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Special Crash Investigations: Remote Vehicle Fire/Child Restraint System Investigation; Vehicle: 2006 Chrysler Pacifica; Location: Missouri; Crash Date: March 2015

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16. Abstract This report documents the remote vehicle fire/child restraint system (CRS) investigation of a post-crash fire in a 2006 Chrysler Pacifica involved in a two-vehicle crash and the child occupants of the Chrysler seated in CRSs. This crash occurred in the afternoon in March 2015 in an urban area of Missouri. The Chrysler was being driven by a belted 23-year-old female. There were three additional passengers, a belted 25-year-old female in the front row right seat position, a 1-year-old female in a forward-facing CRS in the second row left position, and a 2-year-old male in a forward-facing CRS in the second row right position. A 2002 Honda Accord driven by a belted 39-year-old female was traveling in the same lane as the Chrysler and had stopped due to traffic. The driver of the Chrysler was distracted by a rear seat occupant and did not stop in time. The front of the Chrysler struck the back of the Honda and the vehicles caught fire. The driver and front passenger of the Chrysler were able to exit the vehicle under their own power and they removed the child occupants. The police reported that the driver and children sustained "C" (probable, not apparent) injuries and were transported from the scene by EMS ambulance. The front passenger of the Chrysler sustained "B" (evident, not disabling) injuries and was transported from the scene by EMS ambulance. All the occupants of the Chrysler were treated and released. The driver of the Honda was entrapped in her vehicle and was declared deceased on scene.					
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TABLE OF CONTENTS

BACKGROUND	1
SUMMARY	2
Crash Site	2
Pre-Crash	2
Crash	2
Post-Crash	3
Vehicle Fire Discussion	3
2006 CHRYSLER PACIFICA.....	3
Description	3
Exterior Damage	4
NHTSA Recalls and Investigations	4
Interior Damage	4
Manual Restraint Systems	4
Supplemental Restraint Systems	4
Child Restraint System (CRS)	4
Driver Demographics	5
Driver Injuries	5
Driver Kinematics	5
Front Row Right Occupant Demographics	5
Front Row Right Occupant Injuries	6
Front Row Right Occupant Kinematics	6
Second Row Left Occupant Demographics	6
Second Row Left Occupant Injuries	6
Second Row Left Occupant Kinematics	7
Second Row Right Occupant Demographics	7
Second Row Right Occupant Injuries	7
Second Row Right Occupant Kinematics	7
2002 HONDA ACCORD	7
Description	7
Exterior Damage	7
Occupant Data	8
CRASH DIAGRAM.....	9

**Special Crash Investigations
Remote Vehicle Fire/Child Restraint System
Case Number: DS19022
Vehicle: 2006 Chrysler Pacifica
Location: Missouri
Crash Date: March 2015**

BACKGROUND

This report documents the remote vehicle fire/child restraint system (CRS) investigation of a post-crash fire in a 2006 Chrysler Pacifica (**Figure 1**) involved in a two-vehicle crash and the child occupants of the Chrysler who were seated in CRSs. The investigation is intended to determine the events leading to the fire, how quickly the fire spread to the occupant compartment, the magnitude of the fire, how quickly EMS and other responders arrived on-scene, occupant restraint usage, demographics, injury data, and CRS data. The crash was identified during a review of Fatality Analysis Reporting System (FARS) crash reports. The



Figure 1. 2006 Chrysler Pacifica (police image).

criteria for the crash type includes an impact not involving the rear plane, fire that spreads to the occupant compartment, and at least one occupant seated in a CRS. The Special Crash Investigations (SCI) team obtained the on-scene images and the case was initiated by the SCI group of the National Highway Traffic Safety Administration in August 2019.

This two-vehicle crash occurred in the late afternoon in March 2015 in an urban area of Missouri. The crash site was a divided interstate highway. The roadway was straight with four eastbound lanes and four westbound lanes. The Chrysler was being driven eastbound by a belted 23-year-old female in the first lane from the right. There were three additional passengers in the vehicle, a 25-year-old belted female in the front row right seat position, a 1-year-old female in a forward-facing CRS in the second row left position, and a 2-year-old male in a forward-facing CRS in the second row right position. A 2002 Honda Accord driven by a belted 39-year-old female was traveling eastbound in the same lane as the Chrysler. The Honda had stopped due to traffic. The driver of the Chrysler reported to the police that she had turned around to check on the 2-year-old child in the second row right position. As she turned back around she saw the stopped Honda but was unable stop in time. The front plane of the Chrysler struck the back plane of the Honda. The police indicated that the gas tank in the Honda had been punctured, began spilling gasoline onto the roadway, and then caught fire. The Chrysler also caught fire. The Honda contacted a concrete wall as it traveled east. Both vehicles came to rest on the roadway with the Honda facing north and the Chrysler facing south. The driver and front passenger of the Chrysler were able to exit the vehicle under their own power and were able to remove the child occupants. The police reported that the driver and children sustained “C” (probable, not

apparent) injuries and were transported from the scene by EMS ambulance. The front passenger of the Chrysler sustained “B” (evident, not disabling) injuries and was transported from the scene by EMS ambulance. The driver of the Honda was entrapped in her vehicle and was declared deceased on scene.

SUMMARY

Crash Site

The crash site was in the eastbound lanes of a divided interstate highway (**Figure 2**). The asphalt roadway was straight and configured with four travel lanes in each direction. The travel lanes were separated by dashed white lines. The roadway was bordered on the right by a white fog line, a rumble strip, an asphalt shoulder, and a concrete wall. It was bordered on the left by a yellow fog line, an asphalt shoulder, and a concrete median barrier. The posted speed limit was 96 km/h (60 mph). The weather at the nearest reporting station was clear visibility, temperature of 27 degrees C (82 degrees F), 11 percent humidity, scattered clouds, and winds were out of the east southeast at 14 km/h (8.9 mph). A crash diagram is included at the end of this report.



Figure 2. Approach to area of impact, looking east (Google image).

Pre-Crash

The Chrysler was being driven eastbound in the first lane from the right at a driver-reported speed of 96 to 104 km/h (60 to 65 mph). The Honda had stopped in the travel lane due to traffic. The driver of the Chrysler reported to the police that she had turned around to check on the 2-year-old child in the second row right position. As she turned back around she saw the stopped Honda, but was unable stop in time.

Crash

The front plane of the Chrysler struck the back plane of the Honda (Event 1). The impact speed was calculated to be 119 km/h (74 mph).¹ The gas tank in the Honda ruptured at this point and fuel began spilling onto the roadway. The Honda was displaced forward, began a clockwise rotation, and contacted the wall with its left front plane (Event 2).

The Honda continued the rotation as it traveled east before coming to rest facing north approximately 34 m (110 ft) east of the initial point of impact. The Chrysler began a clockwise rotation and continued eastbound before coming to rest facing south 30 m (100 ft) east of the point of impact (**Figure 3**). Both vehicles caught fire (Events 3 and 4).

¹ Calculated using collinear momentum formula using 0.6 coefficient of friction for after-impact speeds.

Post-Crash

The driver and front passenger of the Chrysler were able to exit the vehicle under their own power and were able to remove the child occupants. The police reported that the driver sustained “C” (probable, not apparent) injuries and was transported from the scene by EMS ambulance. She was seen at one hospital and then transferred to a second. ER and radiology reports were obtained and there were no reported injuries. The front right occupant of the Chrysler sustained “B” (evident, not disabling) injuries and was transported from the scene by EMS ambulance to a local hospital where she was treated and released. The second row left occupant sustained

“C” (probable, not apparent) injuries and was transported from the scene by EMS ambulance to a local hospital where she was treated and released. The second row right occupant sustained “C” (probable, not apparent) injuries and was transported from the scene by EMS ambulance. The child arrived with a Glasgow coma scale score of 15 and a pediatric trauma score of 11 out of 12. She was examined and released. A witness exited his vehicle and went to help the driver of the Honda but could not due to the high heat. The driver of the Honda was entrapped in her vehicle and was fatally injured. The medical examiner reported that the immediate cause of death was “blunt thoraco abdominal trauma and thermal injury.” It was the opinion of investigators that she was knocked unconscious from the impact or dazed to the point where she could not exit the vehicle.



Figure 3. 2006 Chrysler Pacifica (left), 2002 Honda Accord (right), looking north (police photo).

Vehicle Fire Discussion

SCI obtained a fire incident report that documented dispatch, arrival, and departure times for fire personnel. Seven fire units and 25 personnel responded. Five of the units, including one chief unit, one rescue unit, and three “quints”² were notified one minute after the crash and arrived 5 minutes later. They found both vehicles to be fully fire-involved. Two additional quints were dispatched shortly after the crash. One unit deployed a 4.4 cm (1.75 in) hand line and used water from a booster tank to attack the fire. A second unit deployed a 2.5 cm (1.0 in) booster line to apply foam to the burning vehicles. After the fire was knocked down it was confirmed that one deceased person was in the Honda. The first unit used one full tank of water plus additional water from another unit to extinguish the fire.

2006 CHRYSLER PACIFICA

Description

The 2006 Chrysler Pacifica station wagon was identified by the Vehicle Identification Number (VIN) 2A4GM68456Rxxxxxx with a build date of March 2006. The vehicle was equipped with a 3.5-liter, 6-cylinder, gasoline engine, 4-speed automatic transmission, ABS antilock disc brakes,

² A “quint” is a quintuple combination fire apparatus that has pump, water tank, fire hose, aerial device, and ground ladders.

and front-wheel-drive. The manufacturer recommended tire size was P235/65R17. The vehicle was configured with front row bucket seats, a second row bench seat with folding back, and a third row bench seat.

Exterior Damage

The Chrysler sustained moderate frontal damage from the rear-end impact with the Honda (**Figure 4**). The direct damage began at the right front bumper corner and extended approximately half-way across the frontal plane. The estimated Collision Deformation Classification (CDC) was 12FZEW2. Shortly after the vehicle came to rest, the fire from the other vehicle spread to this vehicle. The fire covered two-thirds of the exterior from the rear forward and entirely consumed the vehicle passenger compartment.



Figure 4. 2006 Chrysler Pacifica (police image).

NHTSA Recalls and Investigations

There were no related recalls or investigations for this vehicle. The most recent database query occurred in April 2020.

Interior Damage

The Chrysler sustained severe fire-related damage.

Manual Restraint Systems

The Chrysler was equipped with manual lap and shoulder safety belts for all seat positions. The front row safety belts were equipped with retractor pretensioners and adjustable shoulder belt anchorages. The police reported that the driver and front right passenger were belted. The two second row child occupants were reported to be using forward-facing CRSs.

Supplemental Restraint Systems

The Chrysler was equipped with dual-stage frontal air bags for the driver and front right passenger positions and a driver's knee air bag. Side-impact inflatable curtain air bags were available as an option but it does not appear that this vehicle was so equipped. The police indicated that it was unknown if there were any air bag deployments.

Child Restraint System (CRS)

A 1-year-old female was seated in a forward-facing CRS in the second row left position. A 2-year-old male was seated in a forward-facing CRS in the second row right position. Efforts to determine the make/model of the CRSs and their installation were not successful.

Driver Demographics

Age/sex:	23 years/female
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat type:	Bucket
Seat track position:	Unknown
Manual restraint usage:	Lap and shoulder belt
Usage source:	Police report
Air bags:	Driver frontal and knee air bags available. Unknown if any air bags deployed.
Alcohol/drug data:	Tested negative
Egress from vehicle:	Under own power
Transport from scene:	Ambulance
Type of medical treatment:	Transported, transferred, treated and released

Driver Injuries

The driver sustained police-reported “C” (probable, not apparent) injuries and was transported from the scene by EMS ambulance. She was seen at one hospital and then transferred to a second where she was treated and released. ER and radiology reports were obtained and there were no reported injuries. She did report pain to her left knee and lower leg.

Driver Kinematics

The 23-year-old female driver was belted according to the police. She reported to the police that she was looking over her shoulder to her right at the child in the second row right seat position just prior to the crash. When her attention returned to the front she stated that she attempted to brake and steer to the left. At impact, she was displaced forward and probably loaded the lap and shoulder belt. After the initial impact, the vehicle began a clockwise rotation and the driver would have been displaced to the left. The driver remained in place until the vehicle came to rest.

Front Row Right Occupant Demographics

Age/sex:	25 years/female
Height:	Unknown
Weight:	Unknown
Eyewear:	Unknown
Seat type:	Bucket
Seat track position:	Unknown
Manual restraint usage:	Lap and shoulder
Usage source:	Police report
Air bags:	Passenger frontal air bag available, unknown if deployed
Egress from vehicle:	Under own power
Transport from scene:	Ambulance
Type of medical treatment:	Transported, treated and released

Front Row Right Occupant Injuries

Inj. No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Large laceration, front of head at hairline	210600.1	Unknown	Unknown
2	Abrasions, both arms	810202.1	Unknown	Unknown
	Headache, denies LOC			
	Pain to both knees			

Source: EMS report

Front Row Right Occupant Kinematics

The 25-year-old female front right occupant was belted according to the police. Prior to impact, the driver reported that she braked and steered to the left. At impact, she was displaced forward and probably loaded the lap and shoulder belt. After the initial impact, the vehicle began a clockwise rotation and she would have been displaced to the left. She remained belted and in place until the vehicle came to rest. She was transported from the scene by EMS ambulance to a local hospital where she was treated and released.

Second Row Left Occupant Demographics

Age/sex: 19 month/female
 Height: Unknown
 Weight: Unknown
 Eyewear: Unknown
 Seat type: Bench
 Manual restraint usage: Forward-facing CRS
 Usage source: Police report
 Egress from vehicle: Removed by other occupant
 Transport from scene: Ambulance
 Type of medical treatment: Transported, treated and released

Second Row Left Occupant Injuries

Inj. No.	Injury	Injury Severity AIS 2015	Involved Physical Component (IPC)	IPC Confidence Level
1	Abrasion, right parietal, 1 x 0.5 cm	110202.1	CRS shell	Probable
2 3	Abrasion, bilateral neck	310202.1 310202.1	CRS harness	Certain

Source: ER report, radiology, discharge summary

Second Row Left Occupant Kinematics

The 19-month-old female second row left occupant was seated in a forward-facing CRS. At impact, she likely was displaced forward and loaded the CRS harness. She remained in her seated position until being removed from the vehicle by one of the adult occupants. She was transported from the scene by EMS ambulance to a local hospital where she was treated and released.

Second Row Right Occupant Demographics

Age/sex:	2 year/male
Height:	Unknown
Weight:	15 kg (30 lbs)
Eyewear:	Unknown
Seat type:	Bench
Manual restraint usage:	Forward-facing CRS
Usage source:	Police report
Egress from vehicle:	Removed by other occupant
Transport from scene:	Ambulance
Type of medical treatment:	Transported, examined and released

Second Row Right Occupant Injuries

The second row right occupant sustained “C” (probable, not apparent) injuries and was transported from the scene by EMS ambulance. The child arrived with a Glasgow coma scale score of 15 and a pediatric trauma score of 11 out of 12. The child had pre-existing respiratory issues which likely decreased his airway status score for the pediatric trauma score. He was treated and released.

Second Row Right Occupant Kinematics

The 2-year-old male second row left occupant was seated in a forward-facing CRS. At impact, he likely was displaced forward and loaded the CRS harness. He remained in his seated position until being removed from the vehicle by one of the adult occupants.

2002 HONDA ACCORD

Description

The 2002 Honda Accord 4-door sedan was identified by the VIN 1HGCG56752Axxxxxx. The vehicle was equipped with a 2.3-liter, 4-cylinder, gasoline engine, 4-speed automatic transmission, and front-wheel-drive. The vehicle had one incomplete recall notice when the database was last queried in April 2020. Recall number 15V-320 is related to a possible defect in the driver’s frontal air bag inflator.

Exterior Damage

The Honda sustained severe damage to the rear plane from the impact with the front plane of the Chrysler (**Figure 5**). The estimated CDC was 06BYEW6. The Honda contacted the concrete wall with its left front during rotation (Event 2). The direct damage from this impact was obscured by fire damage. The gasoline tank was compromised during the crash and a fire ensued, consuming the entire vehicle.

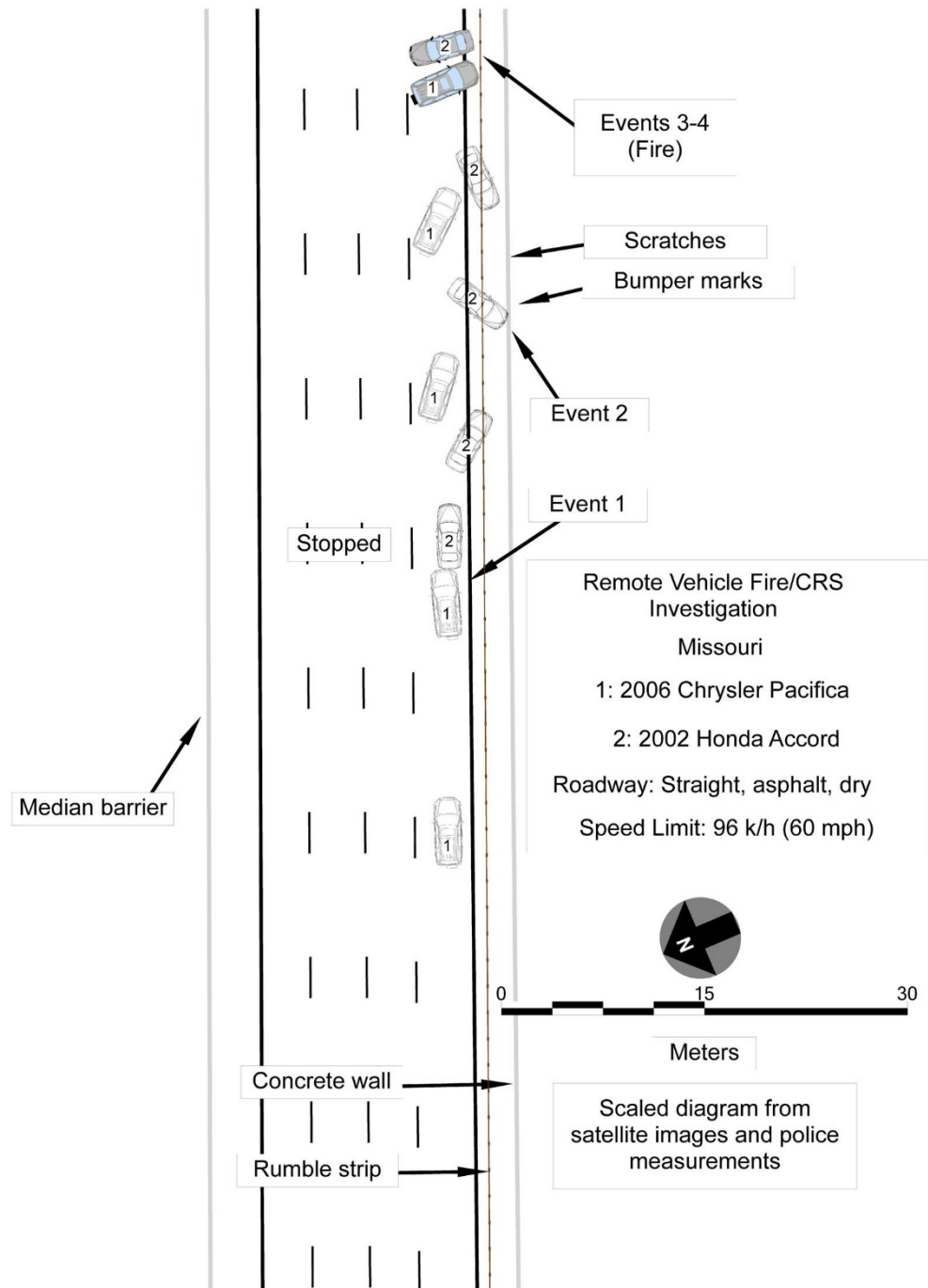
Occupant Data

The 39-year-old female driver of the Honda was fatally injured. She was declared lifeless 26 minutes after the crash. The medical examiner reported that the immediate cause of death was “blunt thoraco abdominal trauma and thermal injury.” It was the opinion of investigators that she was knocked unconscious from the impact or dazed to the point where she could not exit the vehicle.



Figure 5. 2002 Honda Accord (police image).

CRASH DIAGRAM



Case Number:	DS19022

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