On-Site Child Restraint System Investigation

Dynamic Science, Inc. (DSI)
Case Number DS11004
2002 Honda Odyssey
Arizona
March 2011

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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.

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16. Abstract

This on-site investigation focused on the child occupants and the Child Restraint Systems (CRSs) in a 2002 Honda Odyssey involved in a single vehicle rollover crash. The vehicle is a 2002 Honda Odyssey van that was being driven eastbound by a restrained 31-year-old male. The second row right seat was occupied by a restrained 27-year-old female. There were three child occupants seated in CRSs. The Honda was traveling eastbound in the inboard lane at a police-reported speed of 121 km/h (75 mph). The vehicle drifted onto the left shoulder and the driver over-corrected to the right. The vehicle began a clockwise rotation, crossed both travel lanes, departed the roadway, and began a left side leading trip rollover. The vehicle rolled six quarter-turns, impacted a barbed wire fence, and came to rest on its roof. The 4-year-old female sustained a leg fracture and a severe foot laceration and the 2-year-old female was not injured. The remaining occupants sustained minor contusions and abrasions. The driver was able to exit the vehicle under his own power. The child occupants were removed from the seats by bystanders. The adult female was extricated from the vehicle by rescue personnel. All occupants were transported to a local hospital for treatment and/or evaluation. The Honda was towed from the scene due to damage and was later declared a total loss by the insurance company.

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Dynamic Science, Inc.
Crash Investigation
Case Number: DS11004

BACKGROUND

This on-site investigation focused on the child occupants and the Child Restraint Systems (CRSs) in a 2002 Honda Odyssey involved in a single vehicle rollover crash (**Figure 1**). This crash occurred in March 2011 on an interstate highway. The vehicle is a 2002 Honda Odyssey van that was being driven eastbound by a restrained 31-year-old male. The second row right seat was occupied by a restrained 27-year-old female. There were three child occupants seated in CRSs (**Figure 2**). A 6-year-old female was seated in the second row left outboard position in a tethered Safeguard CRS. A 4-year-old female was seated in the third row left outboard position in a tethered Safeguard CRS. A 2-year-old female was seated in the third row right outboard position in a rear-facing Brio Zento CRS.

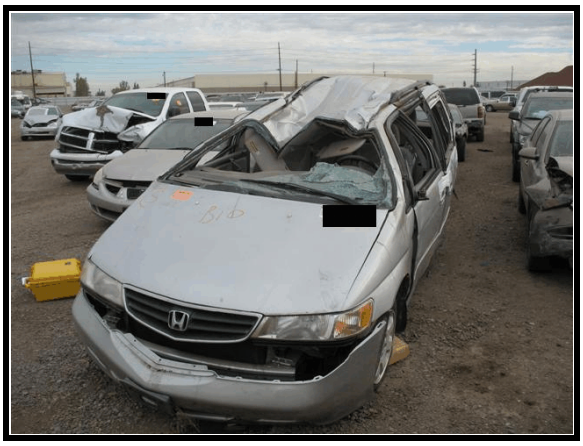

Figure 1. 2002 Honda Odyssey van

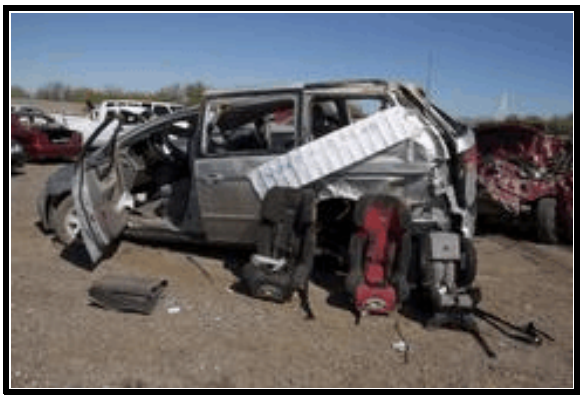

Figure 2. Left side of Honda and view of three CRSs (owner photo)

The Honda was traveling eastbound in the inboard lane at a police-reported speed of 121 km/h (75 mph). The vehicle drifted onto the left shoulder and the driver over-corrected to the right. The vehicle began a clockwise rotation, crossed both travel lanes, departed the roadway, and began a left side leading trip rollover. The vehicle rolled six quarter-turns, impacted a barbed wire fence, and came to rest on its roof.

The 4-year-old female sustained a leg fracture and a severe foot laceration and the 2-year-old female was not injured. The remaining occupants sustained minor contusions and abrasions. The driver was able to exit the vehicle under his own power. The child occupants were removed from the seats by bystanders. The adult female was extricated from the vehicle by rescue personnel. All occupants were transported to a local hospital for treatment and/or evaluation. The Honda was towed from the scene due to damage and was later declared a total loss by the insurance company.

This incident was reported to the Special Crash Investigation (SCI) group of the National Highway Traffic Safety Administration (NHTSA) by an occupant of the vehicle who was also a Child Passenger Safety Technician (CPST). DSI contacted the vehicle occupant on April 1, 2011, and arrangements were made to conduct an interview and inspect the CRSs (seats were in the possession of a friend). The Honda was located and permission to inspect the vehicle was obtained on April 4, 2011. The child seat inspections took place on April 6, 2011 and the vehicle inspection was conducted on the following day.

CRASH SUMMARY

Crash Site

This crash took place in the eastbound lanes of a two-lane divided interstate highway (**Figure 3**). At the time of the crash it was dark and clear and the roadway was dry. The temperature at the nearest reporting station was 14.0° C (57.3° F), the wind direction was west northwest at 9.3 km/h (5.8 mph), and the visibility was 16.0 km (10 mi). The highway was configured with two lanes that were separated by dashed white lines. The asphalt roadway was slightly curved to the right and level. The roadway was bordered on both sides by asphalt shoulders with continuous rumble strips near the edge line. Beyond the left shoulder, the roadway was bordered on the north by grass-covered median that terminated at the westbound lanes of the highway. Beyond the right shoulder, the roadway was bordered by a descending embankment, an area of level dirt and brush, and a barbed wire fence that runs parallel to the roadway. The fence was located 22.9 m (75.0 ft) south of the roadway shoulder. The posted speed limit was 121 km/h (75 mph).

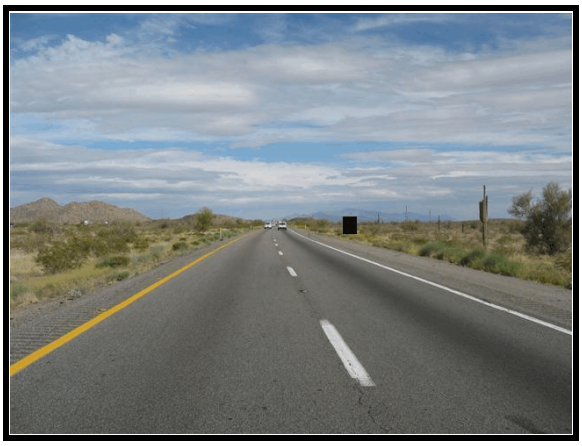

Figure 3. Eastbound approach

Pre-Crash

The Honda was traveling eastbound in the left travel lane at a police-reported speed of 121 km/h (75 mph). The second row right occupant was viewing a web site on her cell phone. The child occupants were either asleep or dozing. The Honda drifted onto the left shoulder and the driver steered to the right and began braking (**Figure 4**). The Honda began a clockwise rotation, crossed both lanes of travel, and departed the roadway on the right (**Figure 5**). The Honda continued rotating as it traveled down a descending embankment.

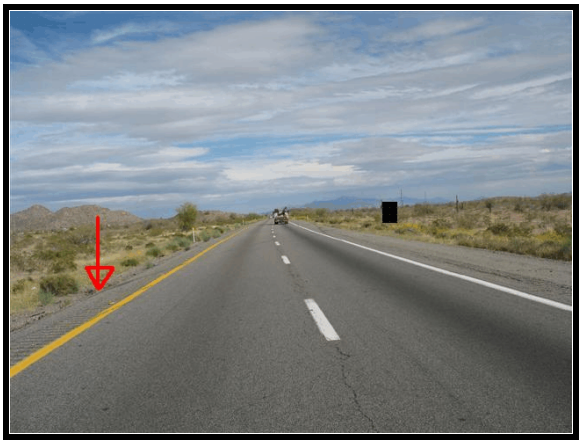

Figure 4. Honda returning to roadway

Figure 5. Right side roadway departure

Crash

Both left side tires engaged the ground inducing a left side leading trip rollover (Event 1). The vehicle rolled six quarter-turns, impacted a barbed wire fence (Event 2), and came to rest on its roof.

Post-Crash
The driver was able to exit the vehicle through the left door under his own power. He sustained minor contusions and abrasions and was transported to a local hospital by ground ambulance where he was treated and released approximately 9 hours post-crash.

The second row left occupant was removed from the vehicle by bystanders. She sustained minor contusions and abrasions and was transported by ground ambulance to a local hospital where she was treated and released.

The second row right occupant was suspended upside down in the vehicle safety belt. She was extricated from the vehicle by rescue personnel after they removed the second row right door. She sustained multiple contusions and abrasions and was transported by ground ambulance to a local hospital where she arrived with a Glasgow Coma Score (GCS) of 15. She was treated and then released approximately 14 hours post-crash.

The third row left occupant was removed from the vehicle by bystanders. She sustained a fractured left tibia and a serious foot laceration. She was transported from the scene by helicopter to a local trauma center. She remained in the hospital for approximately 36 hours before being released.

The third row right occupant was removed from the vehicle by bystanders. She did not sustain any injuries. She was transported by ground ambulance to a local hospital for observation and was released shortly after arrival.

The Honda was towed from the scene due to damage and was later declared a total loss by the insurance company.

2002 HONDA ODYSSEY

Description
The 2002 Honda Odyssey mini-van was identified by the Vehicle Identification Number (VIN): 2HKRL18622Hxxxxxx. Its date of manufacture was February 2002. The vehicle was equipped with a 3.5 -liter, 6-cylinder engine, automatic transmission, front-wheel drive, 4-wheel disc with ABS, traction control, electronic brake force distribution, and power steering with tilt column functionality.

The vehicle manufacturer recommended P225/65R16 tires for the front and rear. The vehicle was equipped with Michelin X-radial tires of the recommended size for all four wheels. The right side tires were manufactured in 2009. The tires were mounted on cast aluminum original manufacturer rims. The specific tire information was as follows:

Position	Measured Pressure	Measured Tread Depth	Restricted	Damage
LF	Tire Flat	6 mm (7/32 in)	Yes	De-beaded
LR	Tire Flat	6 mm (7/32 in)	Yes	De-beaded

RR	Tire Flat	6 mm (7/32 in)	No	De-beaded, holed
RF	255 kPa (37 psi)	6 mm (7/32 in)	No	None

The Odyssey's interior was equipped with fabric-covered seven-passenger seating. The front row outboard bucket seats were separated by a center console. The second row was configured by bucket seats. The third row was a bench seat with a folding back. All seat positions were configured with adjustable head restraints.

Exterior Damage

The Honda sustained damage to the left side, right side, and roof during the rollover event. The direct damage to the top of the vehicle extended laterally from roof side rail to roof side rail and measured 104.0 cm (40.9 in). The damage extended from the front hood edge to the D-pillar area. The left rear wheel assembly was partially displaced from the vehicle. The left upper arm separated from the axle and the rear shock absorber had been pulled apart. The maximum vertical crush measured 36.0 cm (14.1 in) and was located along the windshield header 38.0 cm (14.9 in) to the left of the right A-pillar (**Figure 6**). The maximum lateral crush measured 12.0 cm (4.7 in) and was located at the right A-pillar. The Collision Deformation Classification (CDC) for Event 1 was 00TDDO4.

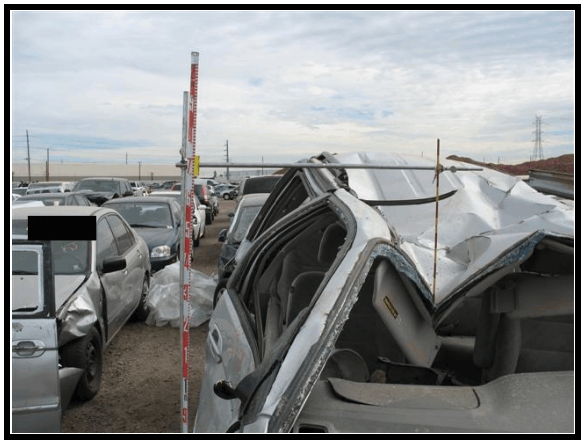

Figure 6. Maximum vertical crush

Based on the vehicle rollover path, the Honda probably contacted the barbed wire fence (Event 2) with its left side. A CDC was not generated because any residual damage from this event was masked by the rollover damage.

Interior Damage

The Odyssey sustained moderate interior damage as a result of intrusions, occupant loading, and contacts. Vertical intrusion was located in the front row at the A-pillars, windshield header, roof, and roof side rail (**Figure 7**). Vertical intrusion was also in the second row at the roof and roof side rails. Evidence of occupant contacts was documented at lower instrument panel, roof, visor, window frame, side interior surfaces, and seat arm rest. Blood was located on the second row headrest, C-pillar, and on the roof. The right side doors were jammed shut. All the glazing was either fixed or closed. The windshield was cracked and holed. All the side and rear hatch glazing was disintegrated.

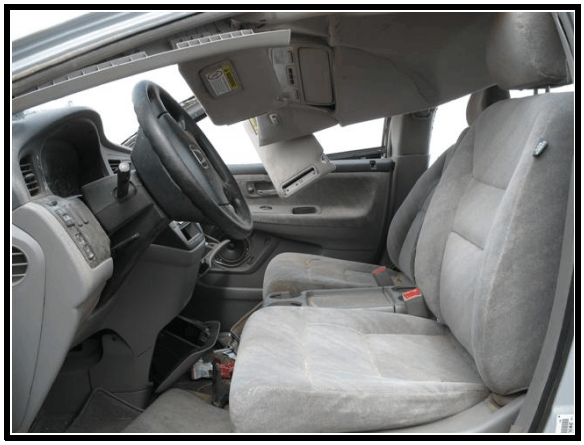

Figure 7. Overview of front row roof intrusion

Manual Restraint System

The Odyssey was equipped with 3-point manual lap and shoulder belts with sliding latch plates for all six outboard seating positions. The third row middle seat was equipped with a manual lap belt. All the outboard seat belts had been removed by the owner prior to the vehicle inspection. The belts associated with the CRSs were inspected during the inspection of the CRSs.

Based on an exemplar vehicle, the driver's safety belt had an Emergency Locking Retractor (ELR) and the remaining outboard safety belts had switchable ELR/Automatic Locking Retractors (ALRs).

The driver's safety belt was equipped with a retractor pretensioner that did not actuate. The anchorage adjustment was in the full-up position. A portion of the seat belt webbing was trapped in the D-ring and showed evidence of loading (**Figure 8**).

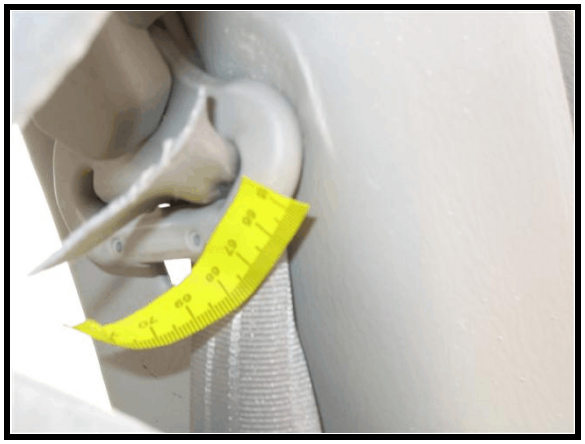

Figure 8. Driver's seat belt D-ring

The front right seat belt and anchorage adjustment was in the full-down position.

The second row left safety belt was used to secure a forward facing CRS. The anchorage adjustment was in the full-down position. The belt was threaded through the forward facing belt path and the shoulder portion of the belt was placed in the CRS shoulder belt lock-off. According to the interviewee, the belt retractor had not been switched and was in the ELR mode. A 68.0 cm (26.8 in) section of the vehicle seat belt webbing had been cut from the vehicle and was still attached to the CRS.

The second row right safety belt was cut from the vehicle and was not present during the inspection.

The third row left safety belt was used to secure a forward facing CRS. The belt was threaded through the forward facing belt path and the shoulder portion of the belt was placed in the CRS shoulder belt lock-off. According to the interviewee, the belt retractor had not been switched and was in the ELR mode. The cut section of the seat belt webbing measured 234.0 cm (92.1 in). The belt was cut 17.0 cm (6.7 in) from the stop button. There were two areas loading marks located, one 33.0 cm (12.9 in) from the stop button and one 43.0 cm (16.9 in) from the stop button.

The third row right safety belt was being used to secure a rear-facing CRS. The belt was routed through the belt path toward the foot area of the CRS. The belt was cut at a point 44.0 cm (17.3 in) from the stop button and the cut section measured 260.0 cm (102.3 in).

It should be noted that the CRS used in this position was from a foreign manufacturer and was not tested using American federal motor vehicle safety standards.

Supplemental Restraint Systems

The Honda was equipped with a steering wheel mounted frontal air bag, a front right passenger top-instrumental panel mounted front air bag, and seat-back mounted side air bags. There were no air bag deployments in this crash.

According to the interviewee, there had not been any service work performed on the air bag and no prior deployments.

Child Restraint Systems

Safeguard F100118 Child Seat (Gray)

The Honda's second row left seat position was occupied by the 6-year-old female occupant. She was seated in a Safeguard F100118 Child Seat (Figure 9). The CRS model number was F100118 and the date of manufacture was 10/24/2007. The CRS was equipped with an adjustable head restraint [adjusted to 14.0 cm (5.5 in) above the seat back], a 5-point internal harness, and the hardware for the Lower Anchors and Tethers for Children (LATCH) system. It was also equipped with safety belt lock-offs which are designed to lock the belt in place in lieu of other belt locking systems such as ALR retractors, locking latch plates or locking clips. The CRS was designed to be used in the forward-facing direction only and by children along the following parameters:

Weight:	Between 10-29 kg (22-65 lbs)
Height:	No more than 145 cm (57 in)
Age:	Greater than one year

The child who occupied this seat met these requirements.

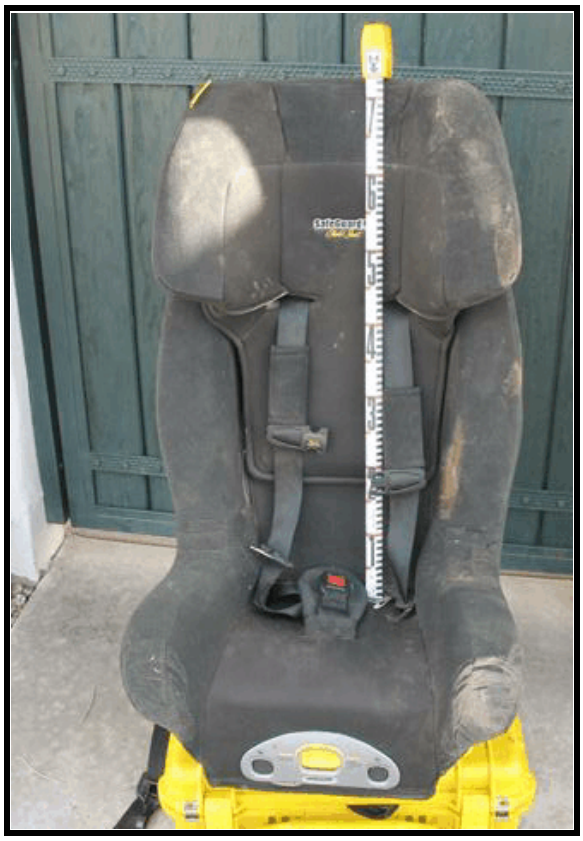

Figure 9. Safeguard Child Seat

The CRS was secured to the vehicle by the lap and shoulder belt. The belt was routed through the belt paths and the belt lock-offs were engaged. The LATCH tether was also used and was attached to the upper tether anchor. The shoulder harness was routed through the single set of top slots and the retainer clip was adjusted to be at the arm pit level. The harness was tightened around the child with the harness adjustment controls.

Safeguard F17510 Child Seat (Red)

The Honda's third row left position was occupied by the 6-year-old female occupant. She was seated in a Safeguard F17510 Child Seat (**Figure 10**). The CRS model number was F17510 and the date of manufacturer was 10/18/ 2007. The CRS was equipped with an adjustable head restraint [adjusted to 16.0 cm (6.3 in) above the seat back], a 5-point internal harness, and the hardware for the LATCH system. It was also equipped with safety belt lock-offs which are designed to lock the belt in place in lieu of other belt locking systems such as ALR retractors, locking latch plates or

locking clips. The CRS was designed to be used in the forward-facing direction only and by children along the following parameters:

Weight:	Between 10-29 kg (22-65 lbs)
Height:	No more than 145 cm (57 in)
Age:	Greater than one year

The child who occupied this seat met these requirements.

The vehicle safety belt was threaded through the rear CRS belt path and the shoulder portion of the belt was placed in the CRS shoulder belt lock-off. According to the interviewee, the belt retractor had not been switched and was in the ELR mode. In addition to the safety belt, the CRS was anchored to the vehicle using a single tether. The tether was routed over the vehicle seat back and attached to the tether attachment hardware on the tailgate sill[1]. The shoulder harness was routed through the single set of top slots and the retainer clip was adjusted to be at the arm pit level. The harness was tightened around the child with the harness adjustment controls.

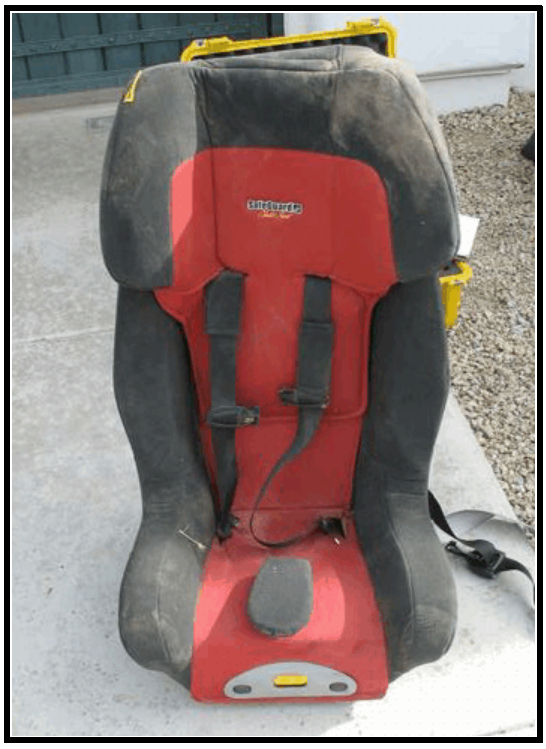

Figure 10. Safeguard Child Seat

Brio Zento[2]

The Honda's third row right seat position was occupied by the 2-year-old female. She was seated in a Brio Zento rear-facing Child Seat (**Figure 11**). The CRS was configured with upper and lower tethers. The lower tether straps are used to create an anchor point. The straps are looped around the vehicle seat bight of the seat in front of the CRS position. The upper tethers attach to the anchor point created by the lower tether straps. The seat was not equipped with standard LATCH hardware. The vehicle lap and shoulder belt was routed through the belt path toward the foot area of the CRS.

Based on information found at the Brio web site, the CRS was intended to be used rear-facing, forward-facing, or as a booster and by children along the

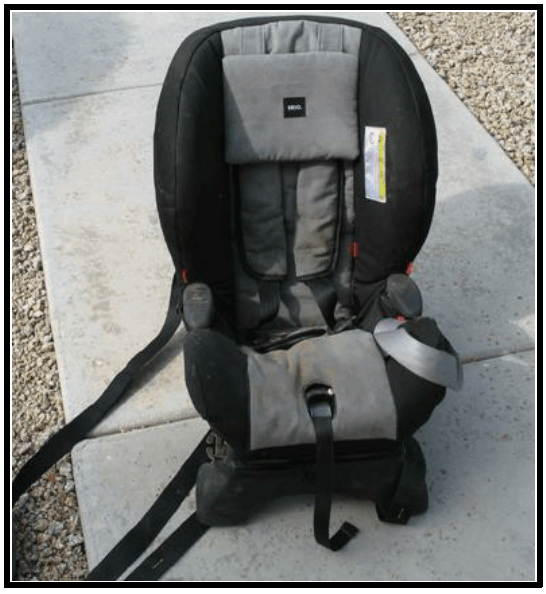

Figure 11. Brio Zento Child Seat

[1]There are three attachment points on the tailgate sill. The owner installed the tether hardware at the two outboard positions using instructions found in the owner's manual.

[2]Not FMVSS approved seat from New Zealand

following parameters:

Weight: Rear-facing 25-0 kg (55-0 lbs)
Front-facing 12-18 kg (26-40 lbs)
Booster 15-25 kg (33-55 lbs)

The child who occupied this seat position met the rear-facing weight requirements.

Rollover

The Static Stability Factor (SSF) for the Honda was 1.32. The SSF of a vehicle is an at-rest calculation of its rollover resistance, which is based on its track width and center of gravity. The Rollover Resistance Rating was four stars, indicating a chance of rollover between 10 and 20 percent.

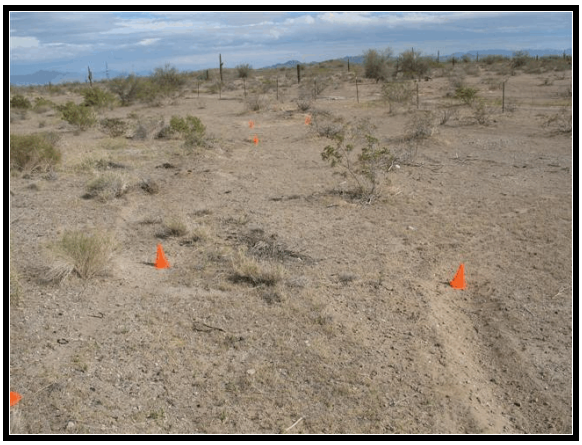

Figure 12. Left side tire trip points

The Honda was traveling eastbound in the left travel lane at a police-reported speed of 121 km/h (75 mph). The vehicle drifted onto the left shoulder and the driver steered to the right and began braking . It began a clockwise rotation, crossed both lanes of travel, and departed the roadway on the right. The Honda continued rotating as it traveled down a descending embankment. The vehicle had traveled approximately 16.0 m (53.0 ft) before both left side tires engaged the ground inducing at left side leading trip rollover (**Figure 12**).

The vehicle rolled six quarter-turns, impacted a barbed wire fence, and came to rest on its roof. The estimated distance from the trip point to final rest was approximately 37.0 m (120.0 ft).

2002 HONDA ODYSSEY OCCUPANTS

Driver Demographics

Age/Sex:	31/Male
Height:	185 cm (73 in)
Weight:	83 kg (183 lbs)
Eyewear:	None
Seat Type:	Bucket
Seat Track Position:	Between middle to rear most.
Manual Restraint Usage:	Lap and shoulder belt
Usage Source:	Vehicle inspection and interview
Air Bags:	Steering wheel mounted frontal air bag and seat-back mounted side air bag did not deploy.
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Exited vehicle through driver's door under own power.
Transport from Scene:	Transported by ground ambulance.
Medical Treatment:	Treated and released.

Driver Injuries

Inj No	Injury	AIS2005/08	Injury Source	Confidence Level
1	Chest contusion	410402.1,9	Seat belt webbing	Certain
2	Abrasion, left shoulder	710202.1,2	Seat belt webbing	Certain
3	Bilateral hip contusions	810402.1,3	Seat belt webbing	Certain
4 5	Lacerations/abrasions, right hand	710600.1,1 710202.1,1	Unknown	Unknown
6	Abrasions, face	210202.1,0	Dirt/debris from ground	Probable

Source: *Trauma evaluation, radiology findings review, interviewee*

Driver Kinematics

The 31-year-old male driver of the Honda was seated in an upright posture and was restrained by the 3-point manual lap and shoulder belt. The shoulder belt was adjusted in the full up position and the bucket seat was slightly reclined. The Honda was traveling eastbound in the left travel lane at a police-reported speed of 121 km/h (75 mph). According to the interviewee, the driver's hands were on the steering wheel at the 11 and 1 o'clock positions, his left foot was on the floor, and his right foot was on the accelerator. As the vehicle drifted onto the left shoulder, the driver steered to the right and began braking. The Honda began a clockwise rotation and the driver was displaced to the left. The vehicle crossed both lanes of travel and departed the roadway on the right. As the vehicle tripped, the driver displaced to the left. The driver was displaced in multiple directions as the vehicle rolled and engaged and loaded the lap and shoulder belt, causing an abrasion to his left shoulder and bilateral hip contusions. Debris entered the vehicle during the rollover causing minor facial abrasions. The driver came to rest upside down in his safety belt. He was able to unbelt himself and exited the vehicle under his own power. The driver was transported by a ground ambulance to a local hospital where he was treated and released.

Second Row Left Occupant Demographics (02)

Age/Sex:	6/Female
Height:	117 cm (46 in)
Weight:	20 kg (44 lbs)
Eyewear:	None
Seat Type:	Bucket
Seat Track Position:	Between middle to rear most
Manual Restraint Usage:	Lap and shoulder belt used with CRS
Usage Source:	Vehicle inspection and interview
Air Bags:	None
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Removed from vehicle by bystanders
Transport from Scene:	Transported by ground ambulance
Medical Treatment:	Treated and released

Second Row Left Occupant Injuries (02)

Inj No	Injury	AIS2005/08	Injury Source	Confidence Level
1	Abrasion, right forearm	710202.1,1	Unknown	Unknown
2	Abrasions, face	210202.1,0	Dirt/debris from ground	Probable
3	Contusion, left elbow	710402.1,2	Door, rear upper quadrant	Possible
4	Abrasions, left forearm	710202.1,2	Flying glass	Possible

Source: Interviewee

Second Row Left Occupant Kinematics (02)

The 6-year-old female second row left occupant was seated in a tethered forward-facing CRS and was asleep. The shoulder harness was routed through the single set of top slots and the chest clip was adjusted to be at the arm pit level. The harness was tightened around the child with the harness adjustment controls. As the vehicle went out of control and tripped, this occupant was displaced to the left. She was displaced in multiple directions as the vehicle rolled. She likely contacted the left door and sustained abrasions on the left arm from flying glass. The bottom of the CRS was displaced to the left during the rollover sequence (**Figure 13**). The child came to rest upside down in the CRS. She was extricated by bystanders and transported to a local hospital where she was treated and released.

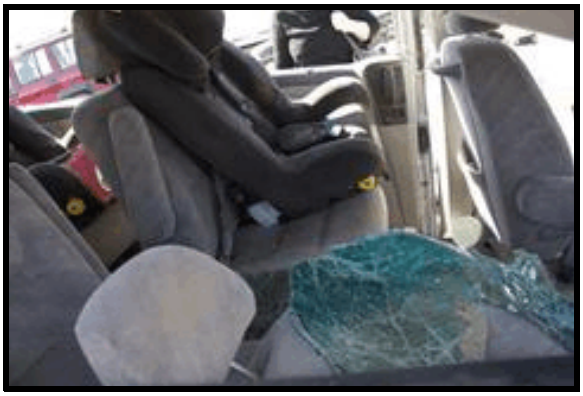

Figure 13. Second row left CRS (owner photo)

Second Row Right Occupant Demographics (03)

Age/Sex:	27/Female
Height:	165 cm (65 in)
Weight:	85 kg (187 lbs)
Eyewear:	Glasses
Seat Type:	Bucket
Seat Track Position:	Between middle to rear most
Manual Restraint Usage:	Lap and shoulder belt
Usage Source:	Vehicle inspection and interview
Air Bags:	None
Alcohol/Drug Involvement:	None
Egress from Vehicle:	Extricated from vehicle by rescue personnel
Transport from Scene:	Transported by ground ambulance
Medical Treatment:	Treated and released

Second Row Right Occupant Injuries (03)

Inj No	Injury	AIS2005/08	Injury Source	Confidence Level
1	Contusion, top of head	110402.1,4	Roof	Certain
2	Contusion, left jaw	210402.1,2	Unknown	Unknown
3	Abrasion, left side of face	210202.1,2	Cell phone	Probable
4	Laceration, left side of face	210600.1,2	Cell phone	Certain
5	Contusion, right shoulder	710402.1,1	Seat belt webbing	Certain
6	Bilateral hip contusions	810402.1,3	Seat belt webbing	Certain
7	Contusion, right elbow	710402.1,1	Arm rest	Certain
8	Abrasions, right forearm	710202.1,1	Road surface	Probable
9	Abrasions, tops of both feet	810202.1,3	Debris	Probable

Source: Trauma room physician assessment form, radiology findings review, interviewee

Second Row Right Occupant Kinematics (03)

The 27-year-old female second row right occupant was seated in an upright posture and was wearing the 3-point manual lap and shoulder belt. The shoulder belt anchorage was in the full-down position and the seat was adjusted to be between middle to rear most track positions. She was holding her cell phone in left hand and was viewing a web site on the phone. As the vehicle began the clockwise rotation, this occupant was displaced to the left. As the vehicle rolled, she was displaced in multiple directions. The cell phone came out of her hand and struck her in the face. She loaded the safety belts, causing contusions to her right shoulder and both hips. Her head contacted the roof and she sustained a contusion to the top of her head. Her right arm came into contact with the roadway surface and she sustained an abrasion to the forearm. She loaded the right arm rest and sustained a contusion to the right elbow. She came to rest upside down in her safety belt. She was the last person extricated from the vehicle. Rescue personnel cut her safety belt and removed the second row right door during the extrication. She was transported by ground ambulance to a local hospital where she was treated and released.

Third Row Left Occupant Demographics (04)

Age/Sex:	4/Female
Height:	109 cm (43 in)
Weight:	20 kg (44 lbs)
Eyewear:	None
Seat Type:	Bench with folding back

Seat Track Position: N/A
Manual Restraint Usage: Lap and shoulder belt used with CRS
Usage Source: Child seat inspection and interview
Air Bags: None
Alcohol/Drug Involvement: None
Egress from Vehicle: Extricated by bystanders
Transport from Scene: Transported by air ambulance to trauma center
Medical Treatment: Hospitalized for one day

Third Row Left Occupant Injuries (04)

Inj No	Injury	AIS2005/08	Injury Source	Confidence Level
1	Fracture, left tibia	854000.2,2	C-pillar	Probable
2	Laceration, left foot, 8.0 cm (3.1 in)	810602.1,2	Side glass	Probable
3	Contusion, left forearm	710402.1,2	Side surface	Probable
4	Facial abrasions	210202.1,0	Roadway debris	Probable

Source: Interviewee

Third Row Left Occupant Kinematics (04)

The 4-year-old female second row left occupant was seated in a tethered forward-facing CRS and was either asleep or dozing. The shoulder harness was routed through the single set of top slots and the chest clip was adjusted to the arm pit level. The harness was tightened around the child with the harness adjustment controls. According to the interviewee, it was this occupant's practice to place both feet on the seat back in front of her seat position. As the vehicle went out of control, this occupant was displaced to the left. As the vehicle tripped, this occupant was displaced to the left and then was displaced in multiple directions as the vehicle rolled. Her left foot was in contact with the seat at the beginning of the rollover. As the vehicle rolled onto its left side, her foot came into contact with the side glass and her lower left leg engaged the C-pillar. The child came to rest upside down in the CRS. She was extricated by bystanders and transported to a local trauma center where she was hospitalized for one day.

Third Row Right Occupant Demographics (05)

Age/Sex: 2/Female
Height: 100 cm (39 in)
Weight: 17 kg (37 lbs)
Eyewear: None
Seat Type: Bench with folding back
Seat Track Position: N/A
Manual Restraint Usage: Lap and shoulder belt used with CRS
Usage Source: CRS inspection and interviewee
Air Bags: None
Alcohol/Drug Involvement: None
Egress from Vehicle: Extricated from vehicle by bystanders

Transport from Scene:	Transported by ground ambulance
Medical Treatment:	Examined, not injured

Third Row Right Occupant Injuries (05)
Not injured.

Third Row Right Occupant Kinematics (05)
The 2-year-old female third row right occupant was seated in a rear-facing CRS. She was properly restrained and did not sustain any injuries during the rollover. She came to rest upside down in the CRS. She was transported to local hospital where she was examined and released.

SCENE DIAGRAM