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ON-SITE SIDE IMPACT INFLATABLE OCCUPANT PROTECTION INVESTIGATION

CASE NUMBER - IN08022
LOCATION - TEXAS
VEHICLE - 2007 HONDA ACCORD EX
CRASH DATE - March 2008

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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. *Abstract* This report covers an on-site investigation that involved a 2007 Honda Accord EX and a 1994 Honda Accord LX that collided within an intersection. The focus of this on-site investigation was the 2007 Honda Accord EX, which was equipped with side curtain air bags and front seat-back mounted side impact air bags that deployed on the right side. The 2007 Honda was traveling south on a divided city street when the driver experienced a seizure and lost consciousness. The front right passenger steered the vehicle left as it accelerated to avoid impacting the back of a southbound vehicle and the 2007 Honda entered the northbound lanes. The vehicle traveled south in the northbound lane as the front right passenger attempted to control it. It entered an intersection on a red traffic signal where the front of the vehicle impacted the left side of the eastbound 1994 Honda. The impact caused the deployment of the 2007 Honda's driver's and front right passenger's frontal air bags. As both vehicle's rotated counterclockwise, the right front door of the 2007 Honda impacted the left quarter panel of the 1994 Honda. This impact caused the deployment of the 2007 Honda's front right seat back-mounted side impact air bag and right side curtain air bag. The 2007 Honda's driver and front right passenger were transported by ambulance to a hospital where they were both admitted for treatment of their injuries.			
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CRASH DIAGRAM 13

The focus of this on-site investigation was the 2007 Honda Accord EX (**Figure 1**), which was equipped with side curtain air bags and front seat-back mounted side impact air bags that deployed on the right side. This crash was brought to the National Highway Traffic Safety Administration's attention on May 7, 2008 by the sampling activities of the National Automotive Sampling System. This on-site investigation was assigned on May 5, 2008. The crash involved a 2007 Honda Accord EX and a 1994 Honda Accord LX that collided within an intersection. The crash occurred in March, 2008 at 2024 hours, in Texas and was investigated by the applicable city police department. This contractor inspected the vehicles and scene on May 15 and 16, 2008. Numerous attempts to contact and interview the 2007 Honda's driver were unsuccessful. This report is based on the police crash report, scene and vehicle inspections, exemplar vehicle inspections, occupant medical records, occupant kinematic principles, and this contractor's evaluation of the evidence.

Figure 1: The damaged 2007 Honda Accord EX

CRASH CIRCUMSTANCES

Crash Environment: The trafficway on which the 2007 Honda was traveling was a six-lane, divided city street, traversing in a north-south direction. The vehicle was traveling south approaching a four-leg intersection. The north leg of the intersection had two southbound through lanes, a left turn lane, and three northbound through lanes. The raised median was constructed of grass and concrete. Each through lane was nominally 3.6 m (11.8 ft) in width. The width of the median was variable and was 1.5 m (4.9 ft) wide near the intersection. Roadway pavement marking consisted of broken white lane lines and raised markers, which designated the left turn lanes. The trafficway on which the 1994 Honda was traveling was a five-lane, divided city street, traversing in an east-west direction. The vehicle was traveling east in the left through lane approaching the intersection. Its roadway had a left turn lane and two eastbound through lanes with a right turn channel. The trafficway was divided by a 1.2 m (3.9 ft) wide raised concrete median and there were two westbound through lanes. The 1994 Honda's travel lane and left turn lane were 3.3 m (10.8 ft) in width while the right through lane was 4.2 m (13.8 ft) in width. Roadway pavement marking consisted of raised markers and pavement reflectors designating the eastbound through lanes. The intersection was controlled by three phase traffic signals and the speed limit for both trafficways was 56 km/h (35 mph). At the time of the crash, the light condition was dark but lighted with overhead street lights and the atmospheric condition was cloudy. The roadway pavement was dry bituminous for the 2007 Honda and dry concrete of the 1994 Honda. The traffic density was unknown and the site of the crash was a combination of suburban residential and commercial. See the Crash Diagram on page 13 of this report.

Pre-Crash: The 2007 Honda was occupied by a restrained 25-year-old male driver and a restrained 23-year-old female front right passenger. The vehicle was initially traveling south when the driver experienced a seizure. The front right passenger told police that when the seizure occurred, the driver lost consciousness and pushed the accelerator to the floor. As the vehicle proceeded south out of control, the front right passenger attempted to pull the driver's foot off the accelerator while also attempting to steer the vehicle. The driver's foot was wedged between the accelerator and the lower center instrument panel, and the passenger was unable to move it. The front right passenger steered the vehicle left to avoid impacting the back of another southbound vehicle and crossed into the northbound lanes at an intersection. The vehicle continued south in the northbound lanes at a high rate of speed toward the intersection (**Figure 1**) where the crash occurred. A witness estimated the vehicle's travel speed at 129 km/h (80 mph). Meanwhile, the 1994 Honda was traveling east in the left through lane (**Figure 2**) approaching the intersection. The traffic signal for eastbound traffic was green and the 1994 Honda's driver intended to continue straight through the intersection.

Figure 1: 2007 Honda southbound in the northbound lanes approaching the intersection; number on pavement indicates meters to impact

Figure 2: 1994 Honda's approach in the inside through lane to impact within the intersection

The driver of the 2007 Honda had a history of seizures beginning when he was 16 years old. He was taking Lamotrigine twice a day to control the on-set of the seizures. He had taken the medication on the morning of the crash. The blood test results reported in the medical records indicated that he tested less than 2 ug/ml. The therapeutic range for seizure control was reported as 3-14 ug/ml. The driver told police that his last seizure was two years ago.

Figure 3: Damage to front of 2007 Honda from impact with left side of 1994 Honda

Crash: The 2007 Honda (**Figure 3**) entered the intersection on a red signal light and the front of the vehicle impacted the left side of the 1994 Honda (event 1, **Figure 4**). The 2007 Honda's direction of force was within the 01 clock sector and the impact force was sufficient to trigger the deployment of the driver's and front right passenger's frontal air bags. Both vehicles rotated counterclockwise and the 1994 Honda's left

quarter panel impacted the 2007 Honda's right fender and right front door (event 2, **Figure 5**). The direction of principal force was within the 03 clock sector and the impact force was sufficient to trigger deployment of 2007 Honda's right side curtain air bag and front right seat back-mounted side impact air bag. The vehicles remained engaged and traversed 27 m (88.6 ft) southward into the southern leg of the intersection and departed the east roadside. As the vehicle's traveled southeast toward the final rest positions, the left side of the 2007 Honda impacted a bus stop sign (event 3). The impact broke the sign off at the base and it was dragged along with the vehicle and impacted the 1994 Honda's left quarter panel (event 4) as the vehicles came to final rest on the sidewalk heading southeast (**Figure 6**). The 2007 Honda traveled approximately 48 m (157.4 ft) from the impact area to final rest. The 1994 Honda traveled 49 m (160.7 ft) from the impact area to final rest.

Figure 4: Damage to left side of 1994 Honda from impact with front of 2007 Honda

Figure 5: Damage to right fender and right front door of the 2007 Honda from impact with 1994 Honda left quarter panel; arrow shows overlapping damage from bus stop sign impact

Post-Crash: The police were notified of the crash at 2025 hours and arrived on scene at 2026 hours. Emergency medical and rescue personnel also responded to the crash scene. The 2007 Honda's driver and front right passenger were transported by ambulance to a hospital. The 1994 Honda's driver and front right passenger were pronounced deceased at the crash scene and their bodies were removed by the medical examiner. The driver had been fully ejected and the front right passenger partially ejected during the crash. Both vehicles were towed from the crash scene due to damage.

Figure 6: Police on-scene photo of final rest positions of both vehicles

CASE VEHICLE

The 2007 Honda Accord EX was a front wheel drive, four-door sedan (VIN: 1HGCM66857A------) equipped with 3.0 L, V6 engine, automatic transmission, four wheel anti-lock disc brakes, traction control, and electronic stability control. The front row was equipped with bucket seats, adjustable head restraints, lap-and-shoulder belts, dual stage driver and front right passenger frontal air bags, seat back-mounted side impact air bags, and side curtain air bags that protected all outboard seating positions. The second row was equipped with

a bench seat with folding backs, lap-and-shoulder belts, adjustable head restraints in the outboard seating positions, and Lower Anchors and Tethers for Children (LATCH) in the outboard seating positions. The vehicle's mileage at the time of the inspection could not be determined because it was equipped with an electronic odometer. The vehicle's specified wheelbase was 274 cm (107.9 in).

Figure 7: Top view of the front crush on the 2007 Honda

CASE VEHICLE DAMAGE

Exterior Damage: The 2007 Honda's initial impact with the 1994 Honda (event 1) involved the front plane. The front bumper, grille, hood, both headlamp/turn signal assemblies and both fenders were directly damaged. The direct damage began at the front right bumper corner and extended across the entire front bumper (**Figure 3**). The residual maximum crush was 21 cm (8.3 in) occurring at both C_4 and C_5 (**Figure 7**). The table below shows the vehicle's front crush profile.

Units	Event	Direct Damage		Field L	C_1	C_2	C_3	C_4	C_5	C_6	Direct	Field L
		Width CDC	Max Crush								±D	±D
cm	1	118	21	118	18	16	19	21	21	16	0	0
in		46.5	8.3	46.5	7.1	6.3	7.5	8.3	8.3	6.3	0.0	0.0

The second impact with the 1994 Honda (event 2) involved the right side. The right fender, right front door, right A-pillar, and side view mirror were directly damaged. The impact with the bus stop sign (event 3) also involved the right front door, mirror and sill. The damage from both impacts overlapped and extended to 89 cm (35 in) rear of the right front axle. The induced damage from the front impact (event 1) also overlapped the damage to the right fender and no crush profile was taken.

The vehicle's right side wheelbase was reduced 6 cm (2.4 in) and the left side wheelbase was reduced 15 cm (5.9 in). The induced damage involved the hood, both fenders, and the right front door.

Damage Classification: The 2007 Honda's Collision Deformation Classification (CDC) for the front impact (event 1) was **01-FDEW-1** (**20** degrees) . The CDC for the right side impact (event 2) was **03-RYAW-2** (**90** degrees). The CDC for the bus sign impact (event 3) was **02-RPEN-2** (**70** degrees). The Damage algorithm of the WinSMASH program calculated the vehicle's total Delta V for the front impact as 55 km/h (34 mph). The Longitudinal, and Lateral velocity changes were -52 km/h (-32 mph) and -19 km/h (-12 mph).

The manufacturer's recommended tire size was P215/50R17. The vehicle was equipped with the recommended size tires. The 2007 Honda's tire data are shown in the table below.

Tire	*Measured Pressure*		*Vehicle Manufacturer's Recommended Cold Tire Pressure*		*Tread Depth*		*Damage*	*Restricted*	*Deflated*
	kPa	psi	kPa	psi	milli-meters	32nd of an inch			
LF	Flat	Flat	221	32	7	9	Hole in sidewall	Yes	Yes
LR	207	30	200	29	6	8	None	No	No
RR	241	35	200	29	6	8	None	No	No
RF	214	31	221	32	6	8	None	Yes	No

Vehicle Interior: Inspection of the vehicle's interior revealed occupant contact evidence on the driver's air bag, steering wheel rim (**Figure 8**), lower instrument panel on each side of the steering column (**Figures 8** and **9**), and right portion of the center console. The right half of the steering wheel was deformed forward 4 cm (1.6 in), probably as a result of the driver riding down the deployed air bag and loading the steering wheel. The lower instrument panel was deformed on each side of the steering column due to loading by the driver's knees. The driver's air bag had a few blood stains on it, but they appeared to related to blood spatter and not direct occupant contact. The right portion of the center lower instrument panel was discolored, probably due to loading by the front right passenger's left knee.

Figure 8: Left side view of deformation on the steering wheel and left lower instrument panel (arrow) due to driver loading

Figure 9: Deformation of the center lower instrument panel due to loading by the driver's right knee

All the vehicle's doors remained closed and operational and all of the window glazing was either fixed or closed. The windshield glazing was in place and cracked due to contact by the deploying front right passenger frontal air bag. The right rear window was in place and cracked from impact forces while the remaining side window glazing was undamaged. The vehicle sustained no passenger compartment intrusion.

The 2007 Honda was equipped with a Certified Advanced 208-Compliant (CAC) frontal air bag system that consisted of dual stage driver and front right passenger frontal air bags, driver seat position sensor, seat belt usage sensors, retractor-mounted pretensioners, and a front right passenger weight presence sensor. The front impact sensors were located on the left and right inner fenders below the headlamps. The manufacturer has certified that the vehicle is compliant to the Advanced Air Bag portion of the Federal Motor Vehicle Safety Standard (FMVSS) No. 208.

Figure 10: Driver's deployed air bag; yellow tape highlights areas with blood stains

The vehicle's side air bag system consisted of front seat back-mounted side impact air bags and side curtain air bags that protected all outboard seating positions. The side impact sensors were located within the left and right door sills.

Figure 11: Front right passenger's deployed air bag

The driver's frontal air bag was located within the steering wheel hub. An inspection of the air bag module cover flaps and the air bag fabric revealed that the cover flaps opened at the designated tear points. There was no evidence of damage to the module cover flaps or air bag fabric. The blood stains mentioned in the vehicle interior section above were located on the upper center and upper right portions of the air bag (**Figure 10**). The deployed air bag was round with a diameter of 59 cm (23.2 in). The air bag was designed with four tethers and two vent ports.

Figure 12: Front right passenger seat back-mounted side impact air bag

The front right passenger's frontal air bag was located within the top of the instrument panel. The inspection of the air bag module cover flaps and air bag fabric revealed that the cover flaps opened at the designated tear points. There was no evidence of damage to the air bag fabric or cover flaps. The deployed air bag (**Figure 11**) was hexagonal and was 62 cm (24.4 in) at its widest point and 54 cm (21.3 in) in height. The air bag was designed with two tethers and two vent ports. There was no evidence of occupant contact on the air bag.

The front right seat back-mounted side impact air bag (**Figure 12**) was located within the outboard side of the seat back and deployed through a tear seam. The air bag was oval with a maximum width of 23 cm (9.1 in) and a height of 32 cm (12.6 in). The air bag was designed without vent ports. The inboard and outboard sides of the air bag were stitched together in a circular pattern near the top and bottom in order to shape the air bag during deployment. An inspection of the air bag and the seat back revealed that the tear seam opened at the designated tear points. There was no damage or discernable evidence of occupant contact on the air bag.

Figure 13: Right side curtain air bag (front portion)

The right side curtain air bag was located within the right roof side rail and extended from the A-pillar to the D-pillar. The curtain air bag (**Figures 13**) was 170 cm (66.9 in) in length and 37 cm (14.6 in) in height. The air bag was designed with two vent ports, one at the lower front corner and one at the back. The curtain air bag deployed uniformly from under the roof liner along the roof side rail. There was no damage or discernable evidence of occupant contact on the air bag.

Figure 14: Arrow shows load abrasion on plastic of driver's D-ring

MANUAL RESTRAINT SYSTEM

The 2007 Honda was equipped with lap-and-shoulder belts for all five seating positions. The driver's position consisted of continuous loop belt webbing, an Emergency Locking Retractor (ELR), and an adjustable upper anchor that was in the middle position. The front right seat belt was similar but had a switchable ELR/Automatic Locking Retractor (ALR) and the adjustable upper anchor was in the full down position. Both front seat belts were also equipped with retractor mounted pretensioners that actuated during the crash. The second row lap-and-shoulder belts were similar to the front right seat belt but were not equipped with pretensioners or adjustable upper anchors.

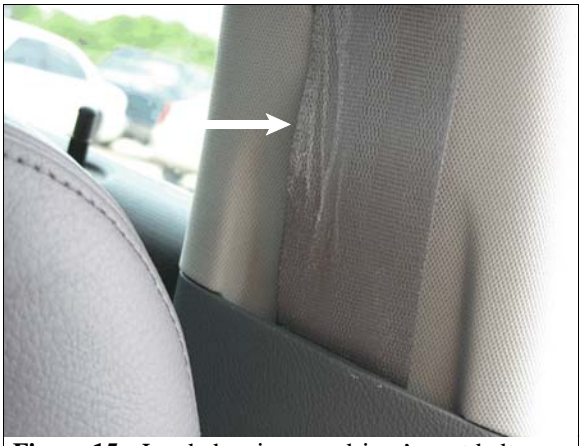

Figure 15: Load abrasions on driver's seat belt

The inspection of the driver's seat belt assembly revealed load marks on the D-ring and belt webbing (**Figures 14** and **15**). The belt webbing would not retract due to actuation of the

pretensioner consistent with the deployment of the driver's frontal air bag. The evidence indicated that the driver was restrained by the lap-and-shoulder belt in this crash.

The inspection of the front right passenger's seat belt assembly revealed subtle load marks on the D-ring. The belt webbing would not retract due to actuation of the pretensioner consistent with the deployment of the driver's frontal air bag. A blood stain was also present on the belt webbing in a location that would have been inside of the retractor had the belt not been in us. The evidence indicated that the front right passenger was restrained by the lap-and-shoulder belt in this crash. The remaining seat positions were unoccupied.

CASE VEHICLE DRIVER KINEMATICS

The 2007 Honda's driver [25-year-old, male; 183 cm and 118 kg (72 in, 260 lbs)] was seated in an unknown posture. The seat track was adjusted to the full rear position and the seat back was slightly reclined. While the vehicle was normally equipped with adjustable head restraints, the driver's head restraint had been removed and was not present at the inspection. The tilt steering column was adjusted to the center position and the telescoping adjustment was at the full forward position. The seat track position was consistent with the driver's height.

The 2007 Honda's front impact with the 1994 Honda displaced the driver forward and slightly to the right opposite the vehicle's 1 o'clock direction of force. He loaded the seat belt and his face and chest loaded the deployed air bag and his knees loaded the lower instrument panel (including the knee bolster). The driver rode down the air bag and loaded the steering wheel, which bent the right half section forward 4 cm (1.6 in, **Figure 16**). The driver sustained a through and through laceration on the middle lower lip due to loading the steering wheel rim and contusions on the chest from loading the air bag and the seat belt. He sustained contusions on the abdomen and right hip from loading the seat belt. Contact with the air bag also caused abrasions on the left elbow and both upper thighs. The driver's upper thighs were also contused from loading the steering wheel.

Figure 16: Right side view of deformation of steering wheel

The driver was transported by ambulance to a hospital and was admitted overnight. Based on the driver's medical records, the admission was probably related to controlling his Lamictal anticonvulsant medication[1]. The table below shows the driver's injuries and injury sources.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
1	Laceration upper lip at frenulum and through and through middle lower lip	minor 290602.1,8	Steering wheel rim	Probable	Hospitalization records
2	Contusion to chest, not further specified	minor 490402.1,4	Air bag, driver's	Probable	Hospitalization records
3	Contusion diagonally across chest, not further specified	minor 490402.1,4	Torso portion of safety belt system	Certain	Hospitalization records
4	Contusion abdomen, right lower quadrant, probably diagonally	minor 590402.1,1	Torso portion of safety belt system	Certain	Hospitalization records
5	Contusion right hip, not further specified	minor 590402.1,1	Lap portion of safety belt system	Certain	Hospitalization records
6	Abrasion right elbow, not further specified	minor 790202.1,1	Air bag, driver's	Probable	Hospitalization records
7	Abrasions right and left inguinal areas and upper anterior thighs	minor 890202.1,3	Air bag, driver's	Probable	Hospitalization records
8	Contusions right and left inguinal areas and left upper thigh	minor 890402.1,3	Steering wheel rim	Probable	Hospitalization records

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[1] ***Lamictal (la-mik′tal)***: trademark for a preparation of ***lamotrigine***.

lamotrigine (la-mo′tr-jen): an anticonvulsant used in the treatment of partial seizures in adult patients formerly treated with an enzyme-inducing anticonvulsant (e.g., carbamazepine) and as an adjunct in the treatment of partial seizures in adults with epilepsy and of generalized seizures associated with *Lennox-Gastaut syndrome*; it is also used as a mood stabilizer in the treatment of bipolar I disorder. Administered orally.

Lennox syndrome, Lennox-Gastaut syndrome: an atypical form of *absence epilepsy* characterized by diffuse slow spike waves, often with atonic, tonic, or clonic seizures and mental retardation; there may also be other neurological abnormalities or multiple seizure types. Unlike typical *absence epilepsy*, it may persist into adulthood. Called also *petit mal variant*.

epilepsy (ep′i-lep"se) **[Gr. epilpsia seizure]**: any of a group of syndromes characterized by paroxysmal transient disturbances of the brain function that may be manifested as episodic impairment or loss of consciousness, abnormal motor phenomena, psychic or sensory disturbances, or perturbation of the autonomic nervous system. A single episode is called a ***seizure***. Many types of epilepsy are combinations of different kinds of seizures. Epilepsy is classified as either ***symptomatic*** or ***idiopathic*** according to whether the cause is known or unknown. Both of these types may be further subdivided into partial and generalized types depending on whether the seizures begin with localized, limited brain dysfunction or with widespread brain dysfunction.

absence epilepsy: epilepsy characterized by absence seizures, usually having its onset in childhood or adolescence; called also *petit mal*, *petit mal e.*, *absence*, and *minor e*.

minor epilepsy: ***absence e***.

petit mal epilepsy: ***absence e***.

The front right passenger [23-year-old, female;165 cm and 54 kg (65 in, 120 lbs)] was leaning over to the left attempting to steer the vehicle with her right hand and remove the driver's foot from the accelerator with her left hand. The seat track was adjusted to the full rear position and the seat back was slightly reclined. While the vehicle was normally equipped with adjustable head restraints, the front right passenger's head restraint had been removed and was not present at the inspection.

The 2007 Honda's front impact with the 1994 Honda displaced the front right passenger forward and slightly to the right opposite the vehicle's 1 o'clock direction of force. While the passenger was out of position leaning to the left, the loading evidence on the seat belt and the injury information indicated that the shoulder belt was still over her right shoulder. She loaded the seat belt causing a comminuted, displaced, fracture of the right clavicle, a fracture of the right transverse process of C_7, a fracture of $T_{12,}$ and a grade 3 pseudoaneurysm to the right vertebral artery at C6 and C_7. The passenger's head probably loaded the driver's deploying air bag, which caused a nonanatomic brain injury with loss of consciousness of less than 30 minutes. The passenger's left arm also probably loaded the center lower instrument panel, which caused a comminuted fracture of the left humerus. There was no evidence that the front right passenger interacted with the front right seat back-mounted side impact air bag or right side curtain air bag during the crash.

CASE VEHICLE FRONT ROW RIGHT PASSENGER INJURIES

The front right passenger was transported by ambulance to a hospital and admitted for treatment of her injuries. She was hospitalized for eight days. The table below shows the passenger's injuries and injury sources.

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
1	Nonanatomic brain injury with loss of consciousness less than 30 minutes	moderate 160202.2,0	Air bag, driver's	Probable	Hospitalization records
2	Injury {pseudoaneurysm, grade 3} to right vertebral artery at C_6-C_7 level	moderate 321099.2,1	Torso portion of safety belt system {Indirect injury}	Probable	Hospitalization records
3	Fracture right transverse process C_7	moderate 650220.2,6	Torso portion of safety belt system {Indirect injury}	Probable	Hospitalization records
4	Fracture, compression, 5%, anterior wedge, superior end plate T_{12}	moderate 650432.2,7	Lap portion of safety belt system {Indirect injury}	Probable	Hospitalization records
5	Fracture, comminuted, displaced, mid-shaft right clavicle	moderate 752200.2,1	Torso portion of safety belt system	Certain	Hospitalization records

Injury Number	Injury Description (including Aspect)	NASS Injury Code & AIS 90	Injury Source	Source Confidence	Source of Injury Data
6	Fracture, comminuted, distal one-third shaft {supracondylar} left humerus with significant angulation and displacement	serious 752604.3,2	Center lower instrument panel	Probable	Hospitalization records
7	Abrasion, small, superficial, left lateral elbow	minor 790202.1,2	Center instrument panel	Probable	Hospitalization records
8	Abrasion {friction burn} right hand, not further specified	minor 790202.1,1	Air bag, driver's	Probable	EMS treatment record
9	Abrasion {friction burn} right upper leg {near hip}, not further specified	minor 890202.1,1	Lap portion of safety belt system	Possible	Emergency room records
10	Abrasion left knee, not further specified	minor 890202.1,2	Center lower instrument panel	Probable	Emergency room records

OTHER VEHICLE

The 1994 Honda Accord LX was a front wheel drive, 4-door sedan (VIN: JHMCD5533RC------), equipped with a 2.2L, 4-cylinder engine and 5-speed manual transmission.

Exterior Damage: The 1994 Honda's initial impact with the 2007 Honda involved the left side (**Figure 14**). The left side doors, left fender, A, B and C-pillars, and the left quarter panel sustained direct damage. The direct damage began 20 cm (7.9 in) rear of the left front axle and extended 226 cm (89 in) rearward along the left side of the vehicle. Due to the separation of the left rear door latch, the crush measurements were taken at the mid door level as well as the sill. There was also separation of the sill that occurred below the left rear door. As a result, the crush at the two levels was equal at C_4-C_6, and the maximum residual crush was 140 cm (55.1 in) at the mid-door level occurring at C_4. The door sill differential, which was measured at the point of maximum crush was therefore 0 cm. The table below shows the left side crush profile, which reflects the average of the two levels of crush.

Units	Event	Direct Damage		Field L	C_1	C_2	C_3	C_4	C_5	C_6	Direct	Field L
		Width CDC	Max Crush								±D	±D
cm	1	226	140	249	10	27	73	140	117	43	-14	-24
in		89.0	55.1	98.0	3.9	10.6	28.7	55.1	46.1	16.9	-5.5	-9.4

The 1994 Honda's second impact with the 2007 Honda (event 2) involved the left quarter panel. The induced damage from the side impact as well as the damage from the bus stop sign

impact (event 4) overlapped the damage to the quarter panel and no crush measurements were taken.

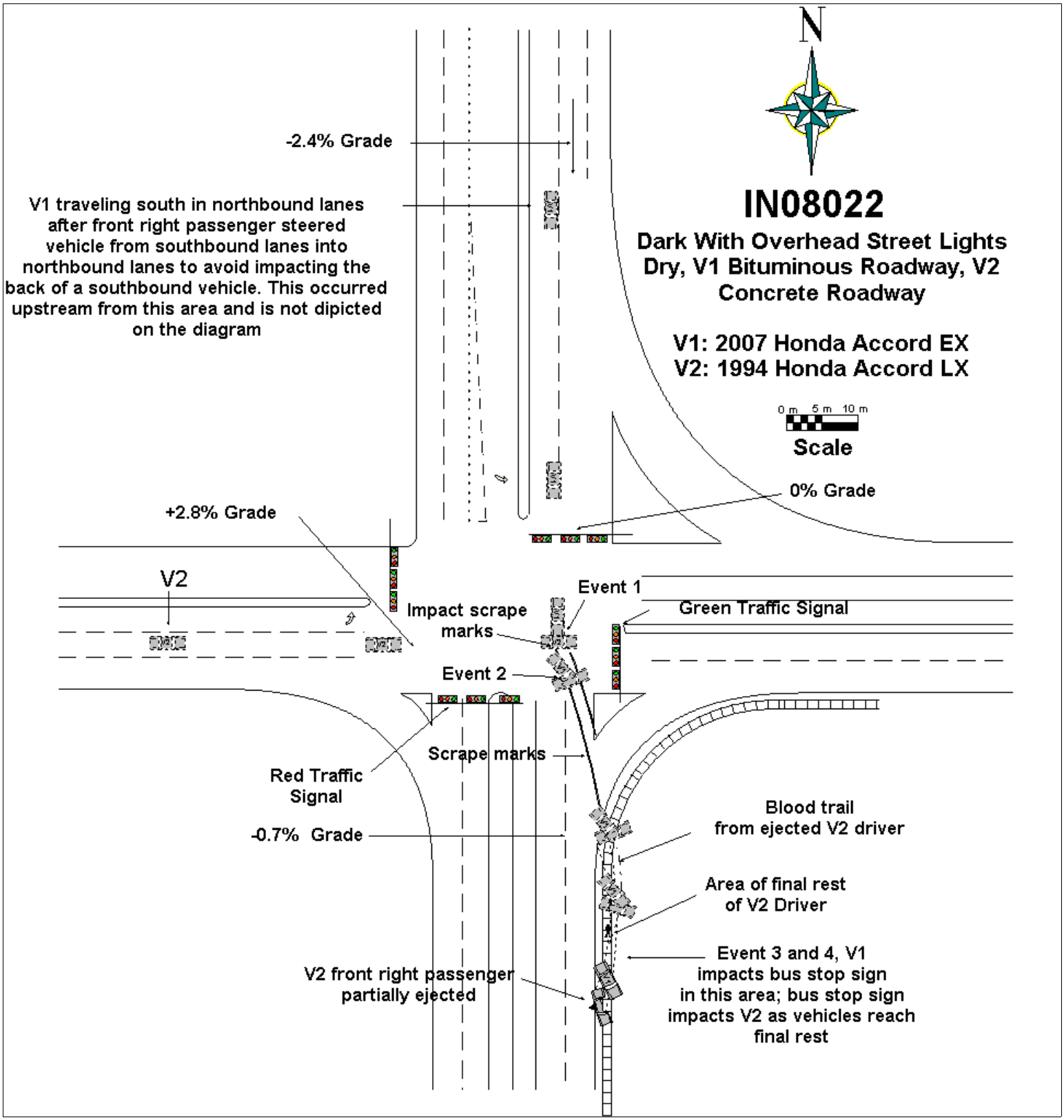
The vehicle's left side wheelbase was reduced 30 cm (11.8 in) while the right side wheelbase was extended 29 cm (11.4 in). The induced damage involved the left fender, hood, roof, right fender, right front and rear doors, and the right quarter panel.

Damage Classification: The CDC for the 1994 Honda's left side impact (event 1) was **10-LDAW-7** (**290** degrees). The CDC for the impact to the left quarter panel (event 2) was **09-LBEW-2** (**270** degrees). The CDC for the bus stop sign impact to the left quarter panel (event 4) was **09-LBEN-2** (**270** degrees). The Damage algorithm of the WinSMASH program calculated the total Delta V for event 1 as 63 km/h (39 mph). The longitudinal and lateral velocity changes were -22 km/h (-14 mph), and 59 km/h (37 mph).

The manufacturer's recommended tire size was P185/70R14. The vehicle was equipped with the recommended size tire on the left front. The tires on the remaining wheels were size P195/70R14. The vehicle's tire data are shown in the table below.

Tire	*Measured Pressure*		*Vehicle Manufacturer's Recommended Cold Tire Pressure*		*Tread Depth*		*Damage*	*Restricted*	*Deflated*
	kPa	psi	kPa	psi	milli-meters	32nd of an inch			
LF	172	25	221	32	6	7	None	No	No
LR	214	31	221	32	3	4	None	No	No
RR	Flat	Flat	221	32	2	3	None	No	Yes
RF	228	33	221	32	4	5	None	No	No

Other Vehicle's Occupants: According to the police crash report, the driver of the 1994 Honda (40-year-old, female) and the front right passenger (15-year-old, female) were restrained by the lap-and-shoulder belts. Both sustained fatal injury and were pronounced deceased at the scene.


N
IN08022
Dark With Overhead Street Lights
Dry, V1 Bituminous Roadway, V2
Concrete Roadway
V1: 2007 Honda Accord EX
V2: 1994 Honda Accord LX
0 m 5 m 10 m
Scale
-2.4% Grade
V1 traveling south in northbound lanes after front right passenger steered vehicle from southbound lanes into northbound lanes to avoid impacting the back of a southbound vehicle. This occurred upstream from this area and is not dipicted on the diagram
0% Grade
+2.8% Grade
V2
Event 1
Impact scrape marks
Green Traffic Signal
Event 2
Scrape marks
Red Traffic Signal
-0.7% Grade
Blood trail from ejected V2 driver
Area of final rest of V2 Driver
Event 3 and 4, V1 impacts bus stop sign in this area; bus stop sign impacts V2 as vehicles reach final rest
V2 front right passenger partially ejected