VCU
Virginia Commonwealth University

Virginia Commonwealth University
Transportation Safety Training Center
Crash Investigation Team

Report Number 192 – July 2004

ABSTRACT

This report describes two separate traffic crashes, each involving older drivers. Both crashes occurred because of human error on the part of these drivers. In the first instance, an 89-year-old male driver apparently became confused and disoriented on a dark evening, turned his car around and began driving in the wrong direction on a rural four lane divided highway. This action resulted in a head on collision. In the second instance, an 86-year-old male driver traveling on a rural four lane divided highway during bright, sunny conditions failed to respond to a slow moving vehicle in front of him. This failure resulted in a rear end collision. In both cases, the unbelted older drivers received fatal injuries.

These crashes illustrate the hazards of driver error and highlight the need for drivers, regardless of their ages, to monitor the environment and their own condition for problems that may affect their safety. The importance of periodic physical and mental examinations for older drivers is stressed in theses cases. Virginia driver licensing and crash rates for older drivers are also discussed in this report.

Virginia Commonwealth University

Transportation Safety Training Center

Crash Investigation Team

Report Number 192 – July 2004

SYNOPSIS – Case Study Number One

Day, Time, Season: Friday, 9:15 p.m., spring

Road/Weather: Clear and dry

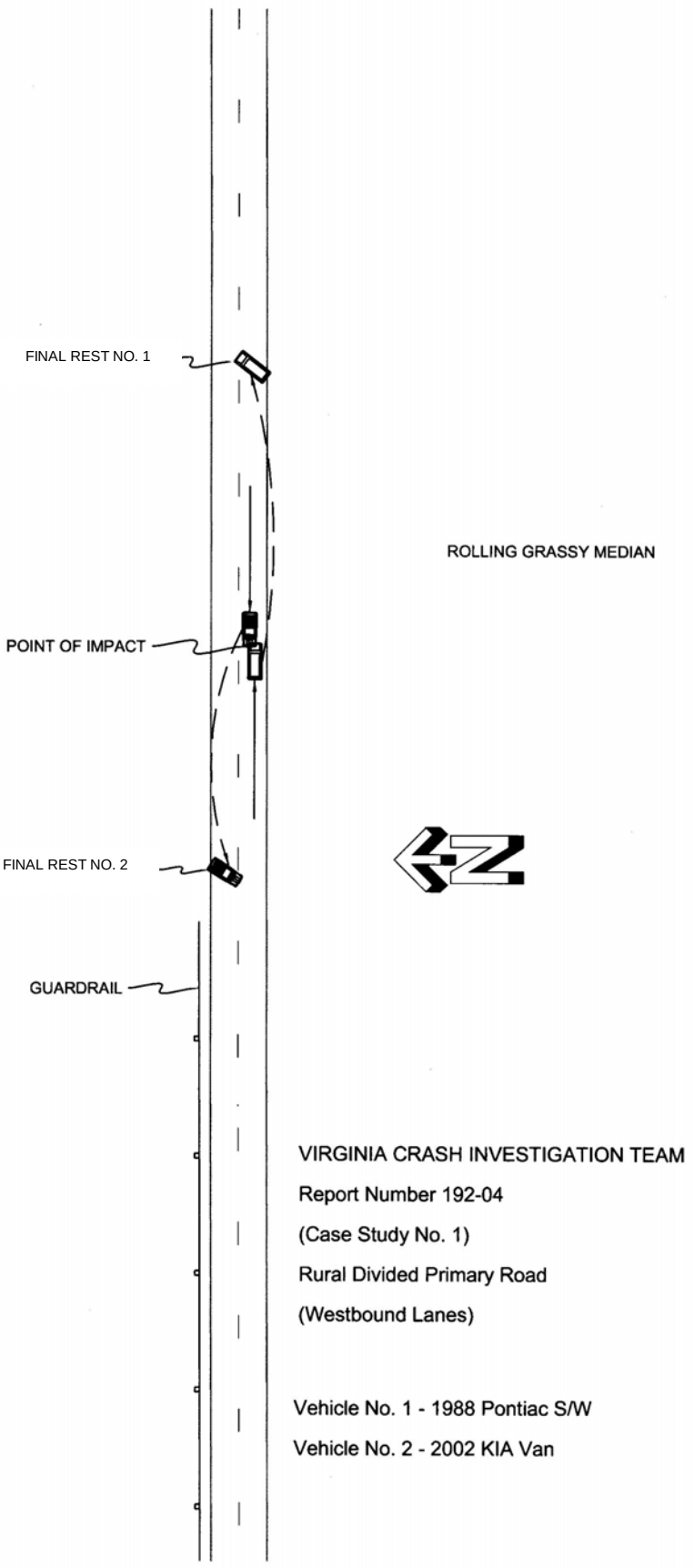
Vehicles Involved: 1988 Pontiac Safari station wagon
2002 Kia Sedona mini van

Summary: The Pontiac was being driven in the wrong direction on a four lane divided highway when it collided head on with the Kia, which was traveling in its correct lane of travel.

Severity: One fatality, one driver injured and extensive property damage.

Probable Cause: The 89-year-old Pontiac driver became disoriented and confused after already driving some distance, turned around and started driving in the wrong lane and in the wrong direction.

Significant Points: Older drivers, wrong-way driving, the need for periodic physical/mental driver evaluations, and safety belt use/non use.


FINAL REST NO. 1
ROLLING GRASSY MEDIAN
POINT OF IMPACT
FINAL REST NO. 2
GUARDRAIL
VIRGINIA CRASH INVESTIGATION TEAM
Report Number 192-04
(Case Study No. 1)
Rural Divided Primary Road
(Westbound Lanes)
Vehicle No. 1 - 1988 Pontiac S/W
Vehicle No. 2 - 2002 KIA Van

CRASH DESCRIPTION

On a Friday night in April at 9:15 pm, a 1988 full size Pontiac station wagon was traveling east in the westbound lane of a major, four lane divided primary highway. The 89-year-old operator was driving his car the wrong way in the left, inside lane of the highway. He was alone, unbelted and very familiar with both his vehicle and the roadway. About 1-1/2 hours earlier, the Pontiac driver had left his son's house, located about 50 miles away. He was en route to his home about 35 miles away. For some reason, the driver turned the car around and reversed his direction of travel: he began traveling east in the inside westbound lane. After traversing several slight grades along a ½ mile straight section of roadway, the Pontiac encountered a westbound vehicle also traveling in the inside westbound lane. Along this section of highway, the area is rural with no highway signing in the vicinity. The roadway is posted for 55 mph and there are no crossovers nearby. Since the roadway follows the natural contour of the land, it is constructed on rolling terrain. Intermittent wooded and clear fields parallel the highway and a typical metal guardrail borders the westbound lanes. A wide median consisting of embankments and wooded sections separate the east and westbound lanes. The opposite lanes of travel are often obscured, especially after dark. The highway is asphalt paved with typical yellow and white painted pavement markings. No centerline delineators are embedded in the pavement throughout this area.

The westbound vehicle was a 2002 Kia Sedona mini van driven by a lone 29-year-old female. The driver was returning from her college located about 20 miles away and was en route to her mother's home about 40 miles away. She was in excellent health and not tired or under the influence of alcohol or drugs. She was familiar with both the roadway and the vehicle. The driver was operating her van at an estimated speed of 55 mph and traveled in the left lane because several vehicles were in the right lane just ahead of her. After cresting a hill, she suddenly saw headlights coming toward her in her lane of travel. She realized that she had no place to go because of the presence of trees in the median and vehicles beside her in the right lane. Although the events unfolding in front of her occurred rapidly, she attempted to swerve to her right in an evasive action. Just before the impending collision, she hit her horn but saw no evasive action from the

approaching car. The impact occurred near the center of the left inside westbound lane just as she began steering in an emergency evasive action to her right. At impact, the van's airbags deployed as she moved forward in her seat. Her safety lap and shoulder belt system kept her upright behind the steering wheel as her van's left front collapsed inward onto her. After impact, the van traveled into the right lane while simultaneously rotating counterclockwise. The Kia traveled about 35 feet west of the collision point and came to rest diagonally straddling the right outside lane, facing southwest. It had rotated about 85 degrees. The belted driver remained inside the van throughout the crash and post crash phases of the collision. The vehicle sustained major left front contact damage measuring 18 inches wide, 16 inches deep and 10 feet along its' left side. The two front tires were flat and the van's electrical system was destroyed, causing the lights to turn off. The driver sustained significant injuries to her lower legs and compression injuries to her head and chest. She remained inside the vehicle at final rest, trapped by the van's collapsed floorboard and dash/steering wheel areas. The safety belt use and deployment of the driver side airbag together saved the life of the van driver. Had she not been belted, she would have struck the deploying airbag, in addition to the collapsing interior and would have likely sustained fatal or near fatal injuries.

The Pontiac collided with the van at a nearly straight-ahead alignment. No evidence exists to show that the driver either steered or braked in any evasive action before the collision. The Pontiac's left front incurred contact damage 25 inches wide, 19 inches deep at the drivers "A"-post and extended along the left front side about 5-1/2 feet. The Pontiac kept going eastward after the collision and continued partially onto the grassy median, where its right side tires furrowed through the sod. The left front wheel collapsed into the firewall and frame and the right front wheel was bent to the left. This caused the car to rotate counterclockwise and travel back entirely into the inside lane. It came to rest 59 feet from the impact point, positioned diagonally across the left inside westbound lane. The Pontiac rotated nearly 80 degrees from its original heading. Because of the severe damage to its left front corner, it too lost all power, including its electrical system.

Photo 1. View looking east from the left inside westbound lane. The wrong way Pontiac was traveling in this lane. Photo was taken about 150 feet before the impact point.

The unbelted Pontiac driver was thrown forward into the steering wheel, dashboard and windshield as they collapsed rearward into him. He sustained massive head and chest injuries and died instantly in the collision. He came to rest slumped over into the right front half of the bench seat. His legs and feet were pinned by the collapsed floorboard and dash areas and he had to be extricated from the vehicle. Due to his age, the amount of impact forces on his chest, and the amount of destruction to the car's front, the Pontiac driver likely would have still received fatal injuries had he been belted.

A westbound motorist ahead of the van just before the collision saw the crash and came back to the scene to render assistance. Within minutes, other motorists stopped at the scene and with their cell phones, called emergency and police personnel. The investigating State Trooper arrived at the scene within minutes of notification, about the same time as the emergency fire and rescue units pulled up. The Kia driver was treated and later transported to a local hospital. Nearly three months after the crash, she is still recovering from serious leg and foot injuries. The Pontiac driver's body was taken to a local morgue. The Trooper completed his investigation, including documenting the scene

and interviewing witnesses, and the scene was cleared nearly 1-1/2 hours after the crash occurred.

Photo 2. View looking west from the left inside westbound lane. The van was properly traveling in this lane. Photo was taken about 300 feet before the impact point. Note the hillcrest and roadway design in the vicinity.

REMARKS

The 89-year-old driver left his home the morning of the crash and drove about 85 miles to his son and daughter-in-law's home. From there, his son drove him to a Veterans Hospital where he was scheduled to have an eye examination at 11:00 a.m. After traveling the nearly 1-1/2 hour trip, they waited until 3 p.m. to finally see the doctor. The two drove back to the son's home where the driver stayed a short time and visited with his son's family. After having dinner, he started on his journey back home. It was already dark at the time and, although he normally preferred not to drive at night, he decided to drive home anyway. Nearly two hours later, after driving three-quarters of the way home, he was killed in this fatal crash.

The driver's son advised that his father, a disabled veteran, was in good general health. While they were together, he was in good spirits and displayed no abnormal physical or mental behavior. He had been receiving medical care for a disc problem in his back that normally would have been treated with surgery. Due to his advanced age, however, the surgery was not performed. He received periodic injections to control the pain. The driver lived alone and independently since the death of his wife two years earlier. He was active, still did his own yard work and, since he was a retired mechanic, he would occasionally work on his own car. He was scheduled to travel to Disney World in Orlando with his son's family in the upcoming months. The son said that no one had expressed any concerns to him about his father's driving skills and/or his mental/physical capacity before the crash. However, the driver's sister mentioned to the son after the crash that he had experienced an episode of confusion and disorientation while driving the week before the crash. On this occasion, he pulled off the road, turned around and headed back home, fortunately without a mishap. The driver's son thought he might have suffered a mini-stroke the night of the crash, which is consistent with the symptoms the driver had reported in the earlier incident. The cause and number of other such episodes (if any) are unknown to the Team. Such concerns by the Pontiac driver's sister and son appear valid considering that strokes are one of the leading causes of death among older americans.

Interestingly, the driver had mistakenly thought that his driver's license was due for renewal and this was part of the reason for the eye exam. He was not scheduled for renewal until the month of his ninetieth birthday in 2005. His DMV record revealed that he had received a speeding conviction 15 months earlier for driving 15-19 mph above the speed limit. This occurred in the same county as the fatal crash and resulted in a balance of plus-two driver points on his record. He was required to wear glasses when he drove. The fatal crash was the only reported accident noted on his record.

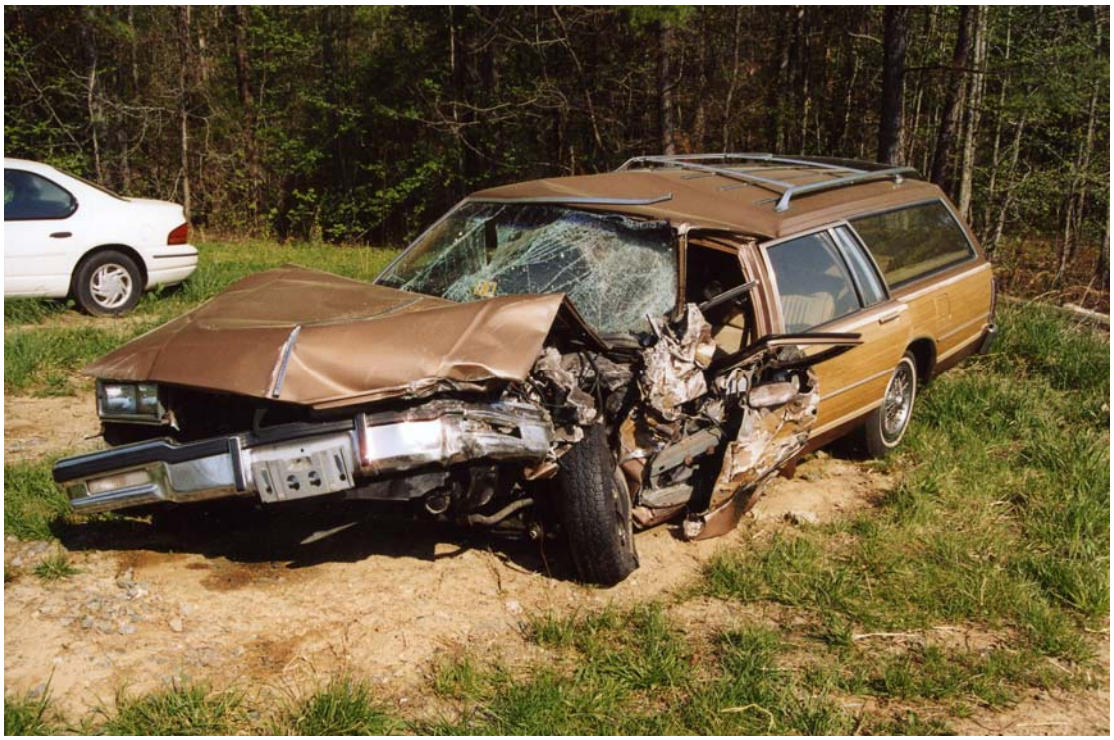


Photo 3. Damage to the 1988 Pontiac station wagon from impact with the van. The 89-year-old unbelted driver died in this collision.

The reason(s) the driver traveled the wrong way on the night of the crash is unknown. However, based on his most recent past, it would appear that he had another episode that left him disoriented and confused. The exact location of where he stopped and turned around and/or the number of miles he had driven in the wrong direction is also unknown. However, given the number of hills on this road that restricted sight distance and the high volume of traffic using this primary highway, it is unlikely that he drove very far. Authorities had received no calls reporting of a wrong way driver.

The Crash Team has noted during investigations of other wrong way crashes that this and other crashes have similarities. Frequently, a wrong way driver is traveling the wrong way in the left-inside lane of divided highways. Apparently, this is because the drivers think they are correctly driving in the right lane of travel. Visual obstacles such as high embankments and bushes or trees may block sight of opposing lanes of travel, lending credibility to their mistaken belief that they are on a two lane undivided highway, rather than on a four lane divided road. Wrong way drivers are typically impaired with such things as alcohol, fatigue, drugs and/or physical/mental problems thus influencing their behavior. Many of the wrong way drivers are elderly and are not familiar with the

roadway. While this 89-year-old was familiar with the area, the Team is of the opinion that he became disoriented and confused. When he reversed directions, he probably thought that he was in the correct lane of travel.

The crash location is situated on a hillcrest that naturally limits approaching sight distance. The nearest crossover that the driver would have passed was in a curve about .8 of a mile west of the crash site. The two motorists who were traveling ahead of the westbound van in the right outside lane saw the wrong way Pontiac's lights approaching in the inside lane for nearly ½ mile. The Pontiac did not veer out of its lane or alter its direction of travel at any time prior to the collision. By the time the van's driver crested the hill and saw the Pontiac's headlights in her lane of travel, she had little time to react. Based on their impact damages and where they came to rest, both vehicles were traveling about 50 mph when they collided. Given the nearly 400 feet of approaching sight distance, the van driver had about 3 seconds in which to respond after seeing the Pontiac's headlights in front of her. Since she would not have been expecting a wrong way car in her lane, once she saw the lights and realized what was happening, her response time was exhausted. Although she says she steered to her right just at the last instance, it was not detected by the Pontiac driver who did not attempt to swerve or brake during the same driver decision time period. Had more sight distance been available and/or had this situation occurred on a long flat section of highway, successful evasive action may have been executed by the van driver and perhaps the Pontiac driver.

Many divided highways within the Commonwealth have delineators embedded in the pavement center lines that are equipped with yellow reflectors on one side and red ones on the other. The red ones are placed to alert errant drivers that they are going the wrong way. This stretch of highway was not equipped with these pavement delineators. It is possible that if they were in use at the time of the crash, the Pontiac driver may have been alerted to his mistake. Additionally, "wrong way" signs affixed to the back of speed limit or other highway signs for normal traffic would have provided a stronger, clearer message.

Photo 4. Damage to the 2002 Kia van from impact with the Pontiac. The 29-year-old belted driver, protected by her safety belt and the van's air bag, survived this head-on collision

Virginia Commonwealth University

Transportation Safety Training Center

Crash Investigation Team

Report Number 192 – July 2004

SYNOPSIS – Case Study Number Two

Day, Time, Season: Monday, 9:45 a.m., spring

Road/Weather: Clear and dry

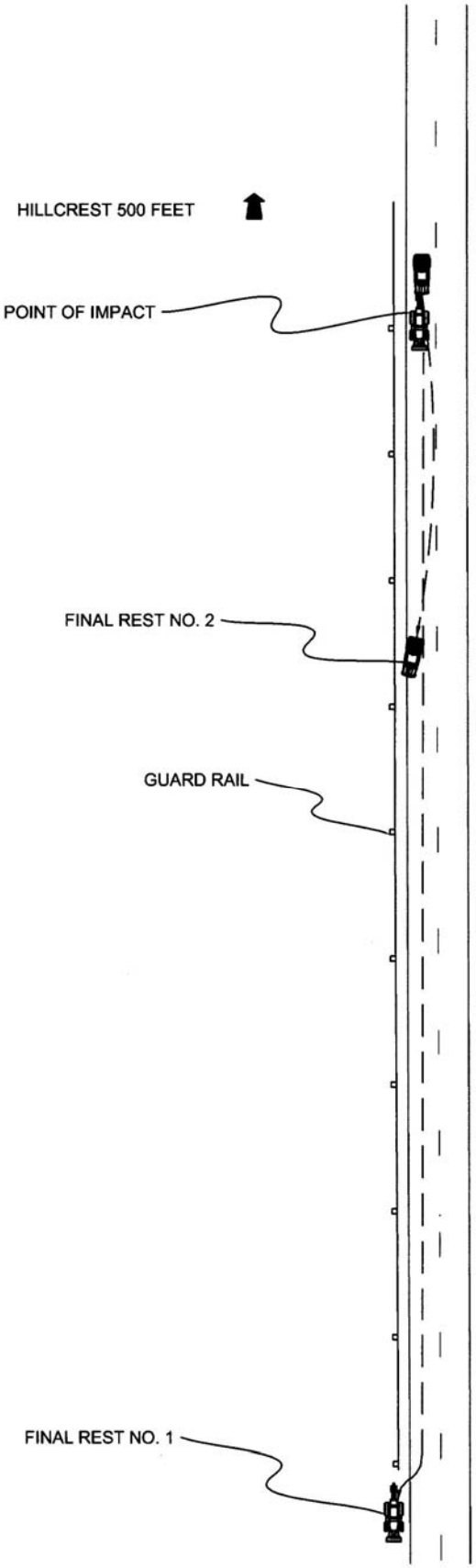
Vehicles Involved: 1997 Case Backhoe
1998 Chevrolet S-10 Pickup Truck

Summary: The Chevrolet collided into the rear of a slow moving backhoe without taking evasive action on a four lane divided, rural primary highway.

Severity: One fatality and the pickup totaled.

Probable Cause: The 86-year-old Chevrolet driver failed to see the flashing lights on the slower moving backhoe and realize the speed difference between the two vehicles.

Significant Points: Older drivers, adequate sight distance, poor driver visual actuity (i.e. driver difficulty in detection of flashing lights and perception problems differentiating closing vehicle speeds), lack of safety belt use and vehicle not displaying slow moving emblem.



GRASSY MEDIAN

VIRGINIA CRASH INVESTIGATION TEAM

Report Number 192-04

(Case Study No. 2)

Rural Divided Primary Road

(Westbound Lanes)

Vehicle No. 1 - 1997 Case Backhoe

Vehicle No. 2 - 1988 Chevrolet Pickup

CRASH DESCRIPTION

On a Monday morning at 9:45 a.m., a 1997 Case backhoe was traveling west on a four lane divided primary highway. The yellow tractor-like backhoe was being driven in the right, outside lane by its 59-year-old driver who was employed by the backhoe's owner. The vehicle was traveling at a driver-estimated speed of about 30mph (no speedometer is installed on this unlicensed, special type vehicle) with its two top-mounted amber lights flashing. It was also displaying its two red taillights and two clear auxiliary lights. The backhoe was not equipped with a slow moving vehicle emblem as required by Virginia law.

The backhoe had just rounded a slight curve and began traveling down a six percent grade along the rural asphalt-paved highway. The speed limit was posted for 55 mph and the facility was appropriately marked with broken white center lines and solid yellow/white edge lines. The median divider is a rolling, grassy/tree-lined area about 50 feet wide at this point. The 23 foot wide pavement is bounded on the right by a four foot wide unimproved grass and gravel shoulder adjacent to a metal guardrail. Bordering the guardrail is a thickly wooded area. A metal guardrail and narrow shoulder are also provided on the median side. The approaching sight distance along the westbound lanes is about 600 feet. The westbound lanes travel a long straight downgrade section of highway beyond the impact point for an additional 1500 feet until it reaches the level ground below where it then turns to the left. From the impact point, a westbound driver can see well beyond the highway and into the far off background below. At this time of morning, the sun was behind and slightly to the left of westbound motorists. The backhoe was traveling from a jobsite to the residence of its owner located about five miles away.

A 1988 white Chevrolet S-10 pickup truck, driven by its lone, unbelted 86-year-old driver, approached the backhoe from behind. The driver was returning home from conducting transactions earlier at his bank. The bank was located about four miles from the crash site and his home about six miles away. As the pickup, estimated by a witness to be traveling about 50 mph, approached the slower moving backhoe along the downgrade portion of the highway, it was never braked or steered in an evasive action. Instead, the pickup's front collided with the rear of the backhoe in a straight-ahead

alignment. The heavy backhoe was pushed forward by the faster moving pickup and it continued to travel downhill for several hundred feet, where the driver pulled it over onto the grassy shoulder. The backhoe driver never saw or heard the pickup's approach and did not realize what had occurred. He said the front of his vehicle suddenly raised off the ground as he was accelerated forward. He initially thought that one of the two large size rear tires had blown out. He looked around to see the damaged pickup against his vehicle and then travel off the right side of the roadway. Now realizing what had occurred, he continued to drive the backhoe to the bottom of the grade and pulled off onto the shoulder. Since the crash site had no wide shoulder, he felt it was unsafe to stop on the highway, blocking the right lane, to check out the collision. He then ran back up the hill to the pickup to assist its driver.

Photo 1. View looking west from the impact point showing final rest of pickup truck and backhoe in distant background. Note the gouge mark in the center of the right lane, the subsequent solid and liquid debris as well as the scuff marks made from the pickup's front tires.

Upon impact, the pickup's front end collapsed from contact with the larger, heavier and slower moving backhoe. Its' front bumper, grille, hood and engine areas collapsed inward about 17 inches. Because it struck the backhoe's narrow "dump-arm," the width of the damage on the pickup's front measured only about two feet wide and was located just right of its' center front. The collision, compounded by the speed difference between the two vehicles, caused the Chevy's front undercarriage to contact the pavement at impact. This contact left a noticeable gouge mark near the center of the right lane that was parallel to the lane. This gouge mark, surrounded by several smaller and lighter scratches, indicates the point of impact. Approximately three feet beyond the gouge was solid debris (dirt) that had become dislodged from underneath the vehicles, followed by a liquid debris trail (radiator fluid) from the Chevy. Two short collision tire scuffmarks made after impact by the pickup's front tires were noticeable on the pavement several feet beyond the gouge marks. The pickup stopped about 50 feet beyond the impact point facing west near the edge of the right lane with its right front tire resting just off the pavements' edge.

At impact, the unbelted Chevy driver came forward and traveled into and over the steering wheel. His head struck the windshield violently, producing a "spider web" type impact pattern. These interior impacts (steering wheel and windshield) produced traumatic injuries that would later prove fatal. The driver was knocked unconscious and he rebounded back into his seat where he was found moments later by passing motorists.

The investigating Trooper and other emergency/rescue personnel were called via cell phones and responded in minutes. The pickup driver was removed from his vehicle with no difficulty and transported to the local hospital. He was later transferred to a larger hospital where he died of blunt trauma to the head, neck and chest about six hours later.

With the assistance of other law enforcement officers, the Trooper completed his at scene investigation and the site was cleared within an hour after the crash occurred. The trooper charged the backhoe driver with failure to display a slow moving vehicle emblem. Several days later, the State Police Division One Crash Reconstruction Team came to the scene to document the physical evidence. Pertinent items were collected via

total station surveying equipment and a scale diagram was later generated. Among the items measured was westbound motorists approaching sight distance.

Photo 2. View looking east from the impact point showing the gouge mark and the roadway leading up to the crash site. Note the hillcrest in the background and the downgrade at this point.

REMARKS

The 86-year-old driver's wife was interviewed by the Crash Investigation Team and she gave the following information. They had owned the pickup truck, which was in excellent condition, for about 10 years and her husband was very familiar with it. They had lived in the area for 15 years and he was likewise very familiar with the roadway and vicinity, as he drove it several times a week. The driver was a retired factory worker and she said he was in "good physical condition and in good health for his age". He was not under the influence of alcohol or drugs at the time of the crash and he was in good spirits. He was not rushed for time nor in a hurry to get back home at the time of the crash. He had no history of driving problems in his 37 years of experience and she said he "always" wore his safety belt (although he did not have it on at the time of the crash). According to his DMV driving record, he was required to wear glasses while driving. He was wearing them on the day of the crash. He had not been convicted of any driving infractions and

his balance showed a plus five safe driver points. This was the only reported crash on his record.

Photo 3. Damage to the 1988 Chevrolet S-10 pickup truck from impact with the backhoe. The 86-year-old unbelted driver died in this frontal collision.

The cause of this tragic crash was the apparent failure of the pickup driver to see the backhoe's flashing lights and to correctly assess the difference in closing speeds between the two vehicles. The approaching site distance looking along the westbound lanes and down the grade to the impact point was about 600 feet. Traveling at 30 mph and 50 mph for the backhoe and pickup respectively, the backhoe should have been constantly visible to the Chevy driver for about the last 8 seconds over this distance. This amount of time and distance was more than sufficient for a normal driver who is paying attention to his/her driving task to see the backhoe and react accordingly. The backhoe driver said that several cars had passed him with no difficulty within minutes prior to the crash. As far as he could recall, the last car to pass was about one minute before impact.

After examining the rear amber flashing lights, the taillights and the auxiliary lights on the backhoe in identical lighting conditions as those on the morning of the crash,

the Team determined that the lights were not particularly bright or detectable. Their intensity tended to fade out in the bright, sunny conditions prevailing at the time. (Had the ambient lighting been darker for instance, the flashing amber lights in particular would have been more conspicuous and noticeable). Given the pickup driver's age and the normal visual degeneration of a driver of his 86 years, it is probable he never saw the lights. However, he certainly should have seen the large backhoe traveling directly in front of him before impact. Due to its' huge size (7 feet 3 inches wide and 8 feet 7 inches tall) and its relatively conspicuous color scheme (yellow and black), the backhoe could be detected several hundreds of feet in advance. It is likely that the Chevy driver did in fact see the backhoe in the distance but he failed to realize that the vehicle was traveling much slower than he. Part of this could be a result of the pickup driver not expecting to encounter a slower moving vehicle. Determining the closing speed between vehicles can be difficult for any driver but for older drivers, such mental processing may be much slower, especially in unusual or unexpected circumstances. It is unknown what the pickup driver was doing the last seconds before the crash. Although he should have been paying attention, he may have been looking at the highway scenery, thinking about his banking transaction and/or distracted by something inside his vehicle. Under normal driving conditions, the average driver perception/reaction time to external stimuli is generally about 1.5 seconds. It has been proven that many older drivers (like impaired drivers) have longer driver perception/reaction times than younger drivers. Whereas a younger driver would have seen and reacted to the presence of the backhoe in ample time to avoid it, this older driver did not.

The backhoe driver was charged and convicted of failing to display a slow moving vehicle emblem in the rear of the backhoe (46.2-1081). Since this crash, the Team has seen many backhoes on the roadways across the Commonwealth and about half of them were displaying these emblems. The emblem is intended to be displayed on vehicles designed for operation at speeds not in excess of 25 mph. The purpose of the law is to increase the visibility of that vehicle and to convey to approaching motorists that it is in fact going slow. By having such a warning, a prudent motorist can assess his/her driving situation and react accordingly. The reason this backhoe was not displaying the emblem, according to its' owner, was because the vehicle could obtain speeds of about 30

mph. The Team feels that although this backhoe could travel at a speed greater than 25 mph on downgrade sections of roadway, it is doubtful that it could maintain those speeds on level surfaces and upgrades, thus necessitating the need for such an emblem. Although speculative, had this backhoe been equipped with such an emblem, (which is triangular shaped and a high intensity orange-pink color) the 86-year-old Chevy driver may have seen it and reacted safely, whereby this crash may have been avoided.

Photo 4. Rear view of the 1997 Case 690 backhoe. The vehicle in this photo is facing west and its two amber flashing hazard lights, two red tail lights and two clear auxiliary lights are all activated in this shot. The physical size of the vehicle is more conspicuous than its lights during bright, sunny conditions. Note the absence of a slow moving vehicle emblem. The backhoe, due to its large size and heavy metal construction, incurred no damage in the collision and its driver was not injured.

The Chevrolet driver was not wearing his safety belt at the time of the crash. He died of multiple impact injuries from striking the steering wheel and windshield. The impact speed between the Chevrolet and the backhoe is estimated at about 20 mph. This collision speed is survivable in most instances if motor vehicle occupants are properly belted. Even when considering the driver's advanced age, and natural frailty, had he

properly been belted with the pickup's combination lap and shoulder belt he may have survived this rear end collision.

Older drivers constitute one of the fastest growing age groups in the Commonwealth. In the last 10 years (1994-2003), the number of Virginia licensed drivers above 70-years-old increased nearly 26%, whereas the number of all drivers under age 70 increased by just under 5%. Unfortunately, the number of older drivers involved in reported traffic crashes also increased 26% and, in fatal crashes, a remarkable 61%. In comparison, the number of drivers under 70 years involved in crashes and fatal crashes over the same corresponding time period increased about 18% and 5% respectively. In 2003, approximately 8.65% of all Virginia licensed drivers were age 70 and above. In 1994, that percentage was 7.33. Older drivers as a group comprise the second smallest age segment of Virginia's licensed driving population; the smallest age group are teen drivers, followed by drivers in their 60's, 20's, 50's, 30's and the most, in their 40's.

Our youngest and oldest drivers comprise the two highest risk populations for crashes. They differ, however, in their approach to driving and in the problems that affect their crash rates. Older drivers often limit their driving or do not drive at all under conditions that are less than optimal. Many choose not to drive during hours of darkness, inclement weather and/or when traffic conditions are more demanding, such as on holidays or during morning/afternoon commute times. Younger drivers will take more risks. For example, they are more likely to pull out sooner in front of approaching traffic in order to beat on-coming vehicles. Older drivers take fewer risks and those who pull out in front of traffic are typically not trying to beat traffic. They often do not see the oncoming traffic as well. This is particularly true during left turn maneuvers and/or when confronted with complex decision making tasks. Older drivers also tend to make errors of omission, whereas younger drivers usually make errors of commission. For instance, younger drivers tend to travel at higher speeds and older drivers at lower speeds. Younger drivers are more likely to have alcohol impair their skills. With older drivers, health related medications are a potential problem.

In an attempt to improve traffic safety for older drivers, the Virginia General Assembly passed legislation during the 2004 session that requires drivers 80-years-old

and above to have their vision tested before their license is renewed. The driver can go to DMV to be tested or can present a report of a vision examination, made 90 days prior to renewal by an ophthalmologist or optometrist, indicating that the applicant's vision meets or exceeds established standards. This legislation was originally written for drivers 65-years-old and older. However, research indicates that drivers in their 80's and not in their 60's are the ones that had more visual related problems.

A medical review bill was also updated in 2004. It added pharmacists and other medical professionals to the list of physicians and immediate family members who are able to anonymously report an unsafe driver. This allows a pharmacist who may be concerned about the customer's driving ability to privately alert DMV. Anyone can report an unsafe driver to the DMV Medical Review Board; however, their identity, if and when requested by the affected driver, must be released.

There are a number of private organizations, which teach and advise older drivers about traffic safety programs aimed at their particular concerns. Some of these are the American Automobile Association, the American Association of Retired Persons, the American Association of Motor Vehicle Administrators, The Department of Motor Vehicles, The Department of Health, The National Safety Council and others. Older drivers who are interested should contact these groups for additional information and advice on how they can best improve their driving skills.

RECOMMENDATIONS

1. Older drivers are encouraged to seek information and educational materials related to the natural aging process and the potential effects on their driving behavior. The best method to ensure the safety of older drivers is for the drivers themselves to self-monitor for degenerative patterns and to take appropriate actions where and when needed.

2. The Virginia Department of Transportation and/or the Virginia Transportation Research Council consider researching "wrong way" crashes occurring in the Commonwealth to see if crash rates and trends are increasing. If such frequencies have been rising for the past several years, especially among older drivers, appropriate counter measures are encouraged. A more widespread use of wrong way signing and/or the placement of wrong way messages on the backs of existing signs at strategic locations on divided highways should be considered.

3. In an attempt to improve the future highway safety environment for all drivers, The Virginia Department of Transportation is encouraged to continue the widespread use of embedded centerline delineators with reflectors of different colors (white for the correct traffic and red for wrong way traffic), particularly on divided roadways. Educational programs to reinforce the correct interpretation of these color delineators and color pavement markings (yellow painted lines versus white lines) would be valuable as well.

4. The Virginia Department of Motor Vehicles, Virginia Transportation Research Council, highway safety officials and others associated with traffic safety should continue to monitor the travel trends, including the numbers and crash rates of older drivers, to determine whether such statistics are changing disproportionately to other motorists. If so, additional research and proactive countermeasures, where appropriate, are encouraged.

5. Backhoes and other similar special vehicles that normally travel at speeds under 25 mph on all types and grades of roadways should be equipped with slow moving emblems as required by law. Not only should the emblems be properly displayed, they should be clean and clearly discernable at all times. Consideration should also be given to the use of high intensity, flashing strobe lights on slow moving vehicles.

6. Motorists are encouraged to devote their full attention to their driving task at all times.

7. All motorists are encouraged to use their safety belts when in transit.