



**Virginia Commonwealth University
Transportation Safety Training Center
Crash Investigation Team**

Report Number 196 – January 2006

ABSTRACT

This report deals with a crash between a high performance sports car operated by a young driver with limited experience and an older dump bed pickup truck operated by an experienced driver. The vehicles were traveling in opposite directions on a heavily traveled two lane secondary roadway comprised of curves and hills. The sports car failed to negotiate a down hill curve to the right and ran off the right side of the pavement. The driver over-reacted in his recovery attempt, lost control, rotated counter-clockwise and slid into the path of the oncoming pickup with the right side leading. The passenger side of the car collided with the front end of the pickup; the lighter sports car wrapped around the front of the pickup and then was pushed by the heavier vehicle backward and off the road to final rest. The collision killed the four restrained occupants of the car and injured the restrained driver of the pickup. Both vehicles were totaled.

This crash illustrates the risk factors associated with teen driving, especially with respect to restrictions set forth in Virginia's graduated licensing laws. The importance of safety restraint use, as well as the critical skill of proper maneuvers for recovery after running off the road, is discussed. In addition, this report addresses issues relating to adjudication of first driving offenses by juveniles, high performance cars, large vehicles versus small cars in collisions, and speed limits on rural highways.

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SYNOPSIS

Day, Time, Season: Saturday, 5:00 p.m., summer

Road/Weather: Dry and cloudy

Vehicles Involved: 1994 Mitsubishi 3000 GT
1980 Chevrolet Custom Deluxe 30 pickup truck

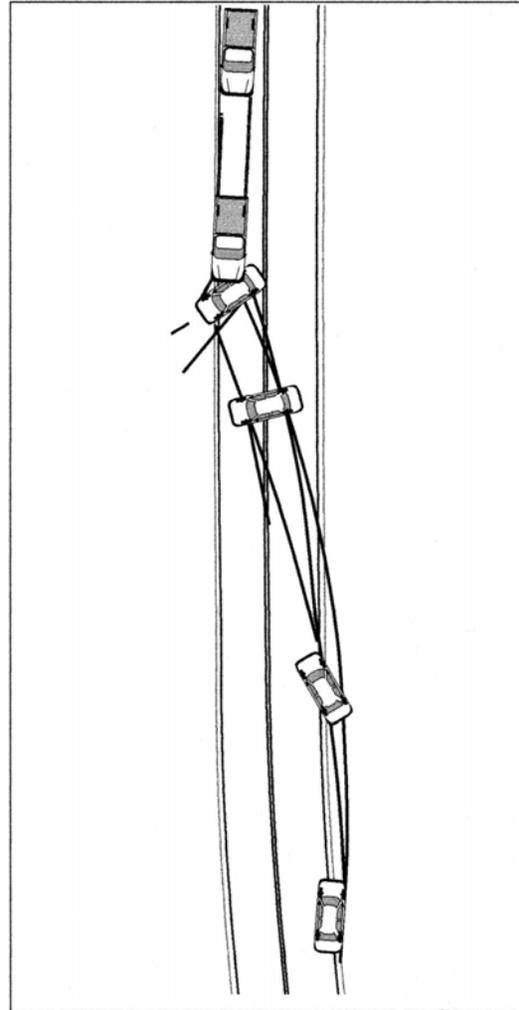
Summary: The Mitsubishi driver over-steered and ran off the road to the right. The driver then overcorrected and the car began to rotate. It crossed the center lines, encroached upon the path of the oncoming pickup and slid broadside into the front of the pickup.

Severity: Four fatalities in the car, truck driver injured, and extensive property damage.

Probable Cause: The 16-year-old driver was traveling too fast and ran off the road to the right. He overcorrected, causing his car to rotate and enter the wrong travel lane.

Significant Points: Inexperienced youthful drivers, high performance cars, large and small vehicles in collisions, speed too fast for roadway, adjudication of youthful drivers' offenses, graduated licensing passenger restrictions, safety restraint use, posting of highway curves.

Vehicles at final rest



Enlarged detail of crash



VIRGINIA CRASH
INVESTIGATION TEAM
REPORT NUMBER 196
Rural Secondary Highway
1994 Mitsubishi
1980 Chevrolet Dump Body
Pickup



CRASH DESCRIPTION

At 5:00 p.m. on a cloudy Saturday, a red 1994 Mitsubishi 3000 GT was traveling east on a rural two lane secondary road. The driver, a 16-year-old male, was accompanied by three teen-aged passengers. A 16-year-old female sat in the front passenger seat. A 15 year-old male sat behind that passenger with a 14-year-old female to his left, behind the driver. All four wore their lap/shoulder belts. The young men had just picked up the girls at the front passenger's home and had not been clear about their destination.

The road in this area is a series of curves and grades. The approach for the car is bordered on both sides with widely spaced residences. Brush and trees located inside a curve leading to the crash site reduce sight distance. The opposite side of the road is open, with utility poles set well off the roadway. The two travel lanes are delineated by white fog lines and separated by a solid double yellow line. Shoulders of compacted gravel and grass the approximate width of a car gently slope down into shallow drainage ditches. The roadway is paved asphalt. Although no speed limit signs were posted on this rural roadway, a statutory 55 mph limit was in force.

The Mitsubishi driver had turned onto this road from another secondary highway and traveled about 6/10 of a mile. Moving at a high rate of speed, he entered a right curve and steep downgrade. As he neared the apex of the curve, he over-steered, running off the road to the right, and began braking and skidding. The driver then overcorrected, steering his vehicle to the left. He traveled approximately 78 feet on the shoulder and re-entered the roadway, still skidding, with the car beginning a counter-clockwise rotation. As he moved into the opposite travel lane, his vehicle had already rotated beyond 90 degrees from its normal direction of travel.

Approaching from the east, a 44-year-old male was driving his white 1980 Chevrolet Custom Deluxe 30 pickup truck with a dump bed. The truck carried a full load of firewood, which the driver was transporting to his home. He was alone in the vehicle and wore his lap/shoulder belt. This driver has just come out of a sharp right curve and was traveling on a straight and slight uphill grade when he saw the Mitsubishi enter his path of travel. He began braking and turning to the right in a futile attempt to avoid a collision. The truck skidded 33 feet and then struck the car on the right side, impacting directly into the front and rear passenger seat areas.



Photo 1: View looking east in the direction the car was traveling as it approached the curve.

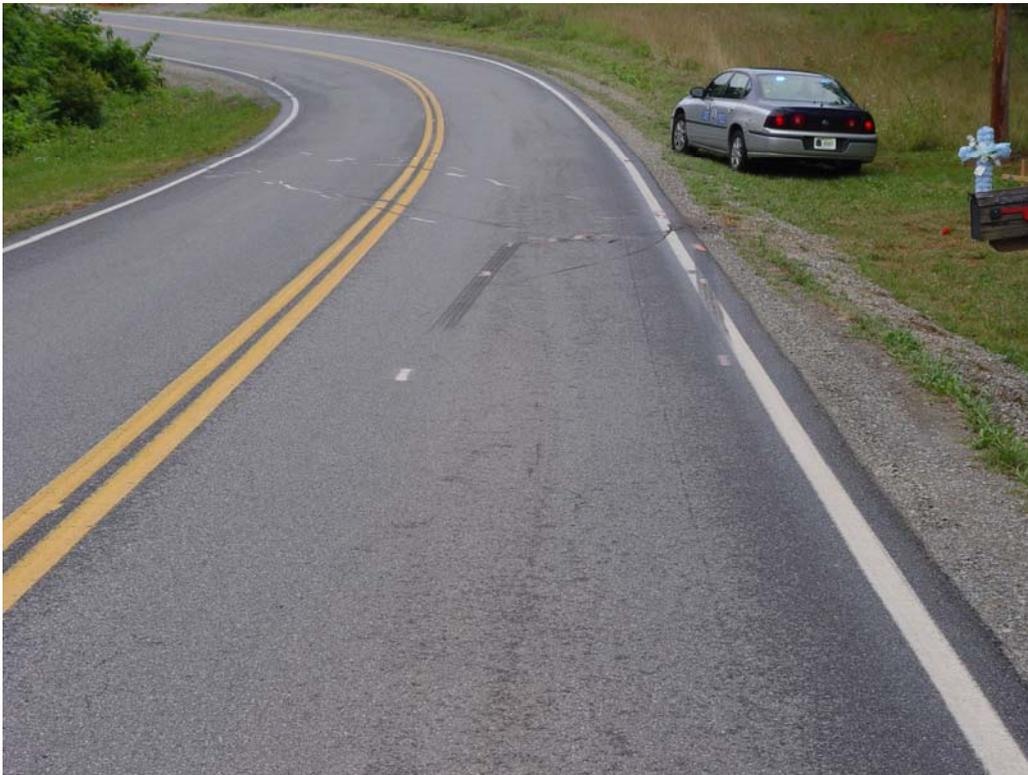


Photo 2: View looking west in the direction the truck was traveling. Note the skid marks from the truck and yaw marks where the car passed in front of the truck.

The front of the truck had extensive buckling and crushing. The combination of the load pushing from behind and the impact to the front caused the frame to buckle downward where the truck bed joins the body. The truck over-rode the passenger side frame rail of the car, as evidenced by the red trace paint on the main cross frame at the front of the truck. The hood buckled upward and the dash area was pushed forward, closing in on the driver in his seat. As the interior collapsed toward him, he was thrown forward against the safety restraint, but remained in place. The steering wheel was pushed to within 6 inches of the seat, deforming after striking the driver's chest. He suffered a head laceration and chest injuries.

At the area of deepest penetration, the bumper and the grill of the truck intruded over two feet into the smaller car, causing immediate fatal head injuries to both right side passengers. The force of deceleration also resulted in fatal head injuries to the driver and a fatal neck fracture to the young female seated behind him. The counter-clockwise rotation of the Mitsubishi was abruptly stopped on impact. The heavier truck continued to skid forward from impact an additional 7.9 feet, pushing the car off the side of the pavement. The vehicles nearly disengaged; they came to rest facing each other with the right front tires of both in contact. The truck came to rest facing west, its left front tires still on pavement. The car faced northeast, sitting in the grassy shoulder.

After the crash, witnesses in a vehicle behind the truck and residents who had heard the collision notified authorities. The driver of the truck crawled out, checked on the occupants of the car and began walking around. He was bleeding from a head laceration and visibly distraught. Within minutes, local fire, rescue and police personnel arrived and took control of the scene. The truck driver was transported to a hospital for treatment. Due to the severity of the crash, Virginia State Police were asked to bring in members of their Divisional Crash Team to gather physical evidence and reconstruct the events. They arrived within an hour. Virginia Department of Transportation workers shut down the road and rerouted traffic. The four victims were extricated from the car and taken to a local funeral home for examination by the medical examiner. The vehicles were removed and the scene cleared approximately four hours after the collision. It was several more hours before all the victims had been identified and their families notified.



Photo 3: Vehicles at final rest. Note extensive damage to both vehicles.

REMARKS

In 2001, the Virginia Crash Investigation Team published *Special Report 14: Young Drivers Involved in Fatal Crashes*. Shortly thereafter, the General Assembly passed a graduated licensing law aimed at lowering the crash rates, injuries and fatalities for this group. Since that study, the Team has monitored data on crashes involving teen drivers. After gathering initial information about this crash, the Team decided to conduct a full investigation.

The Mitsubishi driver was healthy and had no physical or mental deficiencies at the time of the crash. His father reported that he had been at home until about 3 p.m. that afternoon and was not aware that his son was going out or if he had plans for later that evening. A toxicology screen revealed that the teen had not ingested alcohol or other substances that may have impaired his driving skills or his judgment.

A rising senior at the local high school, he had been issued a learner's permit the year before the crash. Nine months later, at 16 years and 7 months of age, he received a provisional driver's license. His record revealed that he was involved in a property damage crash one month later. In following up on this incident, the Team learned that he had been driving the same Mitsubishi on another rural secondary road when he lost control of the vehicle. He ran off the road to the right and overturned in a ditch, damaging the right side, windshield and roof of the car. Neither he nor his passenger, the male friend who would die with him in the later crash, was hurt. The Trooper who investigated the crash stated that the driver claimed to have swerved to avoid hitting a deer; however, evidence at the scene indicated that he was probably traveling too fast for conditions. He charged the driver with reckless driving for failing to maintain control of his vehicle. The penalties for a conviction on this charge range from confinement in jail for up to twelve months, fines up to \$2500 or both. The judge, upon finding of "slight fault", is also empowered to reduce the charge to "improper driving", which is a traffic infraction punishable with fines up to \$250.

When this case came to court, the judge placed it "under advisement" for one year. This meant that, if the driver maintained a clean driving record for the following year, the charges would be dropped. According to the investigating Trooper, placing such first time offenses under advisement is a common practice. By taking a lenient stance, judges allow for the fact that inexperienced drivers often make innocent mistakes and errors in judgment, and they hope that the youth learn and improve. Parents, also, usually express the desire for light punishments,

understandably wanting to protect their children from harsh consequences. For some drivers, the experience of being in a crash or getting a ticket and having to go to court is enough of a wake-up call that they alter their approach to driving. For others, however, these consequences are not enough to influence them to change their behavior.

The judge's decision also meant that the driver would not be subject to any administrative penalties from the Virginia Department of Motor Vehicles, as mandated in the provisional licensing laws. If teens under the age of eighteen are convicted of safety belt or child restraint violations or of any violation for which demerit points are assessed, at the first offense DMV requires them to attend a driver improvement clinic. For a second offense, the Commissioner must suspend their driving privileges for ninety days; a third offense results in revocation of driving privileges for one year. These administrative suspensions run consecutively to any imposed by the courts. If the Mitsubishi driver committed other violations during the year after his case was placed under advisement, the charges would be reinstated and a conviction would result, triggering a retroactive chain of consequences issuing from the courts and from DMV. At the time of the hearing, however, no legal or administrative consequences were applied to this young driver. When they met in court, the Trooper informed the young man's parents that speed had been a factor in the crash and the father stated that he would take his son's license for a period of time as a punishment. In the meantime, the Mitsubishi was in a repair shop. Work was completed only a week prior to the fatal crash and the teen resumed driving the vehicle.

As a 16-year-old driver, his license was provisional and carried certain restrictions. He had certain curfew restrictions for driving late at night, but they were not applicable to this daytime crash. Additionally, he was not permitted to carry more than one passenger (except family or household members) under the age of 18 in his vehicle. Legislators included passenger restrictions in the graduated licensing law because young passengers were considered a distraction for the inexperienced driver and a potential source of peer pressure to increase risk-taking behaviors. Since the law was passed, several studies have confirmed that the presence of peers, especially male passengers, is linked with an increase in risky driving behavior. In laboratory studies cited in *Chronic: A Report on the State of Teen Driving 2005*, teens and young adults were found to take more risks on a variety of tasks when others were present. The researchers indicated that the subjects were not deficient in logical reasoning or risk perception, but they were more willing to make riskier choices when around other people, as compared to when they were alone. A field study reported in *Accident Analysis and Prevention 37* (2005)

found that more teens are likely to exceed the speed limit by 15 mph and to decrease following distances when they are accompanied by a male teen, compared to when they drive alone or with a female passenger. Passengers in the car are apparently more than a possible distraction: they may cue and enhance the likelihood of high risk actions that can have deadly results.

The afternoon of this crash, the driver picked up his fifteen-year-old male friend. The young man's parents did not know that their son was with this driver. They had forbidden him from riding with the Mitsubishi driver after the previous crash and he was acting in defiance of their restriction. The two teens then went by the front female passenger's home. She had a guest, a friend aged fourteen who had spent the night, and the four visited, listening to music for a short while. Then they decided to make a trip to the store, although they were not specific about their destination. The sixteen-year-old girl's mother had never met either young man, but stated that they "seemed to be nice little fellas." Since her daughter had neither a license nor a learner's permit, she may not have been aware of the restrictions on the number of passengers permitted in the vehicle. She allowed both girls to go, reminding them to wear their safety belts. The crash occurred a short time later.

The 3000 GT Mitsubishi, as mentioned above, had been released from a garage only a week prior to the crash. It was in good working condition, with no defects, and displayed valid registration and inspection stickers. Registered to the driver's mother, it had been inspected just that month, most likely while it was being repaired. Other than damage and debris from the wreck, the vehicle was clean and apparently well cared for. Designed and marketed as a sports car, the Mitsubishi had low-profile, high-performance, speed-rated tires. It was equipped with a six speed, manual transmission and a 24 valve V6 dual overhead cam engine that was turbo charged. The odometer showed that it had been driven over 119,000 miles.

Most automobile insurers recommend against allowing teen drivers to operate high performance vehicles. Insurers stress that marketing of high performance cars tempts drivers to speed and take risks. When combined with teens' inexperience on the road, such risky behaviors can be a deadly combination. Unfortunately, there is little empirical data available to support the claim that teens are at any higher risk than more experienced drivers when operating these cars. In fact, contrary to these expectations, a study conducted in Australia in 2005 failed to find a positive relationship between young novice drivers' involvement in serious injury crashes and the power-to-weight ratios of the cars they drove (Palamara & Gavin, 2005). Speeding alone appeared to be a significant problem, irrespective of the type of vehicle driven. It is interesting

to note that, despite the lack of supporting evidence, two states in Australia passed laws restricting young drivers from operating certain types of “high performance” vehicles.

This driver lived in the area and was familiar with the roads, although his experience actually driving on them was limited. Hilly curves and woods are common in this rural area and most secondary roads are not posted with a speed limit. A statutory 55 mph limit is in effect, but only as an upper limit. Drivers are expected to observe conditions and slow down when it is unsafe to travel at higher speeds, such as when roads curve, when they are wet or icy, or when visibility is limited. At this site, the roads were dry and did not have any defects that would have affected the driver’s ability to control his vehicle. However, the steep curve and downgrade that the Mitsubishi traversed just prior to initially running off the road could be difficult to navigate when traveling at or near the 55 mph speed limit. A study conducted by VDOT on this 3.8 mile stretch of highway revealed that compliance with the speed limit was good and that most drivers adjusted their speeds according to the road conditions and the environment. Over a three year span prior to this crash, 14 accidents had occurred and only two were not caused by obvious human error. Half resulted from drivers exceeding safe speeds. Speed was a factor in this fatal crash as well. The driver had initially over-steered while in the curve, and evidence indicates that the car was traveling at an excessive rate when it entered the grassy shoulder on the right. The shoulders were sufficiently wide and did not have any drop-offs or other defects that would have affected his ability to manage the car. By overcorrecting instead of continuing on the shoulder until he had the vehicle back under control, he caused the car to begin rotating and it moved into the path of opposing traffic. As a result of their study, VDOT did not recommend changes to the speed limit on the road. The vast majority of drivers complied with those limits and operated their vehicles safely. However, some warning/advisory signs were recommended, including a “Curve—35 mph” advisory for the location close to the crash site. At the time this report went to press, the signs had already been installed.

In addition to taking risks with speed, many teens fail to wear safety restraints, increasing their risk of injury in the event of a crash. This driver, however, had a history of wearing his restraints. In his first crash, both he and his male friend had been wearing lap/shoulder belts when the Mitsubishi rolled over, and neither suffered reportable injuries. This experience, combined with legal requirements and educational influences, probably reinforced the value of wearing safety restraints. In addition, they may have given the young man a false sense of security while adding to the self-perception of invincibility that many young people hold. While

examining the Mitsubishi, the Team found that all four latch plates remained buckled and that all the belts, though cut, exhibited signs of significant loading. This was consistent with reports that all four occupants were restrained at the time of the fatal crash. The car was also equipped with front airbags for both driver and passenger. These safety devices did not deploy because the forces of the crash were from the side and rear, at an angle in which the airbags would have offered no protection. Although the car was not equipped with side airbags, the severity of the crash was so great that it is unlikely they would have prevented the fatal injuries to these teens. Safety restraints and airbag systems save lives and reduce injuries, but they are not a guarantee.



Photo 4: Belt for car's rear passenger. Note the effects of loading on the belt stitching.

The 44-year-old truck driver had 28 years of driving experience. His record showed no previous accidents or violations. He had lived in the area all his life and was familiar with both the roads and his vehicle, which displayed current registration and inspection stickers. The 1980 truck did not have any known defects. After picking up a load of firewood, the driver was headed back to his home. He had driven approximately eight miles when he reported seeing the

car approaching, saying that it looked like it “was making a big circle”. Upon realizing that the car was crossing into his lane, he attempted to pull over and stop, but it “plowed into” him. His description of the crash was supported by the physical evidence at the scene and by witnesses following his truck. Because he wore his lap/shoulder belt, the driver remained in place inside the truck’s cabin. His chest was bruised as he was thrown forward at impact and the steering wheel encroached into his seat area, pressing him against the seat back. He also cut his head. However, he was able to unbuckle his restraint, slip from the six inch gap between the steering wheel and the seat and crawl out the passenger side window of his truck. Despite the severity of the collision, his lap/shoulder belt prevented worse, potentially fatal, injuries that would have been likely had he been thrown about the interior of his truck or ejected. Instead of becoming an additional fatality in this tragic crash, he was treated and released from the hospital the next day.



Photo 5: Interior of truck. Steering column was pushed to within six inches of the seat back. The restrained driver survived.

RECOMMENDATIONS

1. **Parents, educators and adjudicators** must continue to emphasize to young drivers the importance of driving in a safe and responsible manner:
 - a) **Driver's education curricula** should include ways to develop skills for assessing the roadway environment and making driving adjustments accordingly, as well as providing a solid understanding of the laws related to provisional licenses, their restrictions and the reasons for those restrictions
 - b) **Parents** of young drivers must be knowledgeable about the laws that apply to driving generally and to teen drivers specifically and take an active role in ensuring that their children comply. While it may be difficult emotionally and inconvenient logistically, parents must be willing to revoke their teens' driving privileges if they act in unsafe or irresponsible ways
 - c) **Judges** should be aware that their decisions regarding conviction and sentencing have both short term and long term implications for the teen drivers that appear before them. A failure to convict (including placing a case under advisement) prevents the Virginia Department of Motor Vehicles from identifying offenders and applying administrative sanctions. While leniency in convictions and in sentencing after a first offense may encourage positive changes in some drivers, others will interpret the outcome as a sign that the laws are not necessarily enforced and that they do not have to take responsibility for their actions. If these individuals commit a later offense, they then face significant penalties for both offenses simultaneously.
2. **Young drivers** must comply with Virginia's motor vehicle codes, including those that specify restrictions of their operation of a motor vehicle and the number of passengers they are allowed to carry.
3. **Law enforcement officers** should continue to aggressively enforce those codes, especially the passenger and curfew restrictions for provisional licensed drivers, regardless if they are primary or secondary.

4. **Parents** of teens and children who are likely to be passengers of teen drivers must be made aware of the laws restricting the number of passengers young drivers may transport, as well as the reasons for those laws, so that they may make better informed decisions regarding their children's safe transportation.
5. Both proactive and reactive skills should be emphasized for all drivers, including the inexperienced. Identifying situations where the risk for loss of control is heightened and applying appropriate responses for adjusting driving to minimize those risks is essential to safe driving. Techniques for safely recovering control after running off the road should be stressed as corrective reactions to errors in driving. Overcorrecting by trying to "jerk" a vehicle back onto a roadway is almost an instinctive response, but it is very unsafe, often fails to restore control over the vehicle, and must be over-ridden with conscious effort and skill.
6. **The Virginia Department of Transportation** should continue to monitor the secondary highway system for high risk locations and to identify when signs, markings and/or other improvements may enhance transportation safety.
7. The importance of safety restraint use by all automobile occupants should continue to be emphasized.
8. **Transportation safety researchers** should continue to address the dangers associated with the mix of large and small vehicles in the driving environment, especially with regard to improving the structural integrity of vehicles and supplemental safety devices, such as side airbags, to reduce the severity of injuries.
9. **Transportation safety researchers** should consider investigating the differences between drivers who exhibit high risk behaviors and those who do not, especially among young drivers, in order to better understand the characteristics of those who choose to act responsibly. A great deal of research effort has been invested in providing explanations for risky and irresponsible driving behavior, but little attention or credit is given to those who do not succumb to social pressure or emotional appeal and who drive safely. As a contrast group, these individuals may provide clues to encouraging safer driver behavior overall.

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