

Insurance Institute for Highway Safety Crashworthiness Evaluation

Crash Test Report 2001 Isuzu Trooper (CF00024)

Vehicle identification number: JACDJ58X017J00085
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: 2,021kg

Vehicle specifications (measured):

- Front bumper to firewall: 113 cm
- Curb weight: 1,990 kg
- Test weight: 2,126 kg (49% front, 51% rear)
- Overall width: 184 cm

Nominal test parameters:

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

Crash test date:

- September 22, 2000

Figure 1
Pre-crash and Post-crash Side Views — 2001 Isuzu Trooper



Summary

A 2001 Isuzu Trooper was crash tested on September 22, 2000 into a fixed deformable barrier at 40.0 mi/h (64.3 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 3-4 cm. Resultant intrusion in the driver footwell measured 20 cm at the footrest and 21 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.

Within 8 minutes after the crash, 1.6 ounces of Stoddard solvent was collected that had leaked from a rubber fuel hose that is routed between the transmission housing and the firewall to the right of the vehicle centerline. (The leak had slowed to occasional drips by 5 minutes after the crash.) However, when the vehicle was later rotated onto its right side for postcrash underbody photography, the solvent leaked freely from the same location. The leak came from a tear in the hose as it was apparently pinched between the firewall and a rib on the aluminum transmission housing during the crash.

The driver dummy was restrained by a three-point lap/shoulder belt and an airbag. During the crash, 19 cm of webbing spooled off the retractor. The deploying airbag contacted the dummy's 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 and neck contacted the tilting steering wheel rim through the airbag. After rebounding from the steering wheel, the head moved rearward and upward, contacting the head restraint. After the crash, the upper end of the steering column had moved upward 20 cm and forward 3 cm.

The maximum resultant head acceleration from the steering wheel rim contact was 75 g. The maximum left upper tibia L-M moment was -153 Nm, the maximum left lower tibia resultant moment was 186 Nm, and the maximum left tibia axial force was -11.5 kN, resulting in an upper tibia index of 0.98 and a lower tibia index of 0.97. The maximum resultant left foot acceleration was 330 g. The maximum right tibia axial force was -6.5 kN, and the maximum right lower tibia A-P moment was 338 Nm, significantly contributing to the right lower tibia index of 1.54. The maximum resultant right foot acceleration was 372 g.

Test Conditions

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.

The vehicle was equipped with brackets added to protect fuel lines and hoses routed along the right side of the transmission housing (see Figure 5). These brackets were retrofitted onto certain Troopers as part of a safety-related recall announced by Isuzu in September 2000 to minimize the possibility of fuel leakage in high-speed crashes.

Vehicle acceleration measurements were made by a triaxial arrangement of accelerometers mounted on the vehicle's longitudinal centerline and 39 cm behind its center of gravity (179 cm behind the front axle). The vehicle speed recorded just prior to impact was 40.0 mi/h (64.3 km/h), and the actual overlap was 40 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 left rear door required additional effort but no tools to open, and the right front and right rear doors opened with ease.

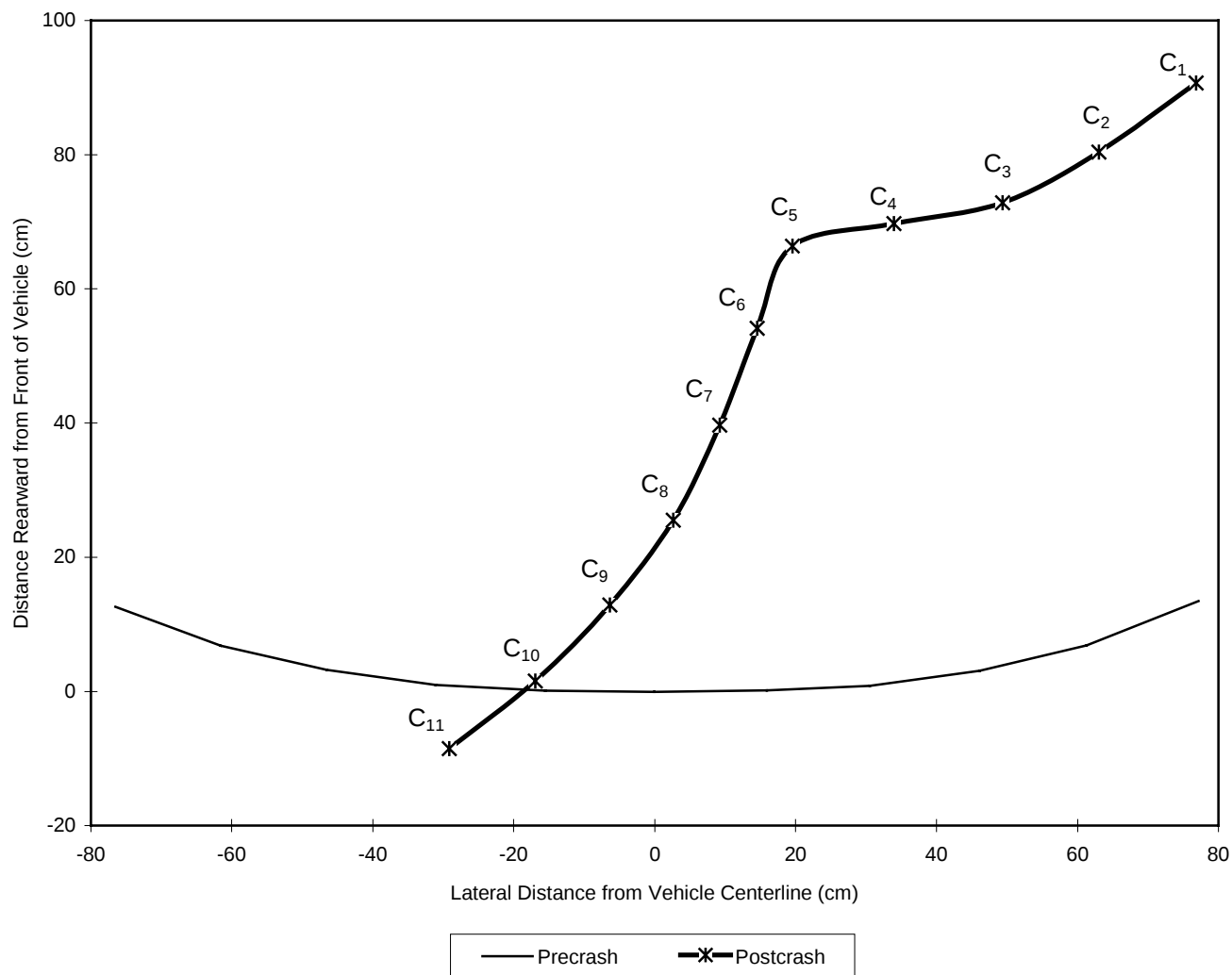
Just after the crash, Stoddard solvent was observed leaking from the right underside of the vehicle near the firewall. There was an initial stream of solvent onto the floor, and then the flow subsided. By 5 minutes after the test, only occasional drips were observed. At 8 minutes after the test, the total spillage was collected and measured to be 1.6 ounces of solvent. However, when the vehicle was rotated onto its right side for postcrash underbody photography, the Stoddard solvent immediately began to flow freely again. The flow was observed coming from a tear in a rubber fuel hose that is routed between the transmission housing and the firewall to the right of the vehicle's centerline. The flow continued from the tear and was stopped only by clamping the fuel lines near the fuel tank. During the crash, the hose apparently was pinched between the firewall and a rib on the aluminum transmission housing, causing the hose to tear.

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 shows the location of the fuel hose tear; Figure 6 shows this area enlarged with the affected fuel hose. Figure 7 illustrates the deformation of the frame rails, door sills, and crossmembers, which are visible in Figure 4.

Figure 2
Overhead View of Crash Deformation — 2001 Isuzu Trooper



Figure 3
Front Bumper Cover Crush Contour — 2001 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)	91	80	73	70	66	54	40	26	13	2	-8
Precrash Contour (cm)	13	7	3	1	0	0	0	1	3	7	13
Resulting Crush (cm)	78	73	70	69	66	54	40	25	10	-5	-21

The length of the reference line was 154 cm precrash and 106 cm postcrash.

Figure 4
Precrash and Postcrash Views from Below — 2001 Isuzu Trooper

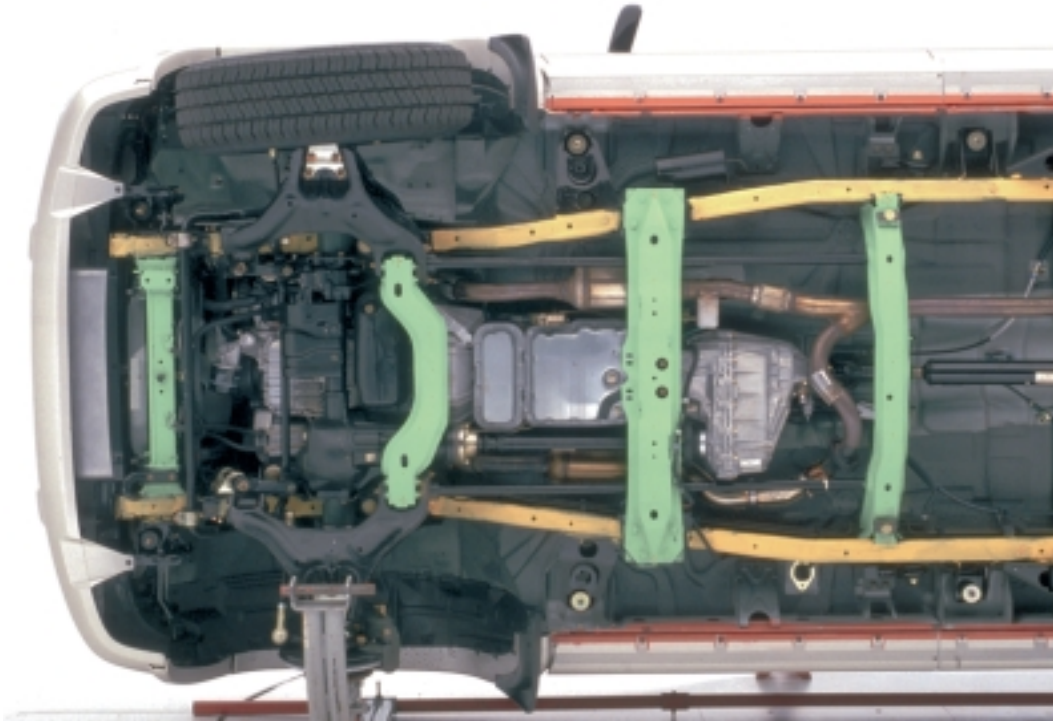
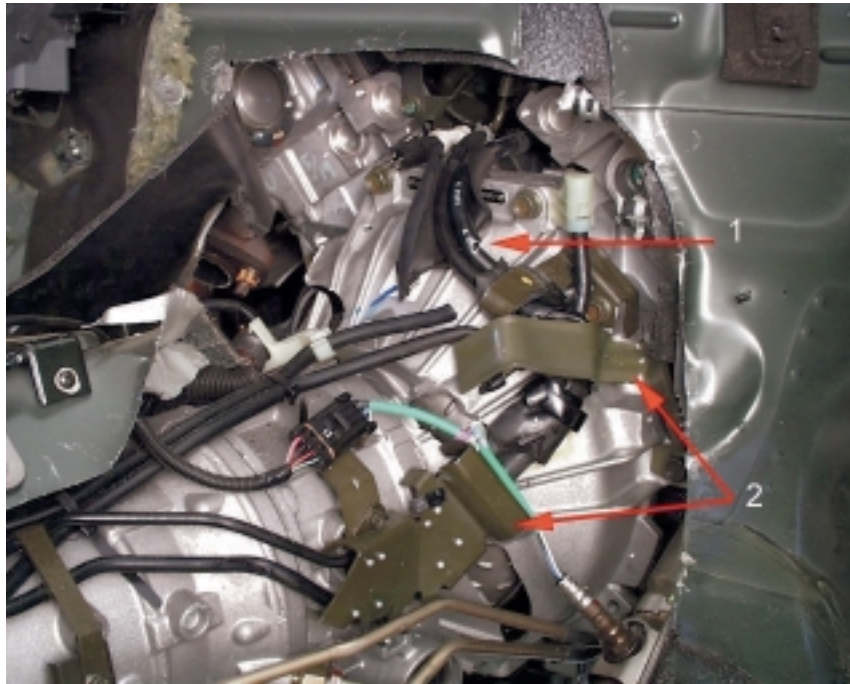


Figure 5
Postcrash Location of Tear in Fuel Hose — 2001 Isuzu Trooper
(View from Right Front Seat with Firewall Cut Away)

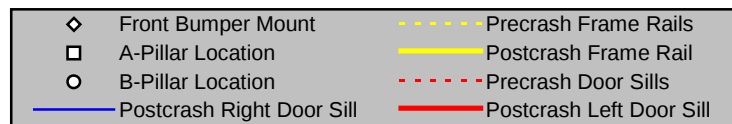
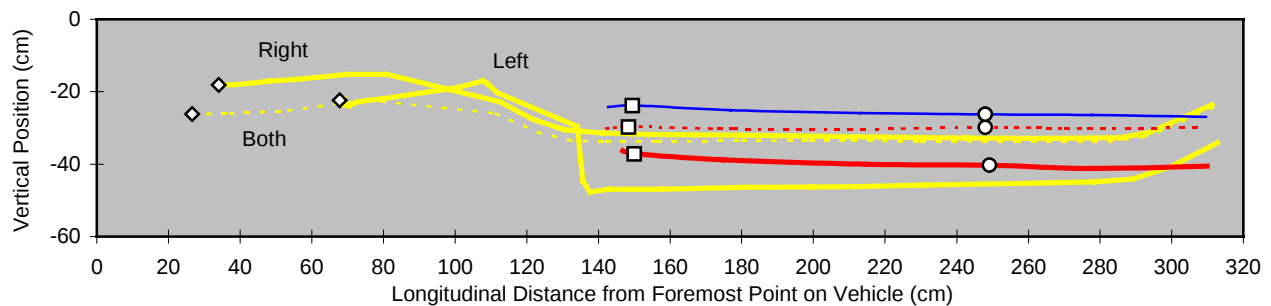
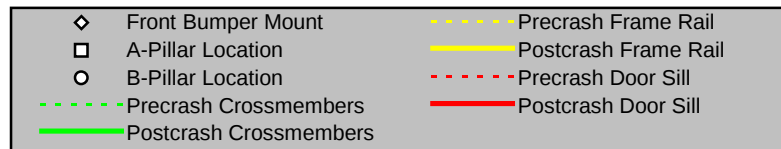
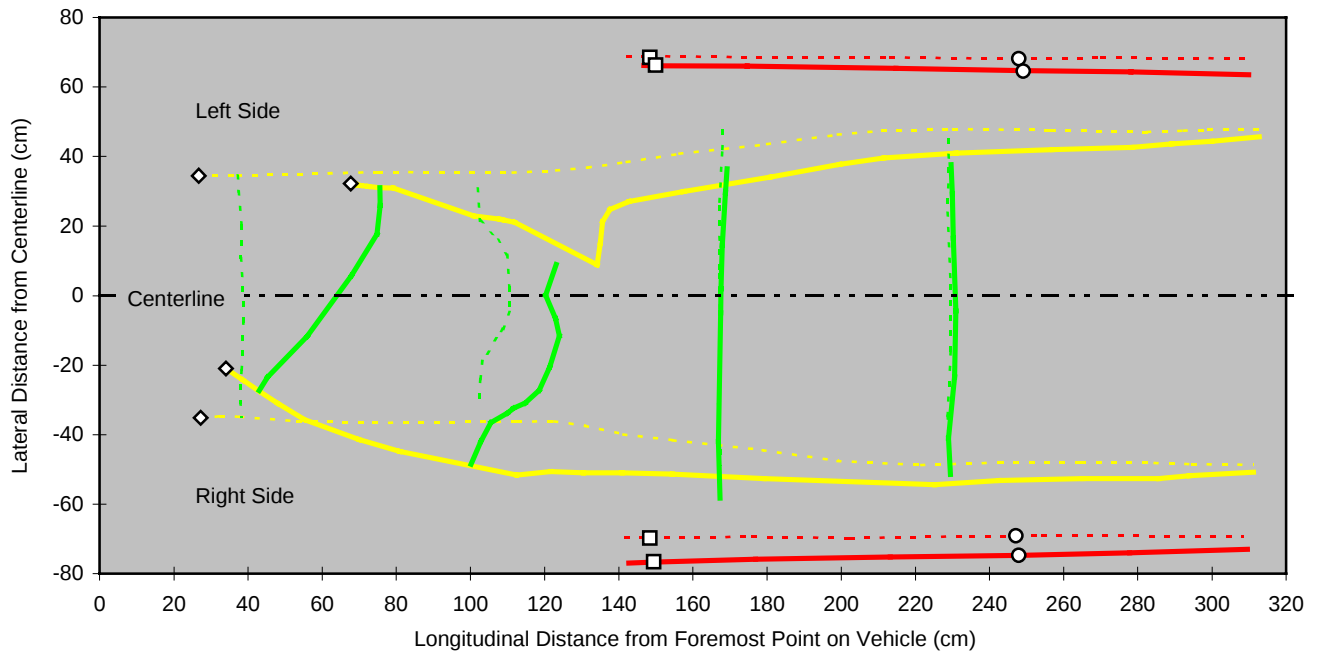


Arrow 1 points to location of leak in 2001 Trooper; Arrow 2 points to retrofit brackets added to protect fuel lines/hoses.

Figure 6
Close-up View of Torn Fuel Hose — 2001 Isuzu Trooper



Figure 7
Structural Deformation, Views from Below and Side — 2001 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.

Table 1 Residual Measurements of Intrusion Relative to Driver Seat — 2001 Isuzu Trooper				
Selected Locations*	Longitudinal	Lateral	Vertical	Resultant
Steering column (cm)	3	3	20	21
Left lower instrument panel (cm)	−3	1	5	6
Right lower instrument panel (cm)	−4	1	6	7
Brake pedal (cm)	−16	−5	9	19
Left toepan (cm)	−19	−2	6	21
Center toepan (cm)	−20	−2	5	21
Right toepan (cm)	−20	−2	6	21
Footrest (cm)	−19	−2	7	20
Average displacement of the four seat-attachment bolts relative to reference system (cm)	−2	1	−3	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 46 ms into the crash and appeared to be fully inflated at 74 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, 19 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. Friction between the belt webbing and D-ring produced a 13-cm scuff mark along the belt length. Postcrash investigation of the force-limiting torsion bar showed that it likely was 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. There was little obvious pitching or tipping of the seat.

Steering Column

The upper end of the steering column moved upward 20 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 and then receded by 64 ms. The face began to load the almost fully inflated airbag at 72 ms. Paint transferred from the dummy's face indicated the nose loaded the airbag 4 cm above and 3 cm to the left of its center. As the dummy's face continued to move forward, 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 a decrease in the neck A-P bending moment, all occurring at the same time (97 ms), were consistent with contact between the dummy's chin and the steering wheel. A subsequent decrease in the neck A-P shear force suggested that the rim then contacted the dummy's neck. On rebound from the steering wheel, the head moved upward and rearward, and the right upper rear of the head contacted the outboard half of the head restraint at about 270 ms. Table 2 provides the timing of these events.

Table 2
Restraint System Performance and Dummy Kinematics —
2001 Isuzu Trooper

Event	Time (ms)
Deployment of airbag	46
Airbag contacts face during deployment	56
Face begins to load airbag	72
Airbag fully inflated	74
Head and neck contact steering wheel	97
Rear of head contacts head restraint	270

Figure 8
Dummy and Vehicle Interior, Postcrash — 2001 Isuzu Trooper



Legs and Feet

Left leg and foot: Paint transferred from the dummy's left knee indicated the knee initially contacted the knee bolster 6 cm above and 1 cm to the left of the left instrument panel intrusion reference point. The leg then moved to the right, and the knee contacted the underside portion of the steering column trim. Paint transferred from the dummy's left shin indicated the shin initially contacted the bolster directly below the knee impact location. The shin then contacted the center of the bolster protrusion under the steering column; the shin was found against this protrusion after the crash. The left foot was found slightly dorsiflexed and somewhat inverted, with the lateral sole of the forefoot just touching the toepan inboard of the raised carpeted footrest hump. The sole at the back of the heel was pressed against the floormat/carpeting on the floorpan.

Right leg and foot: Paint transferred from the dummy's right knee indicated the knee contacted the knee bolster 3 cm above and 4 cm to left of the right instrument panel intrusion reference point. Paint transferred from the dummy's right shin indicated the shin contacted the bolster directly below the knee impact location. The right foot was found somewhat dorsiflexed and considerably inverted, with the sole of the forefoot pressed against the accelerator pedal, which was not fully depressed. The lateral edge of the forefoot was pressed against the plastic side trim of the center console, and the lateral back of the foot was pressed against the floormat/carpeting on the floorpan.

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 from the steering wheel contact was 75 g at 103 ms. Table 3 provides a summary of the maximum head injury measurements recorded during the crash.

Table 3 Head Injury Measurements — 2001 Isuzu Trooper			
Measure	Published Tolerance Threshold	Result	Time (ms)
Vector resultant acceleration (g)	80	75	103
Vector resultant acceleration — 3 ms clip (g)	80	73	101-104
Head Injury Criterion (HIC)	1000	618	83-119
Head Injury Criterion — 15 ms interval (HIC-15)*	700	434	96-111

* 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 — 2001 Isuzu Trooper			
Measure	Published Tolerance Threshold	Result	Time (ms)
A-P shear force (kN)	±3.1	−0.3	102
Axial compression force (kN)	4.0	0.2	144
Axial tension force (kN)	3.3	2.0	106
Flexion bending moment (Nm)	310	14	189
Extension bending moment (Nm)	122	35	103

Chest

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

Table 5 Chest Injury Measurements — 2001 Isuzu Trooper			
Measure	Published Tolerance Threshold	Result	Time (ms)
Vector resultant spine acceleration — 3 ms clip (g)	60	50	109–112
Rib compression (mm)	−50	−33	112
Sternum deflection rate (m/s)	−8.2	−2.2	71

Legs and Feet

Left leg and foot: The maximum left upper tibia L-M moment was -153 Nm at 67 ms, the maximum left lower tibia resultant moment was 186 Nm at 70 ms, and the maximum left tibia axial force was -11.5 kN at 66 ms, resulting in an upper tibia index of 0.98 at 67 ms and a lower tibia index of 0.97, also at 67 ms. The maximum resultant left foot acceleration was 330 g at 65 ms.

The left upper tibia A-P bending moment had a time signature similar to the tibia axial force from about 63 to 73 ms (Figures A-27 and A-32). This indicates that the upper tibia bending could have resulted from the foot force acting through a moment arm due to the bent shape of the dummy's tibia rather than from transverse forces applied by contact with the knee bolster. As a result, no upper tibia A-P or resultant moments are reported, and the reported maximum left upper tibia index of 0.98 at 67 ms was calculated from only the upper tibia L-M moment and tibia axial force.

Right leg and foot: The maximum right tibia axial force was -6.5 kN at 67 ms, and the maximum right lower tibia A-P moment was 338 Nm at 80 ms, significantly contributing to the right lower tibia index of 1.54 at 80 ms. The maximum resultant right foot acceleration was 372 g at 67 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 Isuzu Trooper

Measure	Published Tolerance Threshold	Left		Right	
		Result	Time (ms)	Result	Time (ms)
Femur axial force (kN)	−9.1*	−4.8	67	−4	67
Tibia-femur displacement (mm)	−15	−7	75	−8	67
Upper Tibia					
L-M moment (Nm)	±225	−153	67	−47	116
A-P moment (Nm)	±225	**	n/a	−126	73
Vector resultant moment (Nm)	225	**	n/a	130	73
Index	1.00	0.98	67	0.68	73
Lower Tibia					
L-M moment (Nm)	±225***	143	70	30	72
A-P moment (Nm)	±225***	121	69	338	80
Vector resultant moment (Nm)	225***	186	70	339	80
Axial force (kN)	−8.0***	−11.5	66	−6.5	67
Index	1.00	0.97	67	1.54	80
Foot					
A-P acceleration (g)	±150	−222	64	−246	69
I-S acceleration (g)	±150	−304	66	−304	67
Vector resultant acceleration (g)	150	330	65	372	67

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

** The upper tibia A-P bending could have resulted from the foot force acting through the moment arm of the tibia bend rather than from transverse forces applied by contact with the knee bolster; therefore the A-P and resultant moments are not indicated. The listed upper tibia index was calculated from only the upper tibia L-M moment and tibia axial force.

*** 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

- Backaitis, S.H. and Mertz, H.J. (eds). 1994. *Hybrid III: The First Human-Like Crash Test Dummy*. Warrendale, PA: Society of Automotive Engineers.
- Begeman, P.C. and Prasad, P. 1990. Human ankle impact response in dorsiflexion (SAE 902308). *Thirty-fourth Stapp Car Crash Conference Proceedings*, 39-53. Warrendale, PA: Society of Automotive Engineers.
- Begeman, P.; Balakrishnan, P.; Levine, R.; and King, A. 1993. Dynamic human ankle response to inversion and eversion (SAE 933115). *Thirty-seventh Stapp Car Crash Conference Proceedings*, 83-93. Warrendale, PA: Society of Automotive Engineers.
- Mertz, H.J. and Patrick, L.M. 1971. Strength and response of the human neck (SAE 710855). *Biomechanics of Impact Injury and Injury Tolerances of the Head-Neck Complex*, 821-46. Warrendale, PA: Society of Automobile Engineers.
- Parenteau, C.S. 1995. Foot-ankle injury: epidemiology and method to investigate joint biomechanics. Gothenburg, Sweden: Chalmers University of Technology.
- Prasad, P. and Mertz, H.J. 1985. The position of the United States delegation to the ISO Working Group 6 on the use of HIC in the automotive environment (SAE 851246). *Biomechanics of Impact Injury and Injury Tolerances of the Head-Neck Complex*, 373-83. Warrendale, PA: Society of Automotive Engineers.
- Transport Canada. 1998. Motor Vehicle Safety Regulations – Canadian Motor Vehicle Safety Standards, Schedule IV Part III Standard 208, Occupant Restraint Systems in Frontal Impact. Ottawa, Ontario.
- Welbourne, E.R. 1994. Vehicle performance requirements for head injury protection: a comparison of the head injury criterion with an 80 g limit on resultant acceleration. Technical Memorandum. Ottawa, Ontario: Transport Canada, Vehicle System Division.
- Zeidler, F. 1984. The significance of lower limb injuries of belted drivers. *Journal of Orthopedics* [German].

Appendix

Dummy Clearance Measurements

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

Manufacturer's window sticker

Dummy Clearance Measurements

Test Number: CF00024
Vehicle Make/Model: Isuzu Trooper
Vehicle Model Year: 2001
Seat Type: Manually adjusted bucket seat (fore/aft, height, and seat back angle)

Manufacturer's Specifications

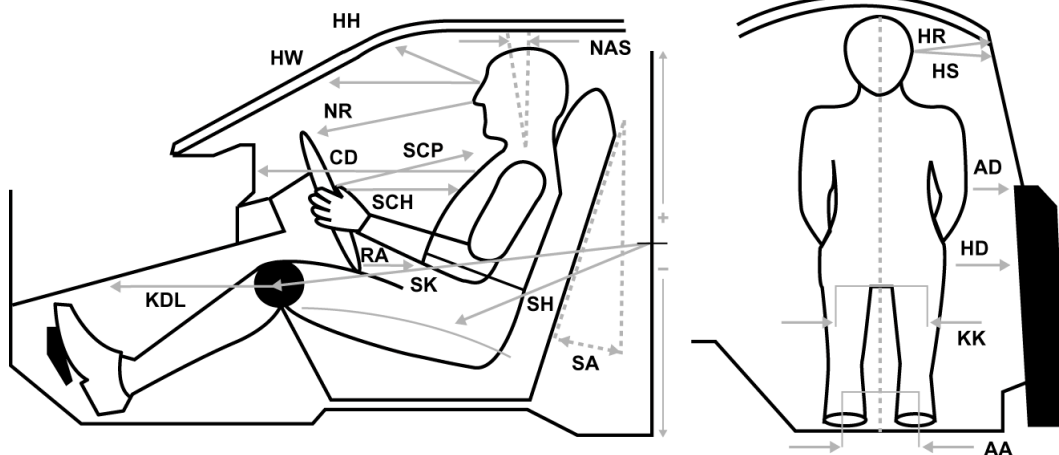
Seat Back Information: Reclined to 3rd position from upright
Upper Belt Anchorage: Set to midpoint of 5 positions
Steering Column Adjustment: Set to 4th tilt position from top

Location	Code	Measure	Location	Code	Measure
Head to header	HH	405	Neck angle, torso 90	NAT90	20.6°
Head to windshield	HW	583	Neck angle, seated**	NAS	5.8°
Nose to rim	NR	401	Torso angle (NAT90 – NAS)	TA	14.8°
Chest to dash	CD	567	Striker to knee***	SK	620
Rim to abdomen	RA	136	Striker to knee angle***	SKA	3.7°
Knee to dash, left	KDL	164	Striker to H-point, horizontal	SHH	224
Knee to dash, right	KDR	162	Striker to H-point, vertical	SHV	-22
Steering wheel to chest, horizontal	SCH	266	Ankle to ankle	AA	315
Steering wheel to chest, perpendicular	SCP	376	Knee to knee	KK	330
Steering wheel to chest, reference	SCR	358	Arm to door	AD	82
Hub to chest, minimum	HCM	200	H-point to door	HD	150
Pelvic angle	PA	23.7°	Head to A-pillar	HA	546
Seat back angle	SA	18.6°	Head to roof	HR	223
			Head to side window	HS	240

All distance measurements are in millimeters (mm).

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

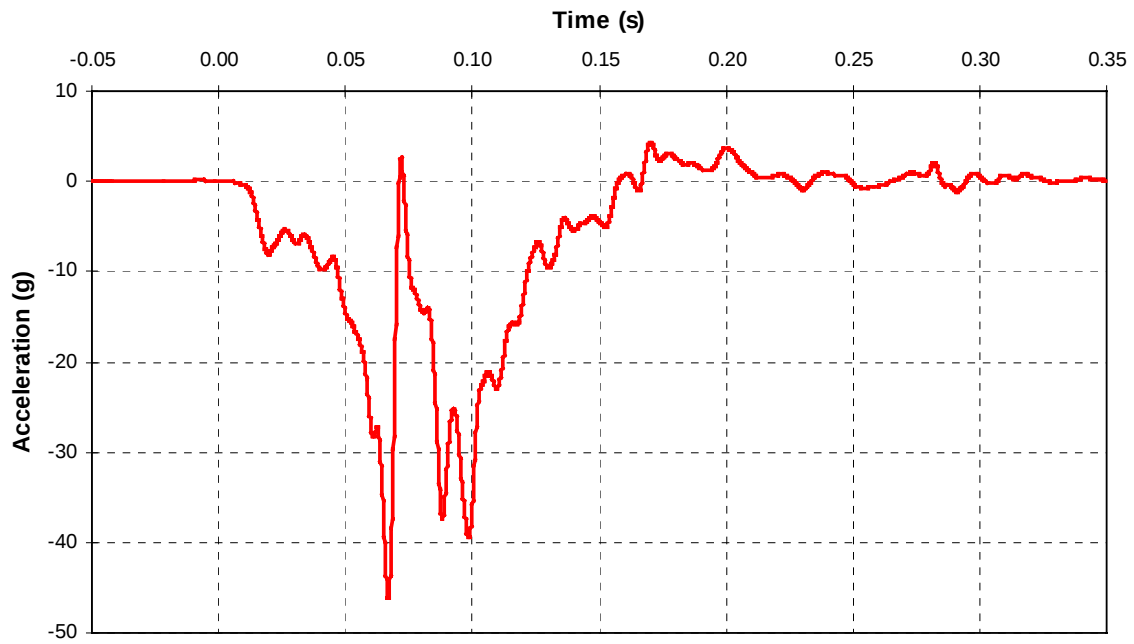
** These measurements were made in a vertical plane containing the striker and parallel to the driver door sill.



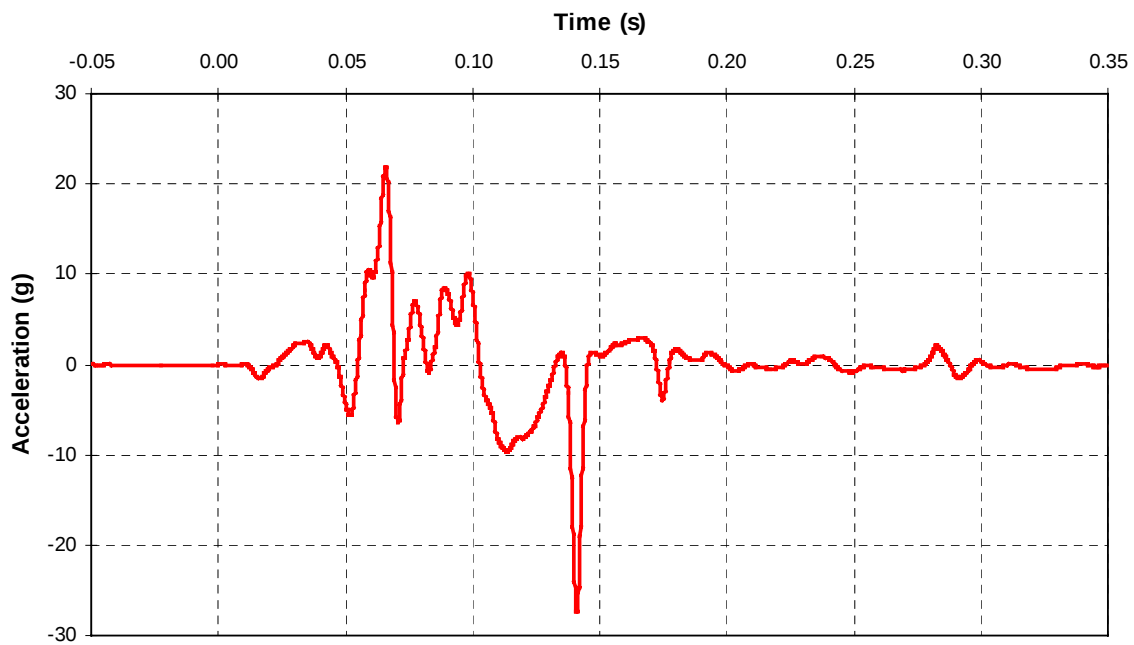
Graph Index

A-1	Vehicle longitudinal acceleration (X)
A-2	Vehicle lateral acceleration (Y)
A-3	Vehicle vertical acceleration (Z)
A-4	Vehicle vector resultant acceleration
A-5	Integration of vehicle longitudinal acceleration (X)
A-6	Head A-P acceleration (X)
A-7	Head L-M acceleration (Y)
A-8	Head I-S acceleration (Z)
A-9	Head vector resultant acceleration
A-10	Neck A-P force (X)
A-11	Neck axial force
A-12	Neck occipital A-P bending moment
A-13	Neck tension — force by duration analysis
A-14	Neck compression — force by duration analysis
A-15	Neck shear (positive) — force by duration analysis
A-16	Neck shear (negative) — force by duration analysis
A-17	Chest compression
A-18	Chest A-P acceleration (X)
A-19	Chest lateral acceleration (Y)
A-20	Chest I-S acceleration (Z)
A-21	Chest vector resultant acceleration
A-22	Sternum deflection rate
A-23	Left femur axial force
A-24	Left femur — force by duration analysis
A-25	Left tibia-femur displacement
A-26	Left upper tibia L-M bending moment
A-27	Left upper tibia A-P bending moment
A-28	Left upper tibia vector resultant bending moment
A-29	Left lower tibia L-M bending moment
A-30	Left lower tibia A-P bending moment
A-31	Left lower tibia vector resultant bending moment
A-32	Left lower tibia axial force
A-33	Left foot vector resultant acceleration
A-34	Left foot A-P acceleration
A-35	Left foot I-S acceleration
A-36	Right femur axial force
A-37	Right femur — force by duration analysis
A-38	Right tibia-femur displacement
A-39	Right upper tibia L-M bending moment
A-40	Right upper tibia A-P bending moment
A-41	Right upper tibia vector resultant bending moment
A-42	Right lower tibia L-M bending moment
A-43	Right lower tibia A-P bending moment
A-44	Right lower tibia vector resultant bending moment
A-45	Right lower tibia axial force
A-46	Right foot vector resultant acceleration
A-47	Right foot A-P acceleration
A-48	Right foot I-S acceleration

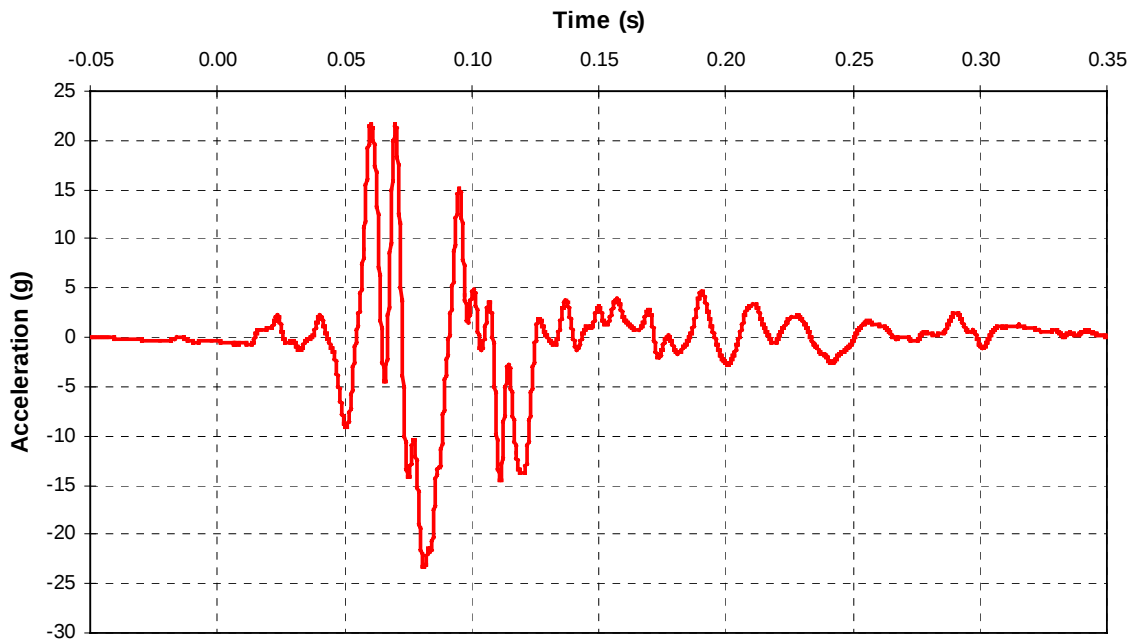
A- 1 CF00024 2001 Isuzu Trooper Vehicle Longitudinal Acceleration



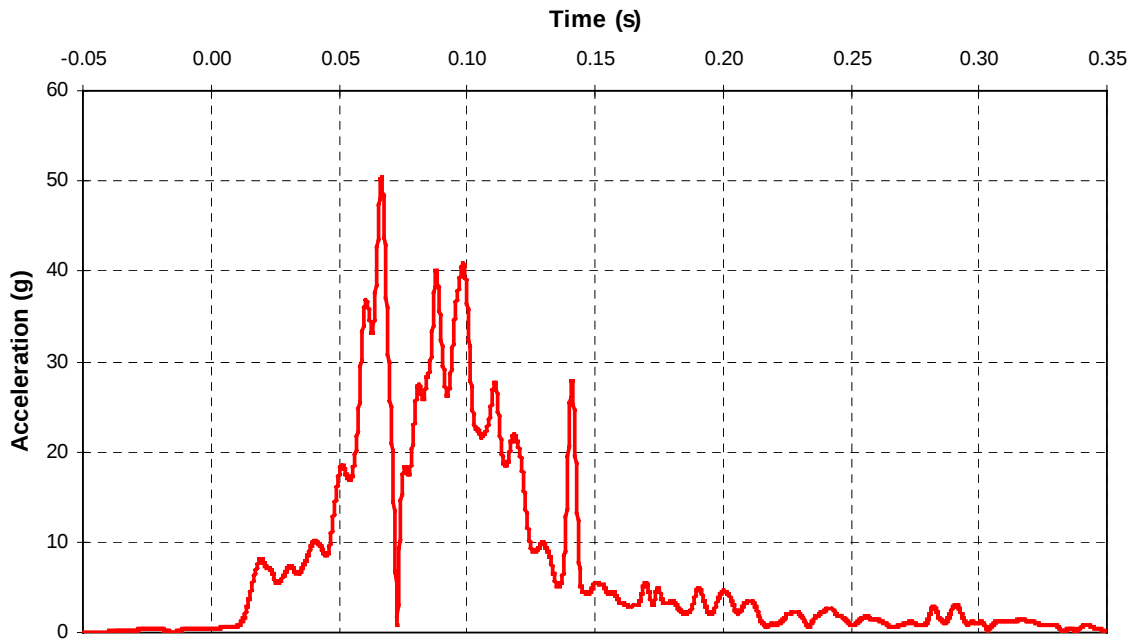
A- 2 CF00024 2001 Isuzu Trooper Vehicle Lateral Acceleration



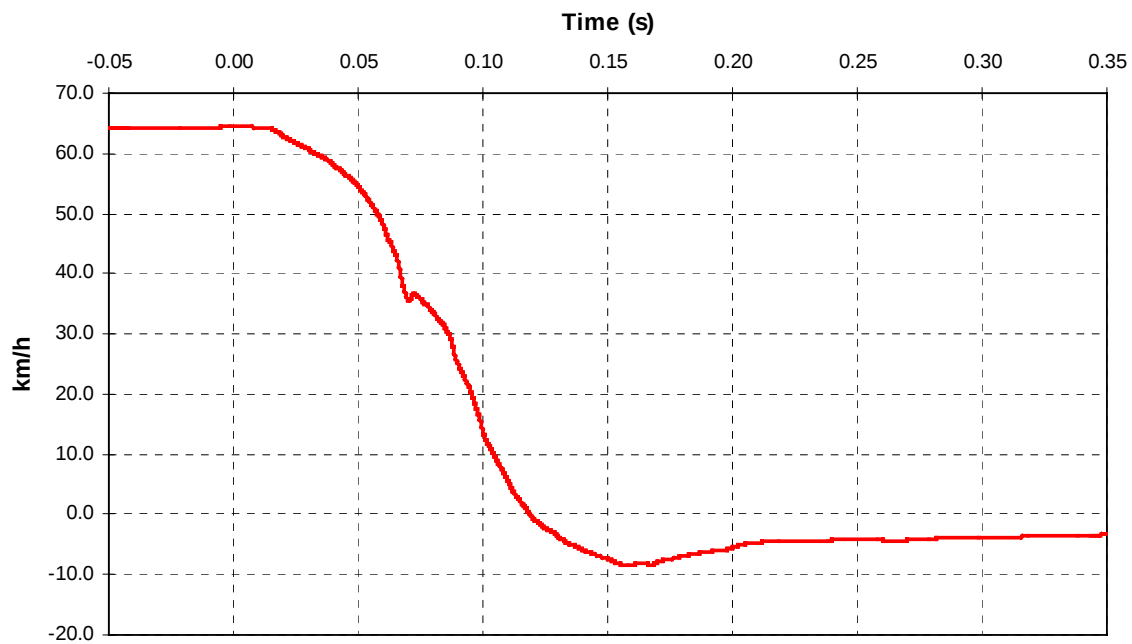
A- 3 CF00024 2001 Isuzu Trooper Vehicle Vertical Acceleration



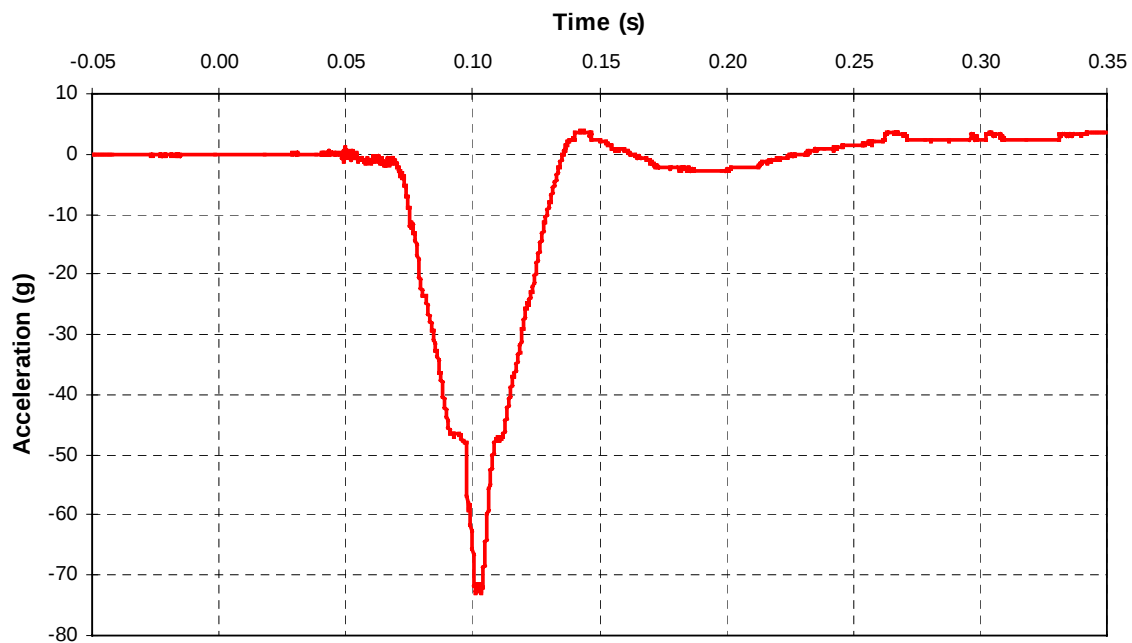
A- 4 CF00024 2001 Isuzu Trooper Vehicle Vector Resultant Acceleration



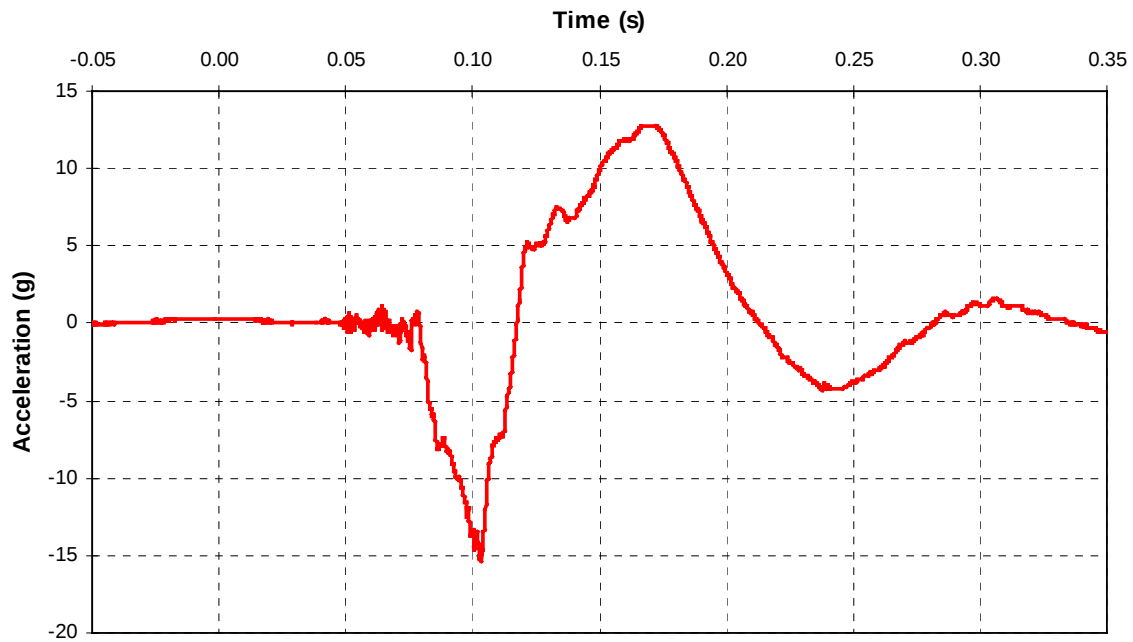
A- 5 CF00024 2001 Isuzu Trooper Integration of Vehicle Longitudinal Acceleration



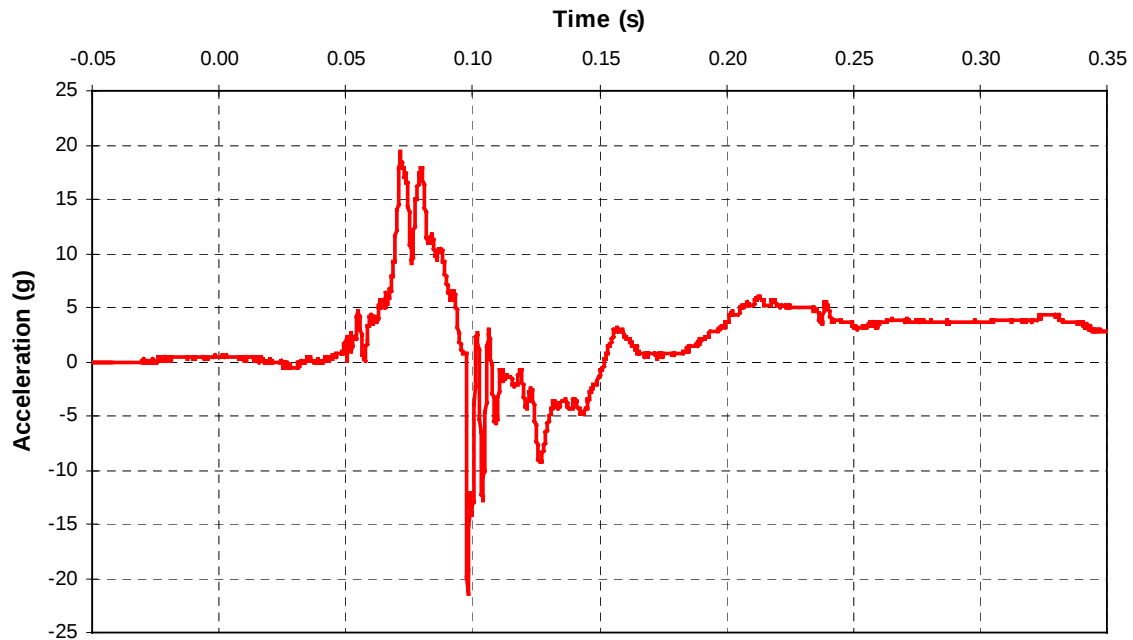
A- 6 CF00024 2001 Isuzu Trooper Head A-P Acceleration



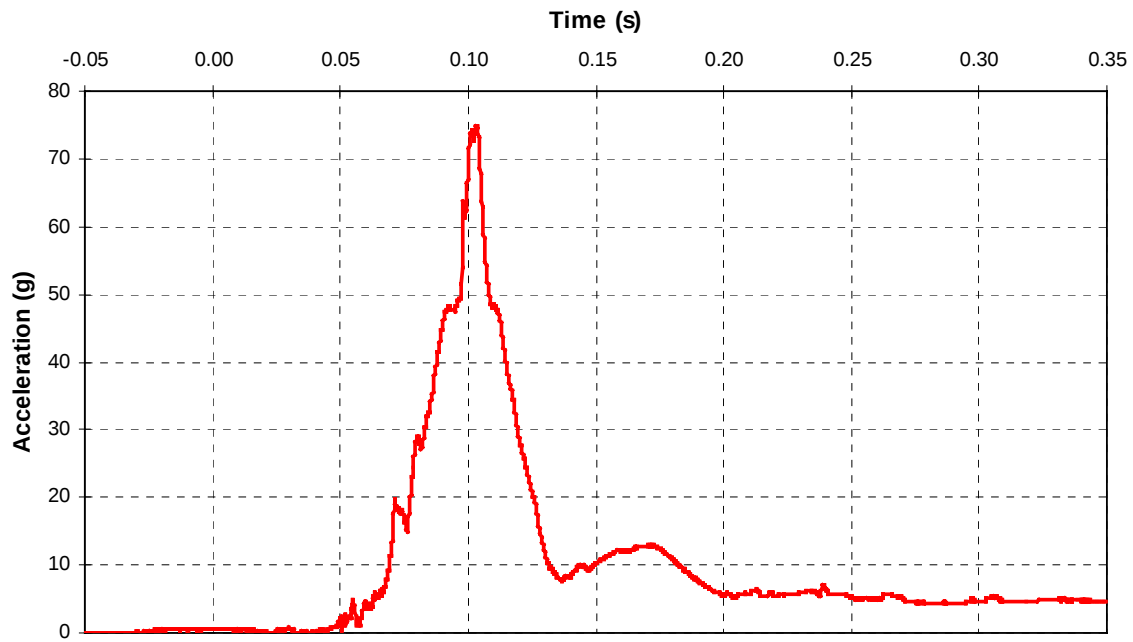
A- 7 CF00024 2001 Isuzu Trooper Head L-M Acceleration



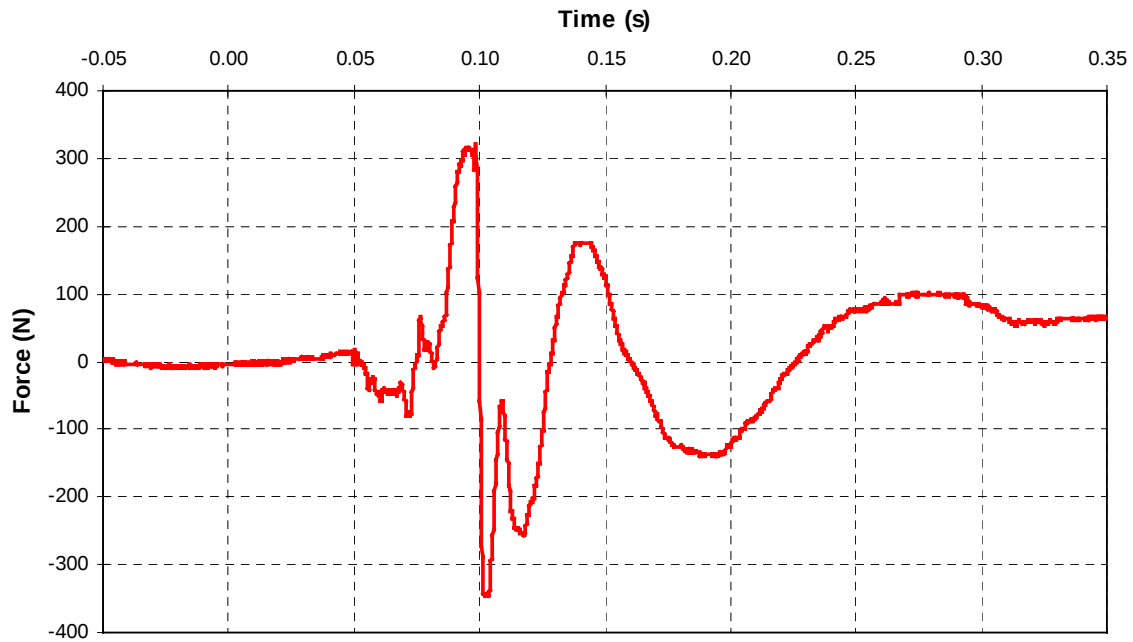
A- 8 CF00024 2001 Isuzu Trooper Head I-S Acceleration



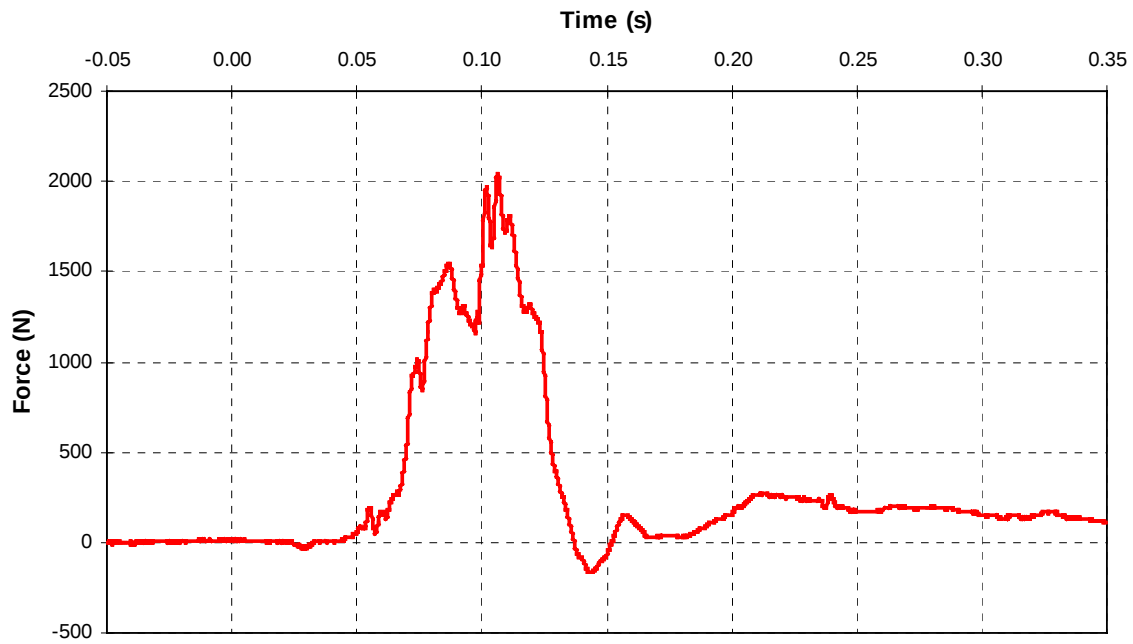
A- 9 CF00024 2001 Isuzu Trooper Head Vector Resultant Acceleration



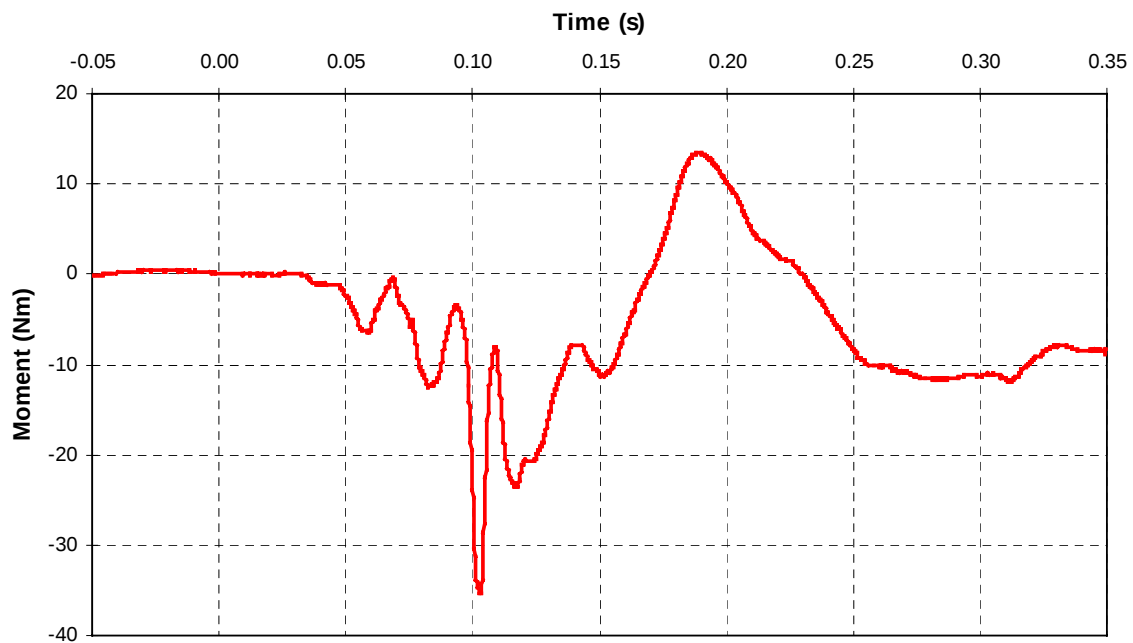
A- 10 CF00024 2001 Isuzu Trooper Neck A-P Shear Force



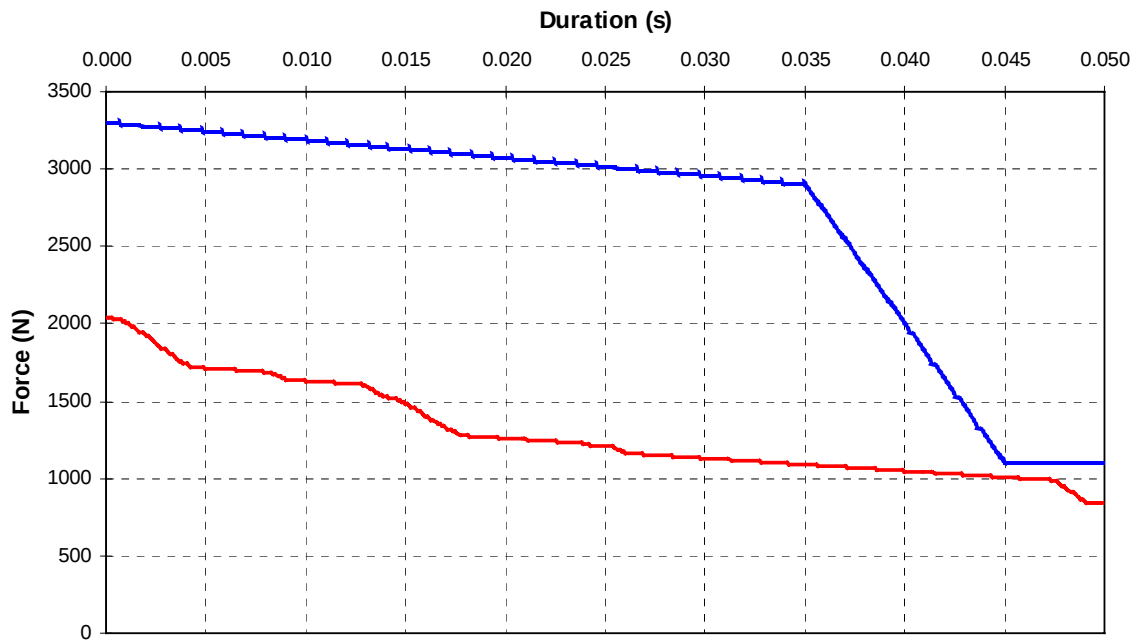
A- 11 CF00024 2001 Isuzu Trooper Neck Axial Force



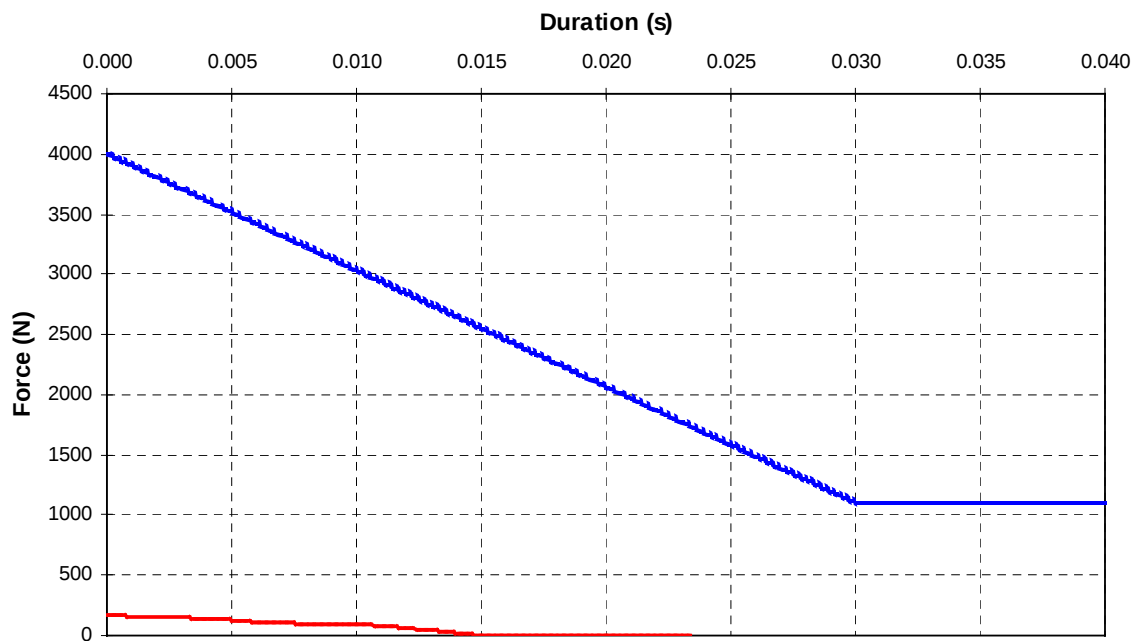
A- 12 CF00024 2001 Isuzu Trooper Neck Occipital A-P Moment



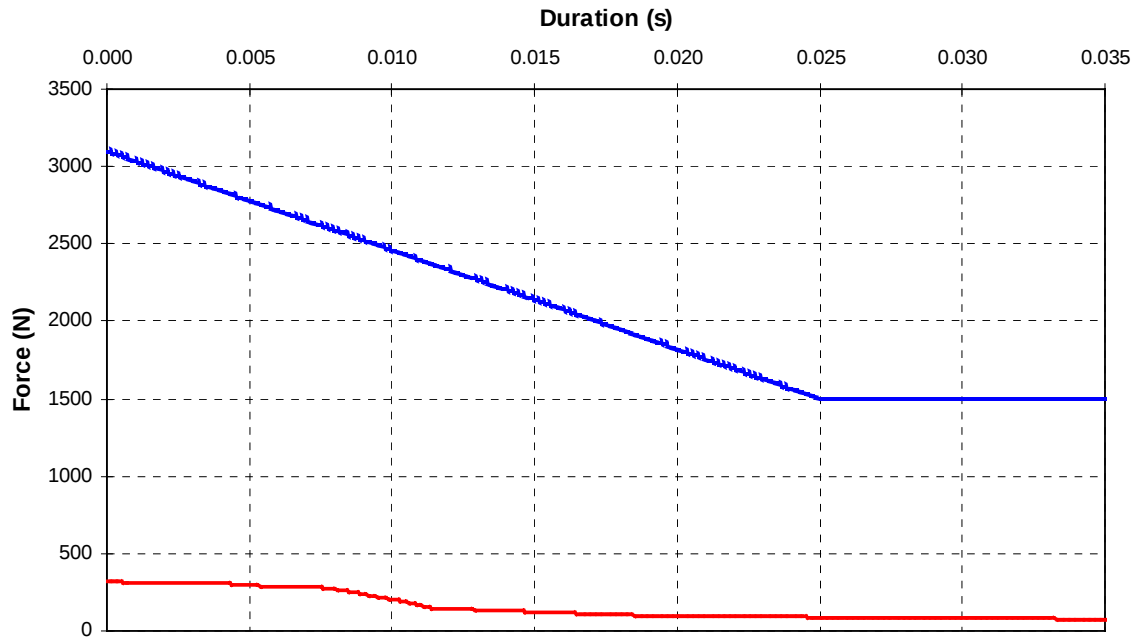
A- 13 CF00024 2001 Isuzu Trooper Neck Tension Analysis



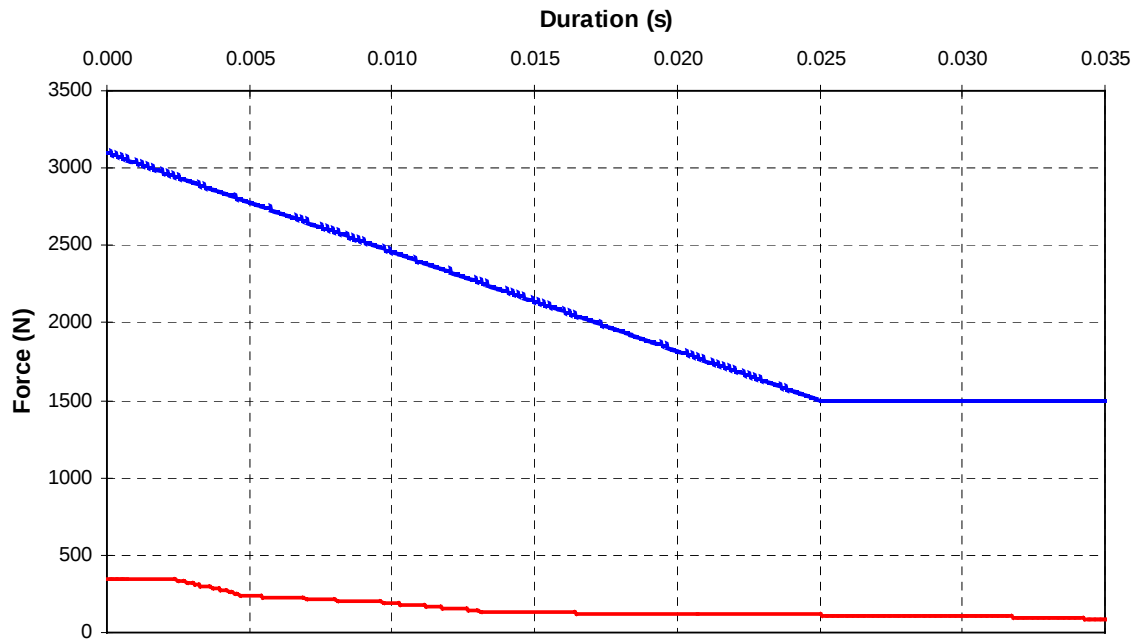
A- 14 CF00024 2001 Isuzu Trooper Neck Compression Analysis



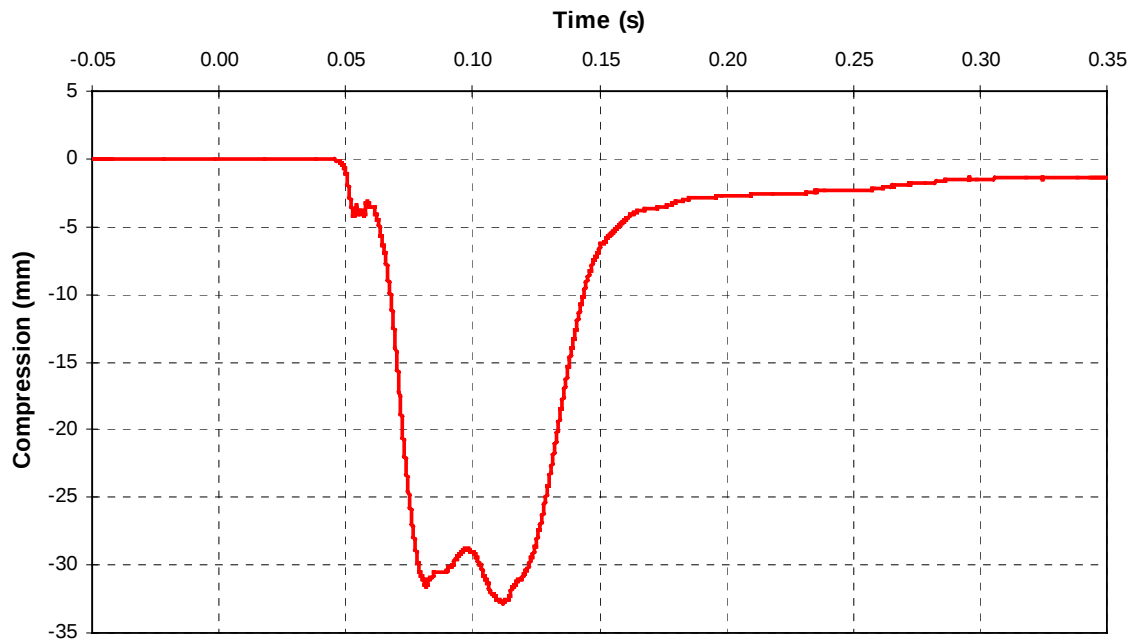
A- 15 CF00024 2001 Isuzu Trooper Neck A-P Shear (Positive) Analysis



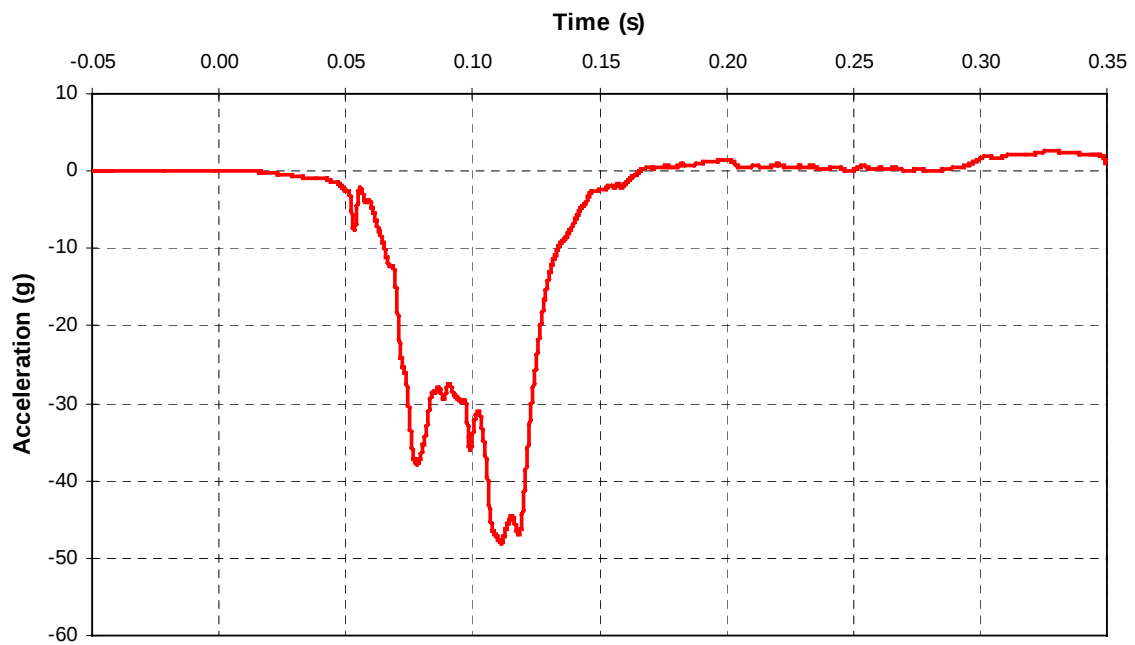
A- 16 CF00024 2001 Isuzu Trooper Neck A-P Shear (Negative) Analysis



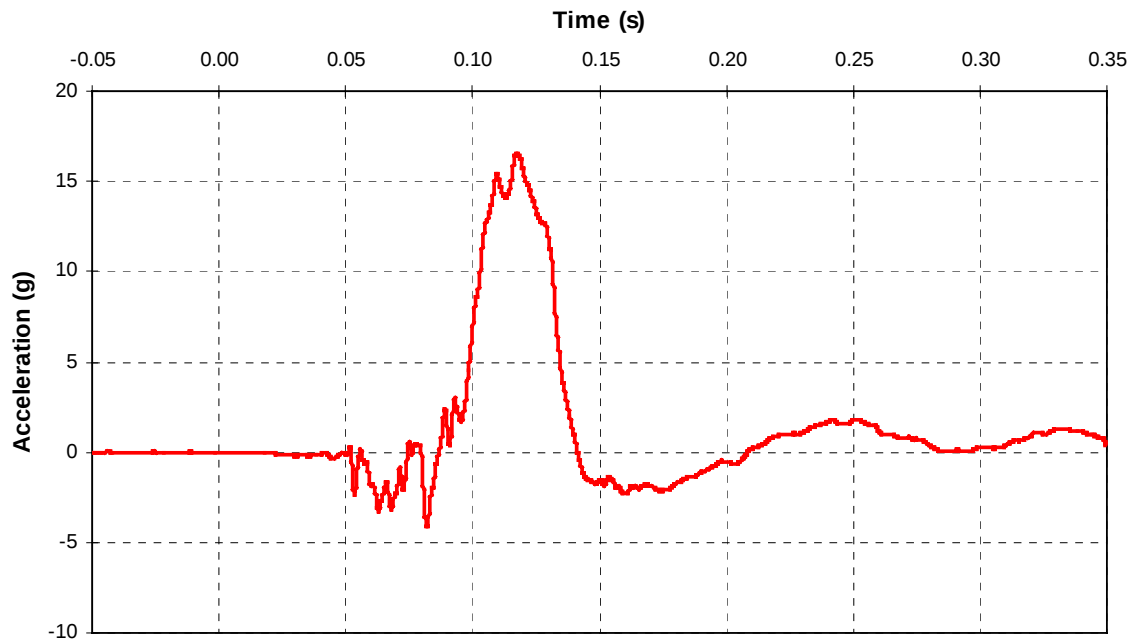
A- 17 CF00024 2001 Isuzu Trooper Chest Compression



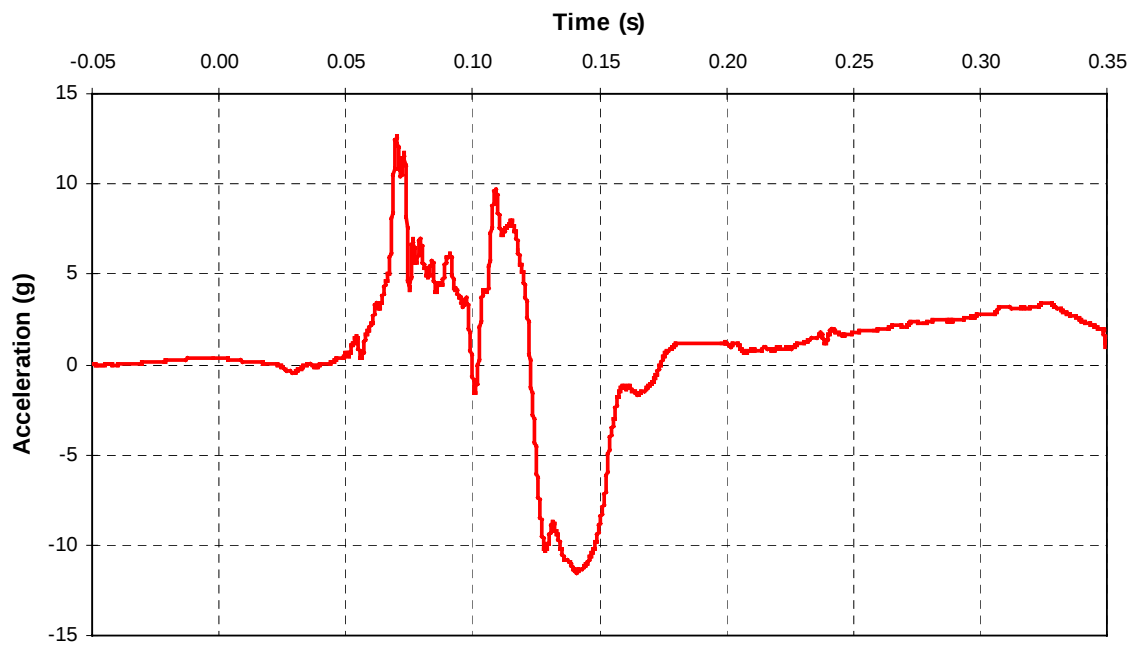
A- 18 CF00024 2001 Isuzu Trooper Chest A-P Acceleration



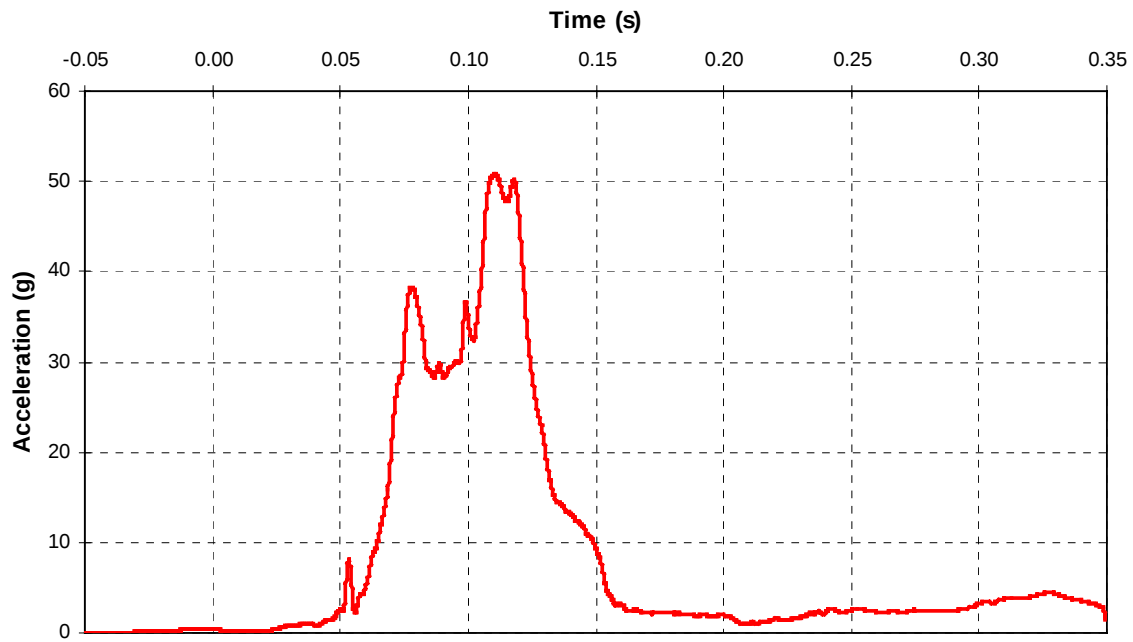
A- 19 CF00024 2001 Isuzu Trooper Chest L-M Acceleration



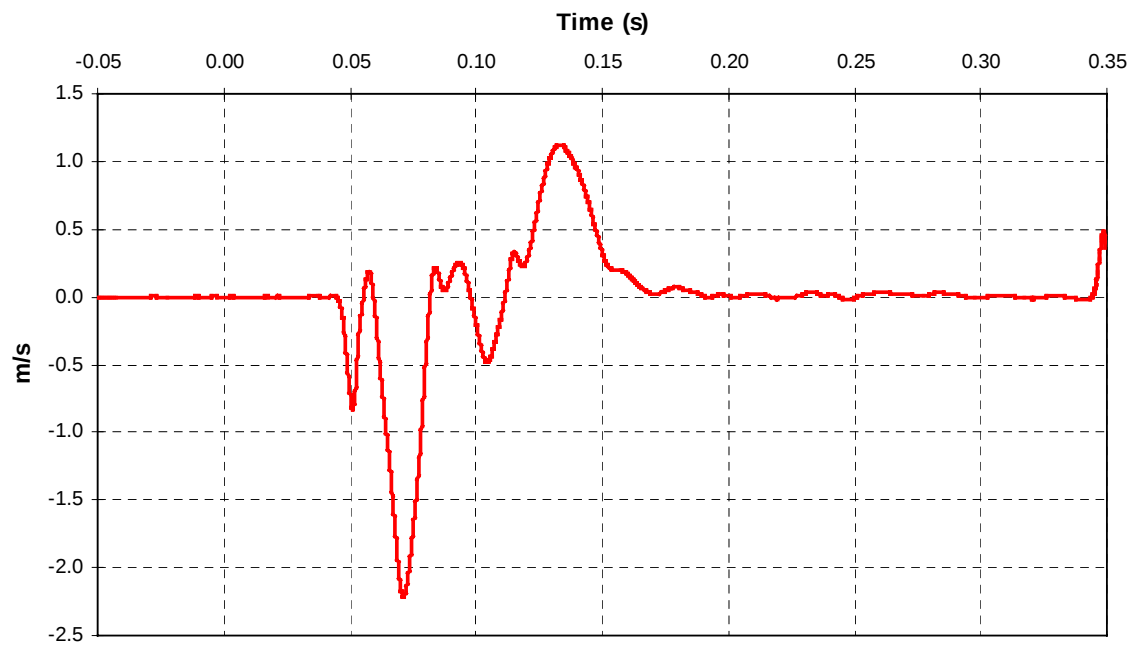
A- 20 CF00024 2001 Isuzu Trooper Chest I-S Acceleration



A- 21 CF00024 2001 Isuzu Trooper Chest Vector Resultant Acceleration

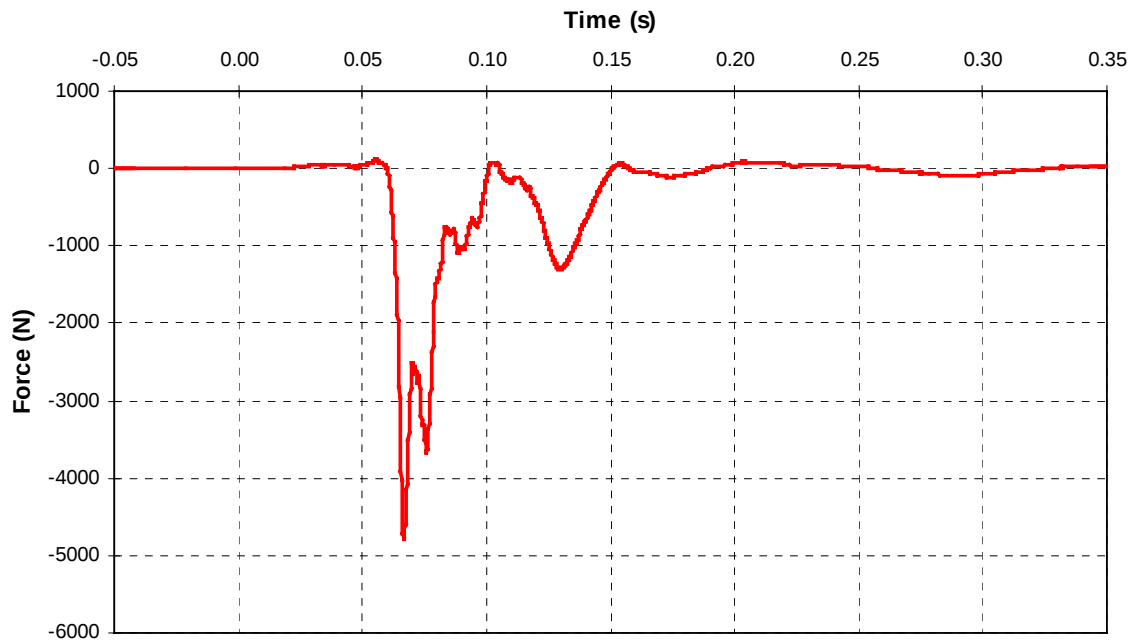


A- 22 CF00024 2001 Isuzu Trooper Sternum Deflection Rate

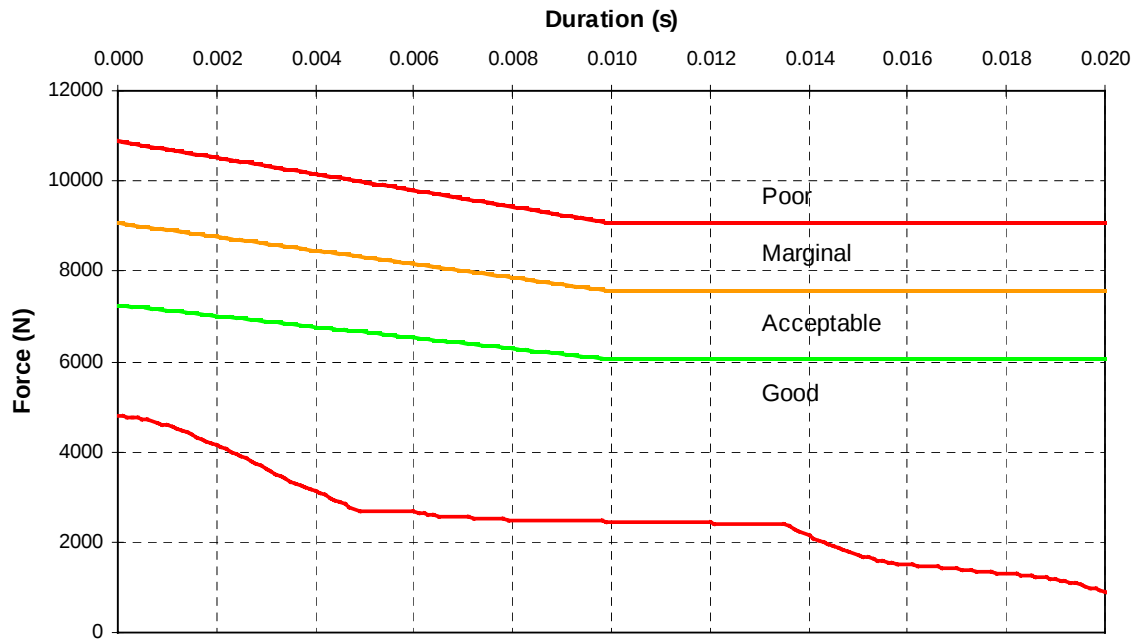


Sternum deflection rate is calculated from the sternum deflection filtered to CFC 60

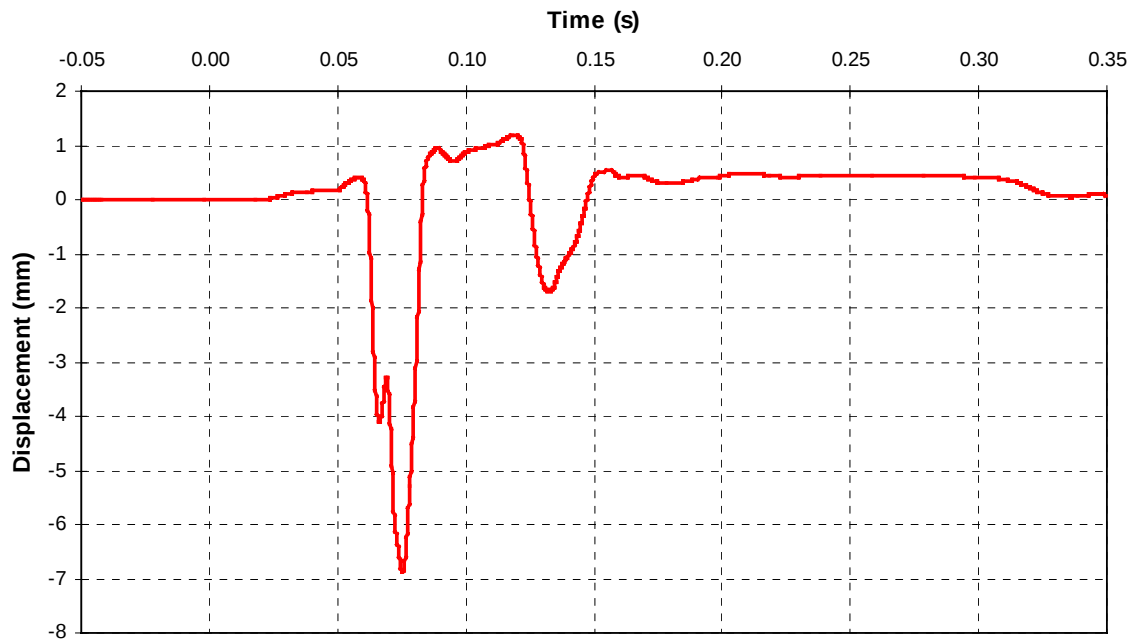
A- 23 CF00024 2001 Isuzu Trooper Left Femur Axial Force



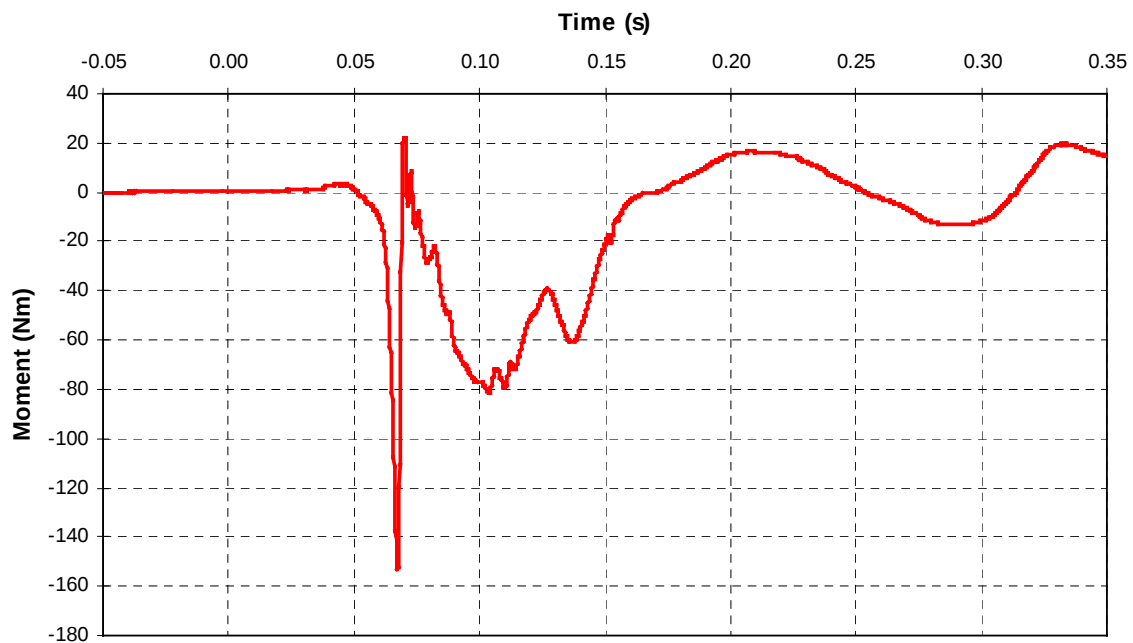
A- 24 CF00024 2001 Isuzu Trooper Left Femur Axial Force Analysis



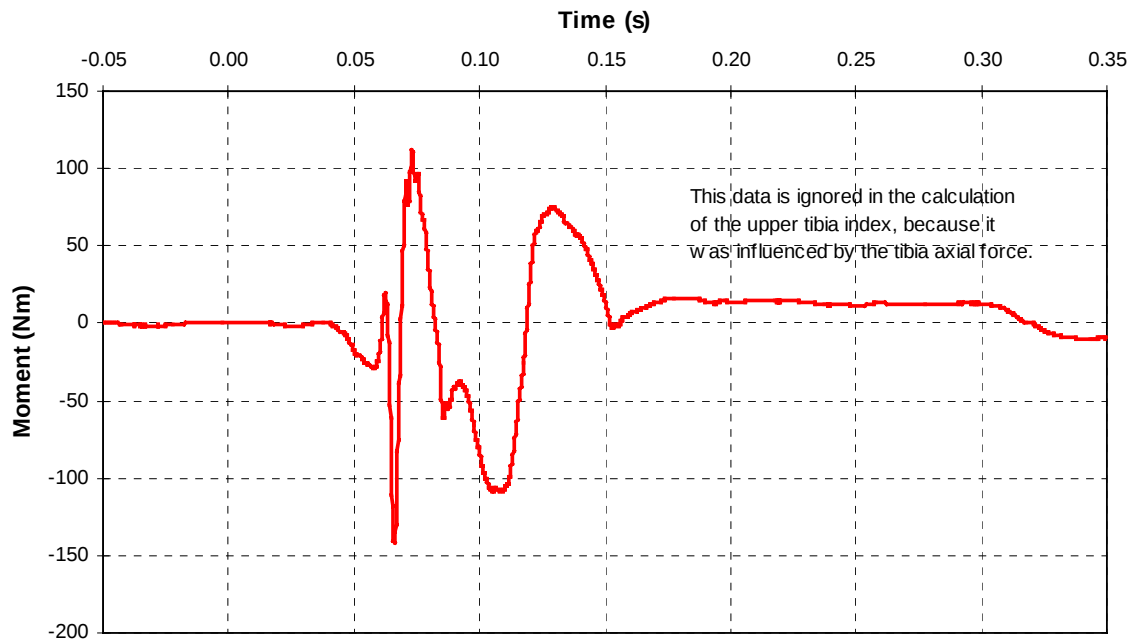
A- 25 CF00024 2001 Isuzu Trooper Left Tibia-Femur Displacement



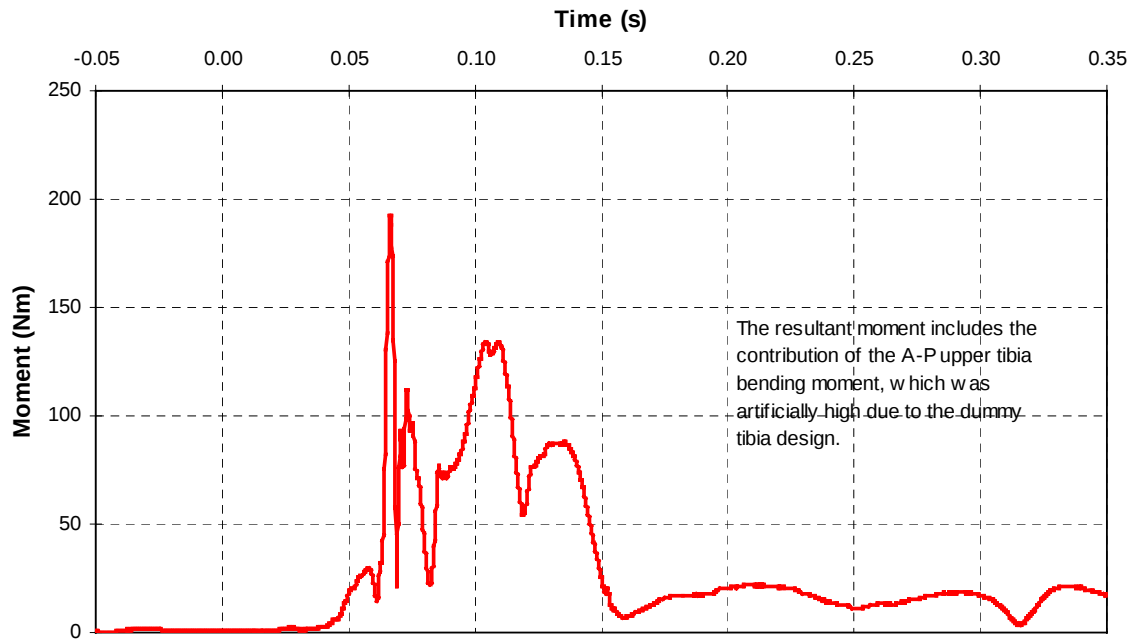
A- 26 CF00024 2001 Isuzu Trooper Left Upper Tibia L-M Moment



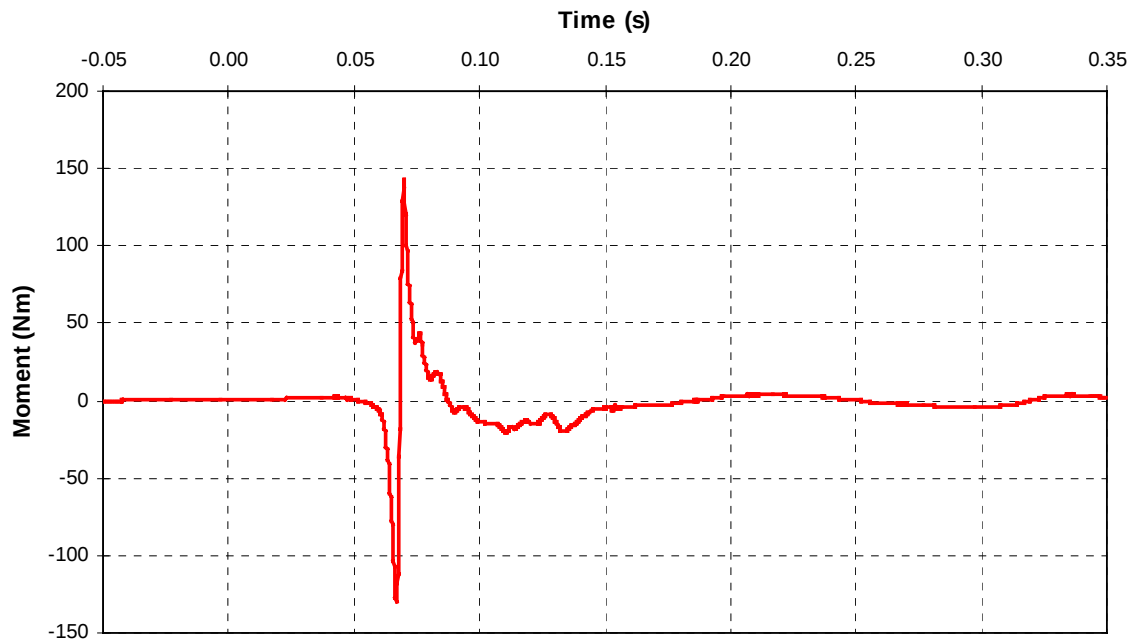
A- 27 CF00024 2001 Isuzu Trooper Left Upper Tibia A-P Moment



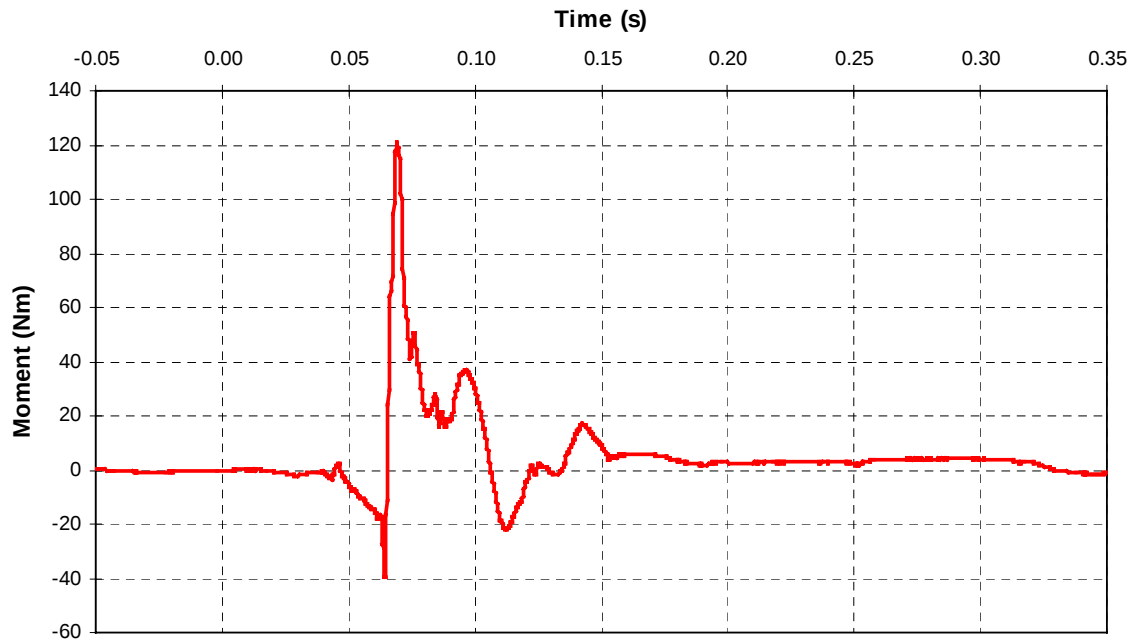
A- 28 CF00024 2001 Isuzu Trooper Left Upper Tibia Vector Resultant Moment



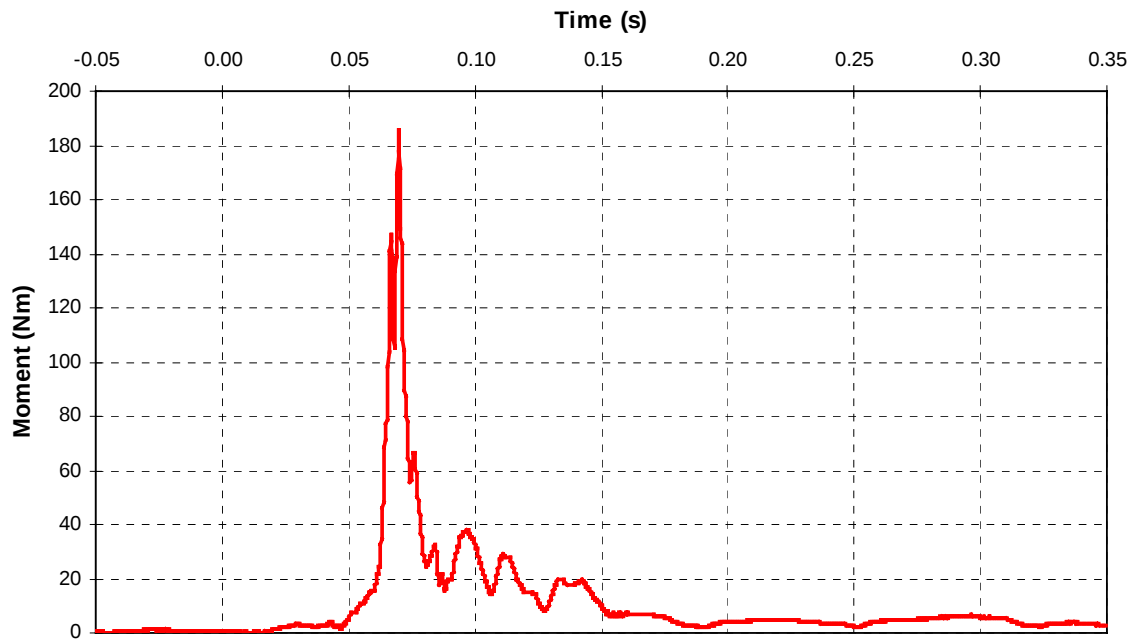
A- 29 CF00024 2001 Isuzu Trooper Left Lower Tibia L-M Moment



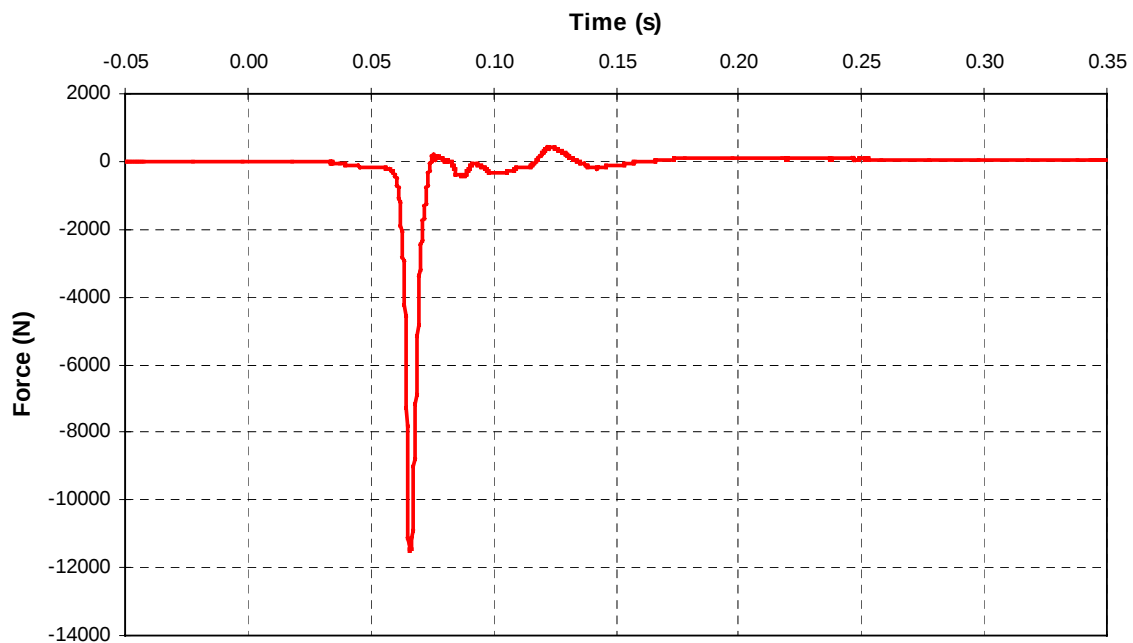
A- 30 CF00024 2001 Isuzu Trooper Left Lower Tibia A-P Moment



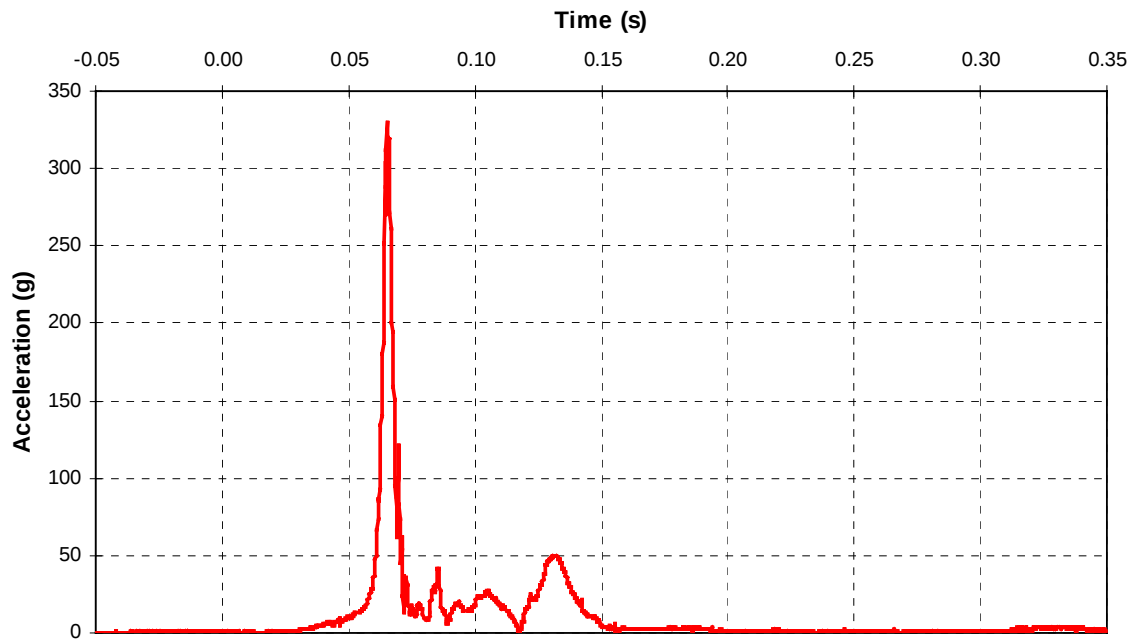
A- 31 CF00024 2001 Isuzu Trooper Left Lower Tibia Vector Resultant Moment



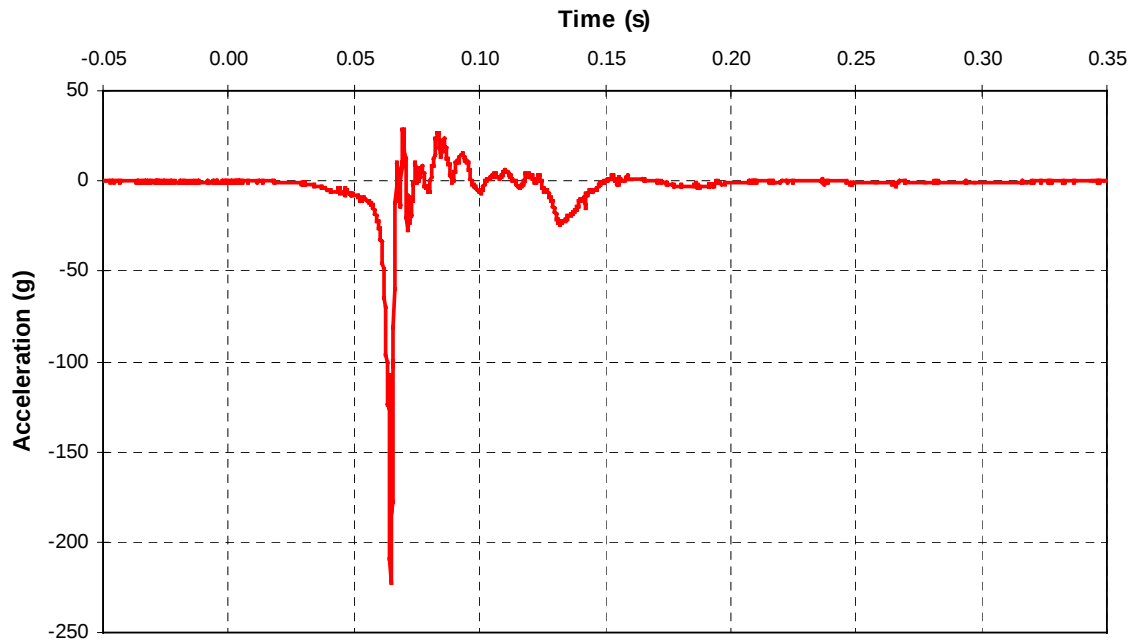
A- 32 CF00024 2001 Isuzu Trooper Left Lower Tibia Axial Force



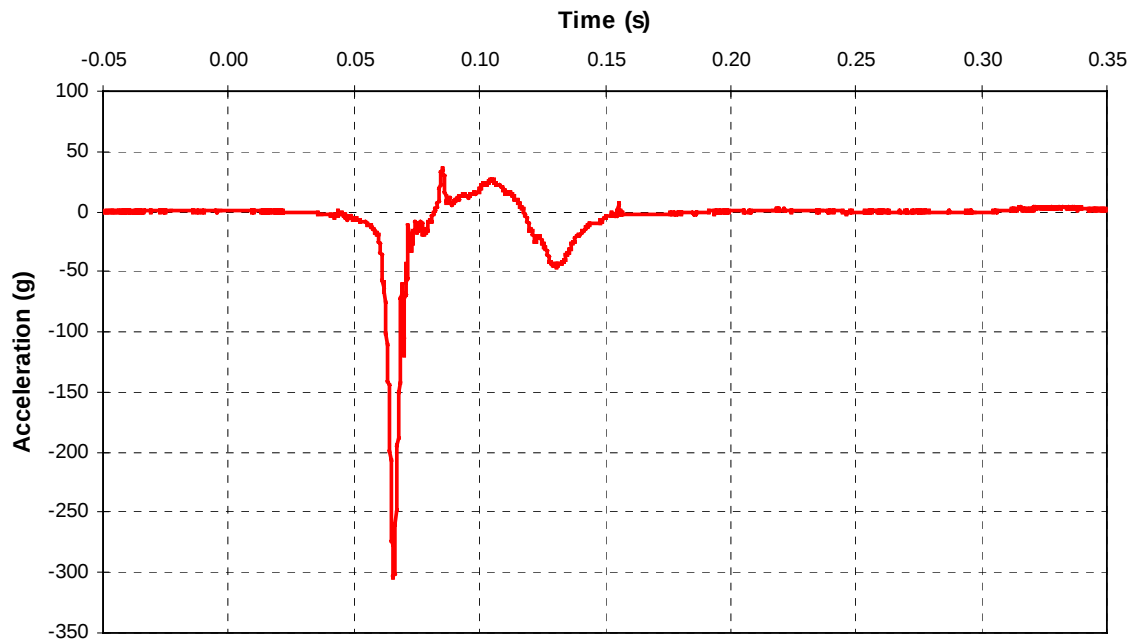
A- 33 CF00024 2001 Isuzu Trooper Left Foot Vector Resultant Acceleration



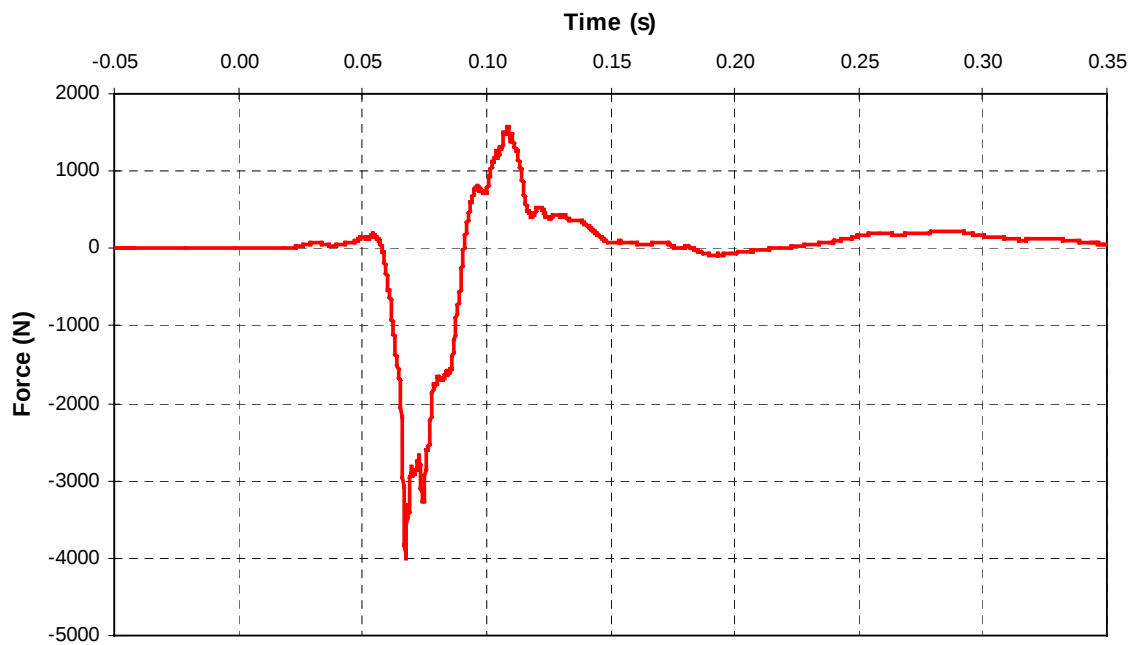
A- 34 CF00024 2001 Isuzu Trooper Left Foot A-P Acceleration



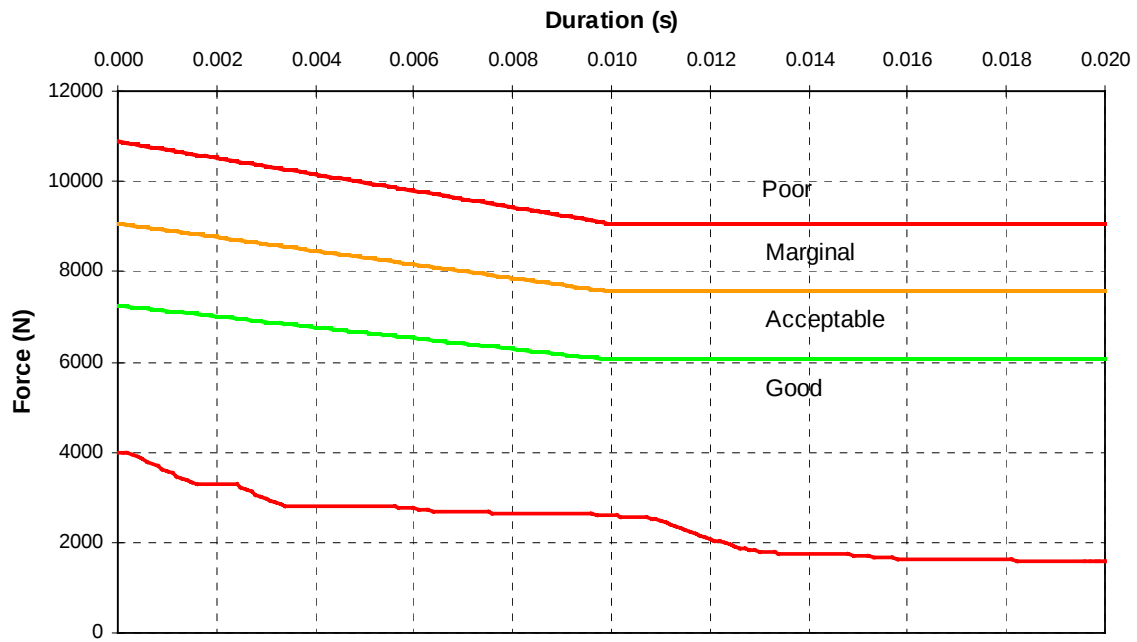
A- 35 CF00024 2001 Isuzu Trooper Left Foot I-S Acceleration



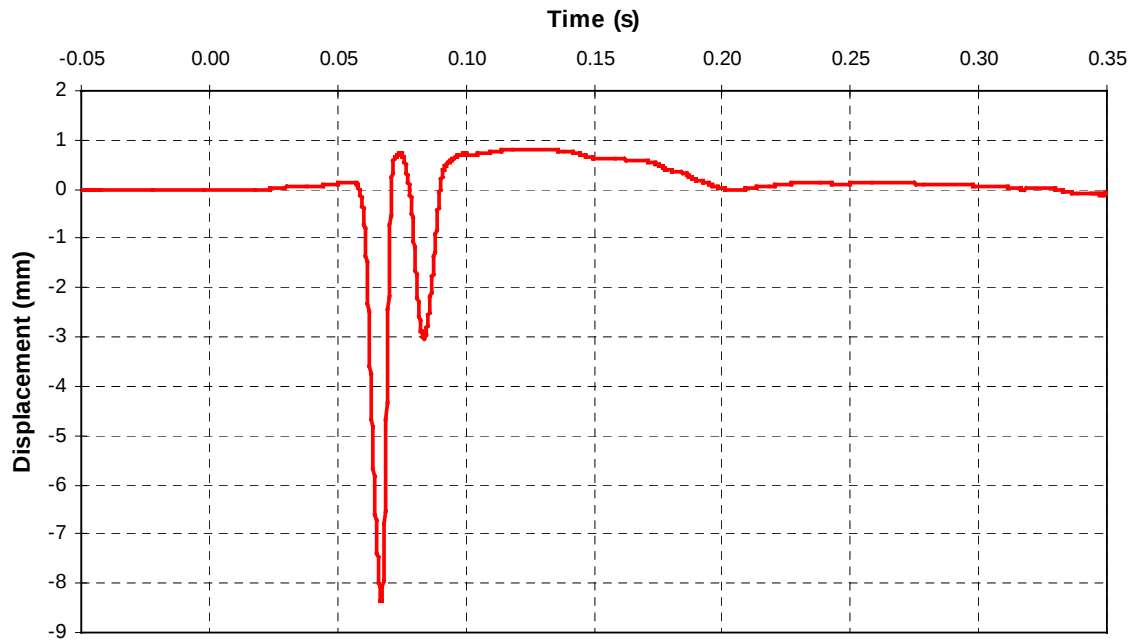
A- 36 CF00024 2001 Isuzu Trooper Right Femur Axial Force



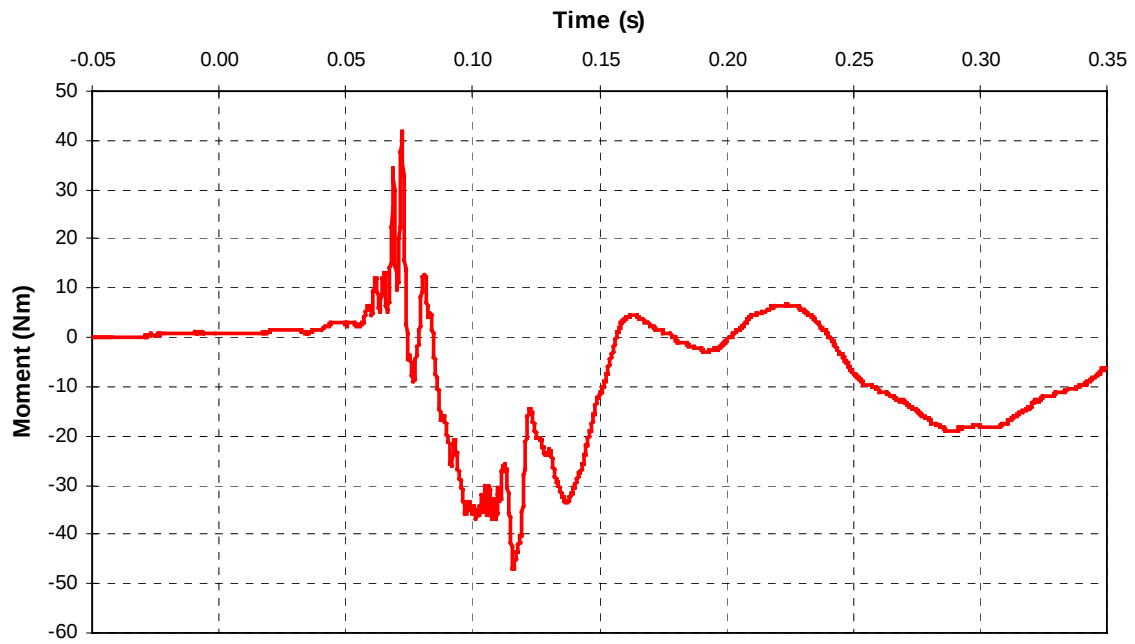
A- 37 CF00024 2001 Isuzu Trooper Right Femur Axial Force Analysis



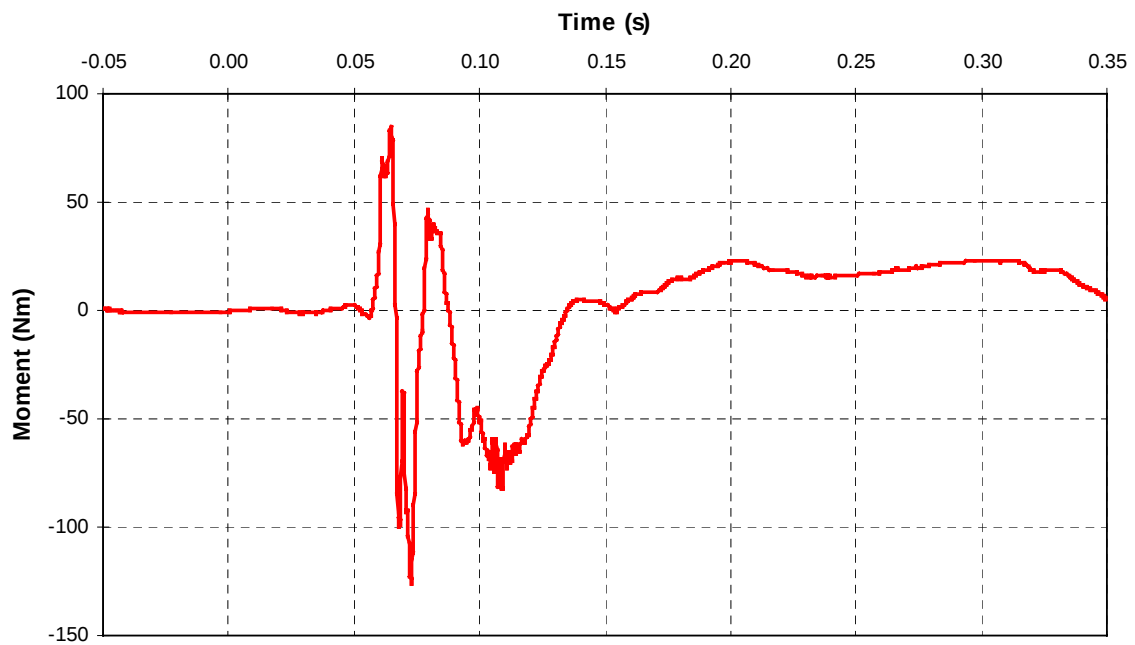
A- 38 CF00024 2001 Isuzu Trooper Right Tibia-Femur Displacement



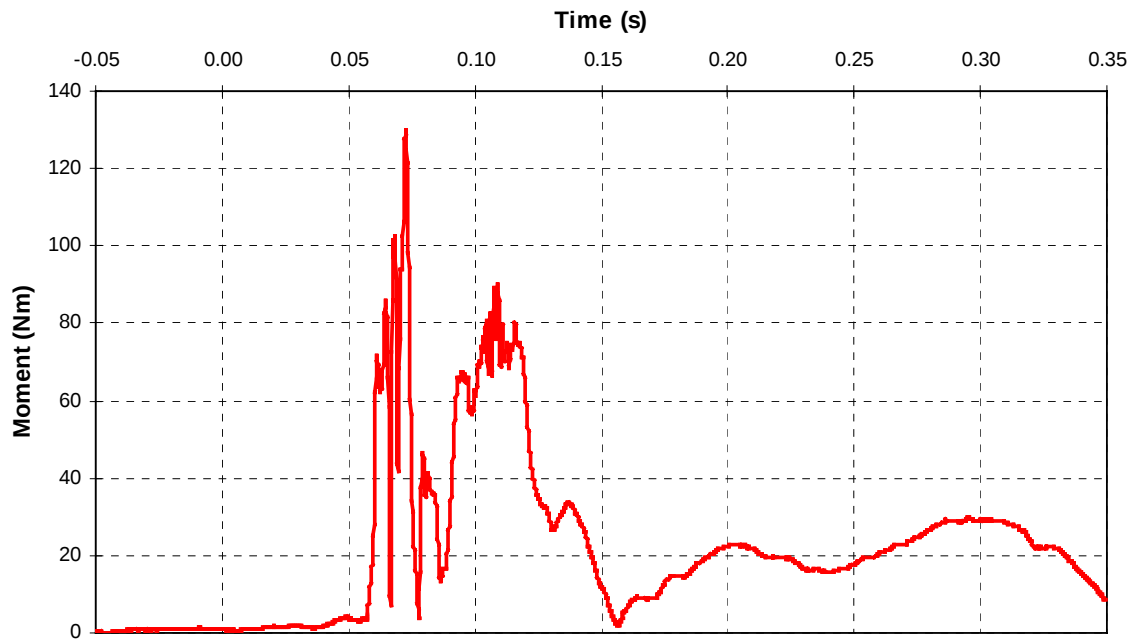
A- 39 CF00024 2001 Isuzu Trooper Right Upper Tibia L-M Moment



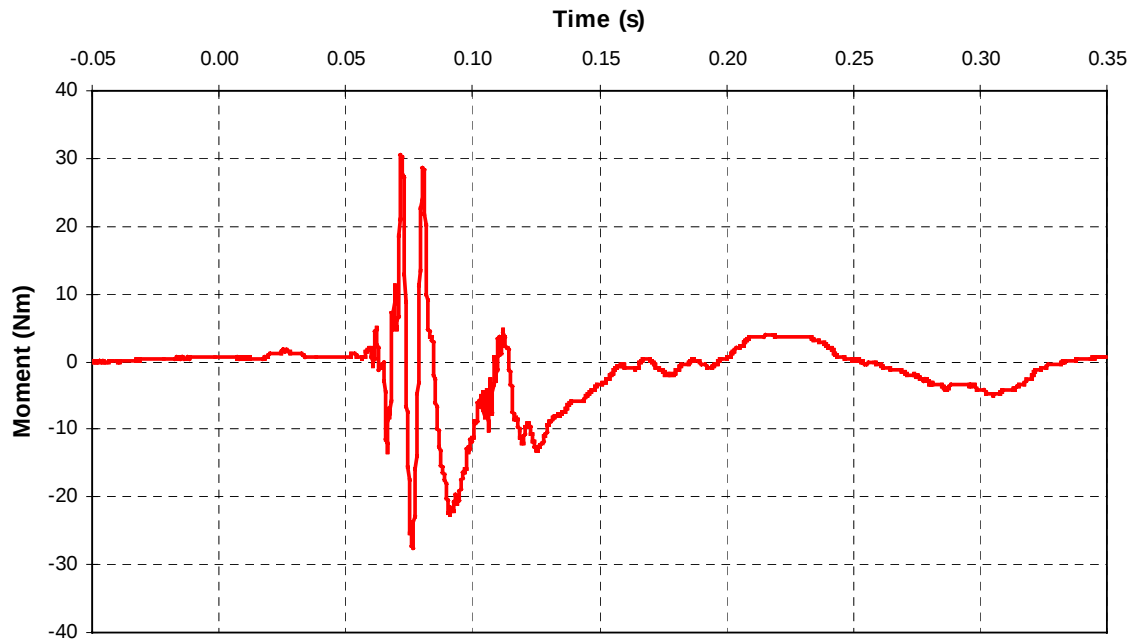
A- 40 CF00024 2001 Isuzu Trooper Right Upper Tibia A-P Moment



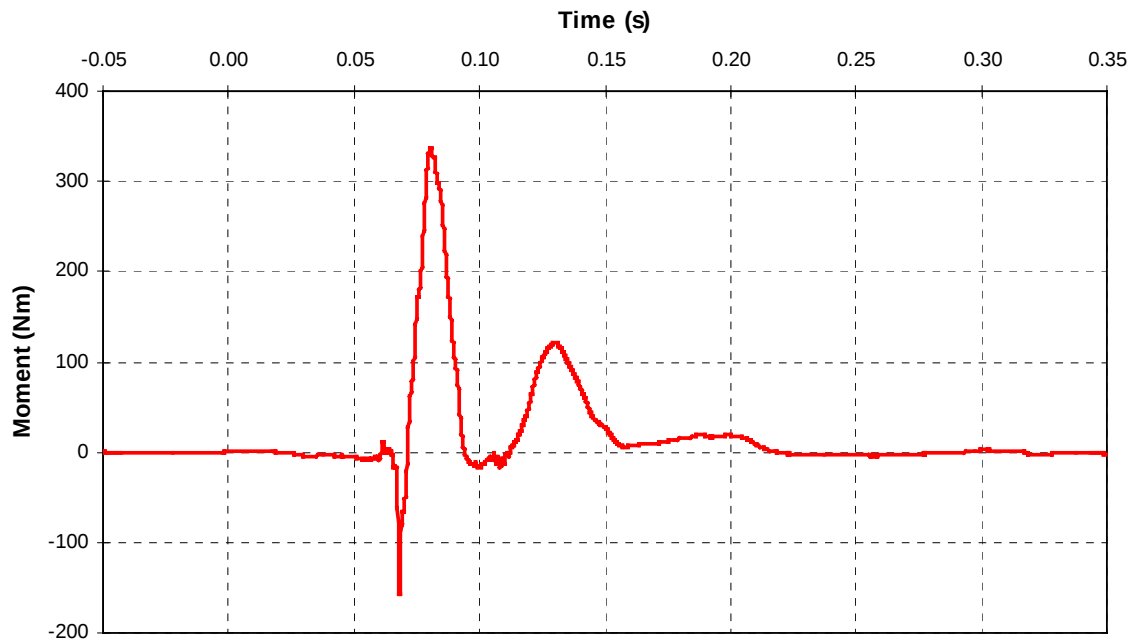
A- 41 CF00024 2001 Isuzu Trooper Right Upper Tibia Vector Resultant Moment



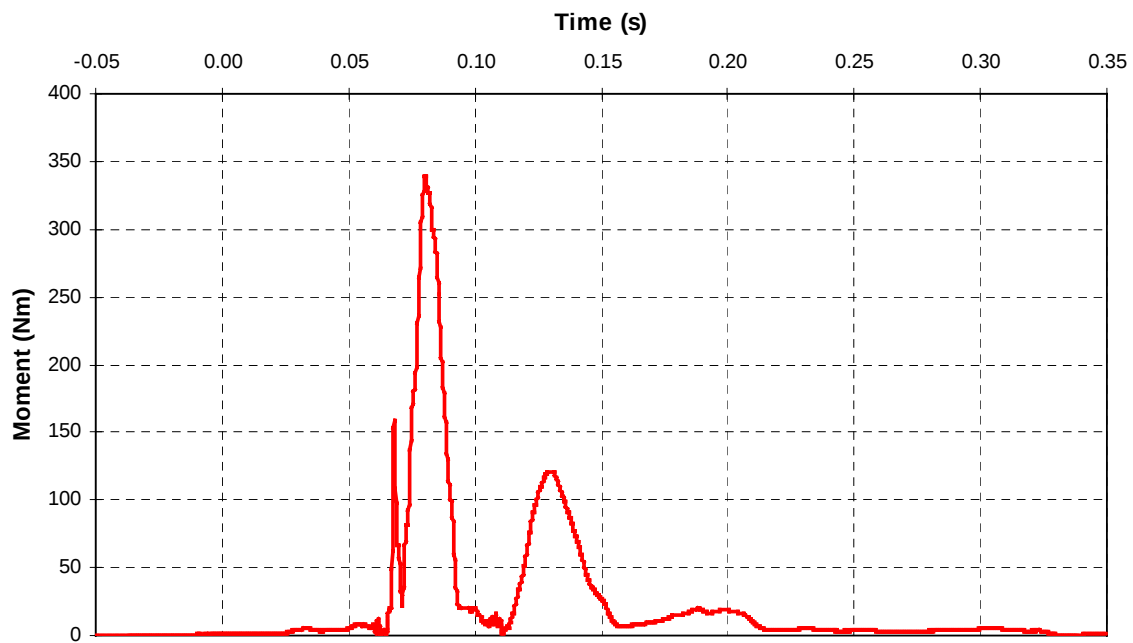
A- 42 CF00024 2001 Isuzu Trooper Right Lower Tibia L-M Moment



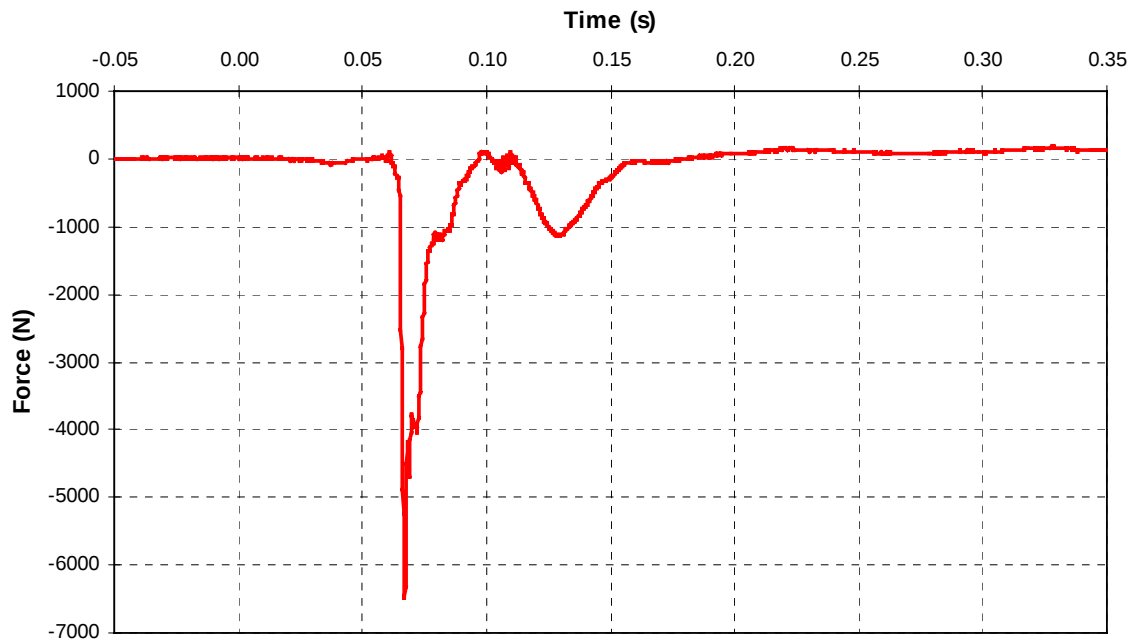
A- 43 CF00024 2001 Isuzu Trooper Right Lower Tibia A-P Moment



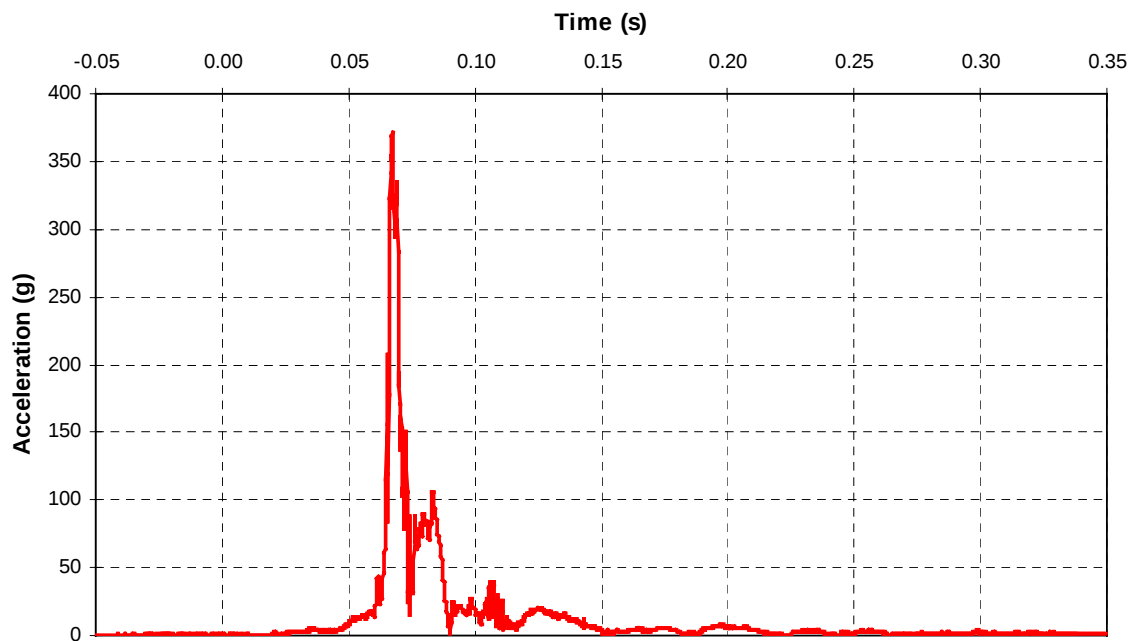
A- 44 CF00024 2001 Isuzu Trooper Right Lower Tibia Vector Resultant Moment



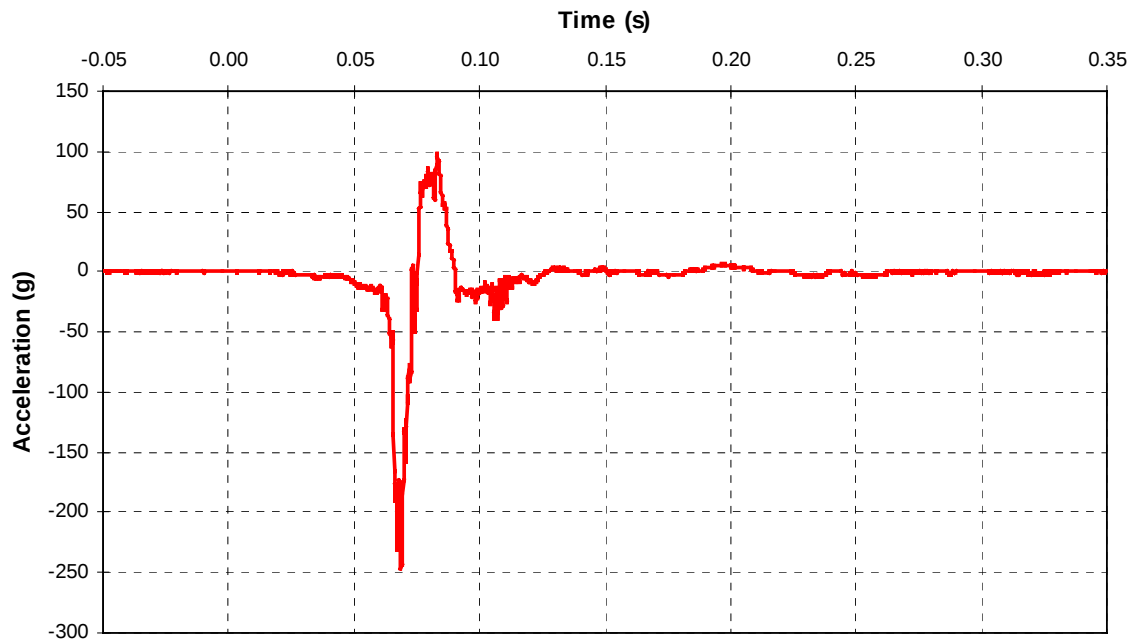
A- 45 CF00024 2001 Isuzu Trooper Right Lower Tibia Axial Force



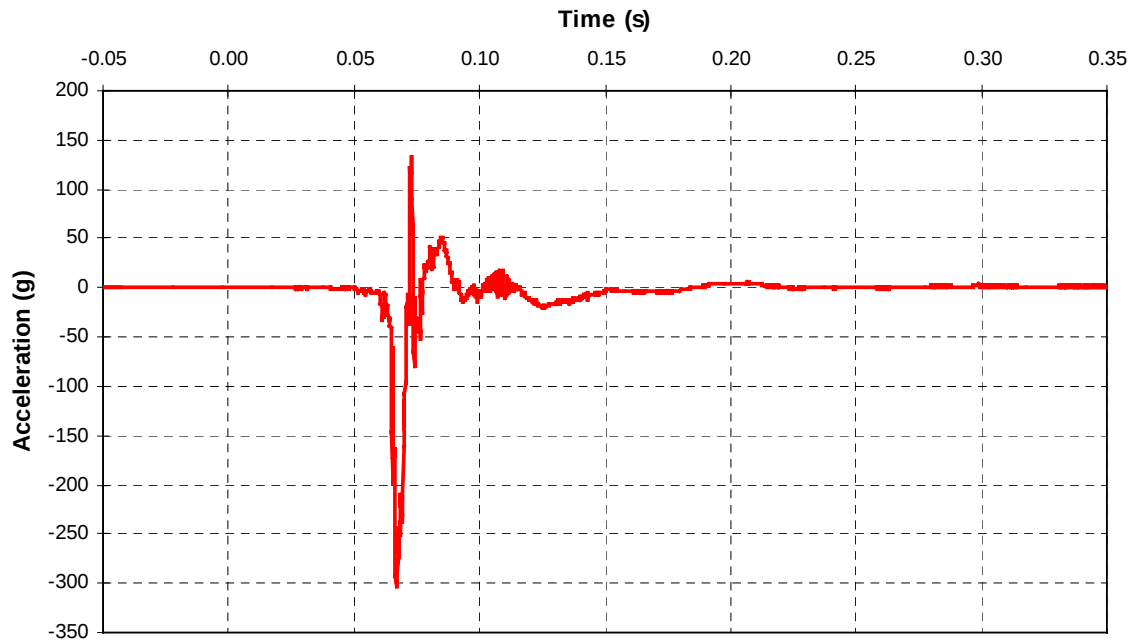
A- 46 CF00024 2001 Isuzu Trooper Right Foot Vector Resultant Acceleration



A- 47 CF00024 2001 Isuzu Trooper Right Foot A-P Acceleration



A- 48 CF00024 2001 Isuzu Trooper Right Foot I-S Acceleration



ISUZU

Go farther.

YEAR

MODEL DESCRIPTION

'01 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 BEIGE

Automatic Climate Control (CFC Free)
Power Windows & Door Locks
6-Speaker AM/FM Stereo/Cassette
4-Way Adjustable Front Seats w/Armrest
60/40 Split Folding/Reclining Rear Seat
Tilt Steering Column & Cruise Control
Center Console Storage/Fr-Rr Cup Holders
Illuminated Dr/Pass Viscr 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

36 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 **\$29,170**

OPTIONAL INSTALLED EQUIPMENT

U.S. Spec. 50 State Certified **N/C**

Destination and Handling **520**

TOTAL VEHICLE PRICE **\$29,690**

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



2001 4WD TROOPER, 3494 CC ENGINE, 6 CYL., DOHC 24V, MULTI-POINT FUEL INJECTION, 4-SPEED AUTOMATIC TRANSMISSION, CATALYST

Estimated Annual Fuel Cost **\$1,191**

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 31 mpg on the highway

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
U.S./CANADIAN PARTS CONTENT: 10%
MAJOR SOURCES OF FOREIGN PARTS CONTENT:
Japan 85%

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 Predelivery 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:
AMERICAN ISUZU MOTORS INC
13340 183RD STREET
CERRITOS CA 90702

PORT/PLANT: BALTIMORE
754
DEALER CODE: 04999
080518

SHIPPED TO: (SAME UNLESS OTHERWISE INDICATED)
04992
PUBLIC RELATIONS
16323 SHOEMAKER AVE.
CERRITOS CA 90702

VIN NO. JACDJ58X017J00085



PEEL BACK HERE →