

REPORT NUMBER: SNCAP-TRC-2009-005

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT TEST**

**NISSAN MOTOR COMPANY
2010 NISSAN FRONTIER 4X2 SE CREW CAB 4-DOOR PICKUP
NHTSA NUMBER: MA5201**

**PREPARED BY:
TRANSPORTATION RESEARCH CENTER INC.
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Test Date: October 28, 2009

Report Date: November 25, 2009

FINAL REPORT

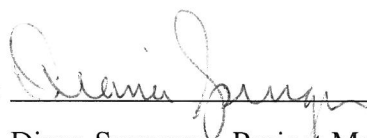
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Approval Date:

November 25, 2009

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

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COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

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15. Supplemental Notes																																					
16. Abstract This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject vehicle, a 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup Truck, in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on October 28, 2009. The impact velocity of the Moving Deformable Barrier (MDB) was 62.0 km/h, and the ambient temperature at the struck (Driver's Side) side of the target vehicle at the time of impact was 21° C. The target vehicle's post-test maximum crush was 221 mm at Level 2. The test or target vehicle's performance is given below (with FIR filter): <table border="0"> <thead> <tr> <th></th><th><u>Front SID HIII</u></th><th></th><th><u>Rear SID HIII</u></th><th></th></tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration:</td><td><u>44.1</u></td><td>g's</td><td><u>27.5</u></td><td>g's</td></tr> <tr> <td>Left Lower Rib Acceleration:</td><td><u>37.8</u></td><td>g's</td><td><u>32.7</u></td><td>g's</td></tr> <tr> <td>Lower Spine Acceleration:</td><td><u>19.1</u></td><td>g's</td><td><u>37.8</u></td><td>g's</td></tr> <tr> <td>Thoracic Trauma Index, (TTI):</td><td><u>31.4</u></td><td>g's</td><td><u>35.2</u></td><td>g's</td></tr> <tr> <td>Pelvis Acceleration (PEV):</td><td><u>45.6</u></td><td>g's</td><td><u>51.2</u></td><td>g's</td></tr> <tr> <td>Head Injury Criteria HIC):</td><td><u>43*</u></td><td></td><td><u>47</u></td><td></td></tr> </tbody> </table> The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during side impact event. The subject vehicle landed on its right side after the impact with the Moving Deformable Barrier.				<u>Front SID HIII</u>		<u>Rear SID HIII</u>		Left Upper Rib Acceleration:	<u>44.1</u>	g's	<u>27.5</u>	g's	Left Lower Rib Acceleration:	<u>37.8</u>	g's	<u>32.7</u>	g's	Lower Spine Acceleration:	<u>19.1</u>	g's	<u>37.8</u>	g's	Thoracic Trauma Index, (TTI):	<u>31.4</u>	g's	<u>35.2</u>	g's	Pelvis Acceleration (PEV):	<u>45.6</u>	g's	<u>51.2</u>	g's	Head Injury Criteria HIC):	<u>43*</u>		<u>47</u>	
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22. Key Words New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID HIII) Occupant Side Impact Protection		22. Distribution Statement <u>Copies of this report are available from:</u> National Highway Traffic Safety Administration Technical Reference Division 1200 New Jersey Ave, SE Washington, DC 20590																																			
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SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test was conducted as part of the FY 2010 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00125. The purpose of this test was to generate comparative side impact performance in a 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup Truck manufactured by Nissan Motor Company. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated November 2002.

TEST PROCEDURE

The side impact test was conducted in accordance with the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002 and the corresponding Transportation Research Center Inc. (TRC Inc.) procedures. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

TRC Inc. does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 2

SUMMARY OF TEST RESULTS

A model year 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup Truck was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 62.0 km/h. The target vehicle was stationary and positioned at an angle of 63° to the line of forward motion. The weight of the vehicle as tested was 2221.6 kg and the test weight of the MDB was 1365.4 kg. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, OH, on October 28, 2009.

One (1) real-time motion picture camera and nine (9) high-speed digital motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. Camera locations and pertinent camera information are documented in the data sheets. Pre-test and post-test photographs of the test vehicle and the moving deformable barrier (MDB), and the side impact dummies (SID HIIIs) are included in Appendix A.

Two 50th percentile adult male SID/HIII's were placed in the driver and left rear passenger designated seating positions according to instructions specified in the Laboratory Test Procedure for New Car Assessment Program Side Impact Testing dated November 2002. Each SID/HIII was instrumented in the following locations:

- Left Upper Rib (LUR) uniaxial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uniaxial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uniaxial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uniaxial accelerometer (Y-axis primary)
- Head Center of Gravity (CG) triaxial accelerometers (X, Y and Z axis)
- Upper Neck load cell (Fx, Fy, Fz, Mx, My, Mz)

The test vehicle was instrumented with twenty-one (21) structural accelerometers and the MDB was instrumented with five (5) accelerometers and two (2) contact switches on the bumper to compare left side to right side bumper impact timing. All data channels were recorded with a fully self-contained onboard Kayser Threde Data Acquisition System. The data was digitally sampled at 10,000 samples per second and processed per Test Data Disposition 12.2 Section 7, of the Test Procedure.

The driver and passenger SID/HIII's, Serial Nos. M001 and 002 respectively, were calibrated prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the SID/HIII's, vehicle, and MDB response data traces. Appendix C contains the SID/HIII's configuration and performance verification data.

The occupant data is summarized below:

ATD position	HIC	T ¹	T ²	TTI (G's)	Peak Pelvis (G's)
Driver	43*	37.6	69.8	31.4	45.6
Passenger	47	42.8	78.8	35.2	51.2

* HIC reading was revised by removing the spike.

Supplemental Restraint Information

Restraint Type	Left Front (Driver)		Left Rear Passenger	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	N/A
Side Torso Airbag	Yes	Yes	No	N/A
Side Torso/Head Airbag	No	N/A	No	N/A
Side Head Curtain Airbag	Yes	Yes	Yes	Yes

The test data can be found on the NHTSA website at www.nhtsa.dot.gov.

TEST NOTES

The Driver dummy's redundant Head X-Axis Accelerometer data channel recorded multiple data spikes throughout the event and the data should be considered questionable.

The vehicle Left Side Sill Y-Axis Accelerometer data channel recorded invalid data after approximately 6 milliseconds. This affected the velocity calculation.

The vehicle Left Lower B-Pillar Y-Axis Accelerometer data channel exceeded the full scale value at 21 milliseconds and recorded questionable data thereafter. This affected the velocity calculation.

The vehicle Center of Gravity Z-Axis Accelerometer data channel recorded a data offset of approximately 70 g. at approximately 75 milliseconds and did not return to zero. This affected the velocity calculation.

The subject vehicle landed on its right side after the impact with the Moving Deformable Barrier.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup NHTSA No.: MA5201
 Test Program: NCAP Side Impact Test Date: 10/28/09

TEST VEHICLE INFORMATION

TEST VEHICLE OPTIONS

Make	Nissan	Driver Front Airbag	Yes
Model Year	2010	Driver Side Torso Airbag	Yes
Model	Frontier 4x2 SE	Driver Head / Torso Airbag	No
Body Style	4-door Pickup Truck	Driver Curtain Airbag	Yes
NHTSA No.	MA5201	Driver Knee Airbag	No
VIN	1N6AD0ER1AC401666	Rear Passenger Front Airbag	No
Color	Night Armor	Rear Passenger Side Torso Airbag	No
Delivery Date	9/30/2009	Rear Passenger Head / Torso Airbag	No
Odometer Reading	45 miles	Rear Passenger Curtain Airbag	Yes
Dealer	Crown Nissan	Rear Passenger Knee Airbag	No
Transmission	Automatic	Load Limiters	Yes
Final Drive	2 wheel drive	Anti-lock Brakes	Yes
Number of Cylinders	6	All-wheel Drive	No
Engine Displacement	4.0 L	Pretensioners	Yes
Engine Placement	V	Air Conditioning	Yes
Roof Rack	No	Tilt Wheel	Yes
Sunroof / T-Top	No	Power Seats	No
Tinted Glass	Yes	Power Windows	Yes
Traction Control	Yes	Power Steering	Yes
Power Brakes	Yes	AM/FM/CD	Yes
Front Disc	Yes	Automatic Door Locks	Yes
Rear Disc	Yes	Other – Vehicle Immobilizer System	Yes
Does owner's manual provide instructions to turn off automatic door locks?			Yes

DATA FROM CERTIFICATION LABEL

Manufactured by	Nissan Motor Company	GVWR (kg)	2599
Date of Manufacture	08/09	GAWR Front (kg)	1495
		GAWR Rear (kg)	1511

TEST VEHICLE SEAT TYPE AND CAPACITY

Measured Parameter	Front	Mid	Rear	Total
Type of Seats	Bucket	None	Split Bench	
Designated Seating Capacity (DSC)	2	0	3	5
Type of Seat Back	Manual Adjustable	None	Fixed	
(A) Capacity Wt. (VCW) (kg)				575
(B) DSC x 68.08 kg				340
(A-B) Cargo Wt. (RCLW) (kg)				136

DATA SHEET NO. 1 (CONTINUED)**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup NHTSA No.: MA5201
 Test Program: NCAP Side Impact Test Date: 10/28/09

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	524.8	451.4		579.0	557.5		561.8	593.8	
Right	kg	519.4	444.6		529.5	555.6		515.0	574.0	
Ratio	%	53.8	46.2		49.9	50.1		48.0	52.0	
Totals	kg	1044.2	896.0	1940.2	1108.5	1113.1	2221.6	1076.8	1167.8	2244.6

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
(A) Total Delivered Weight (UVW)	kg	1940.2
(B) Weight of 2 P572M ATDs	kg	152.0
(C) Rated Cargo/Luggage Weight (RCLW)	kg	136.0
(A+B+C) Vehicle Target Weight (TVTW)	kg	2228.2

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	855	855	892	892	1478
As Tested	mm	845	850	858	870	1603
Fully Loaded	mm	840	842	854	863	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheelbase	mm	3200
Total Vehicle Length at Left Side	mm	5075
Total Vehicle Length at Centerline	mm	5220
Total Vehicle Length at Right Side	mm	5076
Weight of Ballast in Cargo Area	kg	40.8
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	liters	74.2

Vehicle parts removed to make Target Vehicle Test Weight:

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3200
Target Impact Point Aft of Front Axle	mm	508
Actual Impact Point Aft of Front Axle	mm	508
Impact Point Difference	mm	0

DATA SHEET NO. 1 (CONTINUED)

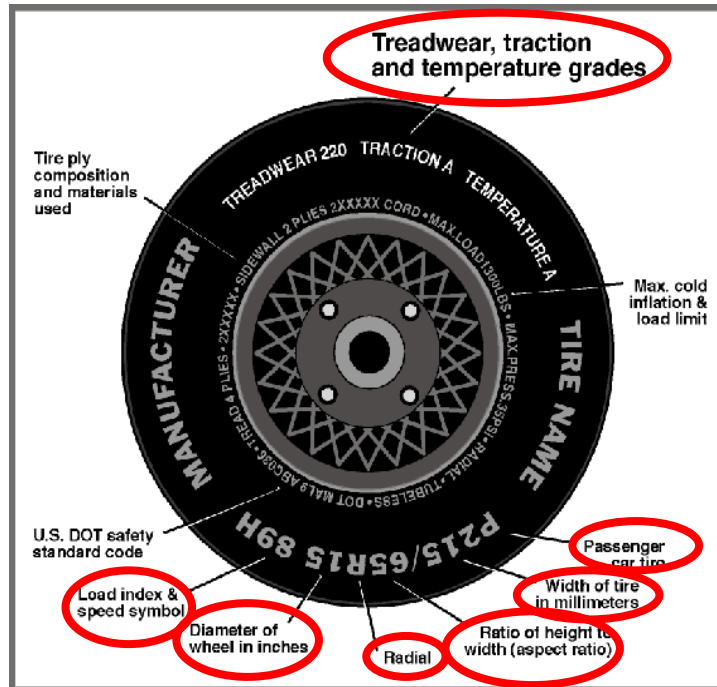
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	P265/70 R16	P265/70 R16
Tire Size on Vehicle	P265/70 R16	P265/70 R16
Tire Manufacturer	B.F. Goodrich	B.F. Goodrich
Tire Name	Long Trail T/A	Long Trail T/A
Load Index & Speed Symbol	111T	111T
Treadwear	440	440
Traction Grade	B	B
Temperature Grade	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Tread	2 Polyester, 2 Steel, and Nylon	2 Polyester, 2 Steel, and Nylon
Tire Material	Polyester, Steel, and Nylon	Polyester, Steel, and Nylon
DOT Safety Code Left	AP72 FB31 3009	AP72 FB31 3009
DOT Safety Code Right	AP72 FB31 3009	AP72 FB31 3009

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND

FUEL SYSTEMS DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09

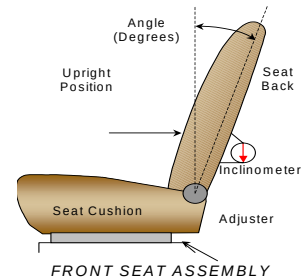
NORMAL DESIGN RIDING POSITION

The seat back angle was measured relative to the rocker sill. The headrest was in the full up position and an inclinometer was placed on the outboard headrest post.

SEAT BACK ANGLE

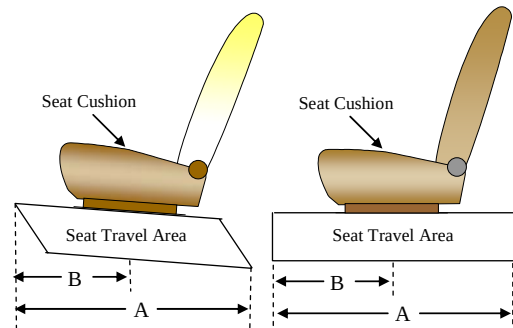
	Degrees	Detent
Driver Seat with Seated Dummy ¹	21	6
Front Passenger Seat	21	6
Rear Seat – Struck Side	Fixed	Fixed
Rear Seat – Non-Struck Side	Fixed	Fixed

¹ Seat back angle at head rest post was 11.4°.



SEAT FORE/AFT POSITIONS

For all seats (driver & passenger, power & manual seat tracks): Position the seat in the mechanical mid-position. Reference points are to be scribed on the seat and the seat track. The total seat travel is measured and the seat is then positioned in place.



SEAT FORE/AFT POSITIONING

	Total Fore/Aft Detent # or Travel (mm) A	Placed in Detent # or Position (mm) B
Driver Seat with Seated Dummy	21 detents	11 detents
Front Passenger Seat	N/A	N/A
Rear Seat – Struck Side	Fixed	N/A
Rear Seat – Non-Struck Side	Fixed	N/A

SEAT BELT UPPER ANCHORAGE

	Total No. of Positions	Placed in Position No.
Driver Seat	4	1
Rear Seat	Fixed	N/A

Position number one is the uppermost adjustment position.

DATA SHEET NO. 2 (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND

FUEL SYSTEMS DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

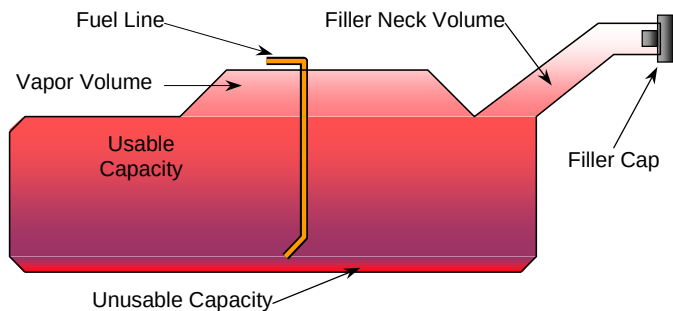
Test Program: NCAP Side Impact

Test Date: 10/28/09

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	79.9
Usable Capacity of "Optional" Tank	N/A
Usable Capacity used for FMVSS301	75.7
Actual Amount of Solvent used	74.2
1/3 of Usable Capacity	26.6

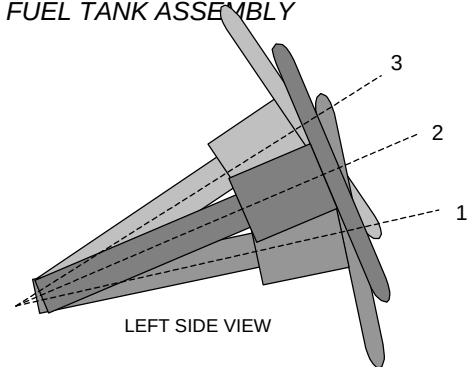
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees / Detents	Fore/Aft Position, mm
Lowermost Position No. 1	Degrees not recorded / 7	
Geometric Center Position No. 2	24.5 / 3	
Uppermost Position No. 3	33.3 / 0	
Telescoping Steering Wheel Travel		No Feature
Test Position		Fixed

The upper most detent is defined as Zero.

DATA SHEET NO. 3

MDB DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup NHTSA No.: MA5201
Test Program: NCAP Side Impact Test Date: 10/28/09

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1252
Overall Length Including Honeycomb Face	4115
Wheel base of Framework Carriage	2591
C.G. Location aft of Front Axle	1102

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	375.4	308.4	
Right	kg	409.4	272.2	
Ratio	%	57.5	42.5	
Totals	kg	784.8	580.6	1365.4

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.0
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.1
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90°

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Primary Value	Redundant Value
Horizontal Offset	mm	+/- 50	0 mm	0 mm
Vertical Offset	mm	+/- 20	10 mm up	10 mm up

DATA SHEET NO. 4**POST TEST OBSERVATIONS**

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup NHTSA No.: MA5201
 Test Program: NCAP Side Impact Test Date: 10/28/09

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat	Rear Seat
Dummy Type / Serial No.	SID/HIII / M001	SID/HIII / 002
Head Contact	Side Curtain Airbag	Side Curtain Airbag
Upper Torso Contact	Side Torso Airbag	C-Pillar Trim Panel
Lower Torso Contact	Door Panel	Door Panel
Left Knee Contact	None	None
Right Knee Contact	None	None

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Unlocked	Unlocked
Left Side Door Opening	Jammed and latched	Jammed and latched
Right Side Door Opening	Closed and latched	Closed and latched
Seat Movement	None	None
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Did not separate from vehicle.
Sill Separation	Did not separate from vehicle.
Windshield Damage	None
Window Damage	None
Other Notable Effects	The subject vehicle landed on its right side after the impact with the Moving Deformable Barrier.

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 01		Left Rear (Passenger) Occupant Location 04	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No	No	N/A
Side Torso Airbag	Yes	Yes	No	N/A
Head Airbag	No	N/A	No	N/A
Head / Torso Side Airbag	No	N/A	No	N/A
Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Unknown	No	N/A
Seat Belt Load Limiter	Yes	Unknown	No	N/A

DATA SHEET NO. 5

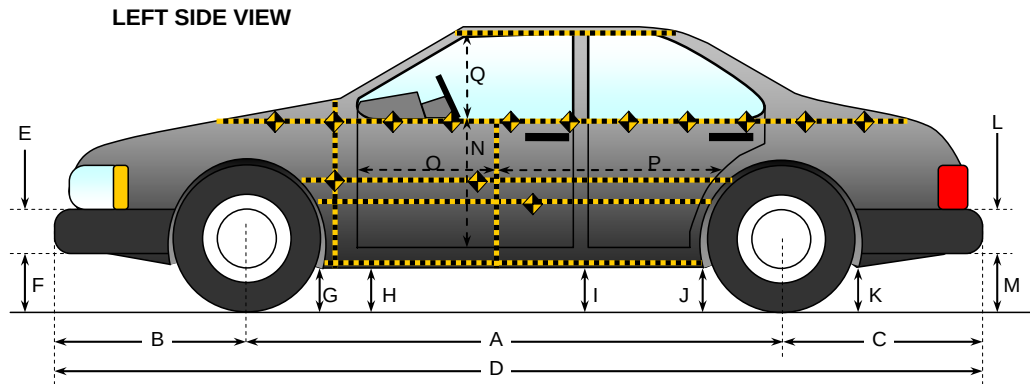
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09



All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3200	3170	30
B	Front Axle to Front Surface of Vehicle	790	790	0
C	Rear Axle to Rear Surface of Vehicle	1230	1230	0
D	Total Length at Centerline	5220	5220	0
E	Front Bumper Thickness	240	240	0
F	Front Bumper Bottom to Ground	420	425	-5
G	Sill Height at Front Wheel Well	377	388	-11
H	Sill Height at Front Door Leading Edge	386	405	-19
I	Sill Height at "B" Pillar	405	425	-20
J1	Pinch Weld Height at Rear Wheel Well	405	430	-25
J2	Sill Height at Rear Wheel Well	340	385	-45
K	Sill Height Aft of Rear Wheel Well	452	485	-33
L	Rear Bumper Thickness	170	170	0
M	Rear Bumper Bottom to Ground	480	515	-35
N	Sill Height to Window Bottom Sill	768	735	33
O	Front Door Leading Edge to Impact CL	751	729	22
P	Rear Door Trailing Edge to Impact CL	1238	1190	48
Q	Front Window Opening	470	470	0
R	Right Side Length	5076	5076	0
S	Left Side Length	5075	5075	0
T	Vehicle Width at "B" Post	1383	1340	43
	Maximum Width, mm	1845	1845	0

DATA SHEET NO. 6

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

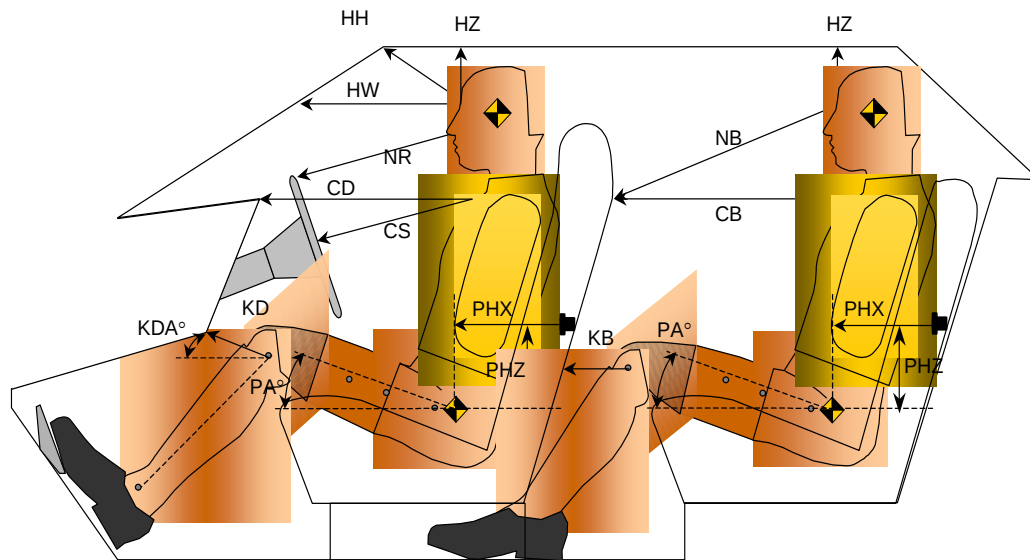
Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09

Dummy Temperature at time of Impact: 22.6° C



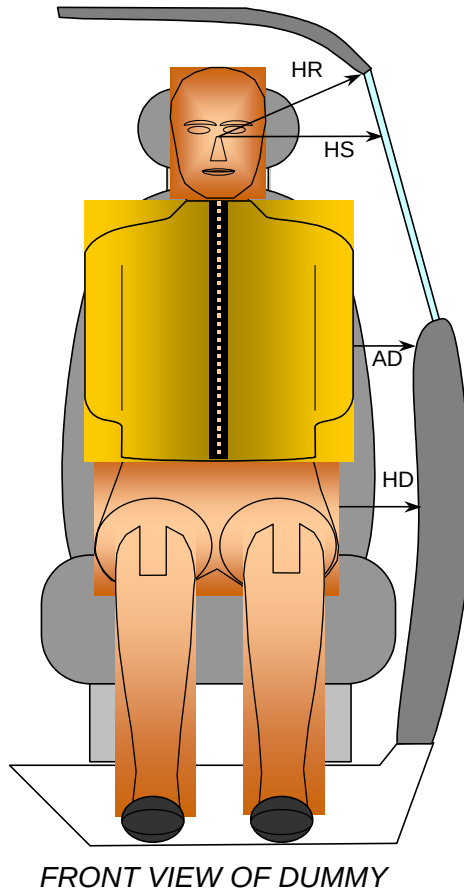
Driver Code	Pass. Code	Measurement Description	Driver S/N M001		Passenger S/N 002	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	422			
HW		Head to Windshield	660			
HZ	HZ	Head to Roof	210		180	
NR	NB	Nose to Rim/Nose to Seatback	482		480	
CD	CB	Chest to Dash or Seatback	588		430	
CS		Chest to Steering Wheel	351			
KDL	KBL	Left Knee to Dash or Seatback	70	0	130	0
KDR	KBR	Right Knee to Dash or Seatback	70	0	130	0
PA	PA	Pelvic Angle		23.2		22.7
PHX	PHX	H-Point to Striker (X-Axis)	250		195	
PHZ	PHZ	H-Point to Striker (Z-Axis)	230		265	

DATA SHEET NO. 7

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup
Test Program: NCAP Side Impact

NHTSA No.: MA5201
Test Date: 10/28/09



Code	Measurement Description	Units	Driver S/N M001	Passenger S/N 002
HR	Head to Side Header	mm	190	200
HS	Head to Side Window	mm	245	235
AD	Arm to Door	mm	50	135
HD	H-Point to Door	mm	160	180

DATA SHEET NO. 8

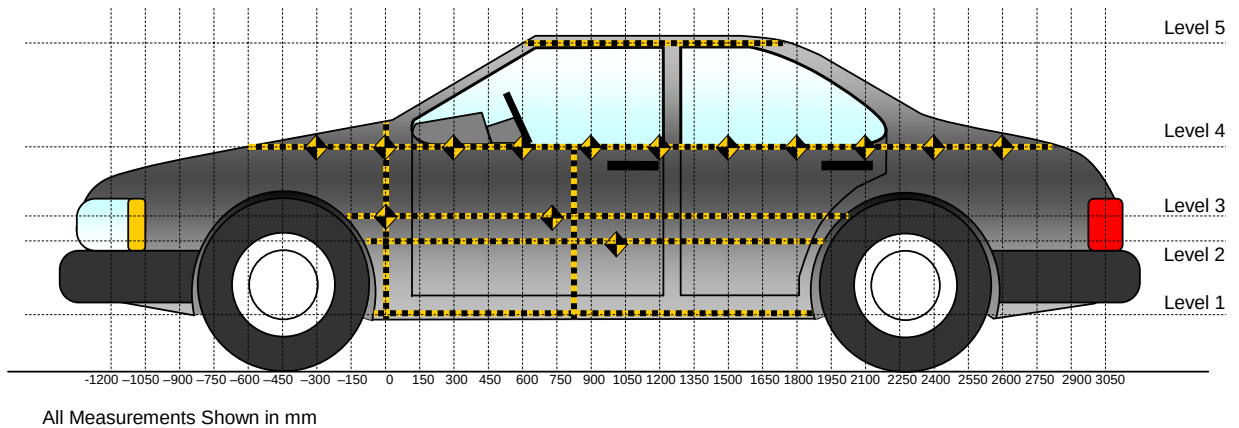
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09



LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.

All measurements below in mm.

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measurement Description	Maximum Exterior Static Crush	Distance From Impact	Height Above Ground
5	Window Top	54	1950	1700
4	Window Sill	85	1200	1117
3	Mid Door	-- ¹	-- ¹	-- ¹
2	Occupant H-Point	221	1200	817
1	Sill Top	206	1500	430
	Maximum Penetration	221		

¹ Mid Door, Level 3 measurement height above ground is equal to the occupant H-Point Measurement level.

DATA SHEET NO. 8 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300				-817					-908					-91	
-150		-921	-- ¹	-826			-976	-- ¹	-903			-55	-- ¹	-77	
0		-909	-- ¹	-833			-950	-- ¹	-896			-41	-- ¹	-63	
150	-861	-873	-- ¹	-839	-796	-867	-892	-- ¹	-884	-851	-6	-19	-- ¹	-45	-55
300	-818	-875	-- ¹	-844	-759	-797	-798	-- ¹	-883	-809	21	77	-- ¹	-39	-50
450	-818	-879	-- ¹	-840	-719	-763	-740	-- ¹	-874	-764	55	139	-- ¹	-34	-45
600	-820	-882	-- ¹	-846	-679	-747	-709	-- ¹	-870	-717	73	173	-- ¹	-24	-38
750	-822	-884	-- ¹	-852	-638	-732	-707	-- ¹	-860	-669	90	177	-- ¹	-8	-31
900	-824	-886	-- ¹	-857	-622	-718	-699	-- ¹	-836	-646	106	187	-- ¹	21	-24
1050	-825	-887	-- ¹	-859	-618	-703	-686	-- ¹	-805	-632	122	201	-- ¹	54	-14
1200	-826	-888	-- ¹	-861	-618	-687	-702	-- ¹	-792	-623	139	186	-- ¹	69	-5
1350	-826	-889	-- ¹	-862	-619	-672	-706	-- ¹	-780	-615	154	183	-- ¹	82	4
1500	-827	-888	-- ¹	-861	-618	-656	-667	-- ¹	-776	-607	171	221	-- ¹	85	11
1650	-826	-888	-- ¹	-862	-619	-638	-682	-- ¹	-780	-599	188	206	-- ¹	82	20
1800	-827	-887	-- ¹	-863	-619	-621	-706	-- ¹	-779	-592	206	181	-- ¹	84	27
1950	-827	-887	-- ¹	-863	-621	-625	-733	-- ¹	-786	-584	202	154	-- ¹	77	37
2100	-830	-886	-- ¹	-863	-621	-683	-778	-- ¹	-800	-576	147	108	-- ¹	63	45
2250	-820	-886	-- ¹	-864	-615	-784	-795	-- ¹	-787	-561	36	91	-- ¹	77	54
2400	-881	-896	-- ¹	-849		-858	-892	-- ¹	-852		23	4	-- ¹	-3	
2550		-924	-- ¹	-851			-922	-- ¹	-856			2	-- ¹	-5	
2700				-853					-858					-5	
2850				-854					-844					10	
3000															

Reference plane is parallel to test vehicle longitudinal centerline.

Given measurements = Reference plane to car body

¹ Mid Door, Level 3 measurement height above ground is equal to the occupant H-Point Measurement level.

DATA SHEET NO. 8 (CONTINUED)

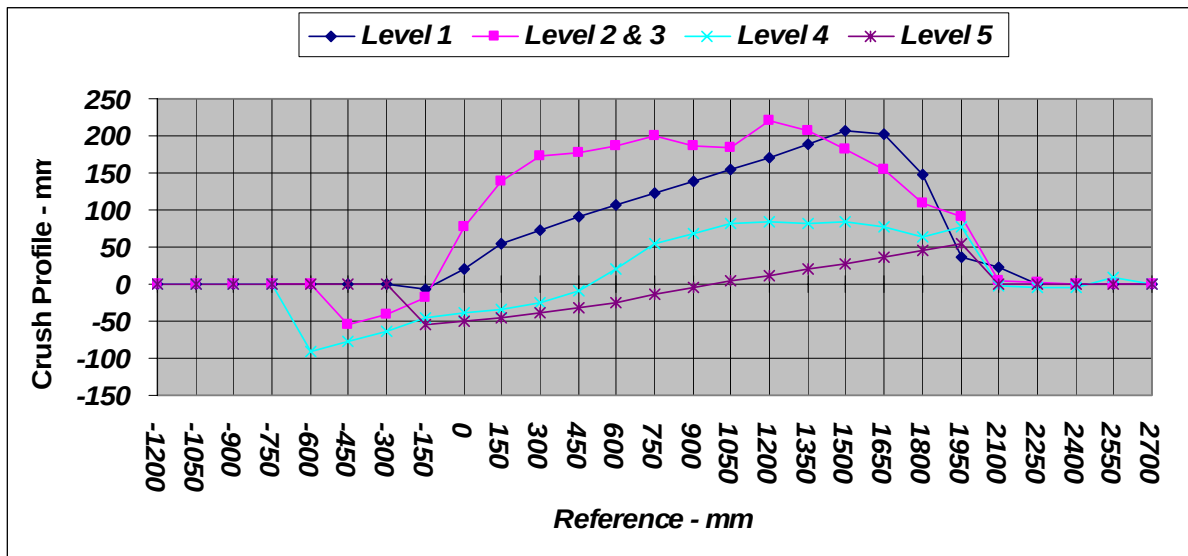
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09



DATA SHEET NO. 8 (CONTINUED)

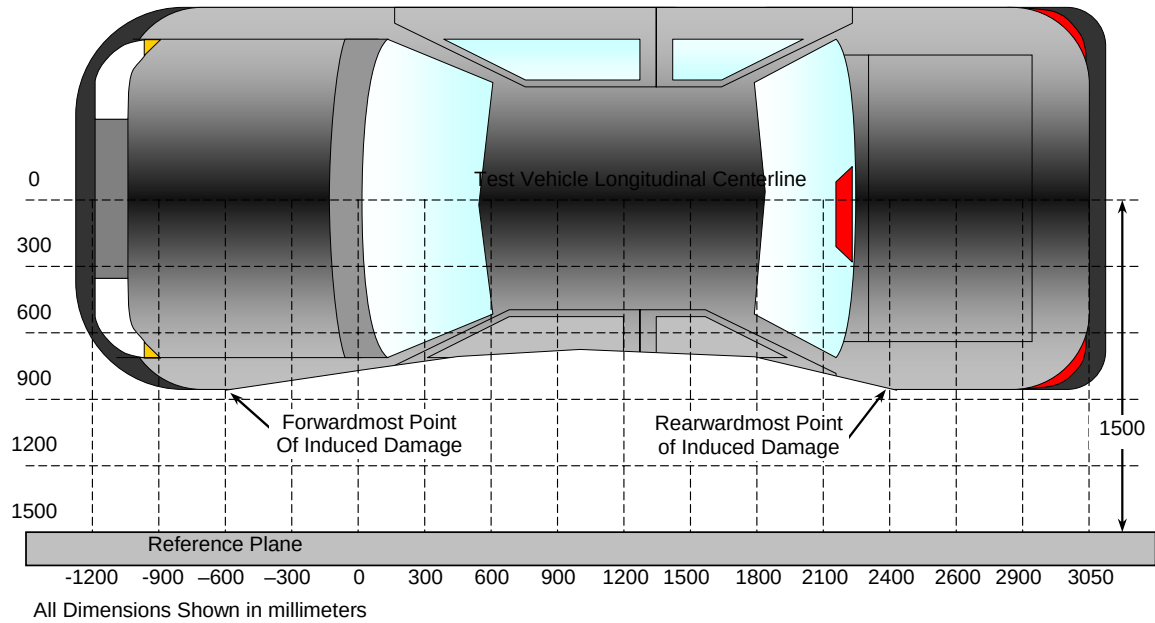
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2700 mm	4	N/A	N/A	0
2	1950 mm	2	886	795	91
3	1200 mm	2	888	667	221
4	600 mm	2	886	699	187
5	-150 mm	5	796	851	-55
6	-750 mm	4	N/A	N/A	0

Reference plane is parallel to test vehicle longitudinal centerline.

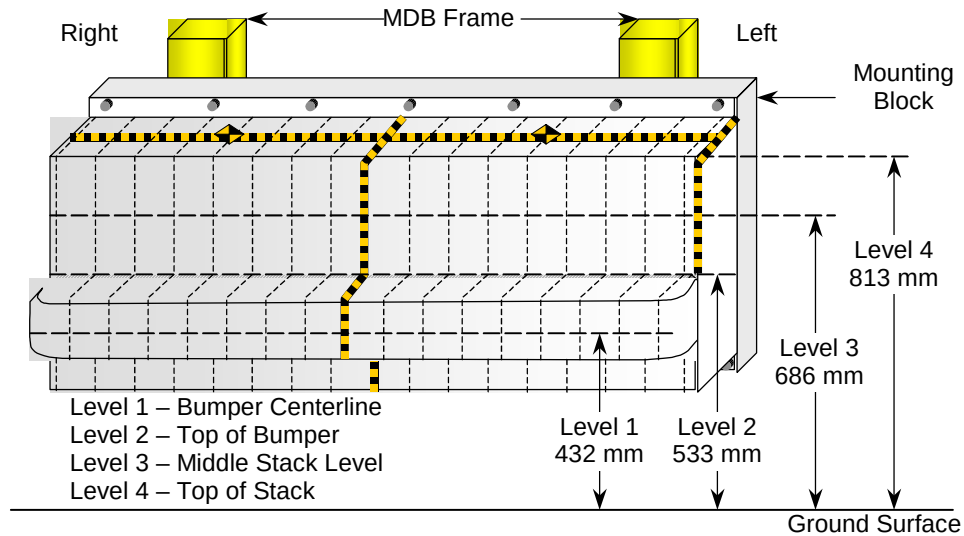
Given dimensions = Reference plane to car body.

DATA SHEET NO. 9

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup
 Test Program: NCAP Side Impact

NHTSA No.: MA5201
 Test Date: 10/28/09



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	-155	-158	-161	-164	-167	-169	-171	-173	-174	-175	-175	-177	-178	-179	-181	-183	-184
2 ¹	-93	-93	-97	-101	-100	-369	-369	-369	-112	-109	-106	-106	-108	-110	-112	-111	-113
3	-104	-68	-57	-59	-83	-113	-78	-68	-49	-43	-39	-39	-38	-43	-52	-77	-132
4	-172	-140	-109	-86	-95	-122	-130	-100	-74	-65	-68	-67	-69	-68	-73	-100	-137

All measurements are in mm

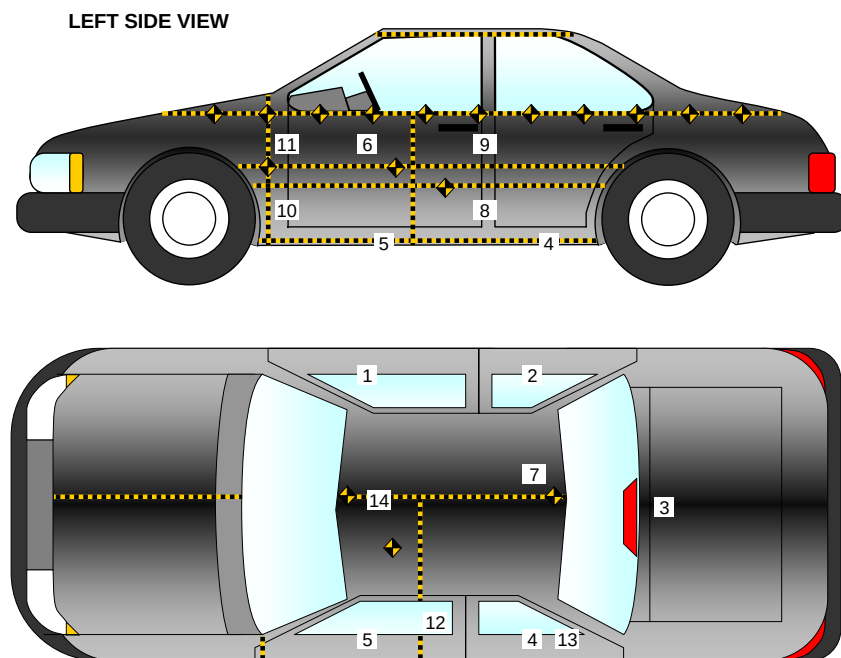
¹ Top Bumper measurements are collected at 560 mm to eliminate post-test measurement point obstruction by the bumper element.

DATA SHEET NO. 10

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup
 Test Program: NCAP Side Impact

NHTSA No.: MA5201
 Test Date: 10/28/09



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	4035	705	-454
2	Right Sill at Rear Seat	2865	610	-523
3	Rear Floorpan Above Axle	1740	0	-672
4	Left Sill at Rear Seat	2865	-608	-522
5	Left Sill at Front Seat	4045	-705	-470
6	Left Front Door C/L	---	---	---
7	Rear Occupant Compartment	2690	625	-530
8	Left Lower B-Post	3145	-795	-720
9	Left Middle B-Post	3140	-795	-1073
10	Left Lower A-Post	4260	-805	-725
11	Left Middle A-Post	4275	-810	-1042
12	Front Seat Track	3342	-585	-628
13	Rear Seat Track or Structure	2645	-625	-532
14	Vehicle CG	3425	0	-695

Reference Points: X - Test Vehicle Rear Bumper (+ forward)

Y - Test Vehicle Centerline (+ to right)

Z - Ground Plane (+ down)

¹Left Front Door Accelerometer was not installed

DATA SHEET NO. 11

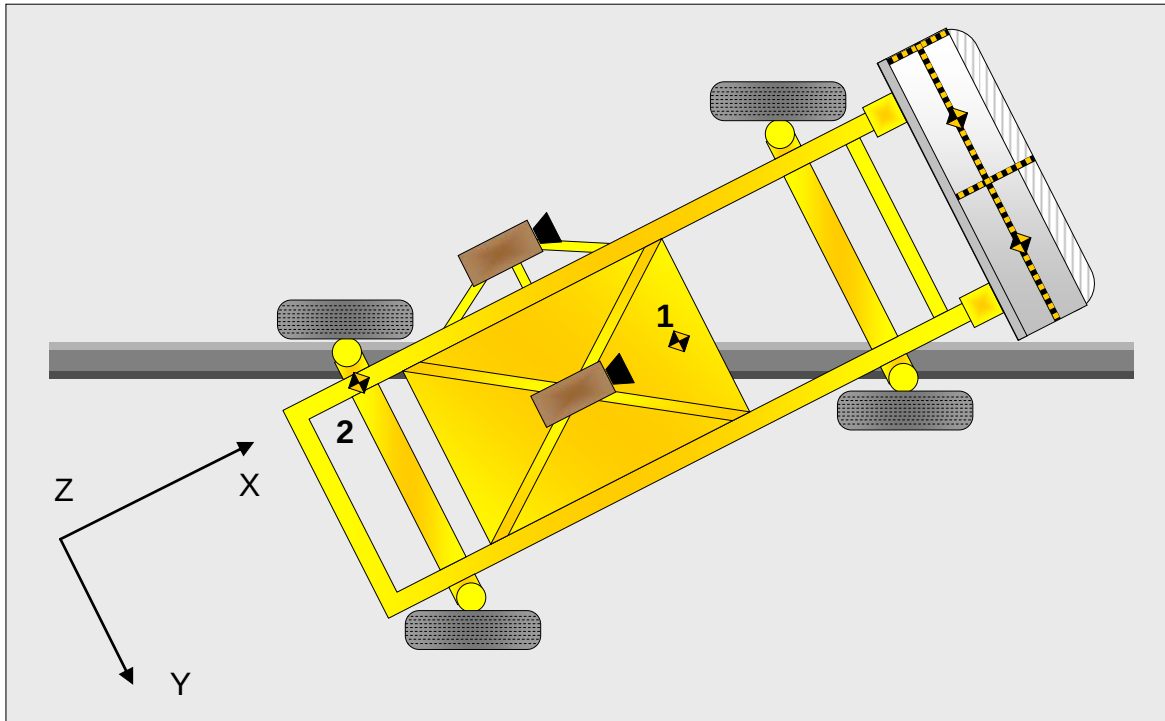
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	1855	0	-520
2	MDB Rear	412	-677	-625

Reference Points: X - Test Vehicle Rear Bumper (+ forward)

Y - Test Vehicle Centerline (+ to right)

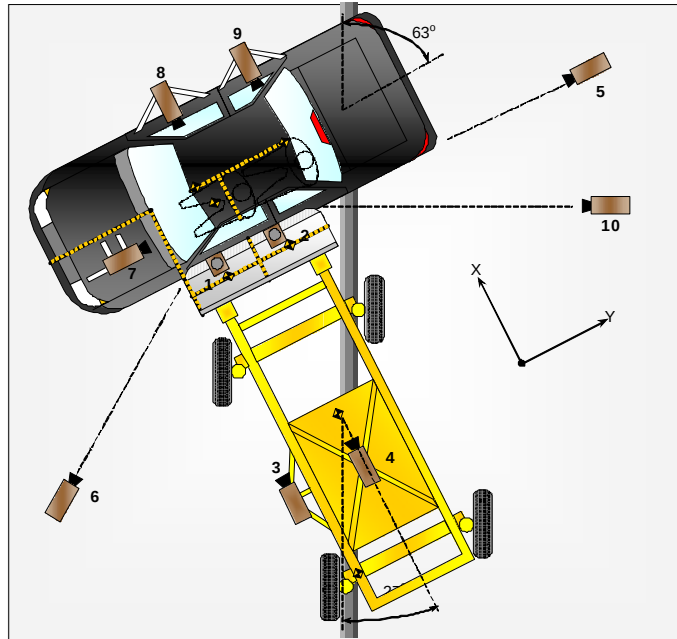
Z - Ground Plane (+ down)

DATA SHEET NO. 12

HIGH SPEED CAMERA DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup
 Test Program: NCAP Side Impact

NHTSA No.: MA5201
 Test Date: 10/28/09



No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	Overhead Close-up	0	240	5650	6	1000
2	Overhead Overall	0	120	5650	25	1000
3	MDB Onboard, Impact Point Close-up				6	1000
4	MDB Onboard, Centerline of Impact				12.5	1000
5	Right Side, Ground Level, Overall	0	11000	-1140	16	1000
6	Left Side, Ground Level, Overall	-3900	-5000	-1040	16	1000
7	Vehicle Onboard Front SID/HIII, Front				25	1000
8	Vehicle Onboard Front SID/HIII, Side				12.5	1000
9	Vehicle Onboard Rear SID/HIII, Side				12.5	1000
10	Real Time Coverage				zoom	30

REFERENCE: (from Point of Impact for X and Y; from Ground for Z):
 +X= Forward of MDB, +Y= Rear of vehicle, +Z= Down

DATA SHEET NO. 13

SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup

NHTSA No.: MA5201

Test Program: NCAP Side Impact

Test Date: 10/28/09

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Rollover Start Time: 16:05

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: 0 oz.

(Maximum allowable = 1 ounce)

B. For the 5 minute period after motion ceases: 0

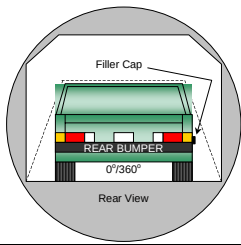
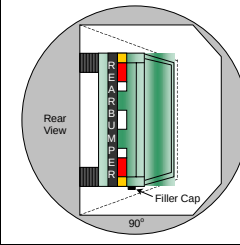
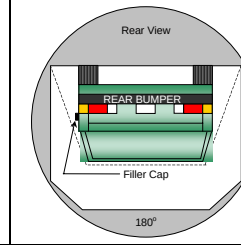
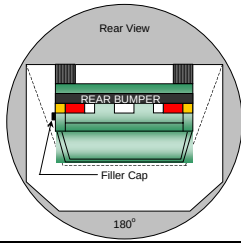
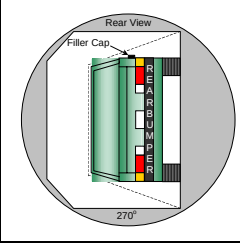
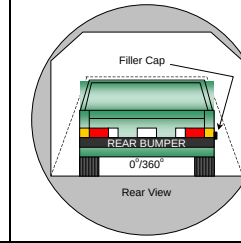
(Maximum allowable = 5 ounces)

C. For the following 25 minutes: 0

(Maximum allowable = 1 oz./minute)

D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA

			1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds. 2. The position hold time at each position is 300 seconds (minimum). 3. Details of Stoddard Solvent spillage locations: 0	
0° to 90°		90° to 180°		
				
180° to 270°		270° to 360°		

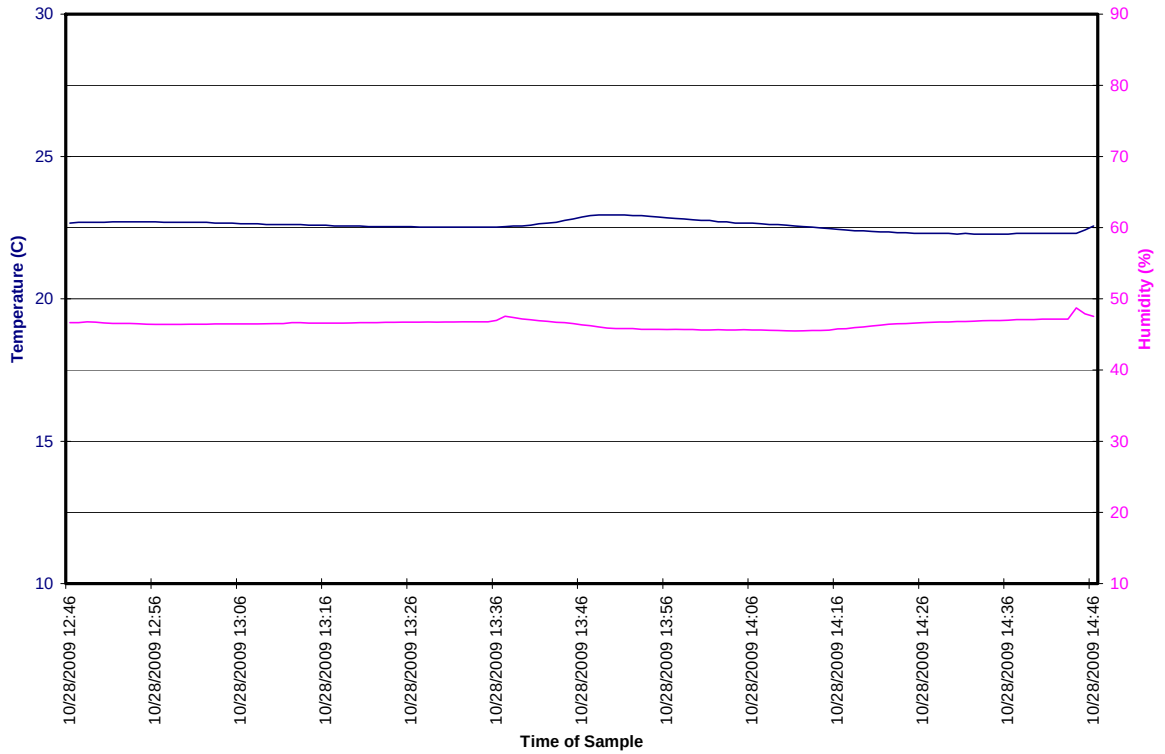
Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage Collection Time (min)	Spillage (oz.)	Spillage Collection Time (min)	Spillage (oz.)	Spillage Collection Time (min)	Spillage (oz.)
0° to 90°	120	300	First 5	0	Sixth	0	Seventh	0
90° to 180°	120	300	First 5	0	Sixth	0	Seventh	0
180° to 270°	120	300	First 5	0	Sixth	0	Seventh	0
270° to 360°	120	300	First 5	0	Sixth	0	Seventh	0

DATA SHEET NO. 14

DUMMY / VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2010 Nissan Frontier 4x2 SE Crew Cab 4-door Pickup NHTSA No.: MA5201
Test Program: NCAP Side Impact Test Date: 10/28/09

2010 Nissan Frontier 4x2 SE LEFT SIDE IMPACT AT 62 KM/H, TEST TIME 14:46



APPENDIX A
PHOTOGRAPHS

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Figure A-1 Pre-Test Front View of Test Vehicle

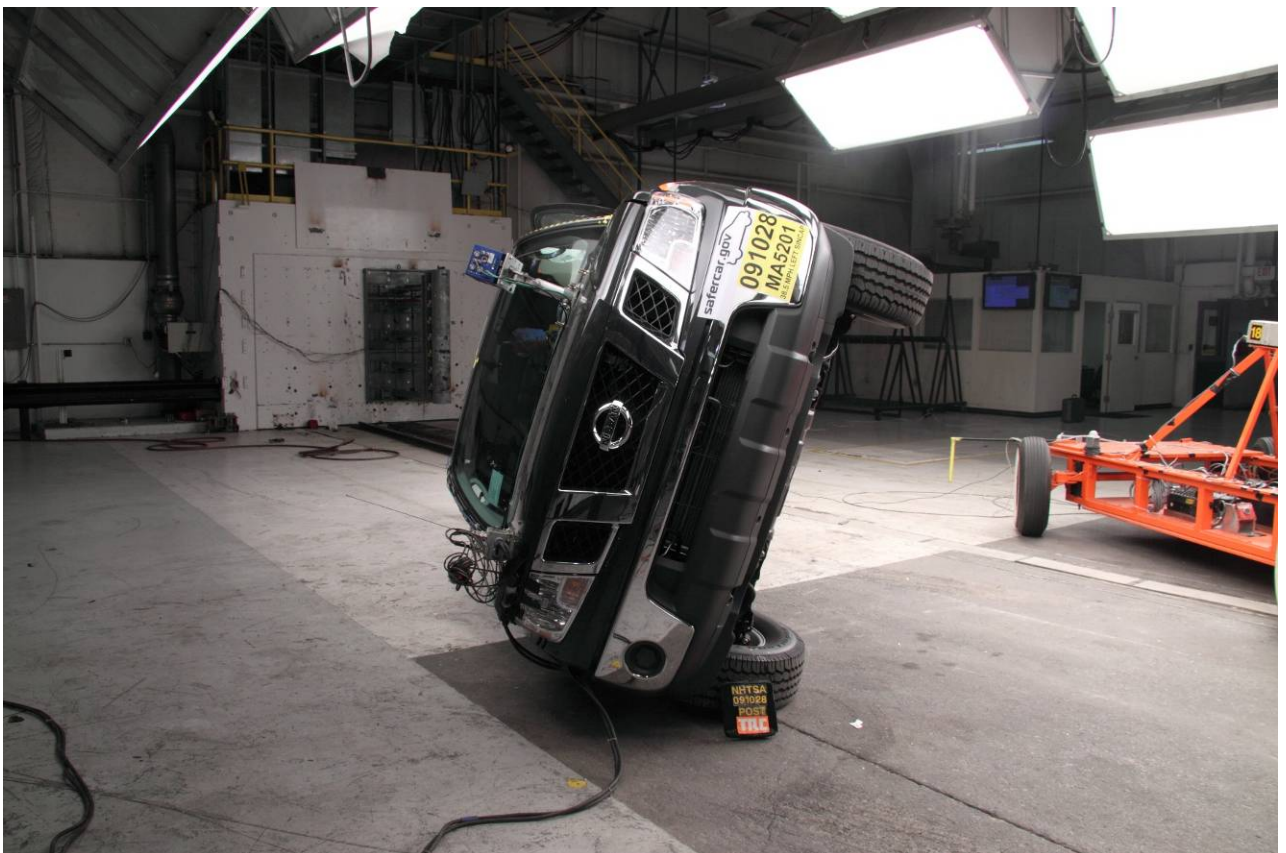


Figure A-2 Post-Test Front View of Test Vehicle



Figure A-3 Pre-Test Left Front View of Test Vehicle

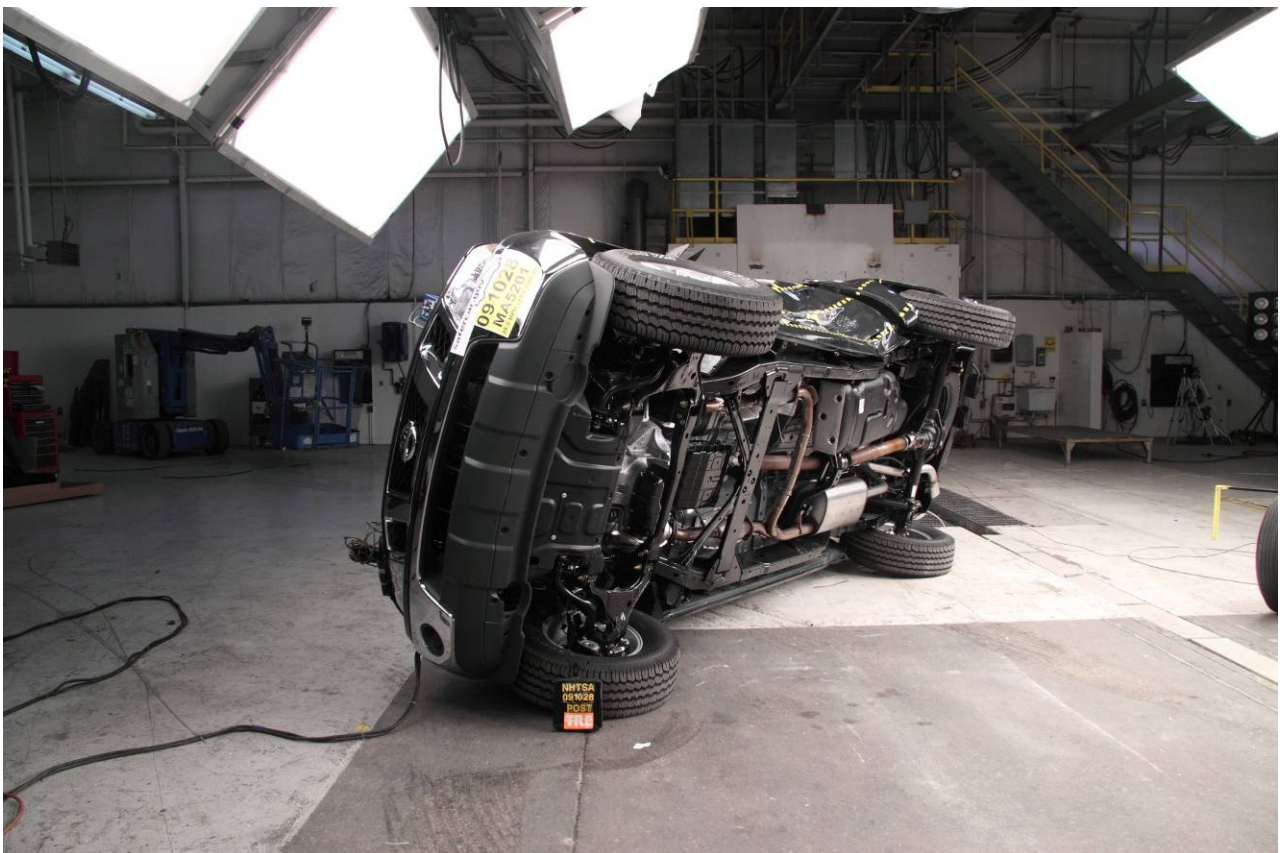


Figure A-4 Post-Test Left Front View of Test Vehicle

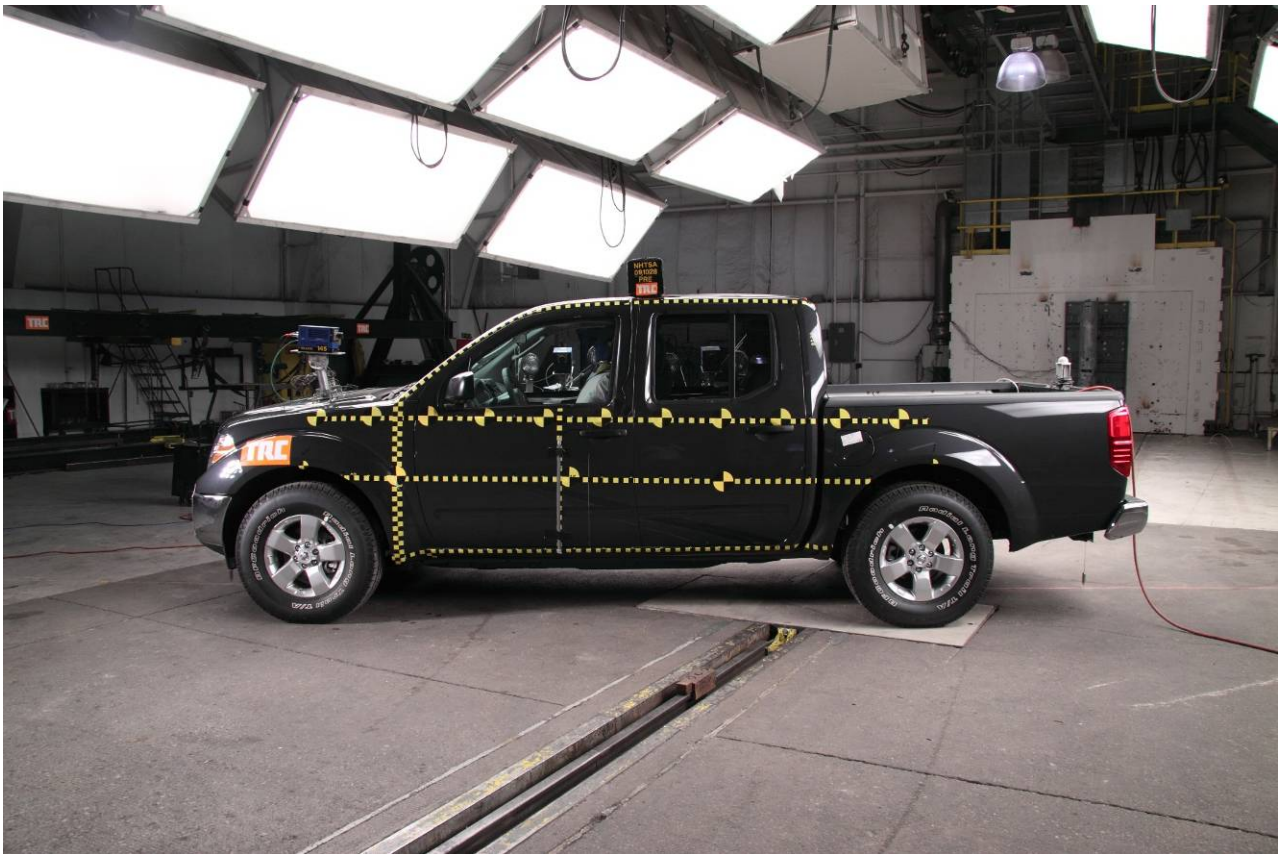


Figure A-5 Pre-Test Impacted Side View of Test Vehicle



Figure A-6 Post-Test Impacted Side View of Test Vehicle



Figure A-7 Pre-Test Left Rear View of Test Vehicle



Figure A-8 Post-Test Left Rear View of Test Vehicle



Figure A-9 Pre-Test Rear View of Test Vehicle



Figure A-10 Post-Test Rear View of Test Vehicle



Figure A-11 Pre-Test Right Rear View of Test Vehicle



Figure A-12 Post-Test Right Rear View of Test Vehicle



Figure A-13 Pre-Test Right Side View of Test Vehicle



Figure A-14 Post-Test Right Side View of Test Vehicle



Figure A-15 Pre-Test Right Front View of Test Vehicle



Figure A-16 Post-Test Right Front View of Test Vehicle

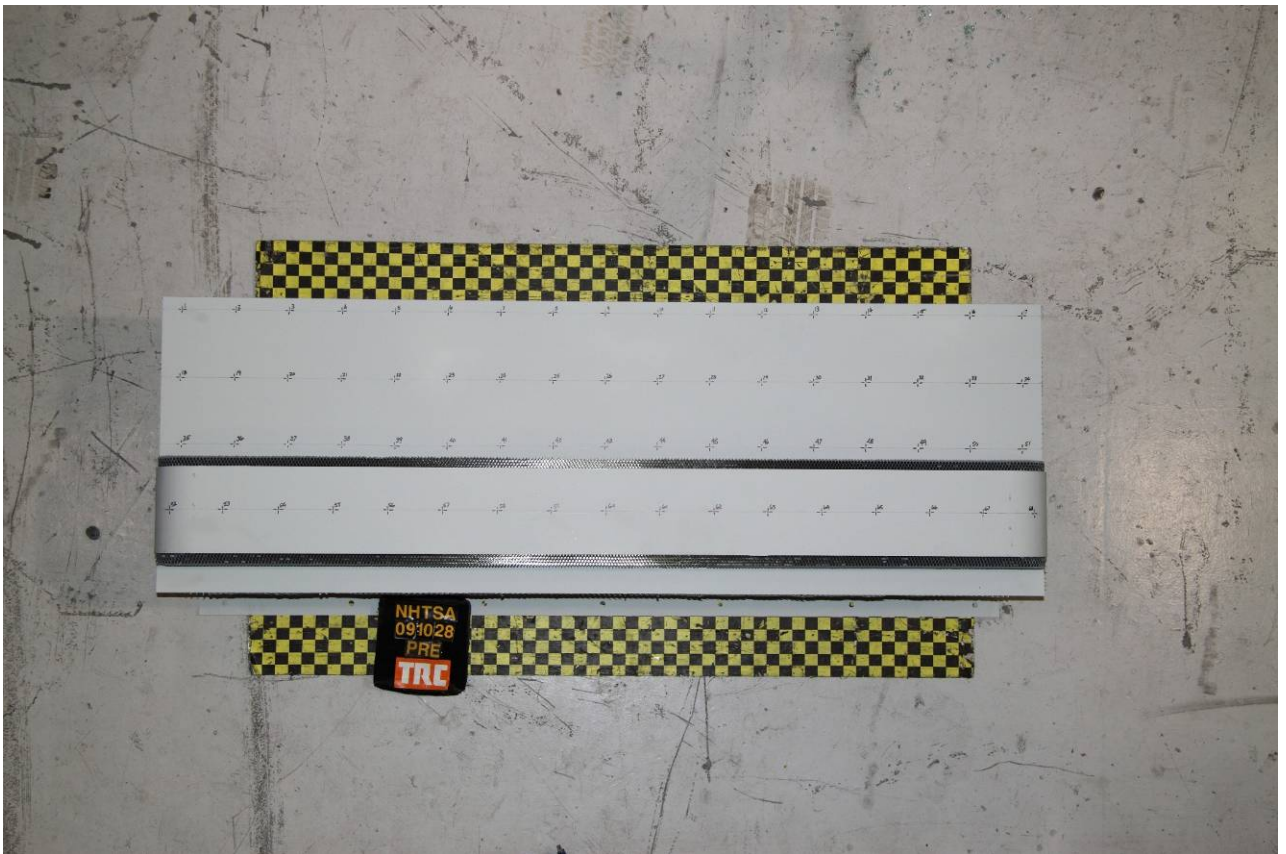


Figure A-17 Pre-Test Frontal View of Impactor Face



Figure A-18 Post-Test Frontal View of Impactor Face



Figure A-19 Pre-Test Left Side View of Impactor Face



Figure A-20 Post-Test Left Side View of Impactor Face



Figure A-21 Pre-Test Right Side View of Impactor Face



Figure A-22 Post-Test Right Side View of Impactor Face

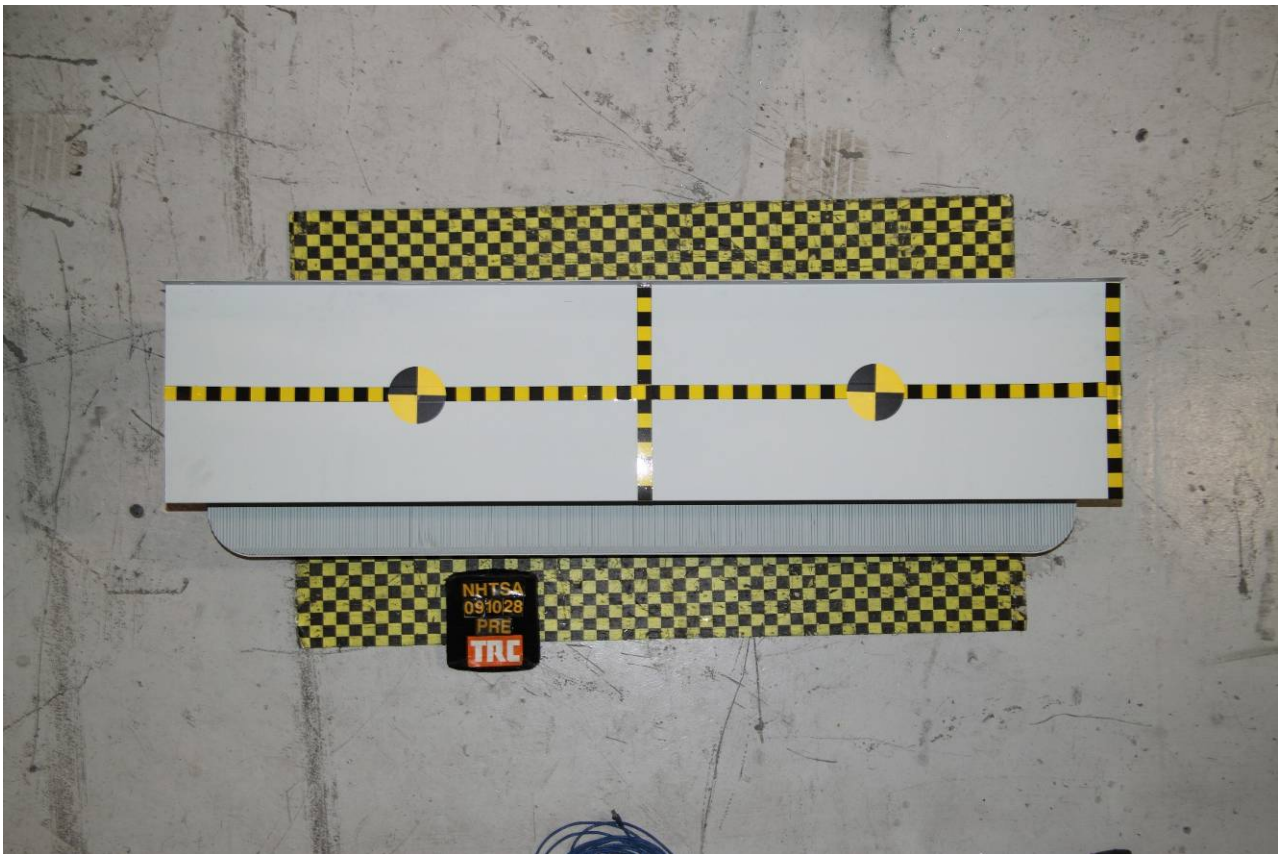


Figure A-23 Pre-Test Top View of Impactor Face



Figure A-24 Post-Test Top View of Impactor Face



Figure A-25 Pre-Test Left Side View of Impactor



Figure A-26 Post-Test Left Side View of Impactor



Figure A-27 Pre-Test Right Side View of Impactor



Figure A-28 Post-Test Right Side View of Impactor

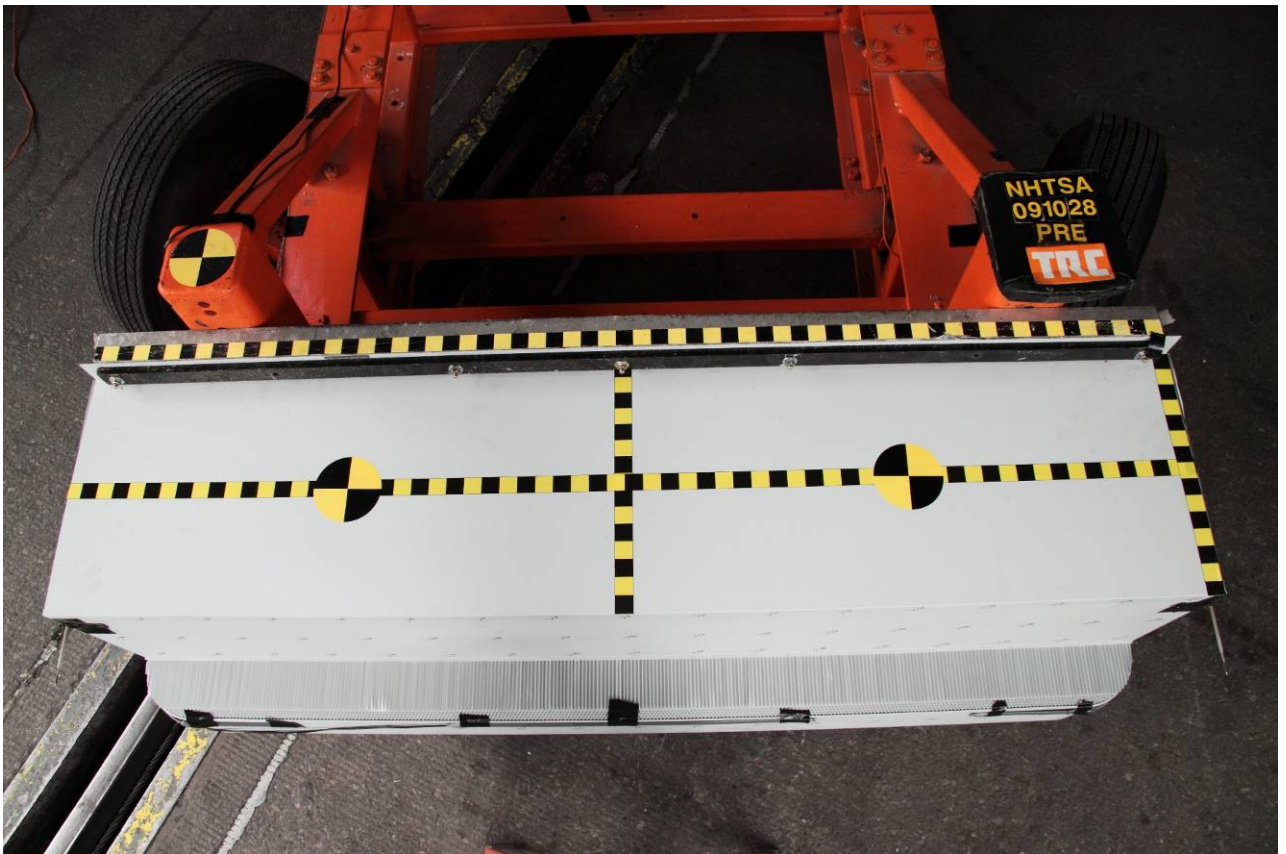


Figure A-29 Pre-Test Top View of Impactor

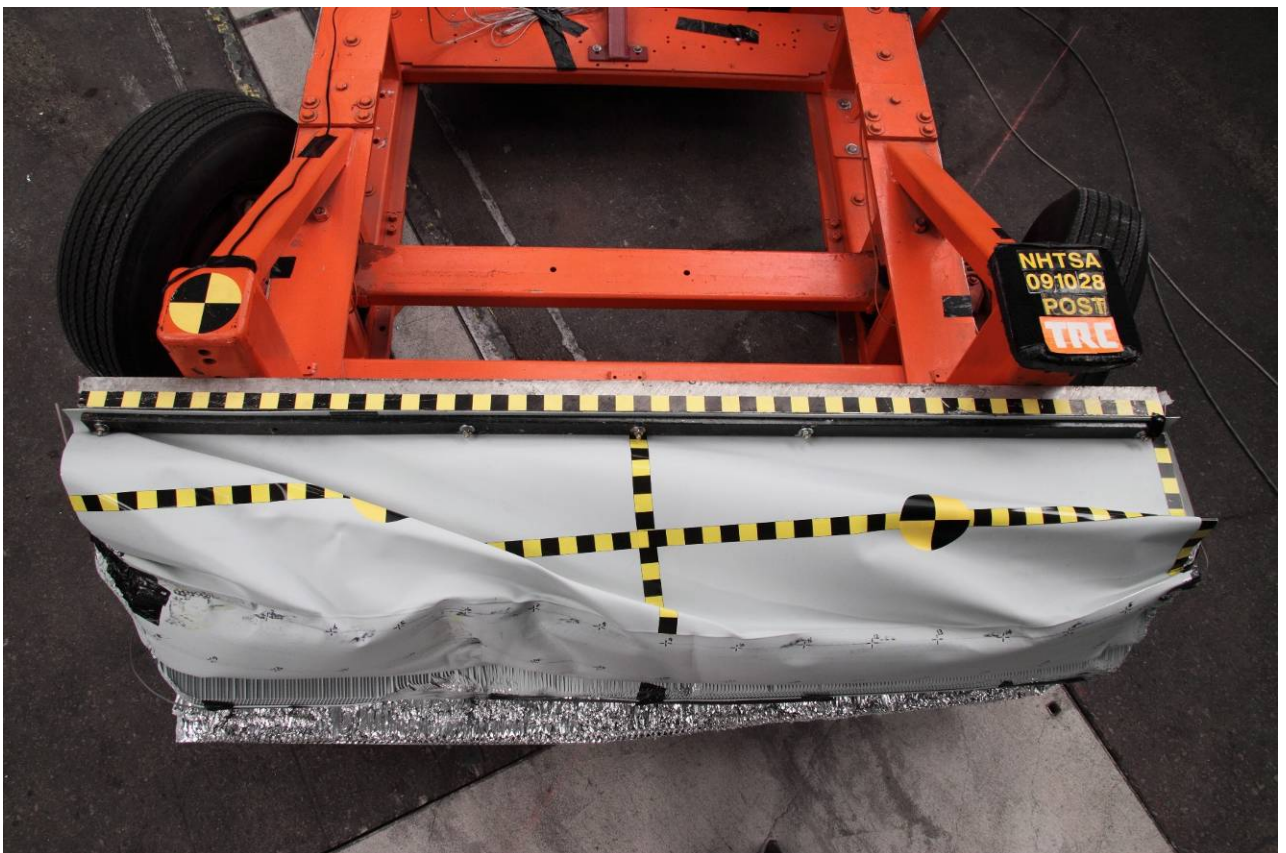


Figure A-30 Post-Test Top View of Impactor



Figure A-31 Pre-Test Left Side Overall View of Impactor



Figure A-32 Post-Test Left Side Overall View of Impactor



Figure A-33 Pre-Test Right Side Overall View of Impactor



Figure A-34 Post-Test Right Side Overall View of Impactor



Figure A-35 Pre-Test View of MDB Showing Contact Switches in Place



Figure A-36 Post-Test View of MDB Showing Contact Switches in Place



Figure A-37 Pre-Test Overhead View of MDB Aligned with Vehicle



Figure A-38 Post-Test Overhead View of MDB and Vehicle



Figure A-39 Pre-Test Right Occupant Compartment View of Front SID HIII



Figure A-40 Post-Test Right Occupant Compartment View of Front SID HIII



Figure A-41 Pre-Test Right Occupant Compartment View of Rear SID HIII

Photo Not Available

Figure A-42 Post-Test Right Occupant Compartment View of Rear SID HIII



Figure A-43 Pre-Test Left View of Front SID HIII



Figure A-44 Post-Test Left View of Front SID HIII



Figure A-45 Pre-Test Left View of Front SID HIII and Belt Position

Intentionally Left Blank



Figure A-46 Pre-Test Left View of Front SID HIII and Door Clearance



Figure A-47 Post-Test Left View of Front SID HIII and Door Clearance



Figure A-48 Pre-Test Left View of Rear SID HIII



Figure A-49 Post-Test Left View of Rear SID HIII



Figure A-50 Pre-Test Left View of Rear SID HIII and Belt Position

Intentionally Left Blank



Figure A-51 Pre-Test Left View of Rear SID HIII and Door Clearance



Figure A-52 Post-Test Left View of Rear SID HIII and Door Clearance



Figure A-53 Pre-Test Interior of Front Door Panel

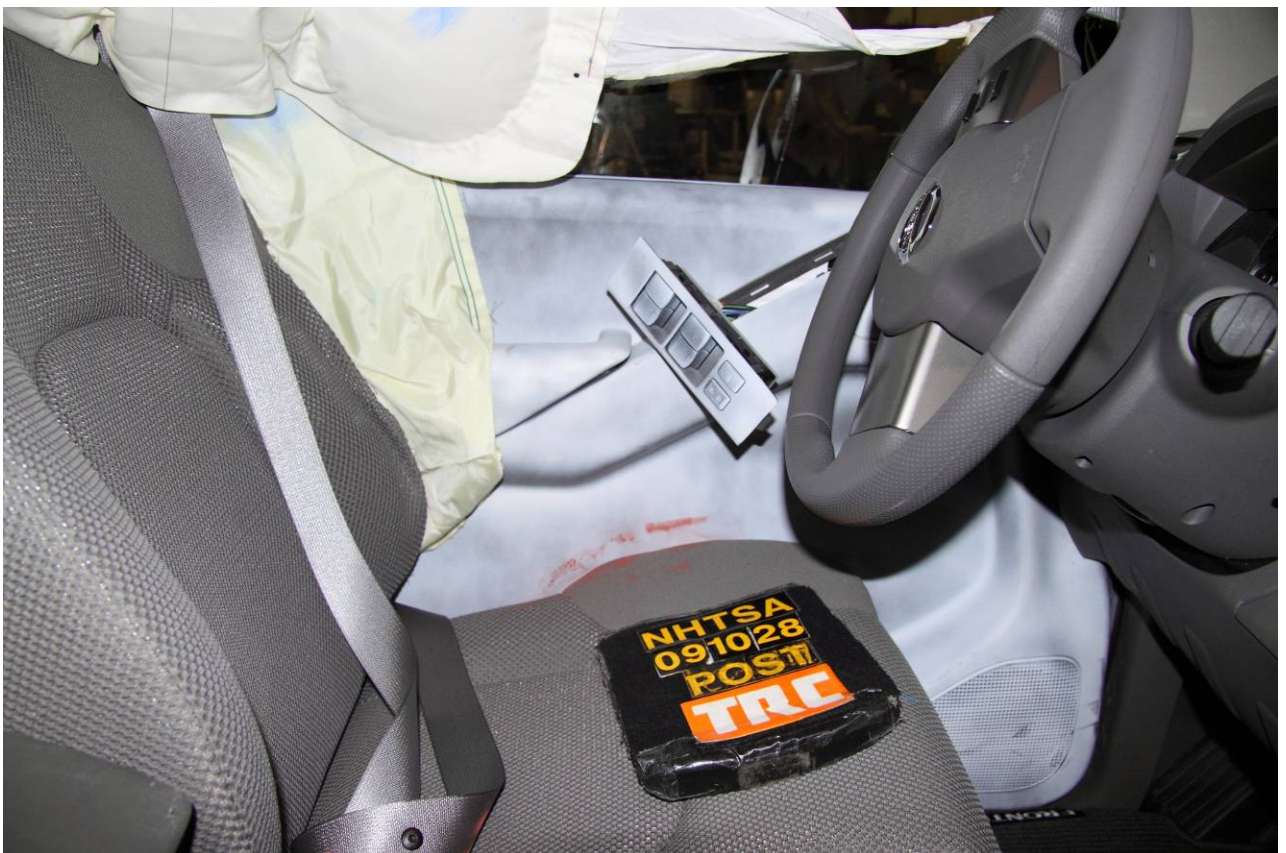


Figure A-54 Post-Test Interior of Front Door Panel



Figure A-55 Post-Test Front SID HIII Contact Overall View



Figure A-56 Post-Test Front SID HIII Contact – View 1



Figure A-57 Post-Test Front SID HIII Contact – View 2

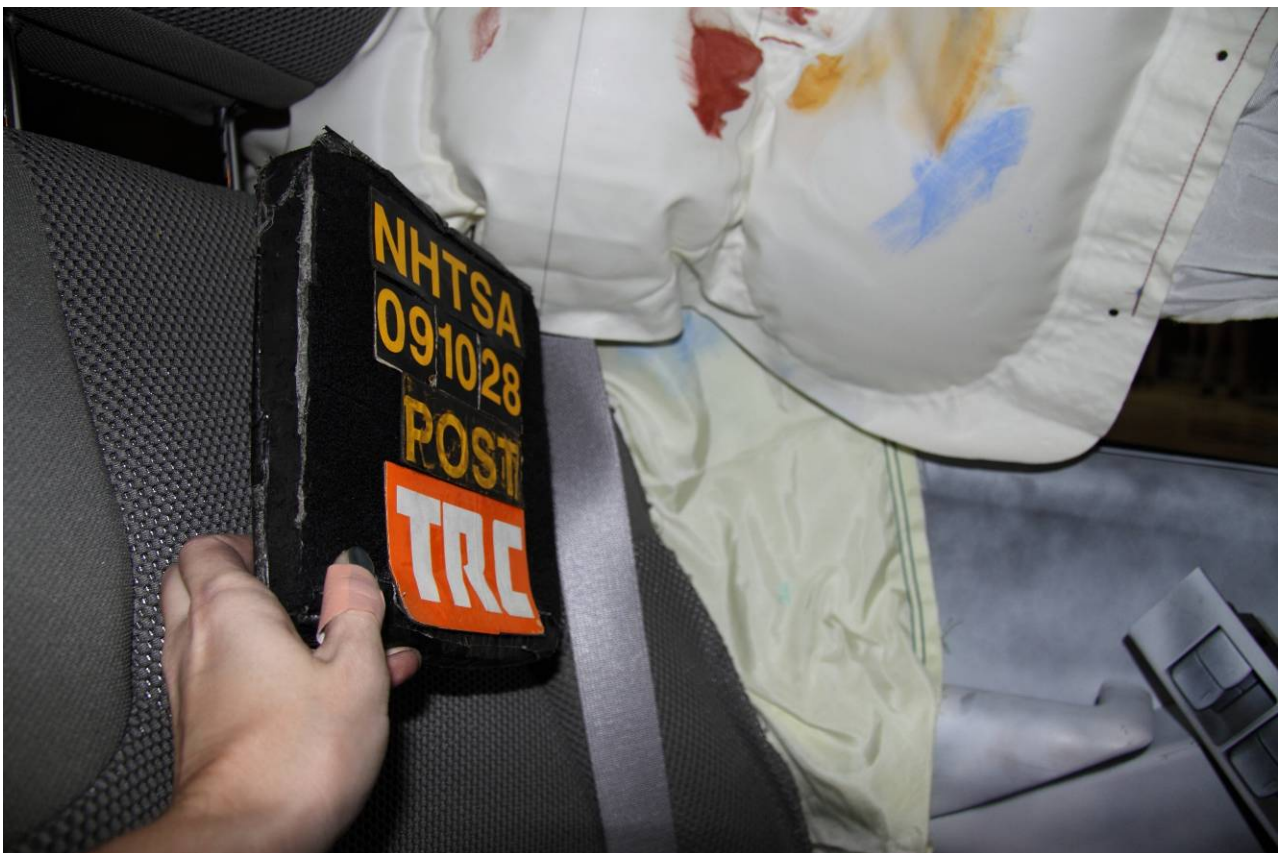


Figure A-58 Post-Test Front SID HIII Contact – View 3



Figure A-59 Pre-Test Interior of Rear Door Panel



Figure A-60 Post-Test Interior of Rear Door Panel



Figure A-61 Post-Test Rear SID HIII Contact Overall View



Figure A-62 Post-Test Rear SID HIII Contact - View 1



Figure A-63 Pre-Test Left Side View of MDB With Impactor Face in Position



Figure A-64 Post-Test Left Side View of MDB With Impactor Face in Position



Figure A-65 Pre-Test Primary Impact Point View

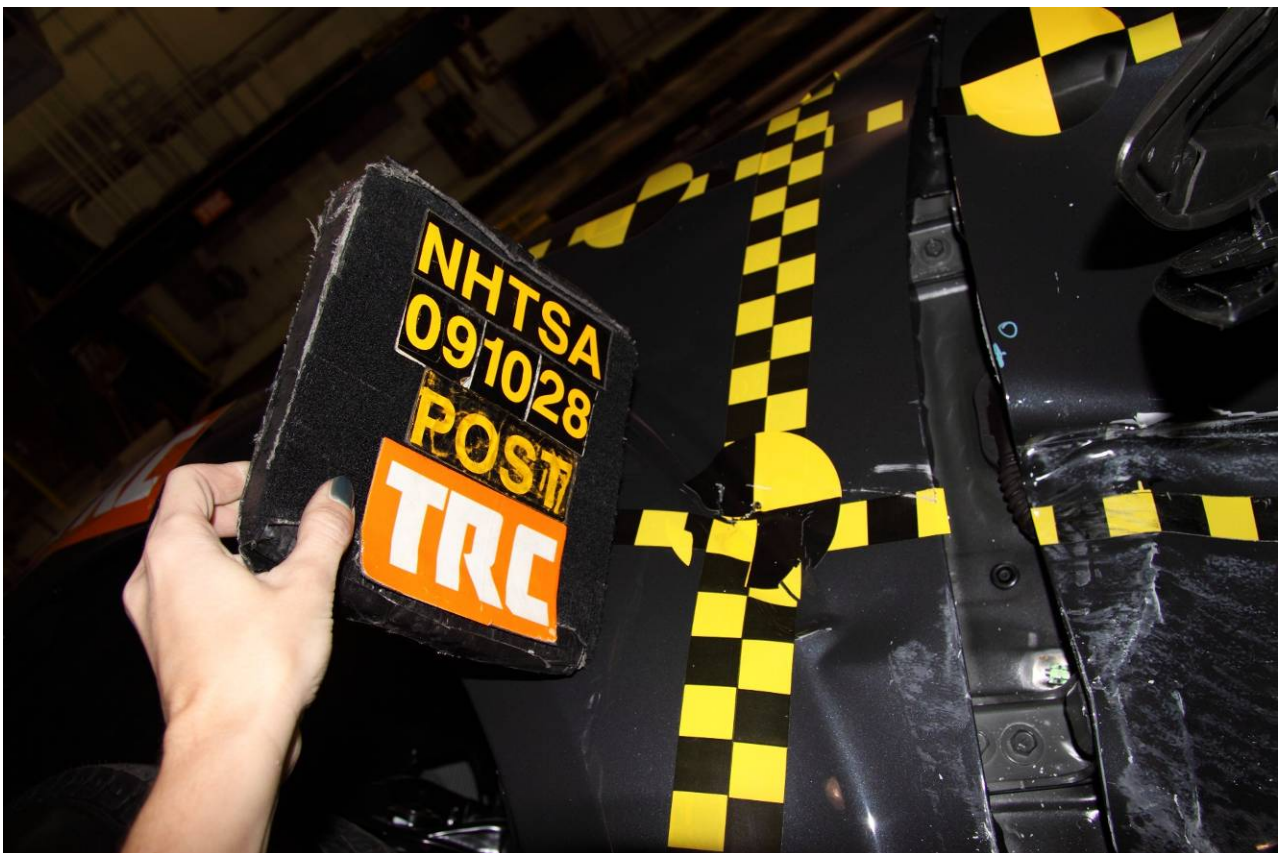


Figure A-66 Post-Test Primary Impact Point View



Figure A-67 Pre-Test Right Side View of MDB With Impactor Face in Position

Photo Not Available

Figure A-68 Post-Test Right Side View of MDB With Impactor Face in Position



Figure A-69 Pre-Test Secondary Impact Point View



Figure A-70 Post-Test Secondary Impact Point View

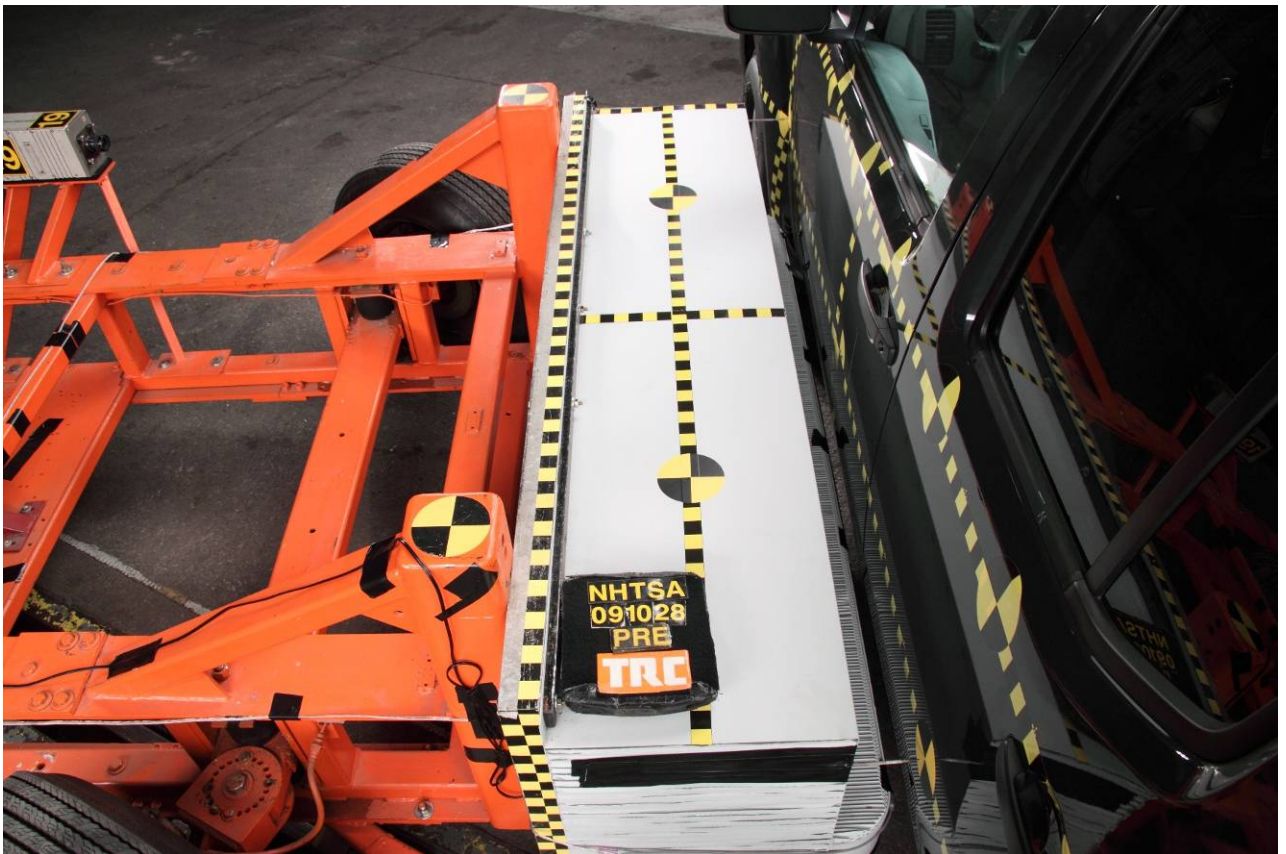


Figure A-71 Pre-Test Left Front View of MDB with Impactor Face in Position

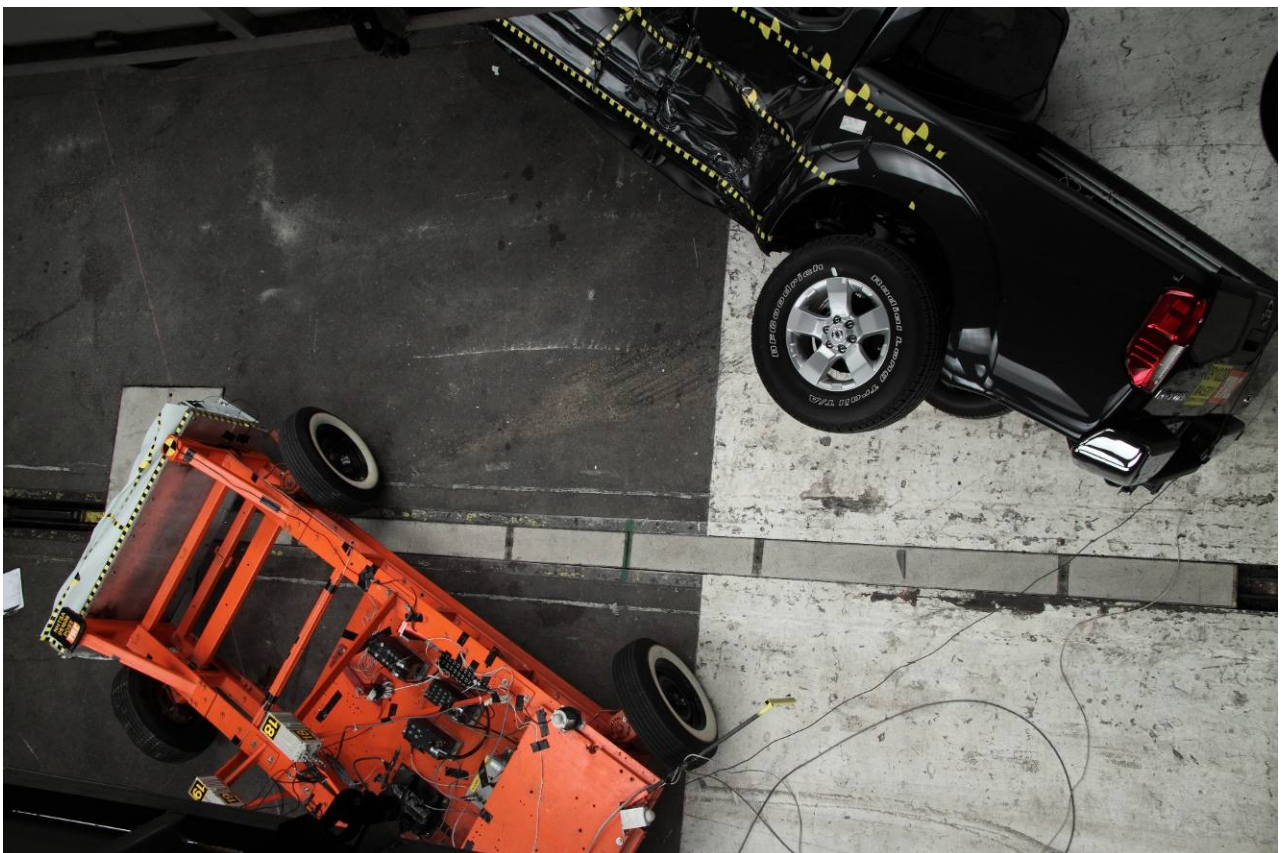


Figure A-72 Post-Test Left Front View of MDB with Impactor Face



Figure A-73 Pre-Test Vehicle Certification Label View



Figure A-74 Pre-Test Vehicle Recommended Tire Pressure Label View



Figure A-75 Post-Test Primary Light Trap Digital Readout



Figure A-76 Post-Test Redundant Light Trap Digital Readout



Figure A-78 Pre-Test Fuel Cap View



Figure A-79 Post-Test Fuel Cap View



Figure A-80 Impact Event

Intentionally Left Blank

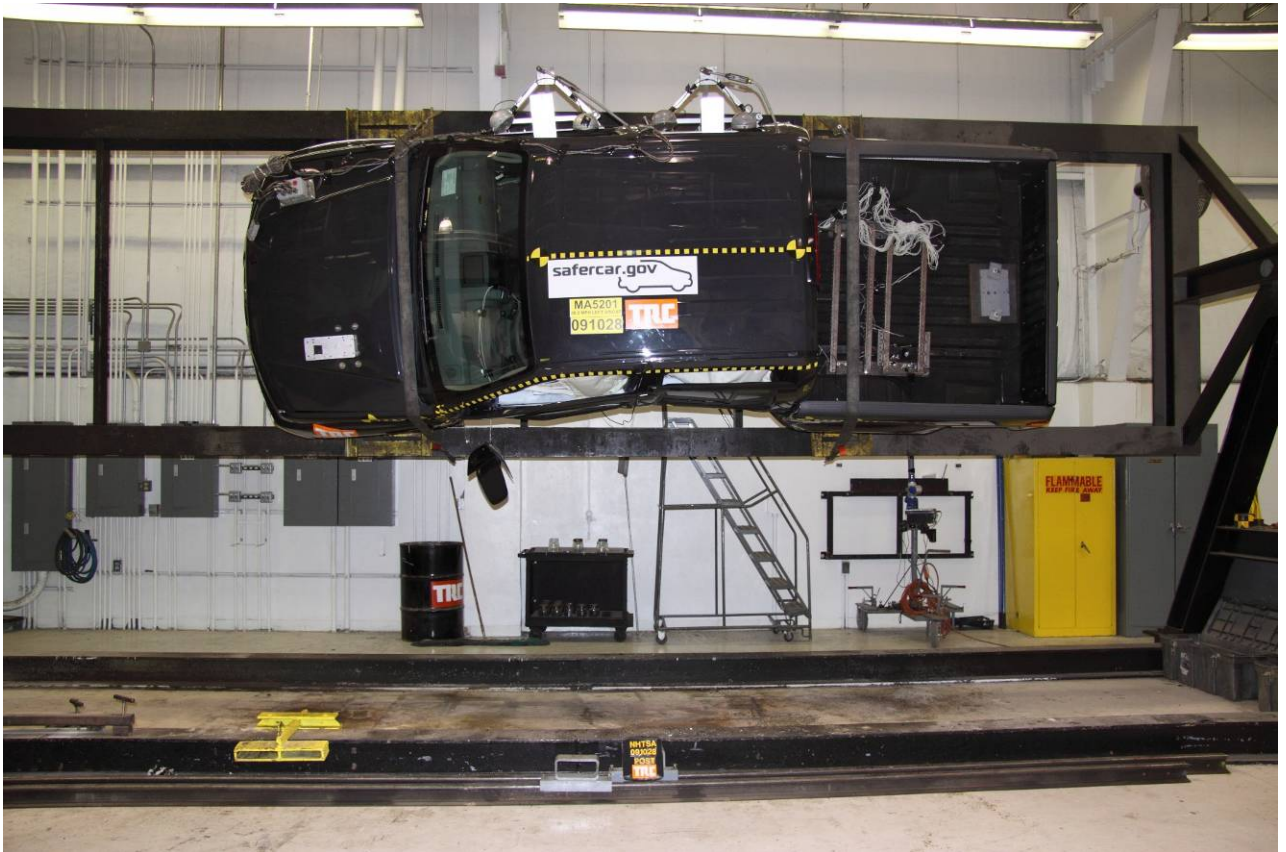


Figure A-81 FMVSS 301 Rollover View at 90°



Figure A-82 FMVSS 301 Rollover View at 180°



Figure A-83 FMVSS 301 Rollover View at 270°

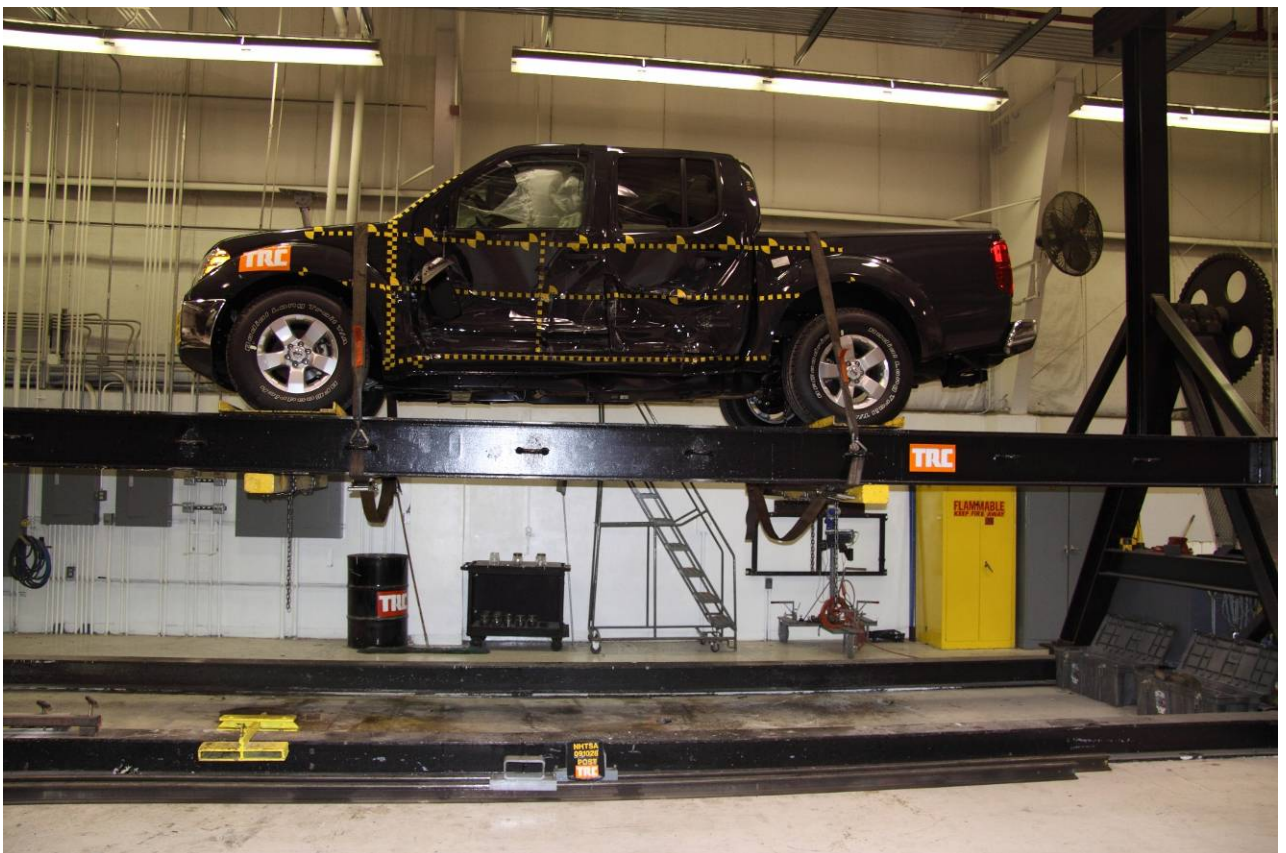


Figure A-84 FMVSS 301 Rollover View at 360°

APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA

Data Plot	LIST OF DATA PLOTS PROVIDED IN THE TEST REPORT	Page
B-1	Driver Upper Rib Primary Y	B-6
B-1	Driver Lower Rib Primary Y	B-6
B-1	Driver Lower Spine Primary Y	B-6
B-1	Driver Pelvis Y	B-6
B-2	Driver Upper Rib Redundant Y	B-7
B-2	Driver Lower Rib Redundant Y	B-7
B-2	Driver Lower Spine Redundant Y	B-7
B-2	Driver Pelvis Redundant Y	B-7
B-3	Passenger Upper Rib Primary Y	B-8
B-3	Passenger Lower Rib Primary Y	B-8
B-3	Passenger Lower Spine Primary Y	B-8
B-3	Passenger Pelvis Y	B-8
B-4	Passenger Upper Rib Redundant Y	B-9
B-4	Passenger Lower Rib Redundant Y	B-9
B-4	Passenger Lower Spine Redundant Y	B-9
B-4	Passenger Pelvis Redundant Y	B-9

The following dummy and vehicle response data can be found in the R&D section of the NHTSA website at: www.nhtsa.dot.gov.

Data Plot	LIST OF DUMMY DATA CHANNELS
	Driver Head X-Axis Acceleration
	Driver Head Y-Axis Acceleration
	Driver Head Z-Axis Acceleration
	Driver Neck X-Axis Shear Force
	Driver Neck Y-Axis Shear Force
	Driver Neck Z-Axis Axial Force
	Driver Neck Moment About X Axis
	Driver Neck Moment About Y Axis
	Driver Neck Moment About Z Axis
	Driver Upper Rib Y-Axis Acceleration
	Driver Lower Rib Y-Axis Acceleration
	Driver Upper Spine Y-Axis Acceleration
	Driver Lower Spine Y-Axis Acceleration
	Driver Pelvis Y-Axis Acceleration
	Left Rear Passenger Head X-Axis Acceleration
	Left Rear Passenger Head Y-Axis Acceleration
	Left Rear Passenger Head Z-Axis Acceleration
	Left Rear Passenger Neck X-Axis Shear Force
	Left Rear Passenger Neck Y-Axis Shear Force
	Left Rear Passenger Neck Z-Axis Axial Force
	Left Rear Passenger Neck Moment About X Axis
	Left Rear Passenger Neck Moment About Y Axis
	Left Rear Passenger Neck Moment About Z Axis
	Left Rear Passenger Upper Rib Y-Axis Acceleration
	Left Rear Passenger Lower Rib Y-Axis Acceleration
	Left Rear Passenger Upper Spine Y-Axis Acceleration
	Left Rear Passenger Lower Spine Y-Axis Acceleration
	Left Rear Passenger Pelvis Y-Axis Acceleration

Data Plot LIST OF DUMMY DATA CHANNELS (CONTINUED)

Driver Head X-Axis Redundant Acceleration
Driver Head Y-Axis Redundant Acceleration
Driver Head Z-Axis Redundant Acceleration
Driver Upper Rib Y-Axis Redundant Acceleration
Driver Lower Rib Y-Axis Redundant Acceleration
Driver Upper Spine Y-Axis Redundant Acceleration
Driver Lower Spine Y-Axis Redundant Acceleration
Driver Pelvis Y-Axis Redundant Acceleration
Left Rear Passenger Head X-Axis Redundant Acceleration
Left Rear Passenger Head Y-Axis Redundant Acceleration
Left Rear Passenger Head Z-Axis Redundant Acceleration
Left Rear Passenger Upper Rib Y-Axis Redundant Acceleration
Left Rear Passenger Lower Rib Y-Axis Redundant Acceleration
Left Rear Passenger Upper Spine Y-Axis Redundant Acceleration
Left Rear Passenger Lower Spine Y-Axis Redundant Acceleration
Left Rear Passenger Pelvis Y-Axis Redundant Acceleration

Data Plot

LIST OF VEHICLE DATA CHANNELS

Right Side Sill at Front Seat X-Axis Acceleration
Right Side Sill at Front Seat Y-Axis Acceleration
Right Side Sill at Front Seat Z-Axis Acceleration
Right Side Sill at Rear Seat X-Axis Acceleration
Right Side Sill at Rear Seat Y-Axis Acceleration
Right Side Sill at Rear Seat Z-Axis Acceleration
Rear Floorpan Above Axle X-Axis Acceleration
Rear Floorpan Above Axle Y-Axis Acceleration
Rear Floorpan Above Axle Z-Axis Acceleration
Left Side Sill at Front Seat Y-Axis Acceleration
Left Side Sill at Rear Seat Y-Axis Acceleration
Right Rear Occupant Compartment Y-Axis Acceleration
Left Lower A-Post Y-Axis Acceleration
Left Mid A-Post Y-Axis Acceleration
Left Lower B-Post Y-Axis Acceleration
Left Mid B-Post Y-Axis Acceleration
Left Front Seat Track Y-Axis Acceleration
Left Rear Seat Track Y-Axis Acceleration
Vehicle Center of Gravity X-Axis Acceleration
Vehicle Center of Gravity Y-Axis Acceleration
Vehicle Center of Gravity Z-Axis Acceleration
MDB Center of Gravity X-Axis Acceleration
MDB Center of Gravity Y-Axis Acceleration
MDB Center of Gravity Z-Axis Acceleration
MDB Rear X-Axis Acceleration
MDB Rear Y-Axis Acceleration
MDB Right Contact Switch
MDB Left Contact Switch

NHTSA

Test Lab: CTF

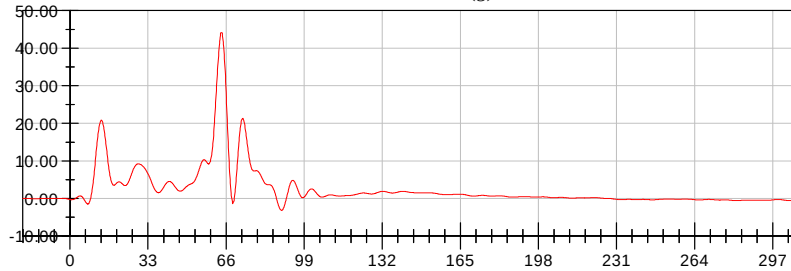
Test Number: 091028 (MA5201)

Position #1 SID H3 Dummy (M001)

Position #4 SID H3 Dummy (002)

Test Date: 10/28/2009

DRIVER UPPER RIB Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

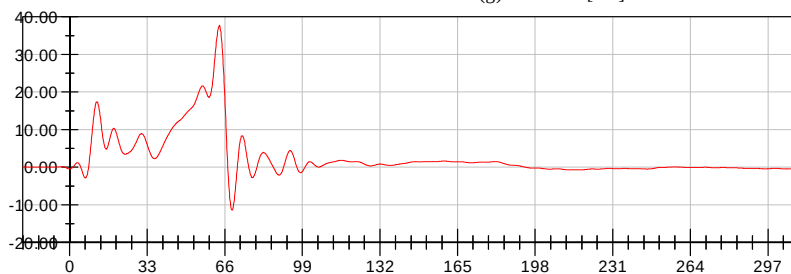
44.14 g at 63.80 ms

<Min>

-3.21 g at 89.40 ms

FIR_100

DRIVER LOWER RIB Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

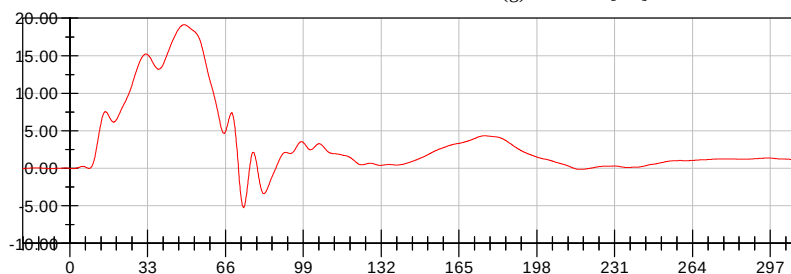
37.76 g at 63.70 ms

<Min>

-11.40 g at 69.30 ms

FIR_100

DRIVER LOWER SPINE Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

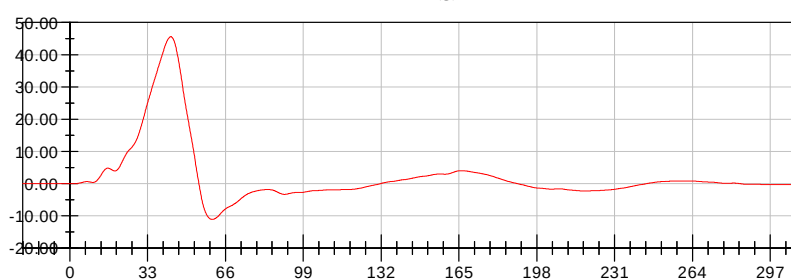
19.13 g at 48.20 ms

<Min>

-5.26 g at 73.70 ms

FIR_100

DRIVER PELVIS Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

45.57 g at 43.10 ms

<Min>

-11.07 g at 60.60 ms

FIR_100



NHTSA

Test Lab: CTF

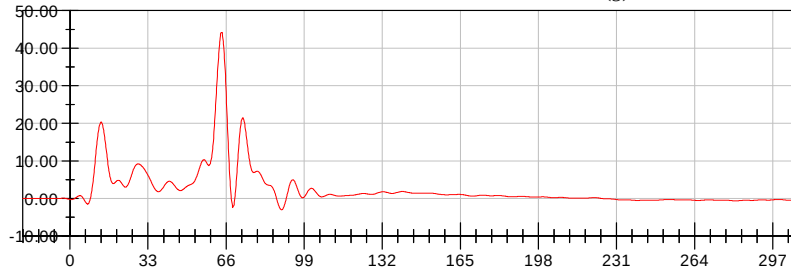
Test Number: 091028 (MA5201)

Position #1 SID H3 Dummy (M001)

Position #4 SID H3 Dummy (002)

Test Date: 10/28/2009

DRIVER UPPER RIB Y-AXIS REDUNDANT ACCELERATION (g) vs. Time [ms]



<Max>

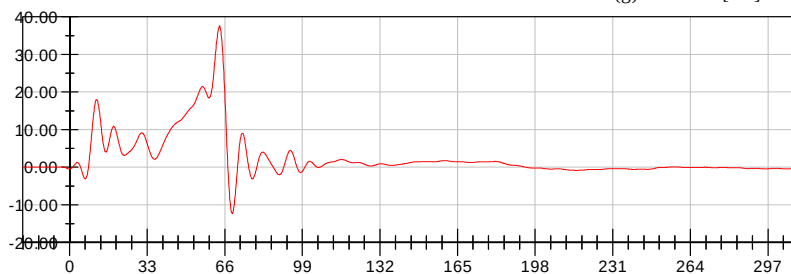
44.16 g at 64.30 ms

<Min>

-3.06 g at 89.40 ms

FIR_100

DRIVER LOWER RIB Y-AXIS REDUNDANT ACCELERATION (g) vs. Time [ms]



<Max>

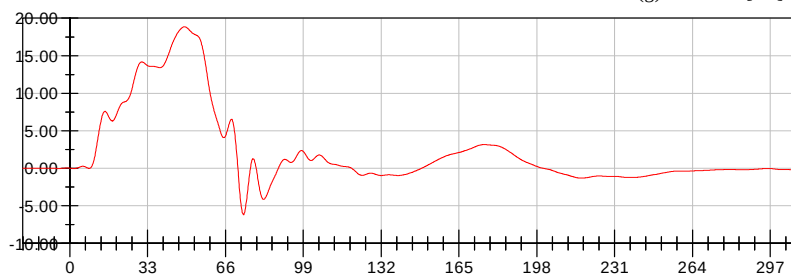
37.61 g at 63.70 ms

<Min>

-12.39 g at 69.30 ms

FIR_100

DRIVER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION (g) vs. Time [ms]



<Max>

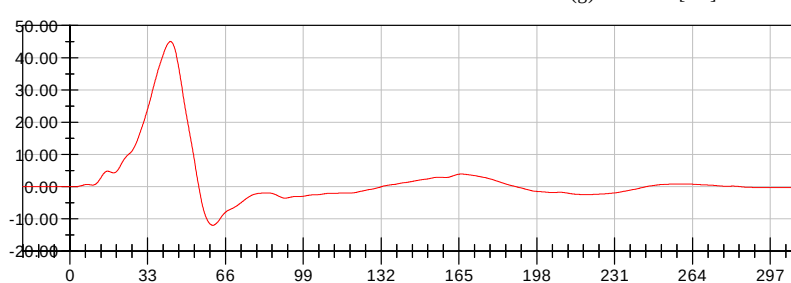
18.85 g at 48.70 ms

<Min>

-6.21 g at 73.70 ms

FIR_100

DRIVER PELVIS Y-AXIS REDUNDANT ACCELERATION (g) vs. Time [ms]



<Max>

45.03 g at 42.50 ms

<Min>

-11.97 g at 60.60 ms

FIR_100



NHTSA

Test Lab: CTF

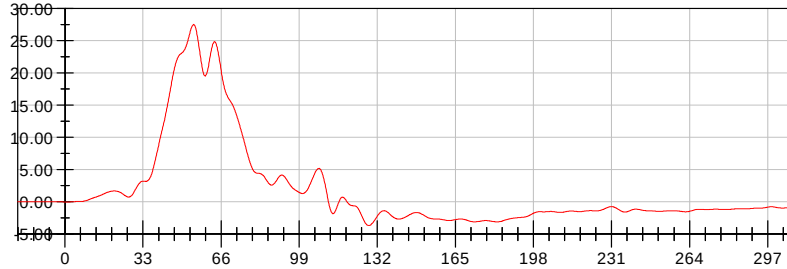
Test Number: 091028 (MA5201)

Position #1 SID H3 Dummy (M001)

Position #4 SID H3 Dummy (002)

Test Date: 10/28/2009

LEFT REAR PASSENGER UPPER RIB Y-AXIS ACCELERATION (g) vs. Time [ms]



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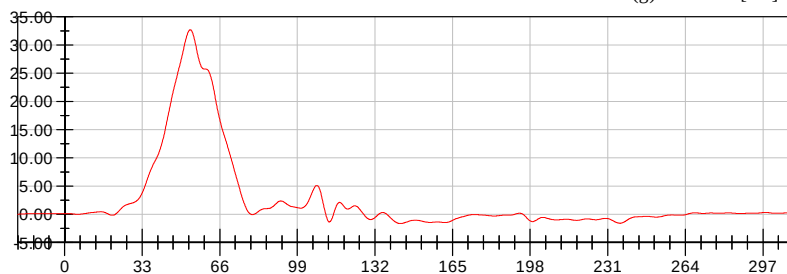
27.55 g at 54.40 ms

<Min>

-3.68 g at 128.20 ms

FIR_100

LEFT REAR PASSENGER LOWER RIB Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

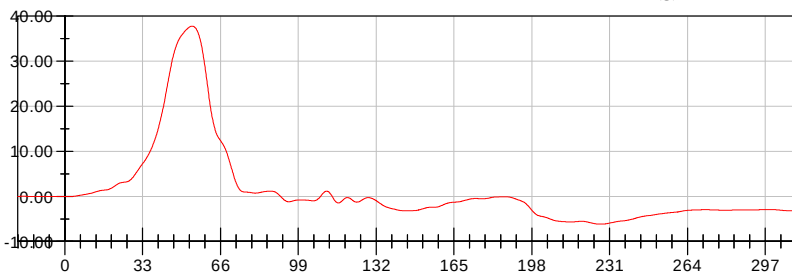
32.71 g at 53.70 ms

<Min>

-1.66 g at 143.10 ms

FIR_100

LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

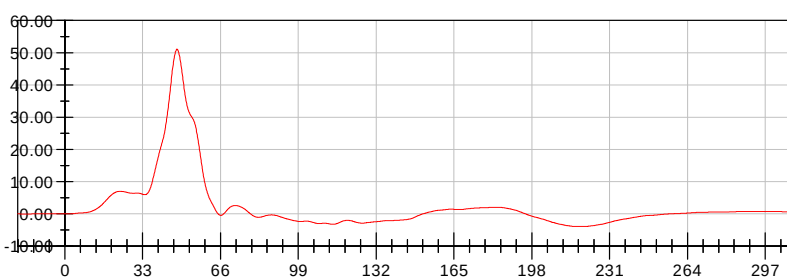
37.78 g at 53.80 ms

<Min>

-6.16 g at 227.50 ms

FIR_100

LEFT REAR PASSENGER PELVIS Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

51.17 g at 47.50 ms

<Min>

-3.91 g at 218.70 ms

FIR_100



NHTSA

Test Lab: CTF

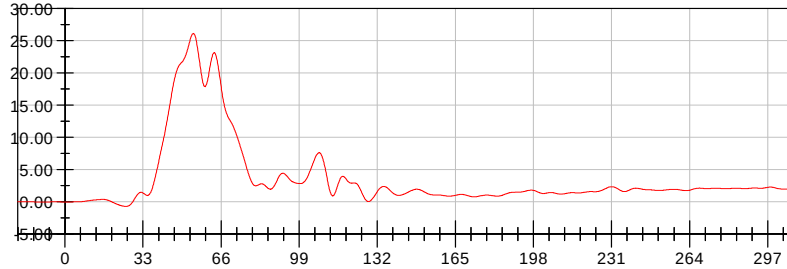
Test Number: 091028 (MA5201)

Position #1 SID H3 Dummy (M001)

Position #4 SID H3 Dummy (002)

Test Date: 10/28/2009

LEFT REAR PASSENGER UPPER RIB Y-AXIS REDUNDANT ACCELERATION (g) vs. Time [ms]



<Max>

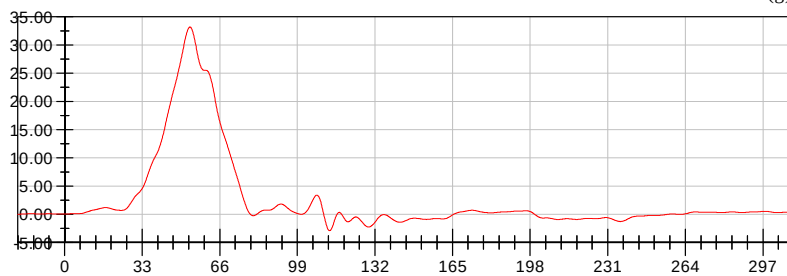
26.16 g at 54.40 ms

<Min>

-0.71 g at 25.60 ms

FIR_100

LEFT REAR PASSENGER LOWER RIB Y-AXIS REDUNDANT ACCELERATION (g) vs. Time [ms]



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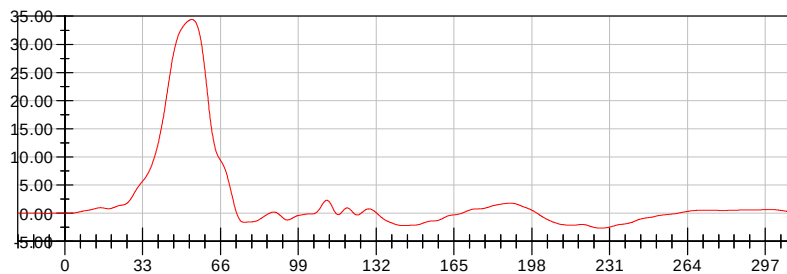
33.21 g at 53.20 ms

<Min>

-2.97 g at 112.50 ms

FIR_100

LEFT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION (g) vs. Time [ms]



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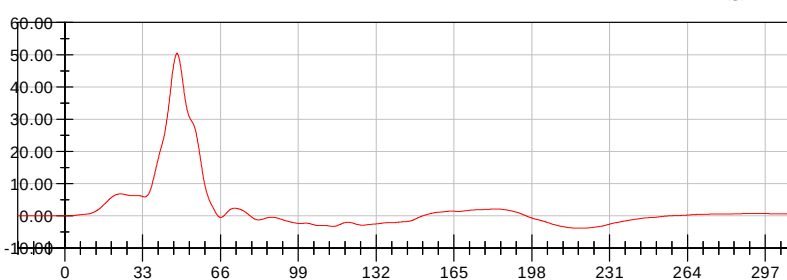
34.43 g at 53.80 ms

<Min>

-2.65 g at 227.50 ms

FIR_100

LEFT REAR PASSENGER PELVIS REDUNDANT Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

50.47 g at 47.50 ms

<Min>

-3.83 g at 218.70 ms

FIR_100



APPENDIX C
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID/HIII: M001

Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. M001 Calibration No. 05

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	905 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	515 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	520 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	499 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	383 mm	Yes
Top Rib Width From C/L	RW-1	165.1 - 180.3 mm	175 mm	Yes
Bottom Rib Width From C/L	RW-2	165.1 - 180.3 mm	175 mm	Yes
Difference Between Top & Bottom Rib Width from C/L		<= 2.5 mm	0.0 mm	Yes

Technician



Approved





Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. M001 Certification No. 5-3

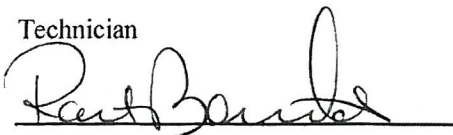
Test Date: 10/21/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	144.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	9.9 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

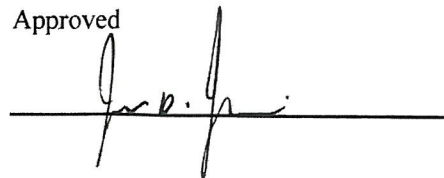
Test meets specifications.

Comments:

Technician



Approved

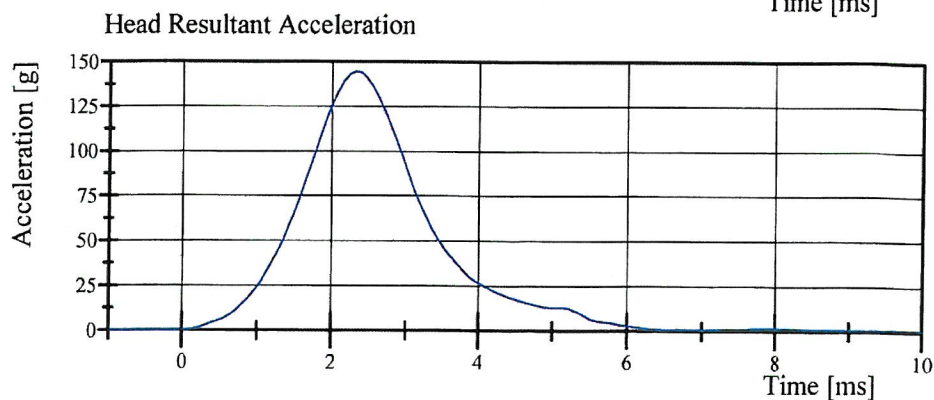
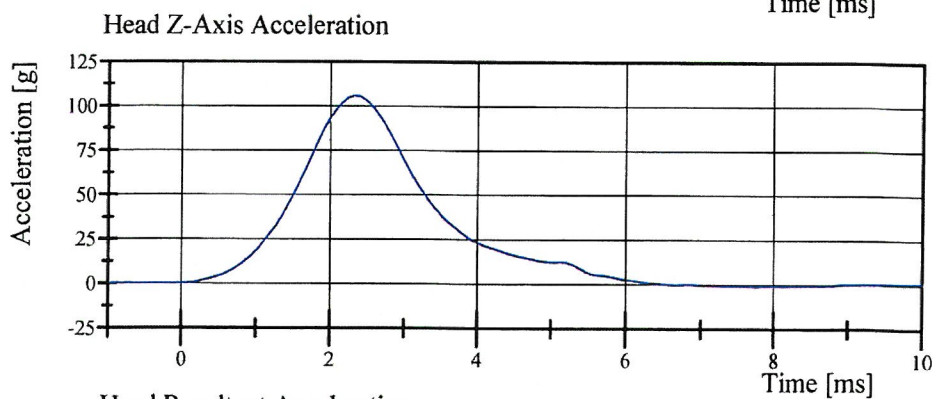
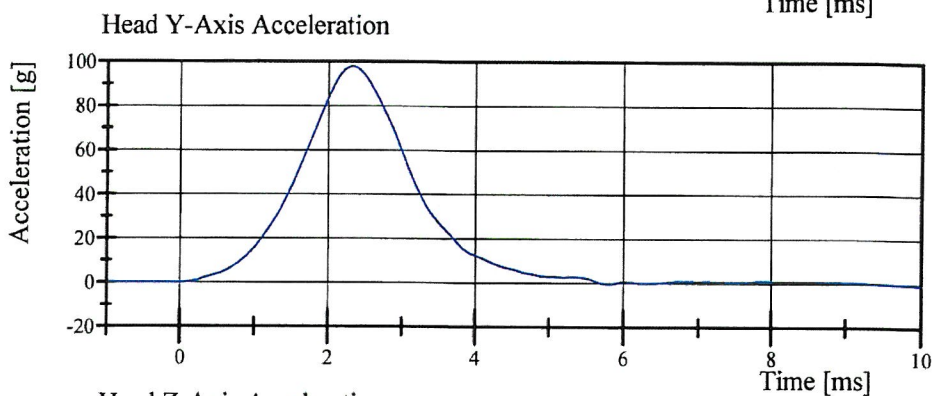
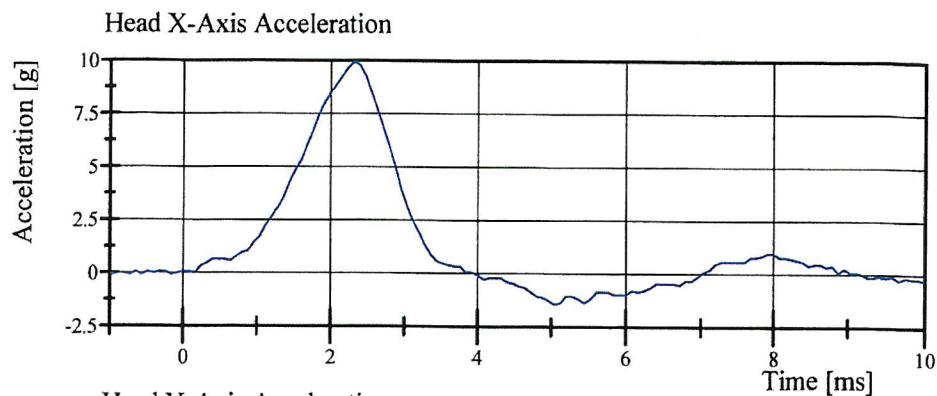


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. M001 Certification No. 5-3

Test Date: 10/21/2009



Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 5-2

Test Date: 10/21/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-6.942 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.282 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.514 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.381 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.233 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-71.3 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	58.3 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	87.7 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	53.1 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	8.2 ms	Yes

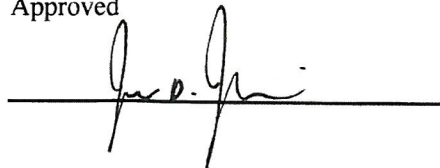
Test meets specifications.

Comments:

Technician



Approved

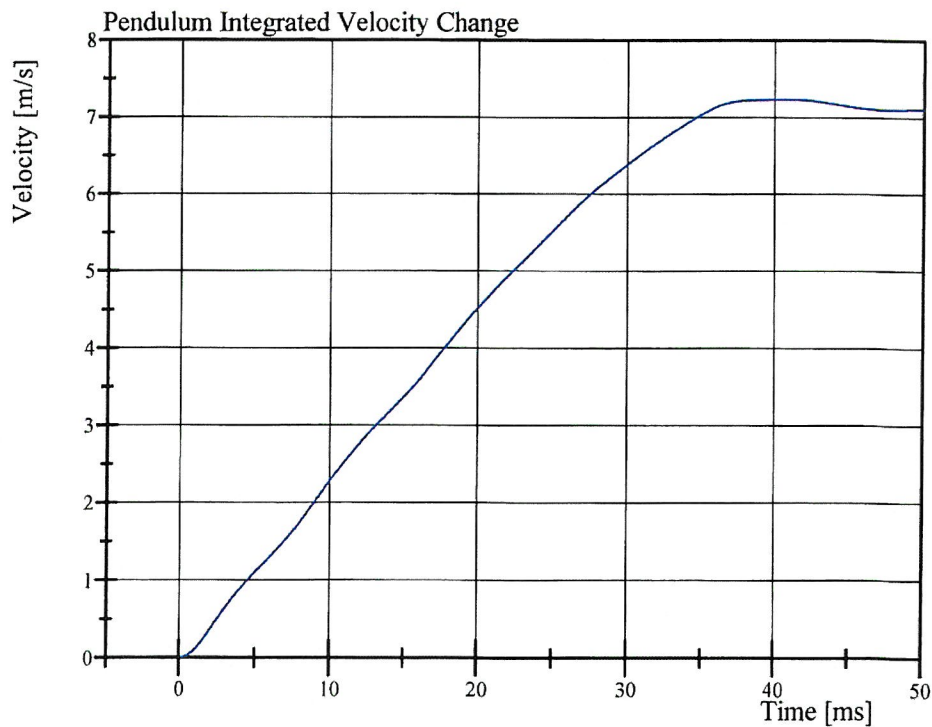
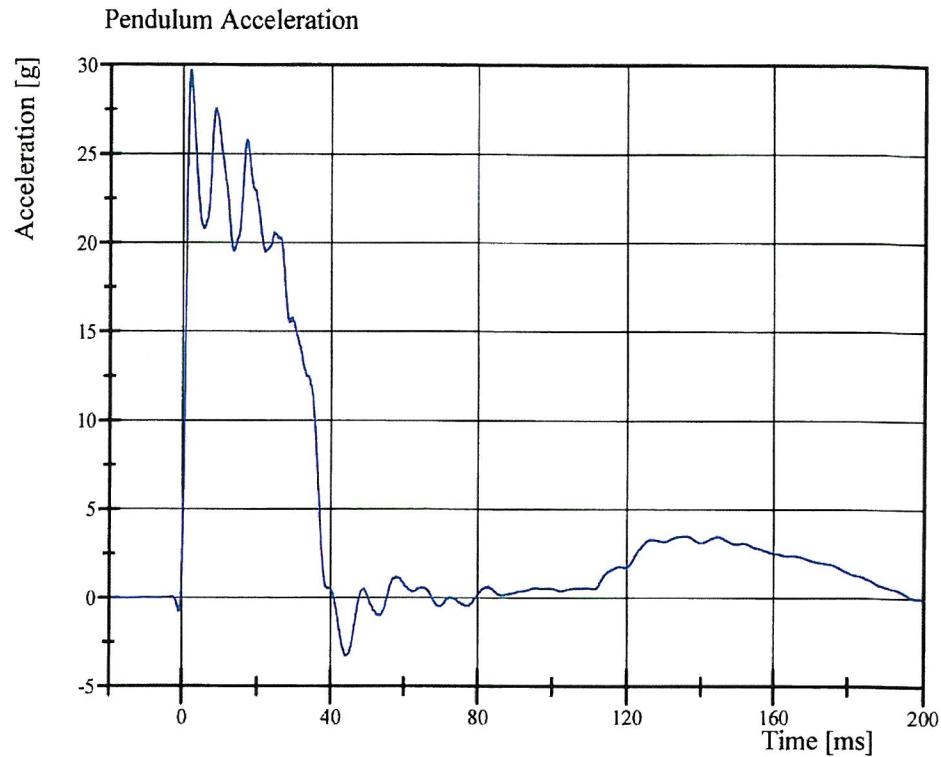


Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 5-2

Test Date: 10/21/2009



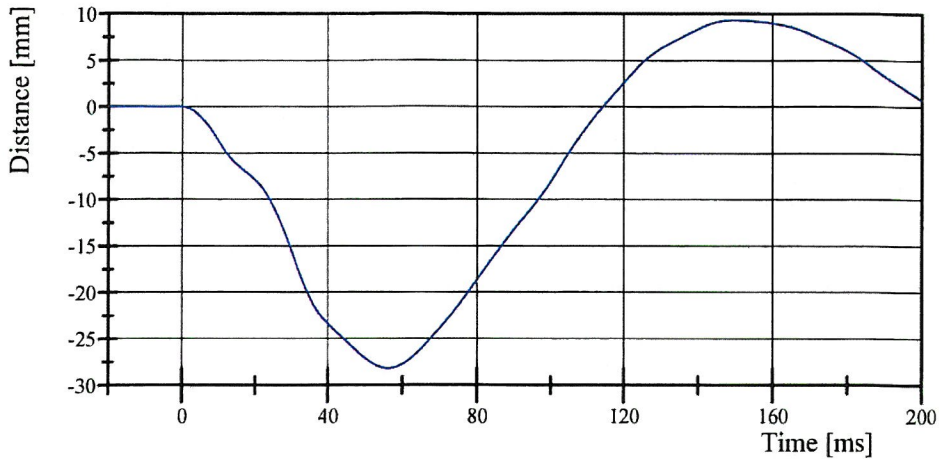
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 5-2

Test Date: 10/21/2009

Pot Rotation at the Base of Neck

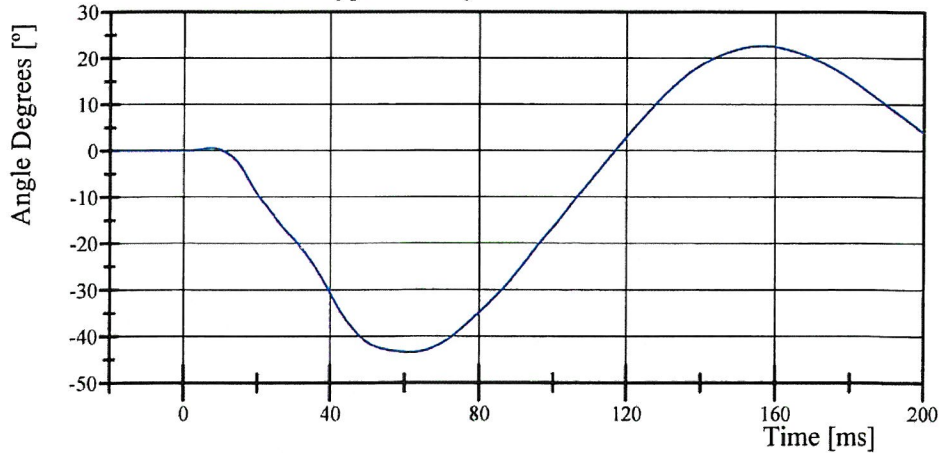


Filter Class: CFC_60

Max: 9.3 mm at 150.0 ms

Min: -28.2 mm at 56.3 ms

Head Rotation at Occypital Condyles

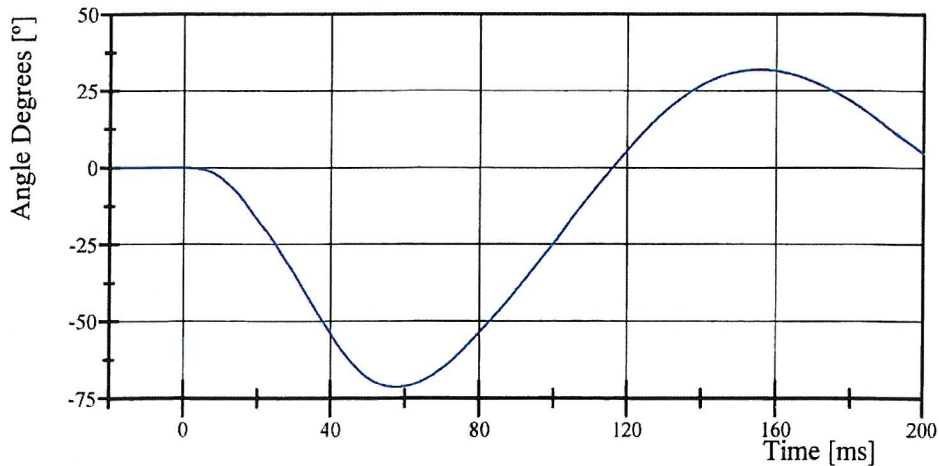


Filter Class: CFC_60

Max: 22.6 ° at 156.7 ms

Min: -43.4 ° at 61.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 31.8 ° at 155.5 ms

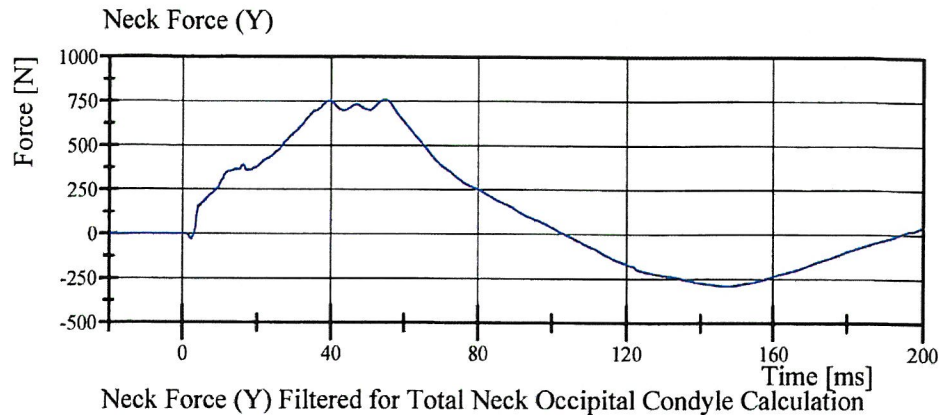
Min: -71.3 ° at 57.8 ms

Transportation Research Center Inc.

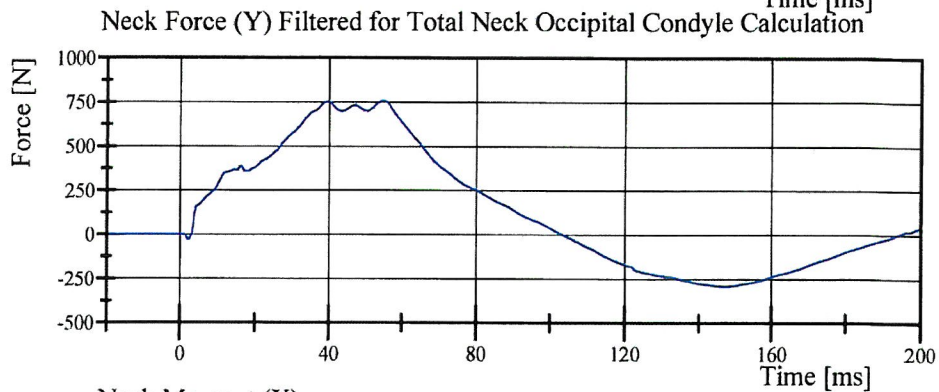
Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 5-2

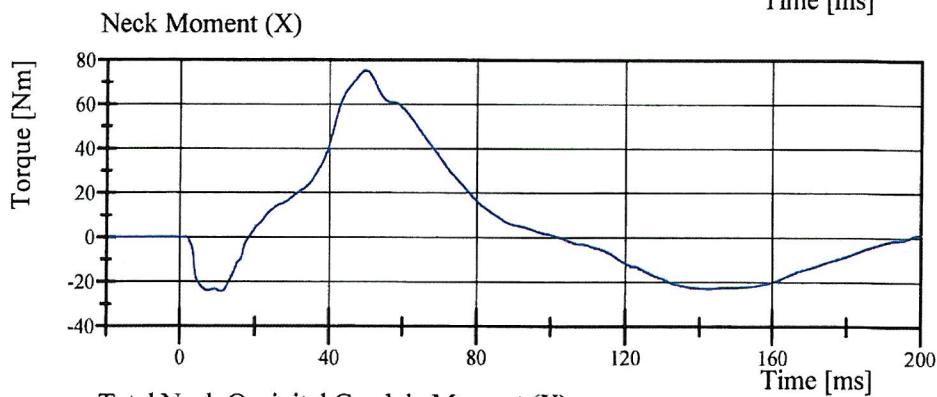
Test Date: 10/21/2009



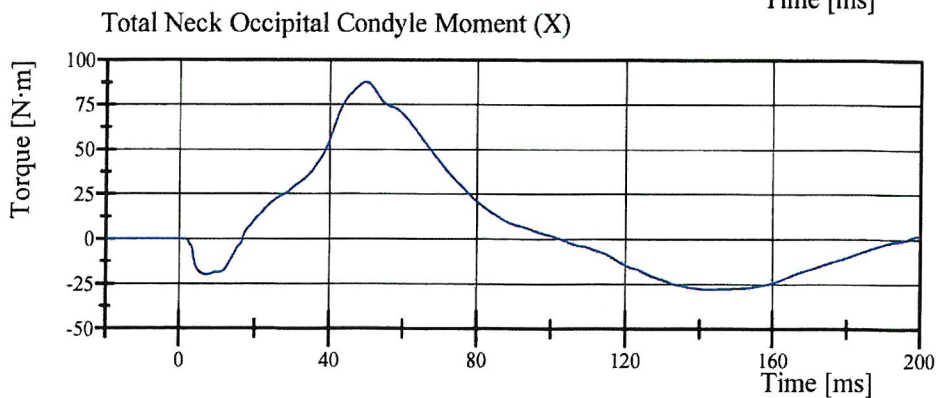
Filter Class: CFC_1000
Max: 759.7 N at 54.6 ms
Min: -292.0 N at 147.1 ms



Filter Class: CFC_600
Max: 759.3 N at 54.7 ms
Min: -291.6 N at 147.2 ms



Filter Class: CFC_600
Max: 75.2 Nm at 49.6 ms
Min: -24.3 Nm at 11.2 ms



Filter Class: CFC_600
Max: 87.7 N·m at 49.6 ms
Min: -27.9 N·m at 143.2 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. M001 Certification No. 4-2

Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	3,706 - 4,394 N	4,077.2 N	Yes
Maximum Displacement at Test Velocity	33.34 - 39.54 mm	39.068 mm	Yes

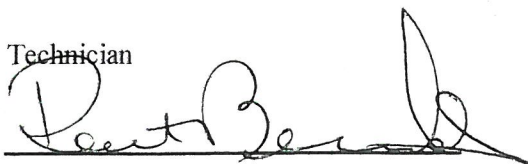
Test meets specifications.

Comments:

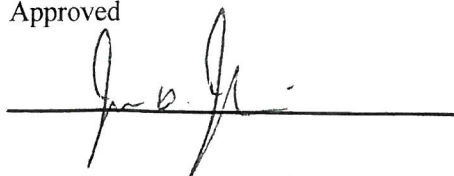
Actual Impactor Velocity (m/s): 6.067

Damper Setting: 7.5

Technician



Approved



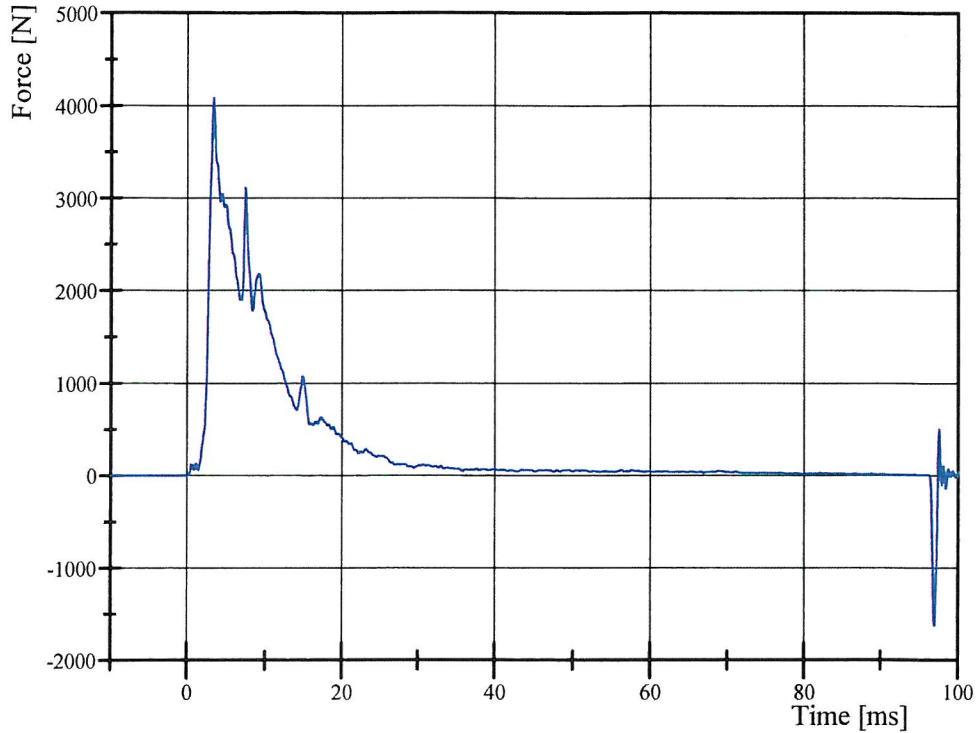
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. M001 Certification No. 4-2

Test Date: 9/24/2009

Shock Absorber Resistive Force

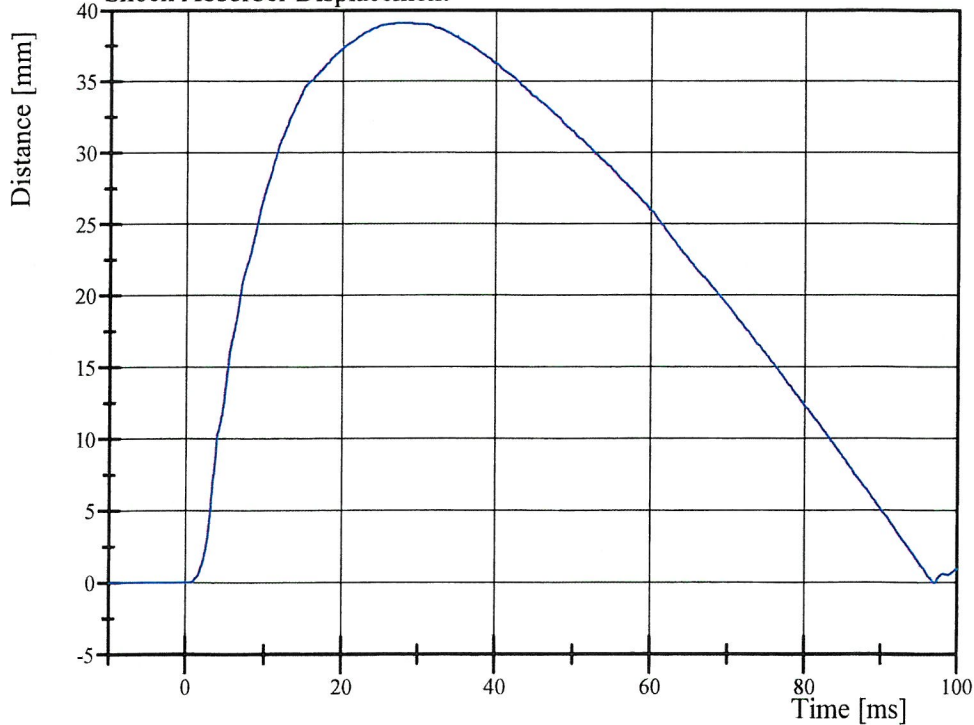


Filter Class: CFC_1000

Max: 4,077.2 N at 3.4 ms

Min: -1,620.4 N at 96.9 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 39.1 mm at 27.4 ms

Min: -0.1 mm at 97.0 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-1
Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	1,757 - 2,124 N	1,776.2 N	Yes
Maximum Displacement at Test Velocity	31.7 - 37.26 mm	37.182 mm	Yes

Test meets specifications.

Comments:

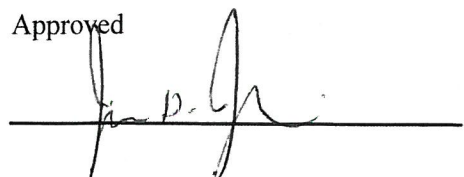
Actual Impactor Velocity (m/s): 4.293

Damper Setting: 7.5

Technician



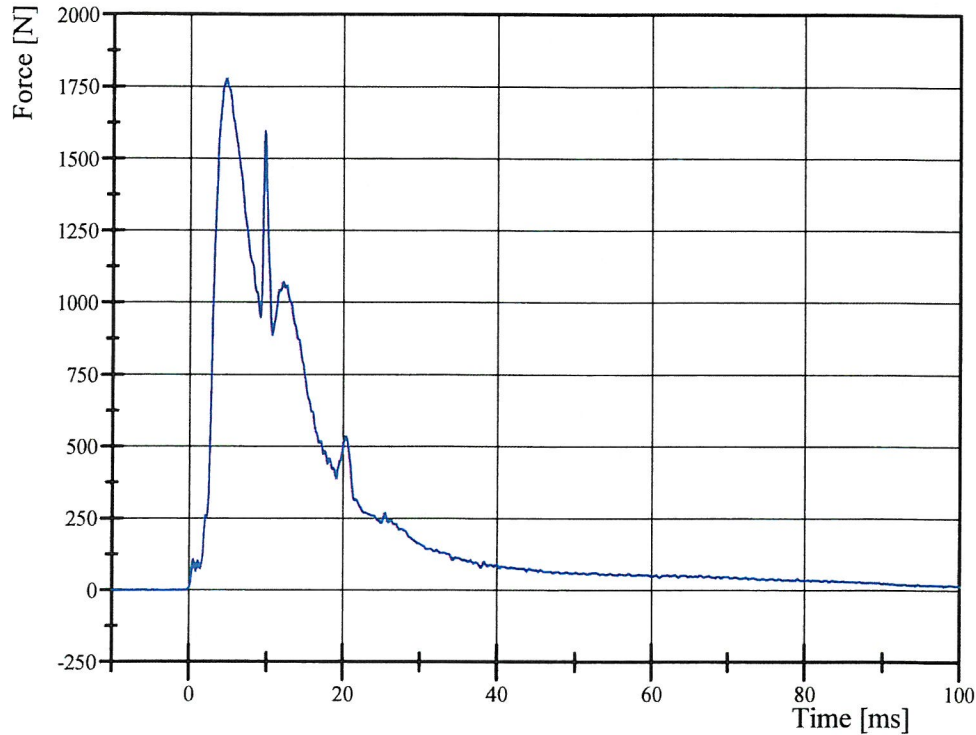
Approved



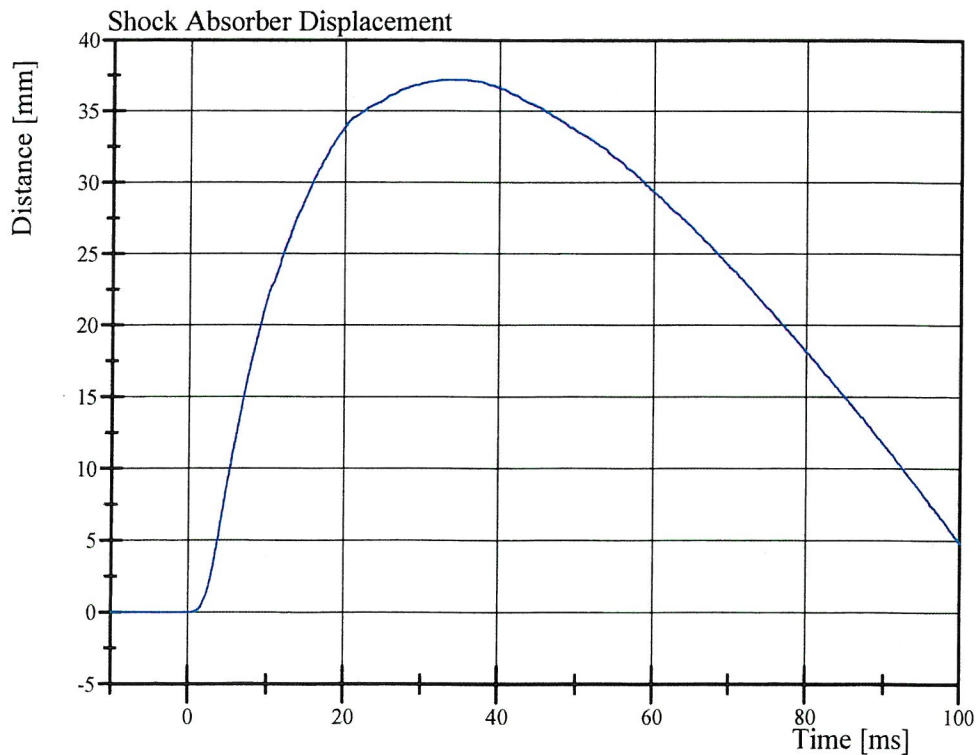
Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-1
Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,776.2 N at 4.6 ms
Min: -2.0 N at -5.2 ms



Filter Class: CFC_1000
Max: 37.2 mm at 33.8 ms
Min: -0.0 mm at -9.6 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-1
Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	856 - 1,145 N	921.4 N	Yes
Maximum Displacement at Test Velocity	30.2 - 35.19 mm	34.770 mm	Yes

Test meets specifications.

Comments:

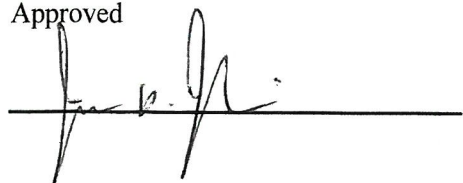
Actual Impactor Velocity (m/s): 3.075

Damper Setting: 7.5

Technician



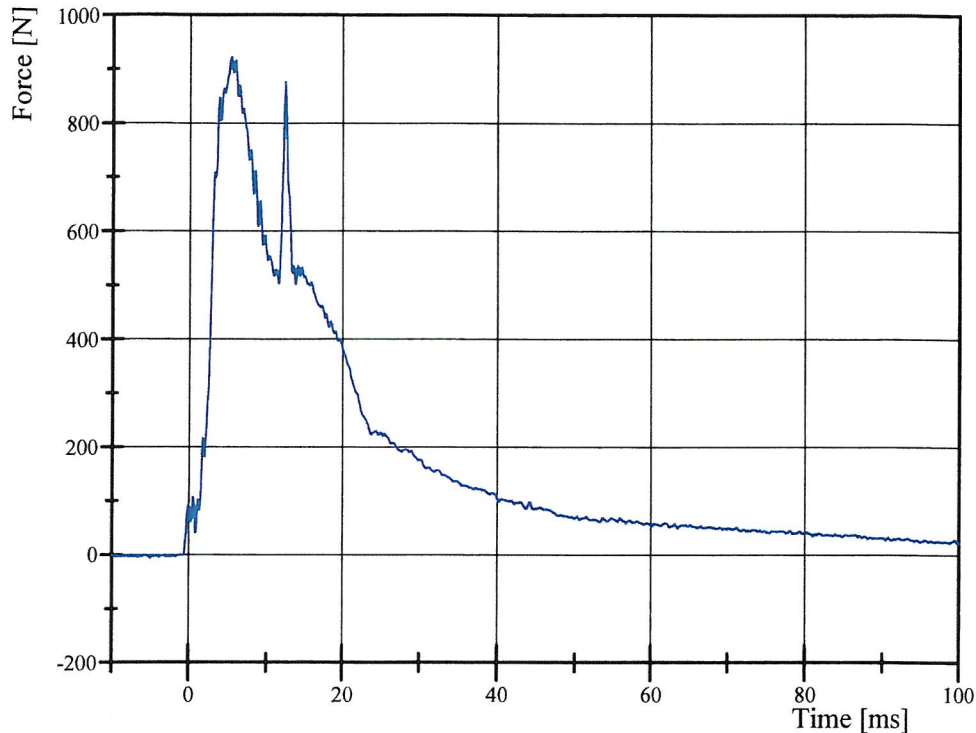
Approved



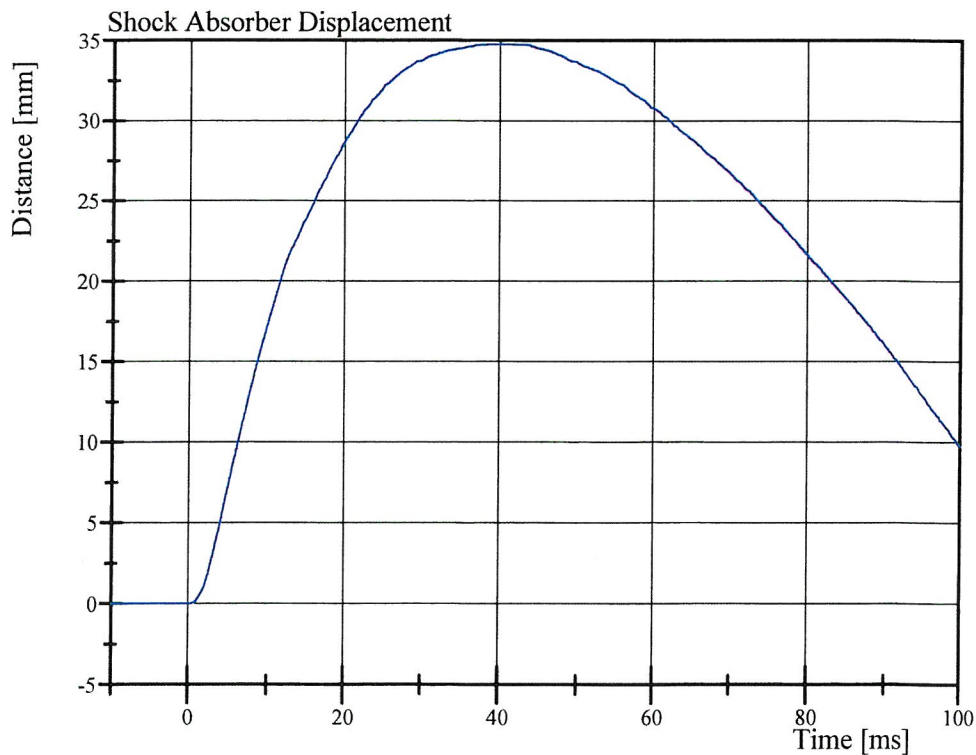
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-1
Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 921.4 N at 5.3 ms
Min: -5.4 N at -5.0 ms



Filter Class: CFC_1000
Max: 34.8 mm at 40.0 ms
Min: -0.0 mm at -9.0 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. M001 Certification No. 5-3

Test Date: 10/26/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	30 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.326 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	42.8 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	40.8 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	20.1 g	Yes

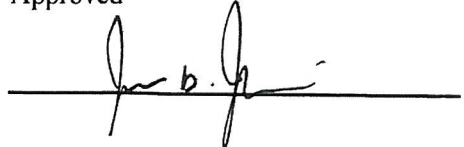
Test meets specifications.

Comments:

Technician



Approved



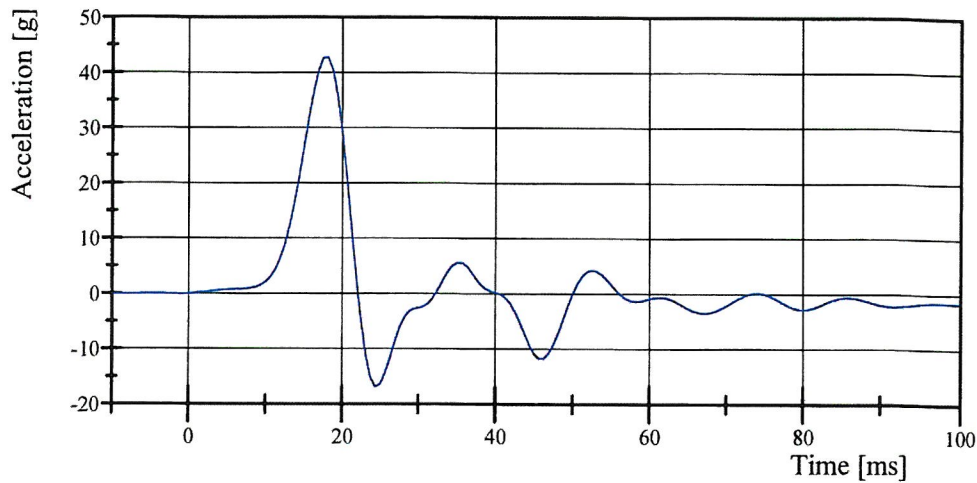
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. M001 Certification No. 5-3

Test Date: 10/26/2009

Upper Rib Acceleration (Y)

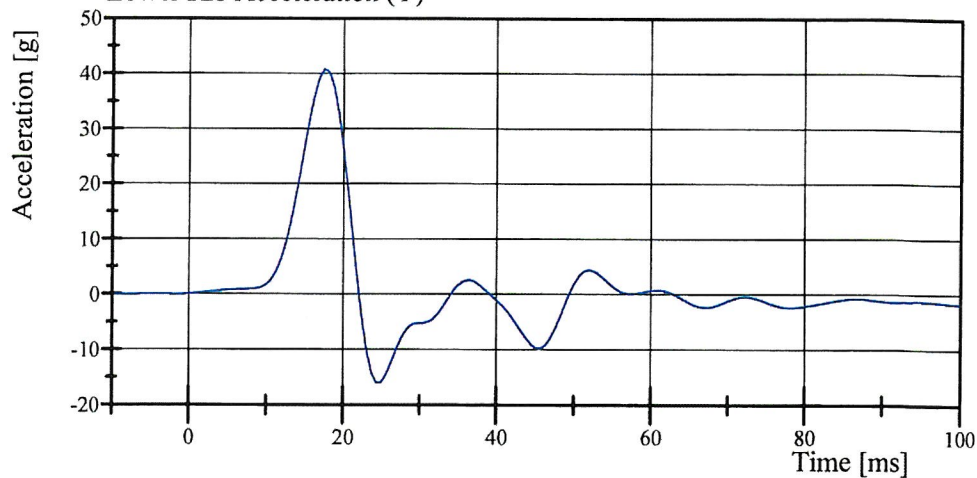


Filter Class: FIR_100

Max: 42.8 g at 18.1 ms

Min: -16.8 g at 24.4 ms

Lower Rib Acceleration (Y)

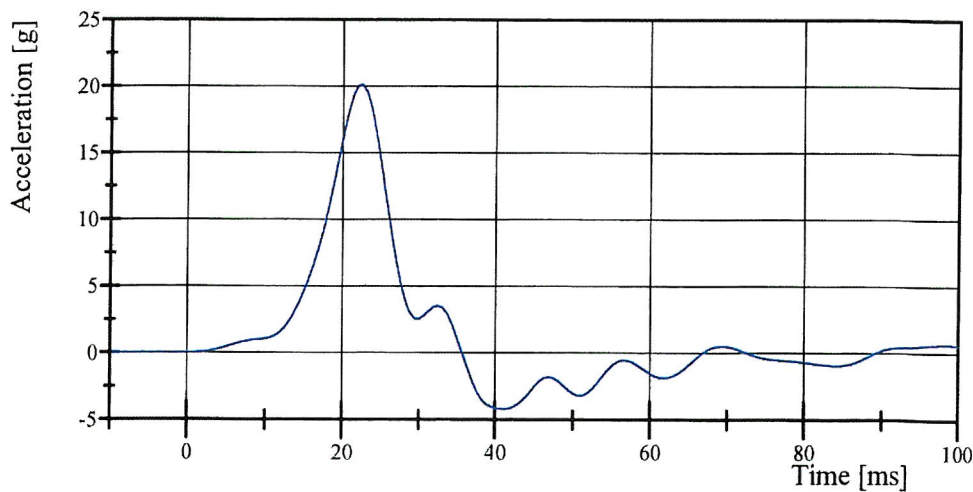


Filter Class: FIR_100

Max: 40.8 g at 17.5 ms

Min: -16.0 g at 24.4 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100

Max: 20.1 g at 22.5 ms

Min: -4.2 g at 41.2 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. M001 Certification No. 5-5

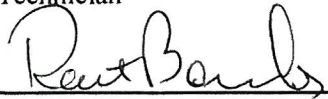
Test Date: 10/22/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.856 mm/s	Yes

Test meets specifications.

Comments:

Technician



Approved

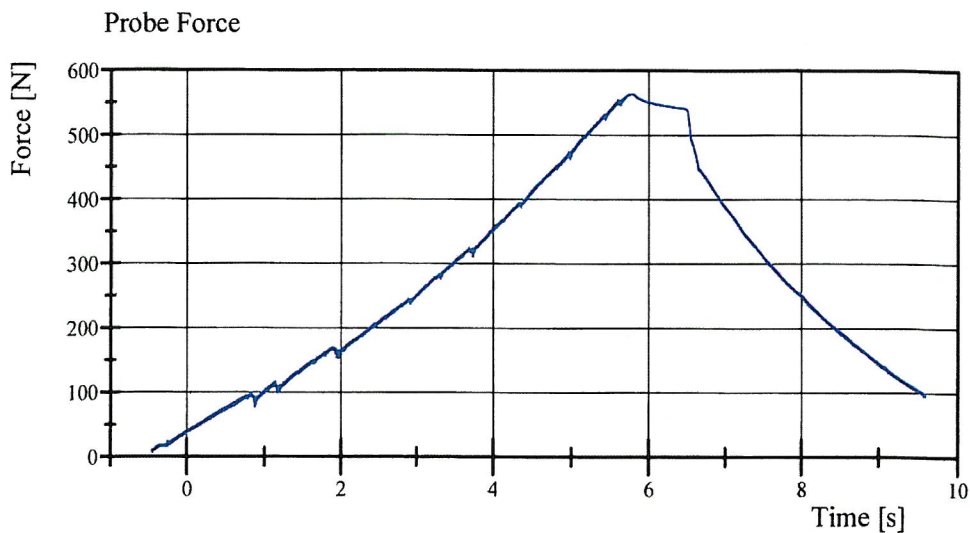


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. M001 Certification No. 5-5

Test Date: 10/22/2009



Filter Class: CFC_600

Max: 563.9 N at 5.8 s

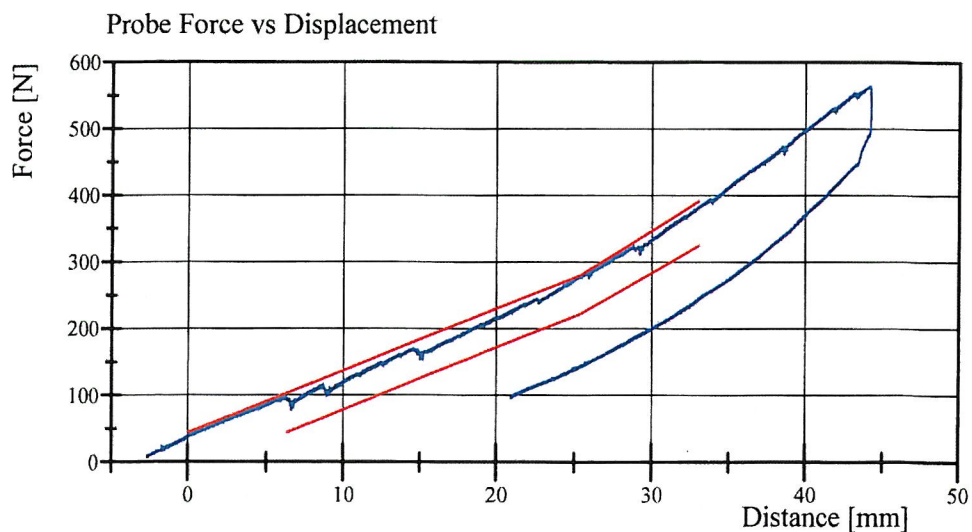
Min: 7.0 N at -0.5 s



Filter Class: CFC_180

Max: 44.3 mm at 6.5 s

Min: -2.6 mm at -0.5 s



Filter Class: CFC_600

Max: 563.9 N at 44.2 mm

Min: 7.0 N at -2.6 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

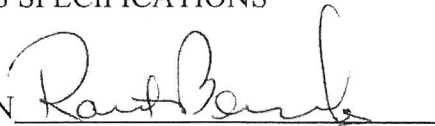
CAL DATE: 22-Oct-09

TRC, INC. TEST NO: TOFL-01 572B SN M001 TORSO FLEX CAL 05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.3 °C
RELATIVE HUMIDITY	10 – 70 %	38 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	129.0 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	186.8 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	222.4 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	8.1 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. M001 Certification No. 5-1

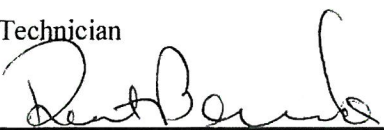
Test Date: 10/23/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.312 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	6.3 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	49.2 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

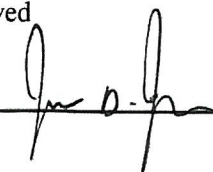
Test meets specifications.

Comments:

Technician



Approved

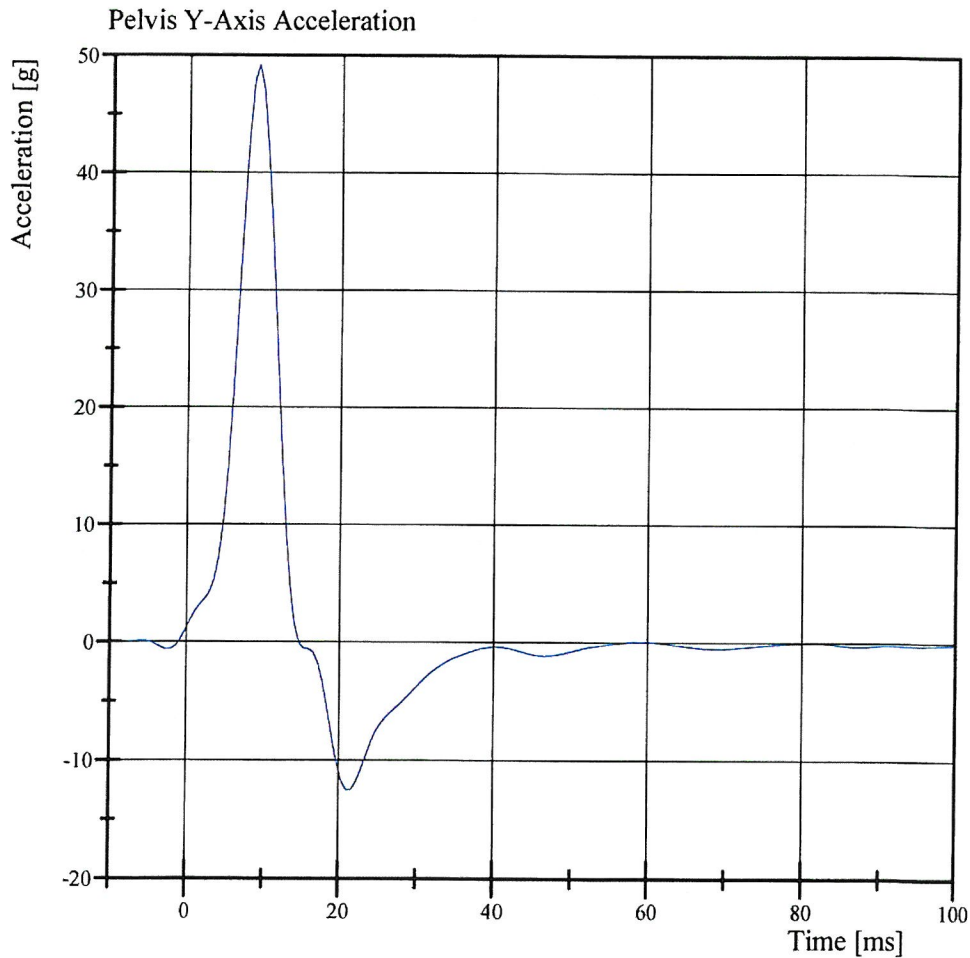


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. M001 Certification No. 5-1

Test Date: 10/23/2009



Filter Class: FIR_100
Max: 49.2 g at 9.1 ms
Min: -12.5 g at 21.0 ms

CALIBRATION TEST RESULTS

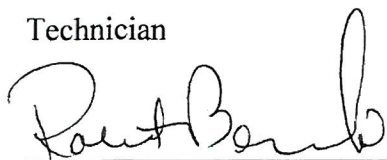
POST-TEST

SID/HIII: M001

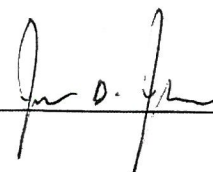
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. M001 Calibration No. 06

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	906 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	516 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	522 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	499 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	383 mm	Yes
Top Rib Width From C/L	RW-1	165.1 - 180.3 mm	175 mm	Yes
Bottom Rib Width From C/L	RW-2	165.1 - 180.3 mm	175 mm	Yes
Difference Between Top & Bottom Rib Width from C/L		<= 2.5 mm	0.0 mm	Yes

Technician



Approved





Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. M001 Certification No. 6-1

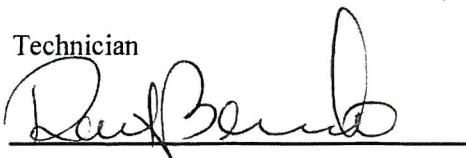
Test Date: 11/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	147.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-4.0 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

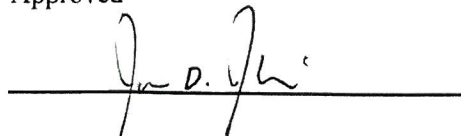
Test meets specifications.

Comments:

Technician



Approved

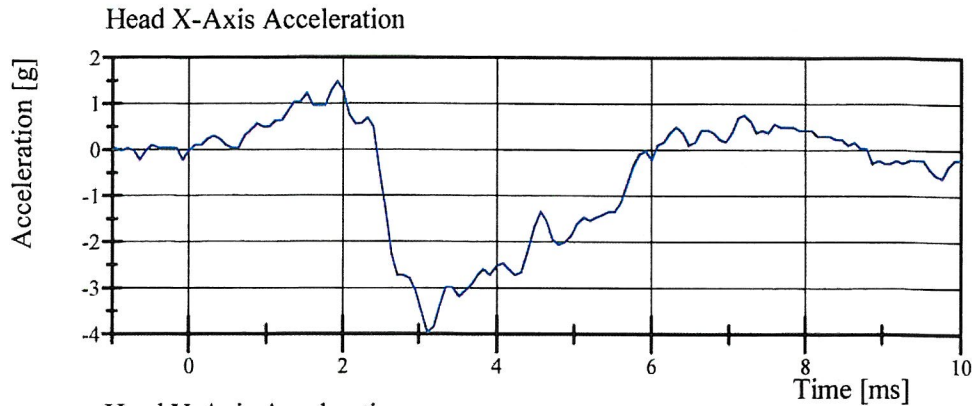


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. M001 Certification No. 6-1

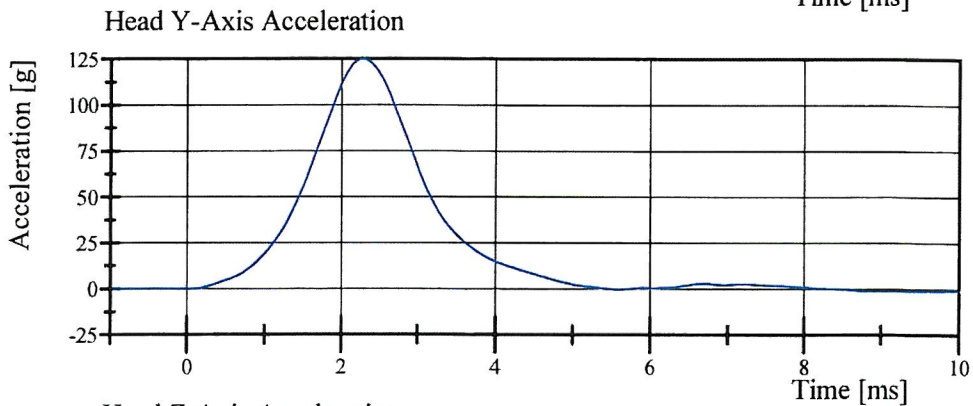
Test Date: 11/9/2009



Filter Class: CFC_1000

Max: 1.5 g at 1.9 ms

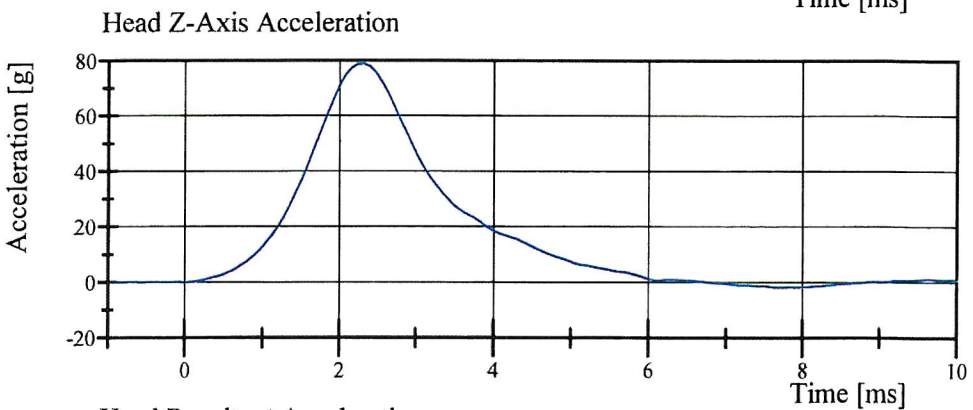
Min: -4.0 g at 3.1 ms



Filter Class: CFC_1000

Max: 124.8 g at 2.2 ms

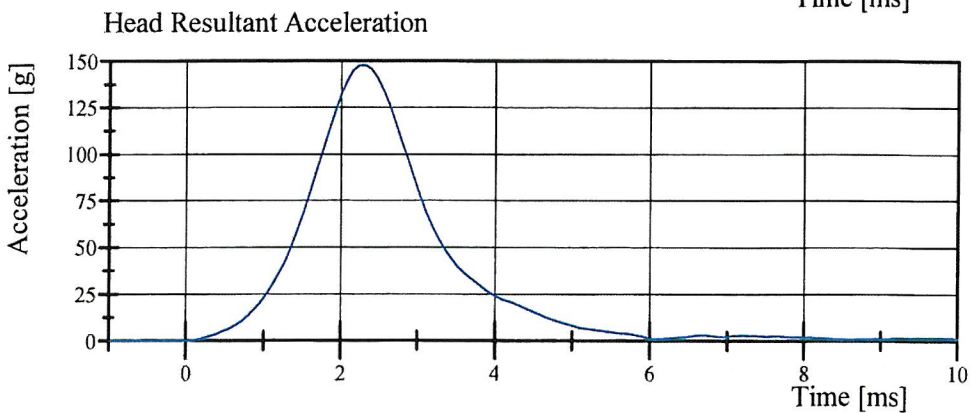
Min: -1.2 g at 9.3 ms



Filter Class: CFC_1000

Max: 78.8 g at 2.3 ms

Min: -1.8 g at 7.7 ms



Filter Class: CFC_1000

Max: 147.7 g at 2.3 ms

Min: 0.0 g at -0.6 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 6-3

Test Date: 11/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-6.948 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.245 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.471 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.102 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.233 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-69.5 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	58.6 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	83.7 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	50.6 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	6.6 ms	Yes

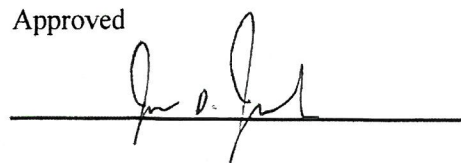
Test meets specifications.

Comments:

Technician



Approved



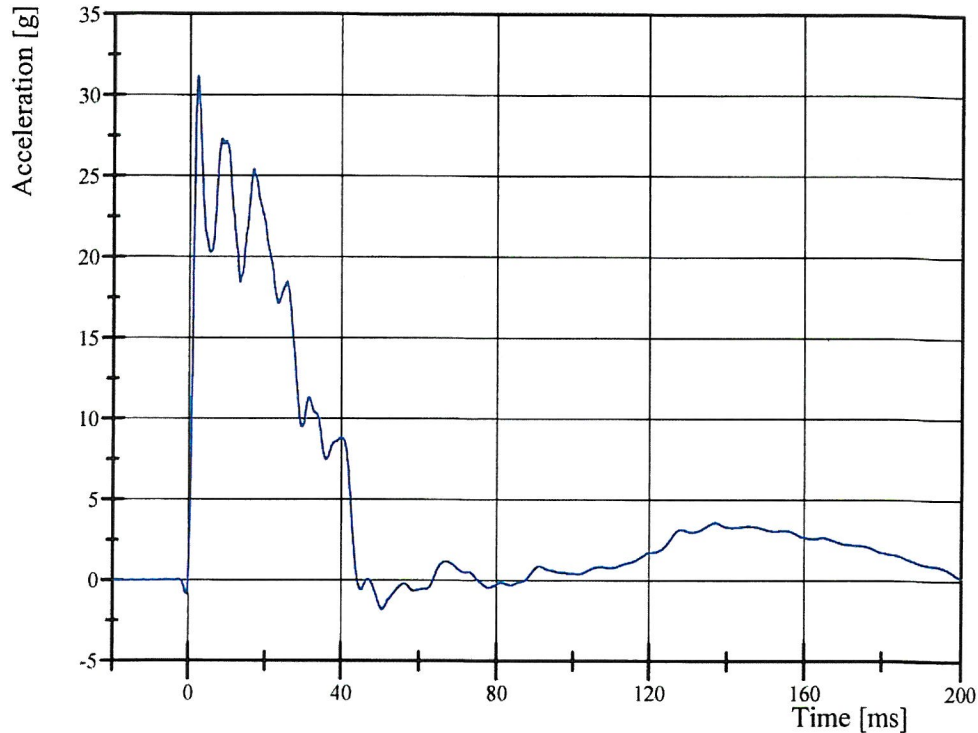
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 6-3

Test Date: 11/9/2009

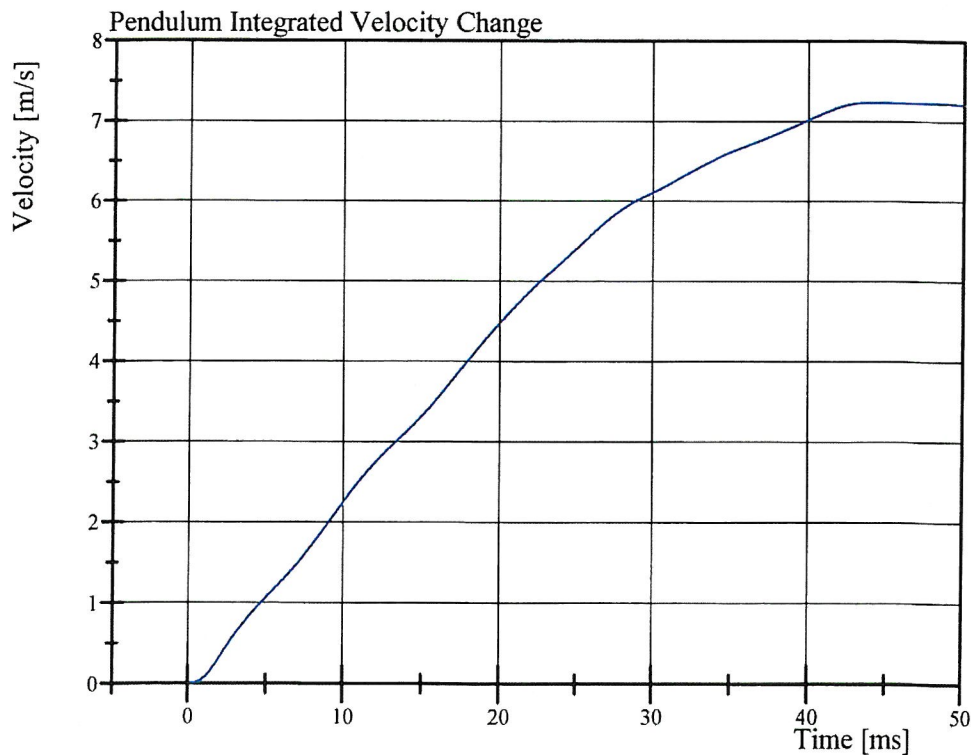
Pendulum Acceleration



Filter Class: CFC_180

Max: 31.1 g at 2.2 ms

Min: -1.8 g at 50.6 ms



Filter Class: CFC_180

Max: 7.2 m/s at 44.2 ms

Min: 0.0 m/s at 0.0 ms

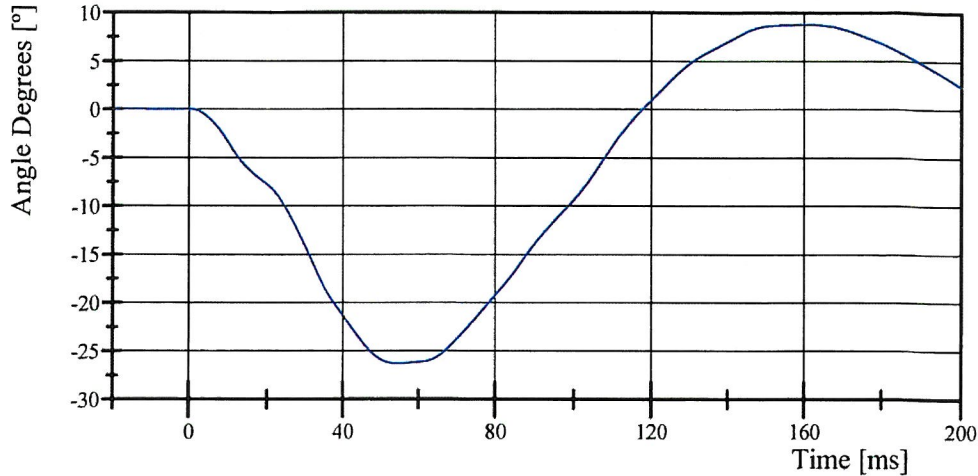
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 6-3

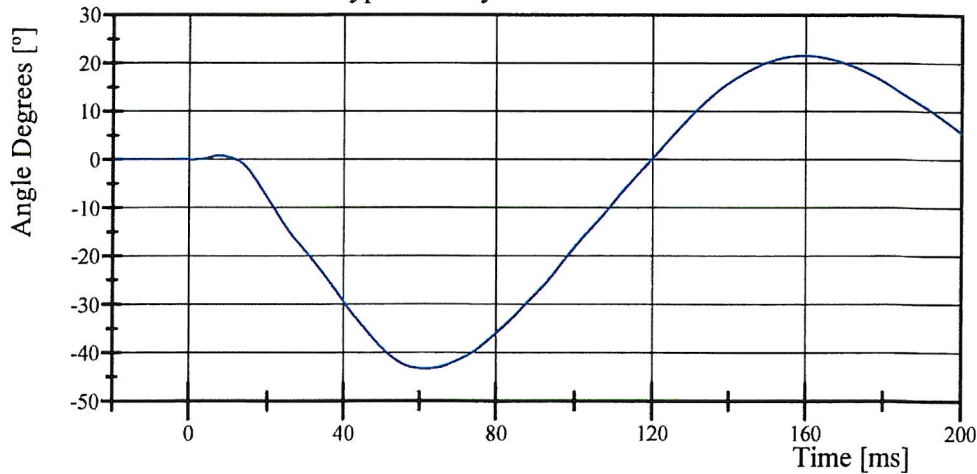
Test Date: 11/9/2009

Pot Rotation at the Base of Neck



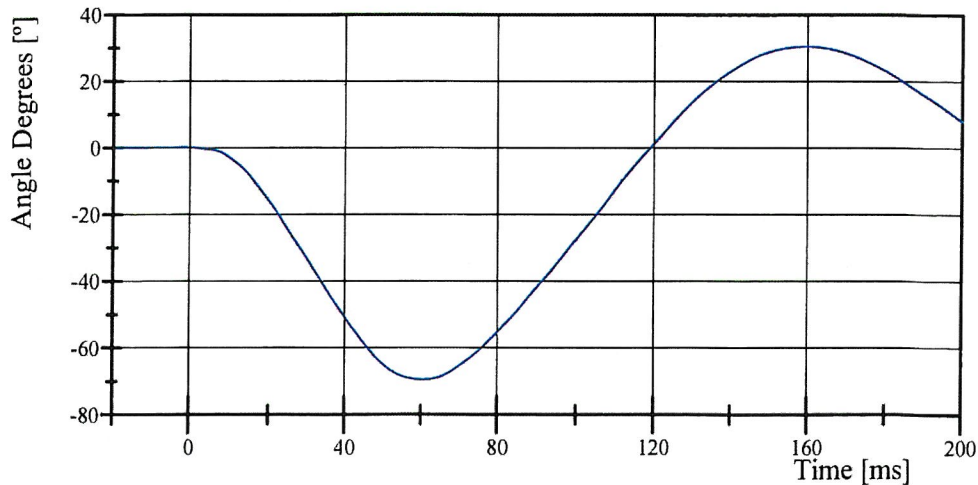
Filter Class: CFC_60
Max: 8.8 ° at 160.6 ms
Min: -26.3 ° at 54.5 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 21.6 ° at 159.5 ms
Min: -43.3 ° at 61.8 ms

Total Head D-Plane Rotation



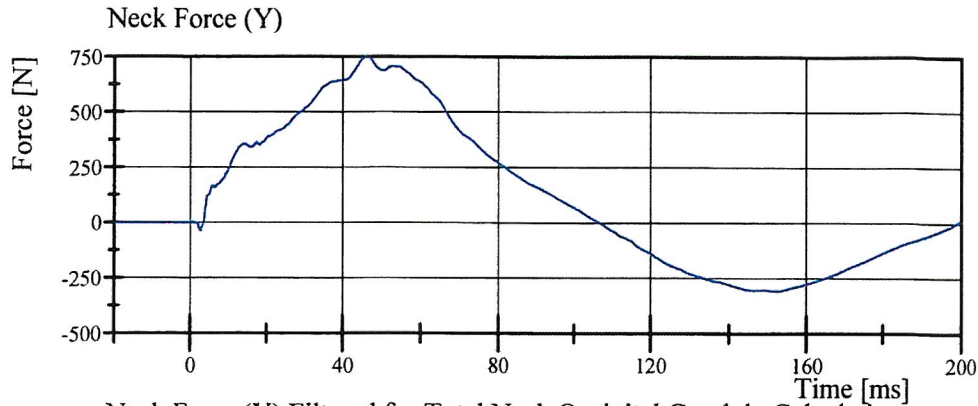
Filter Class: CFC_60
Max: 30.3 ° at 159.7 ms
Min: -69.5 ° at 60.6 ms

Transportation Research Center Inc.

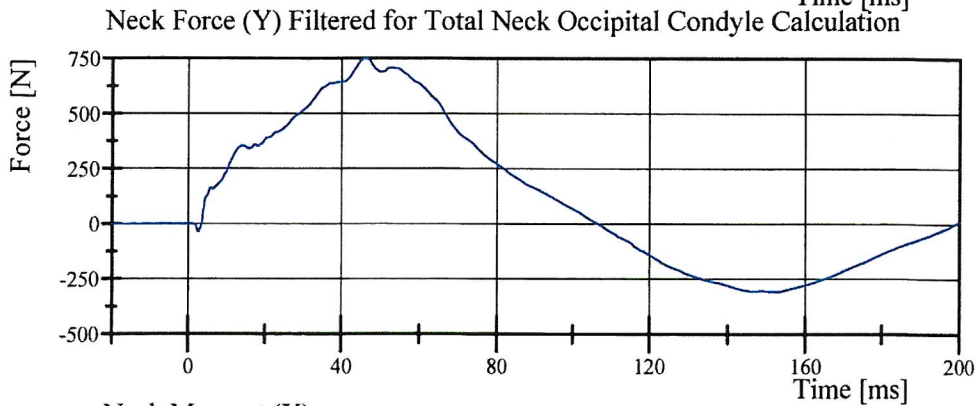
Left Lateral Neck

SID-HIII Serial No. M001 Certification No. 6-3

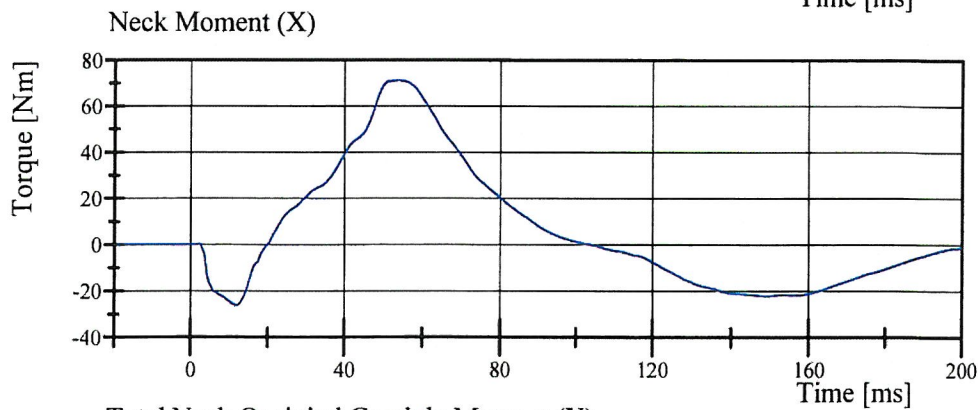
Test Date: 11/9/2009



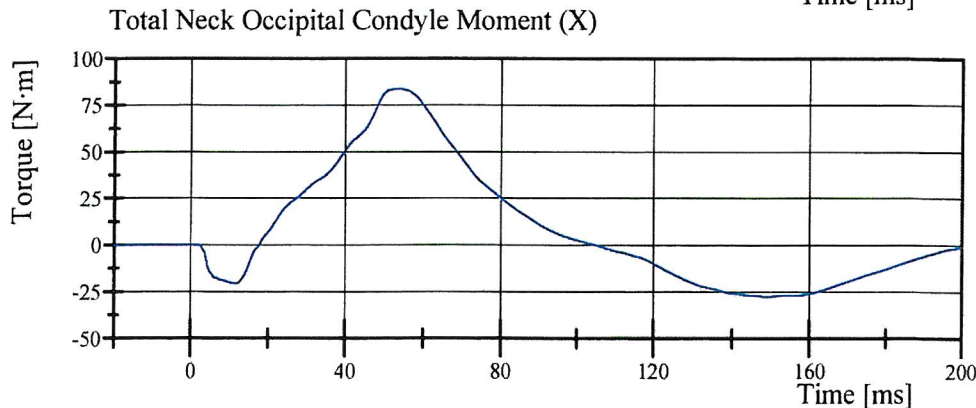
Filter Class: CFC_1000
Max: 749.9 N at 45.8 ms
Min: -307.7 N at 153.0 ms



Filter Class: CFC_600
Max: 749.4 N at 46.6 ms
Min: -307.3 N at 153.0 ms



Filter Class: CFC_600
Max: 71.2 Nm at 54.1 ms
Min: -26.3 Nm at 11.9 ms



Filter Class: CFC_600
Max: 83.7 N·m at 54.1 ms
Min: -27.6 N·m at 149.6 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-2
Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	3,706 - 4,394 N	4,077.2 N	Yes
Maximum Displacement at Test Velocity	33.34 - 39.54 mm	39.068 mm	Yes

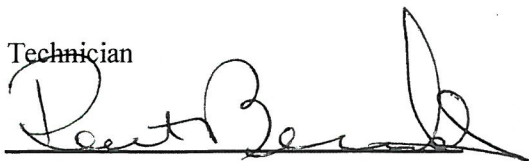
Test meets specifications.

Comments:

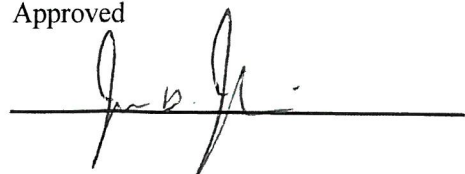
Actual Impactor Velocity (m/s): 6.067

Damper Setting: 7.5

Technician



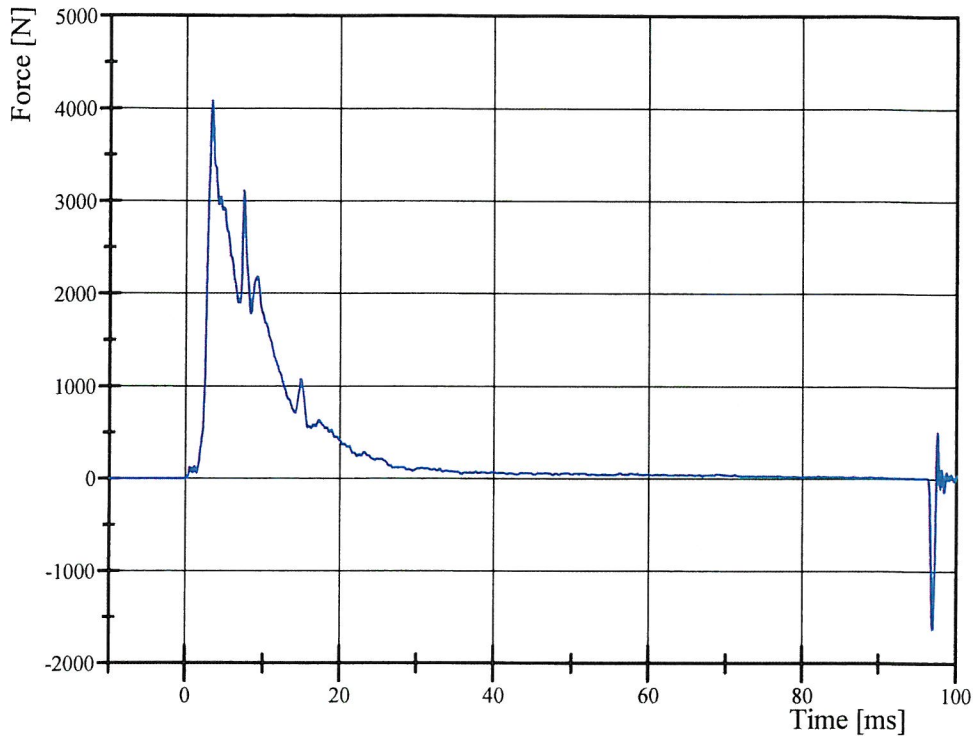
Approved



Transportation Research Center Inc.

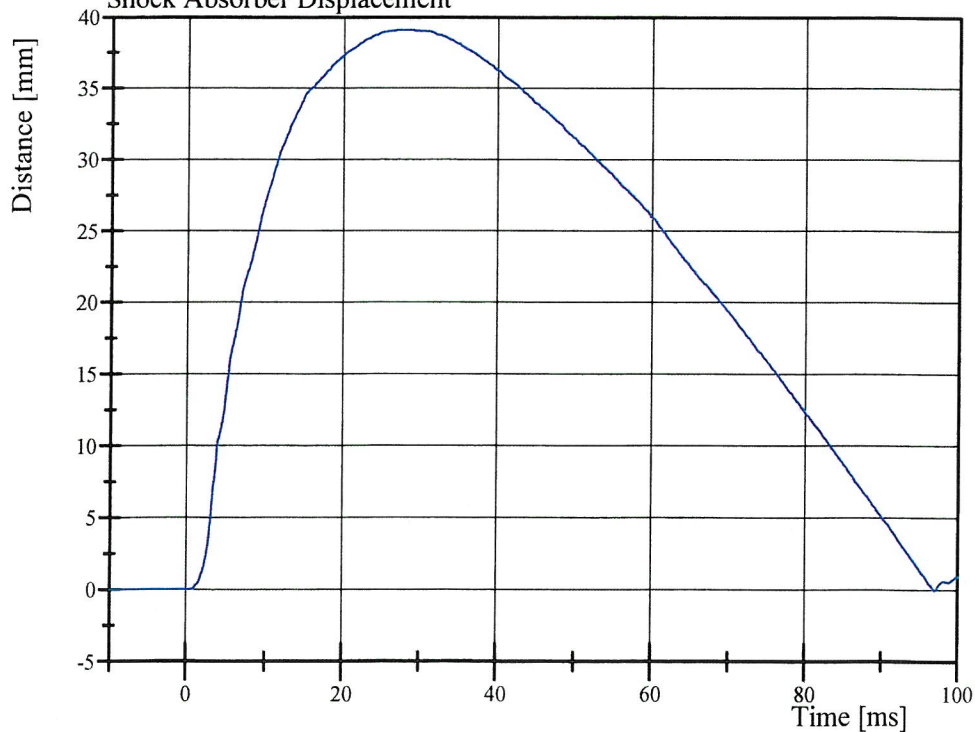
6.10 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-2
Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 4,077.2 N at 3.4 ms
Min: -1,620.4 N at 96.9 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 39.1 mm at 27.4 ms
Min: -0.1 mm at 97.0 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-1
Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	1,757 - 2,124 N	1,776.2 N	Yes
Maximum Displacement at Test Velocity	31.7 - 37.26 mm	37.182 mm	Yes

Test meets specifications.

Comments:

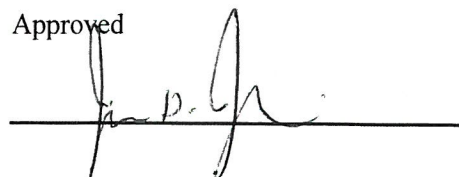
Actual Impactor Velocity (m/s): 4.293

Damper Setting: 7.5

Technician



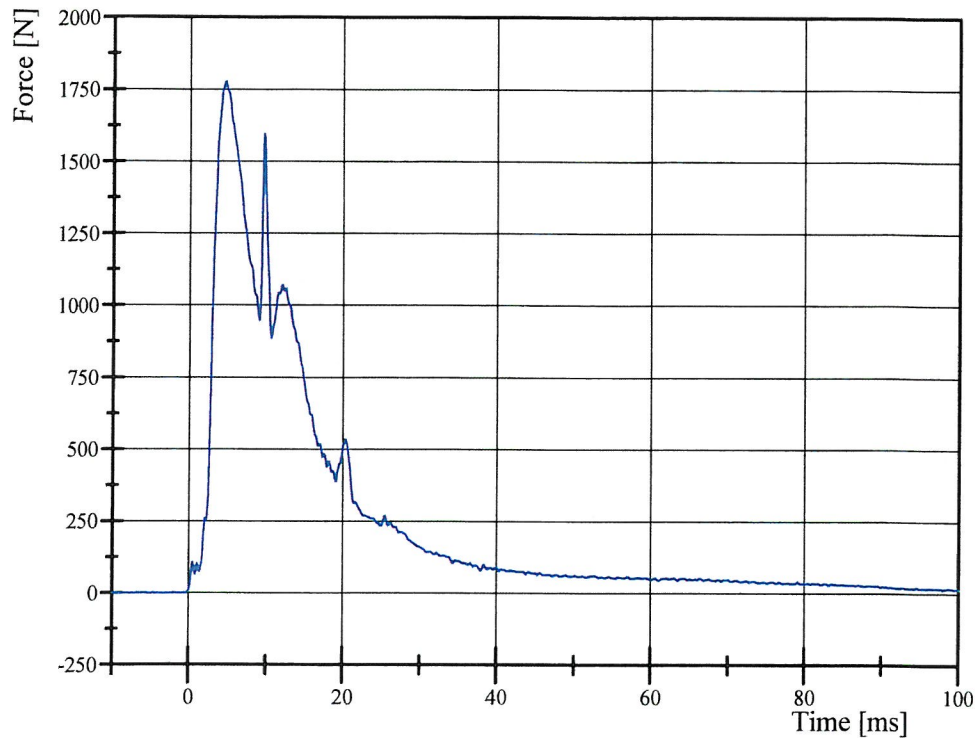
Approved



Transportation Research Center Inc.

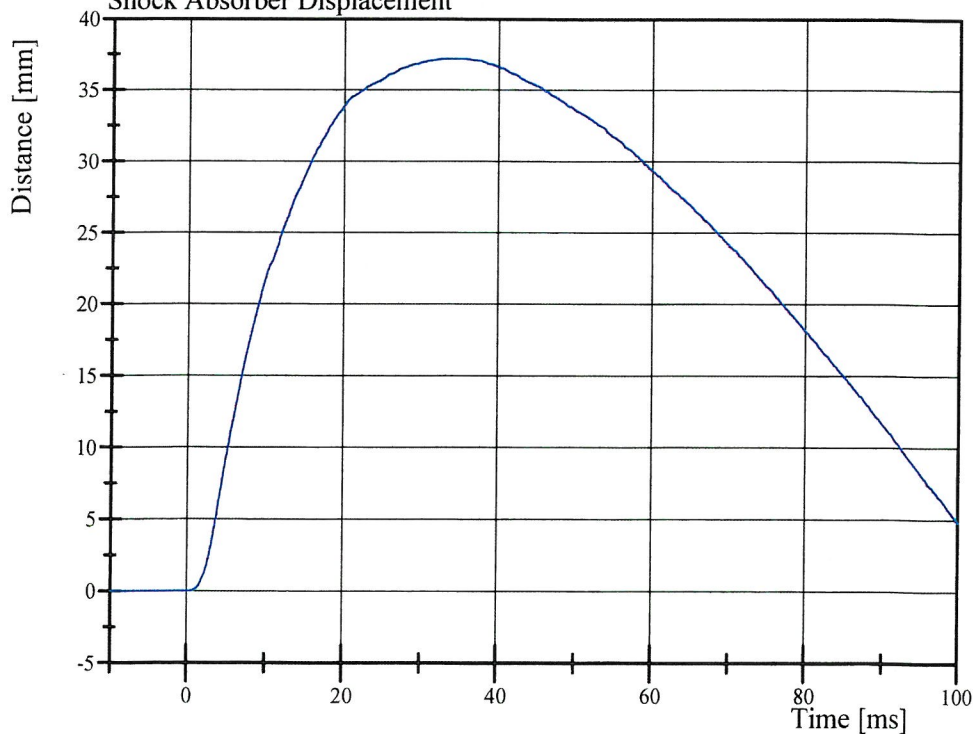
4.27 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-1
Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,776.2 N at 4.6 ms
Min: -2.0 N at -5.2 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 37.2 mm at 33.8 ms
Min: -0.0 mm at -9.6 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. M001 Certification No. 4-1
Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	856 - 1,145 N	921.4 N	Yes
Maximum Displacement at Test Velocity	30.2 - 35.19 mm	34.770 mm	Yes

Test meets specifications.

Comments:

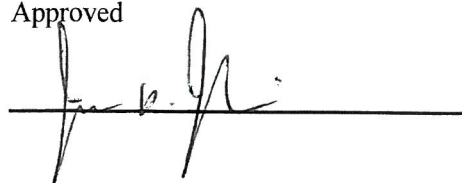
Actual Impactor Velocity (m/s): 3.075

Damper Setting: 7.5

Technician



Approved



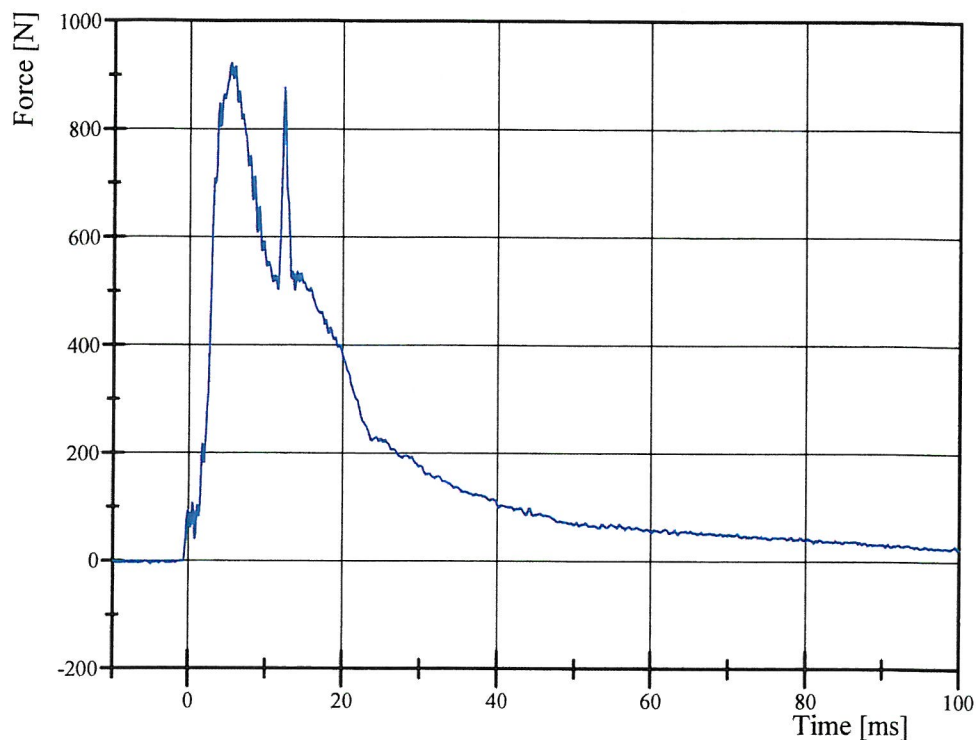
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. M001 Certification No. 4-1

Test Date: 9/24/2009

Shock Absorber Resistive Force

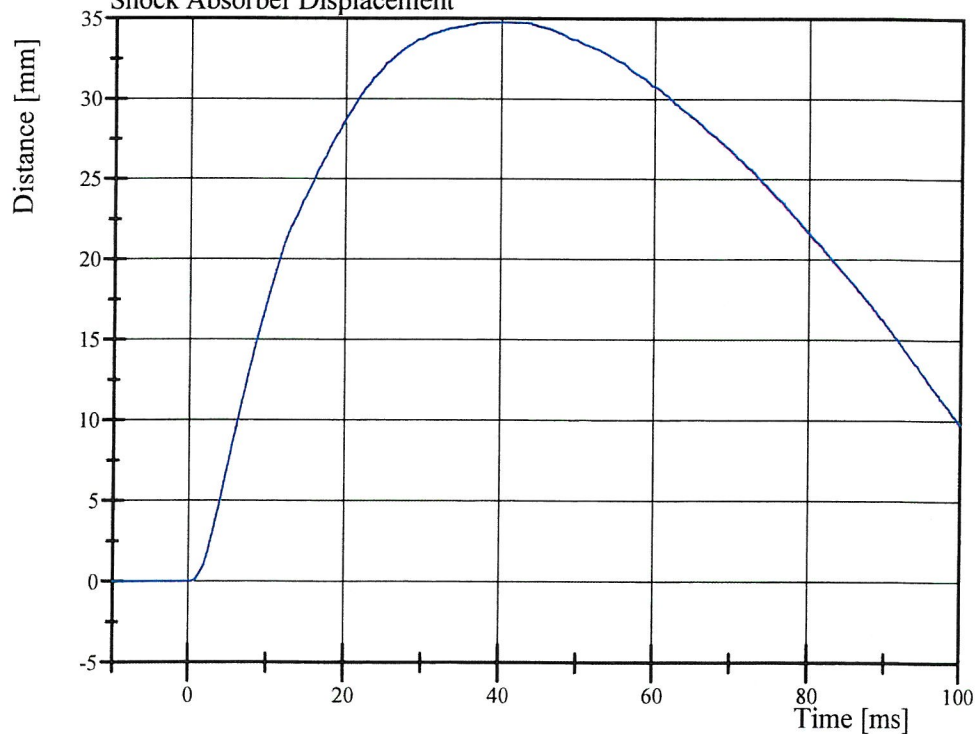


Filter Class: CFC_1000

Max: 921.4 N at 5.3 ms

Min: -5.4 N at -5.0 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 34.8 mm at 40.0 ms

Min: -0.0 mm at -9.0 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. M001 Certification No. 6-1

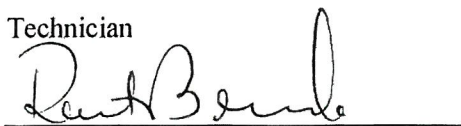
Test Date: 11/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.308 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	44.5 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	40.8 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	19.4 g	Yes

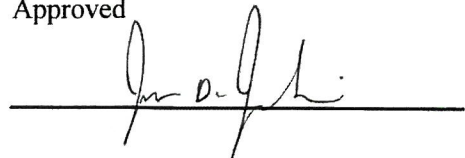
Test meets specifications.

Comments:

Technician



Approved



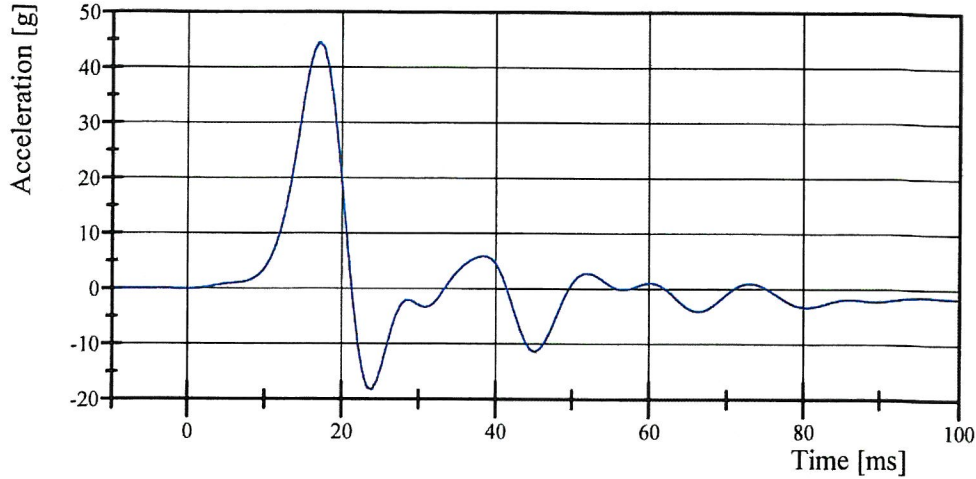
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. M001 Certification No. 6-1

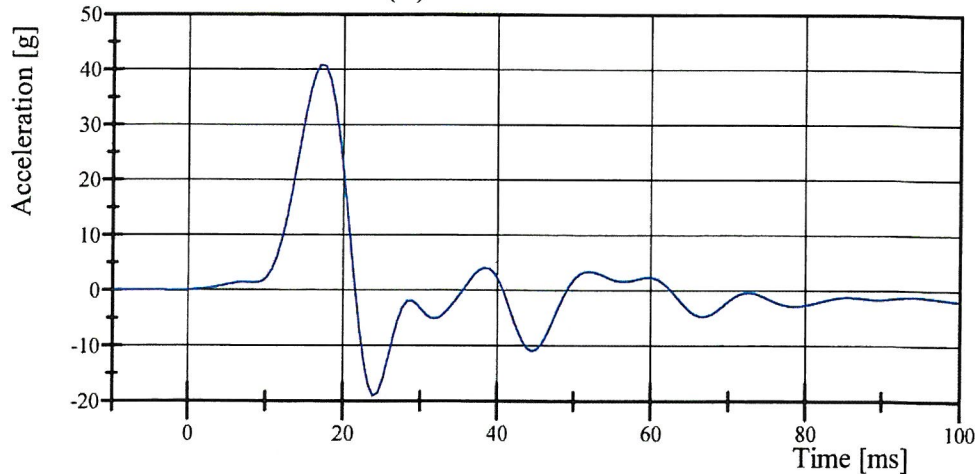
Test Date: 11/9/2009

Upper Rib Acceleration (Y)



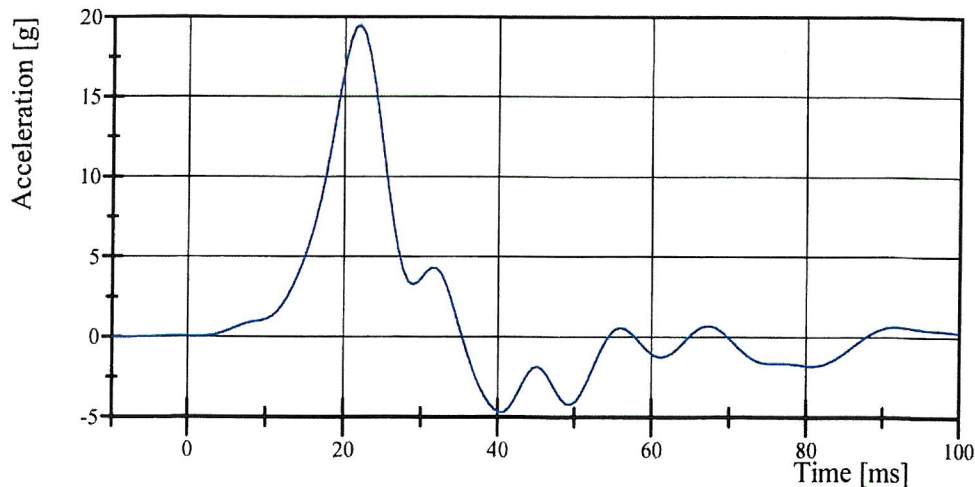
Filter Class: FIR_100
Max: 44.5 g at 17.0 ms
Min: -18.3 g at 23.9 ms

Lower Rib Acceleration (Y)



Filter Class: FIR_100
Max: 40.8 g at 17.1 ms
Min: -19.0 g at 23.9 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100
Max: 19.4 g at 22.1 ms
Min: -4.7 g at 40.2 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. M001 Certification No. 6-1

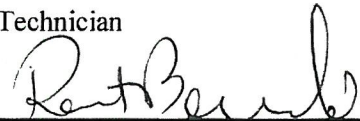
Test Date: 11/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.848 mm/s	Yes

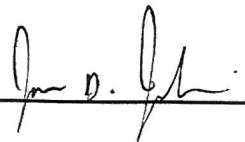
Test meets specifications.

Comments:

Technician



Approved

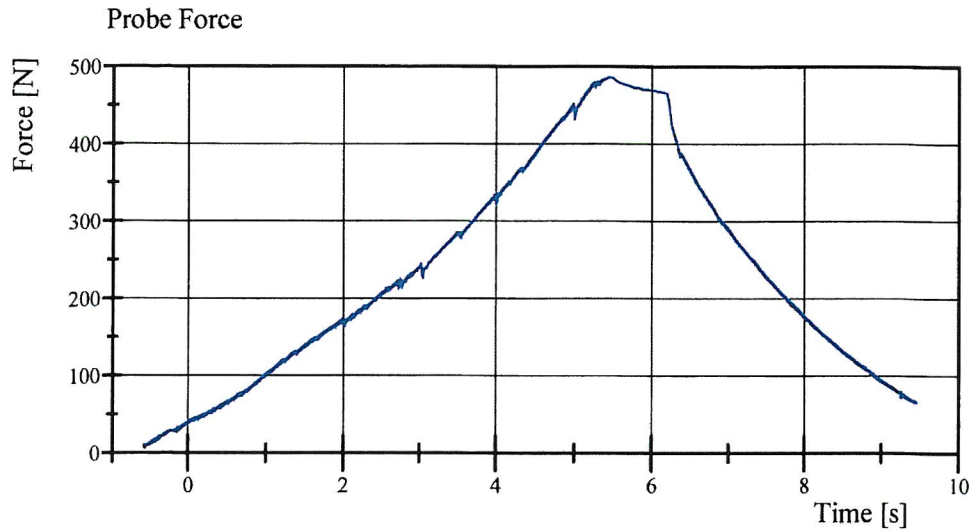


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. M001 Certification No. 6-1

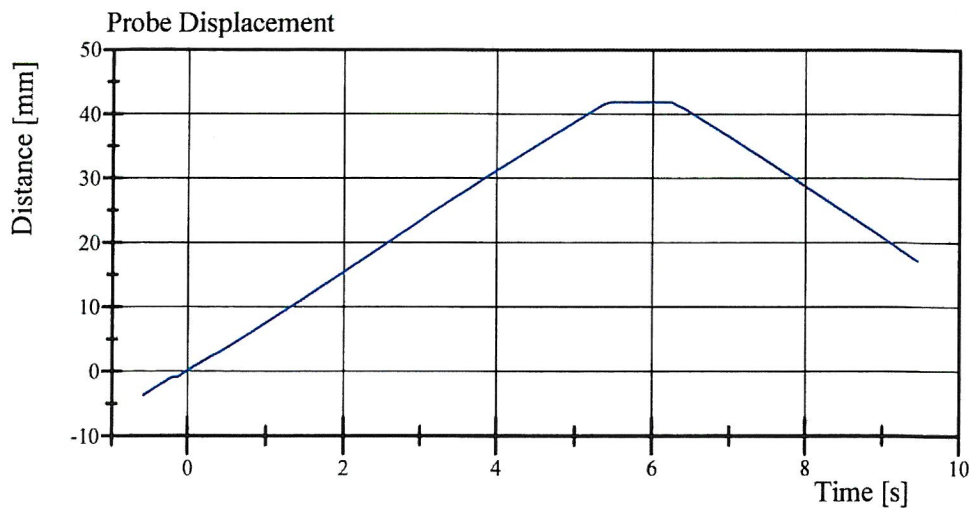
Test Date: 11/9/2009



Filter Class: CFC_600

Max: 486.3 N at 5.5 s

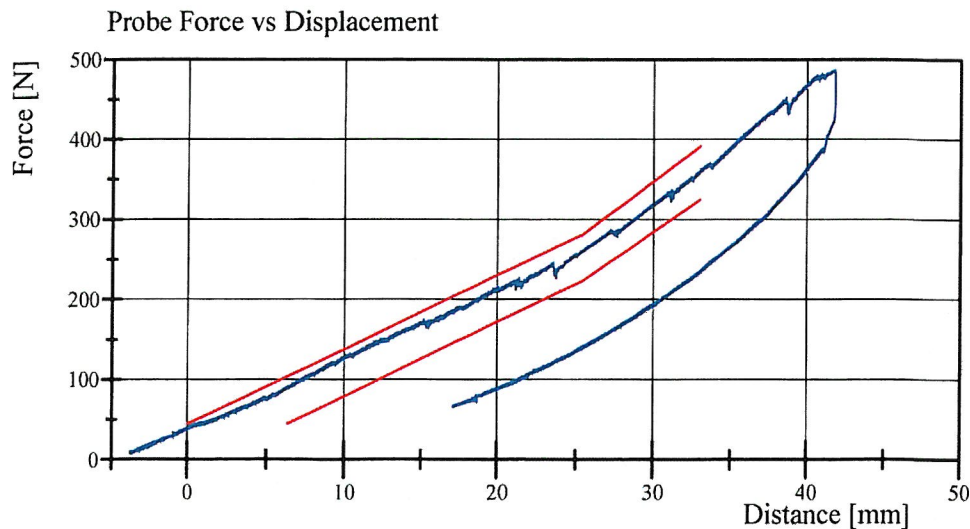
Min: 6.5 N at -0.6 s



Filter Class: CFC_180

Max: 41.8 mm at 6.0 s

Min: -3.8 mm at -0.6 s



Filter Class: CFC_600

Max: 486.3 N at 41.7 mm

Min: 6.5 N at -3.7 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

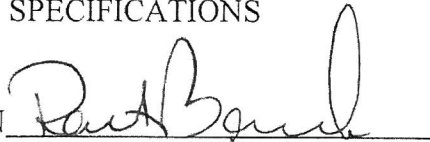
CAL DATE: 09-Nov-09

TRC, INC. TEST NO: TOFL-01 572B SN M001 TORSO FLEX CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	39 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	4.0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	123.5 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	178.0 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	227.0 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	7.3 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. M001 Certification No. 6-1

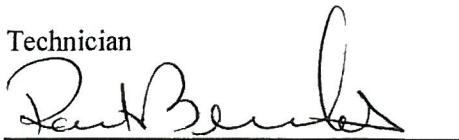
Test Date: 11/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.304 m/s	Yes
Pelvis Lateral Acceleration			
Duration above 20g	3 - 7 ms	6.3 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	49.7 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

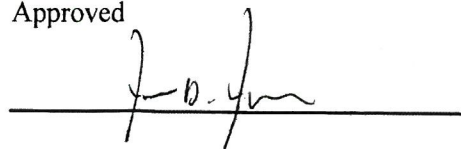
Test meets specifications.

Comments:

Technician



Approved

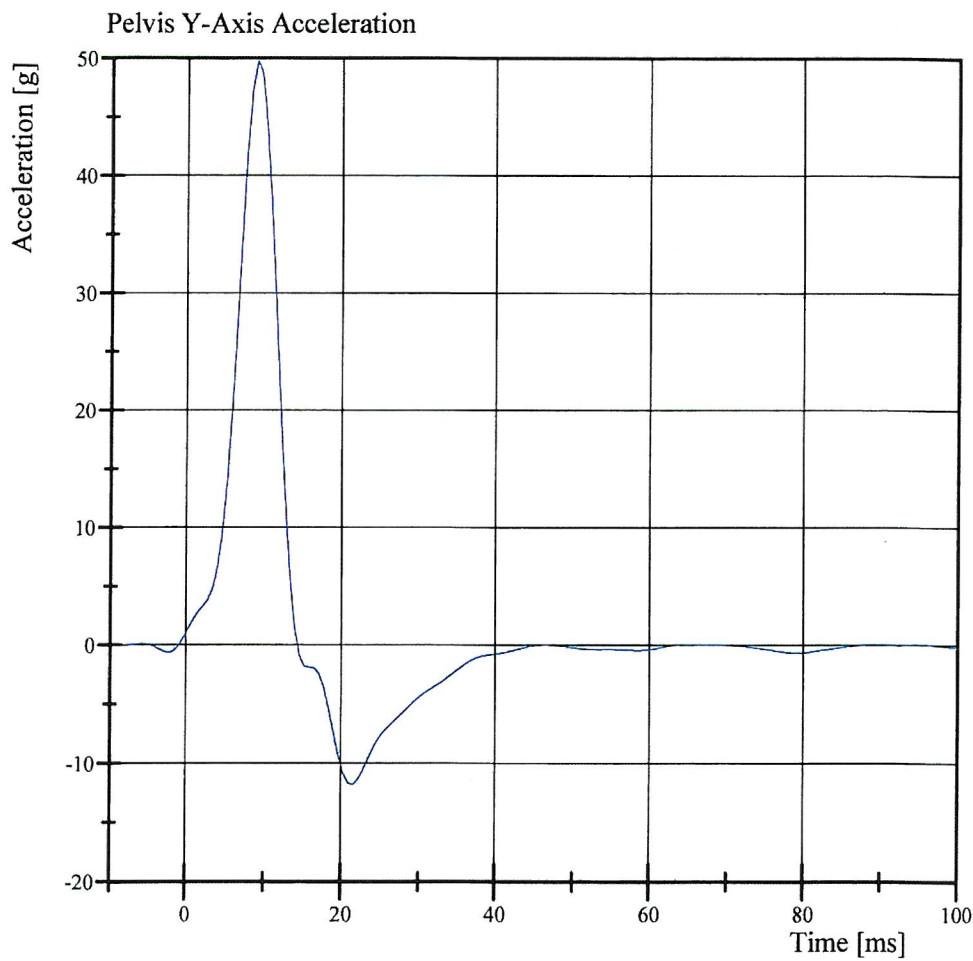


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. M001 Certification No. 6-1

Test Date: 11/9/2009



Filter Class: FIR_100

Max: 49.7 g at 9.0 ms

Min: -11.8 g at 21.5 ms

CALIBRATION TEST RESULTS

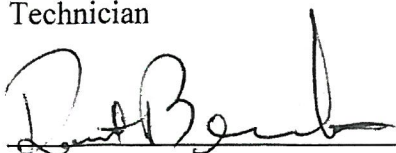
PRE-TEST

SID/HIII: 002

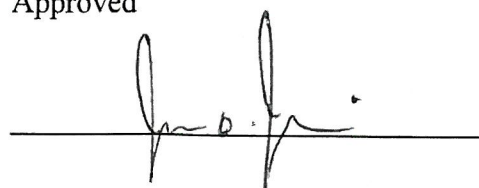
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 002 Calibration No. 06

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	908 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	514 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	520 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	501 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	382 mm	Yes
Top Rib Width From C/L	RW-1	165.1 - 180.3 mm	175 mm	Yes
Bottom Rib Width From C/L	RW-2	165.1 - 180.3 mm	175 mm	Yes
Difference Between Top & Bottom Rib Width from C/L		<= 2.5 mm	0.0 mm	Yes

Technician



Approved




Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 6-1

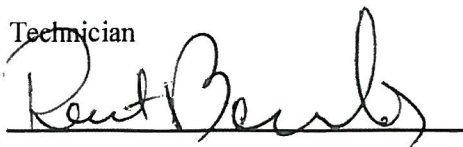
Test Date: 10/22/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	138.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	7.6 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

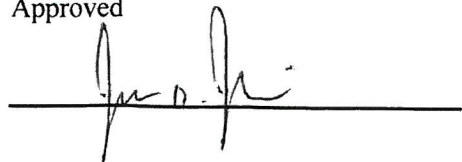
Test meets specifications.

Comments:

Technician



Approved

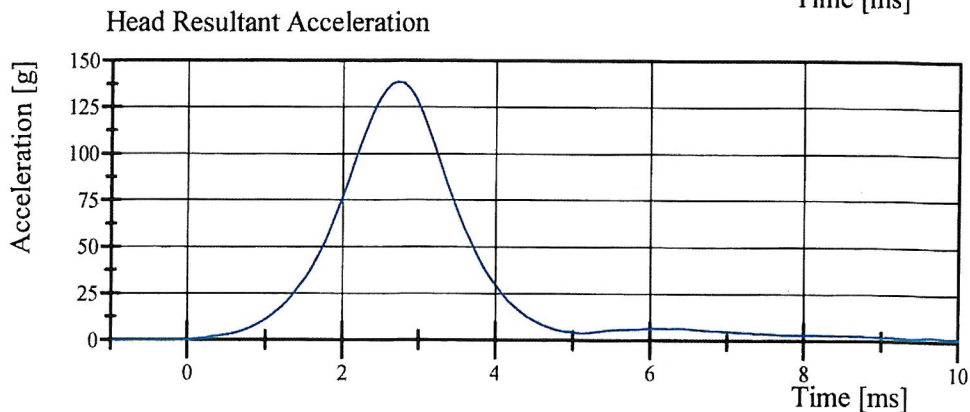
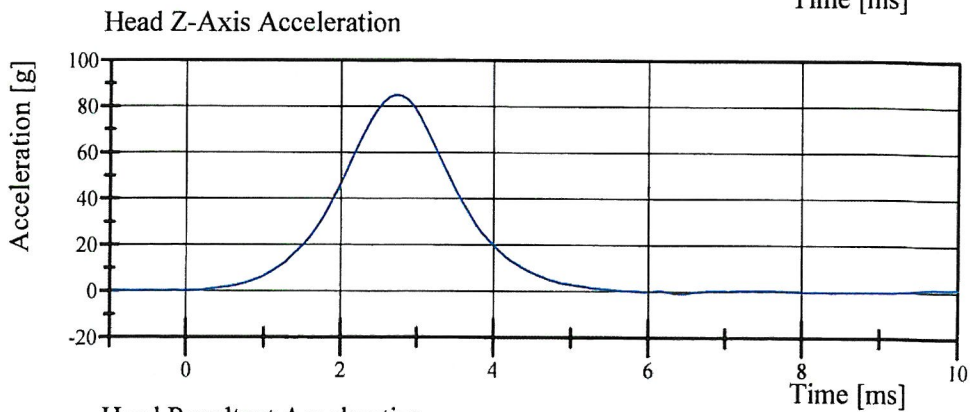
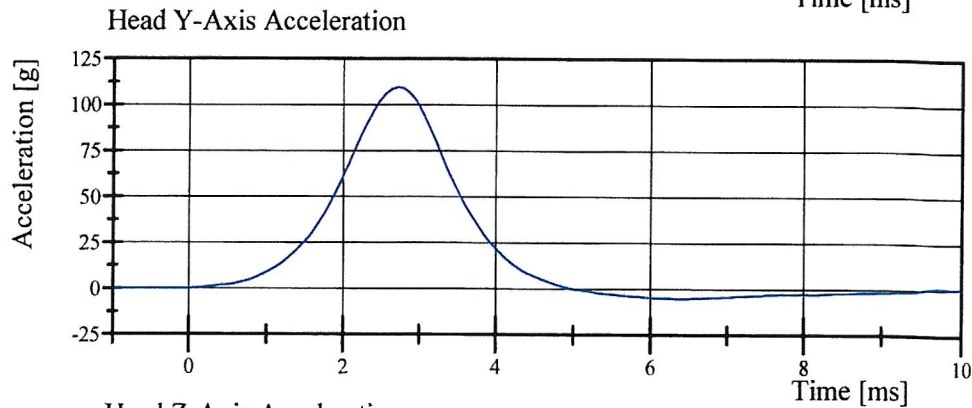
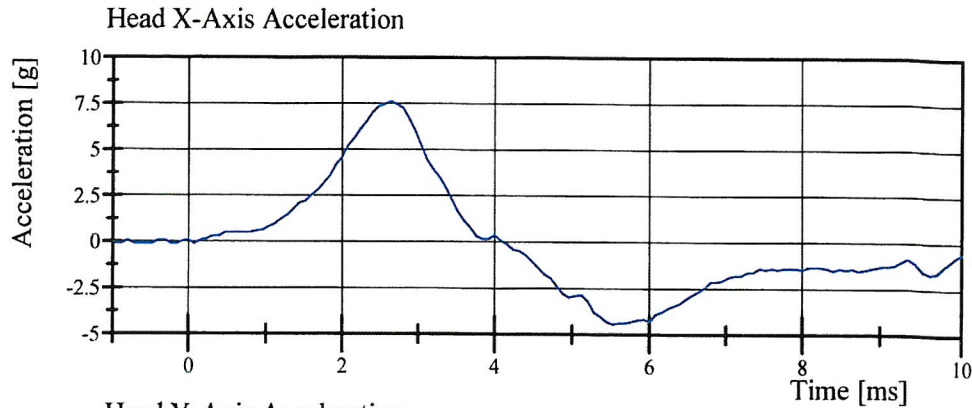


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 6-1

Test Date: 10/22/2009



Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 6-1

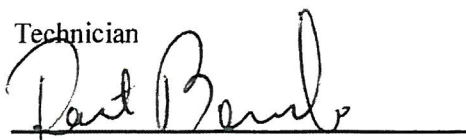
Test Date: 10/22/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-7.027 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.031 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.332 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.235 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.339 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-74.6 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	62.4 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	84.9 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	52.6 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	8.2 ms	Yes

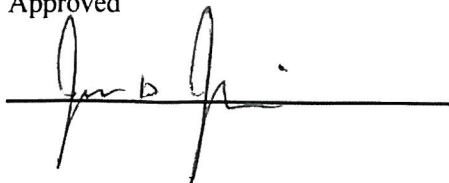
Test meets specifications.

Comments:

Technician



Approved

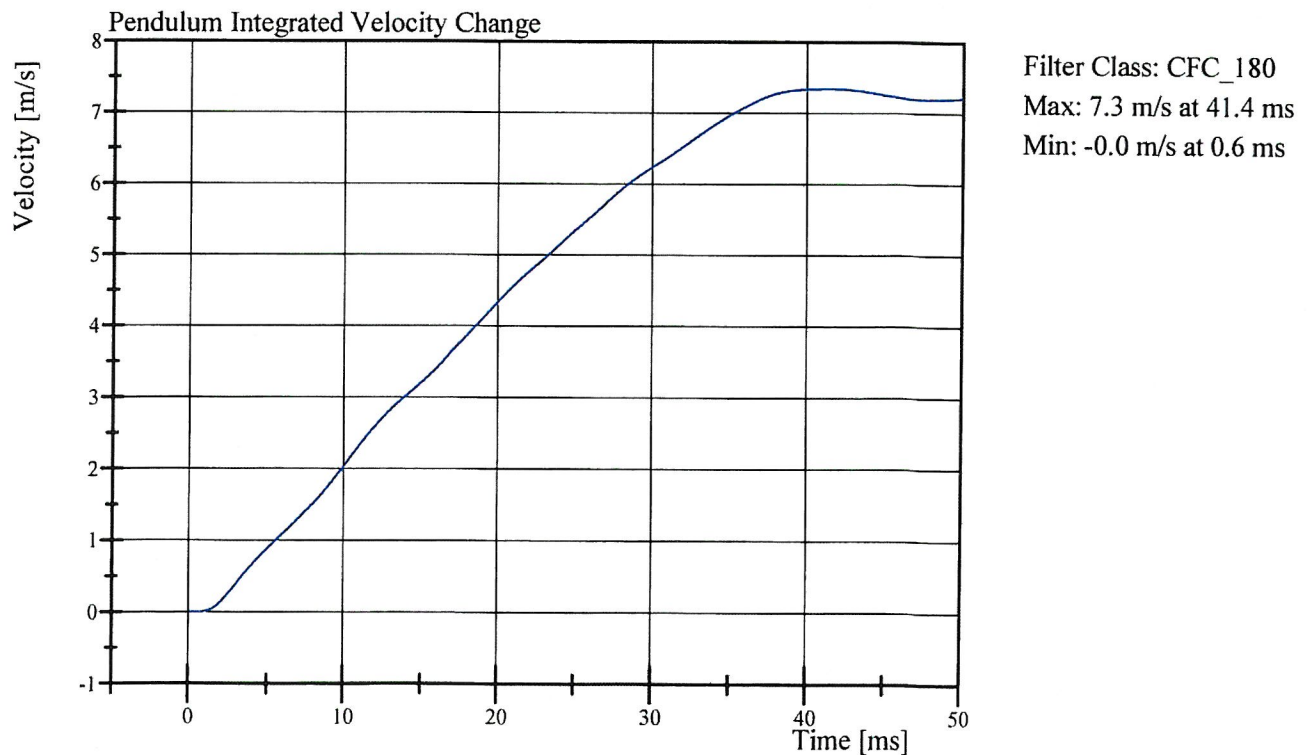
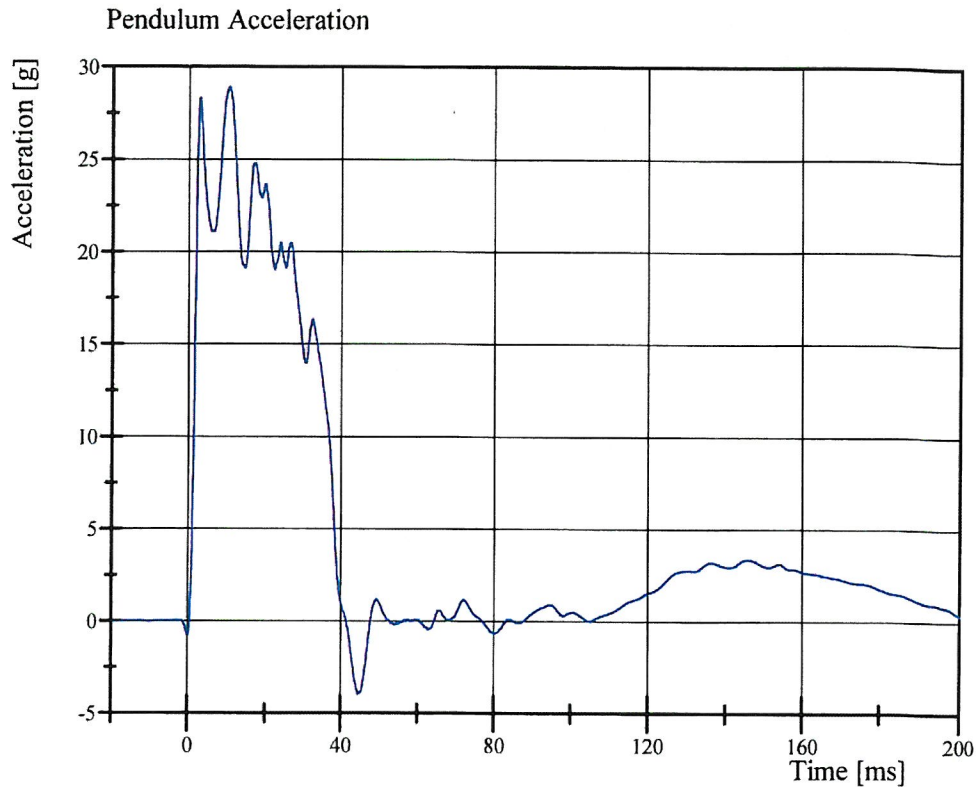


Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 6-1

Test Date: 10/22/2009



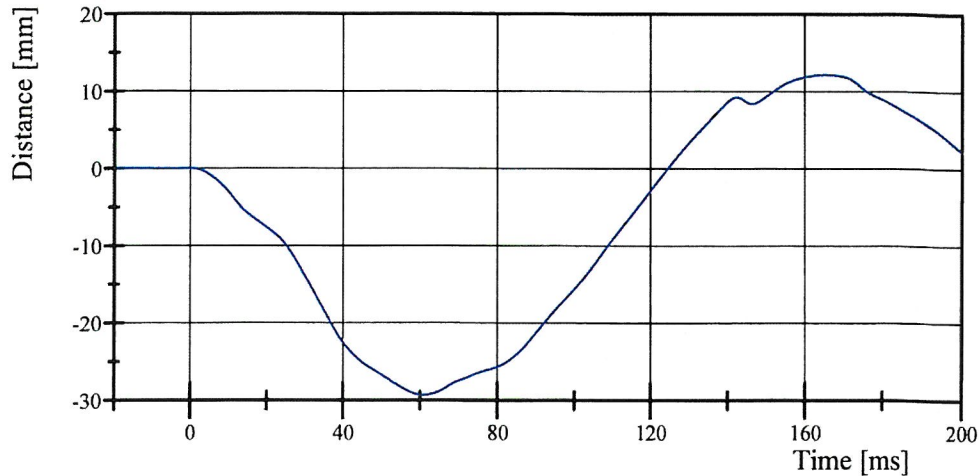
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 6-1

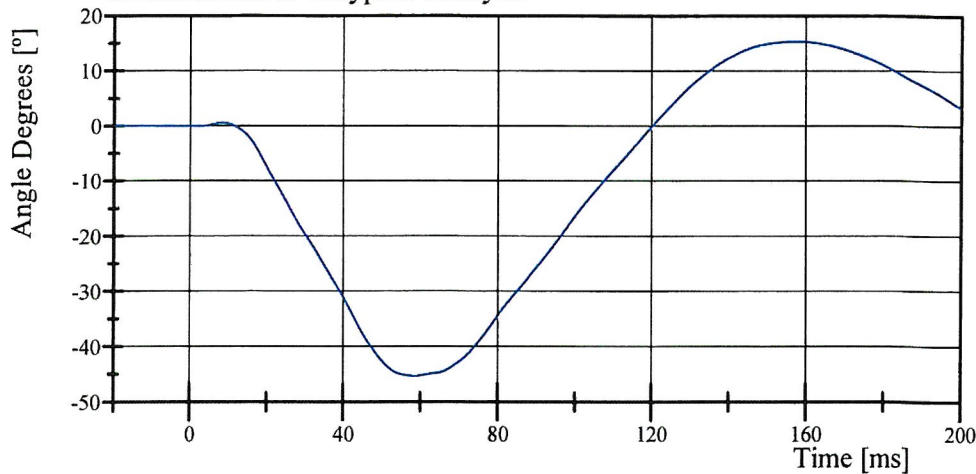
Test Date: 10/22/2009

Pot Rotation at the Base of Neck



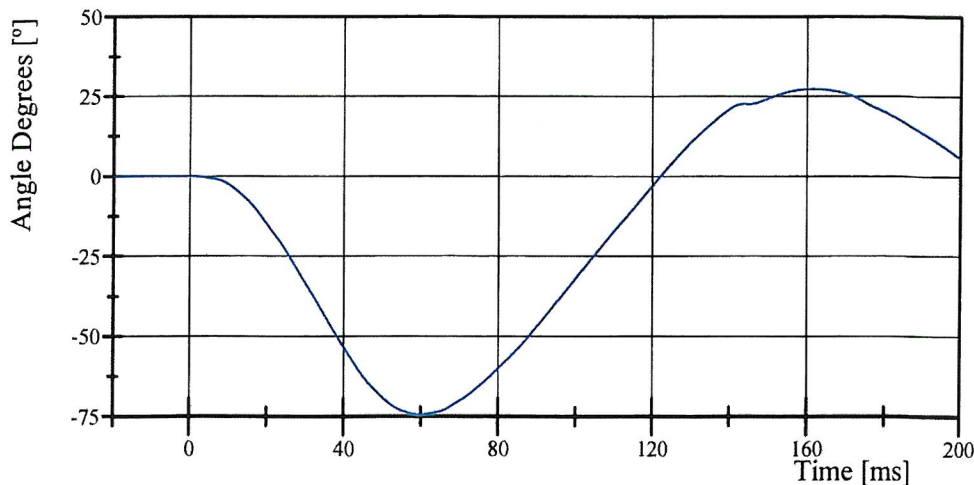
Filter Class: CFC_60
Max: 12.1 mm at 165.0 ms
Min: -29.3 mm at 61.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 15.3 ° at 158.2 ms
Min: -45.4 ° at 58.6 ms

Total Head D-Plane Rotation



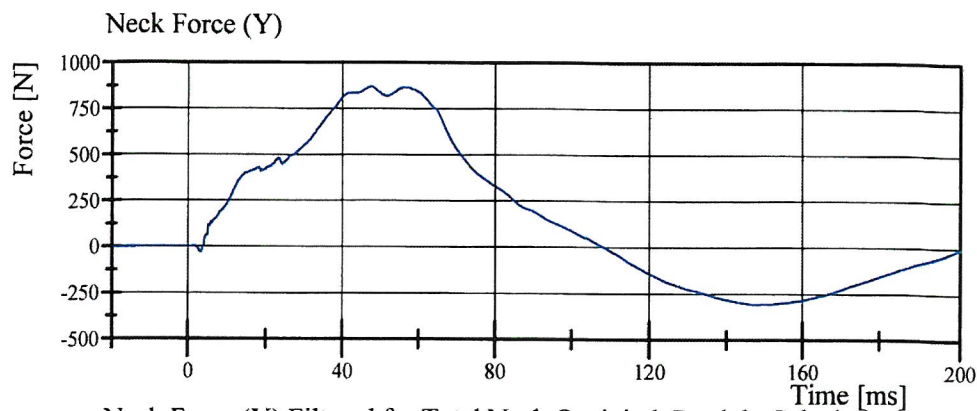
Filter Class: CFC_60
Max: 27.2 ° at 161.4 ms
Min: -74.6 ° at 59.8 ms

Transportation Research Center Inc.

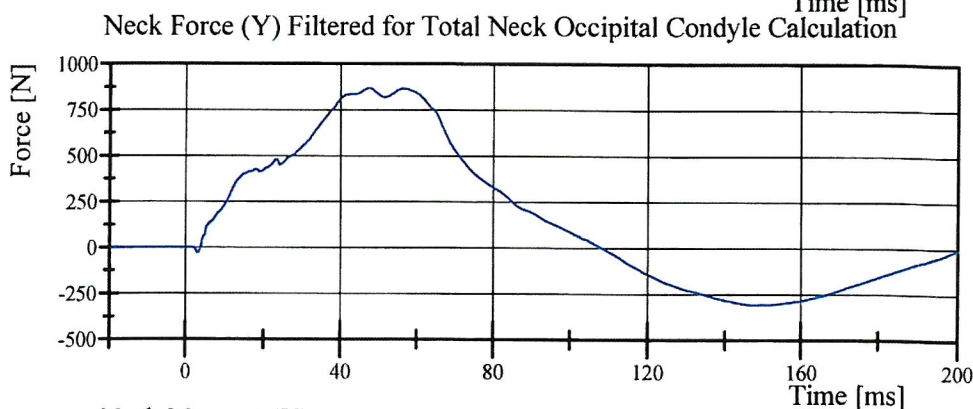
Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 6-1

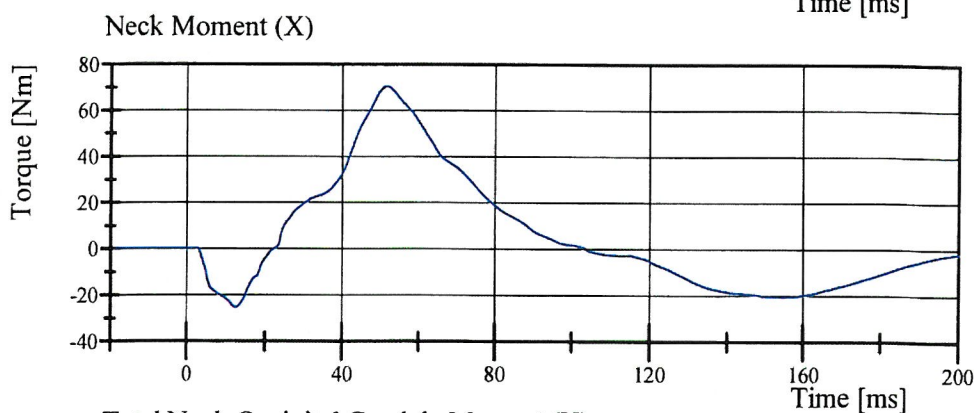
Test Date: 10/22/2009



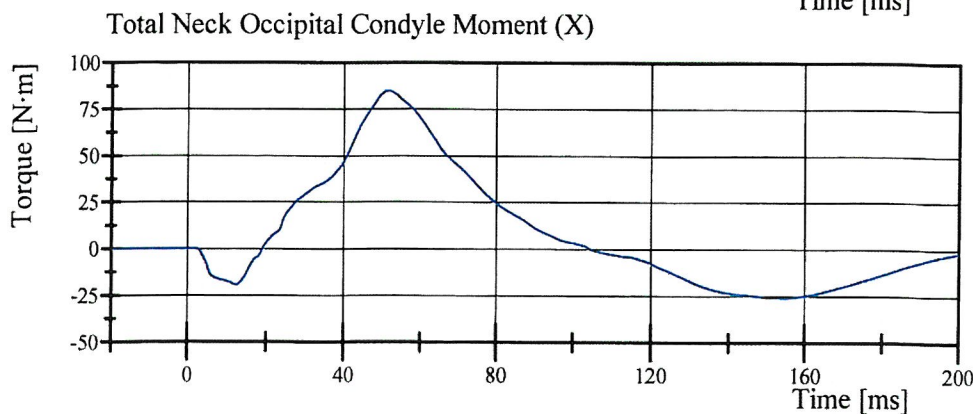
Filter Class: CFC_1000
Max: 867.4 N at 47.5 ms
Min: -309.0 N at 147.6 ms



Filter Class: CFC_600
Max: 867.5 N at 47.7 ms
Min: -308.7 N at 147.7 ms



Filter Class: CFC_600
Max: 70.4 Nm at 51.7 ms
Min: -25.4 Nm at 12.6 ms



Filter Class: CFC_600
Max: 84.9 N·m at 51.7 ms
Min: -26.0 N·m at 154.2 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-9

Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	3,719 - 4,409 N	4,381.1 N	Yes
Maximum Displacement at Test Velocity	33.35 - 39.55 mm	38.366 mm	Yes

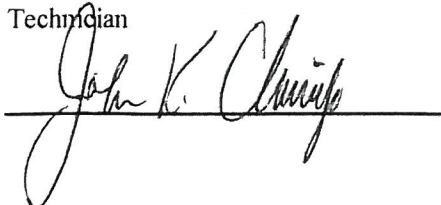
Test meets specifications.

Comments:

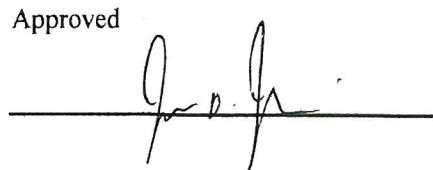
Actual Impactor Velocity (m/s): 6.077

Damper Setting: 7.5

Technician



Approved



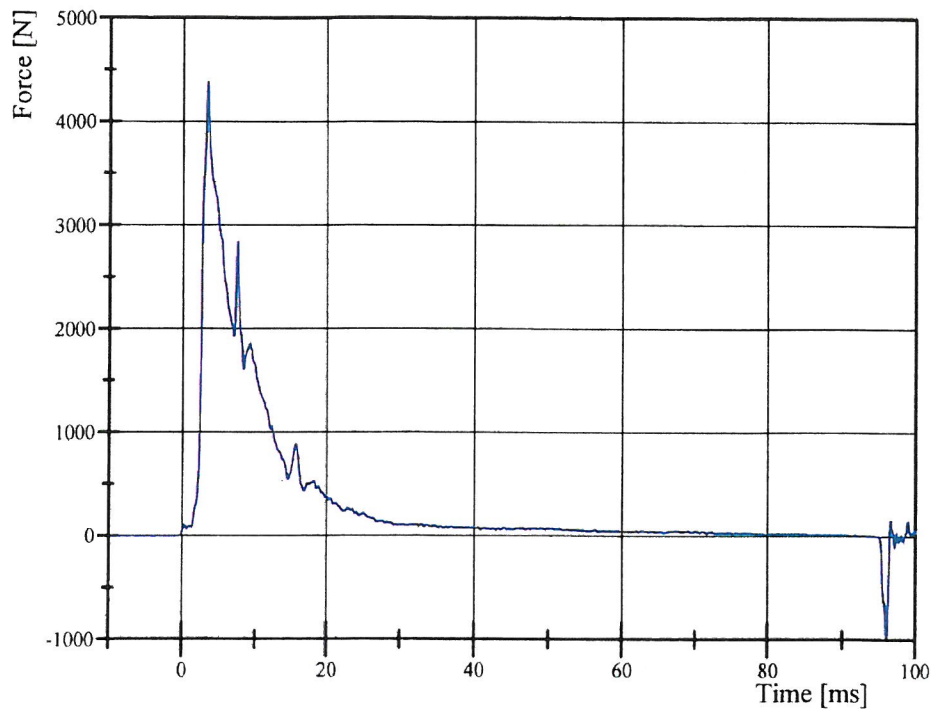
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-9

Test Date: 9/24/2009

Shock Absorber Resistive Force

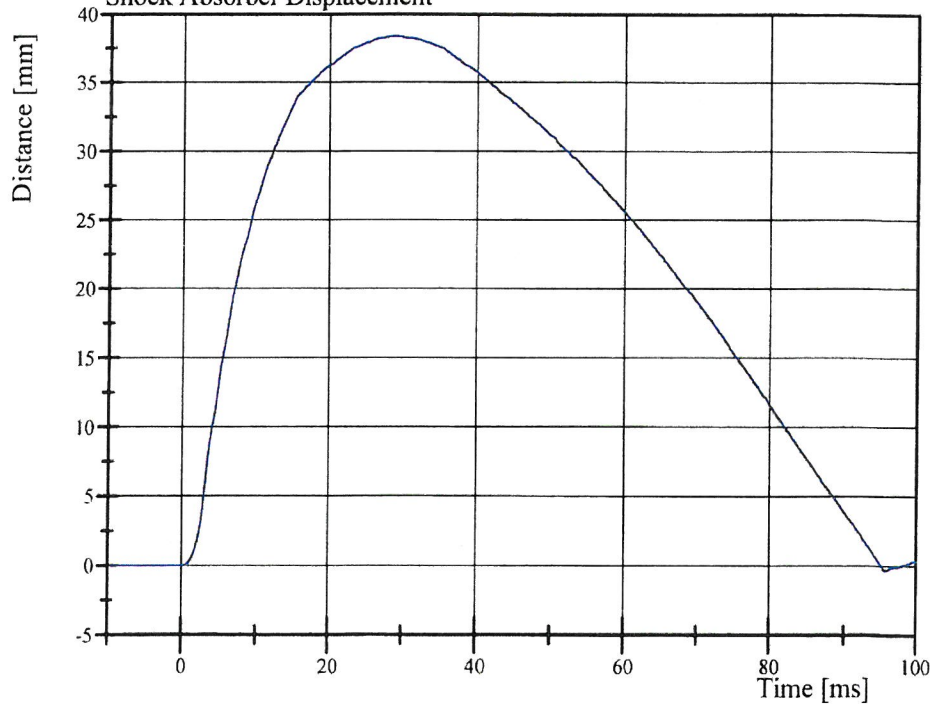


Filter Class: CFC_1000

Max: 4,381.1 N at 3.3 ms

Min: -985.3 N at 96.2 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 38.4 mm at 28.8 ms

Min: -0.3 mm at 95.9 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-1

Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Maximum Force at Test Velocity	1,759 - 2,126 N	1,899.2 N	Yes
Maximum Displacement at Test Velocity	31.71 - 37.26 mm	36.472 mm	Yes

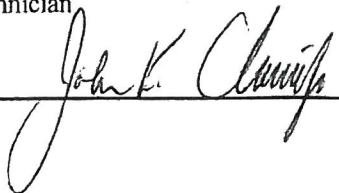
Test meets specifications.

Comments:

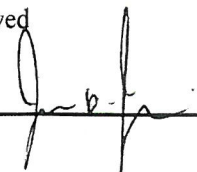
Actual Impactor Velocity (m/s): 4.295

Damper Setting: 7.5

Technician



Approved



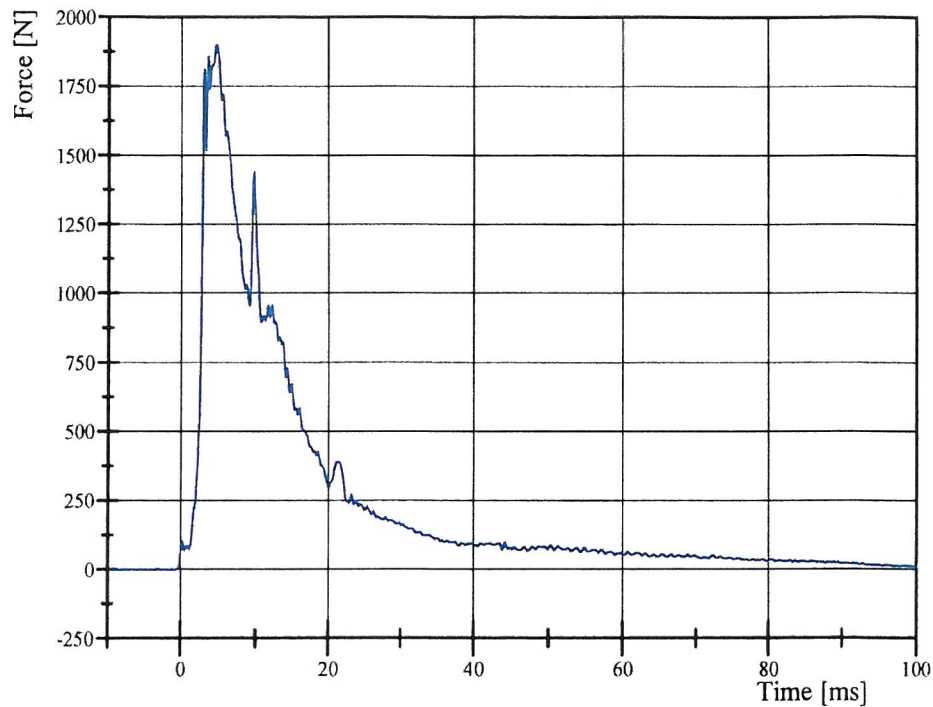
Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-1

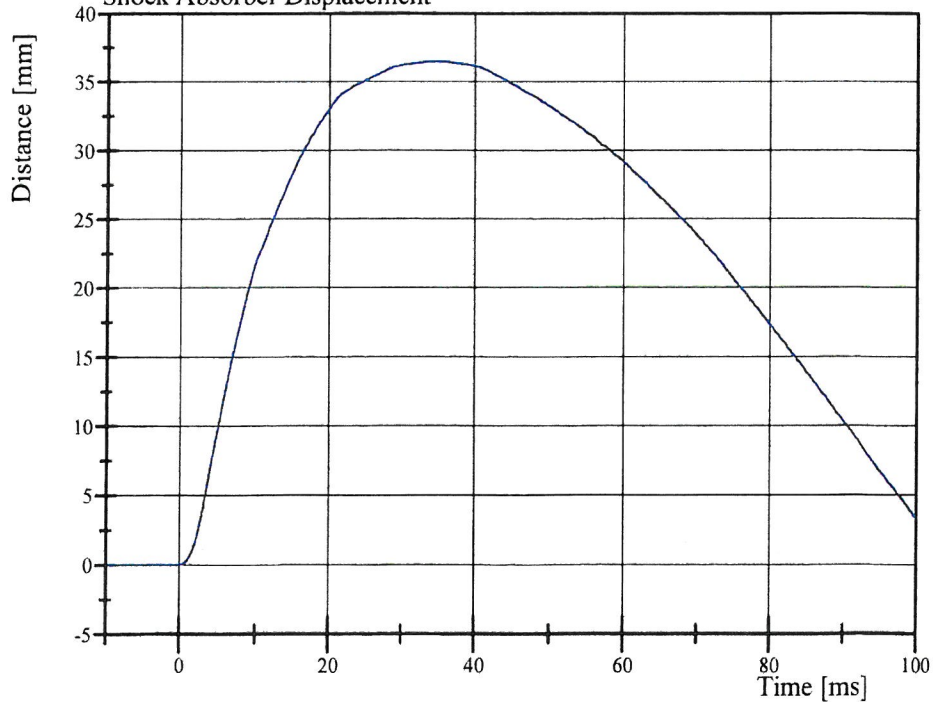
Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,899.2 N at 4.7 ms
Min: -2.5 N at -9.1 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 36.5 mm at 34.3 ms
Min: -0.0 mm at -7.0 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-2

Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	856 - 1,146 N	1,014.3 N	Yes
Maximum Displacement at Test Velocity	30.2 - 35.19 mm	34.042 mm	Yes

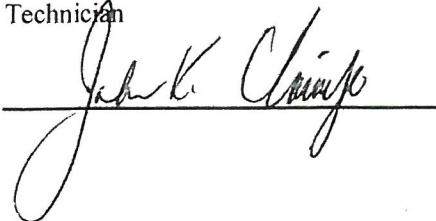
Test meets specifications.

Comments:

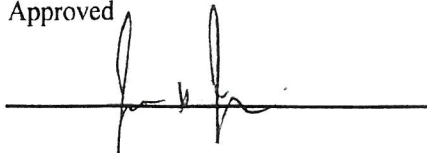
Actual Impactor Velocity (m/s): 3.076

Damper Setting: 7.5

Technician



Approved



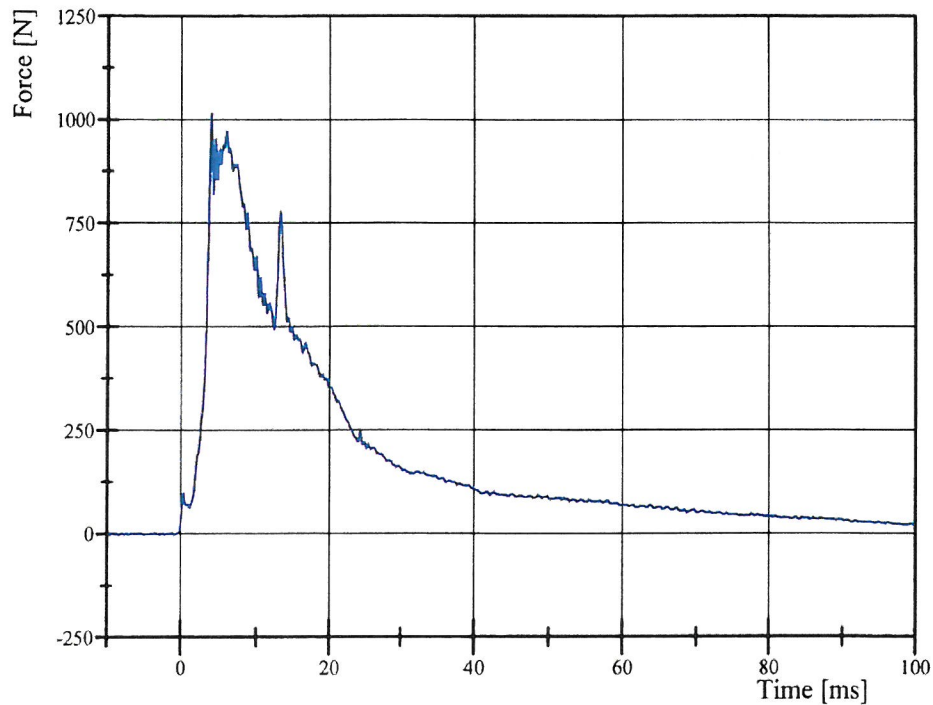
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-2

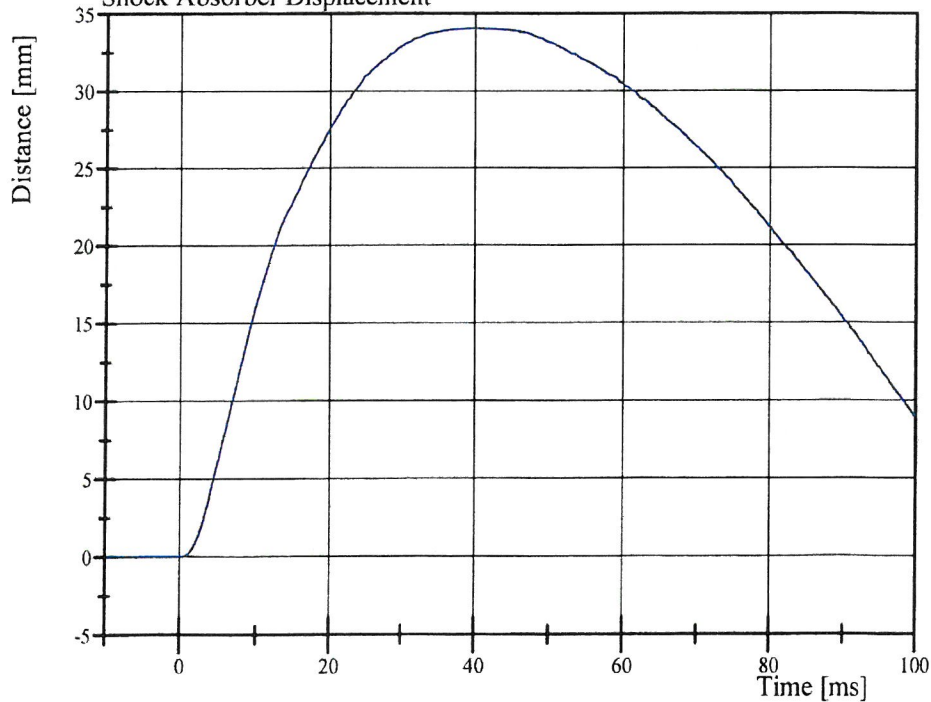
Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,014.3 N at 3.9 ms
Min: -3.7 N at -9.6 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 34.0 mm at 39.3 ms
Min: -0.0 mm at -5.1 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 6-6

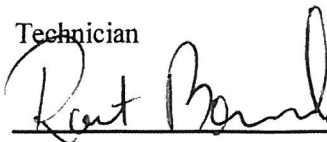
Test Date: 10/23/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.287 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	43.3 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	40.6 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	22.0 g	Yes

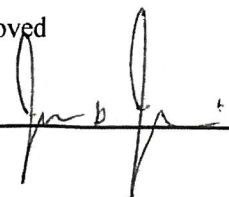
Test meets specifications.

Comments:

Technician



Approved



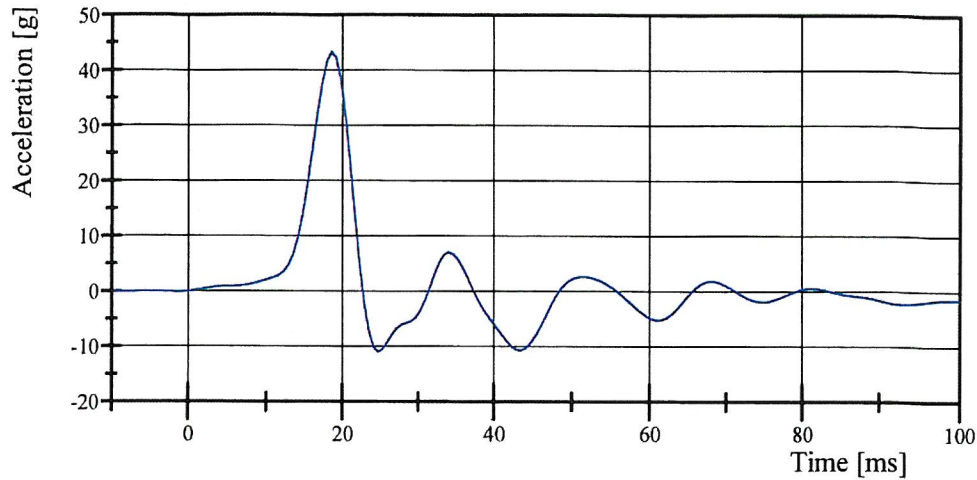
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 6-6

Test Date: 10/23/2009

Upper Rib Acceleration (Y)

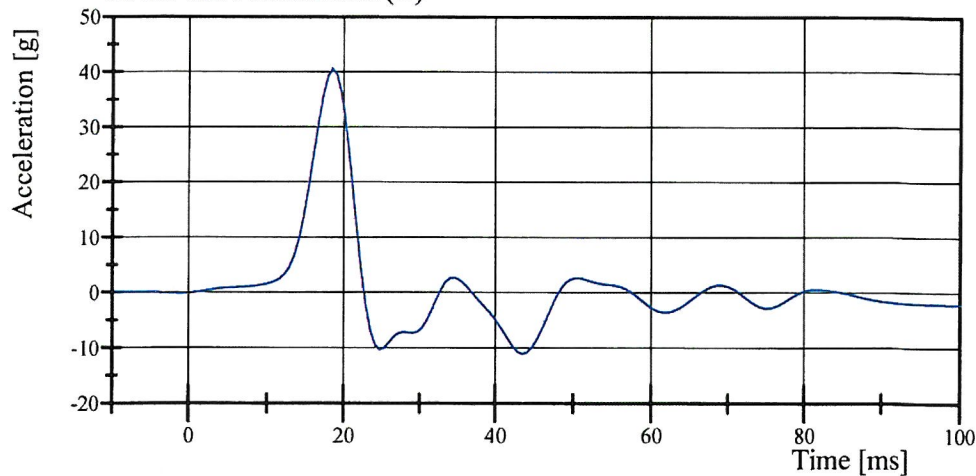


Filter Class: FIR_100

Max: 43.3 g at 18.5 ms

Min: -11.0 g at 24.7 ms

Lower Rib Acceleration (Y)

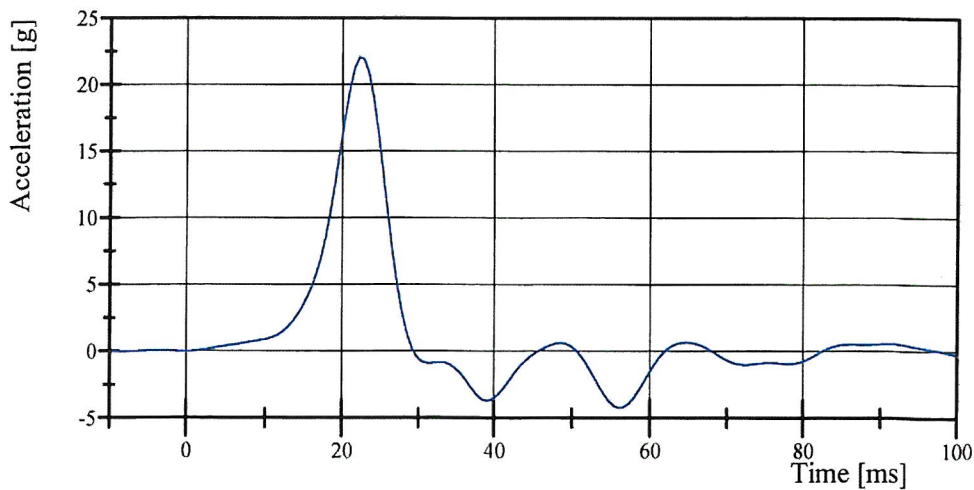


Filter Class: FIR_100

Max: 40.6 g at 18.5 ms

Min: -11.1 g at 43.5 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100

Max: 22.0 g at 22.2 ms

Min: -4.3 g at 56.0 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 6-1

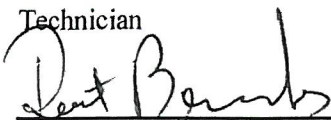
Test Date: 10/22/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.806 mm/s	Yes

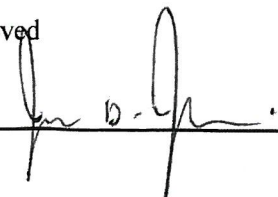
Test meets specifications.

Comments:

Technician



Approved

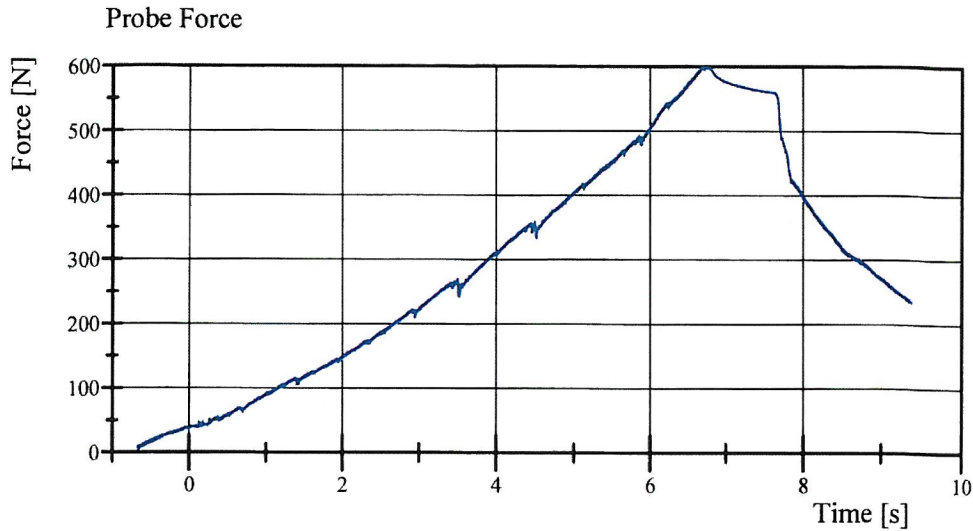


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 6-1

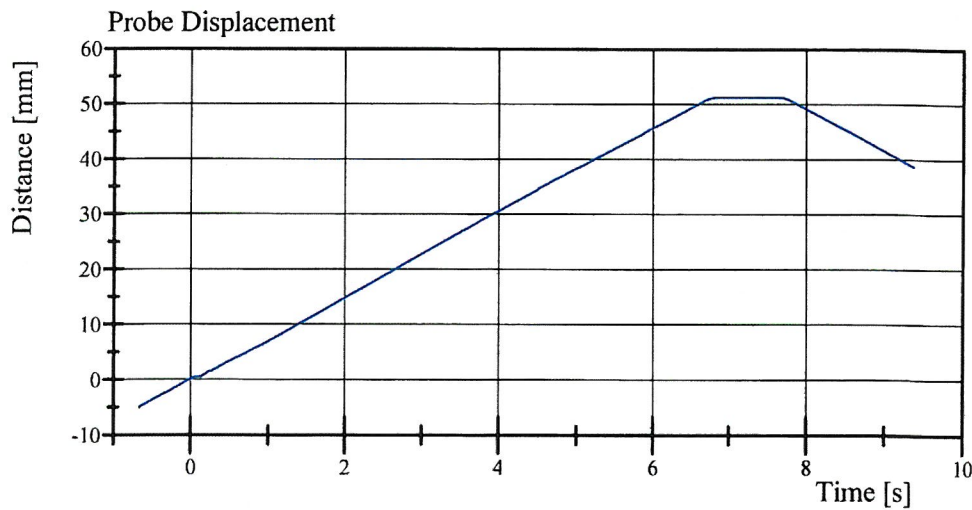
Test Date: 10/22/2009



Filter Class: CFC_600

Max: 599.9 N at 6.7 s

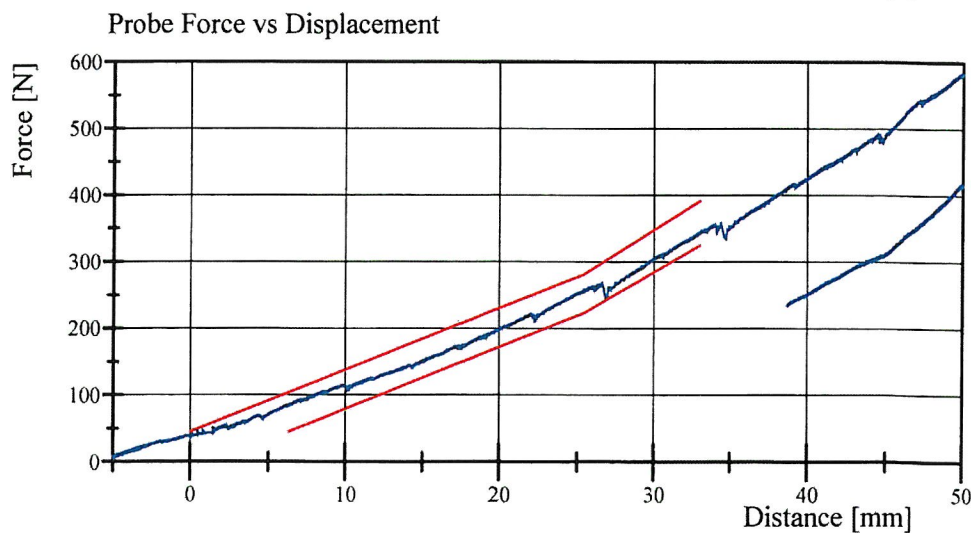
Min: 4.6 N at -0.7 s



Filter Class: CFC_180

Max: 51.3 mm at 7.6 s

Min: -5.0 mm at -0.7 s



Filter Class: CFC_600

Max: 599.9 N at 50.8 mm

Min: 4.6 N at -4.9 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 23-Oct-09

TRC, INC.

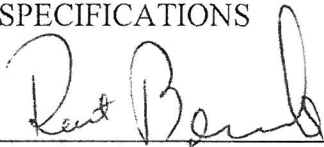
TEST NO: TOFL-01

572B SN 002 TORSO FLEX CAL 06

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	51 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	144 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	201 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	239N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	8.1 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 6-1

Test Date: 10/23/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.302 m/s	Yes
Pelvis Lateral Acceleration			
Duration above 20g	3 - 7 ms	5.8 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	48.7 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

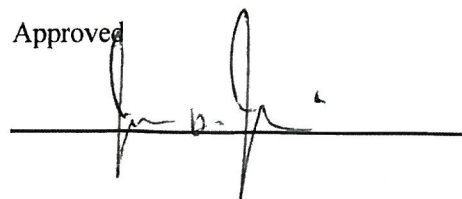
Test meets specifications.

Comments:

Technician



Approved

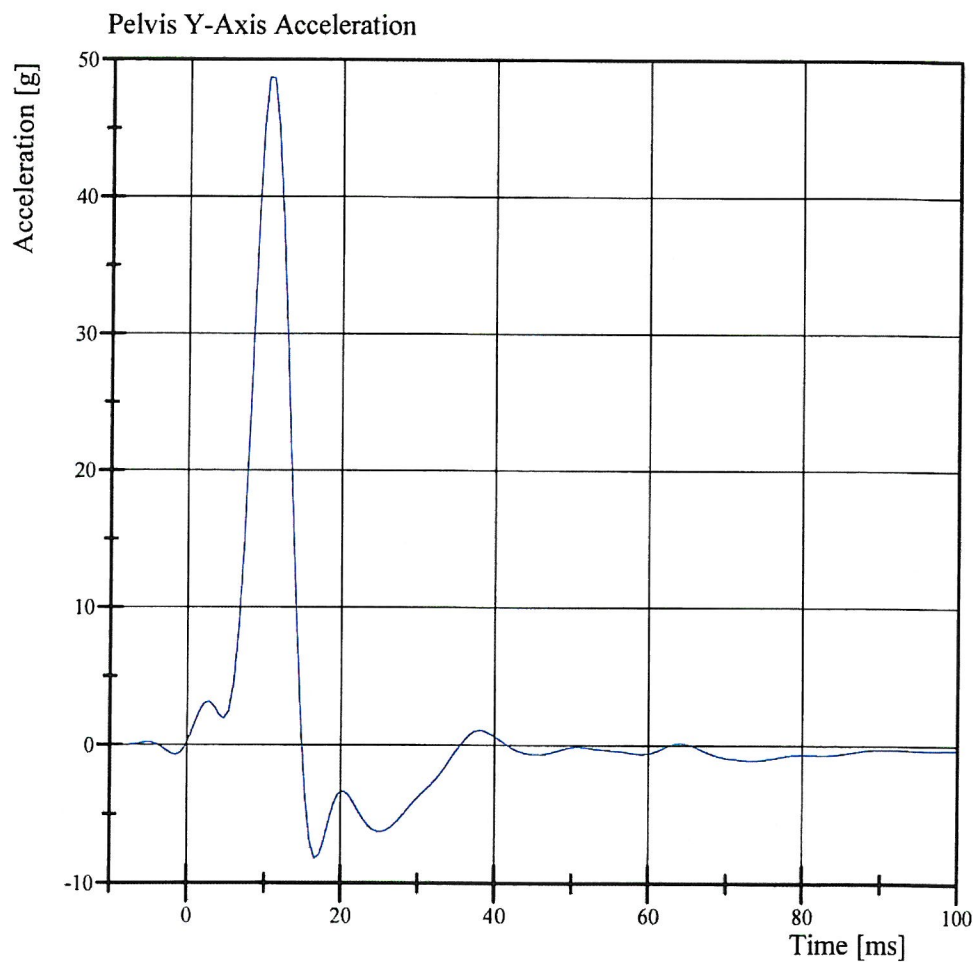


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 6-1

Test Date: 10/23/2009



Filter Class: FIR_100

Max: 48.7 g at 10.3 ms

Min: -8.3 g at 16.6 ms

CALIBRATION TEST RESULTS

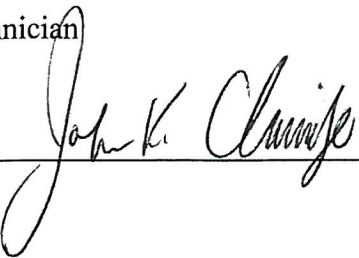
POST-TEST

SID/HIII: 002

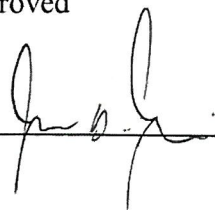
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 002 Calibration No. 07

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	908 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	513 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	519 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	501 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	380 mm	Yes
Top Rib Width From C\L	RW-1	165.1 - 180.3 mm	176 mm	Yes
Bottom Rib Width From C\L	RW-2	165.1 - 180.3 mm	176 mm	Yes
Difference Between Top & Bottom Rib Width from C\L		<= 2.5 mm	0.0 mm	Yes

Technician



Approved





Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 7-1

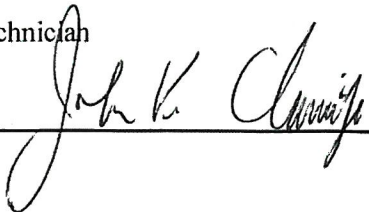
Test Date: 11/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	129.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	6.2 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

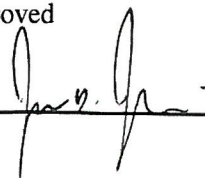
Test meets specifications.

Comments:

Technician



Approved

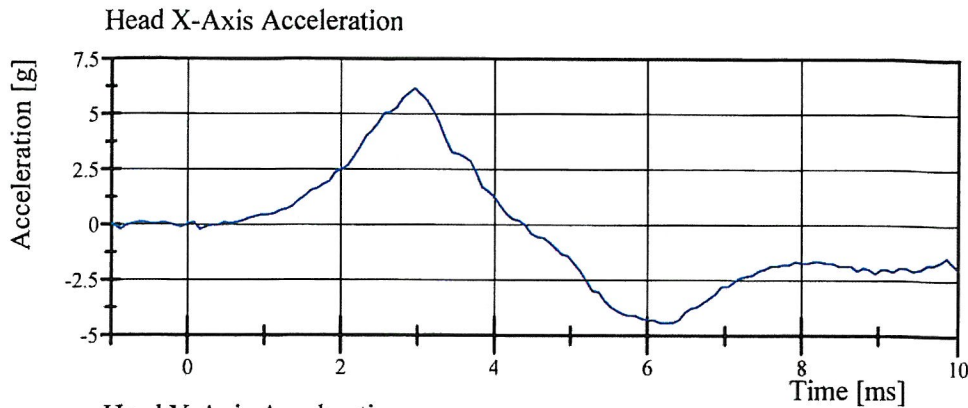


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 7-1

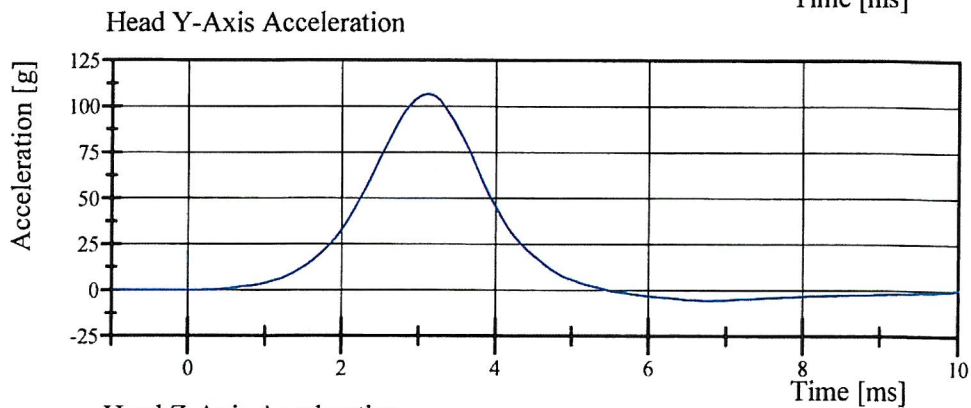
Test Date: 11/9/2009



Filter Class: CFC_1000

Max: 6.2 g at 3.0 ms

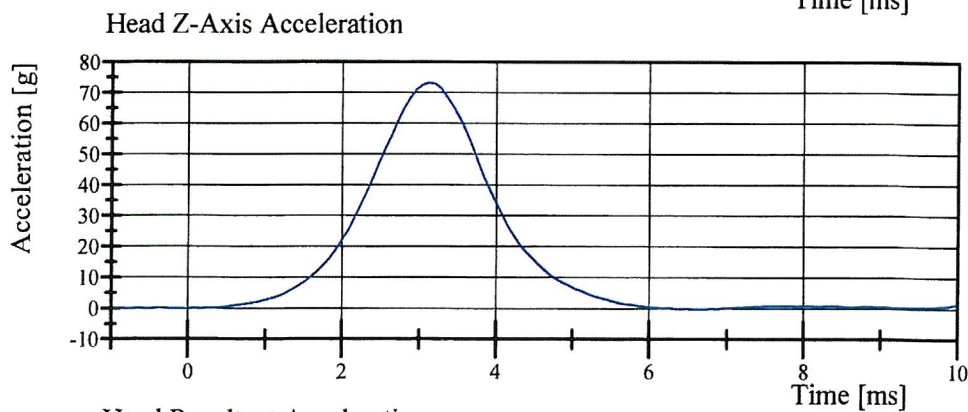
Min: -4.4 g at 6.2 ms



Filter Class: CFC_1000

Max: 106.8 g at 3.1 ms

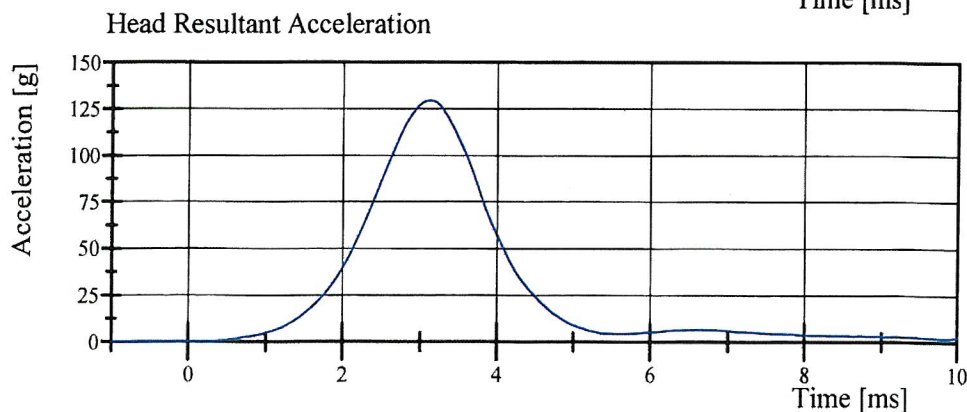
Min: -5.7 g at 6.8 ms



Filter Class: CFC_1000

Max: 73.2 g at 3.1 ms

Min: -0.3 g at 6.6 ms



Filter Class: CFC_1000

Max: 129.6 g at 3.1 ms

Min: 0.0 g at -1.0 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 7-6

Test Date: 11/10/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-7.012 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.258 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.398 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.171 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.315 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-69.2 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	61.8 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	84.1 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	50.7 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	7.0 ms	Yes

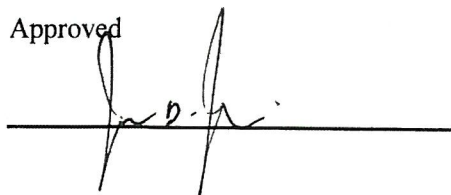
Test meets specifications.

Comments:

Technician



Approved



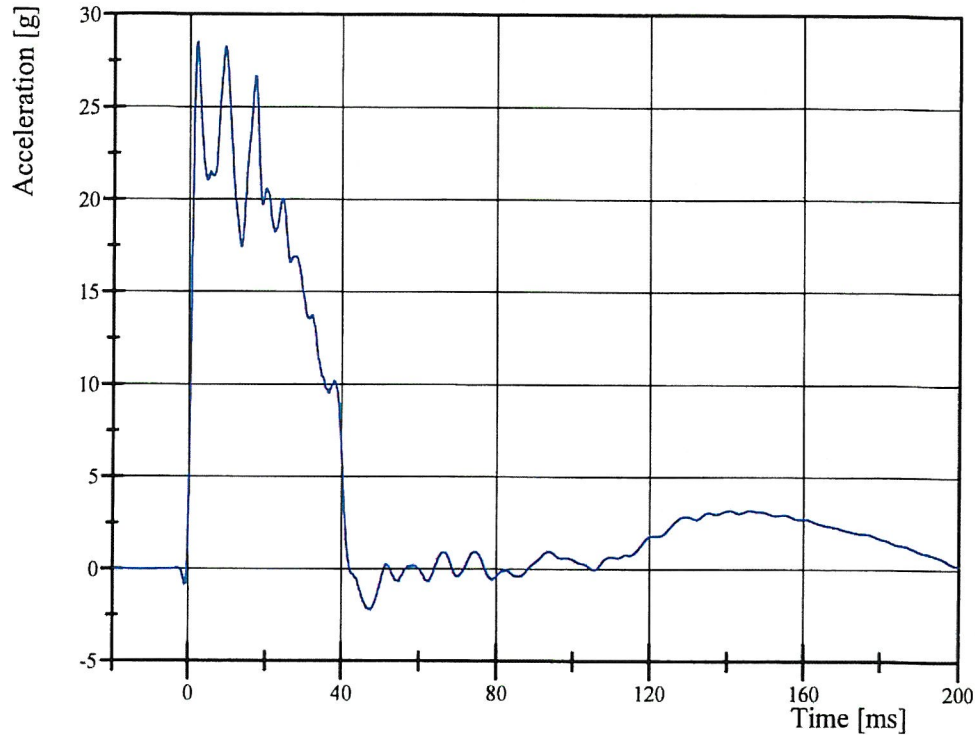
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 7-6

Test Date: 11/10/2009

Pendulum Acceleration

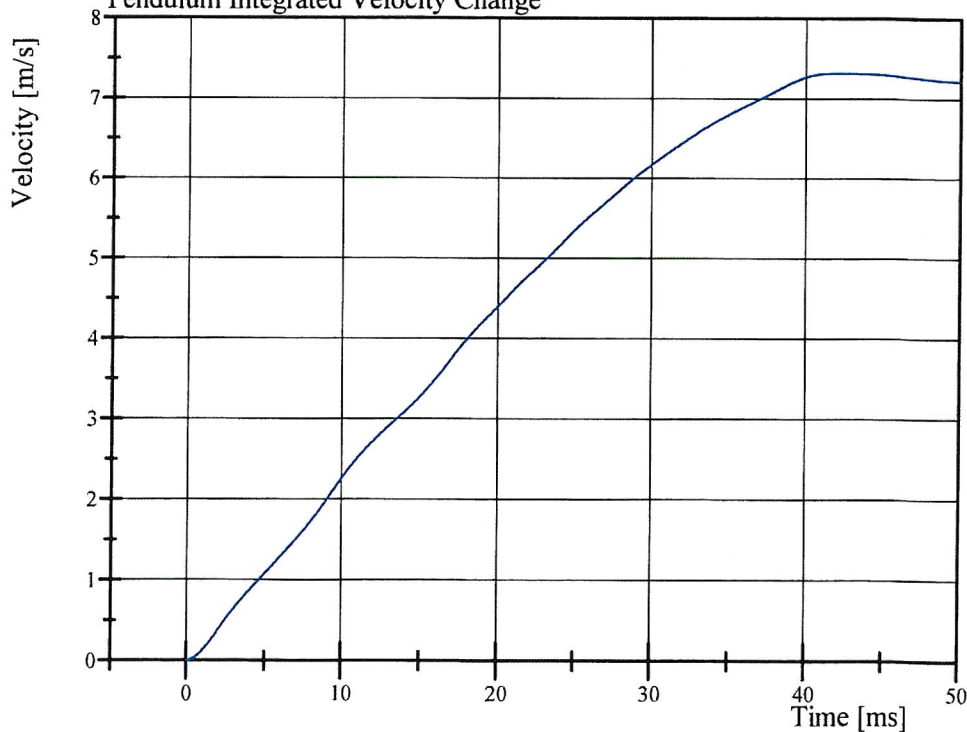


Filter Class: CFC_180

Max: 28.5 g at 1.8 ms

Min: -2.2 g at 47.4 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 7.3 m/s at 42.2 ms

Min: 0.0 m/s at 0.0 ms

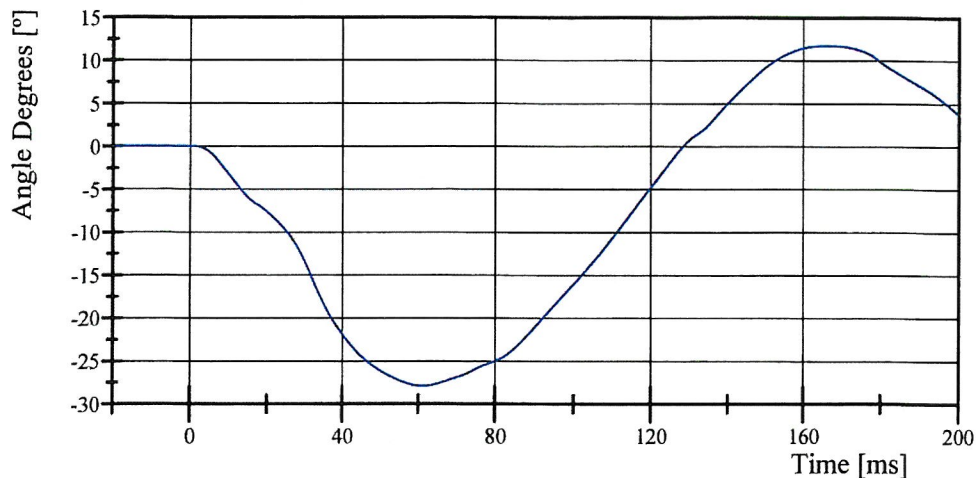
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 7-6

Test Date: 11/10/2009

Pot Rotation at the Base of Neck

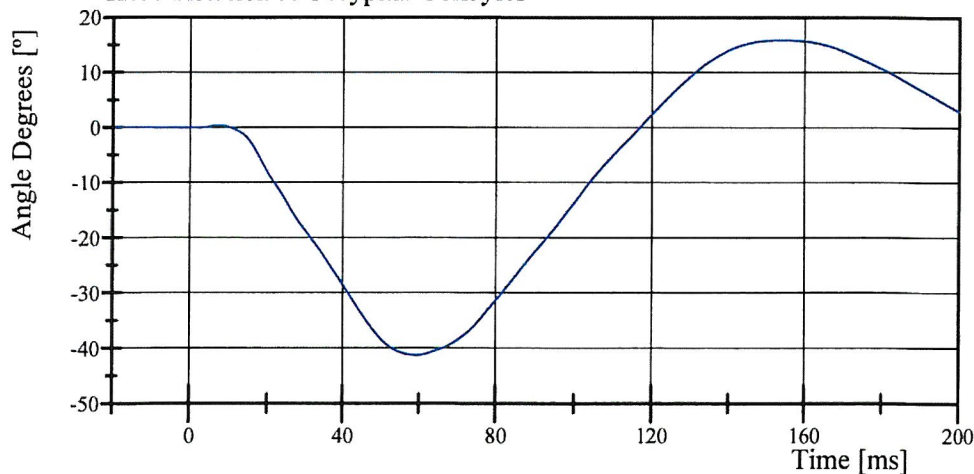


Filter Class: CFC_60

Max: 11.8 ° at 166.0 ms

Min: -27.9 ° at 61.2 ms

Head Rotation at Occypital Condyles

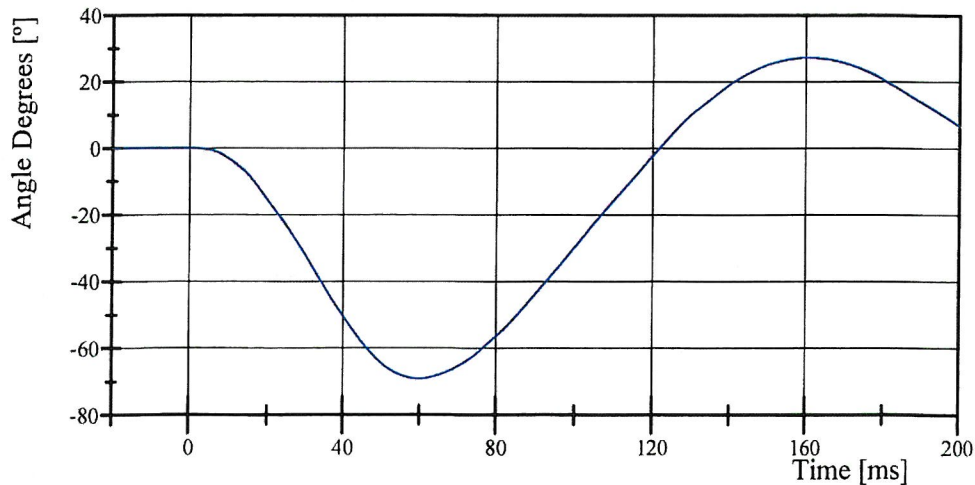


Filter Class: CFC_60

Max: 15.9 ° at 154.4 ms

Min: -41.3 ° at 59.4 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 27.2 ° at 160.7 ms

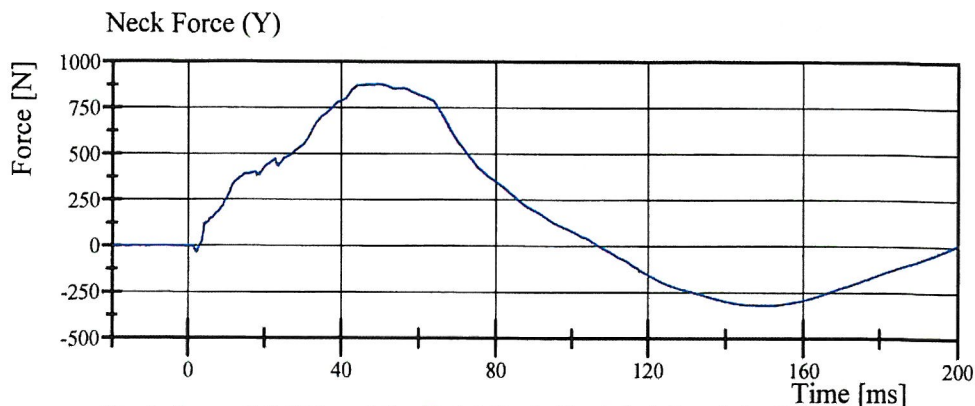
Min: -69.2 ° at 60.0 ms

Transportation Research Center Inc.

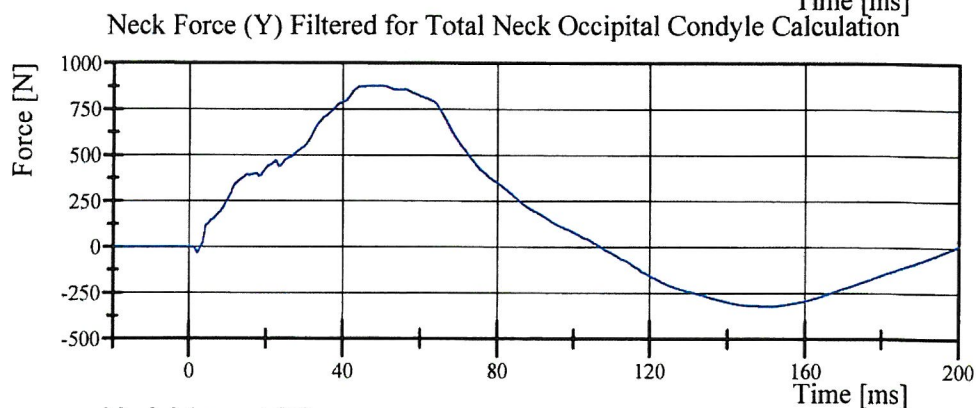
Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 7-6

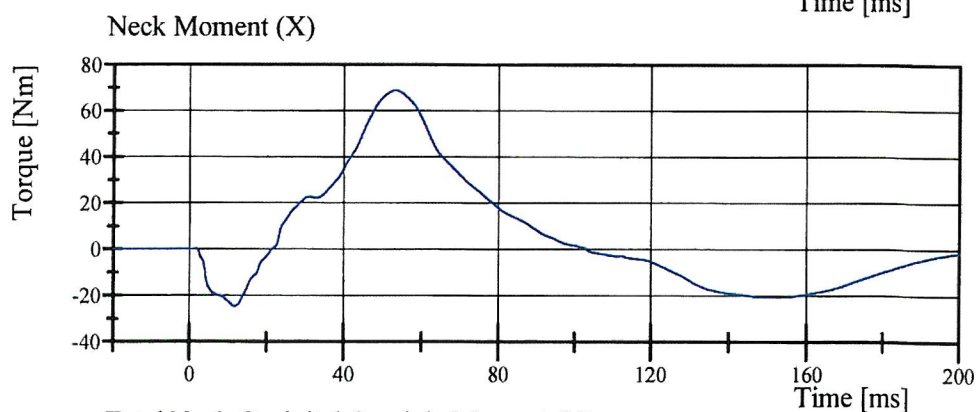
Test Date: 11/10/2009



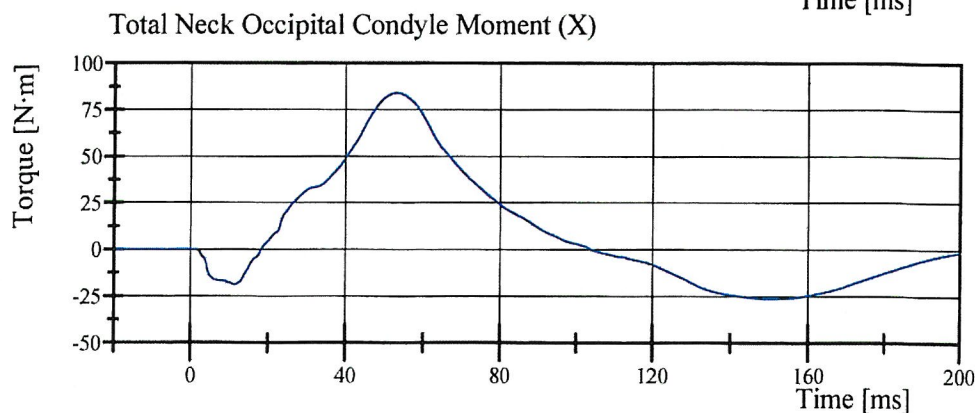
Filter Class: CFC_1000
Max: 878.6 N at 49.8 ms
Min: -321.0 N at 151.4 ms



Filter Class: CFC_600
Max: 877.9 N at 49.7 ms
Min: -320.3 N at 151.4 ms



Filter Class: CFC_600
Max: 68.9 Nm at 53.4 ms
Min: -24.7 Nm at 11.6 ms



Filter Class: CFC_600
Max: 84.1 N·m at 53.0 ms
Min: -26.3 N·m at 149.8 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-9

Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	3,719 - 4,409 N	4,381.1 N	Yes
Maximum Displacement at Test Velocity	33.35 - 39.55 mm	38.366 mm	Yes

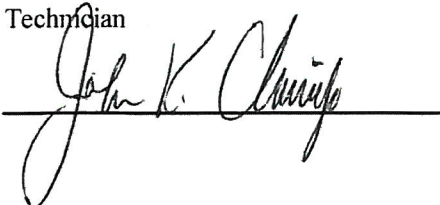
Test meets specifications.

Comments:

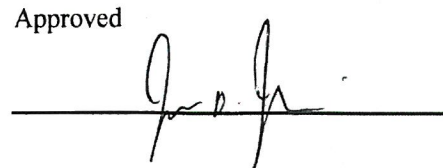
Actual Impactor Velocity (m/s): 6.077

Damper Setting: 7.5

Technician



Approved



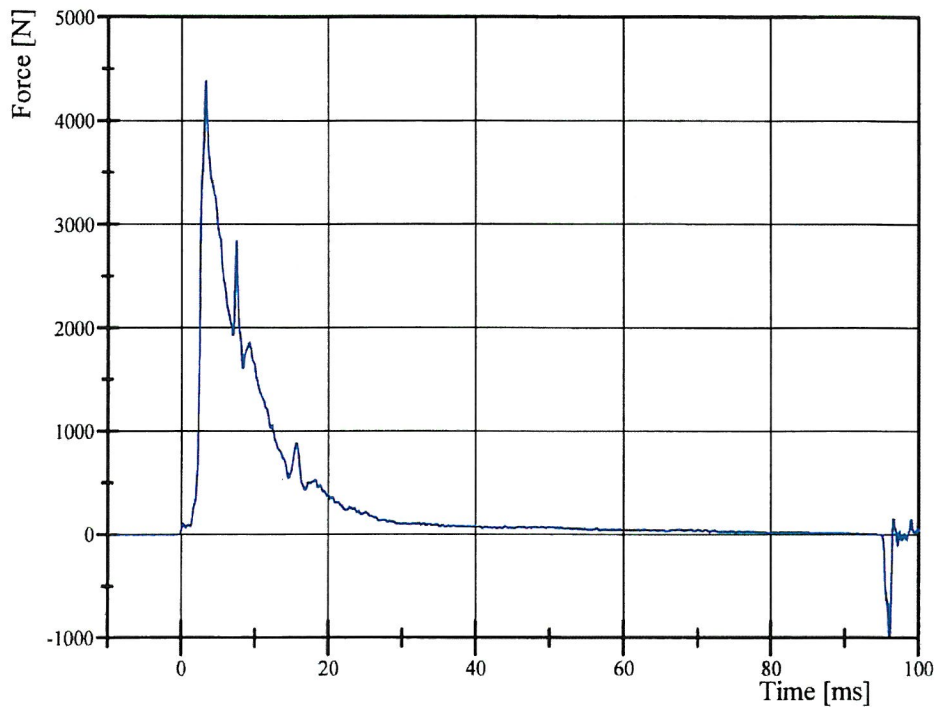
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-9

Test Date: 9/24/2009

Shock Absorber Resistive Force

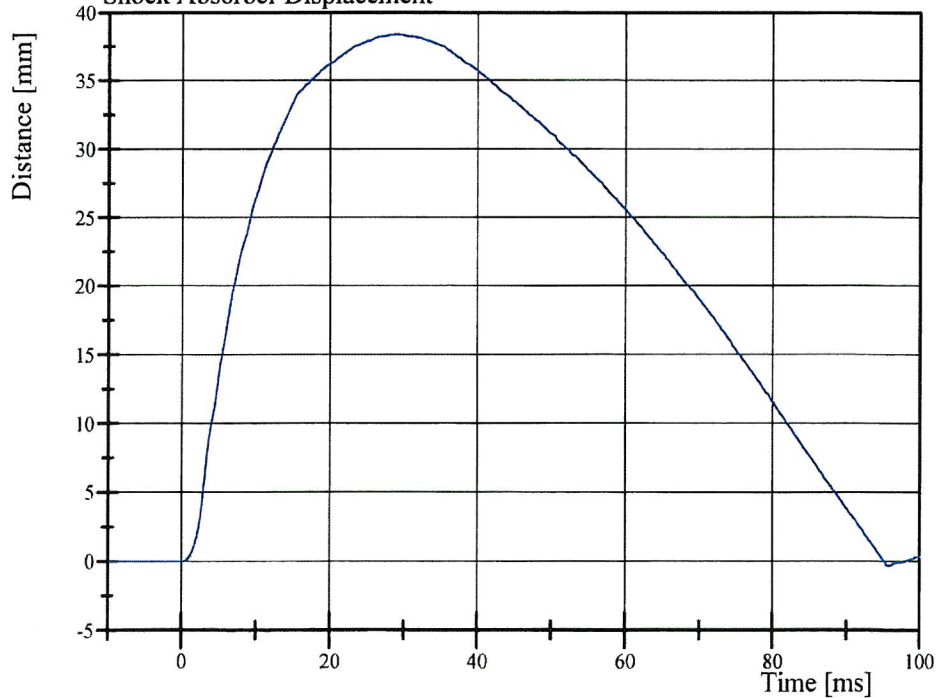


Filter Class: CFC_1000

Max: 4,381.1 N at 3.3 ms

Min: -985.3 N at 96.2 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 38.4 mm at 28.8 ms

Min: -0.3 mm at 95.9 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-1

Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Maximum Force at Test Velocity	1,759 - 2,126 N	1,899.2 N	Yes
Maximum Displacement at Test Velocity	31.71 - 37.26 mm	36.472 mm	Yes

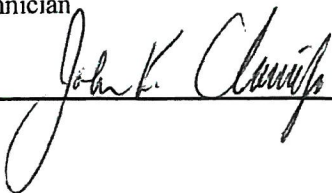
Test meets specifications.

Comments:

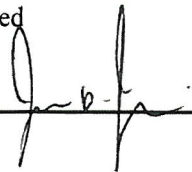
Actual Impactor Velocity (m/s): 4.295

Damper Setting: 7.5

Technician



Approved



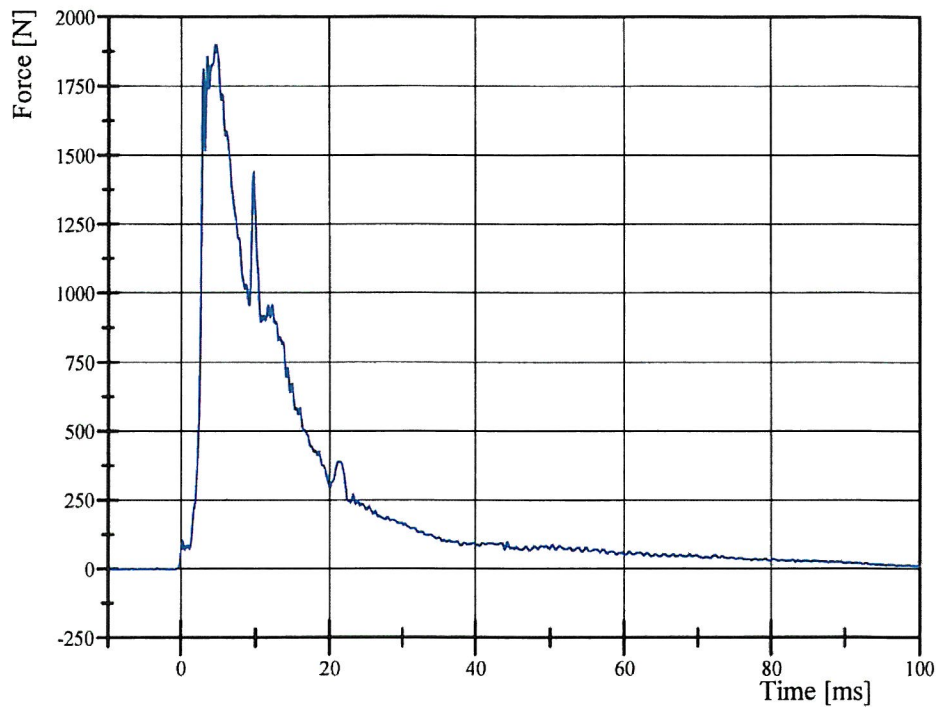
Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-1

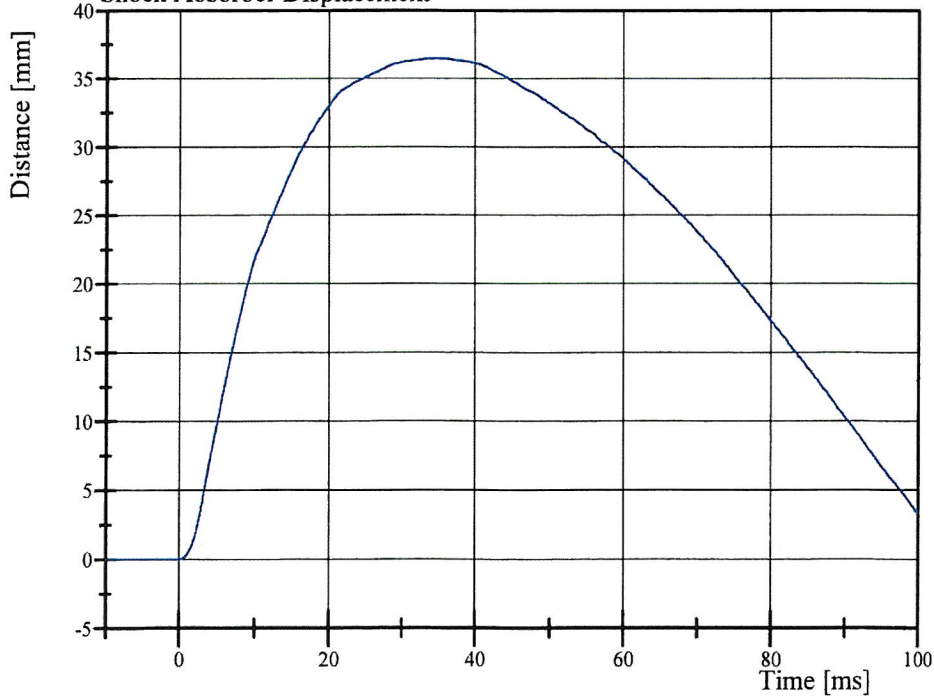
Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,899.2 N at 4.7 ms
Min: -2.5 N at -9.1 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 36.5 mm at 34.3 ms
Min: -0.0 mm at -7.0 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-2

Test Date: 9/24/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	856 - 1,146 N	1,014.3 N	Yes
Maximum Displacement at Test Velocity	30.2 - 35.19 mm	34.042 mm	Yes

Test meets specifications.

Comments:

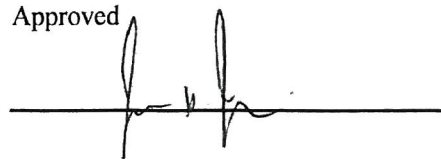
Actual Impactor Velocity (m/s): 3.076

Damper Setting: 7.5

Technician



Approved



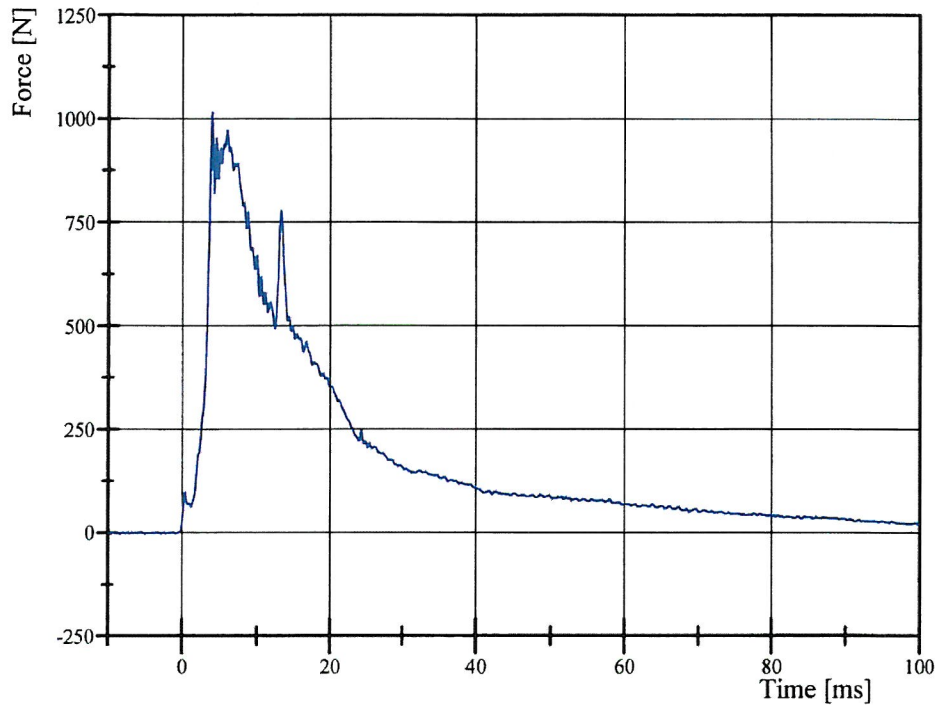
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 5-2

Test Date: 9/24/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,014.3 N at 3.9 ms
Min: -3.7 N at -9.6 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 34.0 mm at 39.3 ms
Min: -0.0 mm at -5.1 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 7-1

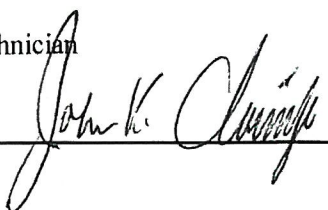
Test Date: 11/10/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.276 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	43.4 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	39.3 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	20.4 g	Yes

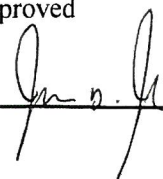
Test meets specifications.

Comments:

Technician



Approved

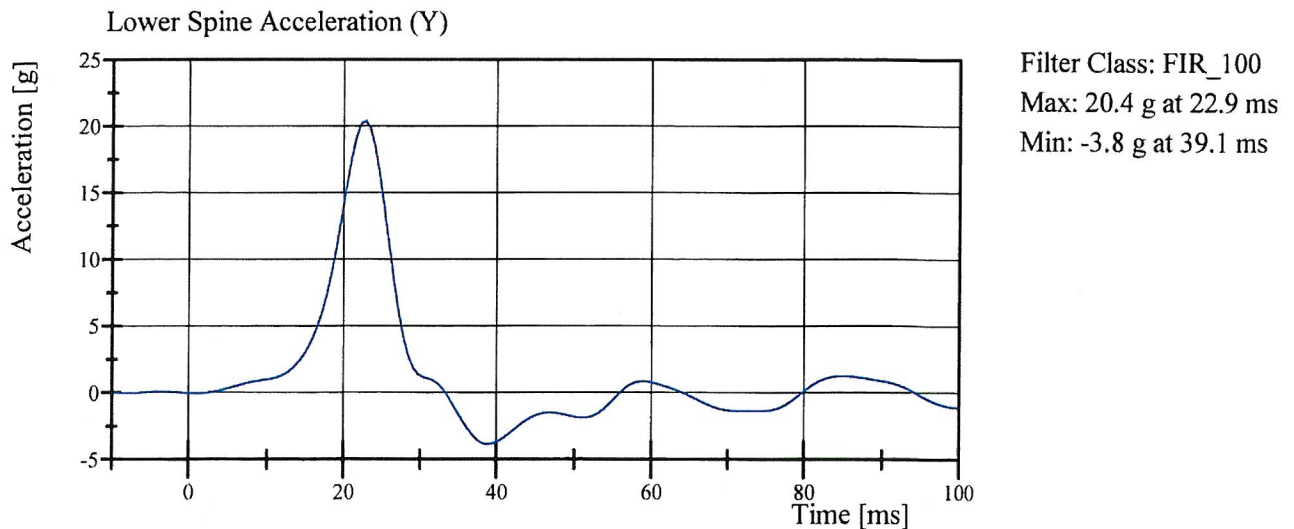
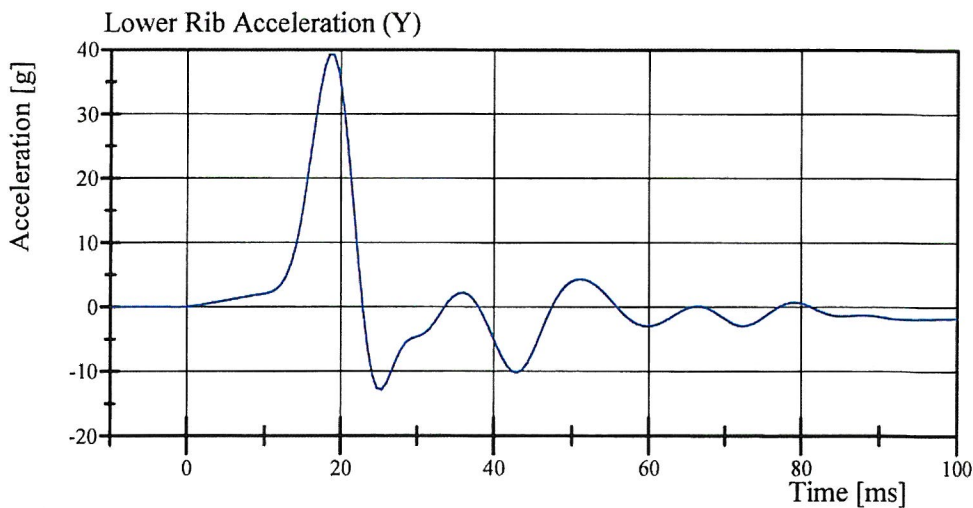
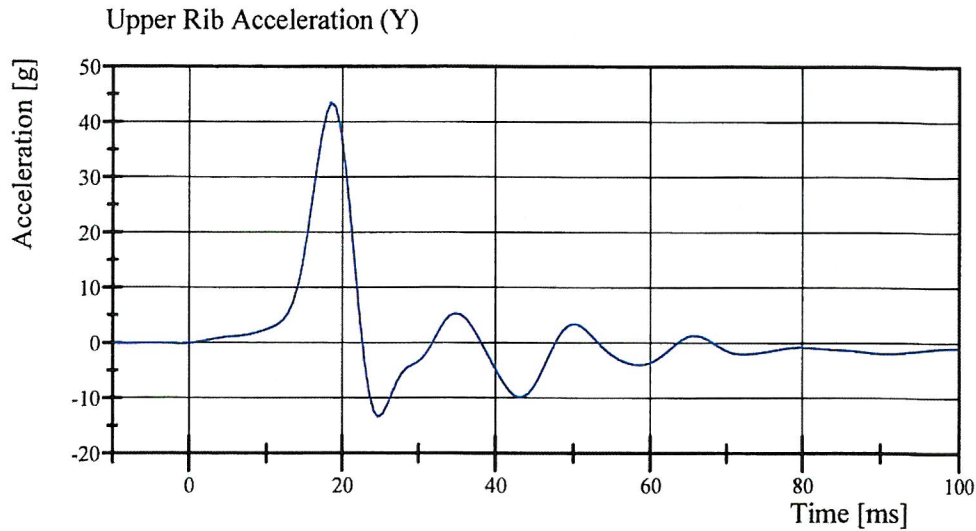


Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 7-1

Test Date: 11/10/2009



Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 7-1

Test Date: 11/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.702 mm/s	Yes

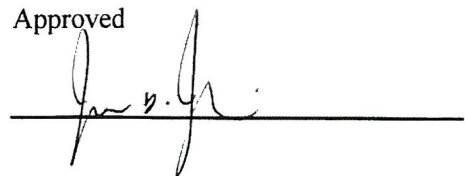
Test meets specifications.

Comments:

Technician



Approved

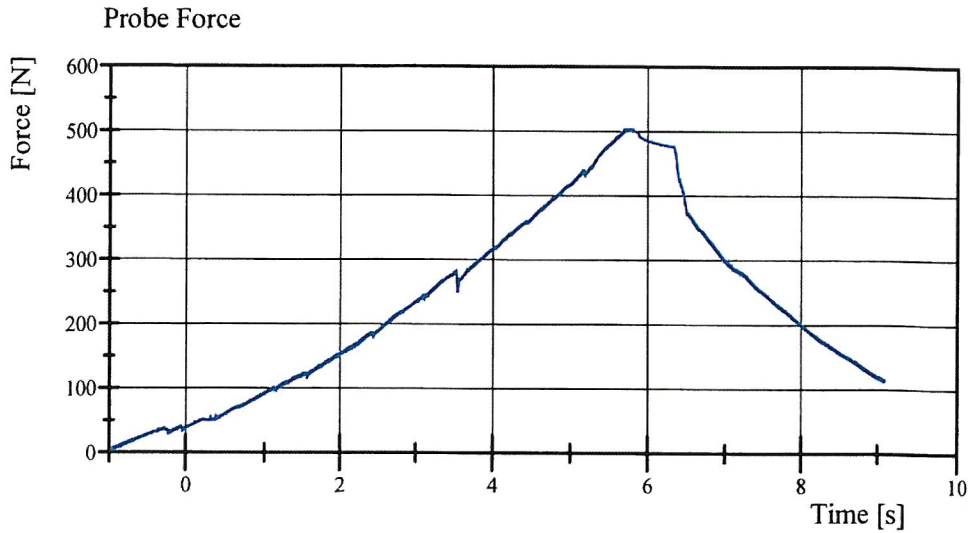


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 7-1

Test Date: 11/9/2009



Filter Class: CFC_600

Max: 504.4 N at 5.8 s

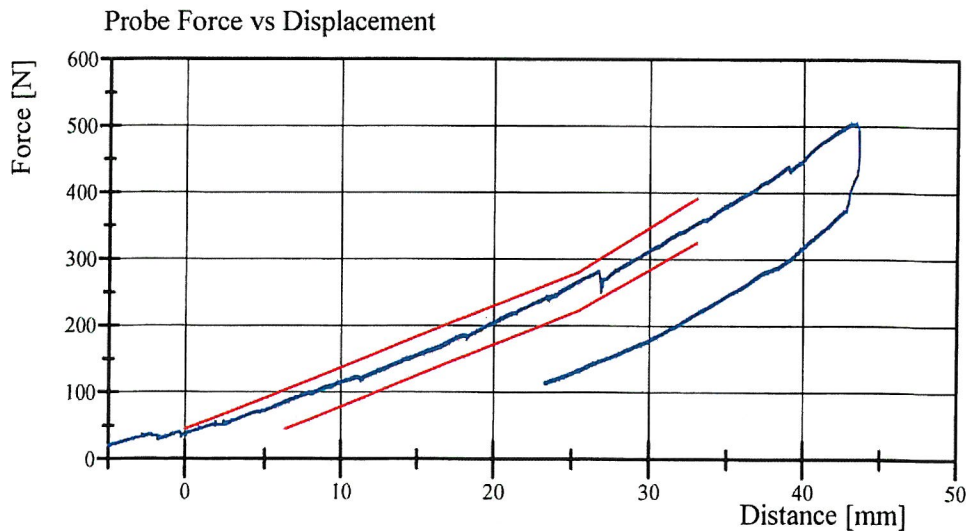
Min: 3.3 N at -0.9 s



Filter Class: CFC_180

Max: 43.6 mm at 6.3 s

Min: -7.3 mm at -1.0 s



Filter Class: CFC_600

Max: 504.4 N at 43.4 mm

Min: 3.3 N at -7.2 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 09-Nov-09

TRC, INC.

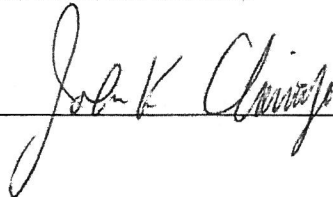
TEST NO: TOFL-01

572B SN 002 TORSO FLEX CAL 07

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	43 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0.0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	125.0 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	180.1 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	230.2N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	9.1 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 7-1

Test Date: 11/10/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.303 m/s	Yes
Pelvis Lateral Acceleration			
Duration above 20g	3 - 7 ms	5.7 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	54.2 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

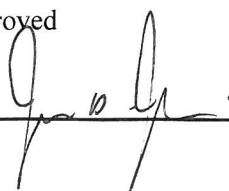
Test meets specifications.

Comments:

Technician



Approved

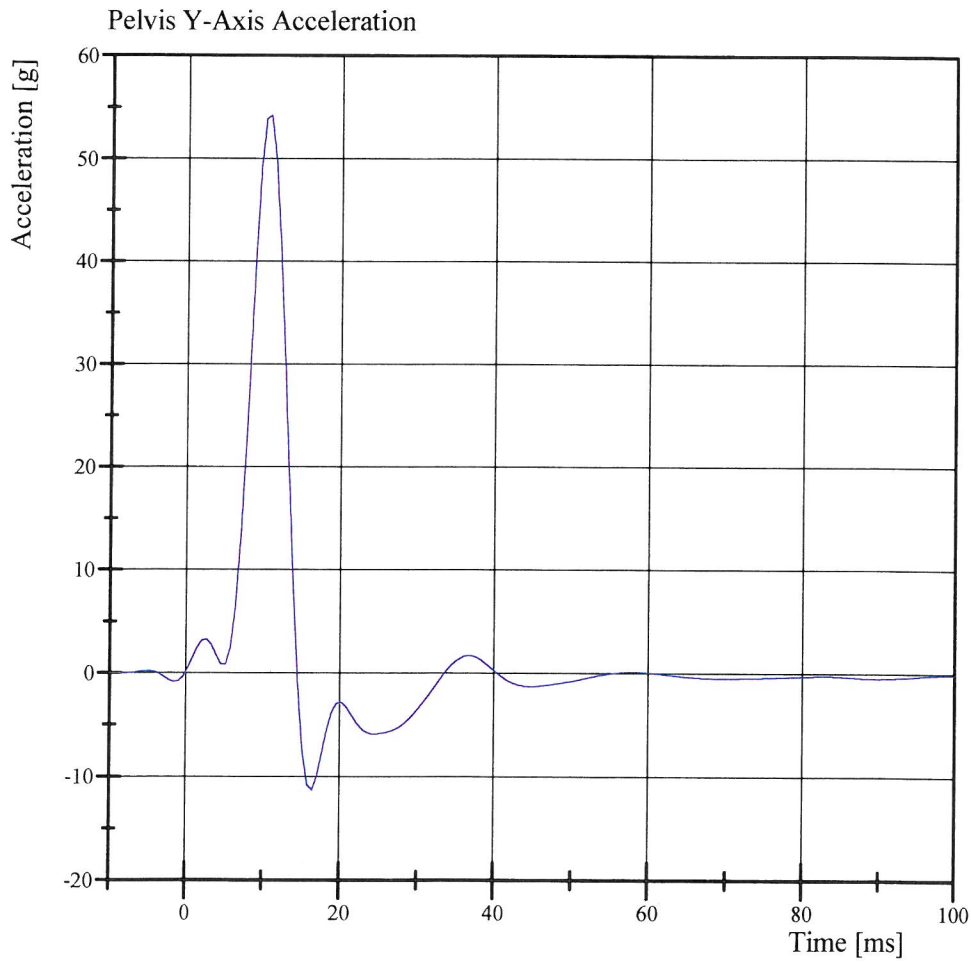


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 7-1

Test Date: 11/10/2009



Filter Class: FIR_100
Max: 54.2 g at 10.8 ms
Min: -11.3 g at 16.5 ms