TRANSPORTATION SCIENCES
CRASH DATA RESEARCH CENTER

General Dynamics
Buffalo, NY 14225

ON-SITE CERTIFIED ADVANCED 208-COMPLIANT VEHICLE CRASH INVESTIGATION

CASE NO: CA03-040

VEHICLE: 2003 CHEVROLET C1500 SILVERADO PICK-UP TRUCK

LOCATION: TEXAS

CRASH DATE: APRIL 2003

Contract No. DTNH22-01-C-17002

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590

DISCLAIMER

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no responsibility for the contents or use thereof.

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the National Highway Traffic Safety Administration.

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.

TECHNICAL REPORT STANDARD TITLE PAGE

<table>
<tr><td colspan="2">1. Report No.
CA03-040</td><td>2. Government Accession No.</td><td colspan="2">3. Recipient's Catalog No.</td></tr>
<tr><td colspan="3" rowspan="2">4. Title and Subtitle
On-Site Certified Advanced 208-Compliant Vehicle Crash Investigation
Vehicle: 2003 Chevrolet C1500 Silverado Pick-up Truck
Location: State of Texas</td><td colspan="2">5. Report Date:
November 2003</td></tr>
<tr><td colspan="2">6. Performing Organization Code</td></tr>
<tr><td colspan="3">7. Author(s)
Crash Data Research Center</td><td colspan="2">8. Performing Organization Report No.</td></tr>
<tr><td colspan="3" rowspan="2">9. Performing Organization Name and Address
Transportation Sciences
Crash Data Research Center
General Dynamics
P.O. Box 400
Buffalo, New York 14225</td><td colspan="2">10. Work Unit No.
C00410.0000.0148</td></tr>
<tr><td colspan="2">11. Contract or Grant No.
DTNH22-01-C-17002</td></tr>
<tr><td colspan="3" rowspan="2">12. Sponsoring Agency Name and Address
U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590</td><td colspan="2">13. Type of Report and Period Covered
Technical Report
Crash Date: April 2003</td></tr>
<tr><td colspan="2">14. Sponsoring Agency Code</td></tr>
<tr><td colspan="5">15. Supplementary Note
On-site investigation focused on the performance of the Certified Advanced 208-Compliant (CAC) occupant protection system in a 2003 Chevrolet C1500 Silverado pick-up truck.</td></tr>
<tr><td colspan="5">16. Abstract
This on-site investigation focused on the performance of the Certified Advanced 208-Compliant (CAC) occupant protection system in a 2003 Chevrolet C1500 Silverado pick-up truck. This vehicle was certified by the manufacturer to meet the advanced air bag requirements of the Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The Chevrolet was involved in a front-to-rear crash sequence with a 2001 Toyota Tacoma pick-up truck. The crash resulted in the deployment of the Chevrolet's advanced driver air bag. The Chevrolet was equipped with an Event Data Recorder (EDR) that captured pre-crash and crash data related to the event. The data was downloaded as a supplement to the on-site investigation. The 20-year old unrestrained male driver of the Chevrolet had a police reported possible injury and refused medical transport. The 32 year old male driver and 34 year old female passenger in the Toyota were not injured.</td></tr>
<tr><td colspan="3">17. Key Words
Certified Advanced 208-Compliant occupant protection
Driver air bag deployment</td><td colspan="2">18. Distribution Statement
General Public</td></tr>
<tr><td>19. Security Classif. (of this report)
Unclassified</td><td>20. Security Classif. (of this page)
Unclassified</td><td>21. No. of Pages
8</td><td colspan="2">22. Price</td></tr>
</table>

TABLE OF CONTENTS

ON-SITE CERTIFIED ADVANCED 208-COMPLIANT
VEHICLE CRASH INVESTIGATION
CASE NO: CA03-040
VEHICLE: 2003 CHEVROLET C1500 SILVERADO PICK-UP TRUCK
LOCATION: TEXAS
CRASH DATE: APRIL, 2003

BACKGROUND

This on-site investigation focused on the performance of the Certified Advanced 208-Compliant (CAC) occupant protection system in a 2003 Chevrolet C1500 Silverado pick-up truck. This vehicle was certified by the manufacturer to meet the advanced air bag requirements of the Federal Motor Vehicle Safety Standard (FMVSS) No. 208. The Chevrolet, **Figure 1**, was involved in a front-to-rear crash sequence with a 2001 Toyota Tacoma pick-up truck. The crash resulted in the deployment of the Chevrolet's advanced driver air bag. The Chevrolet was equipped with an Event Data Recorder (EDR) that captured pre-crash and crash data related to the event. The data was downloaded as a supplement to the on-site investigation. The 20-year old unrestrained male driver of the Chevrolet had a police reported possible injury and refused medical transport. The 32 year old male driver and 34 year old female passenger in the Toyota were not injured.

Figure 1: Left front view of the 2003 Chevrolet C1500.

The Crash Investigation Division of the National Highway Traffic Safety Administration received notification of this crash and assigned an on-site crash investigation to the Special Crash Investigations team at General Dynamics. The case was assigned due to the agency's interest in the field performance of vehicles' equipped with these advanced safety systems. The Chevrolet was considered a total loss by the insurance carrier and cooperation to inspect the vehicle was established with the adjuster handling the claim. However, a considerable delay developed in establishing the title to the vehicle and in transferring the vehicle to the salvage yard. The on-site portion of this investigation was initiated on July 31, 2003.

VEHICLE DATA

2003 Chevrolet C1500 Silverado Pick-Up Truck

The 2003 Chevrolet C1500 Silverado was identified by the Vehicle Identification Number (VIN): 1GCEC14X437 (production sequence deleted). The two wheel drive, 454 kg (1/2 ton) short box, regular cab pick-up was configured with a 302 cm (119 in) wheelbase. The Gross Vehicle Weight Rating (GVWR) was 2,812 kg (6,200 lb). The power train consisted of a 4.3 liter/V6 engine linked to a four-speed automatic transmission with overdrive. The vehicle was equipped with base model equipment to include power steering, power assist four-wheel disc brakes with ABS, manual windows and manual door locks. The manual restraint system consisted of integrated 3-point lap and shoulder belts in the outboard positions. The center

position was lap belt equipped. The Supplemental Restraint System consisted of driver and front right passenger air bags certified to be compliant with the advanced FMVSS 208 occupant protection standard. The vehicles date of manufacture and odometer reading were unknown. The pick-up was equipped with Goodyear Wrangler ST P235/75R16 tires on OEM steel rims. The recommended tire pressure was 241 kpa (35 psi). The specific measured tire data was as follows:

Tire	Measured Pressure	Tread Depth	Restricted	Damage
LF	210.3 kpa (30.5 psi)	7.1 mm (9/32)	Yes	None
LR	227.5 kpa (33.0 psi)	6.4 mm (8/32)	No	None
RF	217.2 kpa (31.5 psi)	7.1 mm (9/32)	No	None
RR	224.1 kpa (32.5 psi)	5.6 mm (7/32)	No	None

2001 Toyota Tacoma Pick-Up Truck

The 2001 Toyota Tacoma was identified by the Vehicle Identification Number (VIN): 5TEGM92N61Z (production sequence deleted). The two-wheel drive, Xtra cab pick-up was manufactured with a 309.6 cm (121.9 in) wheelbase. The vehicle's GVWR was 2,315 kg (5,104 lb). The power train consisted of a 2.7 liter/I4 engine and 4-speed automatic transmission. The service brakes consisted of front disc/rear drum. This vehicle had been repaired prior to SCI involvement in this investigation and was not inspected.

SUMMARY

Crash Site

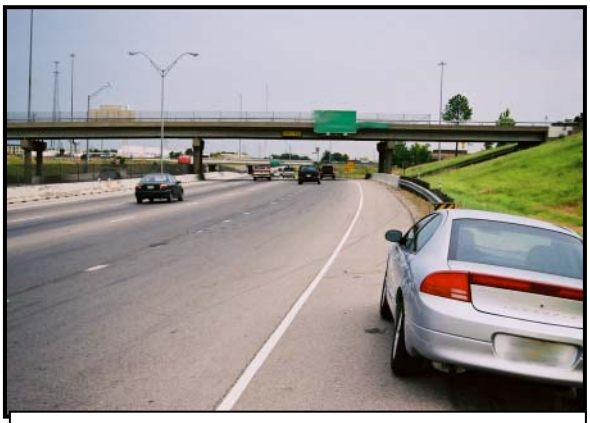


Figure 2: Southbound trajectory view.

This two-vehicle crash occurred during the morning hours in April, 2003. At the time of the crash, it was dawn. The weather was clear and was not a factor in the crash. The road surface was dry. The crash occurred in the outboard southbound lane of a four-lane divided interstate highway. The outboard southbound lane served as a continuous entrance/exit lane for traffic merging onto the interstate from a secondary roadway and/or for traffic exiting the interstate onto an intersecting state route. The three inboard lanes were for continuous southbound through traffic. The police report indicated the crash occurred approximately 91 m (300 ft) north of the exit ramp. Due to the passage of time between the date of the crash and the on-site inspection, there was no physical evidence identified at the scene related to the subject crash. **Figure 2** is a southbound trajectory view of the interstate at the crash site. The speed limit in the area of the crash was 97 km/h (60 mph). The SCI scene schematic is included as **Figure 6** at the end of this narrative report.

CRASH SEQUENCE

Pre-Crash

The 2003 Chevrolet 1500 Series pick-up truck was southbound in the outboard lane driven by a 20-year old male. He was the vehicle's sole occupant. The police indicated the driver was restrained; however, during the vehicle inspection it was determined that the driver was unrestrained at the time of the crash. This determination was consistent with the EDR data. Directly in front of the subject vehicle was a southbound 2001 Toyota Tacoma pick-up truck. The Toyota was occupied by a restrained 32 year old male driver and a restrained 34 year old female front right passenger. The Toyota was reportedly slowing due to merging traffic. The crash occurred when the Chevrolet's driver failed to recognize the slower moving Toyota and braked late in the pre-crash sequence. The downloaded EDR data indicated the brakes were applied 1 second prior to the crash. The Chevrolet was traveling 105 km/h (65 mph) at the time of brake application and decelerated to 101 km/h (63 mph) at impact.

Crash

The front plane of the Chevrolet impacted the back plane of the Toyota in an offset 12/6 o'clock impact configuration. The front-to-rear impact sequence resulted in disabling damage to both vehicles. The force of the impact was sufficient to cause the deployment of the Chevrolet's advanced driver air bag. The crash severity (delta V) calculated by the WINSMASH model for the Chevrolet and Toyota was 31 km/h (19.2 mph) and 32 km/h (19.9 mph), respectively. After the impact, the vehicles came to a controlled stop on the right side of the roadway. None of the occupants in the crash were transported for medical treatment.

EXTERIOR DAMAGE

2003 Chevrolet C1500 Silverado Pickup Truck

The front plane of the Chevrolet sustained 170.2 cm (67.0 in) of direct and induced damage that extended across the vehicle's front end width, **Figure 3**. The direct damage measured 64.3 cm (25.3 in). The direct damage began 20.8 cm (8.2 in) left of center and extended to the left corner. The damage profile was indicative of an under ride with the maximum deformation occurring at the elevation of the upper radiator support. The vehicle's residual crush was measured along the front bumper was as follows: C1 = 18.2 cm (7.2 in), C2 = 11.3 cm (4.4 in), C3 = 6.1 cm (2.4 in), C4 = 1.3 cm (0.5 in), C5 = 0, C6 = 0. The crush profile along the upper radiator support measured: C1 = 52.0 cm (20.5 in), C2 = 59.6 cm (23.5 in), C3 = 52.4 cm (20.7 in), C4 = 32.9 cm (13.0 in), C5 = 17.6 cm (7.0 in), C6 = 10.9 cm (4.3 in). The left wheelbase was reduced 11.2 cm (4.4 in) and the left front tire was restricted against the aft aspect of the wheel opening. The left front door shifted rearward overlapping the left B-pillar and was jammed shut. There was evidence of

Figure 3: Front view of the Chevrolet.

cab-to-bed contact on both sides of the pick-up box. The lower aspect of the windshield was fractured from the exterior crash force.

The Collision Deformation Classification was 12-FYEW-3. The Missing Vehicle Algorithm of the WINSMASH model was used to assess the crash severity (delta V) based on an average of the above referenced profiles. The Chevrolet's calculated total delta V was 30.4 km/h (18.9 mph). The longitudinal and lateral components were -30.4 km/h (-18.9 mph) and 0, respectively. The computed delta V was in agreement with the delta V recorded by the Event Data Recorder. The recorded maximum delta V was -29.97 km/h (-18.62 mph). This maximum value was recorded 142.5 msec after algorithm enable. Refer to the EDR report attached to the end of this document.

INTERIOR DAMAGE

2003 Chevrolet C1500 Silverado Pick-Up Truck

Figure 4 is an interior view of the Chevrolet. The interior damage to the Chevrolet consisted of the deployment of the driver air bag and minor occupant interior contacts. There was no intrusion related to the exterior crash forces.

Figure 4: Interior view of the Chevrolet.

The driver seat was located in a full rear track position. The total seat track travel measured 21.6 cm (8.5 in). The seat back angle measured 10 degrees. The horizontal distance from the center of the steering wheel rim measured 62.2 cm (24.5 in).

The 4-spoke steering wheel was rotated 90 degrees clockwise at inspection. The tilt adjustment was in the center position. There was no deformation of the steering wheel rim. There was no shear capsule displacement.

Inspection of the rigid plastic driver's knee bolster revealed two minor scuffs attributed to contact with the driver's lower extremities. A 5.1 cm x 8.9 cm (2.0 in x 3.5 in) scuff related to the left lower extremity was located 34.3 cm (13.5 in) left of the steering column center line. The lower edge of the panel on the steering column centerline exhibited a 1.3 cm x 1.3 cm (0.5 in x 0.5 in) scuff from the right lower extremity. These minor contacts did not result in injury.

MANUAL RESTRAINT SYSTEM

2003 Chevrolet C1500 Silverado Pick-Up Truck

The manual restraint system in the subject vehicle consisted of integrated 3-point lap and shoulder belts with continuous loop webbing and sliding latch plates for the two outboard positions. The center position was equipped with a lap belt.

The driver's restraint was stowed within the ELR retractor upon inspection. Examination of the latch plate revealed minor indications of historical use. Inspection of the safety belt webbing was unremarkable. There was no crash related evidence identified on the webbing or any of the hardware surfaces. The SCI inspection of the vehicle determined the driver was unrestrained at the time of the crash. This determination was consistent with the downloaded EDR data; the EDR data indicated the driver was unrestrained.

SUPPLEMENTAL RESTRAINT SYSTEM

2003 Chevrolet C1500 Silverado Pick-Up Truck

Certified Advanced 208 Compliant (CAC)

The Supplemental Restraint System in the 2003 Chevrolet C1500 Silverado pick-up truck consisted of frontal air bags certified as compliant with the advanced FMVSS 208 ruling. The deployment of the dual-stage air bags was controlled by a Sensing and Diagnostic Module (SDM) that had Event Data Recording (EDR) capabilities. The EDR was downloaded as a supplement to this investigation. The SDM assessed the severity of the crash and tailored the air bag deployment based on input from following: seat position sensors (for both the driver and the front right passenger seats), front right passenger detection sensor, seat belt buckle switches, a seat belt tension retractor sensor (for the front right manual restraint) and the instrument panel mounted front right passenger air bag suppression switch.

In this crash, a Stage I driver air bag deployment was commanded 15 msec after algorithm enable. The front right passenger air bag did not deploy. The instrument panel mounted suppression switch was in the "Auto" position. The driver was the vehicle's sole occupant and the front right passenger air bag deployment was suppressed by the front right passenger detection sensor.

The EDR also recorded a non-deployment event. Comparison of the pre-crash graphs, from the deployment event and non-deployment event, indicated the non-deployment event occurred after the deployment event, presumably as the vehicle traveled to final rest. The delta V of the non-deployment event was 1.06 km/h (0.66 mph).

The driver air bag module was located in the center hub of the steering wheel. The symmetrical I-configuration module cover flaps measured 6.4 cm x 11.7 cm (2.5 in x 4.6 in), width by height. The deployed driver air bag, **Figure 5**, measured 61 cm (24 in) in diameter. It was tethered by two 8 cm (3 in) wide straps and vented by two ports located in the 11/1 o'clock sectors on the back side of the bag. The face of the air bag was speckled with dirt from post-crash handling. Inspection of the air bag was unremarkable. There was no evidence of driver contact identified on the deployed bag.

Figure 5: Driver air bag.

DRIVER DEMOGRAPHICS

2003 Chevrolet C1500 Silverado Pick-Up Truck

Age/Sex:	20 year old/Male
Height:	Unknown
Weight:	Unknown
Seat Position:	Full rear track
Restraint Use:	Unrestrained
Usage Source:	SCI inspection, EDR
Medical Treatment:	Not injured

DRIVER INJURY

2003 Chevrolet C1500 Silverado Pick-Up Truck

The 20 year old driver of the Chevrolet was not injured in the crash. Although the police report coding indicated the driver sustained a possible injury, the adjuster handling the insurance claim indicated the driver was uninjured.

DRIVER KINEMATICS

2003 Chevrolet C1500 Silverado Pick-Up Truck

The 20 year old male driver of the Chevrolet was seated in a presumed normal posture in a full rear track position. He was unrestrained at the time of the crash. Upon impact with the Toyota, the driver air bag deployed. The driver initiated a forward trajectory in response to the 12 o'clock direction of the impact and loaded the deployed air bag with his chest. The driver rode down the crash forces through the supplemental restraint and rebounded back into his seat. He exited the vehicle under his own power and was uninjured.

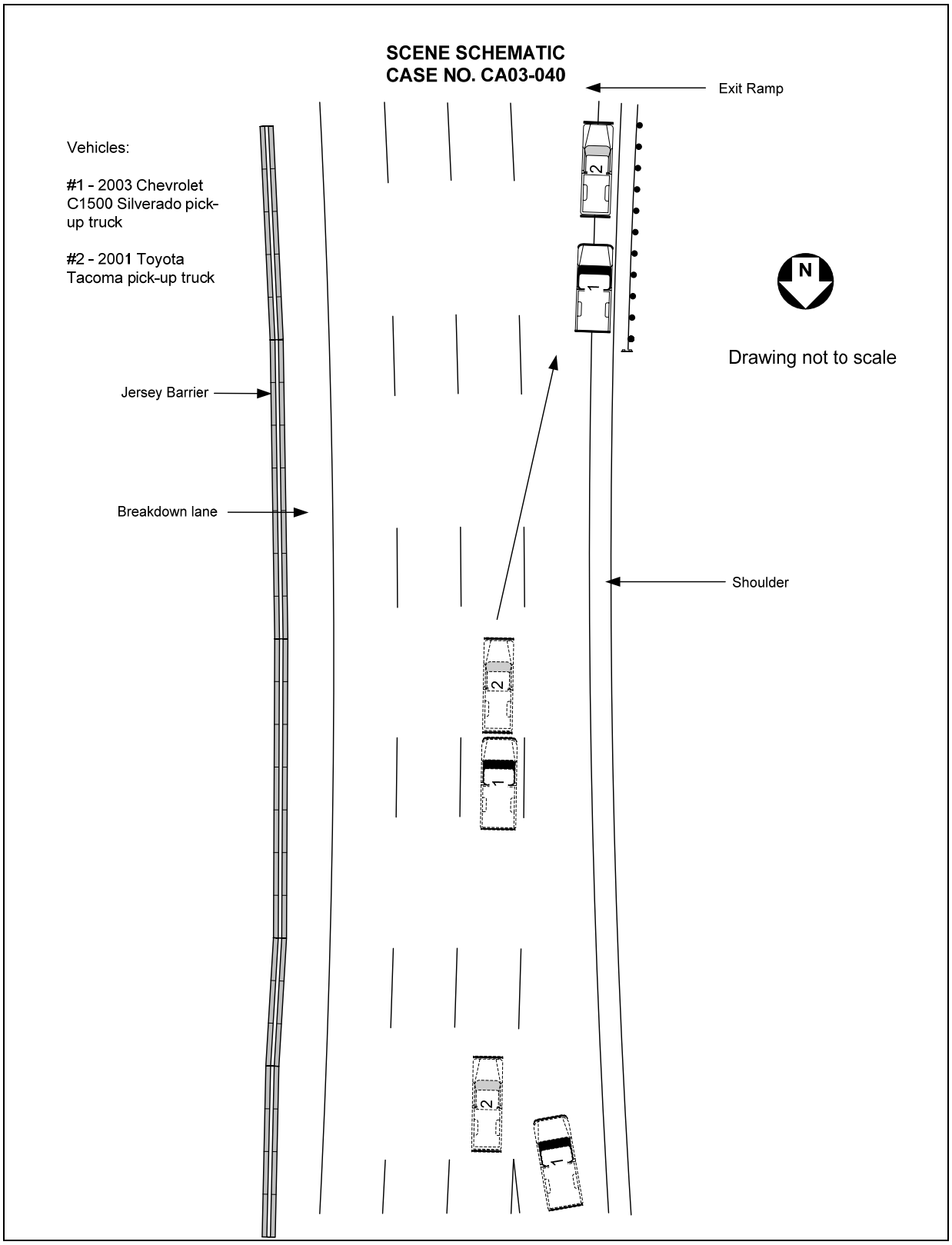


Figure 6 – Scene Schematic

ATTACHMENT A

2003 Chevrolet Silverado EDR Data

CDR File Information

Vehicle Identification Number	1GCEC14X437xxxxxx
Investigator	
Case Number	
Investigation Date	
Crash Date	
Filename	CA03-040 CDR.CDR
Saved on	Thursday, July 31 2003 at 01:44:19 PM
Data check information	E9570216
Collected with CDR version	Crash Data Retrieval Tool 2.10
Collecting program verification number	B6B4FDF8
Reported with CDR version	Crash Data Retrieval Tool 2.10
Reporting program verification number	B6B4FDF8
Event(s) recovered	Deployment Non-Deployment

SDM Data Limitations

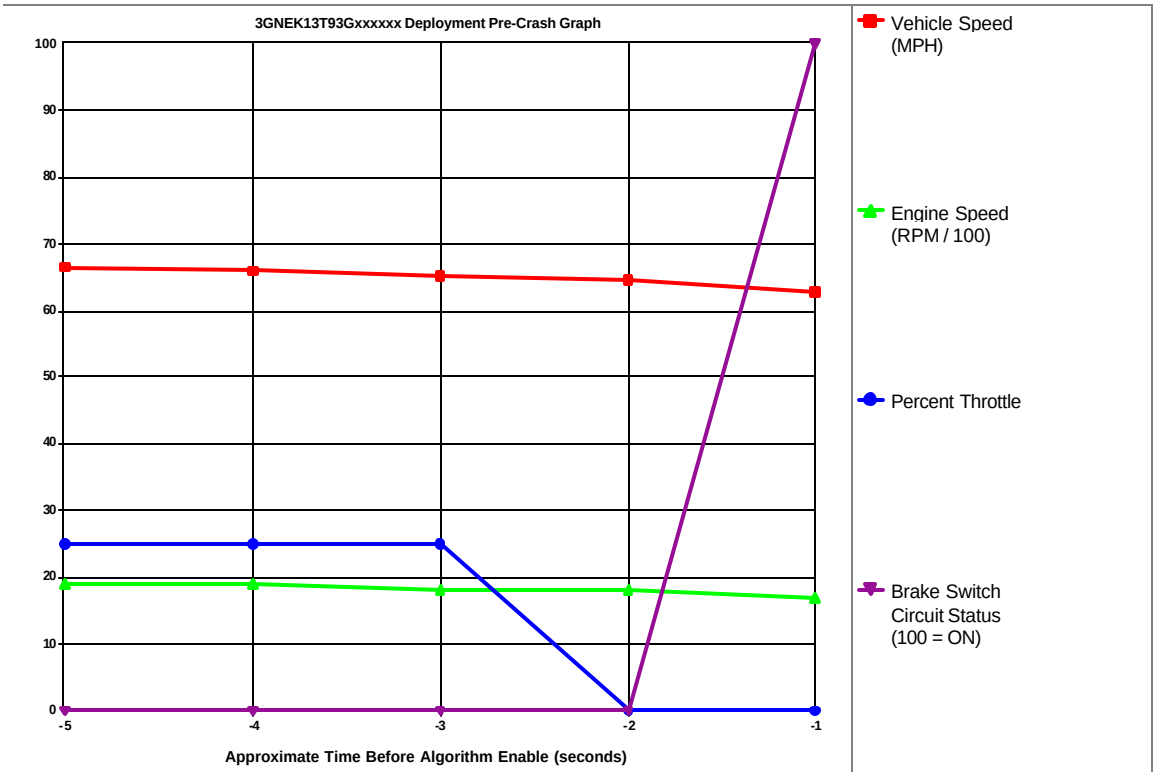
SDM Recorded Crash Events:
There are two types of SDM recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event is an event severe enough to "wake up" the sensing algorithm but not severe enough to deploy the air bag(s). It contains Pre-Crash and Crash data. The SDM can store 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. 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. The SDM will record 100 milliseconds of data after deployment criteria is met and up to 50 milliseconds before deployment criteria is met. The SDM will also record 150 milliseconds of data after non-deployment criteria is met.
-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.
-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 Non-Deployment and Deployment Events is displayed in seconds. If the time between the two events is greater than 25.4 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.

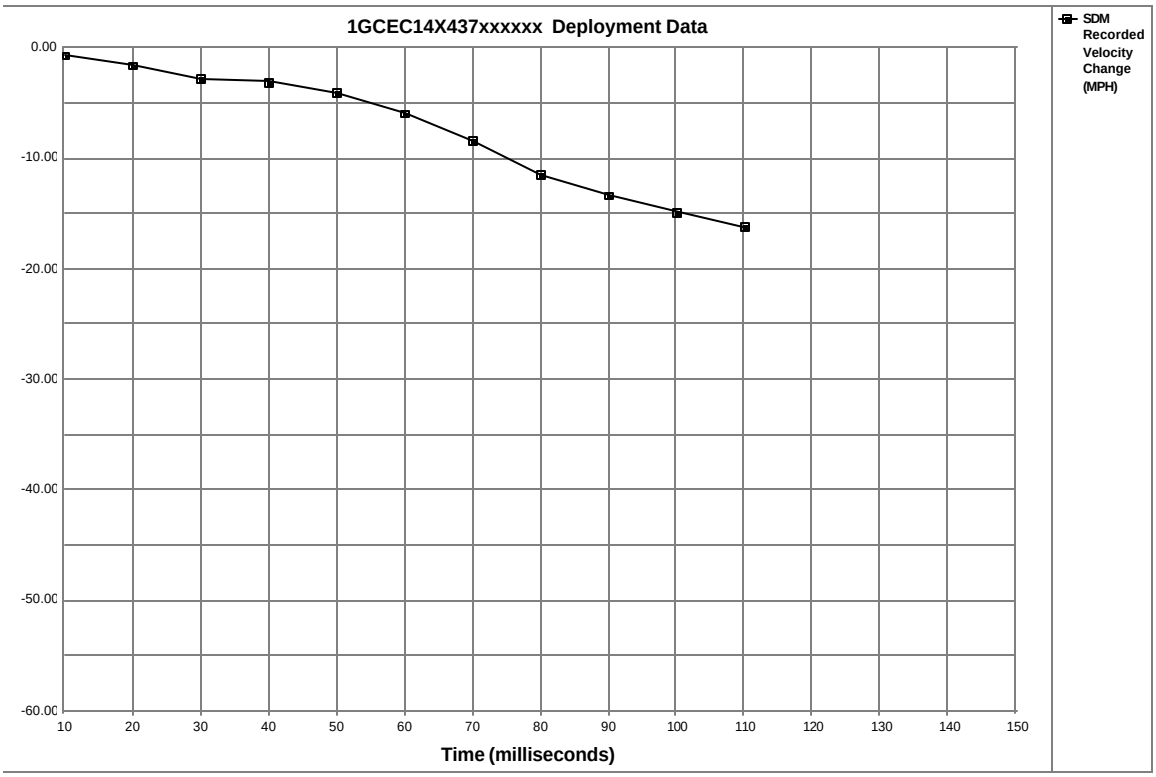
SDM Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Speed, Engine Speed, and Percent Throttle data are transmitted once a second by the Powertrain Control Module (PCM), via the Class 2 data link, to the SDM.
-Brake Switch Circuit Status data is transmitted once a second by either the ABS module or the PCM, via the Class 2 data link, to the SDM.
-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 Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	UNBUCKLED
Ignition Cycles At Deployment	2030
Ignition Cycles At Investigation	2031
Maximum SDM Recorded Velocity Change (MPH)	-18.62
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	142.5
Driver First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	15
Driver Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	N/A
Passenger First Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	N/A
Passenger Second Stage Time Algorithm Enabled to Deployment Command Criteria Met (msec)	N/A
Time Between Non-Deployment And Deployment Events (sec)	N/A
Frontal Deployment Level Event Counter	1
Event Recording Complete	Yes
Multiple Events Associated With This Record	No
One Or More Associated Events Not Recorded	No



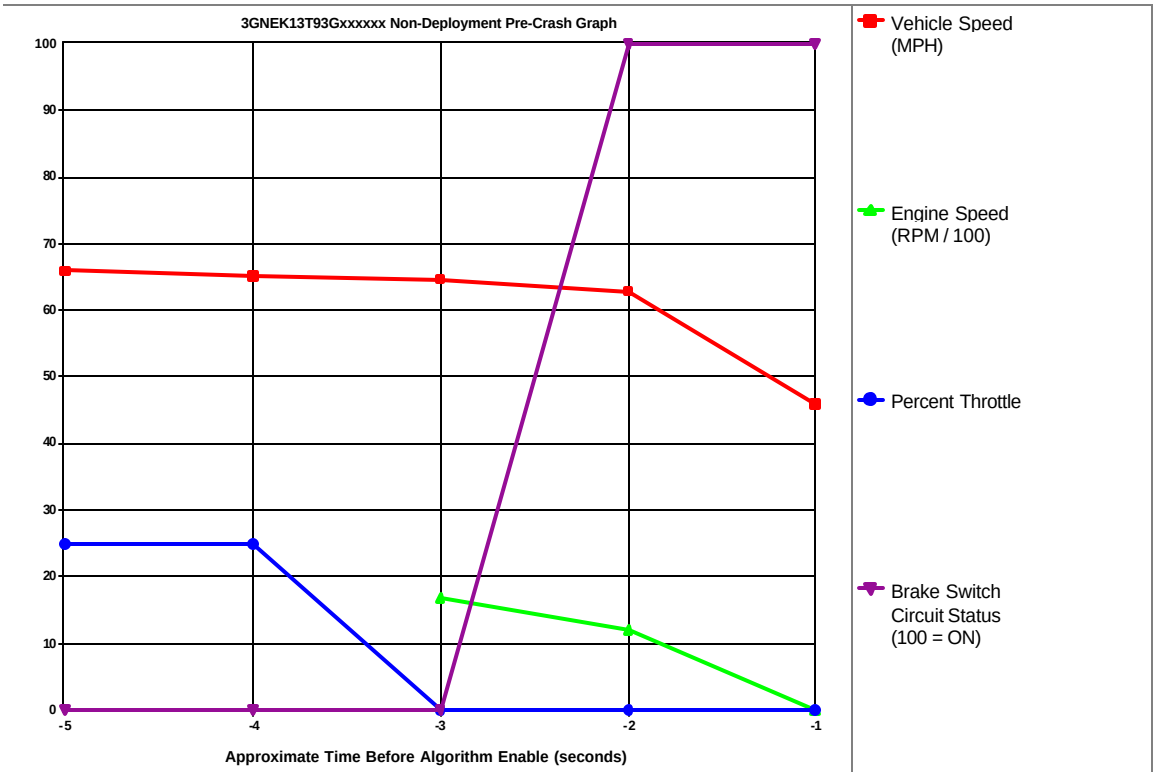
Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	67	1920	25	OFF
-4	66	1856	25	OFF
-3	65	1792	25	OFF
-2	65	1792	0	OFF
-1	63	1728	0	ON



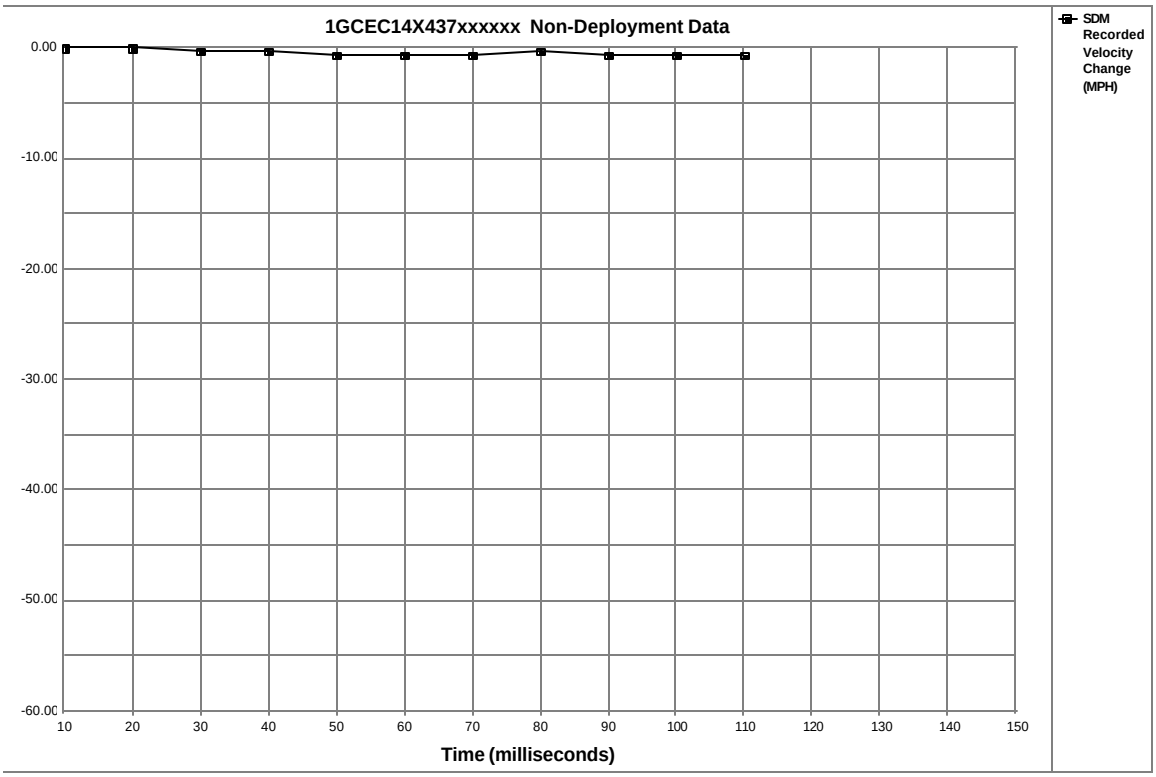
Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Recorded Velocity Change (MPH)	-0.62	-1.55	-2.79	-3.10	-4.03	-5.89	-8.37	-11.47	-13.33	-14.88	-16.12	N/A	N/A	N/A	N/A

System Status At Non-Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	UNBUCKLED
Ignition Cycles At Non-Deployment	2030
Ignition Cycles At Investigation	2031
Maximum SDM Recorded Velocity Change (MPH)	-0.66
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	50
Event Recording Complete	Yes
Multiple Events Associated With This Record	Yes
One Or More Associated Events Not Recorded	Yes



Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle	Brake Switch Circuit Status
-5	66	Invalid	25	OFF
-4	65	Invalid	25	OFF
-3	65	1728	0	OFF
-2	63	1216	0	ON
-1	46	0	0	ON



Time (milliseconds)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Recorded Velocity Change (MPH)	0.00	0.00	-0.31	-0.31	-0.62	-0.62	-0.62	-0.31	-0.62	-0.62	-0.62	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  F0 21 F7 3C AE 5A
$02  F1 F1 00 00 B8 00
$03  41 53 32 32 34 31
$04  4B 33 33 34 55 31
$05  00 00 00 00 00 00
$06  15 05 78 16 00 00
$07  00 00 00 00 00 00
$08  00 00 00 00 00 00
$09  00 00 00 00 00 00
$0A  00 00 00 00 00 00
$0B  00 00 00 00 00 00
$0C  00 00 00 00 00 00
$0D  00 00 00 00 00 00
$0E  00 00 00 00 00 00
$0F  00 00 00 00 00 00
$10  FF 02 80 00 00 00
$11  83 82 83 7D 7C 7D
$12  9F 8D 8C 20 20 01
$13  FF 02 00 00 00 00
$14  03 03 00 00 6C 00
$15  FA FA FA FA FA FA
$16  FA FA FA FA FA FA
$17  FA FA 00 00 00 00
$18  00 0F 05 AC F1 00
$19  09 00 0A 00 00 64
$1A  00 00 00 00 00 00
$1B  00 00 00 00 00 00
$1C  00 0C 00 00 00 00
$1D  00 00 00 00 00 00
$1F  FE 00 00 00 00 00
$20  5E FB 00 00 FF FF
$21  FF F7 FF FF FF FF
$22  FF FF FF FF FF FF
$23  FF FF FF FF FF F7
$24  00 00 22 00 14 03
$25  01 00 00 00 FF FF
$26  00 00 01 01 02 02
$27  02 01 02 02 02 00
$28  00 00 00 0B FF 02
$29  C0 A5 FF FF FF FF
$2A  FF FF FF FF FF FF
$2B  FF FF FF FF FF FF
$2C  FF FF FF FF FF FF
$2D  FF FF 00 00 00 00
$30  B2 FE 00 00 FF FF
$31  FF FF FF FF FF FF
$32  FF FF FF FF FF FF
$33  FF FF FF FF FF FF
$34  00 00 33 0C 06 03
$35  00 00 00 00 00 00
$36  00 00 00 00 00 00
$37  00 00 00 03 C0 52
$38  39 07 5E 33 00 00
```

```
$39  01 00 00 00 FF FF
$3A  02 05 09 0A 0D 13
$3B  1B 25 2B 30 34 00
$3C  00 00 00 0B FF 02
$3D  C0 A5 00 00 00 00
$40  65 68 69 6A 6B 00
$41  80 00 00 00 41 41
$42  41 00 1B 1C 1C 1D
$43  1E 00 7D 80 00 00
$44  4A 65 68 69 6A 00
$45  C0 00 00 00 00 41
$46  41 00 13 1B 1C 1C
$47  1D 00 80 FE 00 00
$48  4A 65 68 69 6A 00
$49  C0 00 00 00 00 41
$4A  41 00 13 1B 1C 1C
$4B  1D 00 80 FE 00 00
$4C  FF FF FF FF FF FF
$4D  FF FF FF FF FF FF
$4E  FF FF FF FF FF FF
$4F  FF FF FF FF 00 00
$50  FF FF FF FF FF FF
$51  FF FF FF FF FF FF
$52  FF FF FF FF FF FF
$53  FF FF FF FF FF FF
$54  FF FF FF FF FF FF
```