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ON-SITE AIR BAG INVESTIGATION

CASE NUMBER - IN01-019

LOCATION - Louisiana

VEHICLE - 2001 FORD CROWN VICTORIA "POLICE INTERCEPTOR"

CRASH DATE - July 2001

Submitted:

July 29, 2002

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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 be 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 Documentation Page

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16. <i>Abstract</i> This report covers an on-site investigation of an air bag deployment crash that involved a 2001 Ford Crown Victoria "Police Interceptor" (case vehicle) and a 1997 Orion V transit bus (other vehicle). This crash is of special interest because the case vehicle was equipped with Advanced Occupant Protection Systems (AOPS) and the case vehicle's unrestrained driver (36-year-old male) sustained minor injuries when his air bag did not deploy during a crash in which the front right passenger air bag did deploy (asymmetrical deployment). The case vehicle was traveling northeastward in the inside through lane of a three-lane roadway that was part of a divided U.S. highway and changed lanes into the outside through lane, intending to maneuver around stopped traffic ahead. The transit bus had been traveling northeastward in the outside through lane of the same roadway and was decelerating in preparation to pull into a bus stop. The case vehicle driver made no avoidance maneuvers prior to the crash. The crash occurred in the outside through lane. The front of the case vehicle impacted and underrode the back left of the bus, causing the case vehicle's front right passenger air bag to deploy. The case vehicle driver's manual, three-point, lap-and-shoulder safety belt system was latched, but he was sitting on it and he was not restrained in any manner. The driver's air bag did not deploy because the control module detected that the safety belt latch was engaged and the crash forces did not reach the deployment threshold for a restrained occupant. The driver's safety belt was equipped with a retractor pretensioner that did actuate. (There was no occupant in the front right passenger position and the safety belt system was not latched. The front right air bag deployed and the pretensioner did not actuate.) The case vehicle driver pitched over the steering wheel and his head struck the windshield. He sustained a concussion plus minor soft tissue injuries and was hospitalized for one day. The case vehicle was towed due to disabling damage and the bus was driven from the scene.					
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This on-site investigation was brought to the NHTSA's attention on August 2, 2001 by a sergeant with the investigating police department. This crash involved a 2001 Ford Crown Victoria "Police Interceptor" (case vehicle) and a 1997 Orion V transit bus (other vehicle). The crash occurred in July, 2001, at 6:25 a.m., in Louisiana, and was investigated by the applicable city police department. This crash is of special interest because the case vehicle was equipped with multiple Advanced Occupant Protection Systems (AOPS) and the case vehicle's unrestrained driver (36-year-old male) sustained minor injuries when his air bag did not deploy during a crash in which the front right passenger air bag did deploy (asymmetrical deployment). This contractor inspected the scene and case vehicle on August 6-7, 2001, and interviewed the case vehicle driver on August 7, 2001. This summary is based on the Police Crash Report, interviews with the case vehicle's driver and the investigating police officer, scene and vehicle inspections, occupant kinematic principles, and this contractor's evaluation of the evidence.

SUMMARY

The case vehicle was traveling northeastward in the inside through lane of a three-lane roadway that was part of a divided U.S. highway and changed lanes to the right, into the outside through lane, intending to maneuver around stopped traffic ahead and continue traveling northeastward. The transit bus had been traveling northeastward in the outside through lane of the same roadway and was decelerating in preparation for pulling into a bus stop, intending to pick-up and/or drop off passengers. According to the case vehicle driver, he passed out prior to the crash and could not remember anything prior to the impact. The case vehicle driver made no avoidance maneuvers prior to the crash. The crash occurred in the outside northeastbound through lane of the roadway; see **CRASH DIAGRAM**.

The front of the case vehicle impacted and underrode the back left of the transit bus, causing the case vehicle's front right passenger air bag to deploy. Specifically, the top half of the case vehicle's bumper impacted the back bumper of the bus and, as a result, the case vehicle's bumper rotated backwards, allowing the case vehicle to underride the back of the bus and, subsequently, become lodged underneath it. After the impact, both vehicles continued traveling northeastward, while linked together, a distance of approximately 15.6 meters [52 feet] before coming to rest at the bus stop. At final rest, both vehicles remained linked together and were headed northeastward. The case vehicle driver's manual, three-point, lap-and-shoulder safety belt system was latched, but he was sitting on it and he was not restrained in any manner. The driver's air bag did not deploy because the control module detected that the safety belt latch was engaged and the crash forces did not reach the deployment threshold for a restrained occupant. The driver's safety belt was equipped with a retractor pretensioner that did actuate. (There was no occupant in the front right passenger position and the safety belt system was not latched. The front right the air bag deployed and the pretensioner did not actuate.)

The case vehicle was a rear wheel drive 2001 Ford Crown Victoria "Police Interceptor" four-door, six-passenger sedan (VIN: 2FAFP71W81X-----). The case vehicle was equipped with four-wheel anti-lock brakes. Based on the vehicle inspection, the CDC for the case vehicle was determined to be: **12-FDEW-2 (360)**. The WinSMASH reconstruction program was not

applicable because the crash configuration (i.e., underride type impact) and the struck vehicle are out-of-scope; however, this contractor's visually estimated Delta V is between 13 km.p.h. [8 m.p.h.] and 19 km.p.h. [12 m.p.h.]. The case vehicle was towed due to damage.

The case vehicle was equipped with a Restraint Control Module (RCM) that was removed and sent to the SCI contact person at the Ford Motor Company in Detroit, Michigan. The recorded data indicated: the case vehicle's passenger air bag deployed 38.4 milliseconds [0.0384 seconds] after the algorithm enabled; there was no second stage inflation; the maximum spike was 10g's; the driver's air bag did not deploy because the module detected that the driver's seat belt was buckled; the driver's seat belt pretensioner in the retractor fired; and a maximum Delta V of 13.9 km.p.h. [8.63 m.p.h.] was recorded. The delta V appears to be below the deployment threshold, but that is most likely because the collision between the front of the case vehicle and the back of the bus occurred while the bus was still traveling forward.

The case vehicle's contact with Orion transit bus involved the entire front with the majority of damage being above bumper. Direct damage extended from bumper corner to front bumper, a measured distance of 150 centimeters [59.1 inches]. Maximum crush at the bumper level was measured as 11 centimeters [4.3 inches] at C6. Maximum crush above the bumper was measured as 53 centimeters [20.9 inches] at C3. The wheelbase on the case vehicle's left side was extended 2 centimeters [0.8 inches] while the right side remained unchanged. The case vehicle's front bumper, bumper fascia, grille, hood, right fender, radiator, and right and left headlight and right turn signal assemblies were directly damaged and crushed rearward. The left turn signal assembly and the right and left fenders sustained induced damage. The right corner of the windshield's glazing, near the base, was cracked from contact by the corner of the hood. None of the case vehicle's tires were restricted or deflated.

The case vehicle's driver air bag, which did not deploy, was located in the steering wheel hub. The existence, number, and size of tethers or vent ports could not be assessed nor could the shape or size of the driver's air bag be described.

The front right passenger's air bag was located in the middle of the instrument panel. Inspection revealed that the cover flap opened at the designated tear points, and there was no evidence of damage during the deployment to the air bag or the cover flap. The air bag was designed without any tethers and had one vent port, approximately 7 centimeters [2.8 inches] in diameter, located at the 10 o'clock position. The deployed air bag was rectangular, approximately 42 centimeters [16.5 inches] vertically and 52 centimeters [20.5 inches] horizontally. There was no contact evidence on the front right air bag.

Inspection of the case vehicle's interior revealed evidence of occupant contact on: the windshield glazing; the brake release handle; the knee bolster; the left instrument panel; and the steering wheel rim, which was bent forward 3 centimeters [1.2 inches]. The steering column's shear capsules also showed movement with 1.5 centimeters [0.6 inches] of separation on the left and 0.5 centimeters [0.2 inches] of separation on the right.

The 1997 Orion V was a rear engine, two-axle transit bus (VIN: 2B1569P78V6-----). The

maximum crush could not be estimated because the only available photographs show the two vehicles still lodged together. It appears that the damage to the bus was limited to minor deformation on the back bumper. The transit bus was taken out of service and was driven away from the scene.

According to the case vehicle driver (36-year-old male, black, non-Hispanic, 180 centimeters and 82 kilograms [71 inches, 180 pounds]), immediately prior to the crash he was seated in an upright posture with his back against the seat back, his left foot on the floor, his right foot on the accelerator, and both hands on the steering wheel. His seat track was located slightly forward of its rearmost position, the seat back was upright, and the tilt steering wheel was located in its center position.

The case vehicle driver was not using his available, active, three-point, lap-and-shoulder safety belt system (i.e., it was buckled behind his back). The inspection of the driver's D-ring showed friction abrasions, but only because the pretensioner in the retractor actuated, which tugged in the belt slack across the D-ring.

The case vehicle driver made no known pre-crash avoidance maneuvers. As a result and independent of the nonuse of his available safety belts, his pre-impact body position did not change just prior to impact. The case vehicle's impact with the transit bus caused the case vehicle's driver to continue forward and slightly upward toward the case vehicle's 12 o'clock direction of principal force as the case vehicle decelerated. The driver's lack of restraint usage combined with the case vehicle's underriding action resulted in the driver going upwards and pitching over the steering wheel rim and contacting the windshield with his head. In addition, the driver's chest loaded and deformed the steering wheel rim and his left shin struck and broke the vehicle's emergency brake release lever. Upon impacting the windshield, the case vehicle's driver rebounded backwards and he fell, unconscious, onto his right side, coming to rest atop the center arm rest.

The driver was transported by ambulance to a hospital. He sustained moderate injuries and was hospitalized for one day post-crash. According to his interview, the injuries he sustained consisted of: cerebral concussion; a forehead laceration; a left lower leg contusion; and a right chest contusion.

CRASH CIRCUMSTANCES

The case vehicle was traveling northeastward in the inside through lane of a three-lane roadway that was part of a divided, U.S. highway and changed lanes into the outside through lane, intending to maneuver around stopped traffic and continue traveling northeastward. The transit bus had been traveling northeastward in the outside through lane of the same roadway was decelerating in preparation for pulling into a bus stop, intending to pick-up



Figure 1: On-scene view looking northeast at final rest positions of case vehicle and transit bus; Note: radiator fluid trail from case vehicle leading to final rest (case photo #39)

and/or drop off passengers. According to the case vehicle driver, he passed out prior to the crash and could not remember anything prior to the impact. The case vehicle driver made no avoidance maneuvers prior to the crash. The crash occurred in the inside northeastbound lane of the roadway.

The northeastbound roadway was straight and level at the area of impact (**Figure 1**). The pavement was bituminous, and the width of the inside through lane was approximately 3.4 meters [11.1 feet]. The northeastbound inside lane was bordered on the northwest side by a painted solid yellow line adjacent to a raised grassy median that was 8.1 meters [26.6 feet] wide. Pavement markings consisted of a painted dashed white line separating the two travel lanes and a painted solid white line separating the outside lane and a parking lane along the curb. The parking lane was 3.7 meters [12.2 feet] wide and was bordered by a mountable curb which protected the concrete sidewalk. The parking lane ended 25.3 meters [83.5 feet] southwest of an intersection, allowing for buses to pick up and drop off passengers at a designated bus stop. The estimated coefficient of friction was 0.70. Traffic controls at the intersection consisted of three vertically mounted on-colors traffic signals. The legal speed limit was 56 km.p.h. [35 m.p.h.].



Figure 2: On-scene view looking southeast at final rest positions of case vehicle and transit bus; Note: case vehicle lodged underneath bus (case photo #40)

At the time of the crash the light condition was between dawn and daylight, the atmospheric condition was clear, and the road pavement was primarily dry with high humidity. Traffic density was light to moderate, and the area around the site of the crash was urban-commercial.

The front of the case vehicle (**Figure 2** and **Figure 3**) impacted and underrode the back left of the transit bus, causing the case vehicle's front right passenger air bag to deploy. Specifically, the top half of the case vehicle's bumper impacted the back bumper of the bus and, as a result, the case vehicle's bumper rotated backwards, allowing the case vehicle to underride the back of the bus and, subsequently, become stuck underneath it (**Figure 3**). After the impact, both vehicles continued traveling northeastward, while linked together, a distance of approximately 15.6 meters [52 feet] before coming to a stop at the bus stop (**Figure 1**).



Figure 3: On-scene view looking southeast at case vehicle and transit bus stuck together at final rest (case photo #41)

At final rest, the two vehicles remained linked together and were headed northeastward. The case vehicle driver's manual, three-point, lap-and-shoulder safety belt system was latched, but he was sitting on it and he was not restrained in any manner. The driver's air bag did not deploy because the control module detected that the safety belt latch was engaged and

the crash forces did not reach the deployment threshold for a restrained occupant. The driver's safety belt was equipped with a retractor pretensioner that did actuate. (There was no occupant in the front right passenger position and the safety belt system was not latched. The front right the air bag deployed and the pretensioner did not actuate.)

CASE VEHICLE

The case vehicle was a rear wheel drive 2001 Ford Crown Victoria "Police Interceptor", four-door sedan (VIN: 2FAFP71W81X-----), equipped with a 4.6 liter V8 engine and an automatic transmission with a column-mounted selector lever. Its wheelbase was 291 centimeters [114.6 inches], and it was equipped with power-assisted rack-and-pinion steering. Braking was achieved by a power-assisted, front disc and rear drum four wheel anti-lock system. The case vehicle's odometer indicated 544 kilometers [338 miles].

Inspection of the interior revealed electronic window and door locks, a split bench seat with separate back cushions and adjustable head restraints for the outboard front seat positions, manual, continuous loop, three-point lap-and-shoulder safety belts in the four outboard seat positions, and a lap belt in the back center seat position. The front outboard safety belts were equipped with retractor pretensioners. The back seat was a bench seat with integral head restraints. The front outboard safety belt systems were equipped with manually operated height adjusters for the D-rings. The case vehicle was equipped with rigid plastic knee bolsters for the driver and front right passenger. In addition, the case vehicle was equipped with a police radio and a laptop computer with a docking station positioned at the center of the instrument panel. Automatic restraint was provided by driver and front right passenger air bags.

CASE VEHICLE DAMAGE

The case vehicle's contact with the Orion transit bus involved the entire front (**Figures 2 and 3** above) with the majority of damage being above bumper (**Figures 4 and 5**). Direct damage extended from bumper corner to front bumper, a measured distance of 150 centimeters [59.1 inches]. Maximum crush at the bumper level was measured as 11 centimeters [4.3 inches] at C6. Maximum crush above the bumper was measured as 53 centimeters [20.9 inches] at C3. The wheelbase on the case vehicle's left side was extended 2 centimeters [0.8 inches] while the right side remained unchanged. The case vehicle's front bumper, bumper fascia, grille, hood, right fender, radiator, and right and left headlight and right turn signal assemblies were directly damaged and crushed rearward. The left turn signal assembly sustained induced damage as well as both the right and left fenders. The right corner of the windshield's glazing, near the base, was cracked from contact by the corner of the hood.



Figure 4: Case vehicle's frontal damage with contour gauge in place for above bumper measurements (case photo #07)

None of the case vehicle's tires were restricted or deflated.

Based on the vehicle inspection, the CDC for the case vehicle was determined to be: **12-FDEW-2 (360)**. The WinSMASH reconstruction program was not applicable because the crash configuration (i.e., underride type impact) and the struck vehicle make this collision out-of-scope; however, this contractor's visually estimated Delta V is between 13 km.p.h. [8 m.p.h.] and 19 km.p.h. [12 m.p.h.]. The case vehicle was towed due to damage.

Inspection of the case vehicle's interior revealed evidence of occupant contact on: the windshield glazing; the brake release handle; the knee bolster; the left instrument panel; and the steering wheel rim, which was bent forward 3 centimeters [1.2 inches]. The steering column's shear capsule also showed movement with 1.5 centimeters [0.6 inches] of separation on the left and 0.5 centimeters [0.2 inches] on the right (**Figure 6**).

AUTOMATIC RESTRAINT SYSTEM

The case vehicle driver's air bag, which did not deploy, was located in the steering wheel hub. The existence, number, and size of tethers or vent ports could not be assessed nor could the shape or size of the driver's air bag be described. There was a 9 centimeter [3.5 inch] area of separation readily apparent along the left side of the driver's air bag module between the module's cover flap and steering wheel (**Figure 7**), which was a result of the steering wheel rim and spokes being deformed from the driver's contact.

The front right passenger's air bag was located in the middle of the instrument panel. An inspection of the front right air bag module's cover flaps and air bag fabric revealed that the cover flap opened at the designated tear points, and there was no evidence of damage during the

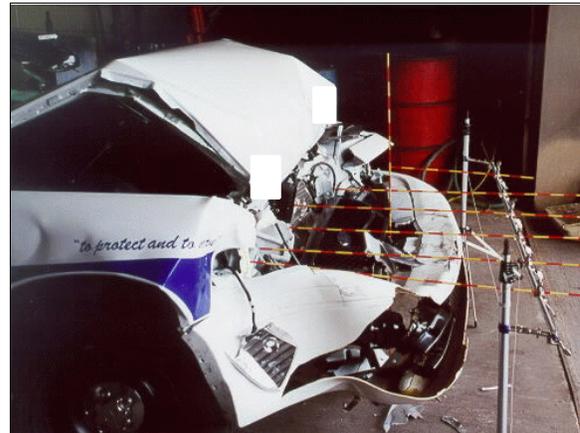


Figure 5: Reference line view from right showing above-bumper crush to case vehicle's front from underride impact with transit bus (case photo #14)



Figure 6: Side view of case vehicle's deformed steering wheel rim; Note: shear capsule movement also occurred (case photo #29)



Figure 7: On-scene view of case vehicle's asymmetrical air bag deployment; Note: separation (highlighted) between steering wheel hub and air bag module (case photo #44)

deployment to the air bag or the cover flap. The front right passenger's air bag was designed without any tethers. The front right air bag had one vent port, approximately 7 centimeters [2.8 inches] in diameter, located at the 10 o'clock position. The deployed front right air bag was rectangular with a height of approximately 42 centimeters [16.5 inches] and a width of approximately 52 centimeters [20.5 inches]. There was no contact evidence on the front right air bag (**Figure 8**).

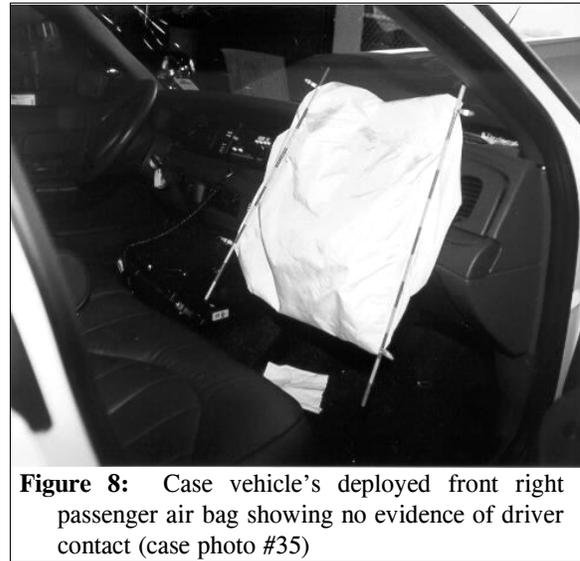


Figure 8: Case vehicle's deployed front right passenger air bag showing no evidence of driver contact (case photo #35)

The case vehicle was equipped with a Restraint Control Module (RCM) made by Takata which was removed and sent to the SCI contact person at the Ford Motor Company in Detroit, Michigan (see **Restraints Control Module Download Report**, attached). The recorded data indicated: the case vehicle's passenger air bag deployed 38.4 milliseconds [0.0384 seconds] after the algorithm enabled; there was no second stage inflation; the maximum spike was 10g's; the driver's air bag did not deploy because the threshold was raised since the driver's seat belt was buckled; the driver's seat belt pretensioner in the retractor actuated; and a maximum Delta V of 13.9 km.p.h. [8.63 m.p.h.] was recorded. The delta V appears to be below the deployment threshold, but that is most likely because the collision between the front of the case vehicle and the back of the transit bus occurred while the bus was still traveling forward.

CASE VEHICLE DRIVER KINEMATICS

According to the case vehicle driver (36-year-old male, black, non-Hispanic, 180 centimeters, 82 kilograms [71 inches, 180 pounds]), immediately prior to the crash he was seated in an upright posture with his back against the seat back, his left foot on the floor, his right foot on the accelerator, and both hands on the steering wheel. His seat track was located slightly forward of its rearmost position, the seat back was upright, and the tilt steering wheel was located in its center position.

The case vehicle's driver was not using his available, active, three-point, lap-and-shoulder, safety belt system (i.e., it was buckled behind his back—**Figure 9**). The inspection of the driver's D-ring showed friction abrasions, but only because the pretensioner in the retractor actuated, which tugged the belt slack across the D-ring.



Figure 9: On-scene view of case vehicle's buckled, driver seat belt, which was behind driver's back; Note: blood on center arm rest (case photo #45)

The case vehicle's driver made no known pre-crash avoidance maneuvers. As a result and

independent of the nonuse of his available safety belts, his pre-impact body position did not change just prior to impact. The case vehicle’s impact with the transit bus caused the driver to continue forward and slightly upward toward the case vehicle’s 12 o’clock direction of principal force as the case vehicle decelerated. The driver’s lack of restraint usage combined with the case vehicle’s underriding action resulted in the driver going upward, pitching over the steering wheel rim and contacting the windshield with his head (**Figure 10**). In addition, the driver’s chest loaded and deformed the steering wheel rim and his left shin struck and broke the emergency brake release lever. Upon impacting the windshield, the case vehicle’s driver rebounded backwards and he fell, unconscious, onto his right side, atop the center arm rest.



Figure 10: Vertical view of case vehicle’s driver seating area showing contacted steering wheel rim, non-deployed driver’s air bag, and “spider web” crack on windshield from driver’s head contact (case photo #30)

CASE VEHICLE DRIVER INJURIES

The driver was transported by ambulance to a hospital. He sustained moderate injuries and was hospitalized for one day post-crash. According to his interview, the injuries sustained by the case vehicle driver consisted of: a cerebral concussion, a forehead laceration, a left lower leg contusion, and a right chest contusion.

CASE VEHICLE DRIVER INJURIES

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
1.	Cerebral concussion, NFS	161000.2 moderate	Windshield	Certain	Interview
2.	Laceration, forehead	290600.1 minor	Windshield	Certain	Interview
3.	Chest contusion, right ribs	490402.1 minor	Steering wheel rim	Certain	Interview
4.	Contusion, left shin	890402.1 minor	Parking brake handle	Certain	Interview

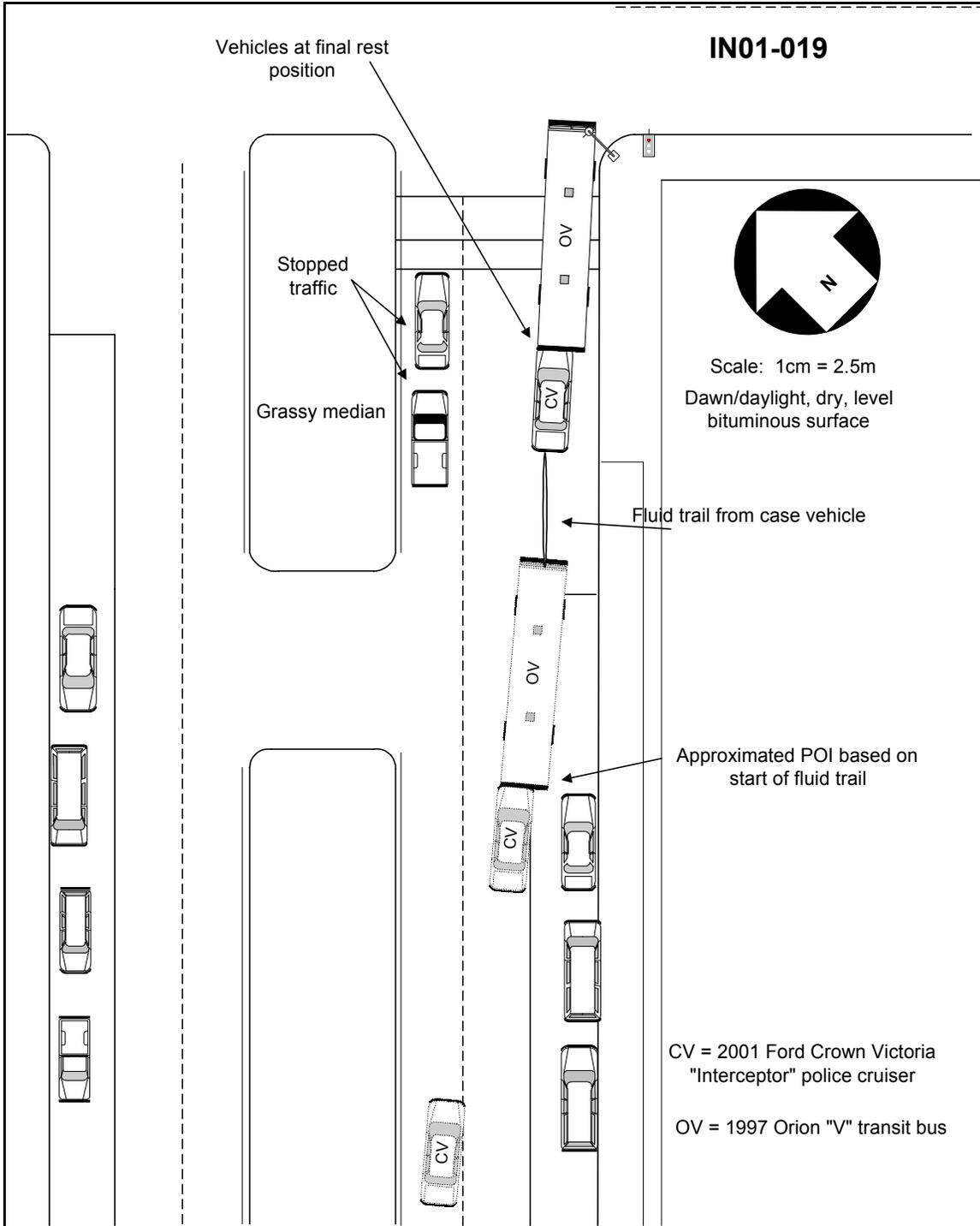
OTHER VEHICLE

IN01-019

The other vehicle was a 1997 Orion V rear engine, two axle transit bus (VIN: 2B1569P78V6-----) (**Figure 11**). The maximum crush could not be estimated because the only available photographs show the two vehicles still lodged together with the case vehicle obscuring the damage on the bus. It appears that the damage to the bus was limited to minor deformation on the back bumper (**Figures 2 & 3**). The transit bus was taken out of service and was driven away from the scene.



Figure 11: Left side of transit bus at final rest, case vehicle visible at far right (case photo #47)



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A Takata Company

Genesis Module Memory Analysis Results – Longitudinal Events

Customer Part Number: 1W7A-14B321-BD
Module Serial# / Bar Code: 51400490 / 8603H01128
RCM Software Version: AB8475L
Module description: NON-Side Airbag, NON-Passenger weight sensor
Vehicle ID#: 2FAFP71W81X

Reported conditions:

Model Year: 2001
Model: Crown Victoria – 4 door vehicle

Alleged event circumstances: per [REDACTED]: "It rear ended the back of a transit bus".

Ford Report#: IN01-019
Requesting report:

[REDACTED] – Special Crash Investigations (SCI), Central Region
[REDACTED]

TAKATA Analysis Summary:

The analysis contained in this report is based on the acceleration and diagnostic fault data stored within the module. All data is analyzed to the extent of the calibration generated and approved by the OEM.

I. REPORT SUMMARY:

Below you will find illustrative and written interpretation of the crash & fault data stored in the RCM's memory. In summary, the crash severity of this event warranted UNBELTED 1st stage airbag deployments ONLY. The crash was NOT severe enough to reach belted 1st stage, or either unbelted or belted 2nd stage thresholds within Fords predefined window of opportunity following the 1st stage deployment (10ms – 20ms). Since the driver was belted, a pretensioner deployment would be expected for the driver given that pretensioner deployment is based on UNBELTED 1st stage thresholds. Since the passenger was unbelted, a pretensioner deployment would NOT be expected for the passenger, however a 1st stage airbag deployment would be expected for the passenger. Therefore, the system responded to the severity of the event as designed. No further analysis to be pursued unless otherwise requested.

Automotive Systems Laboratory, Inc.
A Takata Company

Genesis Module Memory Analysis Results – Longitudinal Events

II. ACCELERATION ANALYSIS:

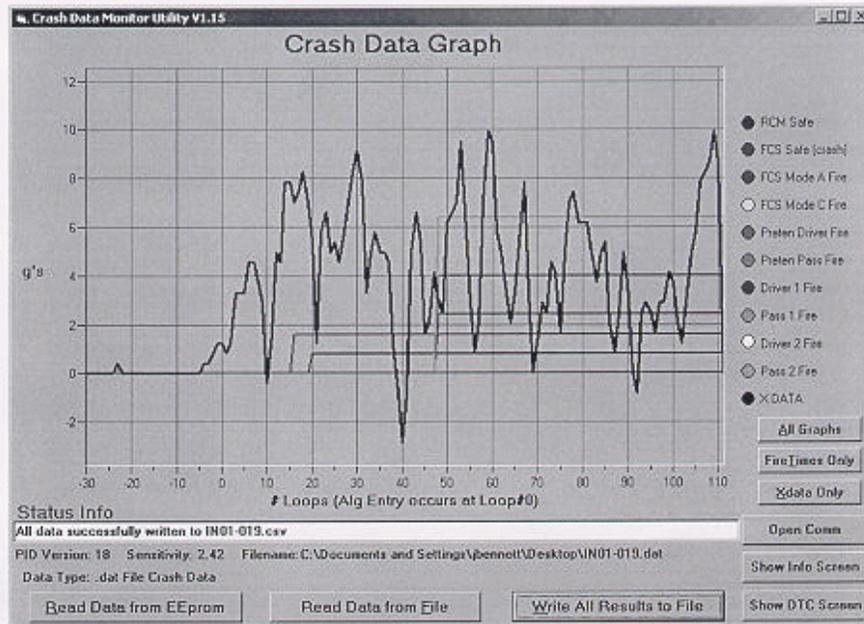


Figure 1.0: Acceleration data (at RCM) overlaid with severity logic & pyro deployment

Description:

The legend on the right describes the individual traces. Acceleration data as seen at the RCM is overlaid with crash severity logic and pyro deployments. Logic decisions and deployment signals are overlaid in time with acceleration so that a visual representation of event sequence can be determined. The X-axis is given in # of Algorithm Timing Loops. Pre Time Zero loops are measured in 1msec increments, post Time Zero loops are measured in 800usec increments. Time Zero is NOT the first moment of vehicle contact or impact.

DeltaV:

The Ford specified amount of acceleration data stored is: "That required to reconstruct impact severity discrimination decisions in a simulation environment". Note that it is not intended to reconstruct the event, just the decision. The following is NOT a DeltaV of the total event. Longitudinal DeltaV accuracy is limited by the fact that (1) the

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Genesis Module Memory Analysis Results – Longitudinal Events

integration is step-wise, (2) the accumulation starts at +/-3G's and stops 50ms after the first deployment, and (3) the amplitude of the acceleration readings is limited by the accelerometer span (-40/+40G). Given these limitations, the approximate Longitudinal DeltaV as measured at the RCM: 8.63 mph

The Front Crash Sensor (FCS) located on the radiator support realized a significant impact given the "FCS Mode A Fire" command illustrated in figure 1.0. The acceleration seen at the RCM, although relatively small is sufficient to "SAFE" the FCS decision thus an unbelted 1st stage airbag deploy results.

III. ALGORITHM DECISION (milliseconds):

- Note that actual initiation attempt is dependent on restraint system status below. Times are measured from "Time Zero" as shown in Figure 1.0 above.

- Pretensioner: 38.4ms
- First (1st) Stage Unbelted: 38.4ms
- First (1st) Stage Belted: NONE -> Did NOT exceed threshold
- Second (2nd) Stage Unbelted: NONE -> Did NOT exceed threshold within Ford predefined window of opportunity following Unbelted 1st stage (10ms - 20ms)
- Second (2nd) Stage Belted: NONE -> Did NOT exceed threshold within Ford predefined window of opportunity following Belted 1st stage (10ms - 20ms)

IV. RESTRAINT SYSTEM STATUS:

- Driver seat belt: Engaged
- Passenger seat belt: NOT Engaged
- Driver seat track position: Rearward
- Occupant Classification (Passenger weight sensor): N/A

V. DEPLOYMENT INITIATION ATTEMPT (milliseconds) -> for Driver & Passenger:

- Note that times are measured from "Time Zero" as shown in Figure 1.0 above.

	<u>Driver</u>	<u>Passenger</u>
• Pretensioner:	38.4ms	None
• First Stage:	None	38.4ms
• Second Stage:	None	138.4ms Disposal

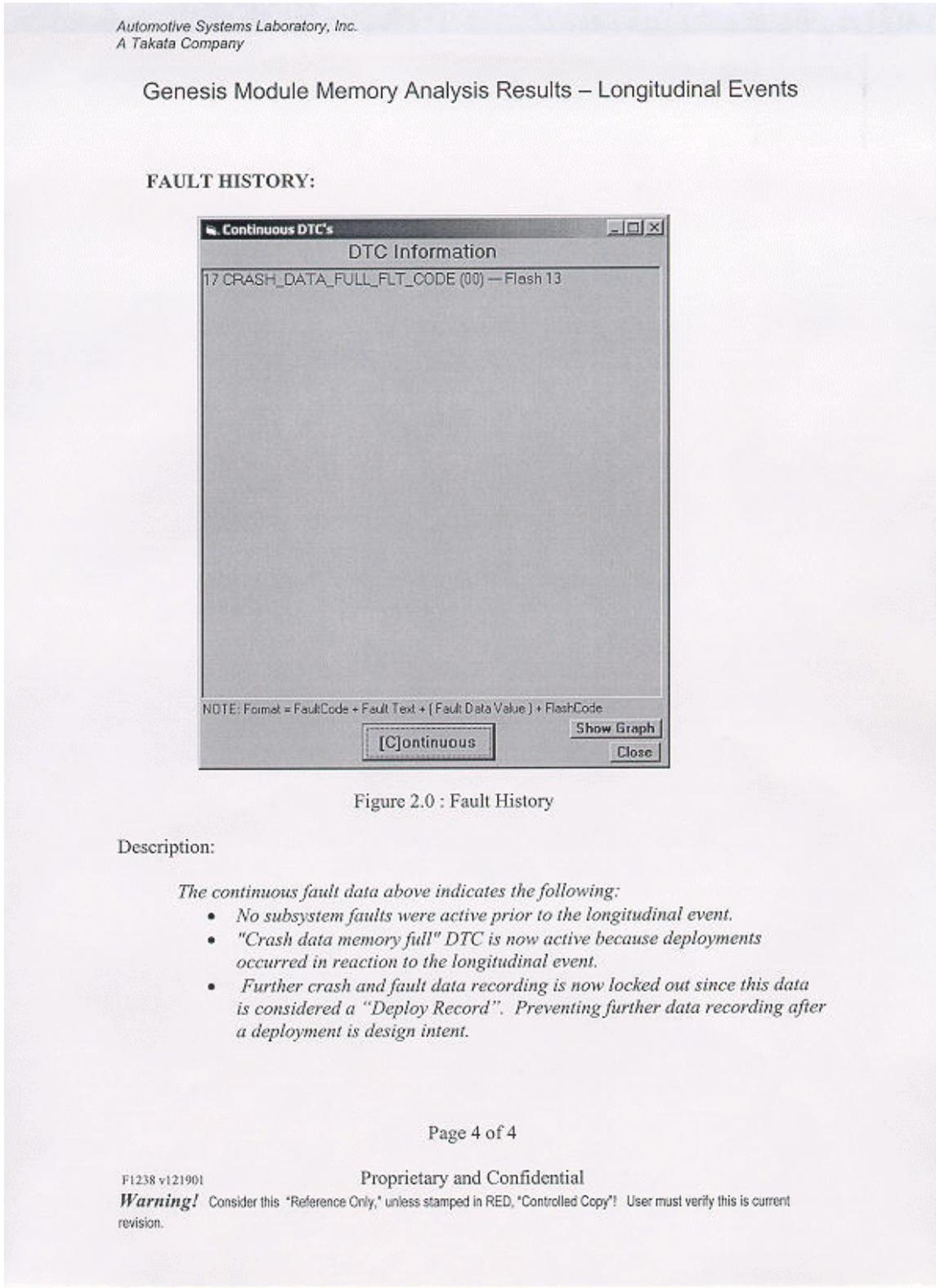


Figure 2.0 : Fault History

Description:

The continuous fault data above indicates the following:

- No subsystem faults were active prior to the longitudinal event.
- "Crash data memory full" DTC is now active because deployments occurred in reaction to the longitudinal event.
- Further crash and fault data recording is now locked out since this data is considered a "Deploy Record". Preventing further data recording after a deployment is design intent.