TRANSPORTATION SCIENCES
CRASH DATA RESEARCH CENTER

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ON-SITE CHILD SAFETY SEAT CRASH INVESTIGATION

VEHICLE: 2002 CHEVROLET VENTURE

CASE NO: CA03-022

LOCATION: MICHIGAN

CRASH DATE: FEBRUARY, 2003

Contract No. DTNH22-01-C-17002

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

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16. Abstract

This on-site investigation focused on the crash severity and the performance of a Century Bravo convertible Child Safety Seat (CSS), and an occupied integrated CSS in a 2002 Chevrolet Venture. In addition, this investigation also focused on the performance of the side impact air bag system in the Venture. The Chevrolet was involved in an angular left side impact with a 1999 Ford E350 van that was towing a loaded enclosed trailer. The impact resulted in severe left side damage to the Venture with extensive intrusion into the second and third row seating areas. The 34 year old male driver of the Chevrolet sustained injuries to his left flank consisting of multiple rib fractures, left scapula fracture, liver laceration, contusions and facial lacerations and was hospitalized in the intensive care unit of a local hospital for ten days. A 7 month infant restrained by the convertible child safety seat (in a rear-facing mode in the third row of the Chevrolet) sustained a fatal closed head injury and was removed from life-support the day following the crash. A 33 month old female child seated in an integrated child safety seat in the Chevrolet's second row was treated for minor facial lacerations and hospitalized overnight for observation. The Chevrolet's 34 year old female front right passenger was treated and released with minor contusions. The 57 year old male driver and 65 year old male front passenger in the Ford van were not injured and declined medical treatment.

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BACKGROUND

This on-site investigation focused on the crash severity and the performance of a Century Bravo convertible Child Safety Seat (CSS), and an occupied integrated CSS in a 2002 Chevrolet Venture, **Figure 1**. In addition, this investigation also focused on the performance of the side impact air bag system in the Venture. The Chevrolet was involved in an angular left side impact with a 1999 Ford E350 van that was towing a loaded enclosed trailer. The impact resulted in severe left side damage to the Venture with extensive intrusion into the second and third row seating areas. The 34 year old male driver of the Chevrolet sustained injuries to his left flank

Figure 1: Left front view of the Chevrolet Venture.

consisting of multiple rib fractures, left scapula fracture, liver laceration, contusions and facial lacerations and was hospitalized in the intensive care unit of a local hospital for ten days. A 7 month infant restrained by the convertible child safety seat (in a rear-facing mode in the third row of the Chevrolet) sustained a fatal closed head injury and was removed from life-support the day following the crash. A 33 month old female child seated in an integrated child safety seat in the Chevrolet's second row was treated for minor facial lacerations and hospitalized overnight for observation. The Chevrolet's 34 year old female front right passenger was treated and released with minor contusions. The 57 year old male driver and 65 year old male front passenger in the Ford van were not injured and declined medical treatment.

The front right passenger in the Chevrolet notified the National Highway Traffic Safety Administration of the February, 2003 crash by submitting the Special Crash Investigations Notification Form to the Crash Investigation Division on March 25, 2003. NHTSA subsequently assigned an on-site investigation to the Special Crash Investigation team at General Dynamics on March 28, 2003 due to the agency's interest in side impact air bag performance and child passenger safety. The driver was contacted and cooperation was established to facilitate an in-person interview, vehicle inspection, and an inspection of the child safety seat. The Chevrolet Venture was towed due to disabling damage and was available for inspection at an insurance salvage yard. The Chevrolet Venture was equipped with an Event Data Recorder that was downloaded by the Michigan State police. A Non-Deployment data file related to the subject crash was recovered   The Ford E350 van and the trailer were removed from the area prior to SCI involvement and were not inspected by the SCI team.

SUMMARY
Crash Site
The crash occurred on a divided east/west interstate highway in February, 2003 during daylight hours. The weather conditions at the time of the crash were changing. It was cold and it had begun to lightly snow. The asphalt road surface was wet. The highway was comprised of two 3.6 m (12.0 ft) travel lanes in the respective directions. The outboard aspect of the travel lanes were bordered by a 3.4 m (11.0 ft) breakdown and a W-beam guardrail. The inboard road shoulder measured 1.4 m (4.5 ft). The opposing travel lanes were separated by an 18.8 m (62.0 ft) wide depressed grass median. The maximum depth of the median was approximately 2 m (6 ft). There was an accumulation of approximately 0.3 m (1.0 ft) of snow in the median at the time of the crash. There was a positive grade (estimated less than 2 percent) in the eastbound direction. A concrete bridge/overpass was located approximately 107 m (350 ft) east of the crash site and influenced the westbound traffic due to the cold and snowy conditions. The bridge measured 91 m (300 ft) in length. The speed limit in the area of the crash was 113 km/h (70 mph). **Figures 2 and 3** are east and westbound trajectory views of the interstate, respectively.

Figure 2: Eastward view along the highway.

Figure 3: Westward trajectory view of the Ford into the center median.

Crash Sequence
  Pre-Crash
The 2002 Chevrolet Venture was eastbound on the inboard lane approaching the bridge at a driver estimated speed of 80 km/h (50 mph). The Chevrolet was occupied by a 34 year old male driver, a 34 year old female front right passenger, a 33 month old female seated in the second row integrated child safety seat and a 7 month old female infant restrained in a rear-facing convertible child safety seat in the center position of the third row. The four occupants of the Venture were restrained by the appropriate manual restraint systems. The 1999 Ford E350 van was westbound towing an enclosed trailer that contained an automobile. As the Ford van crossed the bridge, the driver lost control of the vehicle and it yawed counterclockwise into the center median. The van traversed the depressed grass median and entered the eastbound lanes of the highway in a path that intersected the Venture's trajectory. Tire marks were identified during the SCI scene inspection and evidenced the Ford's trajectory.

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The adult occupants in the Venture detected the van and trailer lose control and enter the median. The driver of the Venture recalled that he thought, given his speed and position, the Ford van and trailer were going to pass behind him. The pre-crash data recorded by the Venture's Event Data Recorder indicated the Chevrolet was traveling 85 km/h (53 mph) five seconds before Algorithm Enable (AE) and decelerated by braking to 51 km/h (32 mph) one second prior to AE. The driver applied the Ventures' brakes three seconds prior to AE.

Crash

A schematic of the crash sequence is attached to the end of this report, **Figure 21**, Page 18. The crash occurred with the front left corner of the van impacting the left side of the Venture at its B-pillar. The directions of force were in the 10 and 1 o'clock sectors for the Chevrolet and Ford, respectively. The side impact air bag in the Chevrolet Venture deployed due to the force of the impact. The force of the impact rearward of the Chevrolet's center of gravity caused the Venture to rotate counterclockwise (CCW) and displaced the vehicle laterally. The Venture rotated approximately 200 degrees CCW and struck the W-beam guardrail bordering the south roadway edge with its front left corner. This guardrail impact was located 15 m (50 ft) east of the initial point of impact and was evidenced by a deflection in the guardrail. The Chevrolet then slid approximately 85 m (280 ft) eastward along the highway to rest, while rotating an additional 360 degrees. The Venture came to rest facing west in the outboard lane of the highway.

After separation with the Chevrolet, the front plane of the Ford struck and deformed the south guardrail, and came to rest blocking the eastbound travel lanes. **Figure 4** is a view looking west along the eastbound traffic lanes depicting the road conditions and the final rest position of the van and trailer. As a baseline analysis the WINSMASH model was used as a crash severity indicator. The total delta V's of the Chevrolet and Ford calculated by the Missing Vehicle Algorithm of the WINSMASH collision model were 52.0 km/h (32.3 mph) and 22.0 km/h (13.7 mph), respectively.

Figure 4: View looking west at the final rest position of the Ford and trailer in the eastbound lanes.

An eastbound 2002 Oldsmobile Intrigue was traveling behind the subject vehicle in the traffic flow. The Oldsmobile was unable to stop to avoid the subject collision and struck the right rear aspect of the enclosed trailer in a secondary collision. The frontal air bags of the Oldsmobile deployed. The 55 year old male restrained driver and 54 year old restrained female front right passenger were not injured. The Oldsmobile was equipped with an EDR that was downloaded by the Michigan State Police. The captured data indicated the Oldsmobile was braking for at least 5 seconds prior to Algorithm Enable (AE). The Oldsmobile had reduced its speed from 68 km/h (42 mph) five seconds prior to AE (T-5) to 34 km/h (21 mph) one second prior to AE. The Oldsmobile's EDR data file is attached to the end of this report. The Oldsmobile was not available for inspection during this on-site SCI investigation.

Post-Crash

A passer-by witnessed the crash and stopped to render aid. He called 911 and provided the crash notification. The police and ambulance crews responded to the scene and began emergency services. The driver of the Venture sustained multiple skeletal and soft tissues injuries. He was removed from the vehicle through the right front door and transported to a level 1 trauma center located within 32 km (20 miles) of the crash site. He was hospitalized in the intensive care unit for a period of 10 days. The 33 month old female restrained in the Venture's OEM integrated child safety seat remained within the confines of her seat and sustained only minor facial lacerations. She was removed from the vehicle through the sliding right door. The child was transported to a local hospital for treatment and held overnight for observation. The 7 month old infant was removed from the vehicle in the child safety seat and placed in another vehicle for warmth until emergency personnel arrived. The infant was not breathing upon initial assessment, and was transported to the nearest available hospital [located approximately 16 km (10 miles) away]. Due to the severity of her injuries she was transferred to the regional trauma center. The infant sustained a closed head injury related to the intrusion and was removed from life-support the day following the crash after it was determined that recovery was not possible. The Venture's front right passenger had exited the vehicle under her own power. She was examined and released from the hospital with minor chest contusions. The occupants in the Ford van declined medical attention.

2002 CHEVROLET VENTURE

The 2002 Chevrolet Venture was identified by the Vehicle Identification Number (VIN): 1GNDX03E12D (production sequence deleted). The four-door minivan was configured with the 304.8 cm (120.0 in) extended wheelbase and had a seven passenger seating configuration of 2/2/3. The vehicle was powered by a 3.4 liter, V6 engine linked to a four-speed automatic transmission. The service brakes were front disc/rear drum with four-wheel ABS. The manual restraint system consisted of 3-point manual lap and shoulder belts for the six outboard positions and a third row center lap belt. The front restraints were equipped with buckle pretensioners. The Venture was equipped with a Supplemental Restraint System (SRS) that consisted of dual-stage frontal air bags and seat mounted side impact air bags for the front occupants. The odometer had recorded 7,898 km (4,908 miles). The driver reported that the vehicle was purchased new on July 1, 2002, and it did not have a prior crash history. The Venture was equipped with Firestone FR680 P215/10R15 tires on OEM steel rims. The manufacturer's

recommended tire pressure was 240 kpa (35 psi). The specific measured tire data at inspection was as follows:

Tire	Measured Pressure	Tread Depth	Restricted	Damage
LF	0 kpa	7.9 mm (10/32)	No	Punctured
LR	212.9 kpa (31.0 psi)	8.7 mm (11/32)	No	None
RF	206.0 kpa (30.0 psi)	8.7 mm (11/32)	No	None
RR	0 kpa	9.5 mm (12/32)	No	Punctured

1991 FORD E350 VAN AND TRAILER

The 1999 Ford E350 XLT super-duty van was identified by the Vehicle Identification Number (VIN):1FBSS31SXH (production sequence deleted). The vehicle was equipped with a 6.8 liter, V-10 engine linked to a four-speed automatic transmission. The service brakes were front disc and rear drum ABS. The trailer was identified as Model No: G824AS2-102 manufactured by Haulmark Inc., with the VIN: 1GHGB2421WU (production sequence deleted).

Figures 5 and 6 are photographs of the Ford van and the enclosed trailer taken by the police investigator. The vehicle was relocated prior to the SCI team's involvement and was not available for inspection. The photographs were used to assess the collision damage to the Ford. At the time of the crash, a Ford Mustang was being transported in the trailer. The estimated weight of the van, trailer, and contents was approximately 4536 kg (10,000 lbs).

Figure 5: Front view of the Ford.

Figure 6: Left front view of the trailer.

Analysis of the photographs indicated the front plane of the Ford sustained approximately 114 cm (45 in) of direct contact damage as a result of its impact to the Chevrolet and subsequent contact to the guardrail. The direct damage began approximately 30 cm (12 in) left of center and extended to the left corner. The estimated maximum crush was 15 cm (6 in) at the front left

corner. There was a minor right-to-left end-shift caused by the lateral momentum of the Chevrolet during engagement. The left front tire separated from the suspension during the impact.

The Ford was occupied by a 57 year old male driver and a 65 year old male front right passenger. Both occupants were police reported as unrestrained. The right aspect of the windshield was fractured due to probable contact from the unrestrained passenger. The Ford's frontal air bags were reported as not deployed. Both occupants were police reported with non-incapacitating injuries. They denied medical treatment and were not transported.

2002 CHEVROLET VENTURE
Exterior Damage

The Chevrolet Venture sustained severe left side damage as a result of the impact with the Ford van. **Figures 7 – 9** are the left front, left rear and rear longitudinal views of the Venture. The combined width of the direct and induced damage measured 340 cm (134 in). The induced damage began on the forward aspect of the left front door, 46 cm (18 in) rearward of the left front axle. The left side direct damage began 152 cm (60 in) aft of the left front axle at the location of the left B-pillar and extended through the D-pillar to the left rear corner. The width of the direct contact damage measured 234 cm (92 in). The principle direction of force was in the 10 o'clock sector. The direct contact deformed the left B-, C-, and D-pillars laterally and deformed the roof downward. The left sliding door separated from the vehicle at its hinges. The principle exterior damage was above the level of the sill and did not result in a measurable change in the left wheelbase dimension. The residual crush profile measured at the mid door height was as follows: C1 = 78.2 cm (30.8 in), C2 = 55.4 cm (21.8 in), C3 = 53.8 cm (21.2 in), C4 = 21.1 cm (20.1 in), C5 = 8.1 cm (3.2 in), C6 = 0. The delta V calculated by the Missing Vehicle Algorithm of the WINSMASH model was 52.0 km/h (32.3 mph). The longitudinal and lateral components of the delta V were -33.4 (-20.8 mph) and 39.8 km/h (24.7 mph), respectively. The Collision Deformation Classification (CDC) of the damage was 10-LZAW-5.

Figure 7: Left front view of the Chevrolet Venture.

Figure 8: Left rear view of the Venture.

Figure 9: Rear left longitudinal view of the Venture.

The Chevrolet Venture also sustained left side impact damage at the front corner related to the W-beam guardrail contact. The impact with the Ford caused the Venture to separate from the initial impact with a counterclockwise rotation and a lateral displacement. As the vehicle reached approximately 200 degrees of rotation, the forward aspect of its left side impacted the guardrail. During its continued rotation, the front left corner rotated through and deformed the guardrail. The length of the Venture's front left corner damage measured 86 cm (34 in) along left side and wrapped 15 cm (6 in) onto the front plane. The depth of the crease in the left front fender measured 6.3 cm (2.5 in) at the front corner. The bumper fascia was pulled forward and separated on the left. The CDC of this impact was 08-LFEW-2.

2002 CHEVROLET VENTURE
Interior Damage
The Chevrolet Venture sustained severe interior damage and intrusion into all three seating rows. The depth of the intrusion increased from front-to-back (with respect to the vehicle). The lateral deformation of the pillars pulled the left aspect of the roof downward. The residual left pillar and roof intrusions are listed in the table below:

Location	Lateral Pillar Intrusion	Vertical Intrusion of the Left Roof Rail
B – Pillar	38.9 cm (15.3 in)	16.5 cm (6.5 in)
C – Pillar	20.8 cm (20.0 in)	27.9 cm (11.0 in)
D –Pillar	61.2 cm (24.1 in)	12.2 cm (4.8 in)
Third Row	Lateral Side Wall 41 cm (16 in)	

The elevation of the maximum B- and D-Pillar intrusion measured 79 cm (31 in) above the floor. The maximum C-Pillar intrusion was located 86 cm (34 in) above the Venture's floor.

The front seating row consisted of manual bucket seats with adjustable head restraints. The driver seat, **Figure 10**, was adjusted to a full rear track position and was jammed in place by deformation. The head restraint was in its lowest position. The trim panel covering the left B-pillar was displaced from the deformed pillar at the belt line and was in contact with the driver seat back. The seat back was deformed to the right in partial contact with the right seat and had rotated counterclockwise. The seat back was laterally compressed approximately 8 cm (3 in). The interior panel of the left door immediately below the arm rest exhibited a 13 cm x 8 cm (5 in

Figure 10: Driver seat deformation and left B-pillar intrusion.

x 3 in) contact by the left flank of the driver. The front right seat was adjusted to a rear track position and measured 2.5 cm (1.0 in) forward of the full rear track position. The seat back was nearly upright and measured 5 degrees aft of vertical. The head restraint was in the lowest position.

The second seating row consisted of a 60/40 split bench seat with folding seat backs. The seats were on an adjustable track and were independent of each other. The width of the left seat measured 46 cm (18 in). This seat was located in the area of direct contact and was impacted by the intruding left sliding door and C-pillar, **Figure 11**. The forward left anchor attaching the seat frame to the floor deformed and released by overload. The floor pan and mount exhibited corresponding damage. The seat deformed rearward and laterally to the right. The rearward displacement of the seat cushion and the lateral displacement of the seat back measured 23 cm (9 in) and 28 cm (11 in), respectively.

Figure 11 View of the second row seat deformation and intrusion.

The second row right seat was not damaged in the impact, **Figure 12**. The seat was adjusted to a full rear track position. The adjustable head restraint was in the full down position. The seat back was reclined 22 degrees. The width of the seat cushion measured 61 cm (24 in). The OEM integrated Child Safety Seat (CSS) with a 5-point harness was located within this seat back. The seat was labeled for use by a child that weighed 10 to 18 kg (22 to 40 lb) and a height of 85.1 cm to 101.6 cm (33.5 in to 40.0 in). A 30 cm x 41 cm (12 in x 16 in) section of the seat back folded down and became the integrated CSS seat cushion. This cushion measured 4.6 cm (1.8 in) in thickness.

Figure 12: View of the integrated Child Safety Seat.

Initial observation of the 5-point harness revealed the right shoulder strap was cut during the removal of the child and the right crotch latch clip was missing. Examination of the straps and the hardware revealed evidence of historical use. The crotch straps exhibited slight creasing/roping at the latch clips that appeared to be more related to routine use than crash loading. There was no crash related evidence on the shoulder straps or harness retainer clip. The location of the clip measured 26.9 cm (10.6 in) below the entrance to the slot in the seat back. The driver reported that the child was restrained at the time of the crash and the retainer clip was located at the level of the child's arm pit. A blood stained yellow blanket located on the cushion was entangled in the harness straps. Reportedly, this blanket was used during the first aid efforts for the child and was originally located in a diaper bag on the floor at the time of the crash. SCI inspection of the integrated CSS determined the 33 month old child was restrained at the time of the crash.

The third row seat was comprised of a 50/50 split rear bench with folding backs. The seats were independent of each other. The row was designed for three occupant seating. The outboard positions utilized a manual 3-point lap and shoulder belt. The center position was lap belt equipped. The 7 month old infant was restrained in a Century Bravo Convertible Child Safety Seat lap belted to the center position in a rear-facing mode. The lap belt was cut during the removal of the CSS, leaving a 36 cm (14 in) section of webbing attached to the anchor. The latch plate was not found.

The left side wall and C-pillar were severely intruded into this region, **Figures 13 and 14**. The width of the right seat cushion measured 61 cm (24 in). This measurement was taken from the centerline of the seat to the right side wall. At the forward edge of the left seat cushion, the distance from the centerline to the residual location of the intruded C-pillar measured 20 cm (8 in). At the seat bight, the left lateral distance from the center to the residual position of the left side wall at the seat bight measured 30 cm (12 in). The left wall was in contact with the left seat back. This contact had displaced it to the right and had compressed the right seat back laterally approximately 10 cm (4 in).

Figure 13: Right view into the third row.

Figure 14: Forward view of the third row intrusion.

Front Manual Restraint System

The manual restraint system in the Chevrolet Venture consisted of 3-point manual lap and shoulder belts with continuous loop webbing and a sliding latch plate in the six outboard positions. The front restraints had adjustable D-rings and buckle pretensioners. The pretensioners did not fire in the side impact crash. The webbing of the driver's restraint was extended from the retractor and captured by the deformation. The retractor was locked. The D-ring was adjusted to the highest position. The latch plate was still latched into the buckle. Examination of the latch plate revealed evidence of historical use and there was evidence of loading to the hardware. The driver was restrained at the time of the crash. This determination was confirmed through interview data. The downloaded EDR data indicated the driver restraint was buckled as well.

The front right restraint was stowed within the switchable retractor and the retractor remained operational. The D-ring was adjusted 1.9 cm (0.75 in) above the lowest position. The total D-ring adjustment measured 7.6 cm (3.0 in). The latch plate revealed evidence of historical use. Examination of the hardware was unremarkable for crash related evidence. With the webbing extended and latched into the buckle, blood spatters were noted on the webbing in the area of the latch plate. The presence of the blood spatters in this location indicated the webbing had to have been extended at the time of the crash. Inspection of the restraint indicated the front right passenger was restrained during the event.

Supplemental Restraint System

The Chevrolet Venture was equipped with a Supplemental Restraint System that consisted of dual-stage frontal air bags and seat-mounted side impact air bags for the driver and front right passenger. A Sensing and Diagnostic control Module (SDM) located under the front right seat monitored and controlled the deployment of the system. A satellite sensor in the lower B-pillars provided input to the SDM regarding lateral crash severity. The SDM had EDR capability to record frontal (only) deployment and non-deployment events. The SDM was removed and downloaded by the investigating Michigan State Police officer during the course of his investigation. The EDR data file is attached to the end of this narrative report.

The frontal driver air bag was located in the center hub of the steering wheel rim and the front passenger air bag was a top-mount design located in the right aspect of the instrumental panel. The frontal air bags were not commanded to deploy in the side impact crash.

The left side impact air bag was housed in a module designed in the outboard aspect of the driver's seat back. The side impact air bag (SAB) module was oriented vertically and the cover flap measured 21.1 cm x 8.4 cm (8.3 in x 3.3 in), height by depth, respectively.

Figure 15 is a left view of the SAB. Note the position of the deployed air bag is aft and outside the left B-pillar. During the impact sequence, the B-pillar intrusion, and deformation/rotation of the driver's seat back caused the side impact air bag to deploy behind the pillar. The deployment of this SAB offered the driver no protection during this crash.

By referencing the right SAB, it was noted that the module was in-line with the B-pillar with the seat in the full rear position. The lateral dimension from the cover flap to the undeformed B-pillar measured 10 cm (4 in).

Figure 15: View of the deployed left SAB.

Close-inspection of the cover flap revealed a 13 cm (5 in) contact between the flap and the B-pillar trim panel, **Figure 16**. A corresponding vinyl transfer was identified on the trim panel (now in contact with the seat back). The outboard lower section of the side bag exhibited a heavy (8 in x 8 in) vinyl transfer caused by the impeded expansion of the bag. The inboard side of the bag exhibited a 23 cm x 10 cm (9 in x 4 in) transfer.

The overall dimensions of the SAB measured 67.3 cm x 34.3 cm (26.5 in x 13.5 in), height by width. The bag was designed to offer both head and thorax protection. The air bag was tethered by two internal straps. The tether located in the upper aspect of the bag measured 6.4 cm (2.5 in) in width. The center aspect tether measured 10 cm (4 in). The inflated depth of the air bag was an estimated 8 cm (3 in).

Figure 16: Close-up view of the impeded SAB.

CHILD SAFETY SEAT DATA
Century Bravo SE Convertible

The 7 month old infant was restrained in a Century Bravo SE Convertible Child Safety Seat, **Figure 17**, that was identified by the Model No: 44622NYK and was manufactured on 10/09/2000. The convertible child restraint was installed in a rear-facing orientation in the third row of the Venture. Reportedly, the seat was purchased new for the family's first child in the later part of 2000. The driver reported that he had read the CSS manual.

The CSS was fastened in a rear-facing position to the center of the vehicle's third seat by the lap belt. The lap belt was equipped with a locking latch plate. The seat was adjusted into the reclined position and the adjustable foot was extended. The driver reported that he had used one rolled towel under the foot at the seat bight to ensure CSS was reclined at the proper angle. He indicated that the level indicator was within the "green limits". He further stated that he took care to ensure an adequate installation by compressing the vehicle seat and cinching the lap belt tight. The rear-facing belt path was used. He indicated that the tether strap was attached to the base frame of the second row of seats. The tether strap on the back of the CSS was cut during its

Figure 17: Front view of the Century CSS.

removal. The use of the tether strap was not observed during the SCI vehicle inspection. It should be noted that the manufacturer's instruction manual for the CSS do not instruct the user to install a tether strap in a rear-facing installation.

The 5-point harness straps were in good condition upon inspection. The straps were routed through the middle slots and the driver stated that in this position the straps were at the infant's shoulder height. Minor roping of the straps was observed at the latch clips in the hip portion of each strap. No crash related evidence was identified. The harness retainer clip was intact and operational. The driver indicated that the retainer clip was at the level of the infant's arm pits when buckled.

Examination of the shell identified two areas of crash related evidence. A contact to the upper right aspect of the shell from the intruding left side and C-pillar was identified, **Figure 18**. This contact resulted in a fracture to the plastic reinforcement on the back side of the shell. Corresponding stress marks were identified on the interior side of the seat back, **Figure 19**. The shell deformation was located in the region where the rear right aspect of the infant's head was probably located.

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Figure 18: View of damage to the back of the CSS shell.

Figure 19: View of plastic stresses to the shell.

Inspection of the CSS also identified damage to the adjustable foot, **Figure 20**. The left side of the foot had collapsed due to overload. This occurred when the upper right rear aspect of the shell was impacted causing the CSS to rotate forward onto the foot.

Figure 20: View of the damage to the adjustable foot.

OCCUPANT DEMOGRAPHICS

	Driver	*Front Right Passenger*
Age/Sex	34 year old/Male	34 year old/Female
Height:	191 cm (75 in)	165 cm (65 in)
Weight:	93 kg (205 lb)	50 kg (110 lb)
Manual Restraint Use:	3-point lap and shoulder	3-point lap and shoulder
Seat Track Position:	Full rear track	Rear track
Usage Source	SCI inspection, interview	SCI inspection, interview
Medical Treatment	Hospitalized for ten days in ICU	Treated and released

	Second Row Passenger	*Third Row Passenger*
Age/Sex	33 month old/Female	7 month old/Female
Height:	89 cm (35 in)	72 cm (28 in)
Weight:	15 kg (33 lb)	11 kg (25 lb)
Manual Restraint Use:	OEM integrated CSS with 5-point harness	Convertible CSS installed rear-facing in center position
Usage Source	SCI inspection, interview	SCI inspection, interview
Medical Treatment	Treated and hospitalized for observation over nigh	Fatally injured

DRIVER INJURY

Injury	*Injury Severity (AIS 98 Update)*	*Injury Mechanism*
Multiple left rib fractures, 1-7 and 9-12 with hemothorax	Severe (450232.4,2)	Intruding left front door
Bilateral lung contusions	Severe (441410.4,3)	Intruding left front door
Left scapular fracture	Moderate (753000.2,2)	Intruding left B-pillar
Left clavicle comminuted fracture	Moderate (752200.2,2)	Intruding left B-pillar
Left thoracic transverse process fracture	Moderate (650420.2,7)	Intruding left B-pillar
5 cm posterior superior Grade III liver laceration	Minor (541822.2,1)	Manual restraint
1 cm left cheek laceration	Minor (290602.1,2)	Flying glass
Right patella contusion	Minor (890402.1,1)	Knee bolster

Note: the above injuries were identified in the driver's Hospital Discharge Summary and Radiology records.

DRIVER KINEMATICS
Immediately prior to the crash, the 34 year old male driver was restrained and seated with an upright posture in a full rear track position. The driver reported that he was aware of the out-of-control westbound vehicle, however, it was his impression that given his speed and position that the vehicle was going to pass behind him. The driver reported that he maintained his speed during the pre-crash sequence. It should be noted that the pre-crash EDR data indicated the driver decelerated by braking during the three second period prior to Algorithm Enable.

At impact, the van struck the Venture at the left B-pillar. The front left window glazing disintegrated causing the driver's facial lacerations. The B-pillar deformed and contacted the outboard aspect of the driver's seat back early in the crash sequence. As the B-pillar continued its lateral deformation, the driver's seat back was displaced laterally and the seat back rotated counterclockwise (with respect to the vehicle). During the contact between the B-pillar and the seat, the left side impact air bag was commanded to deploy. The contact between the pillar and the side air bag module at the time of deployment was evidenced by contact evidence on B-pillar trim panel and side air bag module cover flap and by impeded deployment transfers on the fabric of the side air bag. As the air bag began to escape the module, the deformation of the seat positioned the side air bag module rearward of the B-pillar. In this manner, the side air bag inflated behind and outside of the B-pillar. The deployed side air bag module offered the driver no protection in this crash.

The intruding front door panel contacted the left flank of the driver resulting in his left rib fractures and bilateral lung contusions. The intruding B-pillar contacted his left shoulder resulting in his left scapular, clavicle fracture and thoracic transverse process fracture. The intruding door displaced the driver's torso laterally to the right. The webbing of the locked safety belt compressed into the soft tissue of the abdomen and caused the liver laceration during this movement. The driver came to rest within the confines of the deformed driver seat and was removed from the vehicle through the front right door by the emergency responders.

FRONT RIGHT PASSENGER INJURY

Injury	*Injury Severity (AIS 98 Update)*	*Injury Mechanism*
Chest contusion, NFS	Minor (490402.1,4)	3-point lap and shoulder belt

Note: The above injury was identified in the occupant's Emergency Room records.

FRONT RIGHT PASSENGER KINEMATICS
The 34 year old female front right passenger was seated in an upright posture with the seat adjusted to a rear track position. The passenger was restrained by the vehicle's 3-point lap and shoulder belt system. At impact, the passenger exhibited a leftward and forward trajectory in response to the 10 o'clock direction of the impact force. The passenger contacted and loaded the locked restraint system and rode down the force of the crash. Her loading of the restraint resulted in the identified chest contusion. She rebounded back into her seat and was able to exit the vehicle under her own power.

SECOND ROW CHILD PASSENGER INJURY

Injury	Injury Severity (AIS 98 Update)	Injury Mechanism
Multiple minor abrasions and lacerations of the left cheek	Minor (290202.1,2) (290402.1,2)	Flying glass
Two lacerations above the left eye, 1.5 cm and 2.5 cm in length	Minor (290600.1,7)	Flying glass

Note: the above injuries were identified in the occupant's Emergency Room records. She was held overnight in the hospital for observation.

SECOND ROW CHILD PASSENGER KINEMATICS

The 33 month old female was seated in the left position of the second row in the OEM integrated child safety seat. She was restrained by the 5-point harness of the CSS. She was reportedly awake and seated with an upright posture. Upon impact, the child exhibited a left and forward trajectory and loaded the 5-point restraint. She rode down the force of the crash without contacting any interior component of the vehicle with significant force to produce an injury. The left side of her face was lacerated by the disintegrated left side glass of the deformed vehicle. She remained within the confines of the OEM CSS.

THIRD ROW INFANT PASSENGER

Injury	Injury Severity (AIS 98 Update)	Injury Mechanism
Intracranial hemorrhage, Diffuse Subarachnoid hemorrhage into the parenchyma at the base of the brain, brain stem and cerebellum. Intra-ventricular hemorrhage	Serious (140684.3,1) (140684.3,2) (140466.3,6) Severe (140678.4,9)	Intruding left C-pillar/interior panel
Small basilar skull fracture, petrous portion of the right temporal bone	Serious (150200.3,8)	Intruding left C-pillar/interior panel
Rib fractures, right posterior lateral 1st and 2nd with right hemothorax	Serious (450222.3,1)	Intruding left C-pillar/interior panel
Pulmonary contusions, bilaterally	Severe (441410.4,3)	Intruding left C-pillar/interior panel
Liver laceration 4 cm long through the posterior, superior aspect	Moderate (541822.2,1)	Child safety seat shell

Note: the above injuries were identified in the infant's Autopsy Record and Emergency Room records.

THIRD ROW INFANT PASSENGER KINEMATICS

The 7 month old female infant was restrained within a Century convertible child safety seat in a rear-facing orientation in the center position of the Chevrolet's third row. The child safety seat was restrained by the vehicle's lap belt that was routed through the rear-facing belt path and by a tether strap attached at the base of the second row seat frame. The infant was reportedly sleeping at the time of the crash. Upon impact the infant exhibited a left and forward trajectory and loaded the shell of the child seat with her back. Coincident with this kinematic pattern, the left side of the Venture was intruding laterally due its engagement with the Ford.

The intruded left side of the vehicle impacted the right posterior aspect of the child seat causing a 4 cm posterior liver laceration. This direct contact also resulted in the child's fatal closed head injuries, basilar skull fracture, rib fractures and lung contusions. The force of the impact to the right back of the child seat caused the seat to rotate rearward (with respect to the Chevrolet) about the adjustable foot. The left side of the foot failed due to an overload. During this dynamic motion the infant was accelerated rearward (with respect to the Chevrolet). The infant contacted and loaded the harness straps of the child restraint and then rebounded back into the CSS.

The infant was removed from the Chevrolet in the child safety seat and placed in another vehicle due to the inclement weather. The emergency responders found her in pulseless arrest with a Glasgow Coma score of 3. She was transported to the nearest available hospital for evaluation and stabilization. Reportedly, her heart beat was restarted at that facility. She was then transferred to a regional trauma center. Further evaluation at the trauma center determined that recovery from her injuries was not possible and she was removed from life support 17 hours 10 minutes post-crash.

Crash Schematic
CA03-022

Michigan
February 2003

0 10 20 40

Concrete
Bridge/
Overpass
300 ft long

Chevrolet
Final Rest

Guardrail

Depressed Grass
Median

Asphalt Road

Asphalt Road

Guardrail

Guardrail

Event 3

Event 1

Ford final rest

Event 2

Event 4
Oldsmobile/tralier
impact
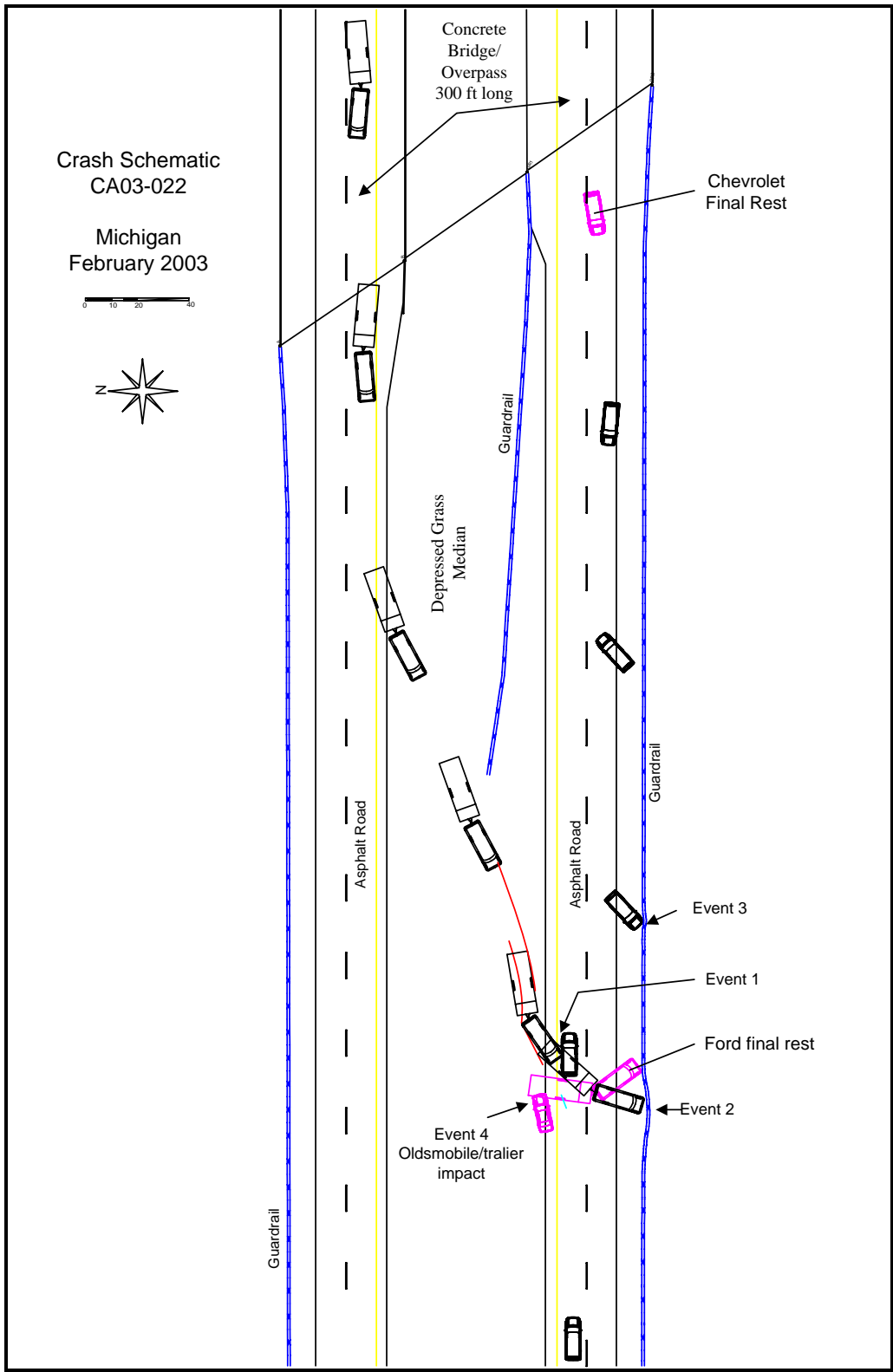
Figure 21: Crash Schematic

ATTACHMENT A

2002 Chevrolet Venture EDR Data

CDR File Information

Vehicle Identification Number	1GNDX03E12Dxxxxxx
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	CA03-021_022 NO SEQ.CDR
Saved on	4/11/2003 1:33:46 PM
Data check information	12766452
Collected with CDR version	Crash Data Retrieval Tool 2.00
Collecting program verification number	A31D1C76
Reported with CDR version	Crash Data Retrieval Tool 2.24
Reporting program verification number	70CD83DD
Interface used to collected data	Block number: 00 Interface version: 35 Date: 01-02-03 Checksum: 6200
Event(s) recovered	Non-Deployment

SDM Data Limitations

SDM Recorded Crash Events:
There are two types of SDM recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event is an event severe enough to "wake up" the sensing algorithm but not severe enough to deploy the air bag(s). It contains Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded forward velocity change. This event will be cleared by the SDM after the ignition has been cycled 250 times.
The second type of SDM recorded crash event is the Deployment Event. It also contains Pre-Crash and Crash data. The SDM can store up to two different Deployment Events, if they occur within five seconds of one another. Deployment events can not be overwritten or cleared from the SDM. Once the SDM has deployed the air bag, the SDM must be replaced.
The data in the non-deployment file will be locked after a deployment, if the non-deployment occurred within 5 seconds before the deployment or a deployment level event occurs within 5 seconds after the deployment.

SDM Data Limitations:
-SDM Adjusted Algorithm Forward Velocity Change:
Once the crash data is downloaded, the CDR tool mathematically adjusts the recorded algorithm forward velocity data to generate an adjusted algorithm forward velocity change that may more closely approximate the forward velocity change the sensing system experienced during the recorded portion of the event. The adjustment takes place within the downloading tool and does not affect the crash data, which remains stored in the SDM. The SDM Adjusted Algorithm Forward Velocity Change may not closely approximate what the sensing system experienced in all types of events. For example, if a crash is preceded by other common events, such as rough road, struck objects, or off-road travel, the SDM Adjusted Algorithm Forward Velocity Change may be less than, and some times significantly less than the actual forward velocity change the sensing system experienced. This data should be examined in conjunction with other available physical evidence from the vehicle and scene when assessing occupant or vehicle forward velocity change. For deployments, the SDM will record 100 milliseconds of data after deployment criteria is met and up to 50 milliseconds before deployment criteria is met. For non-deployments and deployment level events, the SDM will record the first 150 milliseconds of data after algorithm enable. The maximum value that can be recorded for SDM Adjusted Algorithm Forward Velocity Change is about 112 MPH.
-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.
-SDM Recorded Vehicle Speed accuracy can be affected if the vehicle has had the tire size or the final drive axle ratio changed from the factory build specifications.
-Brake Switch Circuit Status indicates the status of the brake switch circuit.
-Some of the Pre-Crash data, from the Deployment file, may be recorded after algorithm enable, if the Deployment event has a long crash pulse.
-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if the SDM does not receive a valid message.
-Driver's Belt Switch Circuit Status indicates the status of the driver's seat belt switch circuit.
-The Time Between Events is displayed in seconds. If the time between the two events is greater than five seconds, "N/A" is displayed in place of the time.
-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.

SDM Data Source:

All SDM recorded data is measured, calculated, and stored internally, except for the following:

-Vehicle Speed, Engine Speed, and Percent Throttle data are transmitted once a second by the Powertrain Control Module (PCM), via the Class 2 data link, to the SDM.

-Brake Switch Circuit Status data is transmitted once a second by either the ABS module or the PCM, via the Class 2 data link, to the SDM. Depending on vehicle option content, the Brake Switch Circuit Status data may not be available.

-In most vehicles, the Driver's Belt Switch Circuit is wired directly to the SDM. In some vehicles, the Driver's Belt Switch Circuit Status data is transmitted from the Body Control Module (BCM), via the Class 2 data link, to the SDM.

System Status At Non-Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	BUCKLED
Ignition Cycles At Non-Deployment	716
Ignition Cycles At Investigation	717
Maximum SDM Recorded Velocity Change (MPH)	-5.85
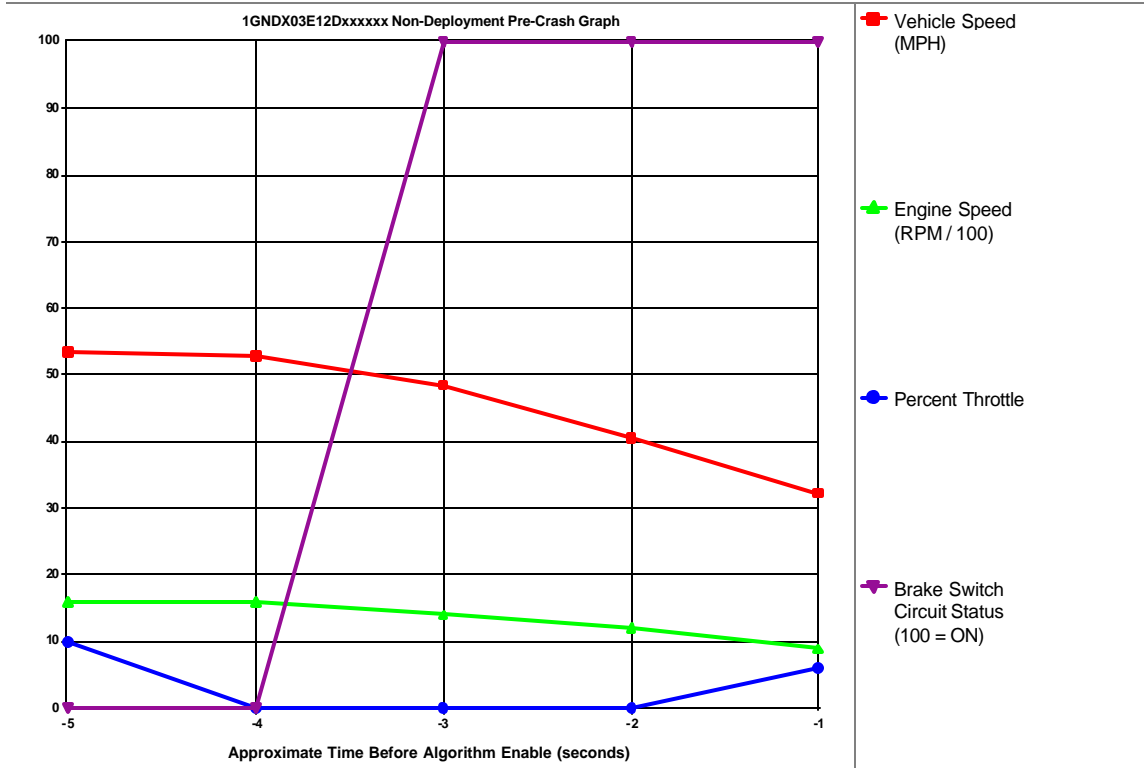
1GNDX03E12Dxxxxxx Non-Deployment Pre-Crash Graph

- Vehicle Speed (MPH)
- Engine Speed (RPM / 100)
- Percent Throttle
- Brake Switch Circuit Status (100 = ON)

Approximate Time Before Algorithm Enable (seconds)

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	53	1600	10	OFF
-4	53	1600	0	OFF
-3	48	1408	0	ON
-2	40	1152	0	ON
-1	32	896	6	ON

Hexadecimal Data

This page displays all the data retrieved from the air bag module.
It contains data that is not converted by this program.

```
$01   0C 04 2A 15 00 00
$02   BC DC 00 00 00 00
$03   41 53 32 31 32 32
$04   4B 35 52 52 37 31
$05   02 41 01 01 00 00
$06   09 38 46 20 00 00
$10   FF A6 E0 00 00 00
$11   AA 00 9C 00 00 7D
$12   00 00 00 00 00 00
$13   01 00 00 00 00 00
$14   FF 44 ED 80 55 00
$18   7D 7C 7D 7E 7E 7F
$1C   FA FA FA FA FA FA
$1D   FA FA FA FA FA FA
$1E   FA FA 00 00 00 00
$1F   FF 02 00 00 00 00
$20   40 00 00 58 C0 00
$21   FF FF DF FF FF FF
$22   FF FF FF FF 00 00
$23   0C 0C 0C 0C 0D 06
$24   07 08 08 09 09 0A
$25   0A 0B 0C 05 00 00
$26   34 41 4E 55 56 E0
$27   0F 00 00 00 1A 00
$28   0E 12 16 19 19 00
$29   FF A6 F0 00 00 00
$2A   00 00 00 00 00 00
$2B   00 00 00 00 00 00
$2C   00 00 FF 00 01 AB
$2D   00 00 00 00 00 00
$2E   00 00 00 00 00 00
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$31   FF FF FF FF FF FF
$32   FF FF FF FF 00 00
$33   FF FF FF FF FF FF
$34   FF FF FF FF FF FF
$35   FF FF FF FF FF FF
$36   FF FF FF FF FF FF
$37   FF FF FF FF FF FF
$38   FF FF FF FF FF 00
$39   FF FF FF FF FF FF
$3A   FF FF FF FF FF 00
$3B   FF FF FF FF 00 00
$3C   FF FF FF FF FF FF
$3D   FF FF FF FF 00 00
$3E   FF FF FF 00 00 00
$40   40 00 00 58 C0 00
$41   FF FF DF FF FF FF
$42   FF FF FF FF 00 00
$43   00 00 00 00 00 00
```

Comments

ATTACHMENT B

2002 Oldsmobile Intrigue EDR Data

CDR File Information

Vehicle Identification Number	1G3WH52H32Fxxxxxx
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	
Saved on	03/06/2003 12:26:39 PM
Data check information	69D765F6
Collected with CDR version	Crash Data Retrieval Tool 1.673
Collecting program verification number	D50959B5
Reported with CDR version	Crash Data Retrieval Tool 2.24
Reporting program verification number	70CD83DD
Event(s) recovered	Deployment Non-Deployment

SDM Data Limitations

SDM Recorded Crash Events:

There are two types of SDM recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event is an event severe enough to "wake up" the sensing algorithm but not severe enough to deploy the air bag(s). It contains Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded vehicle forward velocity change. This event will be cleared by the SDM after the ignition has been cycled 250 times.

The second type of SDM recorded crash event is the Deployment Event. It also contains Pre-Crash and Crash data. The SDM can store up to two different Deployment Events, if they occur within five seconds of one another. Deployment events can not be overwritten or cleared from the SDM. Once the SDM has deployed the air bag, the SDM must be replaced.

The data in the non-deployment file will be locked after a deployment, if the non-deployment occurred within 5 seconds before the deployment or a deployment level event occurs within 5 seconds after the deployment.

SDM Data Limitations:

-SDM Recorded Vehicle Forward Velocity Change is one of the measures used to make air bag deployment decisions. SDM Recorded Vehicle Forward Velocity Change reflects the change in forward velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Forward Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. This data should be examined in conjunction with other available physical evidence from the vehicle and scene when assessing occupant or vehicle forward velocity change. For deployments, the SDM will record 100 milliseconds of data after deployment criteria is met and up to 50 milliseconds before deployment criteria is met. For non-deployments and deployment level events, the SDM will record the first 150 milliseconds of data after algorithm enable.

-SDM Recorded Vehicle Speed accuracy can be affected if the vehicle has had the tire size or the final drive axle ratio changed from the factory build specifications.

-Brake Switch Circuit Status indicates the status of the brake switch circuit.

-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if the SDM does not receive a valid message.

-Driver's Belt Switch Circuit Status indicates the status of the driver's seat belt switch circuit

-Passenger Front Air Bag Suppression Switch Circuit Status indicates the status of the suppression switch circuit.

-The Time Between Non-Deployment and Deployment Events is displayed in seconds. If the time between the two events is greater than five seconds, "N/A" is displayed in place of the time.

-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.
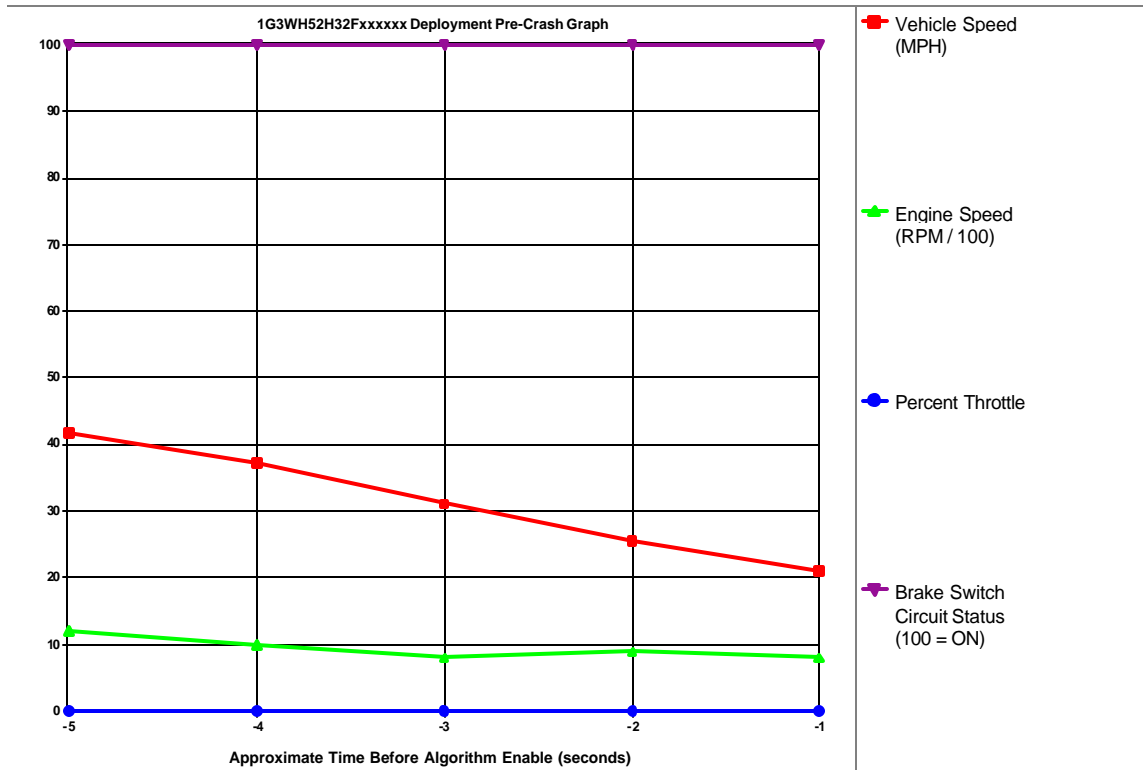
SDM Data Source:

All SDM recorded data is measured, calculated, and stored internally, except for the following:

-Vehicle Speed, Engine Speed, and Percent Throttle data are transmitted once a second by the Powertrain Control Module (PCM), via the Class 2 data link, to the SDM.

-Brake Switch Circuit Status data is transmitted once a second by either the ABS module or the PCM, via the Class 2 data link, to the SDM. Depending on vehicle option content, the Brake Switch Circuit Status data may not be available.

-If the vehicle is a 2000 - 2002 Chevrolet Cavalier Z24 or a Pontiac Sunfire GT, with a manual transmission (RPO MM5) and a 2.4L engine (RPO LD9), the Brake Switch Circuit Status data will be reported in the opposite state than what actually occurred, e.g. an actual brake switch status of "ON" will be reported as "OFF".

-In most vehicles, the Driver's Belt Switch Circuit is wired directly to the SDM. In some vehicles, the Driver's Belt Switch Circuit
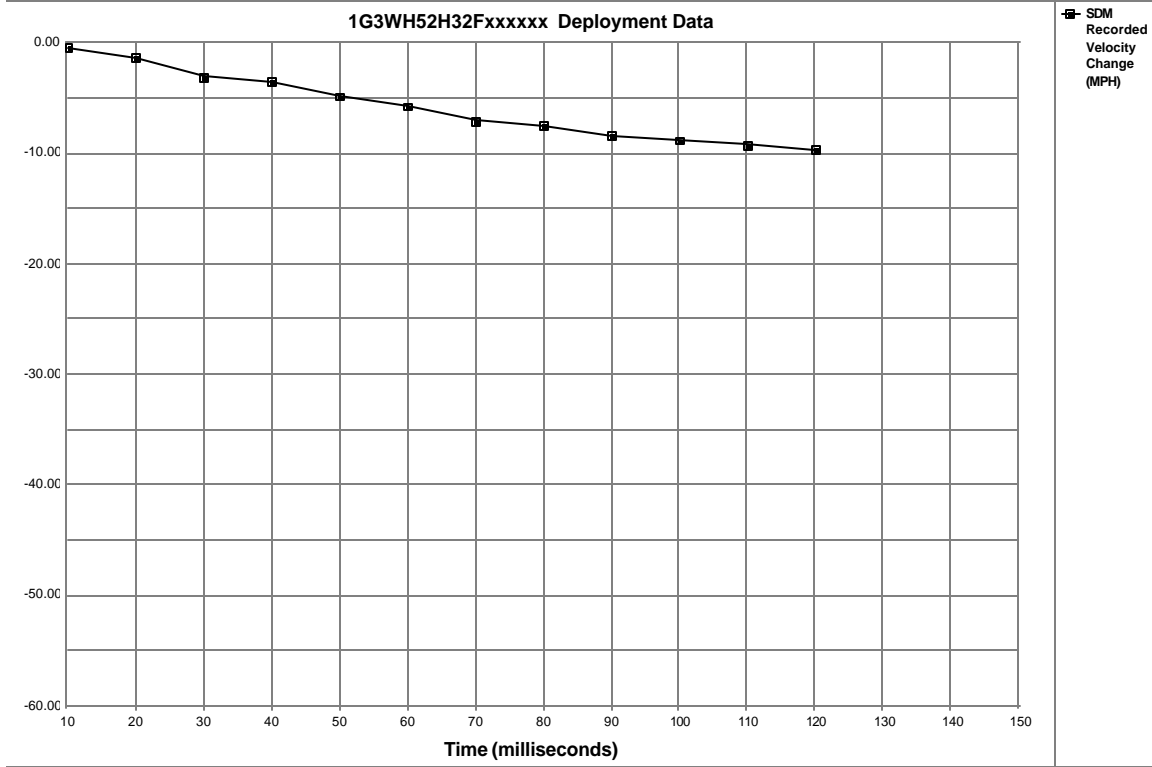
Status data is transmitted from the Body Control Module (BCM), via the Class 2 data link, to the SDM.
-The Passenger Front Air Bag Suppression Switch Circuit is wired directly to the SDM.

System Status At Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	BUCKLED
Passenger Front Air Bag Suppression Switch Circuit Status	Air Bag Not Suppressed
Ignition Cycles At Deployment	761
Ignition Cycles At Investigation	765
Maximum SDM Recorded Velocity Change (MPH)	-10.06
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	112.5
Time Between Non-Deployment And Deployment Events (sec)	N/A
Time From Algorithm Enable to Deployment Command Criteria Met (msec)	17.5

1G3WH52H32Fxxxxxx Deployment Pre-Crash Graph

Legend:
- Vehicle Speed (MPH)
- Engine Speed (RPM / 100)
- Percent Throttle
- Brake Switch Circuit Status (100 = ON)

X-axis: Approximate Time Before Algorithm Enable (seconds)

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	42	1152	0	ON
-4	37	1024	0	ON
-3	31	832	0	ON
-2	25	896	0	ON
-1	21	832	0	ON

1G3WH52H32Fxxxxxx Deployment Data

Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
SDM Recorded Velocity Change	-0.44	-1.32	-3.07	-3.51	-4.83	-5.70	-7.02	-7.46	-8.34	-8.78	-9.21	-9.65	N/A	N/A	N/A

System Status At Non-Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger Front Air Bag Suppression Switch Circuit Status	Air Bag Not Suppressed
Ignition Cycles At Non-Deployment	759
Ignition Cycles At Investigation	765
Maximum SDM Recorded Velocity Change (MPH)	-0.15
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	105
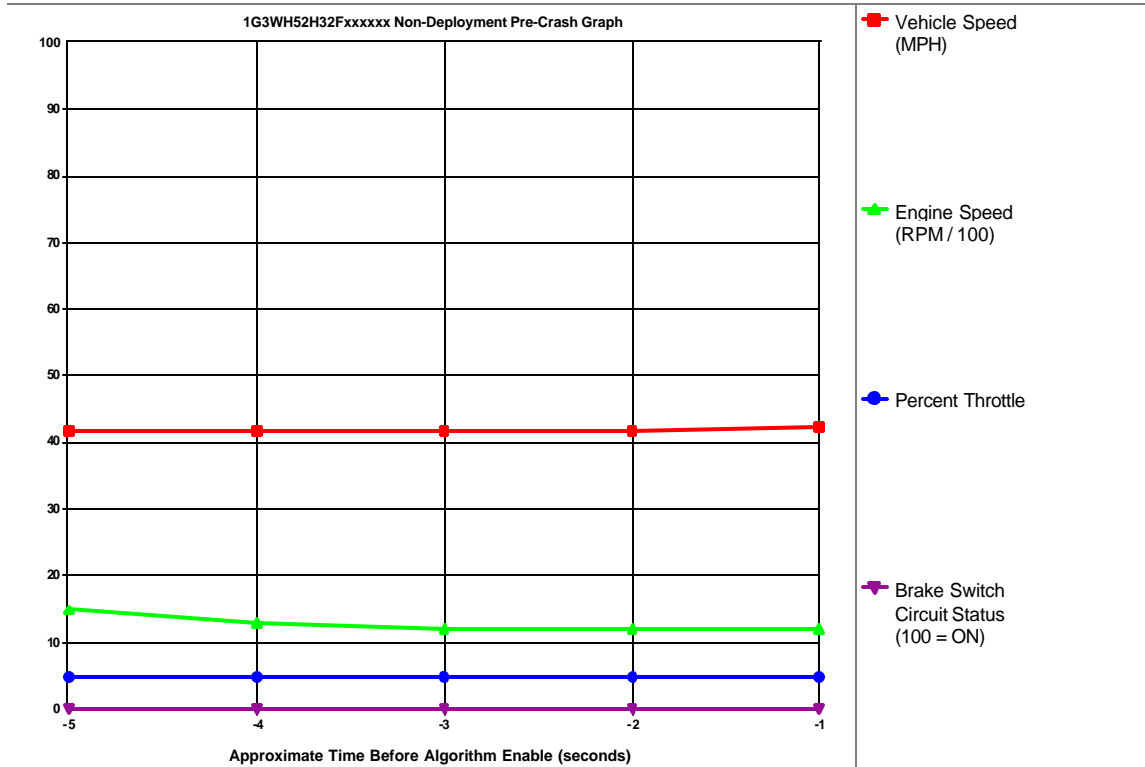
1G3WH52H32Fxxxxxx Non-Deployment Pre-Crash Graph

Approximate Time Before Algorithm Enable (seconds)

- Vehicle Speed (MPH)
- Engine Speed (RPM / 100)
- Percent Throttle
- Brake Switch Circuit Status (100 = ON)

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	42	1472	5	OFF
-4	42	1280	5	OFF
-3	42	1216	5	OFF
-2	42	1152	5	OFF
-1	42	1216	5	OFF
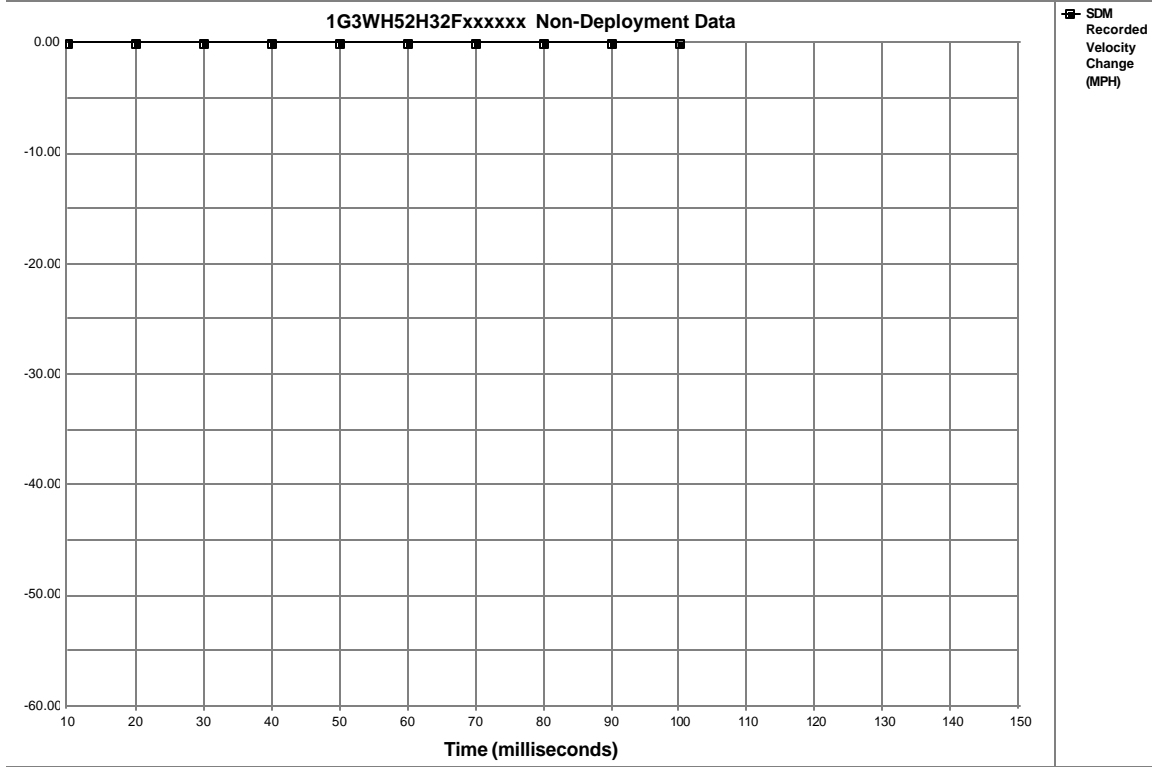
1G3WH52H32Fxxxxxx Non-Deployment Data

SDM Recorded Velocity Change (MPH)

Time (milliseconds)

Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
SDM Recorded Velocity Change	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	N/A

Hexadecimal Data

This page displays all the data retrieved from the air bag module.
It contains data that is not converted by this program.

```
$01   08 23 00 00
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$03   41 53 31 32 38 32
$04   4B 31 34 48 46 33
$05   00
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$10   FF A0 E0
$11   89 8B 8B EA 92 00
$14   03 04 2D 80
$18   81 81 82 B6 FF 00
$1C   33 32 57 48 53 58
$1D   58 33 32 57 48 53
$1E   58 58
$1F   FF 02 00 00 00
$20   A0 00 00 FF 2F FF
$21   FF FF FF FF FF FF
$22   FF FF FF FF FF FF
$23   FF 00 00 0B 00 00
$24   00 00 00 00 00 00
$25   00 00 00 FF FF FF
$26   FF FF 0A 44 43 43
$27   43 43 00 00 00 0D
$28   0D 0D 0D 0D 00 13
$29   12 13 14 17 00 FF
$2A   A1 80 FF FF FF FF
$2B   FF FF FF 00 00 00
$2C   00 00 00 00
$2D   2A 00 00 00
$30   A0 00 00 FF 2F FC
$31   FF BF FF FF FF FF
$32   FF FF FF FF FF FF
$33   7C 0F 03 01 01 03
$34   07 08 0B 0D 10 11
$35   13 14 15 16 FF FF
$36   FF 0C 4D 02 DE 22
$37   29 32 3C 43 00 F8
$38   00 00 00 00 00 00
$39   00 0D 0E 0D 10 12
$3A   00 FF A0 FE 00 00
$3B   00 20 00
$3C   07 2D 4D 2D
$40   FF FF FF FF FF FF
$41   FF FF FF FF FF FF
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$43   FF
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Comments