VCU
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Virginia Commonwealth University
Transportation Safety Training Center
Crash Investigation Team

Report Number 194 – November 2005

ABSTRACT

The crash described in this report occurred when two drivers decided to race their Corvettes on a suburban four lane highway. The driver in the left lane lost control and his car slid across the right lane, off the road and collided with several trees. The driver in the right lane attempted to avoid the car crossing his path. He also lost control, and his car rotated and slid through an intersection, striking a minivan and a brick wall. The crash resulted in two fatalities, the occupants of the Corvette that struck the trees. Both vehicles were damaged extensively.

This crash report focuses on the dangers of illegal street racing and the approaches law enforcement agencies, legislators and the courts have taken to reduce such activities. The report highlights the value of Event Data Recorders ("black boxes") in crash reconstruction and, later, in legal proceedings. Seat belt use and driving while under the influence of alcohol are also discussed.

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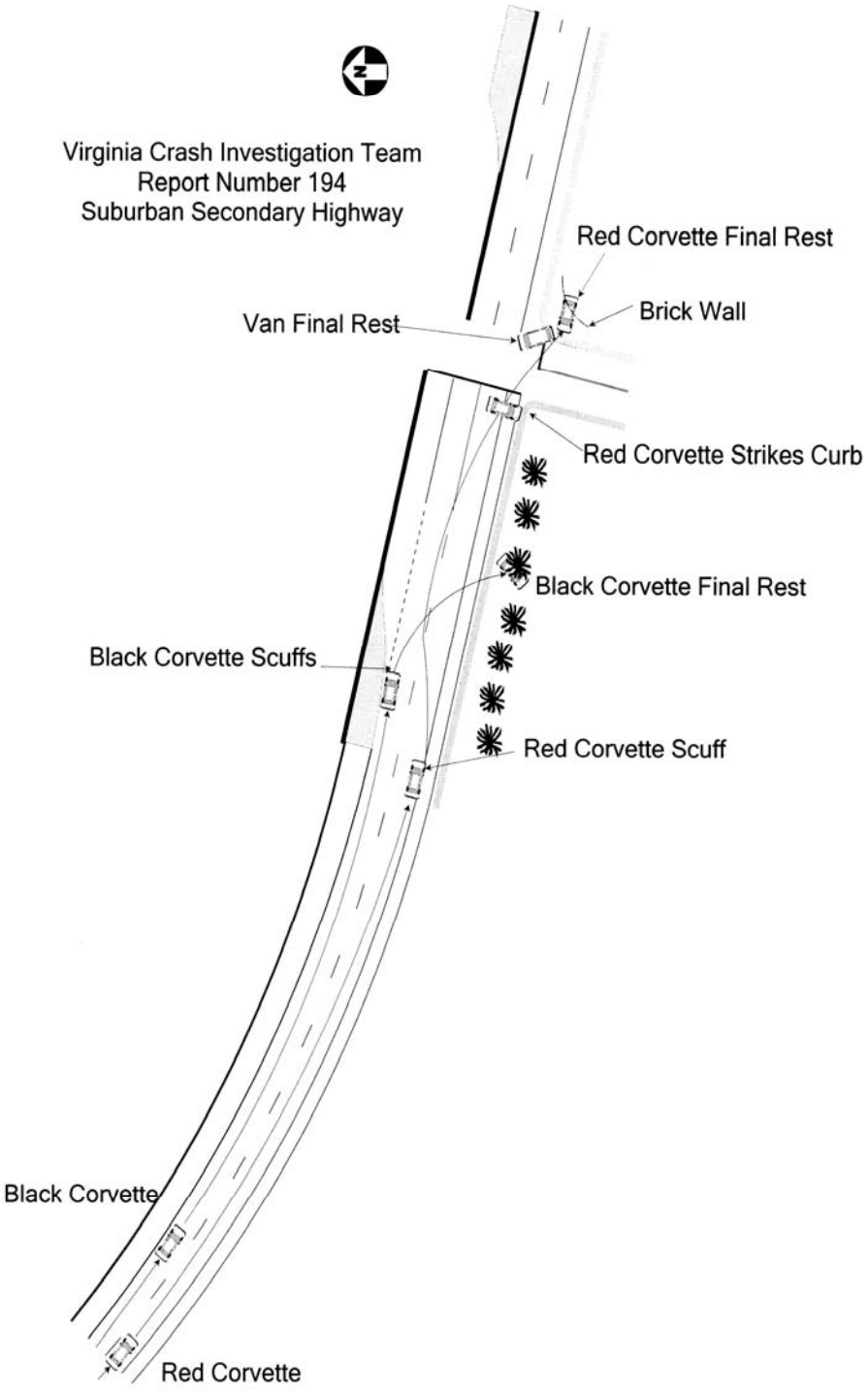
SYNOPSIS

Day, time, season:	Wednesday, 5:33 p.m., winter
Road, weather:	Dry, clear
Summary:	Two Corvettes traveled east on a suburban four lane divided secondary highway, engaged in a speed competition. The Corvette in the left lane began to lose control and subsequently slid across the right lane and shoulder. It slid off the pavement, over the curb and struck several trees with its left side. The Corvette traveling in the right lane attempted evasive action, lost control and began rotating. It slid out of its lane, struck a minivan that was stopped for a traffic light, and then struck a brick wall.
Severity:	Two fatalities (Corvette that struck trees), property damage.
Probable cause:	Reckless driving, racing at high speed and alcohol.
Significant points:	Speed too fast for roadway, illegal street racing, drinking and driving, Event Data Recorders (“black boxes”), legal consequences of driving violations, and seat belt use.


Virginia Crash Investigation Team
Report Number 194
Suburban Secondary Highway
Red Corvette Final Rest
Brick Wall
Van Final Rest
Red Corvette Strikes Curb
Black Corvette Final Rest
Black Corvette Scuffs
Red Corvette Scuff
Black Corvette
Red Corvette

CRASH DESCRIPTION

On a clear, dry, Wednesday afternoon in February at approximately 5:33 p. m., two Corvettes were traveling side by side, preparing to take part in an arranged speed competition. The suburban secondary roadway is a heavily traveled, four lane divided highway with narrow, curb-edged, center medians. The right shoulder is paved and also bordered by curbs, then a narrow grass strip adjacent to sidewalks. The far side of the sidewalk has a line of pine trees next to it. The asphalt paved roadway is comprised of sections of straight road, gentle curves and slight grades. There are numerous subdivisions located along both sides of the highway. The vehicles lined up approximately one and a half miles from a stop light controlled intersection, which is the entrance to a subdivision. The vehicles were moving at a slow rate of speed at the beginning of a straight stretch to allow the traffic in front of them to clear. This also caused traffic to accumulate behind them.

A black, two-door 2001 Chevrolet Corvette occupied the left lane. The twenty-nine year old, unbelted, male driver, the owner of the vehicle, was accompanied by a twenty-five year old male co-worker, sitting unbelted in the front passenger seat. In the right lane, a lone, twenty-seven year old, unbelted male was driving a red, 2003 two-door Chevrolet Corvette that was registered to his mother. This Corvette was a vehicle he normally operated.

The drivers had attended a work related conference earlier in the day that ended approximately one and a half hours prior to the crash. They were long time acquaintances and, after the conference, they met at a local restaurant and bar and began drinking. The conversation revolved around the two cars and a subsequent challenge was issued. The drivers left the establishment and headed to an area west of the crash site where they reversed direction and slowed, side by side in the road, and ran about 5 miles an hour, creating a rolling traffic blockade. The roadway was dry and free of defects. The edge of the pavement on the right had a small accumulation of snow, which had been pushed there from a storm several days prior. According to witnesses who were backed up in traffic behind them, both drivers waited until traffic cleared in front of them. There was some shouted conversation that the witnesses

couldn't make out and then, at a signal from the driver side of the red Corvette, the vehicles took off down the road. The Corvettes rounded a slight curve and downgrade in the road, moving out of sight for the blocked vehicles. When this traffic also rounded the curve, the drivers observed wreckage.

Photo #1 . View looking east, the direction in which the Corvettes were traveling. Both vehicles were traveling out of control on this curving section of road. Note the curbs on each side and the traffic signals identifying the intersection ahead.

The black Corvette was traveling in the left lane. After rounding a left curve, the driver over-steered and lost control. In an attempt to regain control, he over-corrected and began to rotate clockwise, crossing the path of the red Corvette. The black Corvette continued to slide broadside off the highway with the driver's side leading. It jumped the curb approximately 200 feet from where it lost control and struck a pine tree approximately 47 feet from the pavement at the driver's door, killing both occupants. The black Corvette was facing south at final rest.

The driver of the red Corvette attempted evasive action, first steering right, his right side tires barely entering the paved shoulder just across the fog line. The black Corvette crossed his path approximately 40 feet further down the road, so he then swerved left to avoid striking the vehicle as it continued to slide in front of him from

left to right. An inspection of the vehicles after the crash revealed that they never made physical contact. The abruptness of the left swerve caused the red Corvette to rotate counter-clockwise, cross the right lane and enter the left travel lane. The driver of the red Corvette counter-steered the vehicle, which then began rotating clockwise and sliding out of the left lane. It moved back through the right travel lane as it rotated toward 180 degrees. The vehicle slid into the intersection and the front wheels bumped the curb that bordered the southwest corner, accelerating its rotation. It continued to rotate as it slid backwards 115 feet.

A privately owned van, driven by an off-duty state trooper, was stopped south of the intersection for a red traffic light and the driver observed the red Corvette coming toward his vehicle. He accelerated forward from his stopped position to avoid being struck. He managed to move the passenger area of his vehicle out of the path but was struck on the rear corner of the left side by the right rear corner of the red Corvette. After impact with the van, the red Corvette continued to slide backwards over a curb. It then struck and mounted a decorative brick wall located south and east of the intersection. The red Corvette had traveled a total distance of 366 feet from where it first ran onto the shoulder until it came to final rest, facing northwest.

Photo #2. Red Corvette at final rest atop decorative brick wall.

The trooper exited his van as the driver of the red Corvette exited his car. The officer confronted the driver, accusing him of racing, and ordered him not to go anywhere. He then checked the other vehicle while summoning the local police department responsible for the road. While the officer attended to the black Corvette's injured occupants, the driver of the red Corvette attempted to walk away from the scene. A local attorney who had been traveling the other way witnessed the crash and chased the red Corvette driver on foot, following him into the subdivision and convincing him to return to the scene.

The first responding on-duty police officer arrived approximately six minutes after the crash. Rescue personnel arrived several minutes later. They declared the two occupants of the black Corvette dead at the scene and their bodies were transported to the medical examiner's office by a removal service. The investigating officer charged the surviving driver with driving under the influence. Since he was not injured, he was transported to the local police department where he submitted to a breath test. He later admitted to racing and was charged with racing and aggravated vehicular homicide. Both vehicles were towed and investigators spent several hours documenting physical evidence. They cleared the scene around midnight.

REMARKS

Illegal street race competitions have been glamorized in the past in movies like "Grease", and the tradition continues in recent years with the "Fast and Furious" films, as well as provocative ads for sport model automobiles. Taking their cue from these presentations, real life racers are typically young males in their teens and early twenties and they often exhibit impulsive, sensation-seeking personality traits. They do not think ahead to the potential consequences of high-risk actions. Out for a thrill, they are likely to spontaneously challenge their peers to a race. Although some may plan the event well in advance, they still choose to ignore the possibility of disastrous outcomes.

The drivers in this crash were in their mid to late twenties, slightly older than the typical age of illegal street racers. However, both worked in motor vehicle related jobs and both had prior convictions for driving vehicles which had improper or altered equipment. The driver of the red Corvette had been cited the previous year for an improper exhaust on his vehicle. He held a valid Virginia driver's license and his record showed one previous crash that had resulted in property damage. That incident had occurred 19 months before this fatal crash. The black Corvette driver had a valid license with three driving convictions, all incurred just over a year prior to the crash, for driving a vehicle with an altered suspension, tinted windows, and a television visible to the driver.

In addition to any interests and personality factors that may have played a role in their decision-making, the drivers in this crash also consumed alcohol, which impairs judgment and may lower inhibitions. The red Corvette driver had an alcohol content of .11% as measured by a breathalyzer test, above Virginia's .08% legal limit. The toxicology report for the driver of the black car revealed that his blood alcohol content was .05%.

Consistent with their other high-risk behaviors, none of the individuals involved in the race wore safety belts. The severity of the black Corvette's impact with the tree, however, made it unlikely that the driver would have survived if he had been belted. He died as a result of multiple blunt force trauma to his head and chest.

Photo #3. Damage to the driver's side of the black Corvette. Note the collapse from intrusion of the struck tree into the driver's compartment.

His passenger, who also had a blood alcohol level of .05%, died from blunt force trauma to his head. Since the collision with the tree occurred in the area of the driver's door, the passenger is not likely to have suffered the fatal head injuries if he had worn his safety belt. He would have stayed in his seat and the air bag, which deployed properly, would have absorbed some of the deceleration forces. However, because the impact of the crash was severe and at an angle, there is a strong probability that, even belted, he would have experienced internal injuries, such as a ruptured aorta, that also could have proven fatal.

Both drivers were familiar with the vehicles they operated. Both vehicles had current state inspection stickers and no known defects or alterations. Both cars also were equipped with the Corvette Active Handling System, a standard installation on models from 2001 to the present. The Active Handling System is designed to work with Anti-lock Brake (ABS) and traction control systems to increase stability and improve performance during sudden turns, like emergency evasive maneuvers. It monitors and analyzes steering angle, yaw rates and lateral acceleration, then uses this information to help the driver keep the vehicle under control.

Photo #4. Damage to right side of the black Corvette. The passenger compartment remained relatively intact even though the car's frame twisted due to the force of impact with the tree. Note the deflated airbags.

The system has three modes: "ON", "OFF" and "COMPETITVE DRIVING". The latter mode shuts off traction control, allowing for some wheelspin and oversteering, but it maintains the ABS and Active Handling components. A Corvette can transfer from "ON" to "COMPETITIVE DRIVING" mode by holding down a switch inside the vehicle for 5 seconds. This change can be made while the vehicle is in motion. No information was available to indicate whether either Corvette in this crash had the "COMPETITIVE DRIVING" mode engaged at the time of the race.

These late model Corvettes were both equipped with airbag systems, which include technology to monitor onboard systems data needed to make airbag deployment decisions. Event Data Recorders (EDRs) capture information on a number of variables for up to five seconds prior to the algorithm enable (wake-up) of the system. See the Virginia Crash Investigation Team's "Special Report 16—Event Data Recorders (EDR) Study" for an expanded review of this technology and its uses in crash investigations. The information from the Corvettes' EDRs was downloaded to determine if that data matched the findings from conventional reconstruction

techniques employed by crash investigators. The information available from these systems can be found on Tables 1 and 2.

The readings in Table 1 show that the red Corvette was traveling at a very high rate of speed prior to the crash. The speeds recorded were validated against speeds calculated from physical measurements of yaw marks found at the crash site and matched to this vehicle. The driver took his foot off the gas during the five seconds of recorded data, as revealed by the changes in percent throttle, but he didn't brake until the last second.

Table 1
Pre-crash information from the Red Corvette's airbag control module:

Seconds Before Algorithm Enbl.	Vehicle Speed (MPH)	Engine RPM	Percent Throttle	Brake Switch Circuit Status
-5	99	3840	100	OFF
-4	102	3456	0	OFF
-3	100	3392	0	OFF
-2	98	3328	44	OFF
-1	96	3136	0	ON

The readings in Table 2 reveal that the second car was also traveling at very high speeds, but that the driver took his foot off the gas (percent throttle dropped to 0) and began tapping his brakes when he lost control. Again, calculations from physical data at the scene and matched to this car confirmed the recorded speeds. The downloads for both cars also showed the drivers' seat belt status as "unbuckled".

Table 2
Pre-crash information from the Black Corvette's airbag control module:

Seconds Before Algorithm Enbl.	Vehicle Speed (MPH)	Engine RPM	Percent Throttle	Brake Switch Circuit Status
-5	103	4032	0	OFF
-4	98	3840	0	ON
-3	90	3584	0	ON
-2	77	3072	0	ON
-1	63	1920	0	OFF

The data in Table 2 show that the black Corvette was traveling 63 mph the second before it decelerated rapidly enough to trigger the algorithm enable which, in turn, led to the airbag deployment. To determine the car's speed when it impacted the tree, the Team compared results using several different approaches. Projecting the speed based on the average deceleration over the previous five seconds correlated highly with calculations based on crush damage as well as with results using a principle direction of force method. Based on these findings, the Team estimated that the black Corvette was moving between 46 and 48 mph at the time of impact.

The downloaded data confirmed that both vehicles were traveling at high speeds just prior to the crash. The prosecution introduced the report from the EDR in the defendant's Corvette as part of its case in chief and the judge accepted the evidence over the objection of the defense. The defense then introduced the EDR report from the fatal victims' Corvette, which was also accepted into evidence by the judge. Expert witnesses from both sides testified regarding opinions as to where the algorithm enable took place. This is the first time evidence from EDR's was introduced in a criminal proceeding in a court of record in the Commonwealth. Testimony based on the physical evidence found at the scene, as well as witness reports, supported the data and strengthened the prosecution's case.

Prior to 2004, racing motor vehicles on public roads or private roads open to the public could lead to convictions for reckless driving. Sentencing for this type of conviction includes a mandatory license suspension for 6 months to 2 years. In addition, a judge may impose up to $2500 in fines, up to a year in jail, or both a fine and jail time. Table 3 shows the number of these types of convictions recorded by the Department of Motor Vehicles in the Commonwealth for the past five years.

Table 3
RECKLESS DRIVING-RACING CONVICTIONS IN VIRGINIA

YEAR	# OF CONVICTIONS
2000	**176**
2001	**206**
2002	**285**
2003	**261**
2004	**174**

Since 1972, Virginia has also had a law that provides for additional penalties when the competitions are pre-arranged, organized and planned. When individuals are convicted of reckless driving-racing under these specific conditions, the vehicle used in the race will be confiscated by the Commonwealth. Due to the time typically elapsed between an arrest and a conviction for this type of crime, however, owners have time to dispose of the vehicle if they anticipate conviction. Consequently, such confiscations are rare.

Compared to states like California, Arizona and Florida, Virginia does not appear to have a pervasive problem with illegal drag racing on public streets. The Commonwealth does not record information about racing on its accident reporting forms (FR-300), so quantitative information about injuries and fatalities is not available. However, racing is an increasing concern in some urban areas, especially Northern Virginia, Roanoke and Tidewater. In Fairfax County, the police department discovered a rising number of complaints in 2001 and began studying the issue. They found that teenagers and young adults were organizing races, with spectators and betting involved, and with scouts positioned in nearby areas to alert participants when police were nearby. The department developed an undercover operation that netted numerous arrests with high conviction rates, both for racing and for aiding and abetting. The higher reckless driving-racing conviction numbers for 2002 and 2003 in the table above are, in part, a reflection of their success. In addition, they began presenting education campaigns and working with the high schools to discourage racing. They encouraged schools to rescind parking privileges to students involved in illegal street racing activities.

In response to concerns about illegal racing in the Commonwealth, the 2004 General Assembly passed two new laws. One bans driving vehicles with engines that use nitrous oxide on public roadways, although they can still be driven on race tracks. The second imposes stiffer penalties for killing or injuring someone while drag racing on public streets: any driver involved in a motor vehicle race who causes injury to someone not involved in the race can now be charged with a Class 6 felony. The standard punishment following a conviction for this class of felony is one to five years imprisonment, a fine up to $2500, or both. This new law also requires seizure and

forfeiture of the person's driver's license for one to three years. It was signed by the Governor and went into effect on July 1, 2004. In the second half of 2004, no felony convictions for reckless driving-racing were recorded by the Department of Motor Vehicles.

This crash occurred in February of 2004, and the new laws were passed shortly thereafter. However, since neither vehicle used nitrous oxide and since both the driver and passenger in the black Corvette were active participants in the race, the new laws would not have applied in this case. When preparing to present this case in court, the special prosecutor was compelled by statute to elect to pursue either the driving under the influence (DUI) charge or the reckless driving/racing charge and he opted to pursue the DUI. The driver of the red Corvette was ultimately convicted of driving under the influence and leaving the scene of an accident. He was sentenced to 12 months and six months, respectively, for each crime. He was also convicted on two counts of involuntary manslaughter under common law. This conviction is a result of the fact that, even though he did not directly cause injury to the occupants of the black Corvette, he participated in an illegal activity that led to their deaths. He was sentenced to 10 years in jail with 9 years suspended for each count. As this report went to publication, he was serving a minimum of 3 ½ years in jail while his case was being appealed.

RECOMMENDATIONS

1. Driver education programs and public education campaigns should continue to emphasize the importance of driving in a safe and responsible manner.

2. Public education campaigns should consider targeting individuals who witness challenges, boasts, or encouragement to engage in high risk driving, as well as those who are likely to participate in these activities. By modeling ways to defuse and discourage these activities, they can arm drivers to resist such challenges. Schools can reinforce the messages by denying parking passes to students involved in illegal racing activities.

3. The importance of avoiding alcohol or other substances that affect cognitive skills while driving should be continuously emphasized.

4. Law enforcement agencies should aggressively enforce Virginia's motor vehicle codes and the prosecuting attorneys should zealously pursue convictions for individuals who place themselves and others at risk when they choose to violate these laws.

5. Local and state law enforcement agencies should identify, when possible, areas in which illegal street racing is occurring within a community and take actions to stop the activities and/or channel races into legal venues.

6. The information obtained from Event Data Recorders should be used when available and pertinent to legal investigations and for highway safety research.