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REMOTE CHILD AIR BAG-RELATED FATALITY INVESTIGATION

CASE NUMBER - IN-03-024
LOCATION - Missouri
VEHICLE - 1996 CHRYSLER CONCORDE
CRASH DATE - October 2001

Submitted:
August 25, 2004
Revised:
February 15, 2007

Contract Number: DTNH22-01-C-07022

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
National Center for Statistics and Analysis
Washington, D.C. 20590-0003

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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

1. *Report No.* IN-03-024	2. *Government Accession No.*	3. *Recipient's Catalog No.*
4. *Title and Subtitle* Remote Child Air Bag-Related Fatality Investigation Vehicle - 1996 Chrysler Concorde Location - Missouri		5. *Report Date:* August 25, 2004 6. *Performing Organization Code*
7. *Author(s)* Special Crash Investigations Team #2		8. *Performing Organization Report No.*
9. *Performing Organization Name and Address* Transportation Research Center Indiana University 222 West Second Street Bloomington, Indiana 47403-1501		10. *Work Unit No. (TRAIS)* 11. *Contract or Grant No.* DTNH22-01-C-07002
12. *Sponsoring Agency Name and Address* U.S. Department of Transportation (NRD-32) National Highway Traffic Safety Administration National Center for Statistics and Analysis Washington, D.C. 20590-0003		13. *Type of Report and Period Covered* Technical Report Crash Date: October 2001 14. *Sponsoring Agency Code*

15. *Supplementary Notes*
Remote investigation of an air bag deployment crash involving a 1996 Chrysler Concorde, equipped with dual frontal air bags, and a 1992 Nissan Maxima

16. *Abstract*

This report covers a remote investigation of an air bag deployment crash involving a 1996 Chrysler Concorde (case vehicle) and a 1992 Nissan Maxima (other vehicle). This crash is of special interest because the case vehicle's unrestrained front right passenger (3-year-old female) sustained a critical cervical injury from her deploying front right passenger air bag, resulting in her death. There was no child safety seat in the case vehicle. The case vehicle had been traveling south in the center left turn lane of a five-lane, undivided roadway and was attempting to make a left turn into a commercial driveway. The Nissan was traveling north in the inside northbound through lane of the same roadway and intended to proceed straight ahead. The case vehicle's driver began the intended left turn but saw the on-coming Nissan and brought the case vehicle to a stop in the inside northbound through lane. The Nissan's driver braked, attempting to avoid the impact. The crash occurred in the inside northbound through lane. The case vehicle's front right area was impacted by the Nissan's front left, causing the case vehicle's driver and front right passenger air bags to deploy. The case vehicle moved backwards and came to rest straddling the two southbound through lanes, heading southeastward. The Nissan was redirected slightly clockwise and came to rest heading north in the inside northbound lane. The case vehicle's front right passenger encountered the deploying front right passenger's air bag, sustaining contusions and abrasions on her face and neck and blunt force trauma to her cervical spine. The fatal victim was not autopsied and her fatal injury is not further specified. The unrestrained case vehicle driver (20-year-old female) declined treatment at the scene and later at a hospital. The case vehicle was towed due to disabling damage and the Nissan was towed but not due to damage. The Nissan's driver did not sustain any injuries as a result of the crash.

17. *Key Words* Air Bag Deployment Motor Vehicle Traffic Crash Injury Severity		18. *Distribution Statement* General Public	
19 *Security Classif. (of this report)* Unclassified	20. *Security Classif. (of this page)* Unclassified	21. *No. of Pages* 7	22. *Price* $3,300

Form DOT 1700.7 (8-72) Reproduction of completed page authorized

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BACKGROUND

This report was brought to the NHTSA's attention in June 2003 through a review of the 2001 Fatality Analysis Reporting System (FARS) data. This crash involved a 1996 Chrysler Concorde (case vehicle) and a 1992 Nissan Maxima (other vehicle). The crash occurred in October 2001, during late evening hours, in Missouri, and was investigated by the applicable municipal police department. This crash is of special interest because the case vehicle's unrestrained front right passenger (3-year-old female, white, unknown if Hispanic) sustained a critical cervical injury from her deploying front right passenger air bag, resulting in her death. This report is based on the police crash report, police on-scene photographs, emergency medical services and hospital emergency department treatment records (the fatal victim was not autopsied), and this contractor's evaluation of the available evidence.

CRASH CIRCUMSTANCES

The case vehicle had been traveling south in the bi-directional, center, left turn lane of a five-lane, undivided U.S. highway and was attempting to make a left turn into a commercial driveway on the east side of the highway (i.e., there were two through lanes in both north and southbound directions and one bi-directional, center, left turn lane). The Nissan was traveling north in the inside northbound through lane of the same roadway and intended to proceed straight ahead. The speed limit for both vehicles was 64 km.p.h. [40 m.p.h.]. The case vehicle's driver began the intended left turn but saw the on-coming Nissan and brought the case vehicle to a stop in the inside northbound through lane just prior to the impact. The case vehicle driver indicated to the police that, having recognized the threat, she was trying to back her car out of the northbound lanes. The Nissan's driver braked, depositing approximately 21.1 meters [69.1 feet] of skid marks, attempting to avoid the impact. The crash occurred in the inside northbound through lane, within the driveway junction.

The case vehicle's front right area was impacted by the Nissan's front left, causing the case vehicle's driver and front right passenger air bags to deploy. The case vehicle moved backwards in a northwesterly direction approximately 15 meters [50 feet] and came to rest straddling the two southbound through lanes, heading southeastward (**Figure 1**). The case vehicle's driver stated that, immediately prior to the impact, she was trying to back her car out of the northbound lanes, and the case vehicle's transmission may have been in neutral or reverse at the time of the impact. The Nissan was redirected slightly clockwise and came to rest heading north in the inside northbound lane.

Figure 1: Case vehicle's southbound approach, showing case vehicle's back (right) and other vehicle's front (left) at final rest (case photo #01)

The case vehicle was a 1996 Chrysler Concorde front wheel drive, four door, five passenger sedan (VIN: 2C3HD56F0TH------), equipped with a 3.5 liter V6 gasoline engine and an automatic transmission with a console-mounted selector lever. The case vehicle was equipped with four wheel anti-lock brakes and dual frontal air bags with manual lap-and-shoulder safety for the two front row seat positions. The odometer reading is not known and the wheelbase was 287 centimeters [113.0 inches]. The case vehicle was towed due to disabling engine/radiator damage.

The case vehicle sustained direct contact at the apex of the front right corner, extending across the right third of the front and with some direct contact along the leading edge of the right fender. The engine hood was folded upward across the middle and downward in the front, and the right fender was displaced inward. The front bumper was pushed down across the entire width and displaced slightly leftward. The left headlamp/turn signal assembly was knocked loose and thrown free. There was substantial fluid leakage, suggesting that the radiator was damaged. None of the tires appeared to be deflated or restricted and there was no glazing damage.

Figure 2: Front of case vehicle at final rest, showing moderate frontal damage (case photo #08)

The CDC for the case vehicle was estimated from photographs as **01-FZEW-1 (30)**. The WinSMASH reconstruction program, damage only algorithm based on the photo-estimated CDCs for the two vehicles, was used. The total, longitudinal and lateral delta Vs for the case vehicle are, respectively: 16.0 km.p.h. [9.9 m.p.h.], -13.9 km.p.h. [-8.6 m.p.h.] and -8.0 km.p.h. [-4.9 m.p.h.]. This is a borderline reconstruction, but the results appear reasonable. This was a crash of low severity (14-23 km.p.h. [9-14 m.p.h.]) for the case vehicle.

Figure 3: Case vehicle's front right corner at final rest (case photo #13)

AUTOMATIC RESTRAINT SYSTEM

The case vehicle was equipped with driver and front right passenger frontal air bags, both of which deployed as a result of the single impact.

The driver's air bag was located in the steering wheel hub with the module cover flaps in the " I" configuration. The flaps appear to have opened at the designated tear points and there is no evidence of damage to the cover flaps, the adjacent structures or the air bag (but note, these

details are not completely visible in the available photographs). The deployed driver's air bag was round, with its diameter unknown. It is not know if the air bag had any vent ports or tethers. There is no visible evidence of contact on the driver's air bag fabric (**Figure 4**).

Figure 4: Deployed driver's air bag viewed from left (case photo #14)

The front right passenger's air bag was located in the top of the right instrument panel. The configuration of the module cover flap(s) is not known. The cover flap(s) cannot be seen in the available photographs and it is not known if the module opened correctly. The shape of the air bag cannot be discerned in the available photographs, and its size is not known. It is not known if the air bag had any tethers or vent ports. There is no visible evidence of damage to the passenger's air bag, and no evidence of occupant contact can be seen in the available photographs (**Figures 5** and **6**).

Figure 5: Front and left side of deployed passenger's air bag (case photo #22)

Figure 6: Top and right side of deployed passenger's air bag (case photo #23)

FRONT RIGHT PASSENGER'S KINEMATICS

The front right passenger (3-year-old female, white, unknown if Hispanic, 16 kilograms [35 pounds], height unknown) was not restrained by the available, active, three-point, lap-and-shoulder, safety belt system. Her pre-crash posture is not known. There was no child safety seat in the case vehicle.

The case vehicle driver had begun an intended left turn and the front right passenger probably moved slightly to the right in response to this steering maneuver. The driver observed the on-coming other vehicle and braked, bringing the case vehicle to a stop. The child probably moved slightly forward in response to the braking deceleration. According to her statement to the police, the case vehicle driver was attempting to back her car out of the northbound lanes when the impact occurred, and the front right passenger may have moved further forward in response to the possible reverse acceleration. The case vehicle's front right corner was impacted by the other vehicle, causing the case vehicle's driver and front right passenger air bags to deploy. The child

probably moved forward and slightly to the right, toward the 1:00 o'clock direction of force. She encountered the deploying front right air bag with her face and neck, sustaining contusions on her forehead, left face and eye, and across the bridge of her nose, and abrasions on her neck. She was propelled rearward by the force of the air bag's expansion and sustained contusions on her left thigh, possibly as a result of contact with the center console. She was not autopsied, but she was evaluated as having sustained a blunt traumatic injury to her cervical spine, with further details not specified. According to the driver's statement to the police, the driver immediately gathered the child into her lap and was holding her, in the driver's seat, when the EMS crew arrived. There was substantial blood staining in and around the driver's seat area, but none of the medical records mention any lacerative injuries.

FRONT RIGHT PASSENGER'S INJURIES

The front right passenger was transported by ambulance to a hospital, where she was pronounced dead approximately one hour post-crash.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source (Mechanism)	Source Confidence	Source of Injury Data
1	Blunt/traumatic cervical spine injury, not further specified	unknown 615999.7,6	Air bag, front right passenger's	Probable	EMS treatment record
2	Contusion {bruising} about left eye, not further specified	minor 297402.1,2	Air bag, front right passenger's	Probable	Emergency room records
3	Contusion {bruising} about left face, not further specified	minor 290402.1,2	Air bag, front right passenger's	Probable	Emergency room records
4	Contusion {bruising} about bridge of nose, not further specified	minor 290402.1,4	Air bag, front right passenger's	Probable	Emergency room records
5	Contusion {bruising} about forehead, not further specified	minor 290402.1,7	Air bag, front right passenger's	Probable	Emergency room records
6	Abrasion {friction burn, redness} neck, not further specified	minor 390202.1,9	Air bag, front right passenger's	Probable	EMS treatment record
7	Contusion {bruise, ecchymosis} left thigh with swelling, not further specified	minor 890402.1,2	Center console	Possible	Emergency room records

CASE VEHICLE DRIVER'S KINEMATICS

The case vehicle's driver (20-year-old female, white, unknown if Hispanic, height and weight unknown) was not using her available, active, three-point, lap-and-shoulder safety belt

system. Her pre-crash posture and seat adjustments are not known, but she was steering and operating the foot controls and was probably in an approximately normal driving posture. In her statement to the police, the driver indicated that she recognized the impending threat and was trying to back her vehicle out of the northbound lanes, and she may have been turned in her seat to look rearward.

The driver had begun an intended left turn shortly before the impact and she probably moved slightly to the right in response to this steering maneuver. She recognized the impending threat and braked, bring the case vehicle to a stop, and probably moved forward in response to the braking deceleration. The driver stated that she was trying to back the case vehicle out of the northbound lanes when the impact occurred. The case vehicle's front right corner was impacted by the front of the other vehicle, causing the case vehicle's driver and front right air bags to deploy. The driver moved toward the 1:00 o'clock direction of force and probably encountered the deployed driver's air bag with her torso. Her posture at final rest is not known. She immediately gathered the front right passenger into her lap and was holding the child when the emergency crew arrived. The police crash report indicates that the driver sustained "C" (possible) injuries. She declined treatment at the scene and accompanied the front right passenger to a hospital in an ambulance. At the hospital, she declined treatment a second time. There was no record of treatment for the driver and it is not known if she sustained any specific injuries.

OTHER VEHICLE

The other vehicle was a 1992 Nissan Maxima front wheel drive, four-door, five passenger sedan (VIN: JN1HJ01P3NT------), equipped with a 3.0 liter V6 gasoline engine and an automatic transmission with a console mounted selector lever. The Nissan was not equipped with anti-lock brakes. It was fitted with motorized automatic (passive) torso safety belts with manual lap belts for the two front seat positions. Its wheelbase was 265 centimeters [104.3 inches]. The Nissan was towed, but not due to disabling damage.

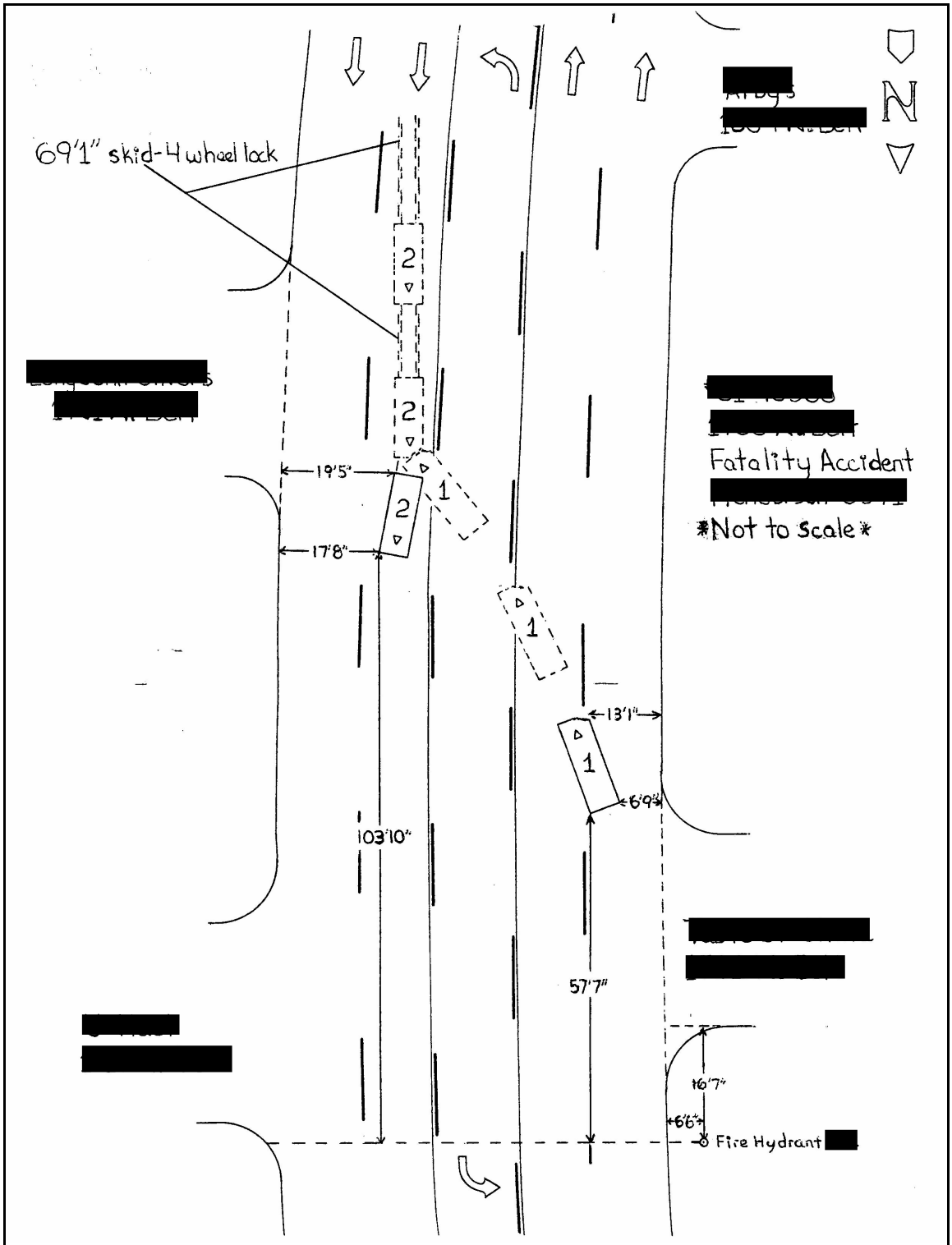
The Nissan sustained direct contact on its bumper and grille, primarily at the center and extending toward the left. The bumper and grille were crushed rearward slightly, with the bumper displaced slightly rightward. The engine hood was bent upward across the middle and slightly downward at the front. None of the tires were deflated or restricted and there was no glazing damage.

Figure 7: Nissan's front at final rest (case photo #27)

The CDC for the Nissan was estimated from photographs as **12-FYEW-1 (0)**. The WinSMASH reconstruction program, damage only algorithm based on the photo-estimated CDCs for

the two vehicles, was used. The total, longitudinal and lateral delta Vs for the Nissan are, respectively: 17.0 km.p.h. [10.6 m.p.h.], -17.0 km.p.h. [-10.6 m.p.h.] and 0 km.p.h. [0 m.p.h.]. This is a borderline reconstruction, but the results appear reasonable. This was a crash of low severity (14-23 km.p.h. [9-14 m.p.h.]) for the Nissan.

The Nissan's driver (22-year-old male, white, unknown if Hispanic) was restrained by the available automatic shoulder (motorized) safety belt. It is not known if he was using the manual lap belt. The driver was not transported by ambulance to the hospital, and according to the police crash report, he did not sustain any injuries as a result of this crash.



Crash diagram copied from the police crash report