Insurance Institute for Highway Safety
Crashworthiness Evaluation

Crash Test Report
2001 Hyundai Elantra (CF00034)

Vehicle identification number: KMHDN45D61U032852
Body style: Small 4-door sedan
Engine/transmission: Transverse 2.0-liter 4-cylinder, 4-speed automatic, front-wheel drive

Standard crashworthiness features:

Driver and right front passenger front airbags
Driver and right front passenger seat-mounted side airbags (designed to protect head and thorax)
Dual-locking shoulder belts (all seating positions)
Shoulder belt upper anchorage height adjusters (front seating positions only)
Seat belt crash tensioners (pyrotechnic, front seating positions only)
Seat belt force-limiting mechanisms (front seating positions only)
Center rear lap/shoulder belt
Right front and all rear shoulder belt retractors are convertible from emergency to automatic locking for ease of child restraint use
LATCH system (rigid lower anchorages and top tether attachments) for child restraints (rear outboard seating positions)

Optional safety features:

4-wheel antilock brakes

Vehicle specifications (provided by manufacturer):

Wheelbase:	261 cm
Overall length:	451 cm
Overall width:	172 cm
Curb weight:	1,195 kg (base model with manual transmission)

Vehicle specifications (measured):

Front bumper to firewall:	109 cm
Curb weight:	1,302 kg
Test weight:	1,432 kg (60% front, 40% rear)
Overall width:	172 cm

Nominal test parameters:

40.0 mi/h (64.4 km/h), 40% overlap, deformable barrier face with slotted bumper

Crash test date:

November 28, 2000

Figure 1
Precrash and Postcrash Side Views — 2001 Hyundai Elantra

Summary

A 2001 Hyundai Elantra was crash tested on November 28, 2000 into a fixed deformable barrier at 39.8 mi/h (64.1 km/h) and a 40 percent overlap on the driver side. A Hybrid III 50th percentile male dummy was positioned in the driver seat with the lap/shoulder belt fastened.

Measures of intrusion taken after the crash indicated the lower instrument panel in front of the dummy moved rearward 4-5 cm. Resultant intrusion in the driver footwell measured 14 cm at the footrest and 13-23 cm at other places on the toepan. All doors remained closed during the crash. After the crash, the driver door and left rear door required additional effort but no tools to open, and the right front and right rear doors opened with ease.

The driver dummy was restrained by a three-point lap/shoulder belt and an airbag. During the crash, the belt crash tensioner activated and retracted 4 cm of shoulder belt webbing. A net amount of 8 cm of webbing (or a total of 12 cm including the tensioner-retracted length) spooled off the retractor, including about 7 cm from the force-limiting mechanism. The dummy's head contacted the steering wheel through the airbag. After rebounding from the steering wheel, the head moved rearward, upward, and outward and contacted the deployed side airbag and the head restraint. After the crash, the upper end of the steering column had moved upward 5 cm and rearward 2 cm.

The maximum resultant head acceleration from the steering wheel contact was 122 g. The maximum left lower tibia L-M moment was –225 Nm, and the maximum left lower tibia A-P moment was 230 Nm, both significantly contributing to the left lower tibia index of 1.45. The maximum right lower tibia L-M moment was –205 Nm, significantly contributing to the right lower tibia index of 1.09. The maximum right tibia axial force was –6.3 kN.

Test Conditions

This vehicle had been tested previously in the Institute's Low-Speed Crash Test Program and subjected to an impact on the front corner of the passenger side at 5 mi/h (8 km/h) into a 30 degree angle barrier and a rear impact at 5 mi/h (8 km/h) into a flat barrier. All structural damage on the front was repaired prior to this test (see Appendix, Low-Speed Crash Test Damage Repair Estimate).

This test was conducted according to the procedures specified in the IIHS Offset Barrier Crash Test Protocol (Version VIII). The Hybrid III dummy positioned in the driver seat was equipped with instrumented lower legs that included feet modified to include two accelerometers and to have a 45 degree dorsiflexion range with soft stops at all extremes of foot-ankle motion. All dummy seating parameters were set according to the procedures specified for Federal Motor Vehicle Safety Standard 208 compliance testing (49 *CFR* Part 571.208 § 11). The dummy's left foot was placed on the footrest.

Seat back, shoulder belt upper anchorage, and steering column adjustments were set according to the manufacturer's specifications for government crash testing. Other adjustments were set according to the procedure specified for Federal Motor Vehicle Safety Standard 208 compliance testing (49 *CFR* Part 571.208 § 7 and 8). After final positioning of the dummy, measurements from various parts of the dummy to a number of vehicle interior points were made. These measurements and the seat back, shoulder belt upper anchorage, and steering column adjustments are described in the Appendix, Dummy Clearance Measurements.

Vehicle acceleration measurements were made by a triaxial arrangement of accelerometers mounted on the vehicle's longitudinal centerline and 56 cm behind its center of gravity (160 cm behind the front axle). The vehicle speed recorded just prior to impact was 39.8 mi/h (64.1 km/h), and the actual overlap was 40 percent.

Structural Performance

All doors remained closed during the crash. The driver door aperture shortened 3 cm, as measured at the lower edge of the window. After the crash, the driver door and left rear door required additional effort but no tools to open, and the right front and right rear doors opened with ease.

No fuel system leaks were observed after the crash. In addition, no fuel system leaks were observed when the vehicle was rotated onto its right side to allow postcrash photography.

Figure 2 shows the overhead view of the crash deformation. Figure 3 illustrates the precrash and postcrash contour measures of the front bumper cover profile and the resulting permanent crush. Figure 4 shows the precrash and postcrash views from below. Figure 5 illustrates the deformation of the side rails, door sills, and engine cradle, which are visible in Figure 4.

Figure 2
Overhead View of Crash Deformation — 2001 Hyundai Elantra

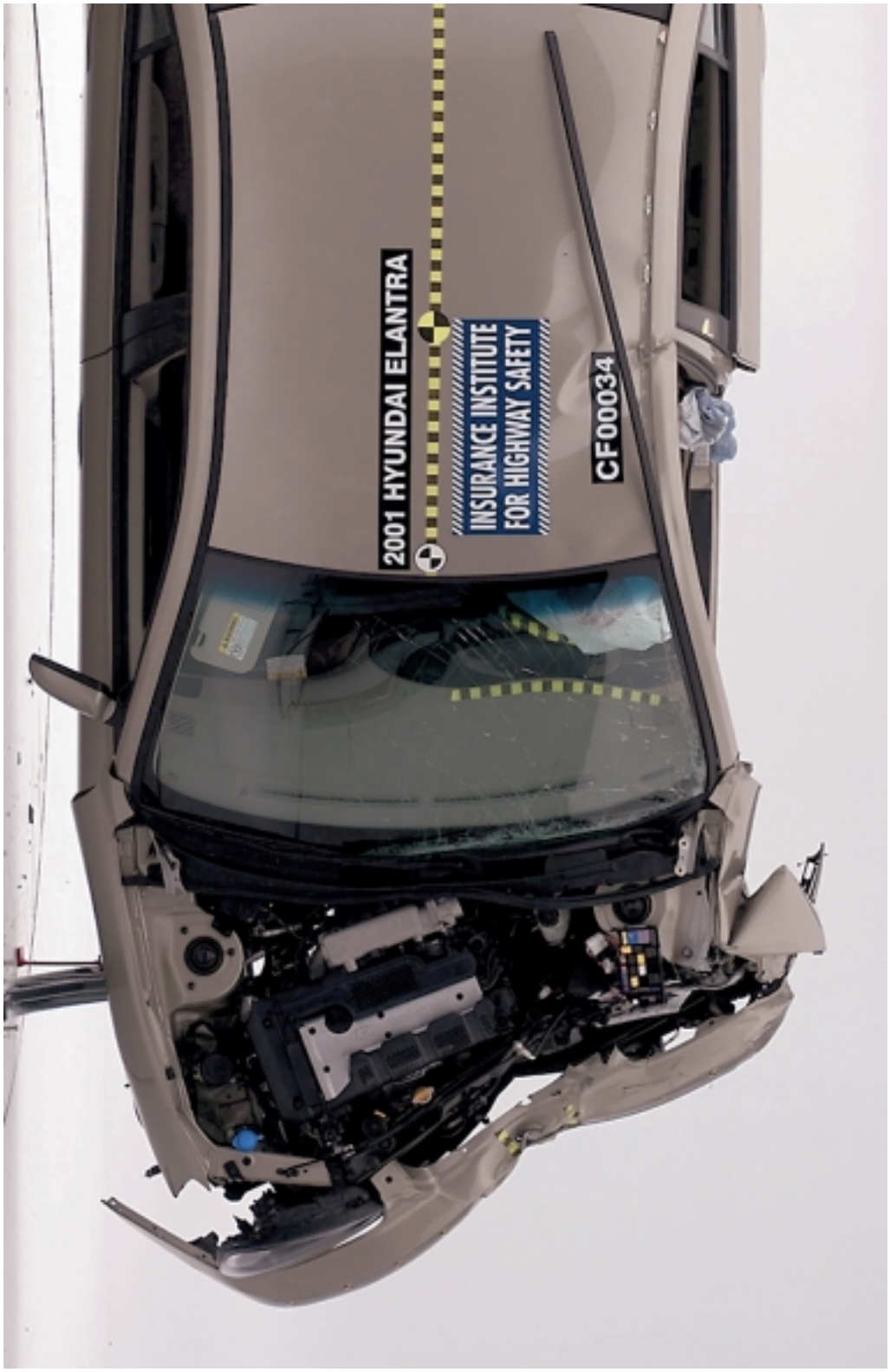
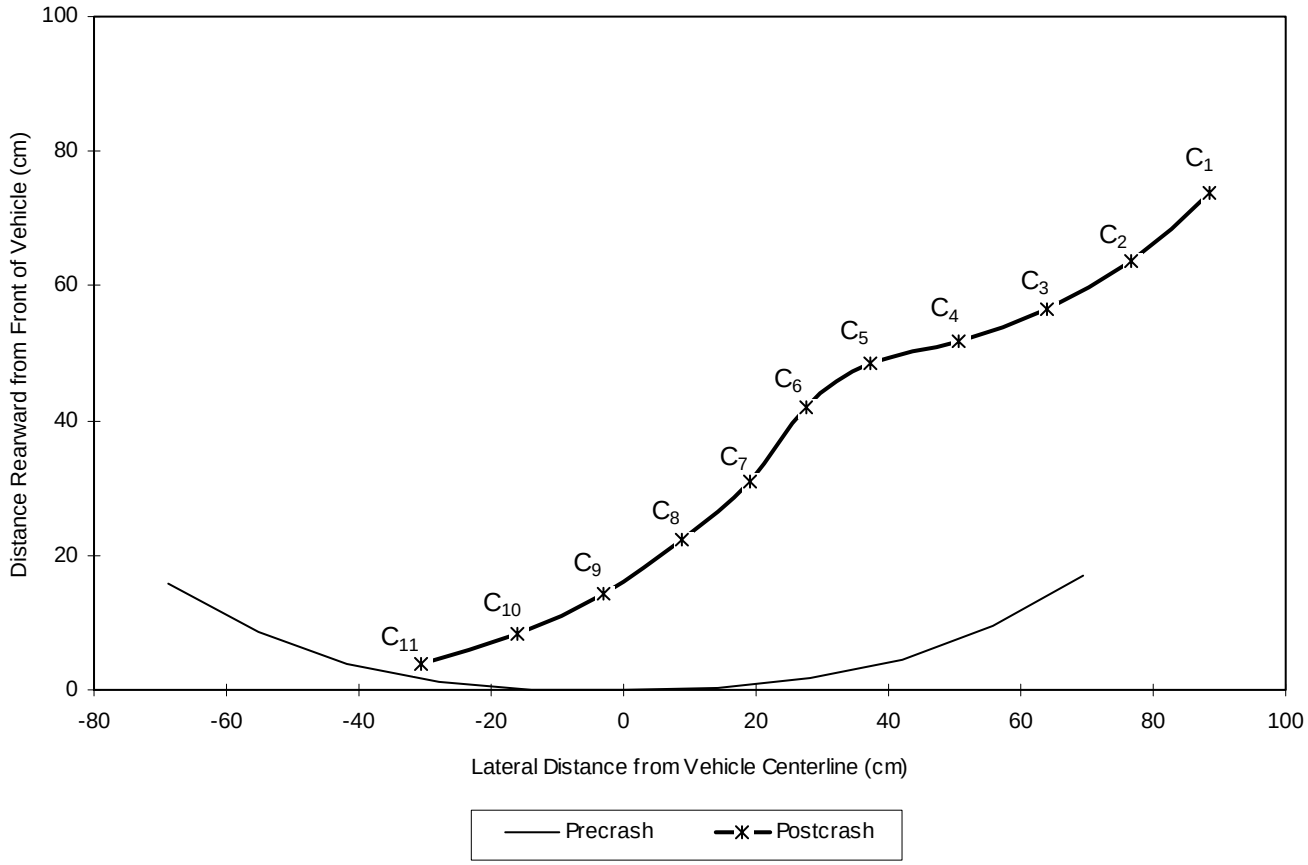


Figure 3
Front Bumper Cover Crush Contour — 2001 Hyundai Elantra



	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}
Postcrash Contour (cm)	74	64	57	52	48	42	31	22	14	8	4
Precrash Contour (cm)	17	9	4	2	0	0	0	1	4	9	16
Resulting Crush (cm)	57	55	53	50	48	42	31	21	10	–1	–12

The length of the reference line was 138 cm precrash and 119 cm postcrash.

Figure 4
Precrash and Postcrash Views from Below — 2001 Hyundai Elantra

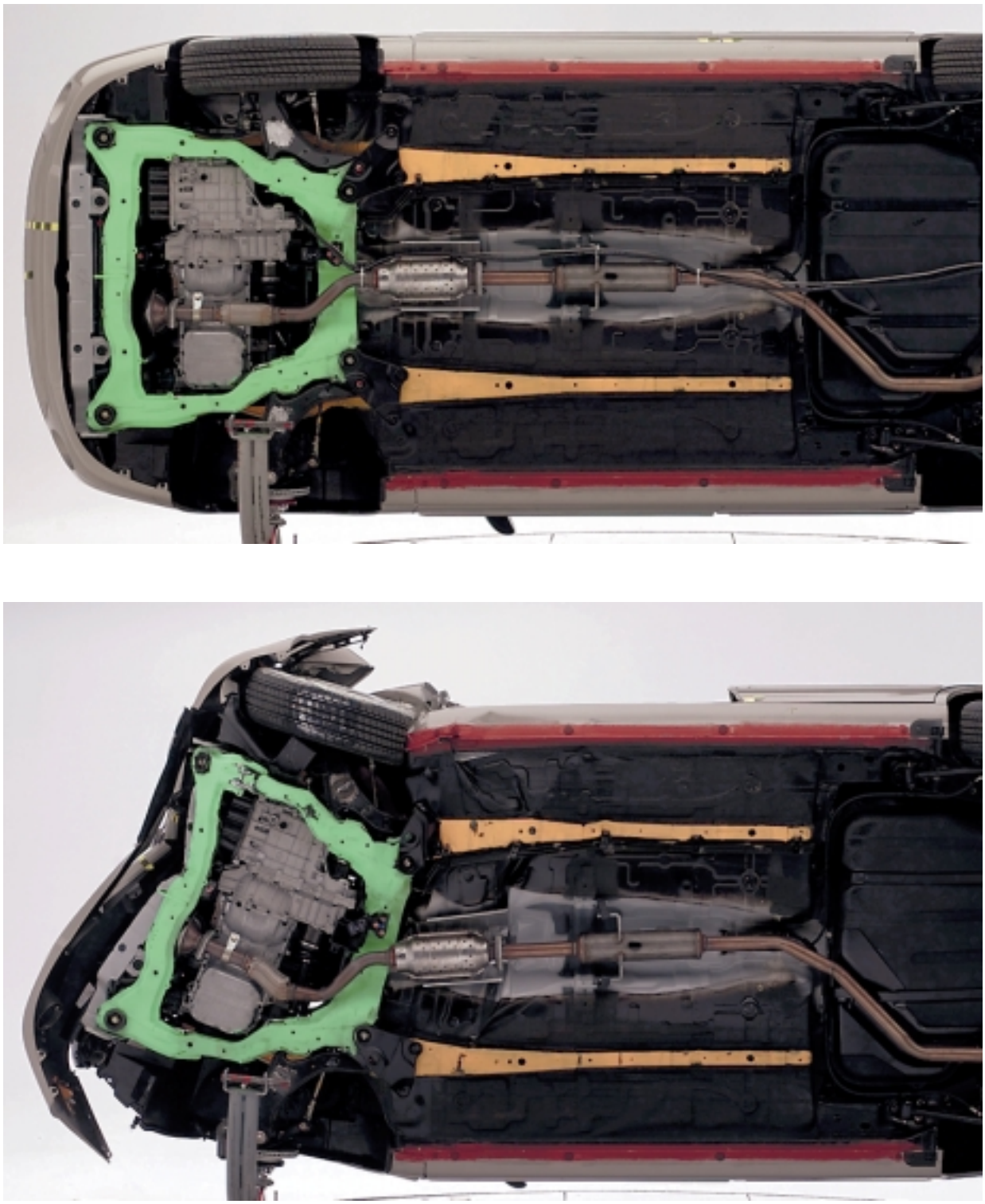
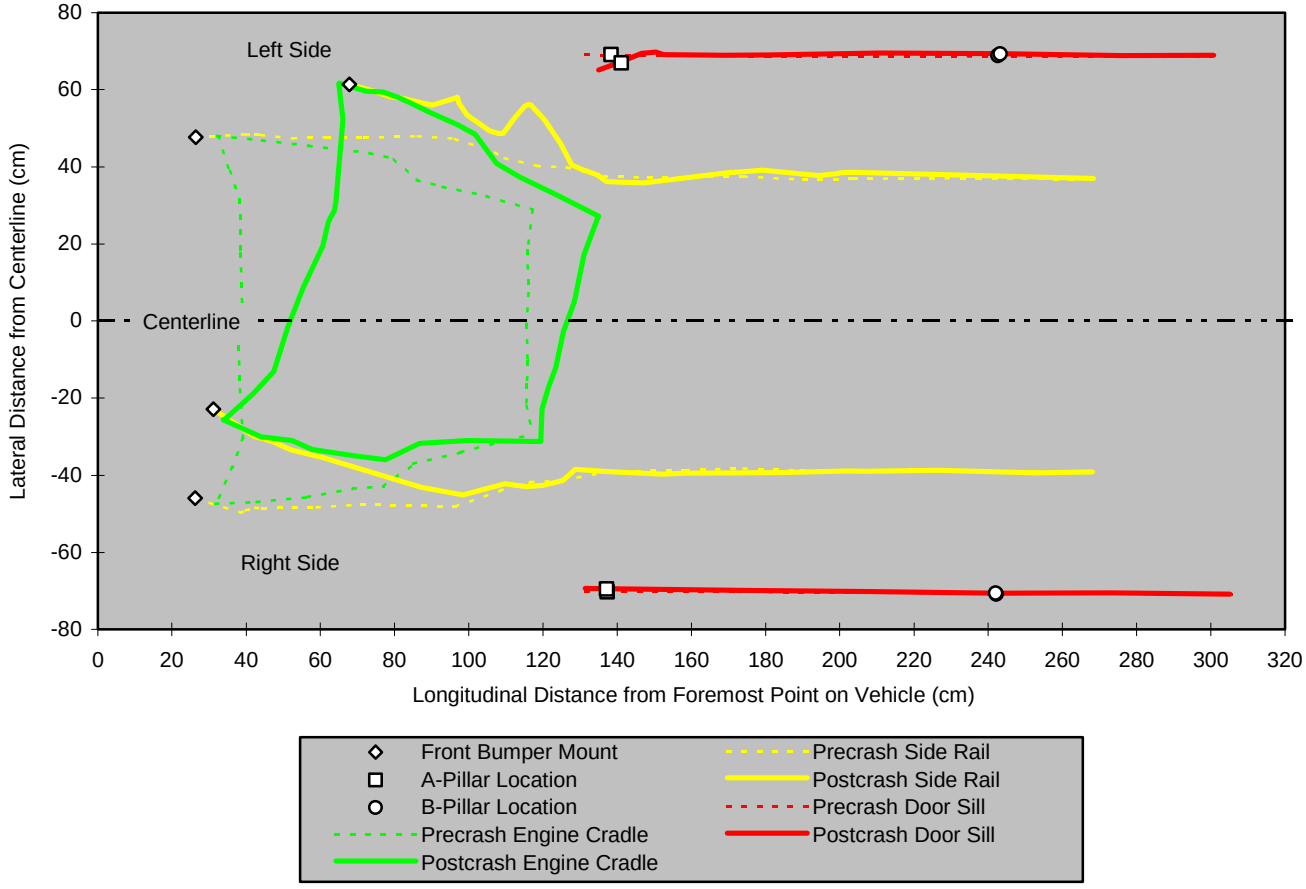
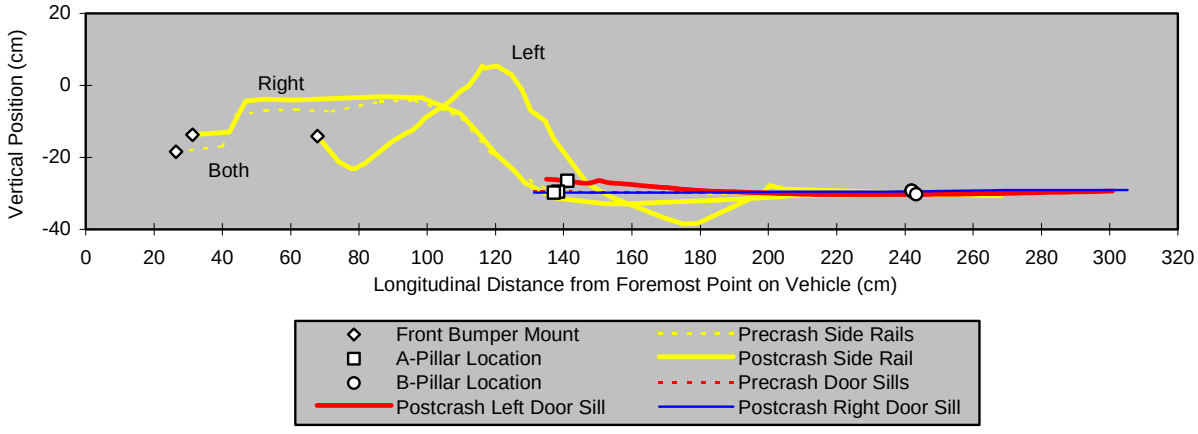


Figure 5
Structural Deformation, Views from Below and Side — 2001 Hyundai Elantra





Various measures of intrusion were made after the crash. These residual measures of intrusion typically are less than the maximum deformation that occurs during the crash. The coordinate reference system for these measures is described in the IIHS Offset Barrier Crash Test Protocol (Version VIII). The measures of deformation shown in Table 1 have been adjusted to better reflect the displacement of the various target locations relative to the driver, based on the locations of the four driver seat-attachment bolts. The average displacement of the seat-attachment bolts relative to the reference system also is shown in Table 1.

Table 1
Residual Measurements of Intrusion Relative to Driver Seat — 2001 Hyundai Elantra

Selected Locations*	Longitudinal	Lateral	Vertical	Resultant
Steering column (cm)	–2	1	5	5
Left lower instrument panel (cm)	–5	–1	4	6
Right lower instrument panel (cm)	–4	–1	4	6
Brake pedal (cm)	–9	–3	5	11
Left toepan (cm)	–21	–4	9	23
Center toepan (cm)	–16	–2	7	17
Right toepan (cm)	–12	–2	5	13
Footrest (cm)	–13	–1	5	14
Average displacement of the four seat-attachment bolts relative to reference system (cm)	–1	2	–2	n/a

* All measurements taken on driver side. From the driver's position, positive is forward, left, and up.

Restraint System Performance

Airbags

Driver: The uninflated driver airbag is approximately 66 cm in diameter, and the excursion of its center when inflated is limited by two tethers. The airbag is vented by two holes located at positions corresponding to 10 and 2 o'clock on the forward-facing surface of the airbag. Analysis of the high-speed film taken from camera position E indicated the airbag deployed at 28 ms into the crash and appeared to be fully inflated at 60 ms. The seat-mounted side airbag deployed at 92 ms.

Passenger: The top-mounted passenger airbag did not deploy during the test. An occupant presence detector in the passenger seat controls deployment. The side airbag also did not deploy during the crash.

Seat Belts

This vehicle is equipped with dual-locking lap/shoulder belts with sliding latch plates at all seating positions and adjustable upper anchorage points at both front seating positions. The front belts also are equipped with pyrotechnic crash tensioners and mechanical force-limiting mechanisms. The front inboard lower anchorage points are attached to and move with the seats. The front outboard lower anchorage points are bolted to the lower B-pillars. During the crash, 4 cm of webbing was pulled by the belt crash tensioner into the retractor through the D-ring, as measured by a pull-string mounted between the webbing and B-pillar trim just above the D-ring. A net amount of 8 cm of webbing (or a total of 12 cm including the tensioner-retracted length) was pulled from the retractor through the D-ring, as measured by a second pull-string mounted between the retractor housing and the webbing beyond the retractor. Postcrash investigation of the force-limiting torsion bar within the retractor spool indicated it was twisted about 180 degrees from its precrash orientation. This measure, combined with the estimated diameter of the retractor spool and stowed webbing (45 mm), suggested the force limiter contributed about 7 cm of webbing to the total amount pulled though the D-ring.

Seat

Postcrash examination of the driver seat rails indicated no discernible movement of the seat in its tracks during the crash. Deformation of the floor under the driver seat caused the seat to pitch slightly forward.

Steering Column

The upper end of the steering column moved upward 5 cm and rearward 2 cm relative to the driver seat.

Dummy Kinematics

Head, Neck, and Torso

Analysis of the high-speed film taken from camera position E indicated the face began to load the airbag at 74 ms into the crash (14 ms after full inflation). Paint transferred from the dummy's face indicated the nose loaded the airbag 2 cm above and 4 cm to the left of its center. The dummy's head continued to move forward, and although the airbag fabric obscured the steering wheel and the dummy's face, it appeared to contact the steering wheel rim. Sudden increases in the head rearward and rightward accelerations and in the neck shear force, all occurring at the same time (101 ms), were consistent with contact between the dummy's head and the steering wheel. On rebound from the steering wheel, the head moved upward, rearward, and outward. The left rear side of the head contacted the seat-mounted side airbag, which had deployed at 92 ms, and the right rear part of the head contacted the outboard portion of the head restraint. Table 2 provides the timing of these events (obscuration of the head by the deployed side airbag made timing of the head contacts with the side airbag and head restraint indeterminable).

Table 2
Restraint System Performance and Dummy Kinematics — 2001 Hyundai Elantra

Event	Time (ms)
Deployment of front airbag	28
Airbag fully inflated	60
Face begins to load airbag	74
Deployment of side airbag	92
Face contacts steering wheel rim through airbag	101

Figure 6
Dummy and Vehicle Interior, Postcrash — 2001 Hyundai Elantra

Legs and Feet

Paint transferred from the dummy's left knee indicated the knee primarily contacted the instrument panel just above the knee bolster, about 5 cm above and 2 cm to the left of the left instrument panel intrusion reference point. The knee also contacted the lower left corner of the steering column trim and broke off the turn signal stalk. Paint transferred from the dummy's left shin indicated the shin contacted the knee bolster directly below the knee contact location on the instrument panel. The knee bolster, made of hard plastic, was found intact. The left foot was found fully dorsiflexed and fully inverted, with the lateral forefoot's sole pressed against the inboard edge of the footrest and the medial sole at the heel also pressed against the footrest. The back of the foot was pressed against a downward buckle in the floorpan/carpeting over the floorpan.

Paint transferred from the dummy's right knee indicated the knee primarily contacted and broke the right underside portion of the steering column trim. The knee also contacted the knee bolster directly below the contact location on the column. Paint transferred from the dummy's right shin indicated the shin contacted the bolster below the knee contact locations. The right foot was found somewhat dorsiflexed but neither inverted nor everted, with the lateral forefoot's sole touching the accelerator pedal, which had been torn off its mounting arm. The sole of the heel was pressed against the intruded toepan, and the back of the foot was pressed against a downward buckle in the floormat/carpeting.

Dummy Injury Measures

Head

The maximum vector resultant head accelerations were recorded and the HICs were calculated during an interval that corresponds with the dummy's head excursion into the airbag and steering wheel. The maximum resultant head acceleration from the steering wheel contact through the airbag was 122 g at 102 ms. Table 3 provides a summary of the maximum head injury measurements recorded during the crash.

Table 3
Head Injury Measurements — 2001 Hyundai Elantra

Measure	Published Tolerance Threshold	Result	Time (ms)
Vector resultant acceleration (g)	80	122	102
Vector resultant acceleration — 3 ms clip (g)	80	74	102-106*
Head injury criterion (HIC)	1000	704	85-118
Head injury criterion — 15 ms interval (HIC-15)	700	547	95-110

* The acceleration level that was continuously maintained for at least 3 ms is indicated. There was no level associated with an interval of exactly 3 ms in duration.

Neck

Table 4 provides a summary of the maximum neck injury measurements recorded during the crash. None of the recorded neck force measures exceeded the magnitude-duration injury criteria (Figures A-13 to A-16).

Table 4
Neck Injury Measurements — 2001 Hyundai Elantra

Measure	Published Tolerance Threshold	Result	Time (ms)
A-P shear force (kN)	±3.1	–0.4	78
Axial compression force (kN)	4.0	0.1	300
Axial tension force (kN)	3.3	1.4	99
N_{ij} tension-extension	1.00	0.23	100
N_{ij} tension-flexion	1.00	0.27	108
N_{ij} compression-extension	1.00	0.12	302
N_{ij} compression-flexion	1.00	0.12	109
Flexion bending moment (Nm)		37	109
Extension bending moment (Nm)		14	302

Chest

Table 5 provides a summary of the maximum chest injury measurements recorded during the crash.

Table 5
Chest Injury Measurements — 2001 Hyundai Elantra

Measure	Published Tolerance Threshold	Result	Time (ms)
Vector resultant spine acceleration — 3 ms clip (g)	60	52	97-100
Rib compression (mm)	–50	–29	100
Sternum deflection rate (m/s)	–8.2	–0.8	58

Legs and Feet

Left leg and foot: The maximum left lower tibia L-M moment was –225 Nm at 80 ms, and the maximum left lower tibia A-P moment was 230 Nm at 83 ms, both significantly contributing to the left lower tibia index of 1.45 at 80 ms.

Right leg and foot: The maximum right lower tibia L-M moment was –205 Nm at 74 ms, significantly contributing to the right lower tibia index of 1.09 at 74 ms. The maximum right tibia axial force was –6.3 kN at 75 ms.

Table 6 provides a summary of the maximum leg and foot injury measurements recorded during the crash.

Table 6
Leg and Foot Injury Measurements — 2001 Hyundai Elantra

Measure	Published Tolerance Threshold	Left		Right	
		Result	Time (ms)	Result	Time (ms)
Femur axial force (kN)	–9.1*	–2.8	90	–4.0	73
Tibia-femur displacement (mm)	–15	0	98	–2	86
Upper Tibia					
L-M moment (Nm)	±225	–79	80	–103	75
A-P moment (Nm)	±225	43	112	97	75
Vector resultant moment (Nm)	225	80	80	141	75
Index	1.00	0.42	80	0.80	75
Lower Tibia					
L-M moment (Nm)	±225**	–225	80	–205	74
A-P moment (Nm)	±225**	230	83	–24	64
Vector resultant moment (Nm)	225**	312	80	205	74
Axial force (kN)	–8.0**	–2.5	81	–6.3	75
Index	1.00	1.45	80	1.09	74
Foot					
A-P acceleration (g)	±150	–33	66	–89	76
I-S acceleration (g)	±150	–60	82	–71	75
Vector resultant acceleration (g)	150	62	82	109	76

* This critical value is for instantaneous loading. Femur loads are compared with magnitude-duration injury criteria in Figures A-24 and A-37.

** These published thresholds are for fractures of the tibia. Ankle and foot injuries have been associated with bending moments as low as 50-100 Nm, and heel fractures have been associated with axial forces as low as –6.0 kN.

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Appendix

Low-Speed Crash Test Damage Repair Estimate

Dummy Clearance Measurements

Graph Index — index to graphs of time plots of dummy and vehicle data

Manufacturer's window sticker

Low-Speed Crash Test Damage Repair Estimate

2001 Hyundai Elantra Small Four-Door Sedan: 5 mi/h Front into Angle Barrier

Test Number: LA00022
VIN: KMHDN45D61U032852
Mileage: 96
Features: Driver and passenger front airbags, driver and front passenger side impact airbags, air conditioning, automatic transmission, power mirrors, keyless entry system, power door locks, power windows, heated back glass, tilt steering wheel, cruise control, two-stage paint.

	Part		Labor	
Description	**Mfg. No**	**Price**	**Operation**	**Hours**
Headlamps			Remove/reinstall	
Bumper reinforcement, front	86530-2D000	$131.26	Replace*	2.4
Bumper absorber, front	86520-2D000	73.05	Replace	
Frame sidemember end, right front			Repair*	2.0
Frame sidemember end right front			Refinish	0.3
Fender, right front			Repair*	0.3
Fender, right front			Touch-up (refinish)	0.2
Headlamps			Aim	0.5
Paint and materials		9.00		
Total Parts		$213.31		
Total Labor		193.80		5.7
Grand Total		$407.11		

* This item was repaired or replaced as indicated before the 40 mi/h frontal offset test.

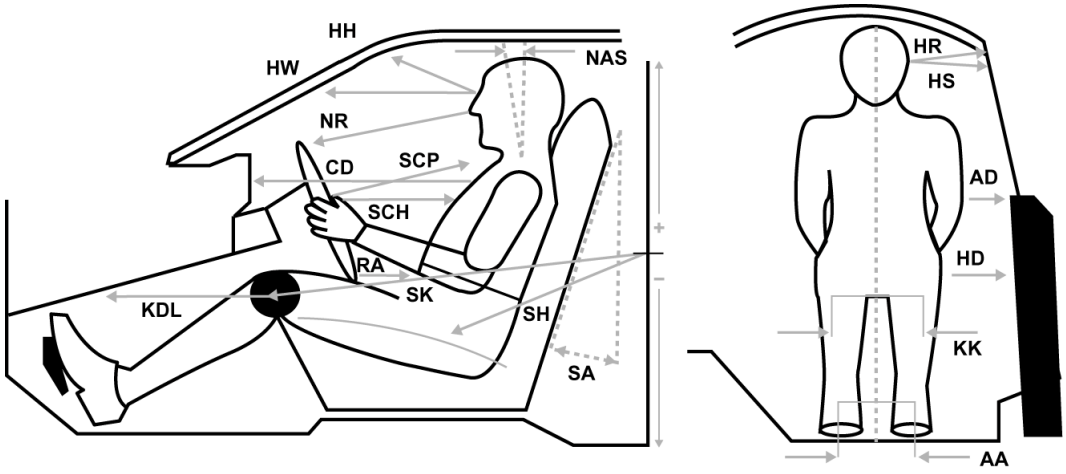
Dummy Clearance Measurements

Test Number: CF00034
Vehicle Make/Model: Hyundai Elantra
Vehicle Model Year: 2001
Seat Type: Manually adjusted bucket seat (fore/aft, height, and seat back angle)

Manufacturer's Specifications
Seat Back Information: Reclined to 9th position from upright
Upper Belt Anchorage: Set to 2nd of 4 positions from top
Steering Column Adjustment: Set to midpoint of tilt adjustment range

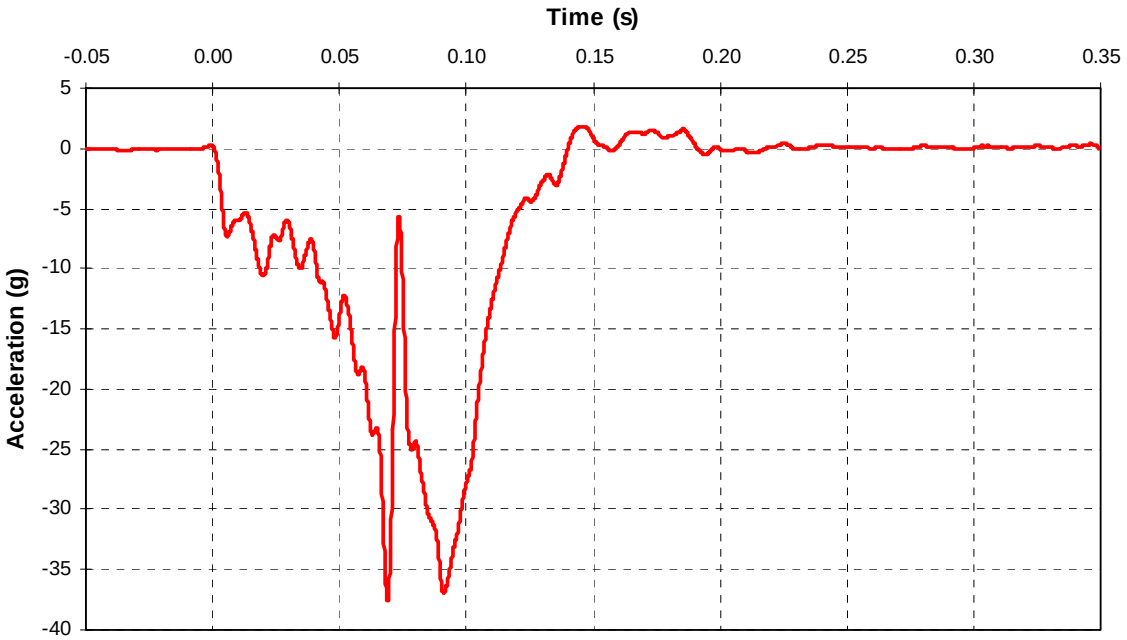
Location	Code	Measure	Location	Code	Measure
Head to header	HH	312	Neck angle, torso 90	NAT90	20.3°
Head to windshield	HW	551	Neck angle, seated	NAS	6.6°
Nose to rim	NR	403	Torso angle (NAT90 – NAS)	TA	13.7°
Chest to dash	CD	654	Striker to knee*	SK	572
Rim to abdomen	RA	202	Striker to knee angle*	SKA	–1.5°
Knee to dash, left	KDL	208	Striker to H-point, horizontal	SHH	200
Knee to dash, right	KDR	230	Striker to H-point, vertical	SHV	130
Steering wheel to chest, horizontal	SCH	300	Ankle to ankle	AA	370
Steering wheel to chest, perpendicular	SCP	393	Knee to knee	KK	335
Steering wheel to chest, reference	SCR	385	Arm to door	AD	92
Hub to chest, minimum	HCM	250	H-point to door	HD	111
Pelvic angle	PA	24.9°	Head to A-pillar	HA	510
Seat back angle	SA	21.4°	Head to roof	HR	225
			Head to side window	HS	252

All distance measurements are in millimeters (mm).
* These measurements were made in a vertical plane containing the striker and parallel to the driver door sill.

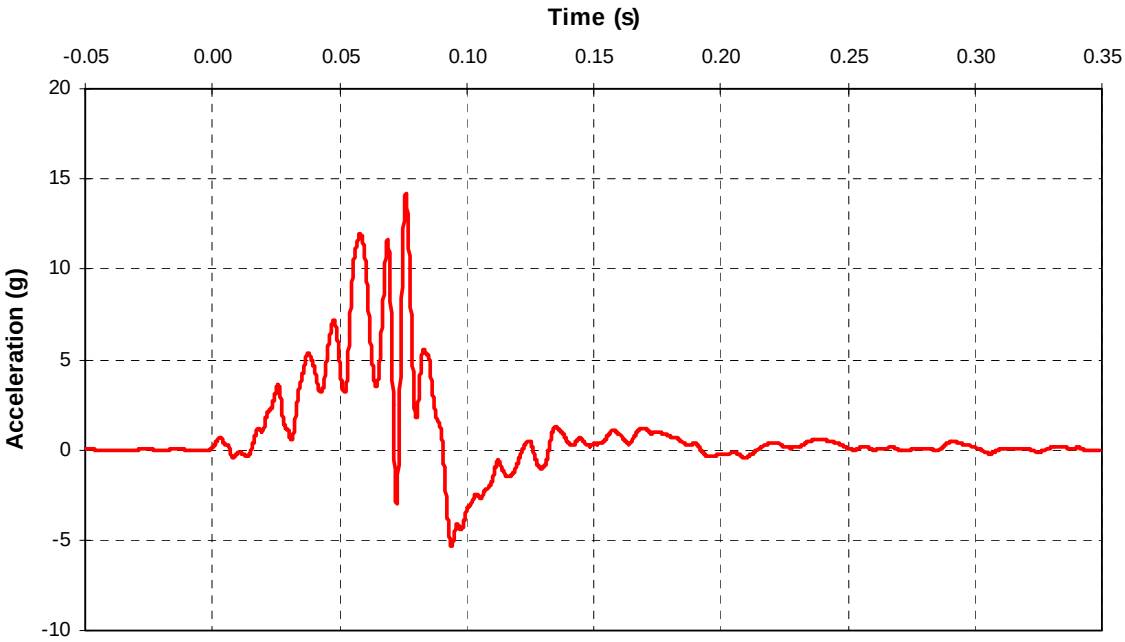


Graph Index

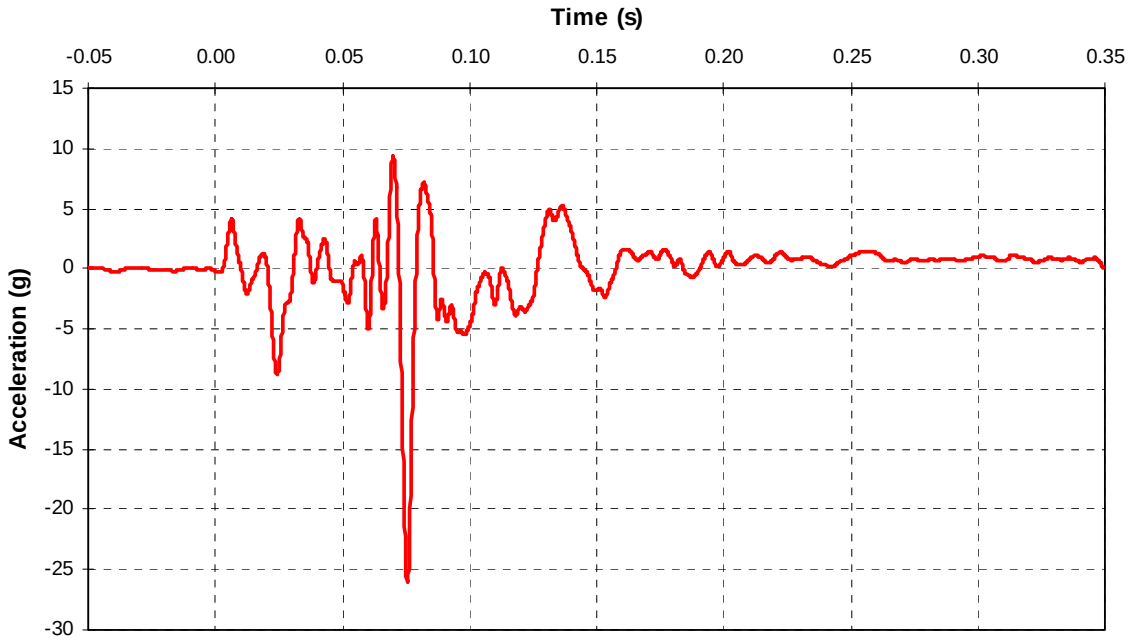
A- 1 CF00034 2001 Hyundai Elantra Vehicle Longitudinal Acceleration



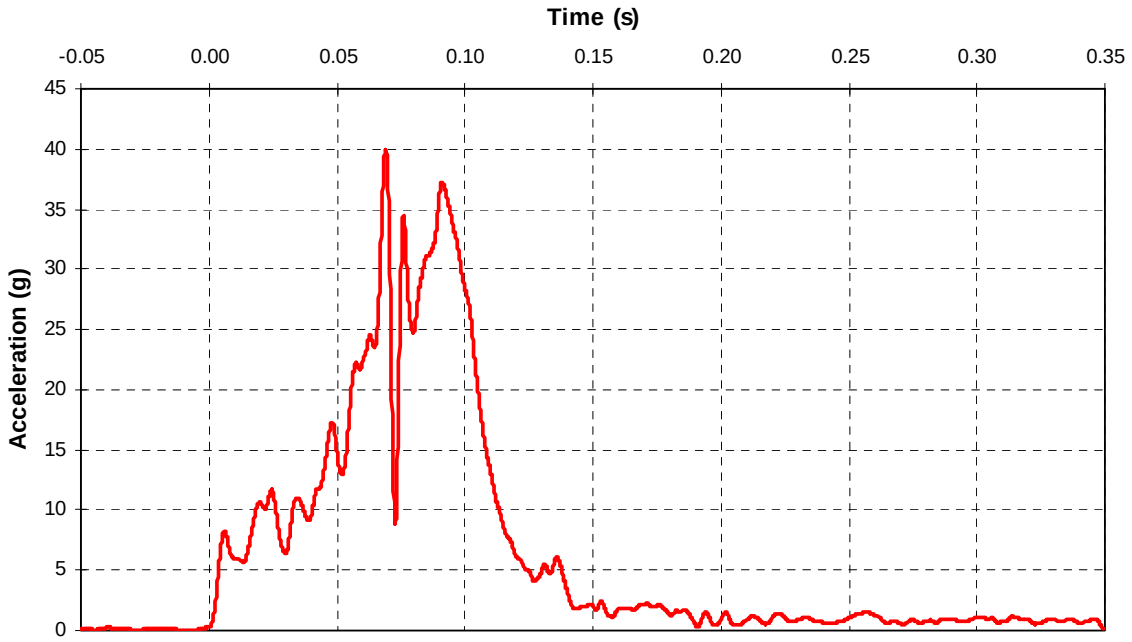
A- 2 CF00034 2001 Hyundai Elantra Vehicle Lateral Acceleration



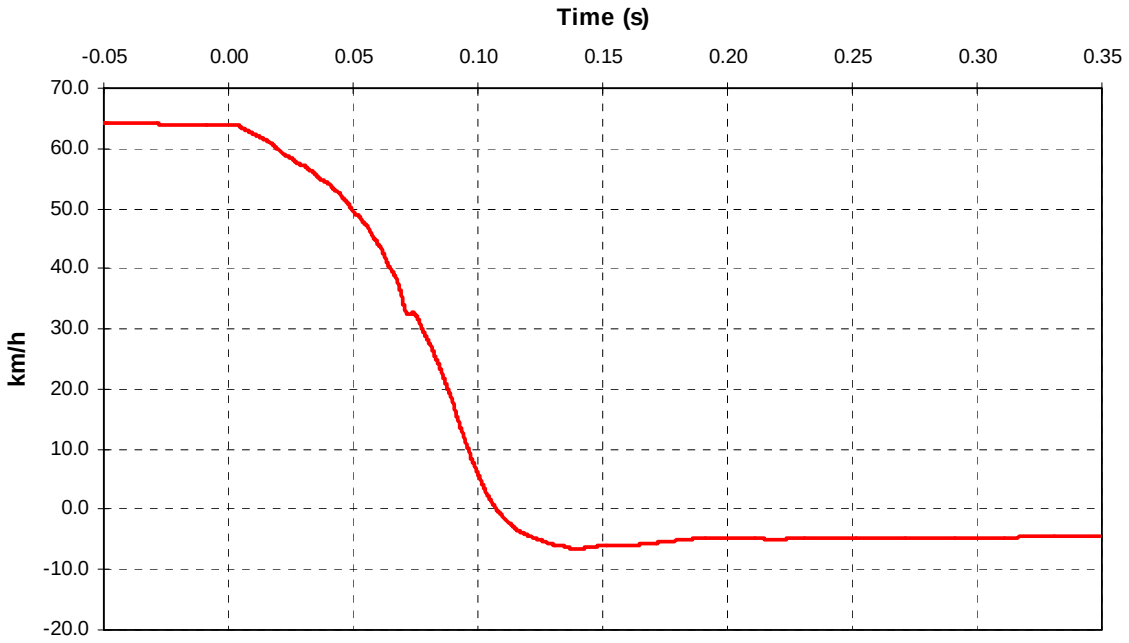
A- 3 CF00034 2001 Hyundai Elantra Vehicle Vertical Acceleration



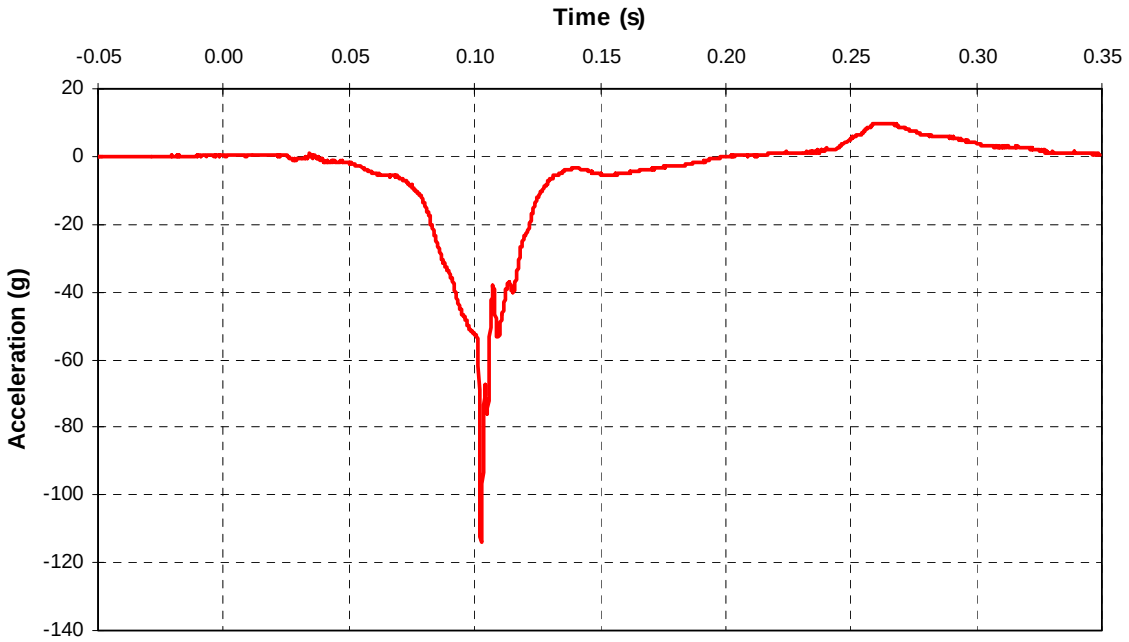
A- 4 CF00034 2001 Hyundai Elantra Vehicle Vector Resultant Acceleration



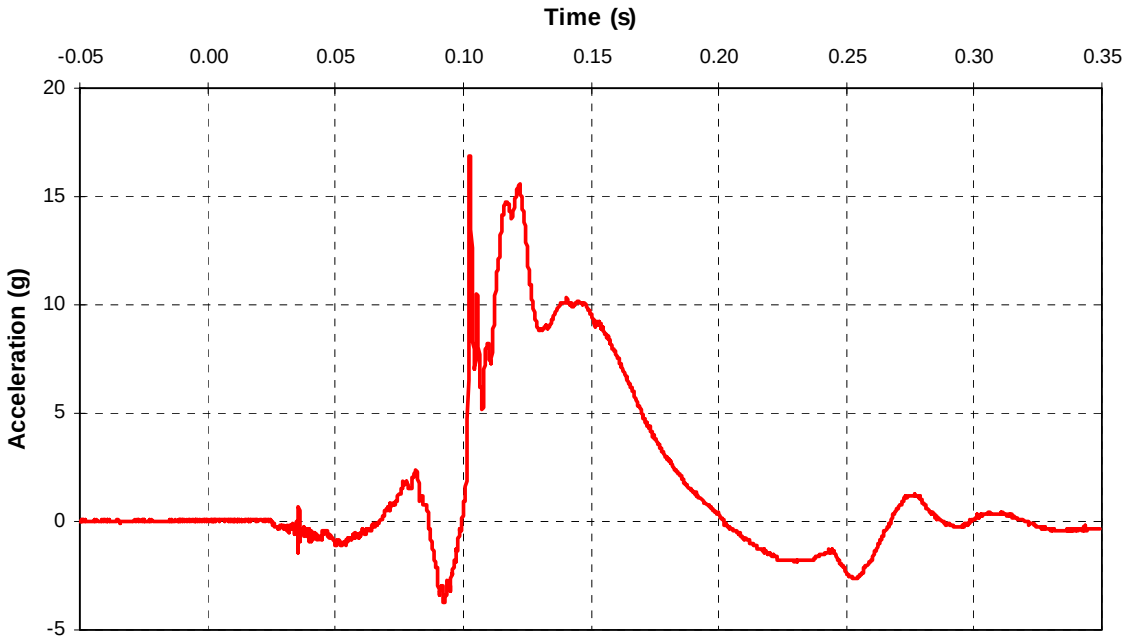
A- 5 CF00034 2001 Hyundai Elantra Integration of Vehicle Longitudinal Acceleration



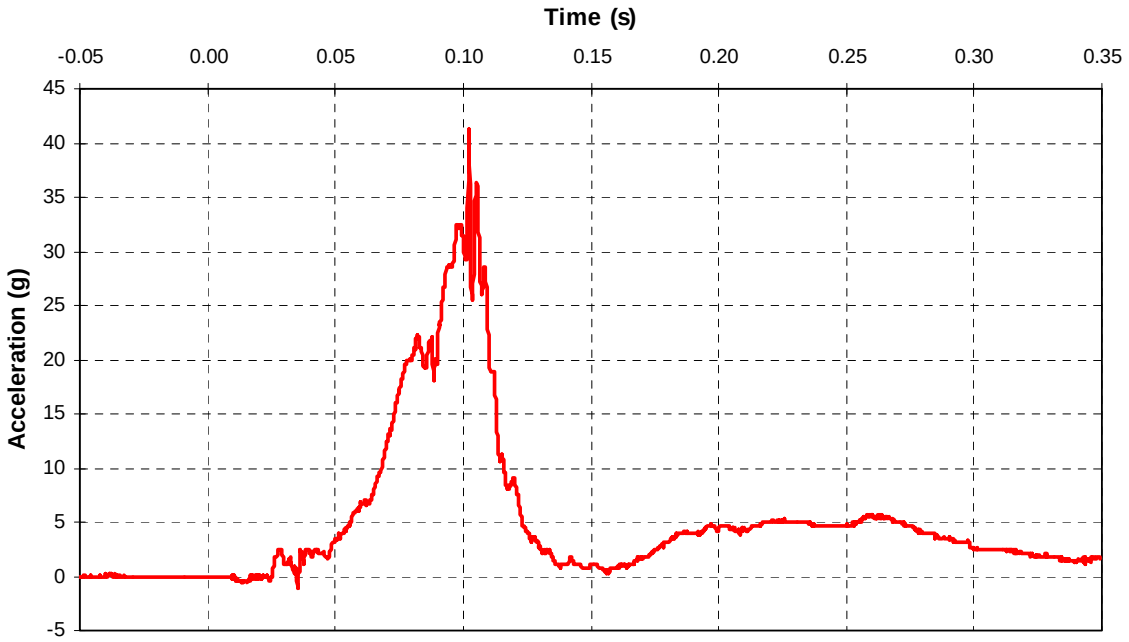
A- 6 CF00034 2001 Hyundai Elantra Head A-P Acceleration



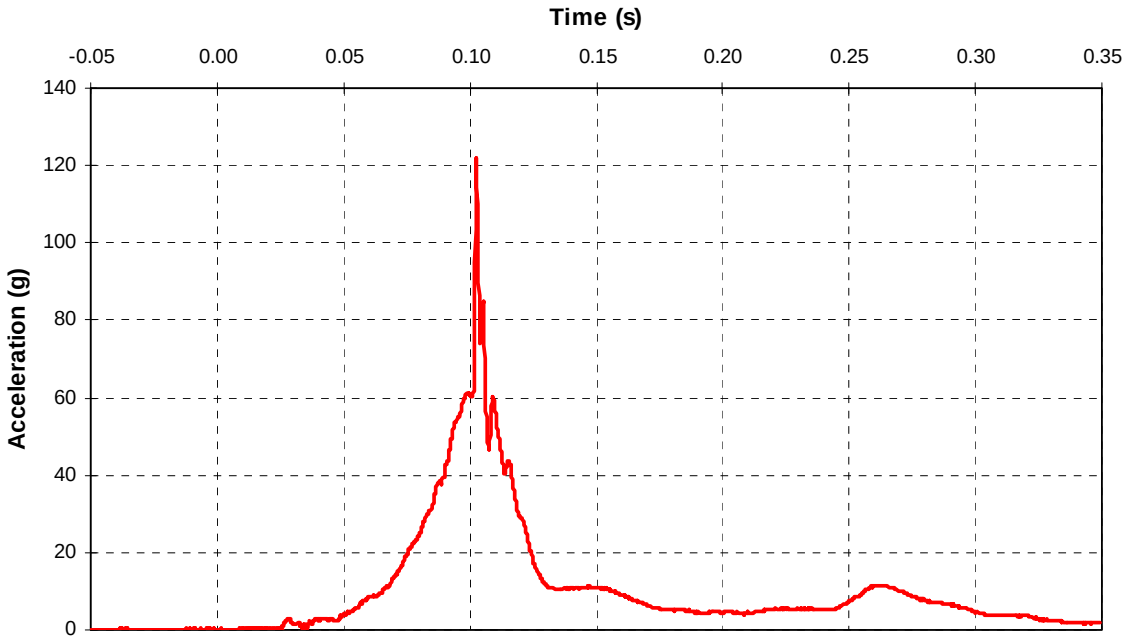
A- 7 CF00034 2001 Hyundai Elantra Head L-M Acceleration



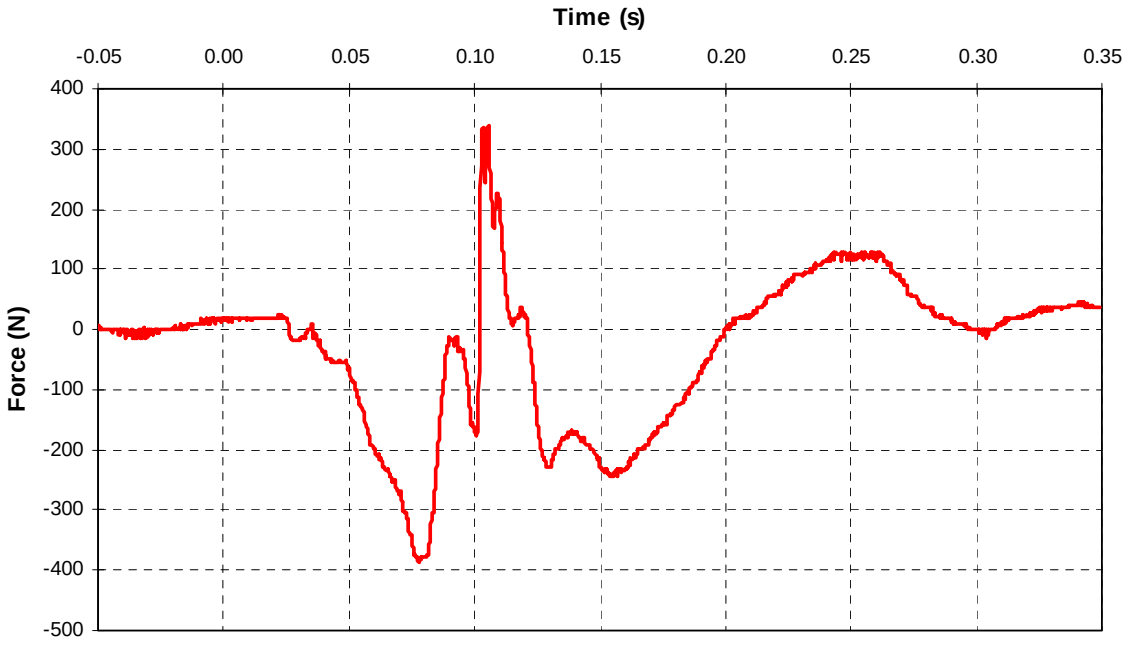
A- 8 CF00034 2001 Hyundai Elantra Head I-S Acceleration



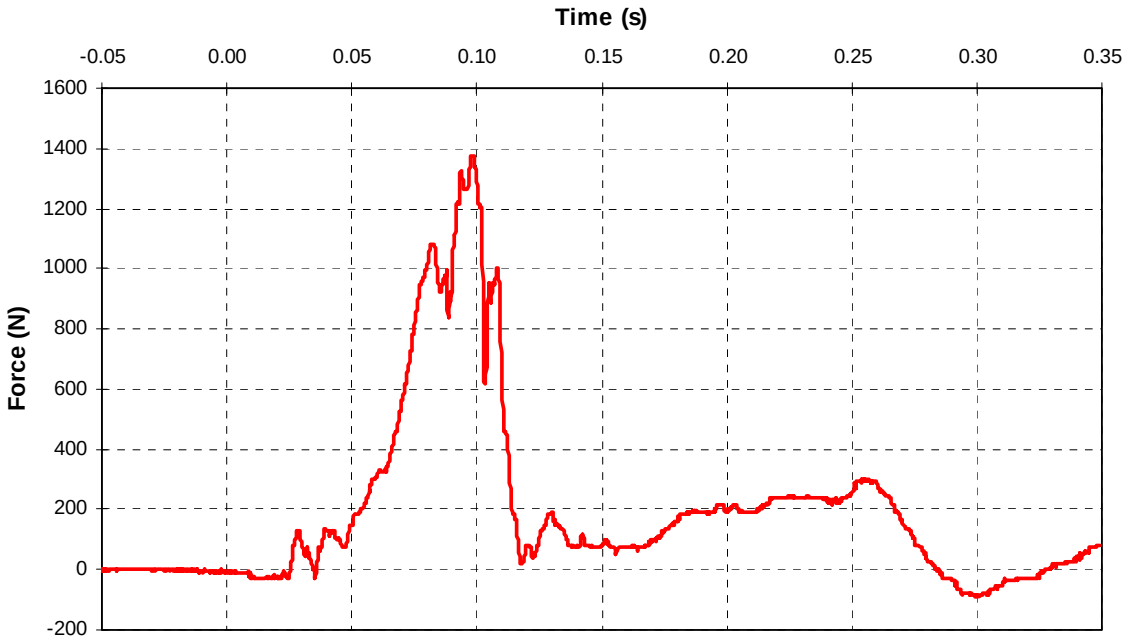
A- 9 CF00034 2001 Hyundai Elantra Head Vector Resultant Acceleration



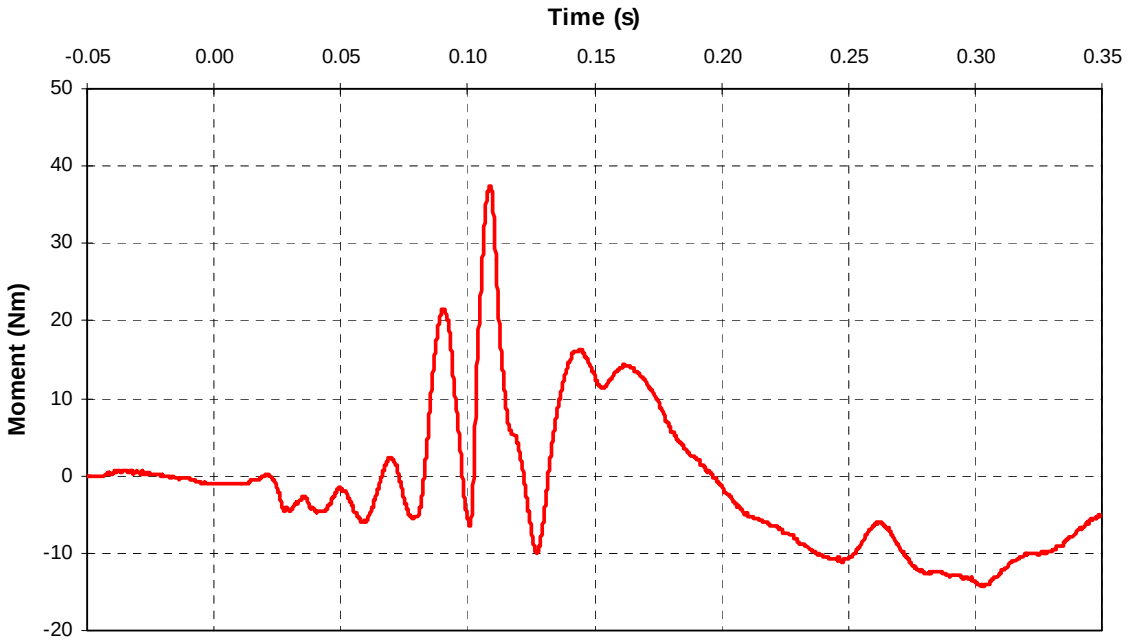
A- 10 CF00034 2001 Hyundai Elantra Neck A-P Shear Force



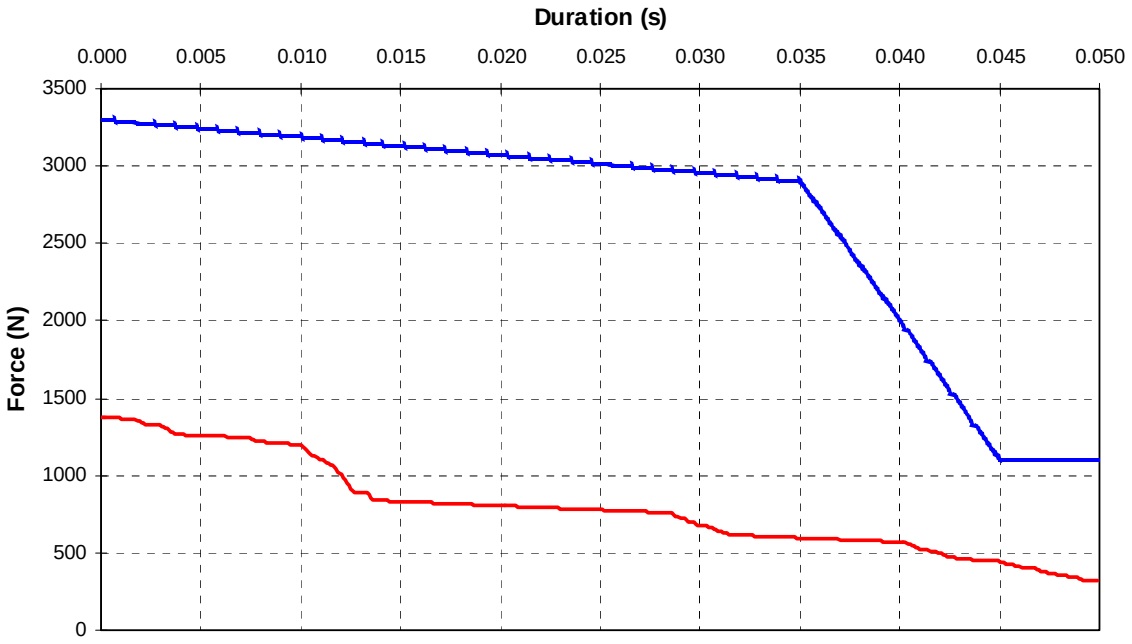
A- 11 CF00034 2001 Hyundai Elantra Neck Axial Force



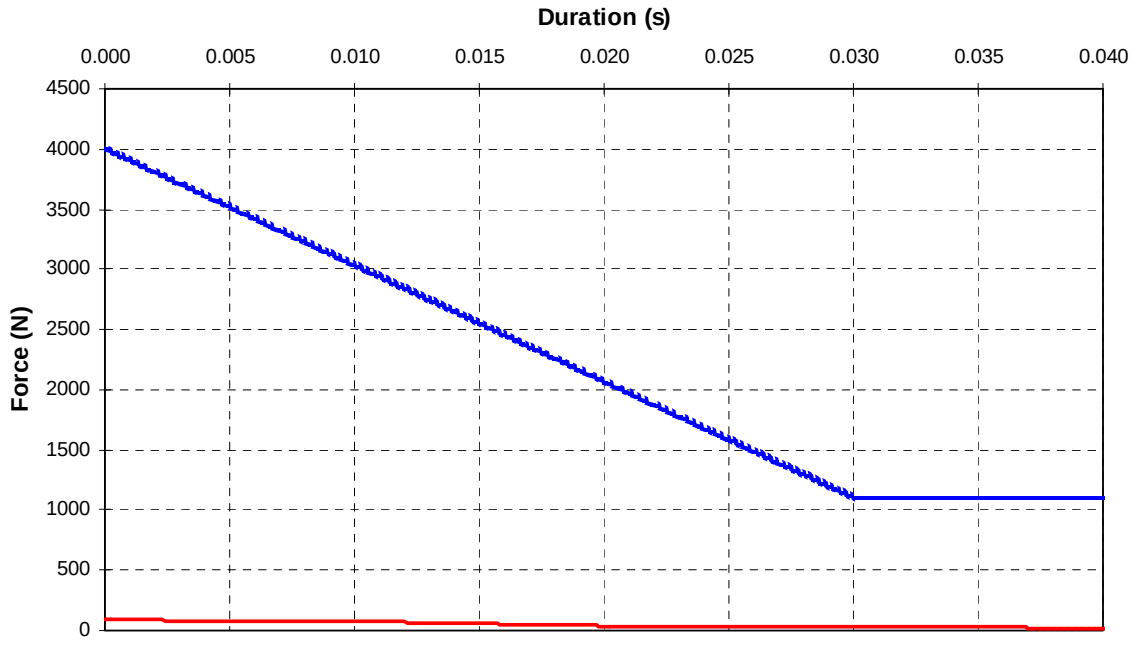
A- 12 CF00034 2001 Hyundai Elantra Neck Occipital A-P Moment



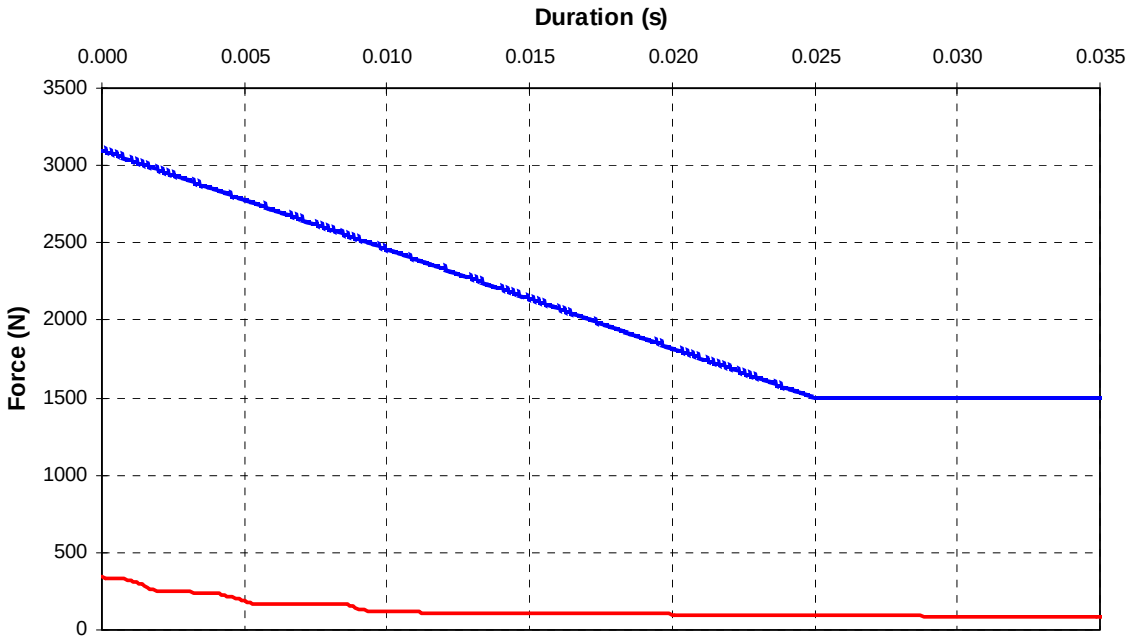
A- 13 CF00034 2001 Hyundai Elantra Neck Tension Analysis



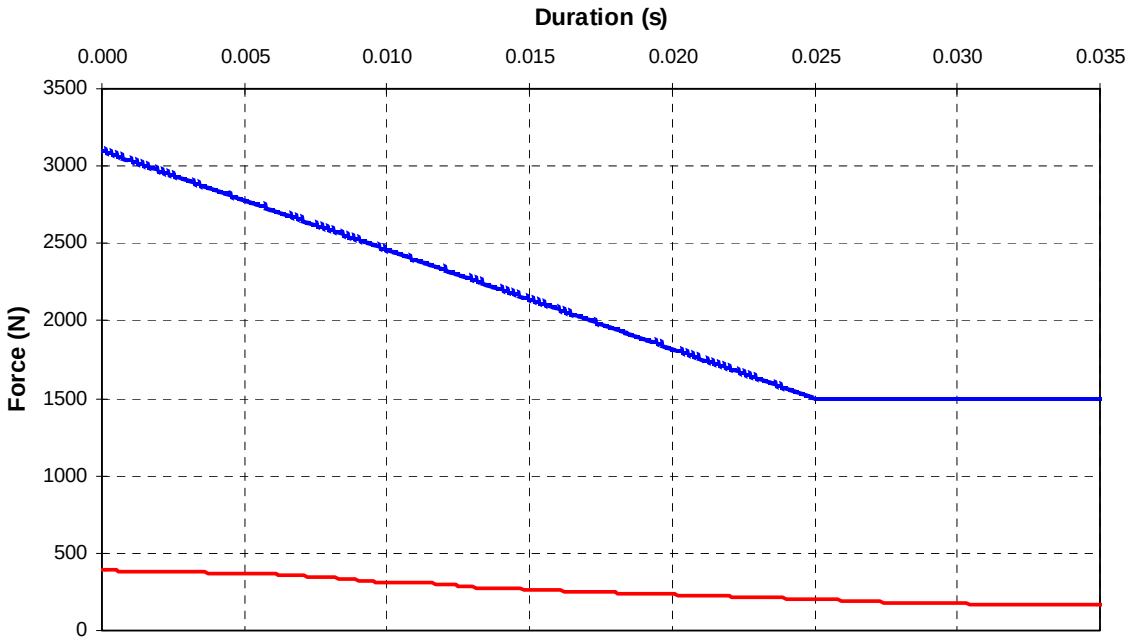
A- 14 CF00034 2001 Hyundai Elantra Neck Compression Analysis



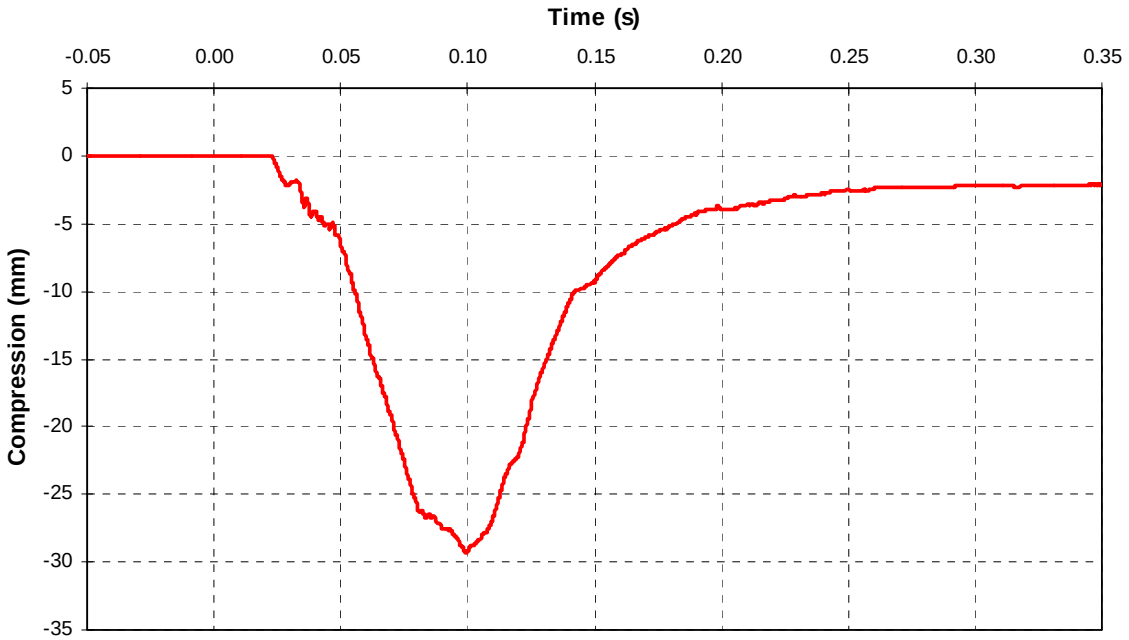
A- 15 CF00034 2001 Hyundai Elantra Neck A-P Shear (Positive) Analysis



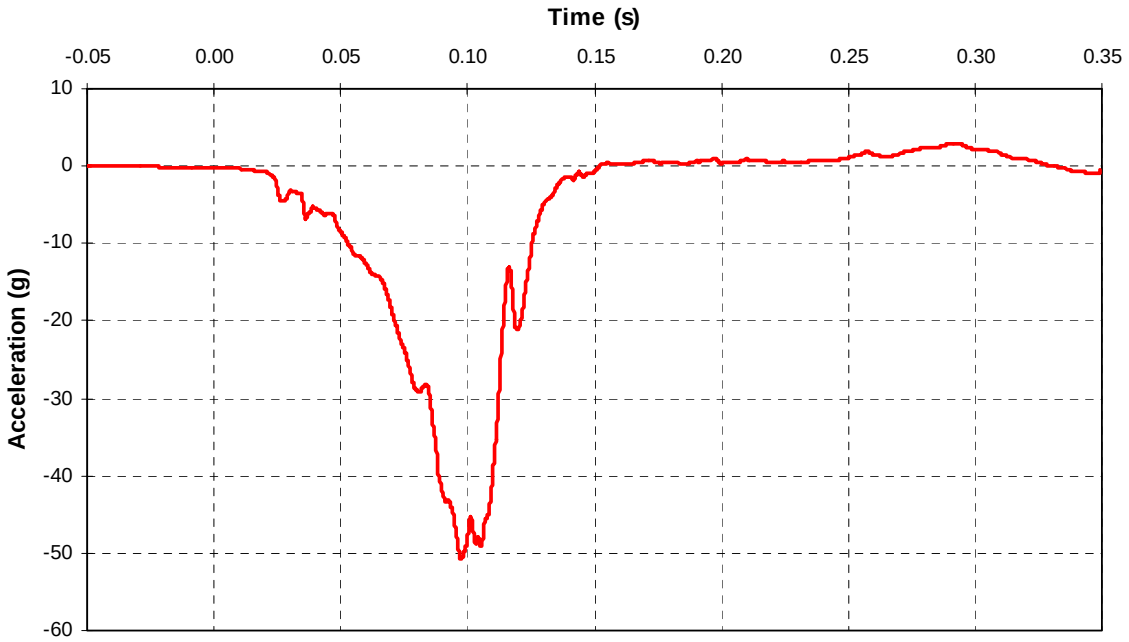
A- 16 CF00034 2001 Hyundai Elantra Neck A-P Shear (Negative) Analysis



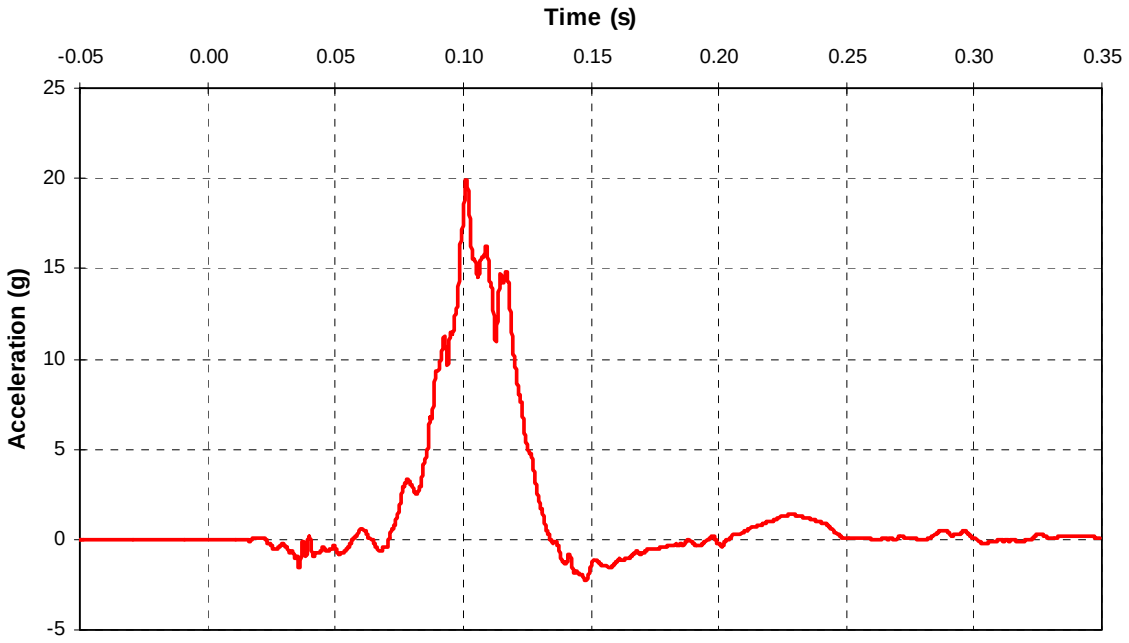
A- 17 CF00034 2001 Hyundai Elantra Chest Compression



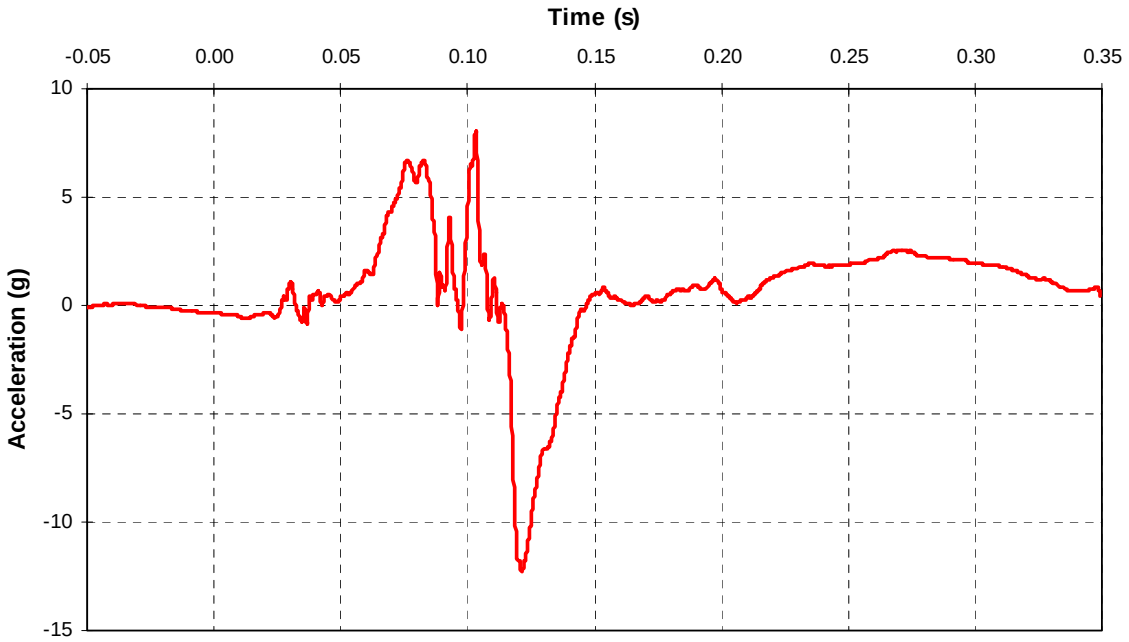
A- 18 CF00034 2001 Hyundai Elantra Chest A-P Acceleration



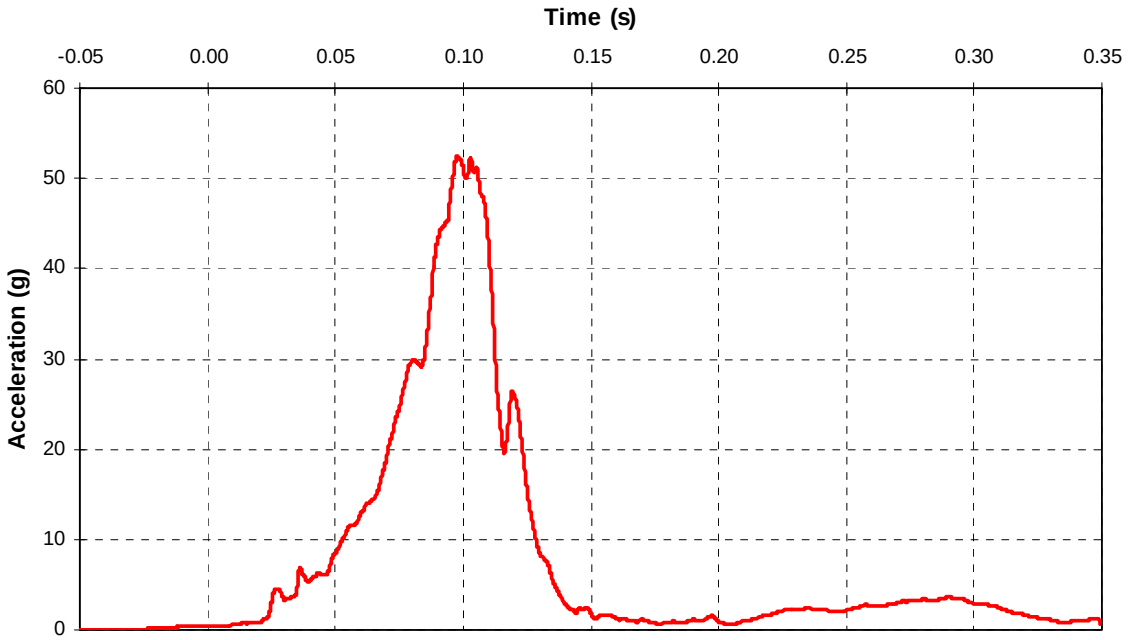
A- 19 CF00034 2001 Hyundai Elantra Chest L-M Acceleration



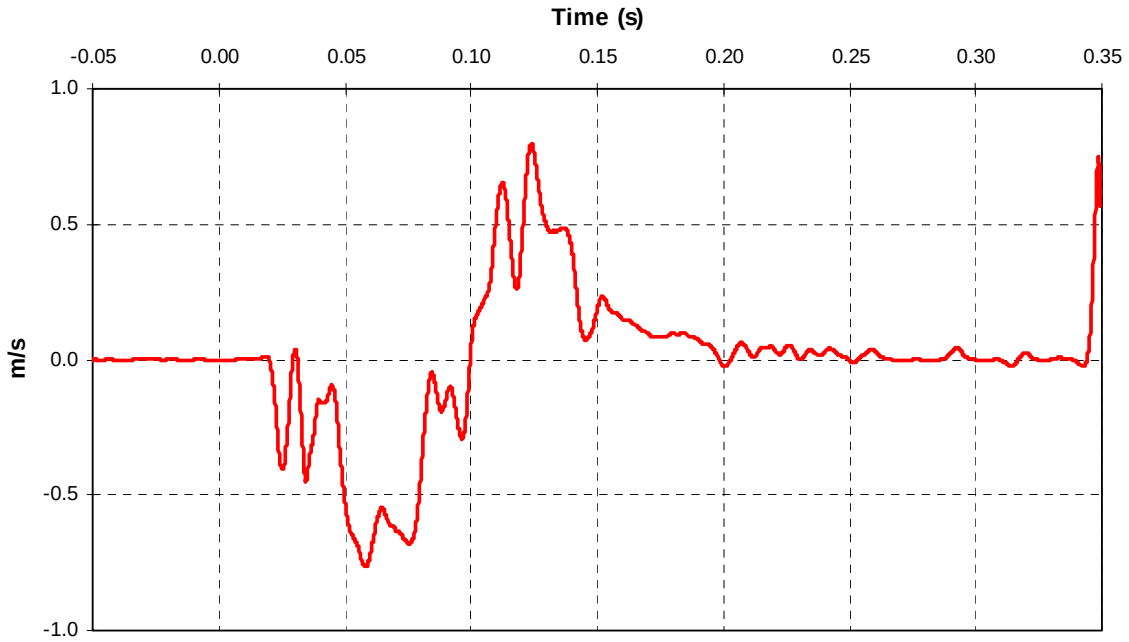
A- 20 CF00034 2001 Hyundai Elantra Chest I-S Acceleration



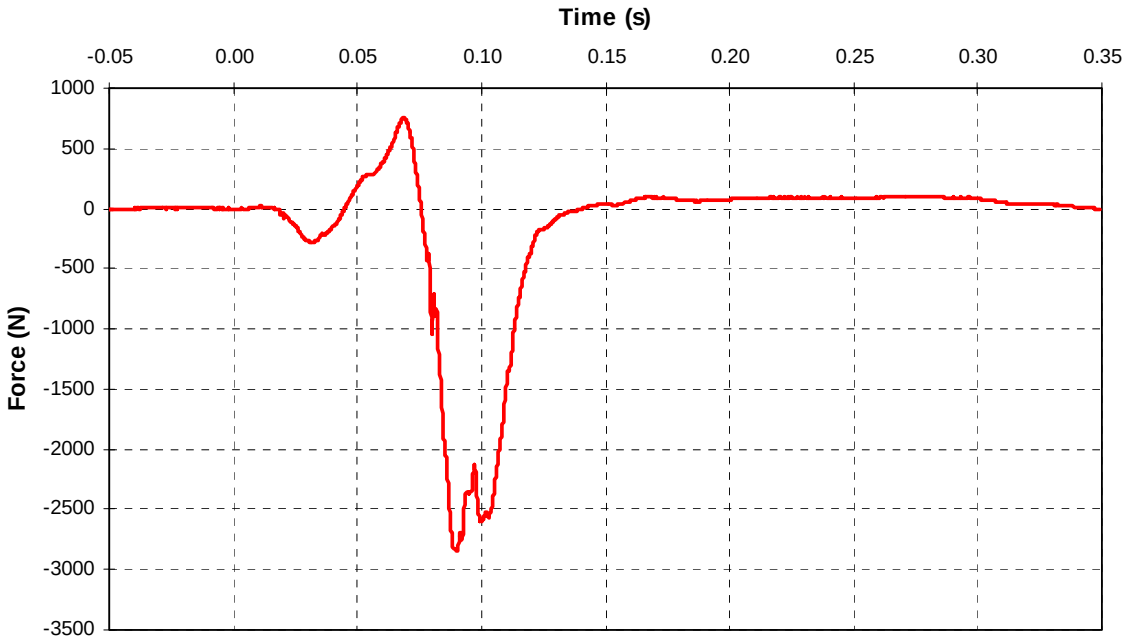
A- 21 CF00034 2001 Hyundai Elantra Chest Vector Resultant Acceleration



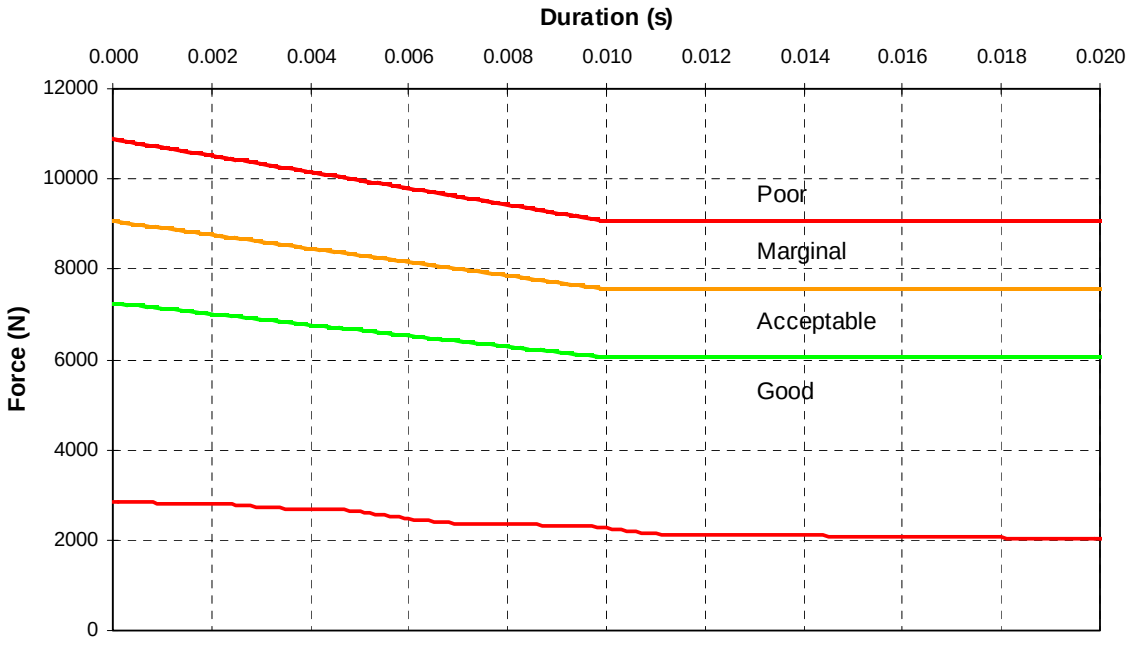
A- 22 CF00034 2001 Hyundai Elantra Sternum Deflection Rate



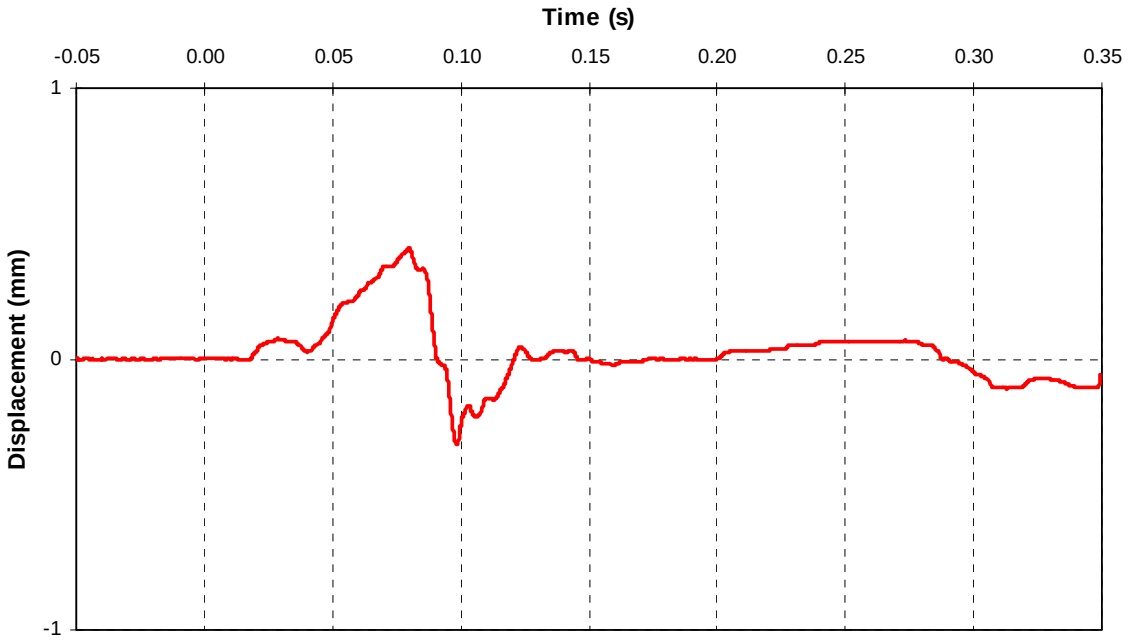
A- 23 CF00034 2001 Hyundai Elantra Left Femur Axial Force



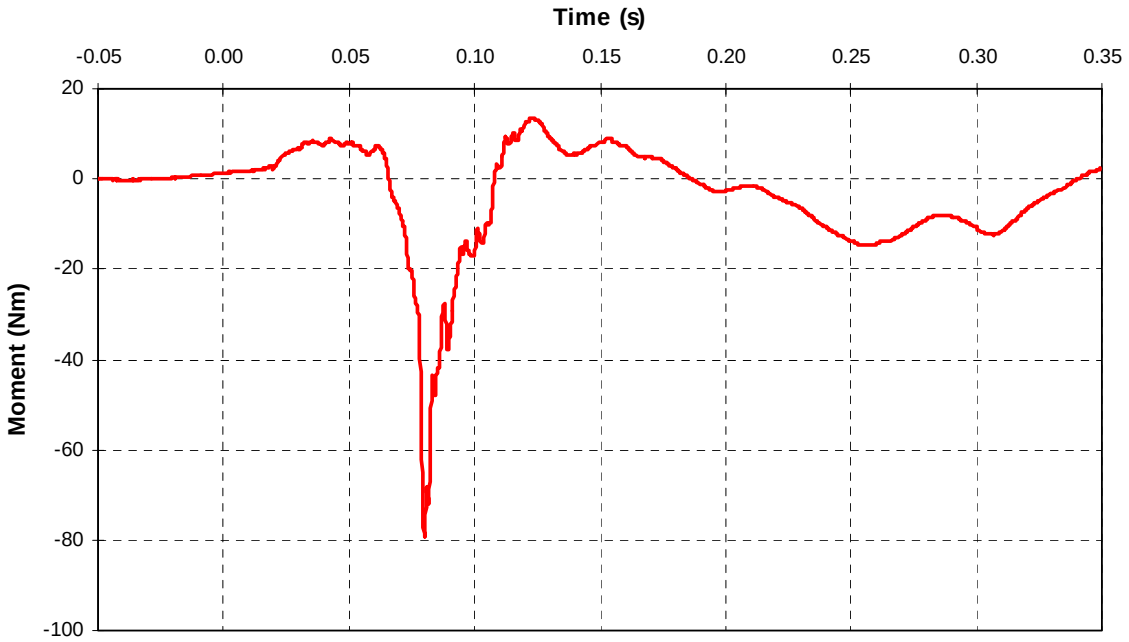
A- 24 CF00034 2001 Hyundai Elantra Left Femur Axial Force Analysis



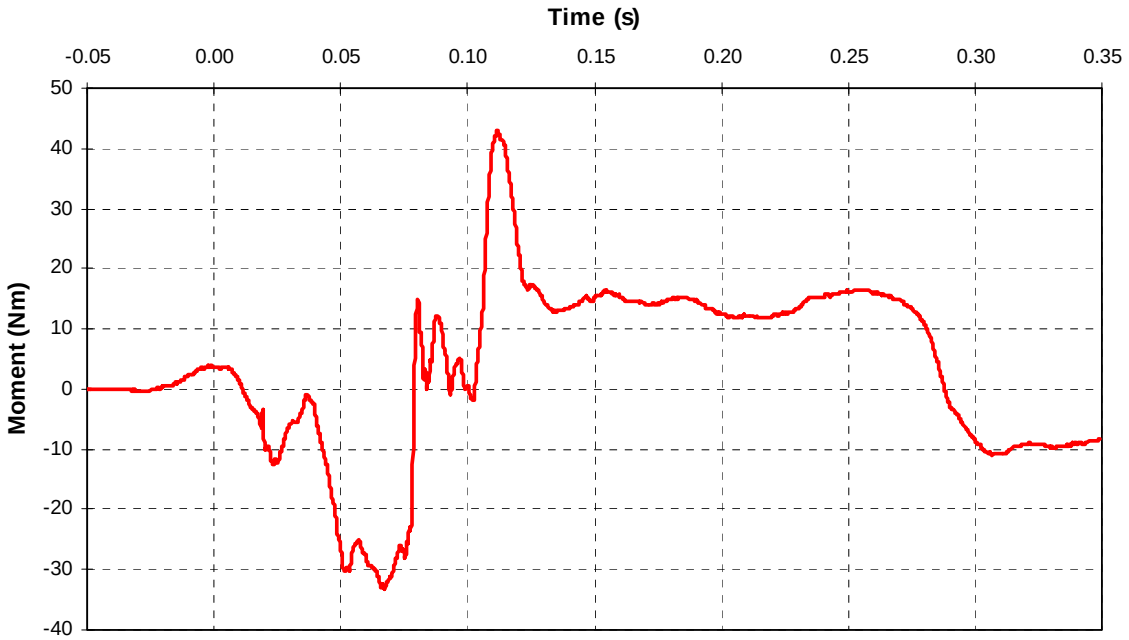
A- 25 CF00034 2001 Hyundai Elantra Left Tibia-Femur Displacement



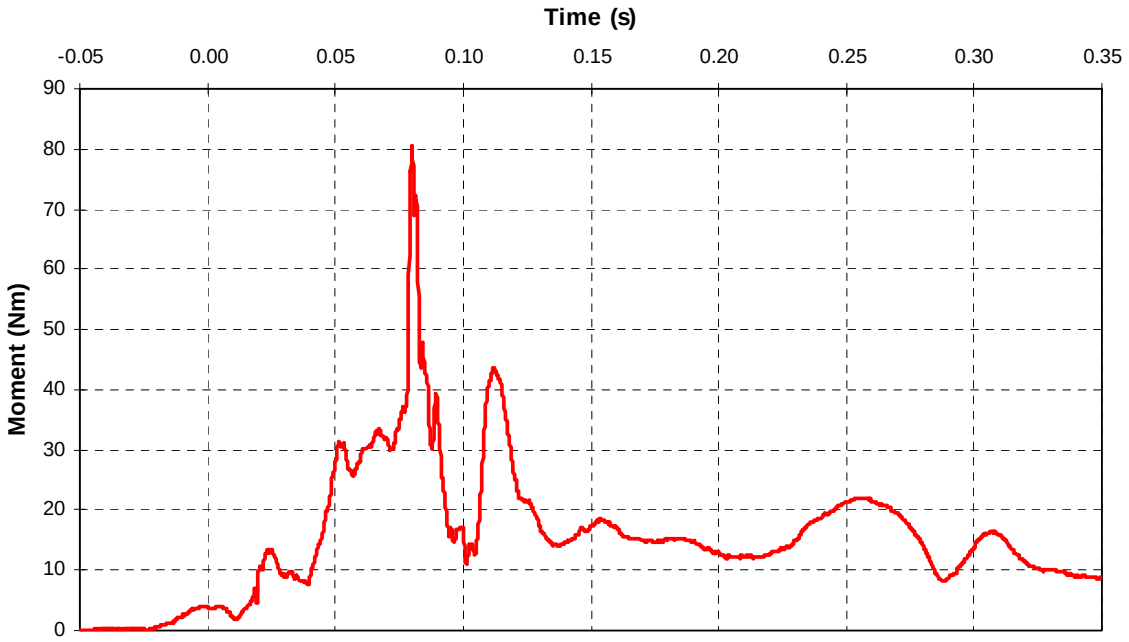
A- 26 CF00034 2001 Hyundai Elantra Left Upper Tibia L-M Moment



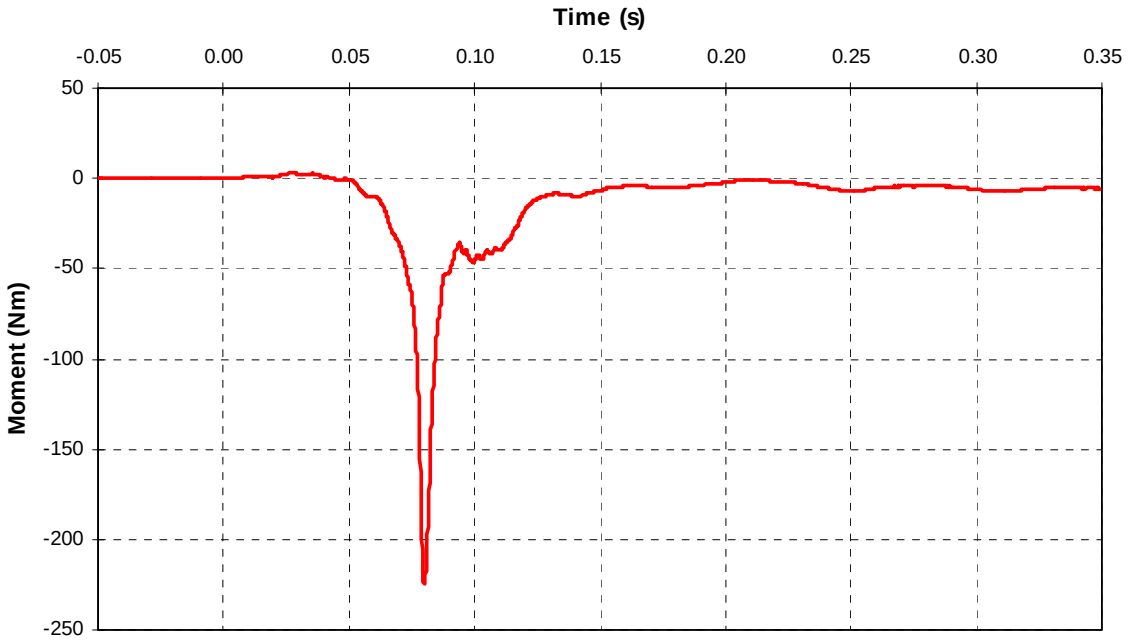
A- 27 CF00034 2001 Hyundai Elantra Left Upper Tibia A-P Moment



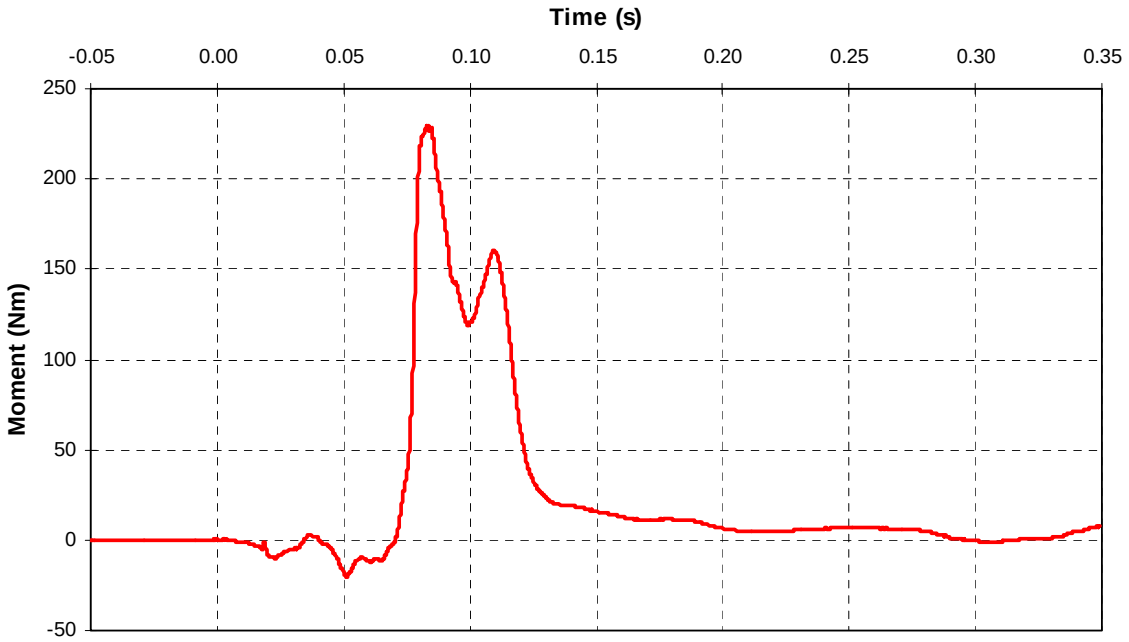
A- 28 CF00034 2001 Hyundai Elantra Left Upper Tibia Vector Resultant Moment



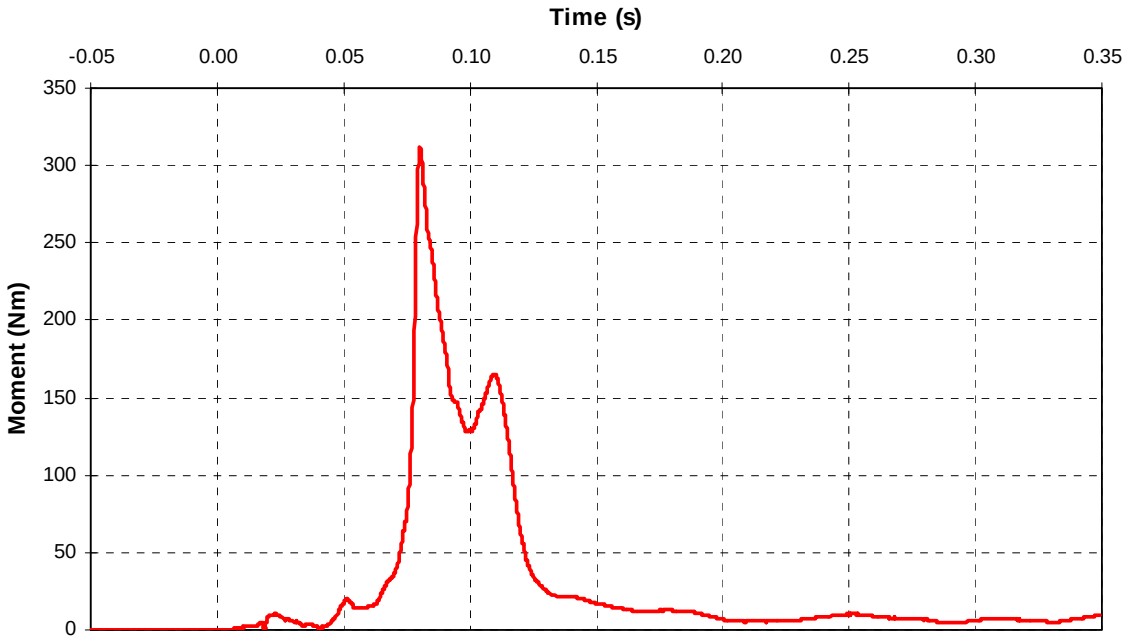
A- 29 CF00034 2001 Hyundai Elantra Left Lower Tibia L-M Moment



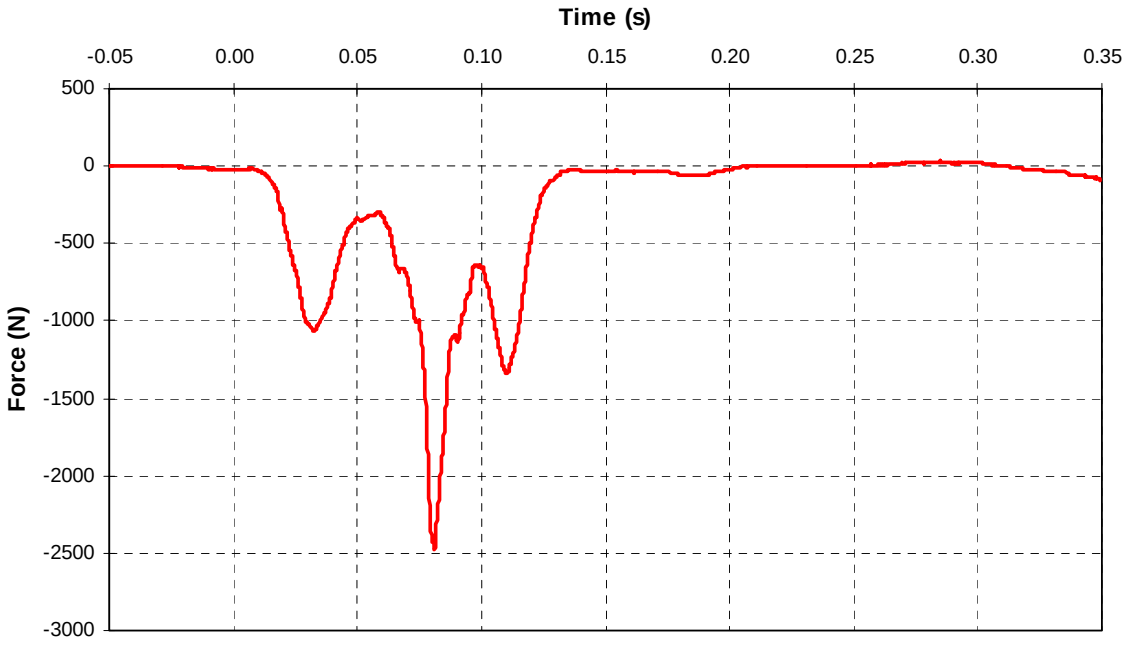
A- 30 CF00034 2001 Hyundai Elantra Left Lower Tibia A-P Moment



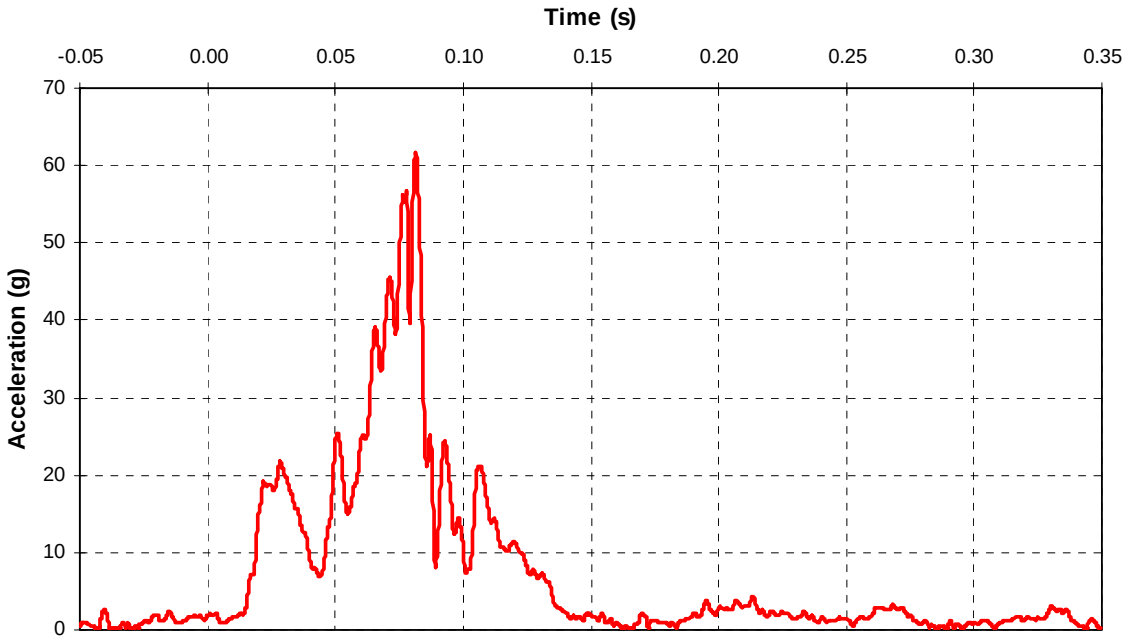
A- 31 CF00034 2001 Hyundai Elantra Left Lower Tibia Vector Resultant Moment



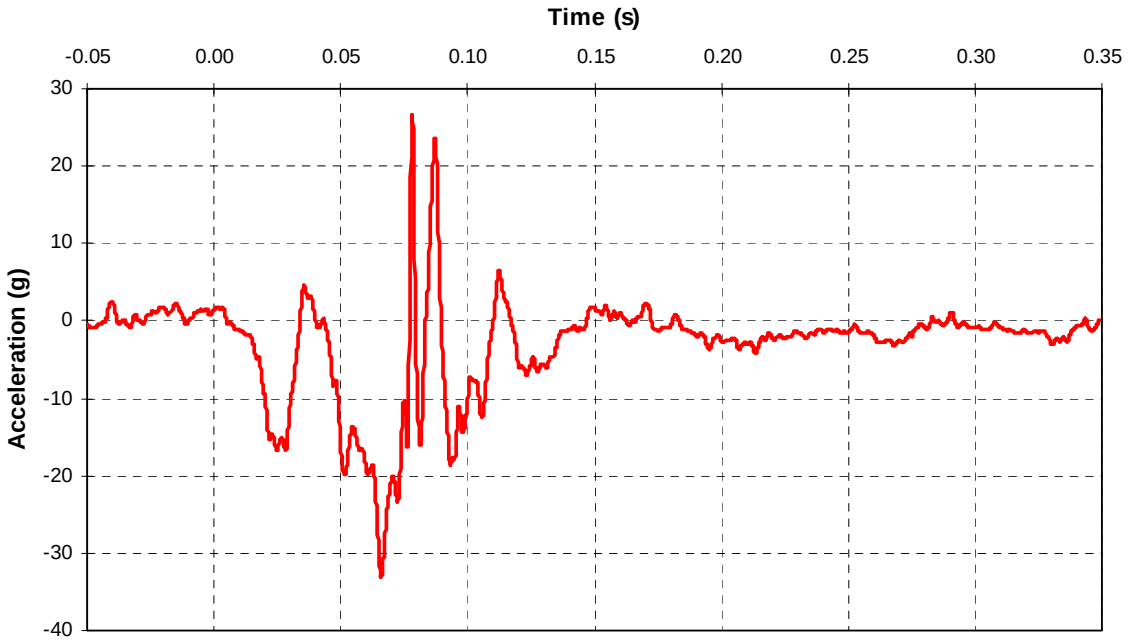
A- 32 CF00034 2001 Hyundai Elantra Left Lower Tibia Axial Force



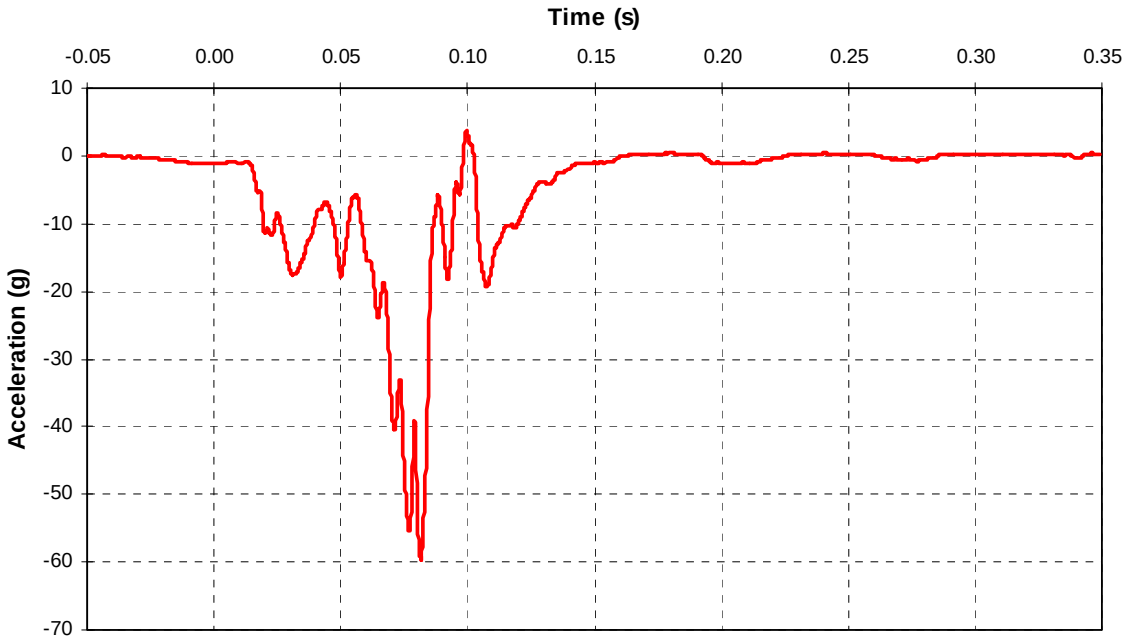
A- 33 CF00034 2001 Hyundai Elantra Left Foot Vector Resultant Acceleration



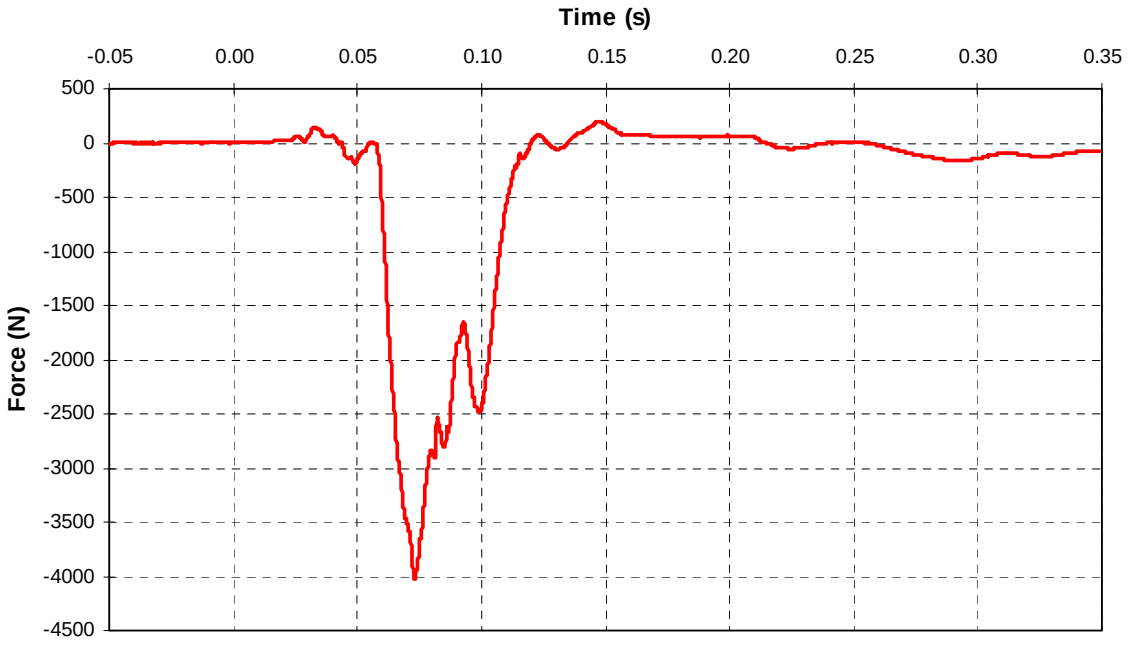
A- 34 CF00034 2001 Hyundai Elantra Left Foot A-P Acceleration



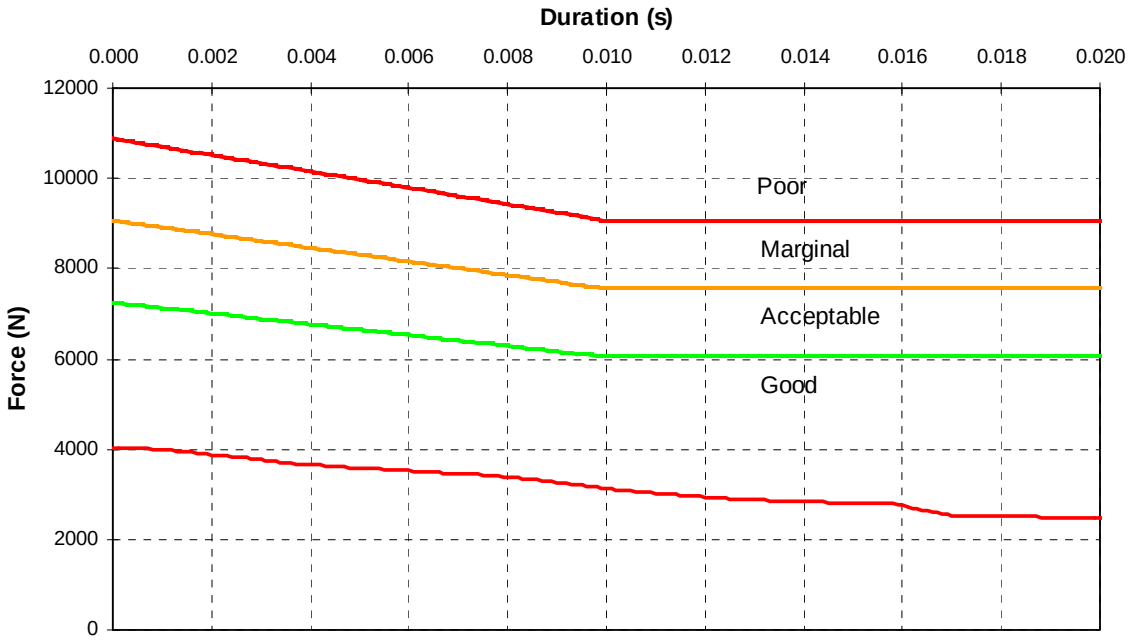
A- 35 CF00034 2001 Hyundai Elantra Left Foot I-S Acceleration



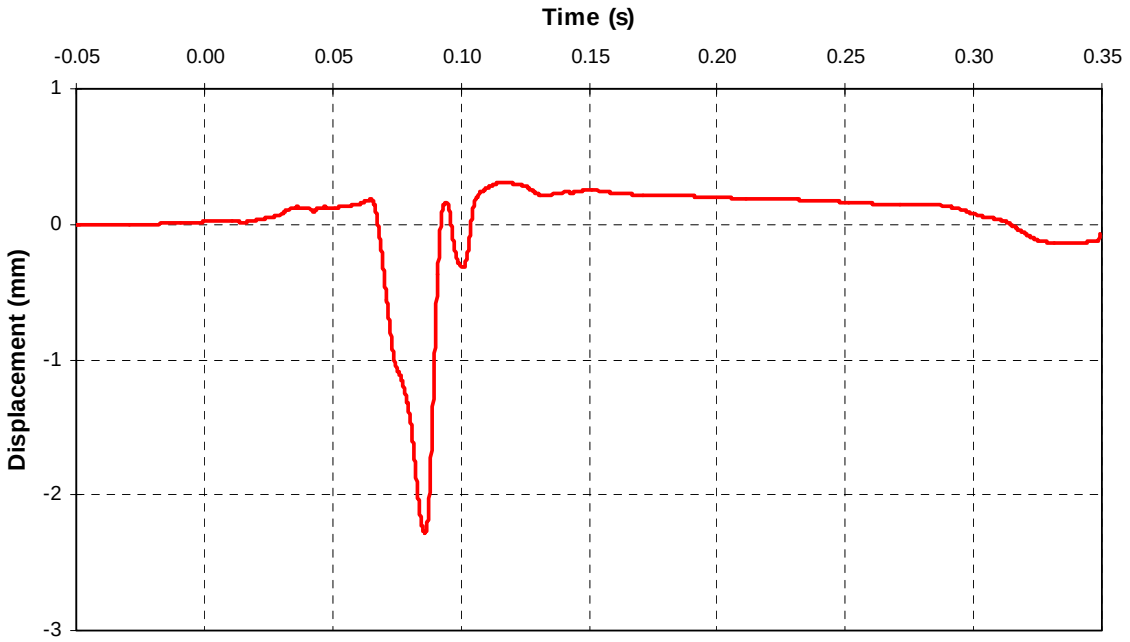
A- 36 CF00034 2001 Hyundai Elantra Right Femur Axial Force



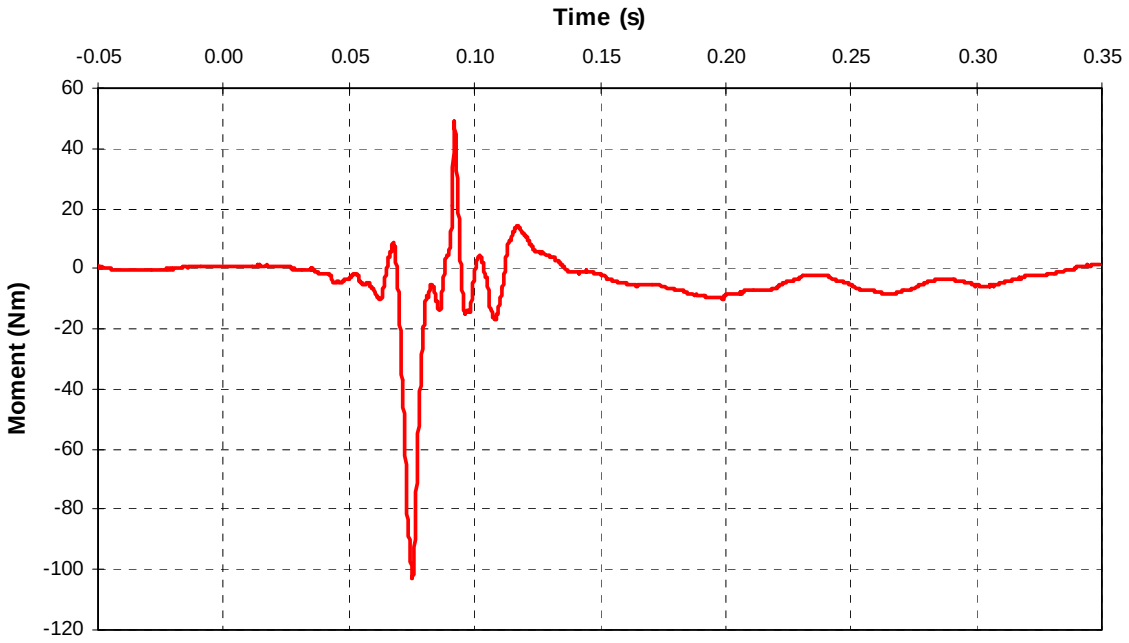
A- 37 CF00034 2001 Hyundai Elantra Right Femur Axial Force Analysis



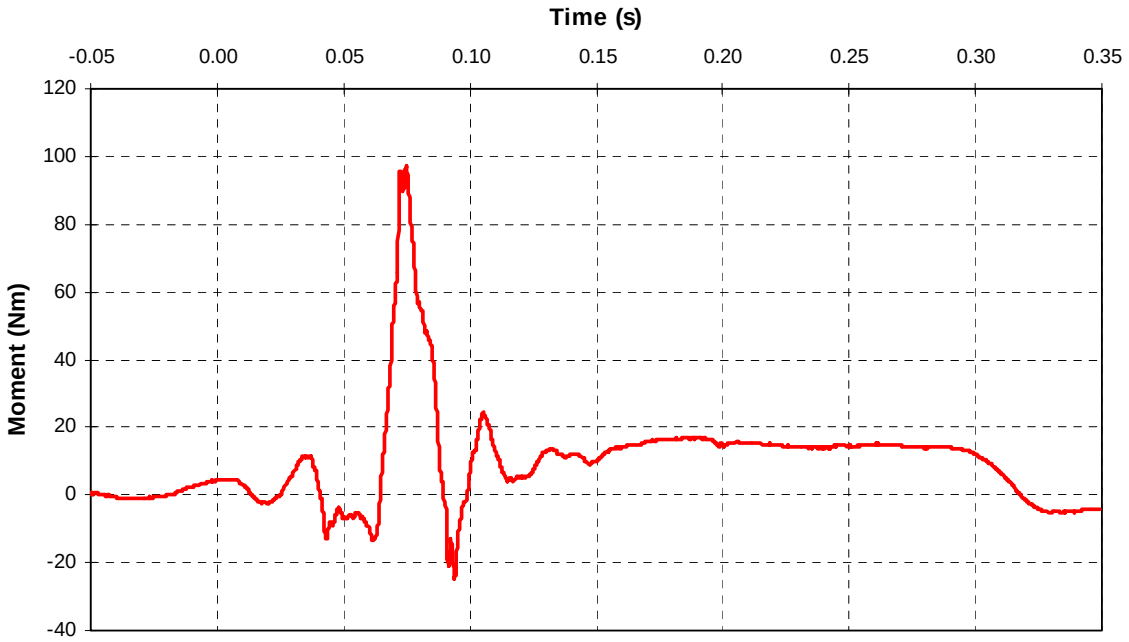
A- 38 CF00034 2001 Hyundai Elantra Right Tibia-Femur Displacement



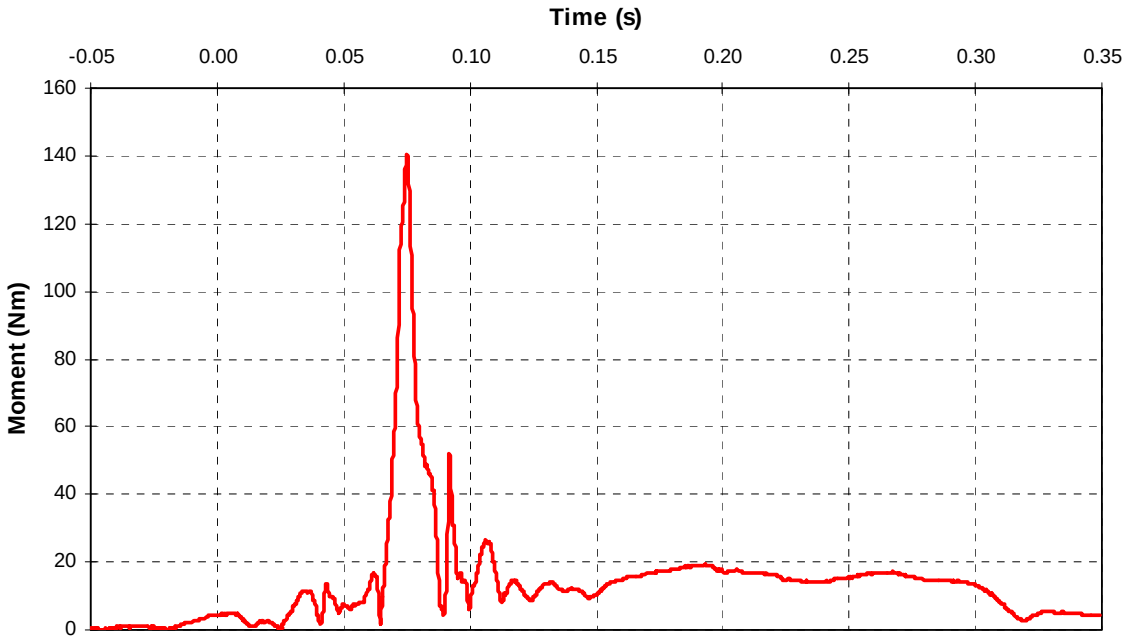
A- 39 CF00034 2001 Hyundai Elantra Right Upper Tibia L-M Moment



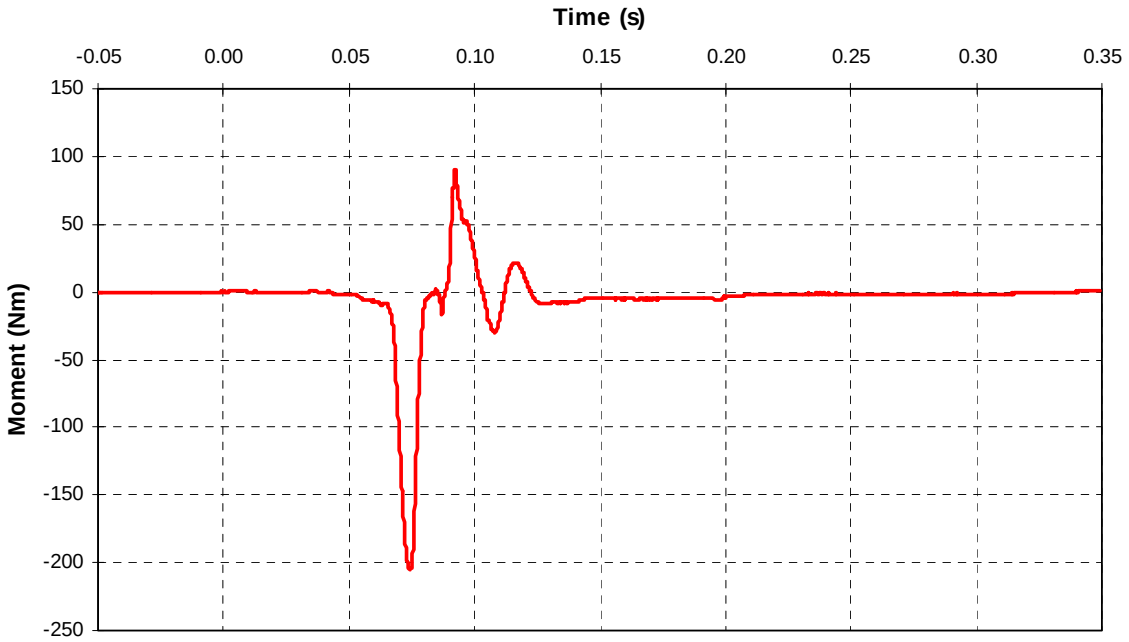
A- 40 CF00034 2001 Hyundai Elantra Right Upper Tibia A-P Moment



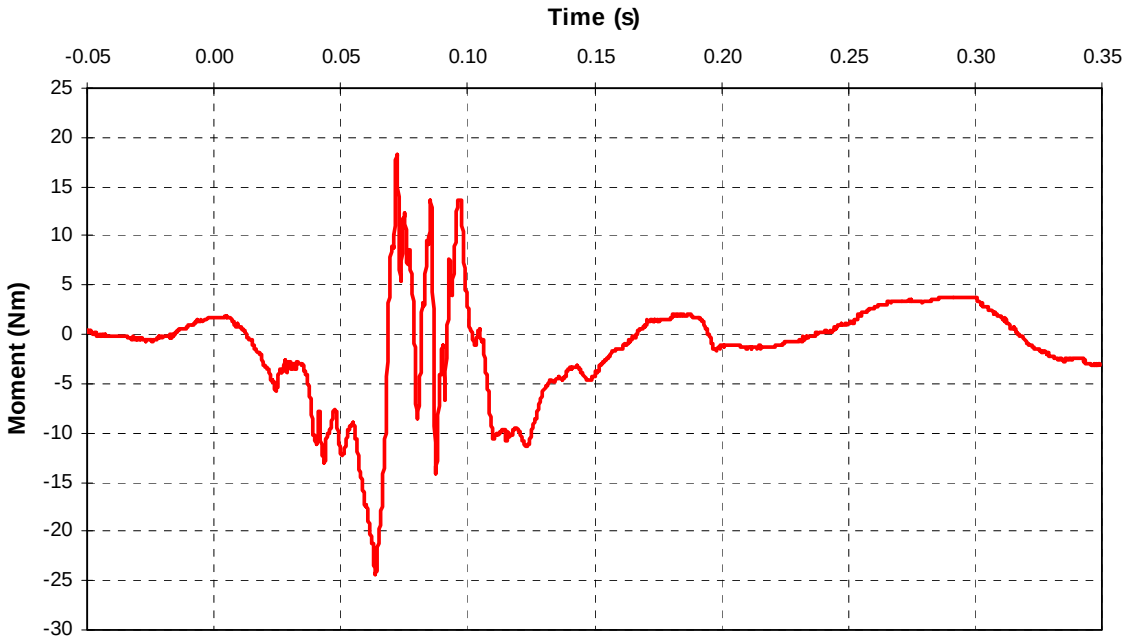
A- 41 CF00034 2001 Hyundai Elantra Right Upper Tibia Vector Resultant Moment



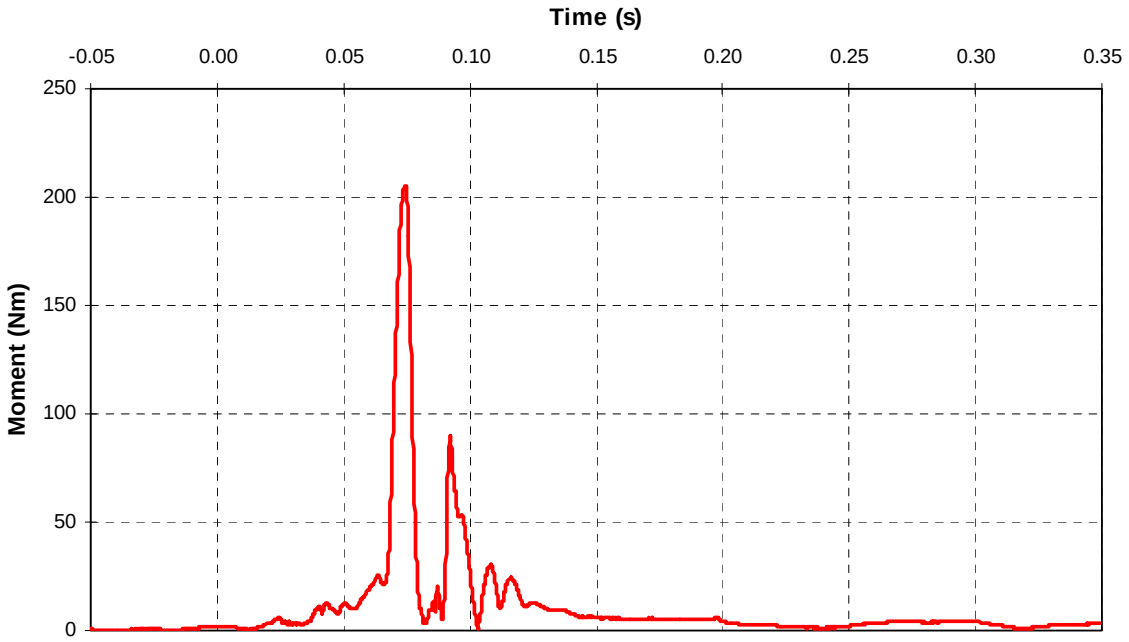
A- 42 CF00034 2001 Hyundai Elantra Right Lower Tibia L-M Moment



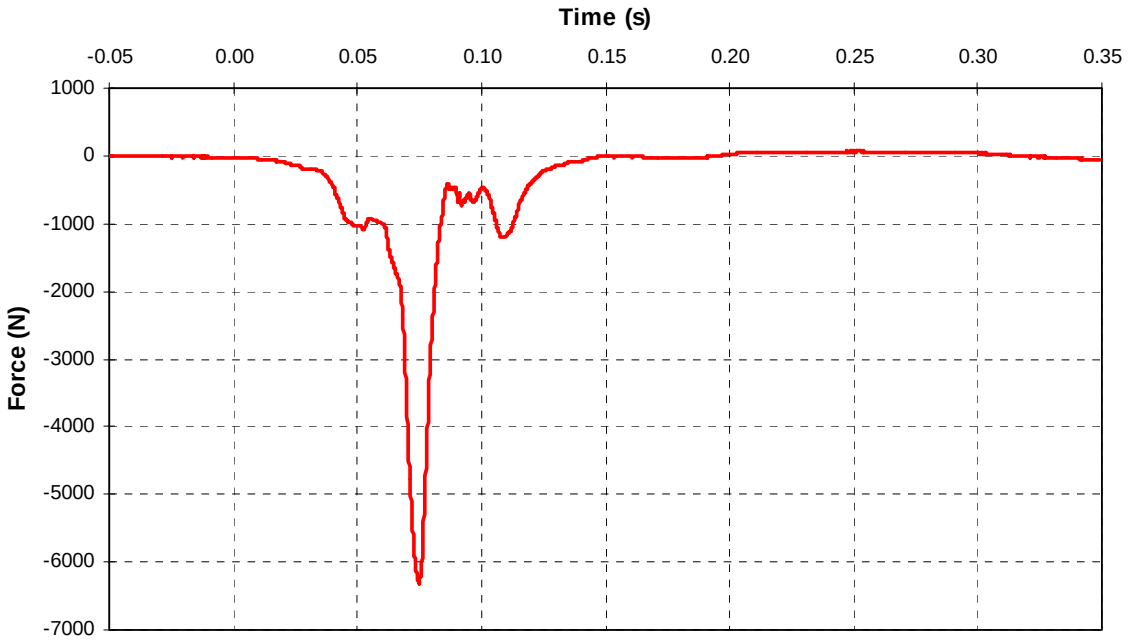
A- 43 CF00034 2001 Hyundai Elantra Right Lower Tibia A-P Moment



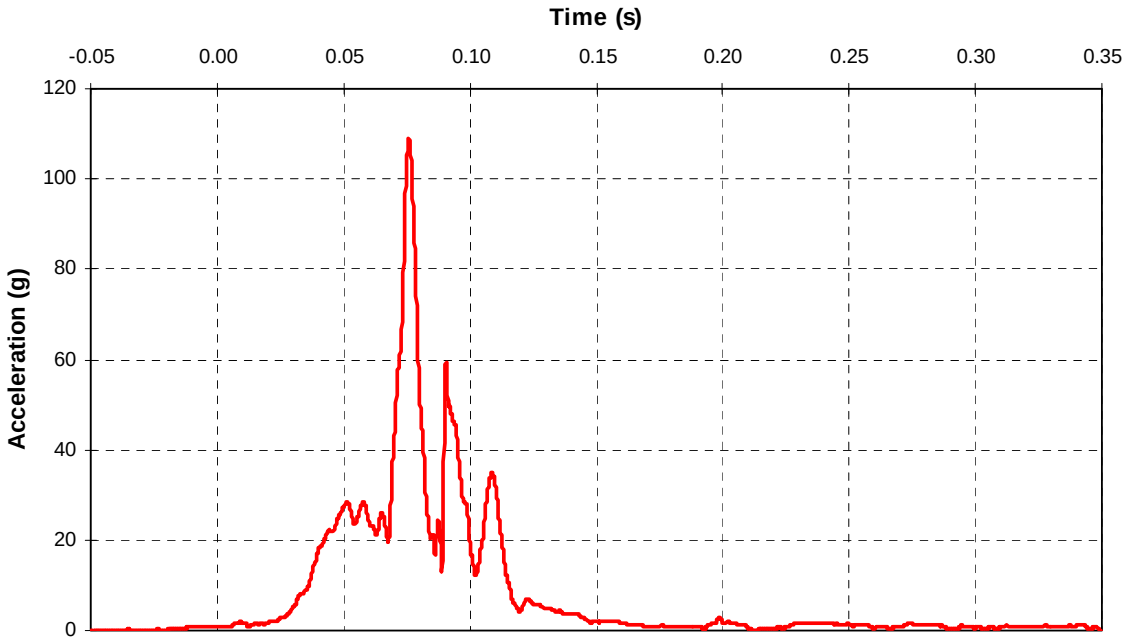
A- 44 CF00034 2001 Hyundai Elantra Right Lower Tibia Vector Resultant Moment



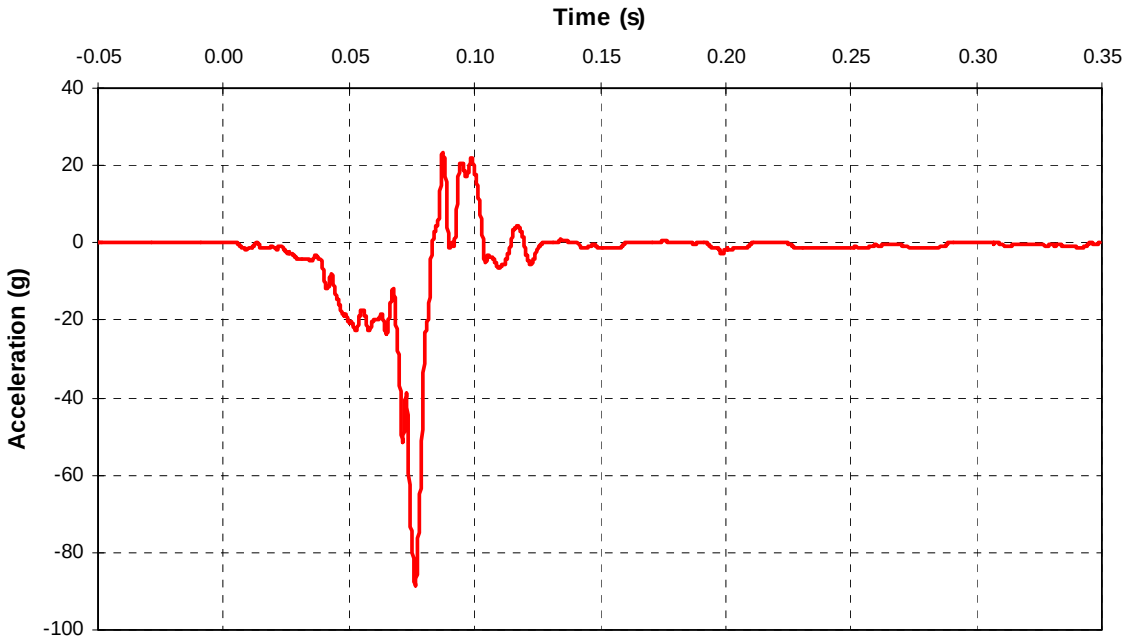
A- 45 CF00034 2001 Hyundai Elantra Right Lower Tibia Axial Force



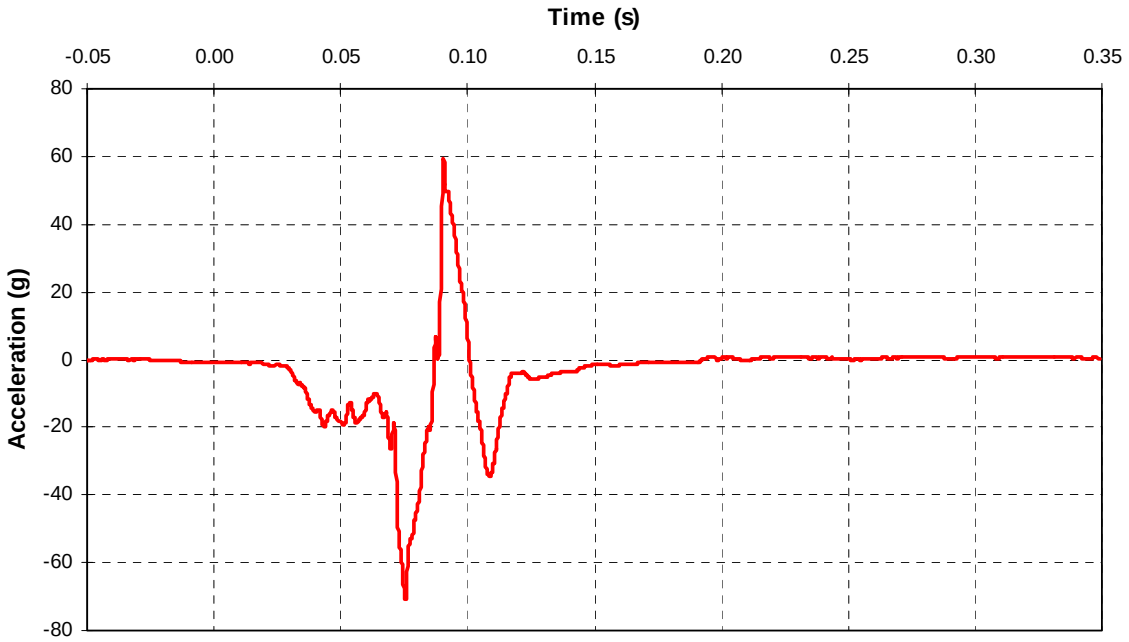
A- 46 CF00034 2001 Hyundai Elantra Right Foot Vector Resultant Acceleration



A- 47 CF00034 2001 Hyundai Elantra Right Foot A-P Acceleration



A- 48 CF00034 2001 Hyundai Elantra Right Foot I-S Acceleration



HYUNDAI

DRIVING IS BELIEVING

2001 ELANTRA SEDAN

VIN:	KMHDN45D61U032652	**Model:**	42442
Engine #:	G4GCY863738	**Port of Entry:**	NJ
Color:	Champagne	**Mode of Transport:**	TRUCK

Sold To: FAIRFAX HYUNDAI
VA006 10595 WARWICK AVE.
FAIRFAX VA 22030

Shipped to:

Compare this vehicle to others in the **FREE FUEL ECONOMY GUIDE** available at the dealer.

CITY MPG
24

HIGHWAY MPG
33

Actual Mileage
will vary with options, driving conditions, driving habits and vehicle's condition. Results reported to EPA indicate that the majority of these vehicles with these estimates will achieve between:
20 and *28* mpg in city and between *28* and *38* mpg on the highway

2001 ELANTRA 2.0 LITER
L4 ENGINE ELEC. FUEL INJECT.
AUTO 4 SPD. TRANS. CATALYST

Estimated Annual Fuel Cost:
$723.00

For comparison shopping
all vehicles classified as
COMPACT
have been issued mileage ratings
from * to * mpg city
and * to * mpg highway

** - NOT AVAILABLE*

Standard Warranty:

- 5-year/60,000-mile new vehicle warranty.*
- 10-year/100,000-mile powertrain warranty.*
- 5-year/100,000-mile anti-perforation warranty.*
- 5-year/unlimited mileage Roadside Assistance.

*Limited warranties; see dealer for details.

Hyundai Protection Plan

- Six Plans from which to choose.
- Affordable, Uninterrupted, Extended Service Coverage (up to 10 years/100,000 miles).
- Rental provision w/all covered repairs (except HI)
- Honored at Hyundai dealers across America.

258 B 2681NH206 15

Driving Enjoyment:

- Air Conditioning, Power Windows, Locks and Mirrors, AM/FM Stereo Cassette with Four Speakers, Tilt Steering Column and 60/40 Split-Folding Rear Seat.

Quality Construction

- Elantra's 2.0-Liter, 140-Horsepower, 16-Valve DOHC Engine Features Multi-Port Electronic Fuel Injection, a Direct Ignition System and Self-Adjusting Valves.

Safety and Security:

- Front and Side Airbags, Power-Assisted Front Disc Brakes, Safety Cage Construction, and 3-Point Front Seatbelt Pretensioners.

High Value Features:

*2.0L DOHC 16-Valve Engine	INCLUDED
*4-Spd Automatic Transmission	INCLUDED
*Independent MacPherson Strut Front and Independent Multi Link Rear Suspension	INCLUDED
*Front & Rear Stabilizer Bars	INCLUDED
*Front Disc/Rear Drum Brakes	INCLUDED
*14.5 Gallon Fuel Tank	INCLUDED
*Power Rack & Pinion Steering	INCLUDED
*P195/60R-15 Michelin Tires	INCLUDED
*Deluxe Wheel Covers	INCLUDED
*Bodycolor Bodyside Moldings	INCLUDED
*Tinted Glass	INCLUDED
*Fixed Mast Antenna	INCLUDED
*Air Conditioning	INCLUDED
*Power Locks/Windows/Mirrors	INCLUDED
*Variable Intermittent Wipers	INCLUDED
*Tilt Steering Column	INCLUDED
*AM/FM Stereo/Cassette	INCLUDED
*Remote Fuel Door Release	INCLUDED
*Remote Trunk Release	INCLUDED
*Rear Window Defroster	INCLUDED
*Center Console with Armrest	INCLUDED
*Tachometer and Trip Meter	INCLUDED
*Low Fuel Indicator Light	INCLUDED
*Quartz Digital Clock	INCLUDED
*Dual Front Airbag System	INCLUDED
*Front Side Airbags	INCLUDED
*Rear Child Seat Anchors	INCLUDED
*Rear Child Safety Locks	INCLUDED

Manufacturer's Suggested Retail Price: **$13,299.00**

Optional Features:

*California Emissions Package 2	100.00 400.00
Cruise Control Remote Keyless Entry Vehicle Security System	
*Carpeted Floor Mats	78.00
Inland Freight & Handling	435.00

Total Manufacturer's Suggested Retail Price: **$14,312.00**

Manufacturers suggested retail price includes manufacturer's recommended pre-delivery service. Gasoline, license and title fees, state and local taxes and dealer installed options and accessories are not included in the manufacturer's suggested retail price.

*The supplemental restraint (airbag) system (SRS) is designed to work with the three-point seat belt system. The SRS is not a substitute for seat belts, which should be worn at all times.

This label has been affixed to this vehicle by Hyundai Motor America, pursuant to the requirements of 15 U.S.C. 1231 et seq. which prohibits its removal or alteration prior to delivery to the ultimate purchaser.