

Insurance Institute for Highway Safety Crashworthiness Evaluation

Crash Test Report 2000 Isuzu Trooper (CF00021)

Vehicle identification number: JACDJ58X1Y7J07010
Body style: Midsize 4-door utility vehicle
Engine/transmission: Longitudinal 3.5-liter V6, 4-speed automatic,
4-wheel drive

Standard crashworthiness features:

- Driver and right front passenger airbags
- Dual-locking shoulder belts (front and rear outboard seating positions)
- Shoulder belt upper anchorage height adjusters (front seating positions only)
- Seat belt force-limiting mechanisms (front seating positions only)
- Right front and both rear shoulder belt retractors are convertible from emergency to automatic locking for ease of child restraint use

Other standard safety features:

- 4-wheel antilock brakes

Vehicle specifications (provided by manufacturer):

- Wheelbase: 276 cm
- Overall length: 471 cm
- Overall width: 184 cm
- Curb weight: 2,021 kg

Vehicle specifications (measured):

- Front bumper to firewall: 113 cm
- Curb weight: 2,004 kg
- Test weight: 2,100 kg (49% front, 51% rear)
- Overall width: 183 cm

Nominal test parameters:

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

Crash test date:

June 21, 2000

Figure 1
Pre-crash and Post-crash Side Views — 2000 Isuzu Trooper



Summary

A 2000 Isuzu Trooper was crash tested on June 21, 2000 into a fixed deformable barrier at 39.8 mi/h (64.1 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 3 cm. Resultant intrusion in the driver footwell measured 17 cm at the footrest and 19-21 cm at other places on the toepan. All doors remained closed during the crash. After the crash, the driver door and the right front and left rear doors required additional effort but no tools to open, and the right rear door opened with ease.

Just after the crash, 1.5 gallons of Stoddard solvent was collected that was leaking from a fuel line that runs next to the transmission along the vehicle centerline. When the vehicle was later rotated onto its right side for postcrash underbody photography, the solvent again leaked from the same location. The leak came from a separation between two sections of fuel line that run along the transmission.

The driver dummy was restrained by a three-point lap/shoulder belt and an airbag. During the crash, 18 cm of webbing spooled off the retractor. The deploying airbag briefly contacted the dummy's chest and face. As the dummy's face began loading the airbag, the steering column tilted upward, causing the lower part of the steering wheel rim to move closer to the dummy's chin. The dummy's head contacted the tilting steering wheel rim through the airbag. After rebounding from the steering wheel, the head moved rearward and upward, contacting the intersection of the B-pillar and roof rail. After the crash, the upper end of the steering column had moved upward 21 cm and forward 3 cm.

The maximum resultant head accelerations were 76 g from the steering wheel rim contact and 24 g from the B-pillar contact. The maximum left lower tibia A-P moment was 168 Nm, and the maximum left tibia axial force was -10.9 kN, resulting in a left lower tibia index of 1.11. The maximum resultant left foot acceleration was 287 g. The maximum right lower tibia A-P moment was 266 Nm, significantly contributing to the right lower tibia index of 1.23. The maximum resultant right foot acceleration was 471 g.

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 VII). 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 50 cm behind its center of gravity (190 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 39 percent.

Structural Performance

All doors remained closed during the crash. The driver door aperture shortened 1 cm, as measured at the lower edge of the window. After the crash, the driver door and the right front and left rear doors required additional effort but no tools to open, and the right rear door opened with ease.

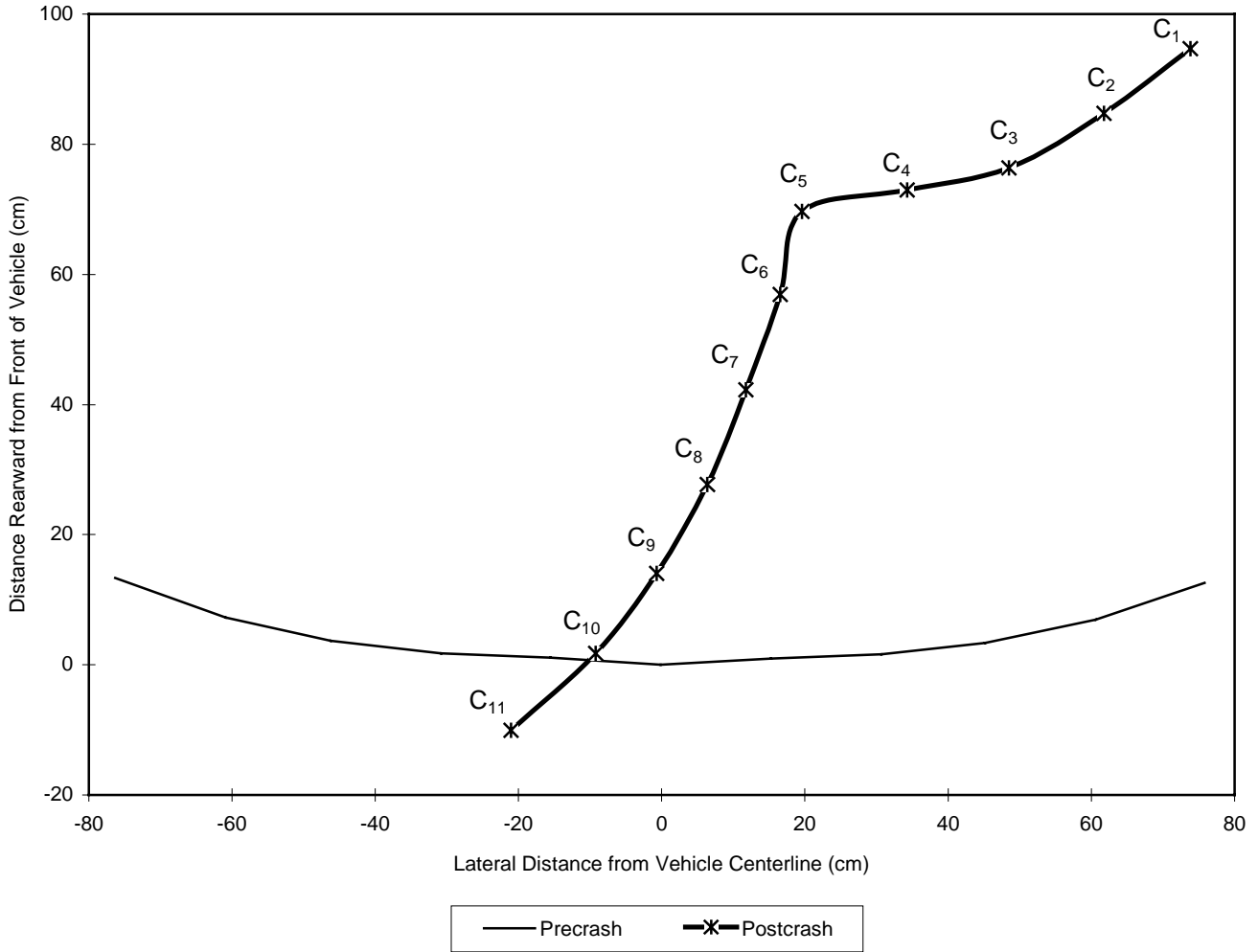
Just after the crash, 1.5 gallons of Stoddard solvent was collected that was leaking from a fuel line that runs next to the transmission along the vehicle centerline. The leaking fluid was collected below the vehicle for 10 minutes, at which time the leak did not appear to slow. The fuel line was then clamped upstream of the leak. In addition to the 1.5 gallons of Stoddard solvent that was collected, there was a large, unmeasured amount of solvent that initially leaked onto the floor at a higher rate. It is likely that the fuel line would have continued to leak had it not been clamped. When the vehicle was rotated onto its right side for postcrash underbody photography, the fuel line clamps were removed, which allowed the Stoddard solvent to immediately flow freely. The solvent leak was observed coming from a separation between a flexible fuel hose running along the front part of the transmission and a metal fuel line running along the rear part of the transmission. During the crash, the longitudinal frame rails were bent, forcing the engine and front portion (torque converter) of the transmission toward the passenger side of the vehicle while the rear end of the transmission stayed closer to the vehicle centerline. This caused the flexible fuel hose to pull away and disconnect from the metal fuel line.

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. The marked area of the postcrash view in Figure 4 shows the location of the fuel line leak; Figure 5 shows this area enlarged with the affected fuel line and hose. Figure 6 illustrates the deformation of the frame rails, door sills, and crossmembers, which are visible in Figure 4.

Figure 2
Overhead View of Crash Deformation — 2000 Isuzu Trooper



Figure 3
Front Bumper Cover Crush Contour — 2000 Isuzu Trooper



	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)	95	85	76	73	70	57	42	28	14	2	-10
Precrash Contour (cm)	13	7	3	2	1	0	1	2	4	7	13
Resulting Crush (cm)	82	78	73	71	69	57	41	26	10	-5	-23

The length of the reference line was 152 cm precrash and 95 cm postcrash.

Figure 4
Precrash and Postcrash Views from Below — 2000 Isuzu Trooper

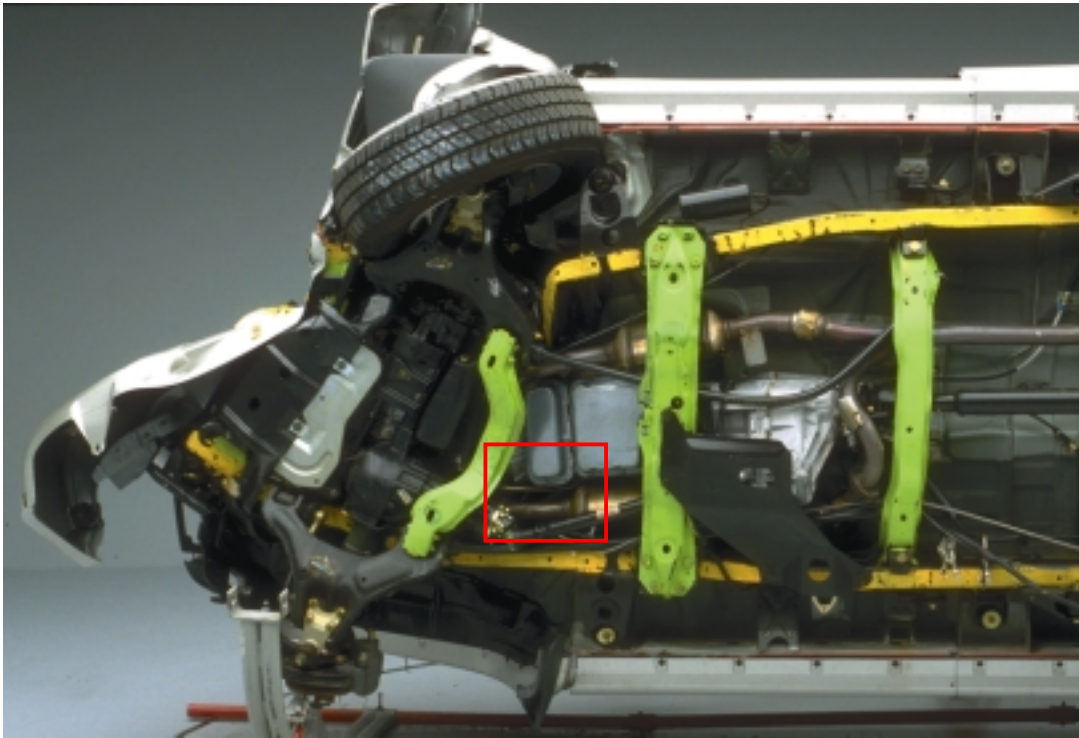
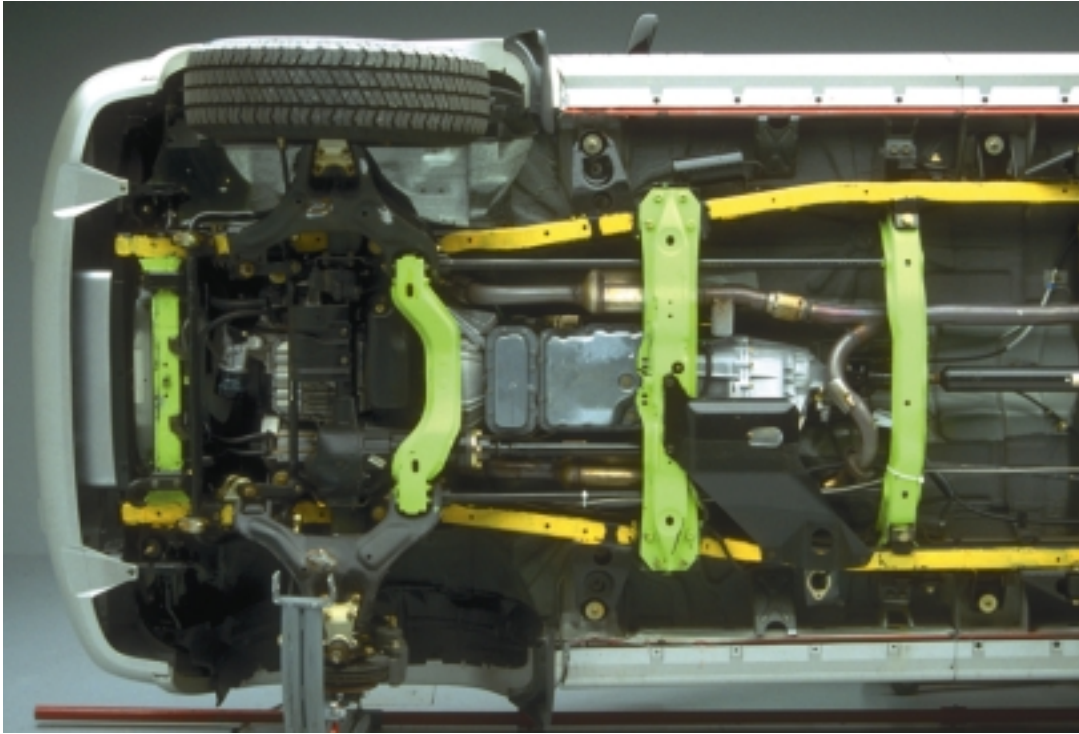


Figure 5
Postcrash Location of Separation of Fuel Hose from Fuel Line

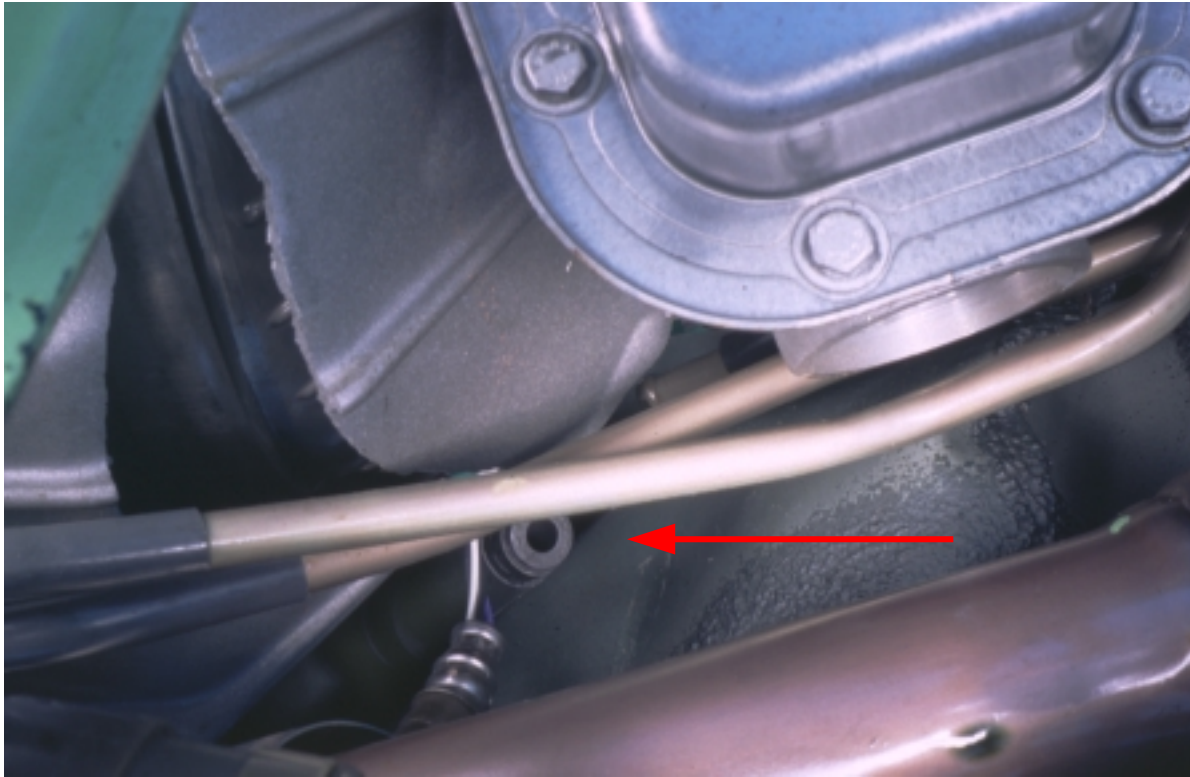
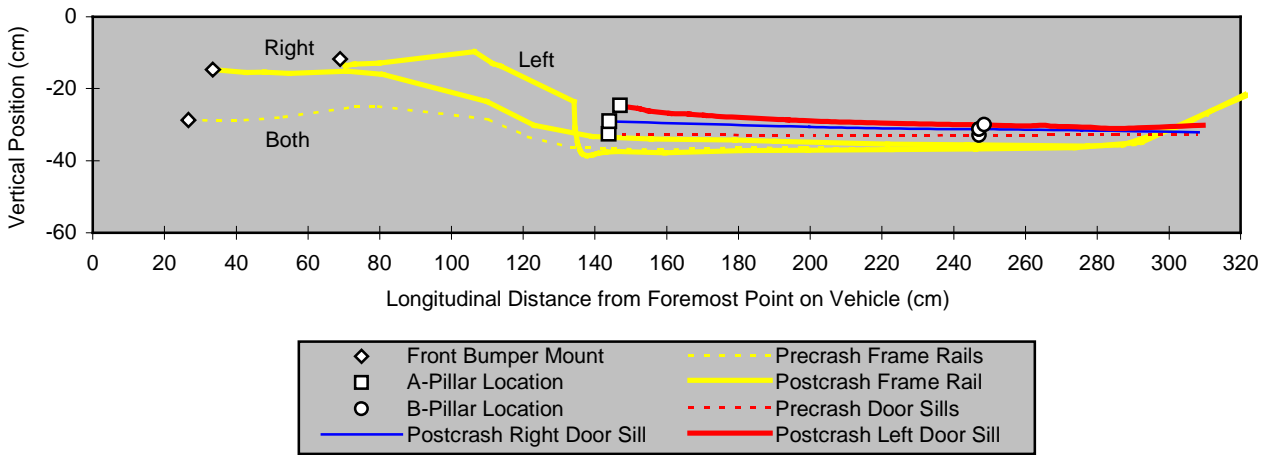
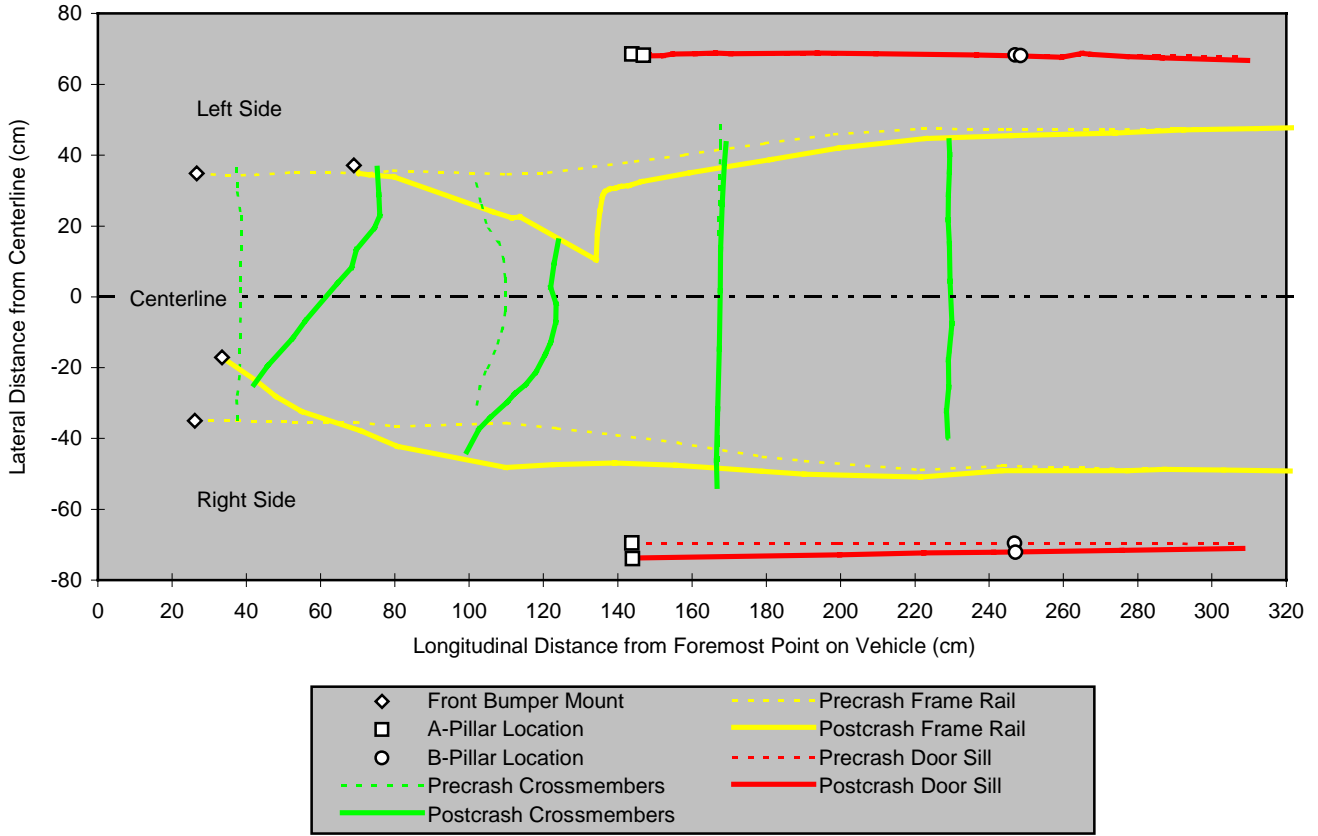


Figure 6
Structural Deformation, Views from Below and Side — 2000 Isuzu Trooper



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 VII). 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.

Selected Locations*	Longitudinal	Lateral	Vertical	Resultant
Steering column (cm)	3	1	21	21
Left lower instrument panel (cm)	-3	0	6	7
Right lower instrument panel (cm)	-3	0	8	8
Brake pedal (cm)	-17	-6	9	20
Left toepan (cm)	-17	-4	7	19
Center toepan (cm)	-18	-4	5	19
Right toepan (cm)	-20	-4	6	21
Footrest (cm)	-15	-4	6	17
Average displacement of the four seat-attachment bolts relative to reference system (cm)	-3	2	-4	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 70 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 48 ms into the crash and appeared to be fully inflated at 70 ms.

Passenger: The corner-mounted passenger airbag deployed at an angle 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 dual-locking lap/shoulder belts with sliding latch plates at the outboard seating positions and adjustable upper anchorage points at both front seating positions. The front belts also are equipped with 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, 18 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 beyond the retractor. Interaction between the belt webbing and D-ring caused a 12 cm scuff mark along the belt length. Postcrash investigation of the force-limiting torsion bar showed that it twisted, allowing some spool-out of the belt webbing. Because the torsion bar did not have an initial position reference mark, the amount of twist it incurred was indeterminable; therefore its contribution to the total spool-out is unknown.

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 tip slightly outboard.

Steering Column

The upper end of the steering column moved upward 21 cm and forward 3 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 deploying airbag contacted the dummy's face at 56 ms into the crash. The airbag then receded from much of the face, but the chin remained in contact with the airbag as it inflated; full inflation occurred by 70 ms. Paint transferred from the dummy's face indicated the nose contacted the fully inflated airbag 2 cm above and 4 cm to the left of its center. As the dummy's face began loading the airbag, the steering column tilted upward, causing the lower end of the steering wheel rim to move close to the dummy's chin. Although the airbag fabric obscured the dummy's face and steering wheel, the dummy's chin appeared to approach the lower center (6 o'clock) portion of the steering wheel. Sudden increases in the rearward head acceleration and neck tension and decreases in the neck A-P shear force and neck A-P bending moment, all occurring at the same time (97 ms), were consistent with contact between the dummy's head and neck and the steering wheel. On rebound from the steering wheel, the head moved rearward and upward toward the intersection of the B-pillar and roof rail, where the left upper rear portion of the head made contact at 299 ms, according to the head acceleration data. The dummy's head contacted the shoulder belt upper anchorage D-ring at 680 ms as the dummy settled back into the seat. Table 2 provides the timing of these events.

Table 2
Restraint System Performance and Dummy Kinematics —
2000 Isuzu Trooper

Event	Time (ms)
Deployment of airbag	48
Airbag contacts face during deployment	56
Airbag fully inflated	70
Face begins to load airbag	72
Head contacts steering wheel	97
Left rear of head contacts B-pillar	299
Left rear of head contacts shoulder belt D-ring	680

Figure 7
Dummy and Vehicle Interior, Postcrash — 2000 Isuzu Trooper



Legs and Feet

Left leg and foot: Paint transferred from the dummy's left knee indicated the knee contacted the knee bolster 7 cm directly above the left instrument panel intrusion reference point. The knee also contacted the underside portion of the steering column trim. Paint transferred from the dummy's left shin indicated the shin contacted the bolster directly below the knee impact location, extending to the base of the bolster. The top of the metal-backed bolster was dislodged and shifted rearward slightly. The left shin also contacted the center of the bolster protrusion below the steering column. The left foot was found slightly dorsiflexed and slightly everted, with the outboard half of the forefoot's sole resting on the raised carpeted footrest hump. The back of the heel was resting on a raised area on the floormat/carpeting.

Right leg and foot: Paint transferred from the dummy's right knee indicated the knee contacted the knee bolster 2 cm above and 4 cm to left of the right instrument panel intrusion reference point. The right knee also contacted the lower right portion of the steering column. Paint transferred from the dummy's right shin indicated the shin contacted the bolster on and below the knee contact, extending to the base of the bolster. The top right portion of the metal-backed knee bolster was dislodged and shifted rearward. The right foot was found fully dorsiflexed and fully inverted, with the sole at the instep on the fully depressed accelerator pedal and the back of the whole foot resting on a downward buckle of the floormat/carpeting. The lateral edge of the forefoot was pressed against the plastic side trim of the center console.

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 accelerations were 76 g at 100 ms from the steering wheel contact and 24 g at 309 ms from the B-pillar contact. Table 3 provides a summary of the maximum head injury measurements recorded during the crash.

Measure	Published Tolerance Threshold	Result	Time (ms)
Vector resultant acceleration (g)	80	76	100
Vector resultant acceleration — 3 ms clip (g)	80	67	99-102
Head Injury Criterion (HIC)	1000	589	80-116
Head Injury Criterion — 15 ms interval (HIC-15)*	700	411	93-108

* Canadian Motor Vehicle Safety Regulations (Standard 208) allow the resultant head acceleration to exceed 80 g in airbag-equipped vehicles if HIC-15 is less than 700 (Transport Canada, 1998).

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 — 2000 Isuzu Trooper			
Measure	Published Tolerance Threshold	Result	Time (ms)
A-P shear force (kN)	±3.1	-0.5	100
Axial compression force (kN)	4.0	0.5	310
Axial tension force (kN)	3.3	2.5	101
Flexion bending moment (Nm)	310	13	339
Extension bending moment (Nm)	122	33	100

Chest

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

Table 5 Chest Injury Measurements — 2000 Isuzu Trooper			
Measure	Published Tolerance Threshold	Result	Time (ms)
Vector resultant spine acceleration — 3 ms clip (g)	60	49	105-108
Rib compression (mm)	-50	-33	110
Sternum deflection rate (m/s)	-8.2	-1.8	73

Legs and Feet

Left leg and foot: The maximum left lower tibia A-P moment was 168 Nm at 70 ms, and the maximum left tibia axial force was -10.9 kN at 68 ms, resulting in a left lower tibia index of 1.11 at 70 ms. The maximum resultant left foot acceleration was 287 g at 68 ms.

Right leg and foot: The maximum right lower tibia A-P moment was 266 Nm at 80 ms, significantly contributing to the right lower tibia index of 1.23 at 80 ms. The maximum resultant right foot acceleration was 471 g at 70 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 — 2000 Isuzu Trooper					
Measure	Published Tolerance Threshold	Left		Right	
		Result	Time (ms)	Result	Time (ms)
Femur axial force (kN)	-9.1*	-5.4	69	-3.3	70
Tibia-femur displacement (mm)	-15	-8	78	-10	70
Upper Tibia					
L-M moment (Nm)	±225	-120	68	-36	114
A-P moment (Nm)	±225	129	76	124	67
Vector resultant moment (Nm)	225	129	76	127	67
Index	1.00	0.81	68	0.57	67
Lower Tibia					
L-M moment (Nm)	±225**	129	71	34	75
A-P moment (Nm)	±225**	168	70	266	80
Vector resultant moment (Nm)	225**	196	70	267	80
Axial force (kN)	-8.0**	-10.9	68	-3.2	71
Index	1.00	1.11	70	1.23	80
Foot					
A-P acceleration (g)	±150	-116	63	-445	70
I-S acceleration (g)	±150	-286	68	-266	69
Vector resultant acceleration (g)	150	287	68	471	70

* 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

2000 Isuzu Trooper Midsize Four-Door Utility Vehicle: 5 mi/h Front into Angle Barrier

Test Number: LA00012

VIN: JACDJ58X1Y7J07010

Mileage: 215

Features: Driver and passenger airbags, four-wheel antilock brakes, air conditioning, automatic transmission, heated power mirrors, keyless entry system, power door locks, power windows, heated back glass, rear wiper, tilt steering wheel, cruise control, full-size spare tire, and two-stage paint.

Description	Part		Labor	
	Mfg. No	Price	Operation	Hours
Bumper cover, front	8972401690	\$323.39	Replace	1.9
Bumper cover, front			Refinish	2.9
Bumper reinforcement bar, front	8971753462	102.70	Replace*	
Bumper cover retainer, upper front	8971750430	78.37	Replace*	
Bumper mounting bracket, right front	8978113670	47.48	Replace*	
Bumper cover retainer/bracket, right front	8971755182	10.80	Replace*	
Grille filler	8972227230	21.45	Replace	0.6
Grille filler			Refinish	0.4
Headlamp assembly, right			Remove/reinstall	0.3
Headlamp mounting panel, right			Repair*	1.5
Headlamps			Aim	0.5
Parking/turn signal lamp, right	8971747921	123.34	Replace*	
Hood			Repair*	3.0
Hood			Refinish	3.4
Hood vertical hood latch support	8971625090	28.02	Replace*	0.2
Hood vertical hood latch support			Refinish	0.2
Fender, right front	8971844490	337.16	Replace**	3.0
Fender, right front			Refinish	2.8
Antenna mast, right front fender			Remove/reinstall	0.1
Fender skirt, right front			Remove/reinstall	
Anti-lock brake module			Remove/reinstall	0.7
Bracket, anti-lock brake module			Repair	0.1
Brake system			Bleed brakes	0.5
Brake fluid, 1 pint		8.00	Replace	
Windshield washer reservoir			Remove/reinstall	0.4
Fill neck, windshield washer reservoir	8943588540	35.15	Replace	0.1
Radiator support/inner fender panel			Set up*	1.0
Radiator support/inner fender panel			Pull/align*	1.0
Radiator support			Repair*	3.0
Radiator support			Refinish	0.5
Inner fender panel, right front			Repair*	1.5
Inner fender panel, right front			Refinish	0.2
Battery			Remove/reinstall	0.2
Windshield washer nozzles, hood			Remove/reinstall	0.2
Horn			Loosen/retighten	0.1
Paint and materials		187.20		
Total Parts		\$1,303.06		
Total Labor		1,030.20		30.3
Grand Total		\$2,333.26		

* This item was repaired or replaced 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: CF00021
Vehicle Make/Model: Isuzu Trooper
Vehicle Model Year: 2000
Seat Type: Manually adjusted bucket seat (fore/aft and seat back angle)

Manufacturer's Specifications

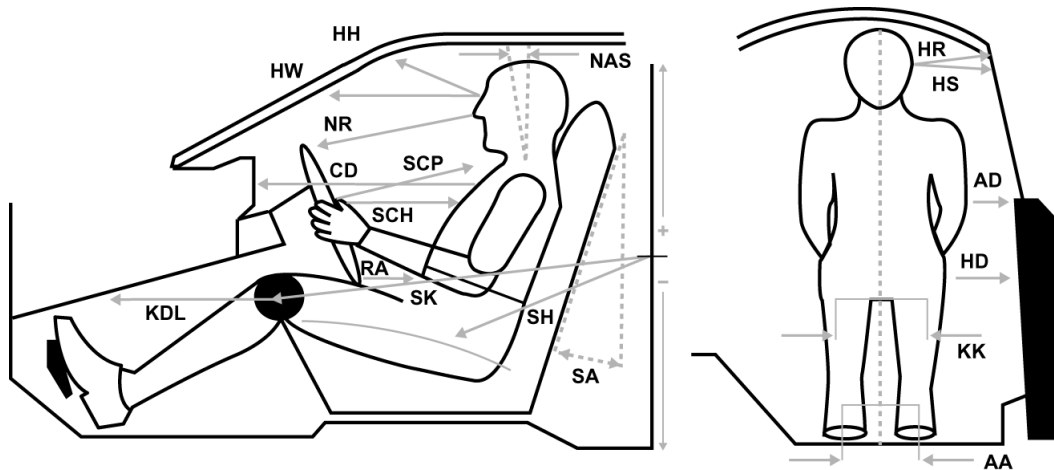
Seat Back Information: Reclined to 3rd position from upright
Upper Belt Anchorage: Set to midpoint of 5 positions
Steering Column Adjustment: Set to 4th tilt position from top

Location	Code	Measure	Location	Code	Measure
Head to header	HH	400	Neck angle, torso 90	NAT90	20.1°
Head to windshield	HW	590	Neck angle, seated*	NAS	6.2°
Nose to rim	NR	380	Torso angle (NAT90 – NAS)	TA	13.9°
Chest to dash	CD	569	Striker to knee***	SK	621
Rim to abdomen	RA	145	Striker to knee angle**	SKA	3.2°
Knee to dash, left	KDL	175	Striker to H-point, horizontal	SHH	213
Knee to dash, right	KDR	155	Striker to H-point, vertical	SHV	-17
Steering wheel to chest, horizontal	SCH	253	Ankle to ankle	AA	290
Steering wheel to chest, perpendicular	SCP	360	Knee to knee	KK	322
Steering wheel to chest, reference	SCR	347	Arm to door	AD	85
Hub to chest, minimum	HCM	200	H-point to door	HD	141
Pelvic angle	PA	23.7°	Head to A-pillar	HA	555
Seat back angle	SA	18.5°	Head to roof	HR	250
			Head to side window	HS	254

All distance measurements are in millimeters (mm).

* Dummy's neck bracket was adjusted to -1.8° to achieve a level instrumentation plane.

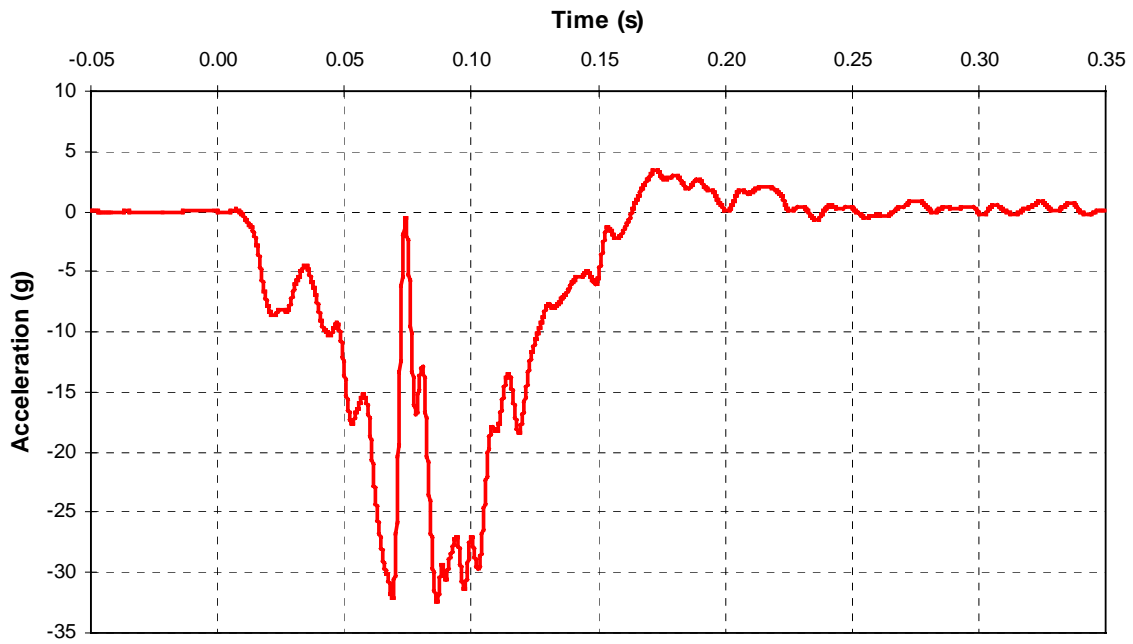
** These measurements were made in a vertical plane containing the striker and parallel to the driver door sill.



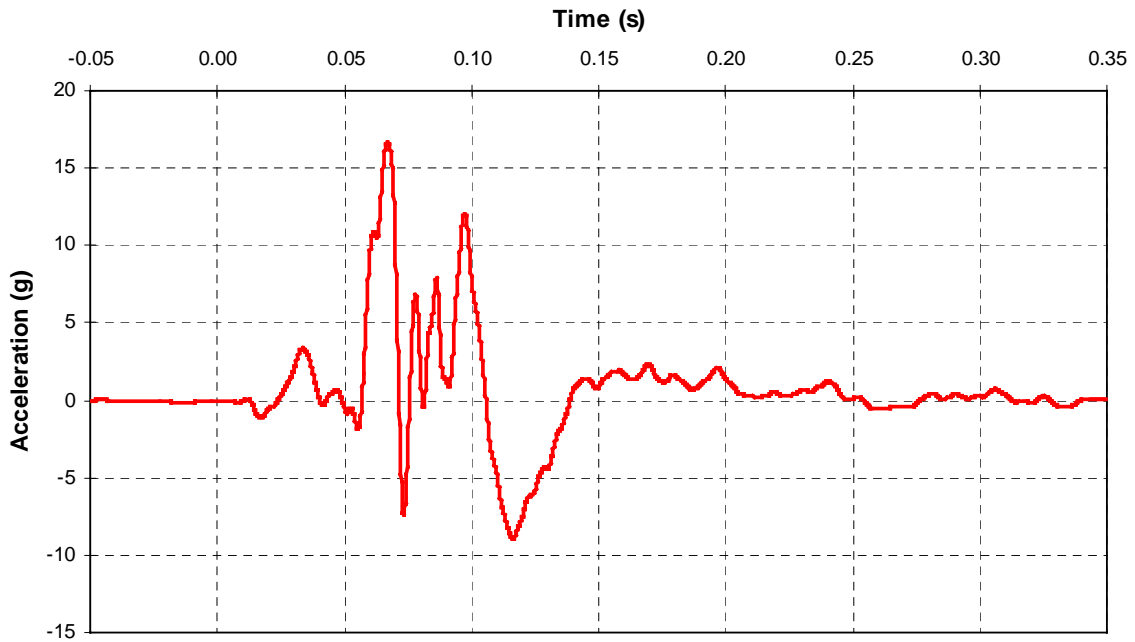
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A-47	Right foot A-P acceleration
A-48	Right foot I-S acceleration

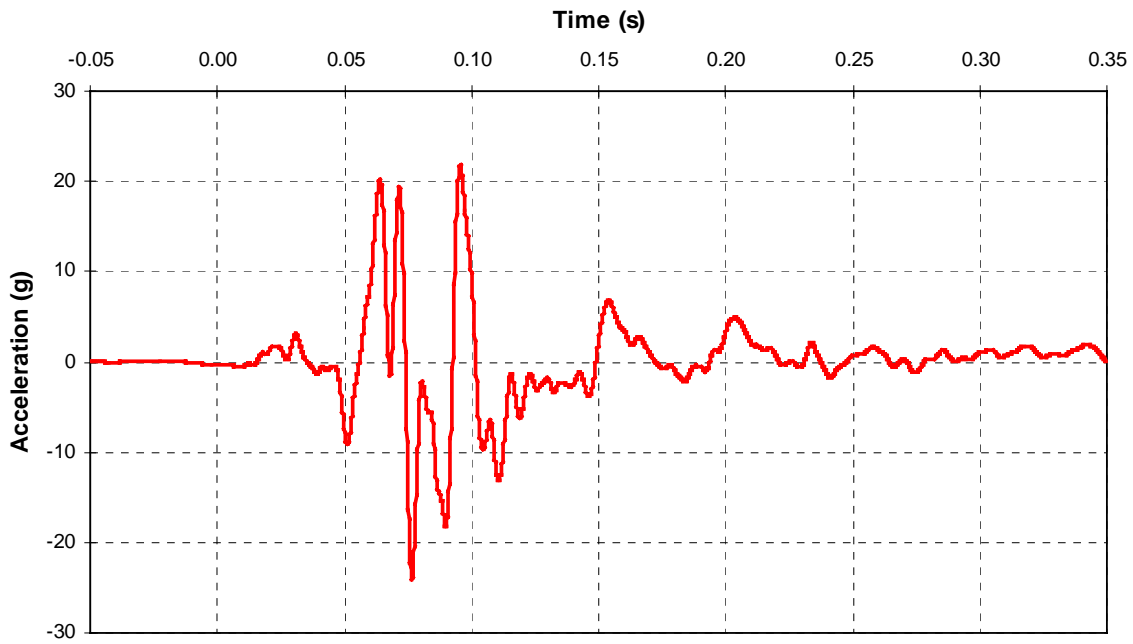
A- 1 CF00021 2000 Isuzu Trooper Vehicle Longitudinal Acceleration



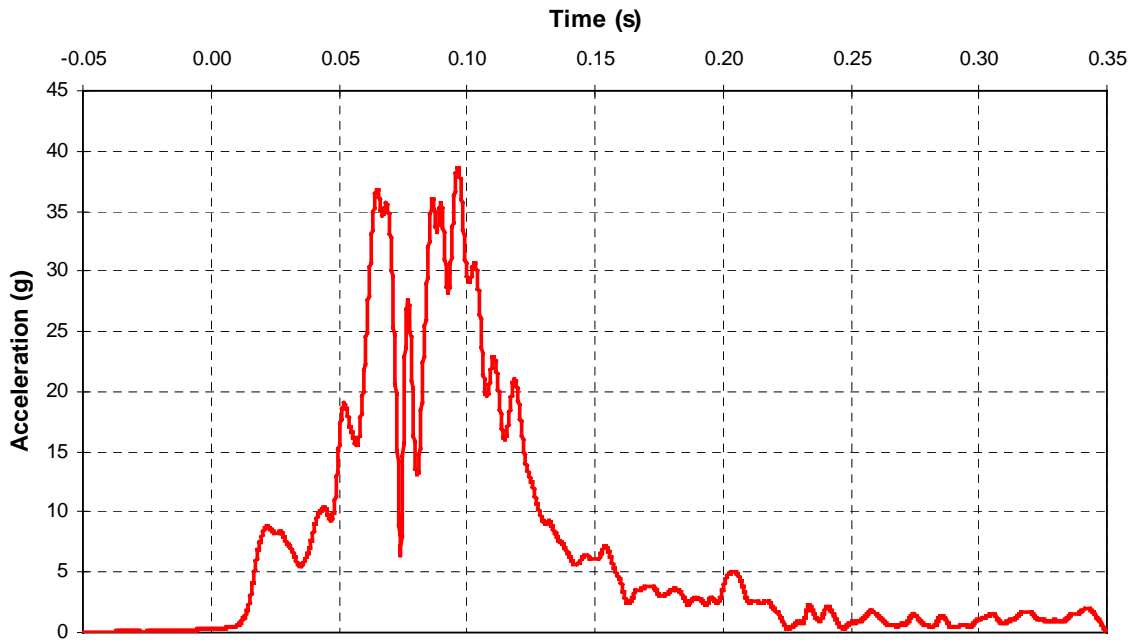
A- 2 CF00021 2000 Isuzu Trooper Vehicle Lateral Acceleration



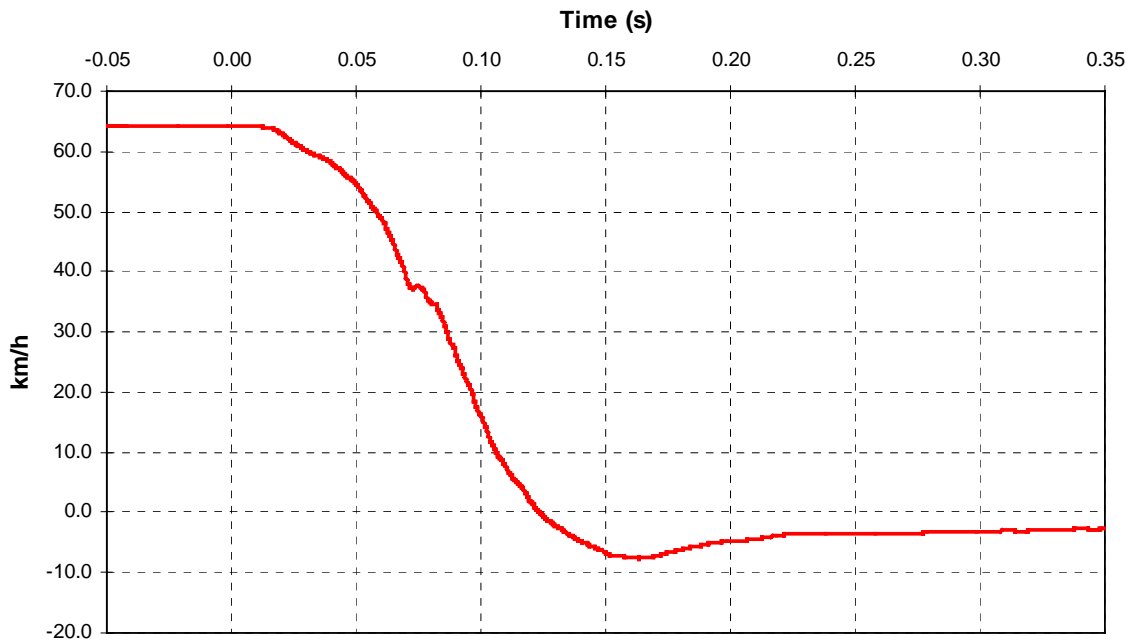
A- 3 CF00021 2000 Isuzu Trooper Vehicle Vertical Acceleration



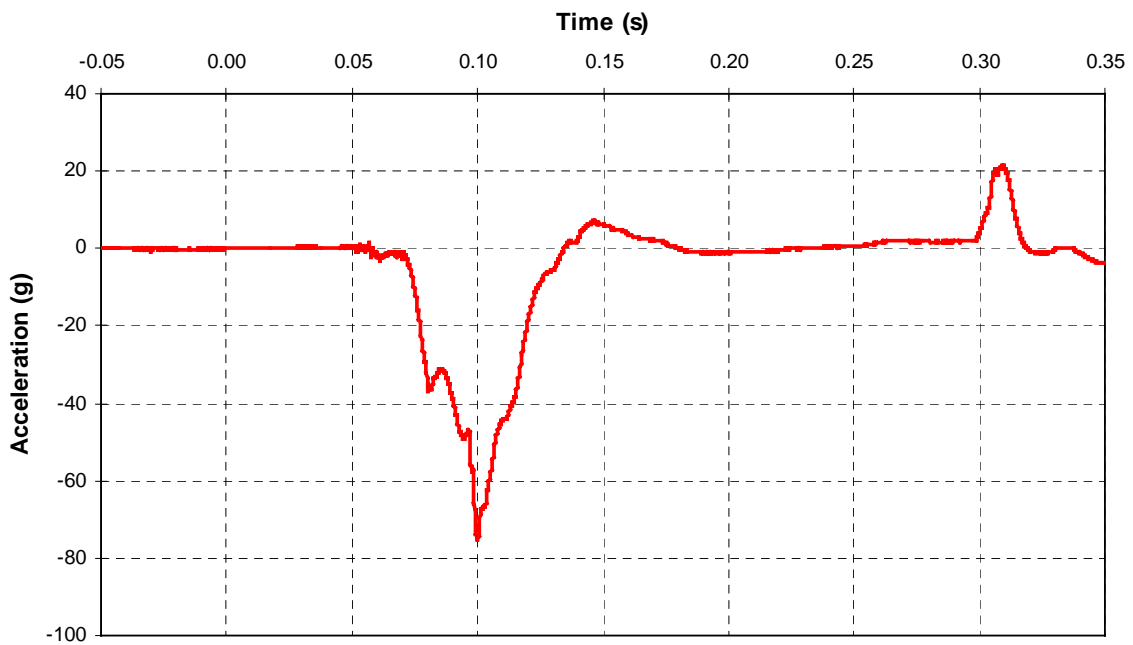
A- 4 CF00021 2000 Isuzu Trooper Vehicle Vector Resultant Acceleration



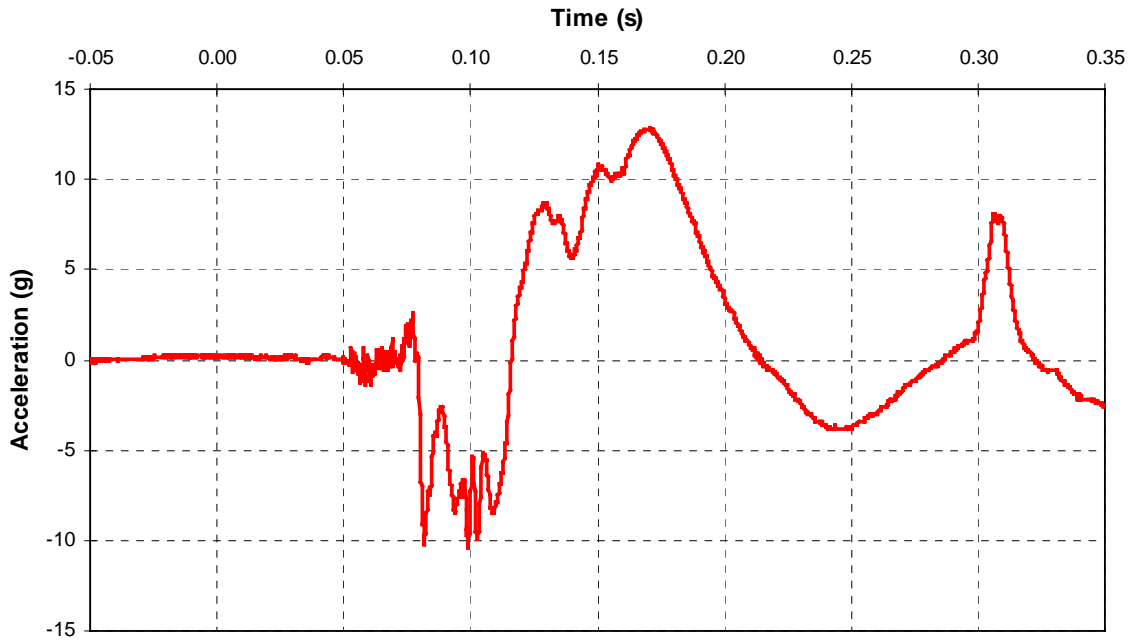
A- 5 CF00021 2000 Isuzu Trooper Integration of Vehicle Longitudinal Acceleration



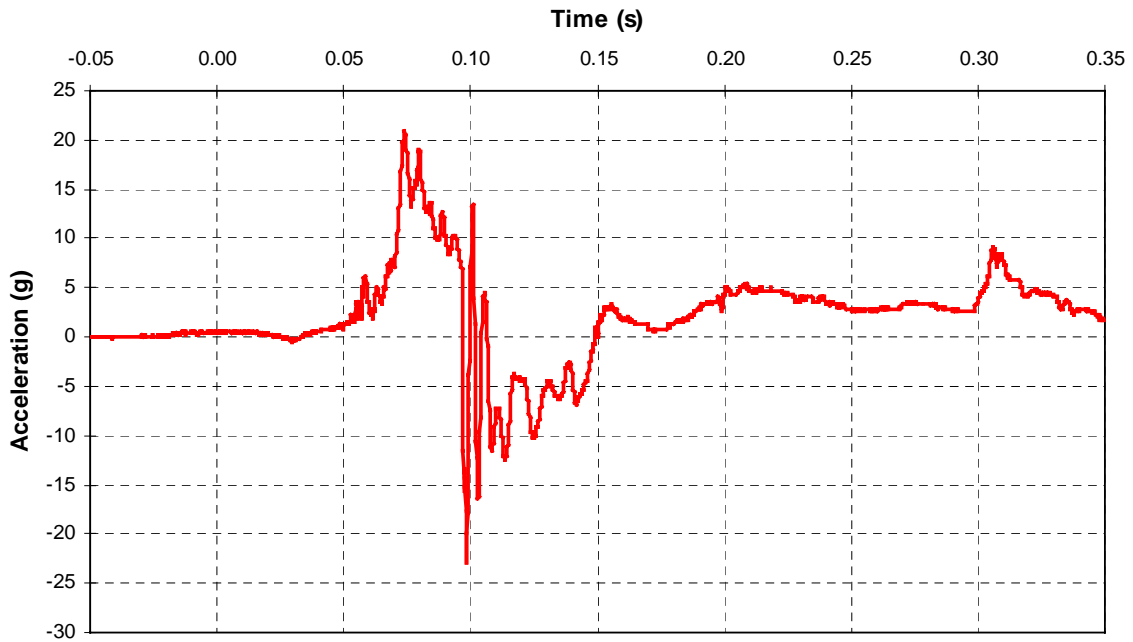
A- 6 CF00021 2000 Isuzu Trooper Head A-P Acceleration



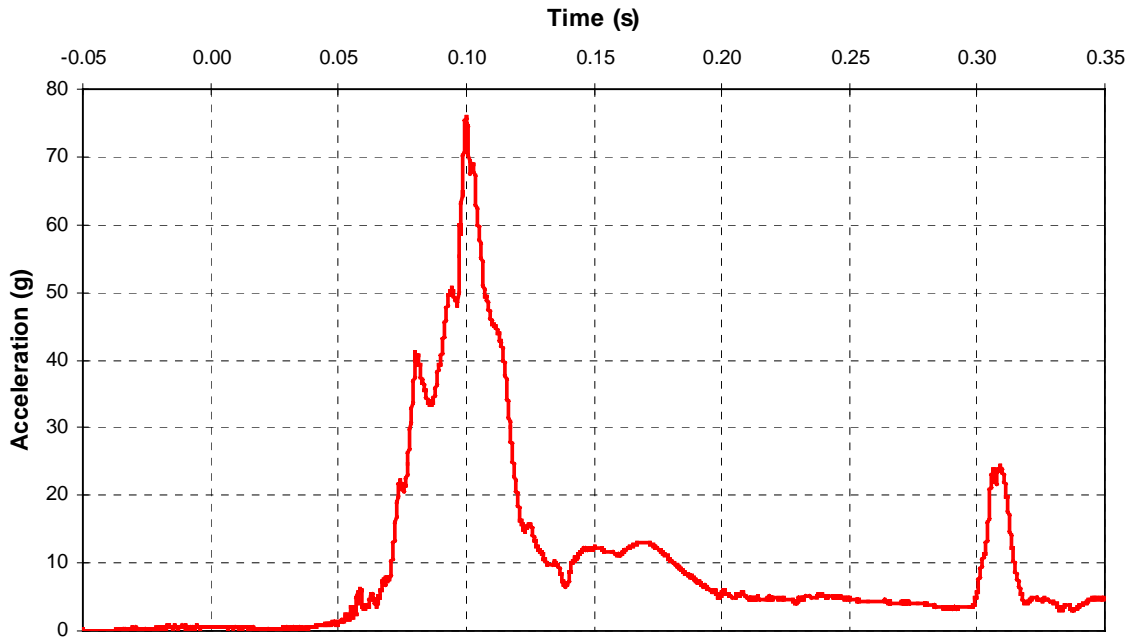
A- 7 CF00021 2000 Isuzu Trooper Head L-M Acceleration



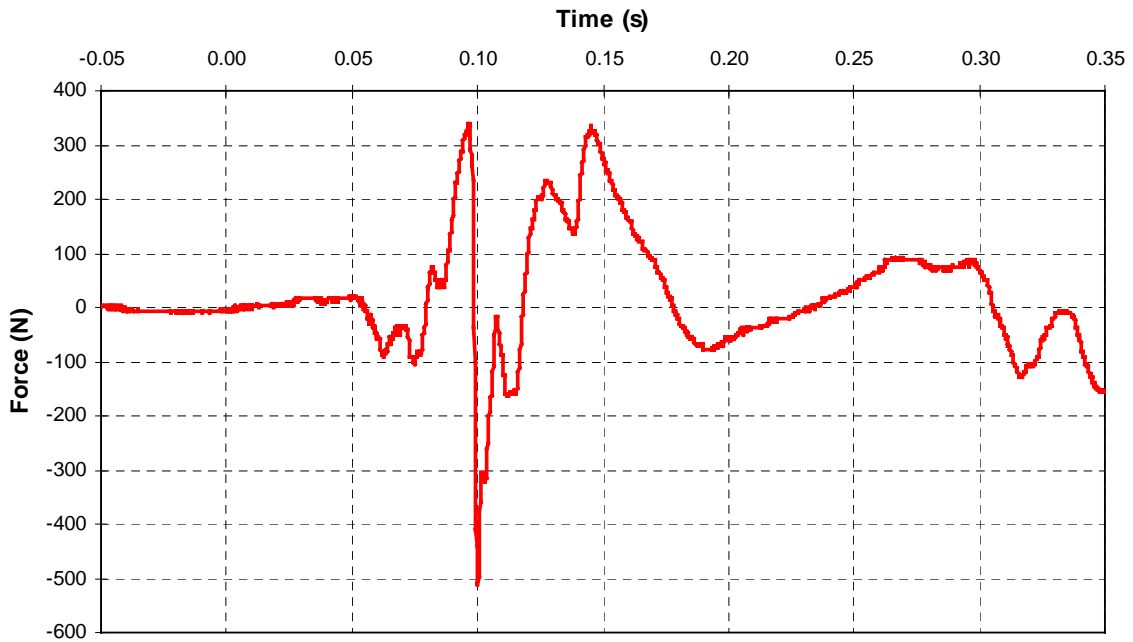
A- 8 CF00021 2000 Isuzu Trooper Head I-S Acceleration



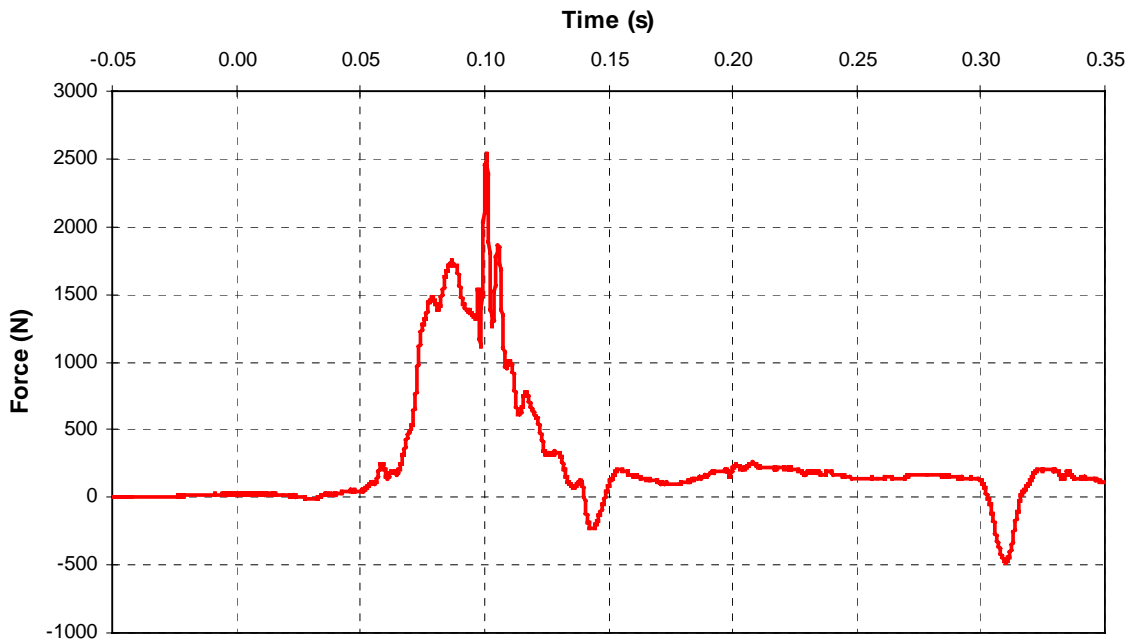
A- 9 CF00021 2000 Isuzu Trooper Head Vector Resultant Acceleration



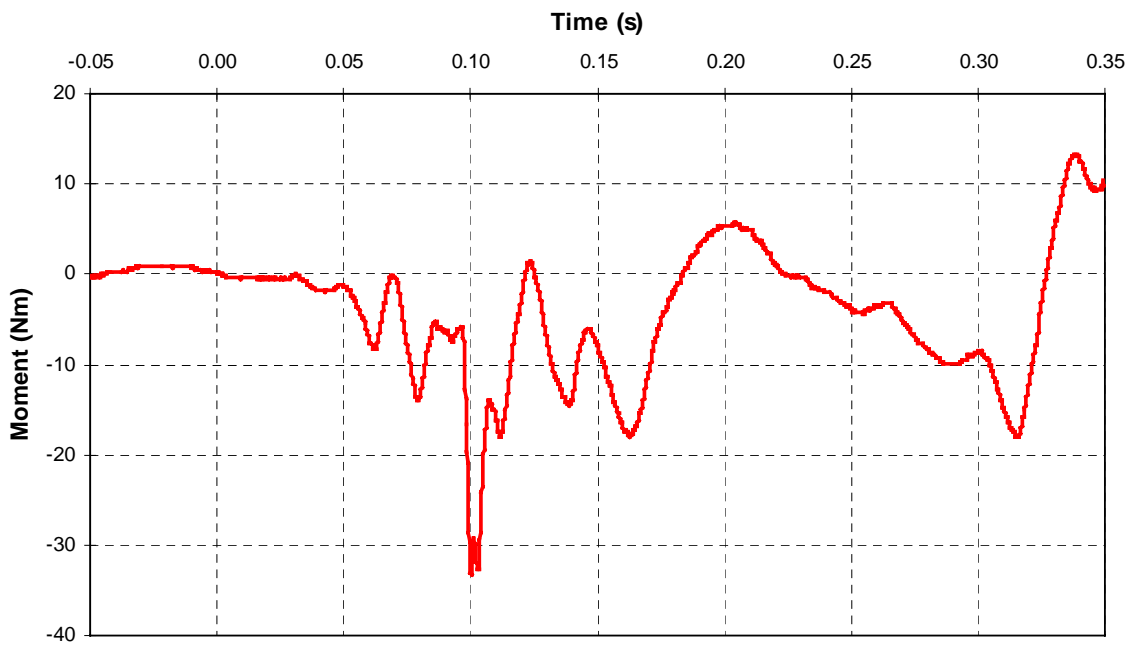
A- 10 CF00021 2000 Isuzu Trooper Neck A-P Shear Force



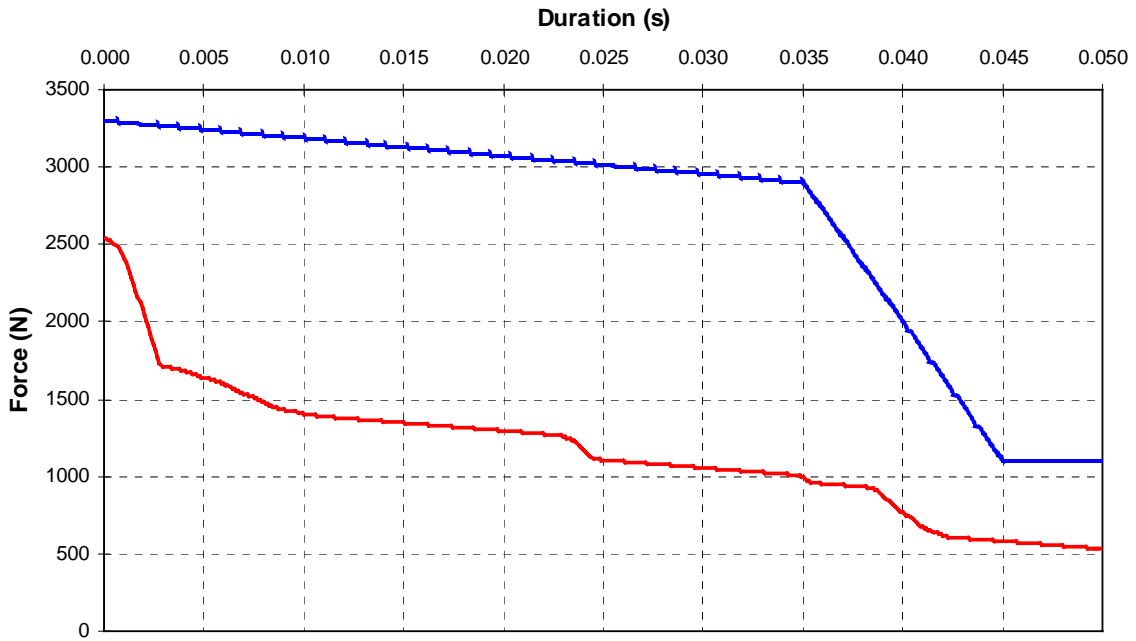
A- 11 CF00021 2000 Isuzu Trooper Neck Axial Force



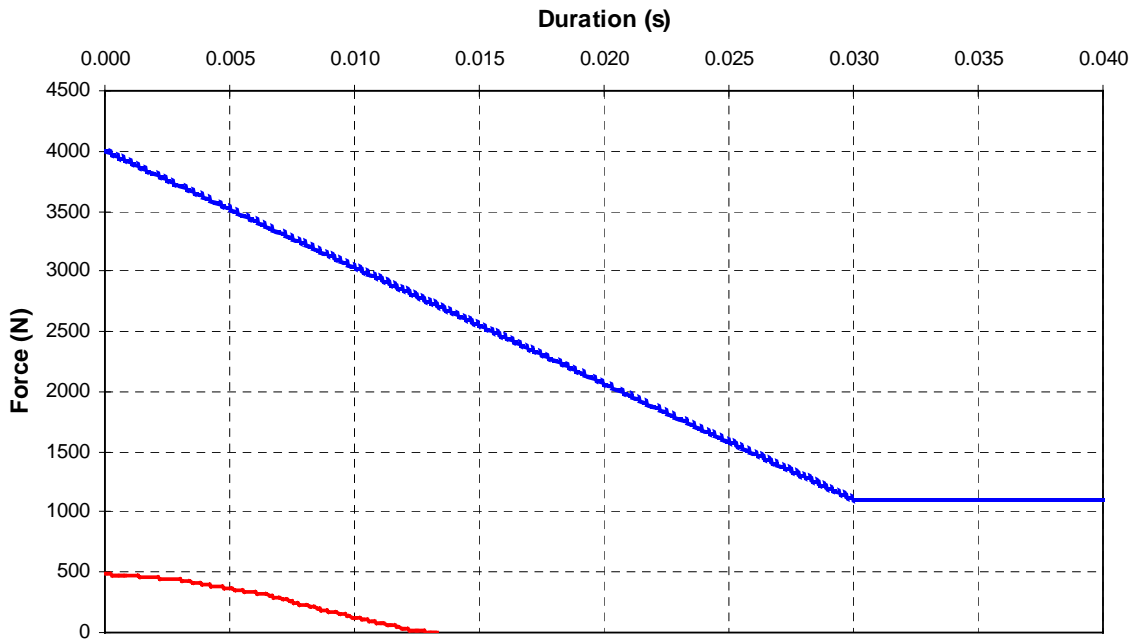
A- 12 CF00021 2000 Isuzu Trooper Neck Occipital A-P Moment



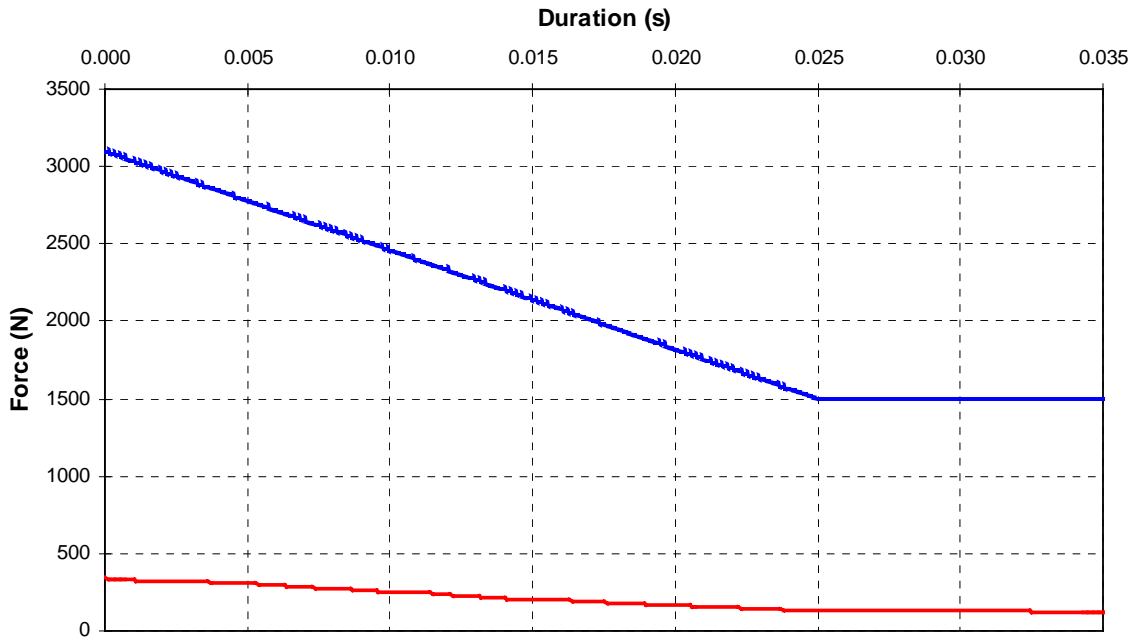
A- 13 CF00021 2000 Isuzu Trooper Neck Tension Analysis



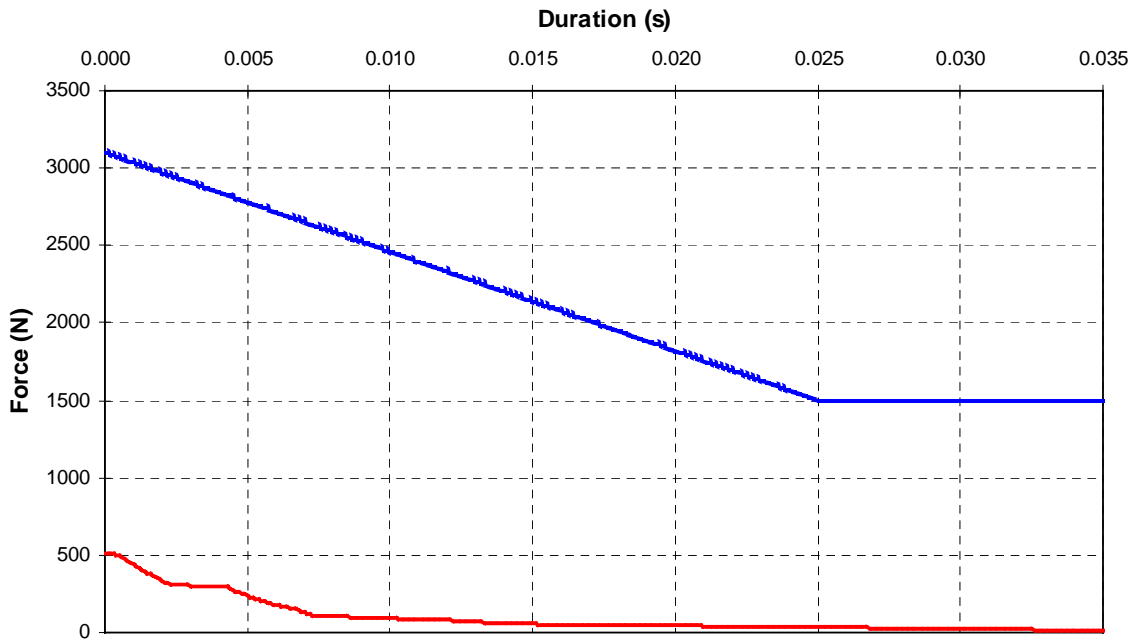
A- 14 CF00021 2000 Isuzu Trooper Neck Compression Analysis



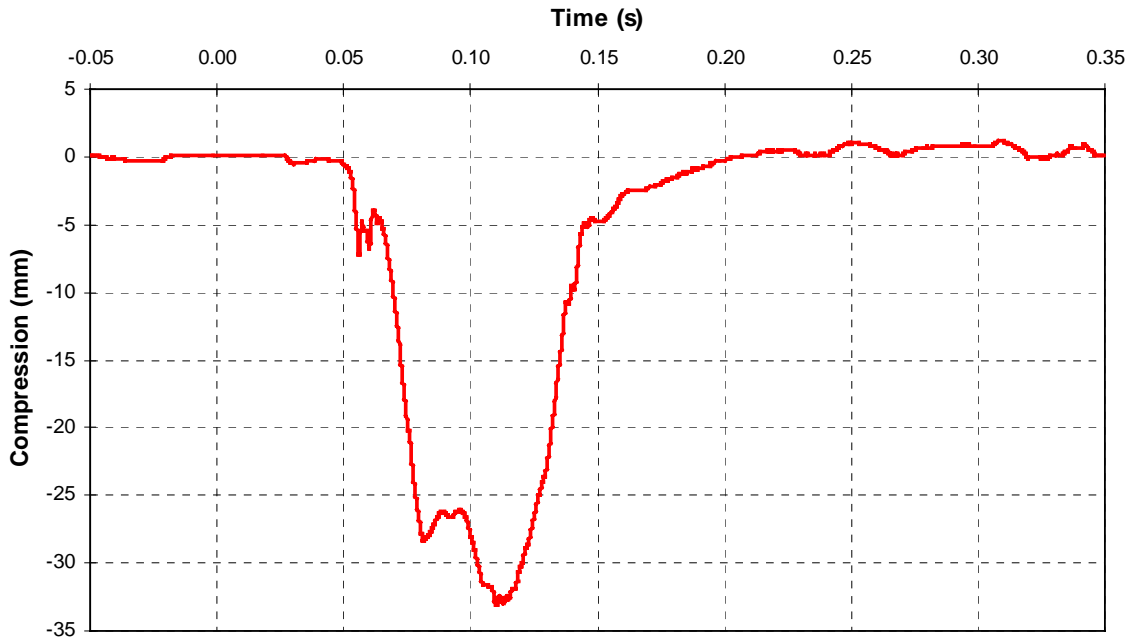
A- 15 CF00021 2000 Isuzu Trooper Neck A-P Shear (Positive) Analysis



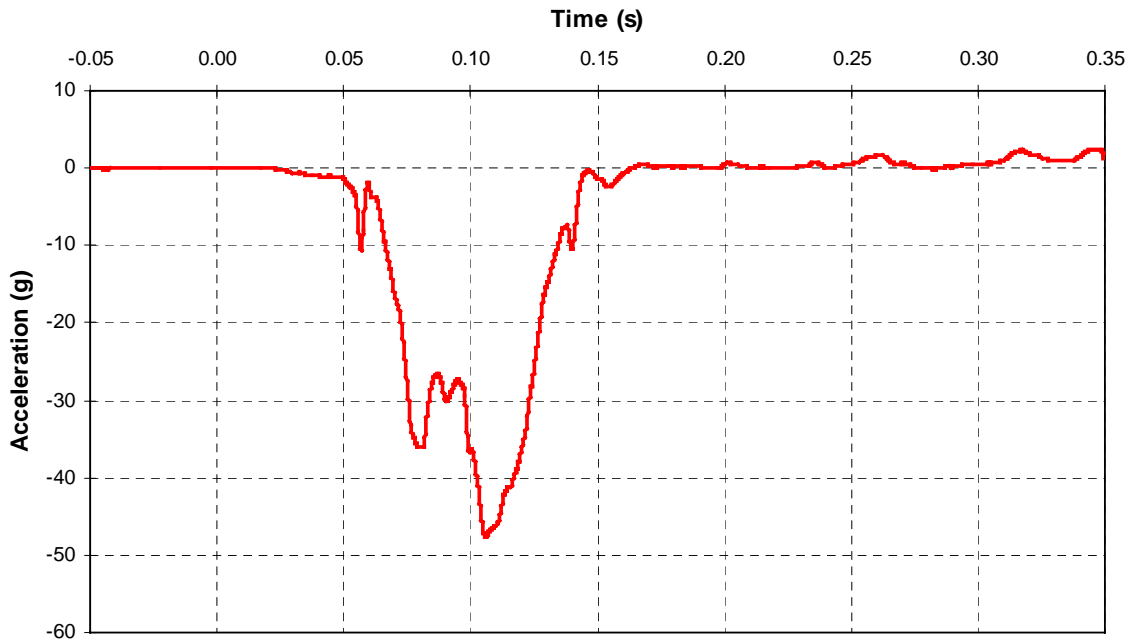
A- 16 CF00021 2000 Isuzu Trooper Neck A-P Shear (Negative) Analysis



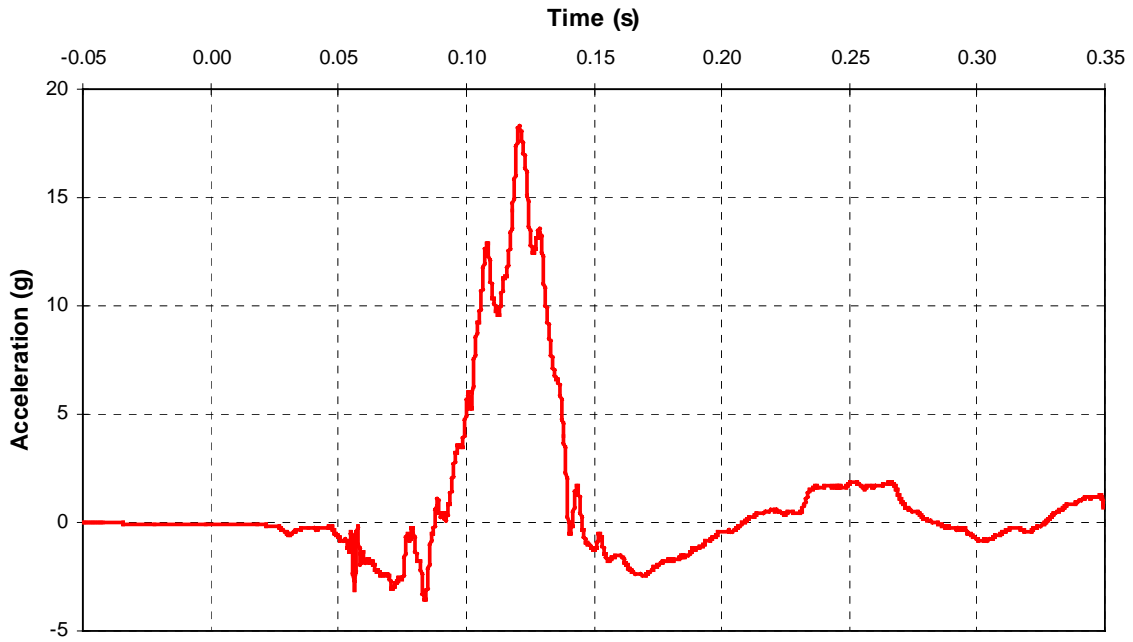
A- 17 CF00021 2000 Isuzu Trooper Chest Compression



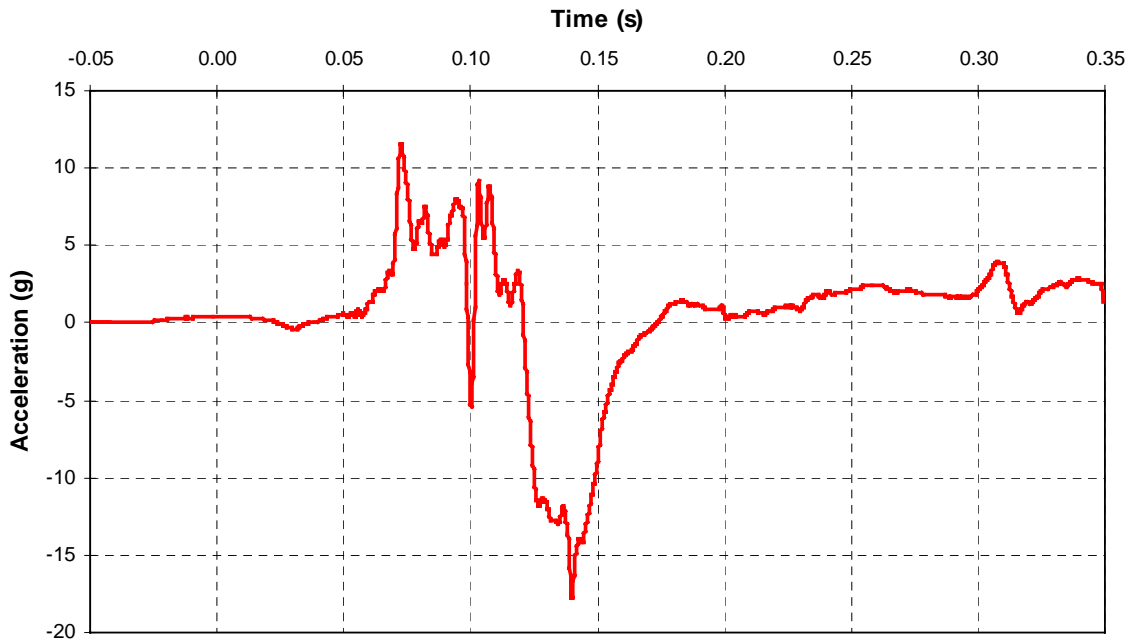
A- 18 CF00021 2000 Isuzu Trooper Chest A-P Acceleration



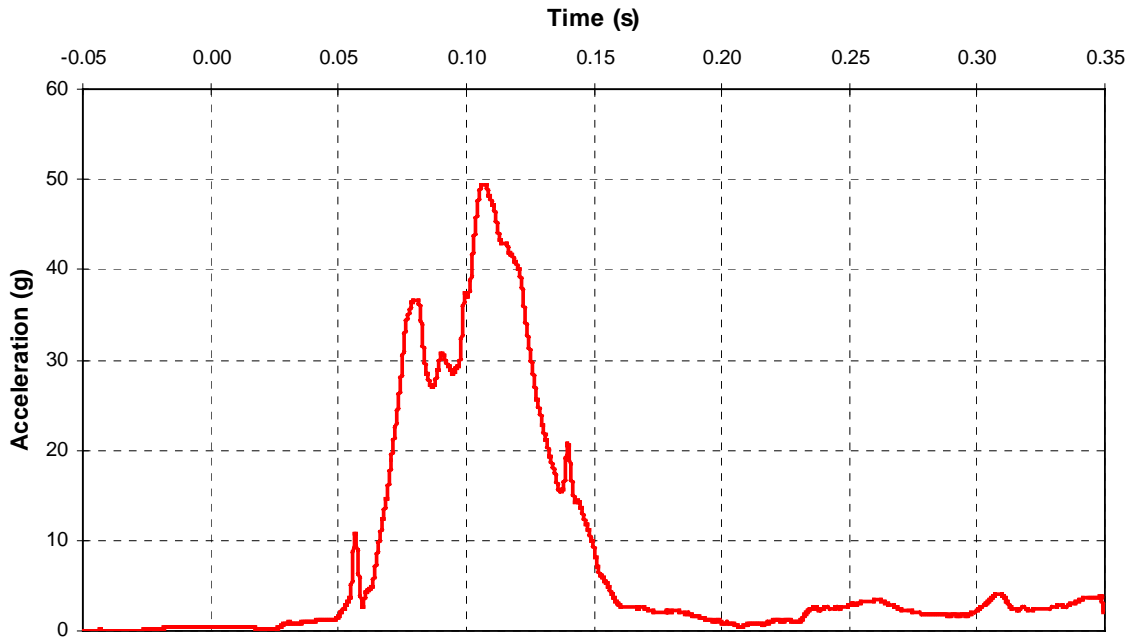
A- 19 CF00021 2000 Isuzu Trooper Chest L-M Acceleration



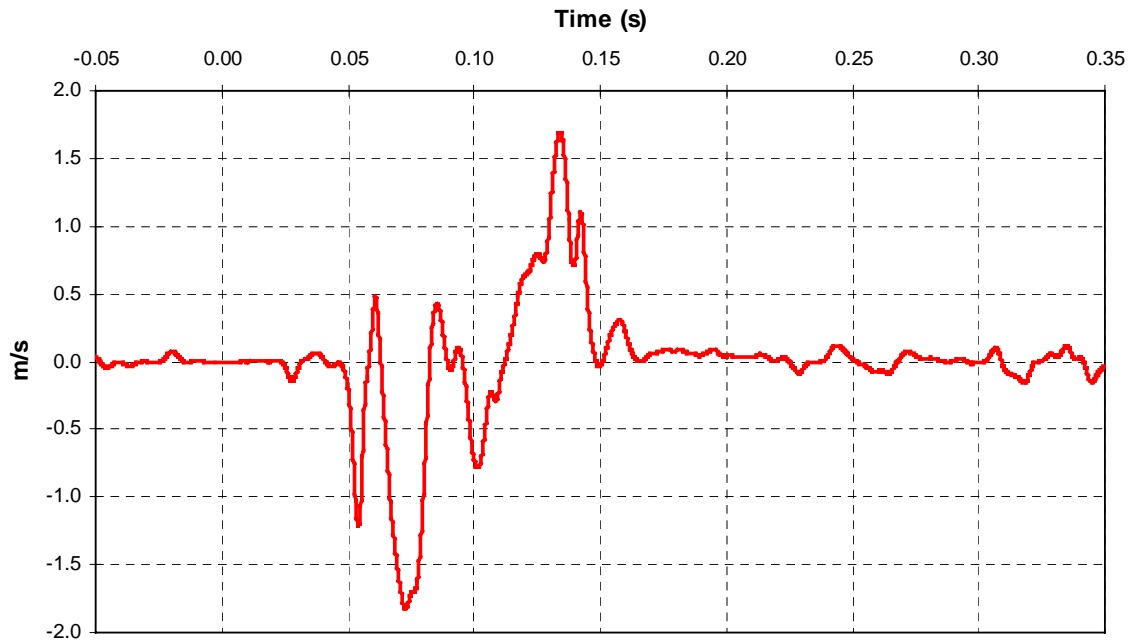
A- 20 CF00021 2000 Isuzu Trooper Chest I-S Acceleration



A- 21 CF00021 2000 Isuzu Trooper Chest Vector Resultant Acceleration

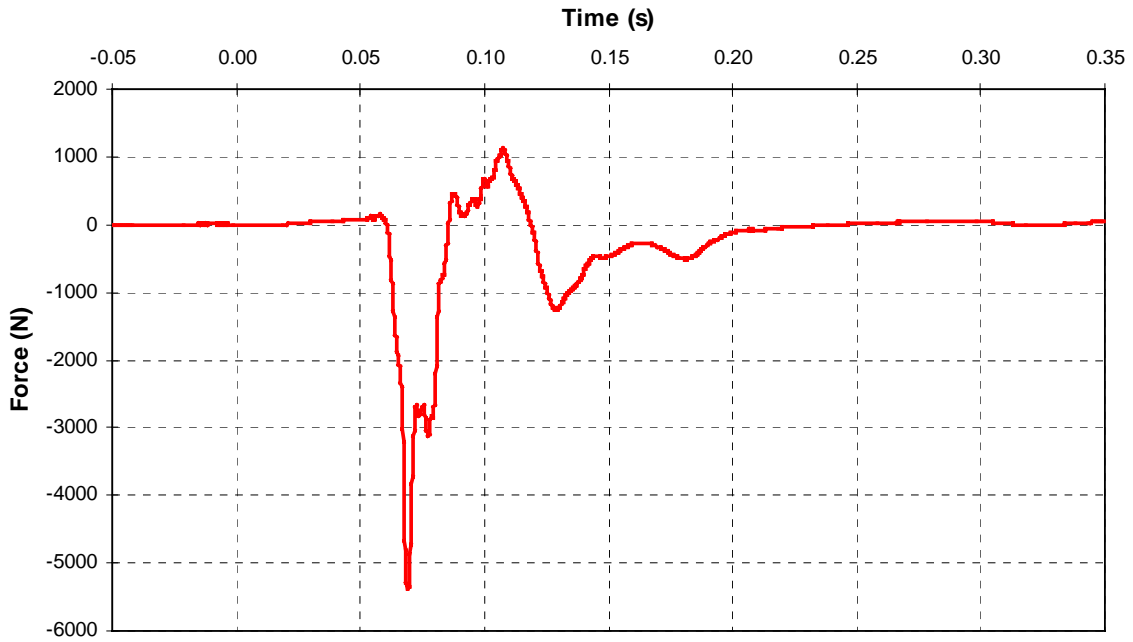


A- 22 CF00021 2000 Isuzu Trooper Sternum Deflection Rate

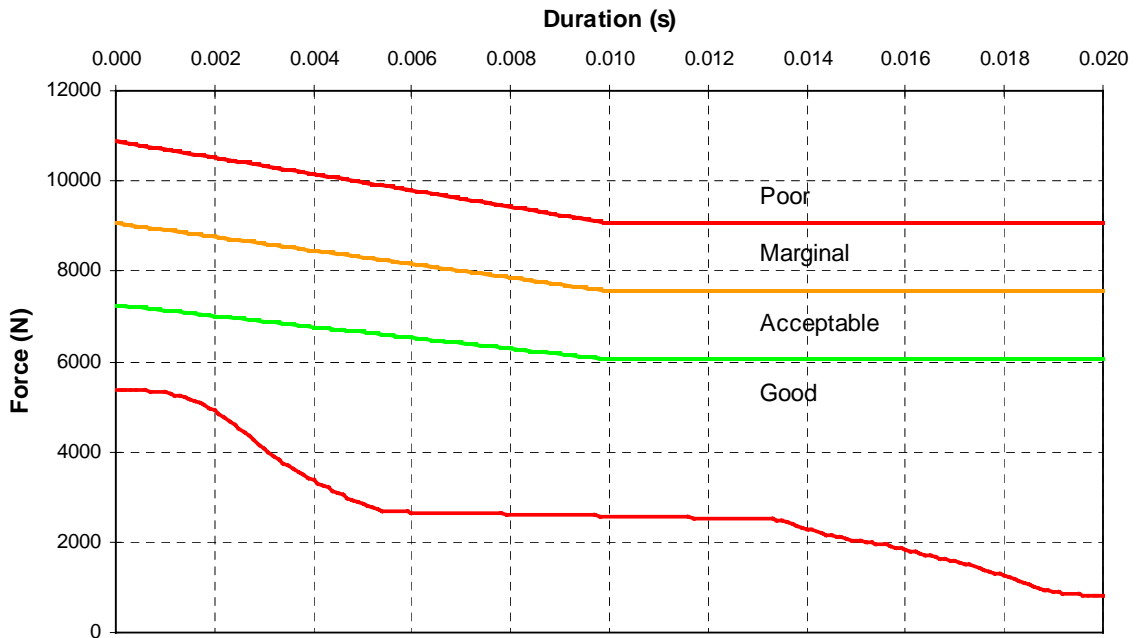


Sternum deflection rate is calculated from the sternum deflection filtered to CFC 60

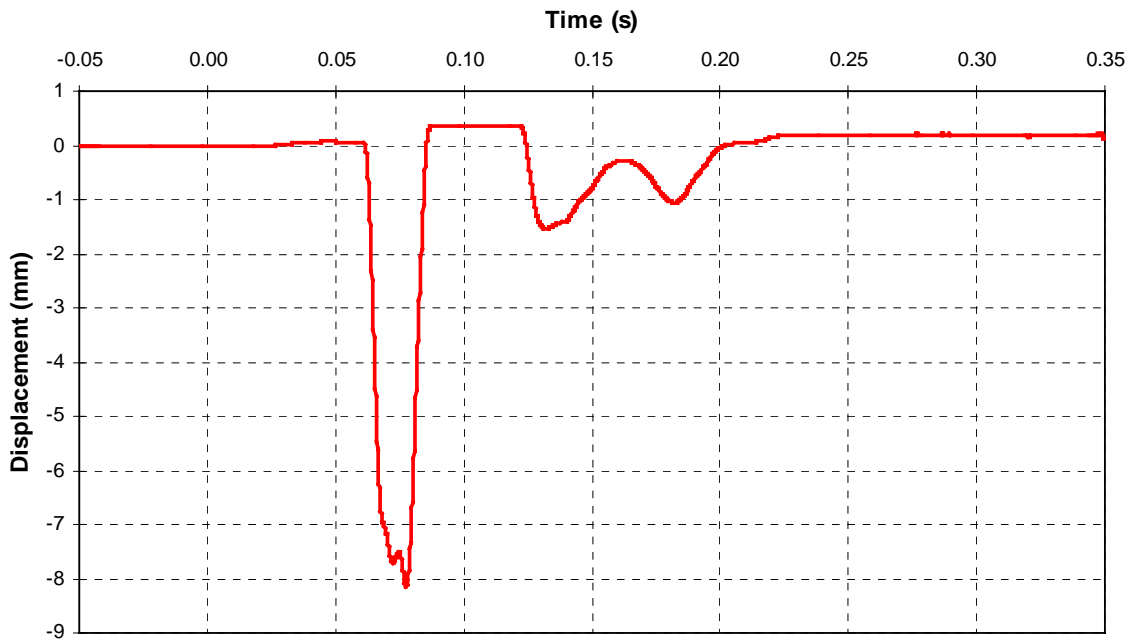
A- 23 CF00021 2000 Isuzu Trooper Left Femur Axial Force



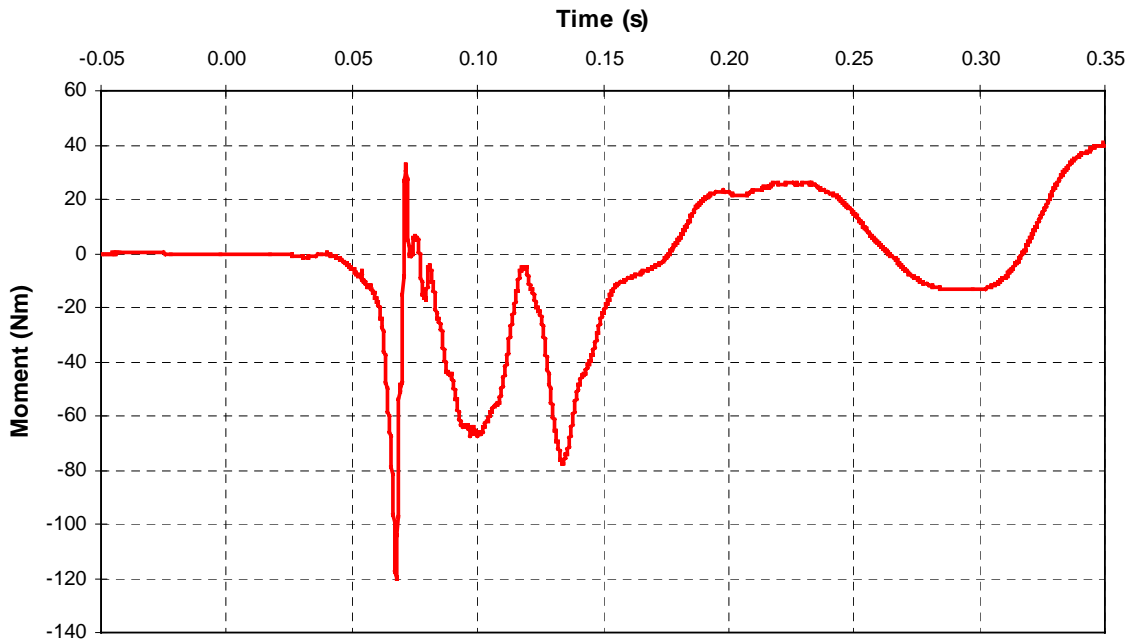
A- 24 CF00021 2000 Isuzu Trooper Left Femur Axial Force Analysis



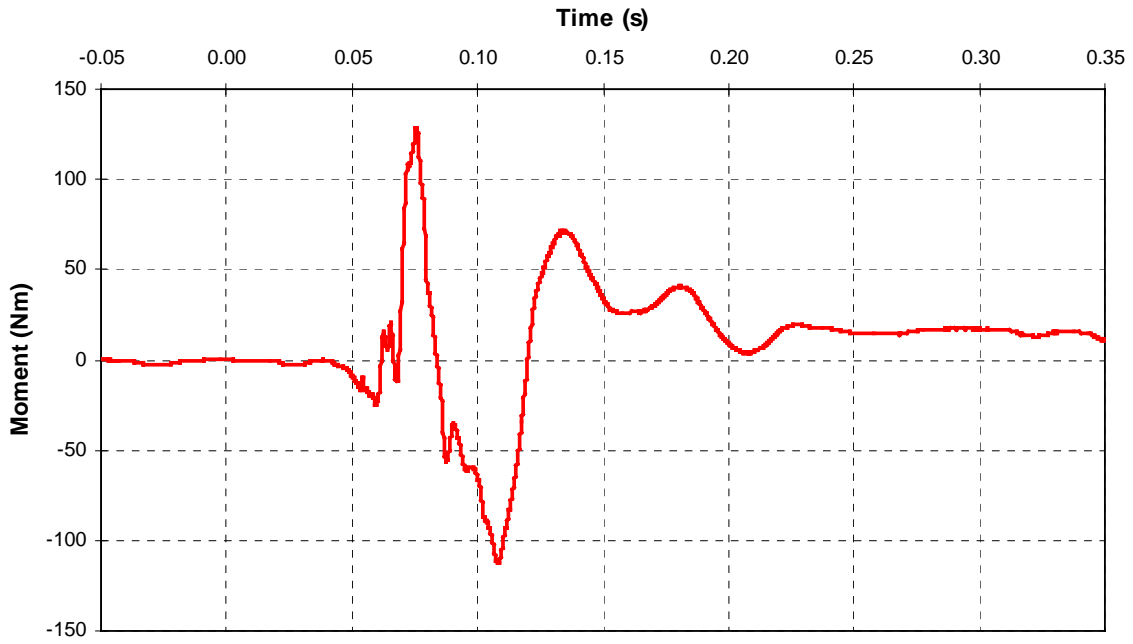
A- 25 CF00021 2000 Isuzu Trooper Left Tibia-Femur Displacement



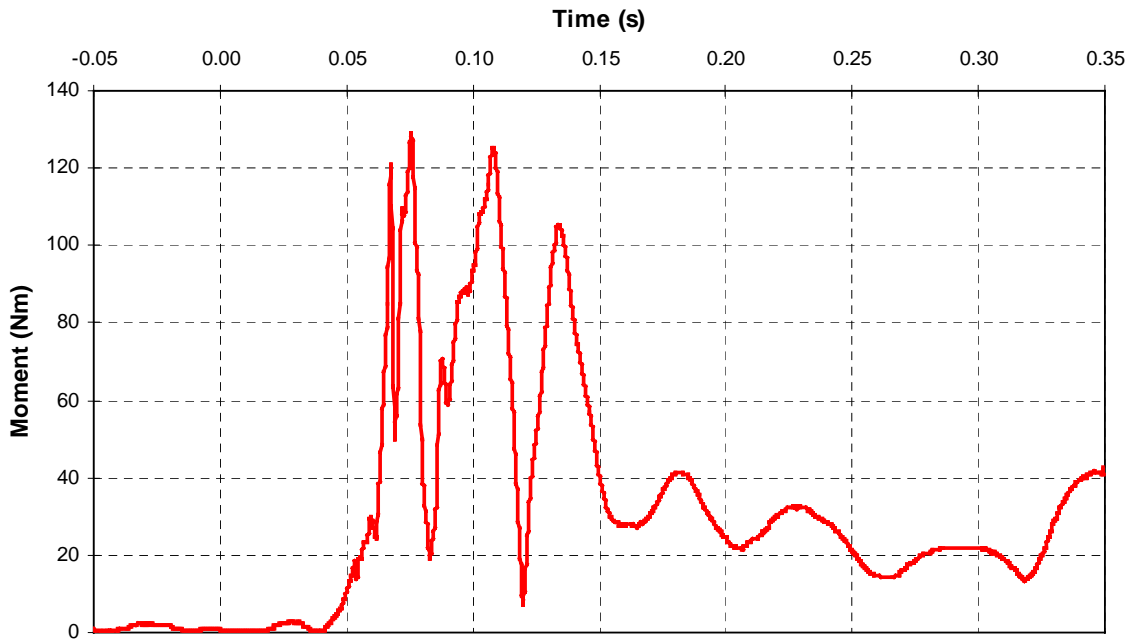
A- 26 CF00021 2000 Isuzu Trooper Left Upper Tibia L-M Moment



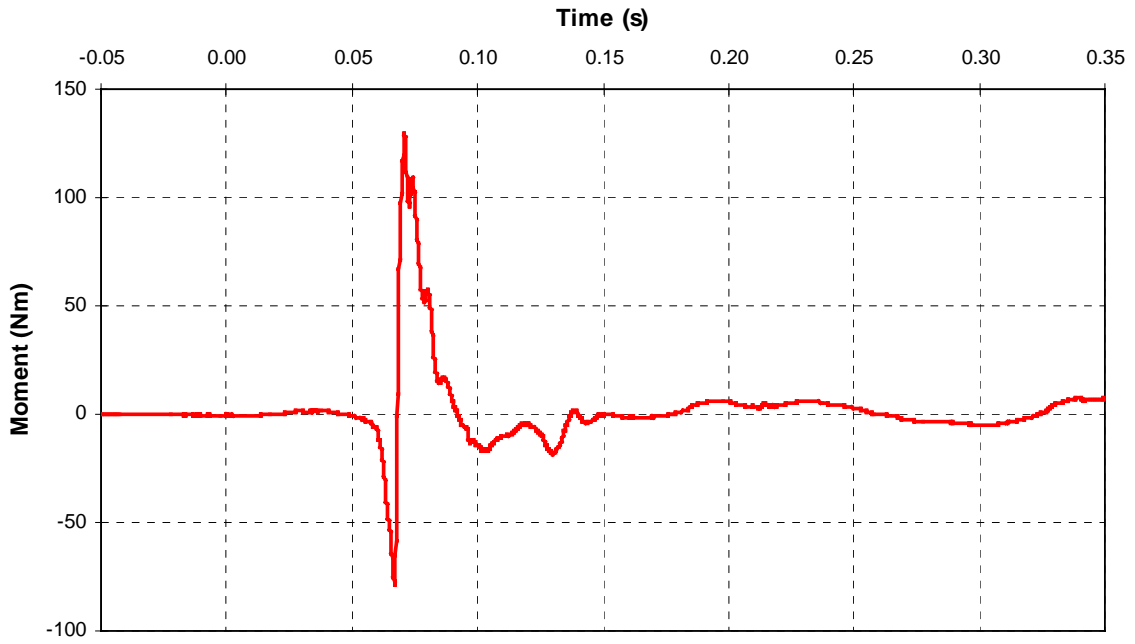
A- 27 CF00021 2000 Isuzu Trooper Left Upper Tibia A-P Moment



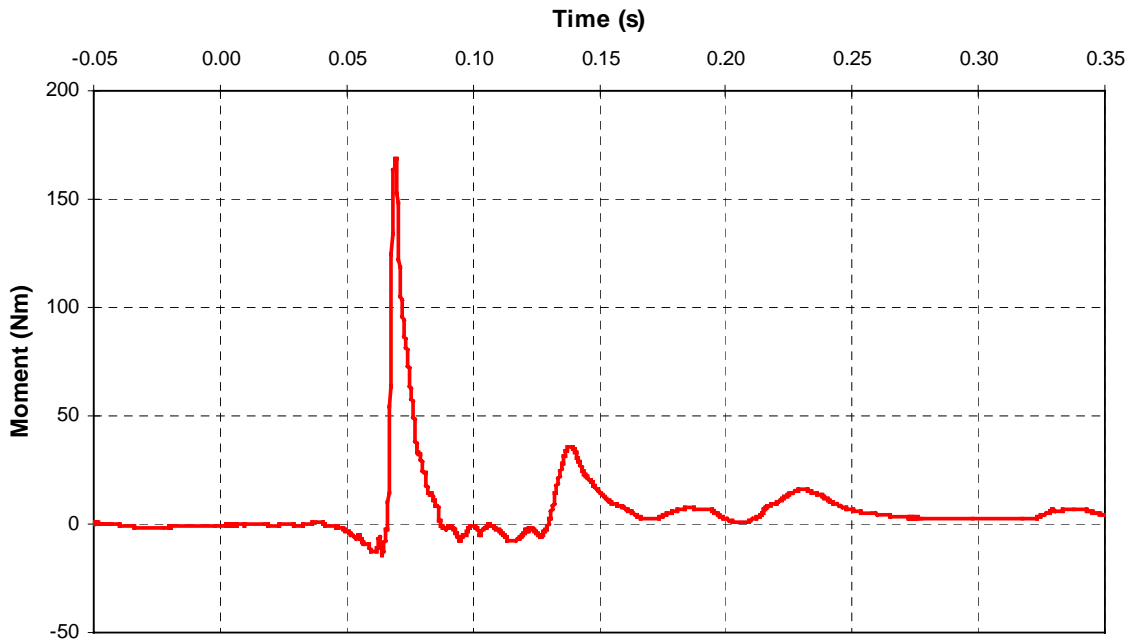
A- 28 CF00021 2000 Isuzu Trooper Left Upper Tibia Vector Resultant Moment



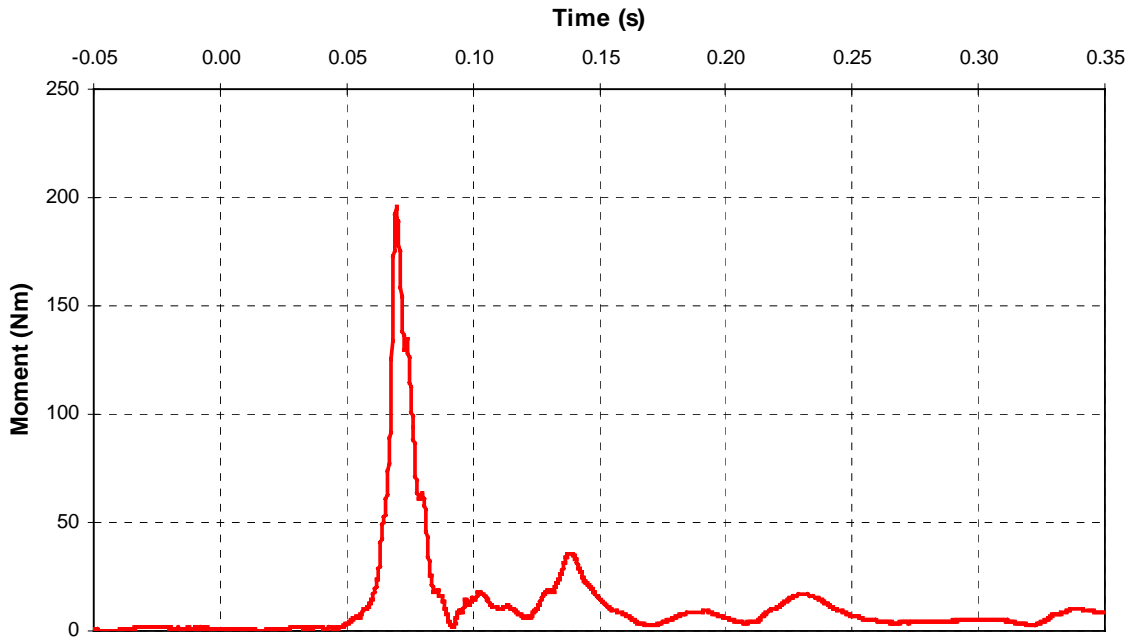
A- 29 CF00021 2000 Isuzu Trooper Left Lower Tibia L-M Moment



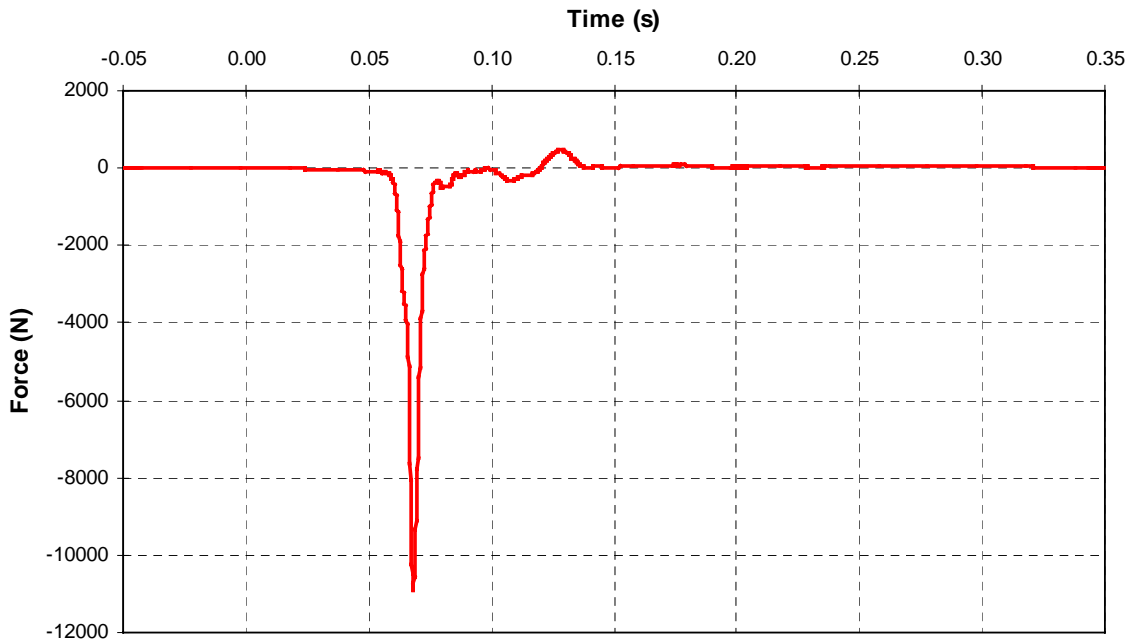
A- 30 CF00021 2000 Isuzu Trooper Left Lower Tibia A-P Moment



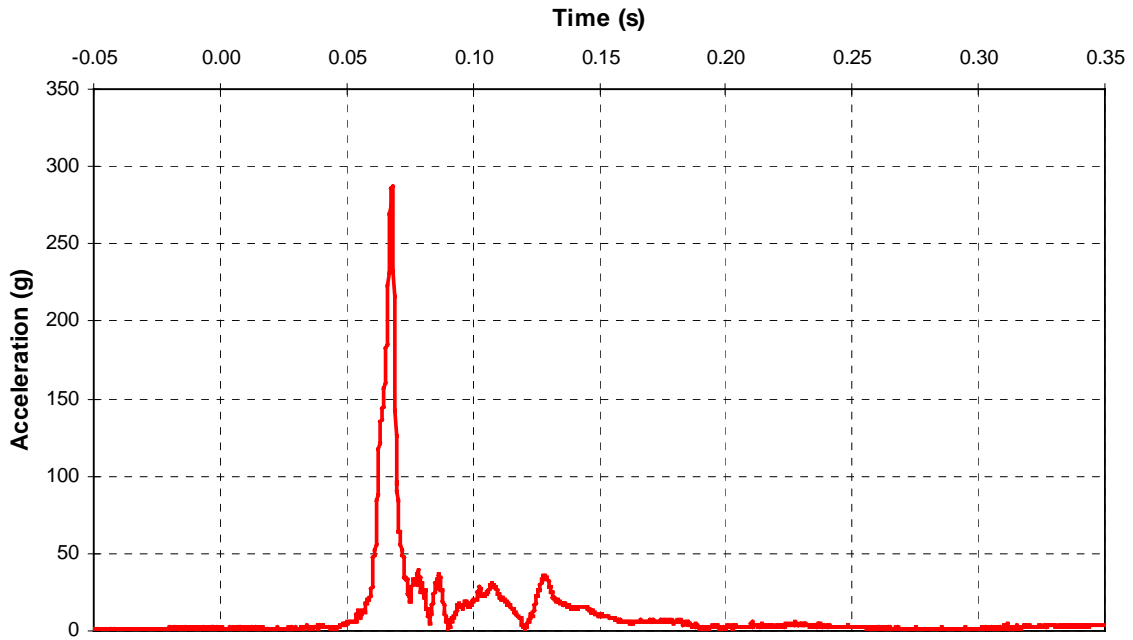
A- 31 CF00021 2000 Isuzu Trooper Left Lower Tibia Vector Resultant Moment



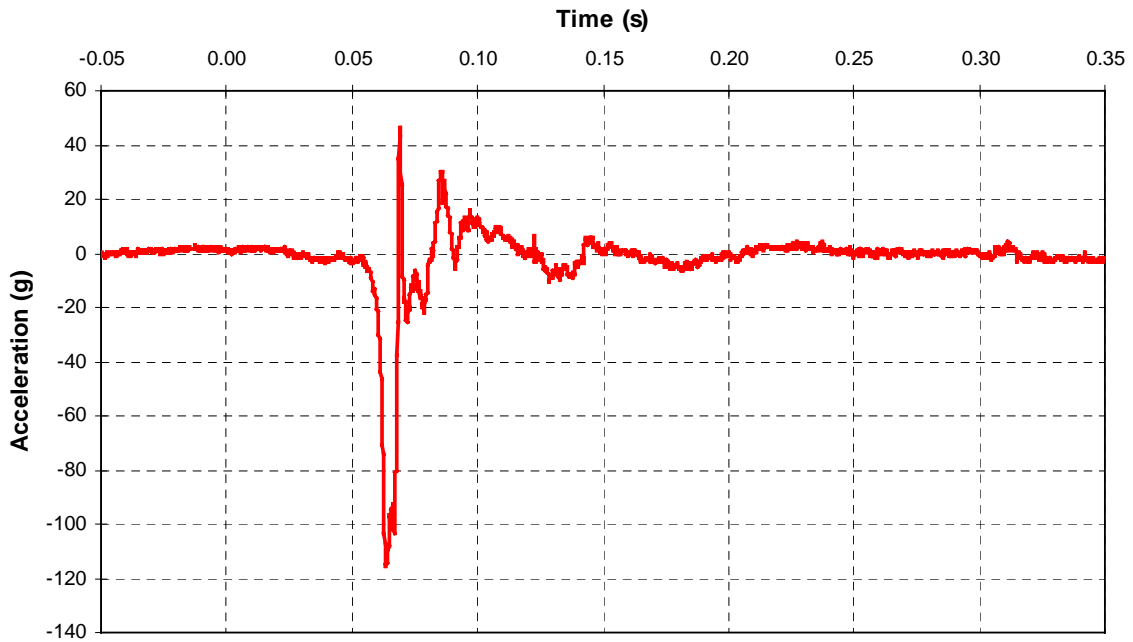
A- 32 CF00021 2000 Isuzu Trooper Left Lower Tibia Axial Force



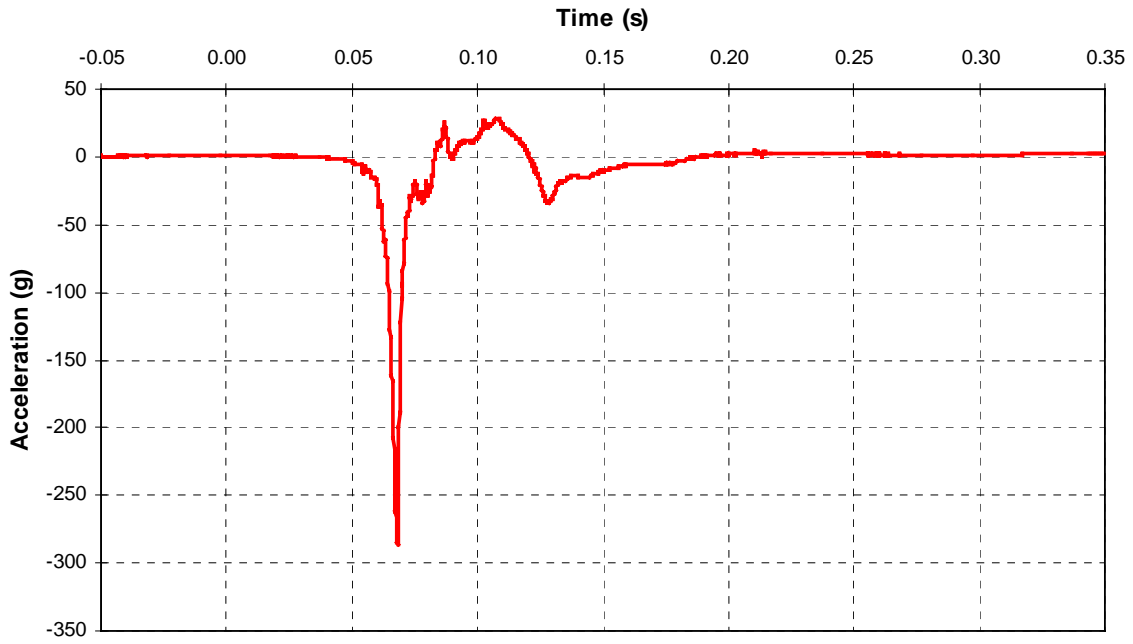
A- 33 CF00021 2000 Isuzu Trooper Left Foot Vector Resultant Acceleration



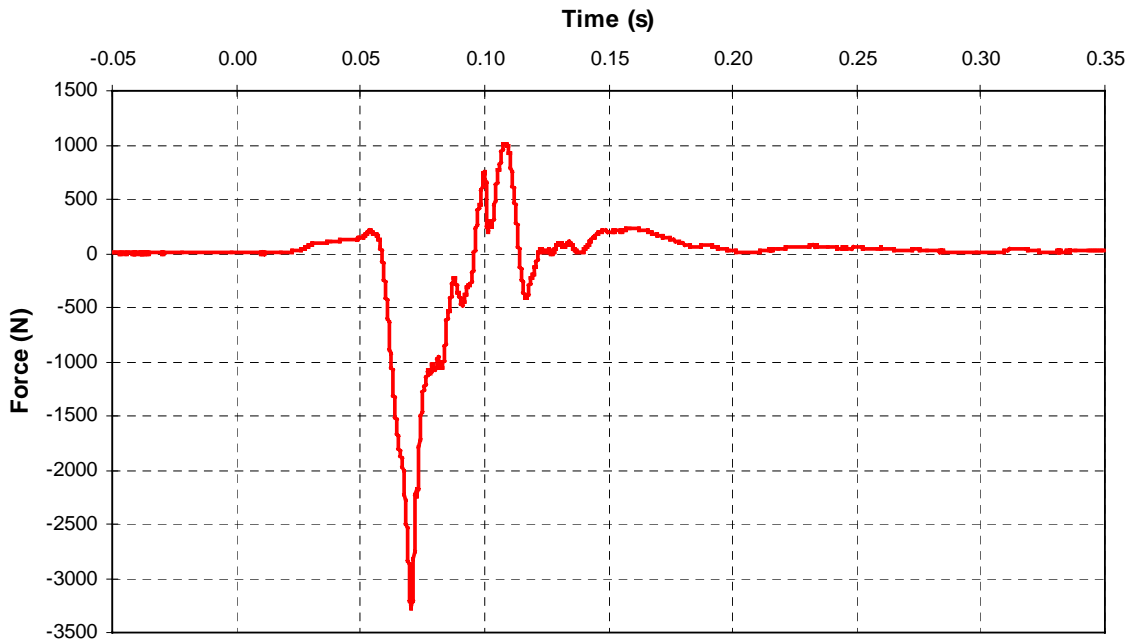
A- 34 CF00021 2000 Isuzu Trooper Left Foot A-P Acceleration



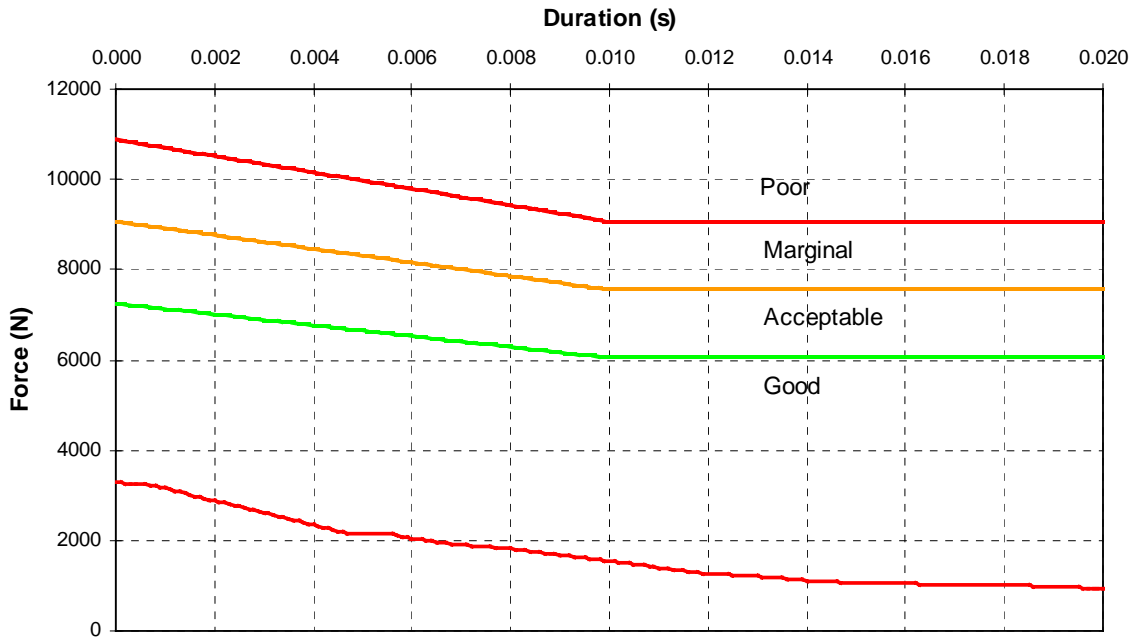
A- 35 CF00021 2000 Isuzu Trooper Left Foot I-S Acceleration



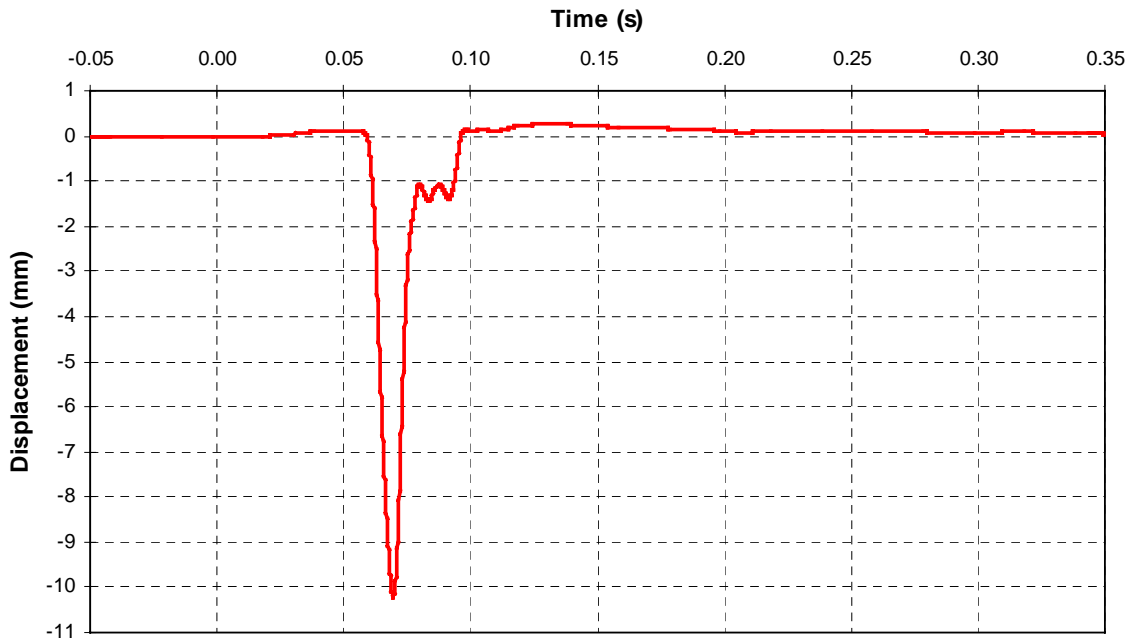
A- 36 CF00021 2000 Isuzu Trooper Right Femur Axial Force



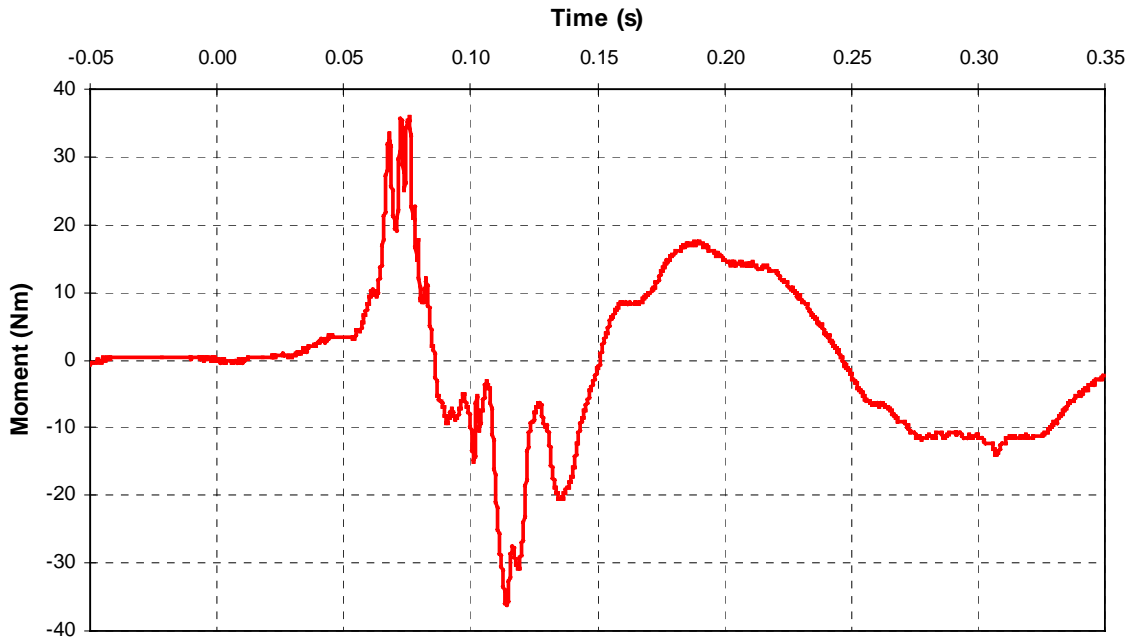
A- 37 CF00021 2000 Isuzu Trooper Right Femur Axial Force Analysis



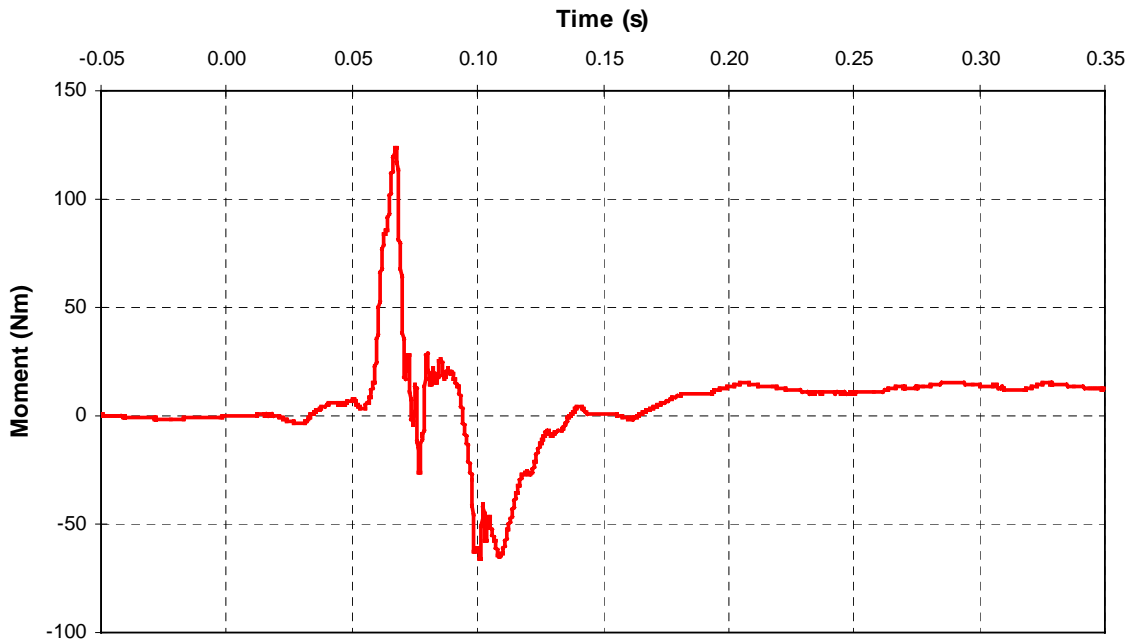
A- 38 CF00021 2000 Isuzu Trooper Right Tibia-Femur Displacement



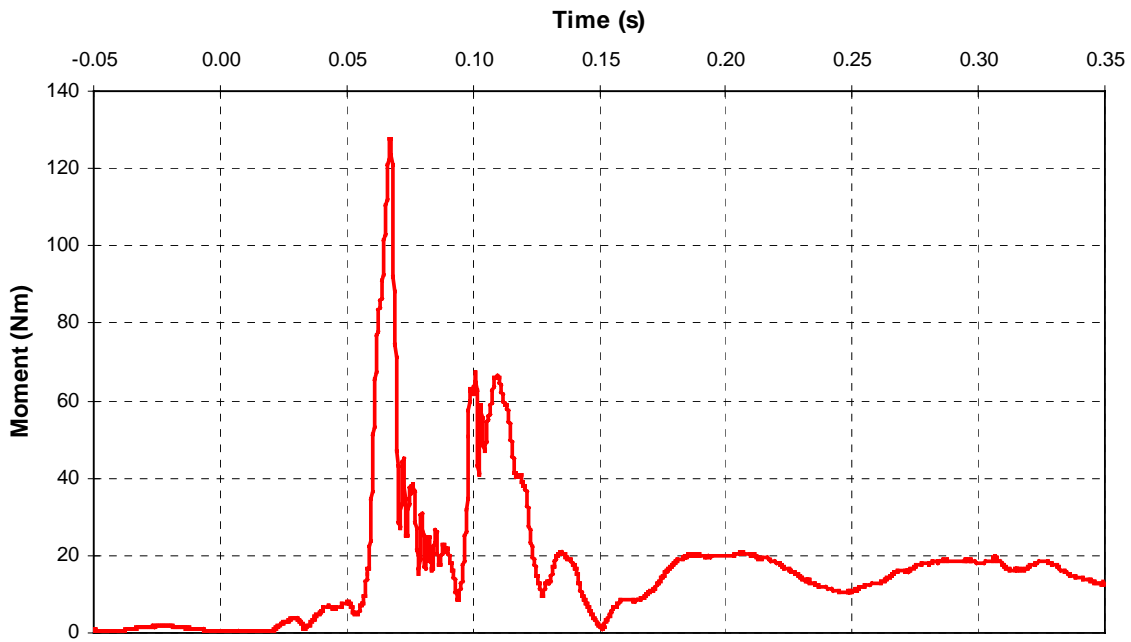
A- 39 CF00021 2000 Isuzu Trooper Right Upper Tibia L-M Moment



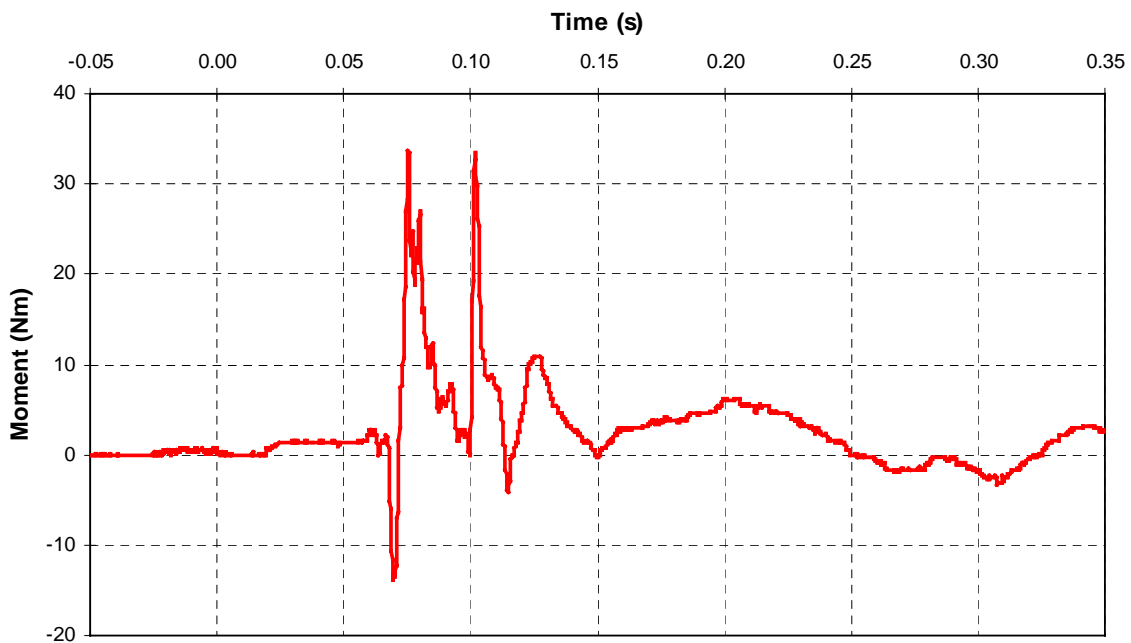
A- 40 CF00021 2000 Isuzu Trooper Right Upper Tibia A-P Moment



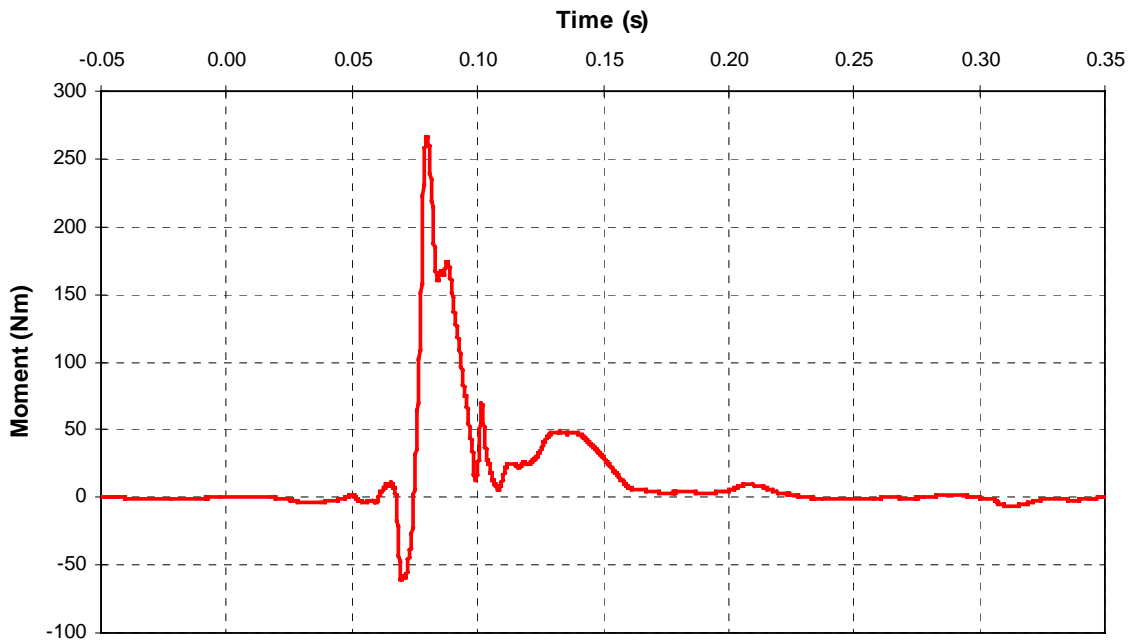
A- 41 CF00021 2000 Isuzu Trooper Right Upper Tibia Vector Resultant Moment



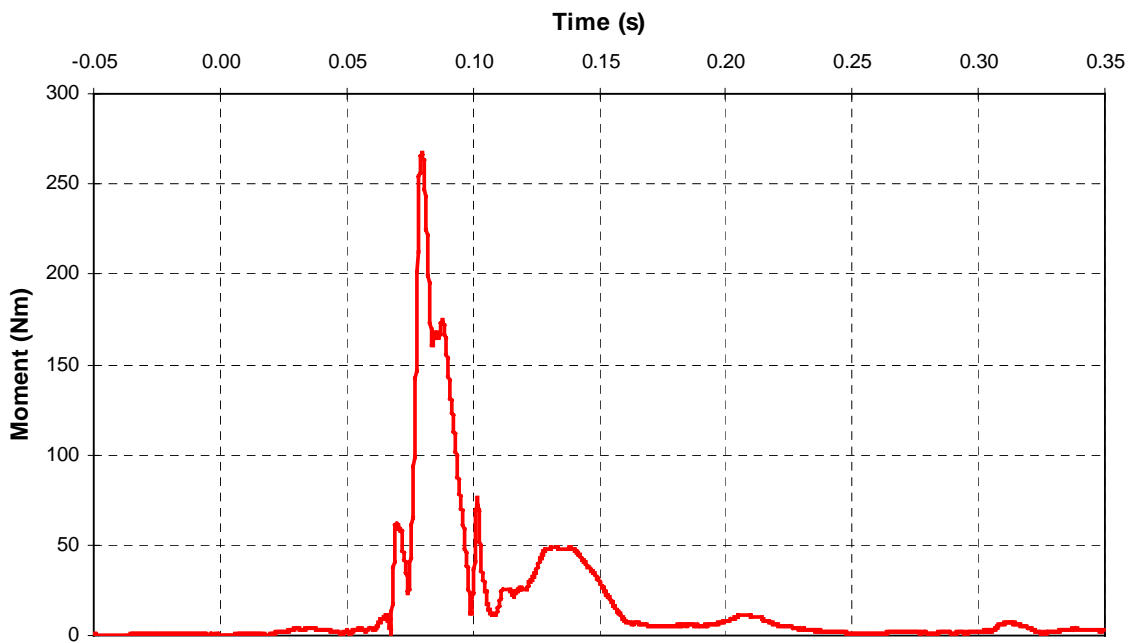
A- 42 CF00021 2000 Isuzu Trooper Right Lower Tibia L-M Moment



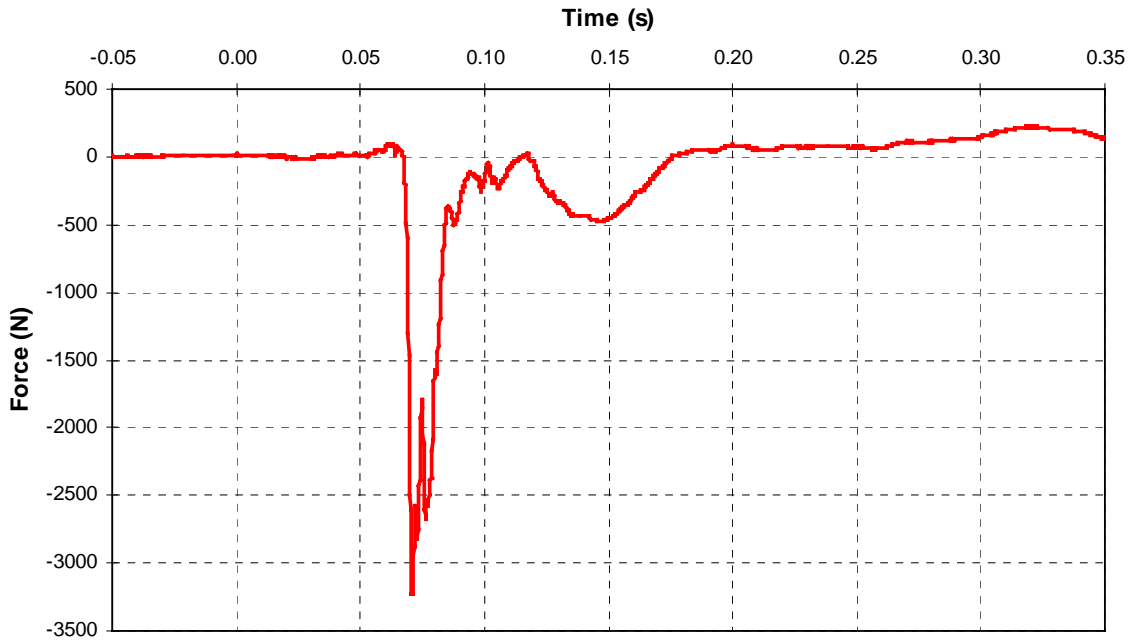
A- 43 CF00021 2000 Isuzu Trooper Right Lower Tibia A-P Moment



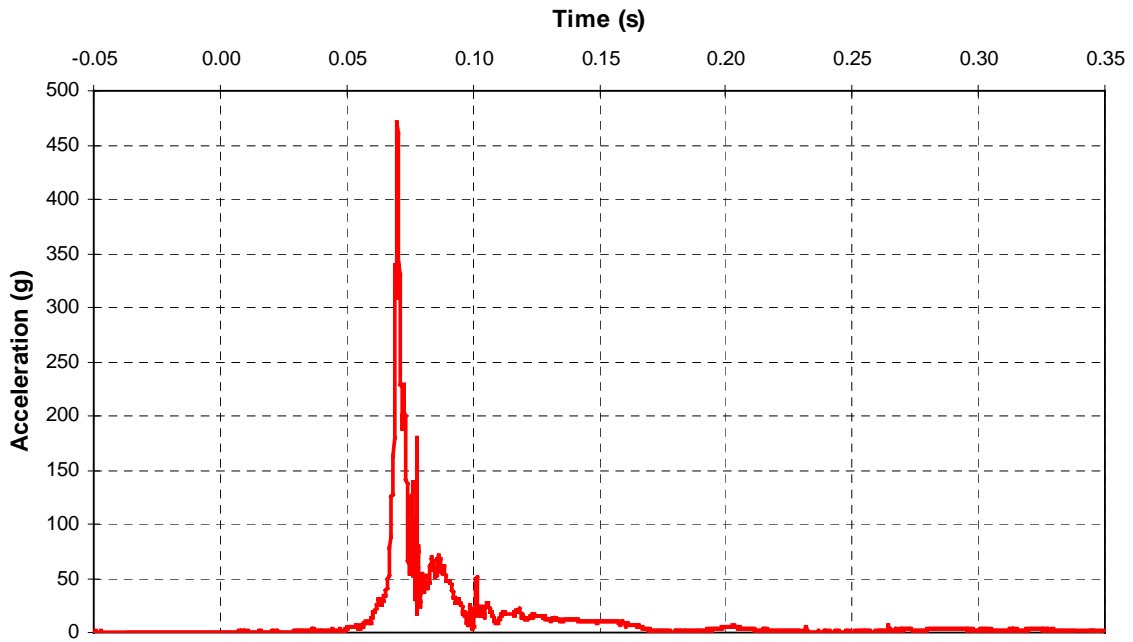
A- 44 CF00021 2000 Isuzu Trooper Right Lower Tibia Vector Resultant Moment



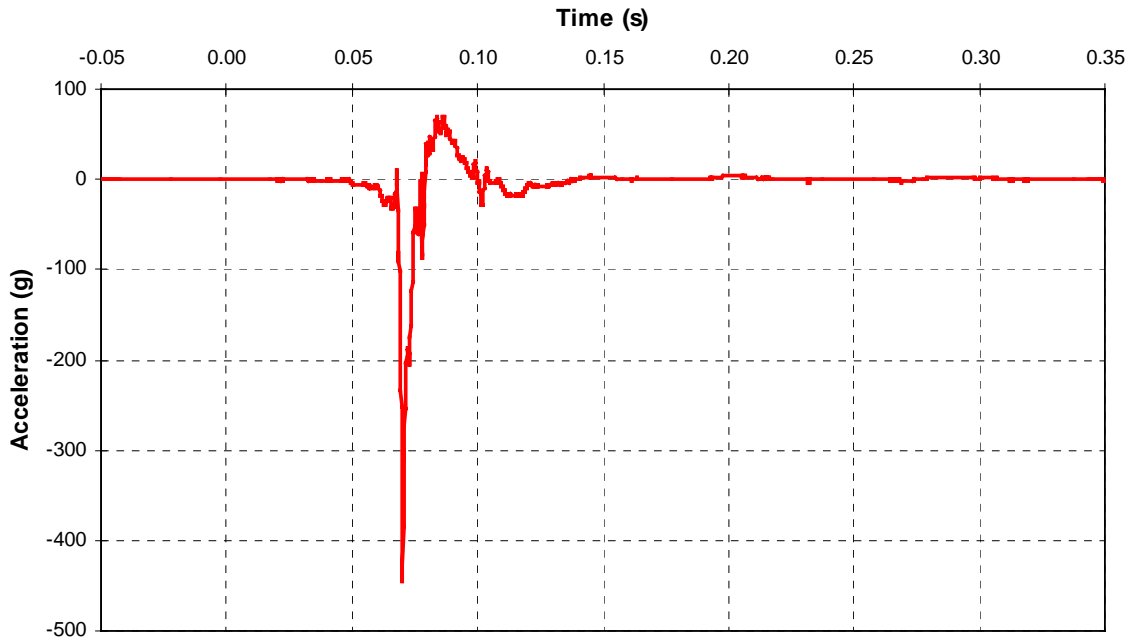
A- 45 CF00021 2000 Isuzu Trooper Right Lower Tibia Axial Force



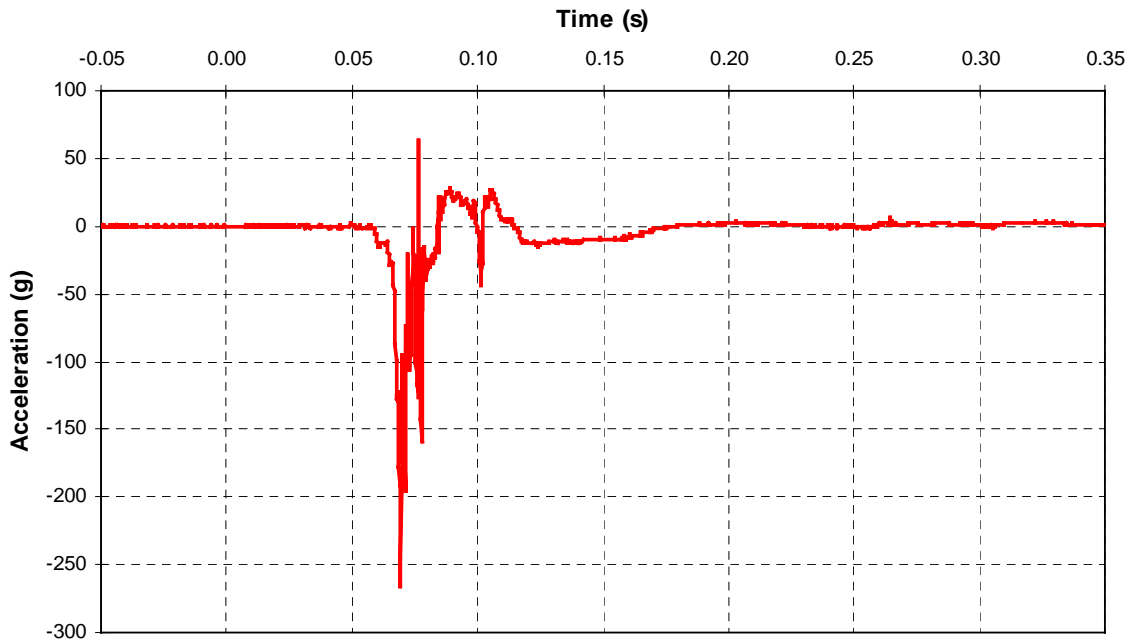
A- 46 CF00021 2000 Isuzu Trooper Right Foot Vector Resultant Acceleration



A- 47 CF00021 2000 Isuzu Trooper Right Foot A-P Acceleration



A- 48 CF00021 2000 Isuzu Trooper Right Foot I-S Acceleration



ISUZU

Go farther.

YEAR MODEL DESCRIPTION

'00 TROOPER

S, 4-WHEEL DRIVE, 4-SPEED AUTOMATIC

EXTERIOR COLOR
DRAGON GREEN MICA

INTERIOR COLOR
BEIGE

MODEL
L44

ENGINE TYPE
3.5 DOHC

STANDARD EQUIPMENT

MECHANICAL/FUNCTIONAL

215-HP 3.5L DOHC V6 24V Aluminum Engine
 4-Speed Automatic Transmission w/Overdrive
 Winter Start & Power Auto. Trans. Modes
TORQUE -ON- DEMAND 4WD SYSTEM
 Limited Slip Differential
 Power 4-Wheel Ventilated Disc Brakes
 Variable-Assist Power Steering
 Stainless Steel Exhaust
 5000 LB Towing Capacity
 22.5-Gallon Fuel Tank
 Complimentary Tank of Fuel

SAFETY

Remote Keyless Entry w/Anti-Theft
 Driver & Front Passenger Air Bags
 4-Wheel Anti-Lock Brakes
 Side-Guard Door Beams
 Collapsible Steering Column
 Height Adjustable Front Seat Belts
 Child-Safe Rear Door Locks
 Rear Seat Auto Retract Belts for Childseat
 Cornering Lamps
 Underbody Skid Plates
 Front & Rear Intermittent Wiper/Washers
 Rear Window Defogger w/Auto-Shutoff
 Power Outside Mirrors with Defoggers
 Roadside Assistance 60 Mo./60,000 Mi.

INTERIOR

Automatic Climate Control (CFC Free)
 Power Windows & Door Locks
 6-Speaker AM/FM Stereo/Cassette
 Reclining Front Bucket Seats
 60/40 Split Folding/Reclining Rear Seat
 Tilt Steering Column & Cruise Control
 Center Console Storage/Fr-Rr Cup Holders
 Illuminated Dr/Pass Visor Vanity Mirrors
 Dome, Cargo, & Door Courtesy Lamps
 Floor Mats/Cargo Cover & Convenience Net
 Remote Hood & Fuel Door Releases
 Front and Cargo Door Pockets
 Beige Patterned Velour Upholstery

EXTERIOR

70/30 Split Rear Doors
 2-Tone Paint w/Painted Overfenders
 P245/70R16 Mud/Snow Steel Belted Radials
 Integrated Front & Rear Splash Guards
 Four 16" Alloy Wheels w/Locks
 Full Size Spare Tire w/Painted Hard Cover

WARRANTY

30 Mo./50,000 Mi. Limited Basic
 10 YR./120,000 Mi. LIMITED POWERTRAIN*
 72 Mo./100,000 Mi. Limited Anti-Corrosion
 SEE WARRANTY INFORMATION BOOK FOR DETAILS



MANUFACTURER'S

SUGGESTED RETAIL PRICE \$28,950

OPTIONAL INSTALLED EQUIPMENT

Cargo Mat 92
 50 STATE CERTIFIED EMISSIONS N/C

Destination and Handling 495

TOTAL VEHICLE PRICE \$29,537

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

CITY MPG

15

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

16 and 22 mpg on the highway



2000 TROOPER, 3494 CC ENGINE, 6 CYL., DOHC 24V, MULTI-POINT FUEL INJECTION, 4-SPEED AUTOMATIC TRANSMISSION, CATALYST

Estimated Annual Fuel Cost \$1,125

HIGHWAY MPG

19

FOR COMPARISON SHOPPING, all vehicles classified as SPECIAL PURPOSE have been issued mileage ratings ranging from

12 and 25 mpg in the city and between

15 and 29 mpg on the highway

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
 U.S./CANADIAN PARTS CONTENT: 15%
 MAJOR SOURCES OF FOREIGN PARTS CONTENT:
 JAPAN 80%

FOR THIS VEHICLE
 FINAL ASSEMBLY POINT: FUJISAWA, JAPAN
 COUNTRY OF ORIGIN:
 ENGINE PARTS: JAPAN
 TRANSMISSION: FRANCE

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

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.

Manufacturer's Suggested Retail Price Includes Manufacturer's Recommended Pre-delivery Inspection.

This Label Has Been Affixed To This Vehicle Pursuant To The Requirements of U.S.C. 15, #1231 Et Seq. Which Prohibits Its Removal Or Alteration Prior To Delivery To The Ultimate Purchaser.

* Excludes Fleet or Commercial Vehicles. Transferable to Immediate Family Only.

DEALER NAME:
 FIRST TEAM ISUZU OF CHESP
 1800 GREENBRIAR PKY
 CHESAPEAKE VA 23320

PORT/PLANT: BALTIMORE
 633

SHIPPED TO: (SAME UNLESS OTHERWISE INDICATED)

VIN NO. JACDJ58X1Y7J07010

DEALER CODE: 44011
 049531

