

REPORT NUMBER: SNCAPP-TRC-2009-002

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

**KIA MOTOR COMPANY
2010 KIA FORTE 4-DOOR SEDAN
NHTSA NUMBER: MA0512**

**PREPARED BY:
TRANSPORTATION RESEARCH CENTER INC.
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Test Date: June 10, 2009

Report Date: September 11, 2009

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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Approval Date: _____

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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16. Abstract This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject vehicle, a 2010 Kia Forte 4-door Sedan 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 June 10, 2009. The impact velocity of the Moving Deformable Barrier (MDB) was 62.1 km/h, and the ambient temperature at the struck (Driver's) side of the target vehicle at the time of impact was 21°. The target vehicle's post-test maximum crush was 260 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>38.2</u></td> <td>g's</td> <td><u>83.3</u></td> <td>g's</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td><u>*36.6</u></td> <td>g's</td> <td><u>81.5</u></td> <td>g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td><u>38.2</u></td> <td>g's</td> <td><u>75.6</u></td> <td>g's</td> </tr> <tr> <td>Thoracic Trauma Index, (TTI):</td> <td><u>*38.2</u></td> <td>g's</td> <td><u>79.4</u></td> <td>g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td><u>63.3</u></td> <td>g's</td> <td><u>117.3</u></td> <td>g's</td> </tr> </tbody> </table> The left rear door on the struck side of the vehicle separated at the latch. The left front door 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. *Lower Rib Acceleration curve truncated at 200ms due to questionable data after this point.					<u>Front SID HIII</u>		<u>Rear SID HIII</u>		Left Upper Rib Acceleration:	<u>38.2</u>	g's	<u>83.3</u>	g's	Left Lower Rib Acceleration:	<u>*36.6</u>	g's	<u>81.5</u>	g's	Lower Spine Acceleration:	<u>38.2</u>	g's	<u>75.6</u>	g's	Thoracic Trauma Index, (TTI):	<u>*38.2</u>	g's	<u>79.4</u>	g's	Pelvis Acceleration (PEV):	<u>63.3</u>	g's	<u>117.3</u>	g's
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17. Key Words New Car Assessment Program (NCAP) Side Impact Side Impact Hybrid III Dummy (SID HIII) Occupant Side Impact Protection		18. 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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TABLE OF CONTENTS

<u>Section</u>		<u>Page No.</u>
1	Purpose and Test Procedure	1
2	Summary of NCAP Side Impact Test	2
<u>Data Sheet No.</u>		
1	General Test and Vehicle Parameter Data	4
2	Test Vehicle Tire Information	7
3	Dummy Longitudinal Clearance Dimensions	9
4	Dummy Lateral Clearance Dimensions	10
5	Camera and Instrumentation Data	11
6	Vehicle Accelerometer Locations	12
7	MDB Accelerometer Data	13
8	Post Test Observations	14
9	Vehicle Profile Measurements	16
10	Vehicle Exterior Crush Profiles	17
11	Dummy/Vehicle Temperature Stabilization Data	20
<u>Additional Data Sheets</u>		
	Deformable Barrier Honeycomb Face Static Crush	21
	Summary of FMVSS 301 Data	22
<u>Appendix</u>		
A	Photographs	A-1
B	SID/HIII, Vehicle, and MDB Response Data Plots	B-1
C	Dummy Configuration and Performance Verification Data	C-1

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. DTNH22-03-D-02005. The purpose of this test was to generate comparative side impact performance in a 2010 Kia Forte 4-door Sedan. The side impact test was conducted in accordance with the Office Crashworthiness Standard's Laboratory Test Procedure dated January 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 January 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 2010 Kia Forte 4-door sedan was impacted on the left side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 62.1 km/h (38.5 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by Transportation Research Center Inc. in East Liberty, Ohio on June 10, 2009. Pre-test and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SID/HIIIs) are included in Appendix A.

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 vehicle and Side Impact Dummy (SID/HIII) can be found in Appendix A. Two 50th percentile adult male SID/HIIIs 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 January 2002. The SID/HIIIs were 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 and redundant)
- Head Center of Gravity (CG) triaxial accelerometers (X, Y and Z axes primary and redundant)
- Upper Neck (NEK) triaxial force and moment 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 Appendix V of the Test Procedure.

The driver SID/HIII, Serial No. 001, and left rear passenger SID/HIII, Serial No. 002, were calibrated prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the SID/HIII, vehicle, and MDB response data traces. Appendix C contains the SID/HIII 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	187.8	35.6	67.3	*38.2	63.3
Passenger	414.8	39.3	62.6	79.4	117.3

*Lower Rib Acceleration curve truncated at 200ms due to questionable data after this point.

Supplemental Restraint Information

Restraint Type	Left Front (Driver)		Left Rear Passenger	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Not Deployed	No	N/A
Side Torso Airbag	Yes	Deployed	No	N/A
Side Torso/Head Airbag	No	N/A	No	N/A
Side Head Curtain Airbag	Yes	Deployed	Yes	Deployed

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

TEST NOTES

The left lower B-pillar post Y-axis acceleration data channel recorded questionable data after 45 milliseconds, exceeded full scale of the instrument at 80 milliseconds and recorded no valid data thereafter.

The left rear seat track Y-axis acceleration data channel exceeded full scale of the instrument at 26.6 milliseconds and recorded no valid data thereafter.

The left lower A-pillar post Y-axis acceleration data channel failed at 14.2 milliseconds and recorded no valid data thereafter.

The driver dummy's left lower rib Y-axis acceleration data channel recorded anomalous data after approximately 24.3 milliseconds and recorded no valid data thereafter.

The left rear passenger door separated at the latch 60 millimeters during the event.

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09

TEST VEHICLE INFORMATION AND OPTIONS

Make	Kia	Driver Front Airbag	Yes
Model Year	2010	Driver Side Airbag	Yes
Model	Forte	Driver Head Airbag	No
Body Style	4-door convertible	Driver Curtain Airbag	Yes
NHTSA No.	MA0512	Driver Knee Airbag	No
VIN	KNAFT4A22A5046469	LR Pass. Front Airbag	No
Color	White	LR Pass. Side Airbag	No
Delivery Date	6/10/2009	LR Pass. Head Airbag	No
Odometer Reading	21 miles	LR Pass. Curtain Airbag	Yes
Dealer	West-Herr New York	LR Pass. Knee Airbag	No
Transmission	Manual 5 Speed	Load Limiters	No
Final Drive	Front wheel drive	Anti-lock Brakes	Yes
Type /No. of Cylinders	Straight 4	All-Wheel Drive	No
Engine Displacement	2.0L	Pretensioners	Yes
Engine Placement	Transverse	Air Conditioning	No
Roof Rack	No	Tilt Wheel	Yes
Sunroof / T-Top	No	Power Seats	No
Tinted Glass	Yes	Power Windows	No
Traction Control	No	Power Steering	No
Power Brakes	Yes	AM/FM CD	Yes
Front Disc	Yes	Automatic Door Locks	No
Rear Disc	Yes	Other	No
Does owner's manual provide instructions to turn off automatic door locks?			N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	KIA MOTOR COMPANY	GVWR (kg)	1710
Date of Manufacture	3/09	GAWR Front (kg)	980
		GAWR Rear (kg)	820

TEST VEHICLE SEAT TYPE AND CAPACITY

Measured Parameter	Front	Mid	Rear	Total
Type of Seats	Bucket	N/A	Bench	
Designated Seating Capacity (DSC)	2	0	3	5
Type of Seat Back	Adjustable	N/A	Fixed	
(A) Capacity Wt. (VCW) (kg)				385
(B) DSC x 68.08 kg				340
(A-B) Cargo Wt. (RCLW) (kg)				45

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

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	382.8	239.2		424.0	323.0		437.2	328.4	
Right	kg	375.8	236.6		379.8	309.2		381.0	297.6	
Ratio	%	61.5	38.5		56.0	44.0		56.7	43.3	
Totals	kg	758.6	475.8	1234.4	803.8	632.2	1436.0	818.2	626.0	1444.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
(A) Total Delivered Weight (UVW)	kg	1234.4
(B) Weight of 2 P572M ATDs	kg	164.2
(C) Rated Cargo/Luggage Weight (RCLW)	kg	45
(A+B+C) Vehicle Target Weight (TVTW)	kg	1443.6

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG(aft of front axle)
As Delivered	mm	679	683	672	680	1021.4
As Tested	mm	666	673	637	654	1166.7
Fully Loaded	mm	665	674	639	654	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Length at Left Side	mm	4172
Total Vehicle Length at Centerline	mm	4250
Total Vehicle Length at Right Side	mm	4172
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	Not Recorded
Amount of Stoddard Solvent in Fuel Tank	liters	23.1

Vehicle parts removed to make Target Vehicle Test Weight: 25.4 liters of Stoddard solvent, Tail lights, head lights, right side door liners and speakers, right side mirror, radiator, air cleaner, rear bumper fascia and trim

TEST VEHICLE VERTICAL IMPACT LINE DATA

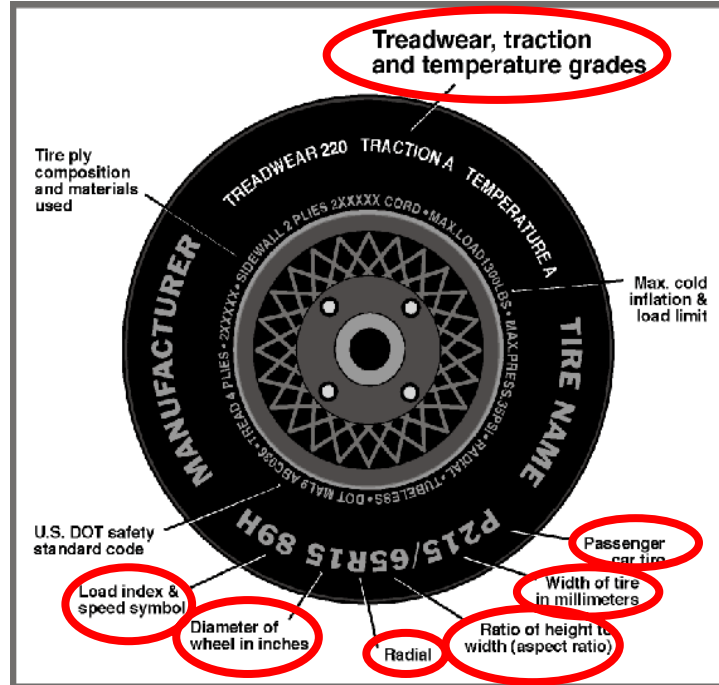
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2650
Vertical Impact Reference Line Aft of Front Axle	mm	385
Actual Impact Point Aft of Front Axle	mm	382
Impact Point Difference	mm	3

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	220	220
Recommended Tire Size	P195/65R15	P195/65R15
Tire Size on Vehicle	P195/65R15	P195/65R15
Tire Manufacturer	Nexen	Nexen
Tire Model	CP 662	CP 662
Load Index & Speed Symbol	89T	89T
Tread wear	440	440
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1 polyester	1 polyester
Tire Plies Tread	Polyester & 2 steel belts	Polyester & 2 steel belts
Tire Material	Polyester & Steel	Polyester & Steel
DOT Safety Code Right	DOT 8E9N	DOT 8E9N
DOT Safety Code Left	DOT 8E9N2	DOT 8E9N

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS

DATA

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

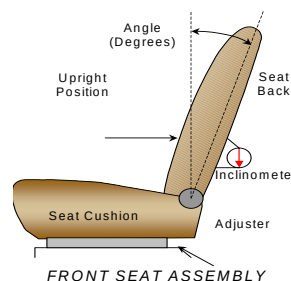
NHTSA No.: MA0512
 Test Date: 6/10/09

SEAT BACK ANGLE 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.

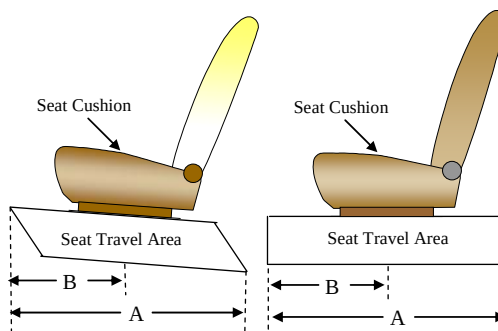
SEAT BACK ANGLE

	Degrees	Detent
Driver Seat with Seated Dummy	8.4°	10
Front Passenger Seat	N/A	N/A
Rear Seat – Struck Side	Fixed	N/A
Rear Seat – Non-Struck Side	Fixed	N/A



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 Travel (mm)	Placed in Detent # or Position (mm)
Driver Seat with Seated Dummy	20 detents	12 th detent
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 zero is the uppermost adjustment position.

DATA SHEET NO. 2 (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS

DATA

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

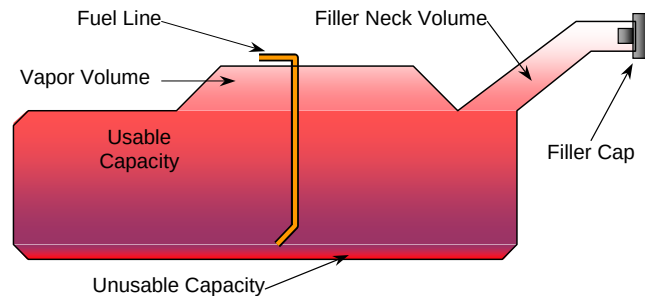
NHTSA No.: MA0512
Test Date: 6/10/09

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	52.0
Usable Capacity of "Optional" Tank	N/A
92-94% of Usable Capacity	47.8 – 48.9
Actual Amount of Solvent used	23.1*
1/3 of Usable Capacity	17.3

*NCAP COTR authorized removing up to 2/3rd usable capacity of Stoddard to obtain test weight.

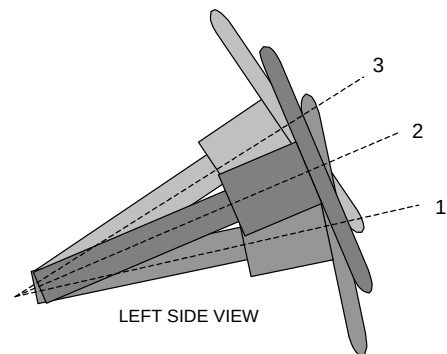
The electric fuel pump operates when engine system is normally operating.



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

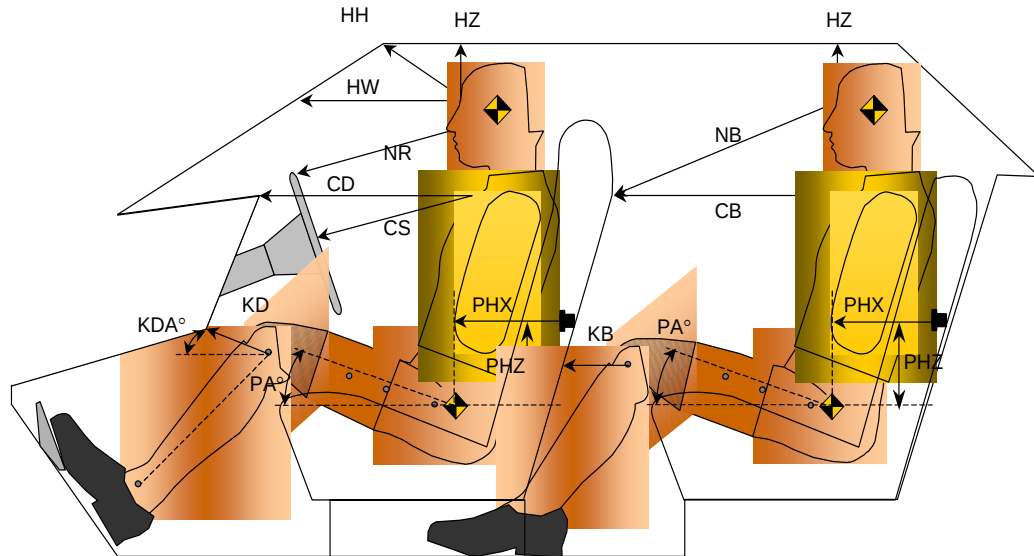
	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	N/A	N/A
Geometric Center, Position No. 2	23.0°	N/A
Uppermost, Position No. 3	N/A	N/A
Telescoping Steering Wheel Travel	Yes	N/A
Test Position	23.0°	N/A

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09



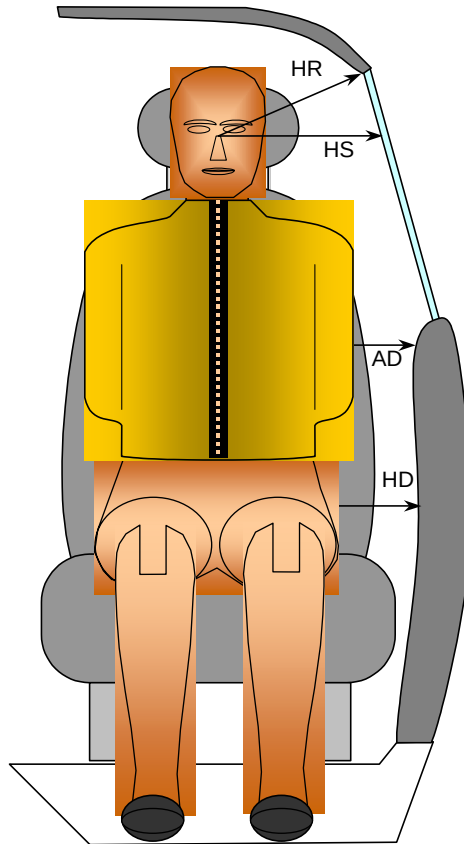
Code	Measurement Description	Driver S/N 001		Passenger S/N 002	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH	Head to Header	348			
HW	Head to Windshield	588			
HZ	Head to Roof	175		149	
NR/NB	Nose to Rim or Seatback	424		668	
CD/CB	Chest to Dash or Seatback	543		576	
CS	Chest to Steering Wheel	323			
KDL/KDAL KBL/KBAL	Left Knee to Dash or Seatback	129	18.5	130	24.1
KDR/KDAR KBR/KBAR	Right Knee to Dash or Seatback	121	18.4	149	15.8
PA	Pelvic Angle		23.0		24.7
PHX	H-Point to Striker (X-Axis)	200		280	
PHZ	H-Point to Striker (Z-Axis)	236		215	
SA	Seat Back Angle		8.4		Fixed

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09



FRONT VIEW OF DUMMY

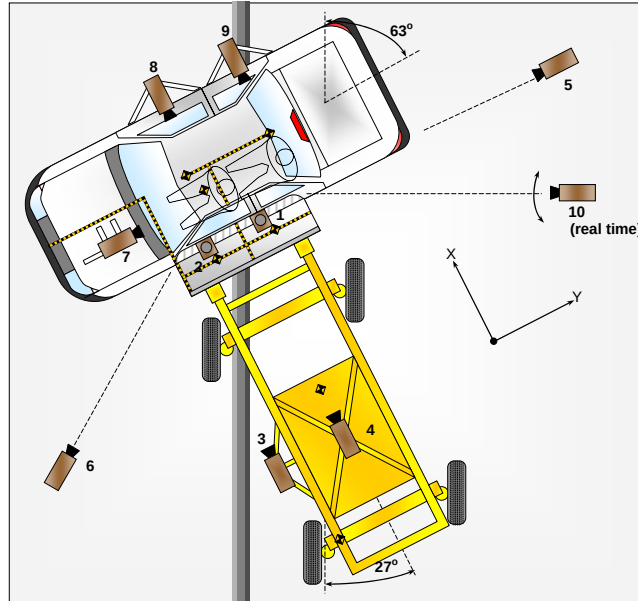
Code	Measurement Description	Units	Driver S/N 001	Passenger S/N 002
HR	Head to Side Header	mm	152	130
HS	Head to Side Window	mm	264	240
AD	Arm to Door (L: lower U: upper)	mm	L: 136 U: 142	L: 67 U: 83
HD	H-Point to Door	mm	167	152

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09



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

No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	Overhead Wide	250	2150	-5750	8.5	1000
2	Overhead Tight	370	1800	-5750	16	1000
3	Onboard Cart at MDB left edge	0	8300	-1100	4.8	1000
4	Onboard cart centerline at struck side	-2400	-4500	-1110	25	1000
5	Vehicle Rear at contact plane	0	10400	970	16	1000
6	Left Side Oblique	1850	-4020	960	16	1000
7	Onboard vehicle hood at Driver Dummy	-560	560	1250	12.5	1000
8	Onboard vehicle door at Driver Dummy	-1600	630	1130	12.5	1000
9	Onboard vehicle door at Rear Passenger Dummy	-1600	1580	1200	12.5	1000
10	Panning/ Documentary				Zoom	30

*All measurements accurate to ± 6 mm

INSTRUMENTATION

	Number of Channels
Driver and Rear Pass. Dummies	44
Vehicle Structure	21
Moving Deformable Barrier	5
Contact Switches	2
Total No. of Data Channels	72

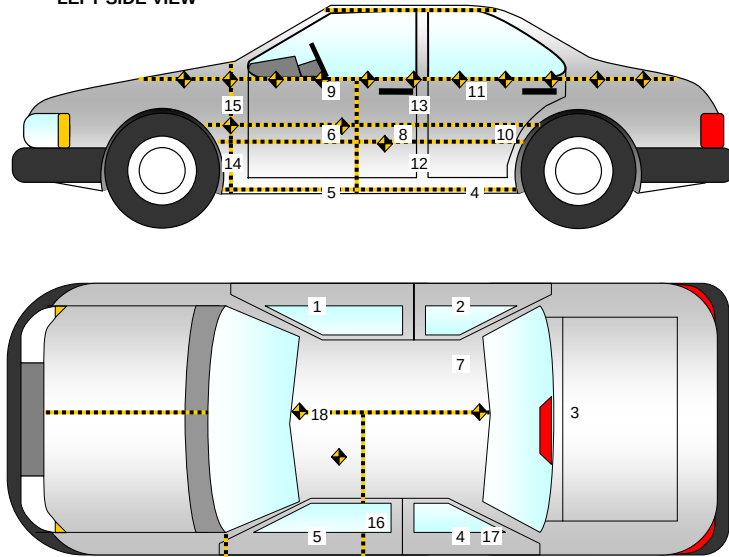
DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09

LEFT SIDE VIEW



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3310	622	281
2	Right Sill at Rear Seat	2200	622	295
3	Rear Floorpan Above Axle	1481	0	462
4	Left Sill at Rear Seat	2210	622	268
5	Left Sill at Front Seat	3310	622	280
6	Left Front Door C/L ¹	N/A	----	----
7	Rear Occupant Compartment	2045	652	327
8	Left Front Door Mid-Rear ¹	N/A	----	----
9	Left Front Door Upper C/L ¹	N/A	----	----
10	Left Rear Door Mid-Rear ¹	N/A	----	----
11	Left Rear Door Upper C/L ¹	N/A	----	----
12	Left Lower B-Post	2392	855	545
13	Left Middle B-Post	2380	825	915
14	Left Lower A-Post	3465	737	505
15	Left Middle A-Post	3460	727	882
16	Front Seat Track	2660	590	256
17	Rear Seat Track or Structure	1860	670	327
18	Vehicle CG	3265	0	408

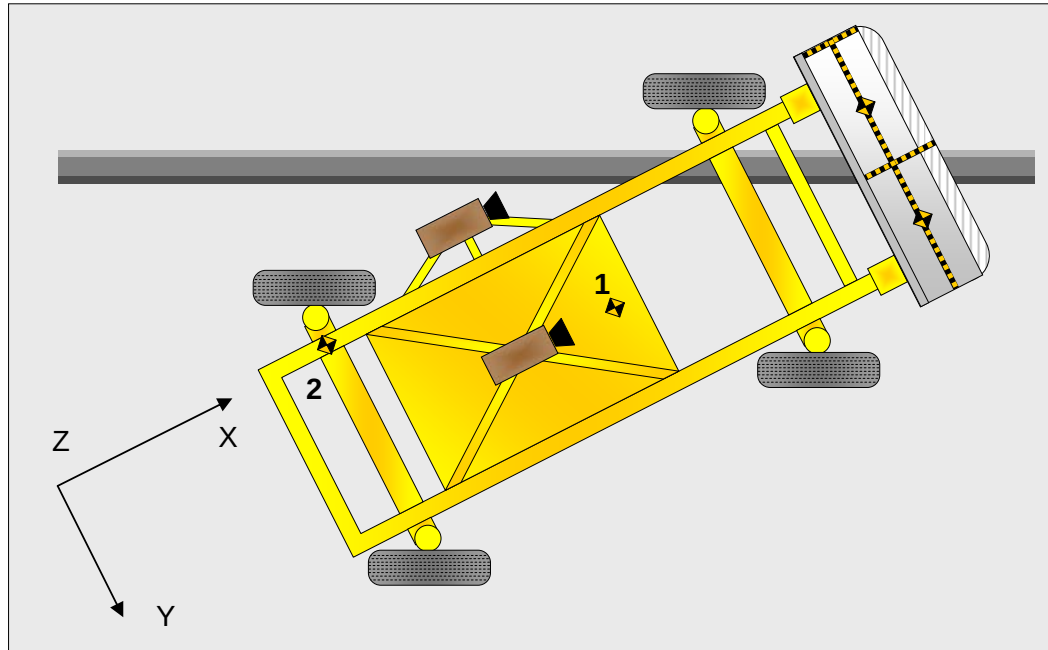
¹ Door Accelerometers were not required.

DATA SHEET NO. 7

MDB DATA

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09



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)

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	1104

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	378.0	301.0	
Right	kg	403.6	278.4	
Ratio	%	57.4	42.6	
Totals	kg	781.6	579.4	1361.0

DATA SHEET NO. 8**POST TEST OBSERVATIONS**

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID/HIII / 001	SID/HIII / 002
Head Contact	Airbag, roof header, headliner	Airbag, roof header
Upper Torso Contact	Airbag	Door panel
Lower Torso Contact	None	None
Left Knee Contact	Door panel	Door panel
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	Separated at latch 60 mm
Right Side Door Opening	Remained closed and operational	Remained closed and operational
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	Both left side windows shattered
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 01		Left Rear (Passenger) Occupant Location 04	
	Installed	Operated	Installed	Operated
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. 8 (CONTINUED)

POST TEST OBSERVATIONS

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.1
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	90.0

IMPACT TARGET DATA

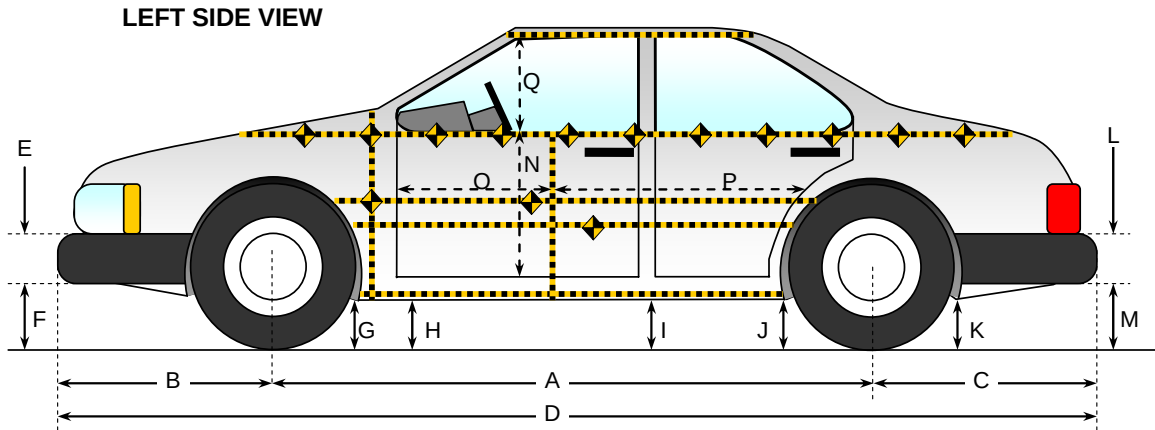
Measured Parameter	Units	Requirement	Primary Value	Redundant
Horizontal Offset	mm	+/- 50	3 mm left	5 mm left
Vertical Offset	mm	+/- 20	5 mm up	7 mm up

DATA SHEET NO. 9

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09



All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2650	2650	0
B	Front Axle to Front Surface of Vehicle	890	890	0
C	Rear Axle to Rear Surface of Vehicle	980	980	0
D	Total Length at Centerline ¹	4250	----	---
E	Front Bumper Thickness	151	151	0
F	Front Bumper Bottom to Ground	394	417	-23
G	Sill Height at Front Axle	299	302	-3
G1	Sill Height at Front Wheel Well	242	254	-12
H	Sill Height at Front Door Leading Edge	232	318	-86
I	Sill Height at "B" Pillar	233	325	-92
J1	Sill Height at Rear Wheel Well	162	225	-63
J2	Pinch Weld Height at Rear Wheel Well	225	295	-70
K	Sill Height Aft of Rear Wheel Well ¹	N/A	----	---
L	Rear Bumper Thickness ¹	N/A	----	---
M	Rear Bumper Bottom to Ground ¹	N/A	----	---
N	Sill Height to Window Bottom Sill	737	603	134
O	Front Door Leading Edge to Impact CL	755	755	0
P	Rear Door Trailing Edge to Impact CL	1434	1434	0
Q	Front Window Opening	393	384	9
R	Right Side Length ¹	4172	----	---
S	Left Side Length ¹	4172	----	---
T	Vehicle Width at "B" Post	1299	1190	109
	Maximum Vehicle Width	1767	1767	0

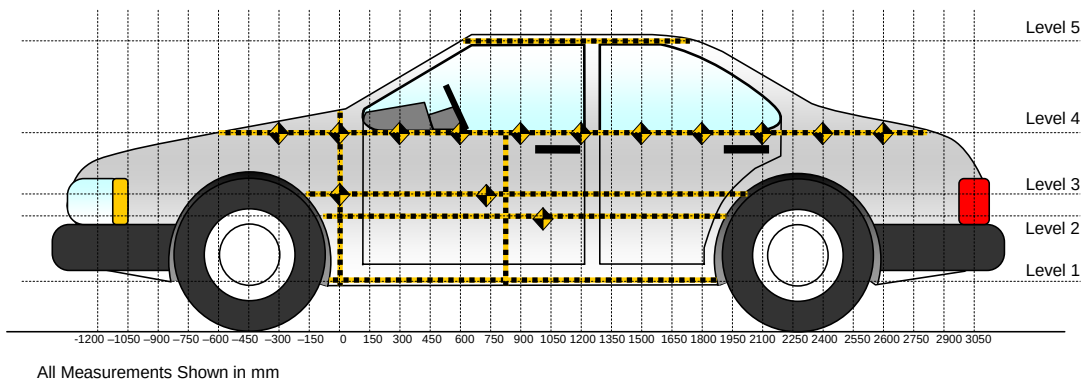
¹ Rear bumper was removed to achieve test weight.

DATA SHEET NO. 10

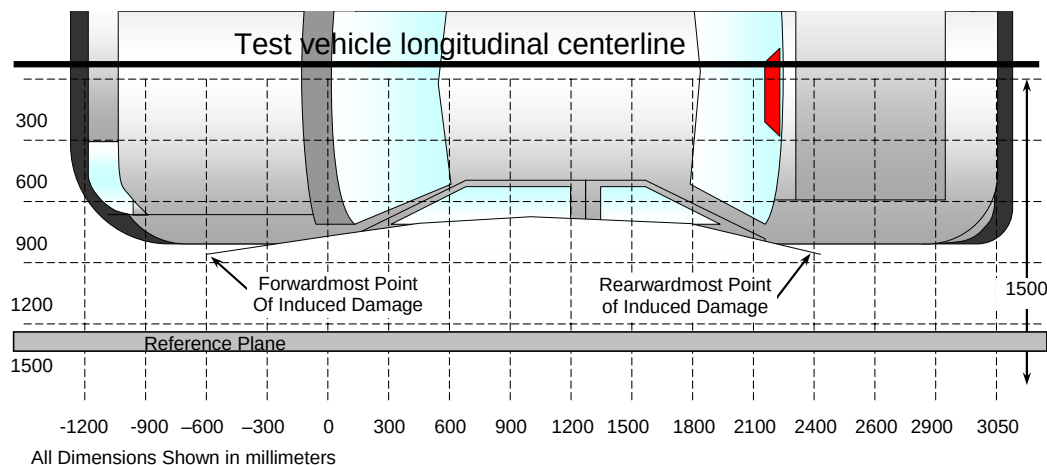
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09



LEFT SIDE VIEW



TOP 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	12	1200	1365
4	Window Sill	177	1350	920
3	Mid Door	231	1050	650
2	Occupant H-Point	260	1050	530
1	Sill Top	80	900 & 1200	285
Maximum Penetration			260	

DATA SHEET NO. 10 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09

	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															
-150			-879	-786				-872	-788				7	-2	
0	-828	-872	-866	-809	-787	-835	-841	-841	-807	-787	-7	31	25	2	0
150	-828	-866	-867	-822	-747	-763	-673	-688	-783	-749	65	193	179	39	-2
300	-827	-867	-869	-812	-706	-767	-631	-675	-734	-709	60	236	194	78	-3
450	-828	-869	-871	-807	-672	-764	-621	-665	-684	-676	64	248	206	123	-4
600	-828	-871	-873	-815	-638	-759	-618	-660	-659	-642	69	253	213	156	-4
750	-828	-871	-874	-825	-614	-753	-618	-653	-668	-617	75	253	221	157	-3
900	-828	-873	-875	-834	-598	-748	-630	-652	-678	-598	80	243	223	156	0
1050	-828	-873	-877	-840	-589	-750	-613	-646	-690	-586	78	260	231	150	3
1200	-828	-873	-877	-843	-584	-748	-673	-688	-683	-572	80	200	189	160	12
1350	-828	-872	-876	-844	-584	-749	-658	-680	-667	-576	79	214	196	177	8
1500	-828	-871	-875	-845	-586	-759	-654	-661	-697	-577	69	217	214	148	9
1650	-828	-871	-874	-844	-590	-780	-662	-663	-724	-579	48	209	211	120	11
1800	-828	-871	-873	-841	-597	-805	-711	-722	-756	-587	23	160	151	85	10
1950		-875	-876	-838	-611		-828	-857	-832	-609		47	19	6	2
2100			-881	-833	-633			-859	-928	-631			22	-95	2
2250				-828	-662				-1000	-659				-172	3
2400				-820	-693				-817	-686				3	7
2550				-809	-744				-816	-744				-7	0
2700				-795					-810					-15	

Reference plane is parallel to test vehicle longitudinal centerline.

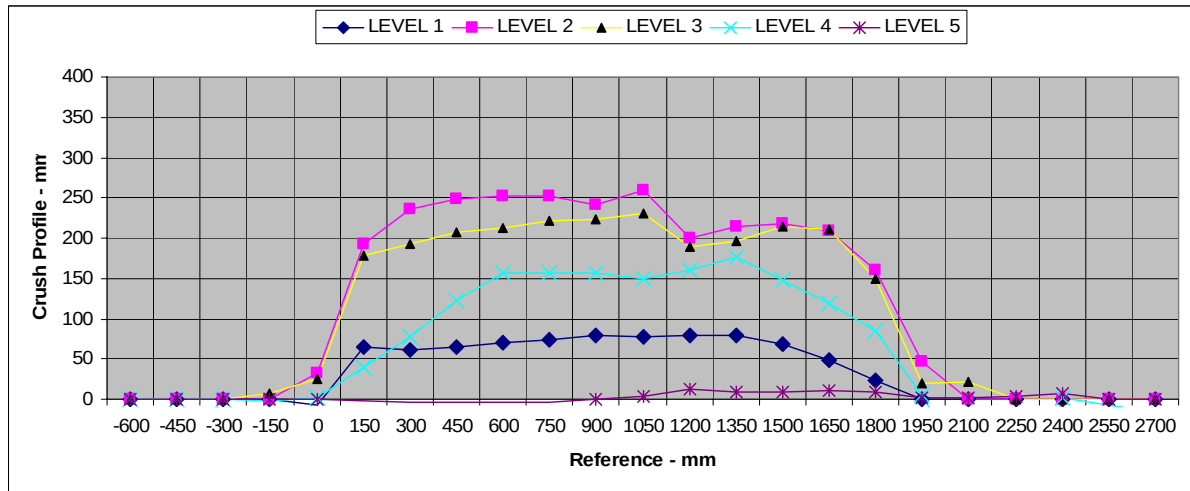
Given measurements = Reference plane to car body

DATA SHEET NO. 10 (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09



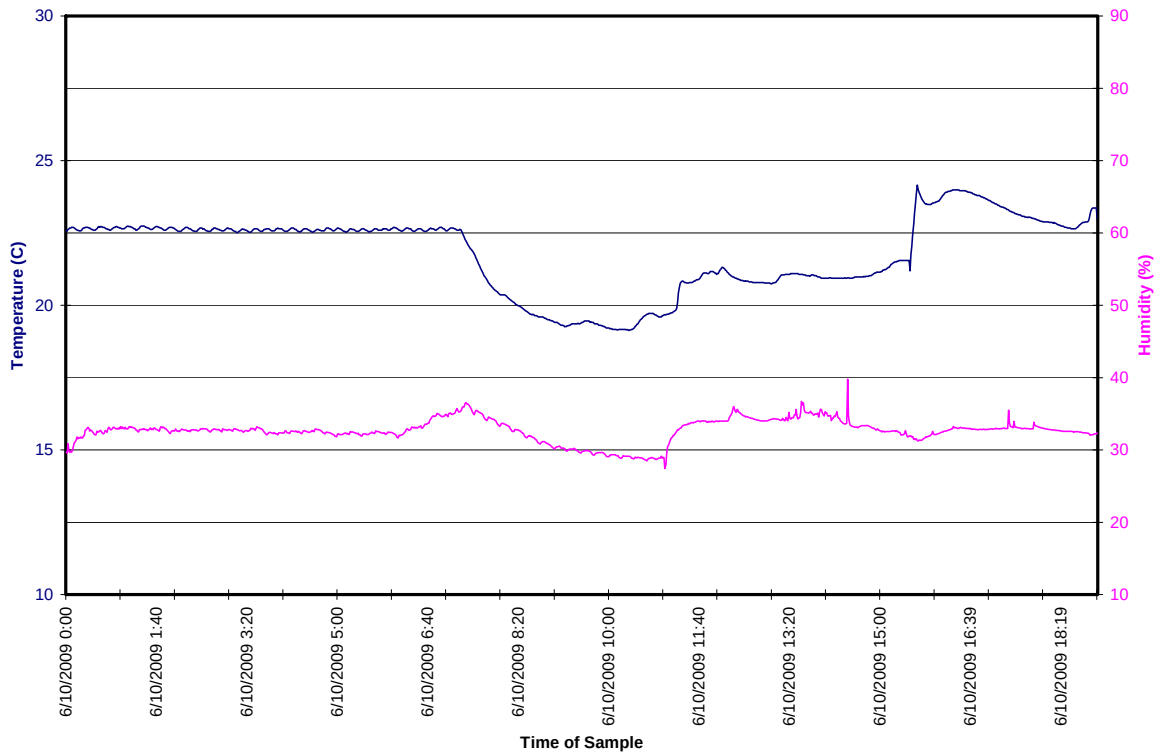
DATA SHEET NO. 11

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09

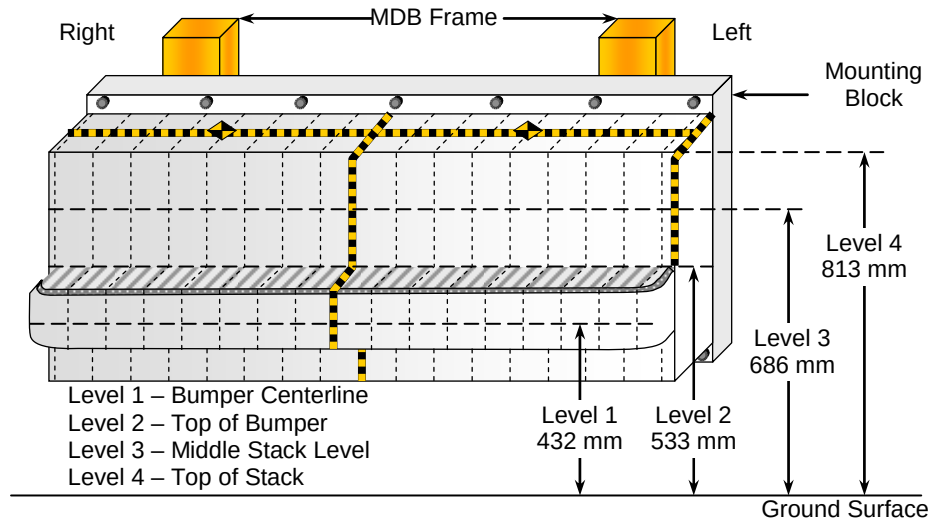
2010 KIA FORTE LEFT SIDE IMPACT AT 62 KM/H



DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2010 Kia Forte
Test Program: NCAP Side Impact

NHTSA No.: MA0512
Test Date: 6/10/09



DEFORMABLE BARRIER STATIC CRUSH

Stack	Distance Right of Center									C/L	Distance Left of Center								
Level	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800		
1	-60	-38	-19	-15	-29	-70	-85	-59	-36	-28	-24	-19	-25	-35	-58	-97	-141		
2 ¹	-33	-10	-7	-13	-15	-21	-28	-25	-10	-8	-8	-8	-11	-17	-27	-48	-87		
3	-37	-38	-41	-42	-43	-45	-56	-52	-45	-40	-39	-36	-37	-38	-40	-51	-71		
4	-114	-115	-114	-116	-117	-123	-122	-121	-120	-117	-115	-116	-116	-117	-119	-132	-152		

All measurements were recorded using TRC Inc.'s FARO Arm with a tolerance of + 0.1 mm.

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

SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2010 Kia Forte
 Test Program: NCAP Side Impact

NHTSA No.: MA0512
 Test Date: 6/10/09

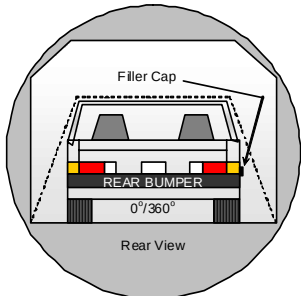
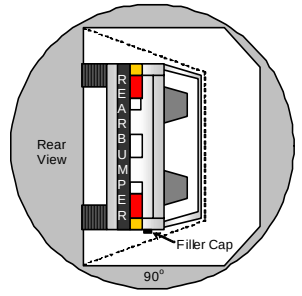
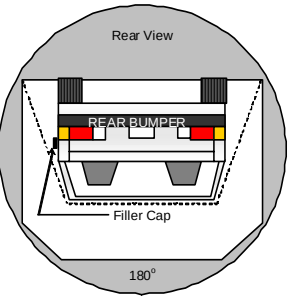
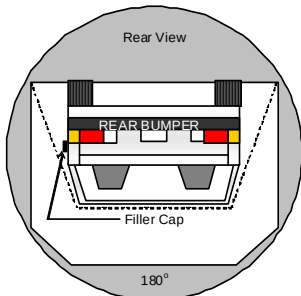
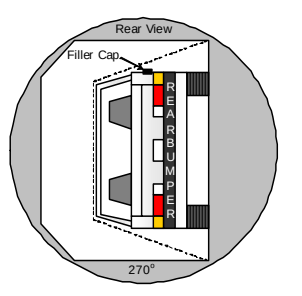
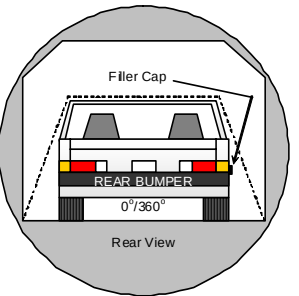
FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 20.6 Test Time: 18:36

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 oz.
 (Maximum allowable = 5 ounces)
- C. For the following 25 minutes: 0 oz.
 (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: None
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

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure		Page
A-1	Pre-Test Front View of Test Vehicle	A-6
A-2	Post-Test Front View of Test Vehicle	A-6
A-3	Pre-Test Left Front View of Test Vehicle	A-7
A-4	Post-Test Left Front View of Test Vehicle	A-7
A-5	Pre-Test Impacted Side View of Test Vehicle	A-8
A-6	Post-Test Impacted Side View of Test Vehicle	A-8
A-7	Pre-Test Left Rear View of Test Vehicle	A-9
A-8	Post-Test Left Rear View of Test Vehicle	A-9
A-9	Pre-Test Rear View of Test Vehicle	A-10
A-10	Post-Test Rear View of Test Vehicle	A-10
A-11	Pre-Test Right Rear View of Test Vehicle	A-11
A-12	Post-Test Right Rear View of Test Vehicle	A-11
A-13	Pre-Test Right Side View of Test Vehicle	A-12
A-14	Post-Test Right Side View of Test Vehicle	A-12
A-15	Pre-Test Right Front View of Test Vehicle	A-13
A-16	Post-Test Right Front View of Test Vehicle	A-13
A-17	Pre-Test Frontal View of Impactor Face	A-14
A-18	Post-Test Frontal View of Impactor Face	A-14
A-19	Pre-Test Left Side View of Impactor Face	A-15
A-20	Post-Test Left Side View of Impactor Face	A-15
A-21	Pre-Test Right Side View of Impactor Face	A-16
A-22	Post-Test Right Side View of Impactor Face	A-16
A-23	Pre-Test Top View of Impactor Face	A-17
A-24	Post-Test Top View of Impactor Face	A-17
A-25	Pre-Test Left Side View of Impactor	A-18
A-26	Post-Test Left Side View of Impactor	A-18
A-27	Pre-Test Right Side View of Impactor	A-19
A-28	Post-Test Right Side View of Impactor	A-19
A-29	Pre-Test Top View of Impactor	A-20

LIST OF PHOTOGRAPHS (CONTINUED)

Figure		Page
A-30	Post-Test Top View of Impactor	A-20
A-31	Pre-Test Left Side Overall View of Impactor	A-21
A-32	Post-Test Left Side Overall View of Impactor	A-21
A-33	Pre-Test Right Side Overall View of Impactor	A-22
A-34	Post-Test Right Side Overall View of Impactor	A-22
A-35	Pre-Test View of MDB Showing Contact Switches in Place	A-23
A-36	Post-Test View of MDB Showing Contact Switches in Place	A-23
A-37	Pre-Test Overhead View of MDB Aligned with Vehicle	A-24
A-38	Post-Test Overhead View of MDB and Vehicle	A-24
A-39	Pre-Test Right Occupant Compartment View of Front SID HIII	A-25
A-40	Pre-Test Right Occupant Compartment View of Rear SID HIII	A-25
A-41	Pre-Test Left View of Front SID HIII	A-26
A-42	Post-Test Left View of Front SID HIII	A-26
A-43	Pre-Test Left View of Front SID HIII and Belt Position	A-27
A-44	Pre-Test Left View of Front SID HIII and Door Clearance	A-28
A-45	Post-Test Left View of Front SID HIII and Door Clearance	A-28
A-46	Pre-Test Left View of Rear SID HIII	A-29
A-47	Post-Test Left View of Rear SID HIII	A-29
A-48	Pre-Test Left View of Rear SID HIII and Belt Position	A-30
A-49	Pre-Test Left View of Rear SID HIII and Door Clearance	A-31
A-50	Post-Test Left View of Rear SID HIII and Door Clearance	A-31
A-51	Pre-Test Interior of Front Door	A-32
A-52	Post-Test Interior of Front Door Showing SID HIII Impact Locations	A-32
A-53	Post-Test Front SID HIII Contact – View 1	A-33
A-54	Post-Test Front SID HIII Contact – View 2	A-33
A-55	Post-Test Front SID HIII Contact – View 3	A-34
A-56	Post-Test Front SID HIII Contact – View 4	A-34
A-57	Pre-Test Interior of Rear Side Panel	A-35
A-58	Post-Test Interior of Rear Side Door Showing SID HIII Impact Locations	A-35

LIST OF PHOTOGRAPHS (CONTINUED)

Figure		Page
A-59	Post-Test Rear SID HIII Contact - View 1	A-36
A-60	Post-Test Rear SID HIII Contact - View 2	A-36
A-61	Post-Test Rear SID HIII Contact - View 3	A-37
A-62	Post-Test Left Rear Door Separation – View 1	A-38
A-63	Post-Test Left Rear Door Separation – View 2	A-38
A-64	Post-Test Left Rear Door Separation – View 3	A-39
A-65	Post-Test Left Rear Door Separation – View 4	A-39
A-66	Pre-Test Left Side View of MDB With Impactor Face in Position	A-40
A-67	Post-Test Left Side View of MDB With Impactor Face in Position	A-40
A-68	Pre-Test Primary Impact Point View	A-41
A-69	Post-Test Primary Impact Point View	A-41
A-70	Pre-Test Right Side View of MDB With Impactor Face in Position	A-42
A-71	Post-Test Right Side View of MDB With Impactor Face in Position	A-42
A-72	Pre-Test Secondary Impact Point View	A-43
A-73	Post-Test Secondary Impact Point View	A-43
A-74	Pre-Test Overhead View of MDB with Impactor Face in Position	A-44
A-75	Post-Test Overhead View of MDB with Vehicle	A-44
A-76	Pre-Test Vehicle Certification Label View	A-45
A-77	Pre-Test Vehicle Recommended Tire Pressure Label View	A-45
A-78	Post-Test Light Trap Digital Readout – View 1	A-46
A-79	Post-Test Light Trap Digital Readout – View 2	A-46
A-80	Post-Test Light Trap Digital Readout – View 3	A-47
A-81	Impact Event	A-47
A-82	Pre-Test Fuel Cap	A-48
A-83	Post-Test Fuel Cap	A-48
A-84	FMVSS 301 Rollover View at 90°	A-49
A-85	FMVSS 301 Rollover View at 180°	A-49
A-86	FMVSS 301 Rollover View at 270°	A-50
A-87	FMVSS 301 Rollover View at 360°	A-50



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

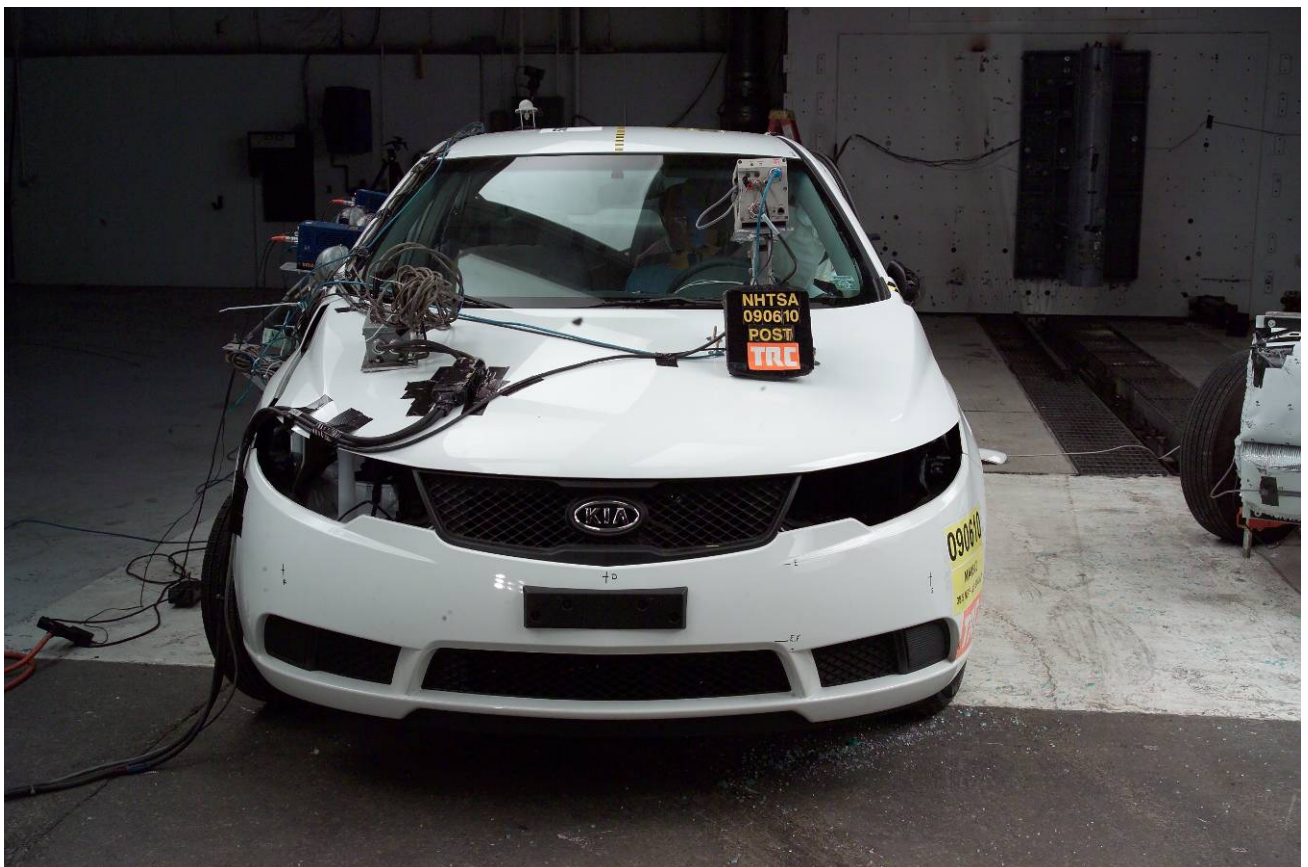


Figure A-2 Post-Test Front View of Test Vehicle



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

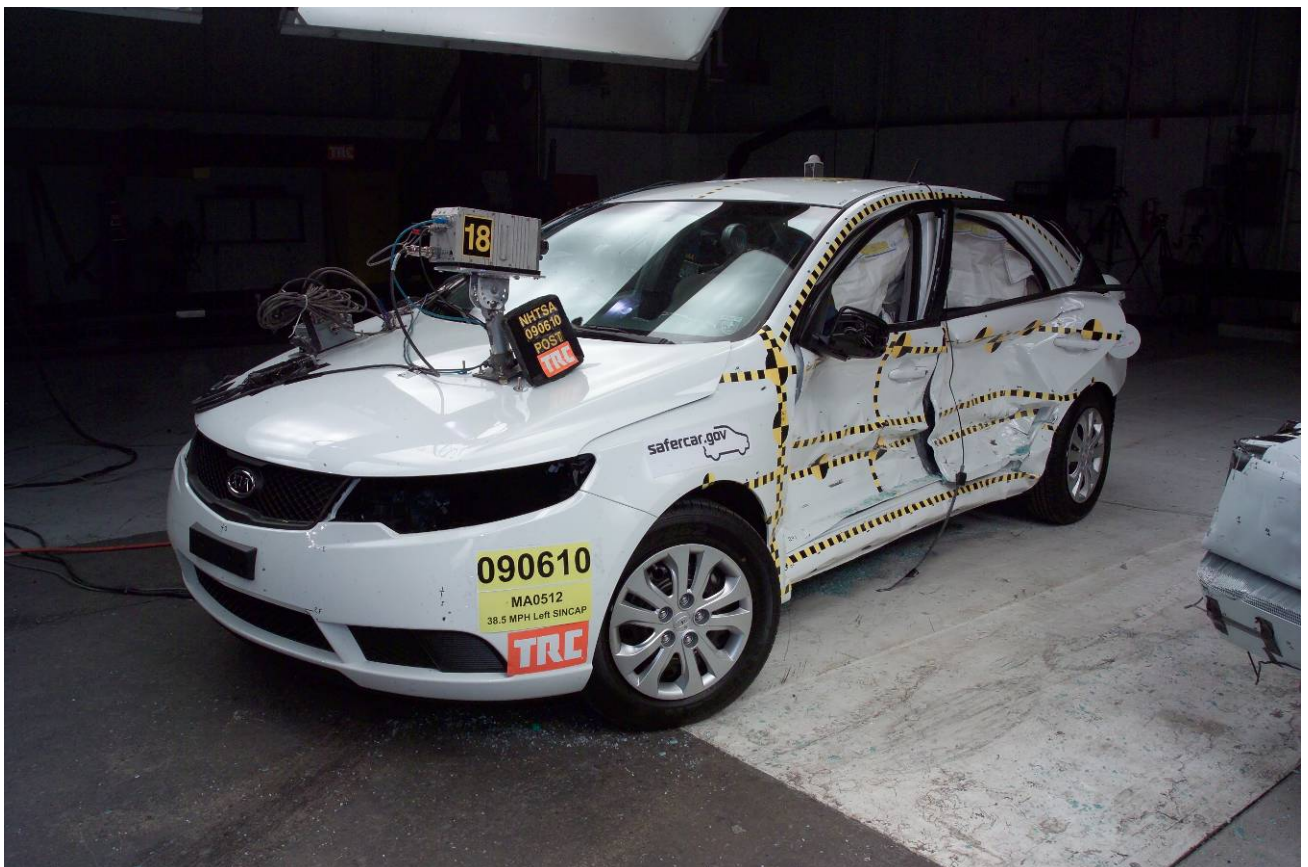


Figure A-4 Post-Test Left Front View of Test Vehicle



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

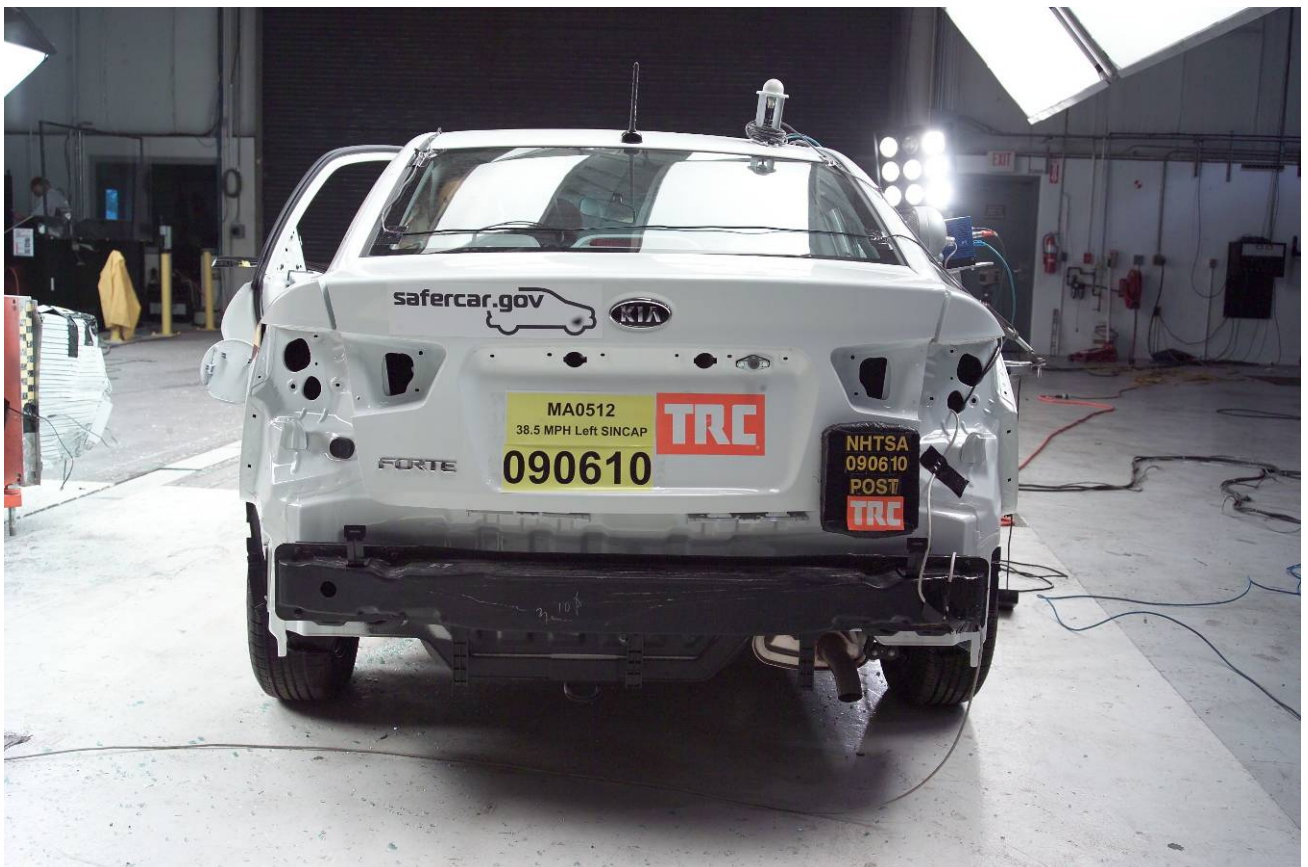


Figure A-10 Post-Test Rear View of Test Vehicle



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



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

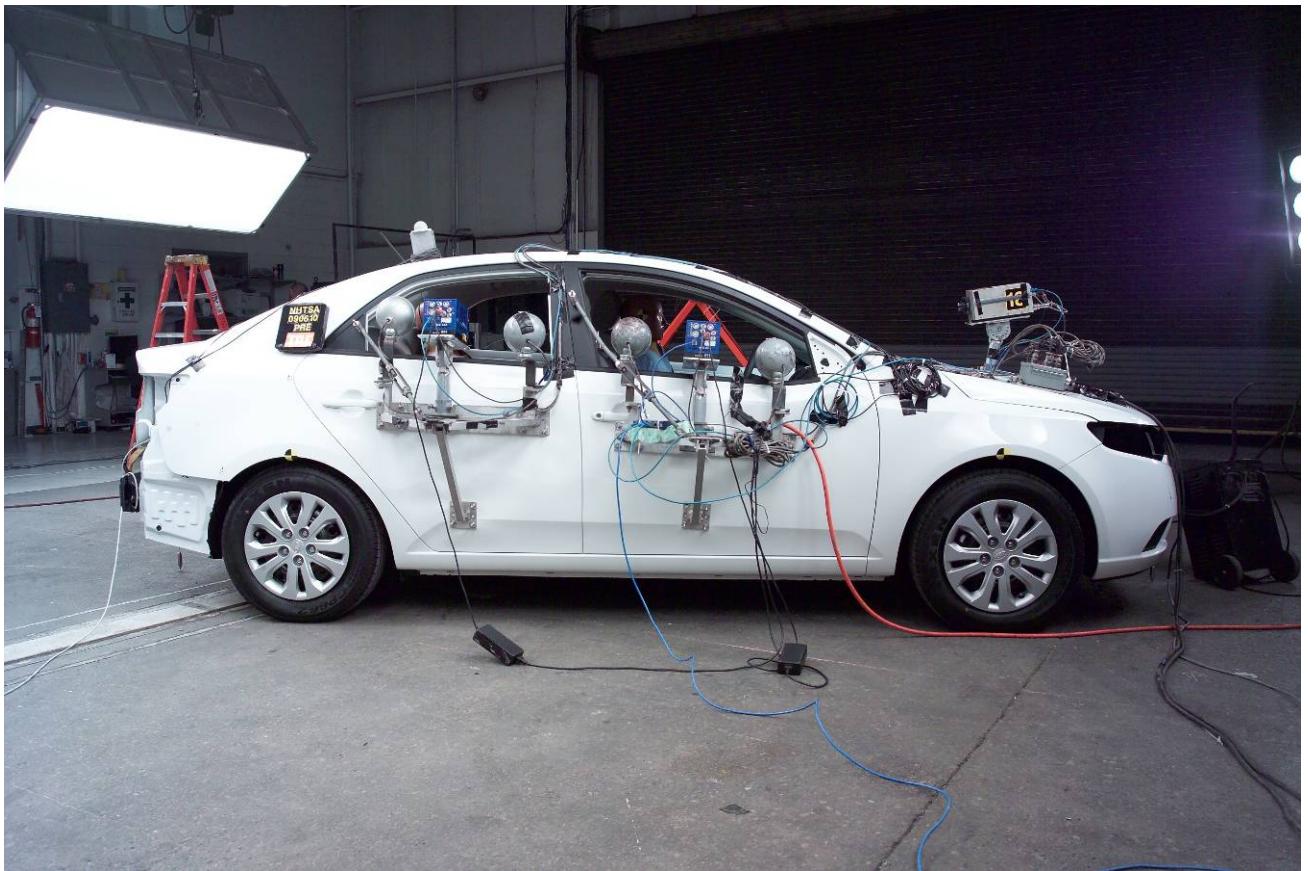


Figure A-13 Pre-Test Right Side View of Test Vehicle



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

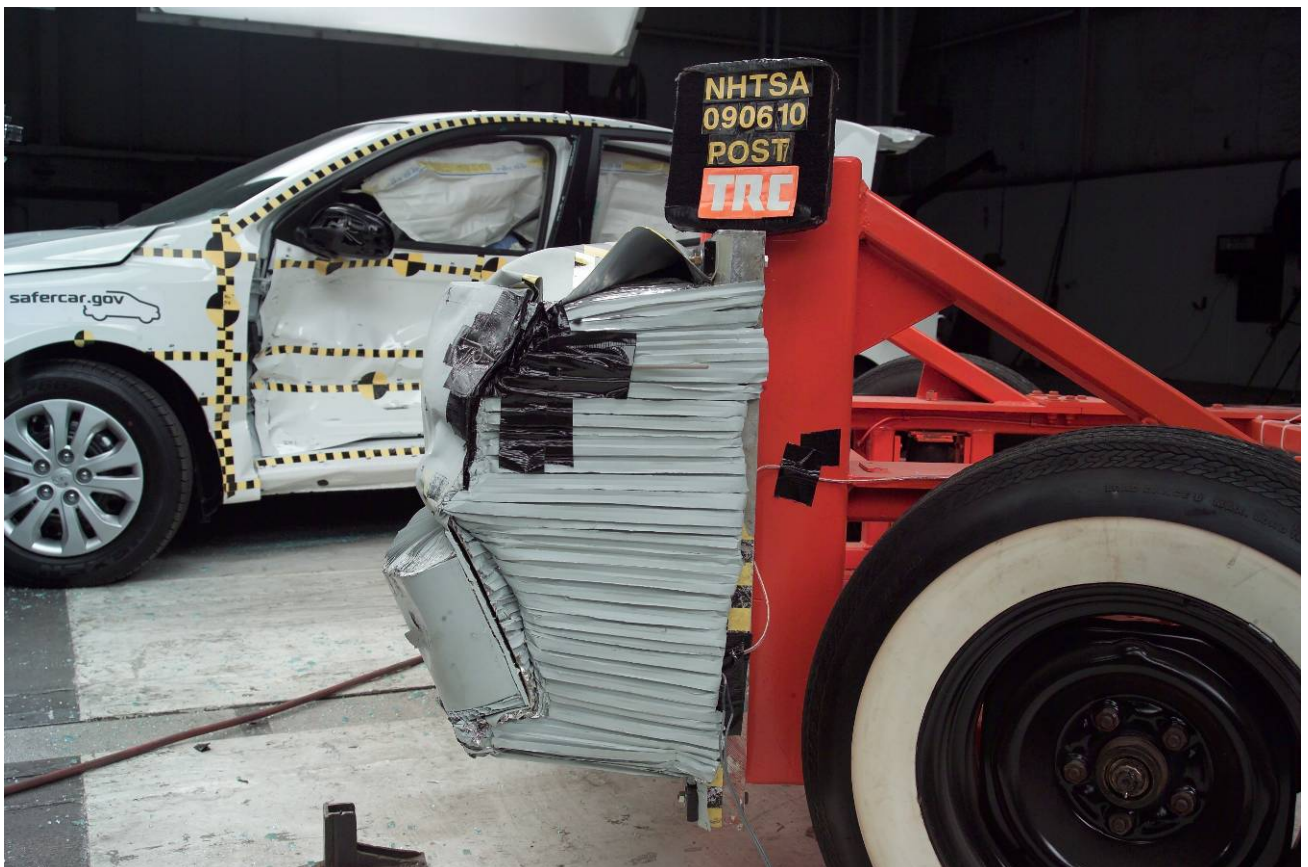


Figure A-26 Post-Test Left Side View of Impactor



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

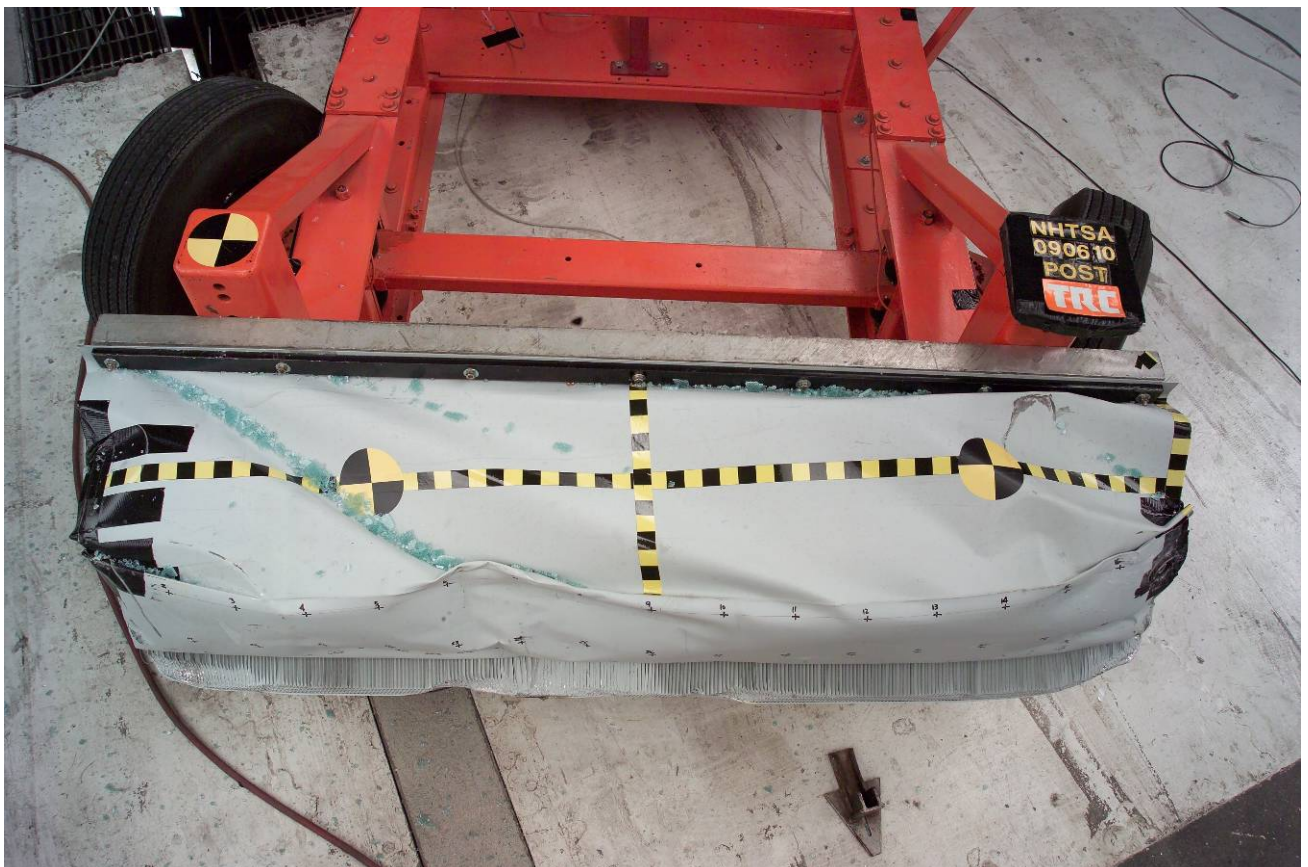


Figure A-30 Post-Test Top View of Impactor



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

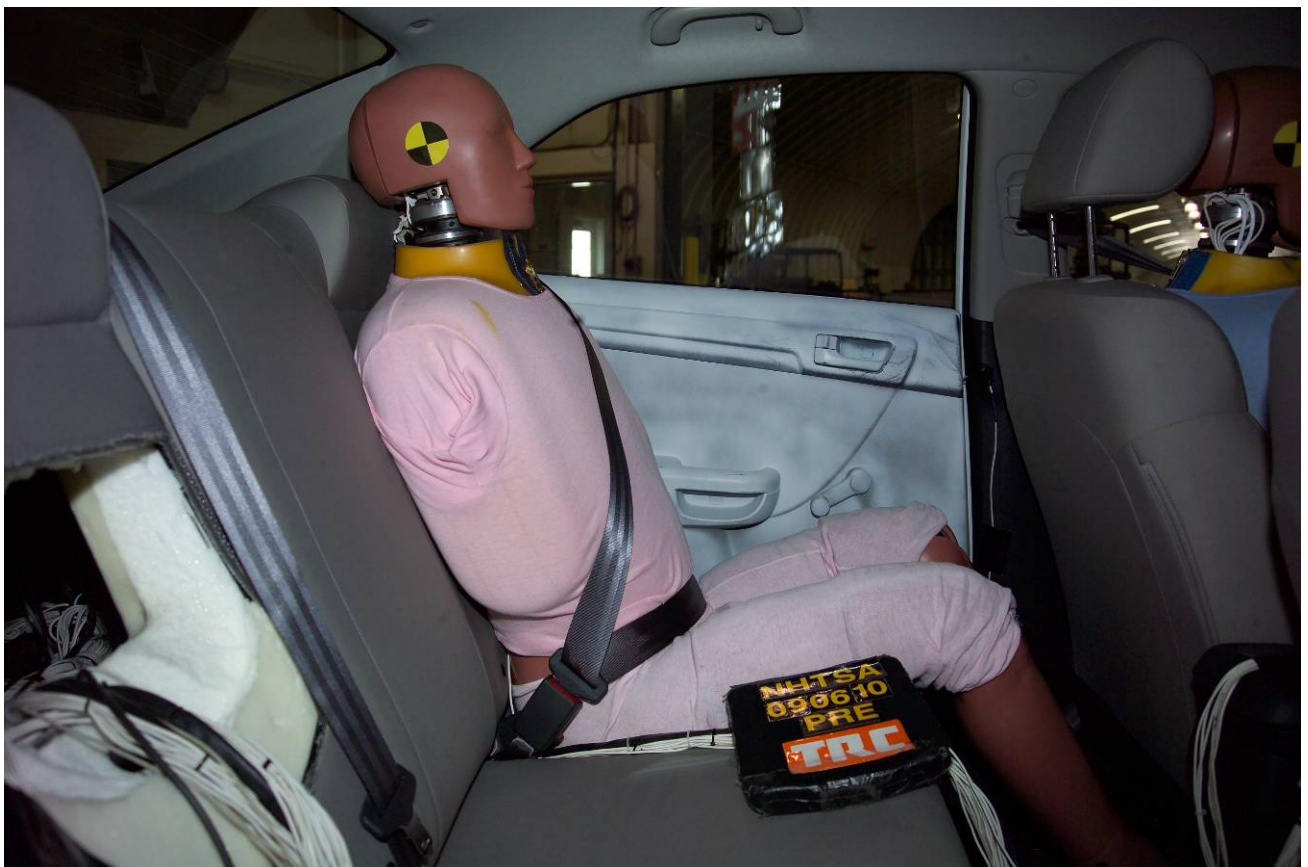


Figure A-40 Pre-Test Right Occupant Compartment View of Rear SID HIII



Figure A-41 Pre-Test Left View of Front SID HIII

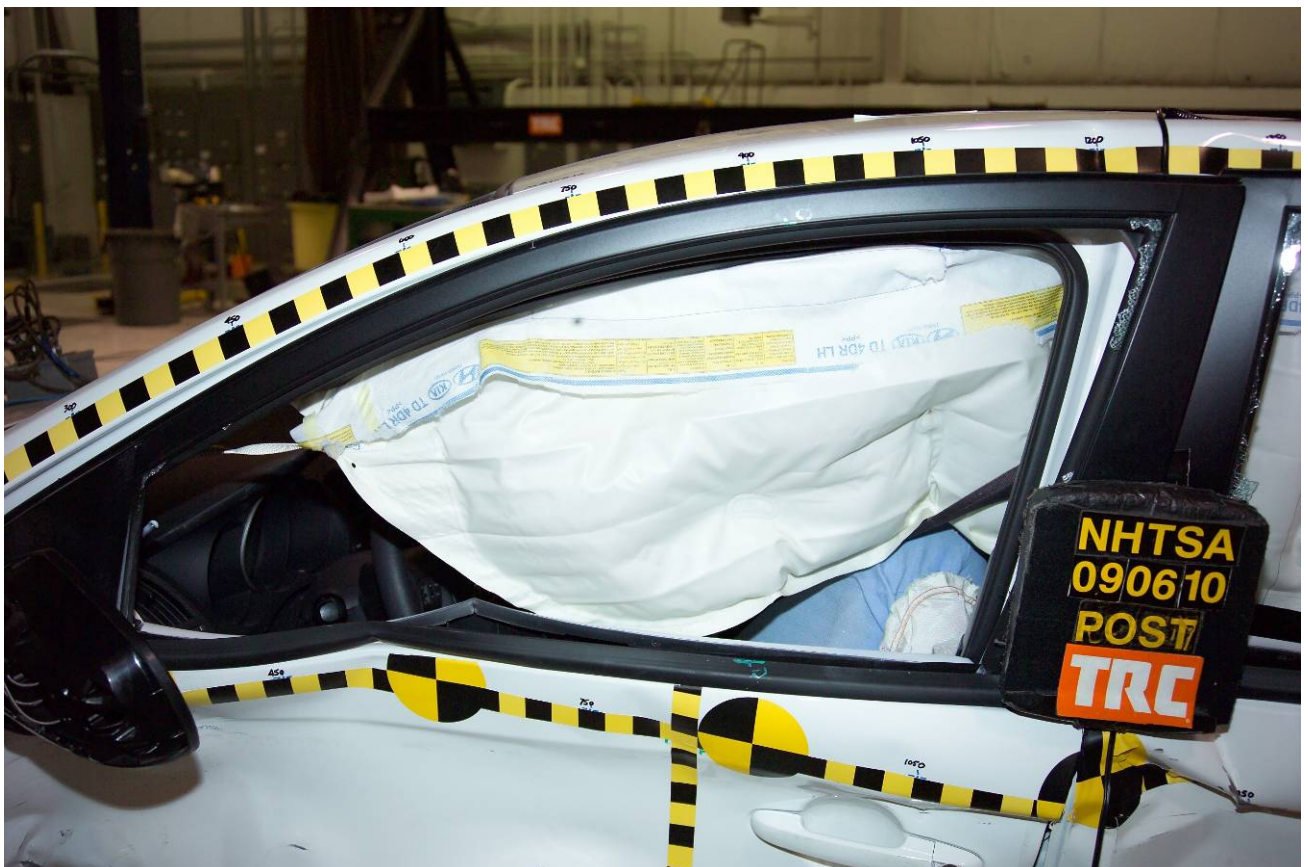


Figure A-42 Post-Test Left View of Front SID HIII



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

Intentionally Left Blank



Figure A-44 Pre-Test Left View of Front SID HIII and Door Clearance



Figure A-45 Post-Test Left View of Front SID HIII and Door Clearance



Figure A-46 Pre-Test Left View of Rear SID HIII



Figure A-47 Post-Test Left View of Rear SID HIII



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

Intentionally Left Blank



Figure A-49 Pre-Test Left View of Rear SID HIII and Door Clearance



Figure A-50 Post-Test Left View of Rear SID HIII and Door Clearance



Figure A-51 Pre-Test Interior of Front Door

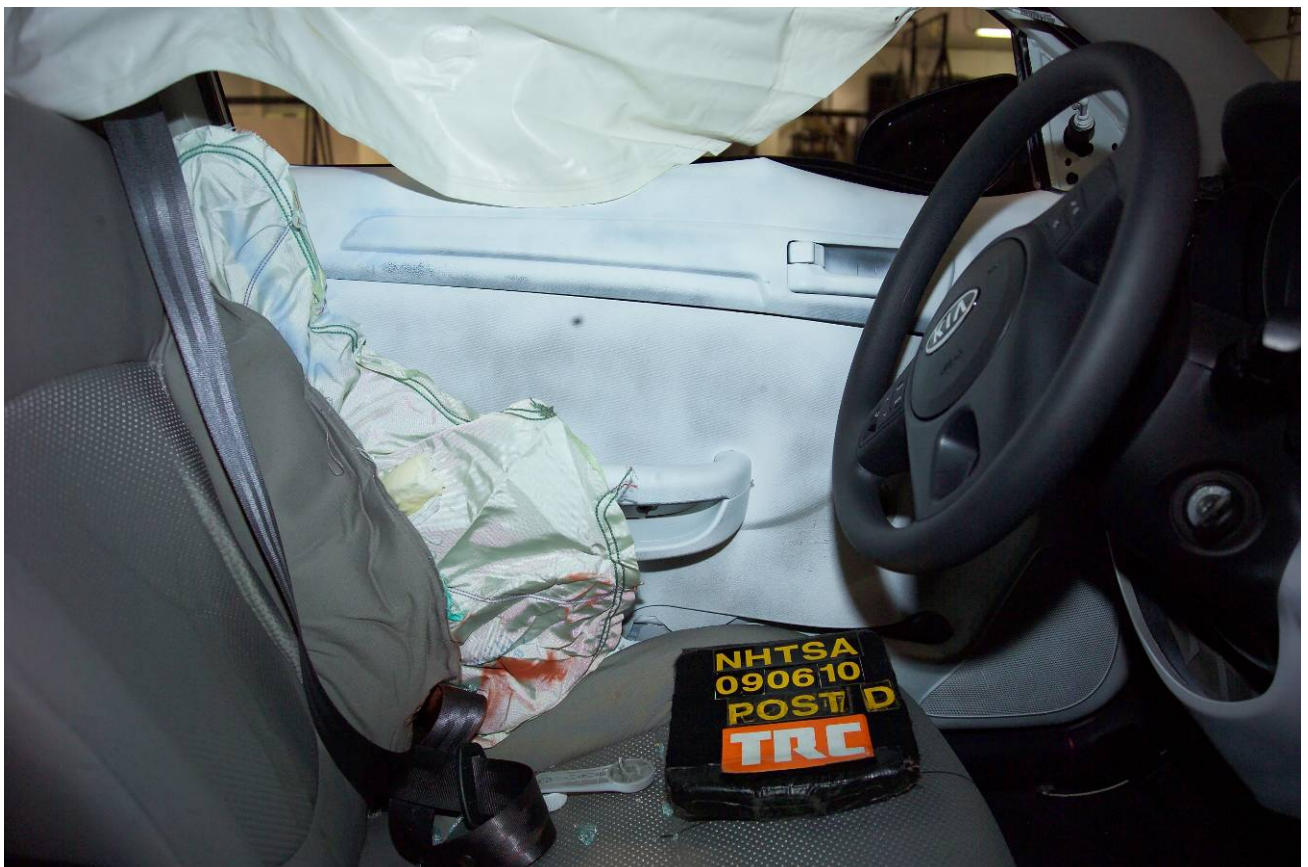


Figure A-52 Post-Test Interior of Front Door Showing SID HIII Impact Locations



Figure A-53 Post-Test Front SID HIII Contact – View 1

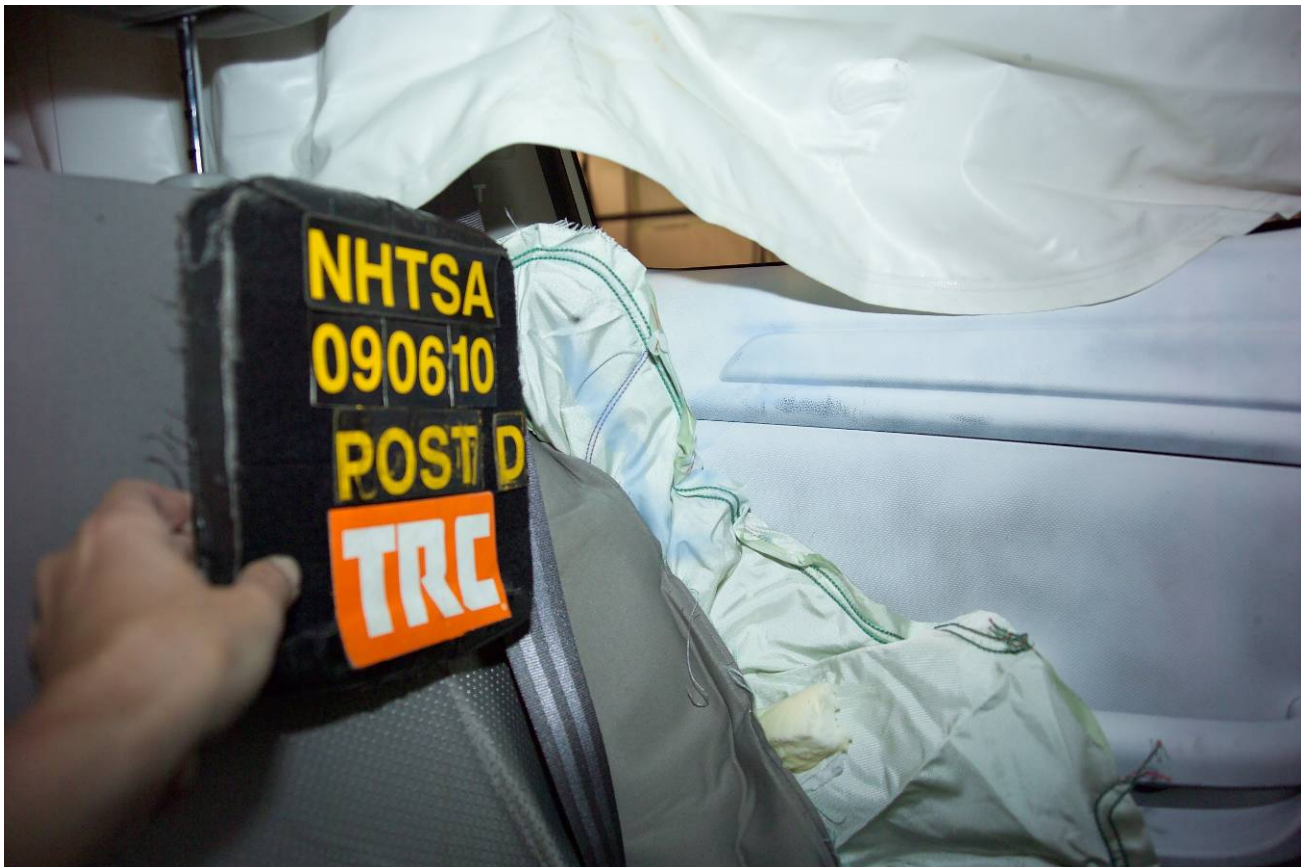


Figure A-54 Post-Test Front SID HIII Contact – View 2



Figure A-55 Post-Test Front SID HIII Contact – View 3



Figure A-56 Post-Test Front SID HIII Contact – View 4



Figure A-57 Pre-Test Interior of Rear Side Panel

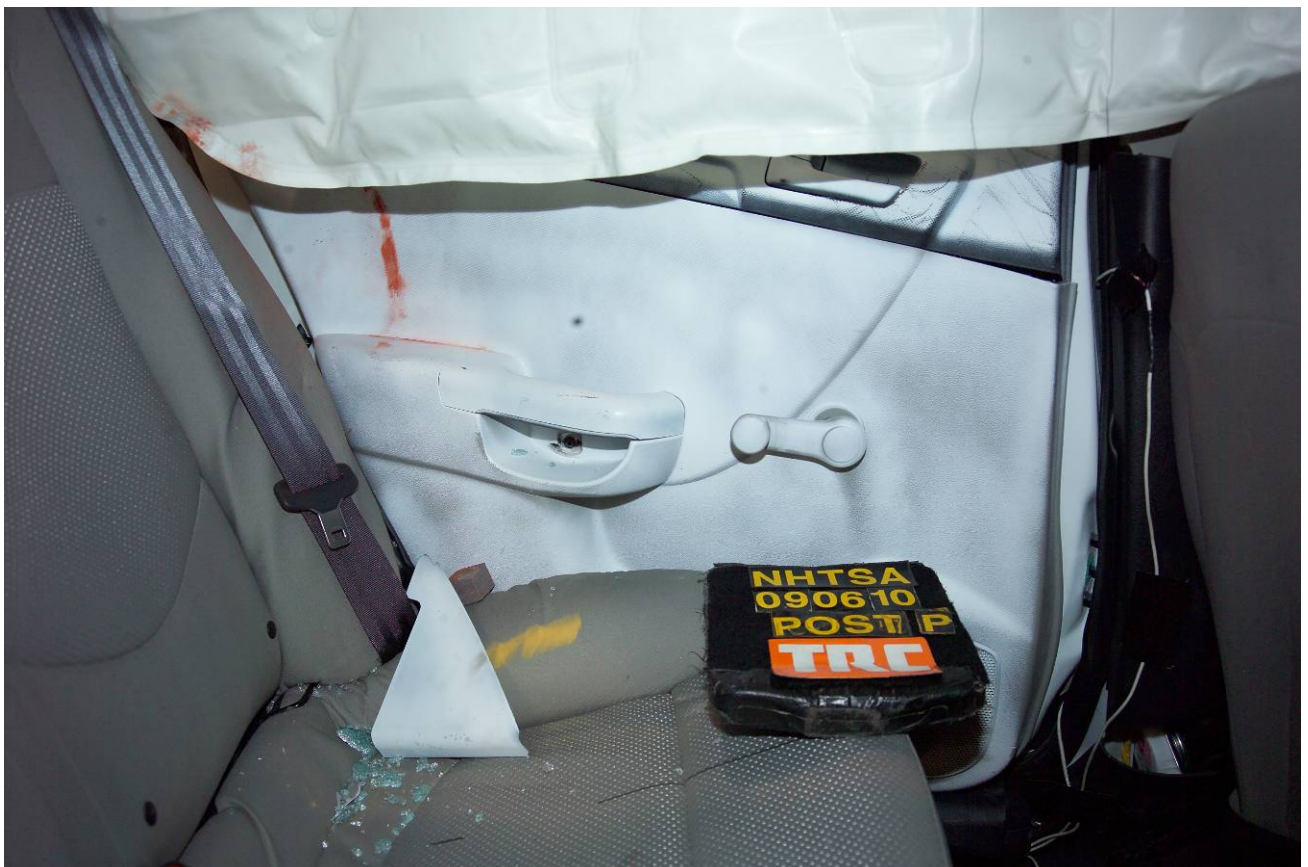


Figure A-58 Post-Test Interior of Rear Side Door Showing SID HIII Impact Locations

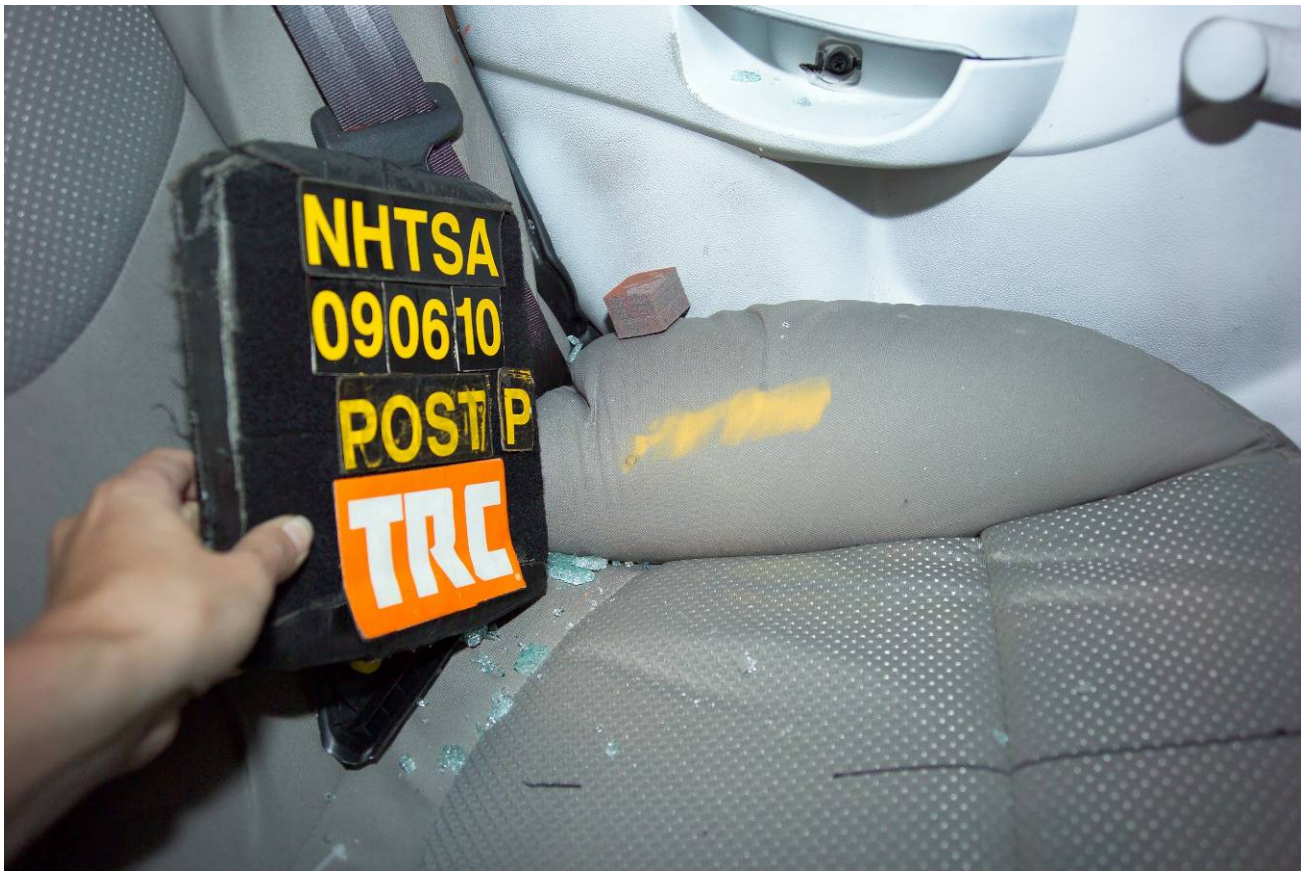


Figure A-59 Post-Test Rear SID HIII Contact - View 1



Figure A-60 Post-Test Rear SID HIII Contact - View 2



Figure A-61 Post-Test Rear SID HIII Contact - View 3

Intentionally Left Blank



Figure A-62 Post-Test Left Rear Door Separation – View 1

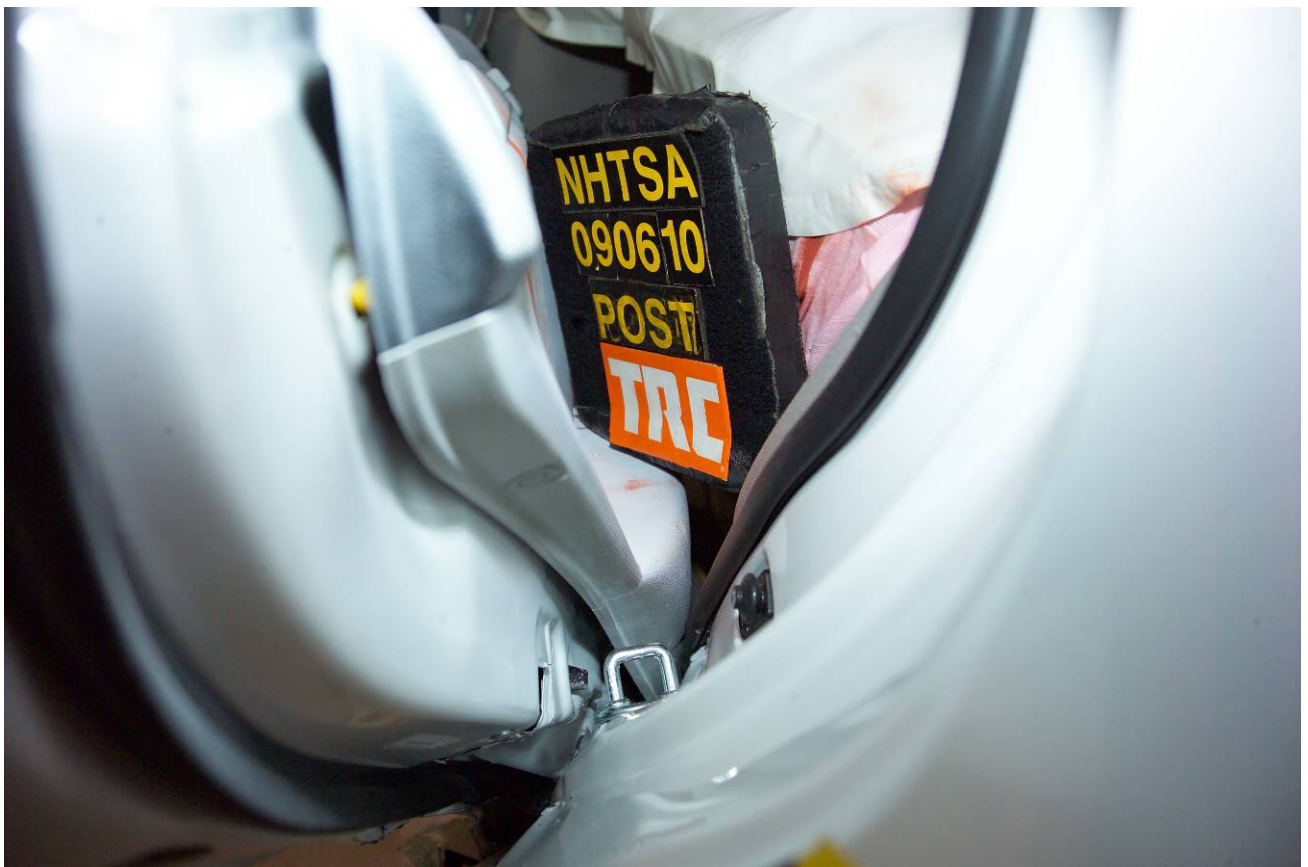


Figure A-63 Post-Test Left Rear Door Separation – View 2



Figure A-64 Post-Test Left Rear Door Separation – View 3



Figure A-65 Post-Test Left Rear Door Separation – View 4



Figure A-66 Pre-Test Left Side View of MDB With Impactor Face in Position



Figure A-67 Post-Test Left Side View of MDB With Impactor Face in Position



Figure A-68 Pre-Test Primary Impact Point View



Figure A-69 Post-Test Primary Impact Point View



Figure A-70 Pre-Test Right Side View of MDB With Impactor Face in Position



Figure A-71 Post-Test Right Side View of MDB With Impactor Face in Position



Figure A-72 Pre-Test Secondary Impact Point View



Figure A-73 Post-Test Secondary Impact Point View



Figure A-74 Pre-Test Overhead View of MDB with Impactor Face in Position

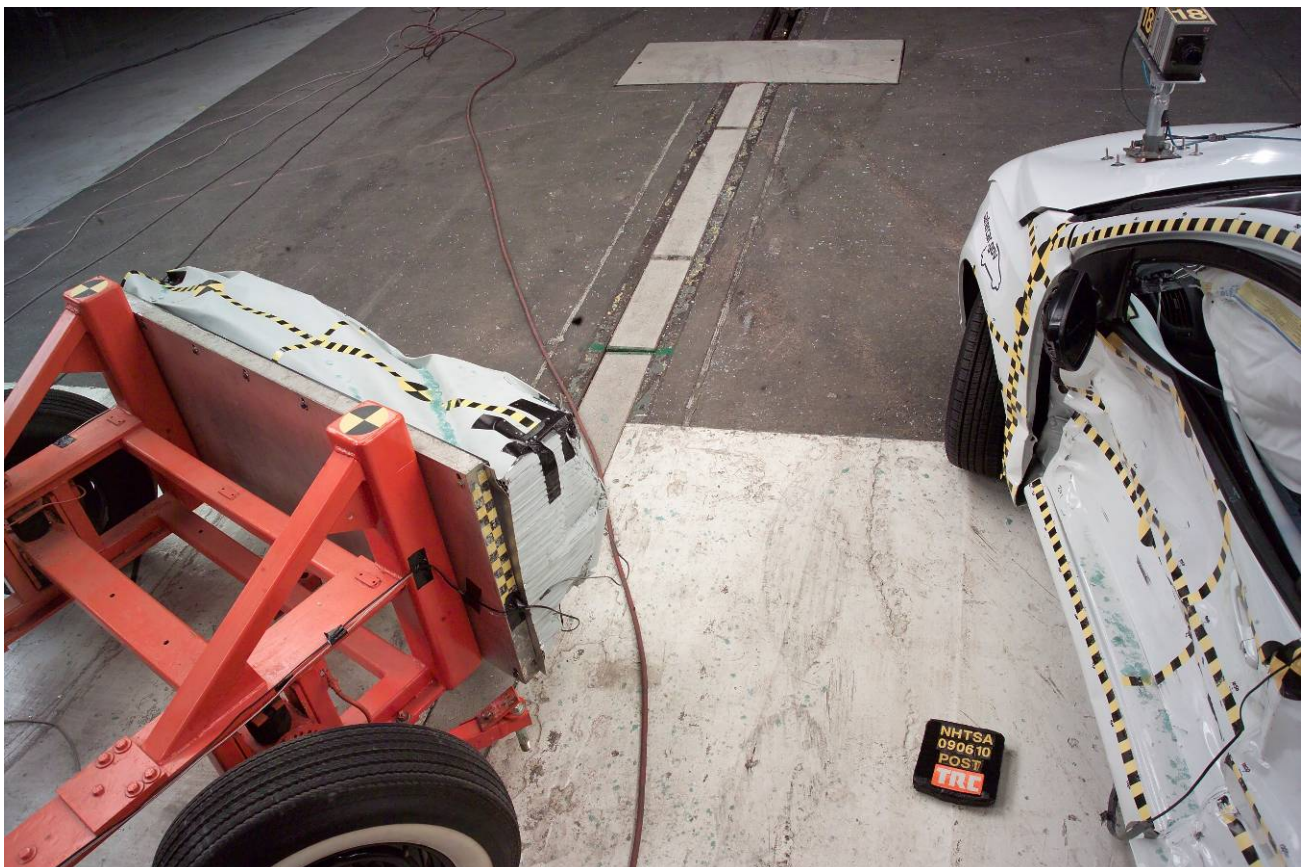


Figure A-75 Post-Test Overhead View of MDB with Vehicle



Figure A-76 Pre-Test Vehicle Certification Label View



Figure A-77 Pre-Test Vehicle Recommended Tire Pressure Label View



Figure A-78 Post-Test Light Trap Digital Readout – View 1



Figure A-79 Post-Test Light Trap Digital Readout – View 2



Figure A-80 Post-Test Light Trap Digital Readout – View 3



Figure A-81 Impact Event



Figure A-82 Pre-Test Fuel Cap



Figure A-83 Post-Test Fuel Cap



Figure A-84 FMVSS 301 Rollover View at 90°



Figure A-85 FMVSS 301 Rollover View at 180°

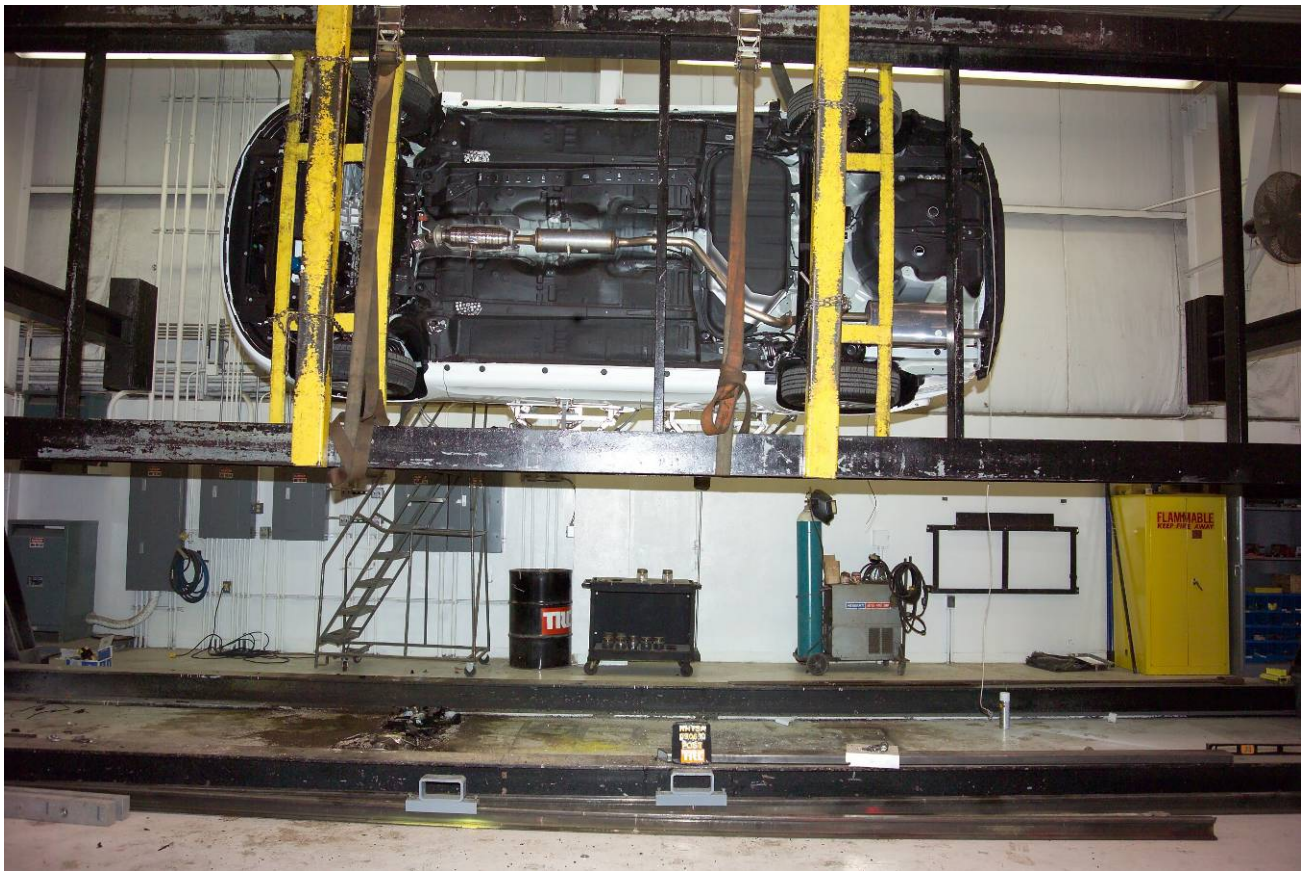


Figure A-86 FMVSS 301 Rollover View at 270°



Figure A-87 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-5
B-1	Driver Lower Rib Primary Y	B-5
B-1	Driver Lower Spine Primary Y	B-5
B-1	Driver Pelvis Primary Y	B-5
B-2	Driver Upper Rib Redundant Y	B-6
B-2	Driver Lower Rib Redundant Y	B-6
B-2	Driver Lower Spine Redundant Y	B-6
B-2	Driver Pelvis Redundant Y	B-6
B-3	Left Rear Passenger Upper Rib Primary Y	B-7
B-3	Left Rear Passenger Lower Rib Primary Y	B-7
B-3	Left Rear Passenger Lower Spine Primary Y	B-7
B-3	Left Rear Passenger Pelvis Primary Y	B-7
B-4	Left Rear Passenger Upper Rib Redundant Y	B-8
B-4	Left Rear Passenger Lower Rib Redundant Y	B-8
B-4	Left Rear Passenger Lower Spine Redundant Y	B-8
B-4	Left Rear Passenger Pelvis Redundant Y	B-8

The following additional data plots for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at:
www.nhtsa.dot.gov.

<u>Data Plot</u>	<u>LIST OF DATA PLOTS (CONTINUED)</u>
	Driver Head X Primary
	Driver Head Y Primary
	Driver Head Z Primary
	Driver Upper Neck Force X
	Driver Upper Neck Force Y
	Driver Upper Neck Force Z
	Driver Upper Neck Moment X
	Driver Upper Neck Moment Y
	Driver Upper Neck Moment Z
	Driver Upper Rib Primary Y
	Driver Upper Rib Redundant Y
	Driver Lower Rib Primary Y
	Driver Lower Rib Redundant Y
	Driver Lower Spine Primary Y
	Driver Lower Spine Redundant Y
	Driver Pelvis Primary Y
	Driver Pelvis Redundant Y
	Left Rear Passenger Head X Primary
	Left Rear Passenger Head Y Primary
	Left Rear Passenger Head Z Primary
	Left Rear Passenger Upper Neck Force X
	Left Rear Passenger Upper Neck Force Y
	Left Rear Passenger Upper Neck Force Z
	Left Rear Passenger Upper Neck Moment X
	Left Rear Passenger Upper Neck Moment Y
	Left Rear Passenger Upper Neck Moment Z
	Left Rear Passenger Upper Rib Primary Y
	Left Rear Passenger Upper Rib Redundant Y
	Left Rear Passenger Lower Rib Primary Y
	Left Rear Passenger Lower Rib Redundant Y
	Left Rear Passenger Lower Spine Primary Y
	Left Rear Passenger Lower Spine Redundant Y

<u>Data Plot</u>	<u>LIST OF DATA PLOTS (CONTINUED)</u>
	Left Rear Passenger Pelvis Primary Y
	Left Rear Passenger Pelvis Redundant Y
	Vehicle Right Sill at Front Seat X
	Vehicle Right Sill at Front Seat Y
	Vehicle Right Sill at Front Seat Z
	Vehicle Right Sill at Rear Seat X
	Vehicle Right Sill at Rear Seat Y
	Vehicle Right Sill at Rear Seat Z
	Vehicle Rear Floor Above Axle X
	Vehicle Rear Floor Above Axle Y
	Vehicle Rear Floor Above Axle Z
	Vehicle Left Sill at Front Seat Y
	Vehicle Left Sill at Rear Seat Y
	Vehicle Right Rear Occupant Compartment Y
	Vehicle Left A-Post Lower Y
	Vehicle Left A-Post Middle Y
	Vehicle Left B-Post Lower Y
	Vehicle Left B-Post Middle Y
	Vehicle Left Front Seat Track Y
	Vehicle Left Rear Seat Track Y
	Vehicle CG X
	Vehicle CG Y
	Vehicle CG Z
	MDB CG X
	MDB CG Y
	MDB CG Z
	MDB Rear X
	MDB Rear Y
	MDB Right Bumper Contact
	MDB Left Bumper Contact

NHTSA

Test Lab: CTF

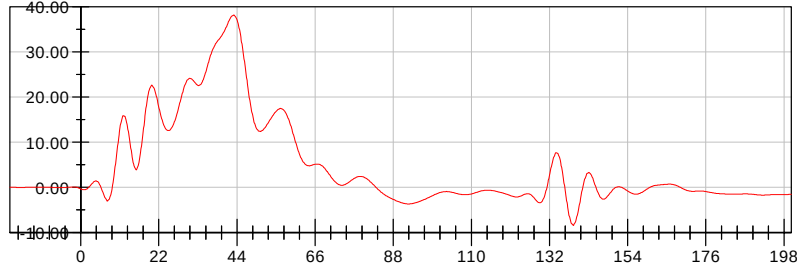
Test Number: 090610 (MA0512)

Position #1 SID H3 Dummy (1)

Position #4 SID H3 Dummy (2)

Test Date: 06/10/2009

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



<Max>

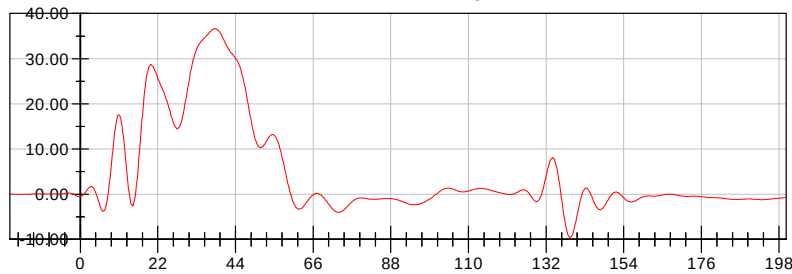
38.20 g at 43.10 ms

<Min>

-8.40 g at 138.70 ms

FIR_100

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



<Max>

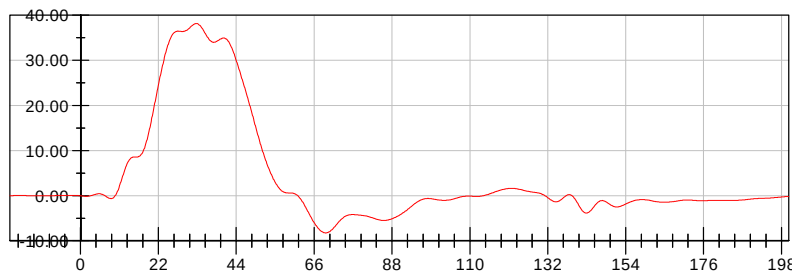
36.64 g at 38.10 ms

<Min>

-9.67 g at 138.80 ms

FIR_100

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



<Max>

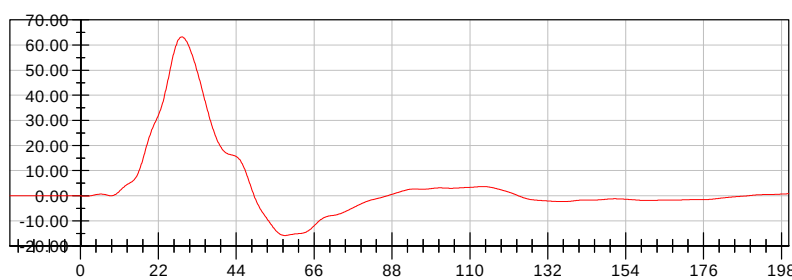
38.17 g at 32.50 ms

<Min>

-8.26 g at 69.40 ms

FIR_100

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



<Max>

63.29 g at 28.70 ms

<Min>

-15.82 g at 57.50 ms

FIR_100



NHTSA

Test Lab: CTF

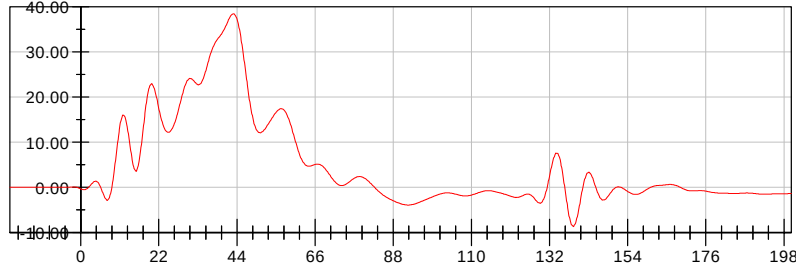
Test Number: 090610 (MA0512)

Position #1 SID H3 Dummy (1)

Position #4 SID H3 Dummy (2)

Test Date: 06/10/2009

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



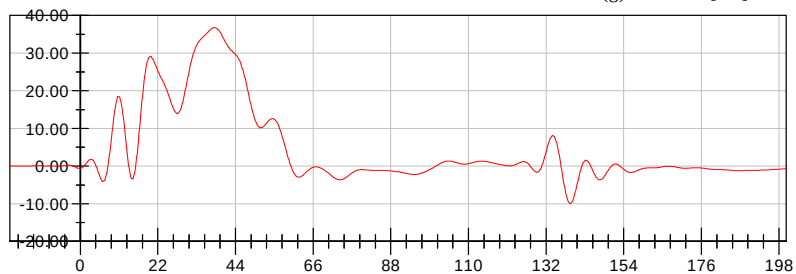
<Max>

38.49 g at 43.10 ms

<Min>

-8.69 g at 138.70 ms

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



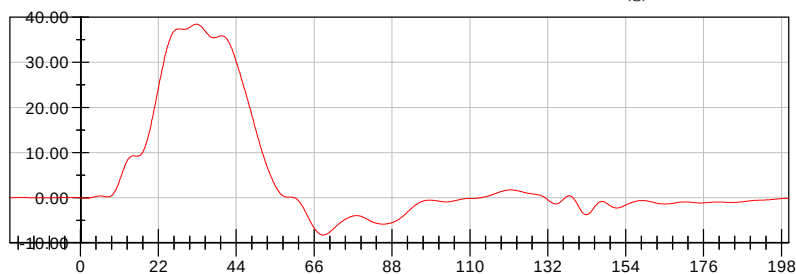
<Max>

36.81 g at 38.10 ms

<Min>

-10.03 g at 138.80 ms

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



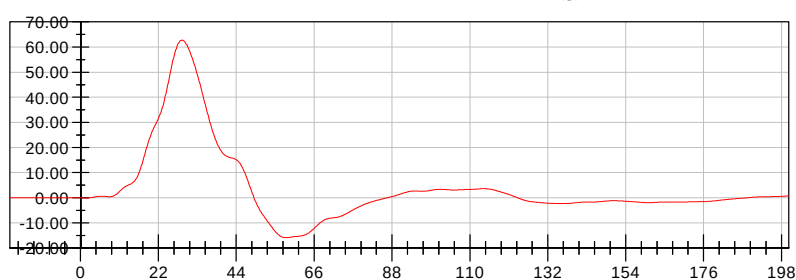
<Max>

38.47 g at 32.50 ms

<Min>

-8.28 g at 68.70 ms

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



<Max>

62.80 g at 28.70 ms

<Min>

-15.91 g at 58.10 ms



NHTSA

Test Lab: CTF

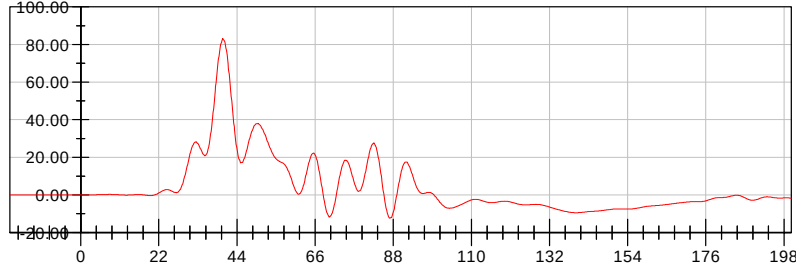
Test Number: 090610 (MA0512)

Position #1 SID H3 Dummy (1)

Position #4 SID H3 Dummy (2)

Test Date: 06/10/2009

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



<Max>

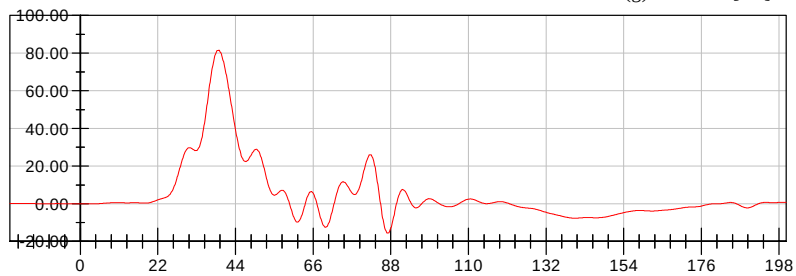
83.25 g at 40.00 ms

<Min>

-12.36 g at 86.90 ms

FIR_100

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



<Max>

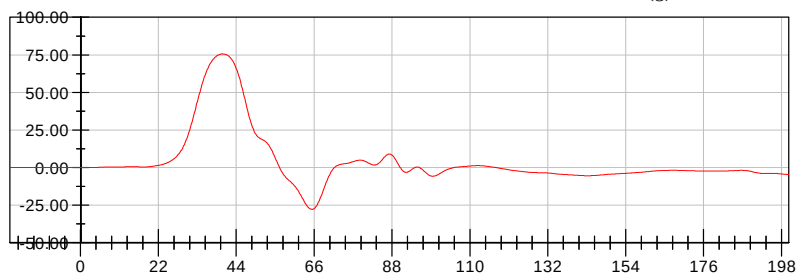
81.52 g at 39.30 ms

<Min>

-15.70 g at 86.90 ms

FIR_100

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



<Max>

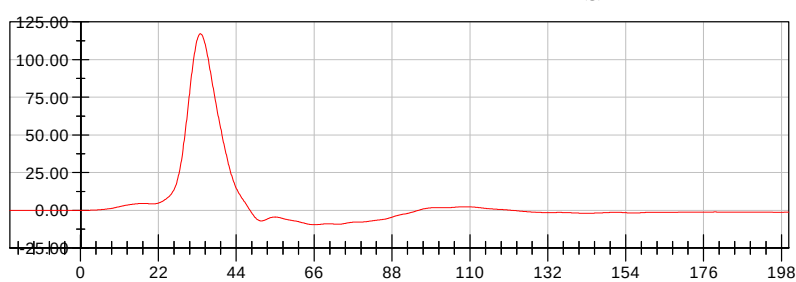
75.63 g at 40.00 ms

<Min>

-27.80 g at 65.60 ms

FIR_100

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



<Max>

117.26 g at 33.80 ms

<Min>

-9.54 g at 66.20 ms

FIR_100



NHTSA

Test Lab: CTF

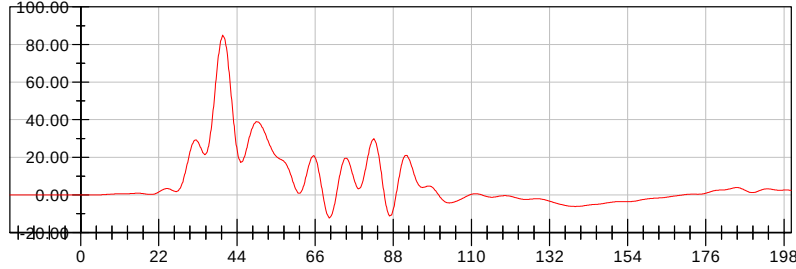
Test Number: 090610 (MA0512)

Position #1 SID H3 Dummy (1)

Position #4 SID H3 Dummy (2)

Test Date: 06/10/2009

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



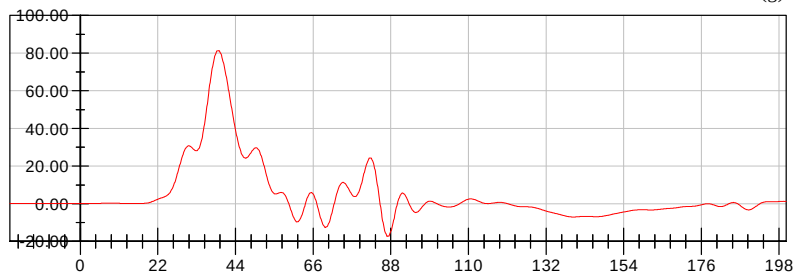
<Max>

85.03 g at 40.00 ms

<Min>

-12.23 g at 70.00 ms

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



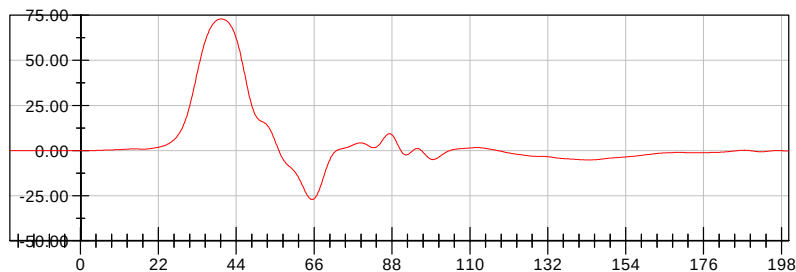
<Max>

81.30 g at 39.30 ms

<Min>

-17.37 g at 86.90 ms

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



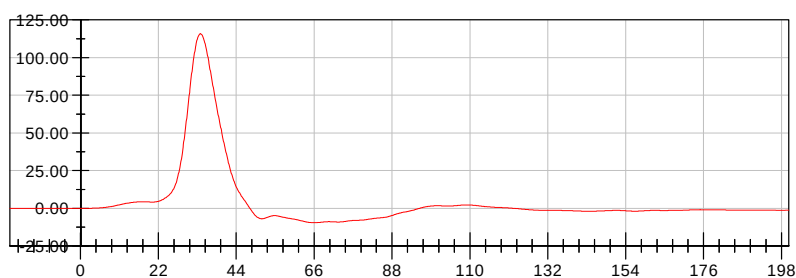
<Max>

72.99 g at 40.00 ms

<Min>

-27.17 g at 65.60 ms

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



<Max>

115.94 g at 33.80 ms

<Min>

-9.53 g at 66.20 ms



APPENDIX C
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID/HIII: 001

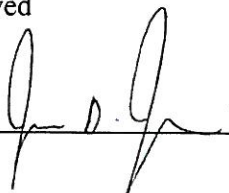
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 001 Calibration No. 02

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	901 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	518 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	496 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	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. 001 Certification No. 2-1

Test Date: 6/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	143.4 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

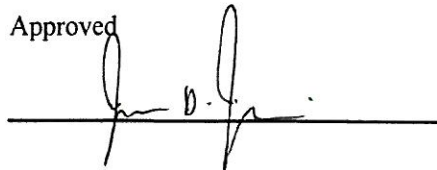
Test meets specifications.

Comments:

Technician



Approved

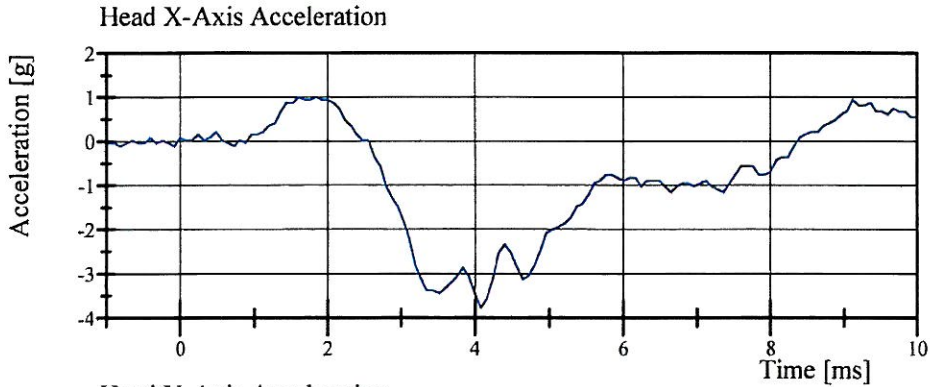


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 001 Certification No. 2-1

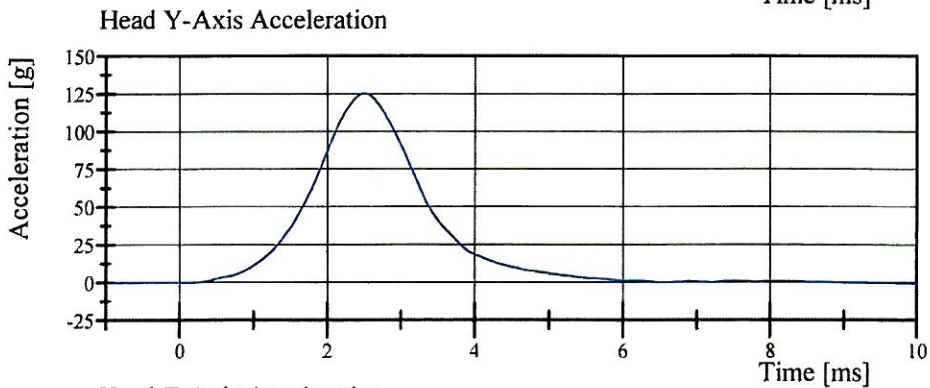
Test Date: 6/2/2009



Filter Class: CFC_1000

Max: 1.0 g at 1.6 ms

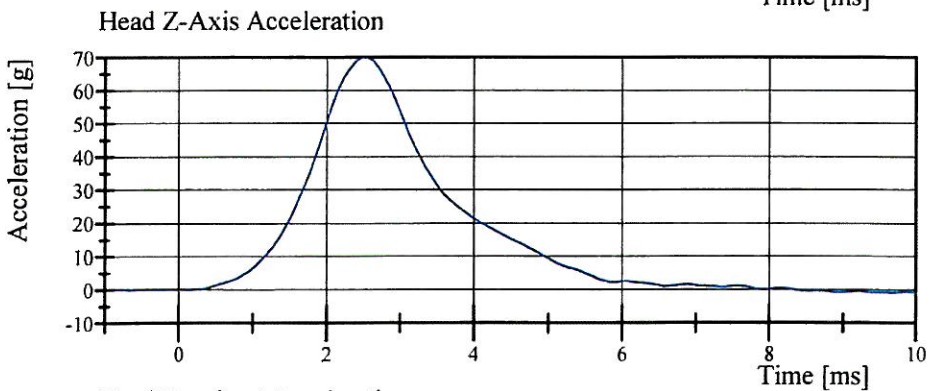
Min: -3.8 g at 4.1 ms



Filter Class: CFC_1000

Max: 125.2 g at 2.5 ms

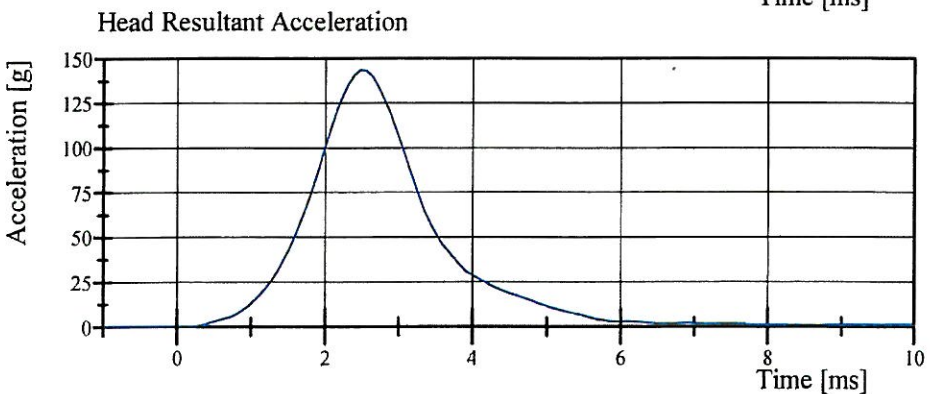
Min: -0.8 g at 10.0 ms



Filter Class: CFC_1000

Max: 69.8 g at 2.5 ms

Min: -0.9 g at 9.7 ms



Filter Class: CFC_1000

Max: 143.4 g at 2.5 ms

Min: 0.0 g at 0.1 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 2-1

Test Date: 6/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-6.941 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.396 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.752 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.585 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.229 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-74.4 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	61.3 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	84.4 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	56.0 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	10.6 ms	Yes

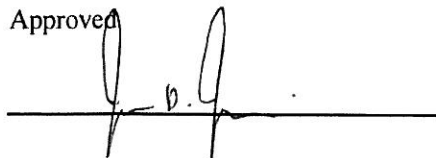
Test meets specifications.

Comments:

Technician



Approved

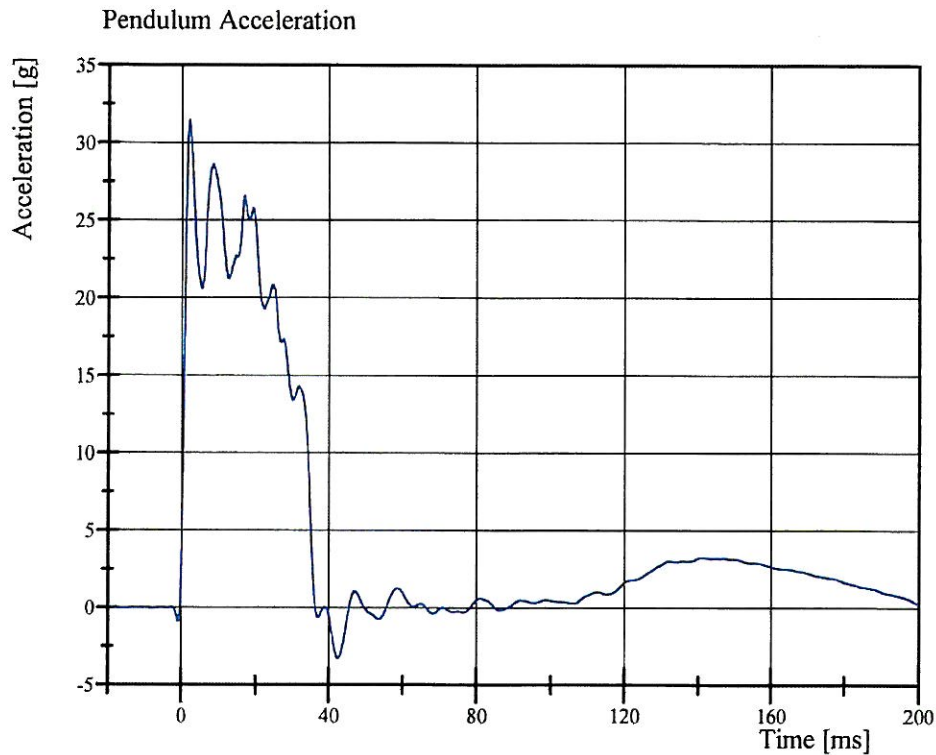


Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 2-1

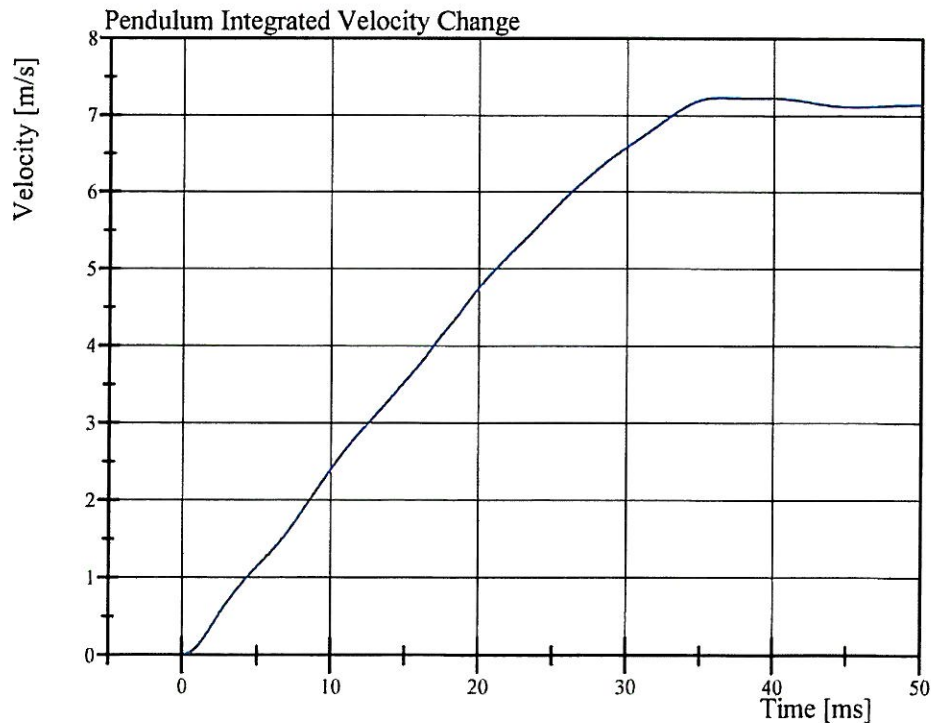
Test Date: 6/2/2009



Filter Class: CFC_180

Max: 31.4 g at 2.1 ms

Min: -3.3 g at 42.5 ms



Filter Class: CFC_180

Max: 7.2 m/s at 36.3 ms

Min: 0.0 m/s at 0.0 ms

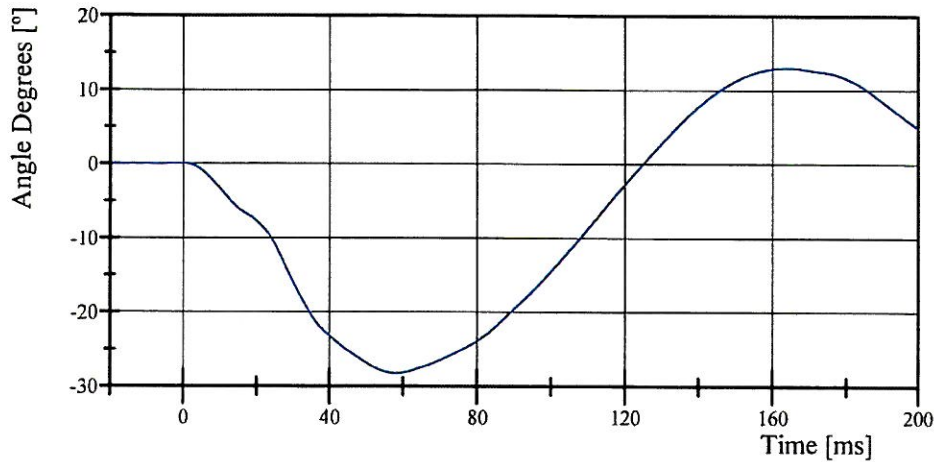
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 2-1

Test Date: 6/2/2009

Pot Rotation at the Base of Neck

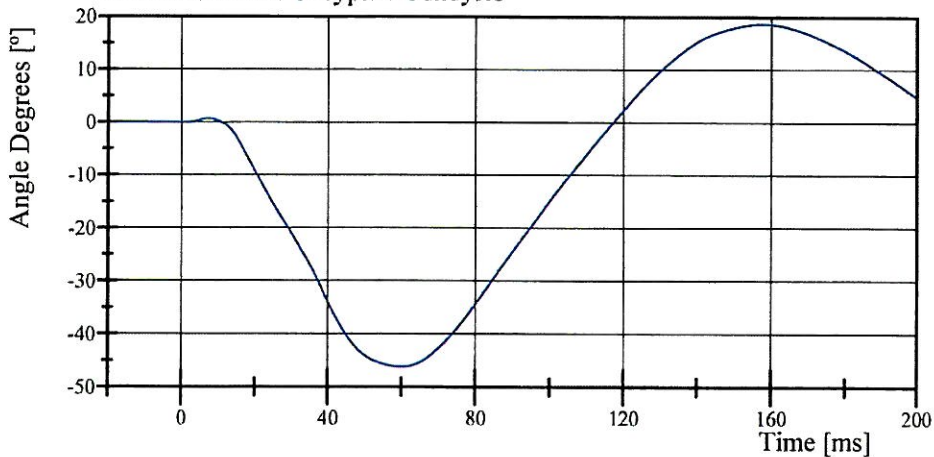


Filter Class: CFC_60

Max: 13.0 ° at 164.0 ms

Min: -28.2 ° at 58.0 ms

Head Rotation at Occypital Condyles

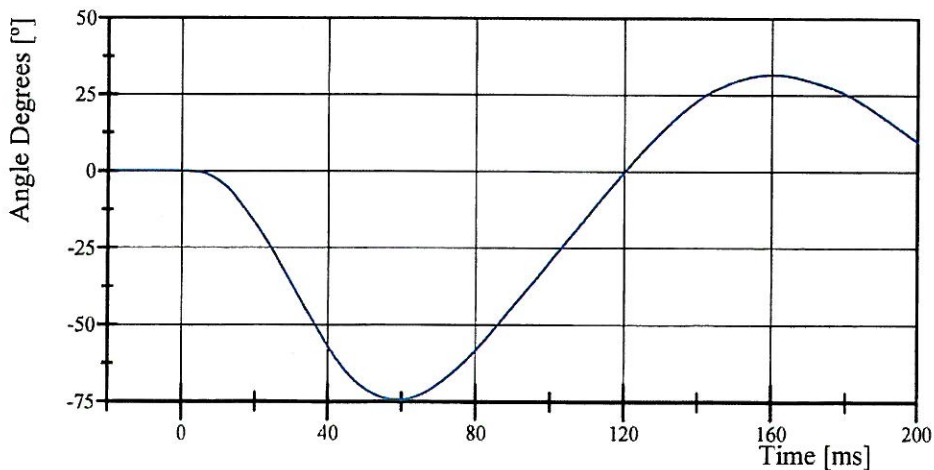


Filter Class: CFC_60

Max: 18.7 ° at 157.7 ms

Min: -46.2 ° at 60.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 31.5 ° at 160.6 ms

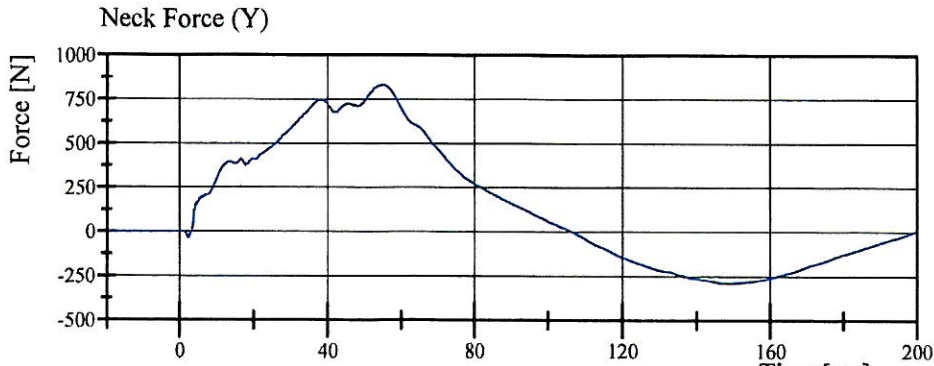
Min: -74.4 ° at 59.0 ms

Transportation Research Center Inc.

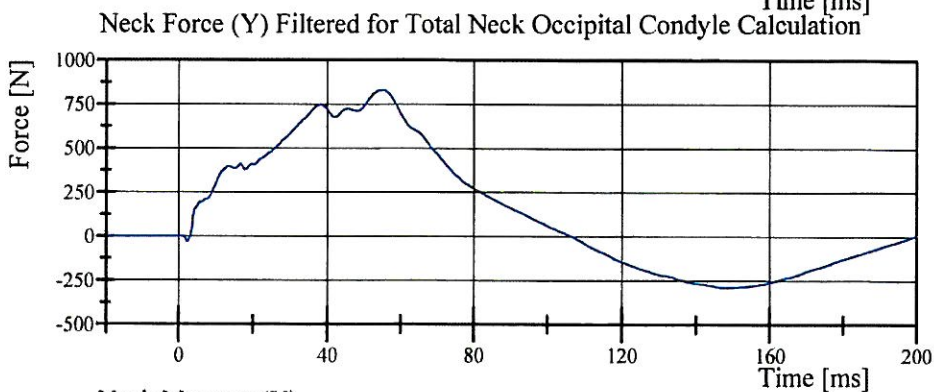
Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 2-1

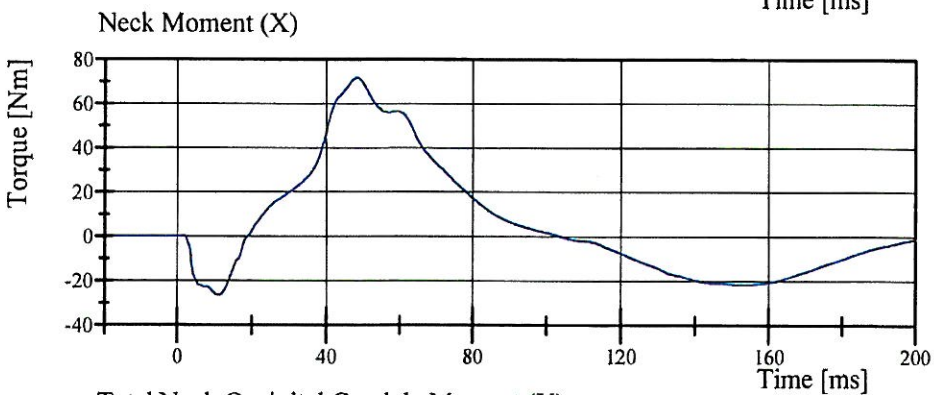
Test Date: 6/2/2009



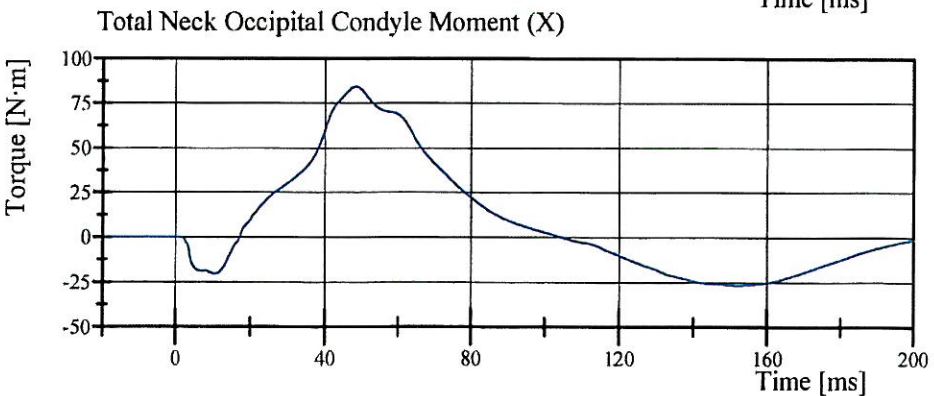
Filter Class: CFC_1000
Max: 832.7 N at 55.0 ms
Min: -289.6 N at 147.8 ms



Filter Class: CFC_600
Max: 832.0 N at 55.1 ms
Min: -289.4 N at 147.8 ms



Filter Class: CFC_600
Max: 71.8 Nm at 48.4 ms
Min: -26.6 Nm at 11.3 ms



Filter Class: CFC_600
Max: 84.4 N·m at 48.4 ms
Min: -26.7 N·m at 152.2 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 2-2

Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Maximum Force at Test Velocity	3,745 - 4,439 N	4,378.4 N	Yes
Maximum Displacement at Test Velocity	33.36 - 39.57 mm	39.008 mm	Yes

Test meets specifications.

Comments:

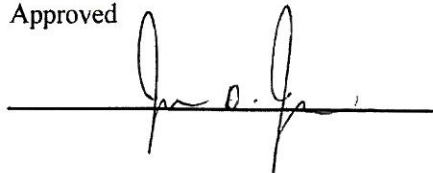
Actual Impactor Velocity (m/s): 6.096

Damper Setting: 7.5

Technician



Approved



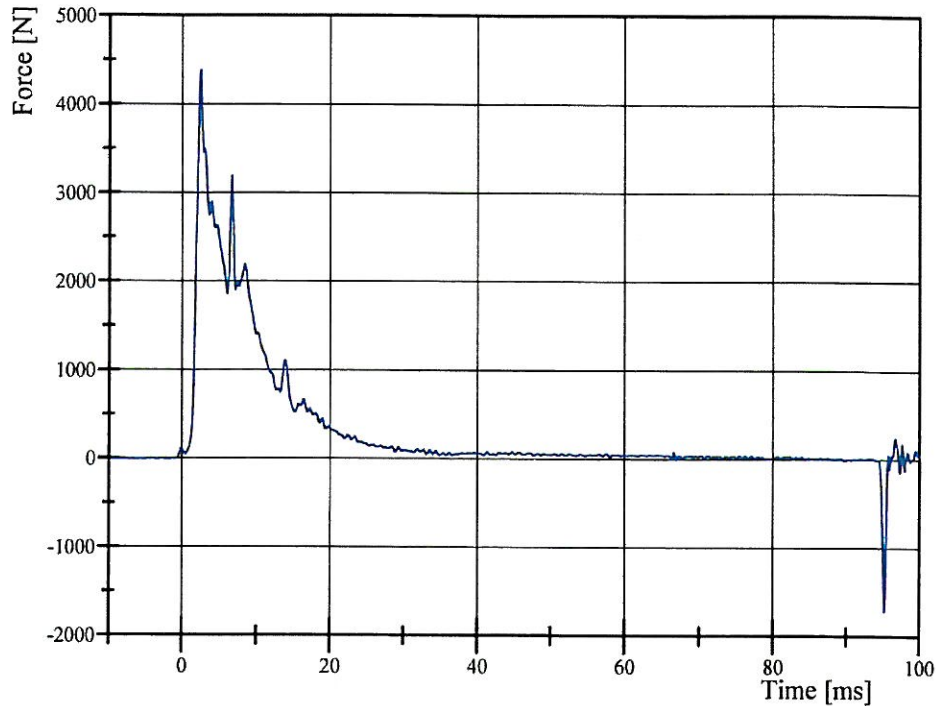
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 2-2

Test Date: 6/4/2009

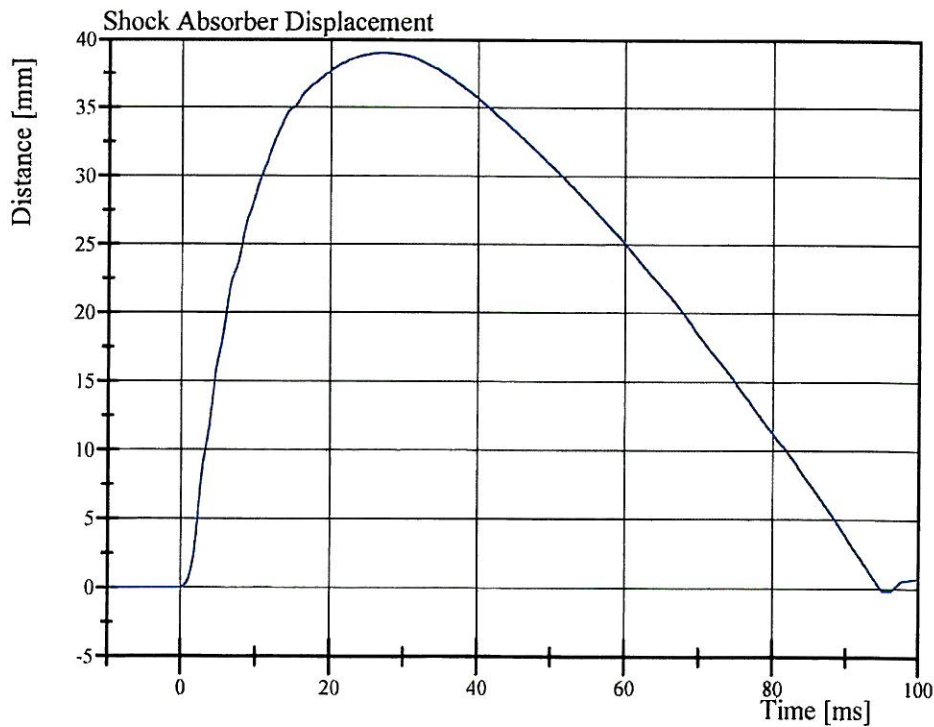
Shock Absorber Resistive Force



Filter Class: CFC_1000

Max: 4,378.4 N at 2.5 ms

Min: -1,713.7 N at 95.3 ms



Filter Class: CFC_1000

Max: 39.0 mm at 27.0 ms

Min: -0.2 mm at 95.3 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 2-6

Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	43 %	Yes
Maximum Force at Test Velocity	1,742 - 2,106 N	1,780.4 N	Yes
Maximum Displacement at Test Velocity	31.69 - 37.24 mm	37.066 mm	Yes

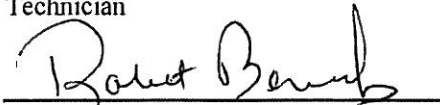
Test meets specifications.

Comments:

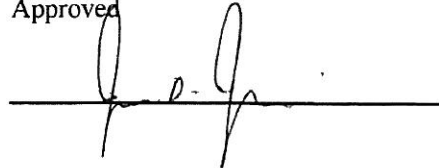
Actual Impactor Velocity (m/s): 4.276

Damper Setting: 7.5

Technician



Approved

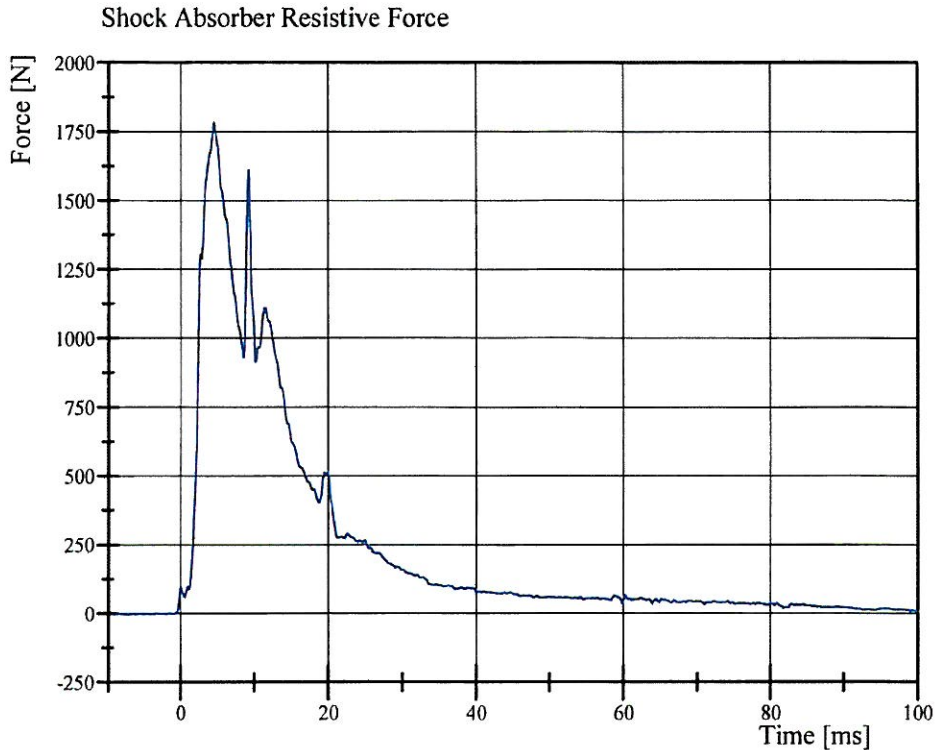


Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 2-6

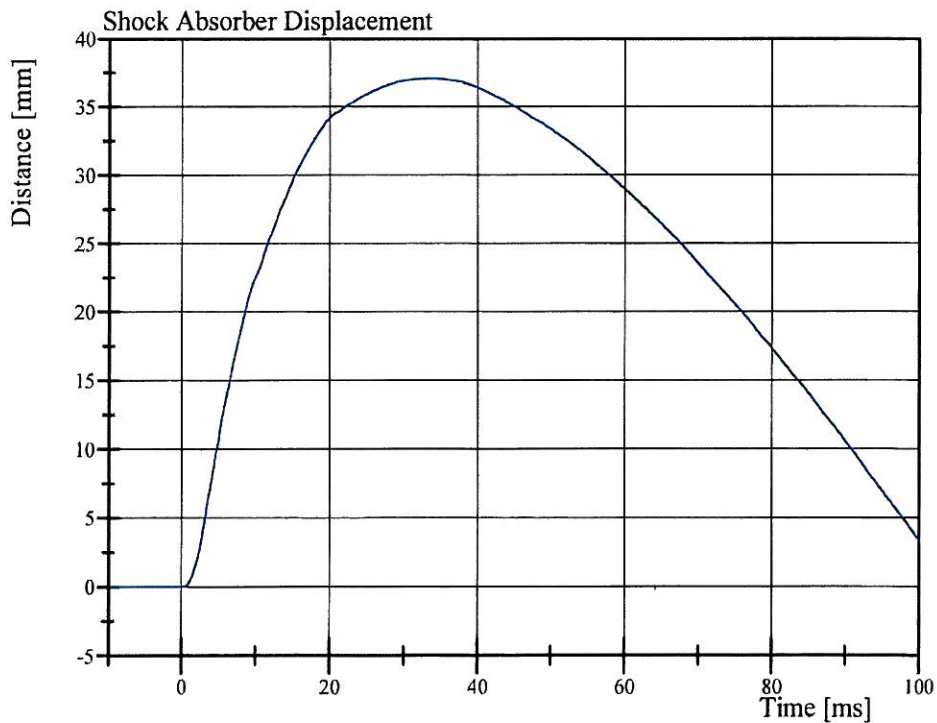
Test Date: 6/4/2009



Filter Class: CFC_1000

Max: 1,780.4 N at 4.6 ms

Min: -3.6 N at -9.0 ms



Filter Class: CFC_1000

Max: 37.1 mm at 33.8 ms

Min: -0.0 mm at -6.5 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 2-1

Test Date: 6/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Maximum Force at Test Velocity	834 - 1,120 N	874.8 N	Yes
Maximum Displacement at Test Velocity	30.15 - 35.12 mm	34.856 mm	Yes

Test meets specifications.

Comments:

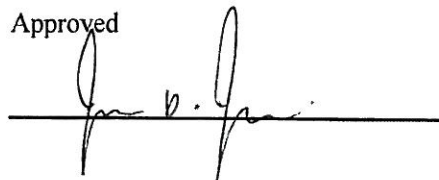
Actual Impactor Velocity (m/s): 3.038

Damper Setting: 7.5

Technician



Approved

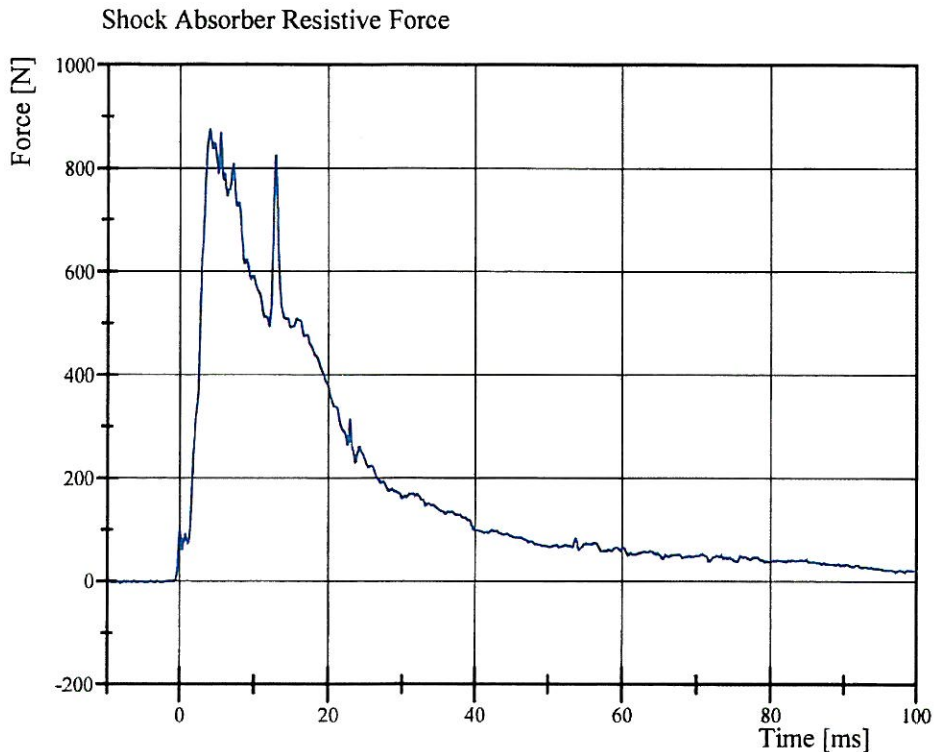


Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 2-1

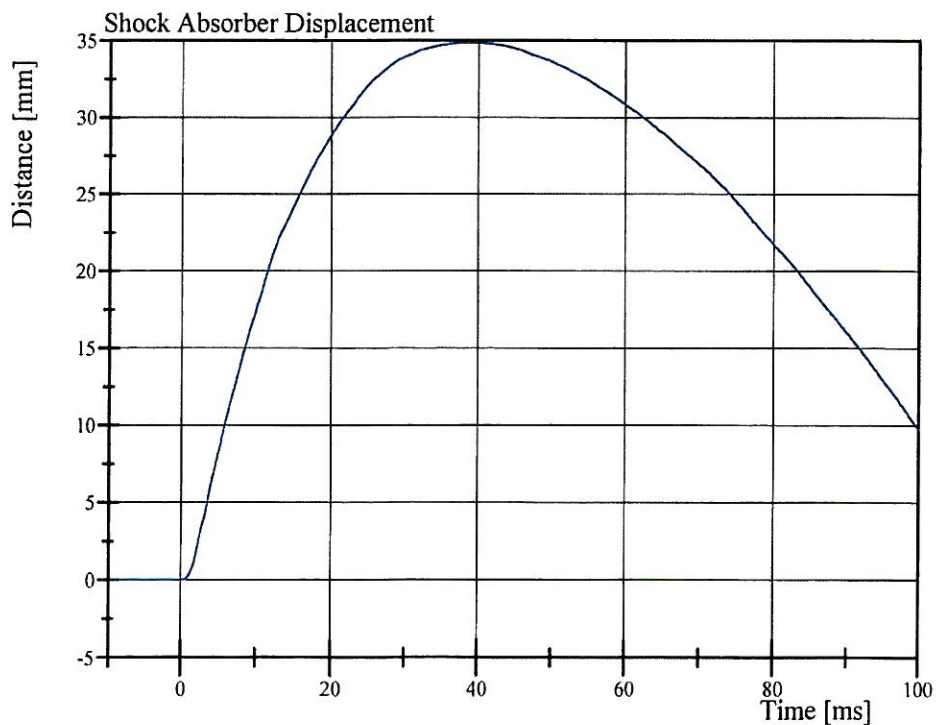
Test Date: 6/2/2009



Filter Class: CFC_1000

Max: 874.8 N at 4.0 ms

Min: -3.7 N at -8.2 ms



Filter Class: CFC_1000

Max: 34.9 mm at 38.5 ms

Min: -0.0 mm at -9.9 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 001 Certification No. 2-1

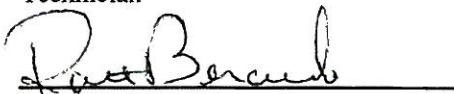
Test Date: 5/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.325 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	40.2 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	38.2 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	18.0 g	Yes

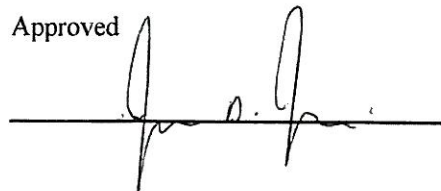
Test meets specifications.

Comments:

Technician



Approved



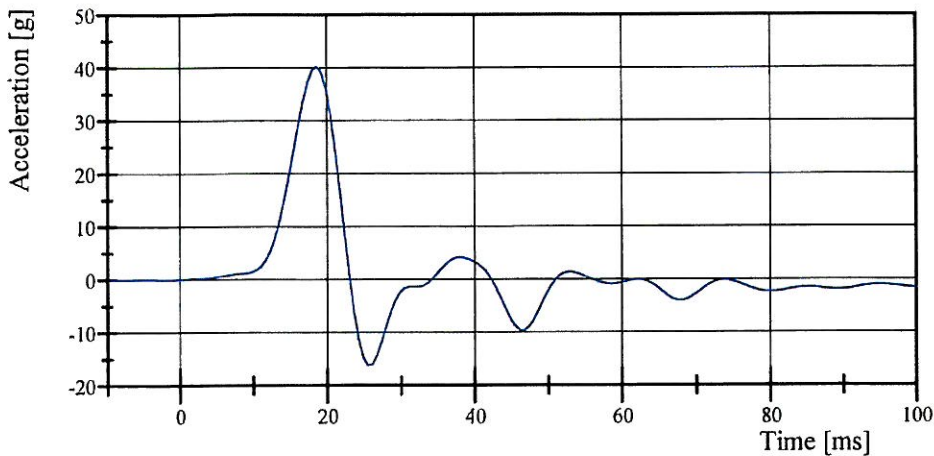
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 001 Certification No. 2-1

Test Date: 5/28/2009

Upper Rib Acceleration (Y)

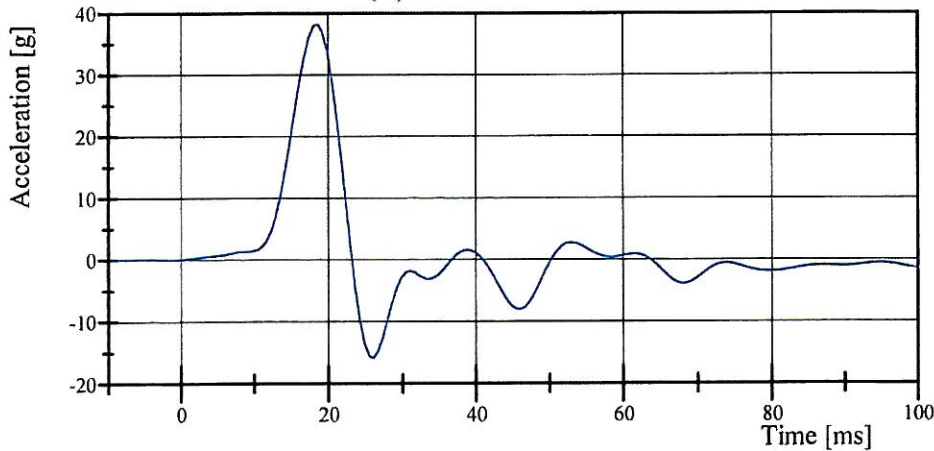


Filter Class: FIR_100

Max: 40.2 g at 18.6 ms

Min: -16.2 g at 25.5 ms

Lower Rib Acceleration (Y)

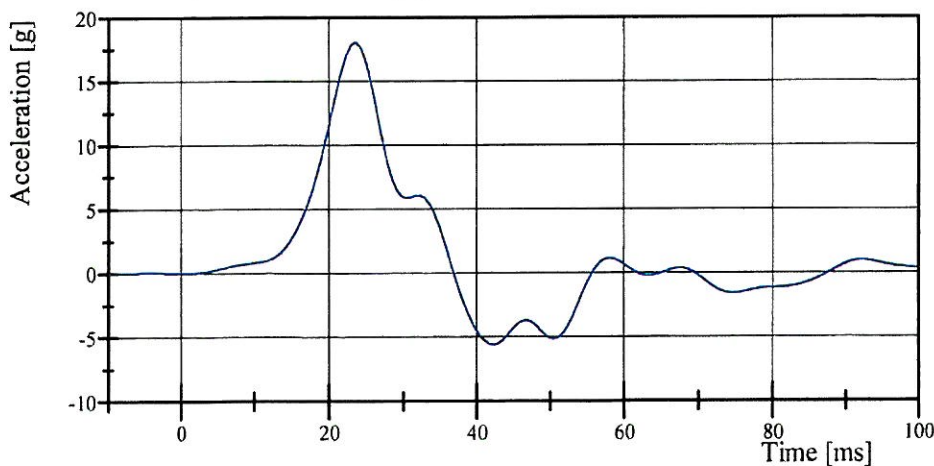


Filter Class: FIR_100

Max: 38.2 g at 18.6 ms

Min: -15.9 g at 26.1 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100

Max: 18.0 g at 23.6 ms

Min: -5.6 g at 42.3 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 001 Certification No. 2-2

Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.827 mm/s	Yes

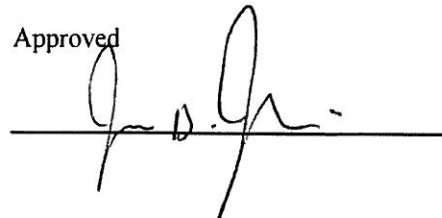
Test meets specifications.

Comments:

Technician



Approved



Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 001 Certification No. 2-2

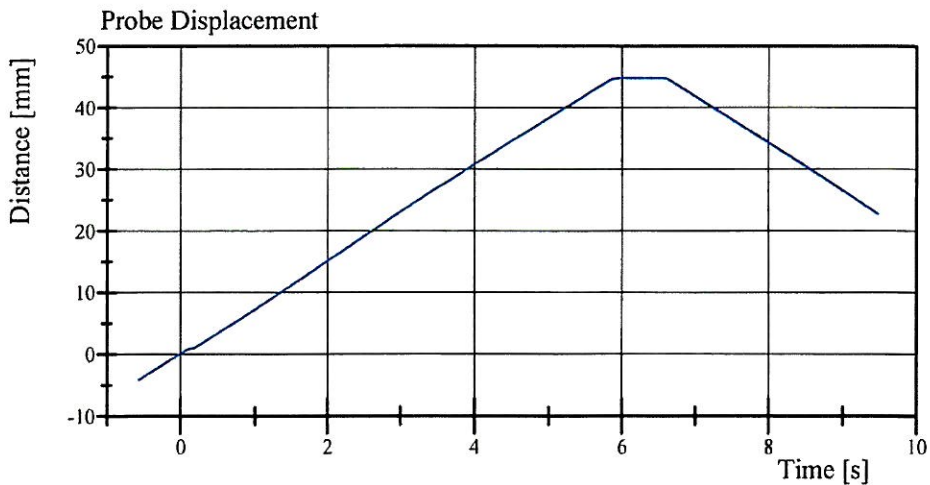
Test Date: 6/4/2009



Filter Class: CFC_600

Max: 566.4 N at 5.9 s

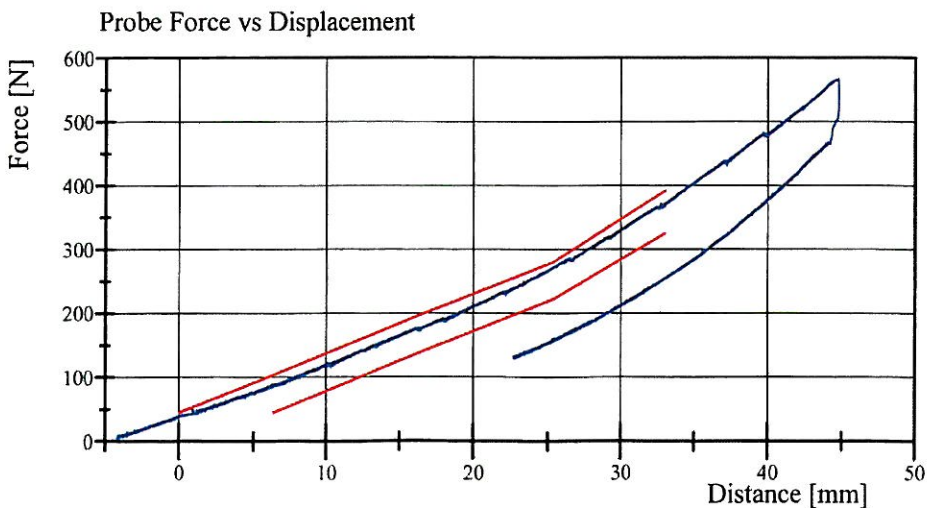
Min: 3.5 N at -0.6 s



Filter Class: CFC_180

Max: 44.8 mm at 6.3 s

Min: -4.2 mm at -0.6 s



Filter Class: CFC_600

Max: 566.4 N at 44.7 mm

Min: 3.5 N at -4.2 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 04-Jun-09

TRC, INC.

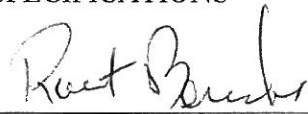
TEST NO: TOFL-01

572B SN 001 TORSO FLEX CAL 02

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	22.0 °C
RELATIVE HUMIDITY	10 – 70 %	43 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	127.5 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	185.0 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	221.5 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	5.5 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 001 Certification No. 2-6

Test Date: 6/5/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.330 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	6.2 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	50.5 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

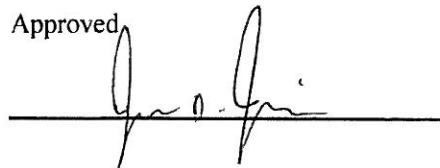
Test meets specifications.

Comments:

Technician



Approved

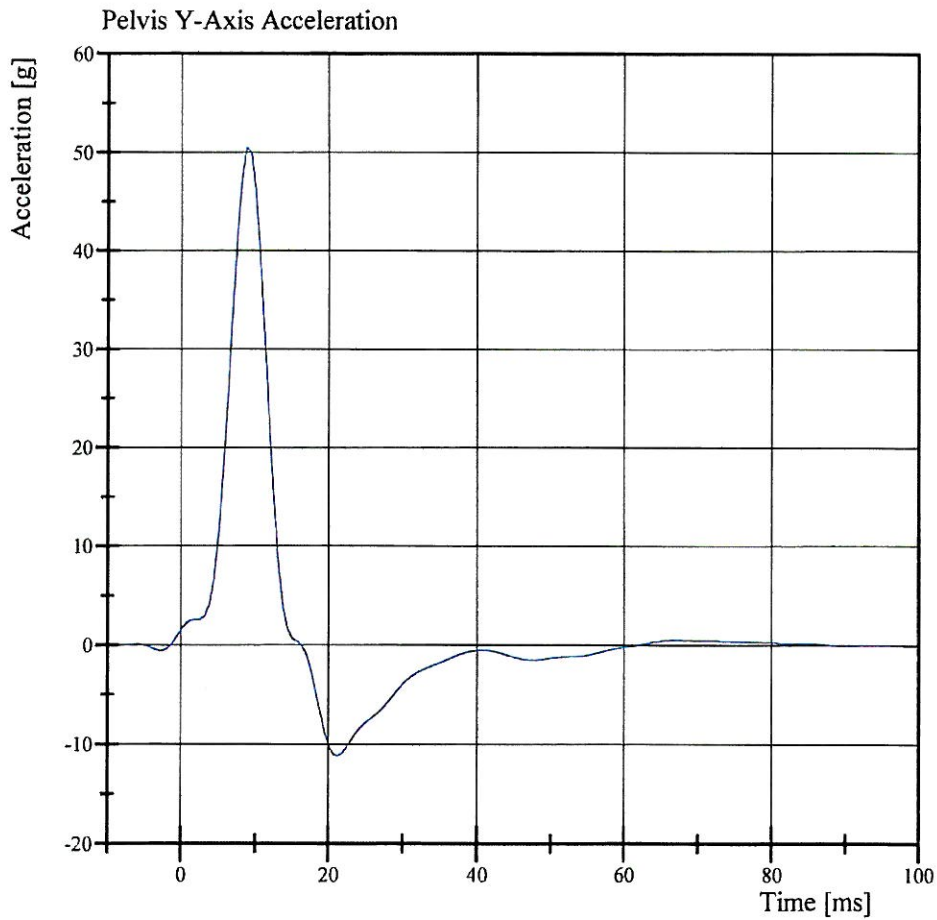


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 001 Certification No. 2-6

Test Date: 6/5/2009



Filter Class: FIR_100

Max: 50.5 g at 8.8 ms

Min: -11.2 g at 21.3 ms

CALIBRATION TEST RESULTS

POST-TEST

SID/HIII: 001

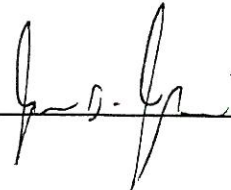
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 001 Calibration No. 03

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	902 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	519 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	497 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	384 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	175 mm	Yes
Difference Between Top & Bottom Rib Width from C/L		$\leq$ 2.5 mm	1.0 mm	Yes

Technician



Approved





Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 001 Certification No. 3-1

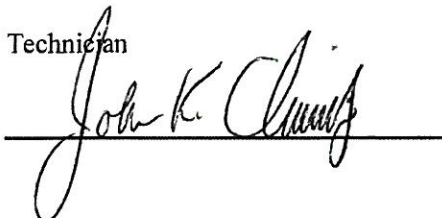
Test Date: 7/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	135.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-6.1 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

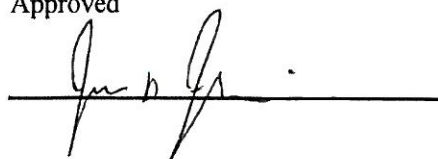
Test meets specifications.

Comments:

Technician



Approved

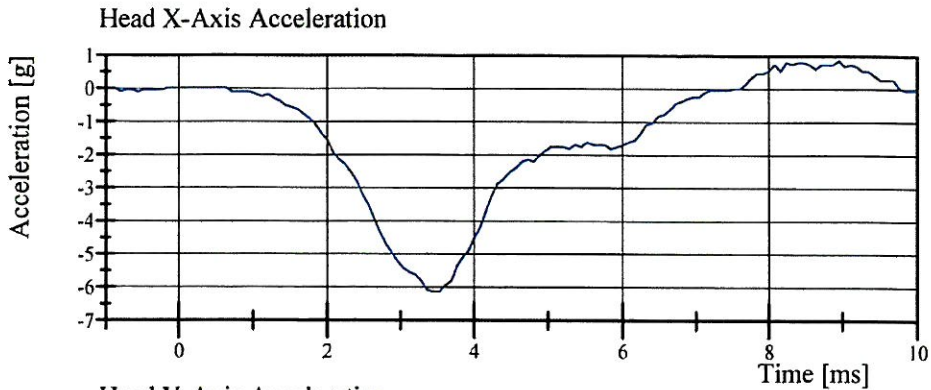


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 001 Certification No. 3-1

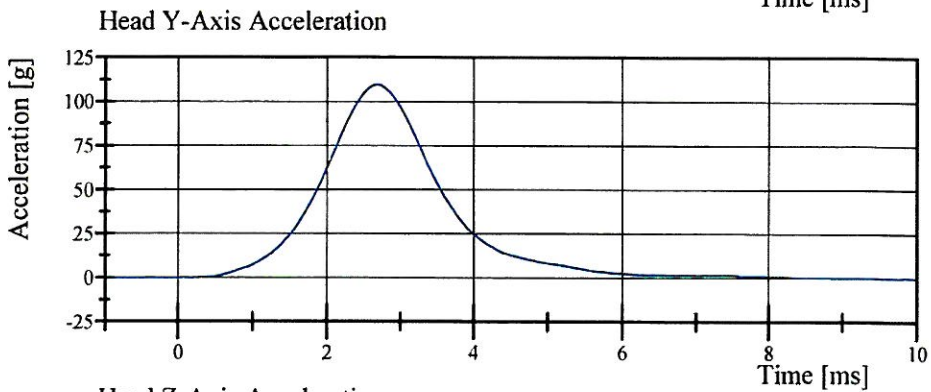
Test Date: 7/2/2009



Filter Class: CFC_1000

Max: 0.9 g at 9.0 ms

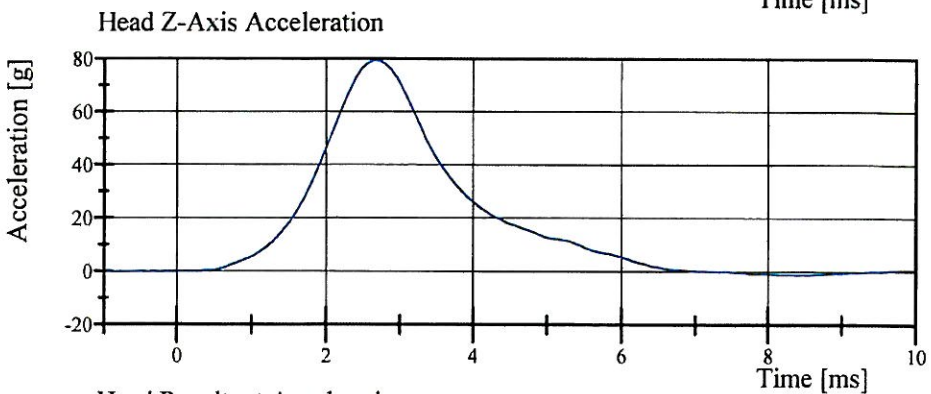
Min: -6.1 g at 3.4 ms



Filter Class: CFC_1000

Max: 109.5 g at 2.6 ms

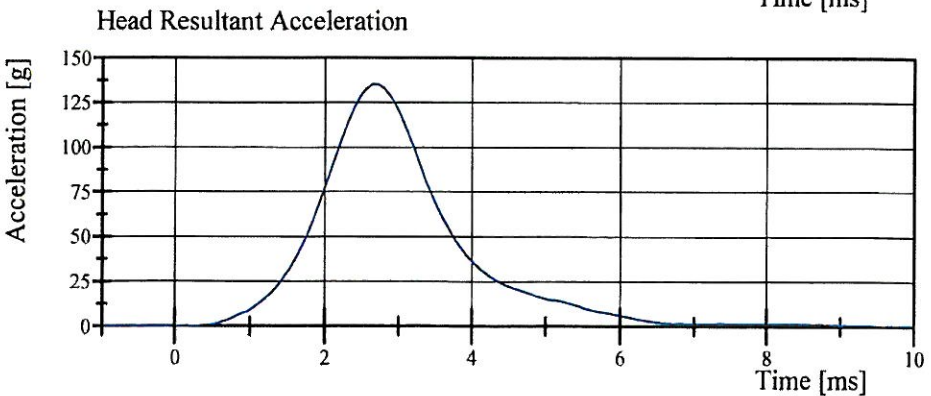
Min: -0.1 g at 9.7 ms



Filter Class: CFC_1000

Max: 79.3 g at 2.6 ms

Min: -1.2 g at 8.4 ms



Filter Class: CFC_1000

Max: 135.2 g at 2.6 ms

Min: 0.0 g at -0.9 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-6.927 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.480 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.759 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.579 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.227 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-68.6 °	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	84.9 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	54.2 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	9.5 ms	Yes

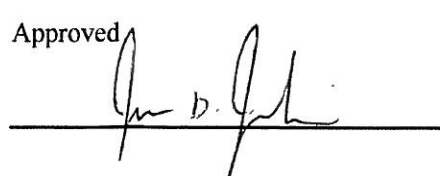
Test meets specifications.

Comments:

Technician



Approved

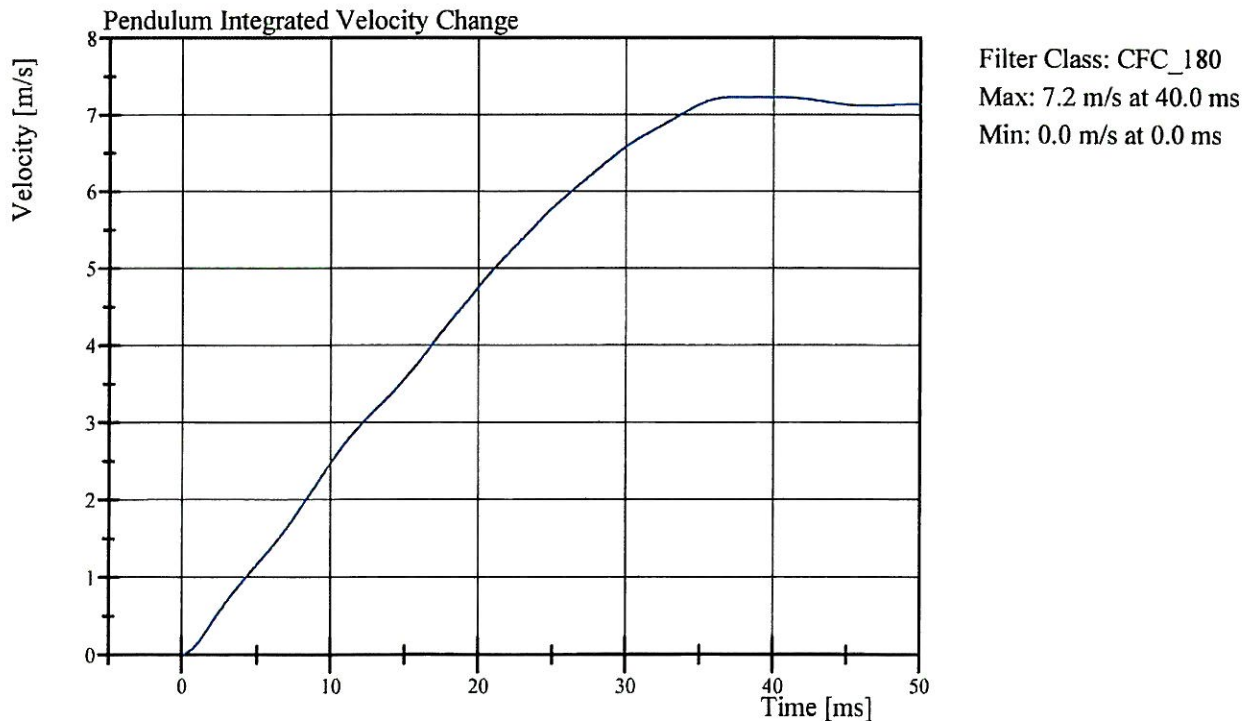
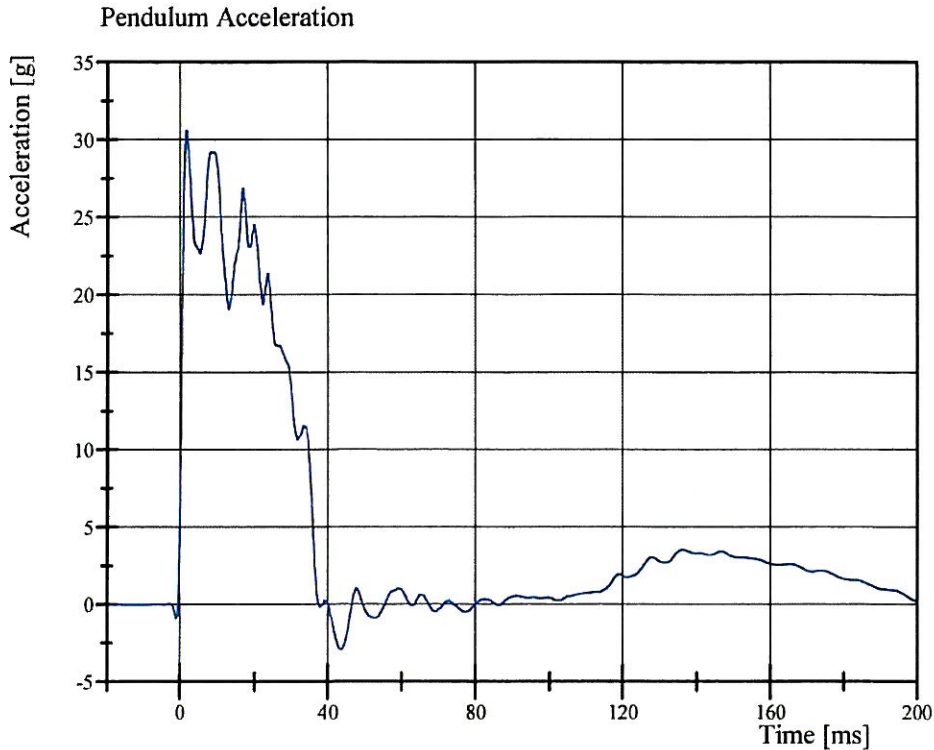


Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/2/2009



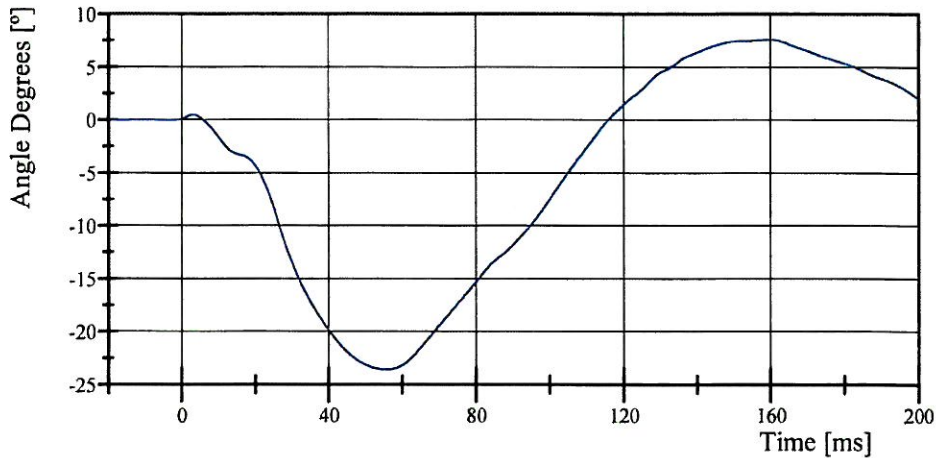
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/2/2009

Pot Rotation at the Base of Neck

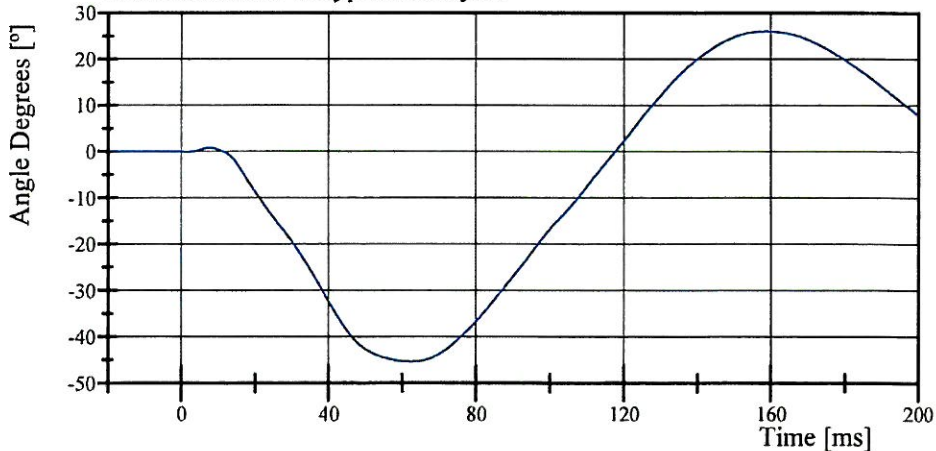


Filter Class: CFC_60

Max: 7.6 ° at 159.5 ms

Min: -23.6 ° at 55.8 ms

Head Rotation at Occypital Condyles

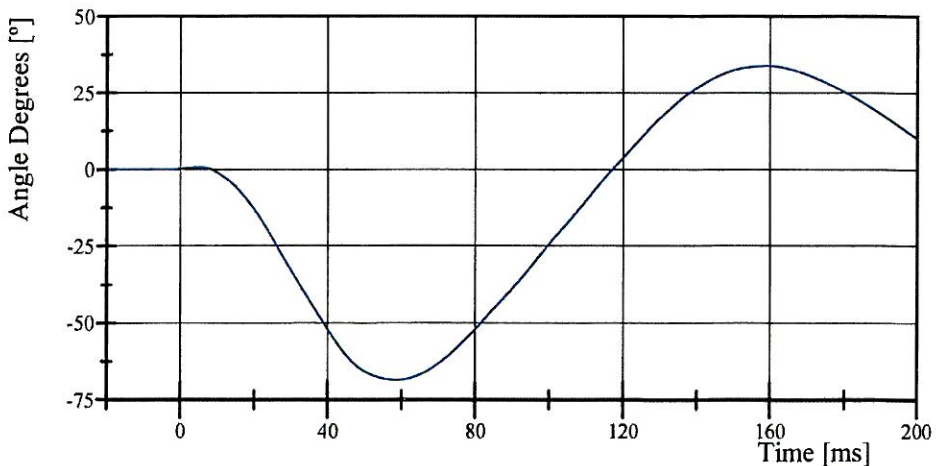


Filter Class: CFC_60

Max: 26.1 ° at 158.7 ms

Min: -45.4 ° at 62.4 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 33.7 ° at 159.1 ms

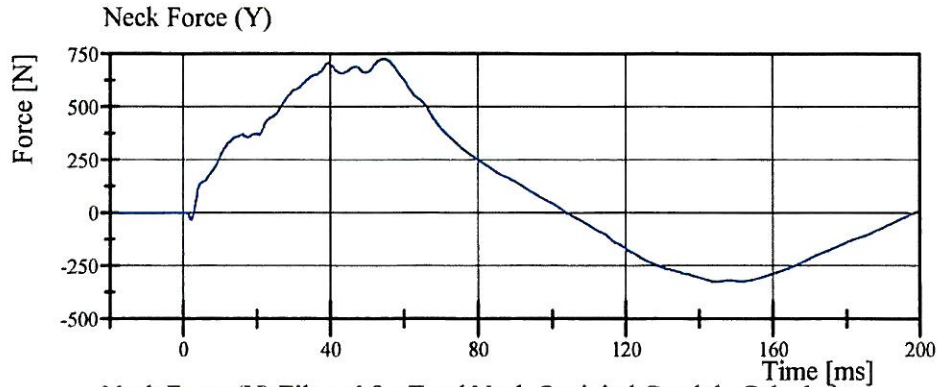
Min: -68.6 ° at 58.6 ms

Transportation Research Center Inc.

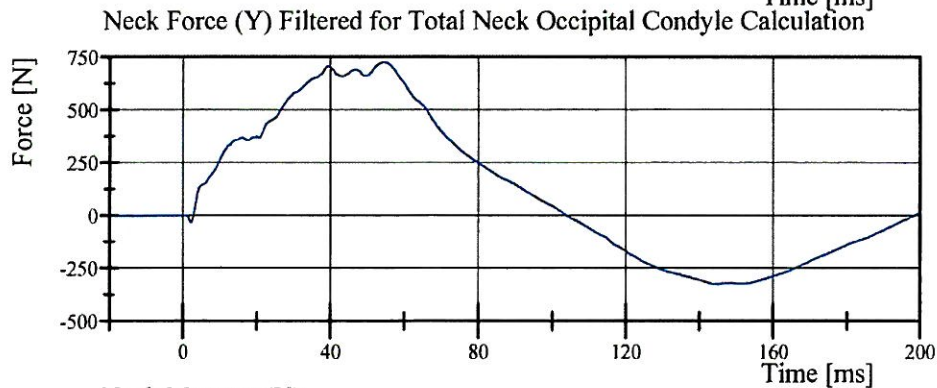
Left Lateral Neck

SID-HIII Serial No. 001 Certification No. 3-1

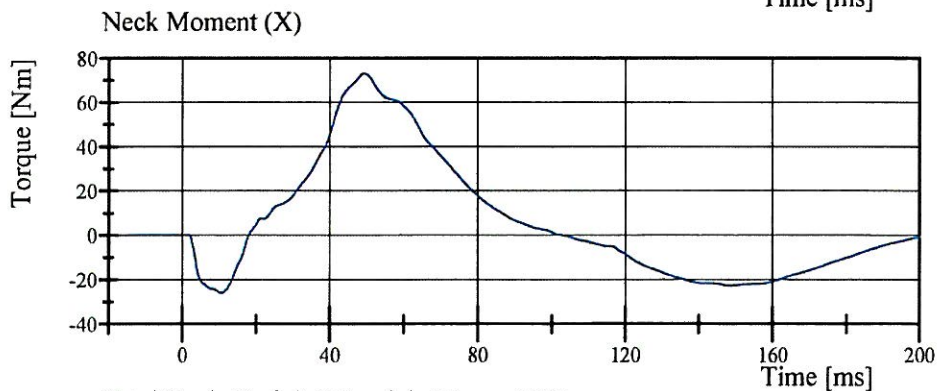
Test Date: 7/2/2009



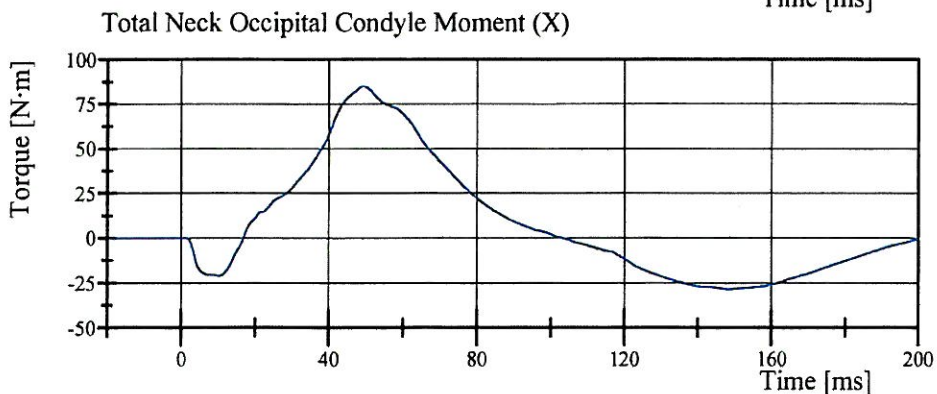
Filter Class: CFC_1000
Max: 727.3 N at 54.6 ms
Min: -324.9 N at 144.3 ms



Filter Class: CFC_600
Max: 726.8 N at 54.7 ms
Min: -324.5 N at 144.4 ms



Filter Class: CFC_600
Max: 73.1 Nm at 49.1 ms
Min: -26.0 Nm at 10.5 ms



Filter Class: CFC_600
Max: 84.9 N·m at 49.0 ms
Min: -28.4 N·m at 148.2 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 3-2

Test Date: 7/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Maximum Force at Test Velocity	3,745 - 4,439 N	4,112.1 N	Yes
Maximum Displacement at Test Velocity	33.36 - 39.57 mm	38.875 mm	Yes

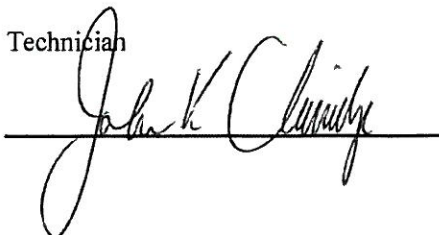
Test meets specifications.

Comments:

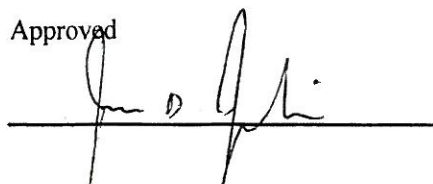
Actual Impactor Velocity (m/s): 6.096

Damper Setting: 7.5

Technician



Approved



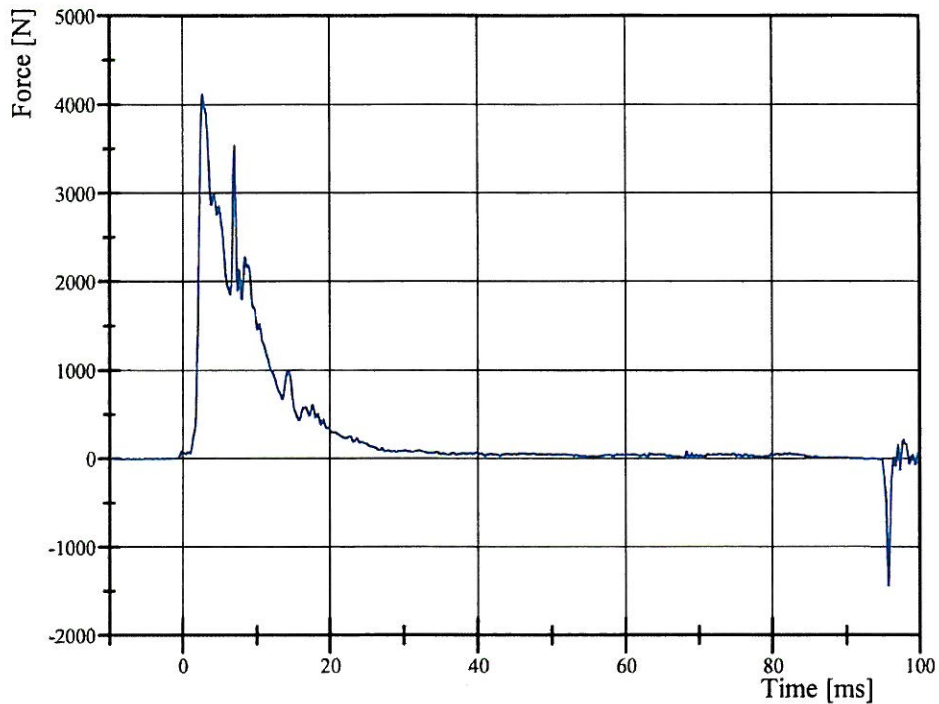
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 3-2

Test Date: 7/2/2009

Shock Absorber Resistive Force

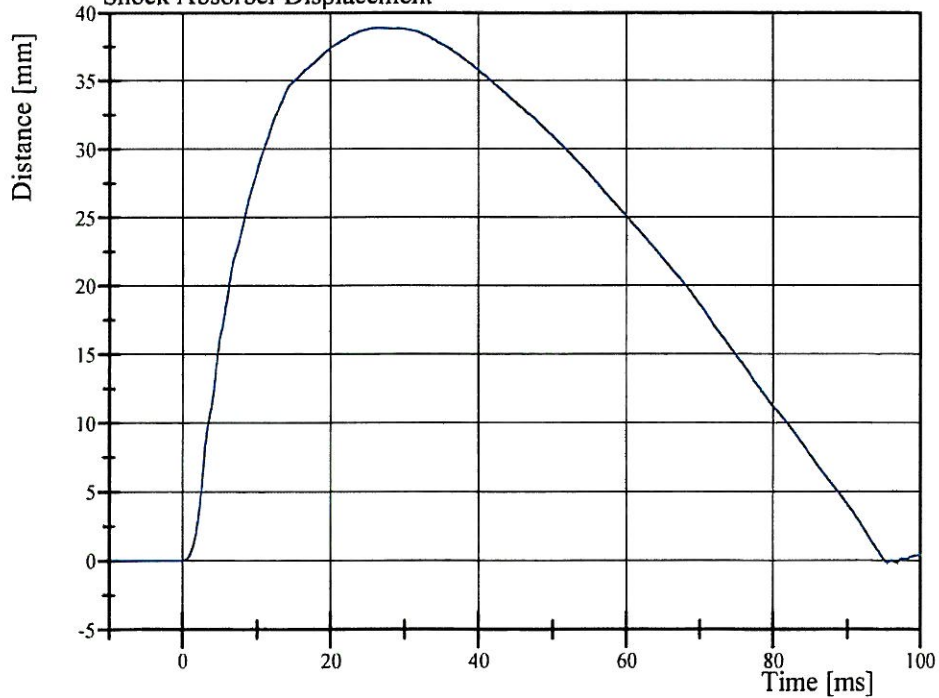


Filter Class: CFC_1000

Max: 4,112.1 N at 2.6 ms

Min: -1,438.6 N at 95.8 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 38.9 mm at 26.6 ms

Min: -0.1 mm at 96.7 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Maximum Force at Test Velocity	1,749 - 2,114 N	1,773.9 N	Yes
Maximum Displacement at Test Velocity	31.69 - 37.25 mm	37.175 mm	Yes

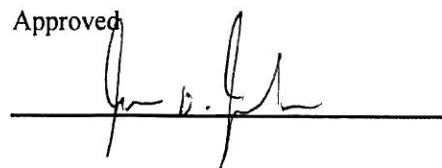
Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 4.283

Damper Setting: 7.5

Technician


Approved


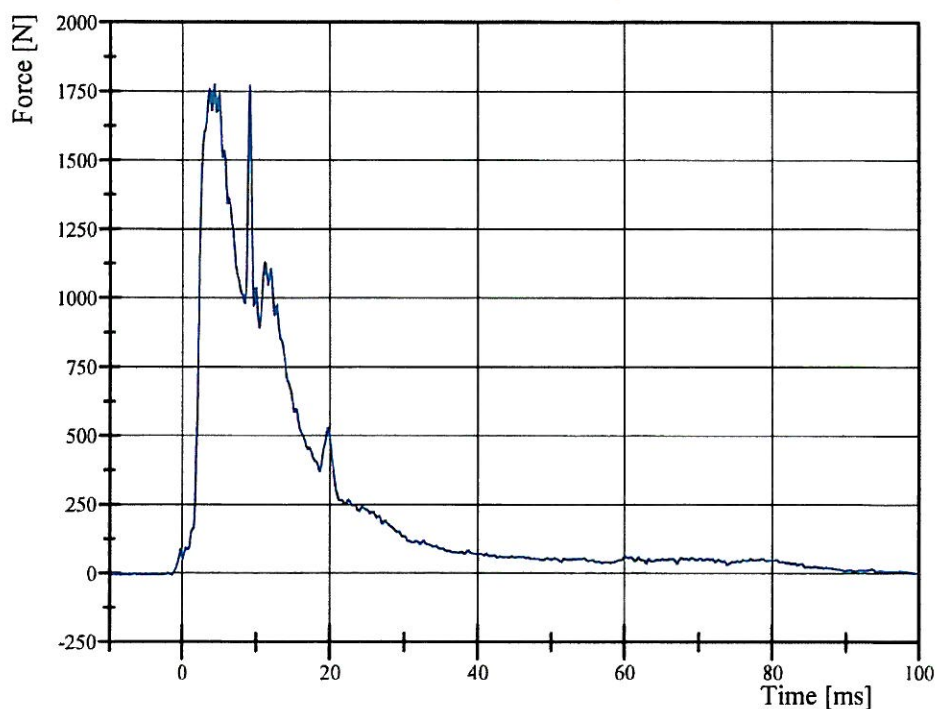
Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/2/2009

Shock Absorber Resistive Force

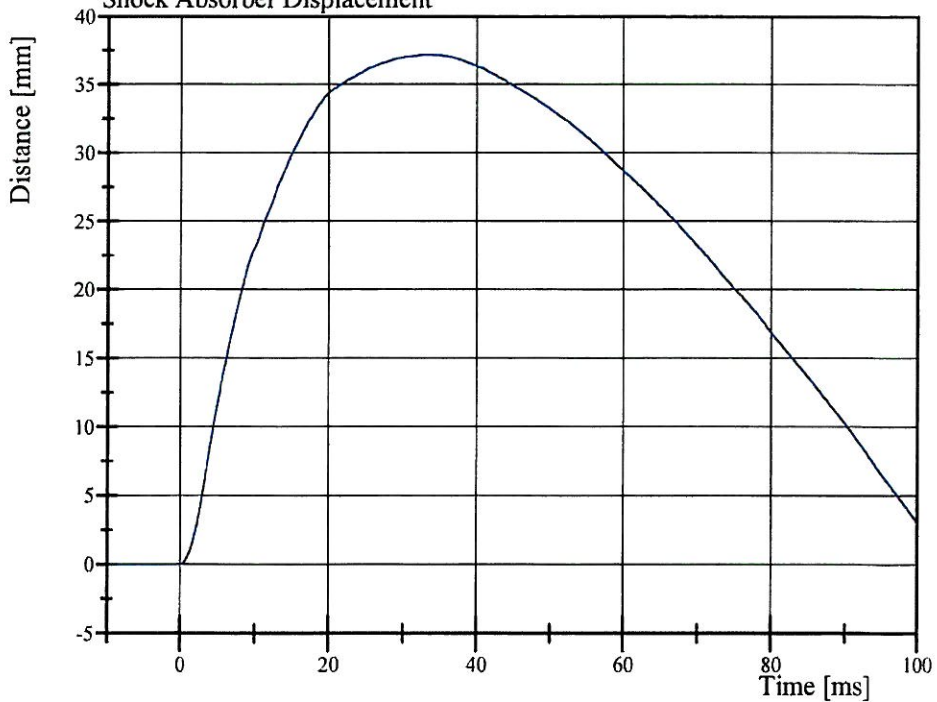


Filter Class: CFC_1000

Max: 1,773.9 N at 4.4 ms

Min: -6.0 N at -8.5 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 37.2 mm at 33.0 ms

Min: -0.0 mm at -0.2 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/2/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Maximum Force at Test Velocity	856 - 1,146 N	955.8 N	Yes
Maximum Displacement at Test Velocity	30.2 - 35.19 mm	35.015 mm	Yes

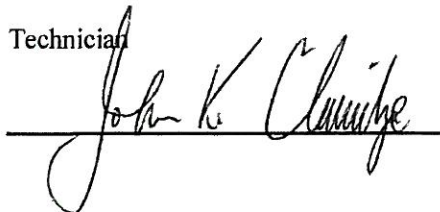
Test meets specifications.

Comments:

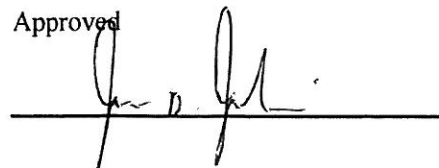
Actual Impactor Velocity (m/s): 3.076

Damper Setting: 7.5

Technician



Approved



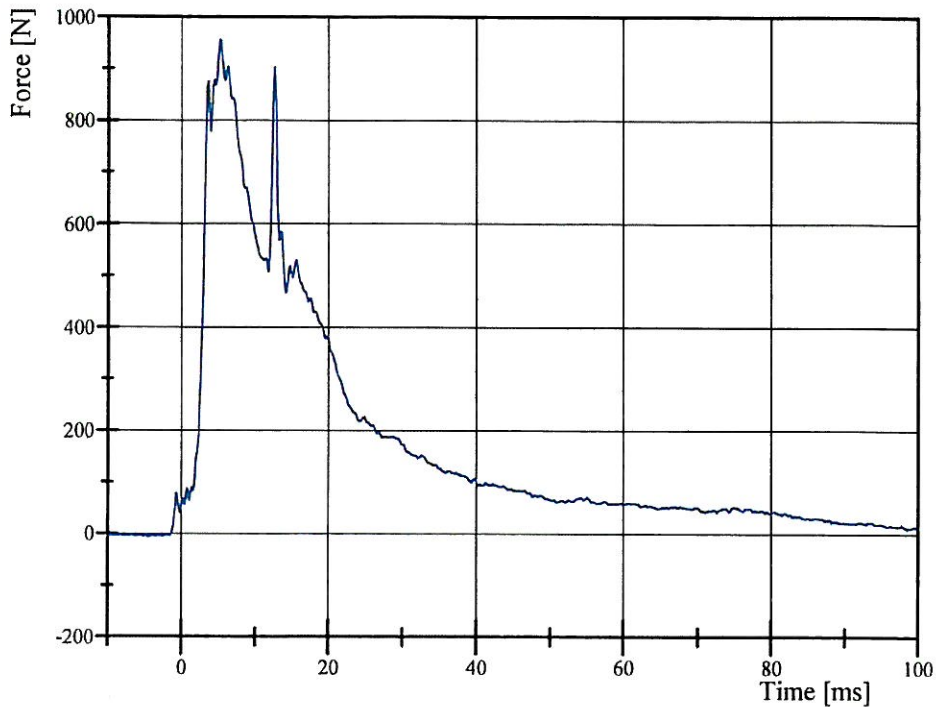
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/2/2009

Shock Absorber Resistive Force

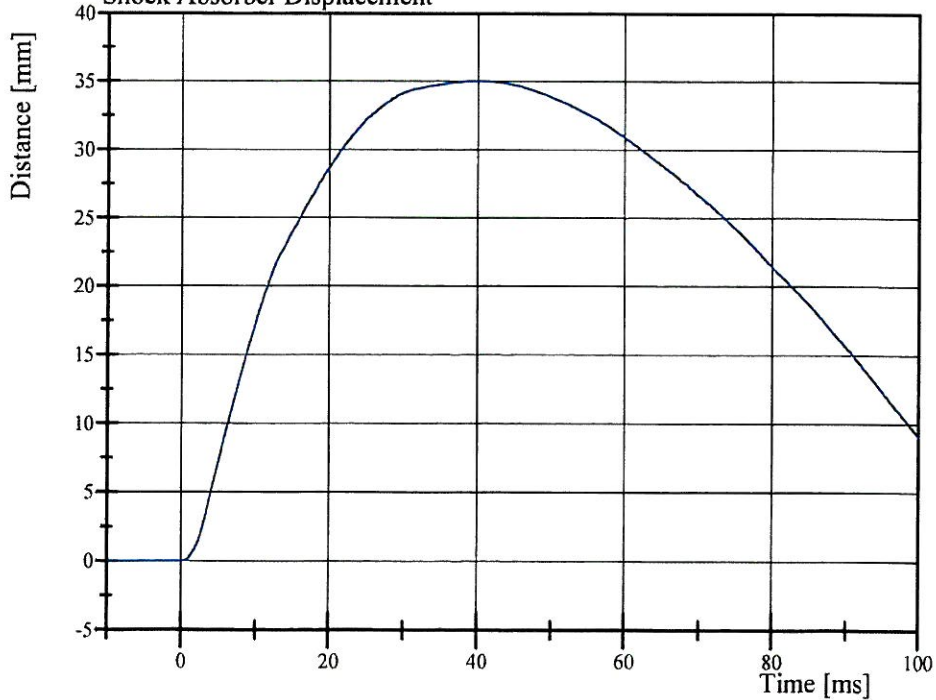


Filter Class: CFC_1000

Max: 955.8 N at 5.2 ms

Min: -5.4 N at -9.9 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 35.0 mm at 39.6 ms

Min: -0.0 mm at -10.0 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 001 Certification No. 3-2

Test Date: 7/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.313 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	42.9 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	42.7 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	20.1 g	Yes

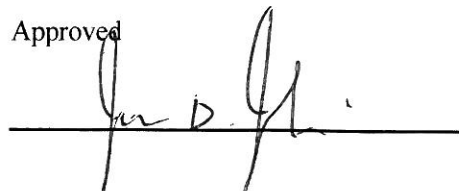
Test meets specifications.

Comments:

Technician



Approved



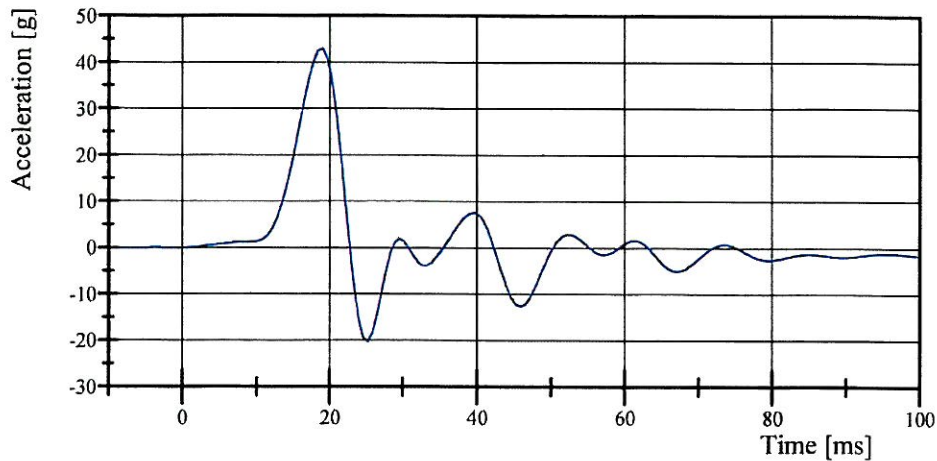
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 001 Certification No. 3-2

Test Date: 7/9/2009

Upper Rib Acceleration (Y)

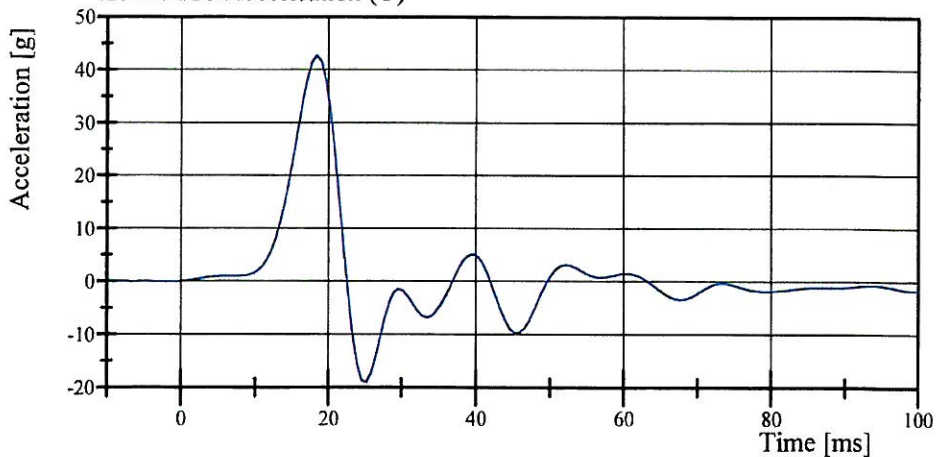


Filter Class: FIR_100

Max: 42.9 g at 19.0 ms

Min: -20.2 g at 25.2 ms

Lower Rib Acceleration (Y)

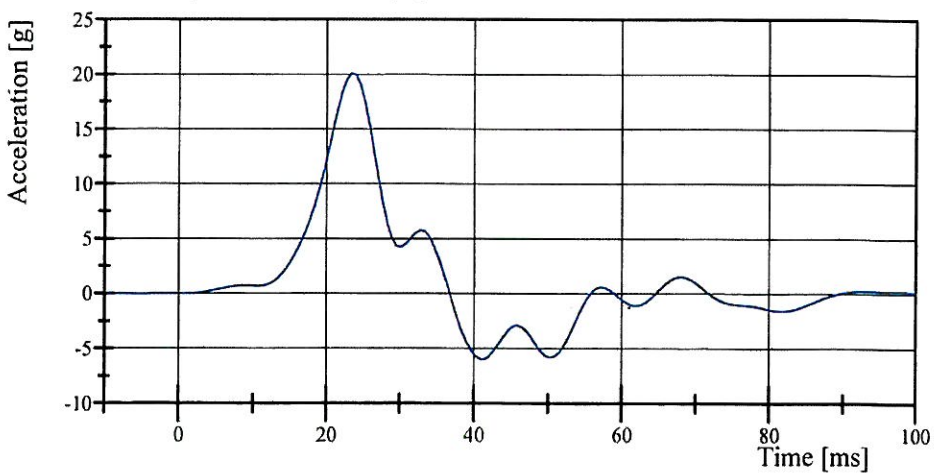


Filter Class: FIR_100

Max: 42.7 g at 18.3 ms

Min: -19.0 g at 25.2 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100

Max: 20.1 g at 23.4 ms

Min: -6.0 g at 40.9 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 001 Certification No. 3-4

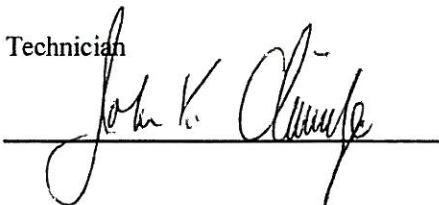
Test Date: 7/8/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.745 mm/s	Yes

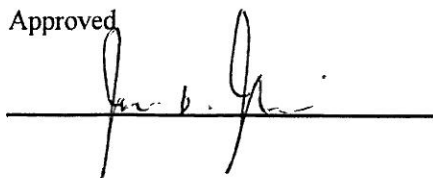
Test meets specifications.

Comments:

Technician



Approved

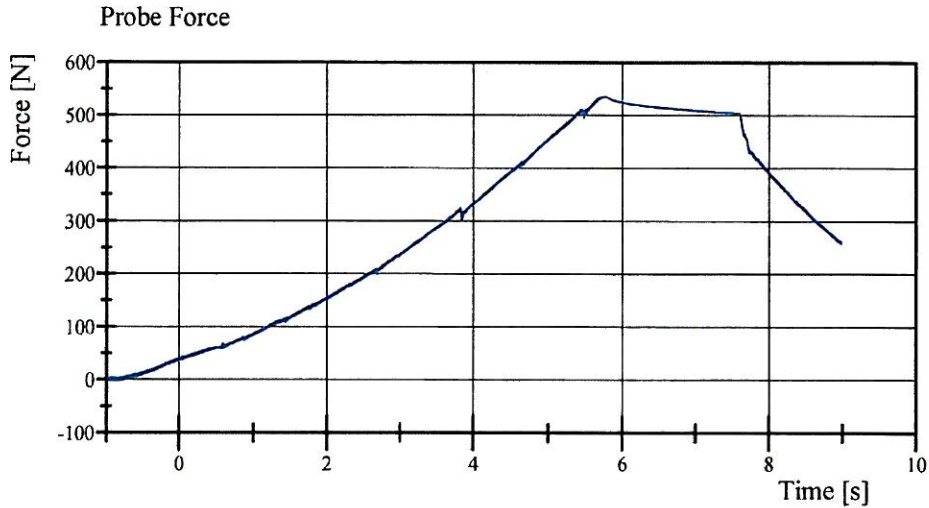


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 001 Certification No. 3-4

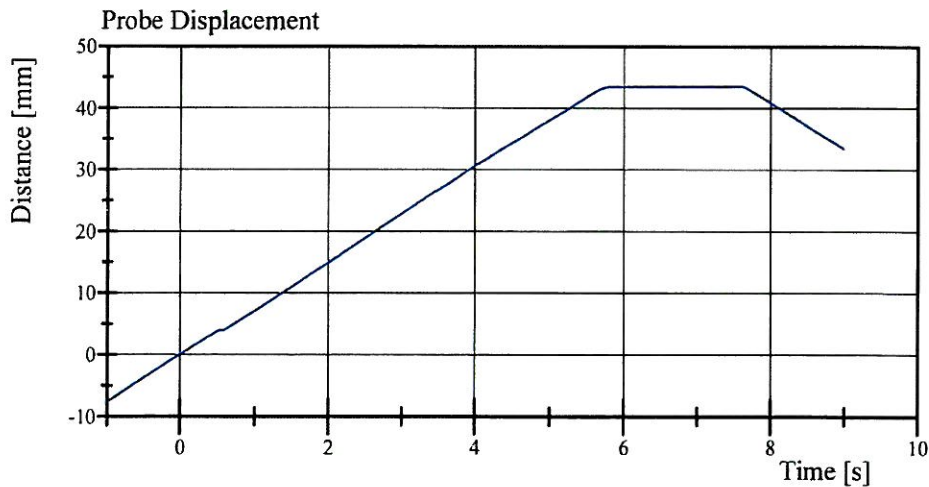
Test Date: 7/8/2009



Filter Class: CFC_600

Max: 535.4 N at 5.7 s

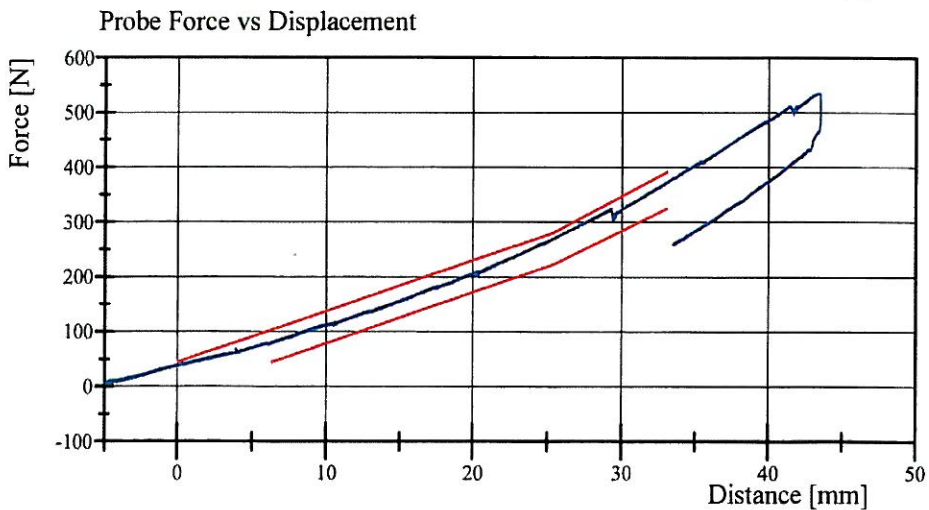
Min: -2.8 N at -0.8 s



Filter Class: CFC_180

Max: 43.5 mm at 7.6 s

Min: -7.7 mm at -1.0 s



Filter Class: CFC_600

Max: 535.4 N at 43.4 mm

Min: -3.2 N at -7.8 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 02-Jul-09

TRC, INC.

TEST NO: TOFL-01

572B SN 001 TORSO FLEX CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	52 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	132.5 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	188.0 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	225.5 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	5.9 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 001 Certification No. 3-1

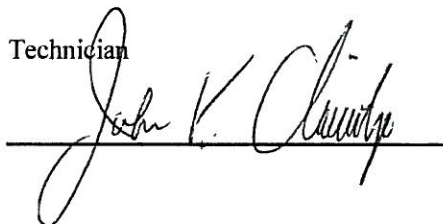
Test Date: 7/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.322 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	6.4 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	46.2 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

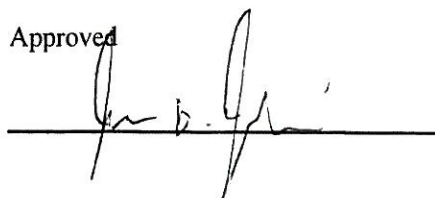
Test meets specifications.

Comments:

Technician



Approved

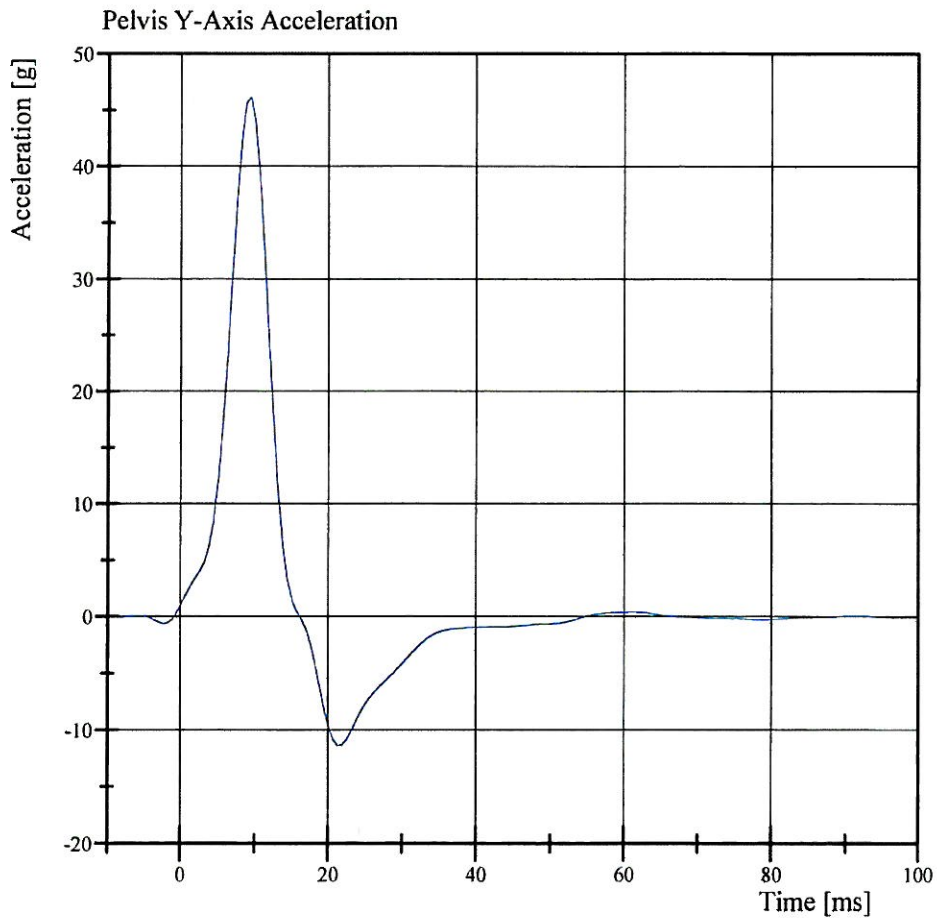


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 001 Certification No. 3-1

Test Date: 7/9/2009



Filter Class: FIR_100

Max: 46.2 g at 9.4 ms

Min: -11.4 g at 21.3 ms

CALIBRATION TEST RESULTS

PRE-TEST

SID/HIII: 002

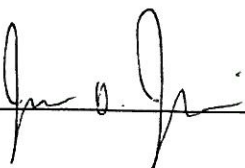
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 002 Calibration No. 03

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	510 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	518 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	499 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	377 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	175 mm	Yes
Difference Between Top & Bottom Rib Width from C/L		<= 2.5 mm	1.0 mm	Yes

Technician



Approved





Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 3-1

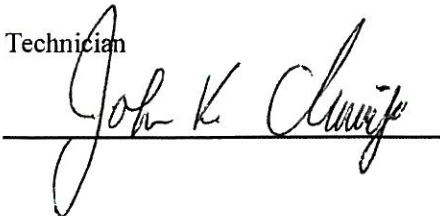
Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	131.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-14.6 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

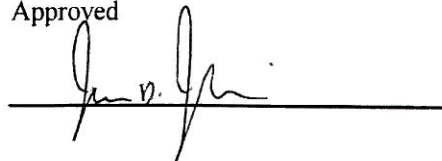
Test meets specifications.

Comments:

Technician



Approved

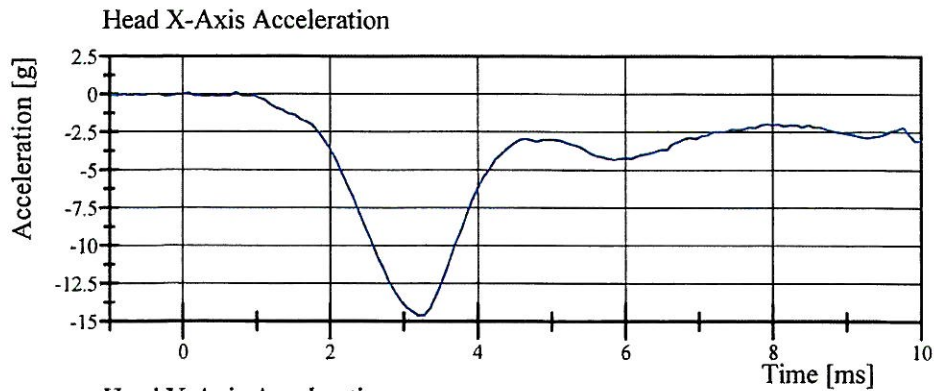


Transportation Research Center Inc.

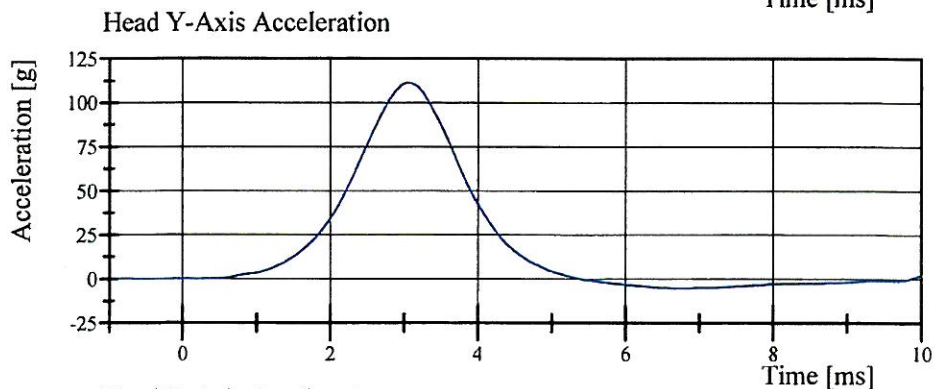
Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 3-1

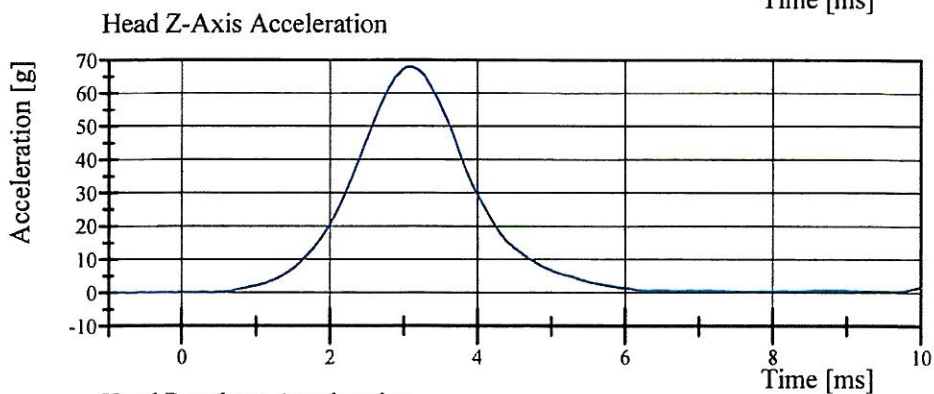
Test Date: 6/4/2009



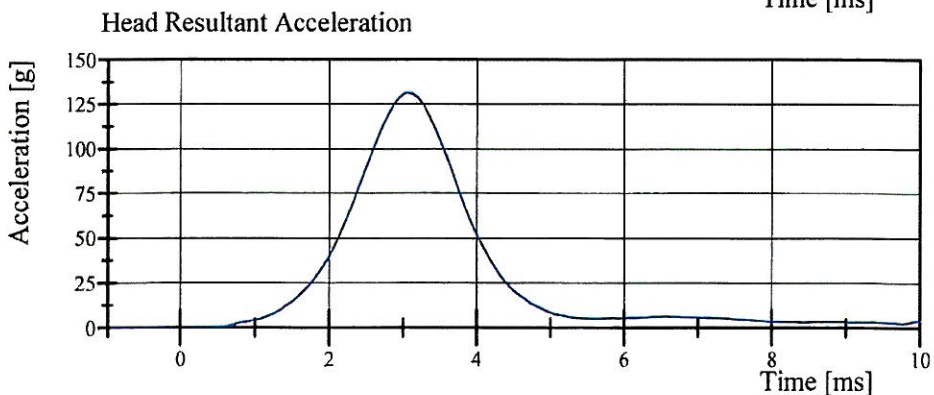
Filter Class: CFC_1000
Max: 0.1 g at 0.7 ms
Min: -14.6 g at 3.2 ms



Filter Class: CFC_1000
Max: 111.5 g at 3.0 ms
Min: -5.2 g at 6.9 ms



Filter Class: CFC_1000
Max: 68.0 g at 3.1 ms
Min: -0.1 g at -0.6 ms



Filter Class: CFC_1000
Max: 131.2 g at 3.0 ms
Min: 0.0 g at -0.4 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-7.020 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.328 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.586 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.502 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.310 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-75.1 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	63.0 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	84.0 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	53.0 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	9.0 ms	Yes

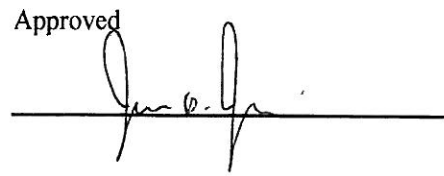
Test meets specifications.

Comments:

Technician



Approved

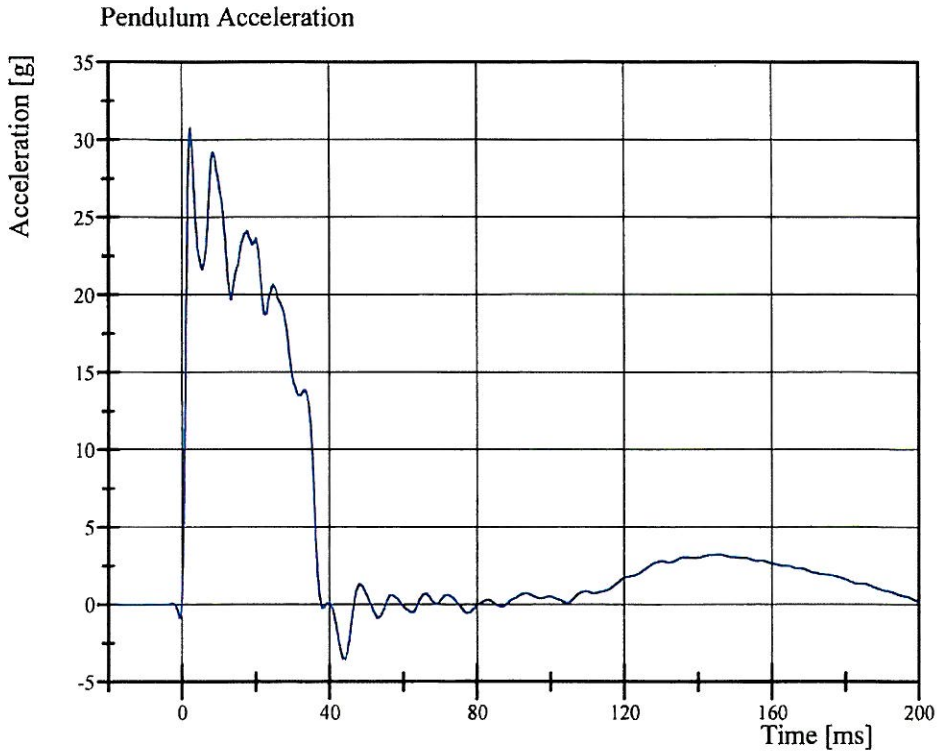


Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 3-1

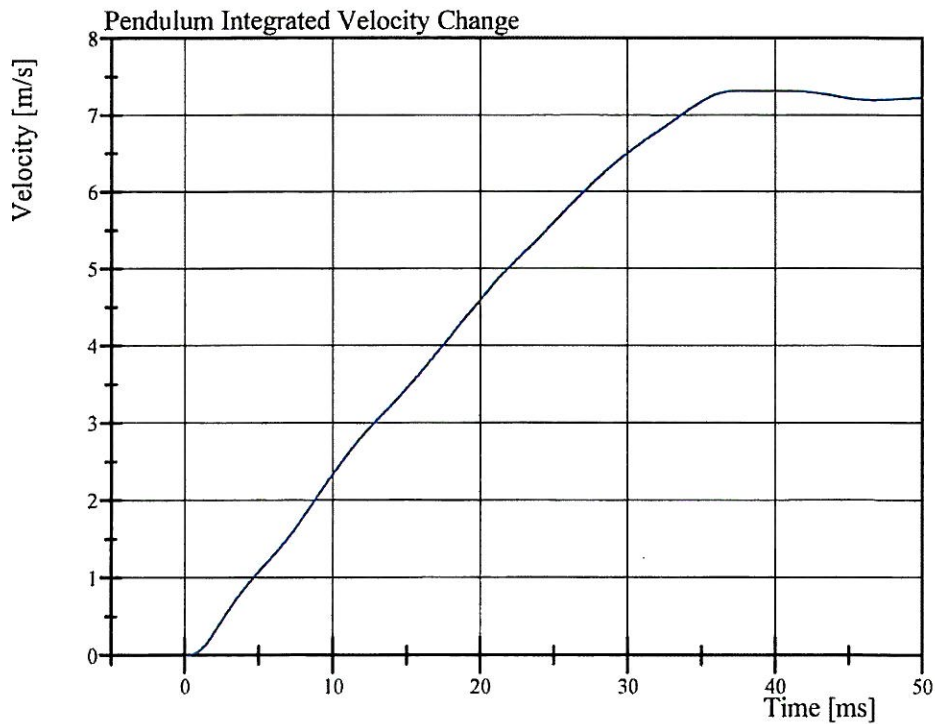
Test Date: 6/4/2009



Filter Class: CFC_180

Max: 30.7 g at 2.3 ms

Min: -3.5 g at 44.1 ms



Filter Class: CFC_180

Max: 7.3 m/s at 37.8 ms

Min: 0.0 m/s at 0.0 ms

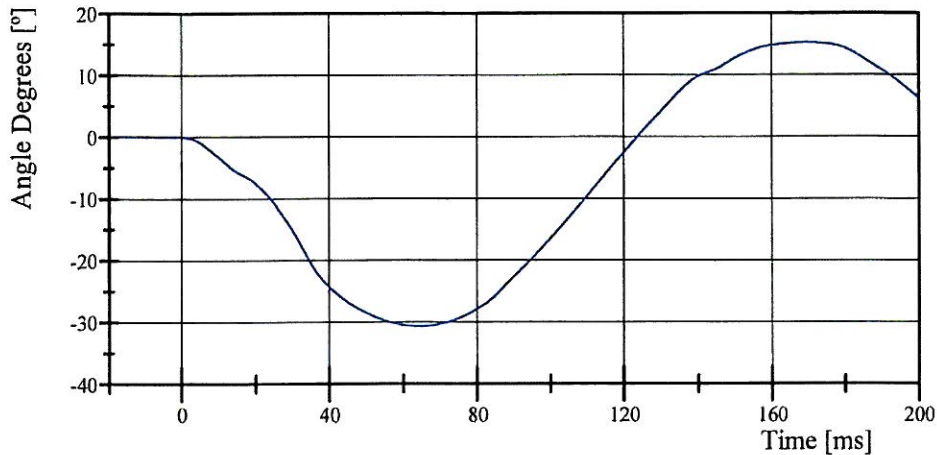
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Pot Rotation at the Base of Neck

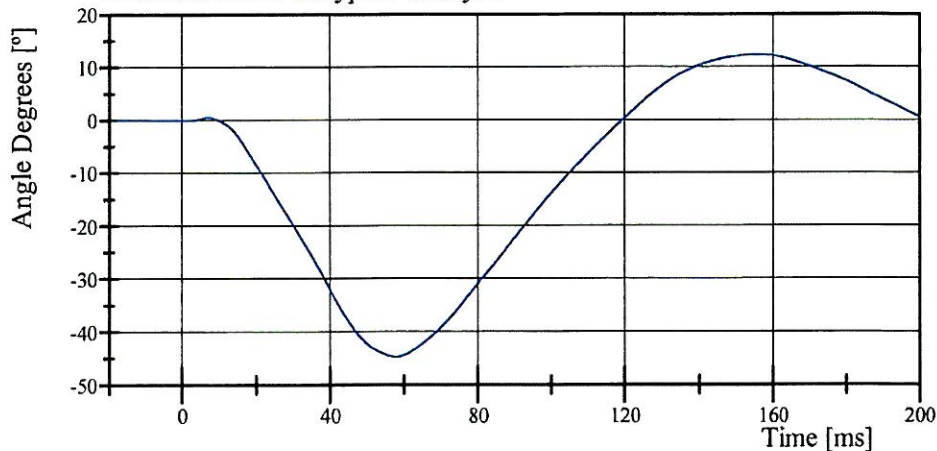


Filter Class: CFC_60

Max: 15.2 ° at 169.2 ms

Min: -30.7 ° at 64.8 ms

Head Rotation at Occypital Condyles

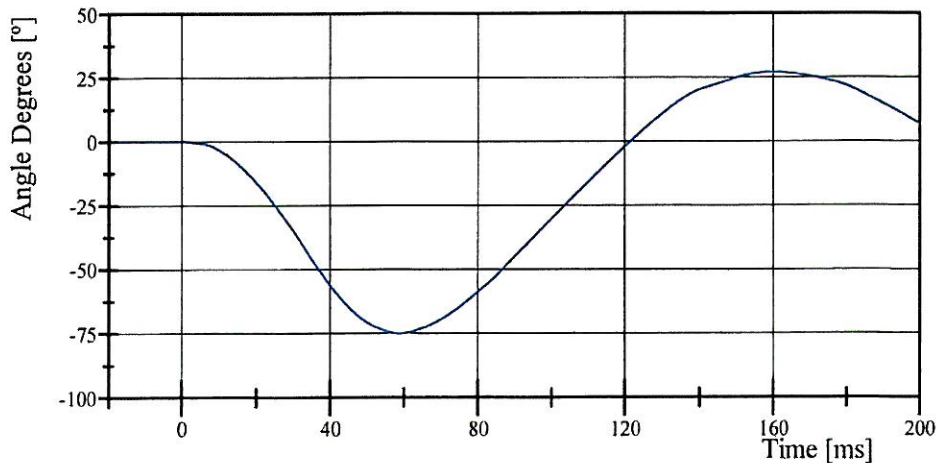


Filter Class: CFC_60

Max: 12.3 ° at 155.8 ms

Min: -44.8 ° at 57.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 26.9 ° at 160.0 ms

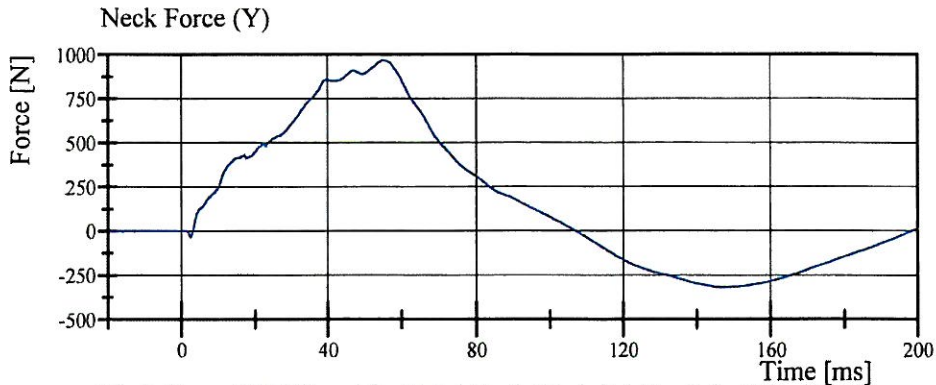
Min: -75.1 ° at 58.8 ms

Transportation Research Center Inc.

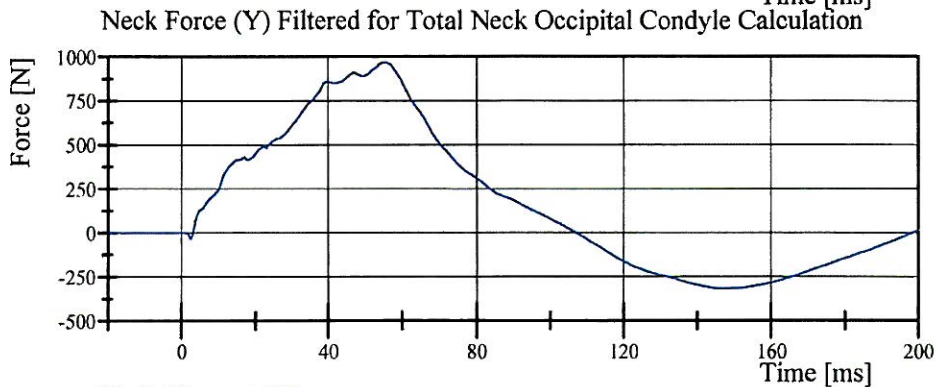
Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 3-1

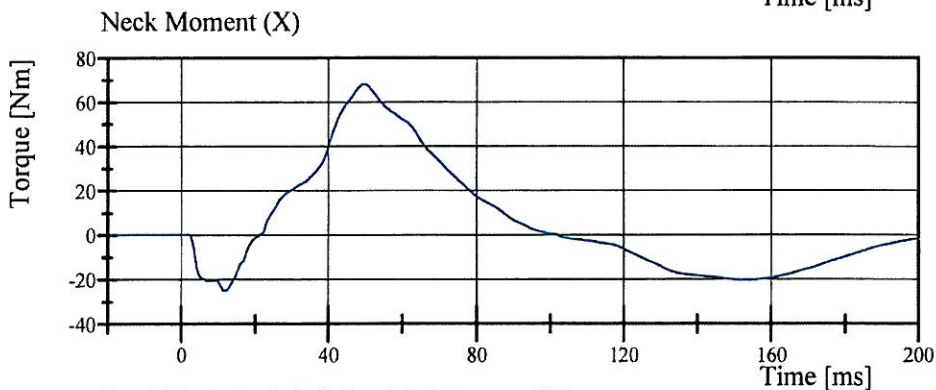
Test Date: 6/4/2009



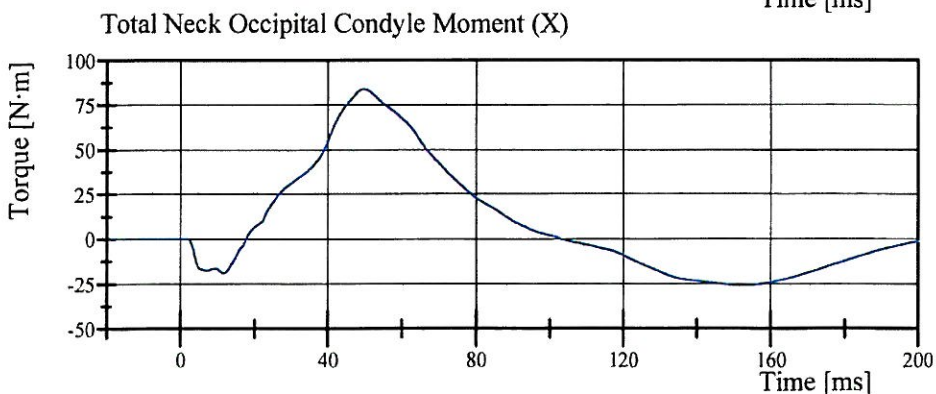
Filter Class: CFC_1000
Max: 968.1 N at 55.0 ms
Min: -318.0 N at 146.3 ms



Filter Class: CFC_600
Max: 967.8 N at 55.0 ms
Min: -317.5 N at 146.9 ms



Filter Class: CFC_600
Max: 68.1 Nm at 49.8 ms
Min: -25.2 Nm at 11.8 ms



Filter Class: CFC_600
Max: 84.0 N·m at 49.8 ms
Min: -25.8 N·m at 151.9 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Maximum Force at Test Velocity	3,745 - 4,439 N	4,144.2 N	Yes
Maximum Displacement at Test Velocity	33.36 - 39.57 mm	38.096 mm	Yes

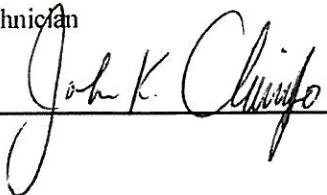
Test meets specifications.

Comments:

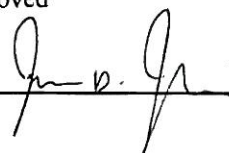
Actual Impactor Velocity (m/s): 6.096

Damper Setting: 7.5

Technician



Approved



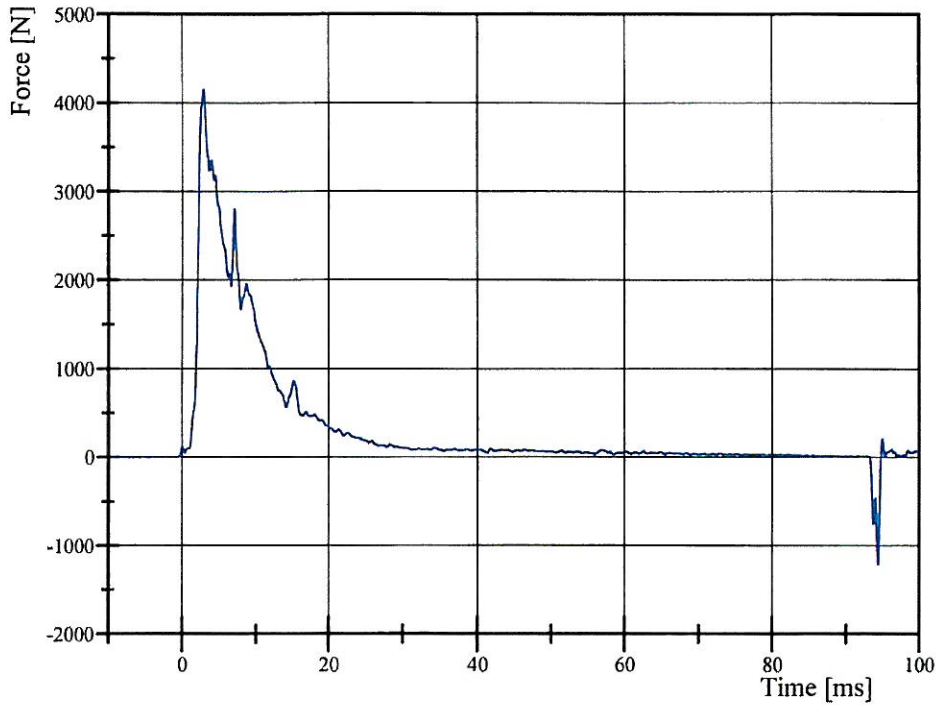
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Shock Absorber Resistive Force

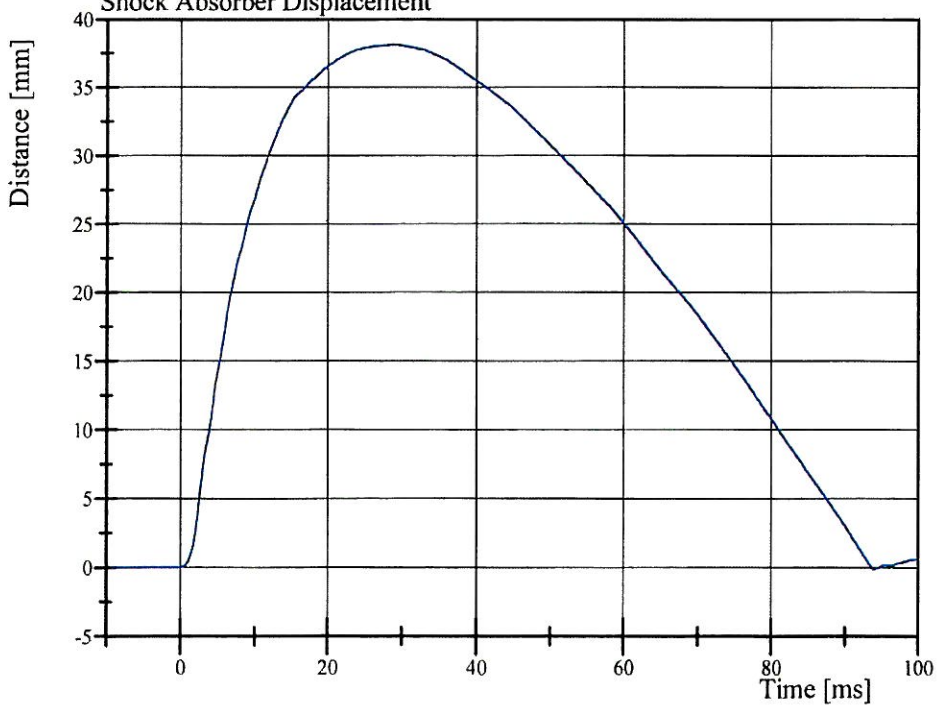


Filter Class: CFC_1000

Max: 4,144.2 N at 3.0 ms

Min: -1,210.6 N at 94.5 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 38.1 mm at 28.9 ms

Min: -0.1 mm at 94.0 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Maximum Force at Test Velocity	1,747 - 2,111 N	1,880.0 N	Yes
Maximum Displacement at Test Velocity	31.69 - 37.24 mm	36.192 mm	Yes

Test meets specifications.

Comments:

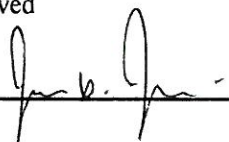
Actual Impactor Velocity (m/s): 4.281

Damper Setting: 7.5

Technician



Approved



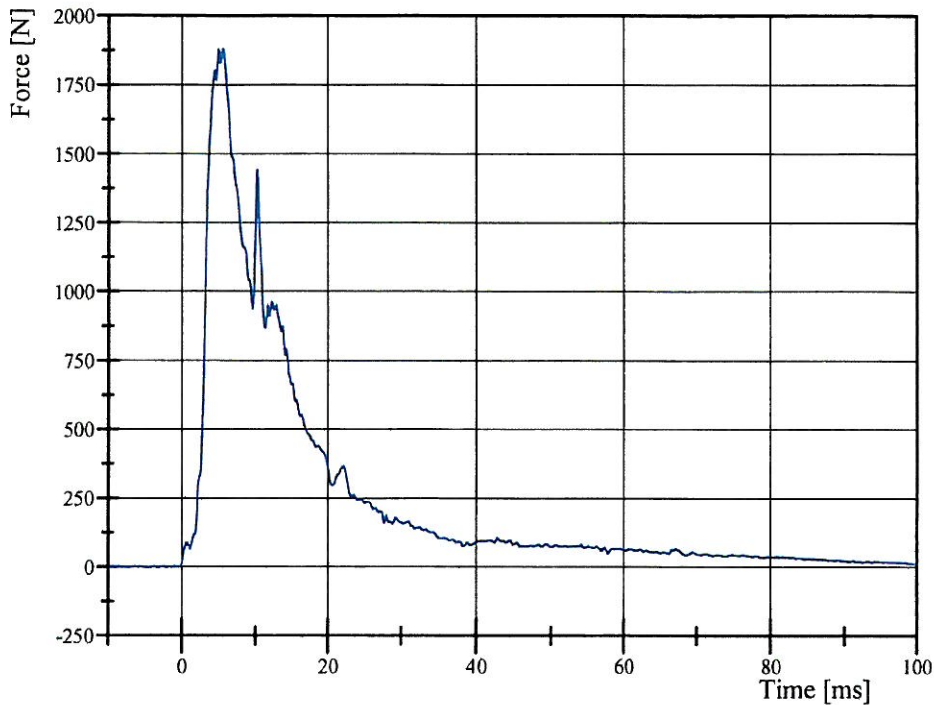
Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Shock Absorber Resistive Force

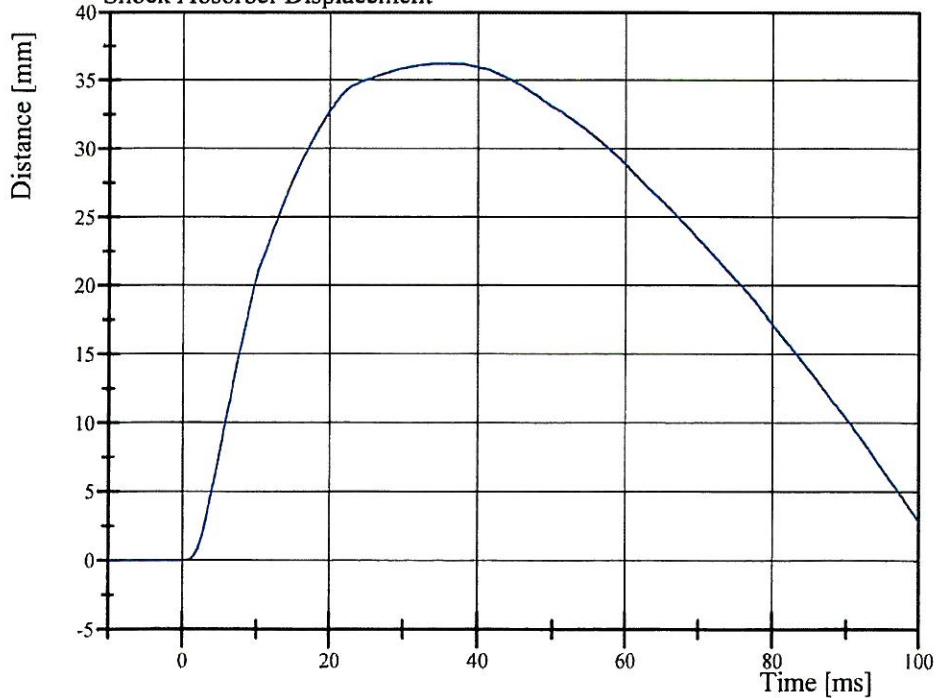


Filter Class: CFC_1000

Max: 1,880.0 N at 5.5 ms

Min: -2.5 N at -3.3 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 36.2 mm at 35.1 ms

Min: -0.0 mm at -9.8 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Maximum Force at Test Velocity	855 - 1,144 N	971.4 N	Yes
Maximum Displacement at Test Velocity	30.2 - 35.19 mm	34.210 mm	Yes

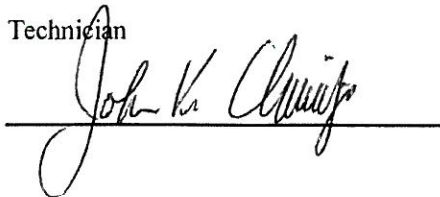
Test meets specifications.

Comments:

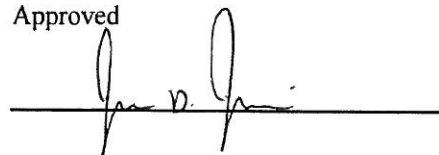
Actual Impactor Velocity (m/s): 3.074

Damper Setting: 7.5

Technician



Approved



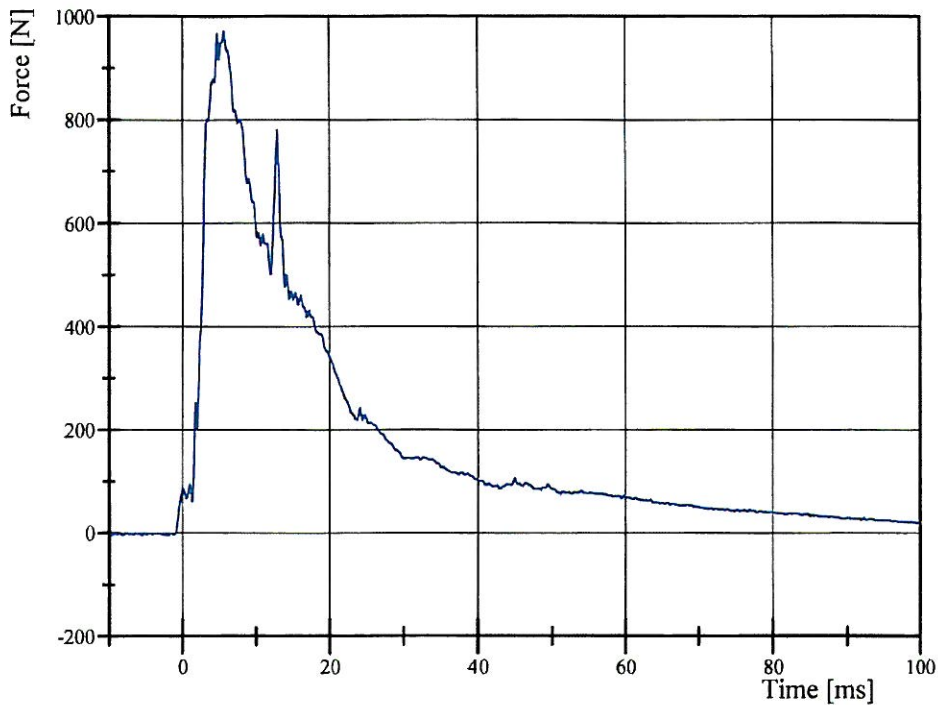
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 3-1

Test Date: 6/4/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000

Max: 971.4 N at 5.6 ms

Min: -4.5 N at -9.5 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 34.2 mm at 39.4 ms

Min: -0.0 mm at -8.8 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 3-1

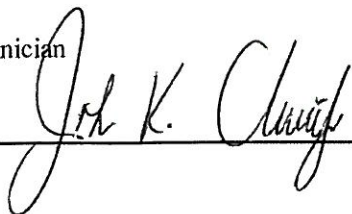
Test Date: 6/4/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.803 mm/s	Yes

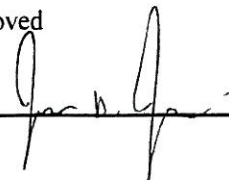
Test meets specifications.

Comments:

Technician



Approved

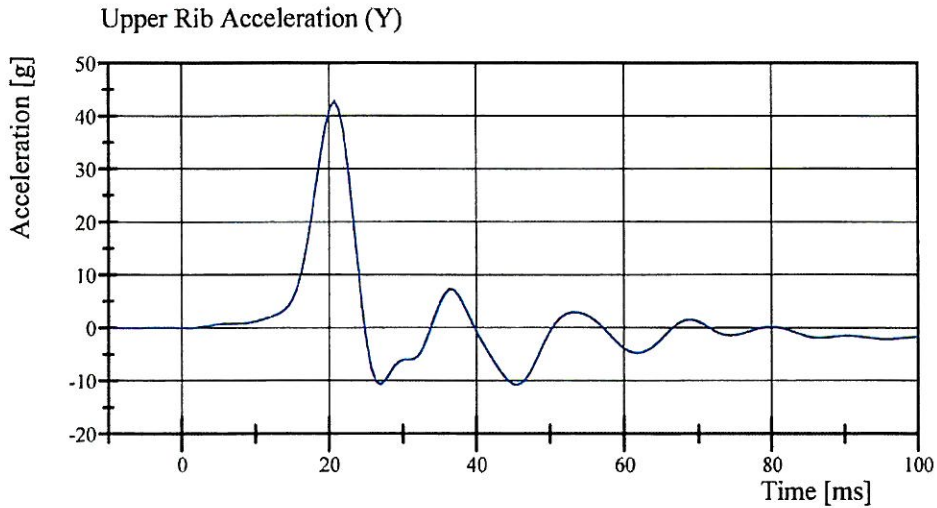


Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 3-1

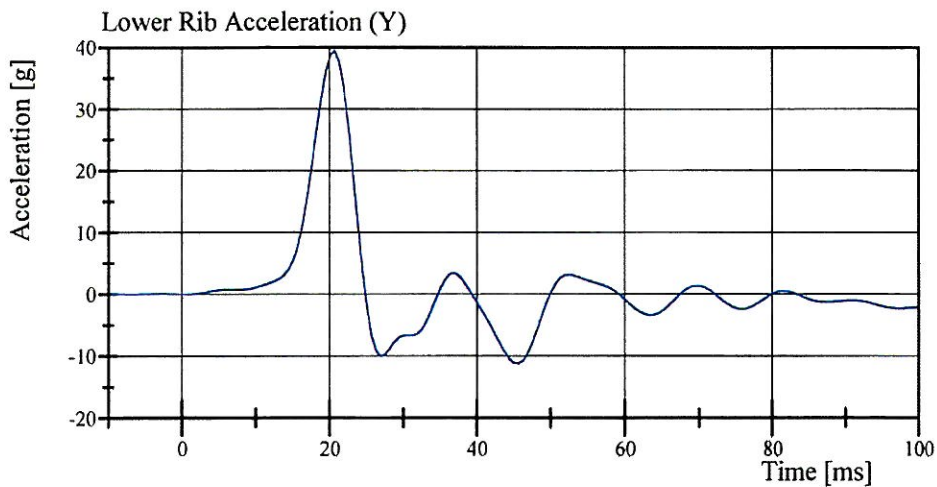
Test Date: 5/28/2009



Filter Class: FIR_100

Max: 42.8 g at 20.7 ms

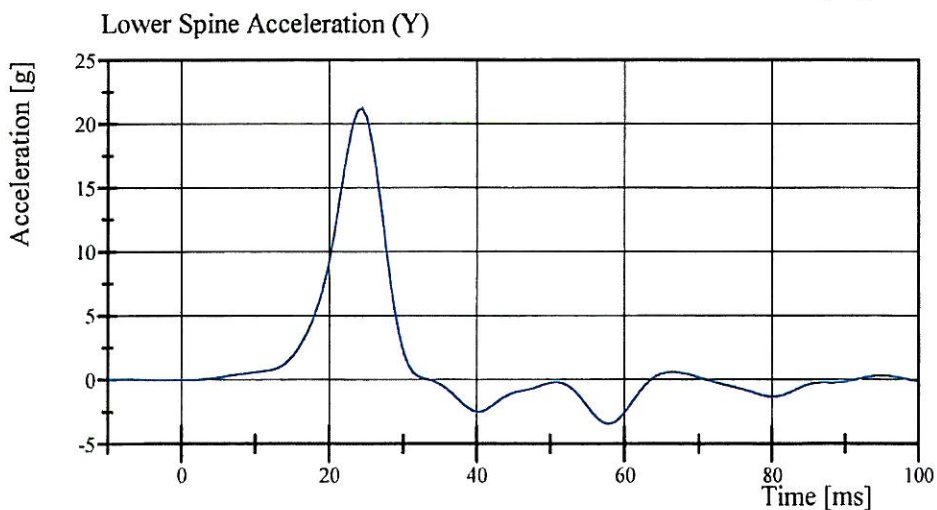
Min: -10.7 g at 45.7 ms



Filter Class: FIR_100

Max: 39.4 g at 20.7 ms

Min: -11.3 g at 45.7 ms



Filter Class: FIR_100

Max: 21.2 g at 24.5 ms

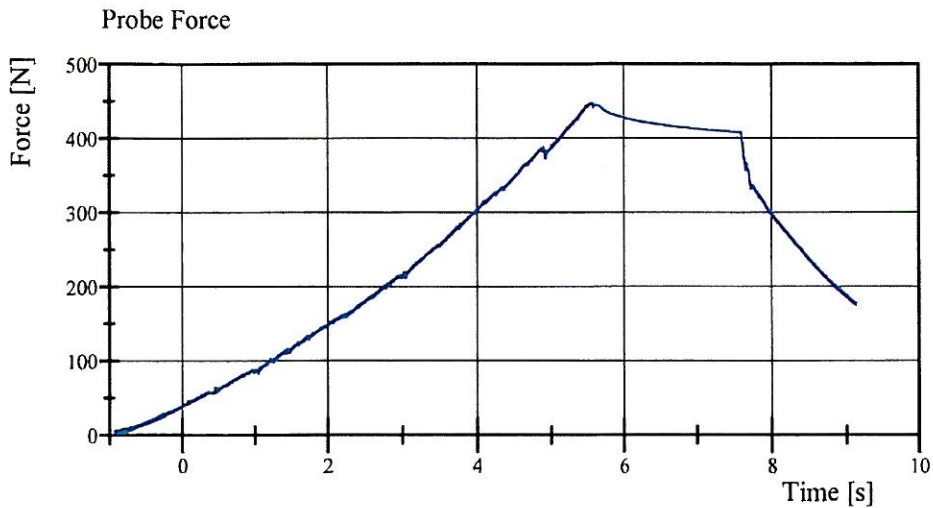
Min: -3.5 g at 57.6 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 3-1

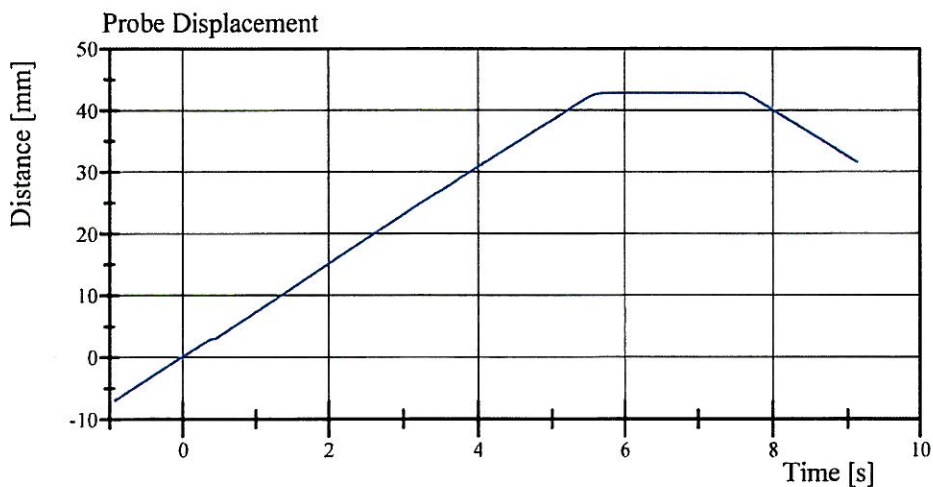
Test Date: 6/4/2009



Filter Class: CFC_600

Max: 447.6 N at 5.6 s

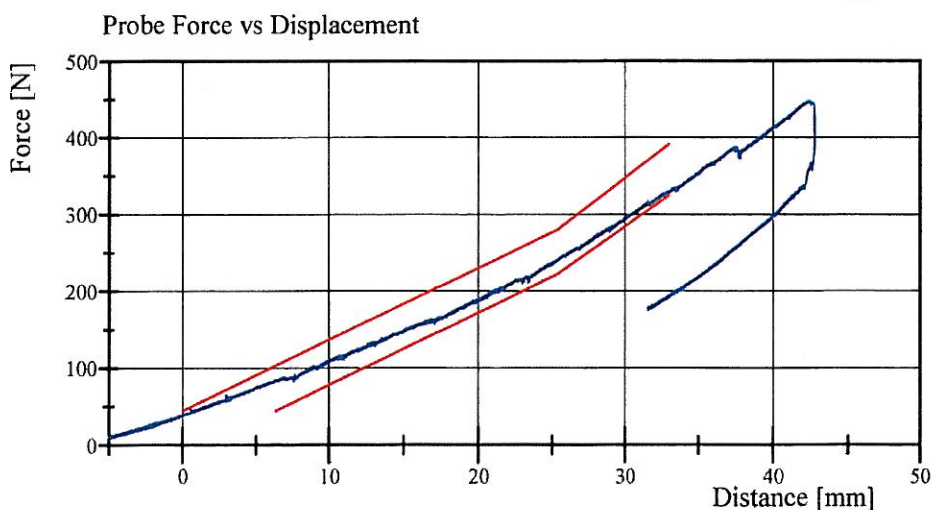
Min: 0.1 N at -0.9 s



Filter Class: CFC_180

Max: 42.8 mm at 7.1 s

Min: -7.0 mm at -0.9 s



Filter Class: CFC_600

Max: 447.6 N at 42.4 mm

Min: 0.1 N at -7.0 mm

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 3-1

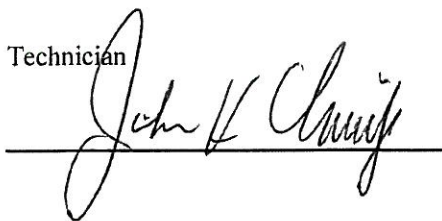
Test Date: 5/28/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.300 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	42.8 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	39.4 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	21.2 g	Yes

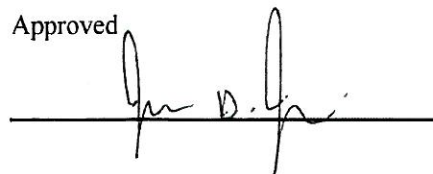
Test meets specifications.

Comments:

Technician



Approved



TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 28-May-09

TRC, INC.

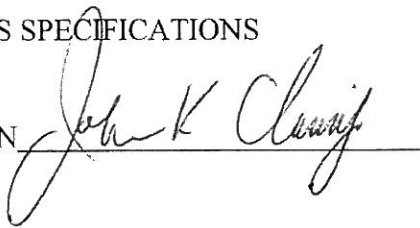
TEST NO: TOFL-01

572B SN 002 TORSO FLEX CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.7 °C
RELATIVE HUMIDITY	10 – 70 %	40 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	138 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	198 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	226 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	7.1 °

TEST MEETS SPECIFICATIONS

TECHNICIAN



Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 3-2

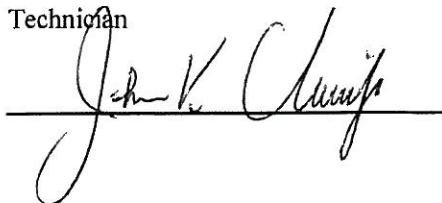
Test Date: 6/5/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.323 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	5.7 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	45.5 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

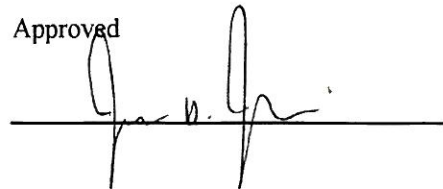
Test meets specifications.

Comments:

Technician



Approved

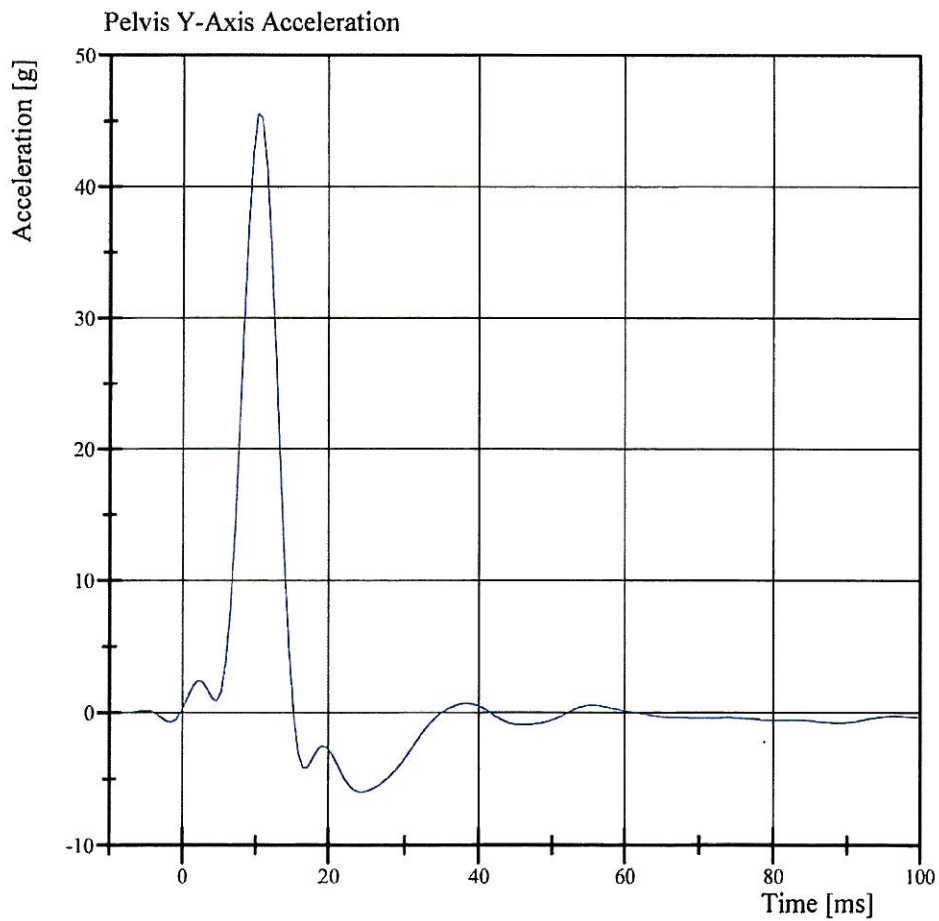


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 3-2

Test Date: 6/5/2009



Filter Class: FIR_100

Max: 45.5 g at 10.3 ms

Min: -6.0 g at 24.6 ms

CALIBRATION TEST RESULTS

POST-TEST

SID/HIII: 002

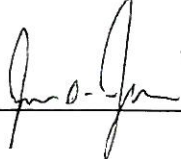
Transportation Research Center Inc.
572F SID Dummy
External Dimensions
Serial No. 002 Calibration No. 04

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	907 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	512 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	517 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	500 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	175 mm	Yes
Difference Between Top & Bottom Rib Width from C/L		<= 2.5 mm	1.0 mm	Yes

Technician



Approved





Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 4-1

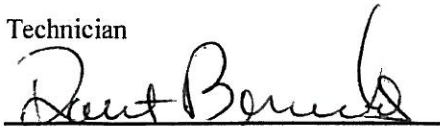
Test Date: 7/6/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	136.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	10.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

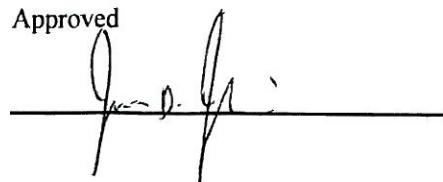
Test meets specifications.

Comments:

Technician



Approved

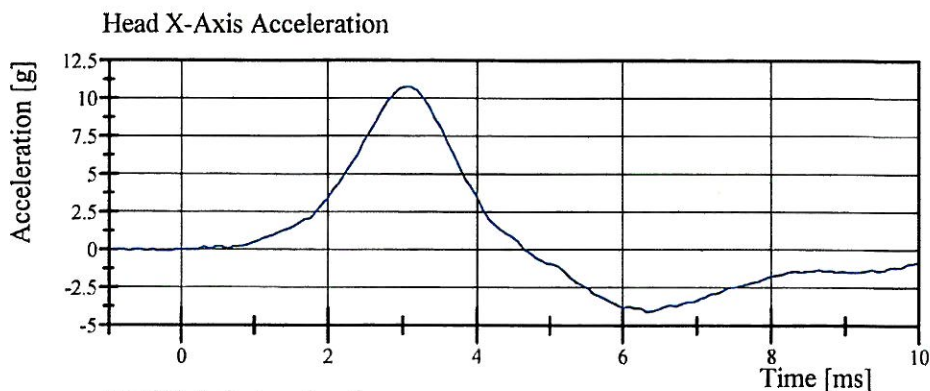


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 002 Certification No. 4-1

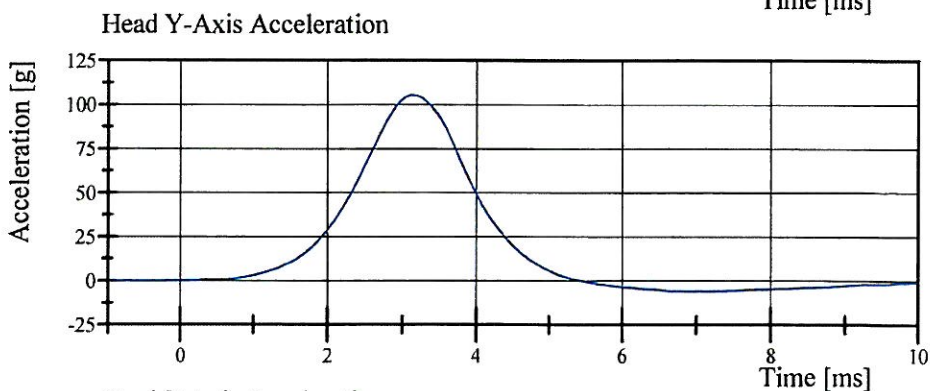
Test Date: 7/6/2009



Filter Class: CFC_1000

Max: 10.8 g at 3.0 ms

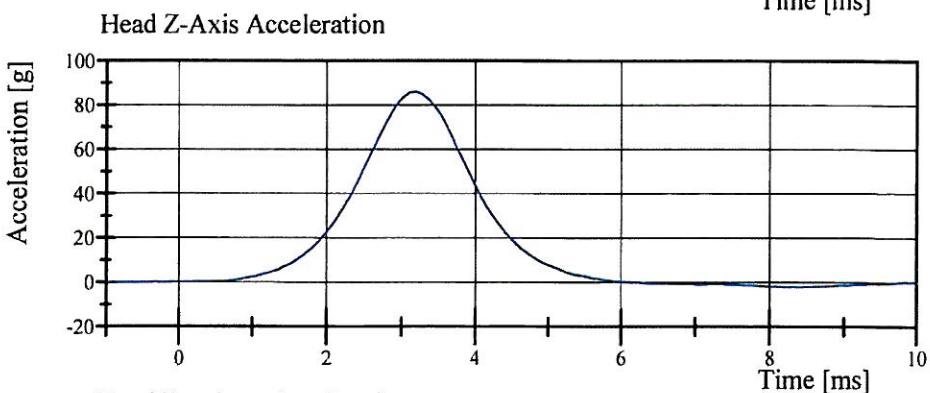
Min: -4.1 g at 6.3 ms



Filter Class: CFC_1000

Max: 105.5 g at 3.1 ms

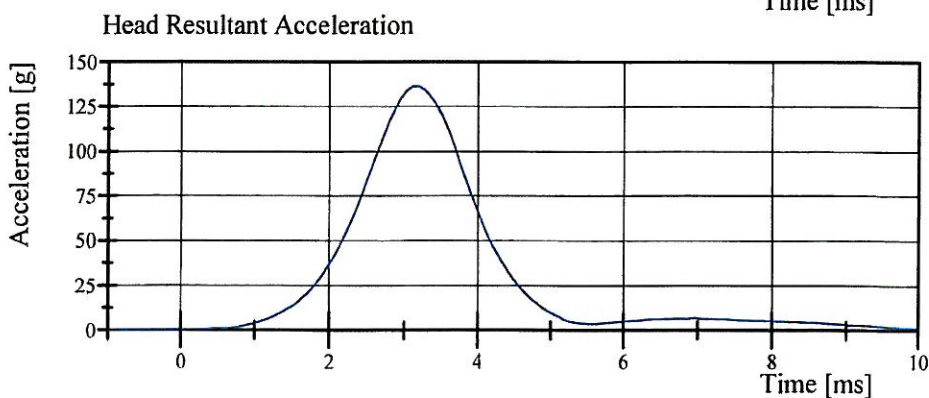
Min: -5.9 g at 7.0 ms



Filter Class: CFC_1000

Max: 86.1 g at 3.2 ms

Min: -2.0 g at 8.2 ms



Filter Class: CFC_1000

Max: 136.6 g at 3.2 ms

Min: 0.0 g at -0.2 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 4-2

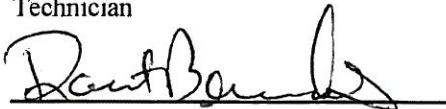
Test Date: 7/7/2009

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-7.020 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.278 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.534 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.366 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.344 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-73.0 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	61.1 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	86.2 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	52.7 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	8.2 ms	Yes

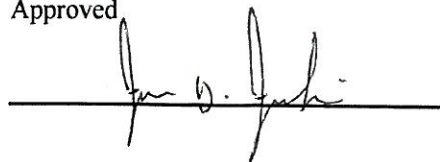
Test meets specifications.

Comments:

Technician



Approved



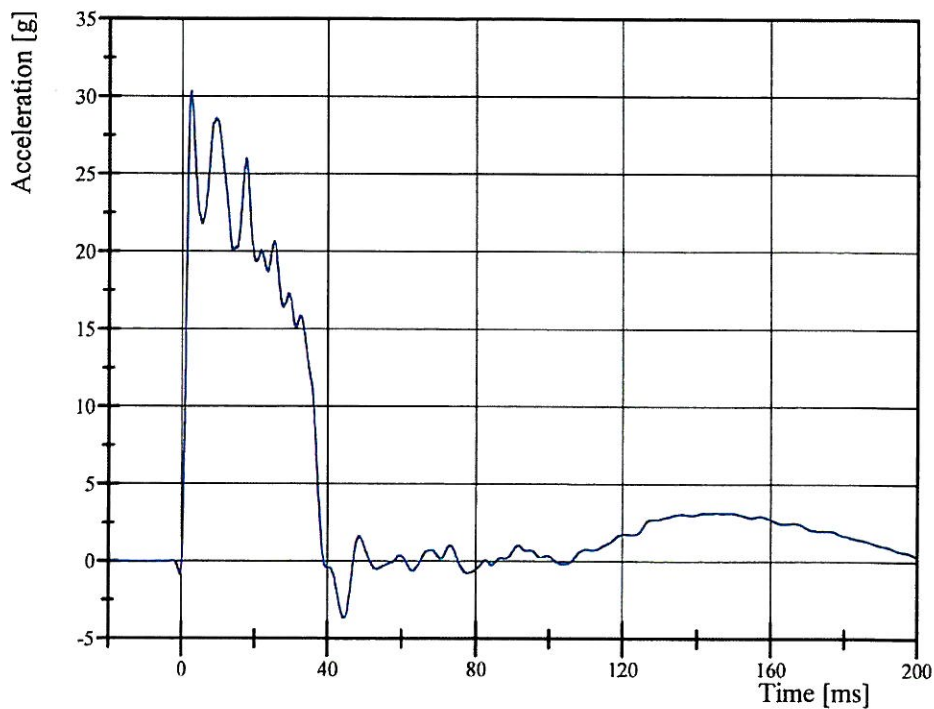
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 4-2

Test Date: 7/7/2009

Pendulum Acceleration

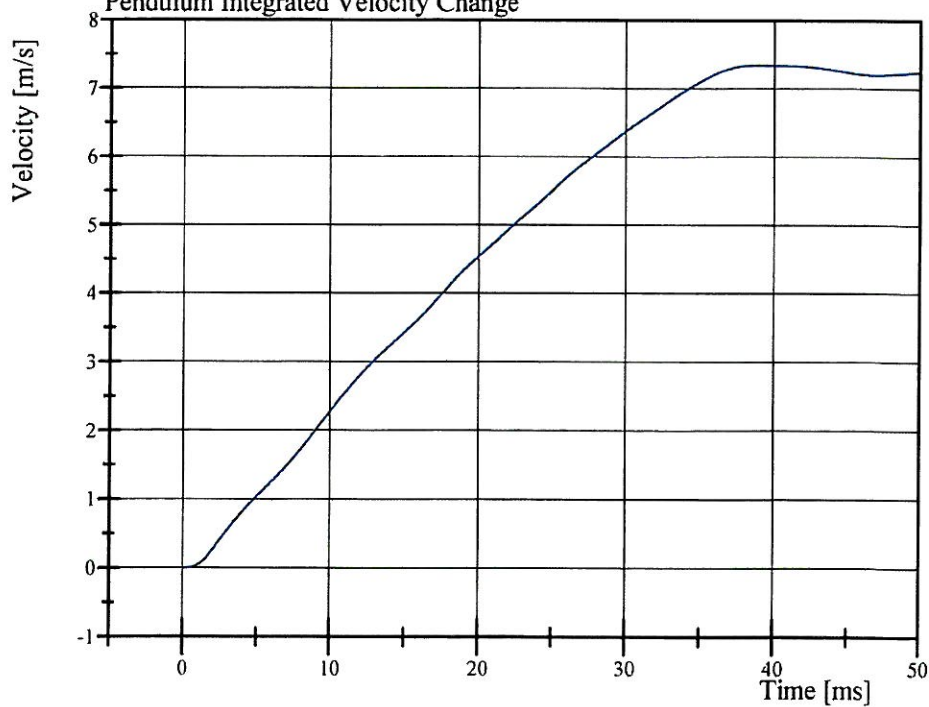


Filter Class: CFC_180

Max: 30.3 g at 2.4 ms

Min: -3.6 g at 44.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 7.3 m/s at 39.0 ms

Min: -0.0 m/s at 0.1 ms

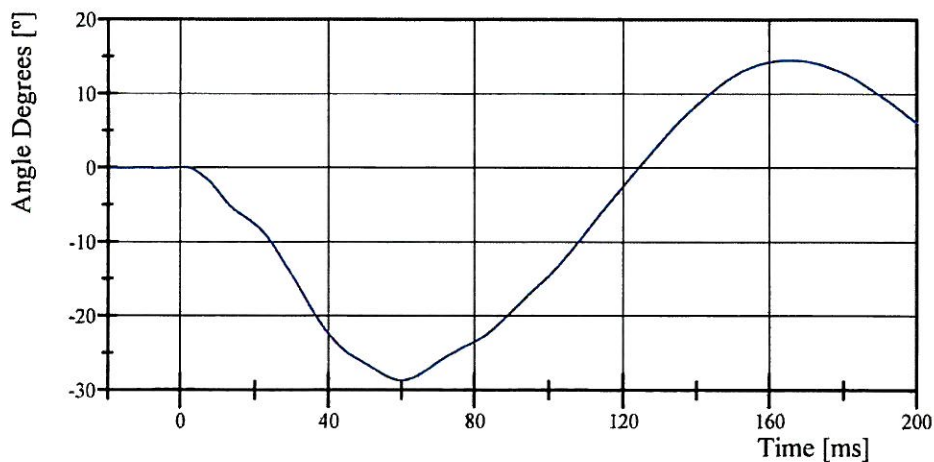
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 4-2

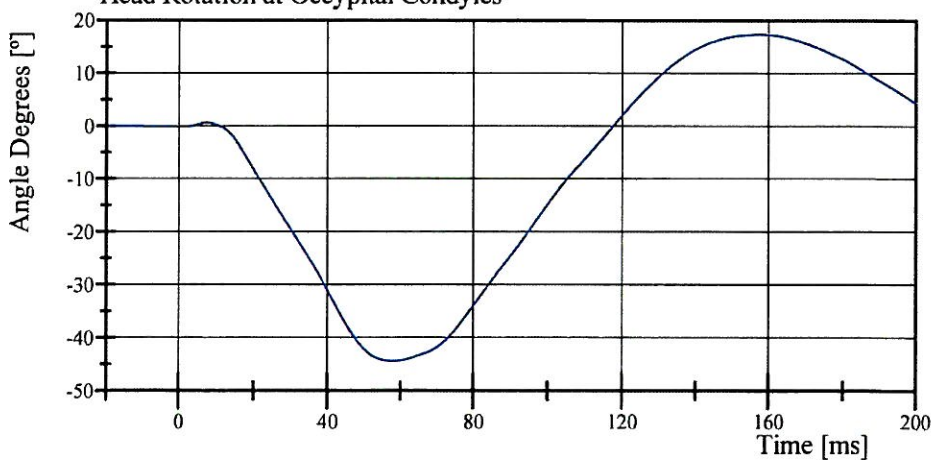
Test Date: 7/7/2009

Pot Rotation at the Base of Neck



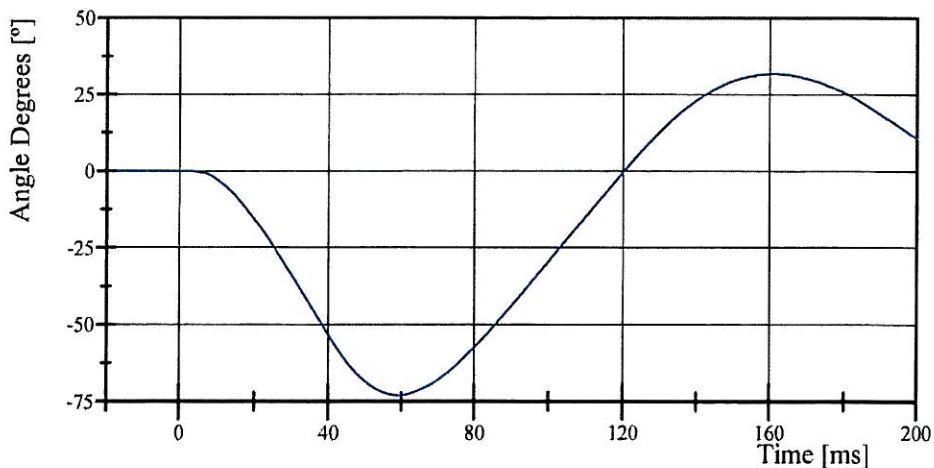
Filter Class: CFC_60
Max: 14.6 ° at 165.6 ms
Min: -28.7 ° at 60.1 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 17.4 ° at 157.5 ms
Min: -44.4 ° at 58.0 ms

Total Head D-Plane Rotation



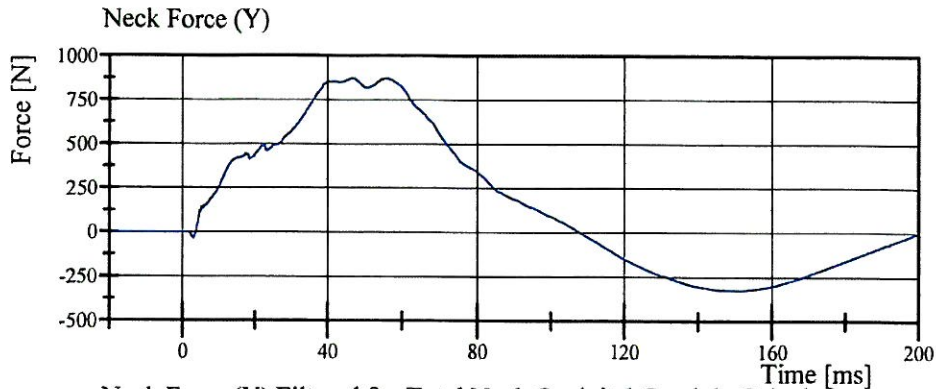
Filter Class: CFC_60
Max: 31.7 ° at 161.4 ms
Min: -73.0 ° at 59.2 ms

Transportation Research Center Inc.

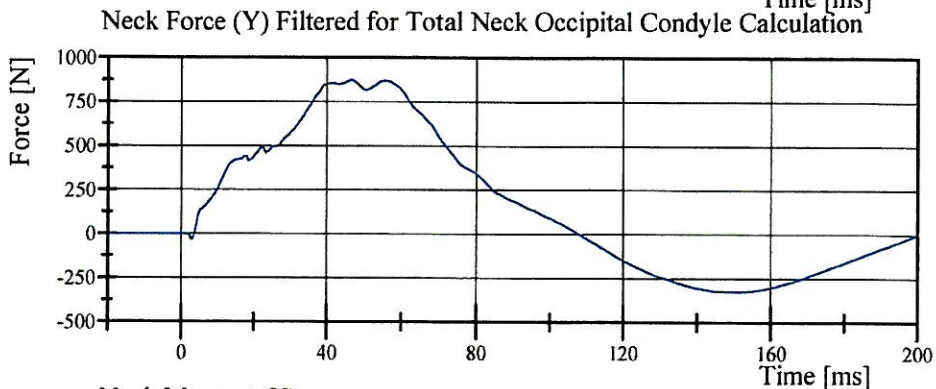
Left Lateral Neck

SID-HIII Serial No. 002 Certification No. 4-2

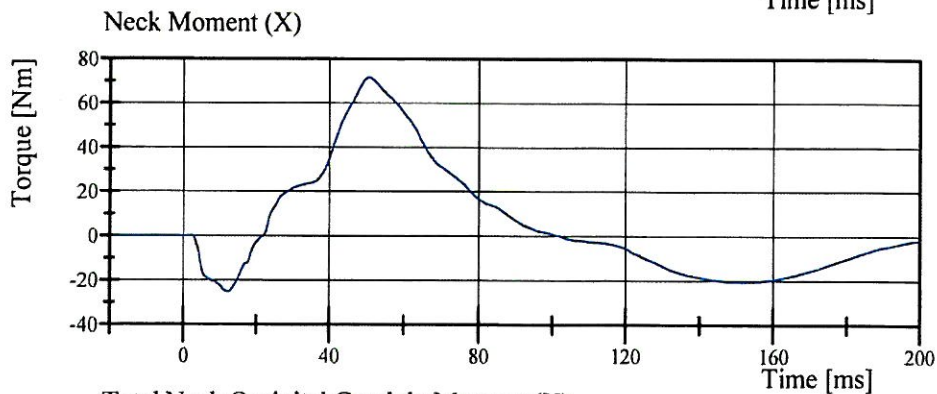
Test Date: 7/7/2009



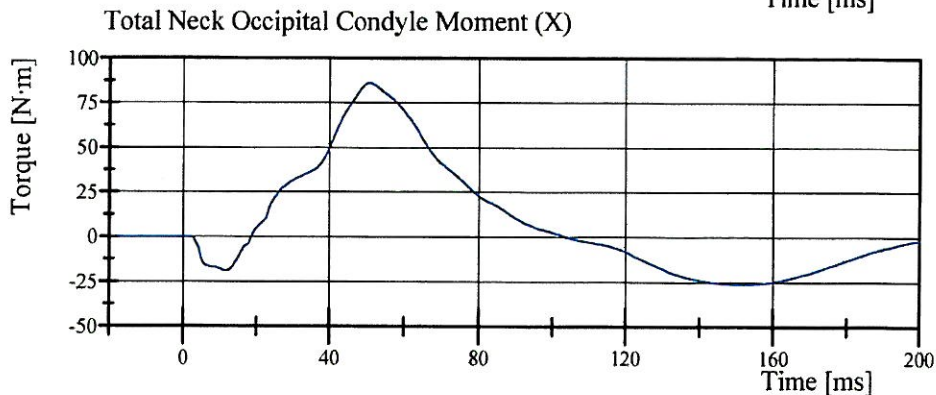
Filter Class: CFC_1000
Max: 875.5 N at 46.6 ms
Min: -324.9 N at 151.2 ms



Filter Class: CFC_600
Max: 875.0 N at 46.7 ms
Min: -324.7 N at 151.4 ms



Filter Class: CFC_600
Max: 71.7 Nm at 51.0 ms
Min: -25.1 Nm at 12.1 ms



Filter Class: CFC_600
Max: 86.2 N·m at 51.0 ms
Min: -26.4 N·m at 151.0 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 4-2

Test Date: 7/8/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Maximum Force at Test Velocity	3,706 - 4,395 N	4,251.7 N	Yes
Maximum Displacement at Test Velocity	33.34 - 39.54 mm	38.178 mm	Yes

Test meets specifications.

Comments:

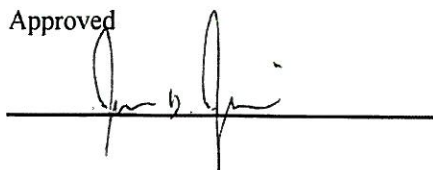
Actual Impactor Velocity (m/s): 6.067

Damper Setting: 7.5

Technician



Approved



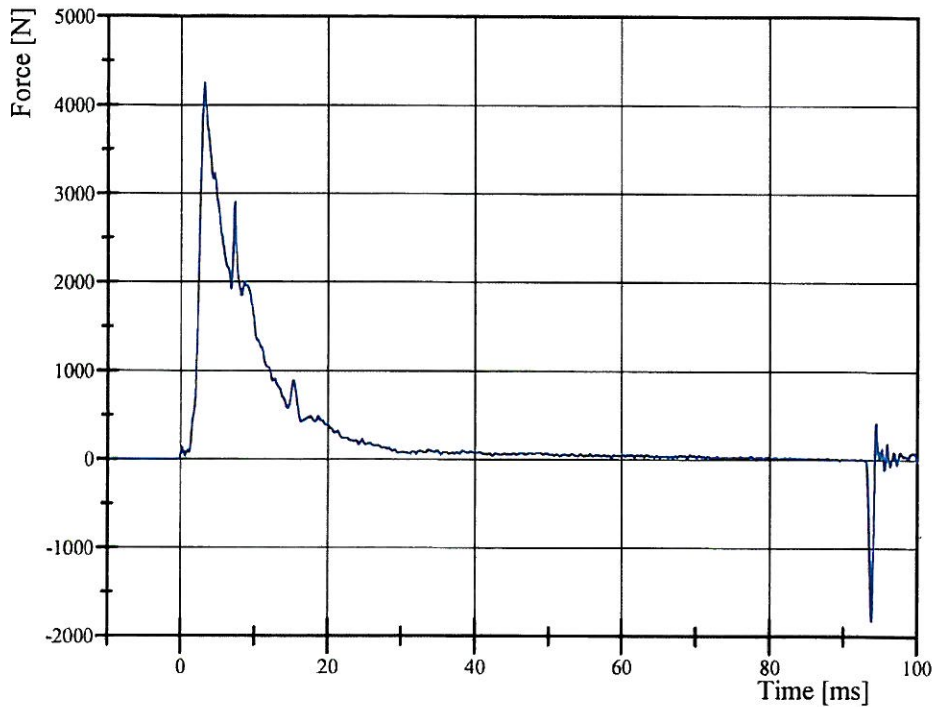
Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 4-2

Test Date: 7/8/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000

Max: 4,251.7 N at 3.3 ms

Min: -1,817.5 N at 93.8 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 38.2 mm at 28.8 ms

Min: -0.1 mm at 93.8 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 4-1

Test Date: 7/8/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Maximum Force at Test Velocity	1,753 - 2,119 N	1,914.2 N	Yes
Maximum Displacement at Test Velocity	31.7 - 37.25 mm	36.679 mm	Yes

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 4.288

Damper Setting: 7.5

Technician

Roset Bravado

Approved

Jim D. Jh...

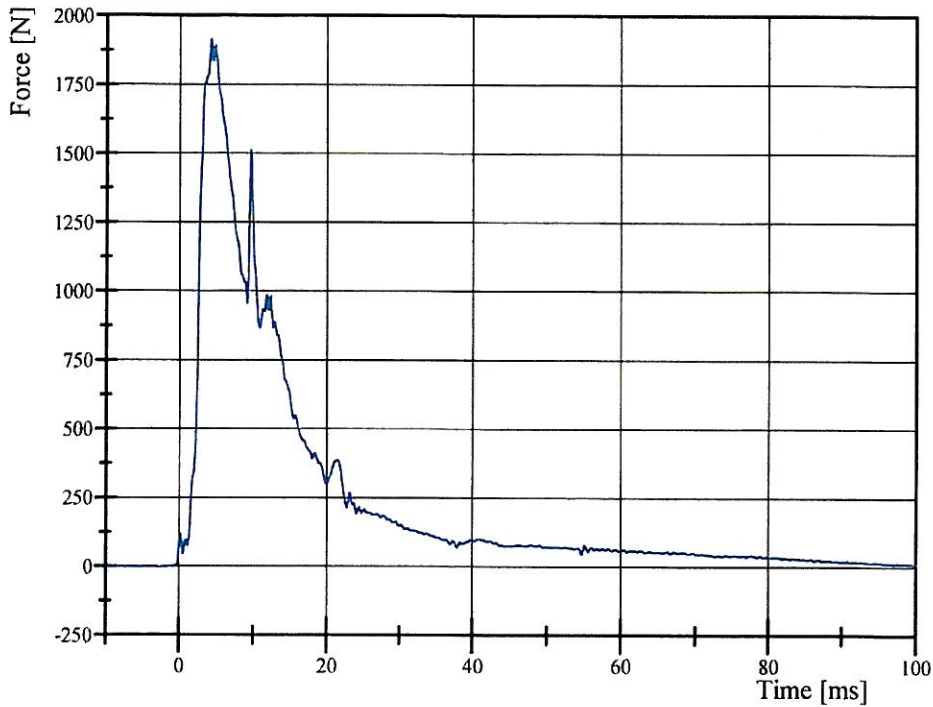
Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 4-1

Test Date: 7/8/2009

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,914.2 N at 4.2 ms
Min: -3.0 N at -7.4 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 36.7 mm at 34.4 ms
Min: -0.0 mm at -9.4 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 4-1

Test Date: 7/8/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Maximum Force at Test Velocity	856 - 1,146 N	921.7 N	Yes
Maximum Displacement at Test Velocity	30.2 - 35.19 mm	34.301 mm	Yes

Test meets specifications.

Comments:

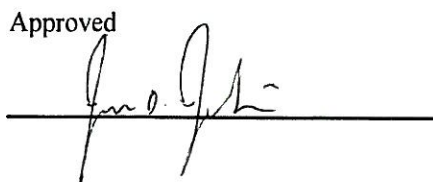
Actual Impactor Velocity (m/s): 3.076

Damper Setting: 7.5

Technician



Approved



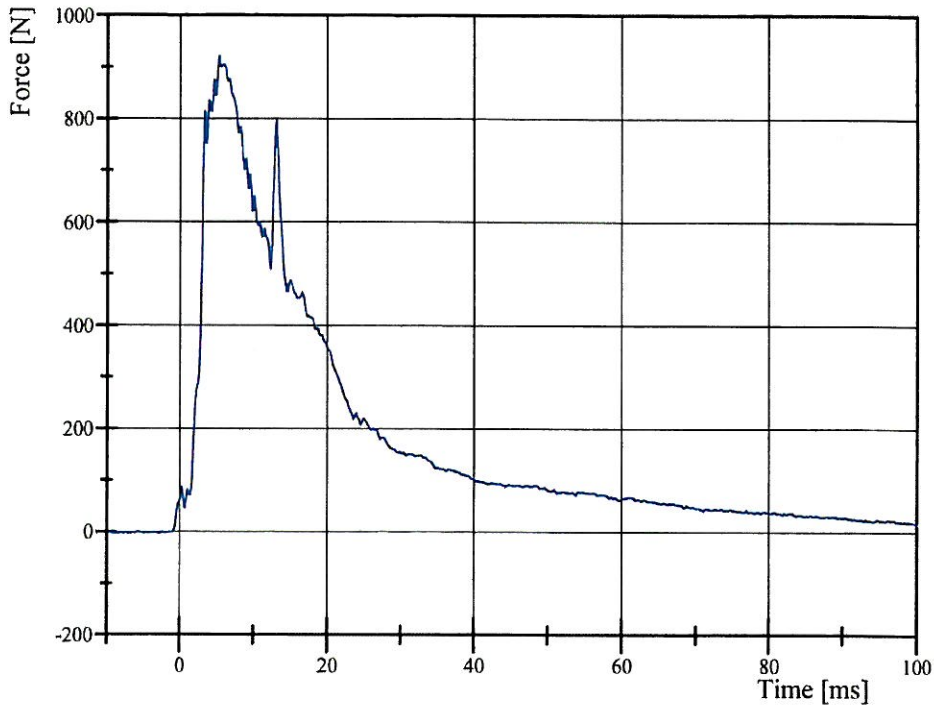
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 002 Certification No. 4-1

Test Date: 7/8/2009

Shock Absorber Resistive Force

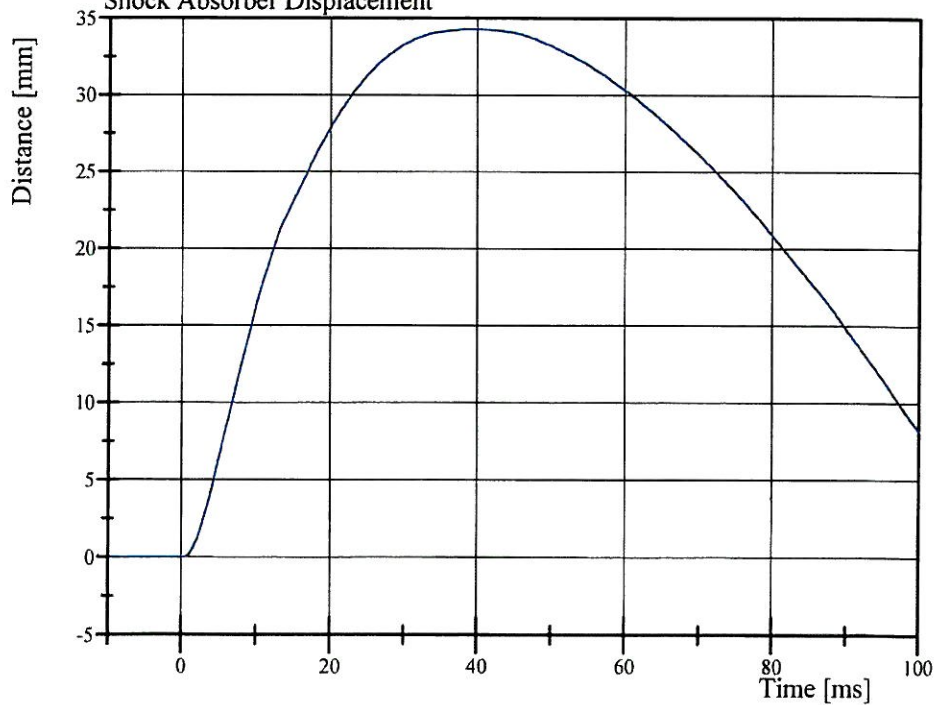


Filter Class: CFC_1000

Max: 921.7 N at 5.4 ms

Min: -3.7 N at -2.7 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 34.3 mm at 39.0 ms

Min: -0.0 mm at -9.4 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 4-1

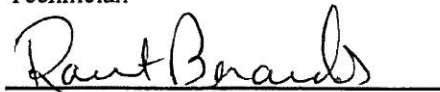
Test Date: 7/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.310 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	43.2 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	42.1 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	21.4 g	Yes

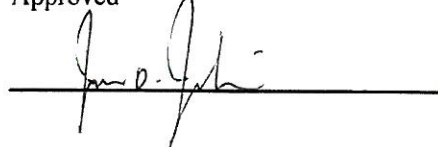
Test meets specifications.

Comments:

Technician



Approved



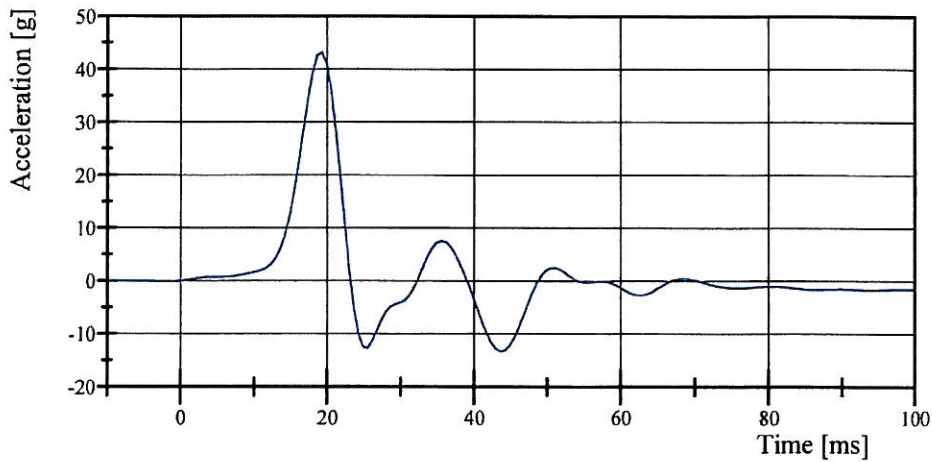
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 002 Certification No. 4-1

Test Date: 7/9/2009

Upper Rib Acceleration (Y)

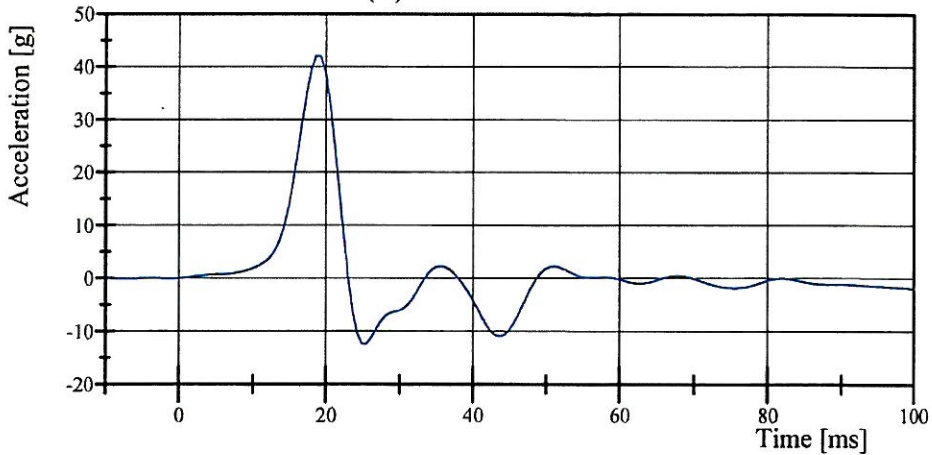


Filter Class: FIR_100

Max: 43.2 g at 19.3 ms

Min: -13.2 g at 43.7 ms

Lower Rib Acceleration (Y)

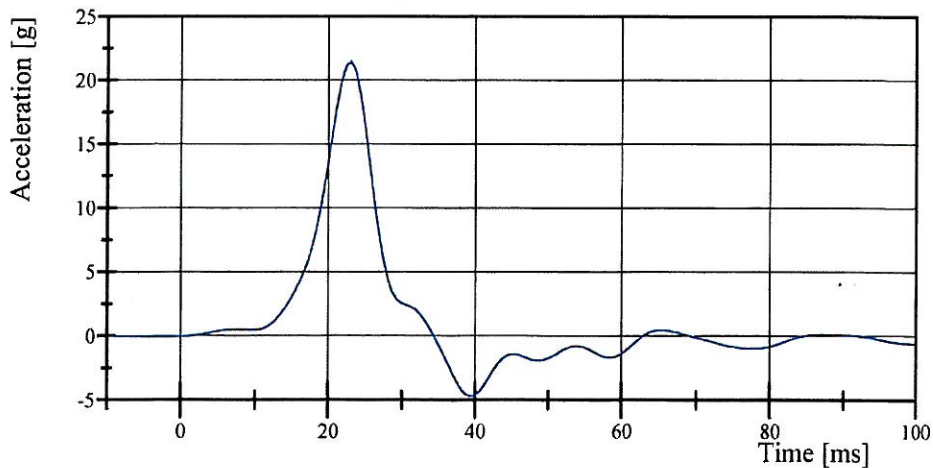


Filter Class: FIR_100

Max: 42.1 g at 18.7 ms

Min: -12.4 g at 25.5 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100

Max: 21.4 g at 23.0 ms

Min: -4.7 g at 39.3 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 4-2

Test Date: 7/8/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.747 mm/s	Yes

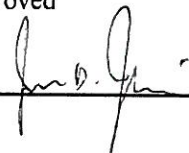
Test meets specifications.

Comments:

Technician



Approved

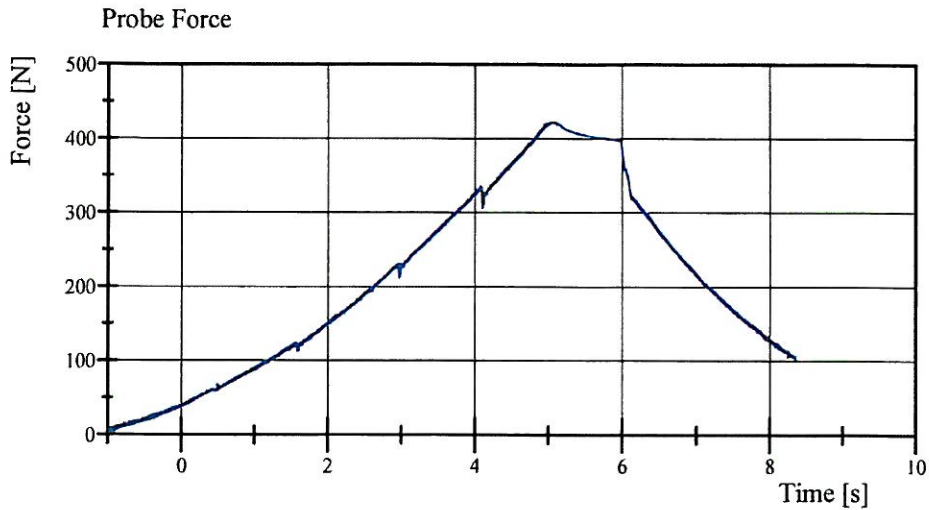


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 002 Certification No. 4-2

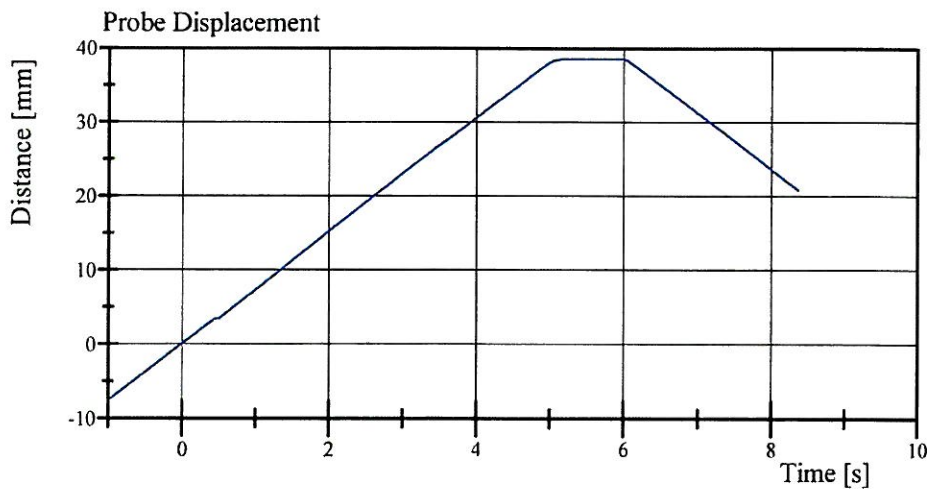
Test Date: 7/8/2009



Filter Class: CFC_600

Max: 422.5 N at 5.1 s

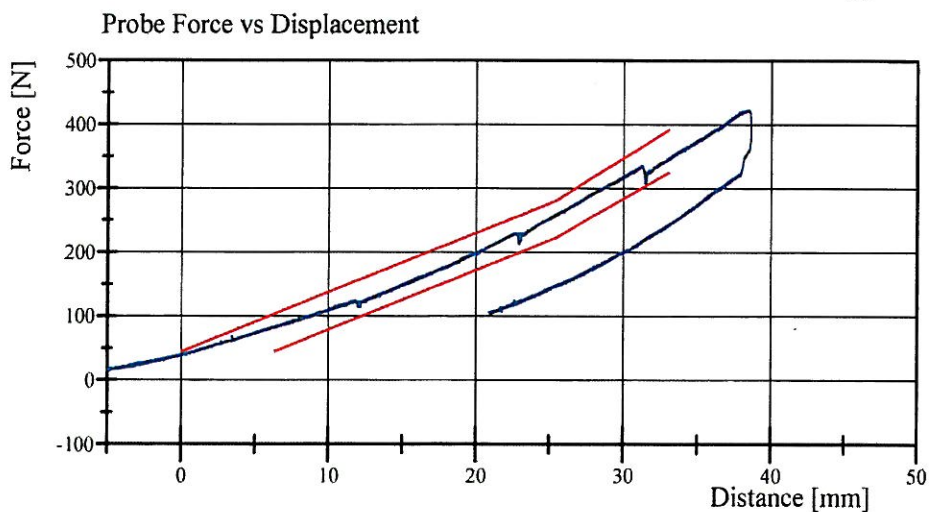
Min: 3.7 N at -1.0 s



Filter Class: CFC_180

Max: 38.6 mm at 6.0 s

Min: -7.6 mm at -1.0 s



Filter Class: CFC_600

Max: 422.5 N at 38.5 mm

Min: -2.6 N at -12.9 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 09-Jul-08

TRC, INC.

TEST NO: TOFL-01

572B SN 002 TORSO FLEX CAL 04

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	18.9 – 25.6° C	21.2 °C
RELATIVE HUMIDITY	10 – 70 %	42 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	140 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	199 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	231N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	7.6 °

TEST MEETS SPECIFICATIONS

TECHNICIAN Ruth Berni

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 4-1

Test Date: 7/9/2009

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.313 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	5.7 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	49.0 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

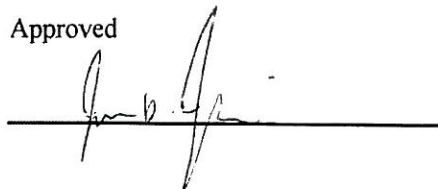
Test meets specifications.

Comments:

Technician



Approved

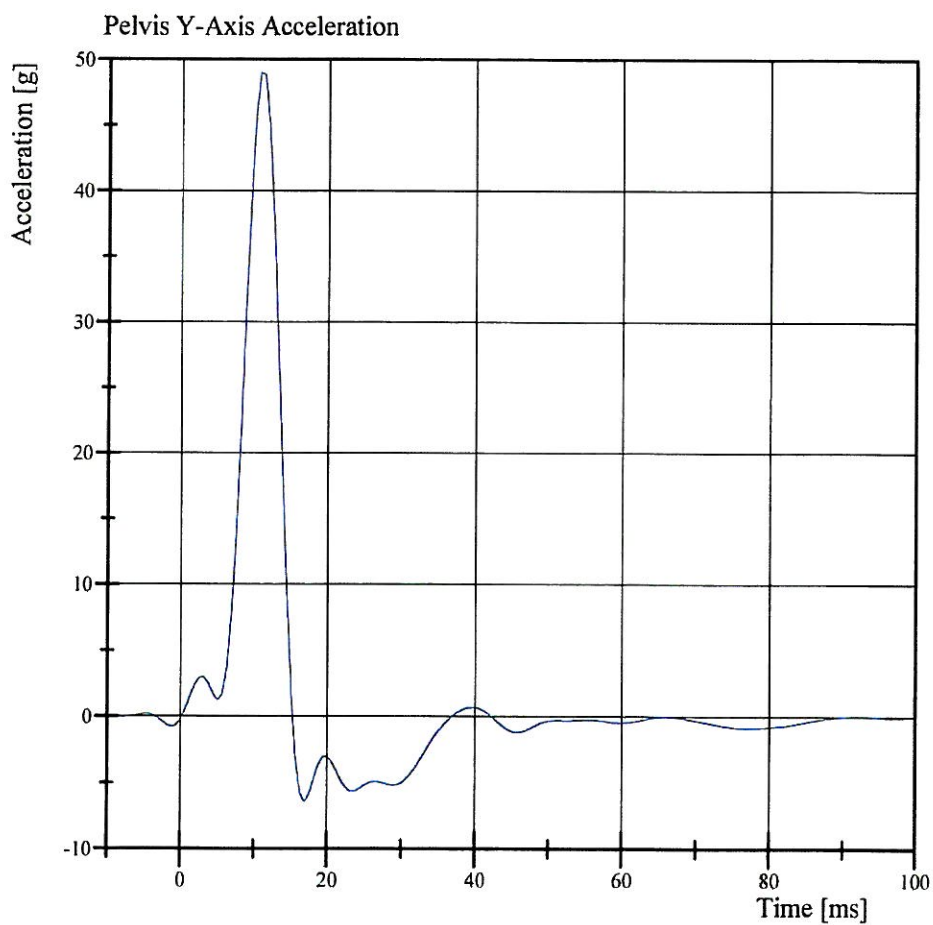


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 002 Certification No. 4-1

Test Date: 7/9/2009



Filter Class: FIR_100

Max: 49.0 g at 10.7 ms

Min: -6.4 g at 17.0 ms