Insurance Institute for Highway Safety
Crashworthiness Evaluation

Crash Test Report
1998 Jeep Cherokee (CF98012)

Vehicle identification number: 1J4FJ68S3WL223246
Body style: Small four-door utility vehicle
Engine/transmission: Longitudinal, 4.0-liter 6-cylinder, 4-speed automatic, 4-wheel drive

Standard crashworthiness features:
Driver and right front passenger airbags
Shoulder belt upper anchorage height adjusters (front seating positions only)

Optional safety features:
Four-wheel antilock brakes

Vehicle specifications (provided by manufacturer):

Wheelbase:	258 cm
Overall length:	425 cm
Overall width:	172 cm
Curb weight:	1,441 kg

Vehicle specifications (measured):

Front bumper to firewall:	106 cm
Curb weight:	1,578 kg
Test weight:	1,701 kg
Overall width:	175 cm

Nominal test parameters:
40.0 mi/h (64.4 km/h), 40 percent overlap, deformable barrier face with slotted bumper

Crash test date:
May 7, 1998

Figure 1
Precrash and Postcrash Side Views — 1998 Jeep Cherokee

Summary

A 1998 Jeep Cherokee was crash tested on May 7, 1998 into a fixed deformable barrier at 39.9 mi/h (64.2 km/h) and a 39 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 cm. Resultant intrusion in the driver footwell measured 28 cm at the area where a footrest typically would be located and 18-26 cm at other places on the toepan. There was extensive tearing of the welded seam connecting the outboard edge of the toepan with the left front wheel housing and door sill. This part of the toepan was pushed rightward about 12 cm, trapping the dummy's left foot against the brake pedal. All doors remained closed during the crash. After the crash, the driver and left rear doors required tools to open, but 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, 2 cm of webbing spooled off the retractor, and the deploying airbag contacted the dummy's face and chest. The dummy's head contacted the steering wheel through the airbag. During rebound, the upper left side of the head contacted the plastic trim above the door opening. Late in the crash, the upper left rear of the head contacted the B-pillar and shoulder belt upper anchorage. After the crash, the upper end of the steering column had moved upward 19 cm and forward 2 cm.

The dummy's head had a maximum resultant head acceleration of 60 g when it contacted the steering wheel through the airbag. The left leg had an upper tibia index of 0.87 and a lower tibia index of 1.52. The right leg had a maximum tibia axial force of 4.3 kN and a lower tibia index of 0.87.

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 IV). 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 area where a footrest typically would be located.

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 44 cm behind its center of gravity (167 cm behind the front axle). The vehicle speed recorded just prior to impact was 39.9 mi/h (64.2 km/h), and the actual overlap was 39 percent.

Structural Performance

All doors remained closed during the crash. The driver door aperture shortened 5 cm as measured at the lower edge of the window. After the crash, the driver and left rear doors required tools to open, but the right front and right rear doors opened with ease.

As the left front wheel was forced rearward, it passed inboard of the driver door sill and loaded the toepan, pushing the left side of the toepan rightward about 12 cm. Later during the impact, the sill itself was loaded by the angled wheel. There was extensive tearing of the welded seam connecting the outboard edge of the toepan with the wheel housing and door sill. The tear's maximum gap width measured more than 20 cm, and the tire intruded into the space.

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. Figures 3 and 4 illustrate the precrash and postcrash contour measures of the front bumper face bar and upper crossmember of the radiator support. Figure 5 shows the precrash and postcrash views from below. Figure 6 illustrates the deformation of the side rails, door sills, and crossmember, which are visible in Figure 5.

Figure 2
Overhead View of Crash Deformation — 1998 Jeep Cherokee

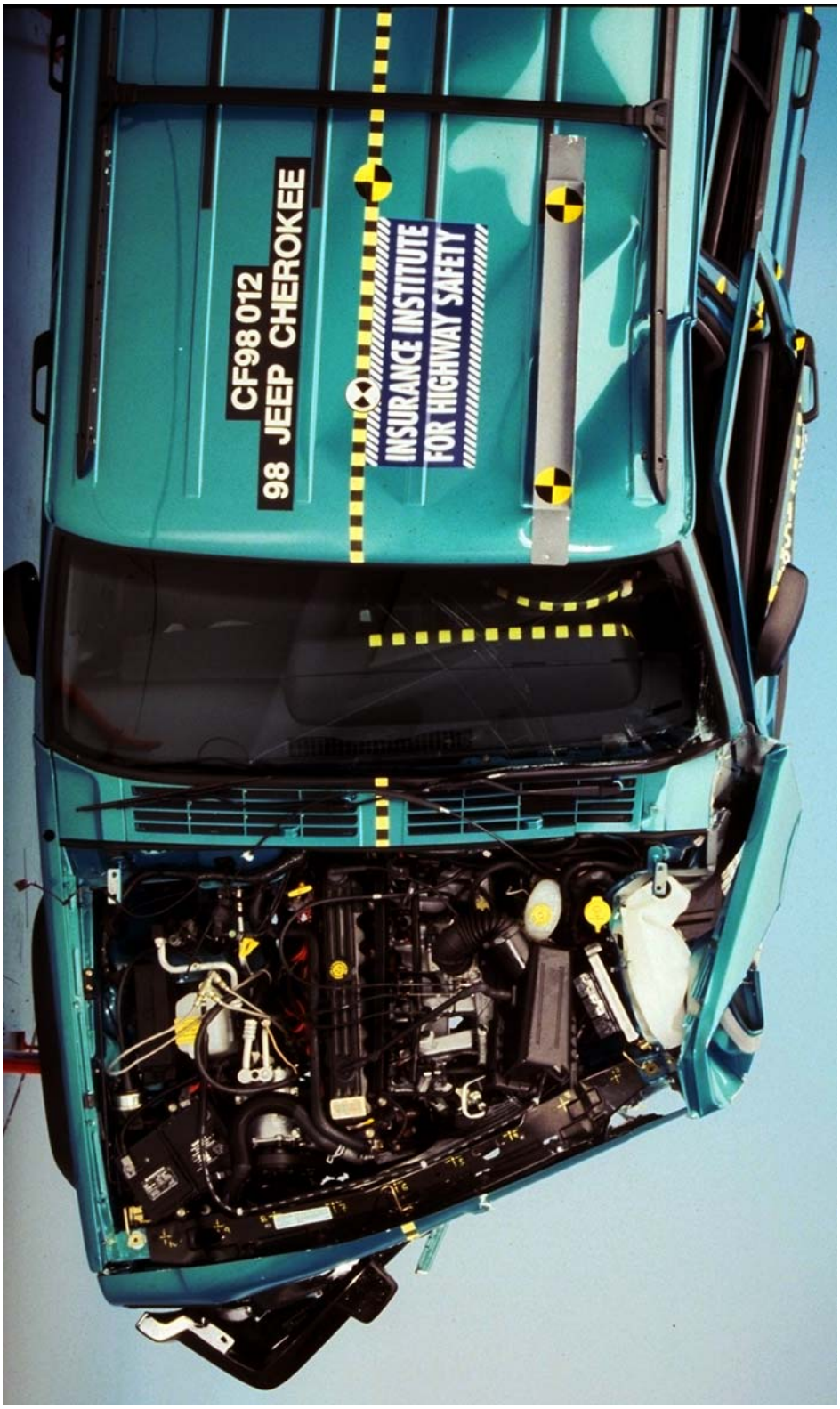
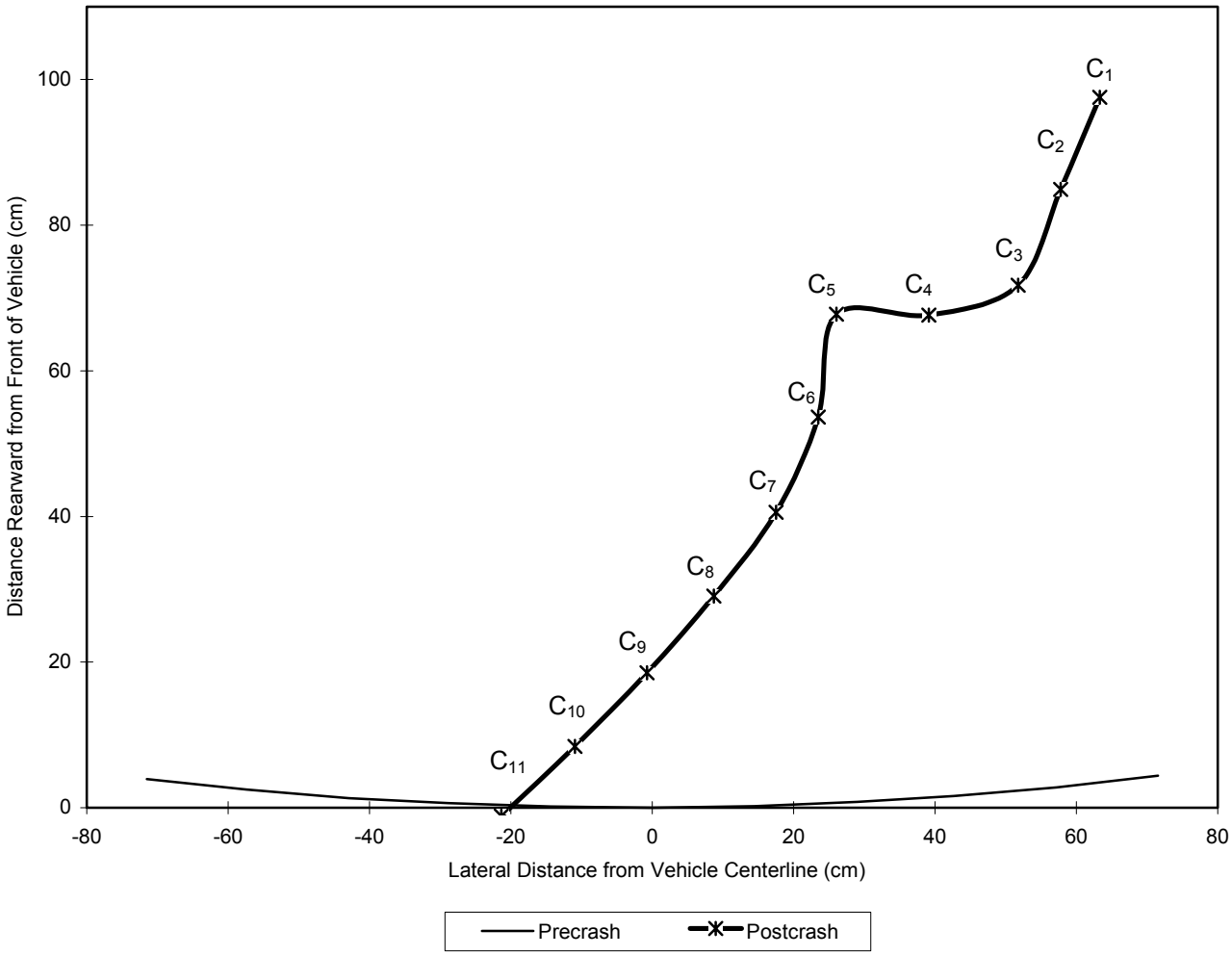


Figure 3
Front Bumper Bar Crush Contour — 1998 Jeep Cherokee



	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)	98	85	72	68	68	54	41	29	19	8	-1
Precrash Contour (cm)	4	3	2	1	0	0	0	1	1	2	4
Resulting Crush (cm)	94	82	70	67	68	54	41	28	18	6	-5

The length of the reference line was 143 cm precrash and 85 cm postcrash.

Figure 4
Upper Radiator Support Crossmember Crush Contour — 1998 Jeep Cherokee

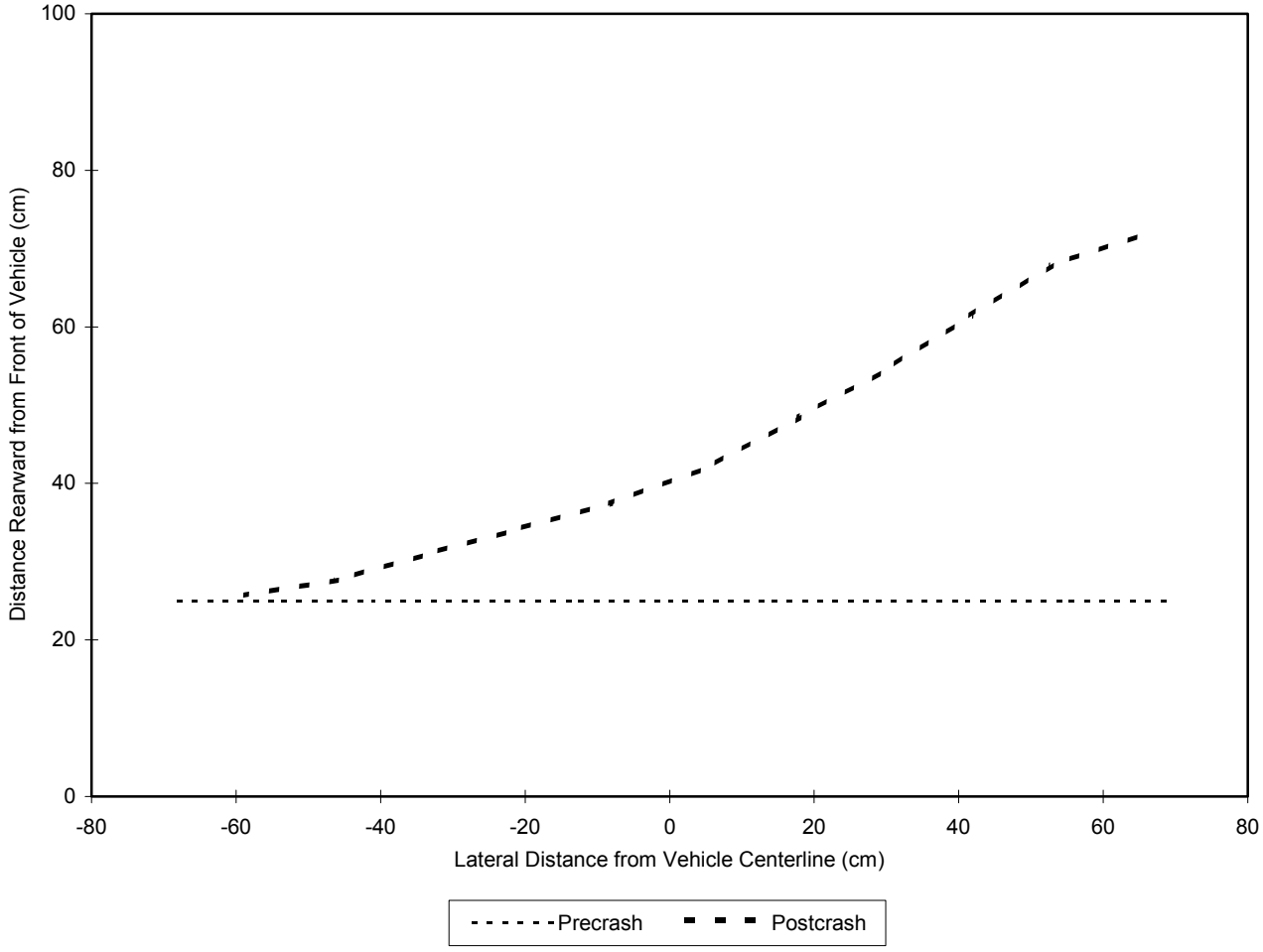
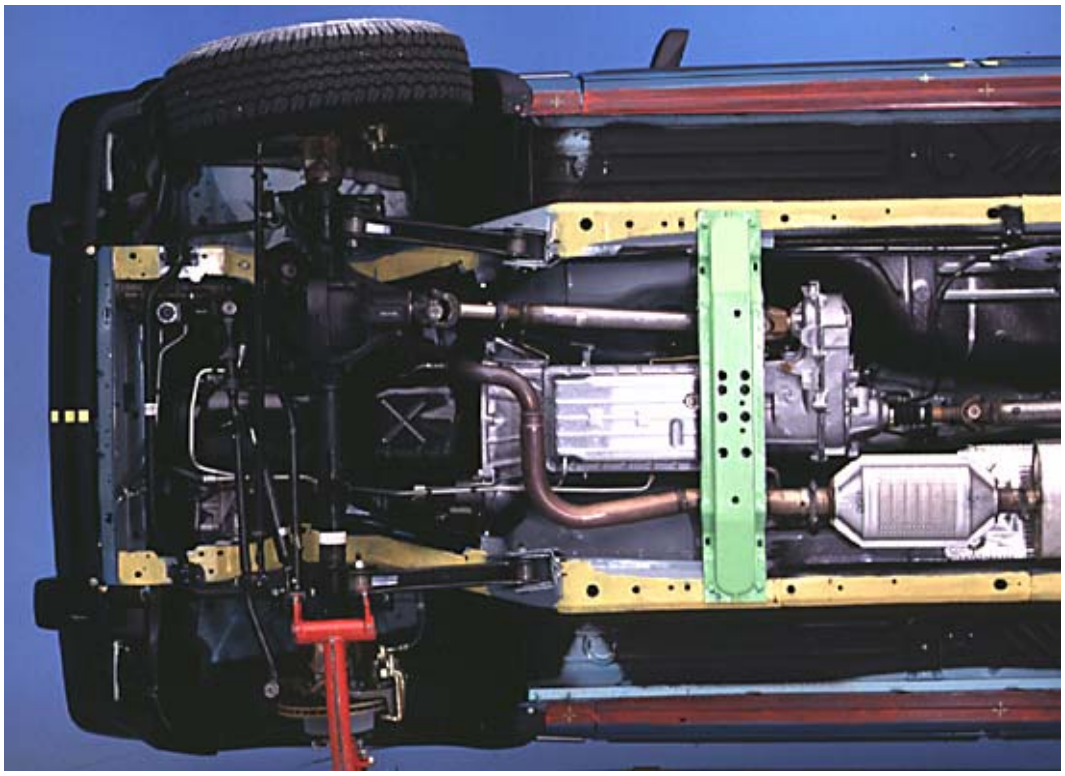


Figure 5
Precrash and Postcrash Views from Below — 1998 Jeep Cherokee



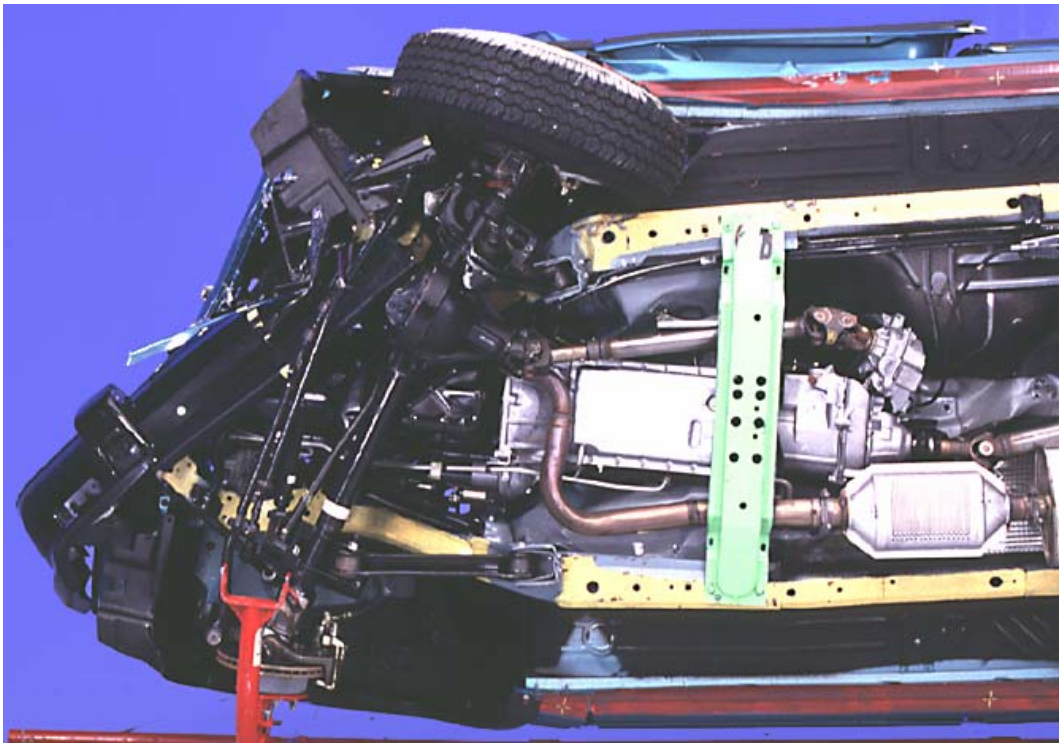
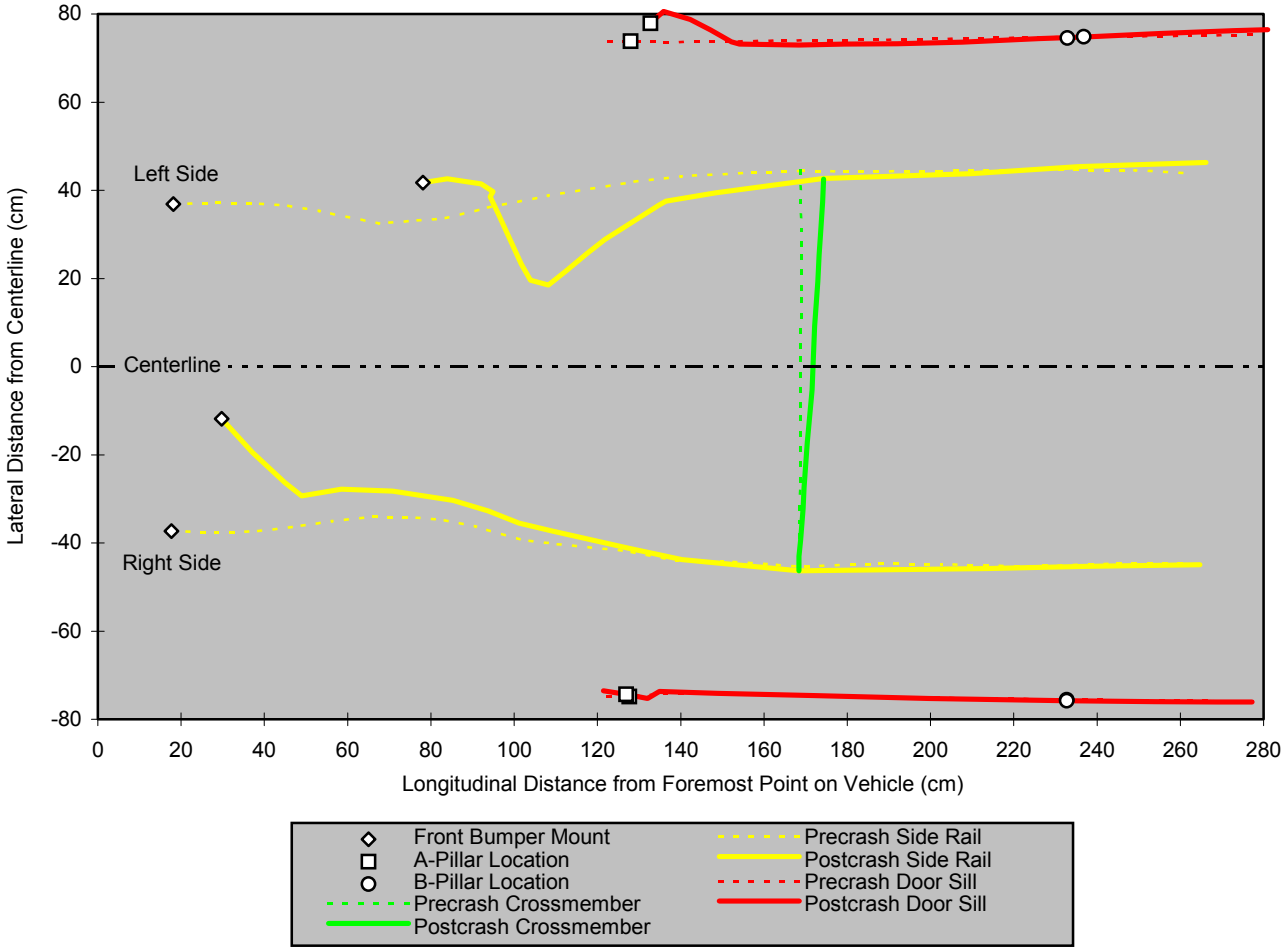
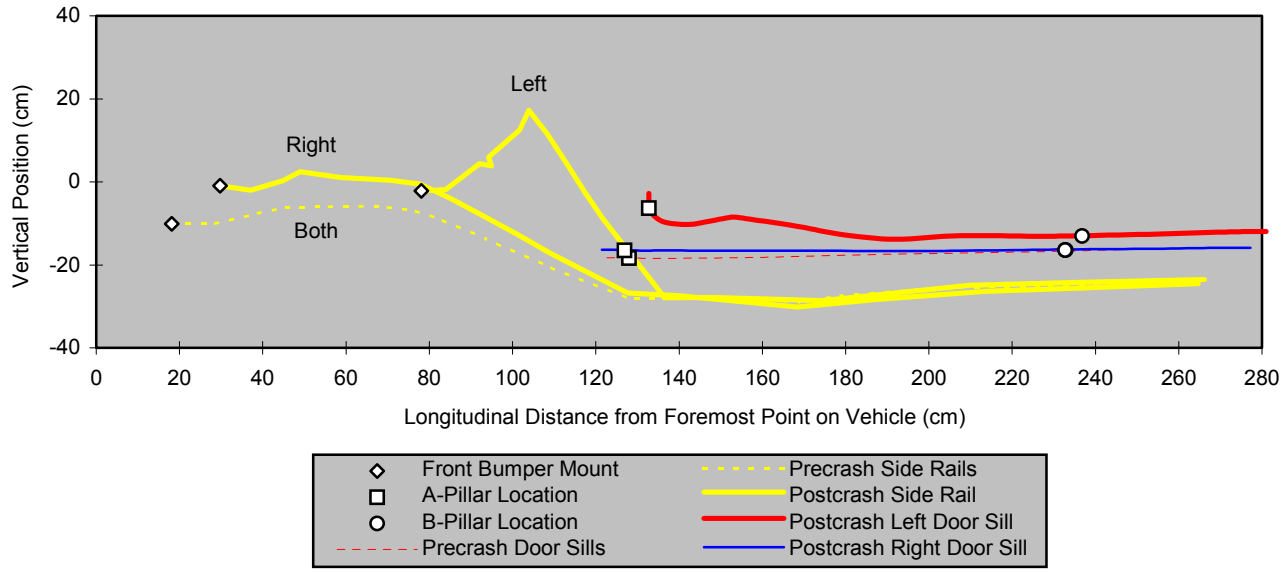


Figure 6
Structural Deformation, Views from Below and Side — 1998 Jeep Cherokee





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 primary coordinate reference system for these measures is described in the IIHS Offset Barrier Crash Test Protocol (Version IV). 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. This was done by subtracting the average component displacements of the four seat-attachment bolts, which also were measured relative to the primary coordinate system, from the respective components of displacement for each of the target locations. The average displacement of the four seat-attachment bolts relative to the primary reference system also is shown in Table 1.

Table 1
Residual Measurements of Intrusion Relative to Driver Seat — 1998 Jeep Cherokee

Selected Locations*	Longitudinal	Lateral	Vertical	Resultant
Steering column (cm)	2	2	19	19
Left lower instrument panel (cm)	-4	1	7	8
Right lower instrument panel (cm)	-4	1	7	8
Brake pedal (cm)	-18	-3	9	20
Left toepan (cm)	-21	-11	10	26
Center toepan (cm)	-16	-3	7	18
Right toepan (cm)	-20	-2	8	21
Footrest (cm)	-22	-13	8	28
Average displacement of the four seat-attachment bolts from primary reference system (cm)	-7	-1	-5	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 64 cm in diameter, and the excursion of its center when inflated is limited by two 20 cm-long tethers. The airbag does not have vent holes but is made of porous fabric. Analysis of the high-speed film taken from camera positions D and E indicated the airbag deployed at 46 ms into the crash and appeared to be fully inflated at 68 ms.

Passenger: The mid-mounted passenger airbag deployed rearward and is untethered. The cylinder-shaped airbag does not have vent holes but is made of porous fabric. The airbag did not contribute to windshield damage during deployment.

Seat Belts

This vehicle is equipped with lap/shoulder belts with sliding latch plates at the outboard seating positions and adjustable upper anchorage points at both front seating positions. 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, 2 cm of webbing was pulled from the retractor through the D-ring as measured by a pull-string mounted between the retractor housing and the webbing above the retractor.

Seat

Postcrash examination of the driver seat rails indicated no discernible movement of the seat in its tracks during the crash. The brackets supporting the front ends of each track were found bent to the left, and the entire seat was tipped forward and outward somewhat.

Steering Column

The upper end of the steering column moved upward 19 cm and forward 2 cm relative to the driver seat. The portion of the steering column between the instrument panel and firewall has a rod joined to a collar holding a universal joint, which connects the upper and lower segments of the column. A residual compression of 1 cm between the rod and collar was found after the crash, and the upper segment of the column was angled upward considerably. Also, the steering column or linkage separated ahead of the firewall, as indicated by free rotation of the steering wheel through about a 90-degree angle following the crash. (Interference between components in the engine compartment prevented further rotation.) There was no axial movement of the shear modules on either side of the column beneath the instrument panel; however, the left module had separated completely in a lateral direction (measured separation was 2 cm), and the metal bracket supporting the left module was cracked extensively.

Dummy Kinematics

Head, Neck, and Torso

Analysis of the high-speed film taken from camera positions D and E indicated the deploying airbag contacted the dummy's chest at 50 ms into the crash and the dummy's face at 56 ms. The chest remained in contact with the airbag as it inflated; full inflation occurred by 68 ms. Paint transferred from the dummy's face onto the airbag indicated the nose loaded the fully inflated airbag 5 cm above and 1 cm to the left of its center. Film analysis of the dummy's head and steering wheel movements showed their close proximity at the time head acceleration rapidly increased (95 ms), indicating the dummy's head bottomed out the airbag and contacted the steering wheel underneath. Nearly simultaneous rapid increases in the magnitudes of the recorded neck A-P shear forces, neck axial tension forces, and neck extension bending moments were observed as well. During rebound from the airbag, the dummy's head moved downward and outward, approaching but not contacting the window sill. The head then moved upward and

rearward, and the upper left side of the head contacted the plastic trim on the left roof rail from about 400 to 480 ms. Late in the crash (about 1,152 ms), the head moved outward and contacted the B-pillar and shoulder belt upper anchorage. Table 2 provides the timing of these events.

Table 2
Restraint System Performance and Dummy Kinematics — 1998 Jeep Cherokee

Event	Time (ms)
Deployment of airbag	46
Airbag contacts chest during deployment	50
Airbag contacts face during deployment	56
Airbag fully inflated and face begins to load airbag	68
Head contacts steering wheel through airbag	95
Upper left side of head in contact with roof side rail	400-480
Left rear of head contacts B-pillar and shoulder belt anchorage	1,152

Figure 7
Dummy and Vehicle Interior, Postcrash — 1998 Jeep Cherokee

Legs and Feet

Left leg and foot: Paint transferred from the dummy's left knee indicated the knee contacted the flat portion of the knee bolster to the left of the steering column and the left edge of the bolster's protrusion around the column. There also was a small paint transfer mark on the bolster directly beneath the center of the steering column. Paint transferred from the dummy's left shin indicated the shin contacted the bolster directly below the left knee impact location on the flat portion of the bolster. The left foot was found fully dorsiflexed, slightly everted, and wedged between the intruded and torn toepan and the brake pedal and brake pedal arm. The foot was underneath the brake pedal, with the top left edge of the pedal pressed against the dorsal surface of the foot. The back of the heel was pressed into a downward buckle of the floormat/carpeting, and the medial sole at the instep was against the medial side of the right ankle. The foot was extracted by first pushing the heel to the right and then pulling the foot rearward and to the right from underneath the brake pedal.

Right leg and foot: Paint transferred from the dummy's right knee indicated the knee contacted the knee bolster at and to the right of the bolster's protrusion around the steering column. There also was a small paint transfer mark to the right of the bolster on the center instrument panel trim. Paint transferred from the dummy's right shin indicated the shin contacted the bolster below the right knee impact locations, on both the flat portion of the bolster and the right edge of the bolster's protrusion around the column. The right foot was found almost fully dorsiflexed but neither inverted nor everted, with the sole at the heel pressed against the intruded toepan. The foot was just left of the accelerator pedal and beneath the right side of the brake pedal (not touching either pedal).

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. The maximum resultant head acceleration (60 g at 104 ms) is coincident with the head's contact against the steering wheel through the airbag. Table 3 provides a summary of the maximum head injury measurements recorded during the crash.

Table 3 Head Injury Measurements — 1998 Jeep Cherokee			
Measure	**Published Tolerance Threshold**	**Result**	**Time (ms)**
Vector resultant acceleration (g)	80	60	104
Vector resultant acceleration — 3 ms clip (g)	80	52	96-99
Head Injury Criterion (HIC)	1000	458	77-113
Head Injury Criterion — 15 ms interval (HIC-15)*	700	273	90-105

* A proposed amendment to the Canadian Motor Vehicle Safety Regulations suggests calculating HIC during a 15 ms interval rather than the 36 ms interval specified by the U.S. standard. The Canadian proposal includes an injury threshold of 700 for front-seat occupants protected by airbags.

Neck

Table 4 provides a summary of the maximum neck injury measurements recorded during the crash.

Table 4 Neck Injury Measurements — 1998 Jeep Cherokee			
Measure	**Published Tolerance Threshold**	**Result**	**Time (ms)**
A-P shear force (kN)	±3.1*	0.5	104
Axial compression force (kN)	4.0*	0.2	302
Axial tension force (kN)	3.3*	2.3	105
Flexion bending moment (Nm)	190**	9	331
Extension bending moment (Nm)	57**	32	98

* These values are for instantaneous loading. Neck loads are compared with magnitude-duration injury criteria in Figures A-13 to A-16.

** These published thresholds are recommended injury assessment reference values from Backaitis and Mertz (1994), but significant neck injury may occur at lower bending moments. Mertz and Patrick (1971) report that bending moments of 47 Nm in extension and 88 Nm in flexion would be non-injurious for occupants represented by the Hybrid III 50th percentile adult male dummy.

Chest

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

Table 5
Chest Injury Measurements — 1998 Jeep Cherokee

Measure	Published Tolerance Threshold	Result	Time (ms)
Vector resultant spine acceleration — 3 ms clip (g)	60	44	95-98
Rib compression (mm)	50	24	83
Viscous criterion (m/s)	1.0	0.3	73

Legs and Feet

Left leg and foot: The left leg had a maximum upper tibia L-M bending moment of 171 Nm at 92 ms, which contributed to an upper tibia index of 0.87 at 91 ms. The left leg had a maximum lower tibia A-P bending moment of 270 Nm at 74 ms and a maximum lower tibia L-M bending moment of 199 Nm at 73 ms, which contributed to a lower tibia index of 1.52 at 74 ms.

Right leg and foot: The right leg had a maximum lower tibia L-M bending moment of 165 Nm at 63 ms, a maximum lower tibia A-P moment of 160 Nm at 69 ms, and a maximum tibia axial force of 4.3 kN at 56 ms, which contributed to a lower tibia index of 0.87 at 69 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 — 1998 Jeep Cherokee

Measure	Published Tolerance Threshold	Left		Right	
		Result	Time (ms)	Result	Time (ms)
Axial femur force (kN)	9.1*	5	76	4	56
Tibia-femur displacement (mm)	15	1	61	5	71
Upper Tibia					
L-M moment (Nm)	±225	171	92	-59	55
A-P moment (Nm)	±225	117	61	105	55
Vector resultant moment (Nm)	225	187	92	120	55
Index	1.00	0.87	91	0.65	55
Lower Tibia					
L-M moment (Nm)	±225**	199	73	165	63
A-P moment (Nm)	±225**	270	74	160	69
Vector resultant moment (Nm)	225**	330	74	189	69
Axial force (kN)	8.0**	2.7	60	4.3	56
Index	1.00	1.52	74	0.87	69
Foot					
A-P foot acceleration (g)	±150	101	72	86	78
I-S foot acceleration (g)	±150	69	60	131	56
Vector resultant foot acceleration (g)	150	111	72	138	56

* This critical value is for instantaneous loading. Femur loads are compared with magnitude-duration injury criteria in Figures A-23 and A-34.

** 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.

References

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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

1998 Jeep Cherokee Small Four-Door Utility Vehicle: 5 mi/h Front into Angle Barrier

Test Number: LA98013
VIN: 1J4FJ68S3WL223246
Mileage: 72
Features: Driver and passenger airbags, air conditioning, automatic transmission, power mirrors, keyless entry system, power door locks, power windows, privacy glass, heated tailgate glass, rear wiper, tilt steering wheel, cruise control, luggage rack, bumper-mounted fog lamps, two-stage paint.

	Part		Labor	
Description	**Mfg. No**	**Price**	**Operation**	**Hours**
Bumper face bar, front	5EE85DX8AB	$120.00	Replace*	2.0
Bumper mounting bracket, right front	55175268AB	13.25	Replace*	
Bumper extension, right front	5DY40DX9	45.50	Replace*	
Front end panel	55055233AC	164.00	Replace*	2.3
Front end panel			Refinish*	3.9
Headlamp bezel, right	55055136	23.00	Replace*	
Side marker lamp assembly, right front	55055146	12.25	Replace*	
Headlamps			Aim	0.5
Radiator support brace, right front			Repair/align*	0.1
Radiator support assembly			Repair/align*	1.5
Radiator support assembly			Refinish	0.5
Fender, right front	55175396	210.00	Replace**	1.9
Fender, right front			Refinish	2.8
Fender molding retainer, right front	55155676AC	13.25	Replace	
Antenna			Remove/reinstall	0.4
Sport decal, right front fender	5FP50SW1	8.25	Replace	0.2
Inner fender panel, right front			Repair/align*	1.0
Paint and materials		122.40		
Total Parts		$731.90		
Total Labor		564.30		17.1
Grand Total		$1,296.20		

* This item was repaired, replaced, or refinished as indicated before the 40 mi/h frontal offset test.
** This cosmetic part was repaired rather than replaced before the 40 mi/h frontal offset test.

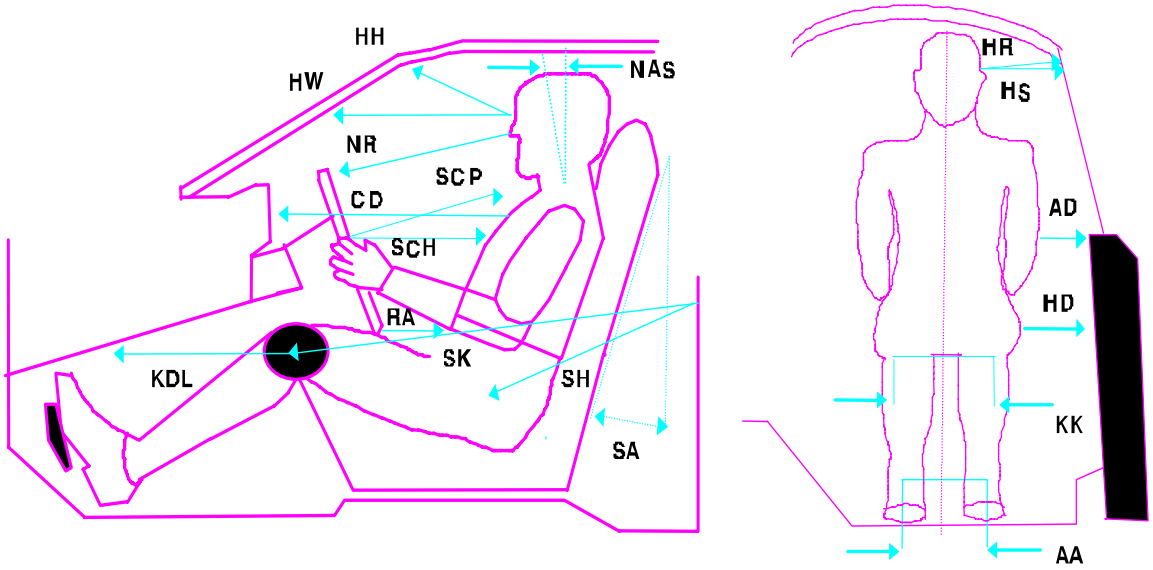
Dummy Clearance Measurements

Test Number: CF98012
Vehicle Make/Model: Jeep Cherokee
Vehicle Model Year: 1998
Seat Type: Manually adjusted bucket seat (fore/aft and seat back angle)

Manufacturer's Specifications
Seat Back Information: Reclined rearward 7 degrees from most upright position
Upper Belt Anchorage: Set to midpoint of 5 positions
Steering Column Adjustment: Set to midpoint of tilt adjustment range

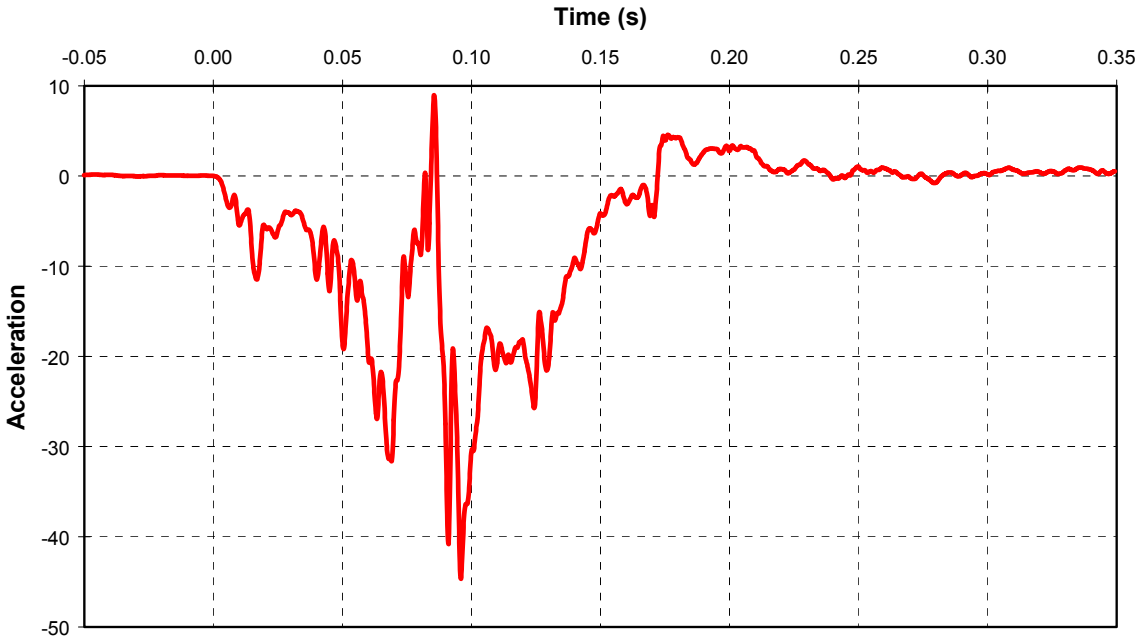
Location	Code	Measure	Location	Code	Measure
Head to header	HH	410	Neck angle, torso 90	NAT90	21.1°
Head to windshield	HW	540	Neck angle, seated	NAS	3.3°
Nose to rim	NR	395	Torso angle (NAT90 – NAS)	TA	17.8°
Chest to dash	CD	626	Striker to knee**	SK	586
Rim to abdomen	RA	168	Striker to knee angle**	SKA	0.4°
Knee to dash, left	KDL	188	Striker to H-point, horizontal	SHH	190
Knee to dash, right	KDR	187	Striker to H-point, vertical	SHV	62
Steering wheel to chest, horizontal	SCH	286	Ankle to ankle	AA	265
Steering wheel to chest, perpendicular	SCP	377	Knee to knee	KK	291
Steering wheel to chest, reference	SCR	362	Arm to door	AD	50
Hub to chest, minimum	HCM	232	H-point to door	HD	115
Pelvic angle	PA	24.5°	Head to A-pillar	HA	475
Seat back angle*	SA	7°	Head to roof	HR	197
			Head to side window	HS	230

All distance measurements are in millimeters (mm).
* Indicated angle is difference between most upright position and specified position for testing.
** These measurements are made in a vertical plane containing the striker and parallel to the driver door sill.

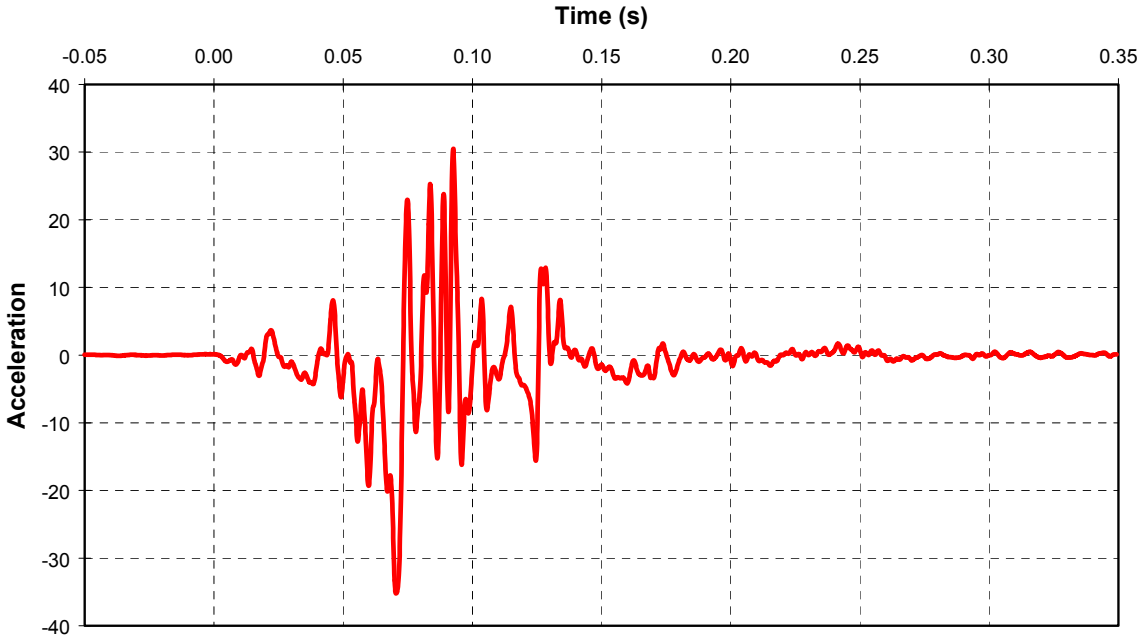


Graph Index

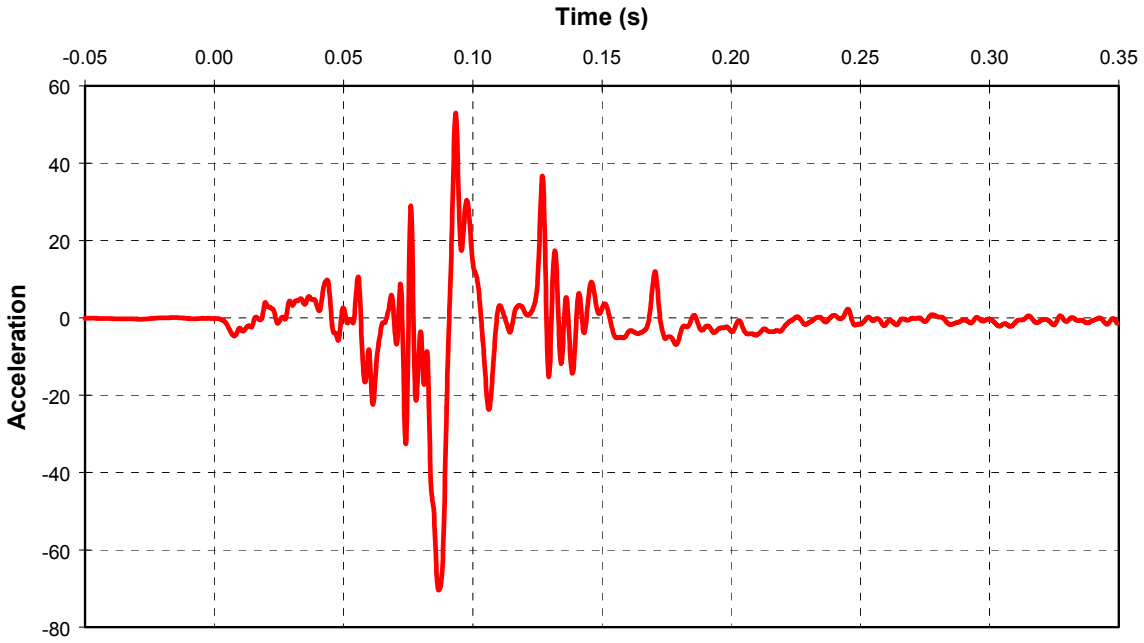
A-1 CF98012 1998 Jeep Cherokee Vehicle Longitudinal Acceleration



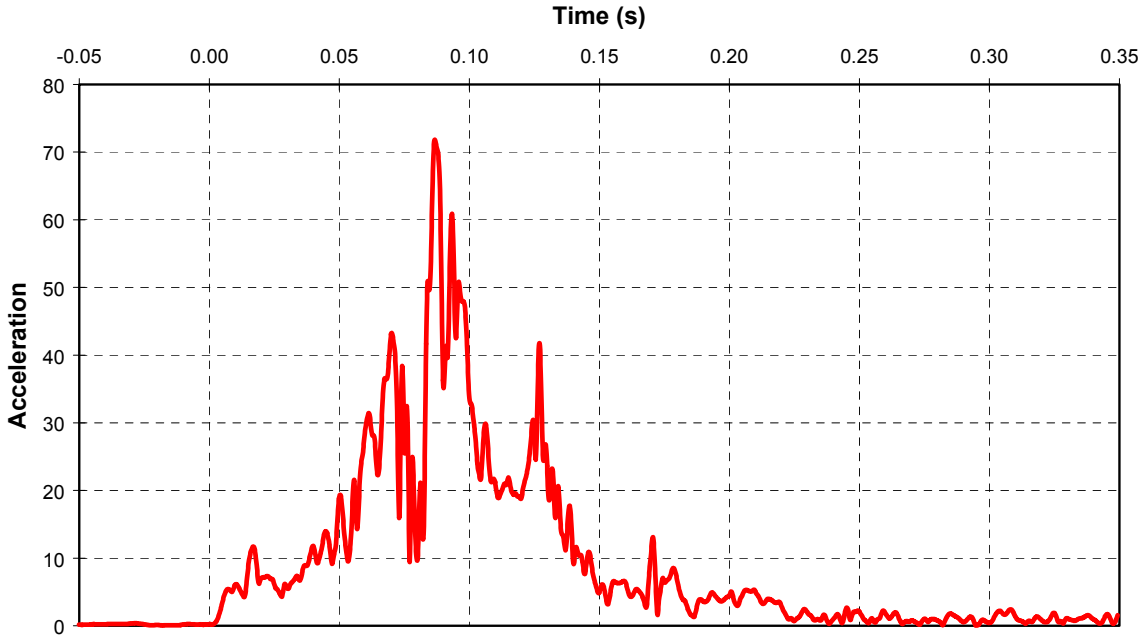
A-2 CF98012 1998 Jeep Cherokee Vehicle Lateral Acceleration



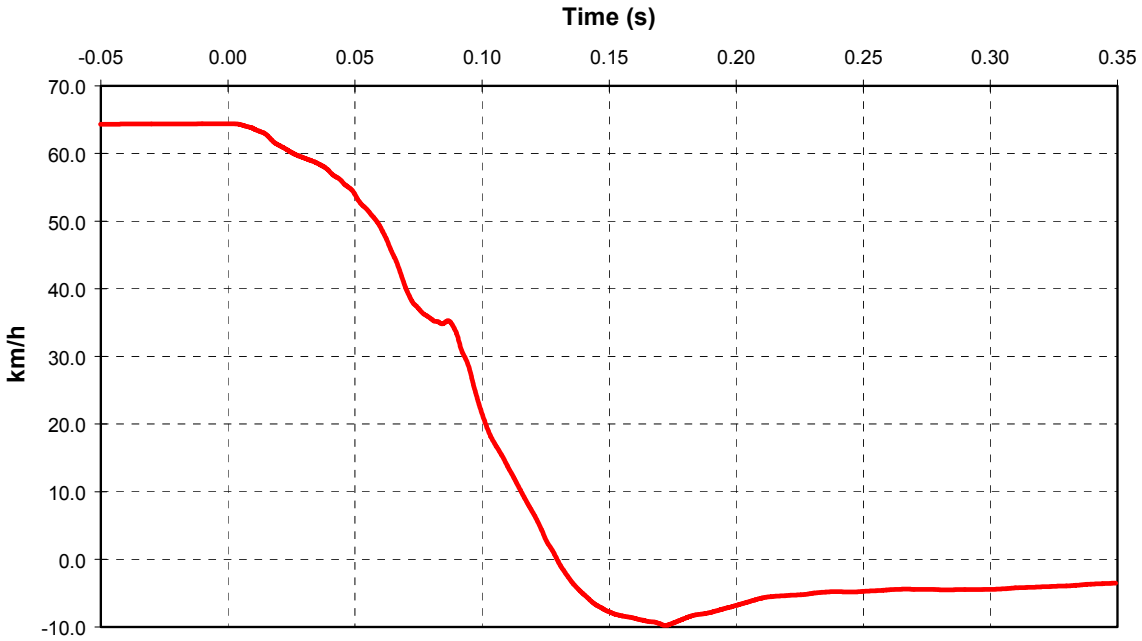
A-3 CF98012 1998 Jeep Cherokee Vehicle Vertical Acceleration



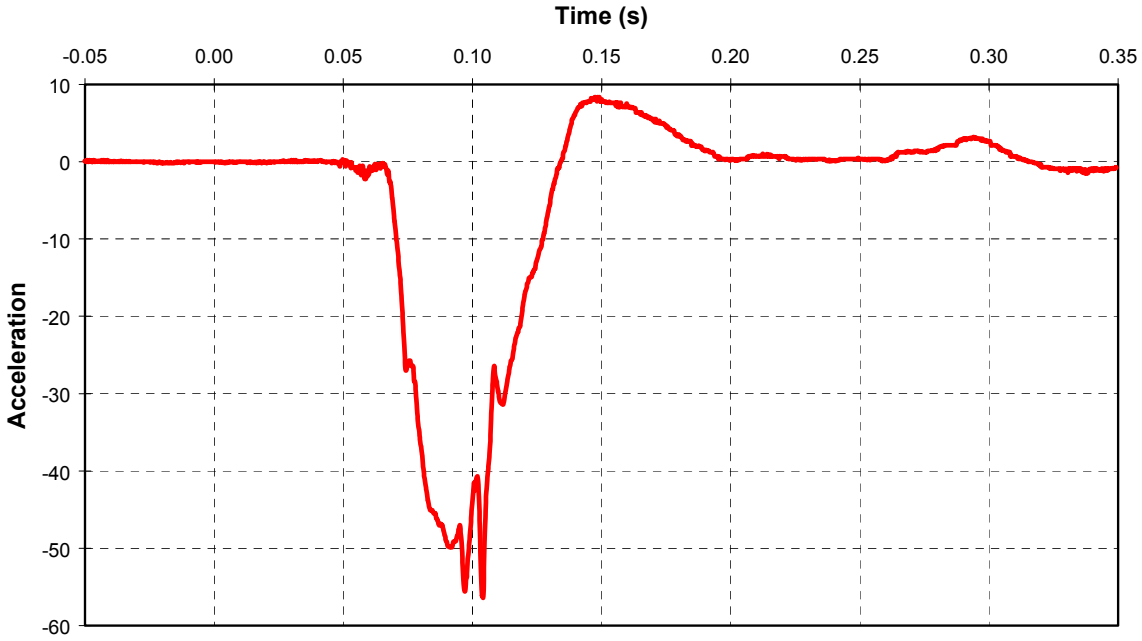
A-4 CF98012 1998 Jeep Cherokee Vehicle Vector Resultant Acceleration

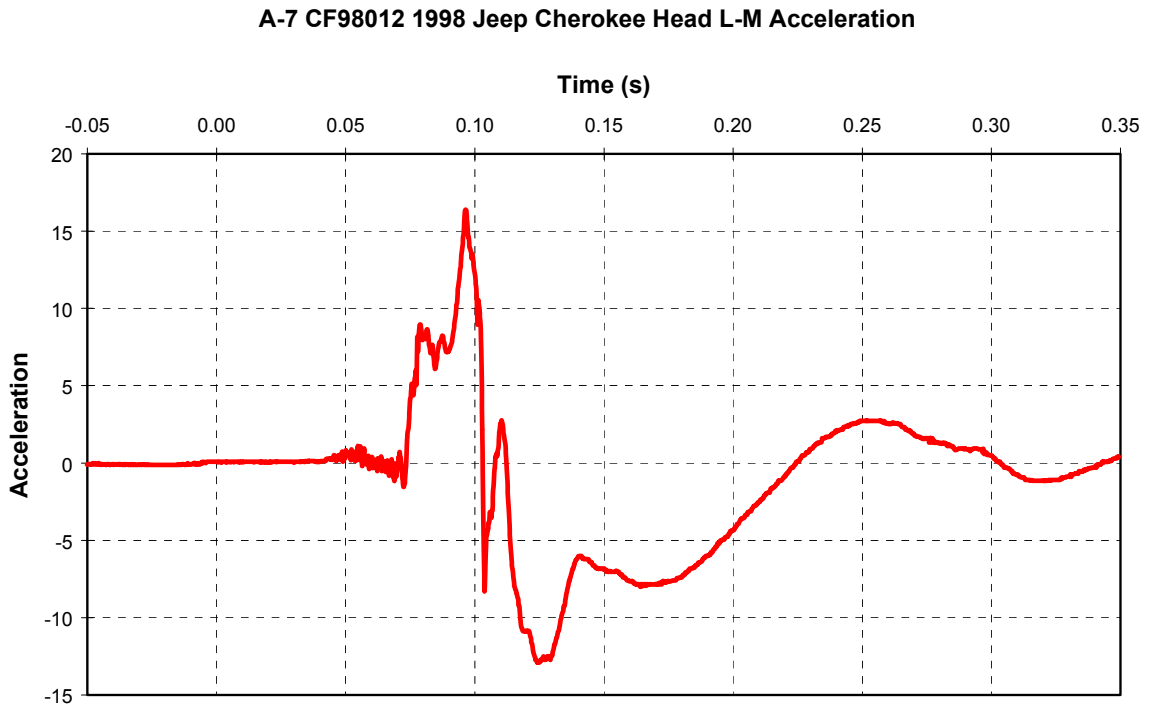


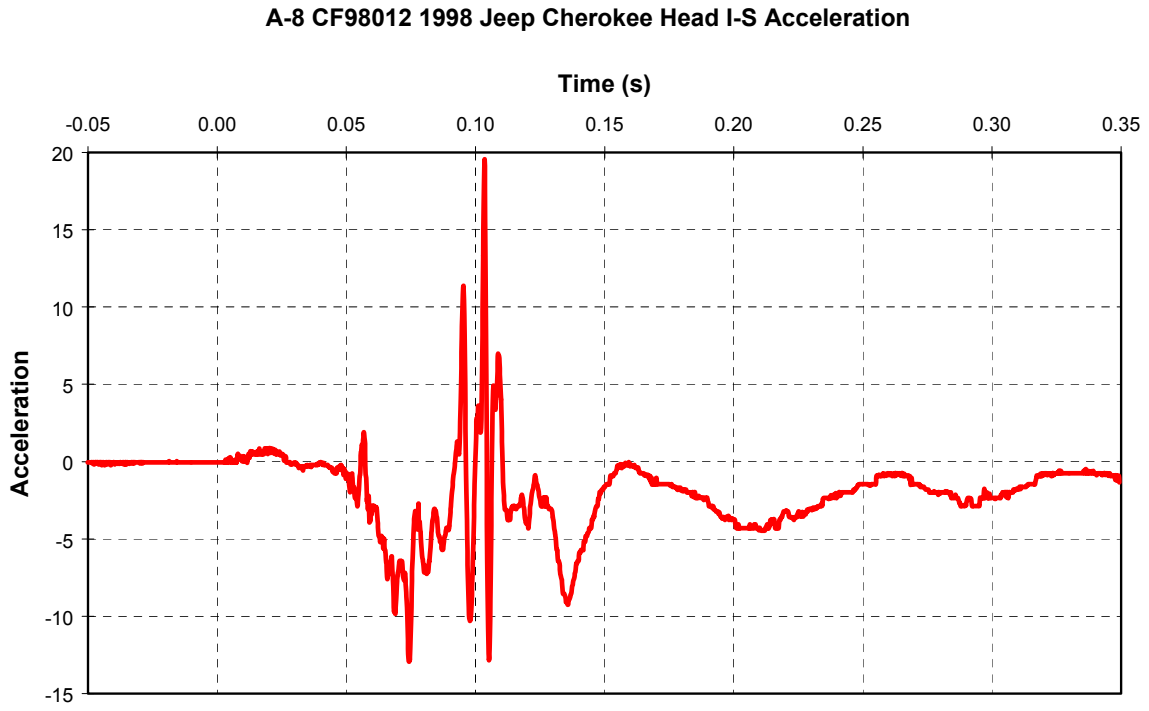
A-5 CF98012 1998 Jeep Cherokee Integration of Vehicle Longitudinal Acceleration



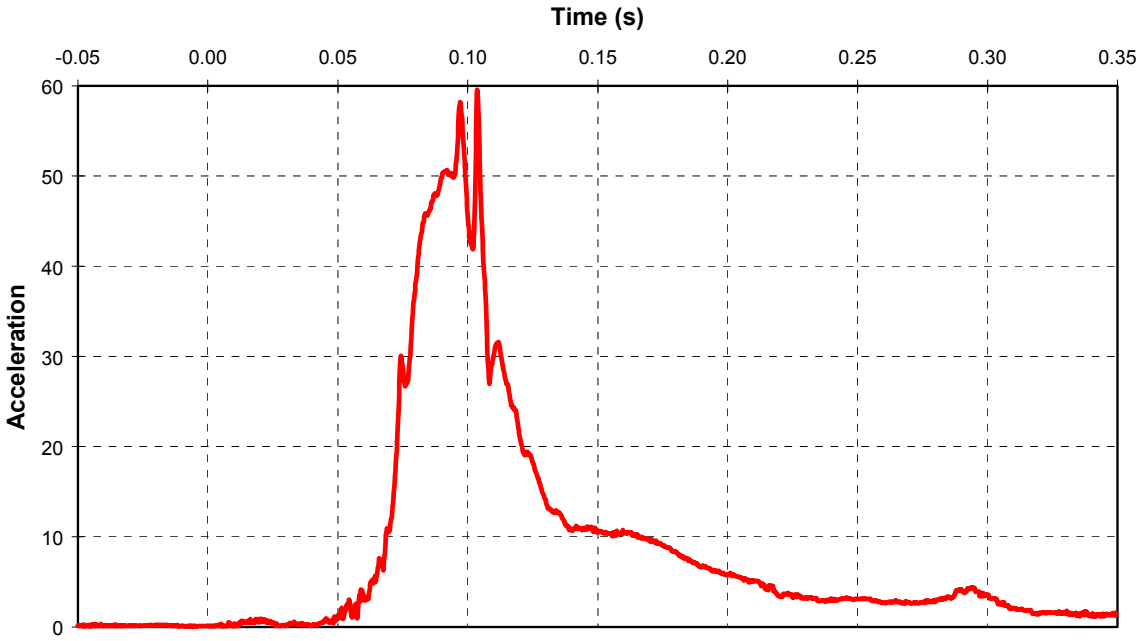
A-6 CF98012 1998 Jeep Cherokee Head A-P Acceleration



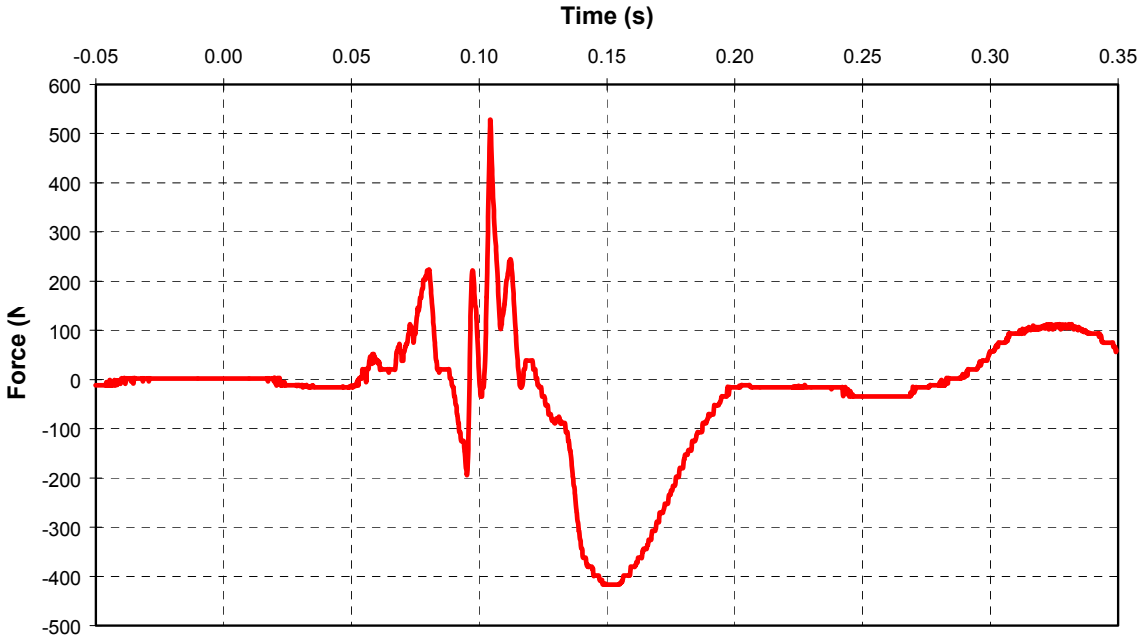




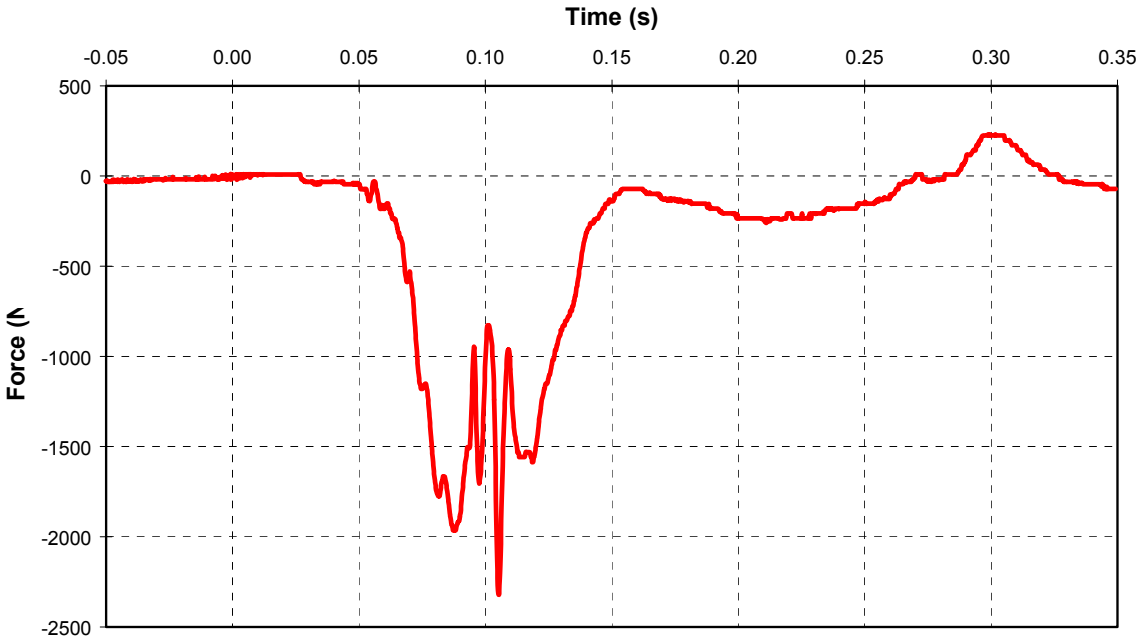
A-9 CF98012 1998 Jeep Cherokee Head Vector Resultant Acceleration



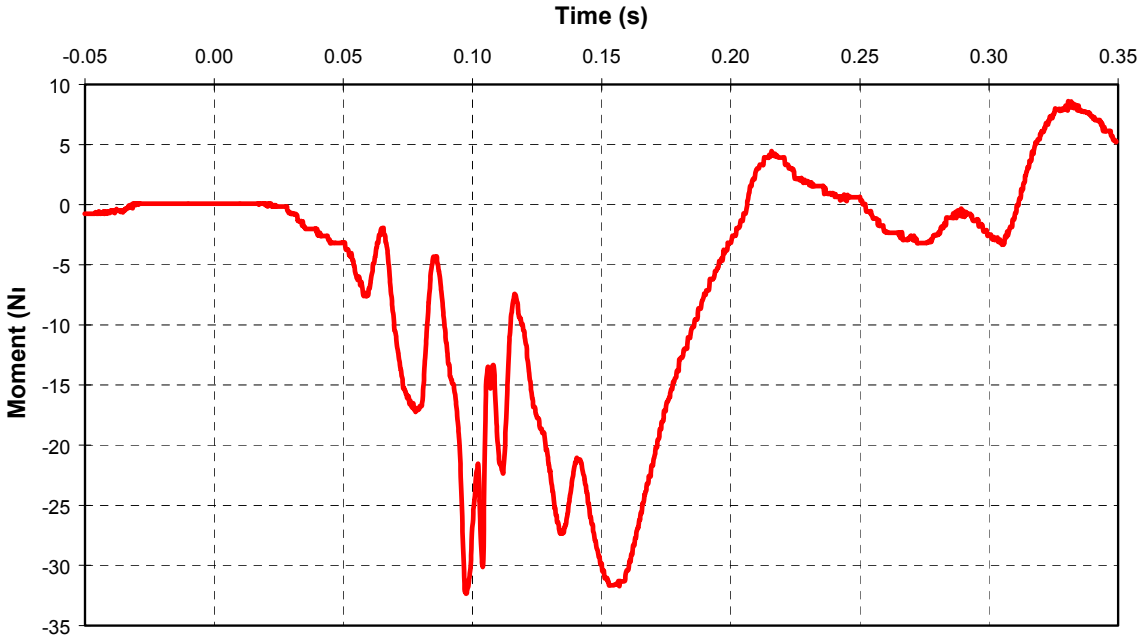
A-10 CF98012 1998 Jeep Cherokee Neck A-P Shear Force



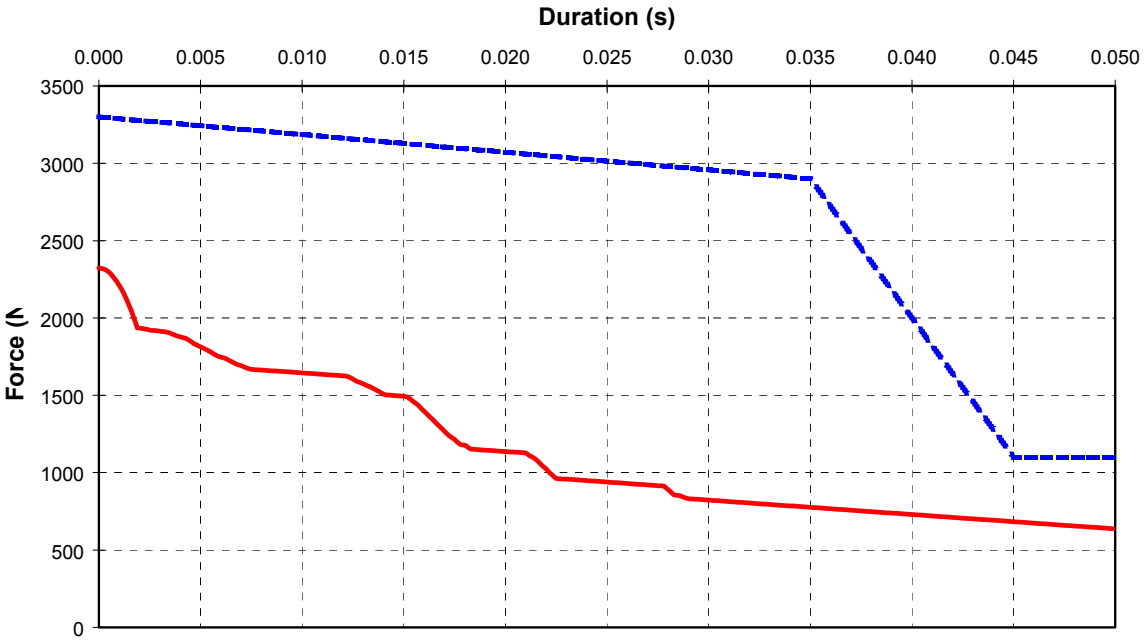
A-11 CF98012 1998 Jeep Cherokee Neck Axial Force



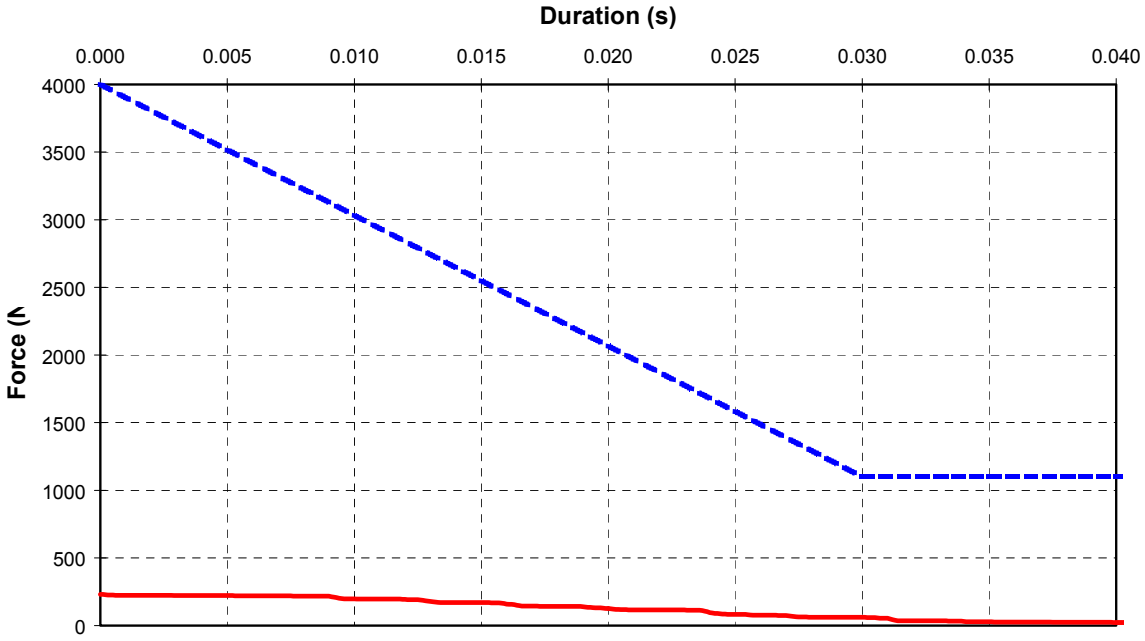
A-12 CF98012 1998 Jeep Cherokee Neck Occipital A-P Moment



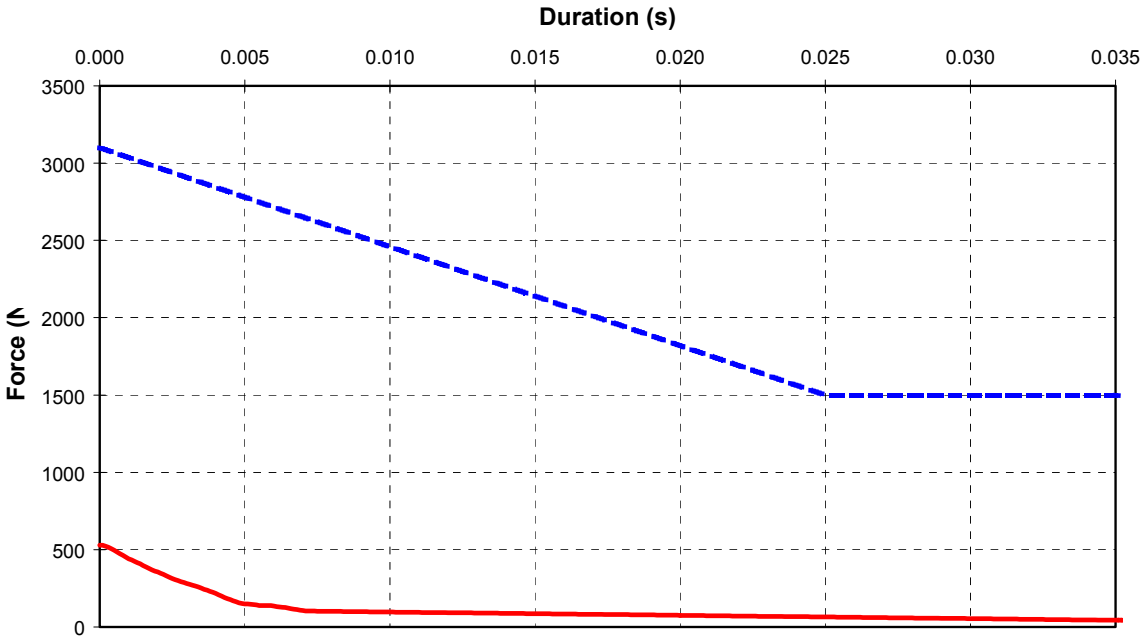
A-13 CF98012 1998 Jeep Cherokee Neck Tension Analysis



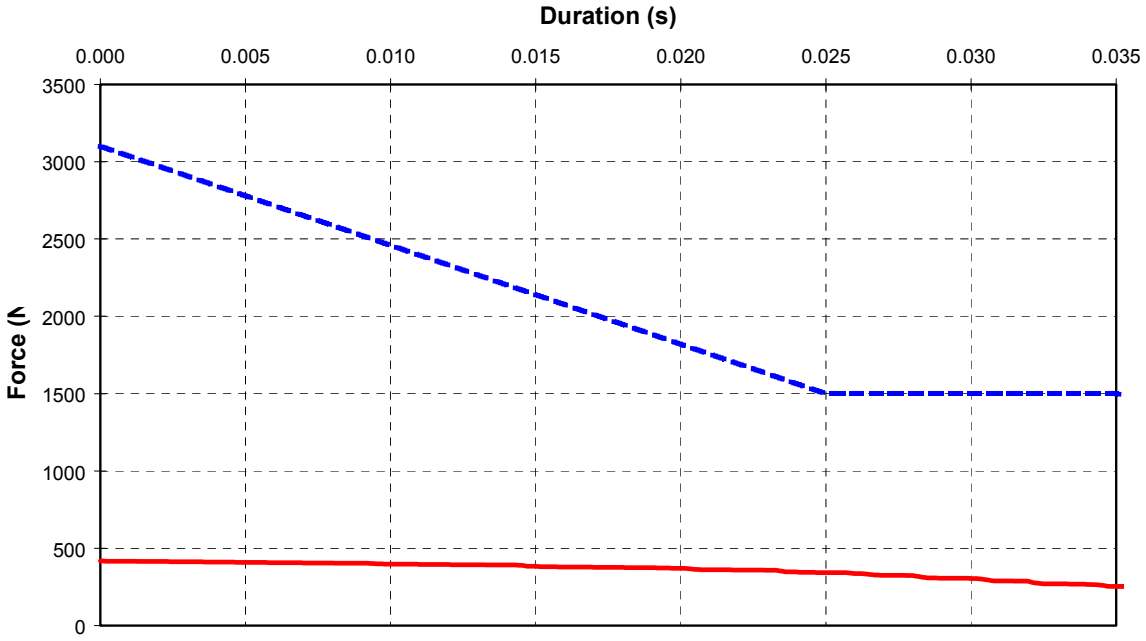
A-14 CF98012 1998 Jeep Cherokee Neck Compression Analysis



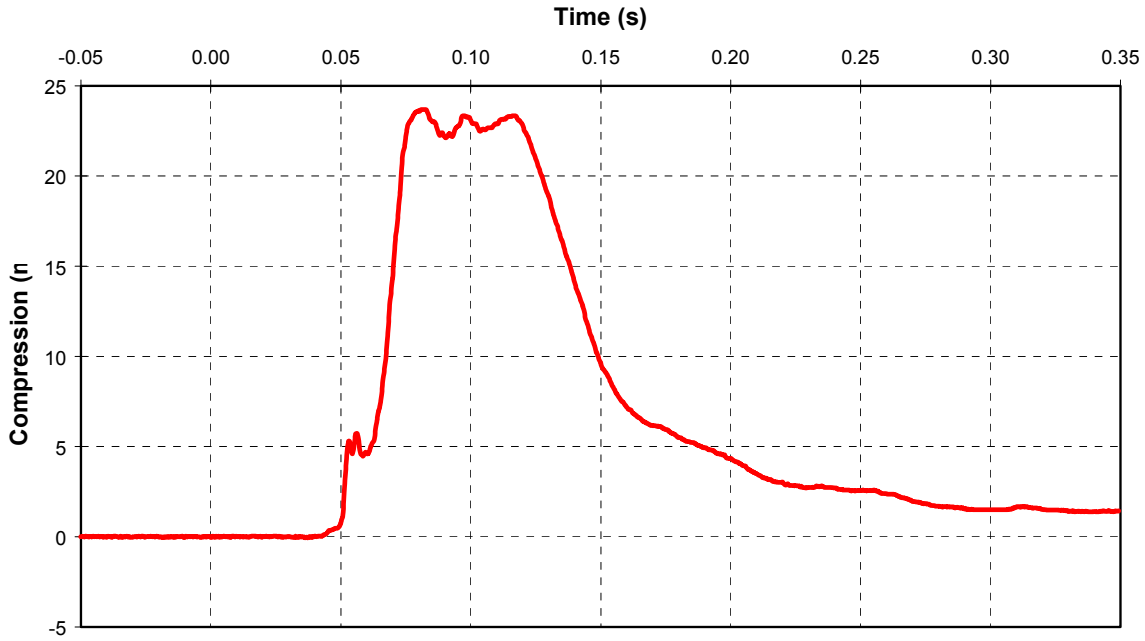
A-15 CF98012 1998 Jeep Cherokee Neck A-P Shear (Positive) Analysis



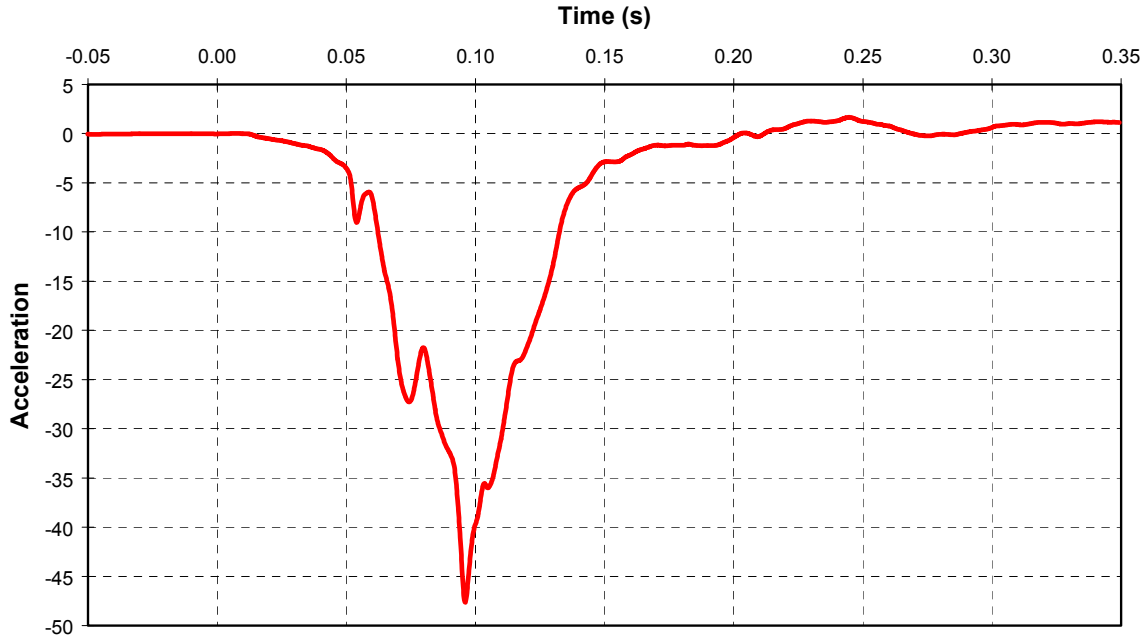
A-16 CF98012 1998 Jeep Cherokee Neck A-P Shear (Negative) Analysis

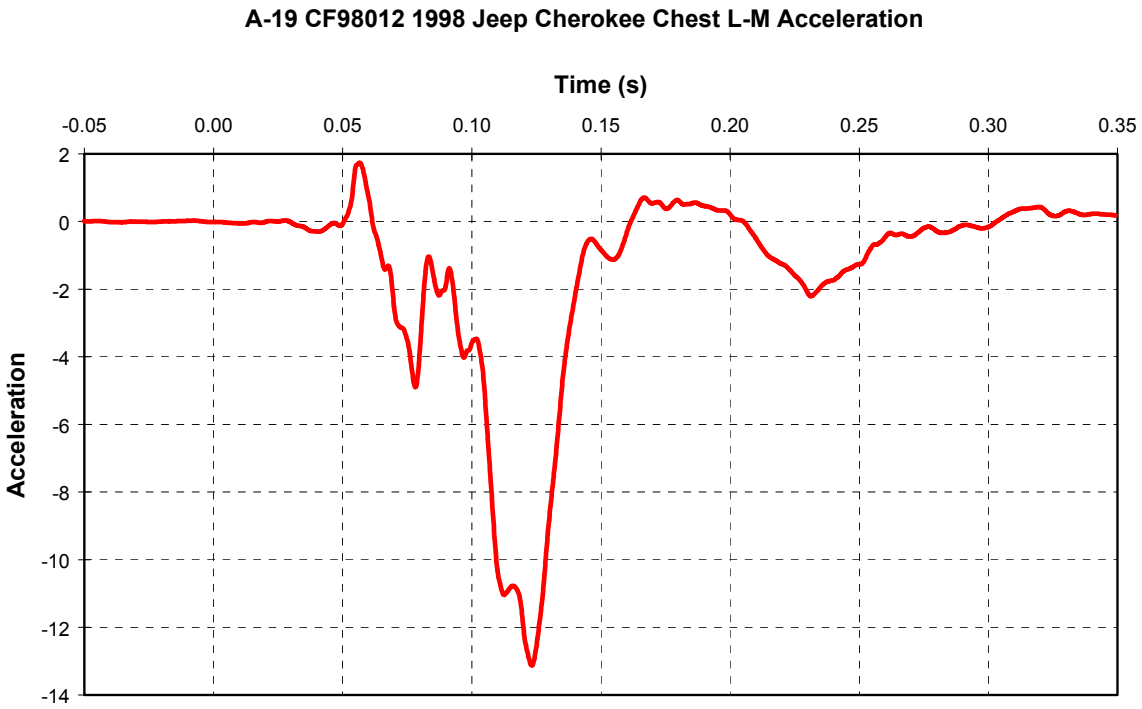


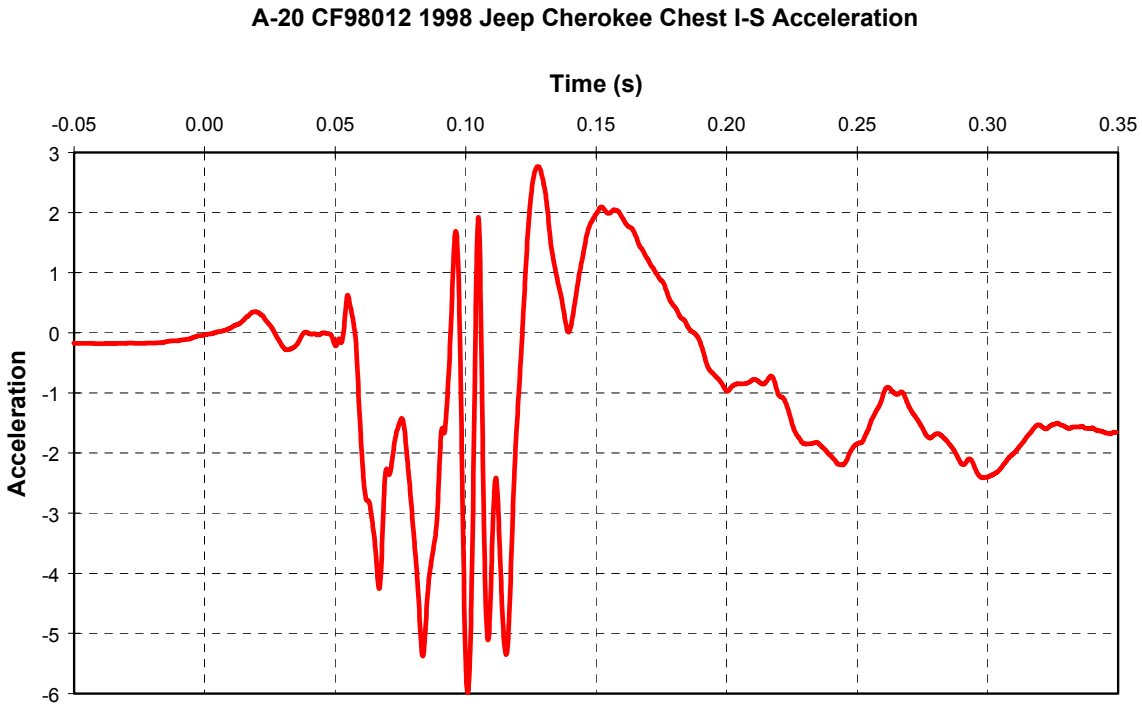
A-17 CF98012 1998 Jeep Cherokee Chest Compression



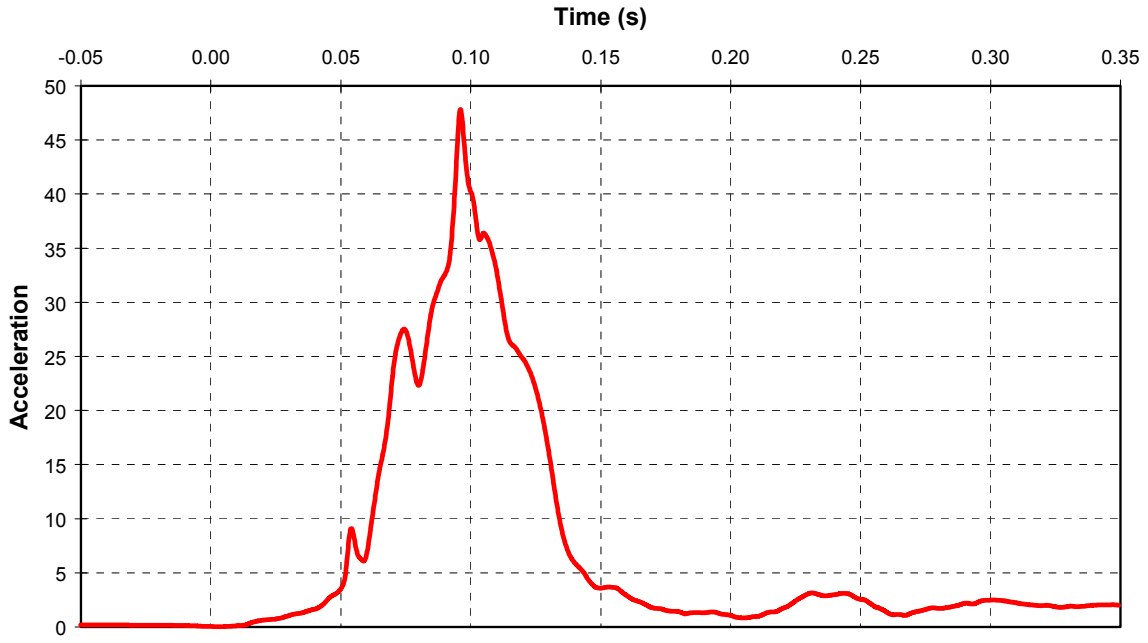
A-18 CF98012 1998 Jeep Cherokee Chest A-P Acceleration



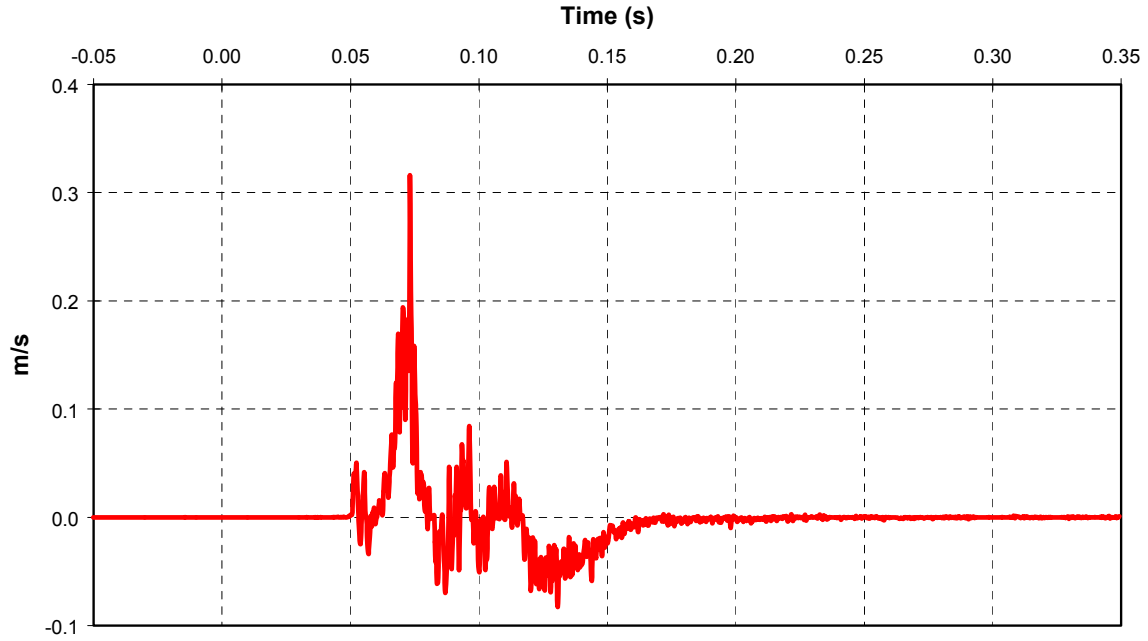




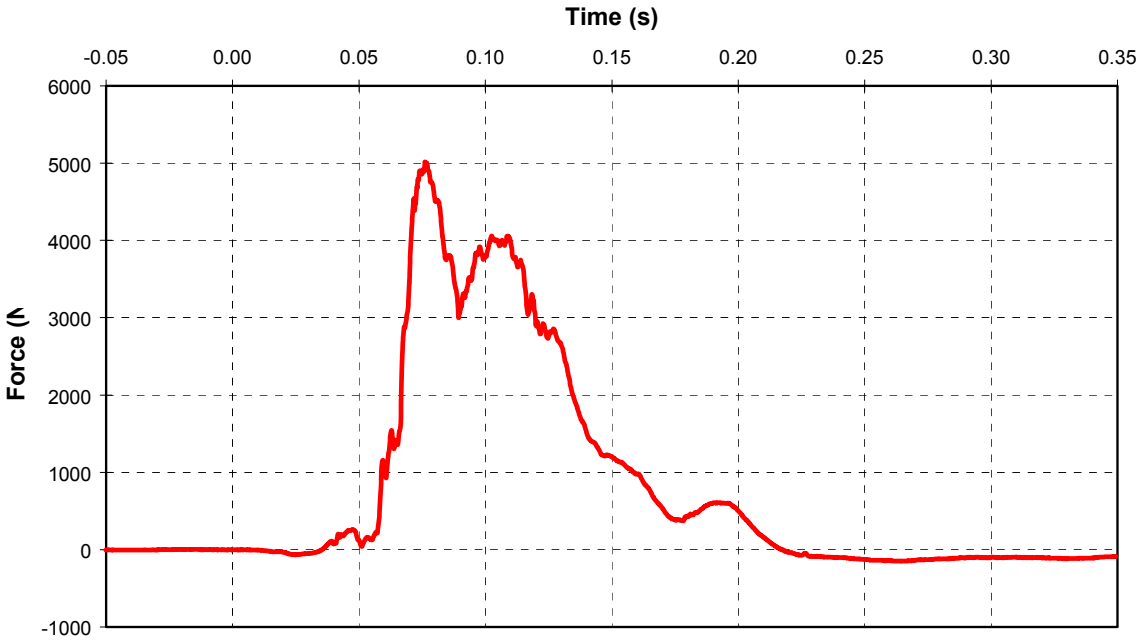
A-21 CF98012 1998 Jeep Cherokee Chest Vector Resultant Acceleration



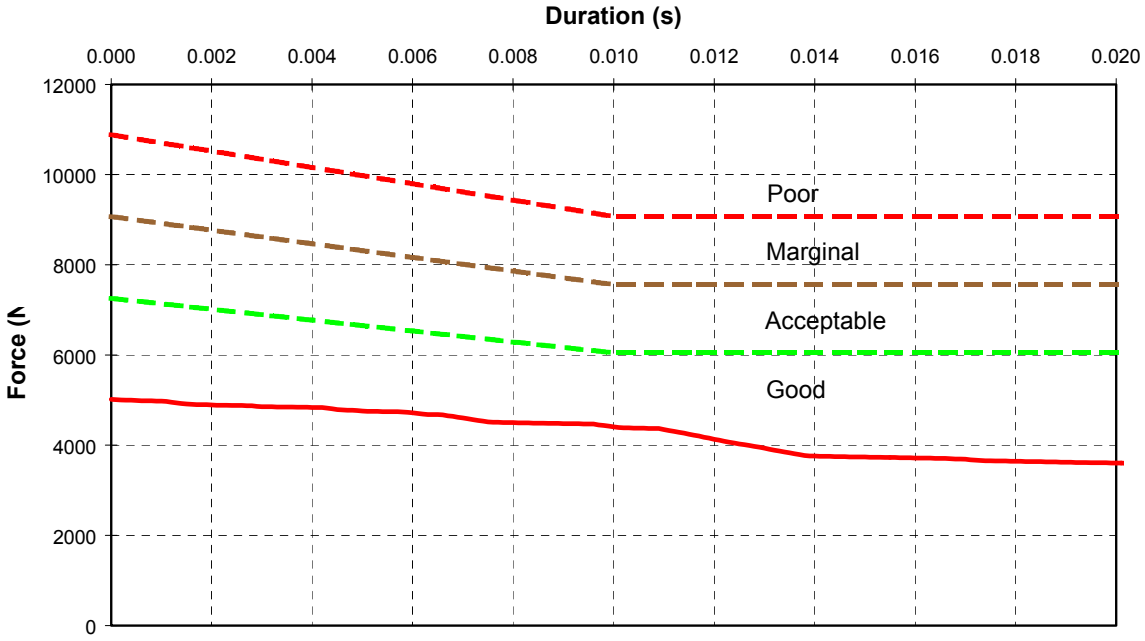
A-22 CF98012 1998 Jeep Cherokee Viscous Criterion

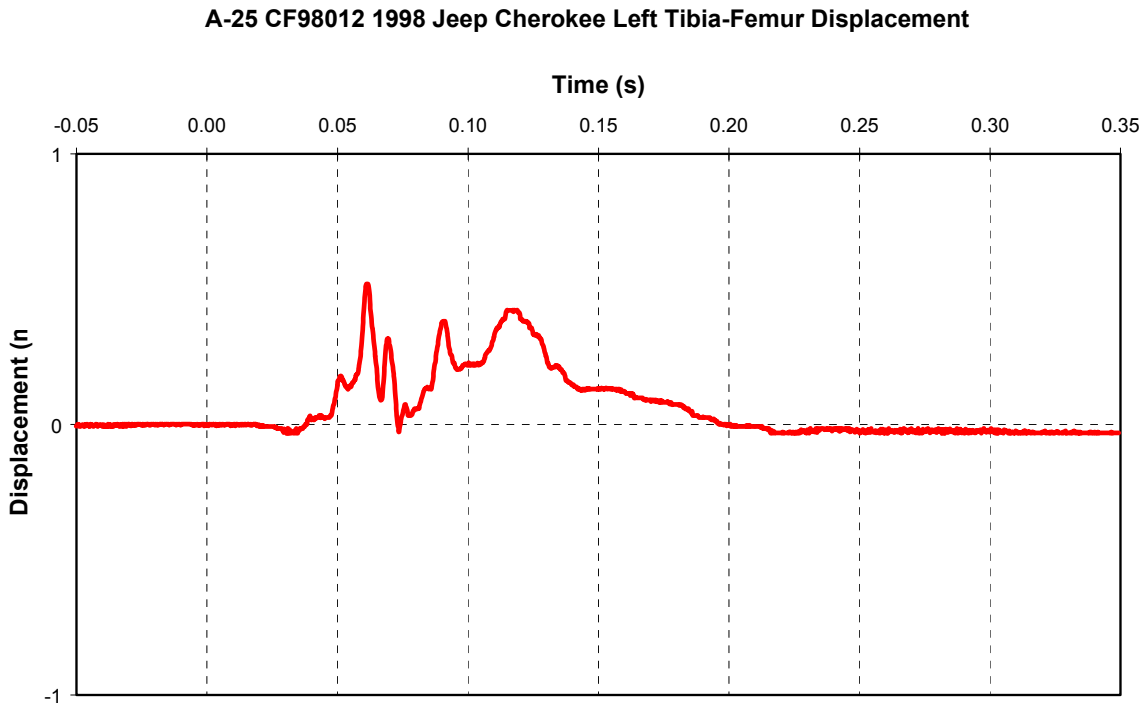


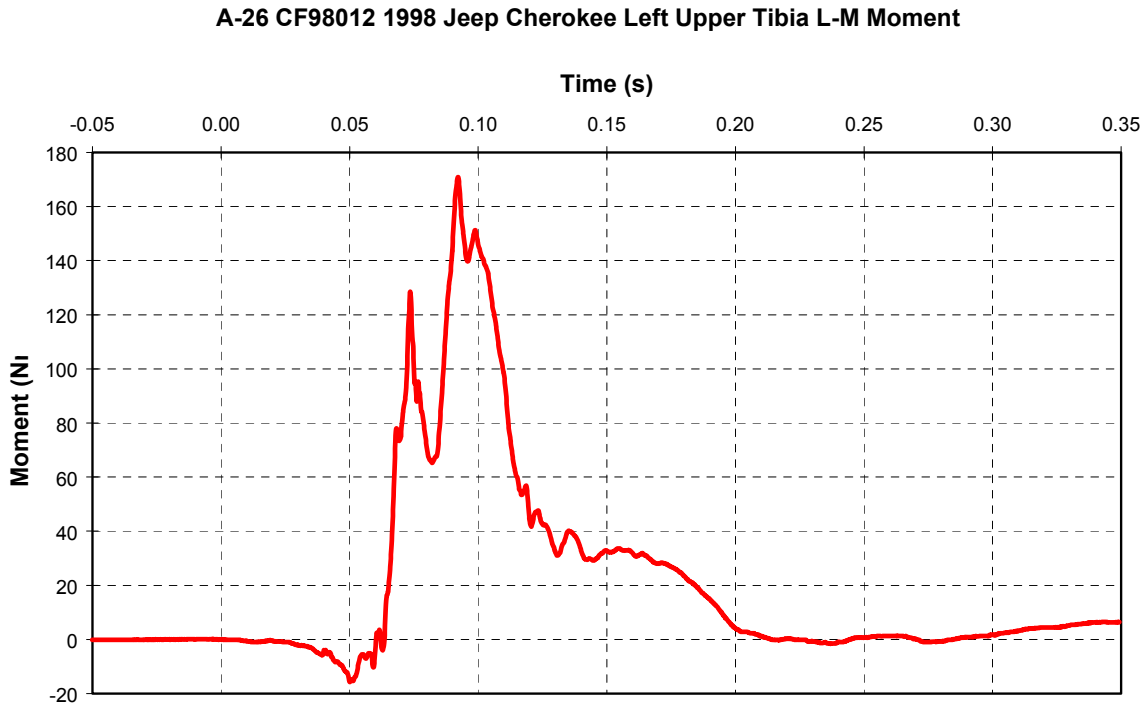
A-23 CF98012 1998 Jeep Cherokee Left Femur Axial Force



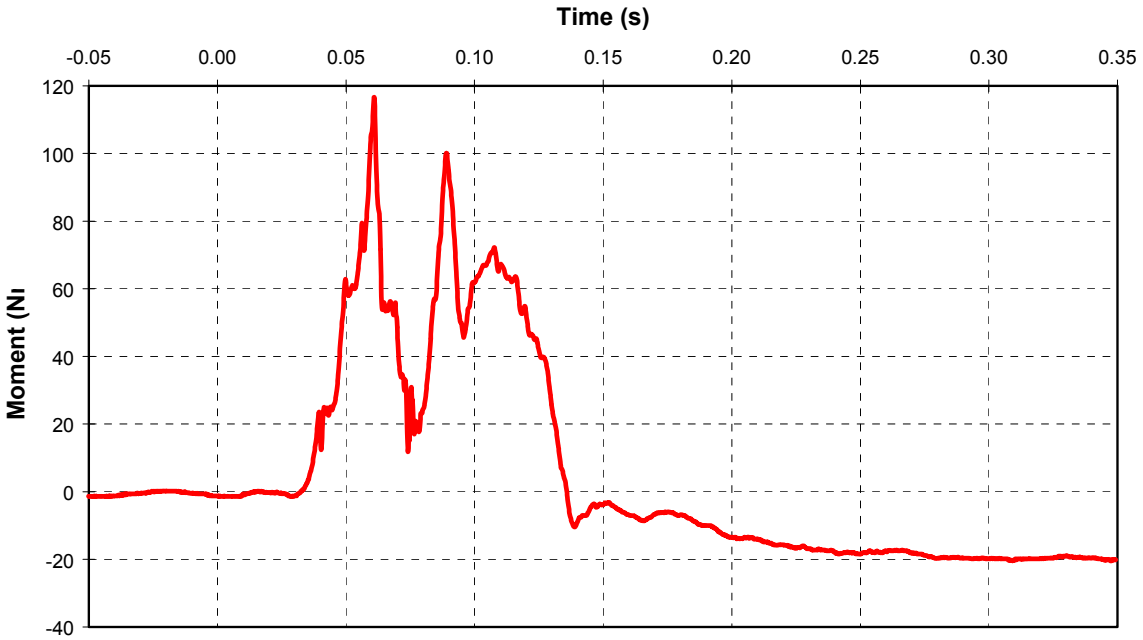
A-24 CF98012 1998 Jeep Cherokee Left Femur Axial Force Analysis



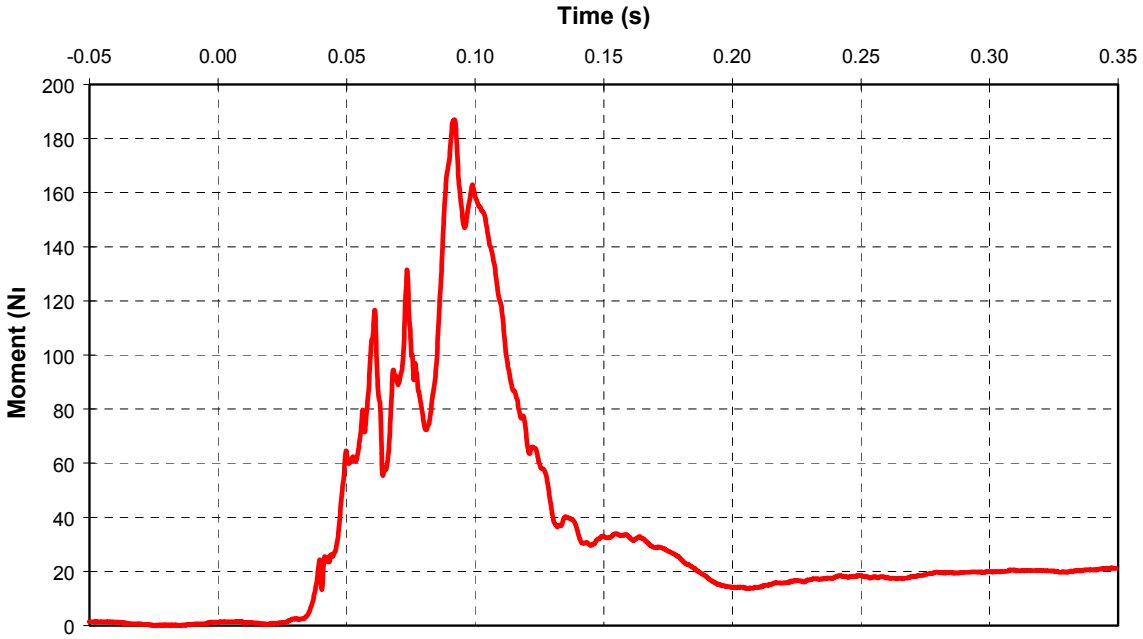


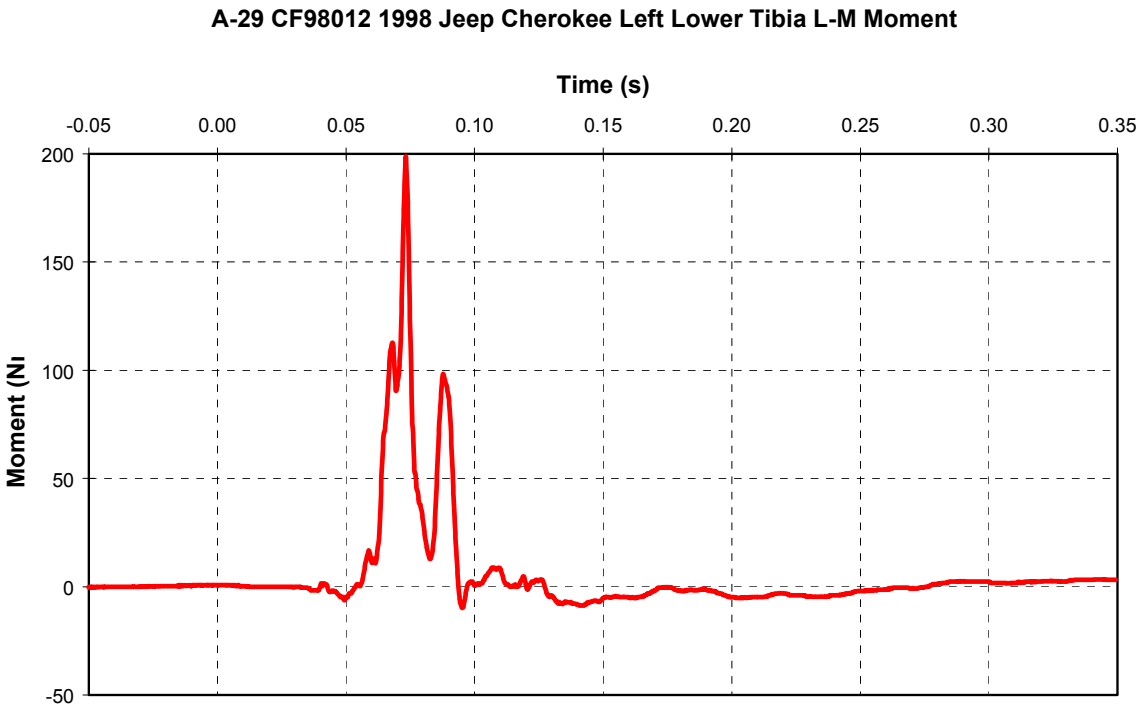


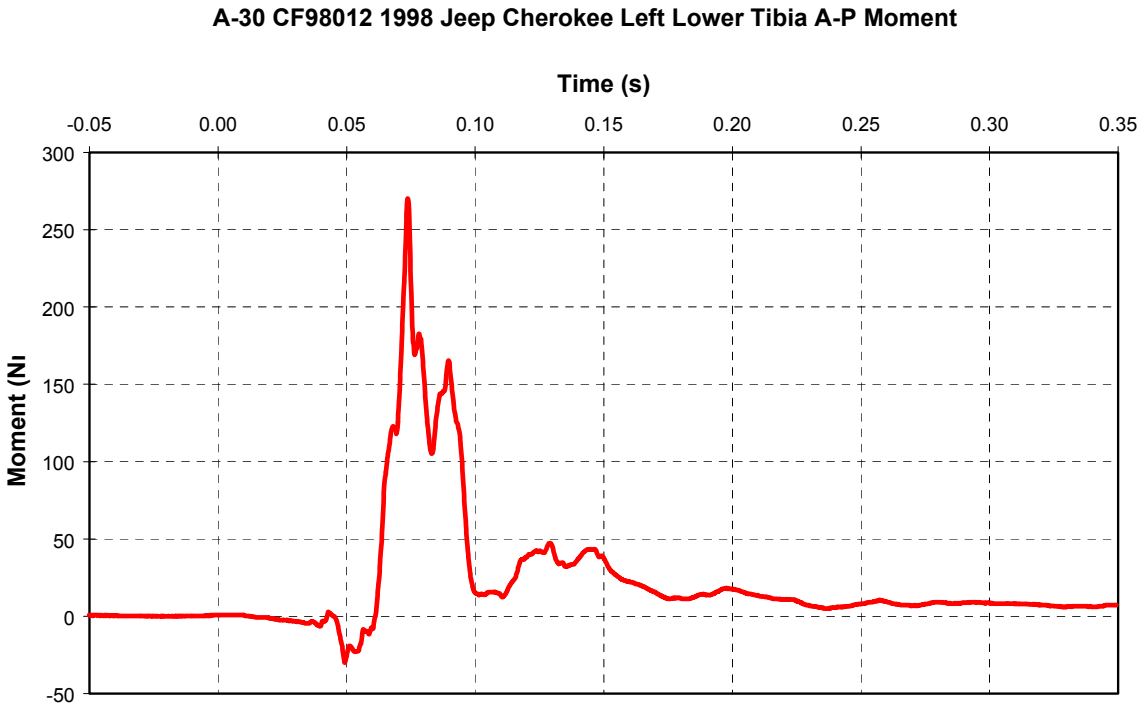
A-27 CF98012 1998 Jeep Cherokee Left Upper Tibia A-P Moment



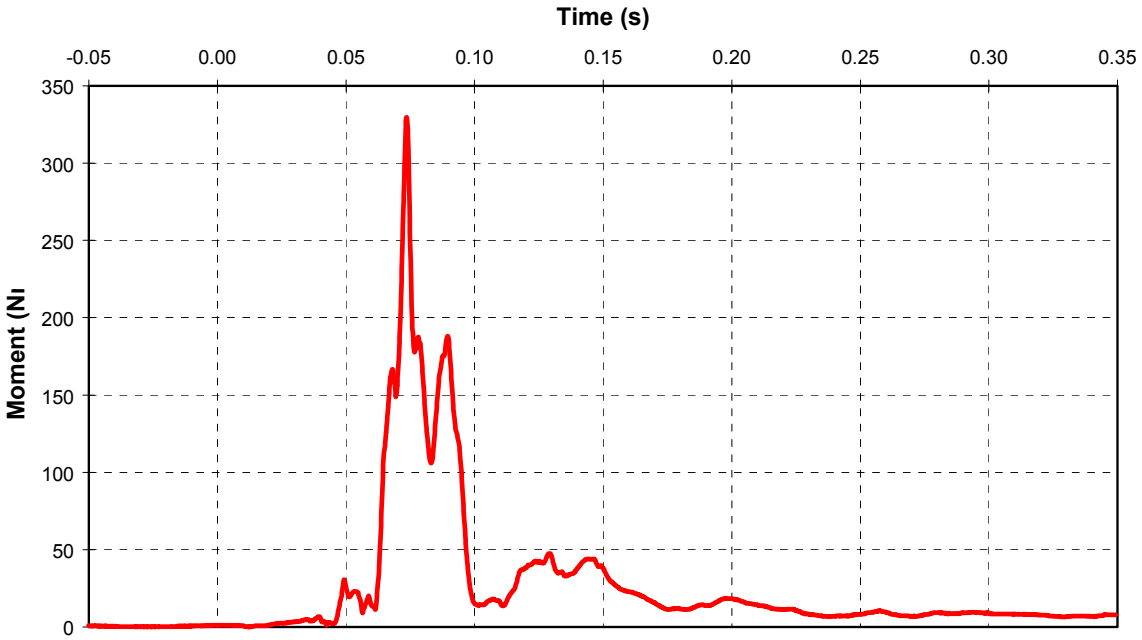
A-28 CF98012 1998 Jeep Cherokee Left Upper Tibia Vector Resultant Moment



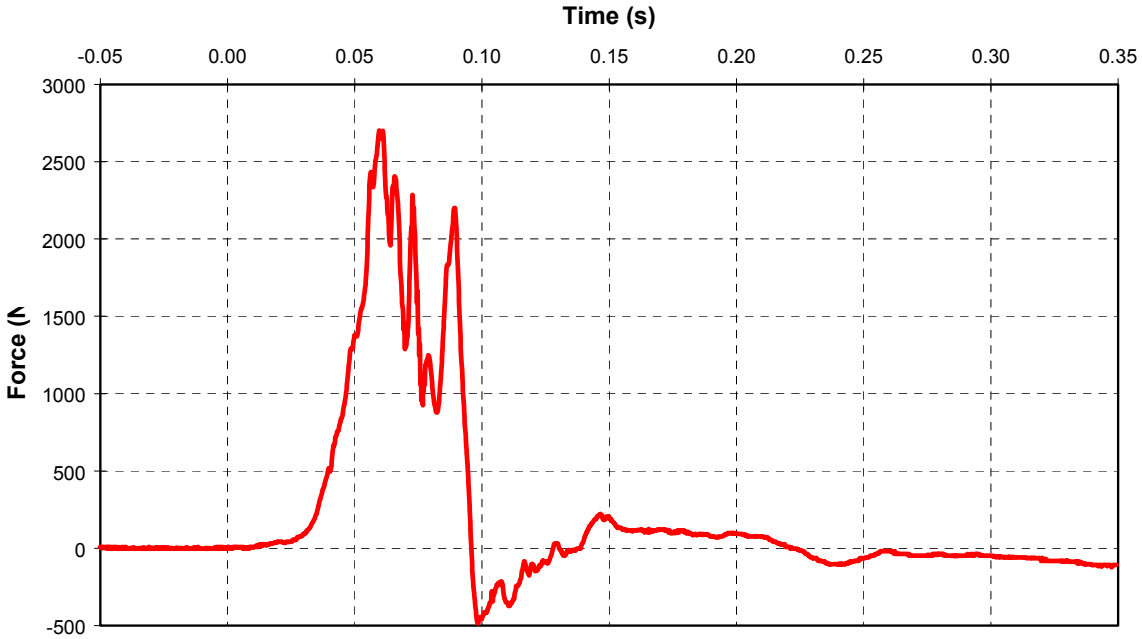




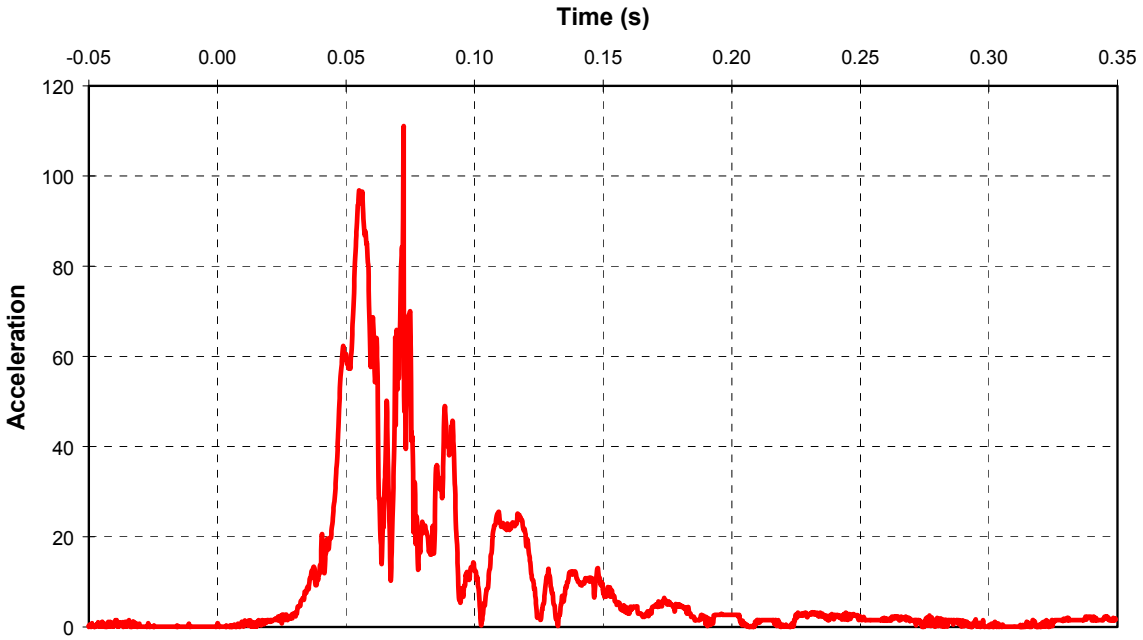
A-31 CF98012 1998 Jeep Cherokee Left Lower Tibia Vector Resultant Moment



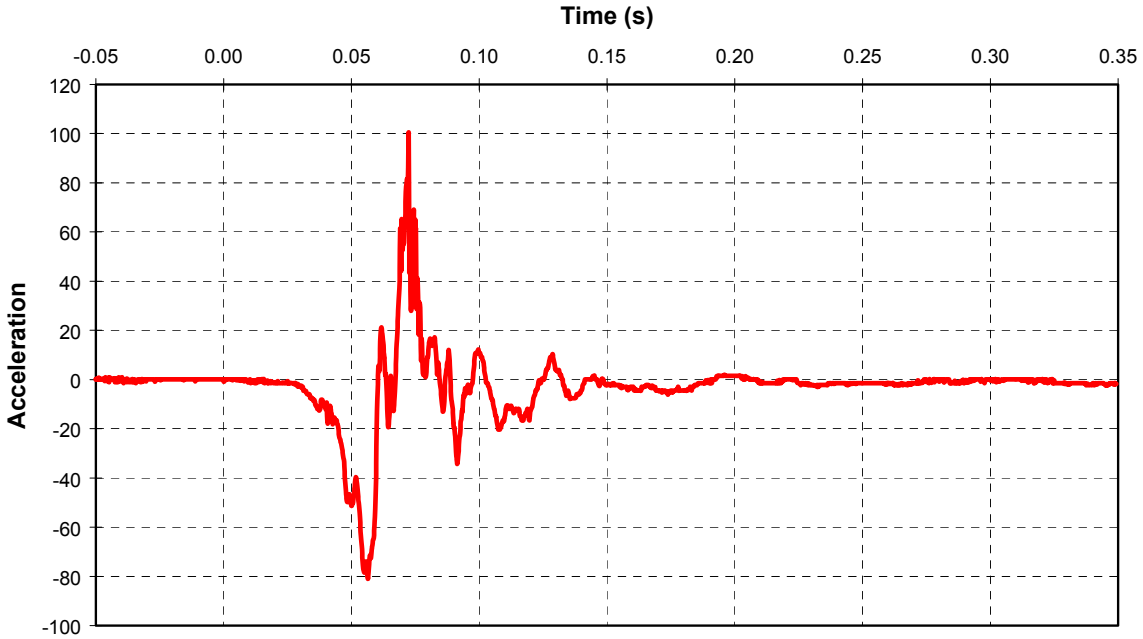
A-32 CF98012 1998 Jeep Cherokee Left Lower Tibia Axial Force

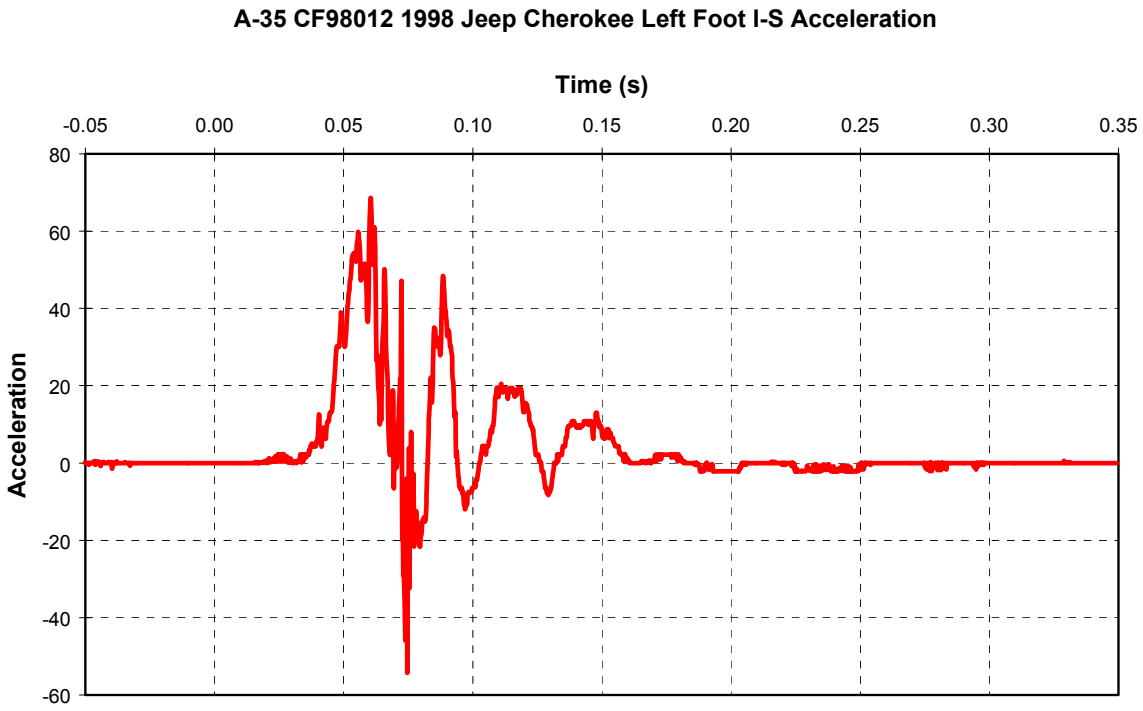


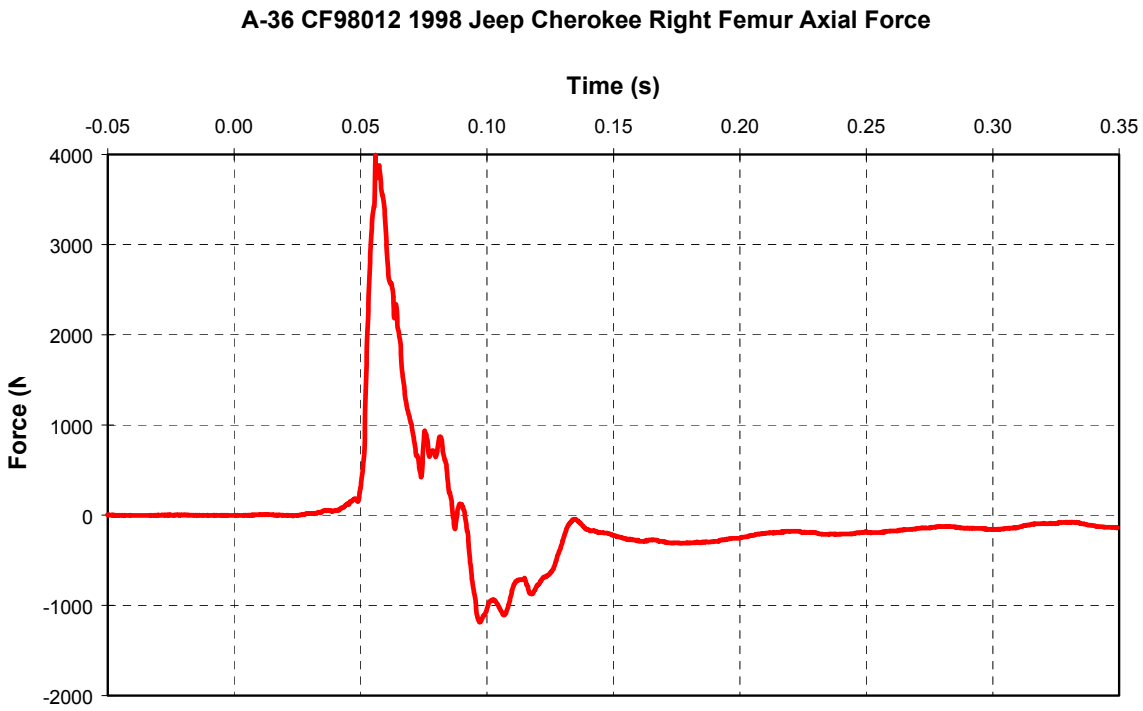
A-33 CF98012 1998 Jeep Cherokee Left Foot Vector Resultant Acceleration



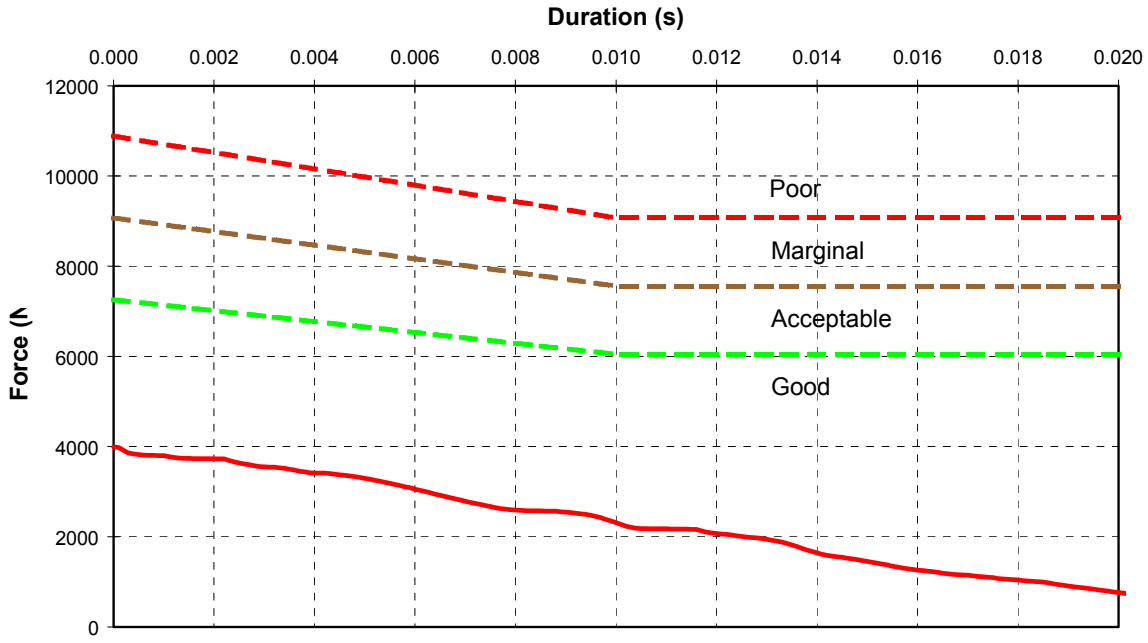
A-34 CF98012 1998 Jeep Cherokee Left Foot A-P Acceleration



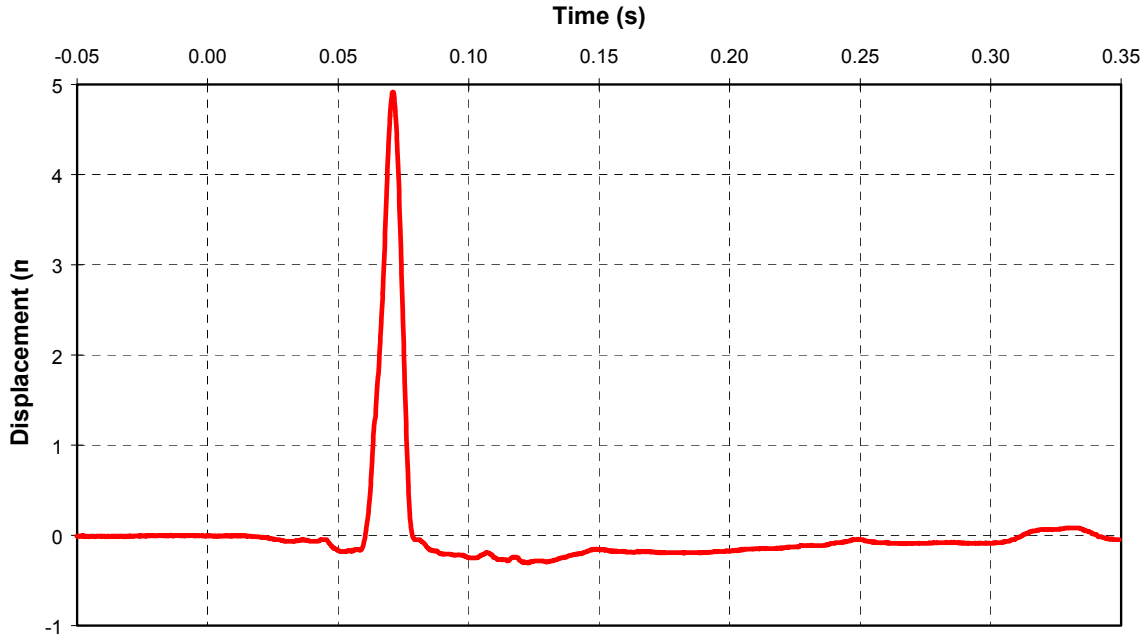


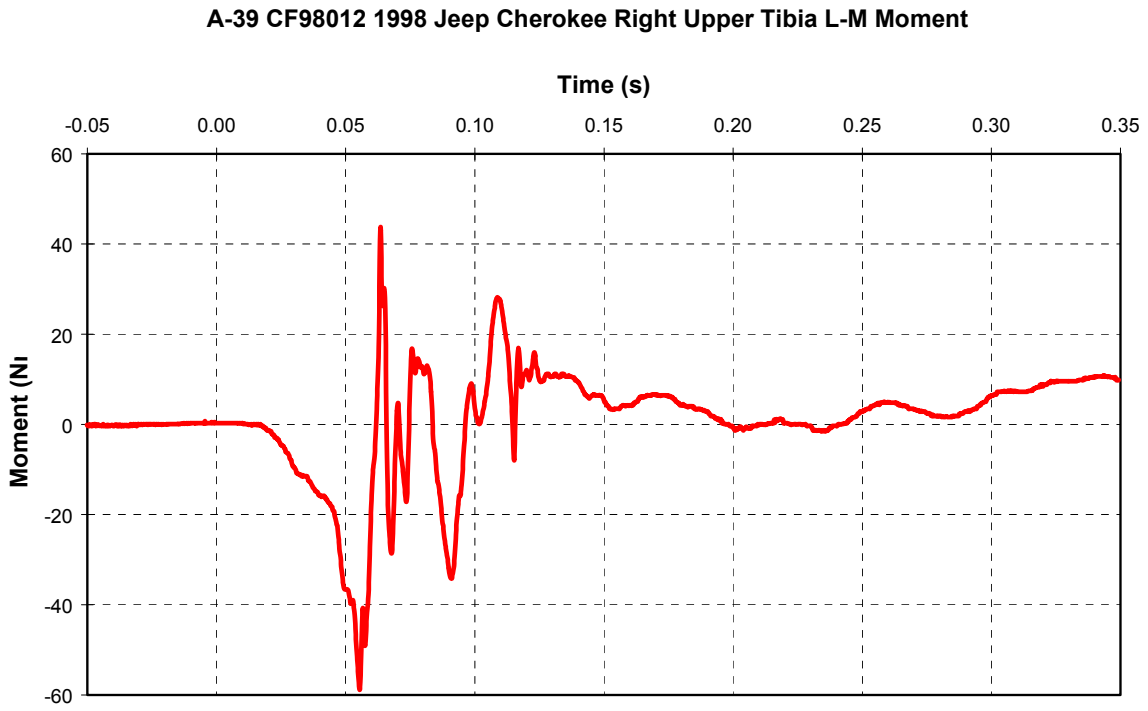


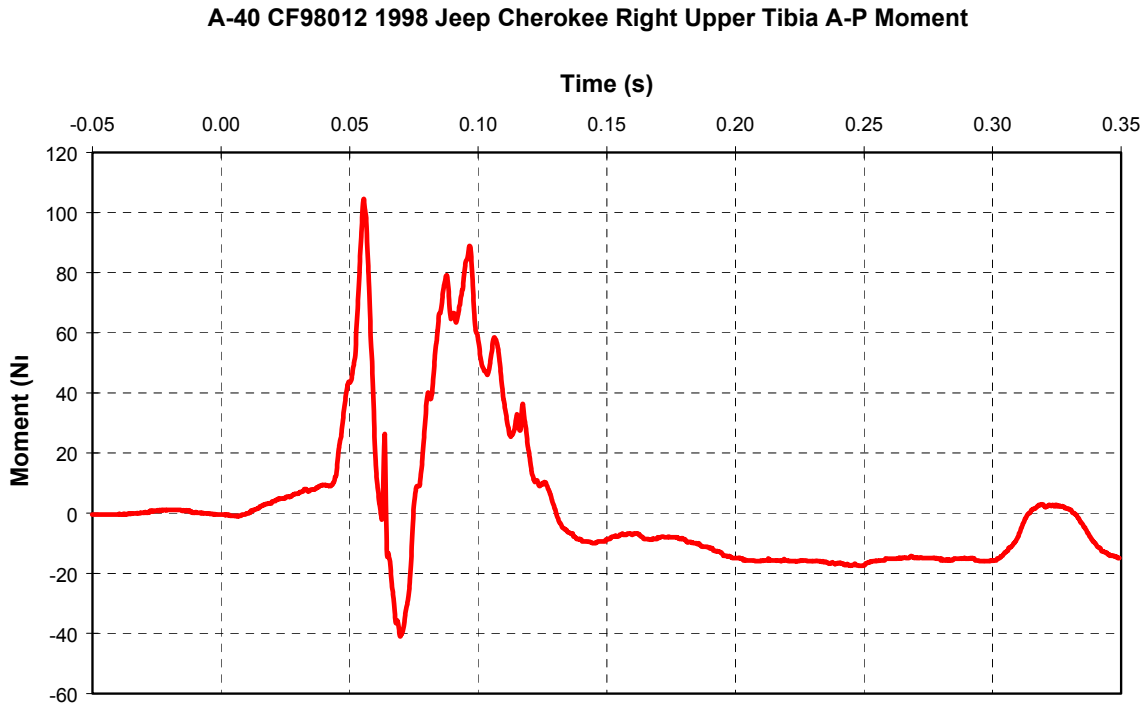
A-37 CF98012 1998 Jeep Cherokee Right Femur Axial Force Analysis



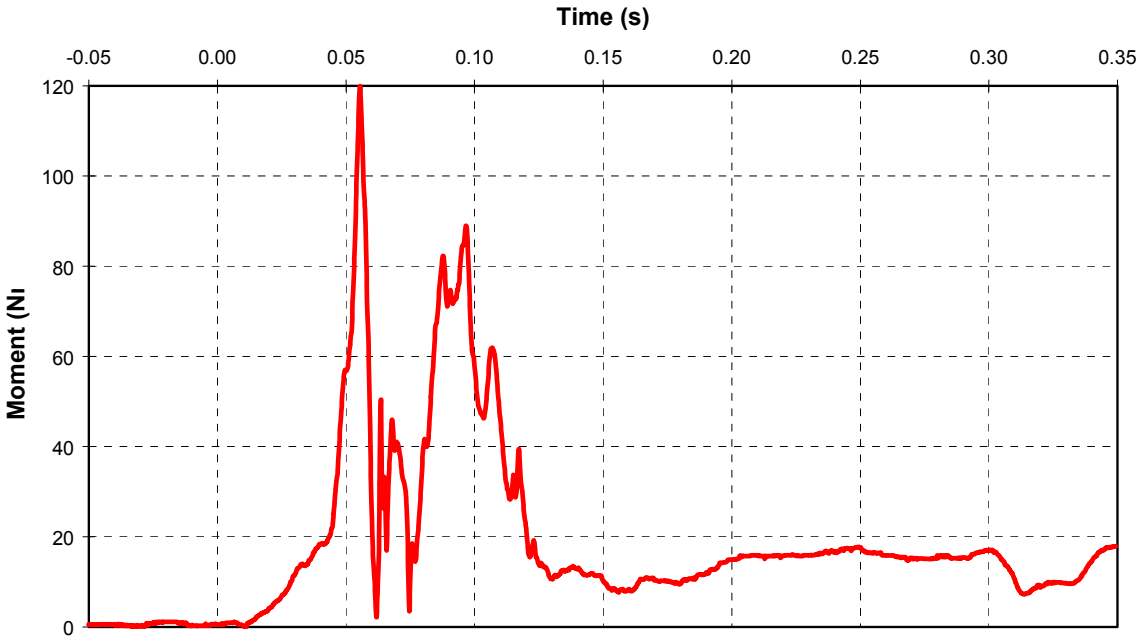
A-38 CF98012 1998 Jeep Cherokee Right Tibia-Femur Displacement



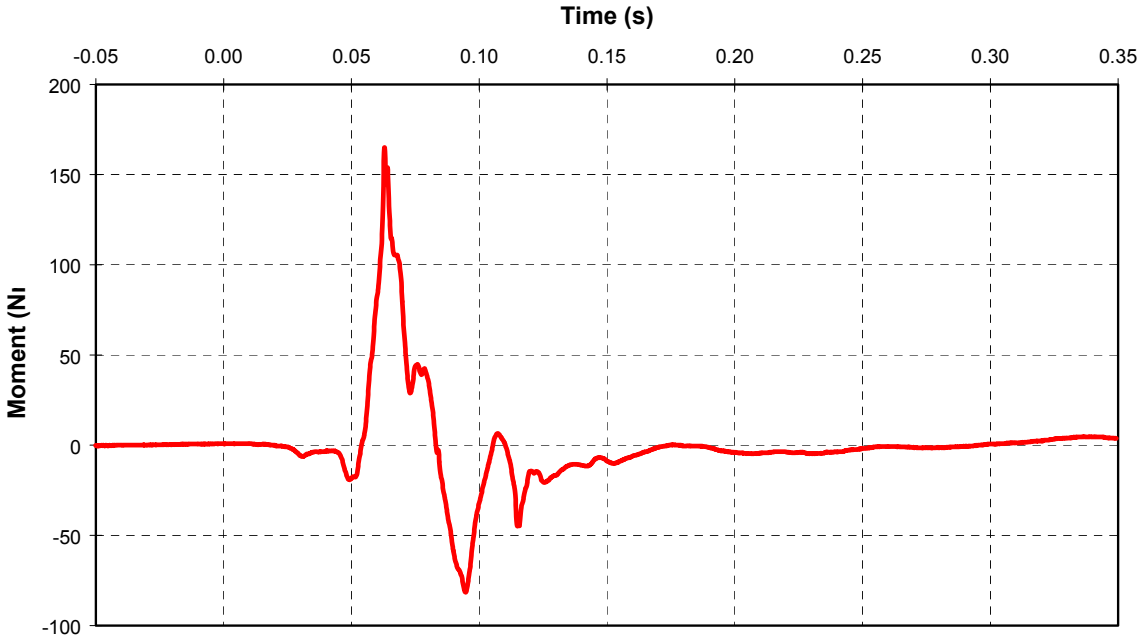




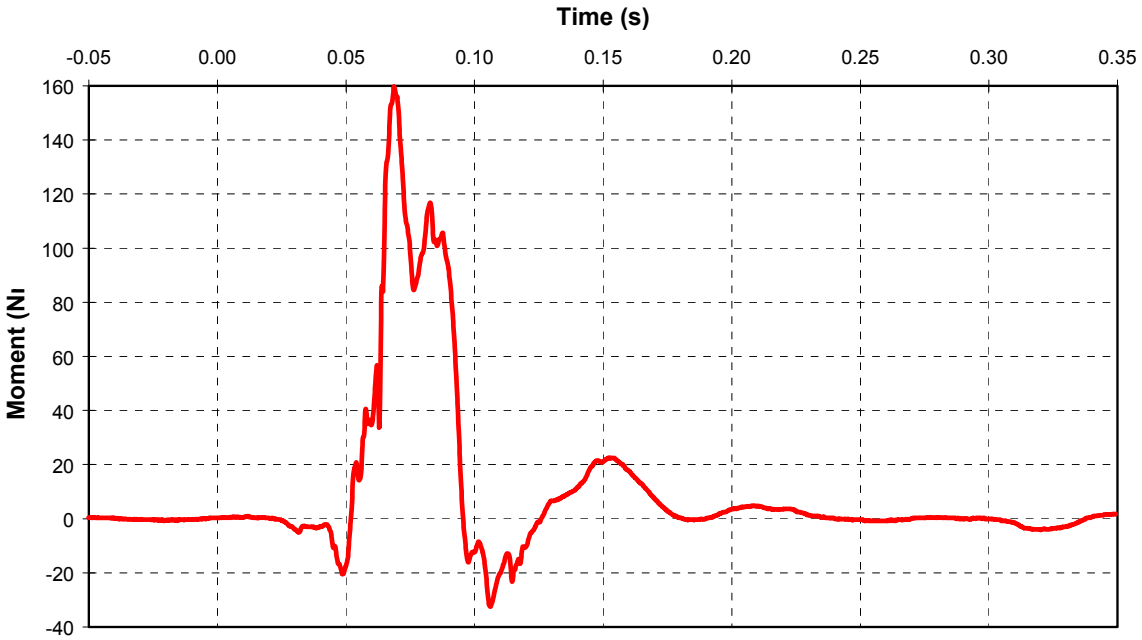
A-41 CF98012 1998 Jeep Cherokee Right Upper Tibia Vector Resultant Moment



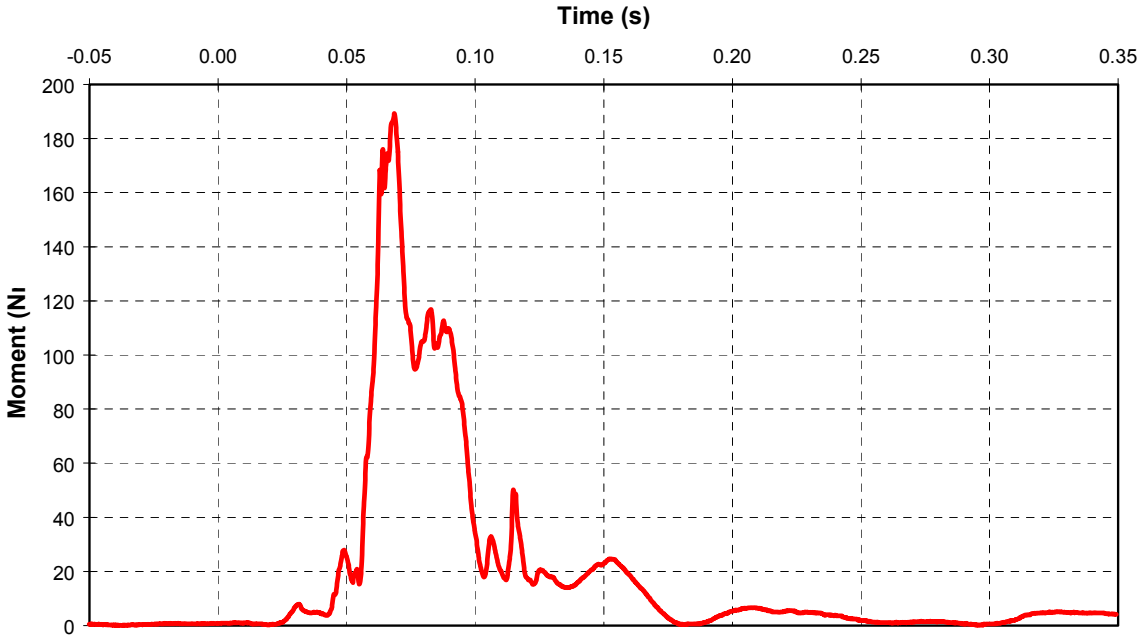
A-42 CF98012 1998 Jeep Cherokee Right Lower Tibia L-M Moment



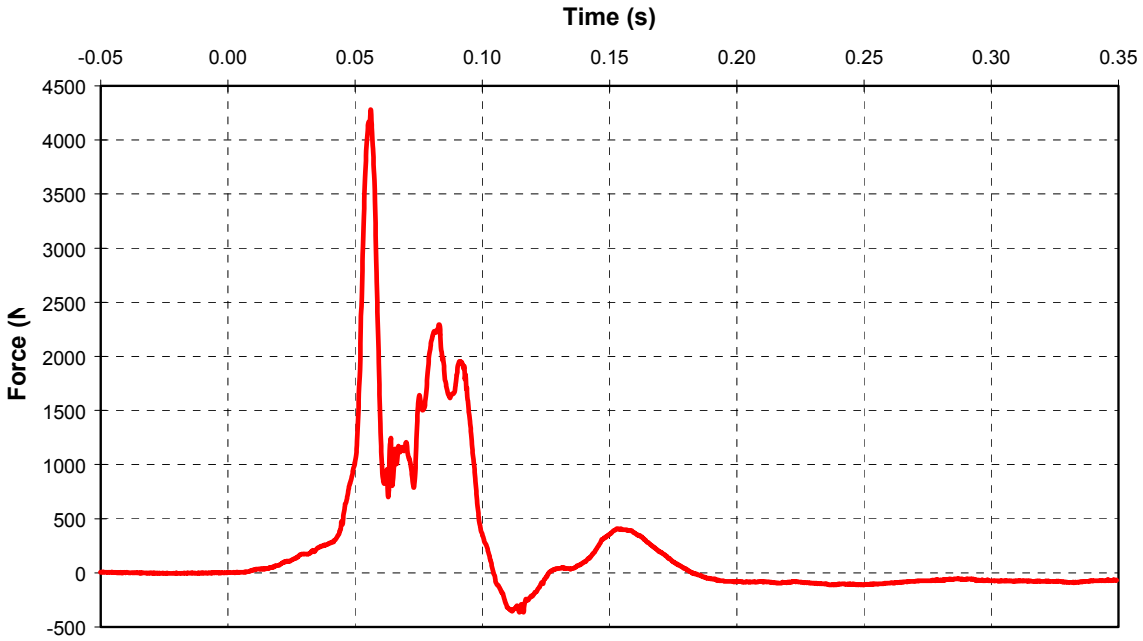
A-43 CF98012 1998 Jeep Cherokee Right Lower Tibia A-P Moment



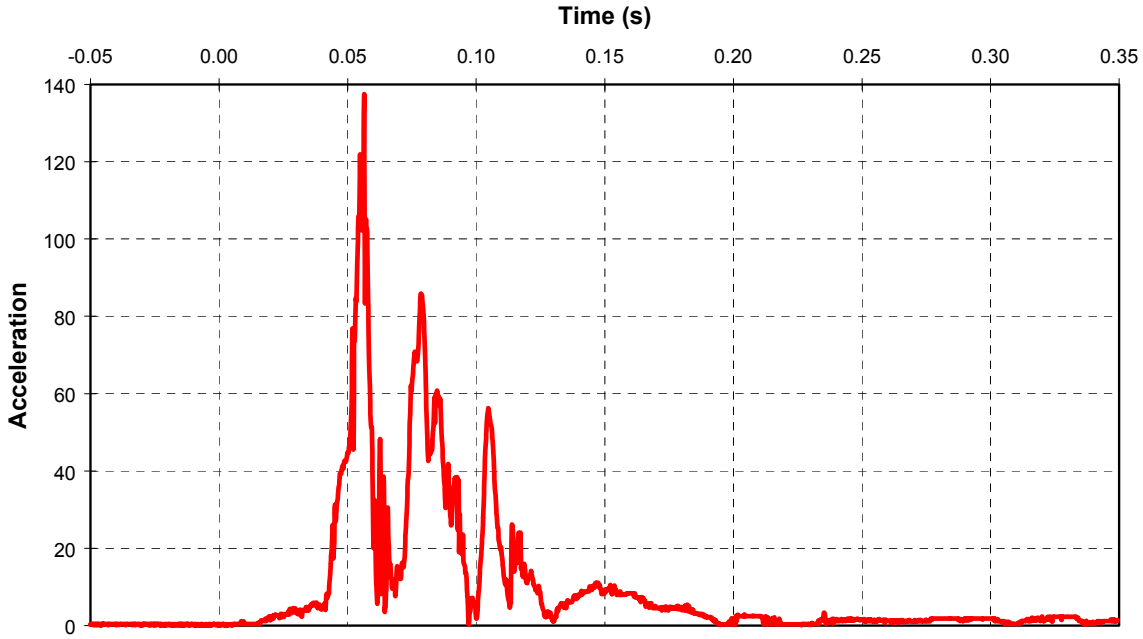
A-44 CF98012 1998 Jeep Cherokee Right Lower Tibia Vector Resultant Moment

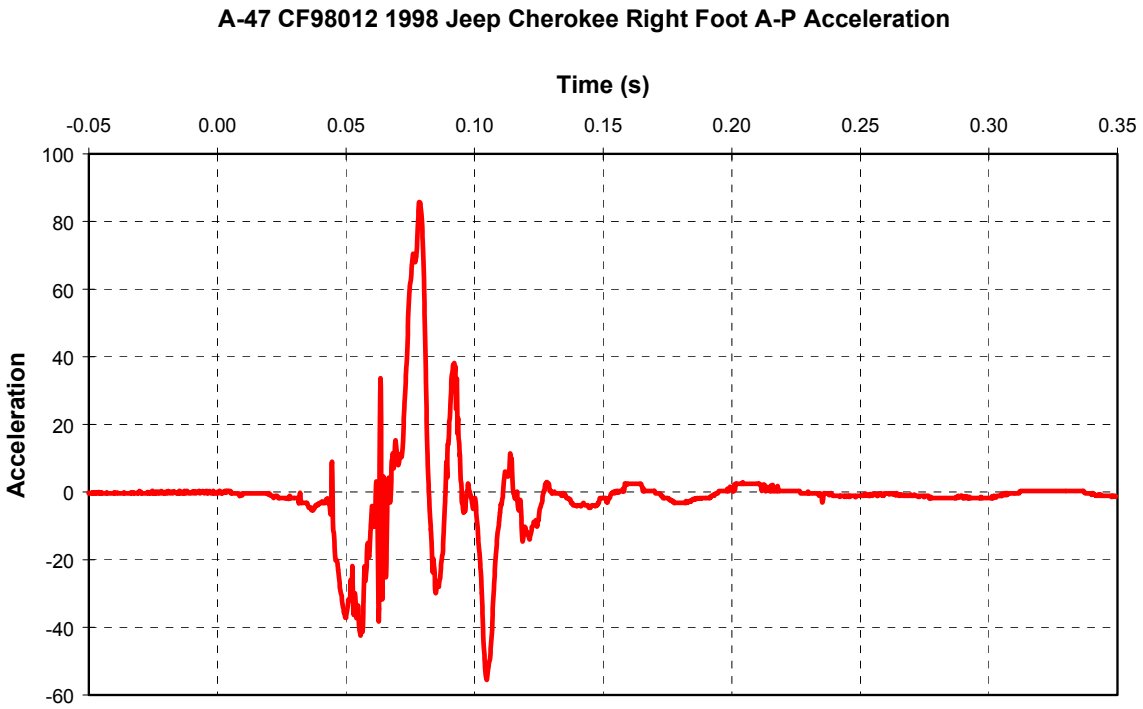


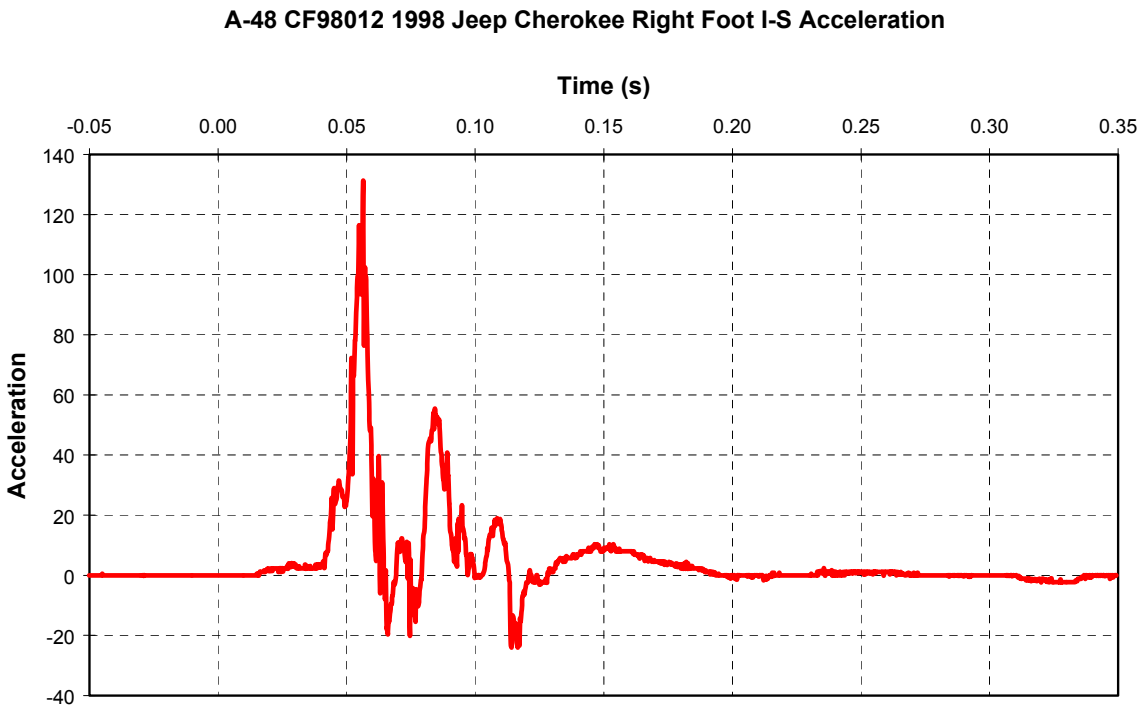
A-45 CF98012 1998 Jeep Cherokee Right Lower Tibia Axial Force



A-46 CF98012 1998 Jeep Cherokee Right Foot Vector Resultant Acceleration







1998 MODEL YEAR

Jeep® CHEROKEE SPORT 4WD

CHRYSLER CORPORATION

PRICE INFORMATION

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: $20,720

Jeep Cherokee 4WD 4dr Sport
Exterior Color: Bright Jade Satin Glow
Interior Color: Mist Gray
Interior: Seats - Prem Cloth Hi-Back Bucket
Engine: Engine - 4.0L Power Tech I-6
Transmission: Transmission - 4-Speed Automatic

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL/SAFETY FEATURES
Air Bags - Next Generation**
Brakes - Power Front Disc/Rear Drum
Steering - Power
Suspension - Normal Duty
Stabilizer Bar - Rear
Transfer Case - Command-Trac 4WD
Battery - 500 Amp Maintenance Free
Alternator - 117 Amp
Fuel Tank - 20 Gallon w/Tethered Cap
Spare Tire - Compact
Windshield Wipers - Var Intermittent

INTERIOR FEATURES
Console - Full Length Floor
Seats - Reclining Front
Seat - Rear Fold w/Removable Cushion
Radio - AM/FM Cassette
Speakers - Four
Instrument Cluster w/Tach
Power Outlet - Auxiliary 12 V
Assist Handles - Passenger
Cargo Tie Down Loops
Spare Tire Cover

EXTERIOR FEATURES
Mirrors - Manual Fold-Away
Tires - P225/75R15 Wrangler RT/S AT
Wheels - 15 x 7.0 Full-Face Steel

OPTIONAL EQUIPMENT

Customer Preferred Package 26J	**$2,345**
Air Conditioning	
Windows - Power	
Locks - Power	
Keyless Entry - Remote	
Mirrors - Power Folding	
Light Group	
Wiper/Washer - Rear Window	
Steering Column - Tilt	
Steering Wheel - Leather Wrapped	
Roof Rack	
Floor Mats - Front & Rear	
Trailer Tow Group	$365
Engine Cooling - Heavy Duty	
Cooler - Auxiliary Transmission Oil	
Cover - Cargo Compartment	$75
Transmission - 4-Speed Automatic	$945
Glass - Deep Tint Sunscreen	$270
Defroster - Rear Window	$165
Fog Lamps	$110
Speed Control	$250
Spare Tire - Full Size	$210
Wheels - 15 x 7.0 Aluminum "Ecco"	$245
DESTINATION CHARGE	$525

TOTAL PRICE BEFORE DISCOUNT [illegible] $26,220

Jeep Discount	**-$2,345**

TOTAL PRICE: * $23,880

** Certified to the new federal regulations that allow less forceful airbags

Assembly Point/Port of Entry: TOLEDO, OHIO, U.S.A.

VIN 1J4-F[illegible]S3WL- [illegible]246 4-VON 0624 0226

SHIPTO 67720 47
BRITT CHRYSLER-PLYMOUTH-JEEP-EAGLE
3427 JEFFERSON-DAVIS HIGHWAY
FREDERICKSBURG VA 22401-4160

SOLDTO 35 67720
BRITT CHRYSLER-PLYMOUTH-JEEP-EAGLE
3427 JEFFERSON-DAVIS HIGHWAY
FREDERICKSBURG VA 22401-4160

THIS LABEL IS ADDED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.

* STATE AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND INSTALLED OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNT, IF ANY, IS BASED ON PRICE OF OPTIONS IF PURCHASED SEPARATELY.

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 74 %

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT:
TOLEDO, OHIO, U.S.A.

COUNTRY OF ORIGIN:
ENGINE PARTS: UNITED STATES
TRANSMISSION PARTS: JAPAN

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

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

CITY MPG
15

HIGHWAY MPG
20

Fuel Mileage Information
DOE EPA

Actual Mileage will vary with options, driving conditions, driving habits and vehicle's condition. Results reported to EPA indicate that the majority of vehicles with these estimates will achieve between
12 and 18 mpg in the city, and between
17 and 23 mpg on the highway.

1998 CHEROKEE 4WD
6 CYL, 4.0 L (242 CID),
MULTIPOINT FUEL INJECTION.
4-SPEED AUTOMATIC TRANS.
W/ LOCKUP TORQUE CONVERTER.

Estimated Annual Fuel Cost:
$ 1102

For Comparison Shopping, all vehicles classified as **SPECIAL PURPOSE** have been issued mileage ratings ranging from 12 to 24 mpg city and 16 to 29 mpg highway.