrections, when (i) responding to an emergency call at a correctional facility, (ii) participating in a drug-related investigation, (iii) pursuing escapees from a correctional facility, or (iv) responding to a request for assistance from a law-enforcement officer; and
7. Any vehicle authorized to be equipped with alternating, blinking, or flashing red or red and white secondary warning lights under the provisions of § 46.2-1029.2.

D. Any law-enforcement vehicle operated by or under the direction of a federal, state, or local law-enforcement officer may disregard speed limits, while having due regard for safety of persons and property, (i) in testing the accuracy of speedometers of such vehicles, (ii) in testing the accuracy of speed measuring devices specified in § 46.2-882, or (iii) in following another vehicle for the purpose of determining its speed.

E. A Department of Environmental Quality vehicle, while en route to an emergency and with due regard to the safety of persons and property, may overtake and pass stopped or slow-moving vehicles by going off the paved or main traveled portion of the highway on the right or on the left. These Department of Environmental Quality vehicles shall not be required to sound a siren or any device to give automatically intermittent signals, but shall display red or red and white warning lights when performing such maneuvers.

F. Any law-enforcement vehicle operated by or under the direction of a federal, state, or local law-enforcement officer while conducting a funeral escort, wide-load escort, dignitary escort, or any other escort necessary for the safe movement of vehicles and pedestrians may, without subjecting himself to criminal prosecution:

1. Disregard speed limits, while having due regard for safety of persons and property;
2. Proceed past any steady or flashing red signal, traffic light, stop sign, or device indicating moving traffic shall stop if the speed of the vehicle is sufficiently reduced to enable it to pass a signal, traffic light, or device with due regard for the safety of persons and property;
3. Park or stop notwithstanding the other provisions of this chapter;
4. Disregard regulations governing a direction of movement of vehicles turning in specified directions so long as the operator does not endanger life or property; or
5. Pass or overtake, with due regard for the safety of persons and property, another vehicle.

Notwithstanding other provisions of this section, vehicles exempted in this subsection may sound a siren or any device to give automatically intermittent signals.

## APPENDIX II

### HOUSE BILL NO. 1403

Offered January 12, 2011

Prefiled August 10, 2010

*A BILL to amend and reenact § 19.2-386.16 of the Code of Virginia, relating to penalty for eluding police.*

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Patron-- Loupassi  
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Referred to Committee for Courts of Justice  
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Be it enacted by the General Assembly of Virginia:

1. That § 19.2-386.16 of the Code of Virginia is amended and reenacted as follows:

§ 19.2-386.16. Forfeiture of motor vehicles used in commission of certain crimes.

A. Any vehicle (i) knowingly used by the owner thereof or used by another with his knowledge of and during the commission of, or in an attempt to commit, a second or subsequent offense of §§ 18.2-346, 18.2-347, 18.2-348, 18.2-349, 18.2-355, 18.2-356 or § 18.2-357 or of a similar ordinance of any county, city or town-~~or~~; (ii) knowingly used for the transportation of any stolen goods, chattels or other property, when the value of such stolen goods, chattels or other property is \$200 or more, or any stolen property obtained as a result of a robbery, without regard to the value of the property; or (iii) driven in violation of subsection B of § 46.2-817 shall be forfeited to the Commonwealth. The vehicle shall be seized by any law-enforcement officer arresting the operator of such vehicle for the criminal offense, and delivered to the sheriff of the county or city in which the offense occurred. The officer shall take a receipt therefor.

B. Any vehicle knowingly used by the owner thereof or used by another with his knowledge of and during the commission of, or in an attempt to commit, a felony violation of (i) Article 3, (§ 18.2-47 et seq.) of Chapter 4 of Title 18.2 (~~§§ 18.2-47 et seq.~~), or (ii) § 18.2-357 where the prostitute is a minor, shall be forfeited to the Commonwealth. The vehicle shall be seized by any law-enforcement officer arresting the operator of such vehicle for the criminal offense, and delivered to the sheriff of the county or city in which the offense occurred. The officer shall take a receipt therefor.

C. Forfeiture of such vehicle shall be enforced as is provided in §§ 4.1-339 through 4.1-348 as to vehicles used for the transportation of illegally acquired alcoholic beverages, and the provisions of §§ 4.1-339 through 4.1-348 shall apply, mutatis mutandis, to proceedings for the enforcement of such forfeiture except that venue for the forfeiture proceeding shall be in the county or city in which the offense occurred.

D. The agency seizing the motor vehicle or other conveyance shall, for such period of time as the court prescribes, be permitted the use and operation of the motor vehicle or other conveyance, after court forfeiture, for the investigation of crimes against the Commonwealth by the agency seizing the motor vehicle or other conveyance. The agency using or operating each motor vehicle shall have insurance on each vehicle used or operated for liability and property damage.