COLLISION ANALYSIS
AND
RECONSTRUCTION REPORT

Incident No.: 2010-195-SWR
Incident Date: July 18, 2010

Location: STH-35 / CTH-OT
Town of Onalaska
LaCrosse County, Wisconsin

Report Date: September 7, 2010

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SYNOPSIS

On July 18, 2010 at approximately 1:08 A.M., a motor vehicle collision occurred between a 2010 Ford Crown Victoria squad car and a 2001 Pontiac Grand Am. The crash occurred on STH-35 in LaCrosse County, WI. The driver of the Pontiac sustained fatal injuries as a result of the crash.

OBJECTIVE

An analysis of the collision was completed using the available physical evidence collected from the scene of the crash. The objective of the analysis was to establish the speed and positioning of the vehicles through the collision sequence. A review of any other highway, human, vehicle, or environmental factors that may have contributed to the collision was also performed.
CRASH SCENE

The collision occurred at the intersection of STH-35 and CTH-OT in the Township of Onalaska, LaCrosse County, Wisconsin (See Figure 1). STH-35 is a two-lane highway that traverses the collision area in the north/south direction. The roadway is divided by a yellow centerline which creates one lane of traffic for each direction of travel. As the highway approaches the intersection with CTH-OT from either direction, the individual traffic lane expands to three lanes. For each respective direction of travel, the outside lanes are designated to be used by traffic intending to turn right onto CTH-OT. Similarly, the inside lanes are intended for traffic turning left onto CTH-OT. Traffic traveling straight through the intersection is required to use the center lane which is approximately 15 feet wide. The individual turn lanes are approximately 11 feet wide and are separated from the center lane by solid white lane lines. White fog lines mark the outside edge of the right-turn lanes, while yellow paint lines establish the inside edges of the left-turn lanes. As the highway begins to travel away from the intersection, each direction of travel reverts back down to a single 15 foot wide traffic lane. In the immediate vicinity of the intersection, the northbound lanes are separated from the southbound lanes by a slightly raised concrete median. STH-35 is relatively straight and flat as it passes through the collision scene, and is regulated by a 55-mph speed limit in this area.

CTH-OT is a four-lane roadway as it approaches STH-35 from the east. The roadway is divided by a yellow centerline which creates two lanes of traffic for each direction of travel. The individual travel lanes are about 12 feet wide and are separated by dashed, white lane-lines. As

FIGURE 1

This aerial photograph obtained from Bing Maps provides an overview of the intersection between STH-35 and CTH-OT. The picture illustrates the general design and setting of the two intersecting roadways. The photo was not taken on the day of the crash and is not intended to depict the conditions at that time. North is towards the top of the photo.
westbound traffic approaches the intersection, the outside lane becomes a turn only lane for motorists intending to proceed north on STH-35. Traffic intending to continue straight or turn south must use the inside lane. The westbound traffic lanes have a slight upward grade (Approximately 1%) as they approach the intersection. CTH-OT is a two-lane roadway as it extends away from the intersection to the west. CTH-OT intersects STH-35 at nearly a 90 degree angle, and is regulated with a 25-mph speed limit. The intersection is controlled by traffic lights that were operational at the time of the crash.

SCENE DOCUMENTATION

A Geodimeter Total Station was used to map the collision scene. A total station is an electronic instrument composed of three primary components. The unit contains a theodolite (angle measuring system), an EDM (electronic distance measuring system), and a data collector (electronic memory). The two measuring systems allow the user to collect accurate three-dimensional data on points of interest. The measurements are stored in the unit’s data collector, along with descriptive tags, until they can be downloaded into a computer system for further analysis. A prism (reflector), usually mounted to a pole, is used to mark evidentiary points so that their placement can be measured by the instrument.

The available physical evidence was mapped on July 18, 2010 at approximately 2:30 A.M. by Troopers Kris Anderson and Arden Asp. The total station was used to document the placement of such things as tire marks, a fluid trail, and vehicle final resting positions. In addition, the applicable portions of the intersecting roadways were also mapped. The instrument was also used to survey the damage profiles of the Ford Crown Victoria and the Pontiac Grand Am. The measurements were stored in the data collector and were later downloaded for the creation of a scaled scene drawing, which was used to complete the collision analysis.
VEHICLE EXAMINATIONS

The collision vehicles were examined and photographed in order to document collision damage. The damage profiles were mapped with the total station. This information was used along with scene evidence to complete the collision analysis.

• **2010 Ford Crown Victoria:**

The Ford Crown Victoria was a four door sedan powered by a 4.6 Liter, 8-cylinder engine. The power was provided at the rear wheels through an automatic transmission. The vehicle was equipped with disc brakes at all four wheels and had an anti-lock brake system. The vehicle had a frontal airbag system and the driver's side airbag was deployed. This particular Ford Crown Victoria was being used as a police vehicle by the La Crosse County Sheriff’s Department and was outfitted with emergency lighting and a siren.

The primary contact damage was located at the right front corner of the squad car. In this area the bumper exhibited inward and rearward displacement. The hood was also pushed back and severely creased (See Figure 2). The right front fender was displaced rearward and exhibited induced crumpling damage. The front passenger door was dented and creased. There was also some light abrading damage in the area where the passenger door meets the front fender. The right front wheel was displaced rearward and was no longer free to roll. The rim exhibited severe damage. The frame of the vehicle appeared to sag in the middle when viewed from the right side of the car (See Figure 3). There was some relatively light induced creasing located in both rear quarter panels near the base of the C-pillars and around the rear wheel wells. The left rear rim was bent. The left front wheel exhibited severe contact damage and was no longer free to roll.
• **2001 Pontiac Grand Am:**

The Pontiac Grand Am was a 2 door coupe equipped with a 3.4 Liter, 6-cylinder engine which powered the front wheels through an automatic transmission. The vehicle had an anti-lock brake system that featured disc brakes at the front and drum brakes at the rear. The vehicle was outfitted with frontal airbags and both were deployed.

The front of the Pontiac sustained extensive damage. The primary contact appeared to be at the front left fender of the vehicle. In this area, the fender and the front left portion of the core support exhibited inward displacement toward the longitudinal centerline of the vehicle. The front left rim exhibited contact damage. The vehicle's hood, head lamp assemblies, and frontal body trim was missing. The front left side of the bumper was detached and pulled outward from the frame (See Figure 4).

The driver's door was bowed out from the original bodyline of the vehicle. Although the door was still attached at the hinge and Nader pin, there was a significant gap between the top of the door frame and the roof line of the vehicle (See Figure 5). The bowing damage was likely a result of occupant loading against the door during the collision pulse. The opening allowed the unbelted driver to be ejected during its post-impact movement.

The Grand Am showed evidence of a secondary impact at the right rear corner. The right tail lamp assembly was missing from the vehicle, and there was light blue color transfer in the vacant cavity. The same color transfer was located on the right corner of the rear bumper cover. The trunk lid had been sprung and was missing from the vehicle (See Figure 6).
COLLISION SEQUENCE

A 2010 Ford Crown Victoria squad car, operated by Deputy Trisha Stratman, was traveling northbound on STH-35 approaching the intersection with CTH-OT. Deputy Stratman was responding to a report of a bar fight at Smokey's Bar and Grill and was operating with her emergency lights and siren activated. Meanwhile, a 2001 Pontiac Grand Am, operated by Brandon Jennings, was approaching the same intersection from the east using CTH-OT (See Figure 7).

The Pontiac proceeded to enter into the intersection in front of the approaching squad car. Based on witness statements and the available physical evidence, the Pontiac was attempting to continue westbound through the intersection. Before the Grand Am could clear the intersection, it was impacted in the front left fender by the front of the approaching Ford. The impact occurred in the center of the intersection where the northbound lane of STH-35 intersected the westbound lane of CTH-OT (See Figure 8). The approximate point of impact was evident by the start of curved tire scrubs left by the Grand Am as it began to depart the collision.
Following the impact, the Pontiac Grand Am spun clockwise as it was forced primarily towards the north. The Grand Am completed nearly three quick rotations before coming to rest approximately 124 feet north of the impact area. The Pontiac remained on the paved road surface during its post impact movement and ended up facing towards the southwest near the outside pavement edge of northbound STH-35. The vehicle’s path of travel was evident by curved tire marks left on the roadway as it moved to final rest (See Figure 9). Mr. Jennings was ejected from the vehicle during its post-impact movement. He came to rest on the outside shoulder of northbound STH-35, approximately 70 feet to the north of his vehicle, after striking a road sign.

The Ford Crown Victoria also acquired a slight clockwise rotation as it departed the collision primarily in a northern direction. After reaching the north side of the intersection, the left front wheel of the squad car impacted a traffic light pole mounted in the concrete median strip. The pole broke away and the squad continued to depart slightly towards the northwest (See Figure 10). The Ford proceeded to cross the concrete median and entered into the southbound lanes of STH-35 approximately 140 feet north of the intersection. The vehicle eventually angled across the southbound lanes and came to rest just onto the outside shoulder of southbound STH-35. The Ford Crown Victoria traveled approximately 461 feet from impact before coming to rest on the shoulder facing towards the northwest (See Figure 11). The vehicle's post-impact movement was evident by scrape marks, tire marks, and a fluid trail.
The following individuals gave statements to investigators from the Wisconsin State Patrol regarding the collision being investigated. This section is only intended to summarize their observations regarding the incident.

- **David Weis** – Mr. Weis noted that he lives at the corner of Rider's Club Road and STH-35. He stated that he observed the squad car go by with its lights and siren activated just prior to the crash while watching television in his living room. He indicated that this squad was going through the area faster than any he had seen in 35 years. He noted that a second squad came through at a slower speed a short time later.

- **Gary A. Spors** – Mr. Spors stated that the squad car passed him on STH-35 just past CTH-Z. He estimated that the squad was going at least 120-mph. He felt it was "crazy" for the squad car to be going that fast in the rain.

- **James Mayer** – Mr. Mayer stated that he was at home when he heard the crash occur. He did not recall hearing a siren or observing any emergency lights from a squad car. He noted that he went to the scene and took some video footage of the squad after hearing the crash.

- **Trisha Stratman** – Deputy Stratman was the operator of the squad car involved in the collision. She stated that she was operating in emergency mode and remembered braking as she traveled into the intersection of STH-35 and CTH-OT. She indicated that she did not remember much else.

- **Ashley F. Rochester** – Ms. Rochester stated that she was approaching CTH-OT from the north when she observed the northbound squad car approaching from the opposite direction with its emergency lights activated. She indicated that she could not hear a siren, but noted that her windows were rolled up with the car radio and air conditioning on. Ms. Rochester indicated that the traffic light was green for her and the squad car. She stated that she witnessed the crash and had to come to a stop as the squad car entered into the southbound lanes and crossed in front of her vehicle.

- **Angela S. Berkley** – Ms. Berkley stated she was traveling westbound on CTH-OT. She indicated that she observed the squad car to the south, but thought that she had time to cross in front of it. After clearing the intersection, she looked in her mirrors and saw sparks flying from the crash. She noted that she never heard a siren.

- **Benjamin J. Weigel** – Mr. Weigel stated that the squad car had passed him at a very high rate of speed. He indicated that he observed the squad car continue up to the intersection of CTH-OT after passing him. He noted that the squad's lights then disappeared. After reaching the intersection, he observed crash debris. He did not observe the collision.
SPEED ANALYSIS

Mathematical Analysis:

The Principle of the Conservation of Momentum approach was used to solve for the impact speeds of the Ford Crown Victoria and the Pontiac Grand Am. The method is dependant upon the approach angles, departure angles, weights, and post impact speeds of the involved vehicles. The approach and departure angles are determined from the damage profiles of the vehicles and the physical evidence left at the scene of the crash. The physical evidence often consists of such things as tire marks, scrape marks, gouges, and fluid trails. A vehicle’s post impact speed is dependant upon the distance the vehicle traveled from impact to final rest, and the drag factor assigned to the vehicle for the particular surface(s) that it traveled over. The drag factors used take into consideration such things as surface type, surface slope, vehicle slip angles, and vehicle tires that are locked due to damage.

Using the Conservation of Momentum approach, the impact speed of the Ford Crown Victoria was estimated to be approximately 86 to 90-mph. The Pontiac Grand Am was estimated to be traveling approximately 15 to 22-mph at impact. The calculated impact speed of the Grand Am was found to be somewhat sensitive to the departure angle of the Crown Victoria. There was no initial tire mark evidence available to determine a relatively precise departure angle for the squad car. However, the vehicle did strike a traffic light pole and eventually began to leave markings which did assist in narrowing its possible range of departure. There was no physical evidence of pre-impact braking found on the roadway for either vehicle. The speed ranges are based upon a sensitivity analysis of the input variables.

Event Data Recorders:

- **2001 Pontiac Grand Am:**

  A vehicle’s safety restraint system is generally monitored and controlled by a dedicated electronic module. This unit is generally referred to as the (A)irbag (C)ontrol (M)odule. This electronic instrument “senses” a crash and makes the “decision” as to whether or not the airbags should be deployed. The module, which utilizes an internal accelerometer to analyze and interpret sudden speed changes, may also record data surrounding a collision event. For most General Motors vehicles manufactured in 2000 or later, this may include pre-crash data such as vehicle speed, engine speed, percent throttle, and brake switch circuit status.

  Since the 2001 Pontiac Grand Am's airbags were deployed during the collision event, a deployment file would be expected to have been written and locked into the ACM's memory. Trooper Mike Marquardt downloaded the ACM from the Grand Am on July 19, 2010 using the Bosch Crash Data Retrieval System. He recovered a deployment file from the module which did contain pre-crash information. The data indicated that the vehicle had accelerated from 18-mph up to 20-mph during the seconds immediately preceding the deployment event (See Figure 12). This data is consistent with the momentum analysis that was performed.
FIGURE 12

Figure 12 shows the vehicle speed data recovered from the 2001 Pontiac Grand Am's Airbag Control Module. The first column reports the time period prior to "Algorithm Enable" that the particular row of data refers to. Algorithm Enable is the point in time when the module's sensing algorithm "awakens." The algorithm then begins to evaluate the acceleration the module is experiencing in order to determine if the vehicle's airbags should be deployed. Due to the manner in which the data is captured by the module, the highlighted time designation could actually be anywhere from approximately .001 seconds to 1.2 seconds prior to Algorithm Enable. The other time stamps would then go back in time at approximately 1 second intervals.

• 2010 Ford Crown Victoria

A vehicle's Power-train Control Module monitors various input sources and sends signals to various components within the vehicle's power-train in order to achieve optimum engine performance. While monitoring the power-train, the PCM continuously obtains information from such locations as the vehicle's speed sensor, throttle position sensor, brake switch sensor, engine speed sensor, and antilock brake sensor. The PCM in the 2010 Ford Crown Victoria contains an event data recorder that continuously stores this data in a circular memory buffer. This means that the data at the beginning of the buffer begins to be overwritten once the allocated memory is full. A PCM will typically store approximately 25 seconds of data.

Trooper Mike Marquardt downloaded the PCM from the Ford Crown Victoria on July 19, 2010 using the Bosch Crash Data Retrieval System. He recovered a PCM data file which appeared to contain pre-crash data leading up to the collision event. The PCM file showed the vehicle braking from a speed of 106-mph approximately 1.6 seconds prior to the collision event. The last speed recorded by the PCM was 90.6-mph (See Figure 13). This data also appears to be consistent with the mathematical speed estimate. For more information on the data collected from the collision vehicles, refer to Trooper William Ryan's Event Data Recorder Analysis which is appended to this report.

<table>
<thead>
<tr>
<th>Seconds Before AE</th>
<th>Vehicle Speed (MPH)</th>
<th>Engine Speed (RPM)</th>
<th>Percent Throttle</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5</td>
<td>19</td>
<td>896</td>
<td>0</td>
</tr>
<tr>
<td>-4</td>
<td>18</td>
<td>896</td>
<td>0</td>
</tr>
<tr>
<td>-3</td>
<td>18</td>
<td>1344</td>
<td>11</td>
</tr>
<tr>
<td>-2</td>
<td>19</td>
<td>1536</td>
<td>11</td>
</tr>
<tr>
<td>-1</td>
<td>20</td>
<td>2048</td>
<td>36</td>
</tr>
</tbody>
</table>

FIGURE 13

Figure 13 charts the final seconds of data recorded by the Ford Crown Victoria's Power-train Control Module leading up to the collision event.
**Digital Video Recorder:**

The Ford Crown Victoria was outfitted with a Mobile-Vision video camera system. In addition to capturing and recording video in digital format, the video camera system also records squad position using a GPS receiver. The system can then compute and display the squad's speed based on the time it takes the vehicle to change position. The video and speed data recorded by the system ended shortly before the squad car entered into the intersection and impacted the Pontiac Grand Am. The remaining digital data leading up to impact was likely missing due to a power loss caused by the collision. In other words, the system likely did not have enough time to record the data to permanent memory prior to the power loss. The system did indicate that the squad was traveling approximately 104-mph just prior to entering the intersection. This speed recording does appear to be consistent with the data recovered from the Ford's Power-train Control Module (See Figure 14).

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**FIGURE 14**

Figure 14 illustrates an approximate time/distance relationship between the Ford and the Pontiac based on information retrieved from the event data recorders of the collision vehicles. The Ford was approximately 190 feet from the intersection about 1.4 seconds prior to impact. The squad was traveling about 104 to 105-mph at this time. Meanwhile, the Pontiac was just starting to cross the white stop line and was approximately 39 feet from impact. The Pontiac was traveling at a rate of approximately 19 to 20-mph. This spatial relationship appears to be relatively consistent with the final video footage and speed data recovered from the squad's onboard digital video recorder.
ENVIRONMENTAL FACTORS

Weather:

Historical weather data recorded at the nearby LaCrosse Municipal Airport indicates the sky was partly cloudy around the time of the crash. The temperature was approximately 69 °F without any significant winds blowing (See Figure 15). There was light rain reported during the approximately 2 hour time period leading up to the crash. The atmospheric conditions were clear and should not have caused any visibility problems. Visibility was reported at the maximum value of 10 miles.

![Figure 15](https://www.weatherunderground.com)

**FIGURE 15** 
Figure 15 charts the weather conditions in the Onalaska area during the hours surrounding the crash. The data was recorded at the LaCrosse Municipal Airport and was obtained from [www.weatherunderground.com](http://www.weatherunderground.com). The highlighted line is the data entry that is closest to the approximate time of the crash.

Sun/Moon Position

According to records kept by the United States Naval Observatory, neither the sun or moon were visible in the sky around the time of the crash. The drivers were operating during night time hours, but street lamps did provide some ambient lighting.

Roadway

The roadway was composed of concrete and appeared to be in relatively good condition. The road surface contained no significant abnormalities in the general area of the collision. The paved surface was wet due to light precipitation preceding the crash. The paint lines did exhibit some fading in the area of the collision, but were visible.
HUMAN FACTORS

• Deputy Stratman

Based on digital video footage recovered from the Ford's onboard camera, the squad car had just passed the intersection of Westview Drive when the traffic lights at the intersection of CTH-OT turned yellow for motorists on STH-35. This occurred around 11 seconds prior to impact. The Mobile-Vision video camera system and the Ford's Power-train Control Module indicate the vehicle was traveling at a speed of around 115-mph at this time. Around 4.5 seconds later, the traffic lights turned red. The video footage shows that the squad had just passed Cloverdale Road and was approaching Penney Lane when the light change occurred. PCM data and Mobile-Vision data indicate the squad was traveling approximately 114 to 115-mph at this time (See Figure 16). Although the PCM data indicates that Deputy Stratman released the accelerator pedal around this time and allowed the vehicle to begin to gradually slow, she was still traveling around 107-mph as she approached to within a few hundred feet of the intersection while facing a red traffic light. Although she was traveling in emergency mode, her decision not to significantly reduce her speed severely limited the time and distance available to react to a potential hazard. Moreover, there would seem to be a greater chance that an unsuspecting motorist would enter into the intersection when the traffic lights are green for their direction of travel.

The records for Deputy Stratman's personal and departmental cell phone showed no usage around the time of the crash. Mobil Data Terminal records were also checked and showed no usage around the time of the collision. There was no evidence to suggest that Deputy Stratman was inattentive to the roadway in the moments preceding the collision.

FIGURE 16

Figure 16 illustrates the approximate locations of the Ford Crown Victoria when the traffic lights changed color for northbound traffic at the intersection of CTH-OT. When the traffic lights turned yellow, the squad was approximately 2,050 feet from the intersection. The Ford was about 1,300 feet from the intersection when the lights turned red.
Brandon Jennings

In the video footage captured by the squad car's onboard video camera, a westbound vehicle could be seen accelerating across the intersection shortly after the police car passed Penney Lane. The vehicle was initially stopped at the intersection. The start of this vehicle's acceleration is consistent with the traffic light change that occurred just prior to the squad car reaching Penney Lane. The driver of this vehicle, Angela Berkley, gave a statement to authorities that is consistent with the video recording.

The Pontiac Grand Am could first be seen approaching the intersection from the east at approximately the same time that Ms. Berkley began to accelerate across the intersection. As the Grand Am first appeared in the video, it appeared that its brake lamps were illuminated. This is consistent with data recovered from the vehicle's airbag control module. The brake lamps go out a short time later and the vehicle proceeds toward the intersection. It would seem likely that the Mr. Jennings was initially braking for a red light at the intersection, but then released the brakes when the lights turned green.

Mr. Jennings should have had an unobstructed view of the Ford Crown Victoria as it approached the intersection of CTH-OT from Penney Lane. The fact that the lights had just turned green and the vehicle ahead of him had just accelerated through the intersection, may have given him a false indication that it was safe to proceed into the intersection. Mr. Jennings cell phone records were checked and showed no signs of usage around the time of the crash. An analysis of the driver's blood showed no presence of alcohol or drugs in the driver's system.

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INVESTIGATION SUMMARY

The following statements are based on information and evidence reviewed by the author as of this writing. They are believed to be true and accurate and are based on a reasonable degree of scientific probability.

- The weather conditions were relatively good around the time of the crash. The temperature was approximately 69 °F and there was little to no precipitation. The atmospheric conditions were clear and should not have caused any visibility problems.

- The roadway was composed of concrete and appeared to be in relatively good condition. The surface was wet due to light precipitation during the hours preceding the crash.

- The collision occurred within the intersection of STH-35 and CTH-OT. The available physical evidence places the approximate area of impact where the northbound lane of STH-35 intersects the westbound lane of CTH-OT.

- Vehicle damage indicates that the front right corner of the Ford Crown Victoria struck the left front fender of the Pontiac Grand Am.

- The Ford Crown Victoria was estimated to be traveling approximately 86 to 90-mph at impact. Data recovered from the vehicle's Power-train Control Module is consistent with the high end of this range.

- The impact speed of the Pontiac Grand Am was estimated to be approximately 15 to 22-mph. Data recovered from the vehicle's Airbag Control Module is consistent with the high end of this range.

- There was no physical evidence on the roadway of any pre-impact braking for either of the collision vehicles. However, data recovered from the Ford's Power-train Control Module indicates the driver of the Ford did achieve some braking just prior to impact.

- The operator of the Ford Crown Victoria was approaching the intersection at a high rate of speed while facing a red traffic light. Although the squad car was being operated in emergency mode, the driver's speed significantly reduced the time and distance available to respond to the path intrusion.
➢ The driver of the Pontiac Grand Am had a clear site line to the approaching squad car for a few seconds prior to entering into the intersection. It is unknown why he did not see the approaching emergency vehicle.

➢ The cell phone records of both drivers where checked for usage around the time of the crash. There was no evidence of usage for either driver.

➢ There was no evidence of alcohol or drug impairment for either driver.

Respectfully Submitted,

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INFORMATION REVIEWED FOR REPORT PREPARATION

• **Printed Material(s) and Police Reports**

*In completing the offered objective, several police reports and published references were consulted. These items of information that were reviewed include the following:*

1. Wisconsin State Patrol Reports
   a. Wisconsin Motor Vehicle Accident Report (MV4000e) completed by Trooper Jamie La Brec.
   b. Narrative Report by Trooper Kris Anderson ~ 07/20/10 (5) pages.
   c. Narrative Report by Trooper Mike Marquardt ~ 07/23/10 (2) pages.
   e. Vericom VC4000 Skid Test Files Produced by Trooper Mike Marquardt

2. Witness / Driver Statements
   a. Driver Statement of Trisha J. Stratman ~ 07/18/10
   b. Voluntary Statement of David A. Weis ~ 07/21/10
   c. Voluntary Statement of Gary A. Spors ~ 07/18/10
   d. Voluntary Statement of James Mayer ~ 07/21/10
   e. Voluntary Statement of Ashley F. Rochester ~ 07/18/10
   f. Voluntary Statement of Ashley F. Rochester ~ 07/21/10
   g. Voluntary Statement of Angela S. Berkley ~ 07/18/10
   h. Voluntary Statement of Angela S. Berkley ~ 07/21/10
   i. Voluntary Statement of Benjamin J. Weigel ~ 07/18/10
3. Vehicle Data
   a. Vehicle specification data for the 2010 Ford Crown Victoria and the 2001 Pontiac Grand Am from the Expert Autostats (Ver. 5.0.1) computer program

4. Other References
   a. Bosch Crash Data Retrieval File Downloaded from the 2010 Ford Crown Victoria's Powertrain Control Module ~ (11) pages.
   b. Bosch Crash Data Retrieval File Downloaded from the 2001 Pontiac Grand Am's Airbag Control Module ~ (5) pages.
   d. La Crosse Sheriff's Department Dispatch Transmission Recordings from 1:08 a.m to 6:34 a.m. ~ 07/18/2010.
   e. La Crosse Sheriff's Department MDC Traffic Recordings from 1:00 a.m. to 1:08 a.m. ~ 07/18/10.

• **Computer Software/Data**

  *The following computer software programs or professional websites were utilized or consulted in preparing this report:*

1. Computer Programs
   a. Crash Zone Ver. 8.5.4 – Professional Drawing Software
   b. Microsoft Office Word – Word Processing Software
   c. REC-TEC Platinum Professional Version 20100901 – Crash Reconstruction Software
   d. Bosch Crash Data Retrieval System Version 3.4 - Crash Data Retrieval Software
   e. Vericom Profile 5 – Software for Analyzing Acceleration Data
   f. Geodimeter Software Tools Version 2.0 - Total Station Data Download Software
2. Professional Websites

a. Historical Weather Data, [www.weatherunderground.com](http://www.weatherunderground.com)


c. Aerial Photograph of the collision area, [http://www.bing.com/maps](http://www.bing.com/maps)


e. Aerial Photograph of the collision area, [http://bing.com/maps](http://bing.com/maps)

- **Geodimeter Total Station Surveys**

  The following forensic mapping data was used to complete the reconstruction analysis:

1. Scene Surveys

   a. Forensic Mapping of the Collision Scene by Trooper Asp and Trooper Anderson, Wisconsin State Patrol (07-18-10)

2. Vehicle Damage Measurements


   b. Vehicle Damage Measurements of the 2001 Pontiac Grand Am by Trooper Marquardt and Trooper Anderson, Wisconsin State Patrol (07-22-10)

- **Photographs**

  The following digital photographs were reviewed while completing the analysis:

1. 87 Scene Photographs by Troopers Asp and Anderson, Wisconsin State Patrol (07-18-10)

2. 7 Vehicle Photographs by Trooper Asp, Wisconsin State Patrol (07-19-10)

3. 13 Scene Photographs by Sgt. Wierzbicki, La Crosse County Sheriff's Department (07-18-10)

4. 62 Scene Photographs by Officer McCluskey, Onalaska Police Department (07-18-10)
APPENDIX

The following items will be appended to this report:

1. Trooper Mike Marquardt's Narrative Report
2. Trooper Kris Anderson's Narrative Report
3. Trooper William Ryan's Narrative Report
4. Bosch CDR File Recovered from the 2010 Ford Crown Victoria
5. Bosch CDR File Recovered from the 2001 Pontiac Grand Am
6. Post-Collision Scaled Drawing