Insurance Institute for Highway Safety
Crashworthiness Evaluation

Crash Test Report
2001 Isuzu Trooper (CF00029)

Vehicle identification number: JACDJ58X617J04920
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:	114 cm
Curb weight:	1,991 kg
Test weight:	2,124 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:

November 2, 2000

Figure 1
Precrash and Postcrash Side Views — 2001 Isuzu Trooper

Summary

A 2001 Isuzu Trooper was crash tested on November 2, 2000 into a fixed deformable barrier at 39.9 mi/h (64.2 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 1-2 cm. Resultant intrusion in the driver footwell measured 21 cm at the footrest and 21-23 cm at other places on the toepan. All doors remained closed during the crash. After the crash, the driver door and right front and left rear doors required additional effort but no tools to open, and the right rear door opened with ease.

The driver dummy was restrained by a three-point lap/shoulder belt and an airbag. During the crash, 17 cm of webbing spooled off the retractor. The deploying airbag contacted the dummy's chin. 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 upper portion of the B-pillar and the head restraint. After the crash, the upper end of the steering column had moved upward 21 cm and forward 2 cm.

The maximum resultant head acceleration from the steering wheel rim contact was 74 g. The maximum left upper tibia L-M moment was –176 Nm, the maximum left lower tibia resultant moment was 186 Nm, and the maximum left tibia axial force was –10.9 kN, resulting in an upper tibia index of 1.08 and a lower tibia index of 1.04. The maximum resultant left foot acceleration was 300 g. The maximum right tibia axial force was –6.6 kN, and the maximum right lower tibia A-P moment was 233 Nm, significantly contributing to the right lower tibia index of of 1.07. The maximum resultant right foot acceleration was 345 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.

Before the test, an Isuzu representative at the Institute's test facility replaced a segment of the fuel hoses routed between the transmission housing and the firewall. The replacement segment included a tougher sheathing and was identical to the type that was to be retrofitted onto certain Troopers as part of a safety-related recall announced by Isuzu in November 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 35 cm behind its center of gravity (176 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 40 percent.

Structural Performance

All doors remained closed during the crash. The driver door aperture shortened 2 cm, as measured at the lower edge of the window. After the crash, the driver door and right front and left rear doors required additional effort but no tools to open, and the right rear door opened with ease.

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

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

Figure 2
Overhead View of Crash Deformation — 2001 Isuzu Trooper

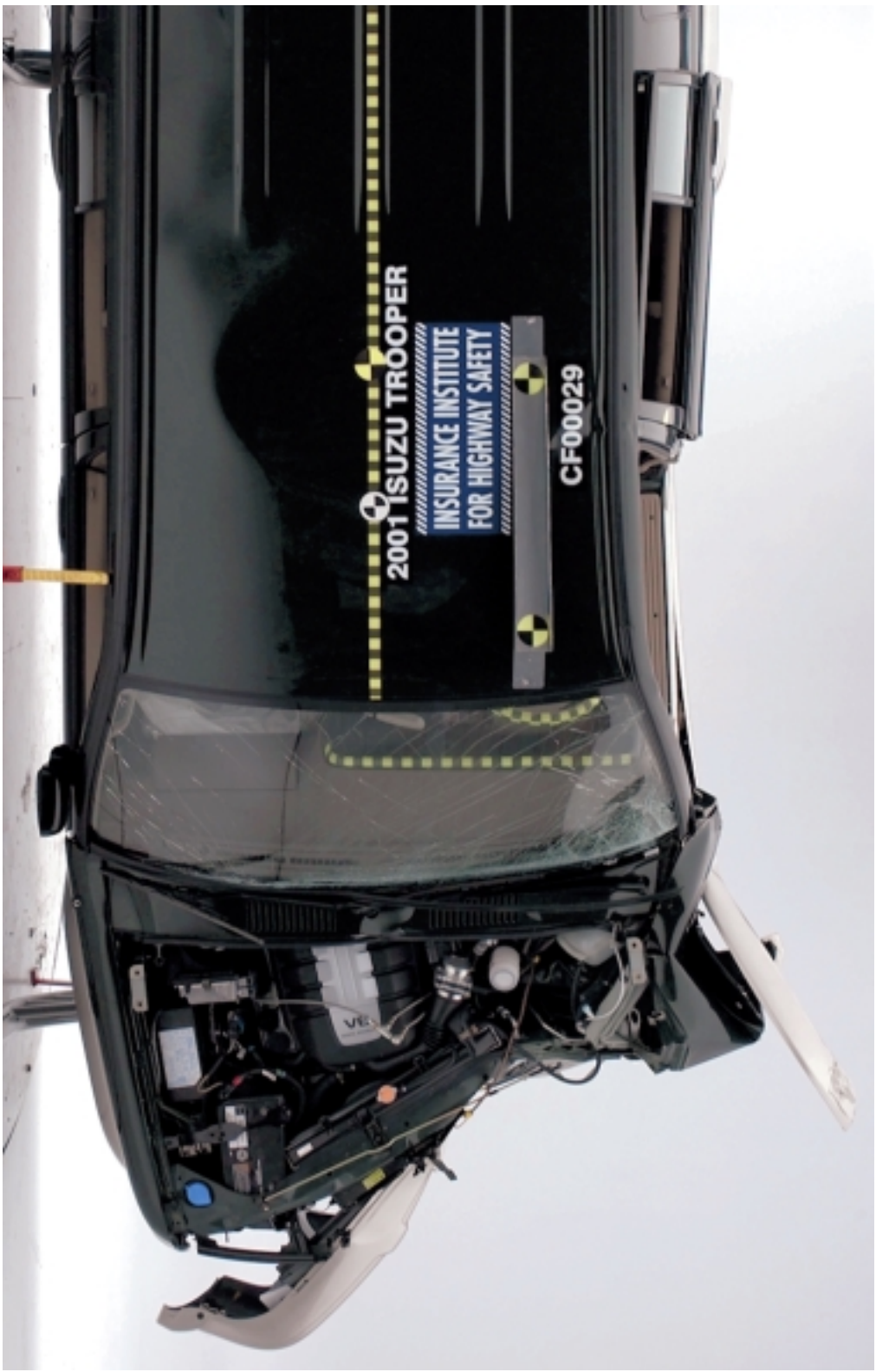
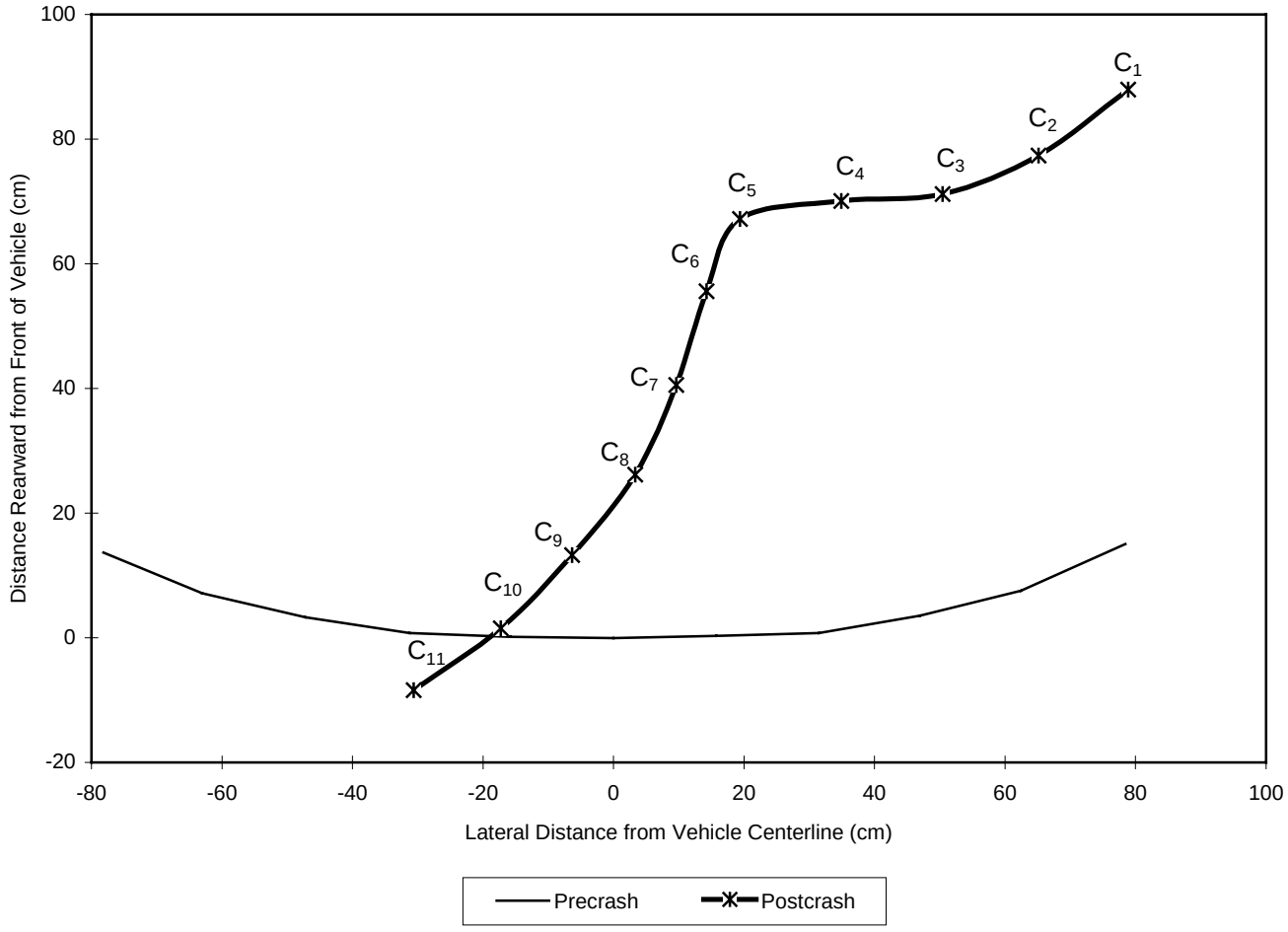


Figure 3
Front Bumper Cover Crush Contour — 2001 Isuzu Trooper



	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)	88	77	71	70	67	56	41	26	13	2	–8
Precrash Contour (cm)	15	8	4	1	0	0	0	1	3	7	14
Resulting Crush (cm)	73	69	67	69	67	56	41	25	10	–5	–22

The length of the reference line was 157 cm precrash and 109 cm postcrash.

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

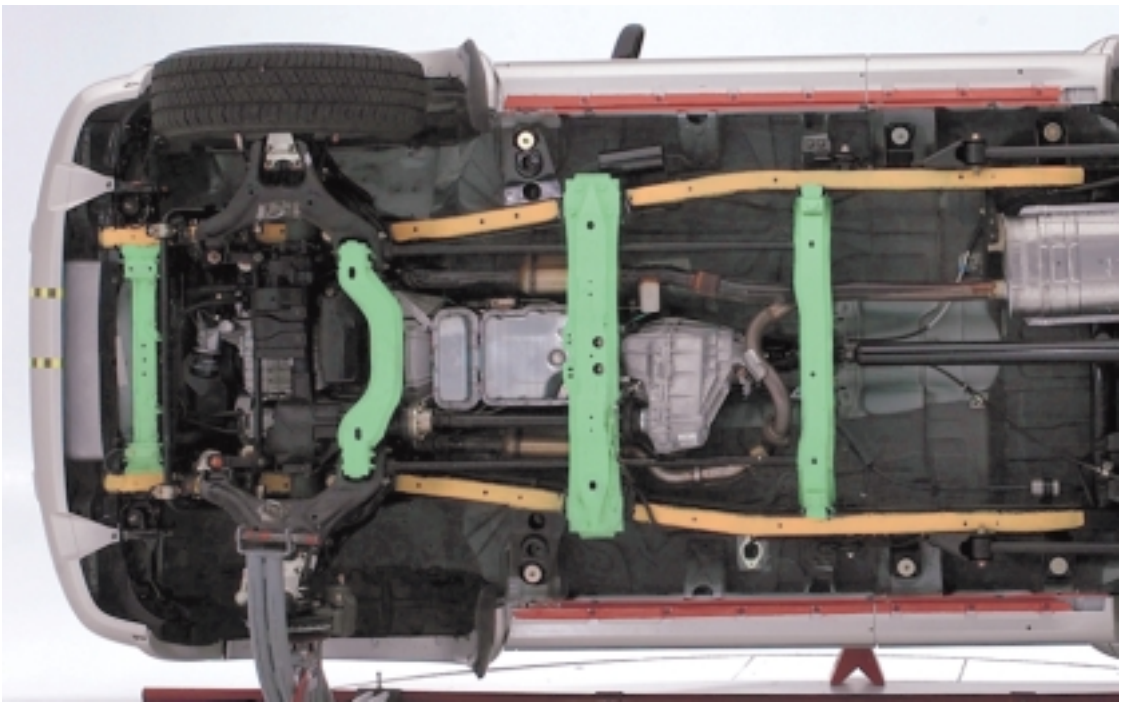
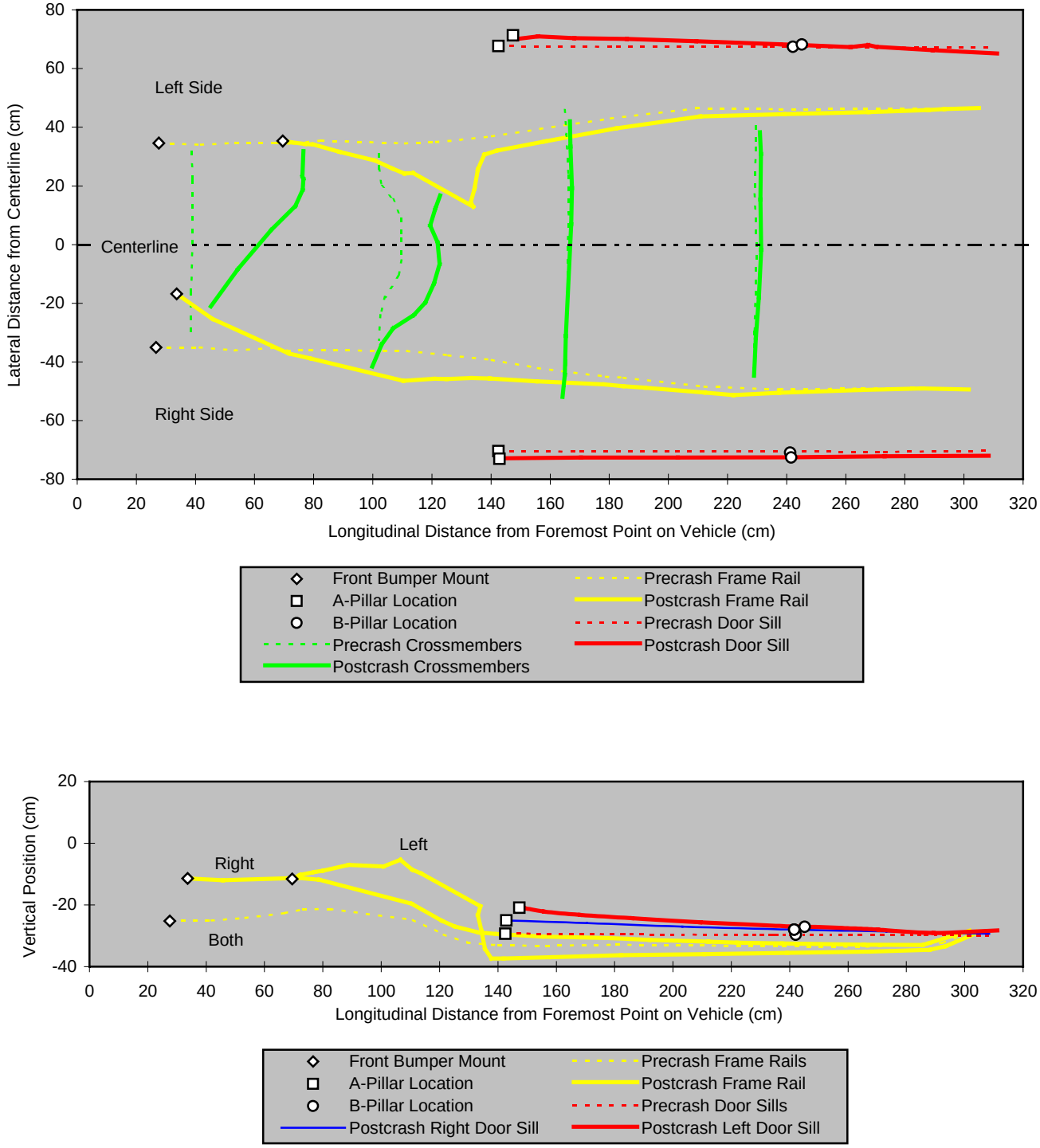


Figure 5
Structural Deformation, Views from Below and Side — 2001 Isuzu Trooper



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)	2	2	21	22
Left lower instrument panel (cm)	–2	0	6	6
Right lower instrument panel (cm)	–1	0	7	7
Brake pedal (cm)	–17	–5	9	20
Left toepan (cm)	–20	–1	7	21
Center toepan (cm)	–22	–2	6	23
Right toepan (cm)	–22	–2	7	23
Footrest (cm)	–19	–2	7	21
Average displacement of the four seat-attachment bolts relative to reference system (cm)	–2	1	–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 positions D and E indicated the airbag deployed at 42 ms into the crash and appeared to be fully inflated at 68 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, 17 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. 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 21 cm and forward 2 cm relative to the driver seat.

Dummy Kinematics

Head, Neck, and Torso

Analysis of the high-speed film taken from camera position D indicated the deploying airbag contacted the dummy's chin at 52 ms into the crash and then receded by 60 ms. The face began to load the airbag at 70 ms (2 ms after full inflation). Paint transferred from the dummy's face indicated the nose loaded the airbag 5 cm above and 1 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 and upward head accelerations and neck tension and a decrease in the neck A-P bending moment, all occurring at the same time (98 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 left upper rear side of the head grazed the B-pillar trim above the shoulder belt upper anchorage D-ring at about 326 ms. At about the same time, the right rear of the head contacted the upper outboard corner of the head restraint. 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	42
Airbag contacts face during deployment	52
Airbag fully inflated	68
Face begins to load airbag	70
Head and neck contact steering wheel	98
Rear side of head grazes B-pillar	326

Figure 6
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 flat part of the knee bolster 5 cm directly above 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 and the right edge of the knee bolster protrusion underneath the column. Paint transferred from the dummy's left shin indicated the shin contacted the bolster directly below the initial knee impact location. The left foot was found somewhat dorsiflexed and somewhat everted, with the medial toe pressed against the intruded toepan to the right of the footrest. 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 initially contacted the flat portion of the knee bolster 2 cm above and 2 cm to the left of the right instrument panel intrusion reference point as well as the right edge of the bolster protrusion under the steering column. The leg then moved to the right, and the knee contacted the left edge of the lower center instrument panel. Paint transferred from the dummy's right shin indicated the shin contacted the flat part of the knee bolster below the initial knee contact location. The right foot was found somewhat dorsiflexed and somewhat inverted, with the lateral sole of the forefoot pressed against the accelerator pedal, which was almost fully depressed. The lateral edge of the forefoot had pressed against and broken the plastic side trim of the center console, and the lateral back of the heel was 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 74 g at 102 ms. The head acceleration from the B-pillar contact was not readily distinguishable. 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	74	102
Vector resultant acceleration — 3 ms clip (g)	80	64	101-104
Head Injury Criterion (HIC)	1000	570	83-119
Head Injury Criterion — 15 ms interval (HIC-15)*	700	390	95-110

* 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	0.4	99
Axial compression force (kN)	4.0	0.1	306
Axial tension force (kN)	3.3	2.1	104
Flexion bending moment (Nm)	310	10	193
Extension bending moment (Nm)	122	24	102

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	51	115-118
Rib compression (mm)	–50	–34	116
Sternum deflection rate (m/s)	–8.2	–1.9	71

Legs and Feet

Left leg and foot: The maximum left upper tibia L-M moment was –176 Nm at 68 ms, the maximum left lower tibia resultant moment was 186 Nm at 70 ms, and the maximum left tibia axial force was –10.9 kN at 68 ms, resulting in an upper tibia index of 1.08 at 68 ms and a lower tibia index of 1.04, also at 68 ms. The maximum resultant left foot acceleration was 300 g at 67 ms.

The left upper tibia A-P bending moment had a time signature similar to the tibia axial force from about 64 to 71 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 1.08 at 68 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 –6.6 kN at 69 ms, and the maximum right lower tibia A-P moment was 233 Nm at 86 ms, significantly contributing to the right lower tibia index of 1.07 at 86 ms. The maximum resultant right foot acceleration was 345 g at 70 ms.

The right upper tibia A-P bending moment had a time signature similar to the tibia axial force from about 67 to 80 ms (Figures A-40 and A-45). 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 right upper tibia index of 1.07 at 86 ms was calculated from only the upper tibia L-M moment and tibia axial force.

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*	–5.3	68	–3.4	71
Tibia-femur displacement (mm)	–15	–8	76	–6	69
Upper Tibia					
L-M moment (Nm)	±225	–176	68	71	70
A-P moment (Nm)	±225	**	n/a	**	n/a
Vector resultant moment (Nm)	225	**	n/a	**	n/a
Index	1.00	1.08	68	0.49	70
Lower Tibia					
L-M moment (Nm)	±225***	–149	67	–122	76
A-P moment (Nm)	±225***	153	69	233	86
Vector resultant moment (Nm)	225***	186	70	237	86
Axial force (kN)	–8.0***	–10.9	68	–6.6	69
Index	1.00	1.04	68	1.07	86
Foot					
A-P acceleration (g)	±150	–120	66	–232	71
I-S acceleration (g)	±150	–295	67	–260	70
Vector resultant acceleration (g)	150	300	67	345	70

* 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

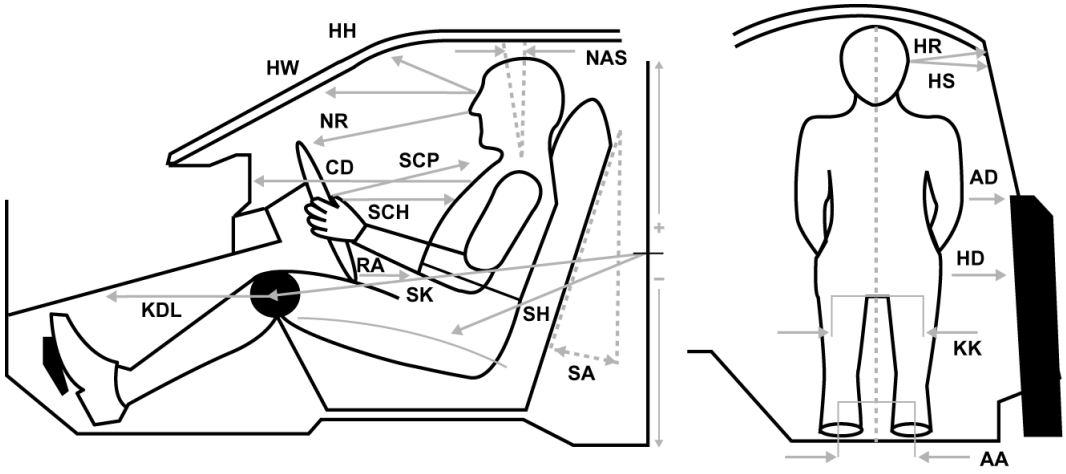
Dummy Clearance Measurements

Test Number: CF00029
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

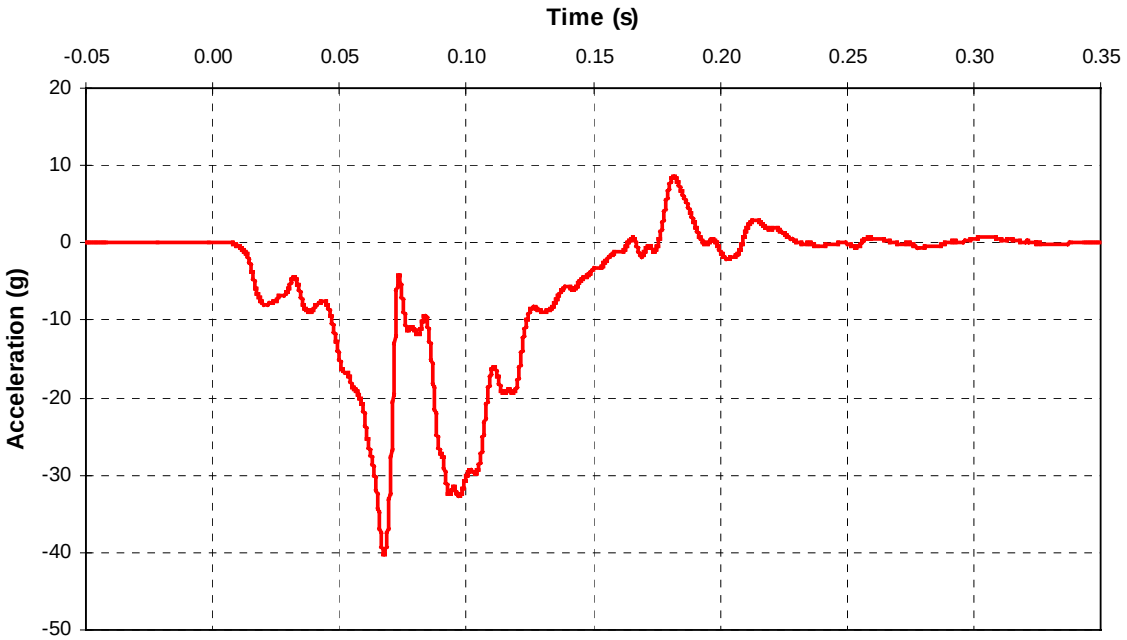
Location	Code	Measure	Location	Code	Measure
Head to header	HH	399	Neck angle, torso 90	NAT90	21.1°
Head to windshield	HW	567	Neck angle, seated	NAS	6.7°
Nose to rim	NR	397	Torso angle (NAT90 – NAS)	TA	14.4°
Chest to dash	CD	564	Striker to knee*	SK	617
Rim to abdomen	RA	142	Striker to knee angle*	SKA	2.7°
Knee to dash, left	KDL	179	Striker to H-point, horizontal	SHH	217
Knee to dash, right	KDR	168	Striker to H-point, vertical	SHV	–7
Steering wheel to chest, horizontal	SCH	266	Ankle to ankle	AA	312
Steering wheel to chest, perpendicular	SCP	396	Knee to knee	KK	341
Steering wheel to chest, reference	SCR	356	Arm to door	AD	89
Hub to chest, minimum	HCM	202	H-point to door	HD	112
Pelvic angle	PA	22.1°	Head to A-pillar	HA	540
Seat back angle	SA	18.1°	Head to roof	HR	222
			Head to side window	HS	228

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

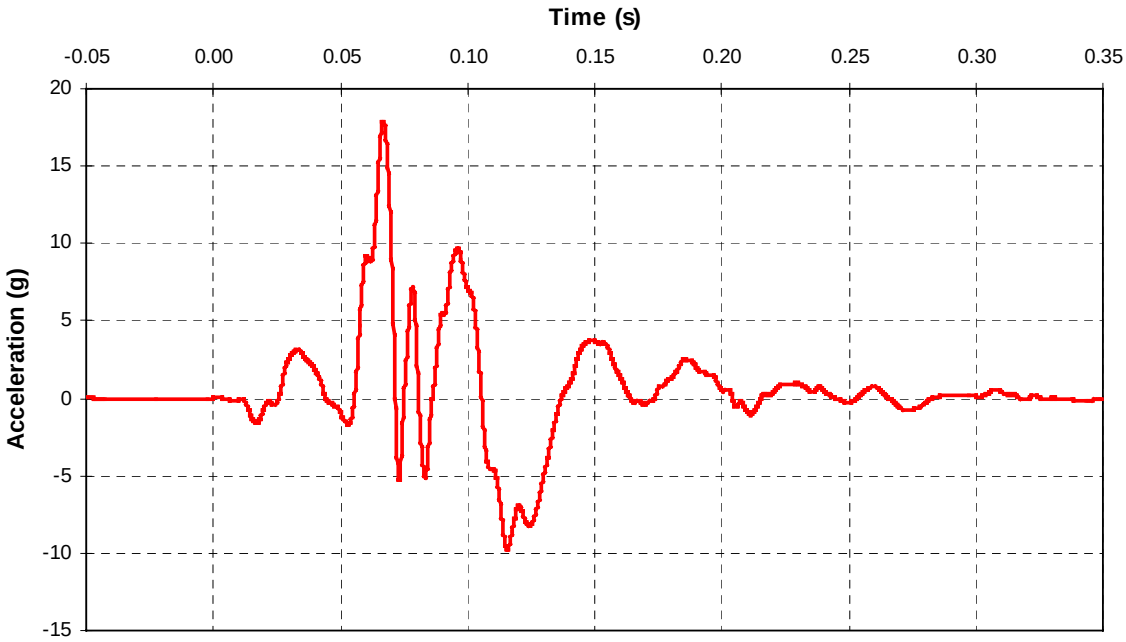


Graph Index

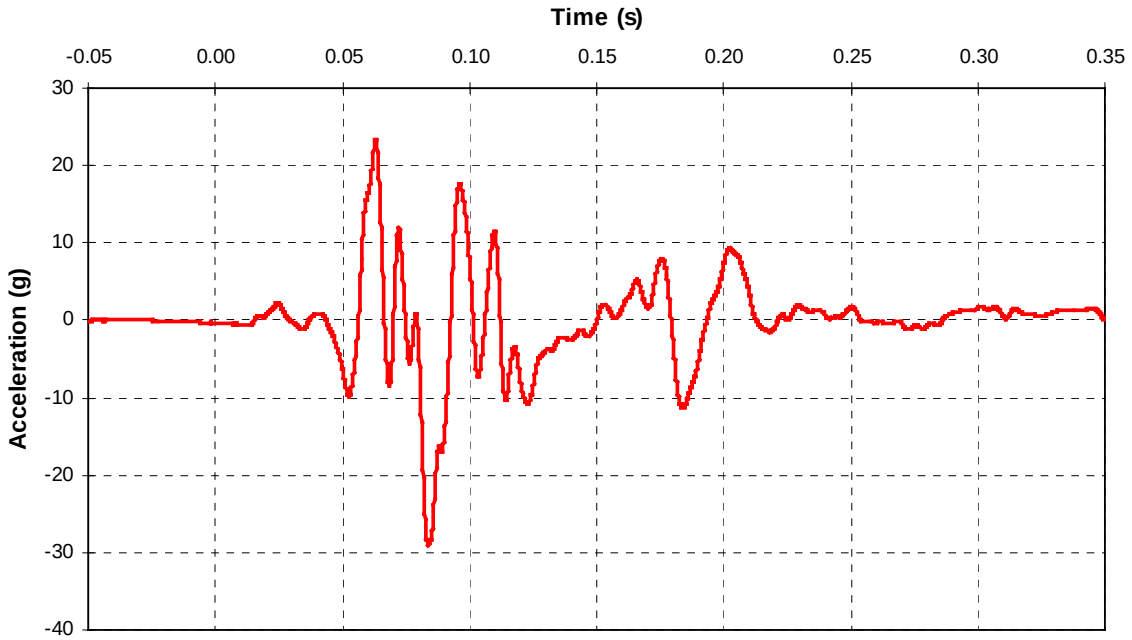
A- 1 CF00029 2001 Isuzu Trooper Vehicle Longitudinal Acceleration



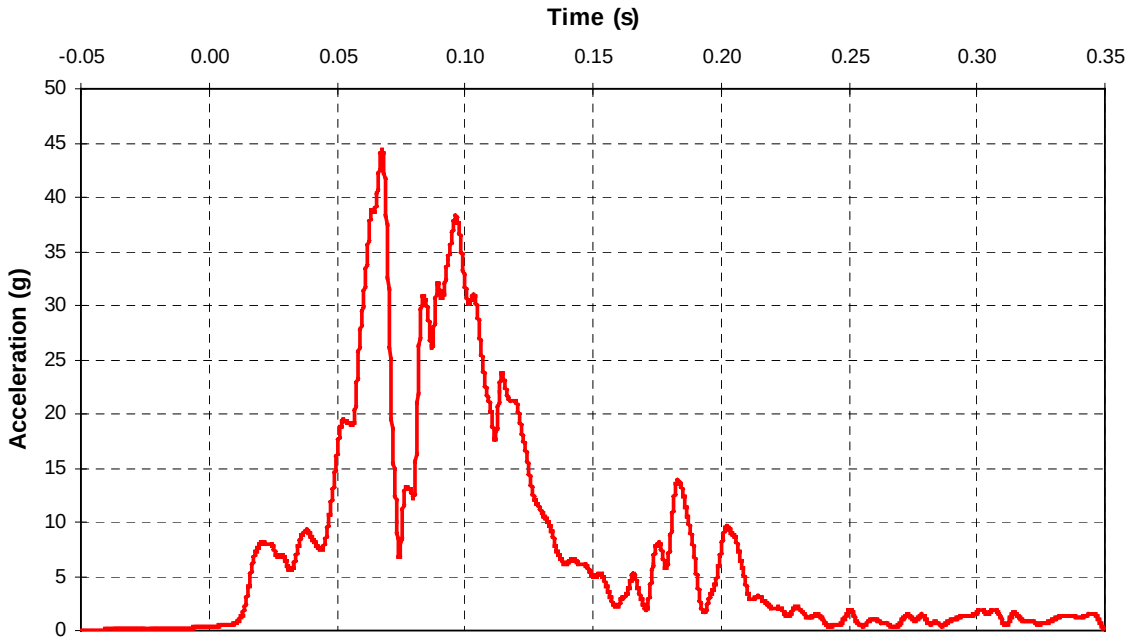
A- 2 CF00029 2001 Isuzu Trooper Vehicle Lateral Acceleration



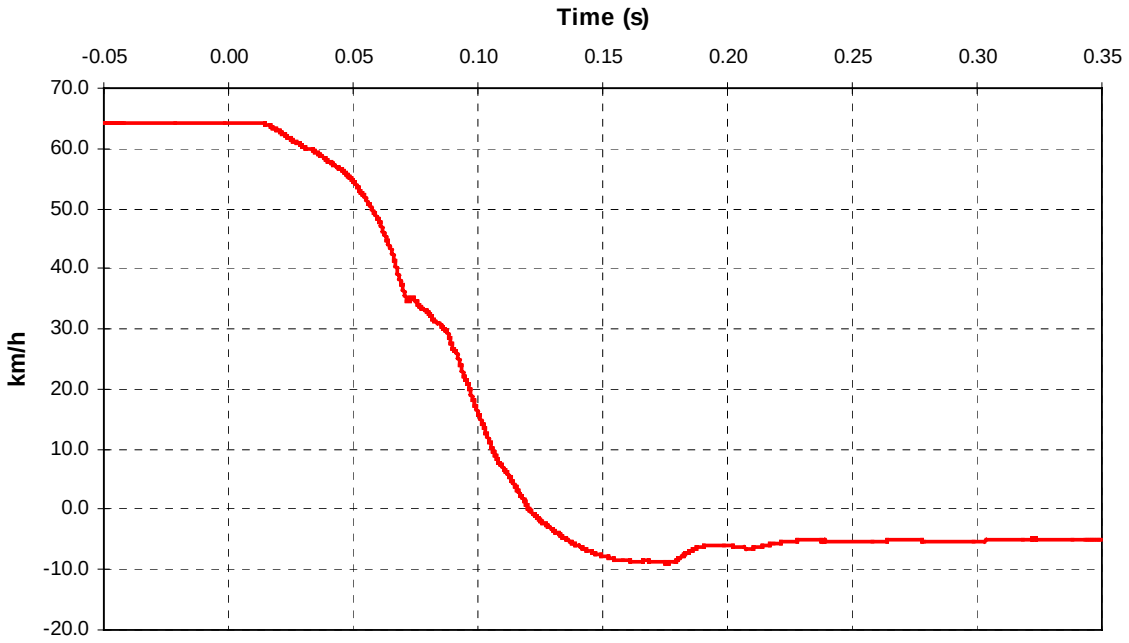
A- 3 CF00029 2001 Isuzu Trooper Vehicle Vertical Acceleration



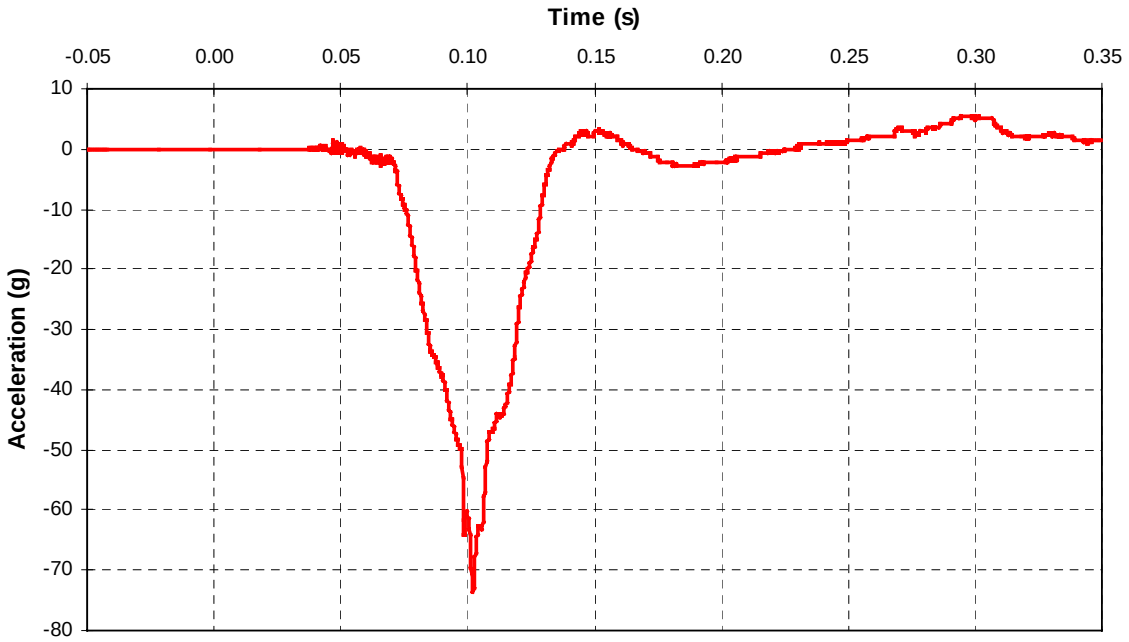
A- 4 CF00029 2001 Isuzu Trooper Vehicle Vector Resultant Acceleration



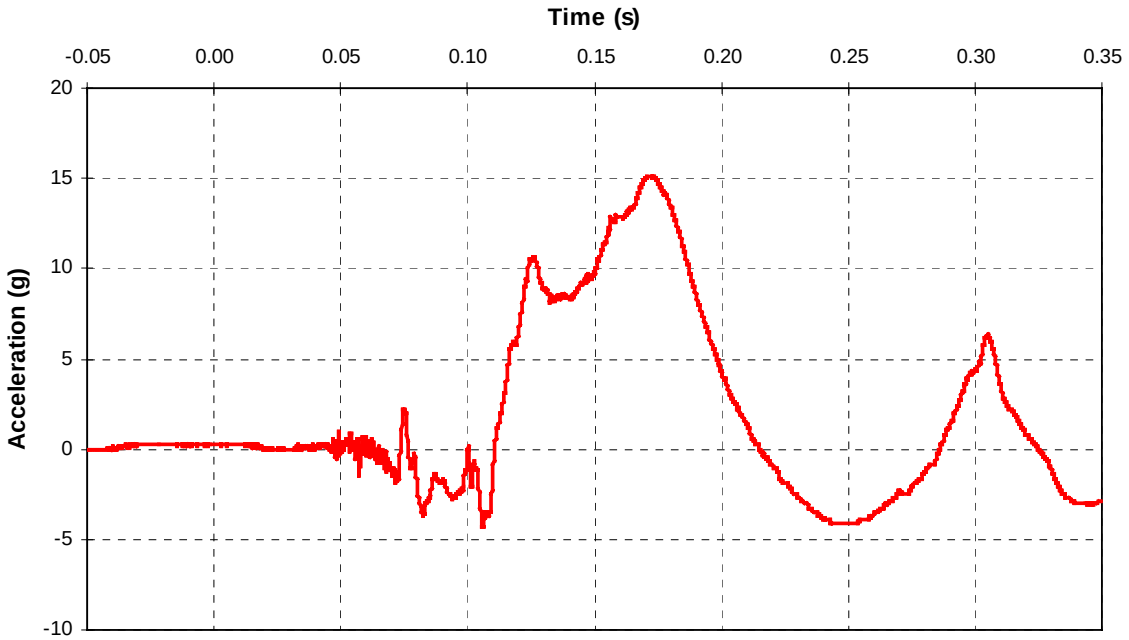
A- 5 CF00029 2001 Isuzu Trooper Integration of Vehicle Longitudinal Acceleration



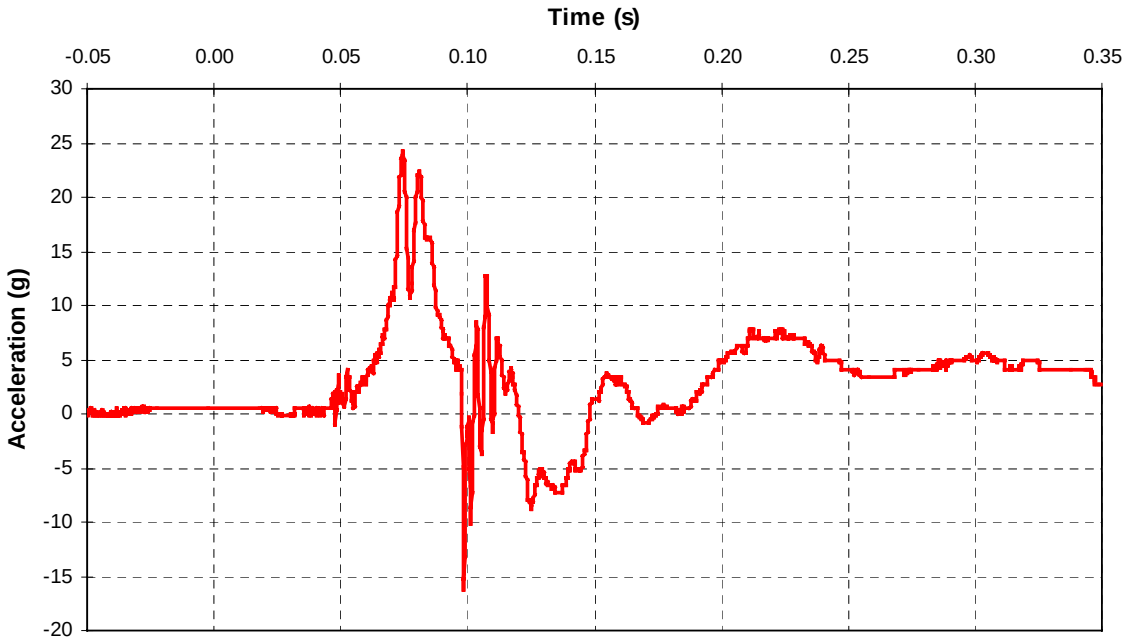
A- 6 CF00029 2001 Isuzu Trooper Head A-P Acceleration



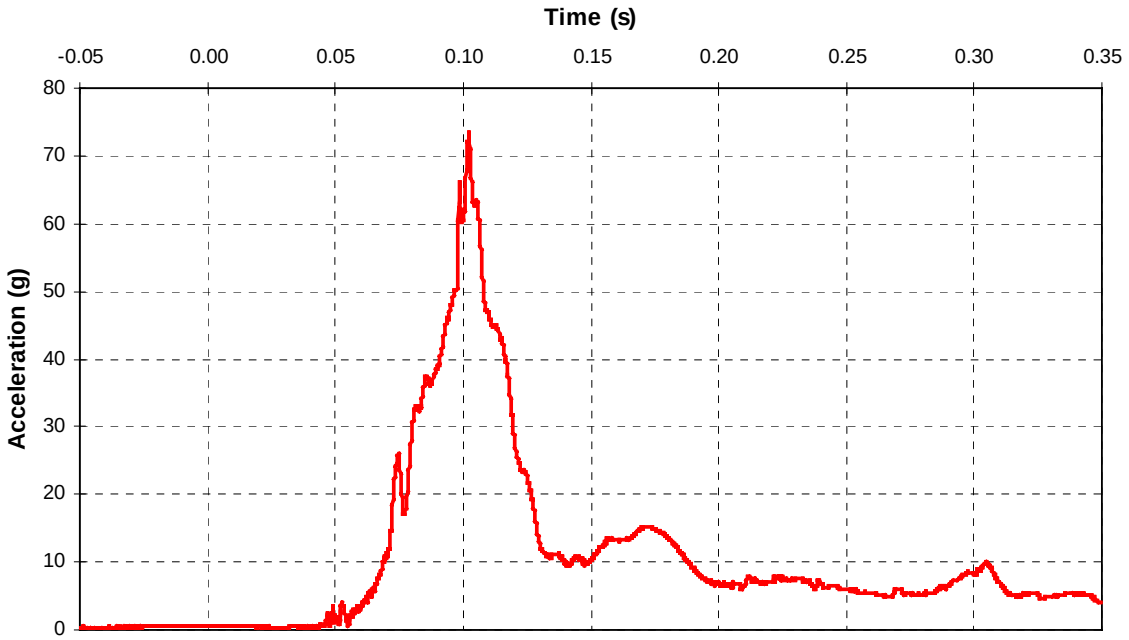
A- 7 CF00029 2001 Isuzu Trooper Head L-M Acceleration



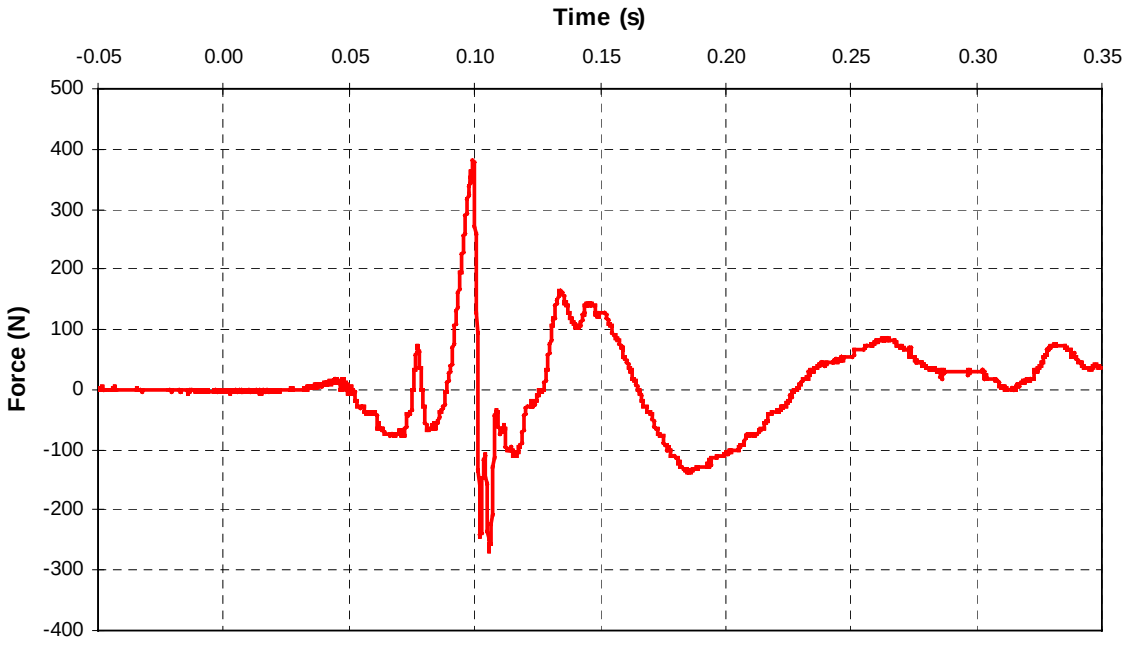
A- 8 CF00029 2001 Isuzu Trooper Head I-S Acceleration



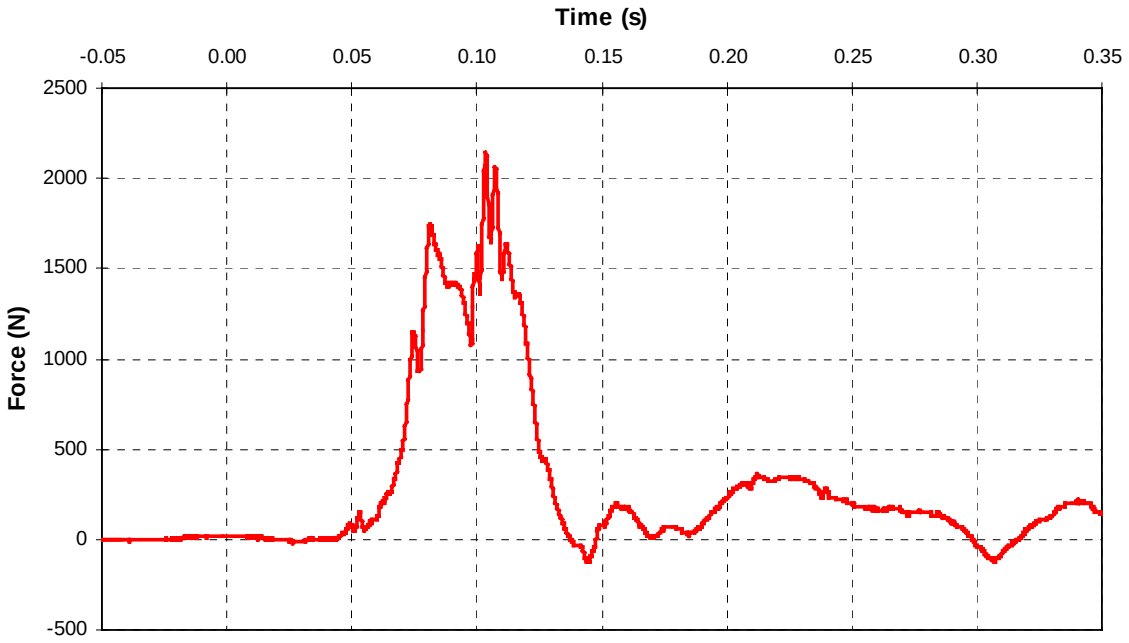
A- 9 CF00029 2001 Isuzu Trooper Head Vector Resultant Acceleration



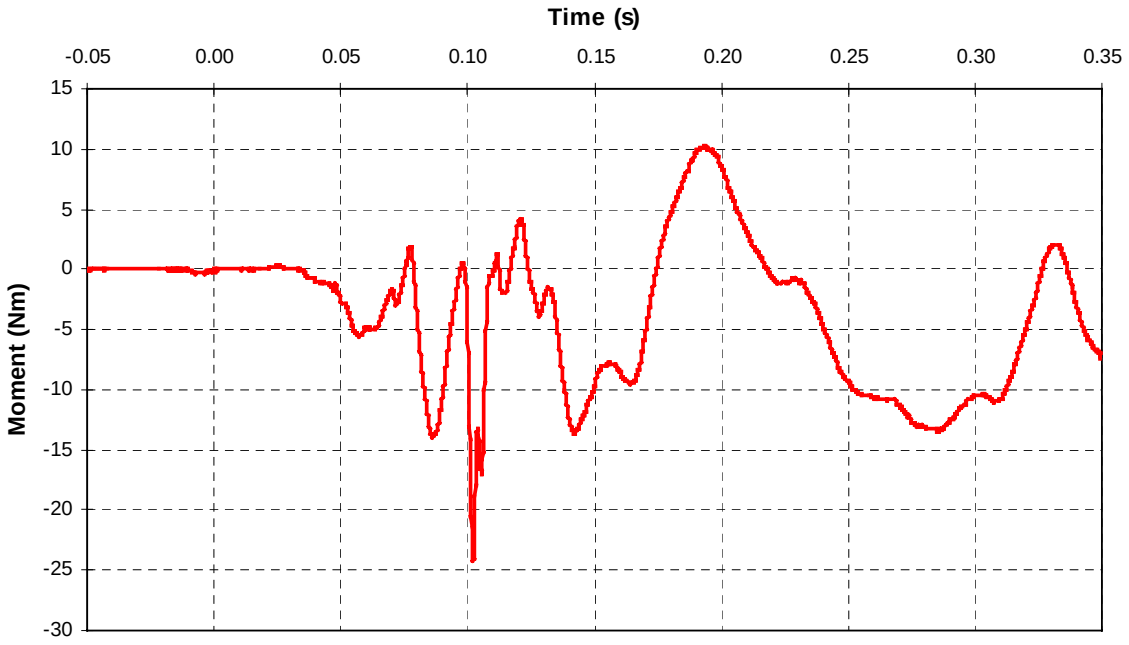
A- 10 CF00029 2001 Isuzu Trooper Neck A-P Shear Force



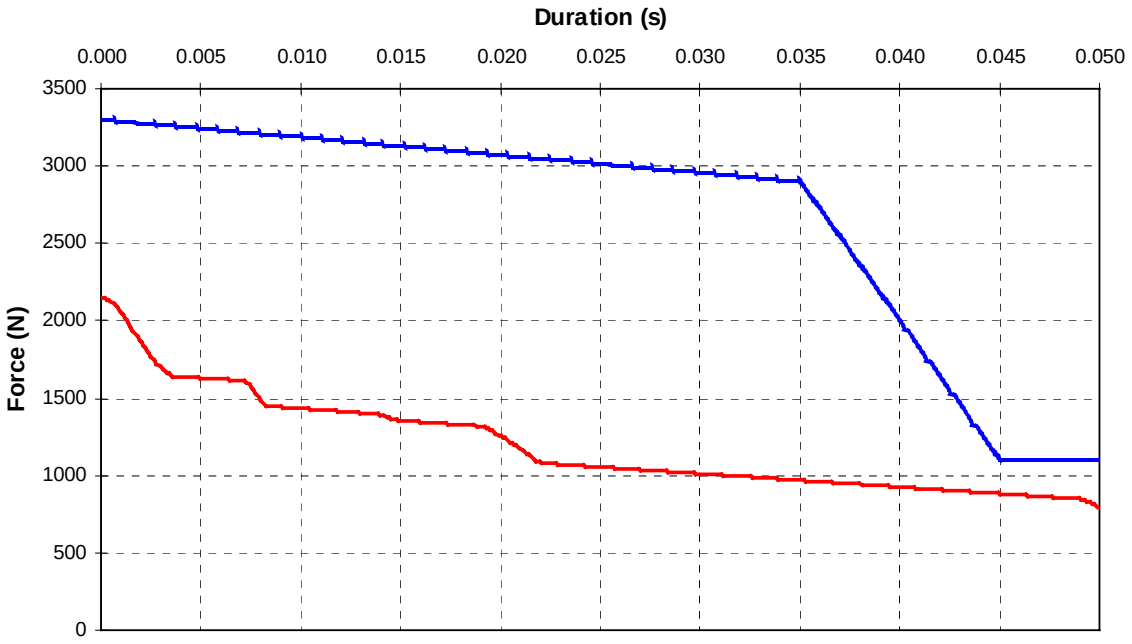
A- 11 CF00029 2001 Isuzu Trooper Neck Axial Force



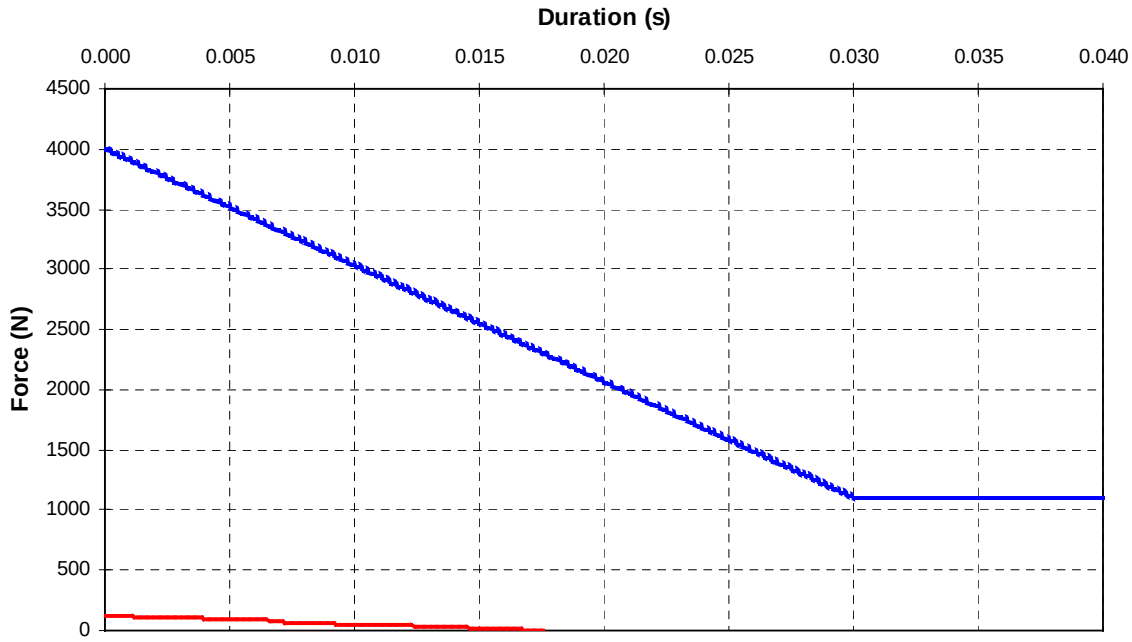
A- 12 CF00029 2001 Isuzu Trooper Neck Occipital A-P Moment



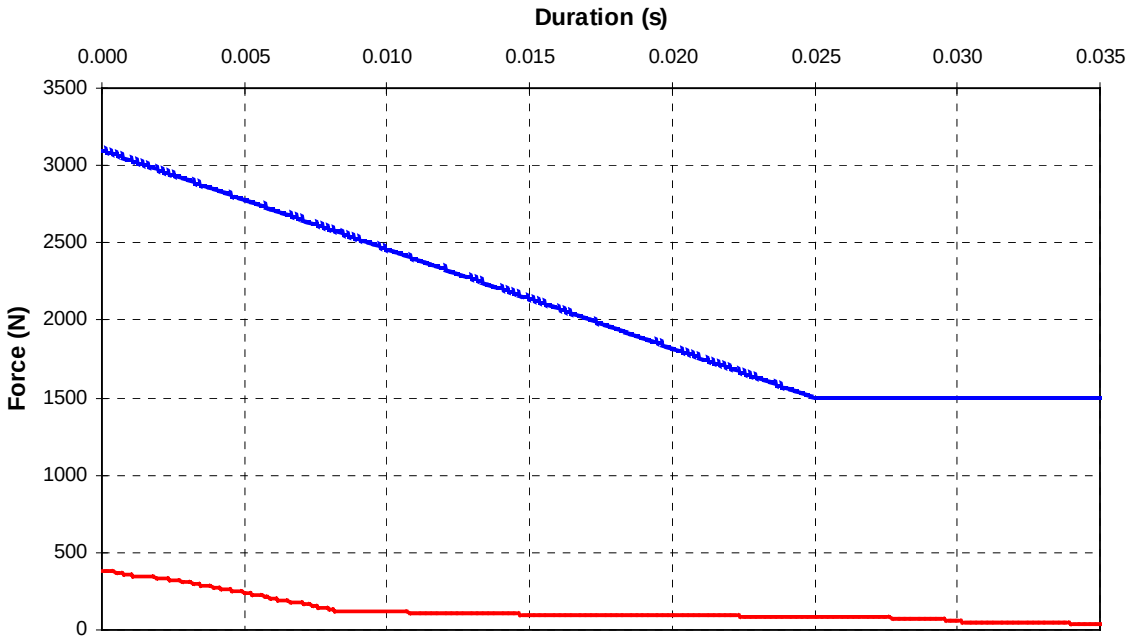
A- 13 CF00029 2001 Isuzu Trooper Neck Tension Analysis



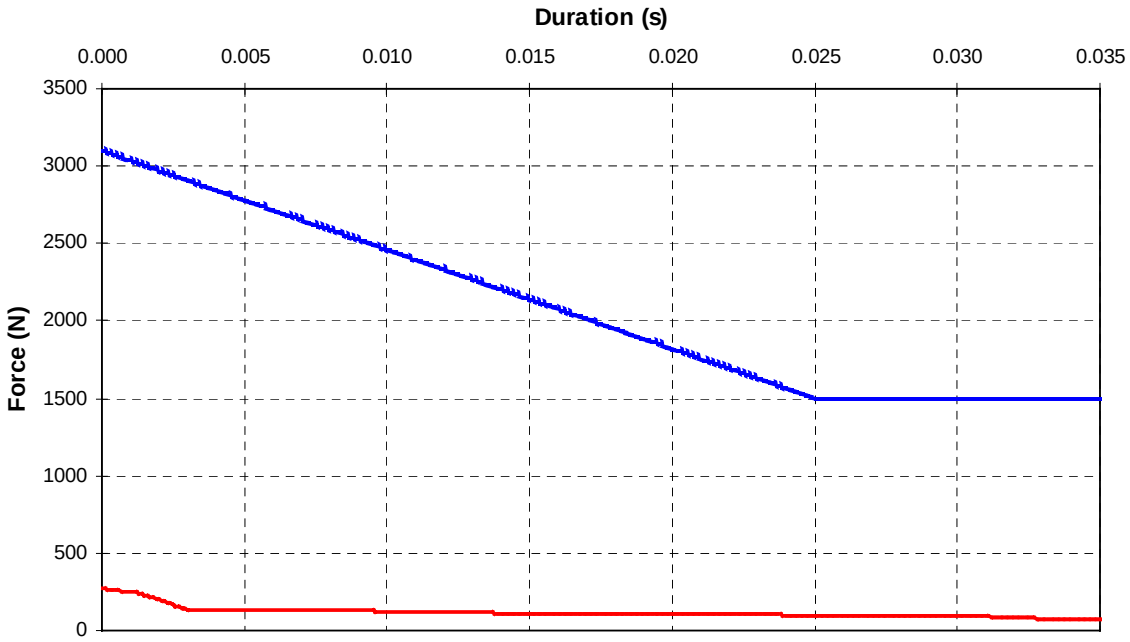
A- 14 CF00029 2001 Isuzu Trooper Neck Compression Analysis



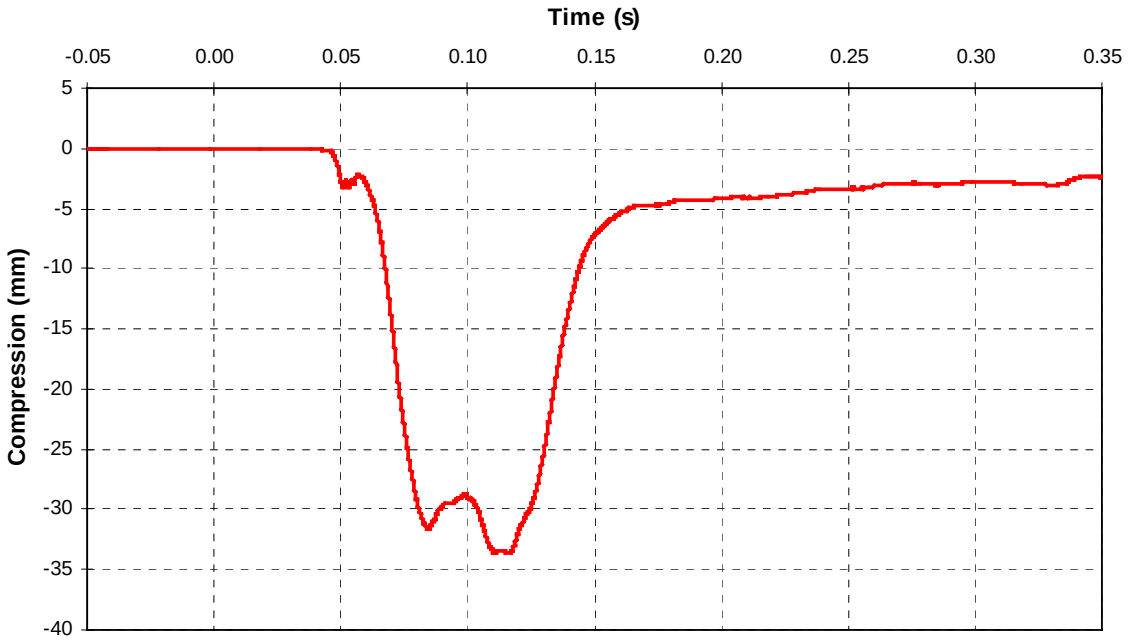
A- 15 CF00029 2001 Isuzu Trooper Neck A-P Shear (Positive) Analysis



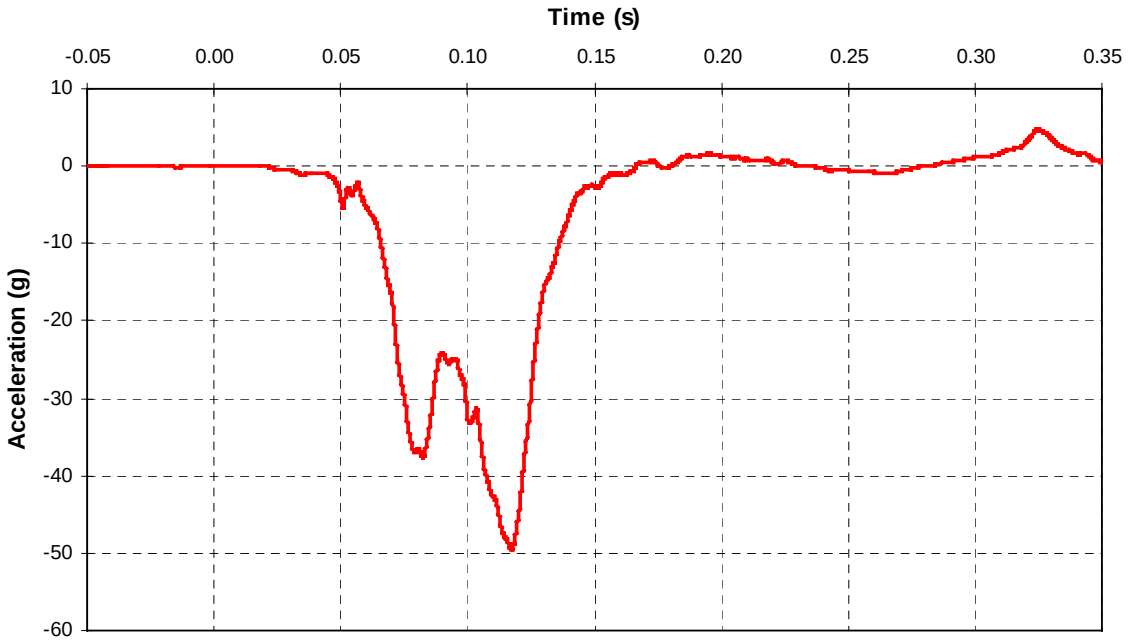
A- 16 CF00029 2001 Isuzu Trooper Neck A-P Shear (Negative) Analysis



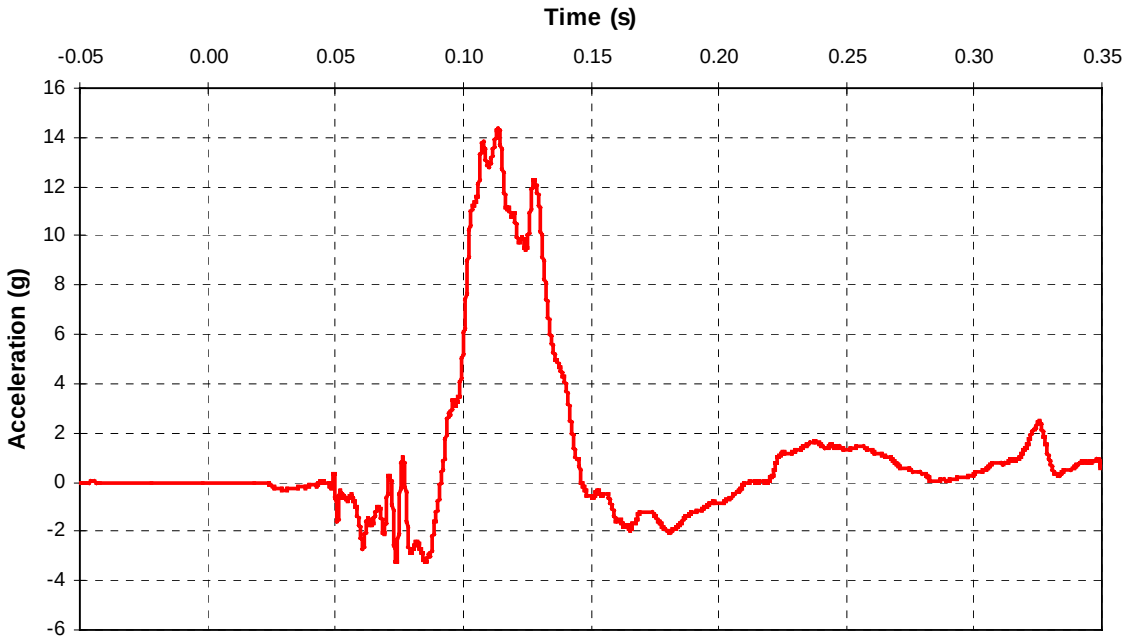
A- 17 CF00029 2001 Isuzu Trooper Chest Compression



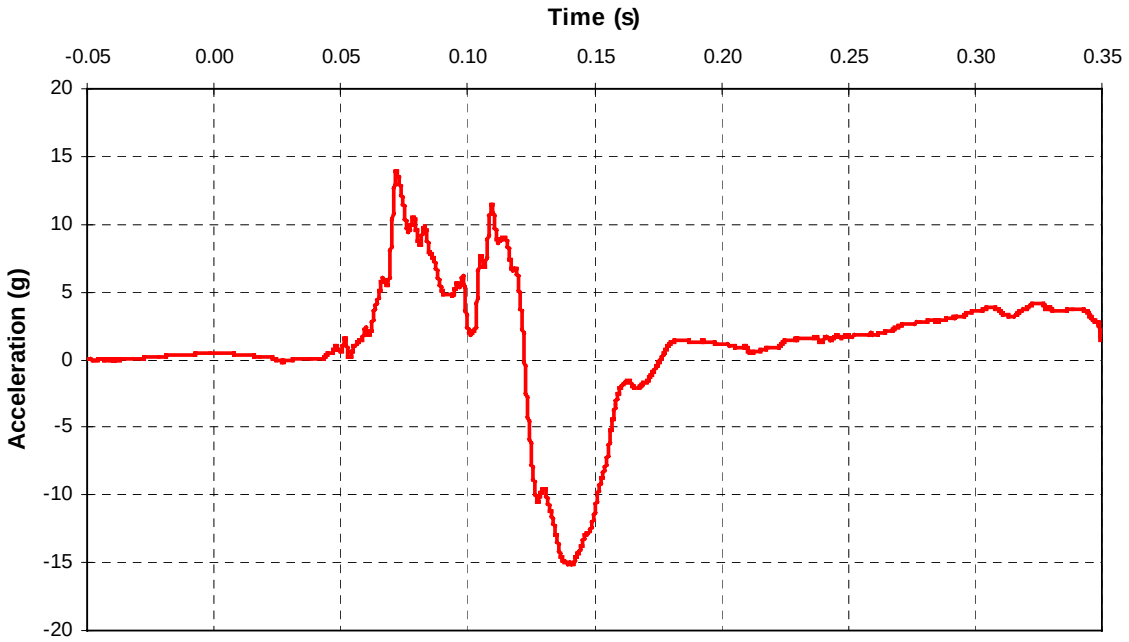
A- 18 CF00029 2001 Isuzu Trooper Chest A-P Acceleration



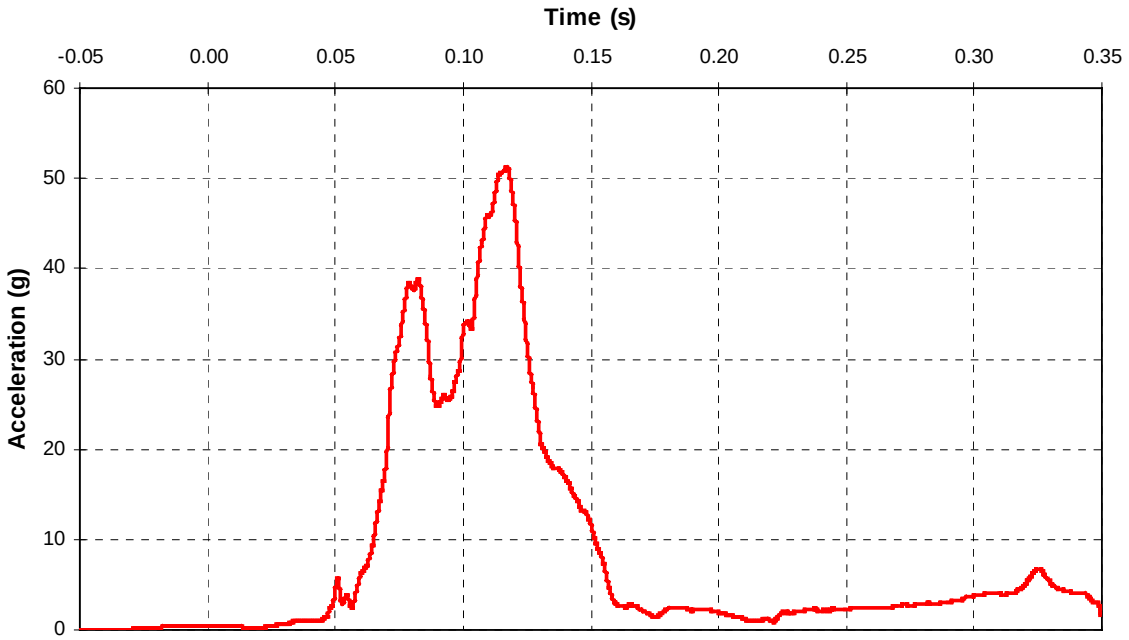
A- 19 CF00029 2001 Isuzu Trooper Chest L-M Acceleration



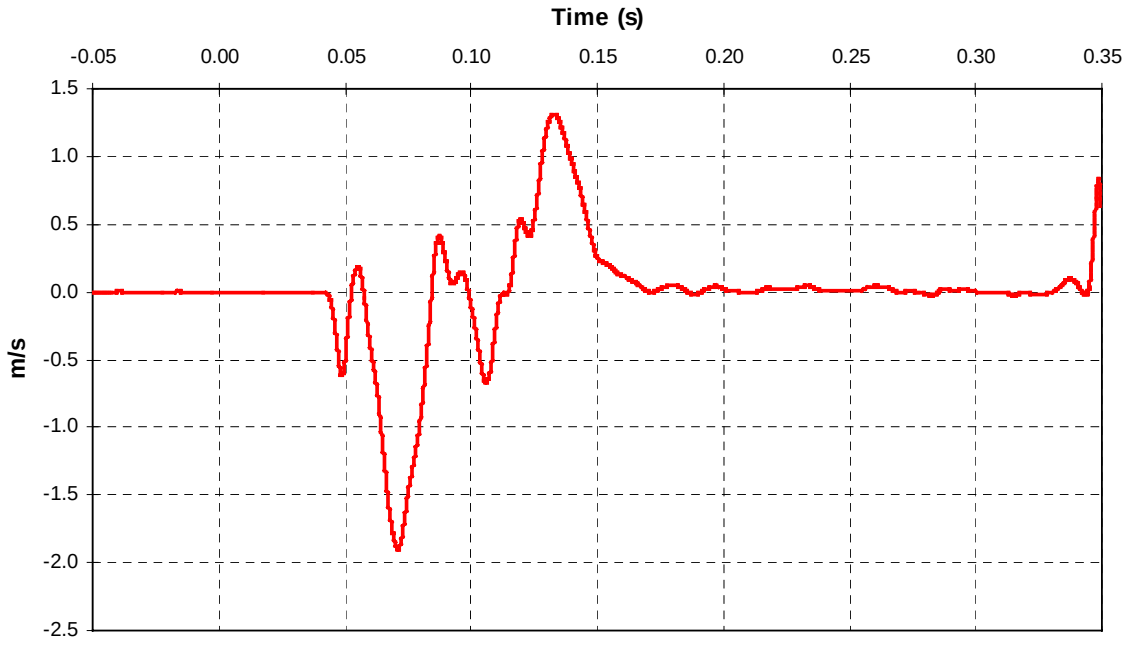
A- 20 CF00029 2001 Isuzu Trooper Chest I-S Acceleration



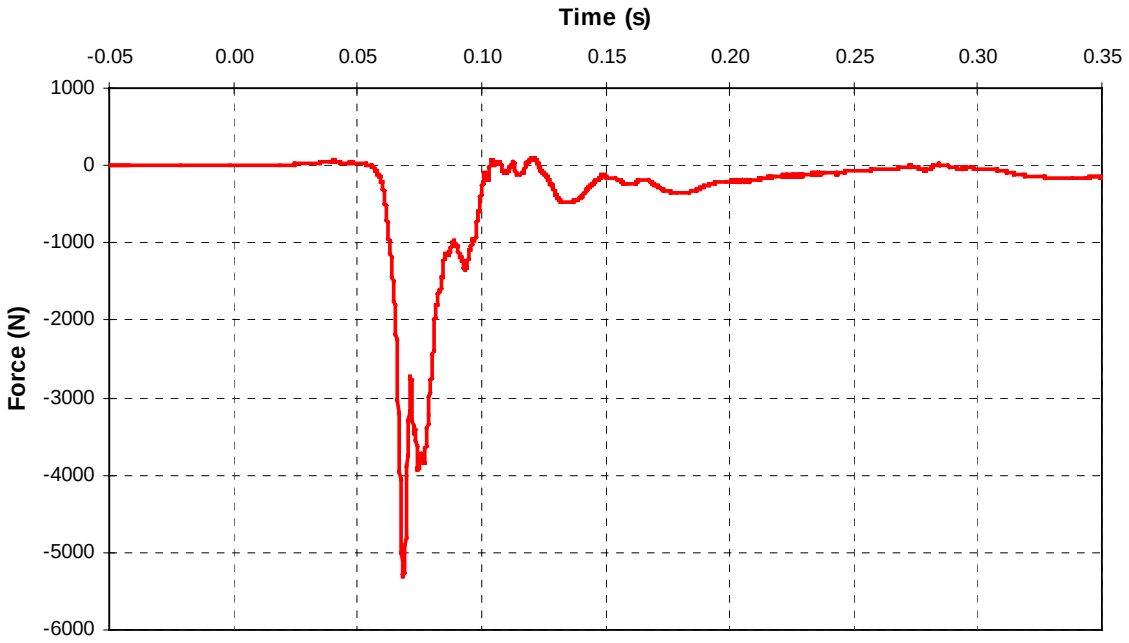
A- 21 CF00029 2001 Isuzu Trooper Chest Vector Resultant Acceleration



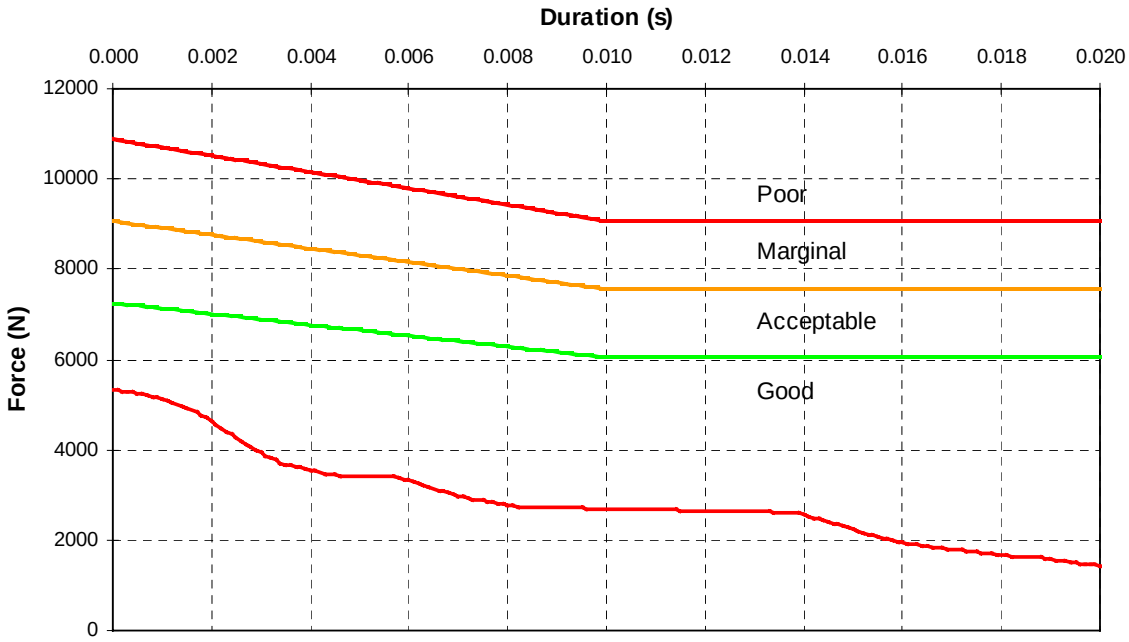
A- 22 CF00029 2001 Isuzu Trooper Sternum Deflection Rate



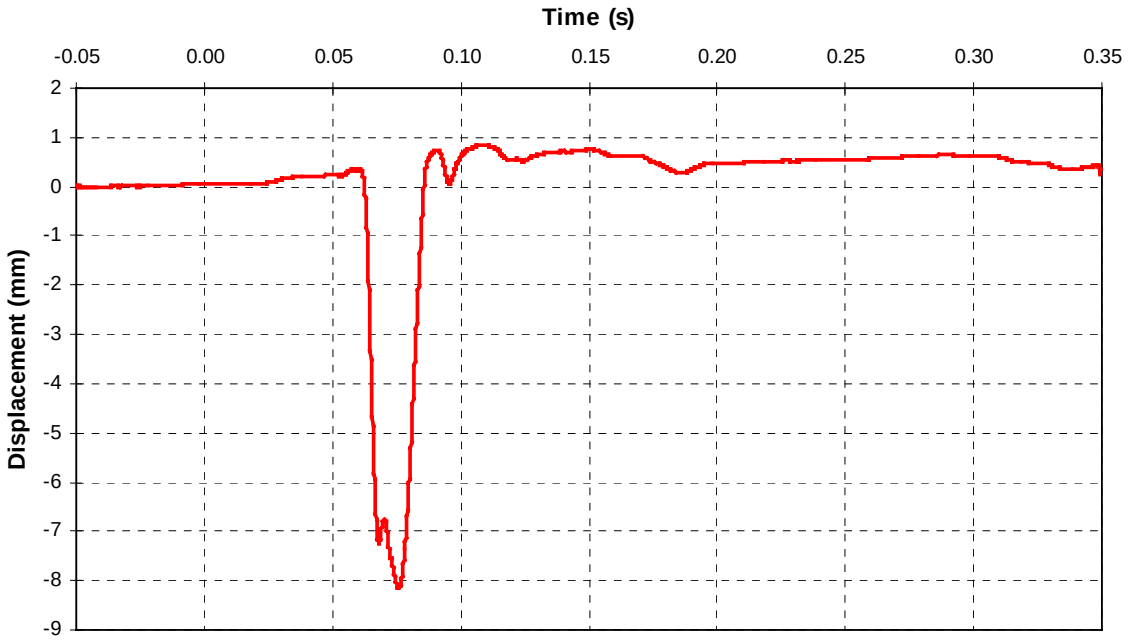
A- 23 CF00029 2001 Isuzu Trooper Left Femur Axial Force



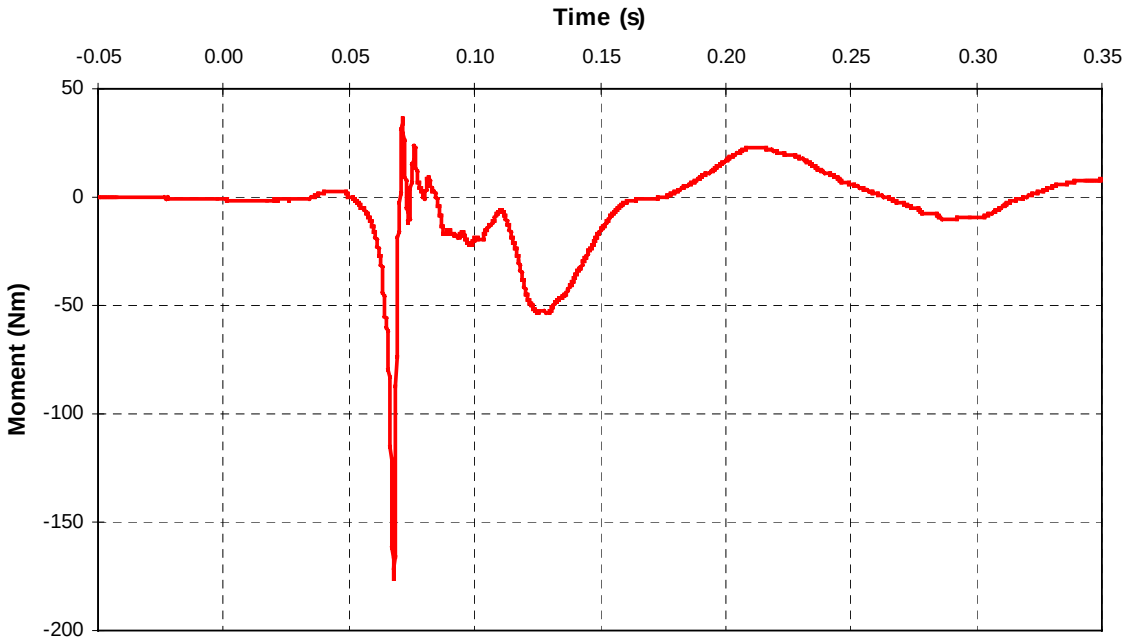
A- 24 CF00029 2001 Isuzu Trooper Left Femur Axial Force Analysis



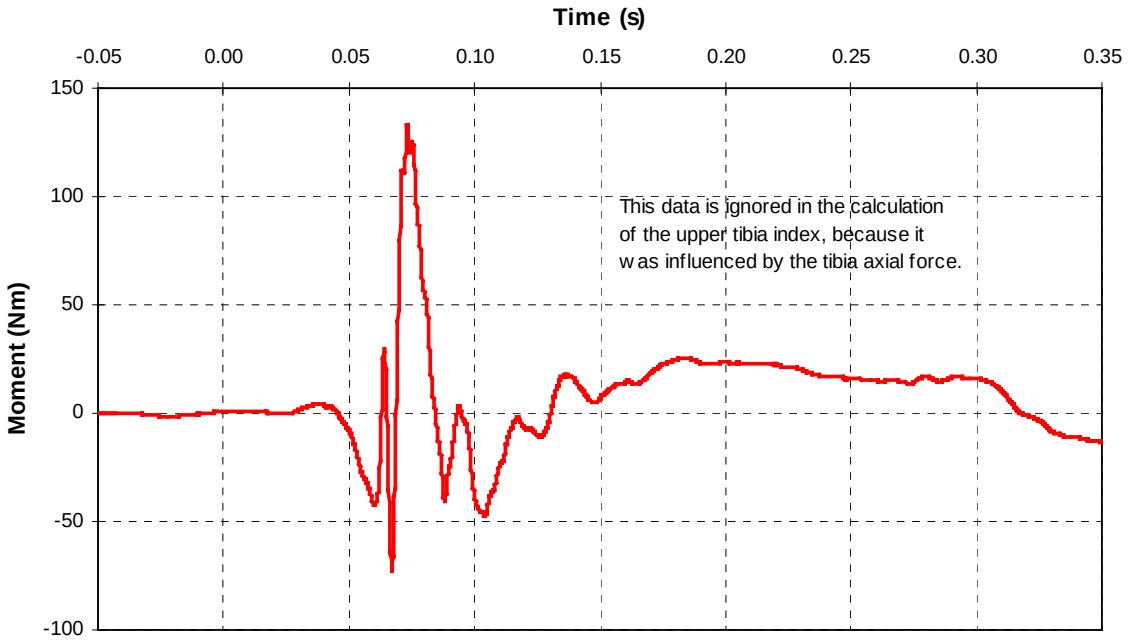
A- 25 CF00029 2001 Isuzu Trooper Left Tibia-Femur Displacement



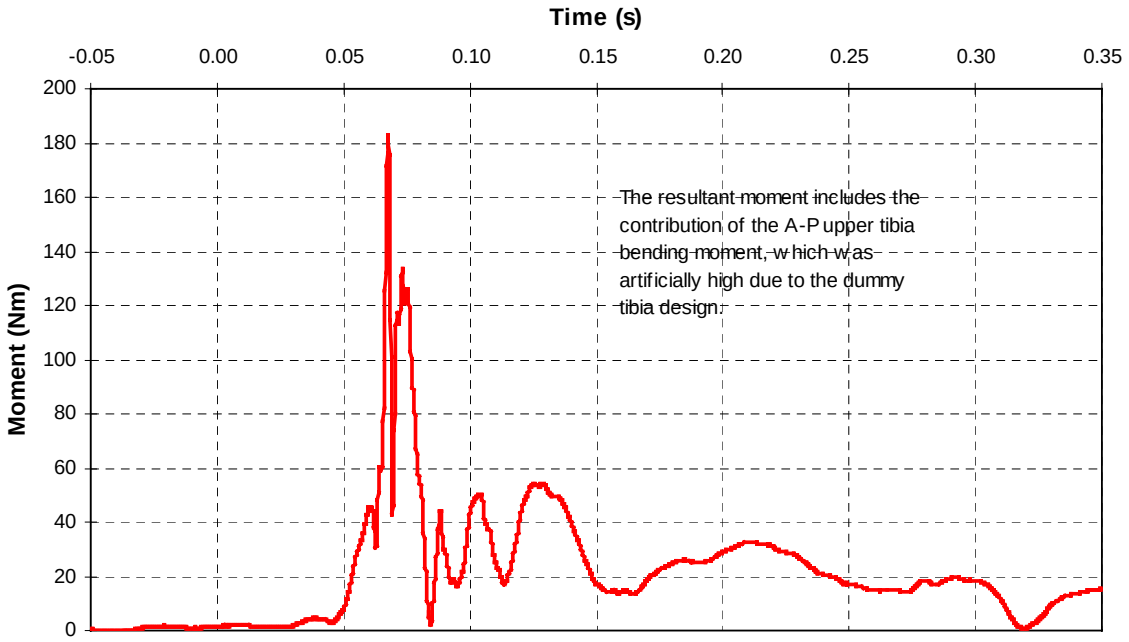
A- 26 CF00029 2001 Isuzu Trooper Left Upper Tibia L-M Moment



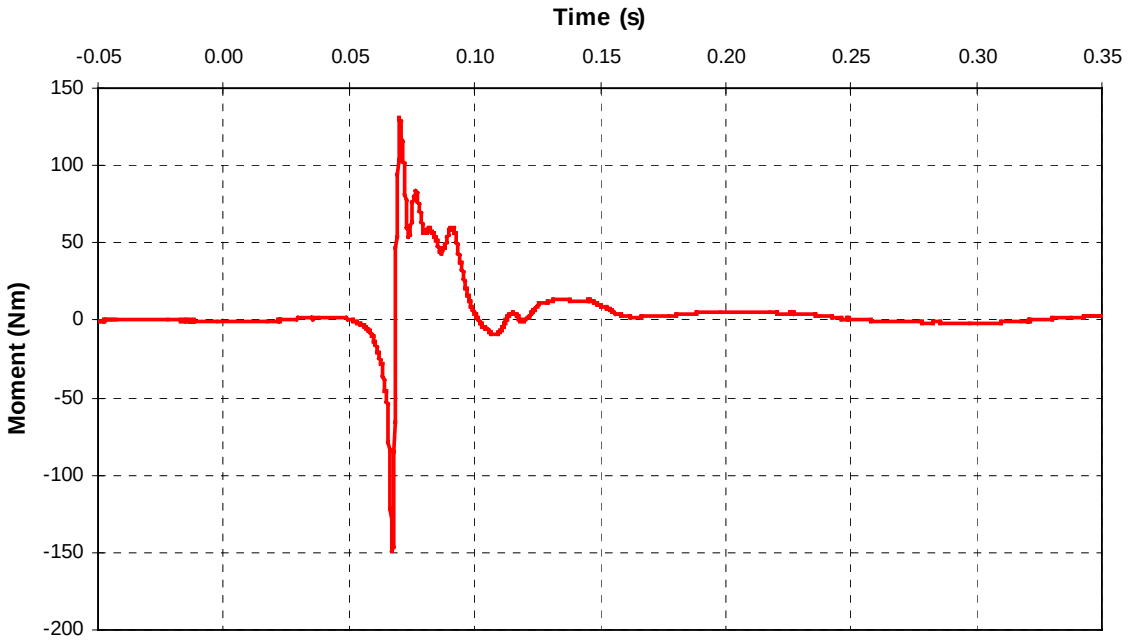
A- 27 CF00029 2001 Isuzu Trooper Left Upper Tibia A-P Moment



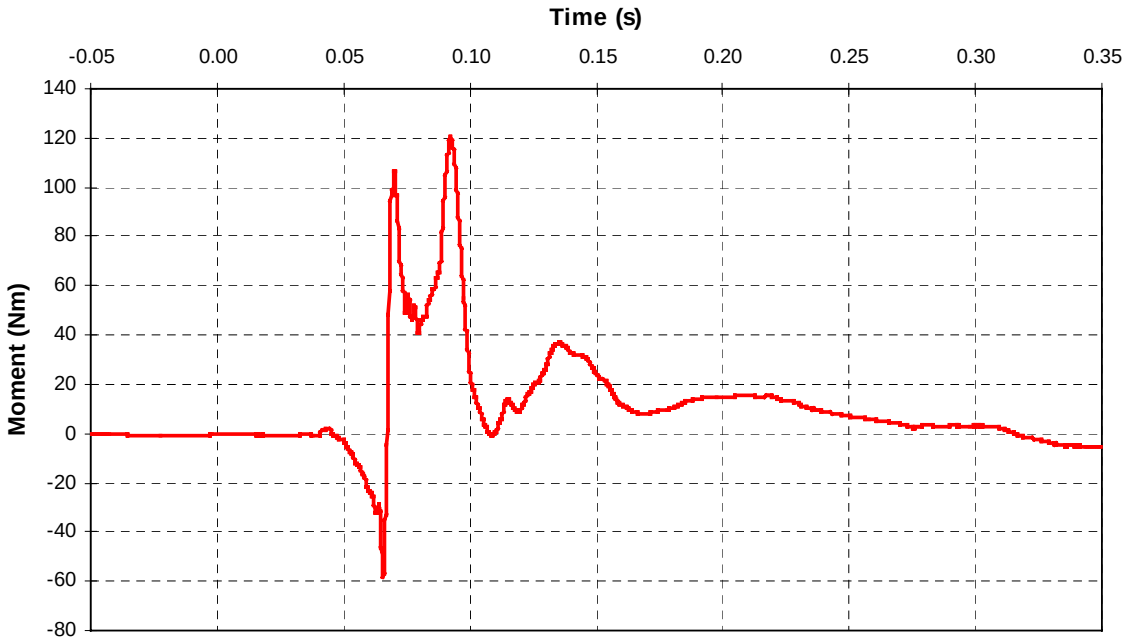
A- 28 CF00029 2001 Isuzu Trooper Left Upper Tibia Vector Resultant Moment



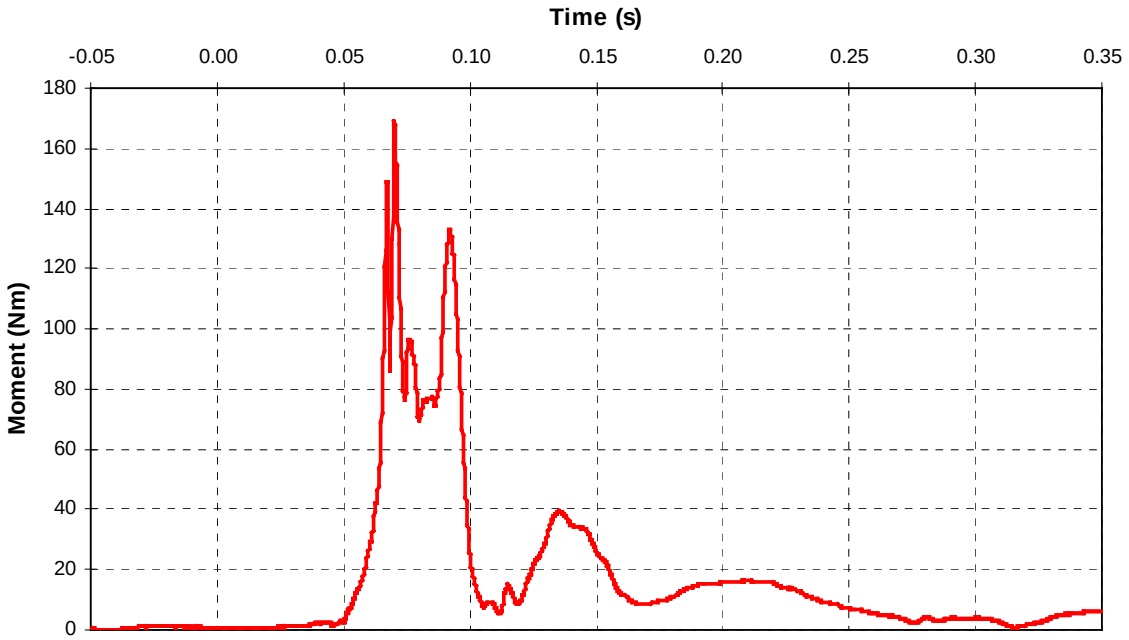
A- 29 CF00029 2001 Isuzu Trooper Left Lower Tibia L-M Moment



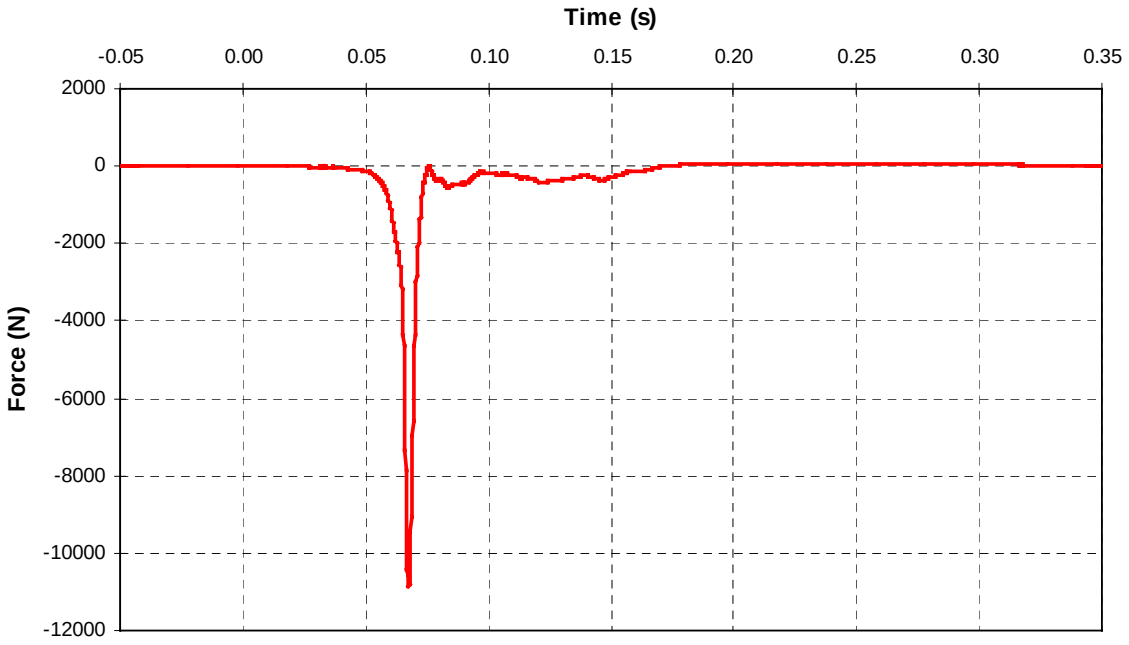
A- 30 CF00029 2001 Isuzu Trooper Left Lower Tibia A-P Moment



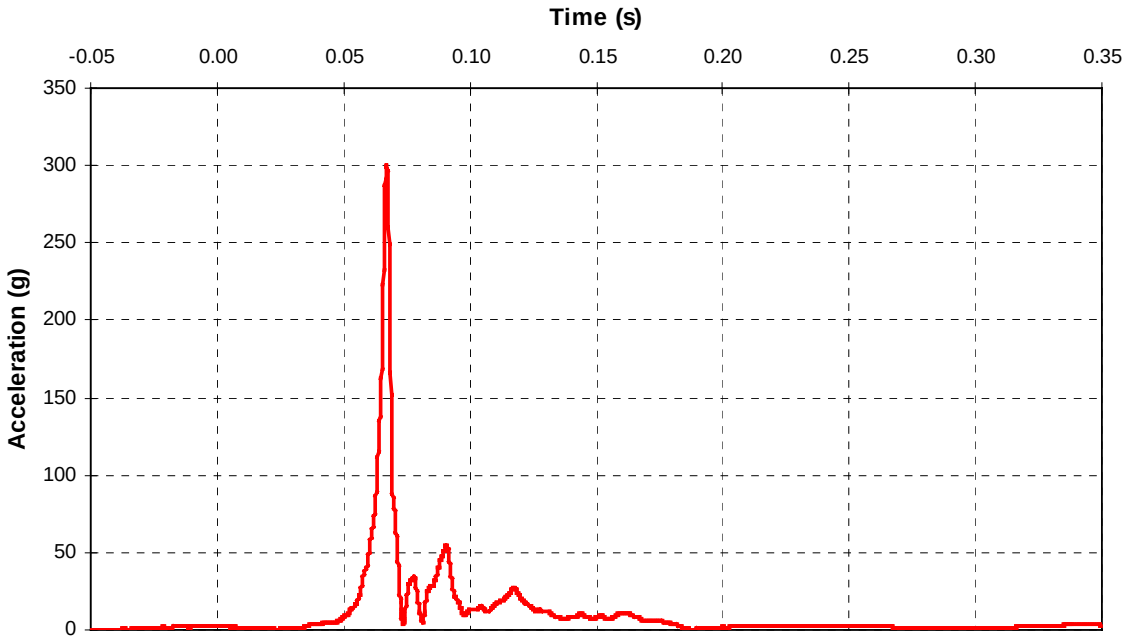
A- 31 CF00029 2001 Isuzu Trooper Left Lower Tibia Vector Resultant Moment



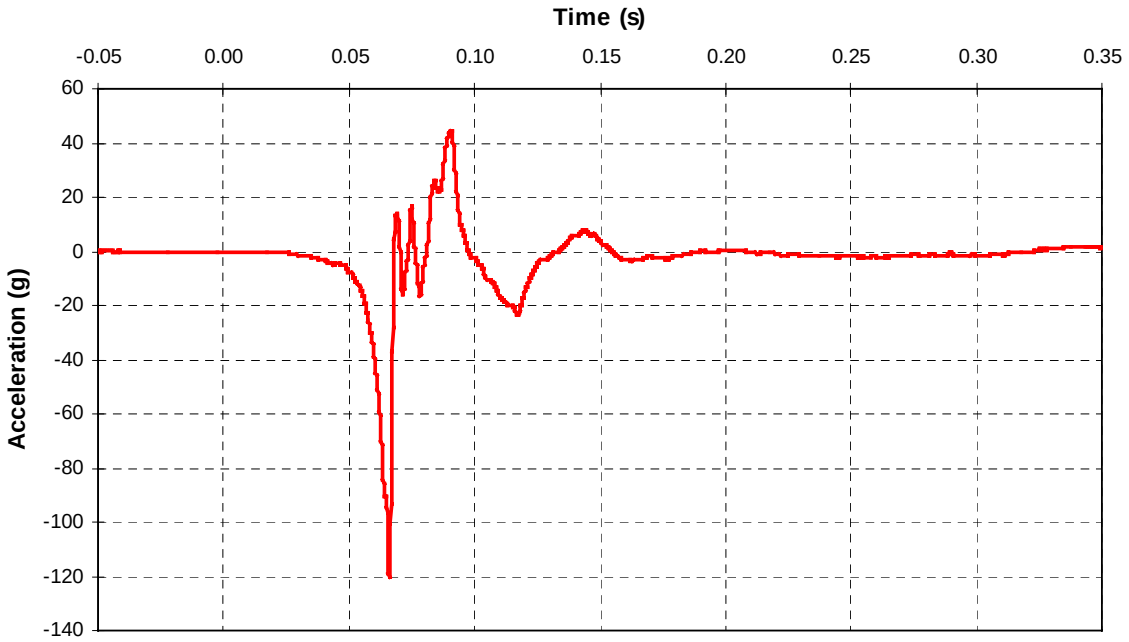
A- 32 CF00029 2001 Isuzu Trooper Left Lower Tibia Axial Force



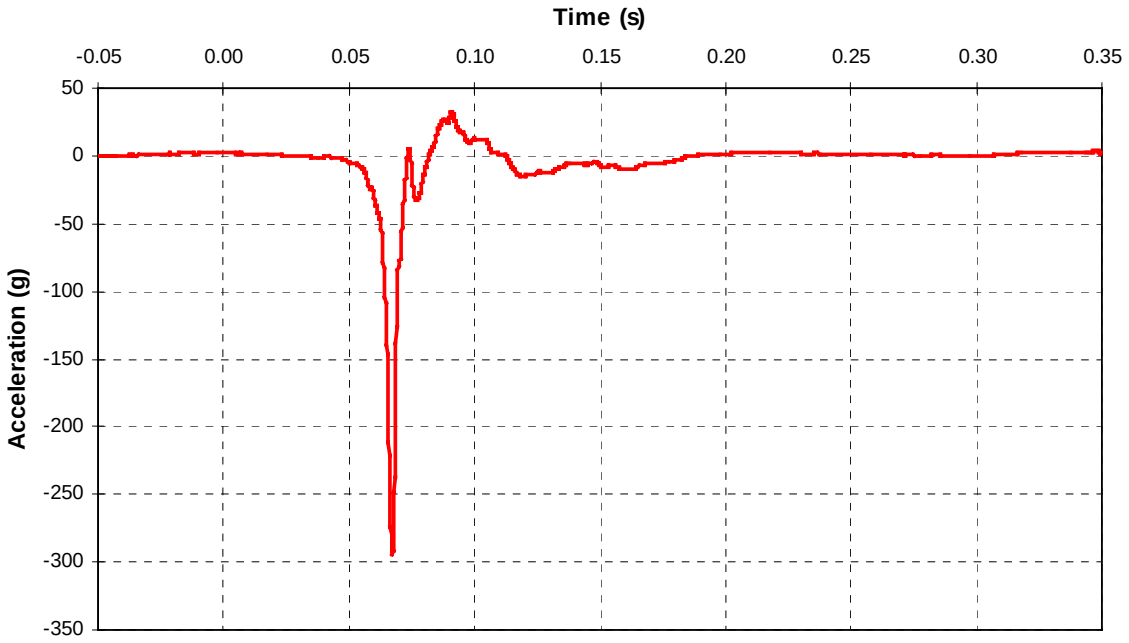
A- 33 CF00029 2001 Isuzu Trooper Left Foot Vector Resultant Acceleration



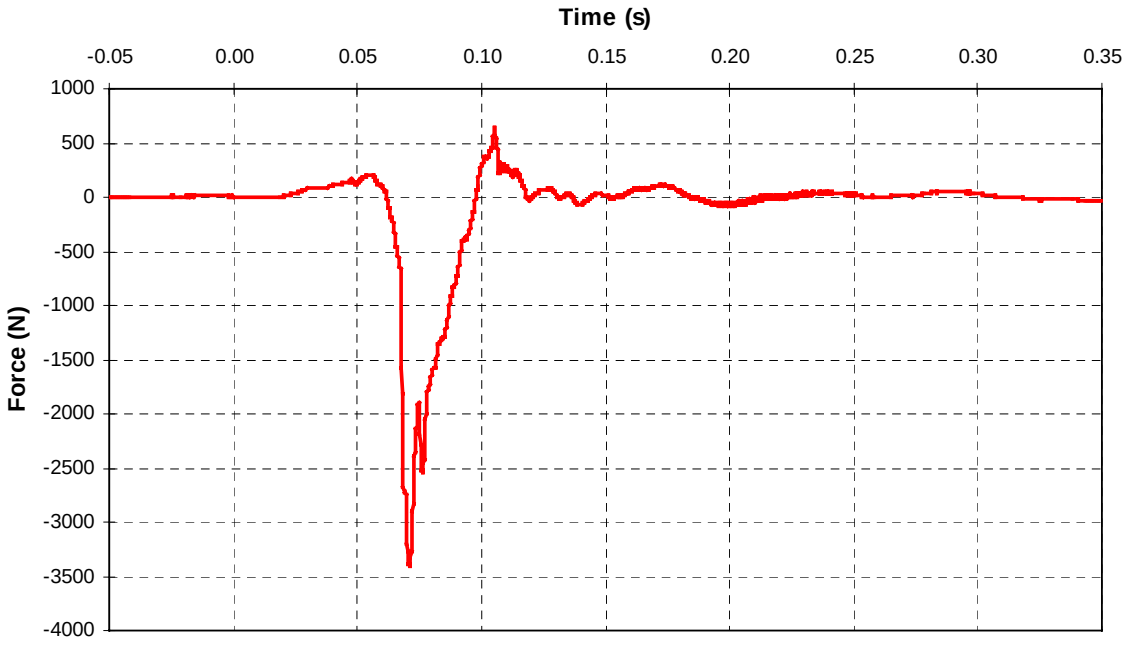
A- 34 CF00029 2001 Isuzu Trooper Left Foot A-P Acceleration



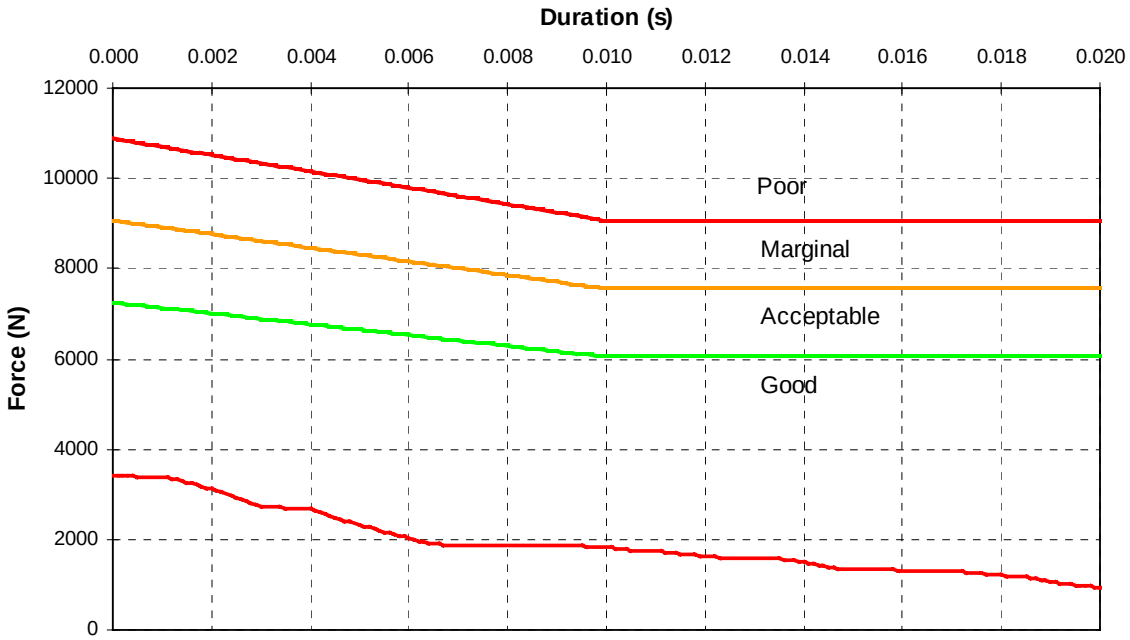
A- 35 CF00029 2001 Isuzu Trooper Left Foot I-S Acceleration



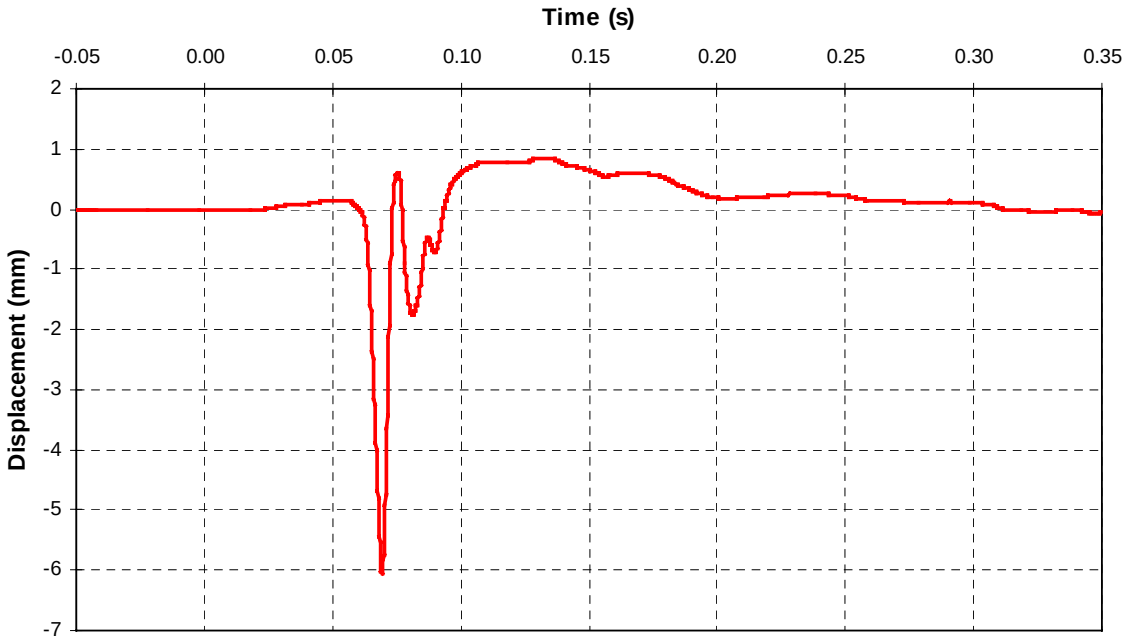
A- 36 CF00029 2001 Isuzu Trooper Right Femur Axial Force



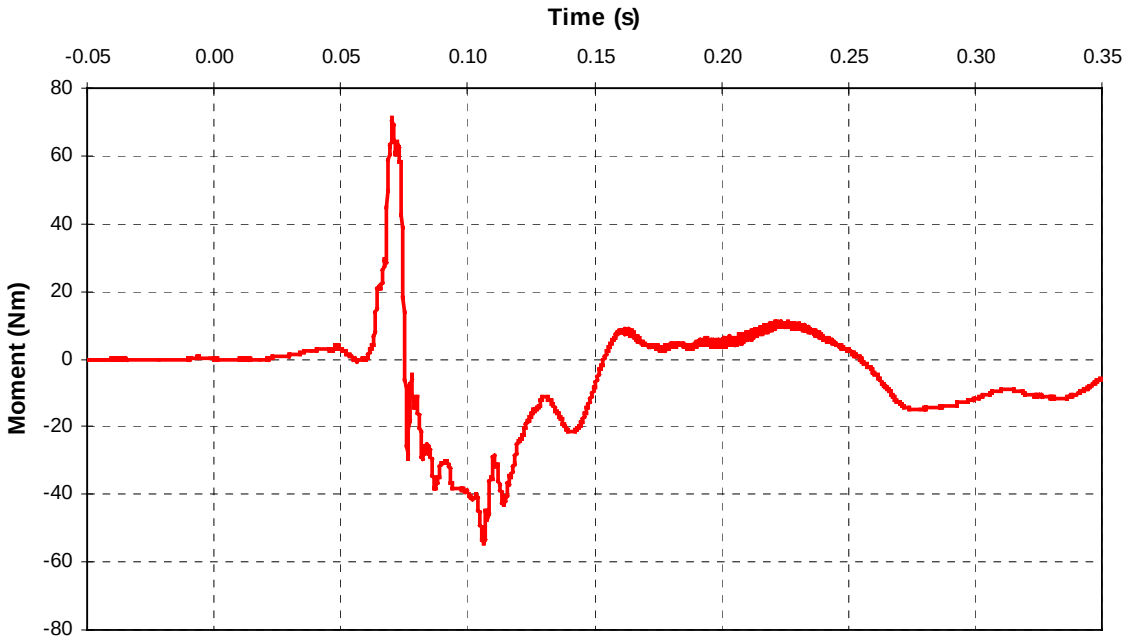
A- 37 CF00029 2001 Isuzu Trooper Right Femur Axial Force Analysis



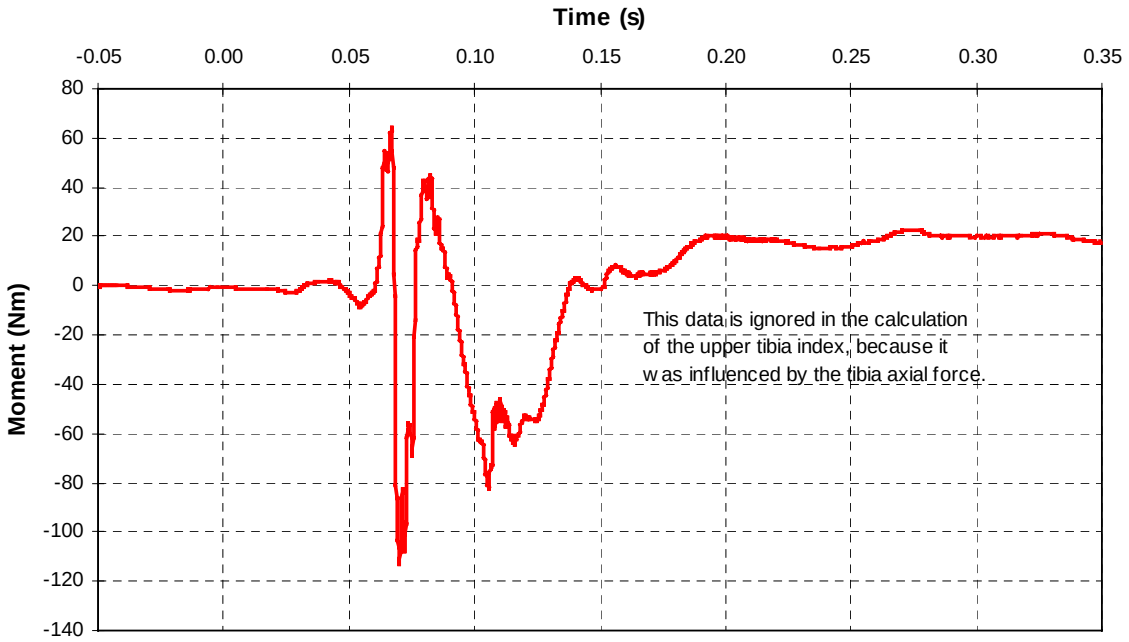
A- 38 CF00029 2001 Isuzu Trooper Right Tibia-Femur Displacement



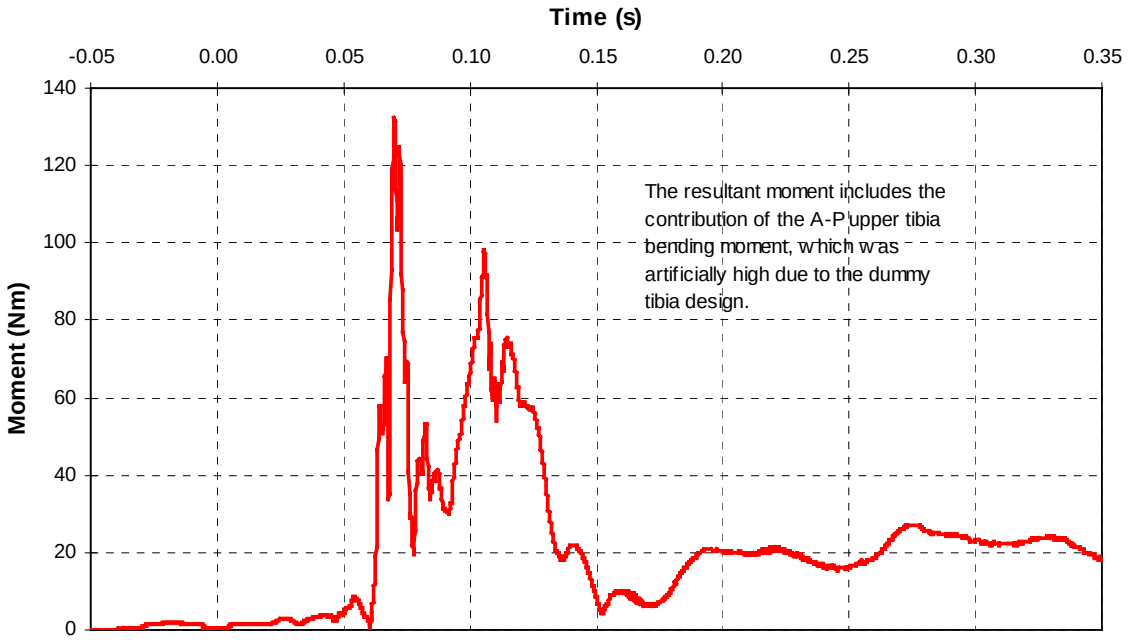
A- 39 CF00029 2001 Isuzu Trooper Right Upper Tibia L-M Moment



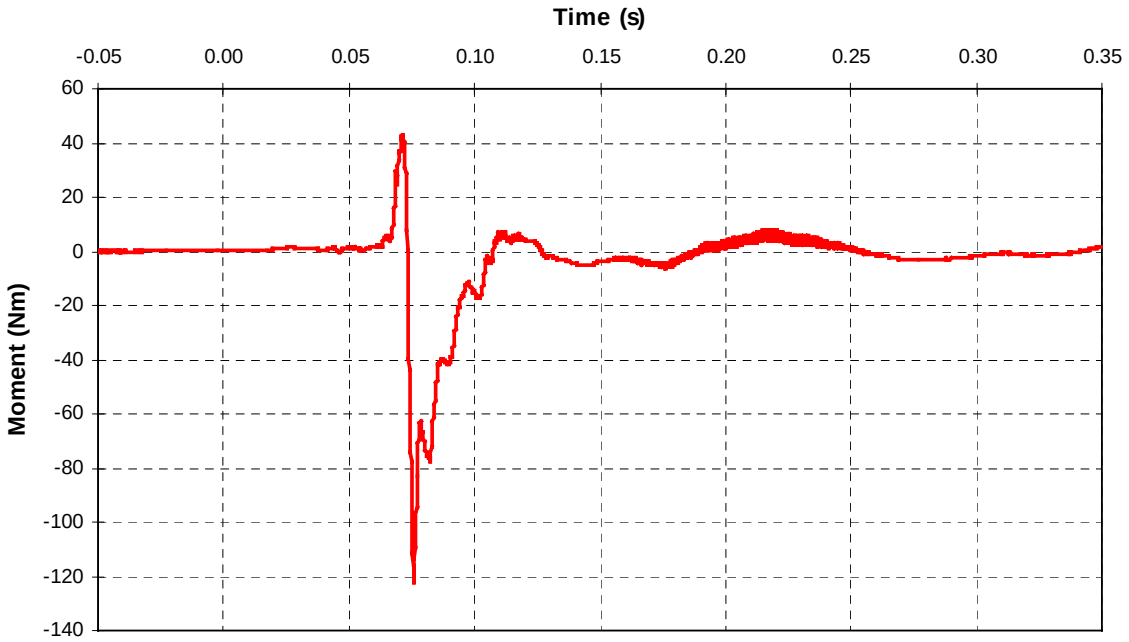
A- 40 CF00029 2001 Isuzu Trooper Right Upper Tibia A-P Moment



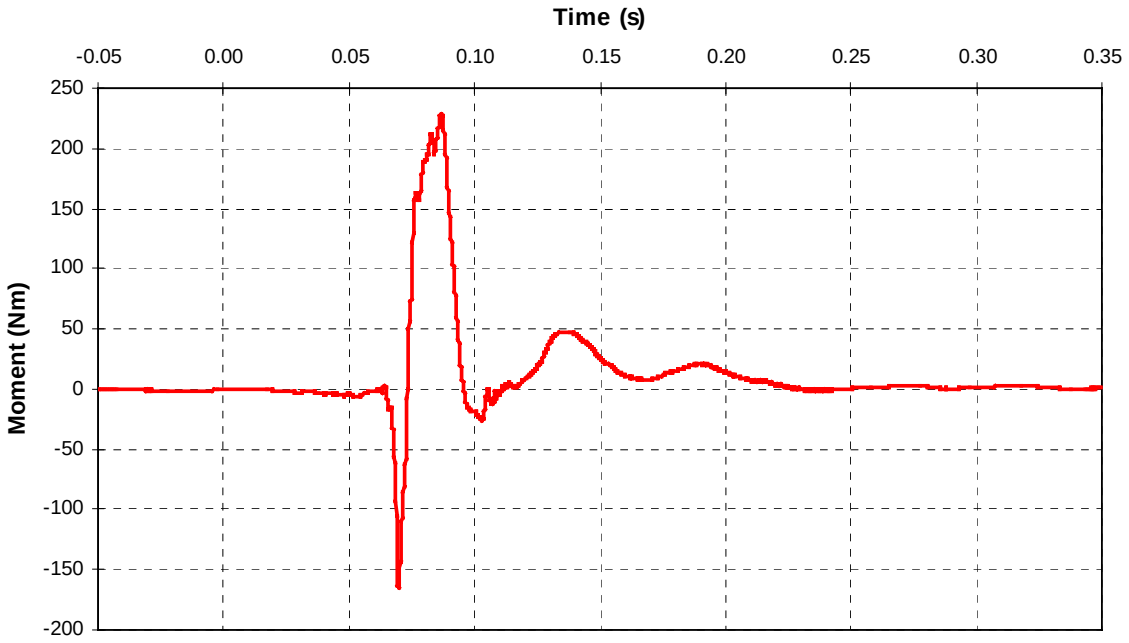
A- 41 CF00029 2001 Isuzu Trooper Right Upper Tibia Vector Resultant Moment



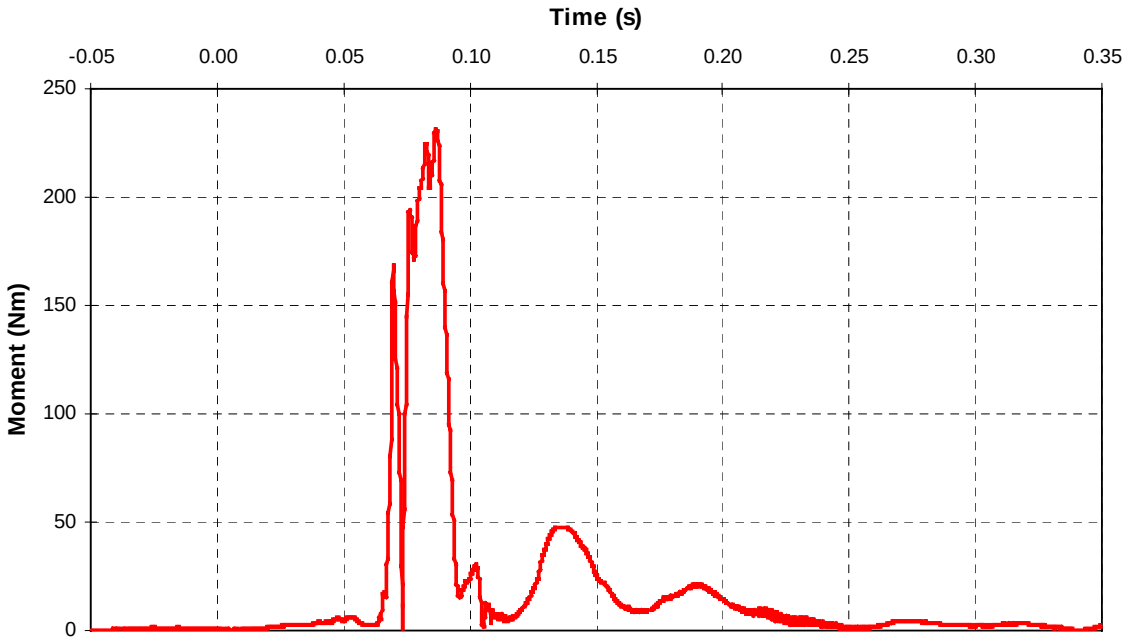
A- 42 CF00029 2001 Isuzu Trooper Right Lower Tibia L-M Moment



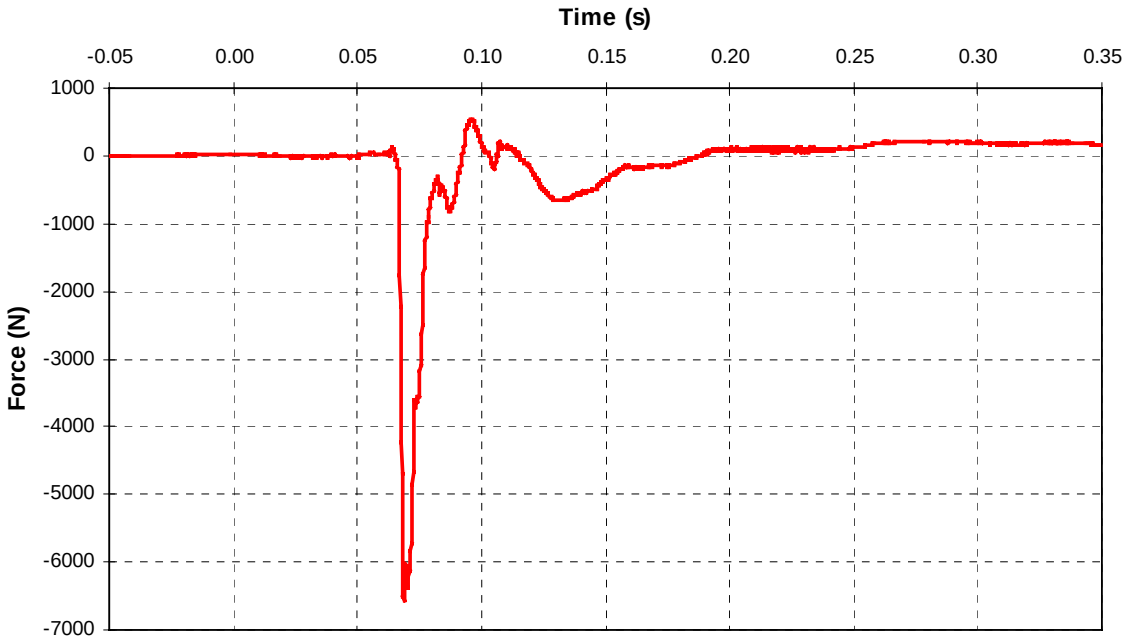
A- 43 CF00029 2001 Isuzu Trooper Right Lower Tibia A-P Moment



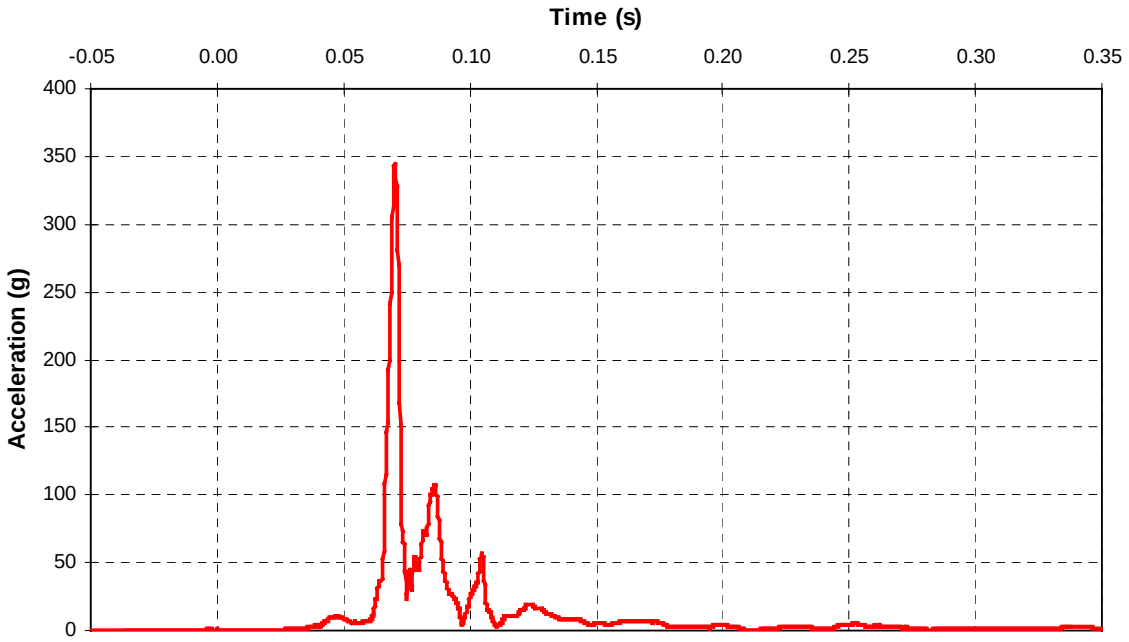
A- 44 CF00029 2001 Isuzu Trooper Right Lower Tibia Vector Resultant Moment



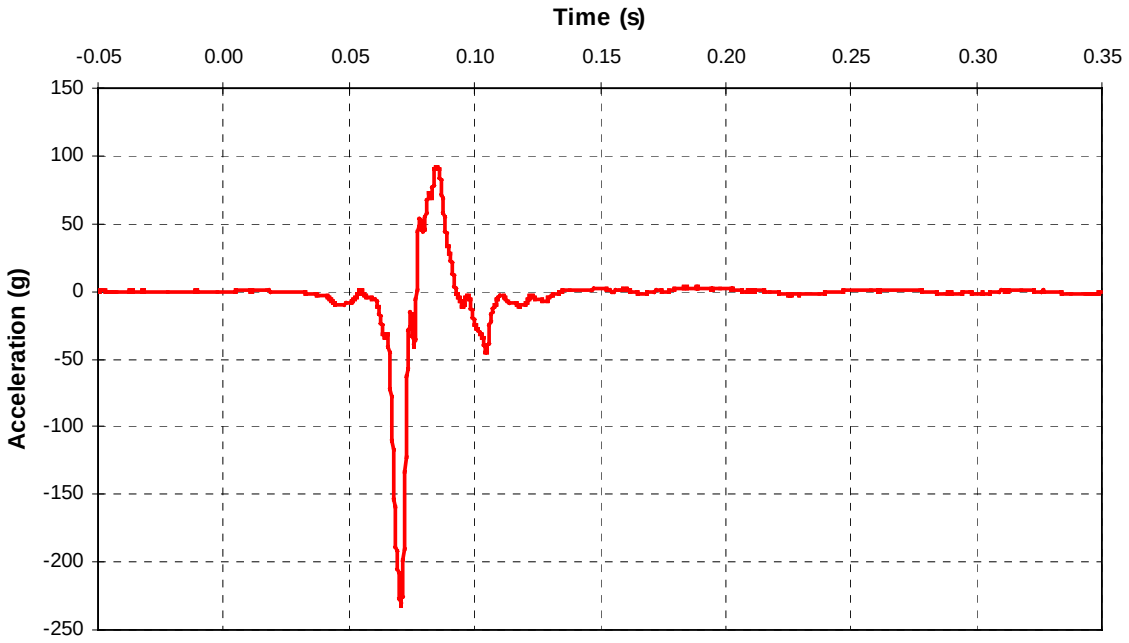
A- 45 CF00029 2001 Isuzu Trooper Right Lower Tibia Axial Force



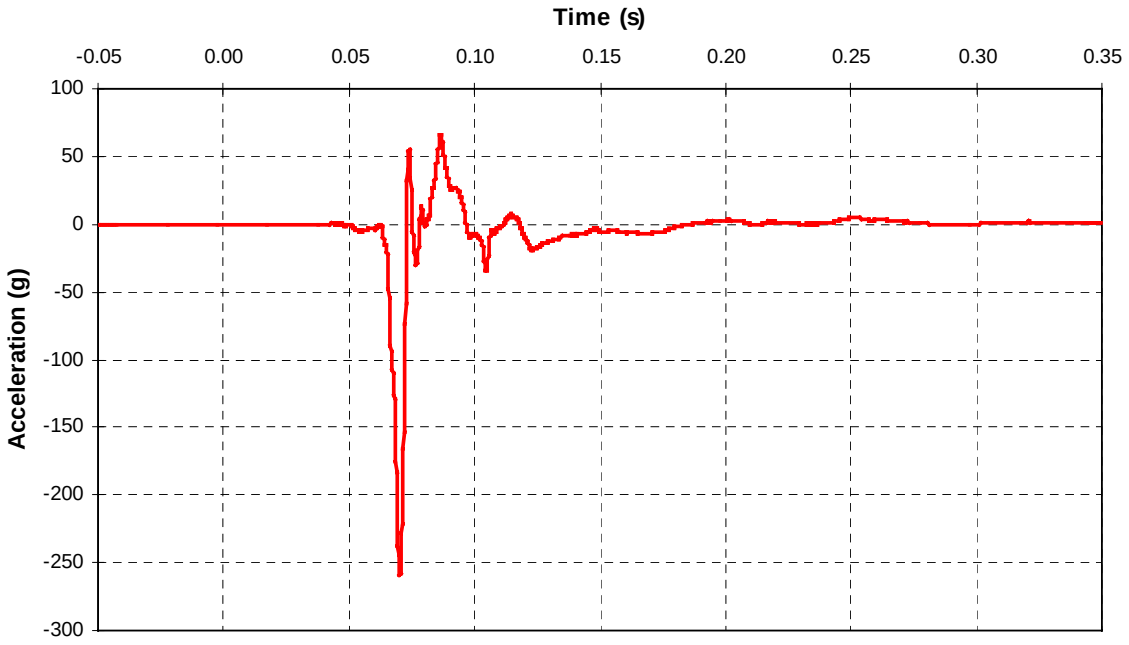
A- 46 CF00029 2001 Isuzu Trooper Right Foot Vector Resultant Acceleration



A- 47 CF00029 2001 Isuzu Trooper Right Foot A-P Acceleration



A- 48 CF00029 2001 Isuzu Trooper Right Foot I-S Acceleration



ISUZU

Go farther.

YEAR: '01 MODEL DESCRIPTION: TROOPER

S, 4-WHEEL DRIVE, 4-SPEED AUTOMATIC

EXTERIOR COLOR	INTERIOR COLOR	MODEL	ENGINE TYPE
DRAGON GREEN MICA	BEIGE	L44	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 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

- 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

10 YEARS 120,000 MILES POWERTRAIN LIMITED WARRANTY

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	HIGHWAY MPG
15	19

Fuel Economy 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

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

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:
PUBLIC RELATIONS
16323 SHOEMAKER AVE.
CERRITOS CA 90703

PORT/PLANT: BALTIMORE 784

DEALER CODE: 04992 080539

SHIPPED TO: (SAME UNLESS OTHERWISE INDICATED) 04999
AMERICAN ISUZU MOTORS INC
16323 SHOEMAKER AVE.
CERRITOS CA 90702

VIN NO. JACDJ58X617J04920