

REPORT NUMBER: NCAPSIDE-TRC-2007-001

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**NISSAN MOTOR CO., LTD.
2008 NISSAN SENTRA 4-DOOR SEDAN
NHTSA NUMBER: M85210**

**PREPARED BY:
TRANSPORTATION RESEARCH CENTER INC.
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EAST LIBERTY, OH 43319**



Test Date: October 8, 2007

Report Date: October 19, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVENUE, S.E., ROOM W43-410
WASHINGTON, D.C. 20590**

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Transportation Research Center Inc.

Approval Date: 10/19/2007

FINAL REPORT ACCEPTANCE BY OCWS:

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16. Abstract <p>This 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject vehicle, a 2008 Nissan Sentra 4-door sedan, to obtain new car assessment and research data indicant of FMVSS 214D performance. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on October 8, 2007.</p> <p>The impact velocity of the Moving Deformable Barrier (MDB) was 61.8 km/h, and the ambient temperature at the struck (driver's side) side of the target vehicle at the time of impact was 25° C. The target vehicle's post-test maximum crush was 296 mm at Level 2.</p> <p>The test or target vehicle's performance is given below (with FIR filter):</p> <table border="0" style="margin-left: 40px;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>Front SID HIII</u></th> <th></th> <th style="text-align: center;"><u>Rear SID HIII</u></th> <th></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib Acceleration:</td> <td style="text-align: center;"><u>67.9</u></td> <td>g's</td> <td style="text-align: center;"><u>61.6</u></td> <td>g's</td> </tr> <tr> <td>Left Lower Rib Acceleration:</td> <td style="text-align: center;"><u>64.7</u></td> <td>g's</td> <td style="text-align: center;"><u>64.8</u></td> <td>g's</td> </tr> <tr> <td>Lower Spine Acceleration:</td> <td style="text-align: center;"><u>46.1</u></td> <td>g's</td> <td style="text-align: center;"><u>66.0</u></td> <td>g's</td> </tr> <tr> <td>Thoracic Trauma Index, (TTI):</td> <td style="text-align: center;"><u>57.0</u></td> <td>g's</td> <td style="text-align: center;"><u>65.4</u></td> <td>g's</td> </tr> <tr> <td>Pelvis Acceleration (PEV):</td> <td style="text-align: center;"><u>76.3</u></td> <td>g's</td> <td style="text-align: center;"><u>63.7</u></td> <td>g's</td> </tr> <tr> <td>Head Injury Criteria (HIC):</td> <td style="text-align: center;"><u>259</u></td> <td>g's</td> <td style="text-align: center;"><u>752</u></td> <td>g's</td> </tr> </tbody> </table> <p>The doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during side impact event.</p>					<u>Front SID HIII</u>		<u>Rear SID HIII</u>		Left Upper Rib Acceleration:	<u>67.9</u>	g's	<u>61.6</u>	g's	Left Lower Rib Acceleration:	<u>64.7</u>	g's	<u>64.8</u>	g's	Lower Spine Acceleration:	<u>46.1</u>	g's	<u>66.0</u>	g's	Thoracic Trauma Index, (TTI):	<u>57.0</u>	g's	<u>65.4</u>	g's	Pelvis Acceleration (PEV):	<u>76.3</u>	g's	<u>63.7</u>	g's	Head Injury Criteria (HIC):	<u>259</u>	g's	<u>752</u>	g's
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SECTION 1
PURPOSE AND TEST PROCEDURE

PURPOSE

This side impact test was conducted as part of the FY' 2007 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 evaluate side impact protection in a 2008 Nissan Sentra manufactured by Nissan Motor Co., Ltd.

TEST PROCEDURE

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

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

SECTION 2

SUMMARY OF NCAP SIDE IMPACT TEST

A model year 2008 Nissan Sentra was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.8 km/h. The specified impact velocity range is from 61.1 to 62.7 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1551.3 kg and the test weight of the MDB was 1361.2 kg. The test was conducted at TRC Inc. in East Liberty, OH, on October 8, 2007.

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 November 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 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 12,500 samples per second and processed per Appendix V of the Test Procedure.

GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 296 mm at level 2, 600 mm rearward of the left impact point. The driver SID/HIII, Serial No. 066, and left rear passenger SID/HIII, Serial No. 059, were calibrated prior to this test.

Appendix A contains the still photograph prints. Appendix B contains the driver 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 (36)	T ¹	T ²	TTI (G's)	Peak Pelvis (G's)
Driver	259	43.4	73.9	57.0	76.3
Passenger	752	45.8	57.6	65.4	63.7

Supplemental Restraint Information

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

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

TEST NOTES

The following channels did not collect valid data:

- Left Rear Passenger Neck Force Y
- Left Rear Passenger Neck Moment about X
- Left Lower A-Post Y
- Left Lower B-Post Y
- Left Upper B-Post Y

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

TEST VEHICLE INFORMATION

Make	Nissan
Model	Sentra
Body Style	4-door sedan
NHTSA No.	M85210
VIN	3N1AB61E38L608236
Color	Super Black Charcoal
Delivery Date	09/14/2007
Odometer Reading	74 miles
Dealer	Ricart Automotive
Transmission	Automatic
Final Drive	Front wheel drive
Number of Cylinders	4
Engine Displacement	2.0 L
Engine Placement	Transverse
Air Conditioning	Yes
Power Windows	Yes
Power Seats	No
Power Door Locks	Yes

TEST VEHICLE OPTIONS

Sun Roof/T-Top	No
Roof Rack	No
Cruise Control	No
Tilt Steering	Yes
Power Steering	Yes
Rear Defroster	Yes
Anti-Lock Brakes	Yes
AM/FM CD	Yes
Keyless Entry	No
Tinted Glass	No
Driver Front Airbag	Yes
Driver Side Head Airbag	No
Driver Side Torso Airbag	Yes
Rear Passenger Head Airbag	No
Rear Passenger Curtain Airbag	Yes
Pretensioner	Yes
Load Limiters	Yes
Bucket Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., Ltd.
Date of Manufacture	8/07

GVWR (kg)	1778.1
GAWR Front (kg)	1010.1
GAWR Rear (kg)	821.0

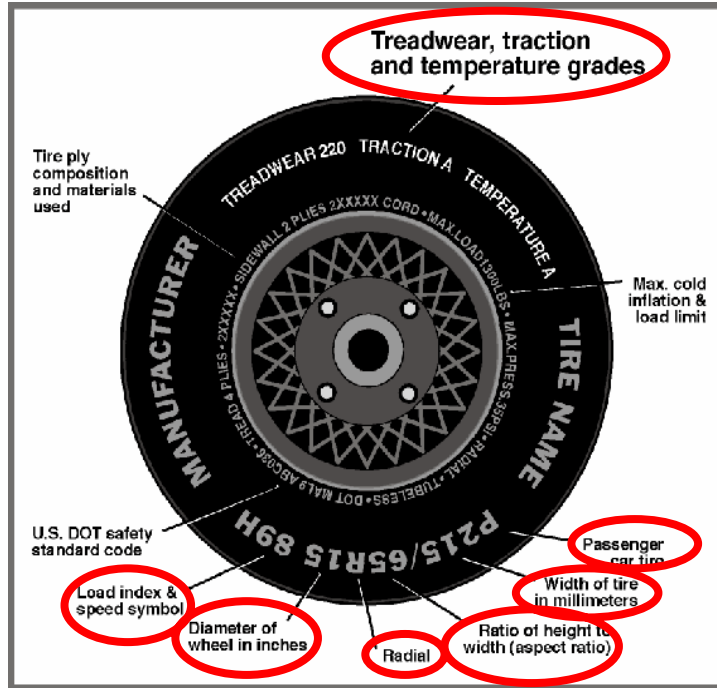
Measured Parameter	Front	Mid	Rear	Total
Type of Seats	Bucket	N/A	Bench	
Number Of Occupants	2	0	3	5
Capacity Wt. (VCW)				385
Cargo Wt. (RCLW) (kg)				45

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	230	230
Recommended Tire Size	P205/60R16	P205/60R16
Tire Size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Name	Turanza	Turanza
Tire Type	P	P
Tire Width (mm)	205	205
Ratio of Height to Width (aspect ratio)	60	60
Radial	R	R
Wheel Diameter	16	16
Load Index & Speed Symbol	90H	90H
Treadwear	300	300
Traction Grade	A	A
Temperature Grade	A	A

DATA SHEET NO. 3

TEST VEHICLE INFORMATION

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

NORMAL DESIGN RIDING POSITION

The driver and passenger seat back is positioned to the manufacturer's designated angle.

Driver: Total Number of detents: 25

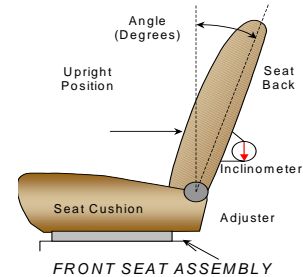
Test detent (with the forward-most detent defined as 0): 13

Passenger: Total Number of detents: Fixed

Test detent (with the forward-most detent defined as 0): N/A

Driver seat back angle: 11.2° measured for head restraint post

Passenger seat back angle: Fixed

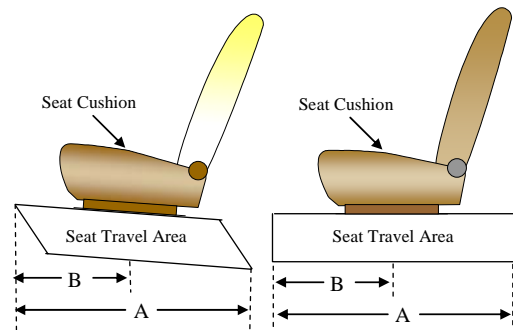


SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position with vertical adjustment at the lowest position obtainable for both the driver and passenger.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	25	13
Rear Seat	Fixed	Fixed



SEAT BELT UPPER ANCHORAGE

	Total No. of Positions	Placed in Position No.
Driver Seat	3	1
Rear Seat	Fixed	N/A

Position number one is the uppermost adjustment position.

DATA SHEET NO. 3 (CONTINUED)

TEST VEHICLE INFORMATION

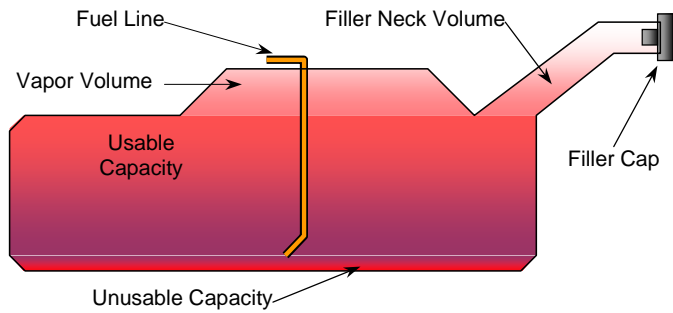
Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	55.0
Usable Capacity used for FMVSS301	55.0
Actual Amount of Solvent used	48.8

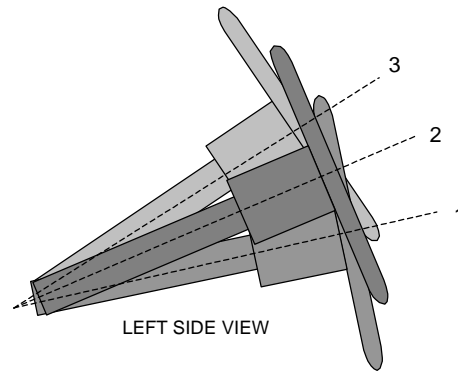
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies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



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position, mm
Lowermost Position	26.4°	N/A
Geometric Center Position	27.0°	N/A
Uppermost Position	28.5°	N/A

DATA SHEET NO. 4

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle:	<u>2008 Nissan Sentra</u>	NHTSA No.:	<u>M85210</u>
Test Program:	<u>NCAP Side Impact</u>	Test Date:	<u>10/08/07</u>

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	1112

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	382.0	295.8	
Right	kg	392.6	285.8	
Ratio	%	57.3	42.7	
Totals	kg	779.6	581.6	1361.2

SPEED AND IMPACT ANGLE DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.8
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.9
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.0

POST TEST OBSERVATIONS

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	2 mm left
Vertical Offset	mm	+/- 20	11 mm up

DATA SHEET NO. 5

POST TEST OBSERVATIONS

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	SID/HIII / 066	SID/HIII / 059
Head Contact	Airbag, head rest	Airbag, side header, head rest
Upper Torso Contact	Door panel, 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	Locked	Locked
Left Side Door Opening	Jammed & Latched	Jammed & Latched
Right Side Door Opening	Close & Latched	Closed & Latched
Seat Movement	None	None
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Did not separate from vehicle
Sill Separation	Did not separate from vehicle
Windshield Damage	None
Window Damage	Left front and left rear shattered
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

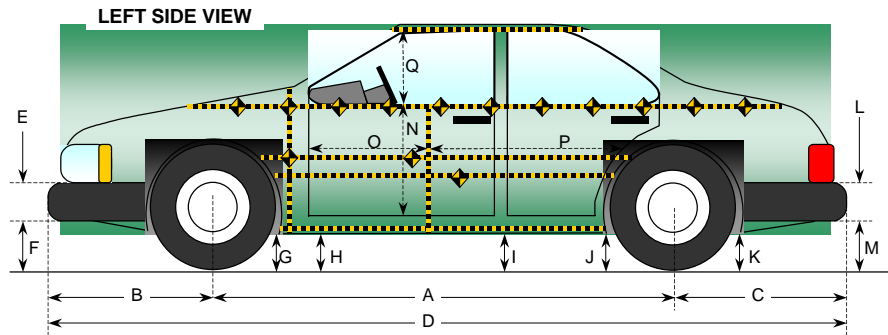
Restraint Type	Left Front (Driver) Occupant Location 01		Left Rear (Passenger) Occupant Location 04	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No	N/A	
Side Airbag	Yes	Yes	N/A	
Head Airbag	N/A		N/A	
Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter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

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



All Measurements in mm

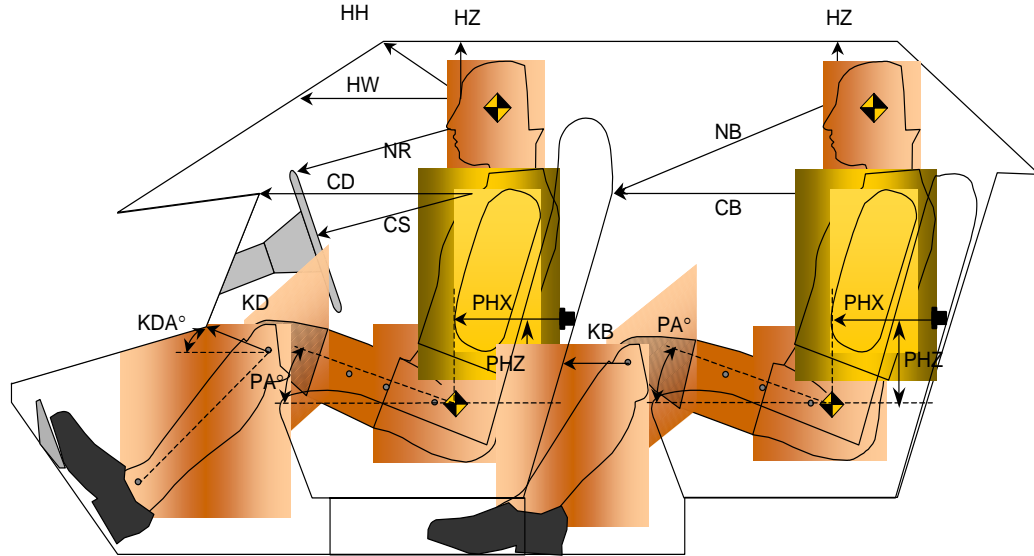
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2680	2680	0
B	Front Axle to Front Surface of Vehicle	920	915	5
C	Rear Axle to Rear Surface of Vehicle	965	971	-6
D	Total Length at Centerline	4565	4569	-4
E	Front Bumper Thickness	177	177	0
F	Front Bumper Bottom to Ground	415	393	22
G	Sill Height at Front Wheel Well	290	256	34
H	Sill Height at Front Door Leading Edge	234	201	33
I	Sill Height at "B" Pillar	233	304	-71
J1	Sill Height at Rear Wheel Well	176	170	6
J2	Pinch Weld Height at Rear Wheel Well	225	228	-3
K	Sill Height Aft of Rear Wheel Well	260	256	4
L	Rear Bumper Thickness	234	234	0
M	Rear Bumper Bottom to Ground	346	353	-7
N	Sill Height to Window Bottom Sill	1153	652	501
O	Front Door Leading Edge to Impact CL	886	822	64
P	Rear Door Trailing Edge to Impact CL	1135	1061	74
Q	Front Window Opening	436	302	134
R	Right Side Length	4312	4320	-8
S	Left Side Length	4305	4298	7
T	Vehicle Width at "B" Post	1245	1139	106

DATA SHEET NO. 7

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



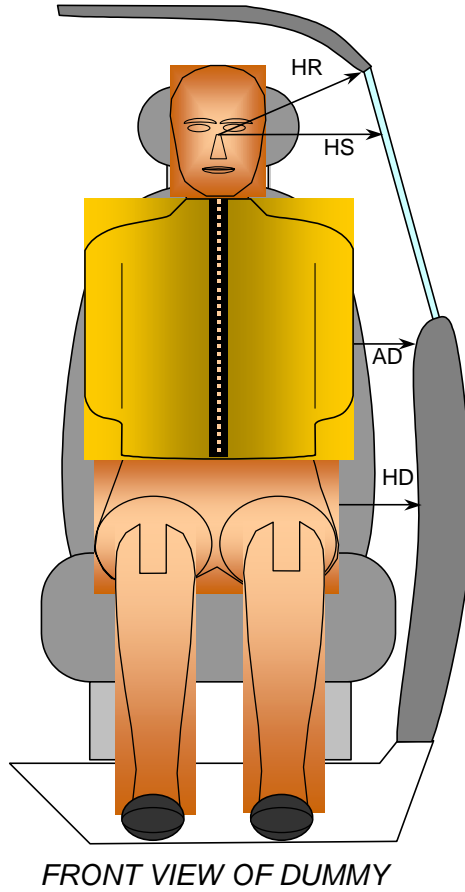
Driver Code	Pass. Code	Measurement Description	Driver S/N 066		Passenger S/N 059	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	360			
HW		Head to Windshield	625			
HZ	HZ	Head to Roof	165		145	
NR	NB	Nose to Rim/Nose to Seatback	438		626	
CD	CB	Chest to Dash or Seatback	537		552	
CS		Chest to Steering Wheel	337			
KDL	KBL	Left Knee to Dash or Seatback	105	20.5	140	15.7
KDR	KBR	Right Knee to Dash or Seatback	106	23.1	148	15.7
PA	PA	Pelvic Angle		23.9		24.5
PHX	PHX	H-Point to Striker (X-Axis)	222		276	
PHZ	PHZ	H-Point to Striker (Z-Axis)	102		120	

DATA SHEET NO. 8

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



FRONT VIEW OF DUMMY

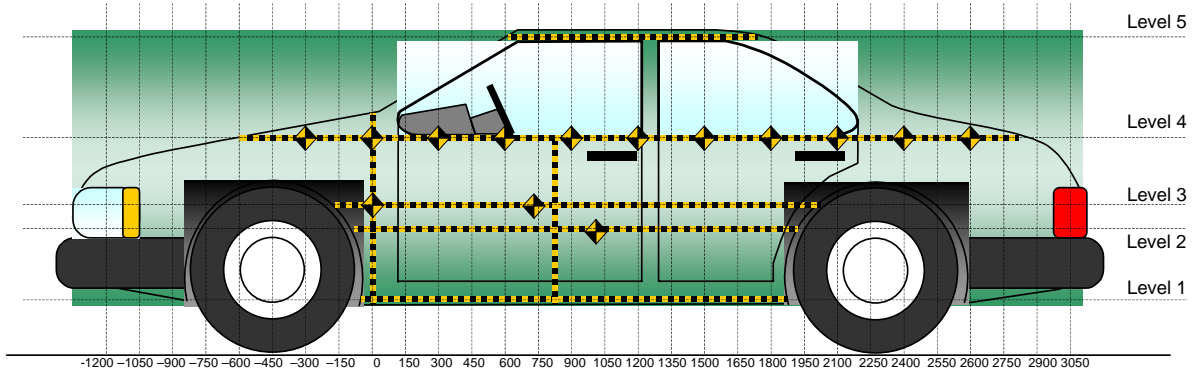
Code	Measurement Description	Units	Driver S/N 066	Passenger S/N 059
HR	Head to Side Header	mm	160	140
HS	Head to Side Window	mm	280	216
AD	Arm to Door	mm	118	95
HD	H-Point to Door	mm	149	140

DATA SHEET NO. 9

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.

All measurements below in mm.

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measurement Description	Height Above Ground
5	Window Top	1445
4	Window Sill	920
3	Mid Door	640
2	Occupant H-Point	556
1	Sill Top	225

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1200															
-1050															
-900															
-750															
-600			867					877					-10		
-450				772					782					-9	
-300				791					788					3	
-150			878	805				879	809				-1	-5	
0	877	876	870	817	763	880	857	854	812	766	-2	19	16	5	-2
150	826	869	868	822	734	751	620	650	755	739	75	249	217	68	-5
300	817	870	870	826	705	750	591	607	673	708	66	278	263	153	-3
450	815	872	873	829	677	744	595	616	643	679	71	278	257	186	-2
600	815	874	876	832	652	740	589	610	625	652	76	285	265	207	-1
750	815	874	876	834	628	736	592	632	618	627	79	282	244	217	1
900	815	873	876	837	615	736	599	642	621	609	79	275	234	216	6
1050	816	873	875	841	605	733	612	648	624	590	83	261	227	217	15
1200	817	872	874	846	603	732	591	614	621	591	85	281	261	224	12
1350	817	871	874	848	601	728	575	583	615	587	89	296	291	233	14
1500	818	869	872	849	600	757	585	608	612	586	61	284	264	236	14
1650	820	866	870	847	604	777	605	621	644	588	43	261	249	203	16
1800	827	868	869	845	611	800	656	673	709	587	27	212	196	136	24
1950		874	876	831	617		829	780	774	604		46	95	57	14
2100				838	633				842	622				-5	11
2250				833					814					18	
2400				822					814					8	
2550				808					807					1	
2700				790					793					-3	

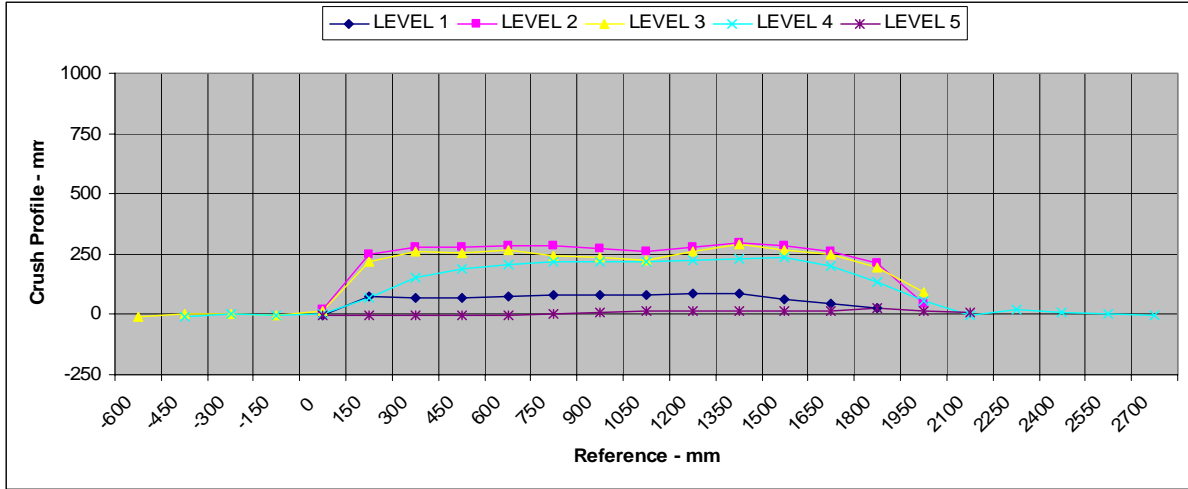
Reference plane is parallel to test vehicle longitudinal centerline.

Given measurements = Reference plane to car body

DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



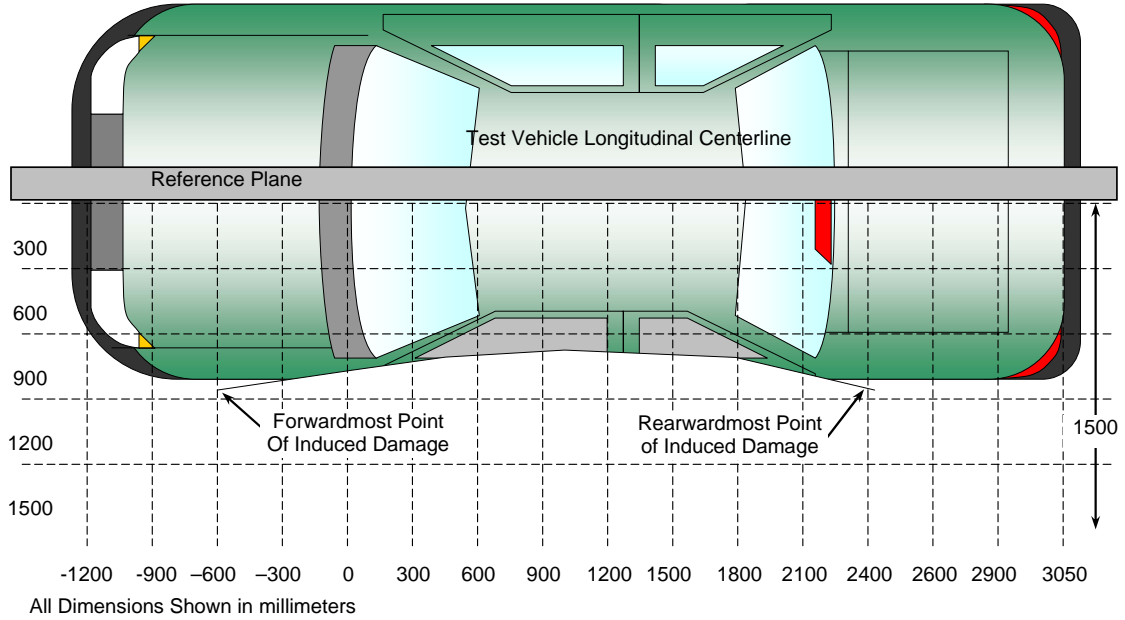
	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	89	296	291	237	24
Distance from Impact	mm	1350	1350	1350	1500	1800

DATA SHEET NO. 11

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2700 mm	4	790	793	-3
2	2100 mm	5	633	622	11
3	1350 mm	2	871	575	296
4	750 mm	2	874	592	282
5	0 mm	2	876	857	19
6	-600 mm	3	867	877	-10

Reference plane is parallel to test vehicle longitudinal centerline.

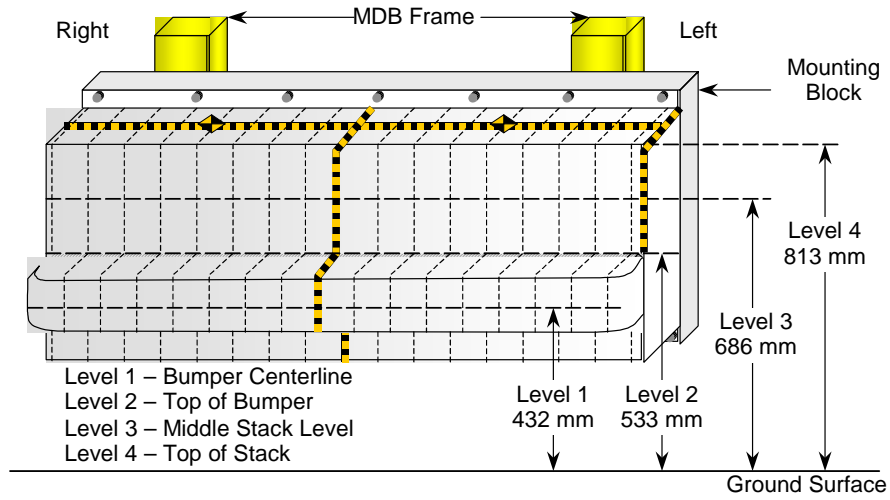
Given dimensions = Reference plane to car body.

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	-127	-117	-105	-102	-101	-102	-100	-99	-97	-96	-93	-93	-92	-93	-97	-103	-108
2	-38	-29	-20	-19	-19	-19	-24	-24	-22	-22	-22	-22	-23	-25	-28	-38	-51
3	-74	-35	-17	-11	-12	-20	-37	-34	-22	-18	-10	-11	-14	-18	-25	-37	-93
4	-86	-35	-13	-6	-11	-26	-52	-29	-23	-22	-22	-25	-30	-38	-52	-87	-141

All measurements are in mm

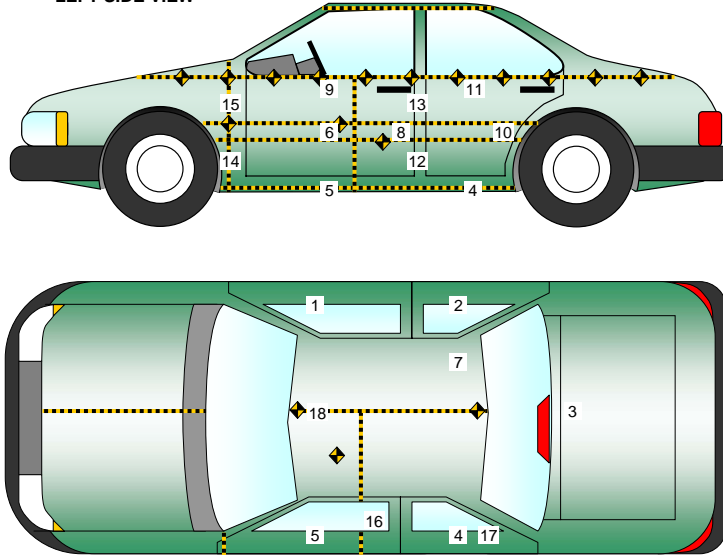
DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

LEFT SIDE VIEW



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3050	700	-281
2	Right Sill at Rear Seat	2130	700	-264
3	Rear Floorpan Above Axle	1293	0	-478
4	Left Sill at Rear Seat	2130	700	-270
5	Left Sill at Front Seat	3070	700	-275
6	Left Front Door C/L			
7	Rear Occupant Compartment	1980	560	-336
8	Left Front Door Mid-Rear			
9	Left Front Door Upper C/L			
10	Left Rear Door Mid-Rear			
11	Left Rear Door Upper C/L			
12	Left Lower B-Post	2265	-795	-540
13	Left Upper B-Post	2260	-780	-885
14	Left Lower A-Post	3345	-800	-500
15	Left Upper A-Post	3380	-810	-819
16	Front Seat Track	2170	-560	-262
17	Rear Seat Track or Structure	1765	-570	-332
18	Vehicle CG	2645	0	-420

Reference Points: X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

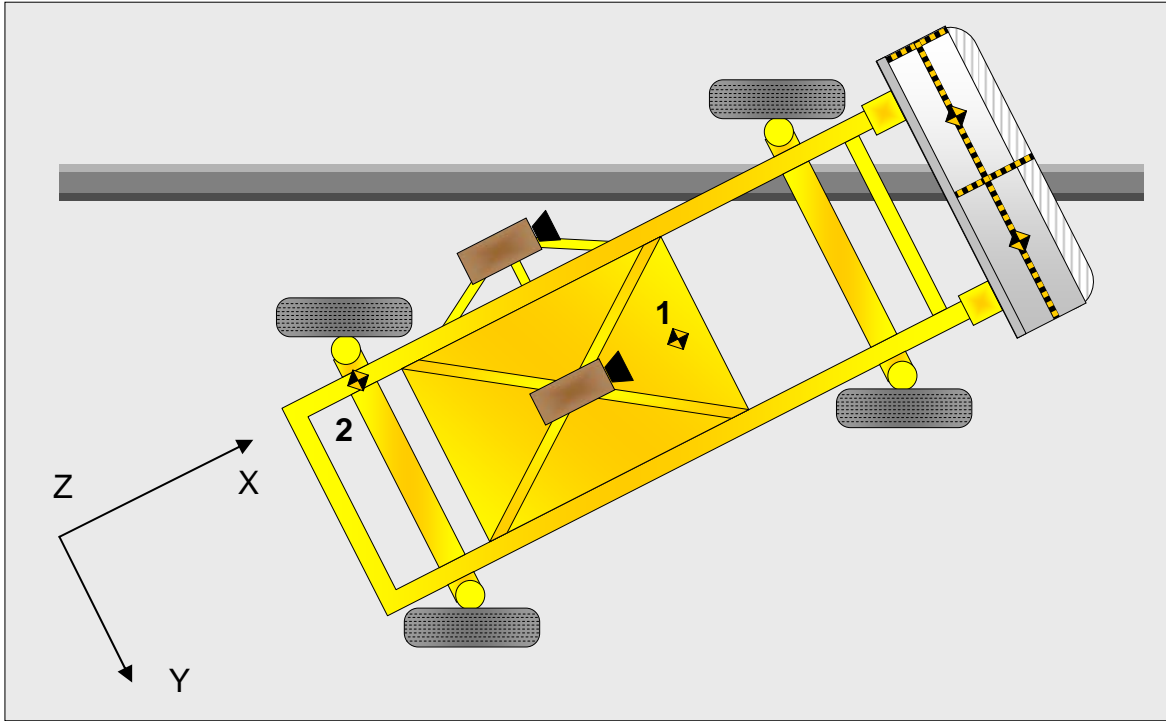
¹ Accelerometer not applicable to test mode.

DATA SHEET NO. 14

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



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

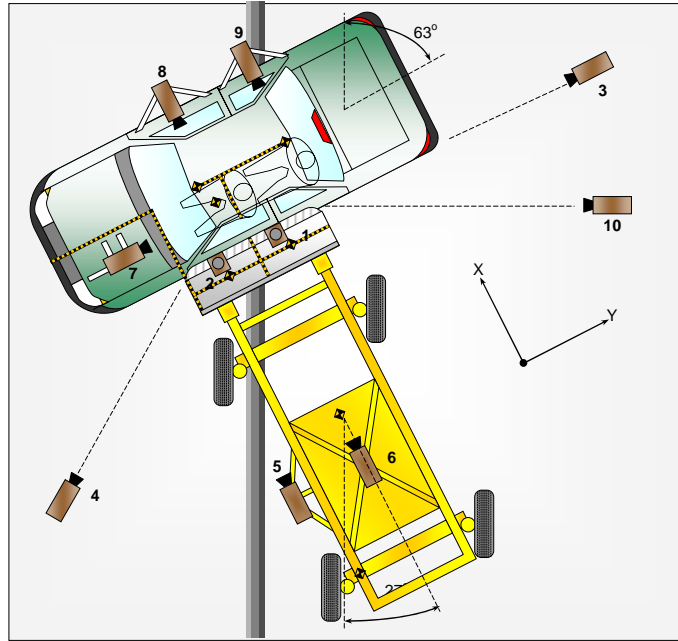
Reference Points: X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 15

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	Overhead Overall	0	350	-7000	12.5	1000
2	Overhead Close-up	0	600	-7000	25	1000
3	Right Side, Ground Level, Overall	0	8180	-1010	25	1000
4	Left Side, Ground Level, Overall	-3800	-5480	-980	12.5	1000
5	MDB Onboard, Impact Point Close-up	-1720	890	-850	12.5	1000
6	MDB Onboard, Centerline of Impact	-2590	0	-1400	12.5	1000
7	Vehicle Onboard Front SID/HIII, Front	530	-1510	-1170	12.5	1000
8	Vehicle Onboard Front SID/HIII, Side	1620	240	-1210	6.5	1000
9	Vehicle Onboard Rear SID/HIII, Side	1620	790	-1230	6.5	1000
10	Real Time Coverage				Zoom	30

Reference Points: X - Impact Line
 Y - MDB Left Edge Impact Point
 Z - Ground Plane

DATA SHEET NO. 16

SUMMARY OF FMVSS 301 DATA

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 25.5° C Test Time: 13:41

Stoddard Solvent Spillage Measurements

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

(Maximum allowable = 1 ounce)

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

(Maximum allowable = 5 ounces)

C. For the following 25 minutes: 0

(Maximum allowable = 1 oz./minute)

D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA

			<p>1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.</p> <p>2. The position hold time at each position is 300 seconds (minimum).</p> <p>3. Details of Stoddard Solvent spillage locations: None</p>	
0° to 90°		90° to 180°		
180° to 270°		270° to 360°		

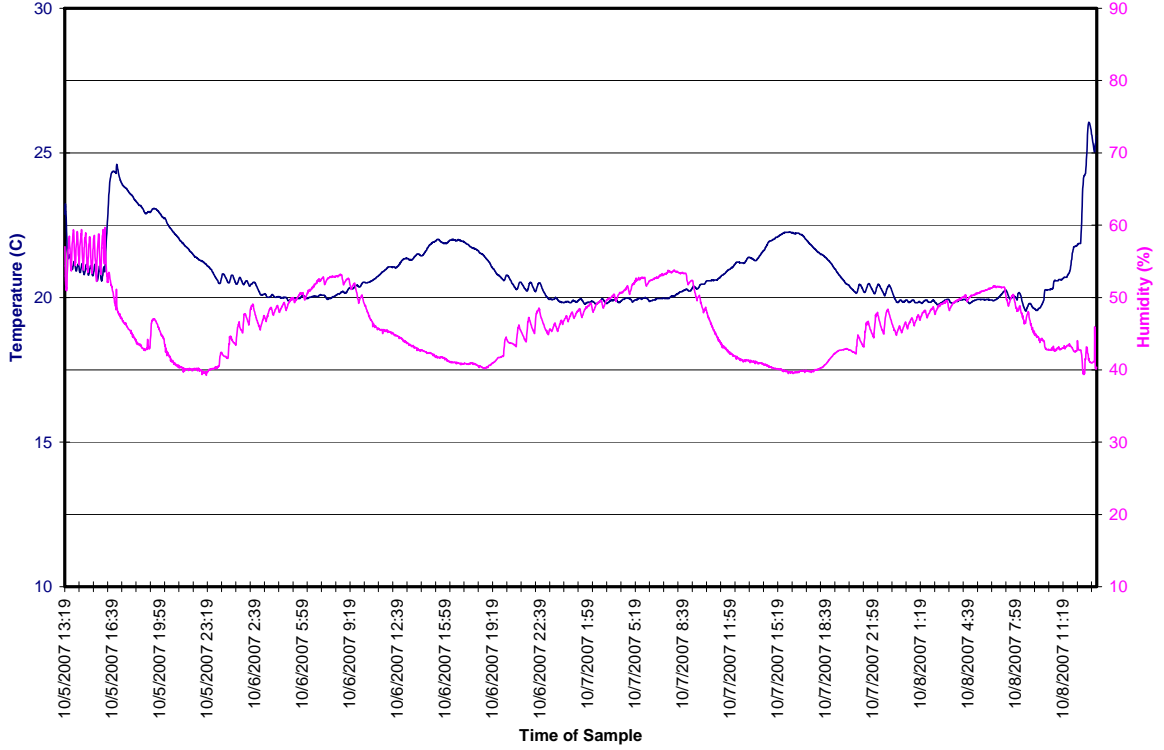
Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage Collection Time (min)	Spillage (oz.)	Spillage Collection Time (min)	Spillage (oz.)	Spillage Collection Time (min)	Spillage (oz.)
0° to 90°	120	300	First 5	0	Sixth	0	Seventh	0
90° to 180°	120	300	First 5	0	Sixth	0	Seventh	0
180° to 270°	120	300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

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2008 Nissan Sentra
Test Program: NCAP Side Impact

NHTSA No.: M85210
Test Date: 10/08/07



APPENDIX A
PHOTOGRAPHS

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



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



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



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



Figure A-5 Pre-Test Left Front View of Test Vehicle



Figure A-6 Post-Test Left Front View of Test Vehicle

A-10

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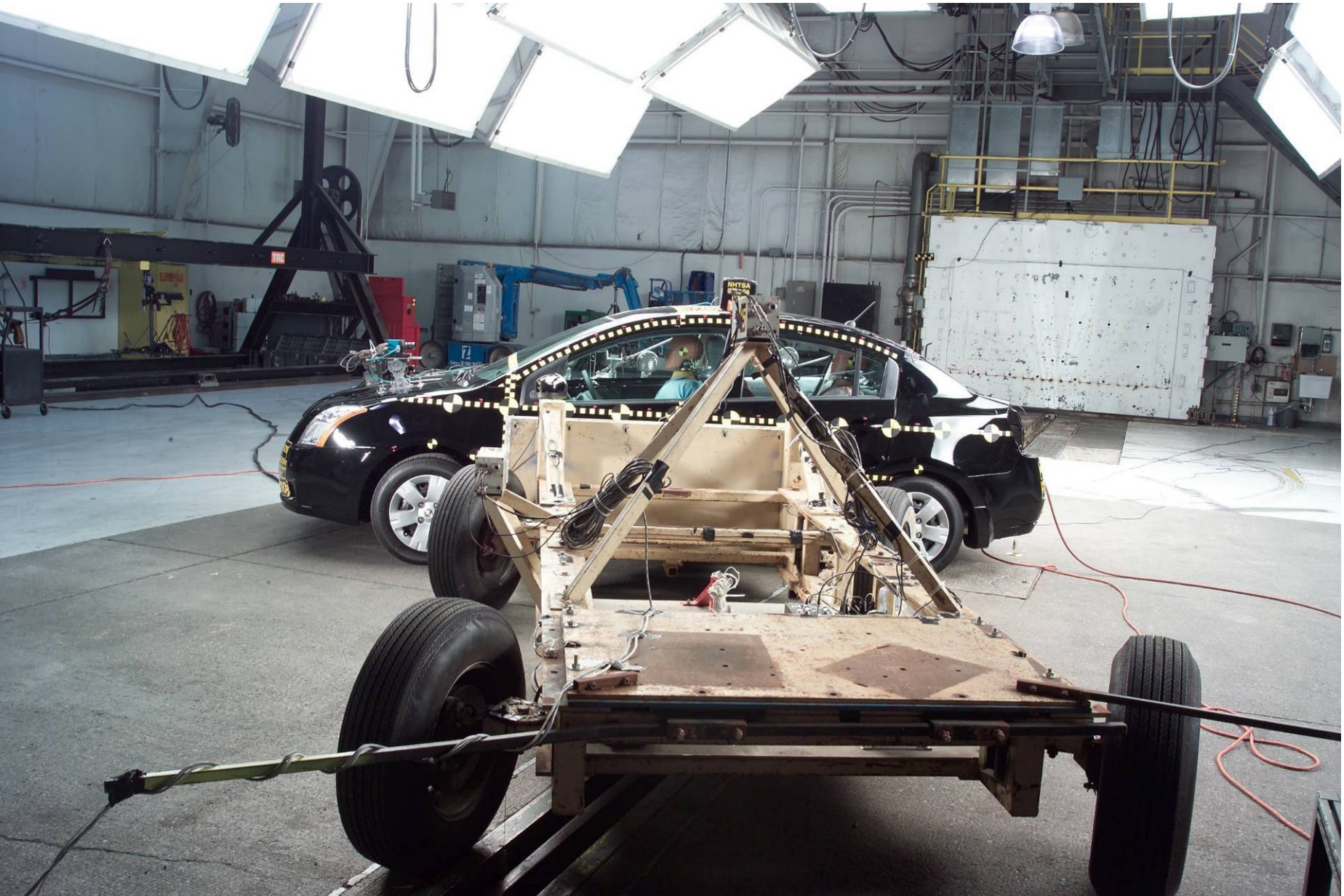


Figure A-7 Pre-Test Impacted Side View of Test Vehicle with Barrier



Figure A-8 Post-Test Impacted Side View of Test Vehicle with Barrier



Figure A-9 Pre-Test Impacted Side View of Test Vehicle



Figure A-10 Post-Test Impacted Side View of Test Vehicle

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

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

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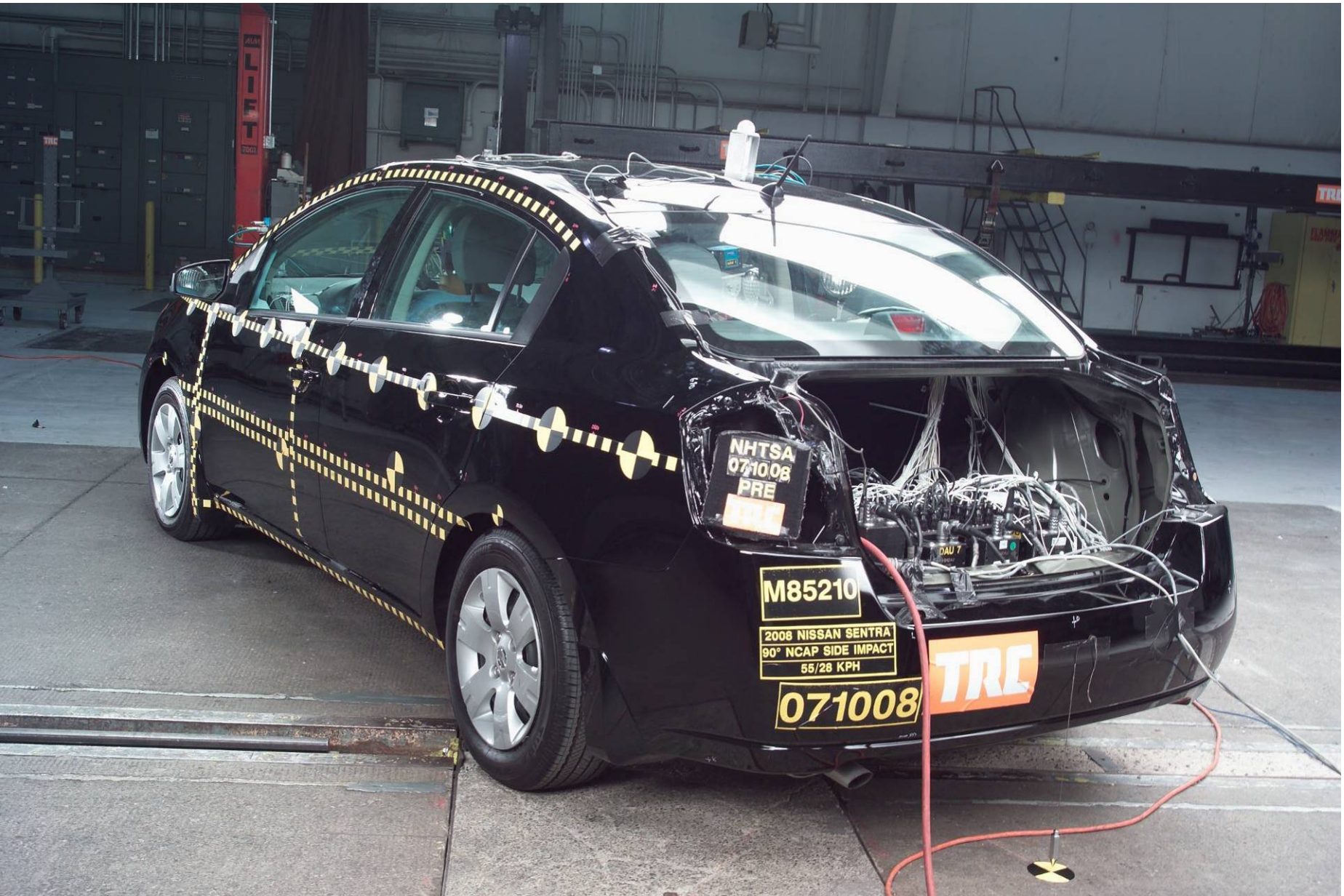


Figure A-13 Pre-Test Rear View of Test Vehicle



Figure A-14 Post-Test Rear View of Test Vehicle



Figure A-15 Pre-Test Right Rear View of Test Vehicle with Barrier



Figure A-16 Post-Test Right Rear View of Test Vehicle with Barrier



Figure A-17 Pre-Test Right Rear View of Test Vehicle



Figure A-18 Post-Test Right Rear View of Test Vehicle



Figure A-19 Pre-Test Right Side View of Test Vehicle



Figure A-20 Post-Test Right Side View of Test Vehicle



Figure A-21 Pre-Test Right Front View of Test Vehicle



Figure A-22 Post-Test Right Front View of Test Vehicle

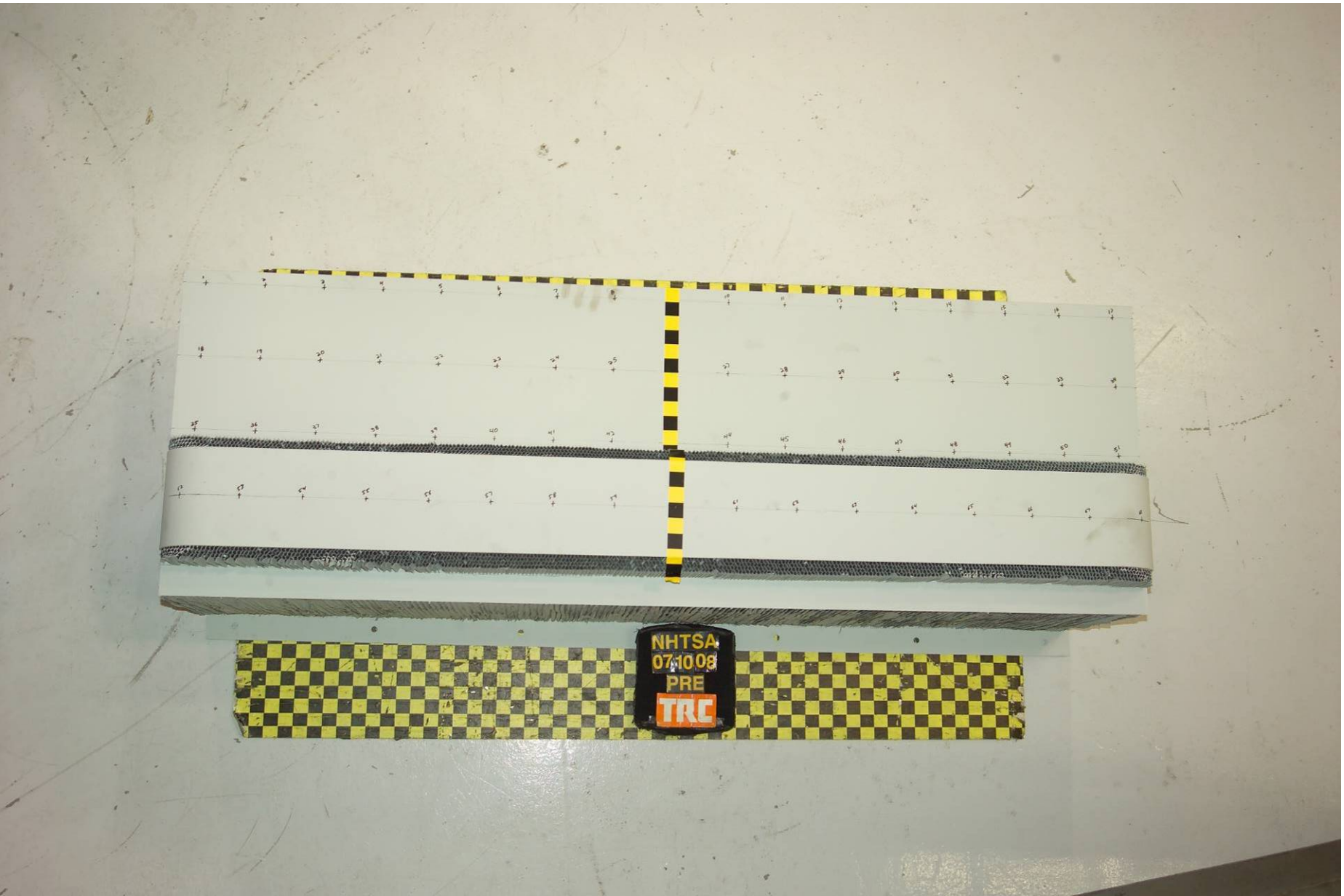


Figure A-23 Pre-Test Frontal View of Impactor Face

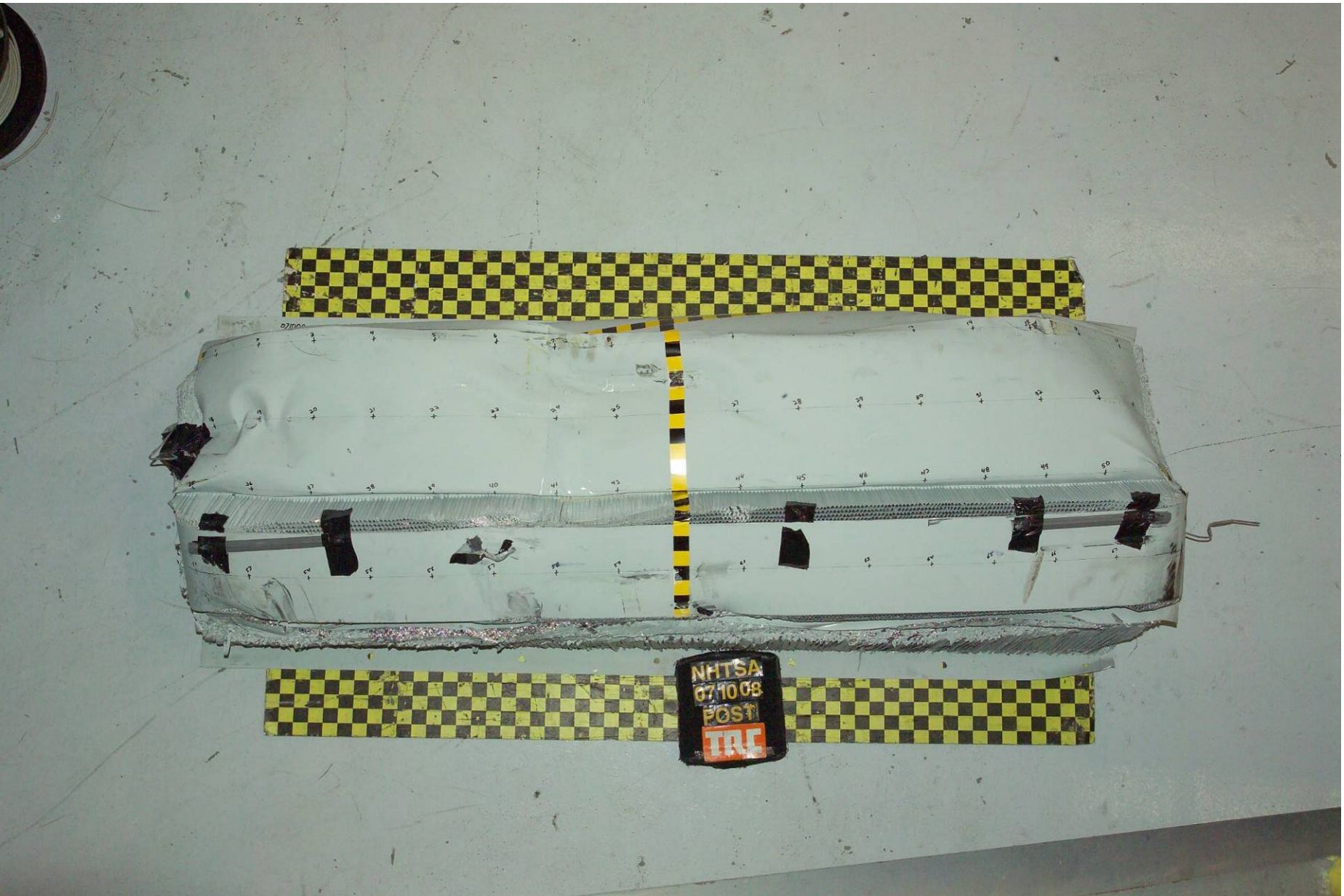


Figure A-24 Post-Test Frontal View of Impactor Face

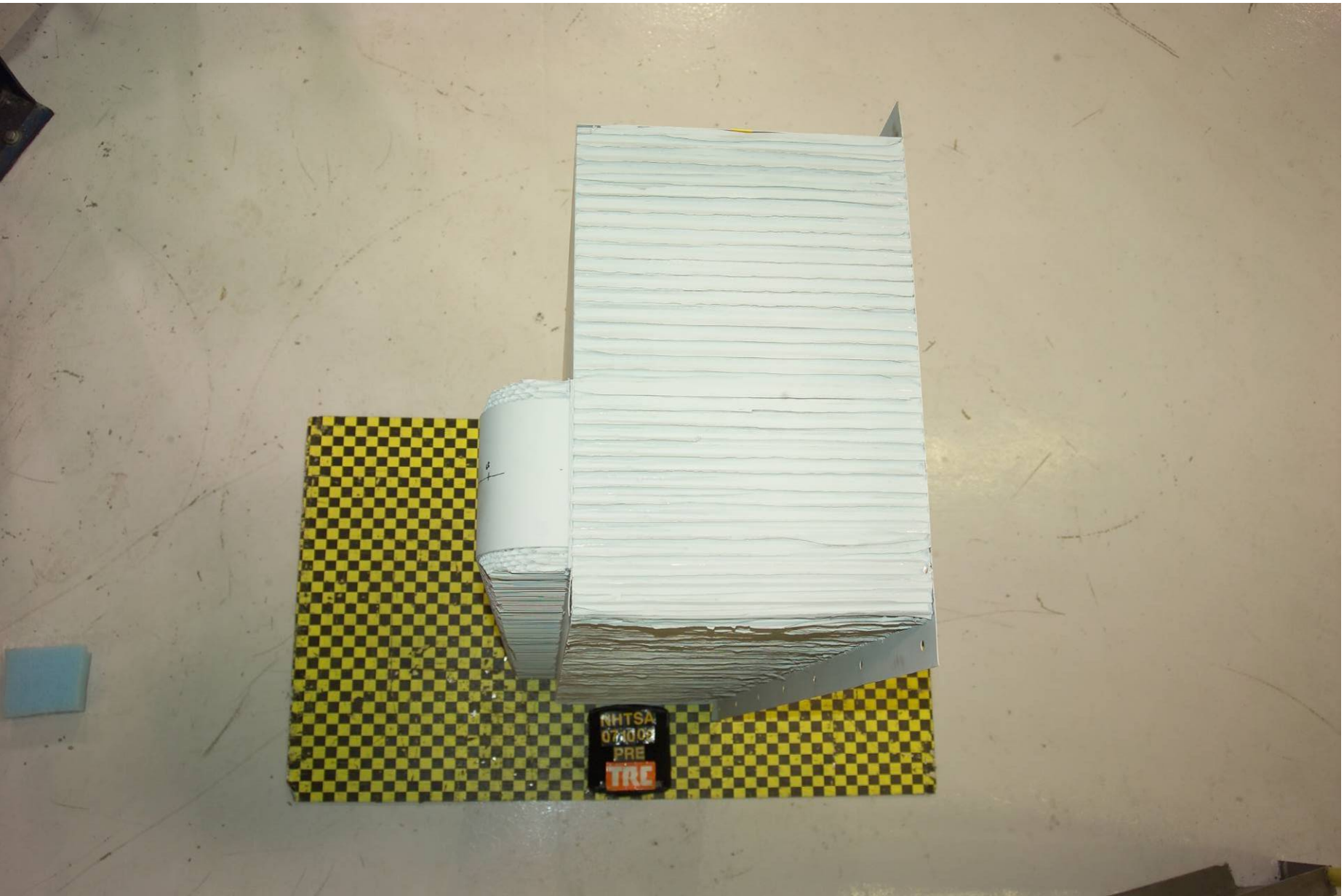


Figure A-25 Pre-Test Left Side View of Impactor Face



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

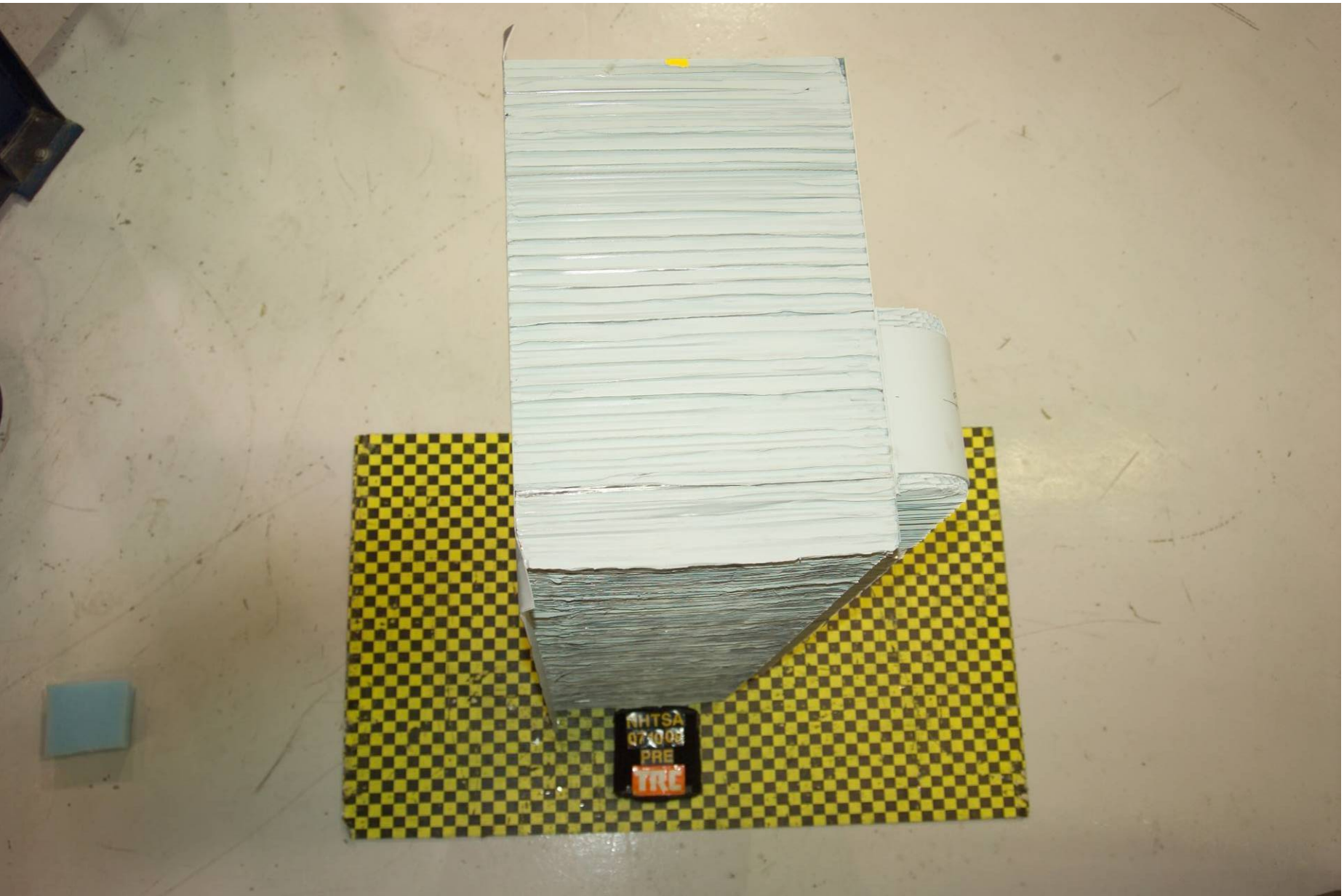


Figure A-27 Pre-Test Right Side View of Impactor Face



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

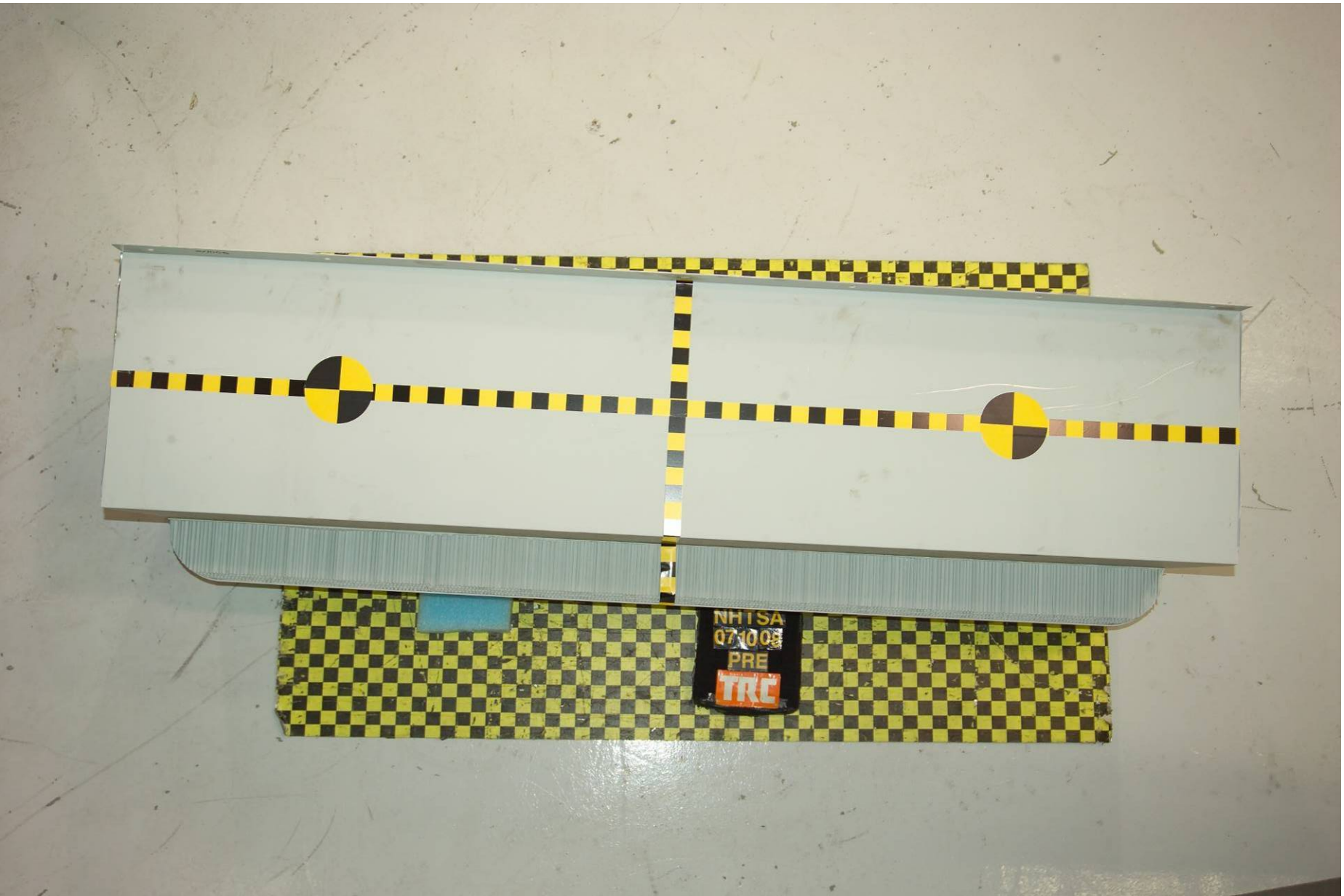


Figure A-29 Pre-Test Top View of Impactor Face

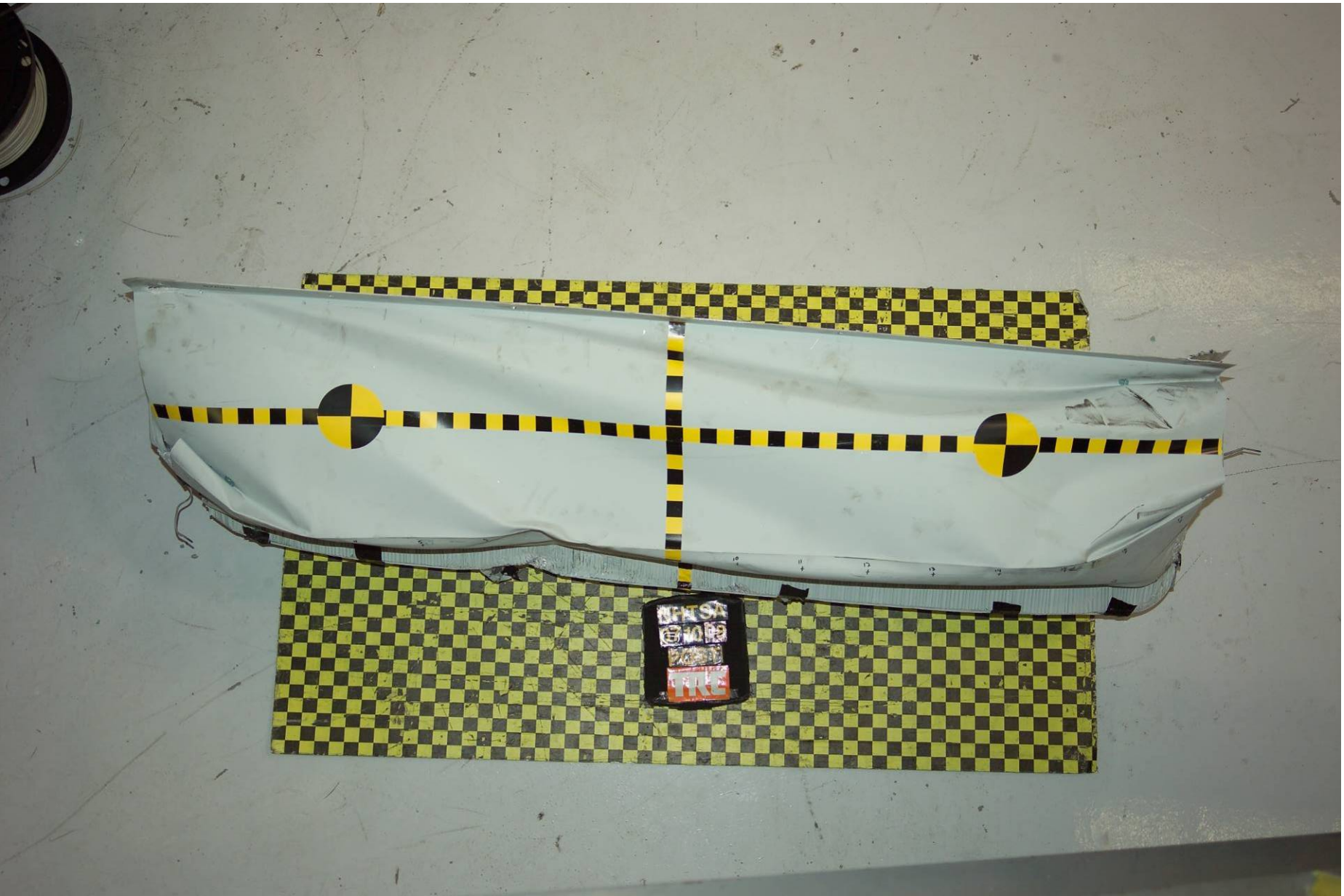


Figure A-30 Post-Test Top View of Impactor Face



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



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



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



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

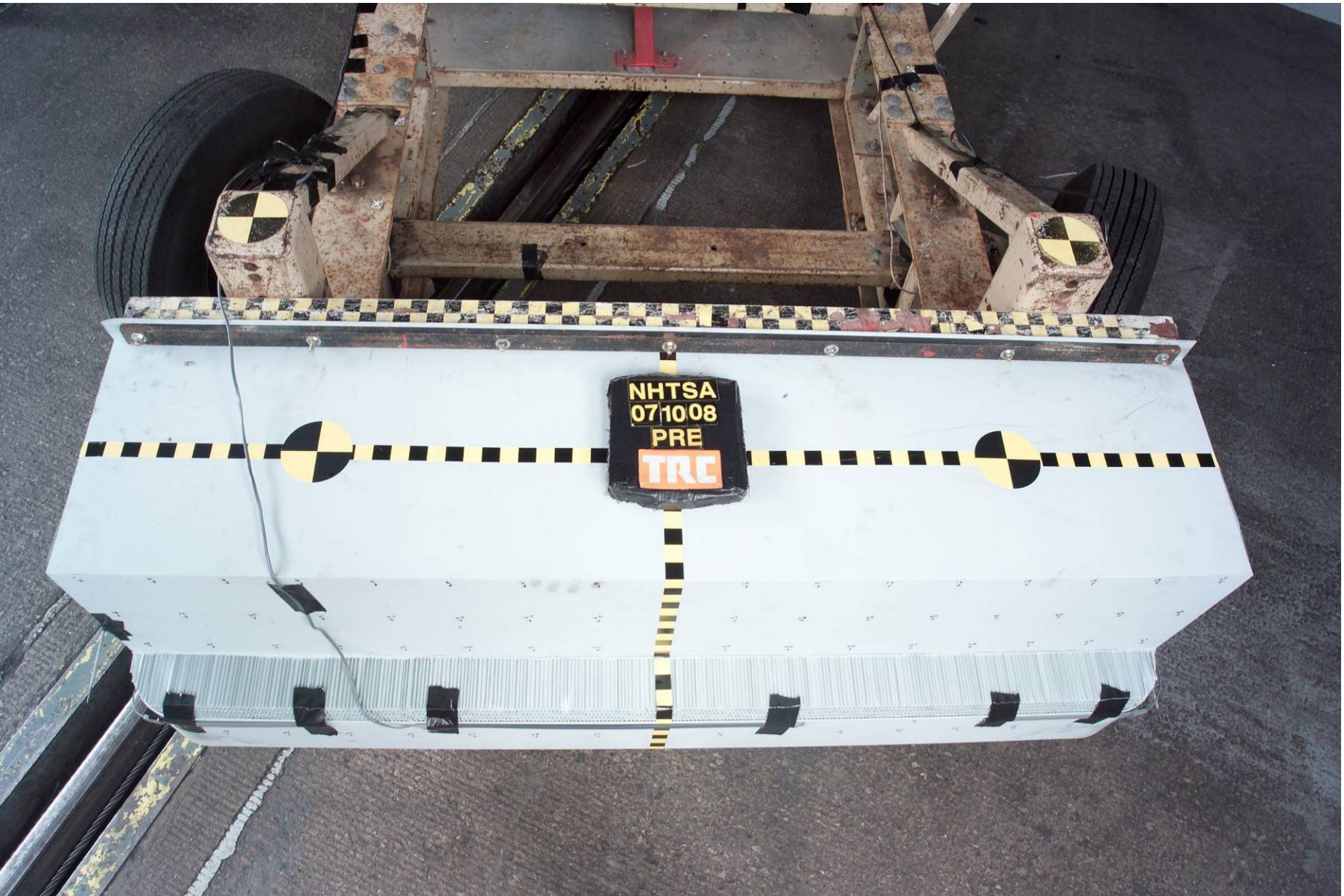


Figure A-35 Pre-Test Top View of Impactor



Figure A-36 Post-Test Top View of Impactor



Figure A-37 Pre-Test Left Side Overall View of Impactor

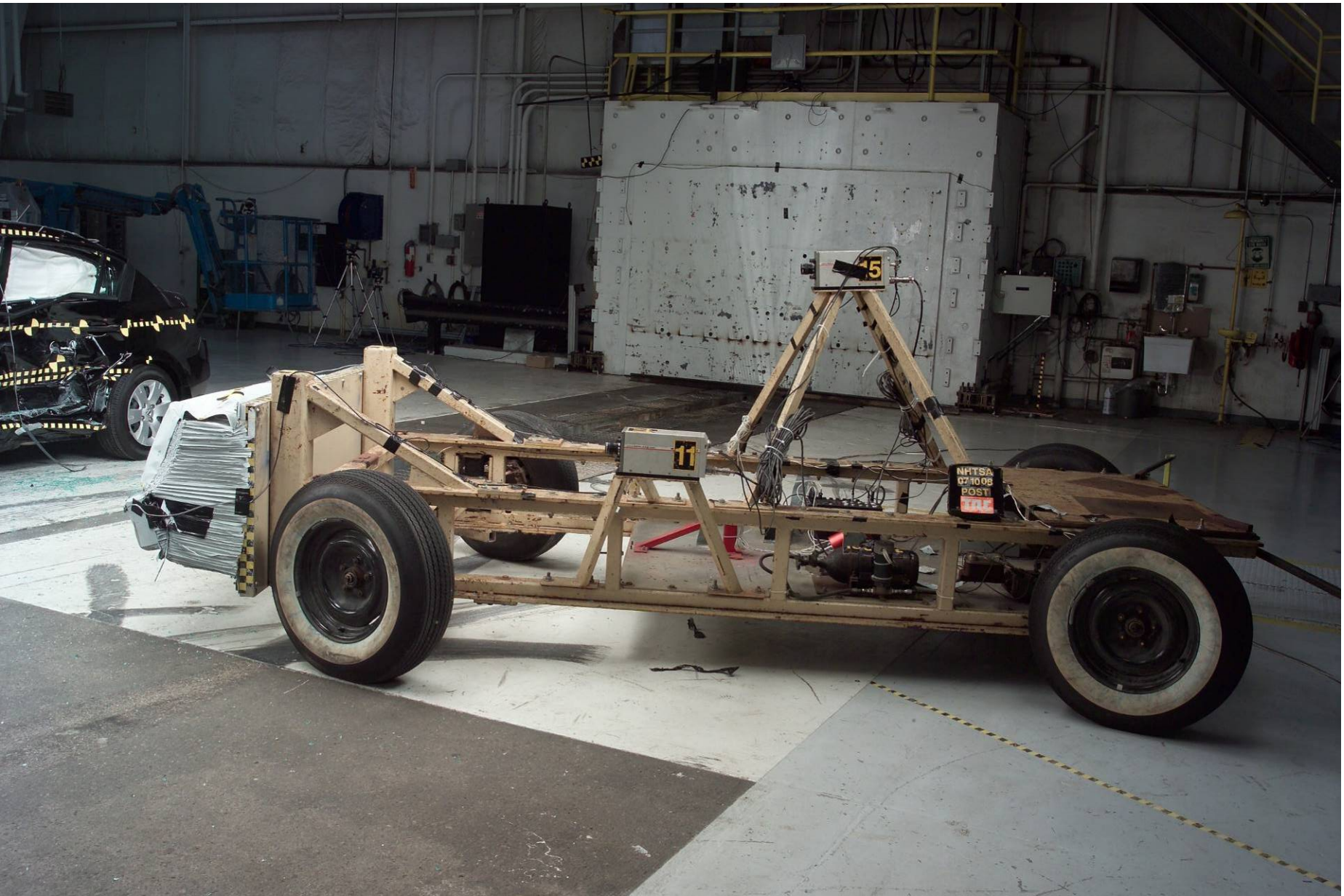


Figure A-38 Post-Test Left Side Overall View of Impactor

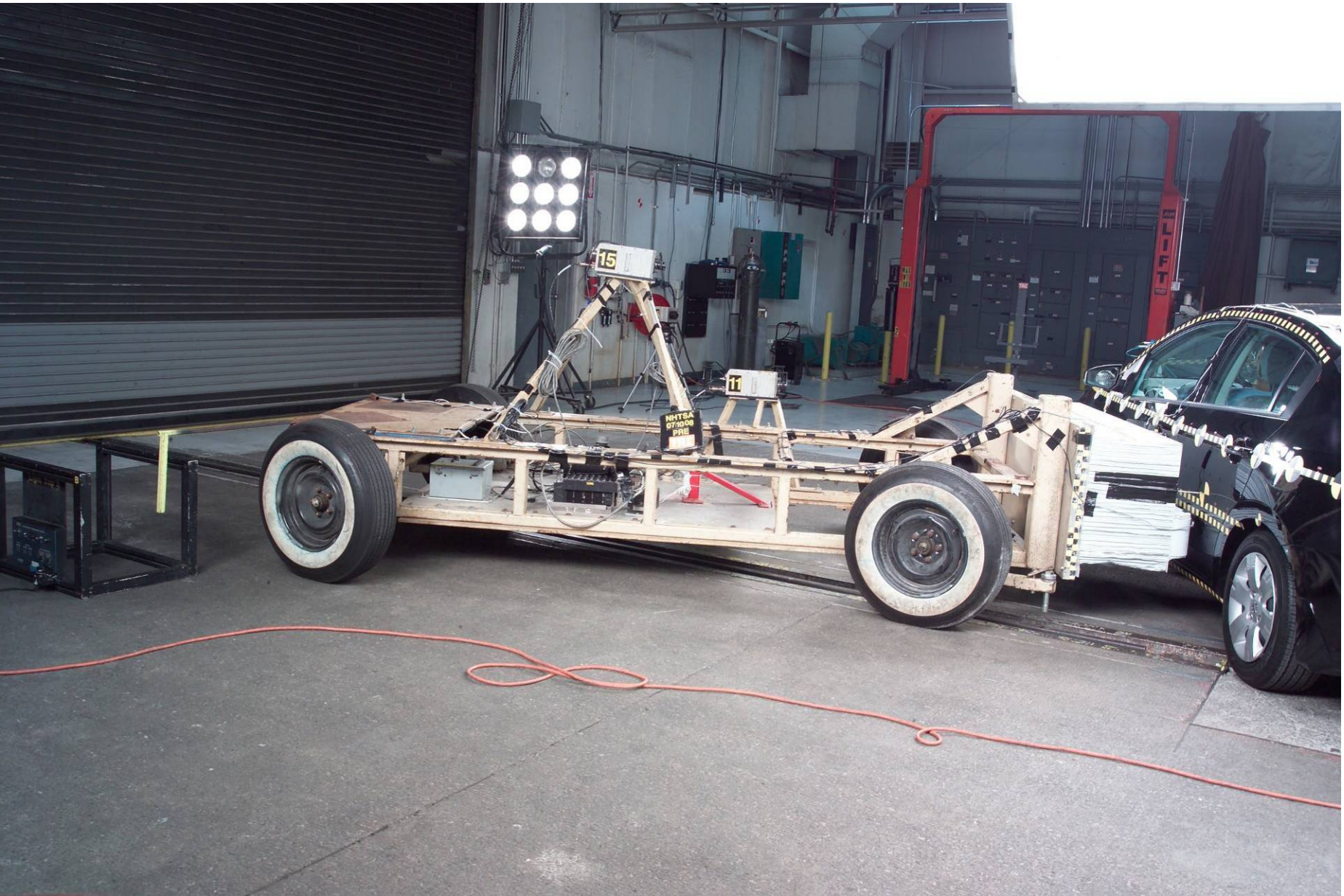


Figure A-39 Pre-Test Right Side Overall View of Impactor



Figure A-40 Post-Test Right Side Overall View of Impactor



Figure A-41 Pre-Test Right Front Overall View of Impactor



Figure A-42 Pre-Test View of MDB Showing Contact Switches in Place

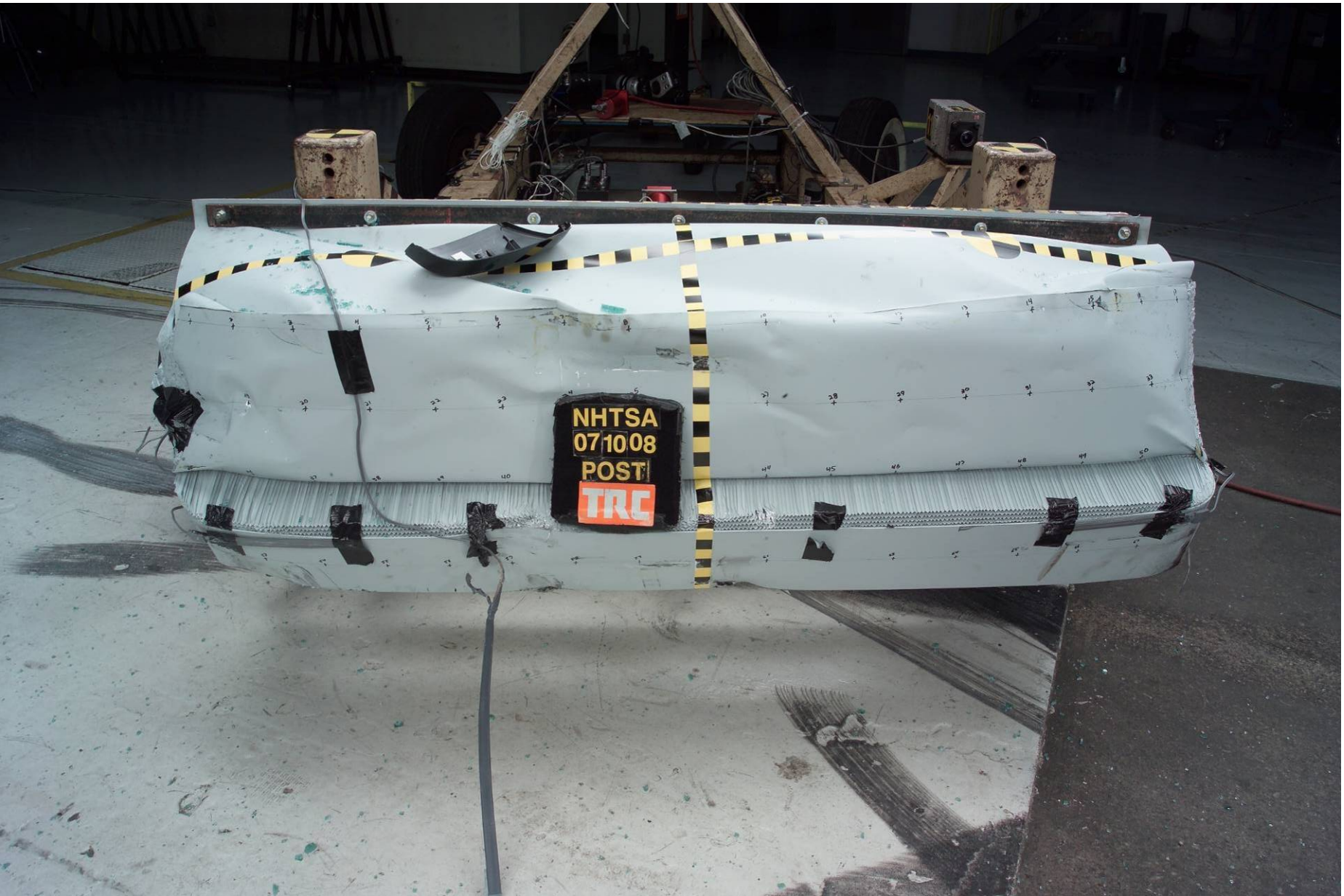


Figure A-43 Post-Test View of MDB Showing Contact Switches in Place



Figure A-44 Pre-Test Overhead View of MDB Aligned with Vehicle



Figure A-45 Post-Test Overhead View of MDB and Vehicle



Figure A-46 Pre-Test Left Occupant Compartment View of Front SID



Figure A-47 Post-Test Left Occupant Compartment View of Front SID

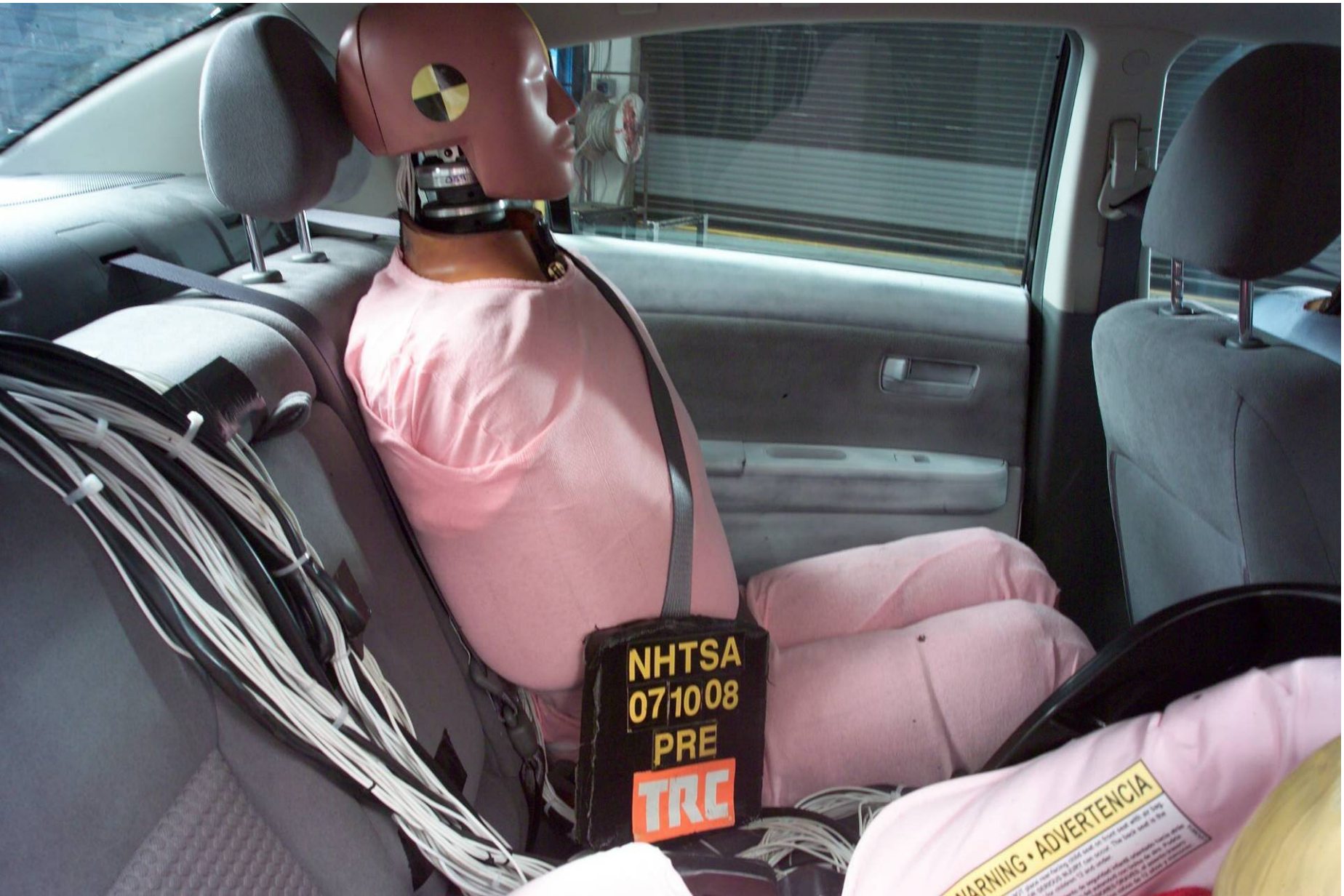


Figure A-48 Pre-Test Left Occupant Compartment View of Rear SID



Figure A-49 Post-Test Left Occupant Compartment View of Rear SID

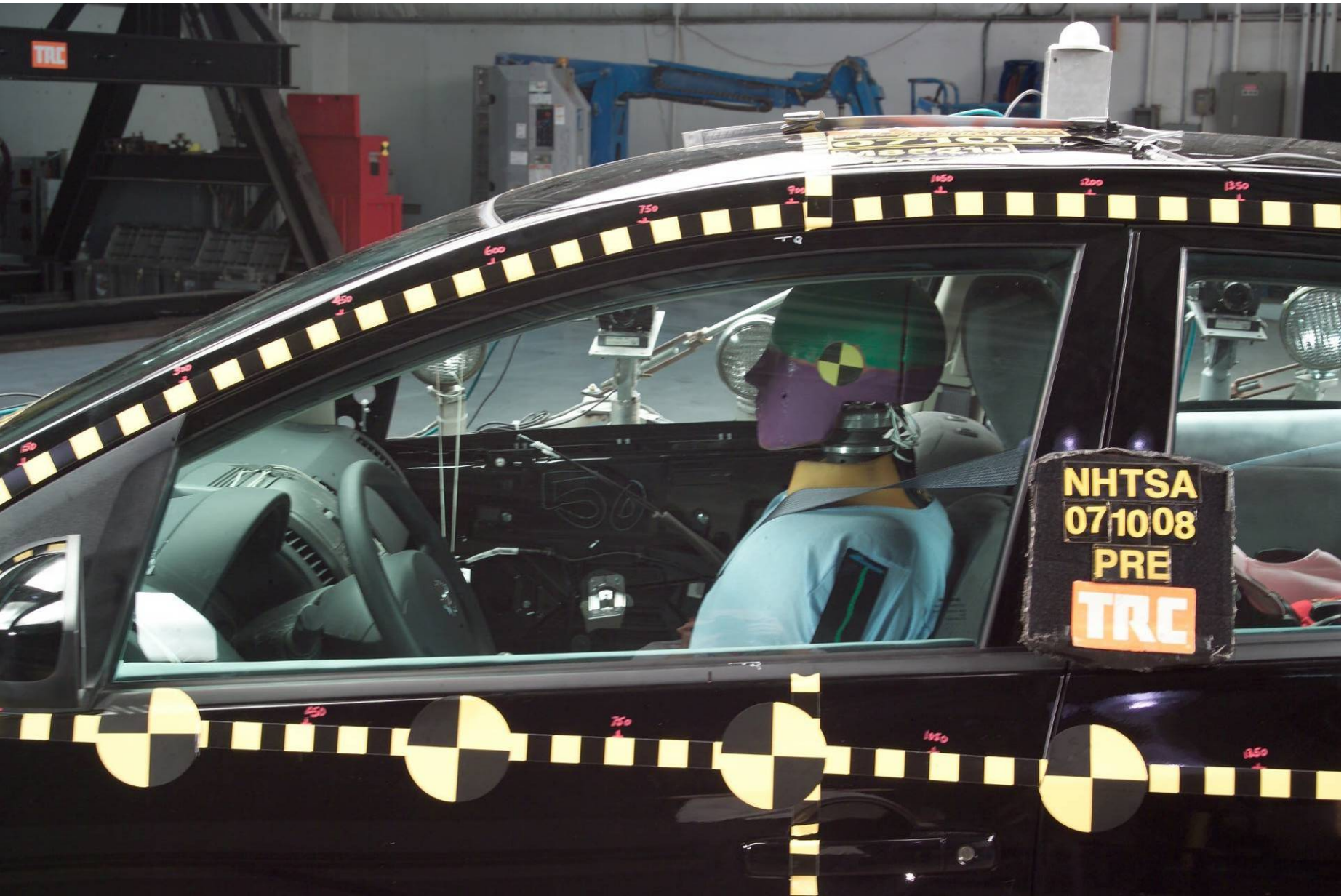


Figure A-50 Pre-Test Left View of Front SID



Figure A-51 Post-Test Left View of Front SID



Figure A-52 Pre-Test Left View of Front SID and Belt Position



Figure A-53 Pre-Test Left View of Front SID and Door Clearance

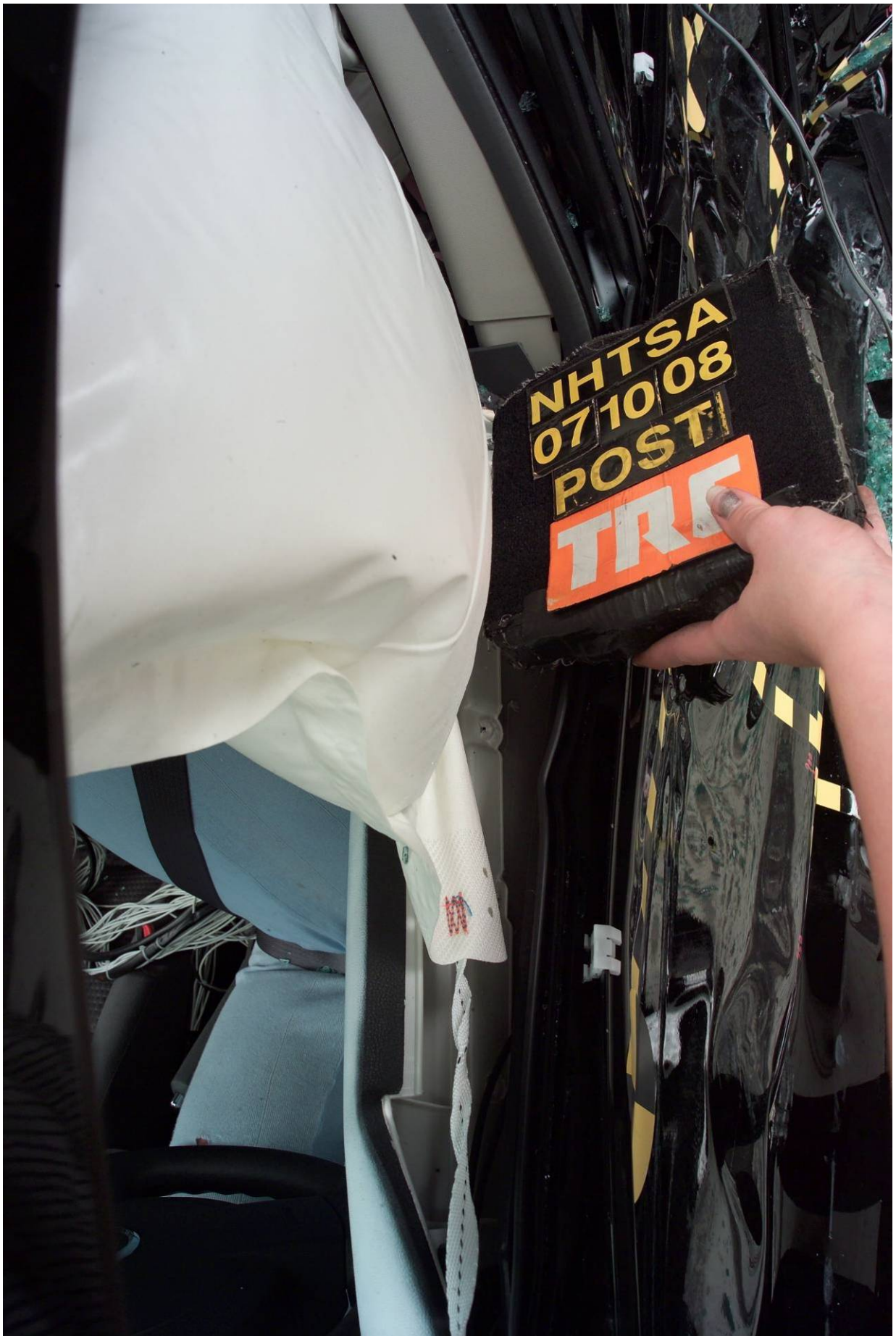


Figure A-54 Post-Test Left View of Front SID and Door Clearance



Figure A-55 Pre-Test Left View of Rear SID

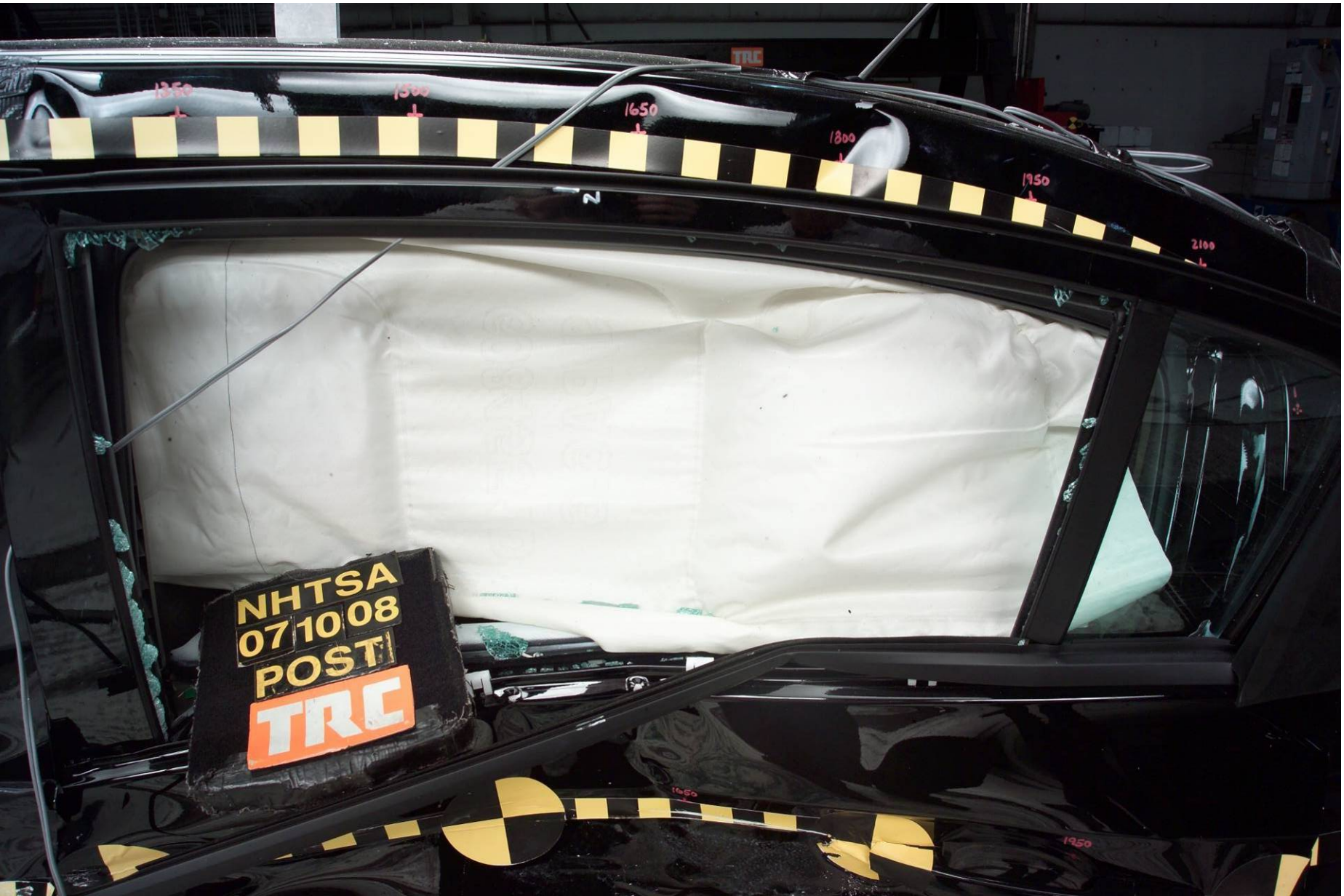


Figure A-56 Post-Test Left View of Rear SID



Figure A-57 Pre-Test Left View of Rear SID and Belt Position



Figure A-58 Pre-Test Left View of Rear SID and Door Clearance



Figure A-59 Post-Test Left View of Rear SID and Door Clearance



Figure A-60 Pre-Test Interior of Front Door

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Figure A-61 Post-Test Interior of Front Door Showing SID Impact Locations



Figure A-62 Post-Test Front SID Contact – View 1



Figure A-63 Post-Test Front SID Contact – View 2



Figure A-64 Pre-Test Interior of Rear Door

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071008-1



Figure A-65 Post-Test Interior of Rear Door Showing SID Impact Locations



Figure A-66 Post-Test Rear SID Contact – View 1



Figure A-67 Post-Test Rear SID Contact – View 2



Figure A-68 Pre-Test Left Side View of MDB with Impactor Face in Position



Figure A-69 Pre-Test Primary Impact Point View



Figure A-70 Post-Test Primary Impact Point View



Figure A-71 Pre-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



TIRE AND LOADING INFORMATION
PNEU ET INFORMATION DE CHARGEMENT

SEATING CAPACITY NOMBRE DE PLACES	TOTAL TOTAL	5	FRONT AVANT	2
			REAR ARRIÈRE	3

The combined weight of occupants and cargo should never exceed 385 kg or 848 lbs.
Le poids combiné d'occupants et de cargaison ne devrait jamais excéder 385 kg ou 848 lbs.

TIRE PNEU	ORIGINAL SIZE TAILLE ORIGINAL	COLD TIRE PRESSURE PRESSION DES PNEUS FROIDS
FRONT AVANT	P205/60R15	230kPa, 33PSI
REAR ARRIÈRE	P205/60R15	230kPa, 33PSI
SPARE DE SECOURS	T125/70D16	420kPa, 60PSI

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION.
POUR D'AUTRES DÉTAILS, SE REPORTER AU MANUEL DU CONDUCTEUR.

ET000

Figure A-75 Pre-Test Vehicle Certification Label View

MANUFACTURED BY NISSAN MOTOR CO., LTD.
DATE: 08/07. GVWR: 3920 LBS
GAWR FR: 2227 LBS GAWR RR: 1810 LBS

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR,
VEHICLE SAFETY, BUMPER AND THEFT PREVENTION STANDARDS
IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.
SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION.

VIN: 3N1AB6LE38L608236 PASSENGER CAR.
COLOR TRIM TRANS AXLE ENGINE

KH3 W REOF10A G854 MR20DE 1997 CC
MODEL: BDRALCZ-EUA 42000



3N1AB6LE38L608236

Figure A-76 Pre-Test Vehicle Recommended Tire Pressure Label View

DAS VELOCITY MEASUREMENT SYSTEM



POWER



MPH

A



ALIGNMENT

Figure A-77 Post-Test Light Trap Digital Readout – View 1



Figure A-78 Post-Test Light Trap Digital Readout – View 2



Figure A-79 Impact Event

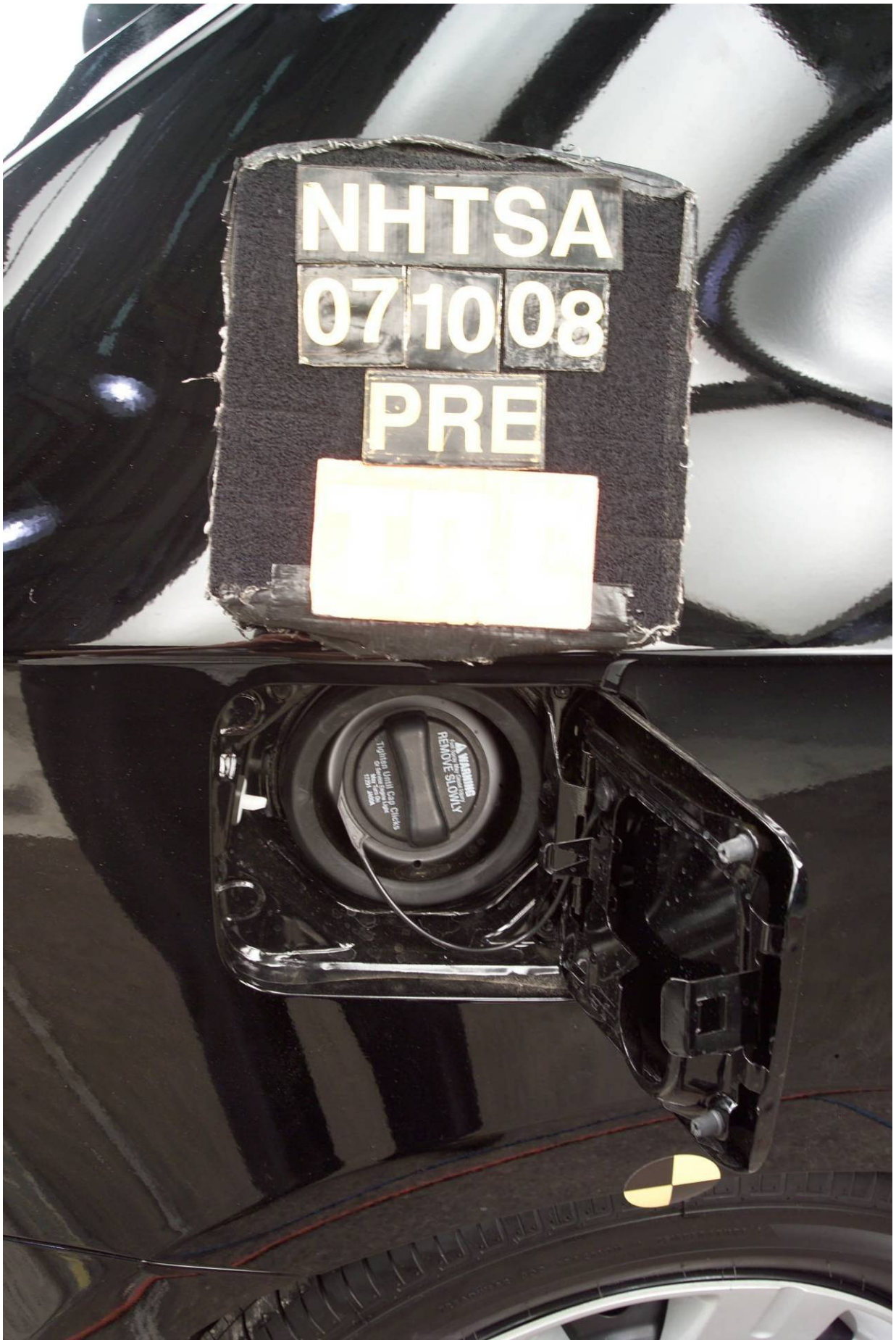


Figure A-80 Pre-Test Fuel Cap



Figure A-81 Post-Test Fuel Cap



Figure A-82 FMVSS 301 Rollover View at 90°

A-86

071008-1

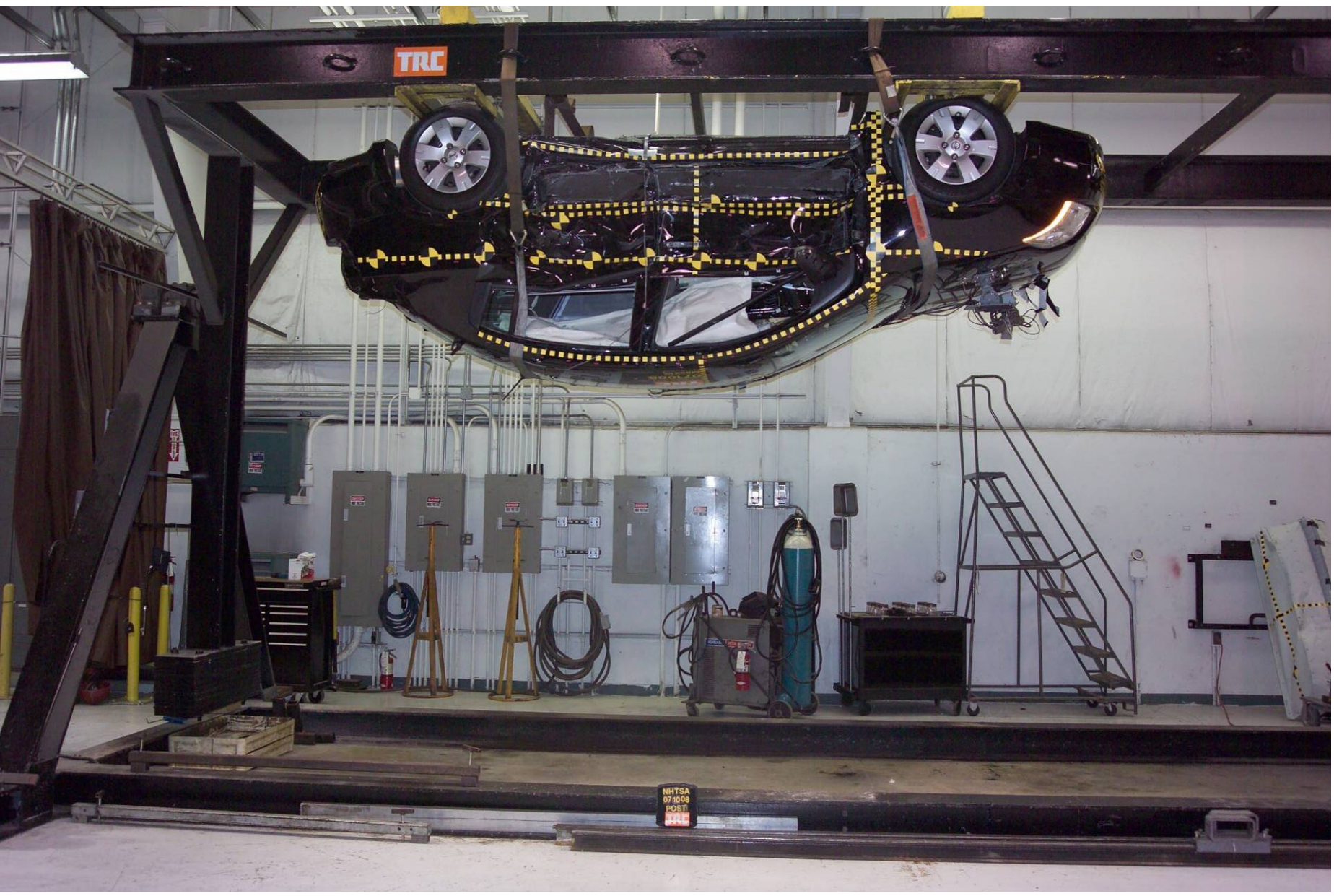


Figure A-83 FMVSS 301 Rollover View at 180°

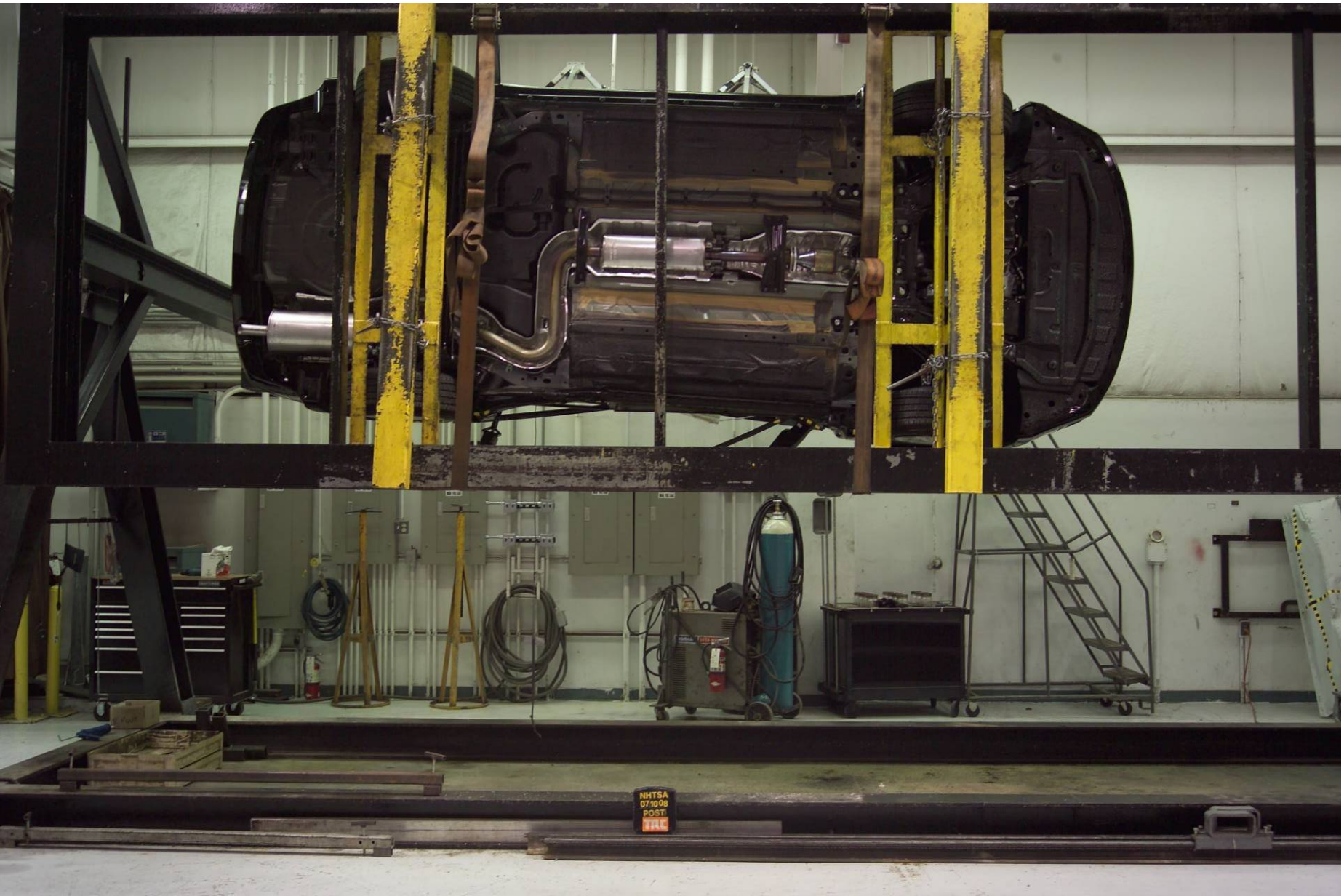


Figure A-84 FMVSS 301 Rollover View at 270°

A-88

071008-1



Figure A-85 FMVSS 301 Rollover View at 360°

A-89

071008-1

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

Data Plot	LIST OF DATA PLOTS (CONTINUED)
	Driver Head X Primary
	Driver Head Y Primary
	Driver Head Z Primary
	Driver Head X Redundant
	Driver Head Y Redundant
	Driver Head Z Redundant
	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 Redundant Y
	Driver Lower Rib Redundant Y
	Driver Lower Spine Redundant 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 Head X Redundant
	Left Rear Passenger Head Y Redundant
	Left Rear Passenger Head Z Redundant
	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 Redundant Y
	Left Rear Passenger Lower Rib Redundant Y
	Left Rear Passenger Lower Spine Redundant Y
	Left Rear Passenger Pelvis Redundant Y

Data Plot

LIST OF DATA PLOTS (CONTINUED)

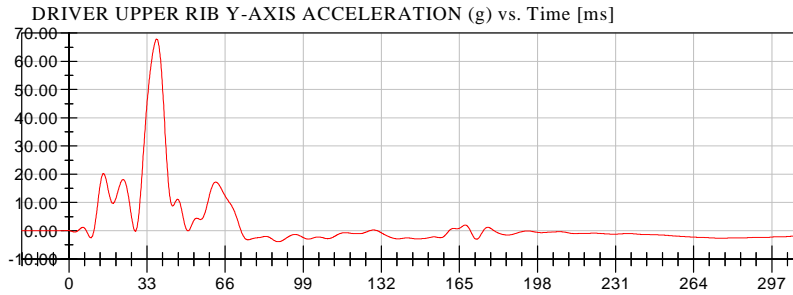
Vehicle Right Sill at Front Seat X
Vehicle Right Sill at Front Seat Y
Vehicle Right Sill at Front Seat Z
Vehicle Right Sill at Rear Seat X
Vehicle Right Sill at Rear Seat Y
Vehicle Right Sill at Rear Seat Z
Vehicle Rear Floor Above Axle X
Vehicle Rear Floor Above Axle Y
Vehicle Rear Floor Above Axle Z
Vehicle Left Sill at Front Seat Y
Vehicle Left Sill at Rear Seat Y
Vehicle Right Rear Occupant Compartment Y
Vehicle A-Post Lower Y
Vehicle A-Post Upper Y
Vehicle B-Post Lower Y
Vehicle B-Post Upper 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

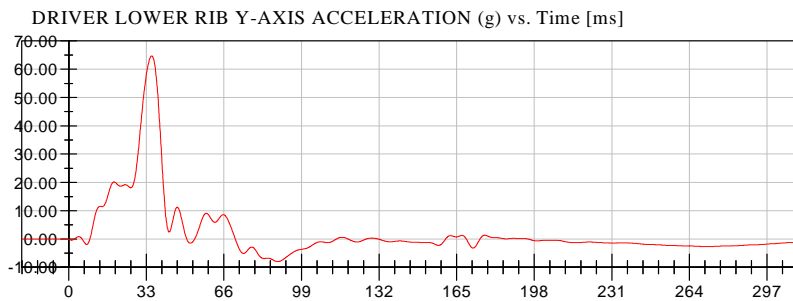
Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

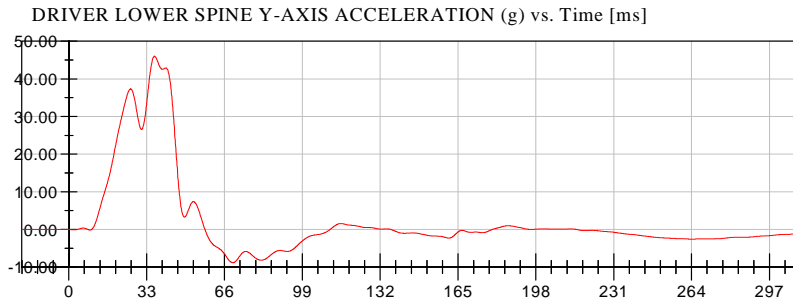
Test Date: 10/08/2007



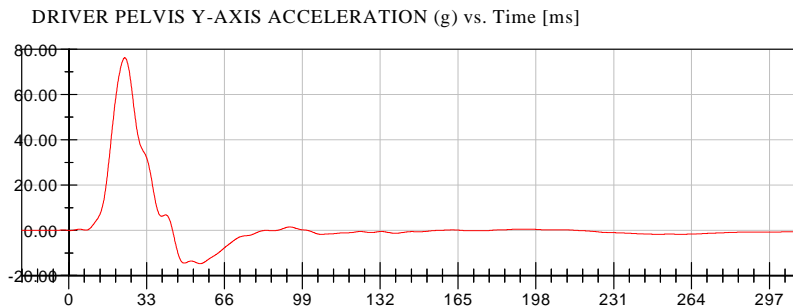
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67.94 g at 36.88 ms
<Min>
-3.90 g at 88.16 ms
FIR_100



<Max>
64.71 g at 35.60 ms
<Min>
-7.96 g at 88.80 ms
FIR_100



<Max>
46.06 g at 36.24 ms
<Min>
-8.84 g at 69.36 ms
FIR_100



<Max>
76.33 g at 23.76 ms
<Min>
-14.76 g at 55.60 ms
FIR_100

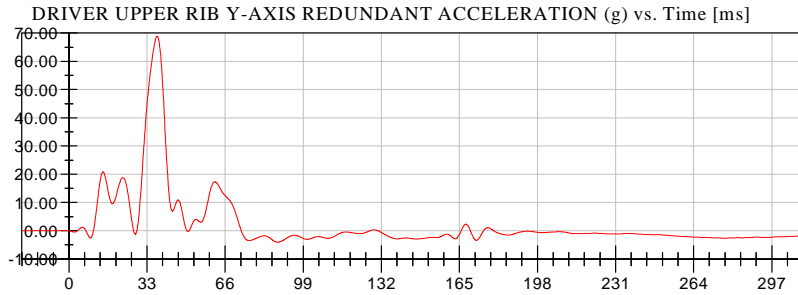


NHTSA

Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

Test Date: 10/08/2007



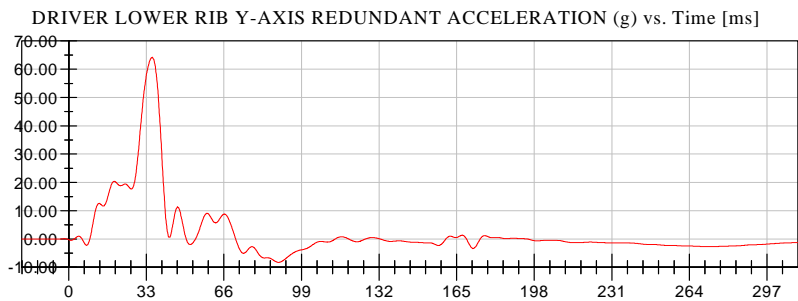
<Max>

68.96 g at 37.44 ms

<Min>

-4.07 g at 88.16 ms

FIR_100



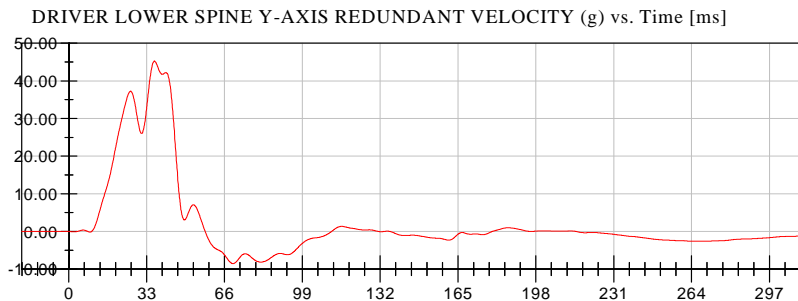
<Max>

64.23 g at 35.60 ms

<Min>

-8.22 g at 89.36 ms

FIR_100



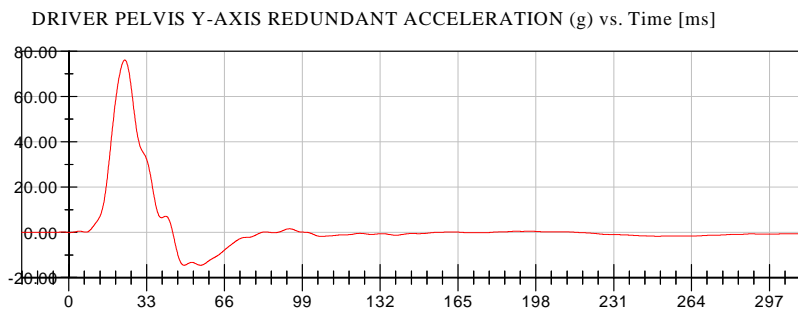
<Max>

45.31 g at 36.24 ms

<Min>

-8.53 g at 69.44 ms

FIR_100



<Max>

76.26 g at 23.76 ms

<Min>

-14.61 g at 48.80 ms

FIR_100

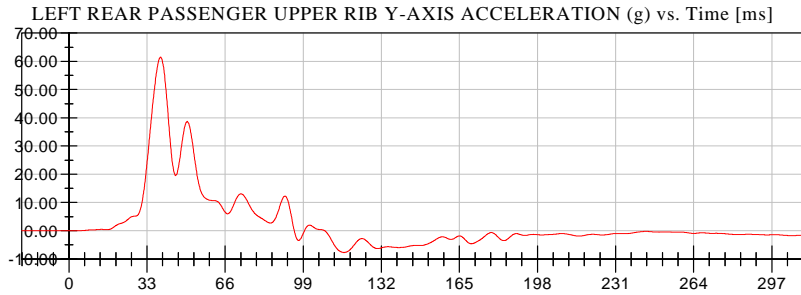


NHTSA

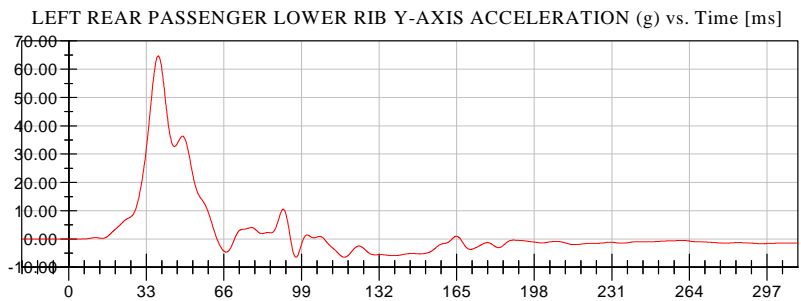
Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

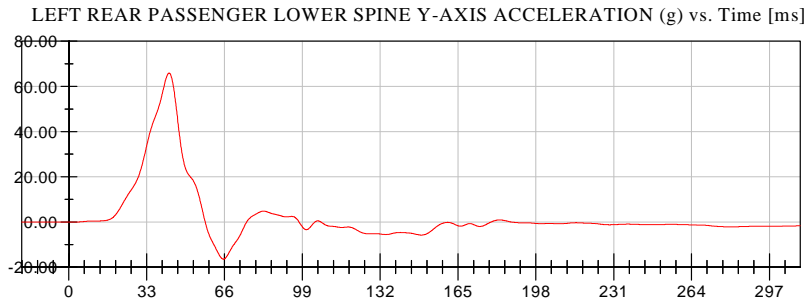
Test Date: 10/08/2007



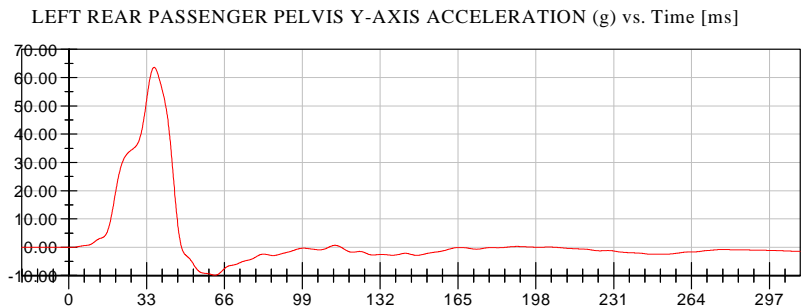
<Max>
61.56 g at 38.72 ms
<Min>
-7.68 g at 116.24 ms
FIR_100



<Max>
64.81 g at 38.16 ms
<Min>
-6.45 g at 96.88 ms
FIR_100



<Max>
66.01 g at 42.48 ms
<Min>
-16.48 g at 65.60 ms
FIR_100



<Max>
63.69 g at 36.24 ms
<Min>
-9.87 g at 61.84 ms
FIR_100



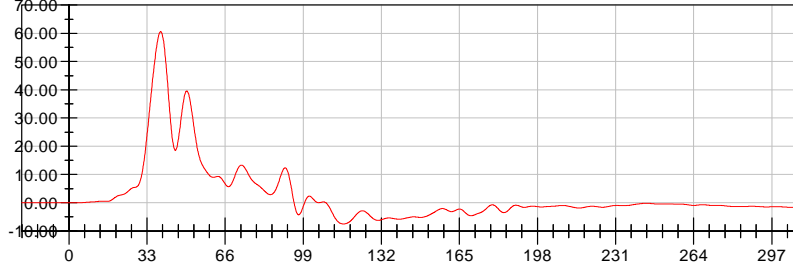
NHTSA

Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

Test Date: 10/08/2007

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



<Max>

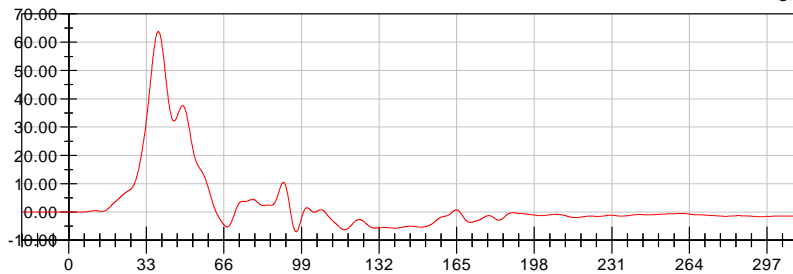
60.72 g at 38.72 ms

<Min>

-7.50 g at 116.24 ms

FIR_100

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



<Max>

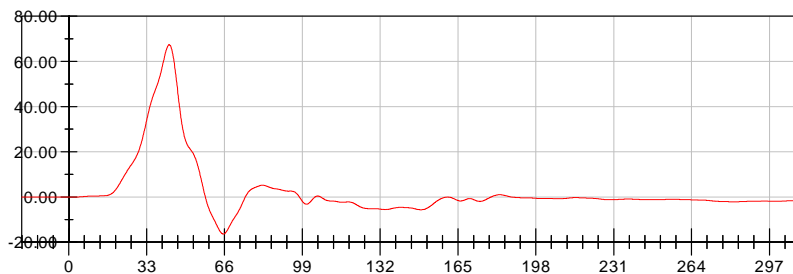
63.92 g at 38.16 ms

<Min>

-7.03 g at 96.88 ms

FIR_100

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



<Max>

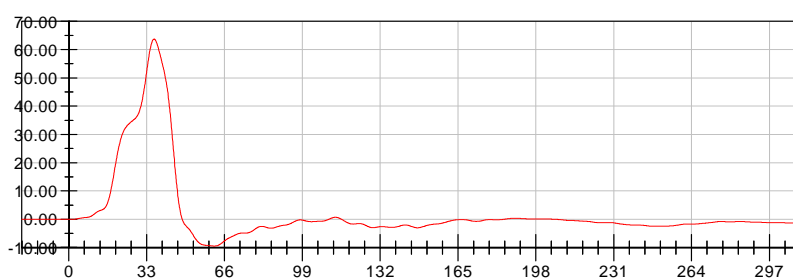
67.46 g at 42.48 ms

<Min>

-16.44 g at 65.60 ms

FIR_100

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



<Max>

63.79 g at 36.24 ms

<Min>

-9.51 g at 61.84 ms

FIR_100



APPENDIX C
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID/HIII: 066

Transportation Research Center Inc.
572M SID/HIII Dummy
External Dimensions
Serial No. 066 Calibration No. 23

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	904 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	523 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	498 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	365 mm	Yes
Top Rib Width From CL	RW-1	165.1 - 180.3 mm	173 mm	Yes
Bottom Rib Width From CL	RW-2	165.1 - 180.3 mm	173 mm	Yes
Difference Between Top & Bottom Rib Width from CL		<= 2.5 mm	0.0 mm	Yes

Technician

Rant Barrels

Approved

Ron Stone



Transportation Research Center Inc.

Left Lateral Head Drop
SID-HIII Serial No. 066 Certification No. 23-1
Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	132.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-5.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

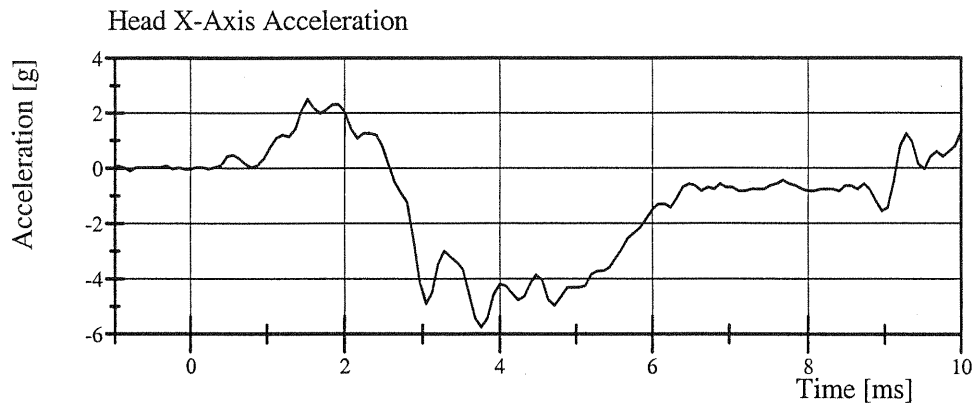
Ron Stoner

Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 066 Certification No. 23-1

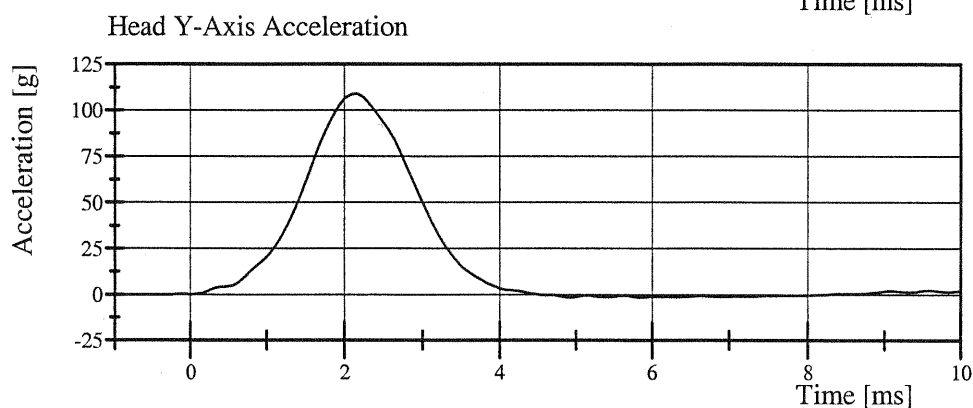
Test Date: 10/2/2007



Filter Class: CFC_1000

Max: 2.5 g at 1.5 ms

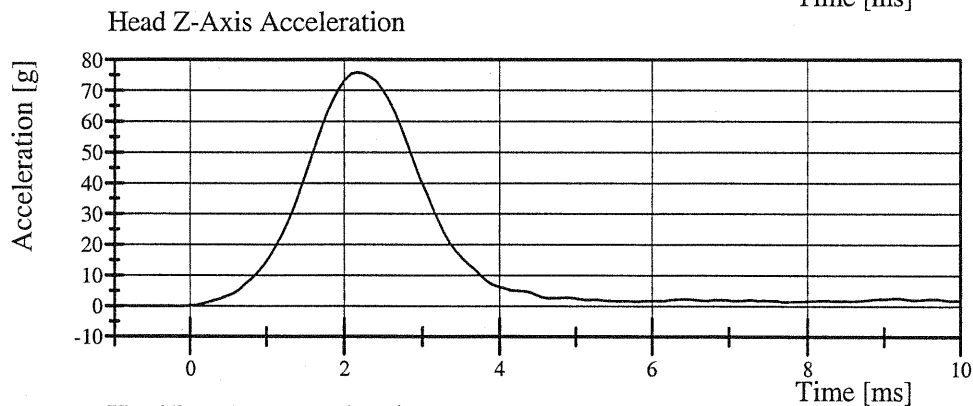
Min: -5.8 g at 3.8 ms



Filter Class: CFC_1000

Max: 109.0 g at 2.2 ms

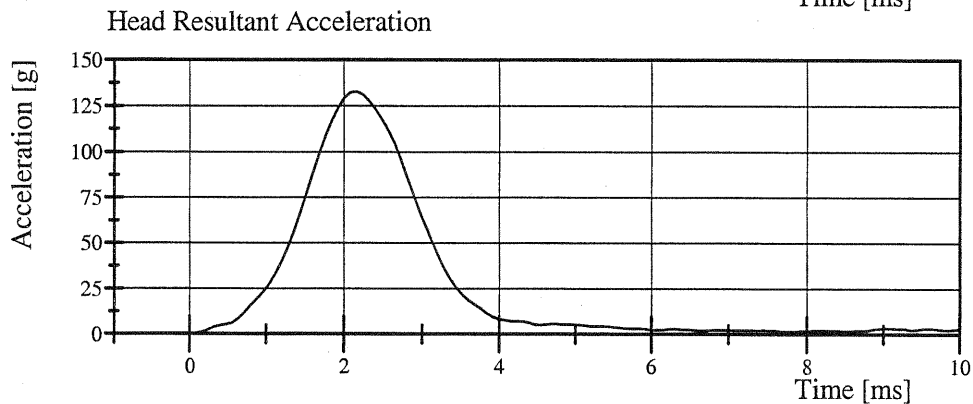
Min: -1.7 g at 5.0 ms



Filter Class: CFC_1000

Max: 75.9 g at 2.2 ms

Min: -0.1 g at -0.2 ms



Filter Class: CFC_1000

Max: 132.8 g at 2.2 ms

Min: 0.0 g at -0.7 ms



Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 23-1

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-6.948 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.162 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.305 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.238 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.159 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-72.7 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	59.8 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	86.4 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	53.4 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	9.3 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Stoner

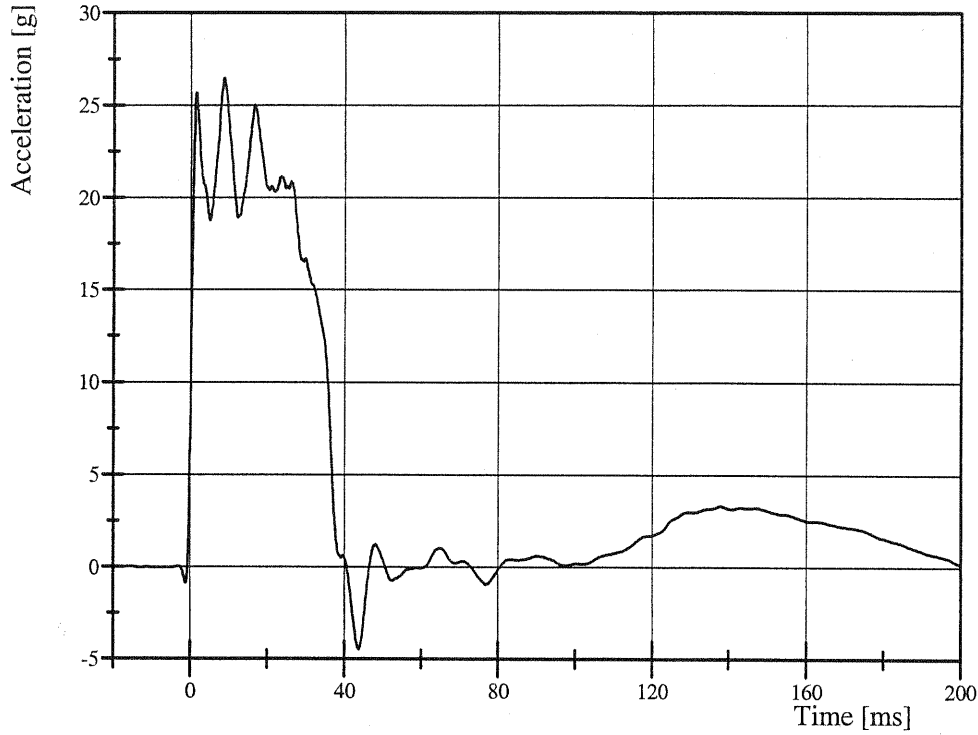
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 23-1

Test Date: 10/2/2007

Pendulum Acceleration

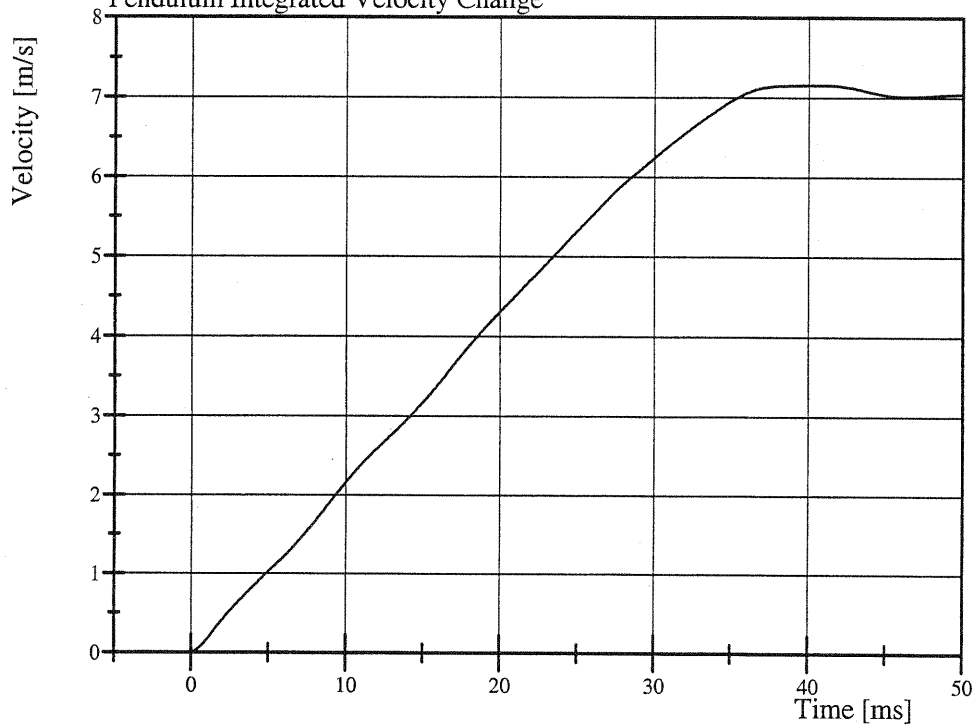


Filter Class: CFC_180

Max: 26.4 g at 8.6 ms

Min: -4.5 g at 43.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 7.2 m/s at 40.7 ms

Min: 0.0 m/s at 0.0 ms

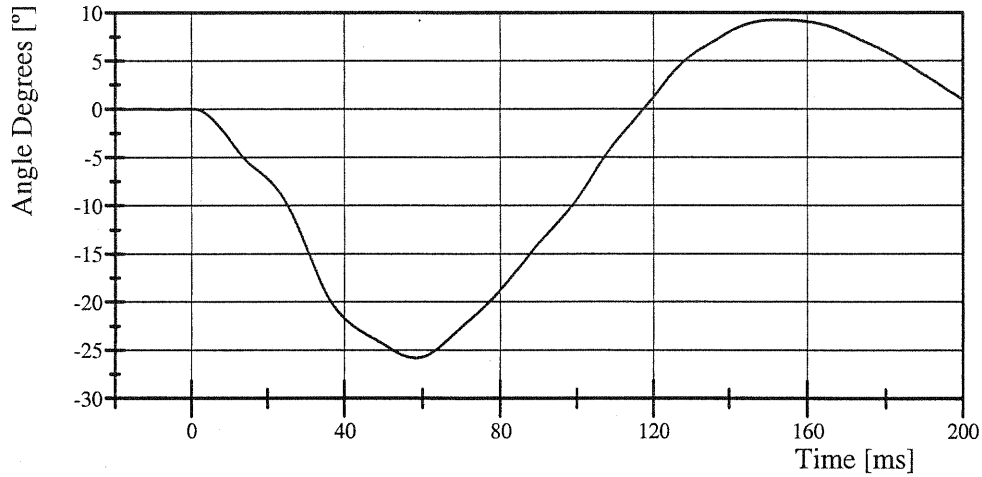
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 23-1

Test Date: 10/2/2007

Pot Rotation at the Base of Neck

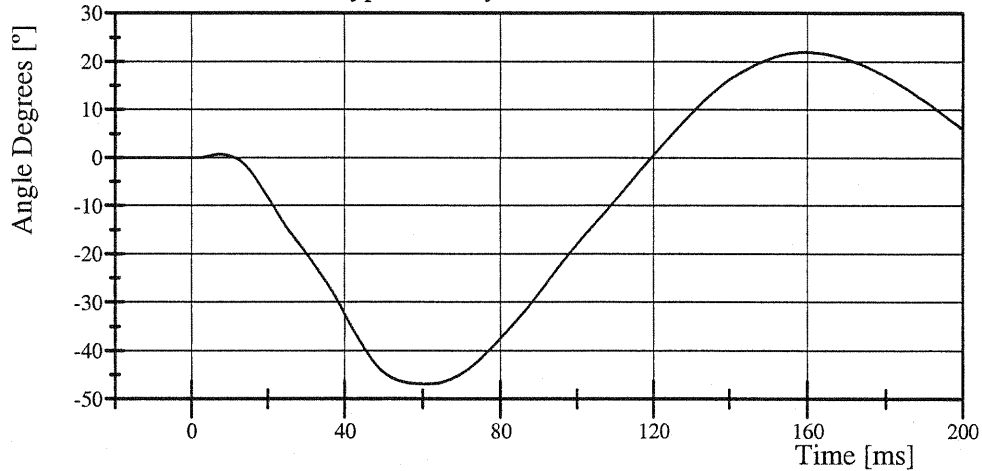


Filter Class: CFC_60

Max: 9.2 ° at 152.8 ms

Min: -25.8 ° at 58.3 ms

Head Rotation at Occypital Condyles

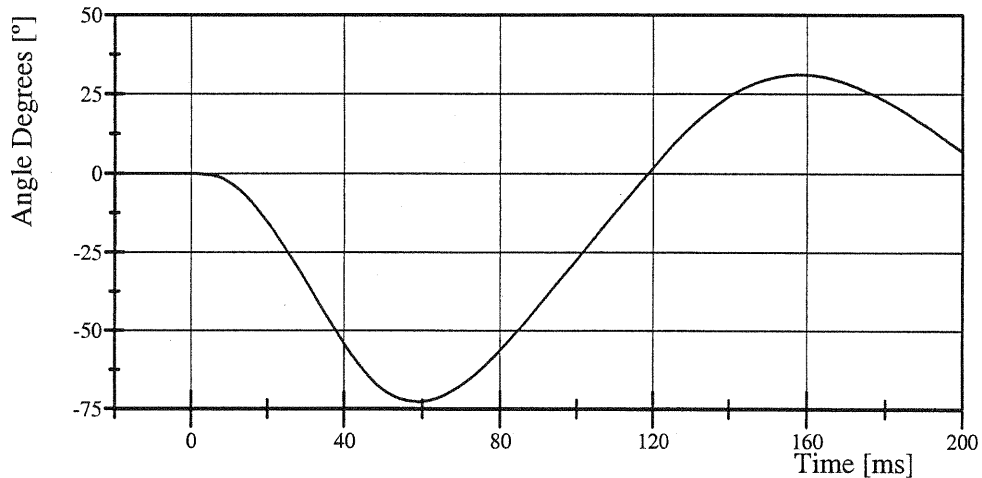


Filter Class: CFC_60

Max: 22.0 ° at 159.5 ms

Min: -46.9 ° at 60.8 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 31.1 ° at 158.3 ms

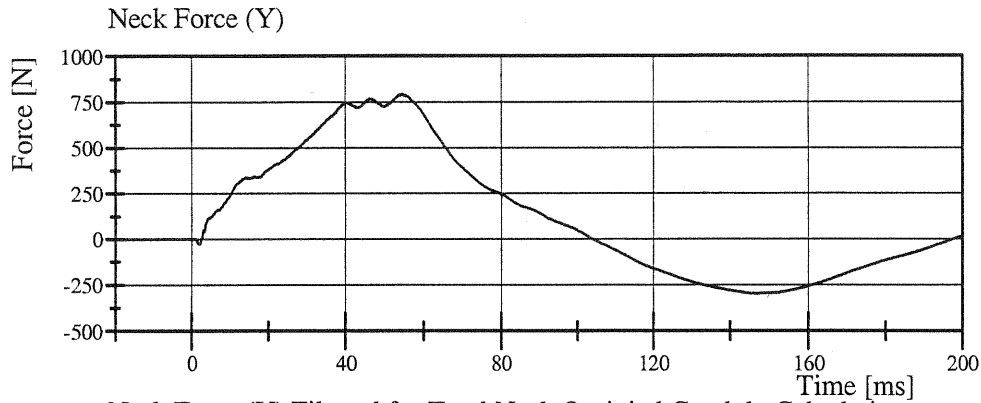
Min: -72.7 ° at 59.0 ms

Transportation Research Center Inc.

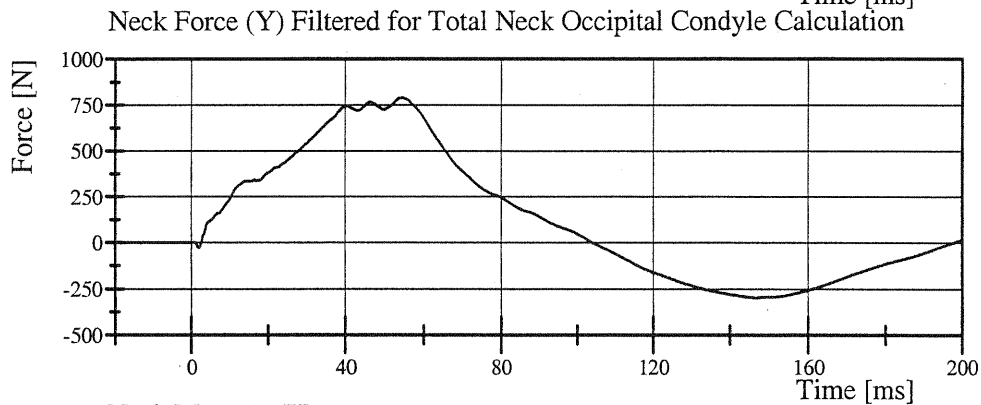
Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 23-1

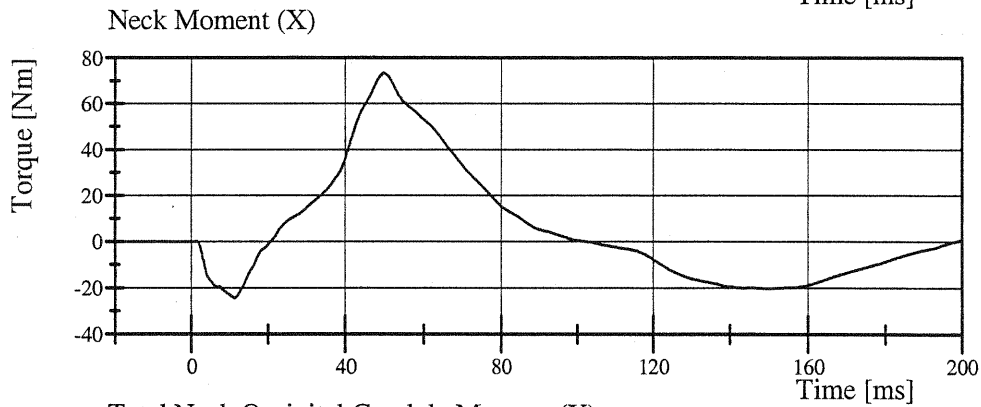
Test Date: 10/2/2007



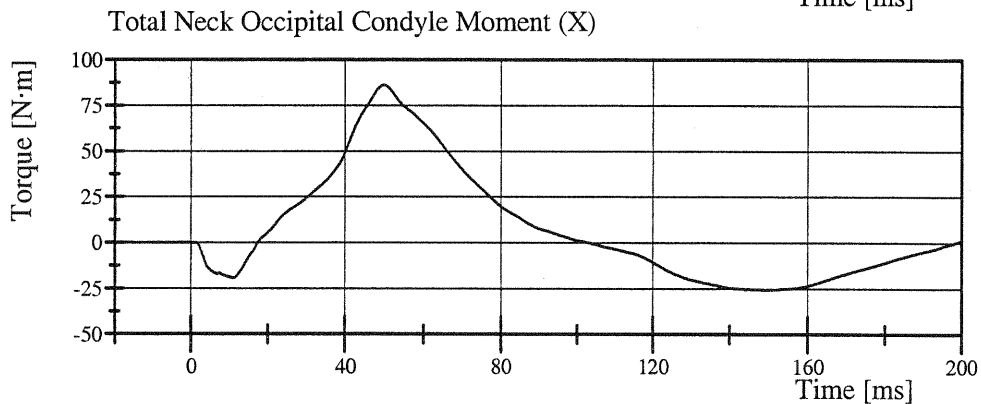
Filter Class: CFC_1000
Max: 793.1 N at 54.6 ms
Min: -297.6 N at 146.6 ms



Filter Class: CFC_600
Max: 791.9 N at 54.5 ms
Min: -297.4 N at 146.7 ms



Filter Class: CFC_600
Max: 73.4 Nm at 49.8 ms
Min: -24.3 Nm at 11.3 ms



Filter Class: CFC_600
Max: 86.4 N·m at 49.8 ms
Min: -25.4 N·m at 150.0 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 066 Certification No. 23-5

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.273 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	42.9 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	41.8 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	20.2 g	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Stone

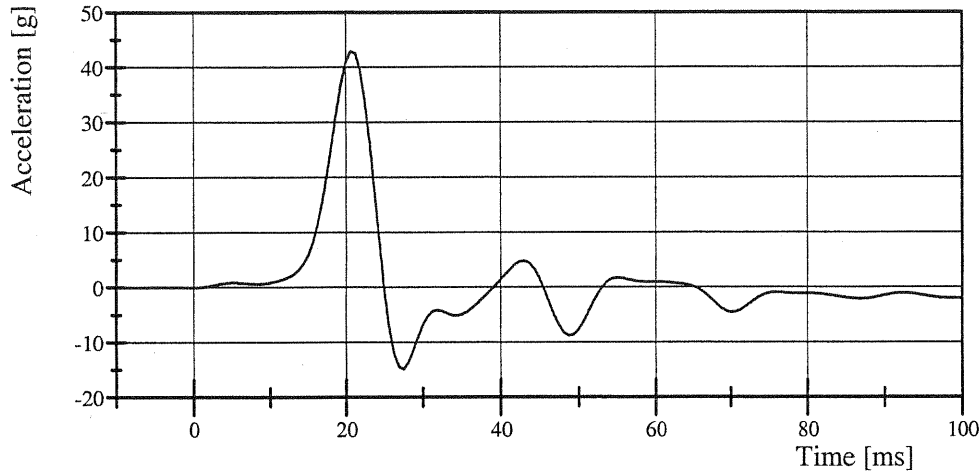
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 066 Certification No. 23-5

Test Date: 10/2/2007

Upper Rib Acceleration (Y)

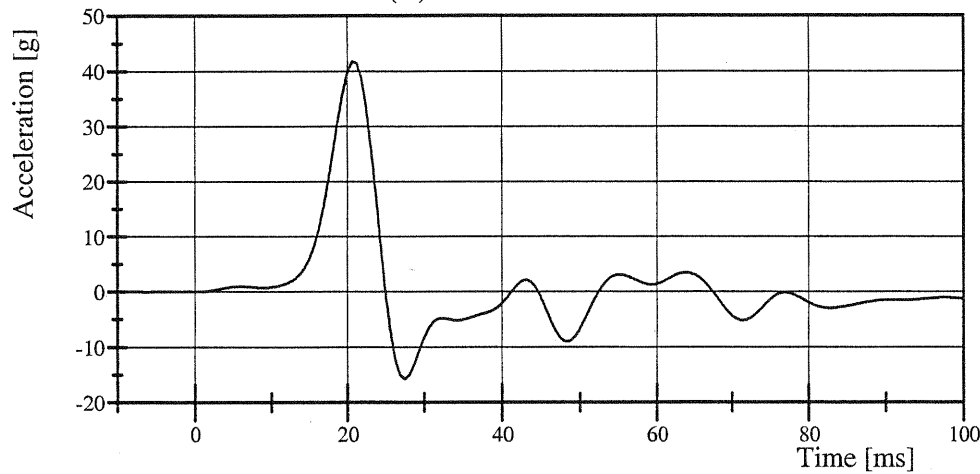


Filter Class: FIR_100

Max: 42.9 g at 20.6 ms

Min: -14.8 g at 27.4 ms

Lower Rib Acceleration (Y)

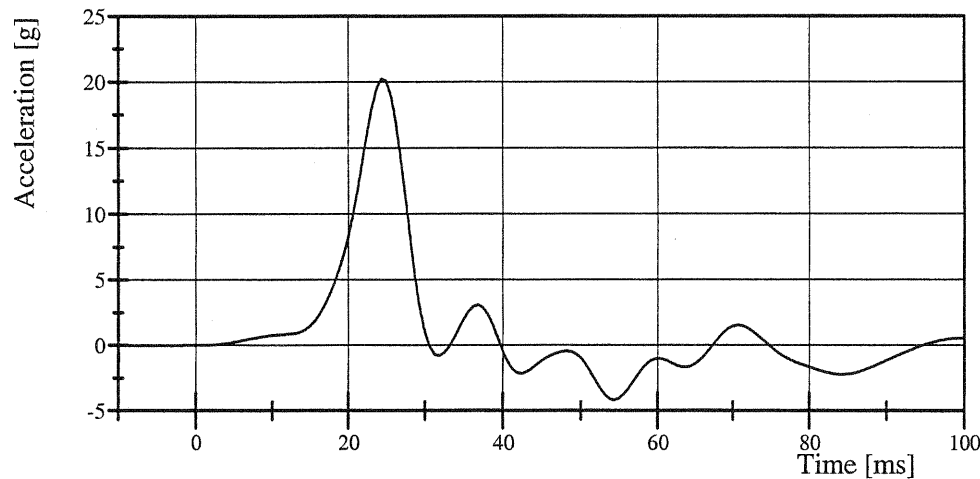


Filter Class: FIR_100

Max: 41.8 g at 20.6 ms

Min: -15.8 g at 27.5 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100

Max: 20.2 g at 24.4 ms

Min: -4.2 g at 54.3 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 066 Certification No. 23-1

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.697 mm/s	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Stoner

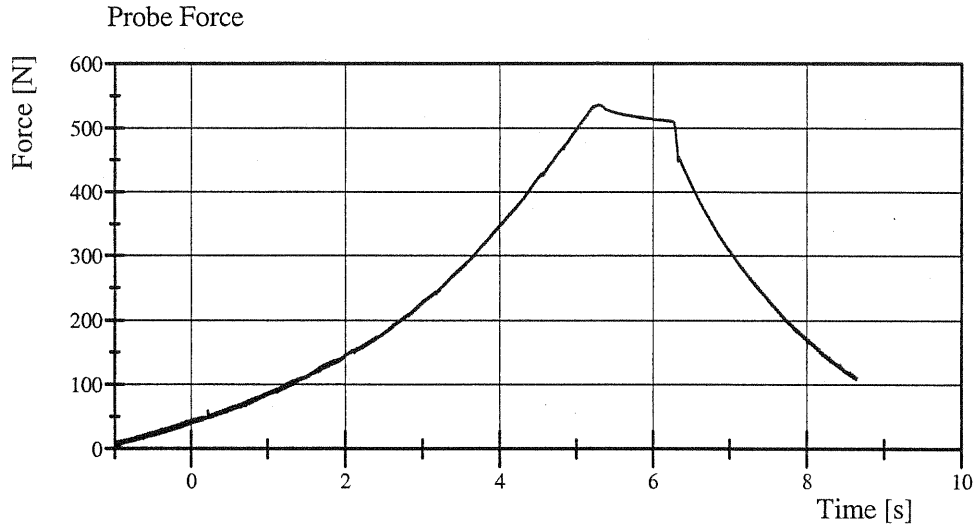


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 066 Certification No. 23-1

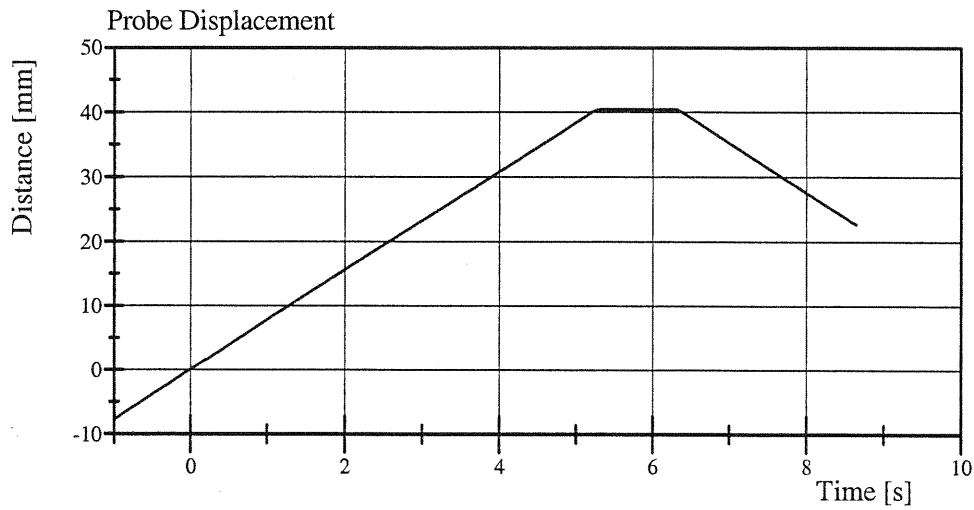
Test Date: 10/2/2007



Filter Class: CFC_600

Max: 535.8 N at 5.3 s

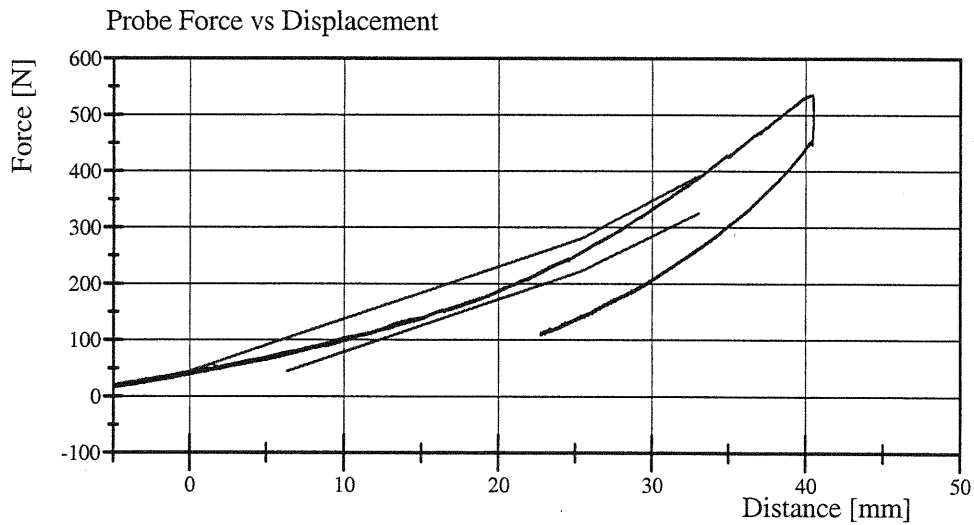
Min: 4.6 N at -1.0 s



Filter Class: CFC_180

Max: 40.5 mm at 6.2 s

Min: -7.8 mm at -1.0 s



Filter Class: CFC_600

Max: 535.8 N at 40.4 mm

Min: -3.3 N at -10.9 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 02-Oct-07

TRC, INC.

TEST NO: LUFL-01

572B SN 066 TORSO FLEX CAL 23

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TIME	NA	1455
TEMPERATURE	18.9 – 25.6° C	21.2 C
RELATIVE HUMIDITY	10 – 70 %	56 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	133.45 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	195.72 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	240.20 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	6 °

TEST MEETS SPECIFICATIONS

TECHNICIAN Charles W. Bell

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 066 Certification No. 23-1

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.316 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	5.6 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	50.6 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved

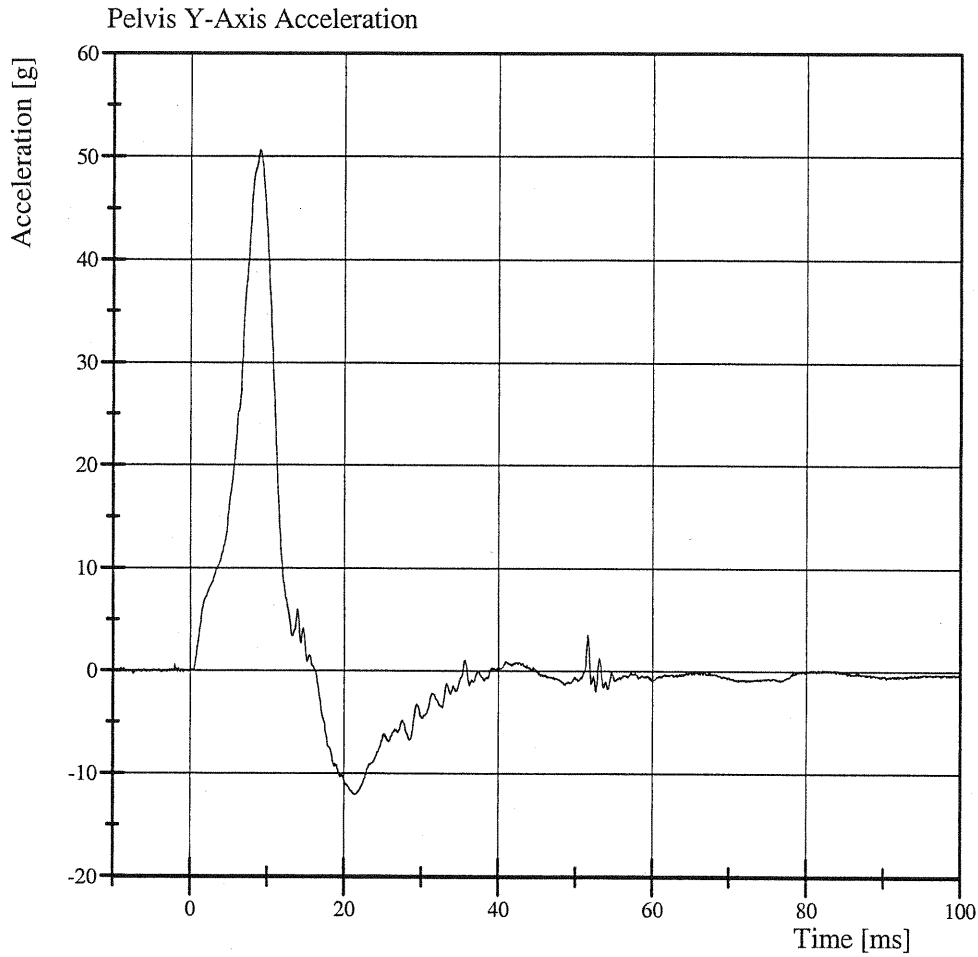


Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 066 Certification No. 23-1

Test Date: 10/2/2007



Filter Class: FIR_100
Max: 50.6 g at 9.0 ms
Min: -12.0 g at 21.3 ms

Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 066 Certification No. 23-2

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Maximum Force at Test Velocity	852 - 1,141 N	900.3 N	Yes
Maximum Displacement at Test Velocity	30.19 - 35.18 mm	34.115 mm	Yes

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 3.069

Damper Setting: 5.5

Technician

Rout Baruch

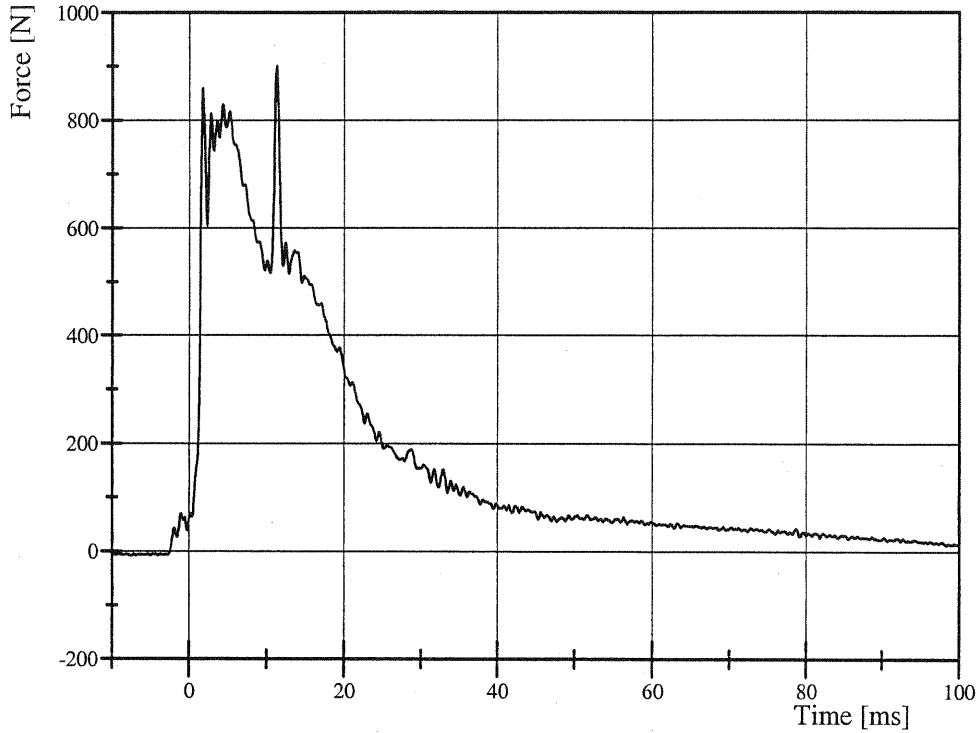
Approved

Ron Stoner

Transportation Research Center Inc.

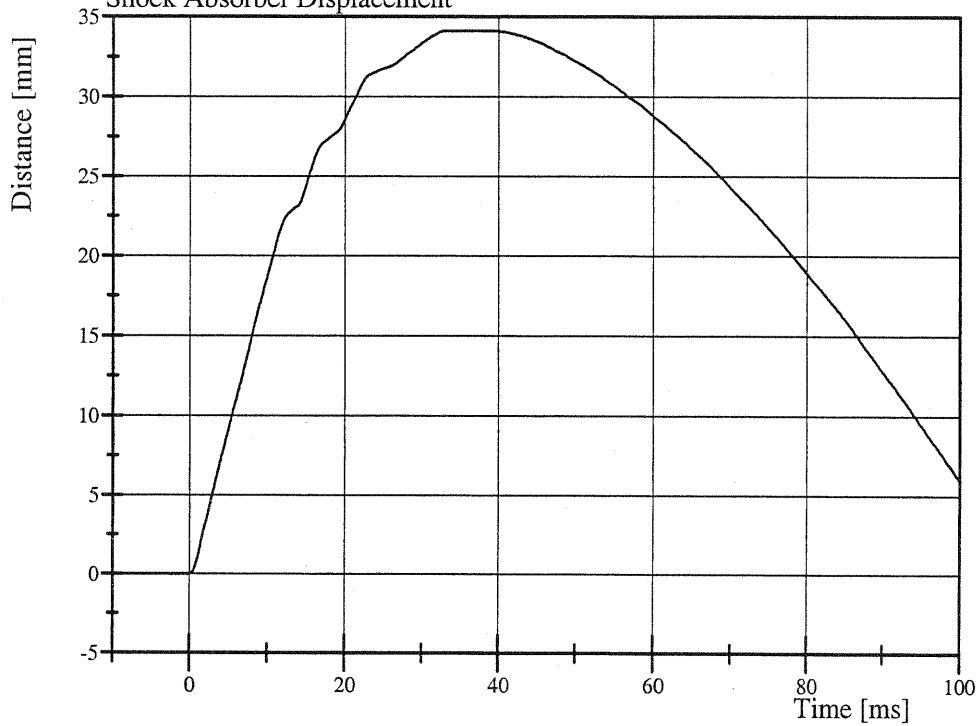
3.05 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 066 Certification No. 23-2
Test Date: 10/2/2007

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 900.3 N at 11.3 ms
Min: -7.9 N at -7.4 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 34.1 mm at 37.8 ms
Min: -0.0 mm at -0.1 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 066 Certification No. 23-7

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Maximum Force at Test Velocity	1,749 - 2,114 N	1,969.5 N	Yes
Maximum Displacement at Test Velocity	31.69 - 37.25 mm	36.559 mm	Yes

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 4.283

Damper Setting: 5.5

Technician

Rout Brouil

Approved

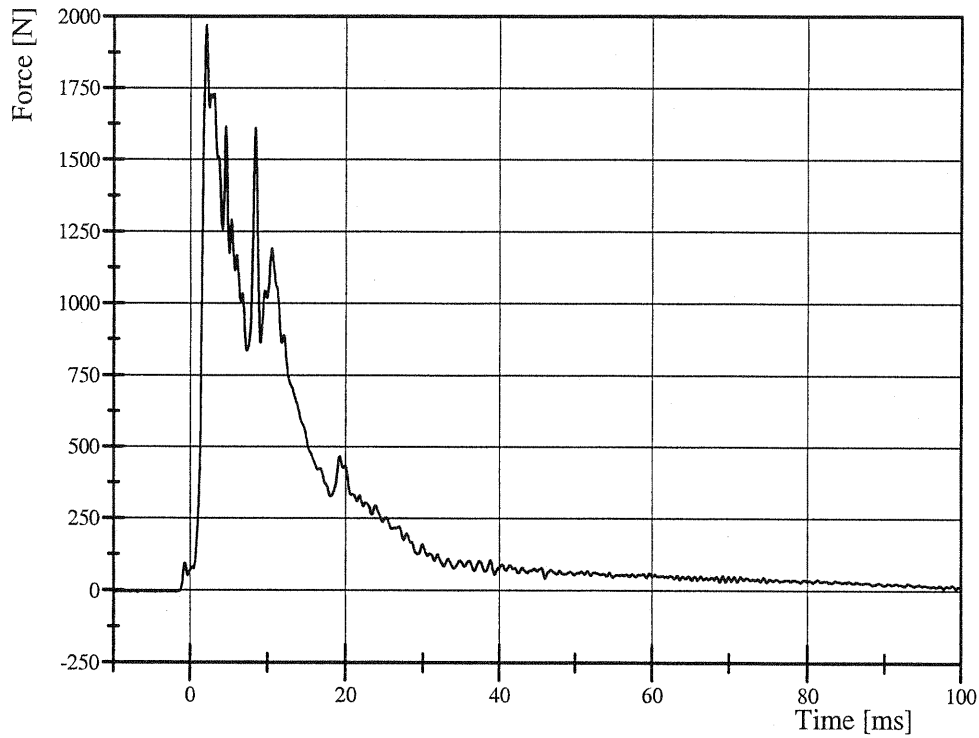
Ron Stoner



Transportation Research Center Inc.

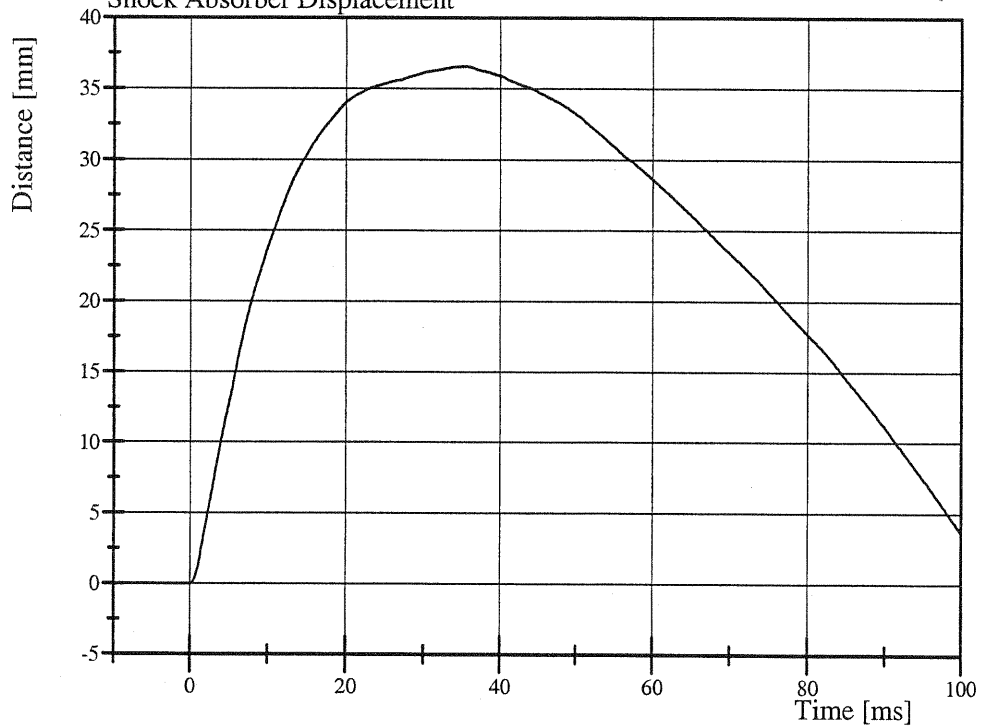
4.27 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 066 Certification No. 23-7
Test Date: 10/2/2007

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,969.5 N at 2.1 ms
Min: -6.0 N at -6.8 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 36.6 mm at 35.4 ms
Min: -0.0 mm at -9.7 ms

Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 066 Certification No. 23-3

Test Date: 10/1/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Maximum Force at Test Velocity	3,803 - 4,507 N	3,981.5 N	Yes
Maximum Displacement at Test Velocity	33.4 - 39.62 mm	39.422 mm	Yes

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 6.140

Damper Setting: 5.5

Technician

Rent B...

Approved

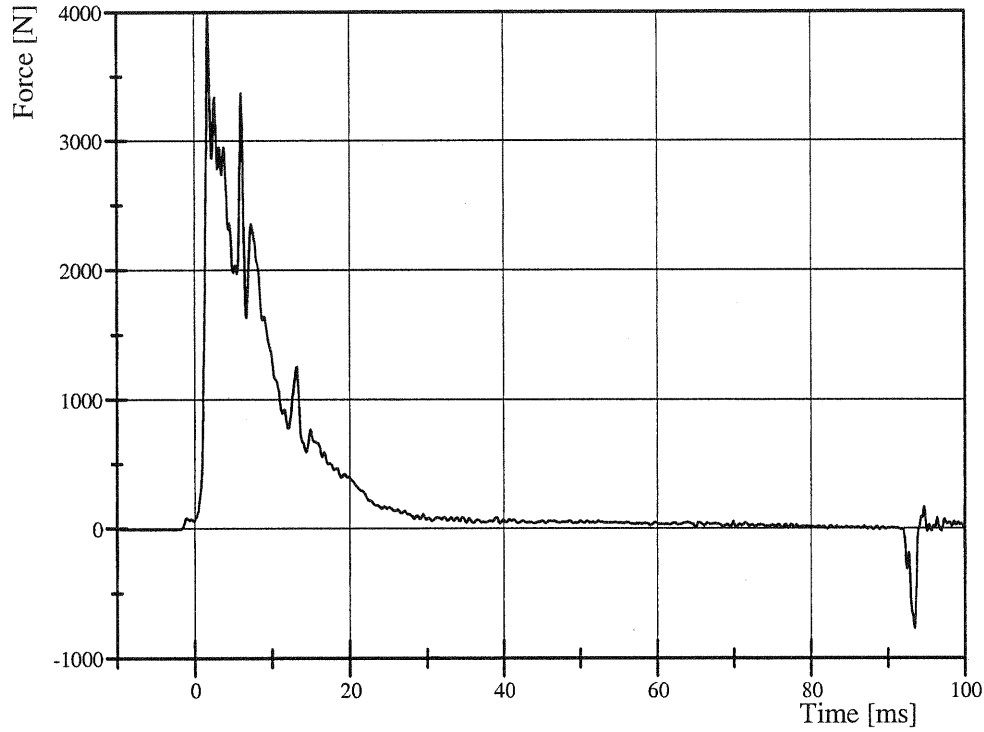
Ron Stoner



Transportation Research Center Inc.

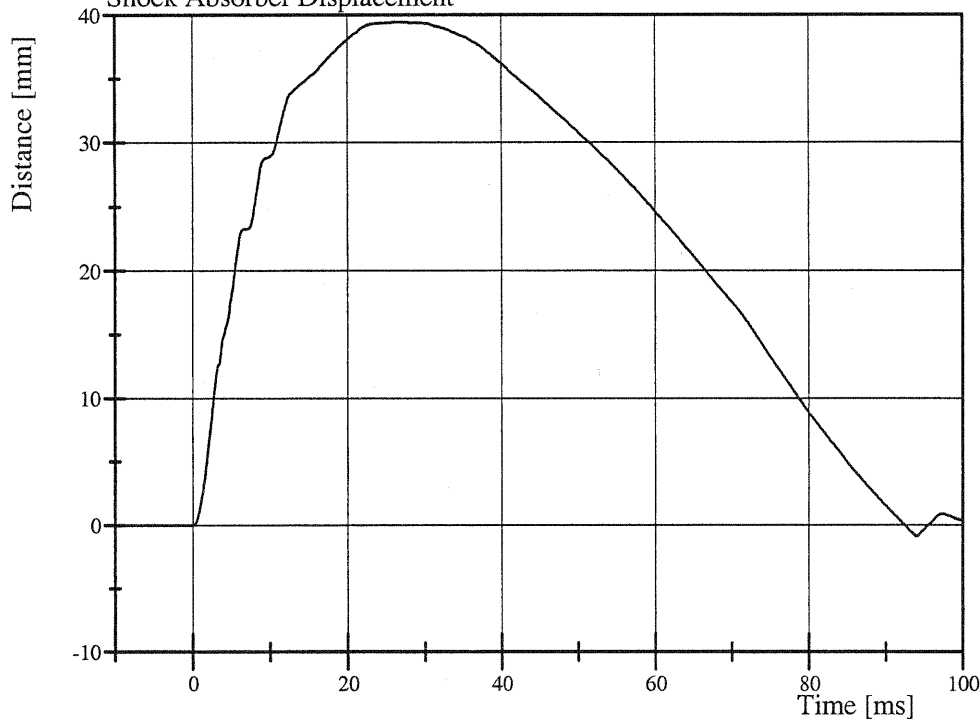
6.10 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 066 Certification No. 23-3
Test Date: 10/1/2007

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 3,981.5 N at 1.8 ms
Min: -768.5 N at 93.4 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 39.4 mm at 26.8 ms
Min: -0.9 mm at 93.9 ms

CALIBRATION TEST RESULTS

POST-TEST

SID/HIII: 066

Transportation Research Center Inc.
572M SID/HIII Dummy
External Dimensions
Serial No. 066 Calibration No. 24

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	905 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	516 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	523 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	498 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	370 mm	Yes
Top Rib Width From CL	RW-1	165.1 - 180.3 mm	174 mm	Yes
Bottom Rib Width From CL	RW-2	165.1 - 180.3 mm	174 mm	Yes
Difference Between Top & Bottom Rib Width from CL		<= 2.5 mm	0.0 mm	Yes

Technician

Paul Barab

Approved

Ron Stoner



Transportation Research Center Inc.

Left Lateral Head Drop
SID-HIII Serial No. 066 Certification No. 24-1
Test Date: 10/15/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	140.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	9.5 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. DeM

Approved

Ron Stover

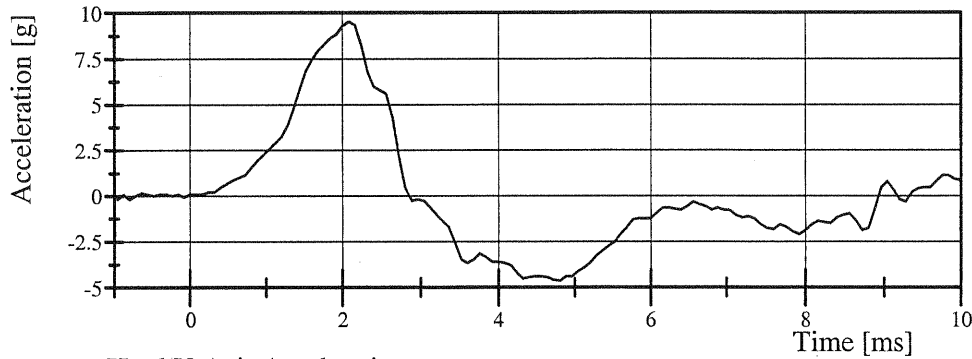
Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 066 Certification No. 24-1

Test Date: 10/15/2007

Head X-Axis Acceleration

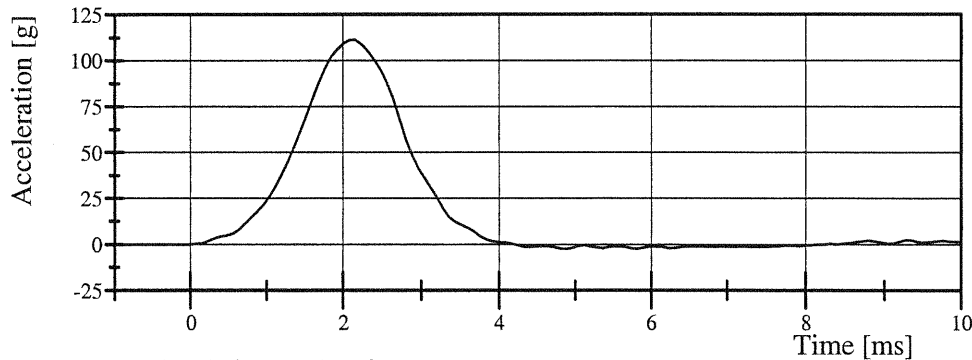


Filter Class: CFC_1000

Max: 9.5 g at 2.1 ms

Min: -4.6 g at 4.8 ms

Head Y-Axis Acceleration

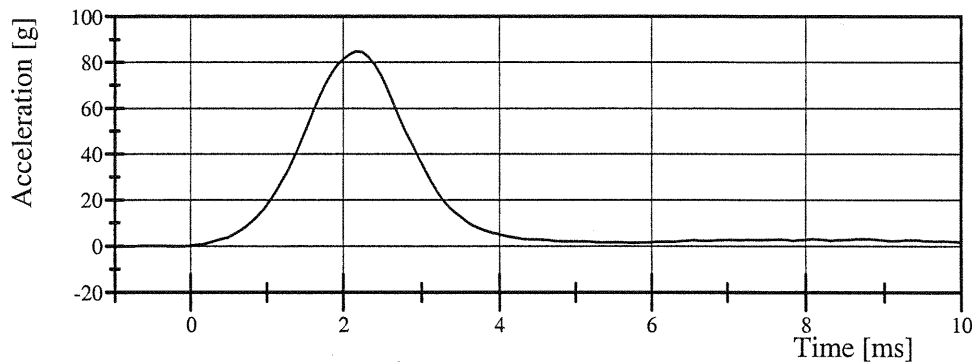


Filter Class: CFC_1000

Max: 111.4 g at 2.2 ms

Min: -2.7 g at 4.9 ms

Head Z-Axis Acceleration

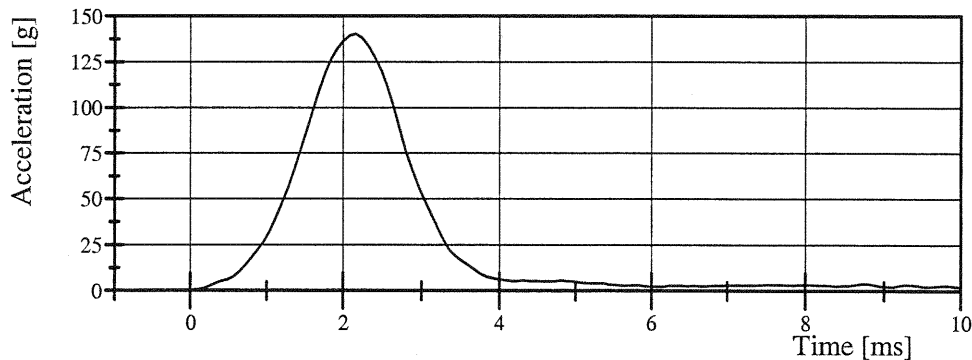


Filter Class: CFC_1000

Max: 84.8 g at 2.2 ms

Min: -0.0 g at -1.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 140.3 g at 2.2 ms

Min: 0.0 g at -0.2 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 24-1

Test Date: 10/15/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	45 %	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	2.422 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.774 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.702 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.160 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-71.7 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	59.5 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	85.3 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	54.3 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	9.7 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Storer

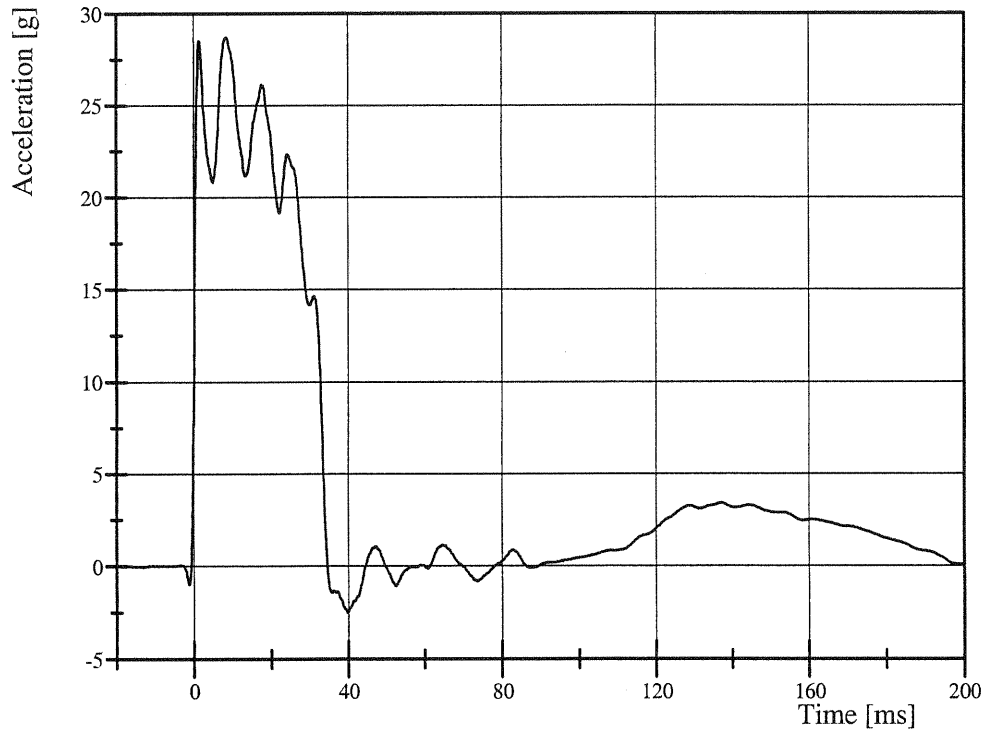
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 24-1

Test Date: 10/15/2007

Pendulum Acceleration

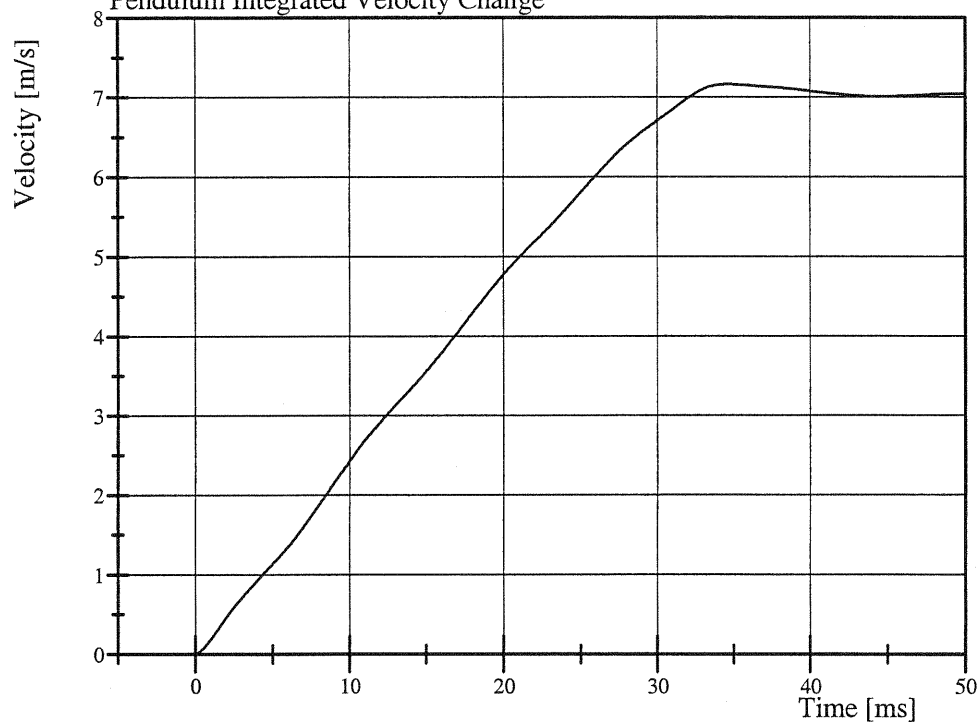


Filter Class: CFC_180

Max: 28.7 g at 8.5 ms

Min: -2.5 g at 39.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 7.2 m/s at 34.6 ms

Min: 0.0 m/s at 0.0 ms



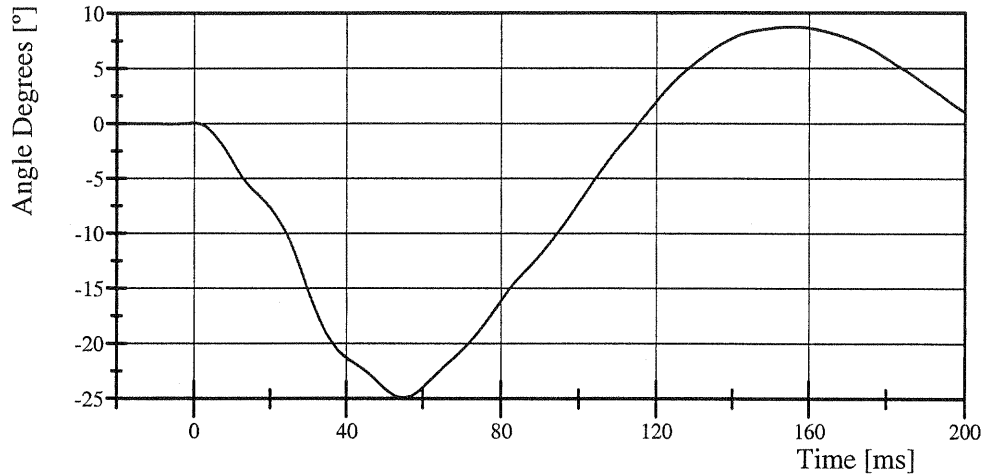
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 24-1

Test Date: 10/15/2007

Pot Rotation at the Base of Neck

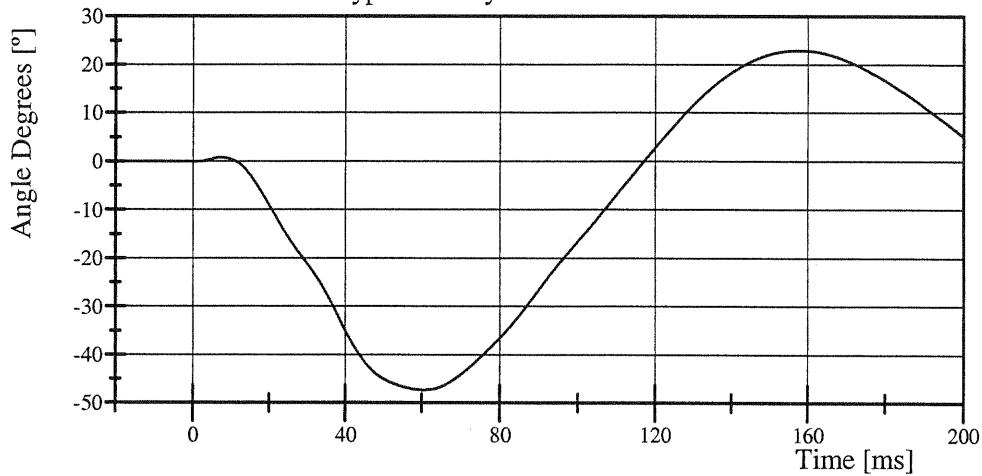


Filter Class: CFC_60

Max: 8.7 ° at 155.5 ms

Min: -24.9 ° at 55.0 ms

Head Rotation at Occypital Condyles

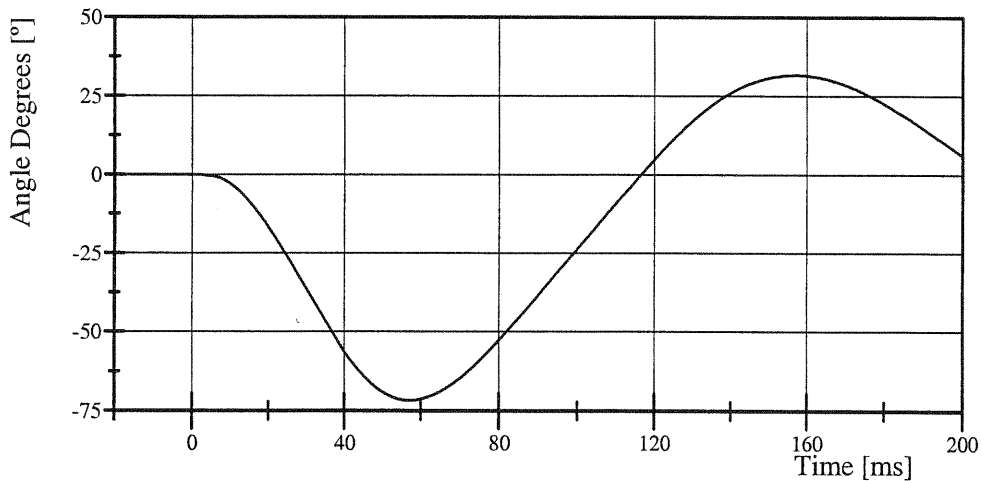


Filter Class: CFC_60

Max: 23.0 ° at 157.7 ms

Min: -47.3 ° at 60.6 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 31.7 ° at 157.0 ms

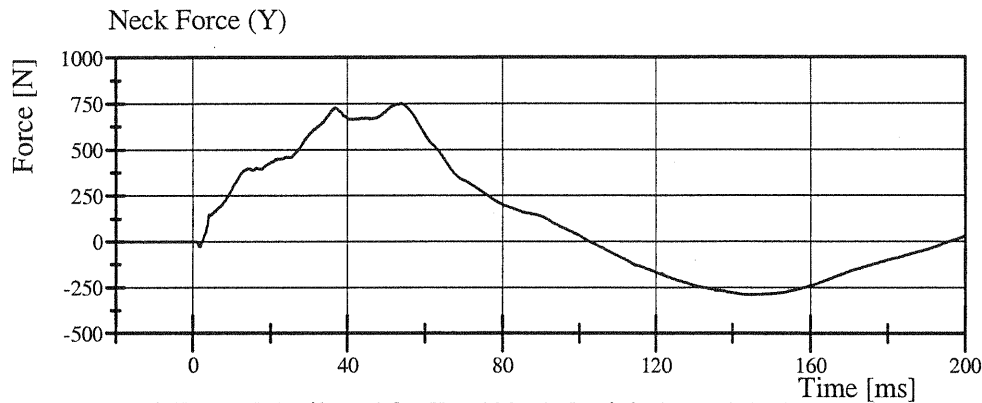
Min: -71.7 ° at 57.1 ms

Transportation Research Center Inc.

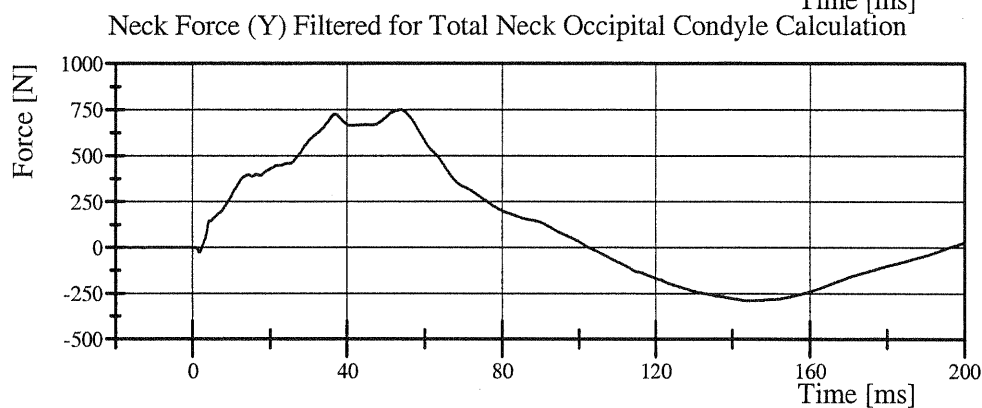
Left Lateral Neck

SID-HIII Serial No. 066 Certification No. 24-1

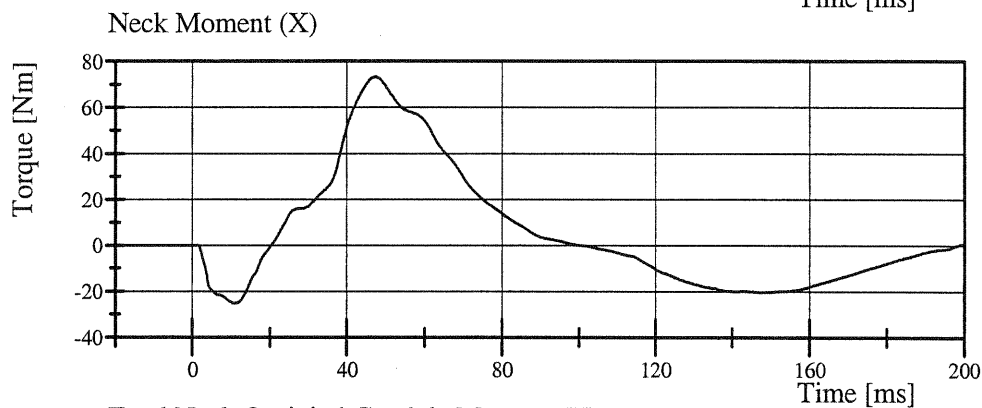
Test Date: 10/15/2007



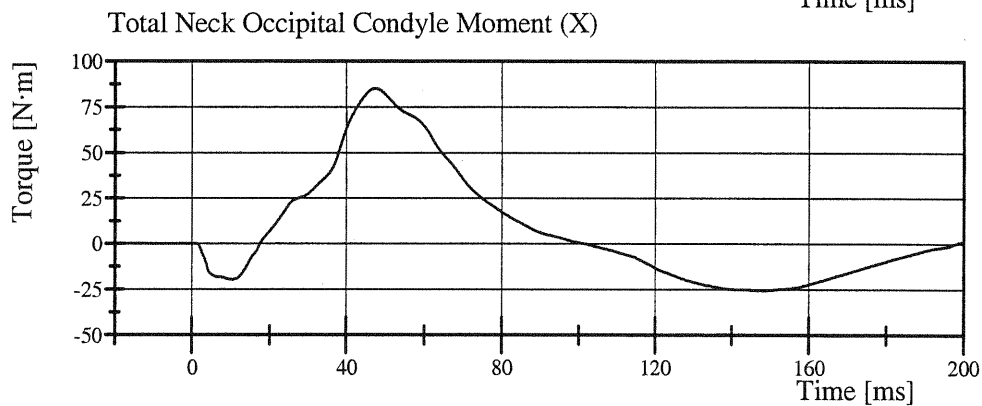
Filter Class: CFC_1000
Max: 751.0 N at 53.8 ms
Min: -289.9 N at 144.4 ms



Filter Class: CFC_600
Max: 750.6 N at 53.8 ms
Min: -289.4 N at 144.4 ms



Filter Class: CFC_600
Max: 73.4 Nm at 47.4 ms
Min: -25.1 Nm at 10.6 ms



Filter Class: CFC_600
Max: 85.3 N·m at 47.4 ms
Min: -25.5 N·m at 148.9 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 066 Certification No. 24-5

Test Date: 10/16/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.270 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	46.0 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	42.4 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	21.3 g	Yes

Test meets specifications.

Comments:

Technician

Rant Boransh

Approved

Ron Stoner

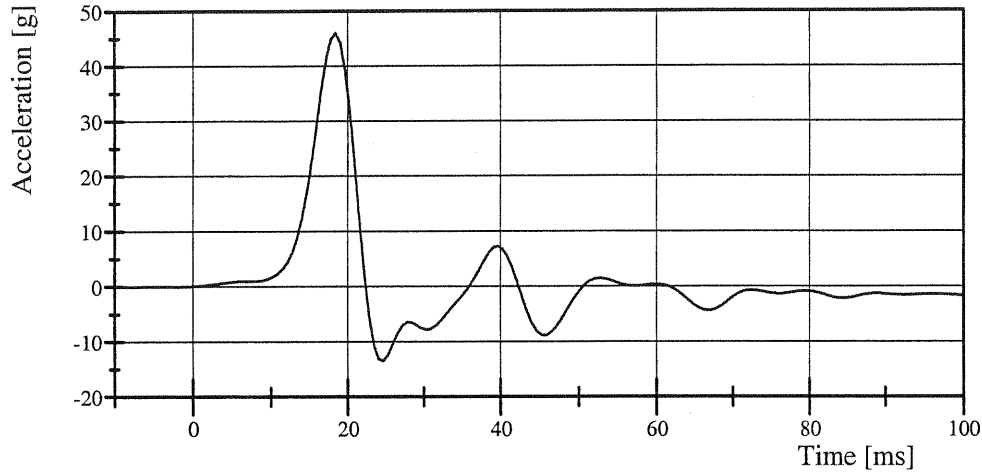
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 066 Certification No. 24-5

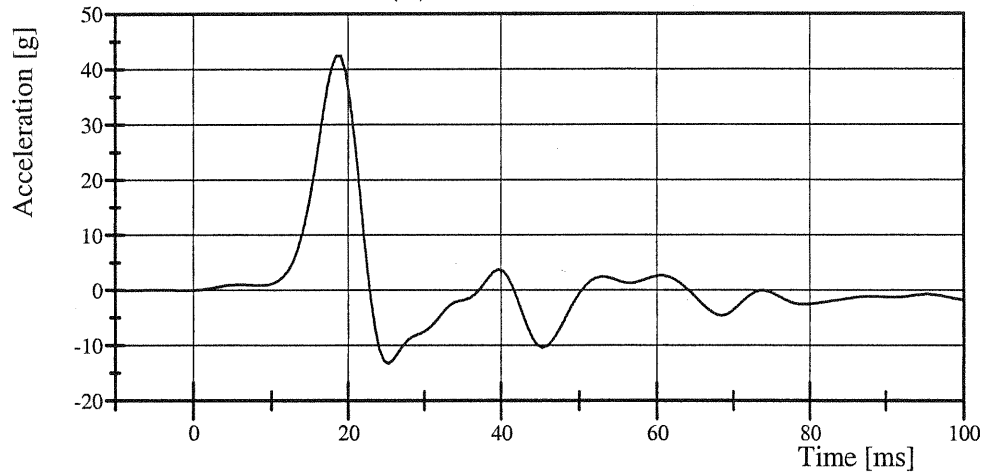
Test Date: 10/16/2007

Upper Rib Acceleration (Y)



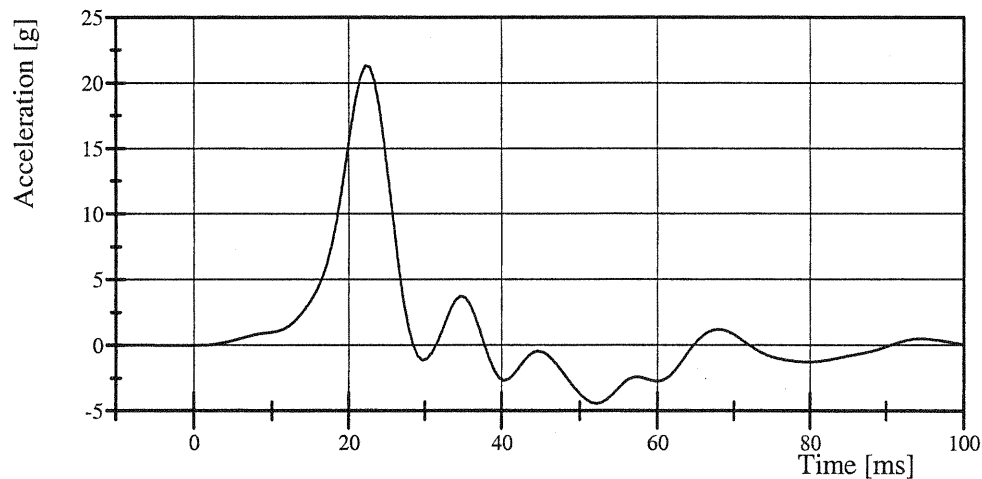
Filter Class: FIR_100
Max: 46.0 g at 18.4 ms
Min: -13.5 g at 24.6 ms

Lower Rib Acceleration (Y)



Filter Class: FIR_100
Max: 42.4 g at 18.5 ms
Min: -13.3 g at 25.3 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100
Max: 21.3 g at 22.2 ms
Min: -4.4 g at 52.2 ms

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 066 Certification No. 24-1

Test Date: 10/15/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.284 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	6.1 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	47.6 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Rand Bond

Approved

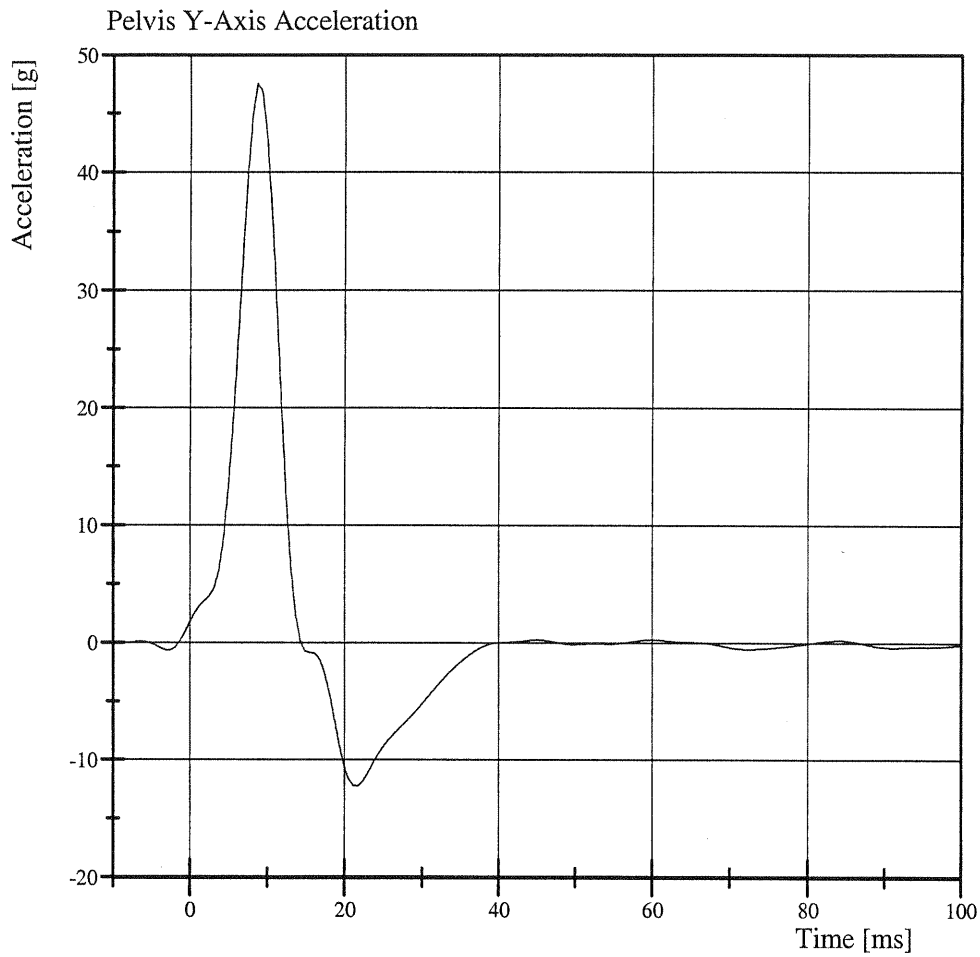
Ron Stoner

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 066 Certification No. 24-1

Test Date: 10/15/2007



Filter Class: FIR_100
Max: 47.6 g at 8.6 ms
Min: -12.2 g at 21.8 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 066 Certification No. 24-2

Test Date: 10/15/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.742 mm/s	Yes

Test meets specifications.

Comments:

Technician



Approved

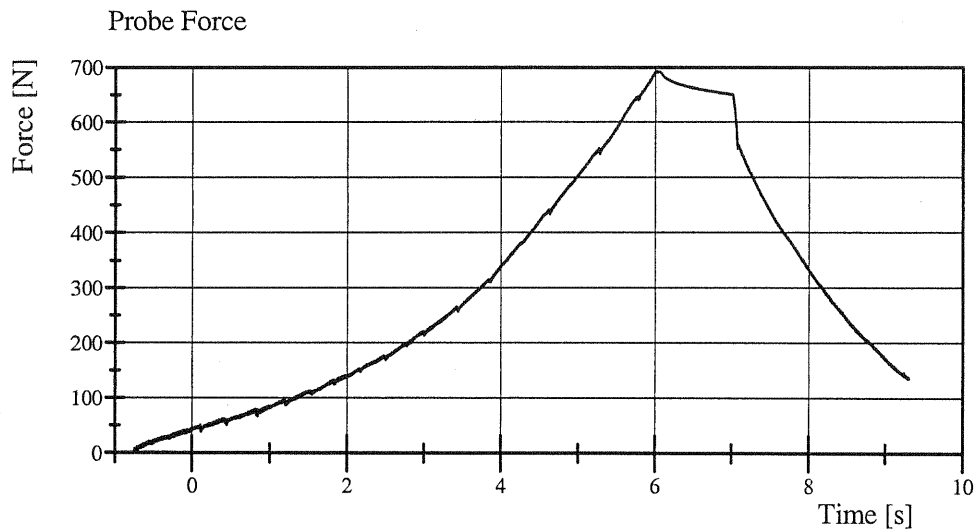


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 066 Certification No. 24-2

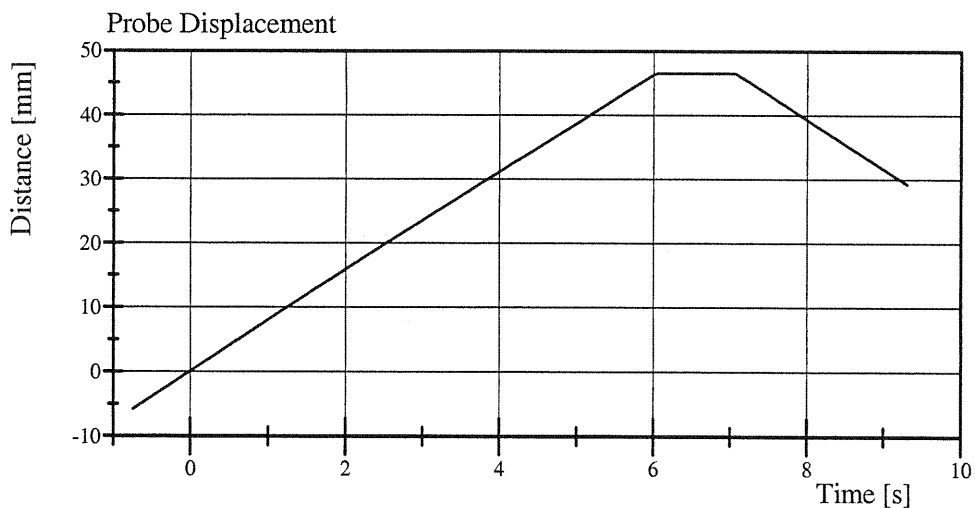
Test Date: 10/15/2007



Filter Class: CFC_600

Max: 692.1 N at 6.0 s

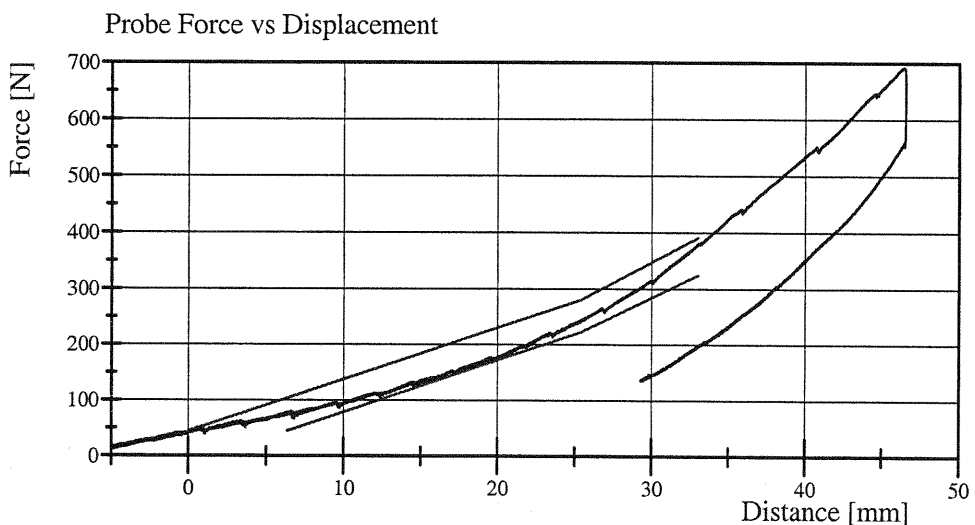
Min: 4.6 N at -0.7 s



Filter Class: CFC_180

Max: 46.6 mm at 7.0 s

Min: -5.8 mm at -0.7 s



Filter Class: CFC_600

Max: 692.1 N at 46.5 mm

Min: 4.6 N at -5.7 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 15-Oct-07

TRC, INC.

TEST NO: LUFL-01

572B SN 066 TORSO FLEX CAL 24

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TIME	NA	1010
TEMPERATURE	18.9 – 25.6° C	21.0 C
RELATIVE HUMIDITY	10 – 70 %	46 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	0.44 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	120.10 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	177.92 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	226.85 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	7 °

TEST MEETS SPECIFICATIONS

TECHNICIAN

Charles W. Daly

CALIBRATION TEST RESULTS

PRE-TEST

SID/HIII: 059

Transportation Research Center Inc.
SID/HIII Dummy Post-Test
External Dimensions
Serial No. 059 Calibration No. 23

Test Parameter	Dimension	Specification	Results	Pass
Seated Height	SH	889.0 - 909.3 mm	905 mm	Yes
Rib Height	RH	501.7 - 520.7 mm	511 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	522 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	498 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	366 mm	Yes
Top Rib Width From CL	RW-1	165.1 - 180.3 mm	172 mm	Yes
Bottom Rib Width From CL	RW-2	165.1 - 180.3 mm	172 mm	Yes
Difference Between Top & Bottom Rib Width from CL		<= 2.5 mm	0.0 mm	Yes

Technician

Charles W. Bell

Approved

Ron Stoner



Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 059 Certification No. 23-5

Test Date: 10/3/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	147.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	7.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved

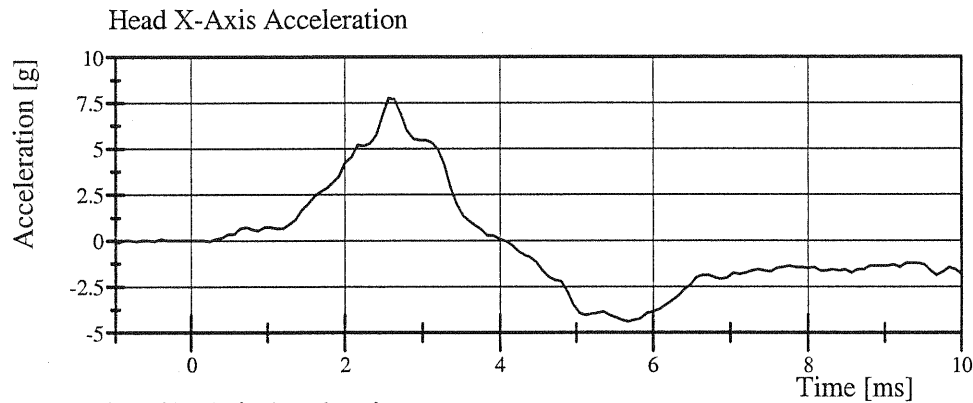


Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 059 Certification No. 23-5

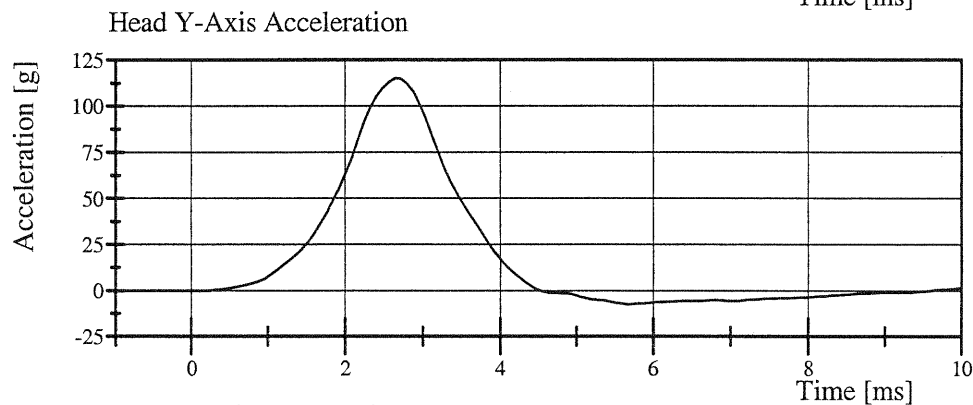
Test Date: 10/3/2007



Filter Class: CFC_1000

Max: 7.8 g at 2.6 ms

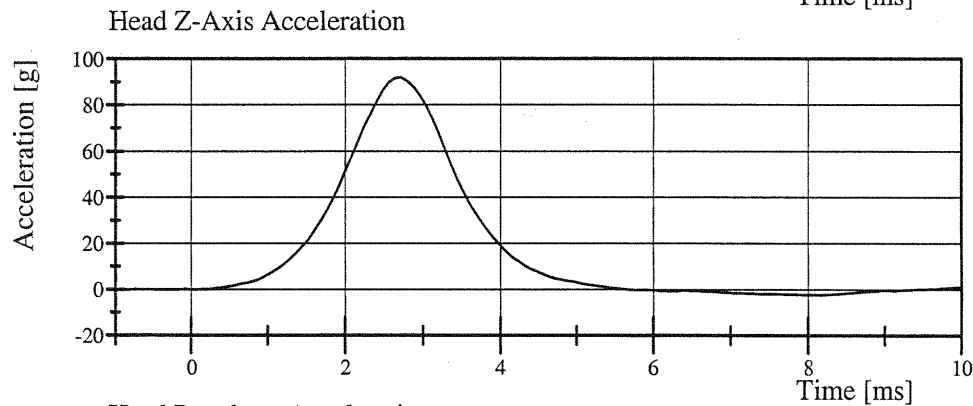
Min: -4.4 g at 5.7 ms



Filter Class: CFC_1000

Max: 115.0 g at 2.6 ms

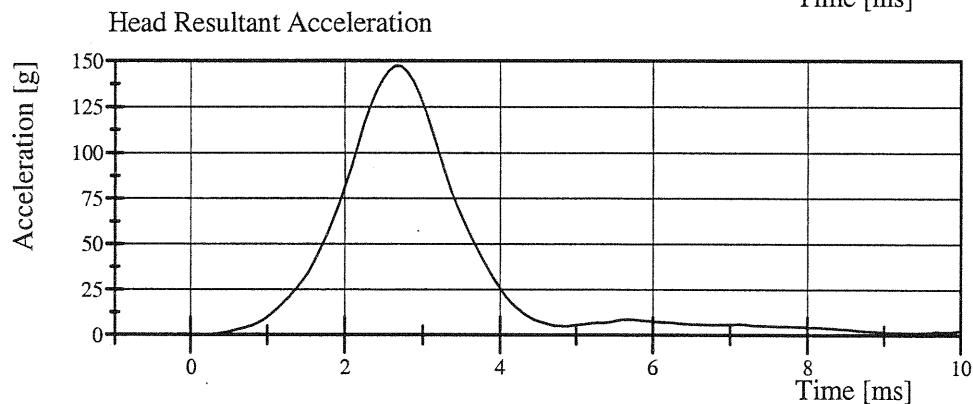
Min: -7.4 g at 5.7 ms



Filter Class: CFC_1000

Max: 91.9 g at 2.7 ms

Min: -2.4 g at 8.2 ms



Filter Class: CFC_1000

Max: 147.3 g at 2.6 ms

Min: 0.0 g at -0.9 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 23-3

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-6.955 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.197 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.399 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.380 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.192 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-74.9 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	64.0 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	83.8 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	56.5 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	9.9 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bull

Approved

Ron Stone

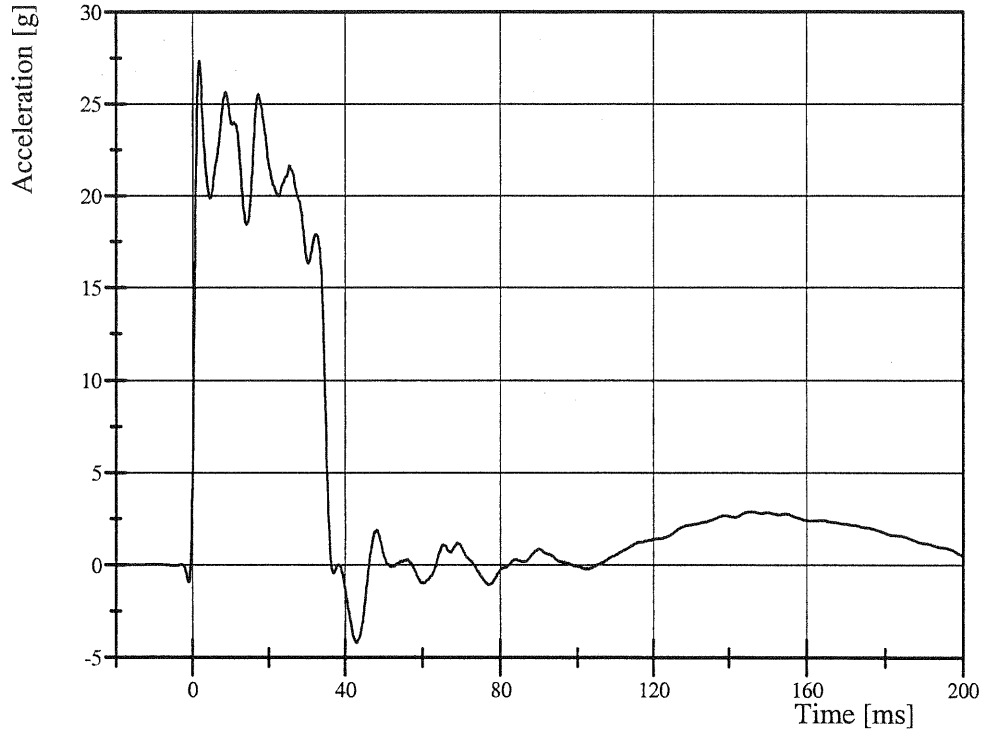
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 23-3

Test Date: 10/2/2007

Pendulum Acceleration

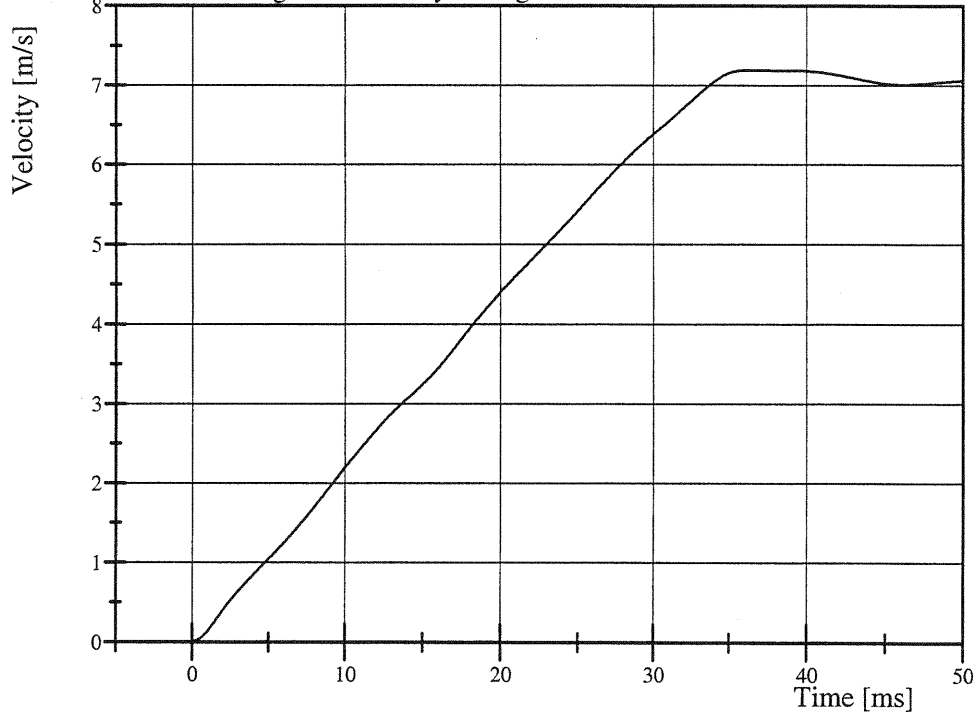


Filter Class: CFC_180

Max: 27.3 g at 1.8 ms

Min: -4.2 g at 43.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 7.2 m/s at 36.4 ms

Min: 0.0 m/s at 0.0 ms



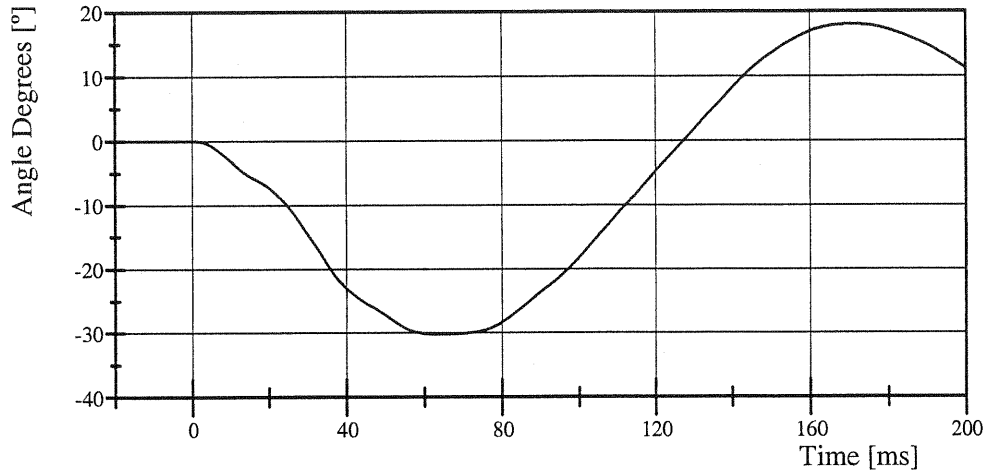
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 23-3

Test Date: 10/2/2007

Pot Rotation at the Base of Neck

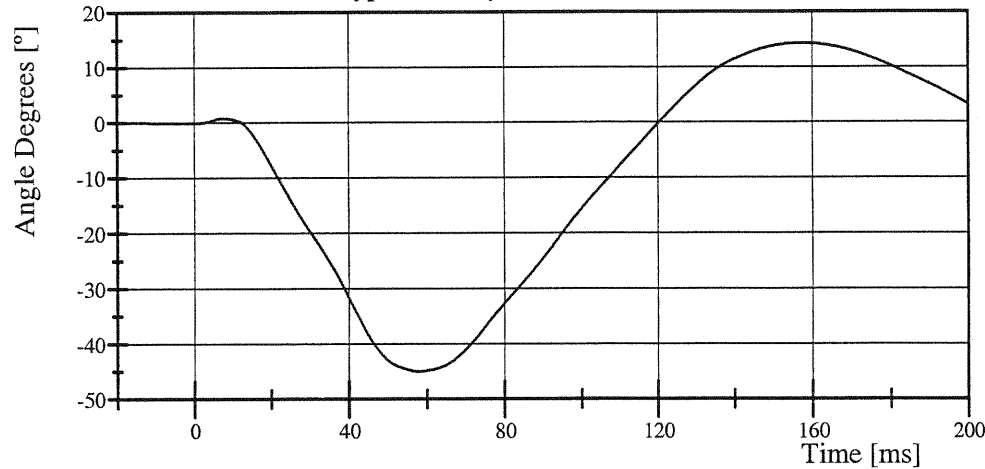


Filter Class: CFC_60

Max: 17.9 ° at 170.9 ms

Min: -30.3 ° at 63.8 ms

Head Rotation at Occypital Condyles

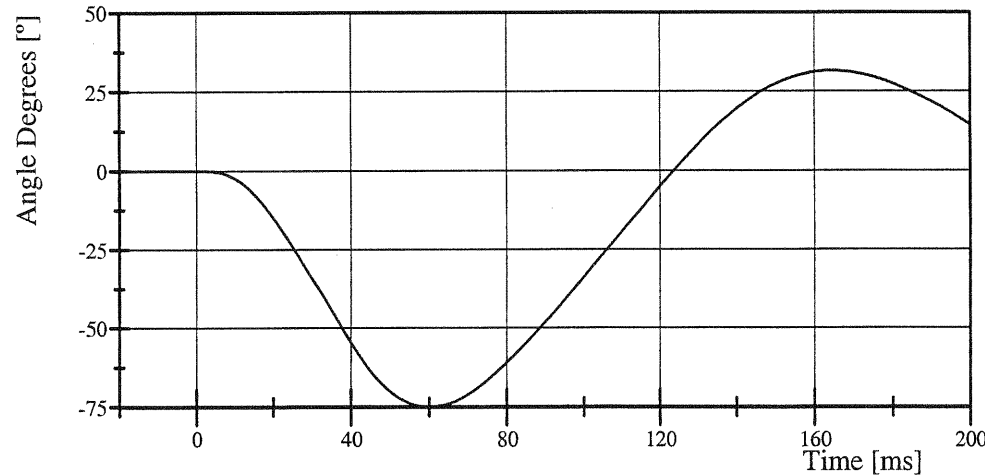


Filter Class: CFC_60

Max: 14.3 ° at 157.4 ms

Min: -45.0 ° at 57.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 31.5 ° at 164.4 ms

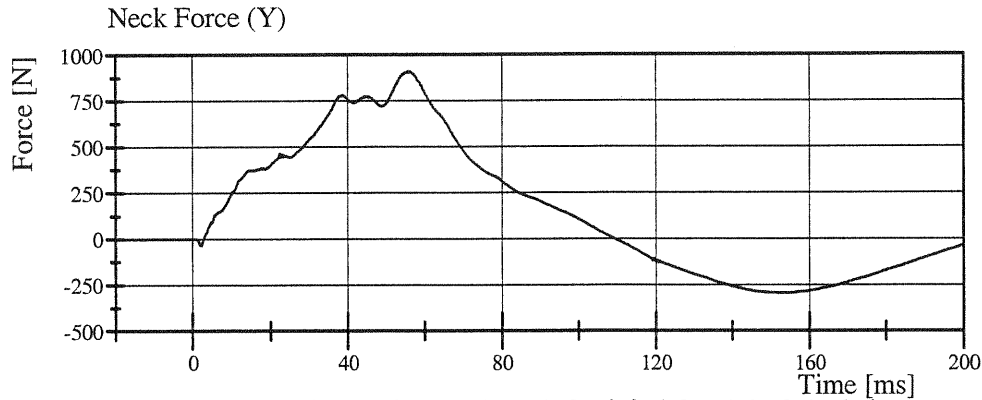
Min: -74.9 ° at 59.7 ms

Transportation Research Center Inc.

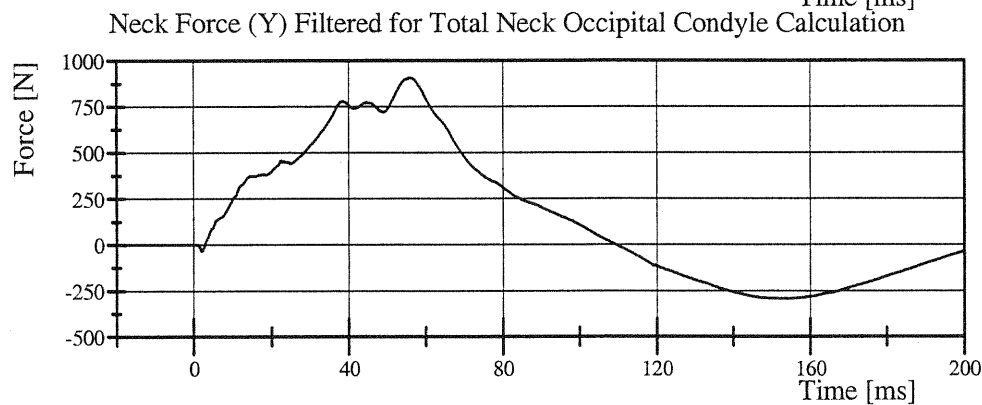
Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 23-3

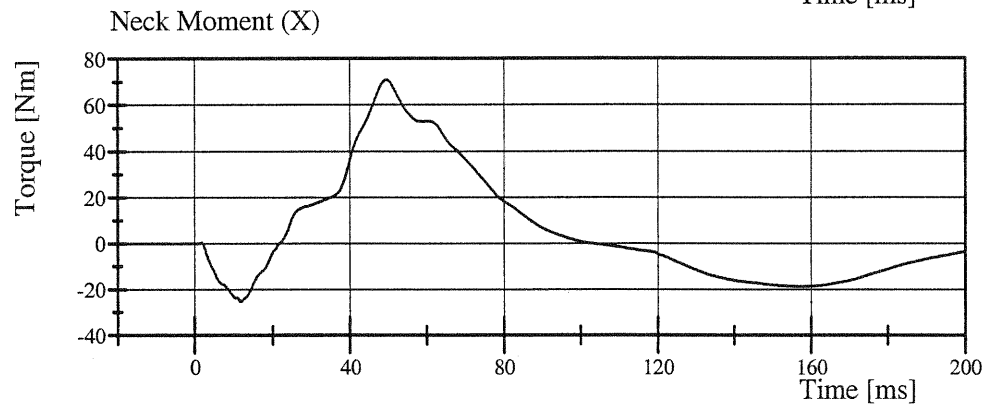
Test Date: 10/2/2007



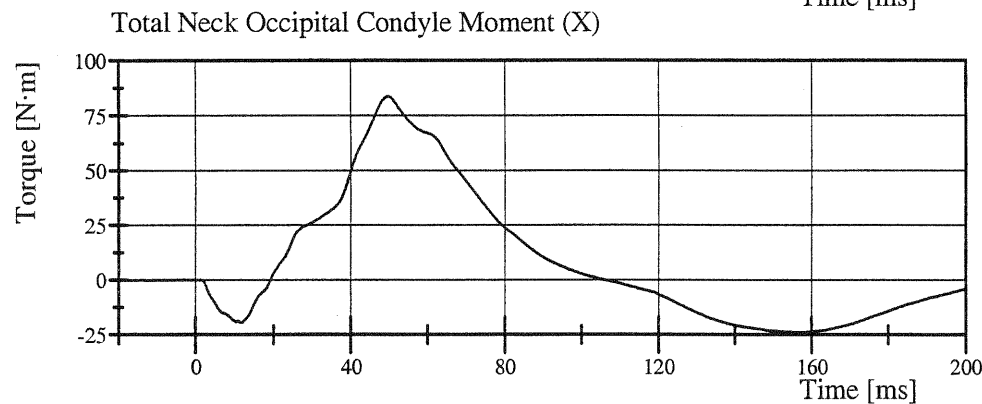
Filter Class: CFC_1000
Max: 909.5 N at 56.3 ms
Min: -294.1 N at 153.4 ms



Filter Class: CFC_600
Max: 907.7 N at 56.3 ms
Min: -293.8 N at 153.4 ms



Filter Class: CFC_600
Max: 70.9 Nm at 49.6 ms
Min: -25.2 Nm at 11.8 ms



Filter Class: CFC_600
Max: 83.8 N·m at 49.8 ms
Min: -23.8 N·m at 157.4 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 059 Certification No. 23-1

Test Date: 10/3/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.286 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	41.0 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	40.7 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	18.5 g	Yes

Test meets specifications.

Comments:

Technician

Raul Bonch

Approved

Ron Starnes

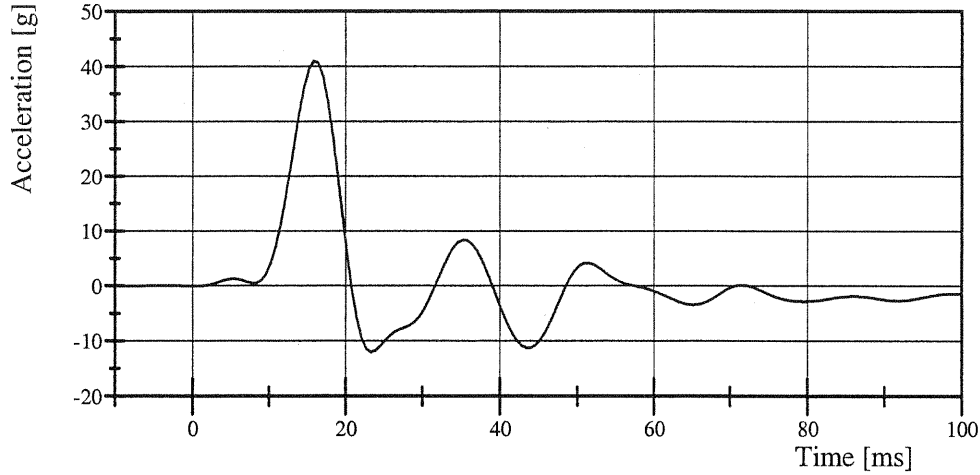
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 059 Certification No. 23-1

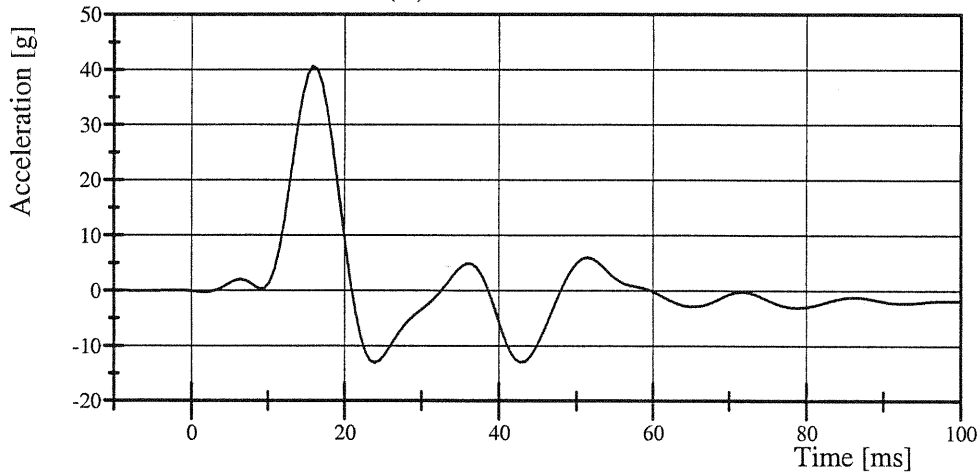
Test Date: 10/3/2007

Upper Rib Acceleration (Y)



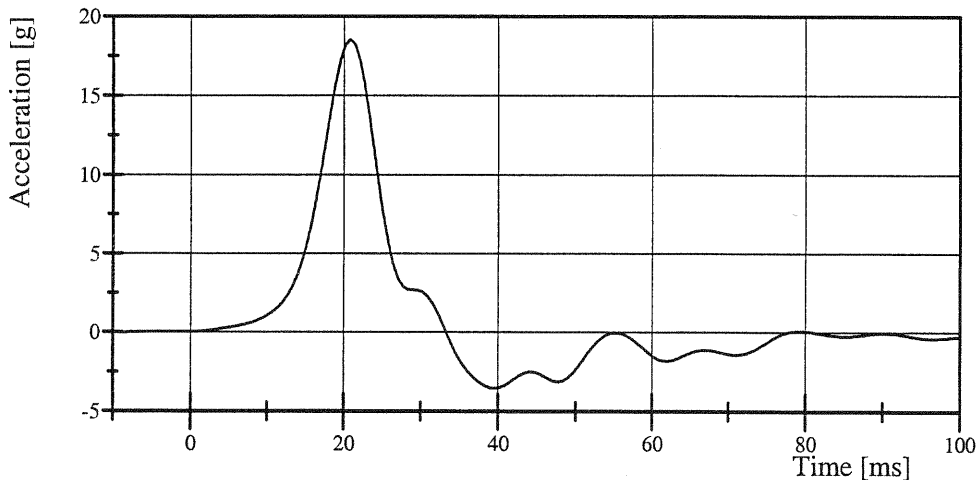
Filter Class: FIR_100
Max: 41.0 g at 15.8 ms
Min: -12.0 g at 23.4 ms

Lower Rib Acceleration (Y)



Filter Class: FIR_100
Max: 40.7 g at 15.8 ms
Min: -13.0 g at 24.0 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100
Max: 18.5 g at 20.9 ms
Min: -3.5 g at 39.6 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 059 Certification No. 23-7

Test Date: 10/2/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.728 mm/s	Yes

Test meets specifications.

Comments:

Technician

Rod Brouil

Approved

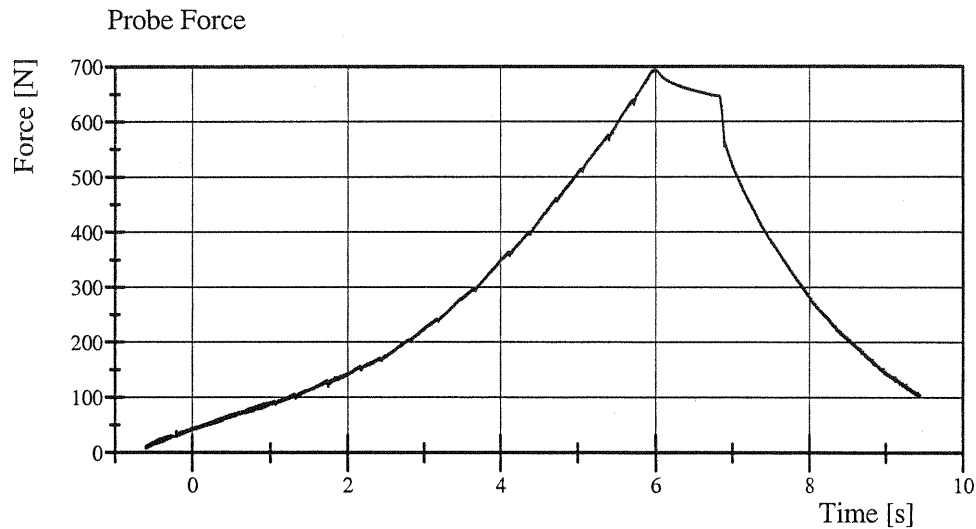
Ron Stoner

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 059 Certification No. 23-7

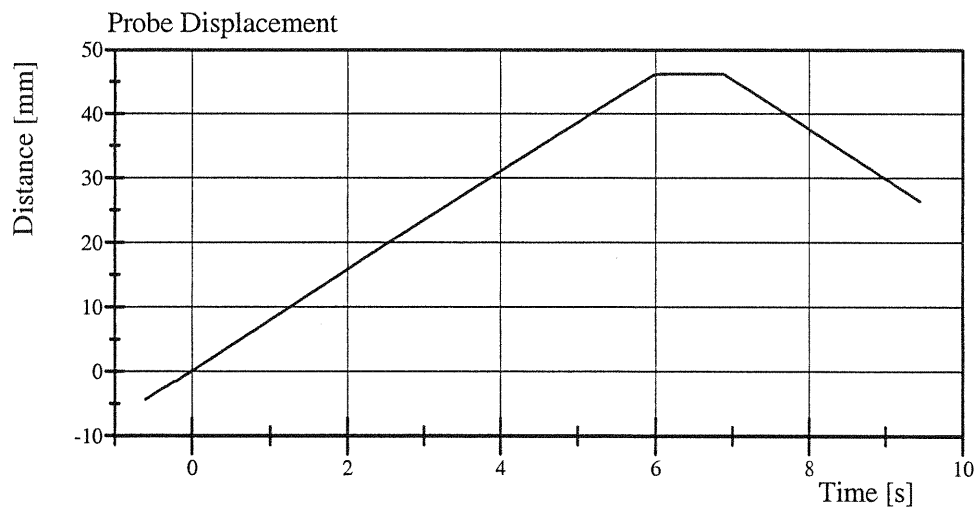
Test Date: 10/2/2007



Filter Class: CFC_600

Max: 693.0 N at 6.0 s

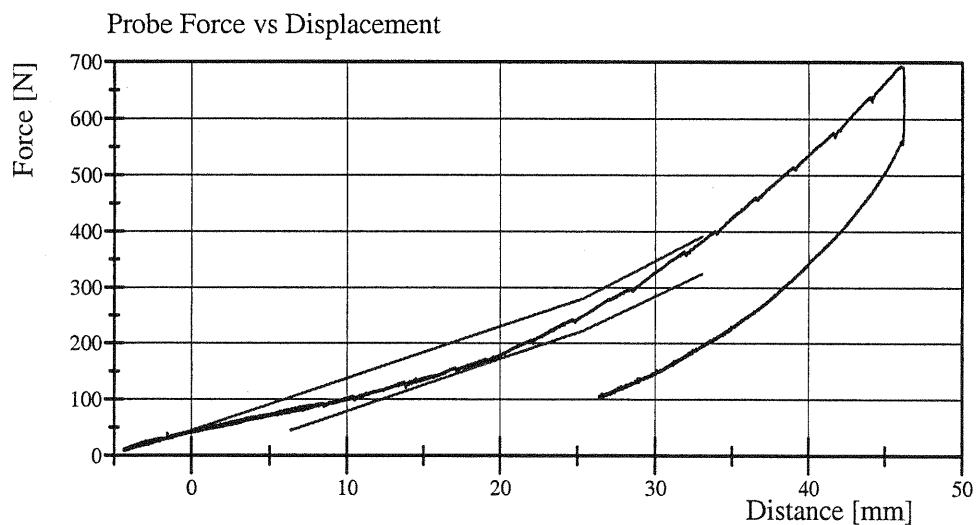
Min: 8.2 N at -0.6 s



Filter Class: CFC_180

Max: 46.2 mm at 6.7 s

Min: -4.4 mm at -0.6 s



Filter Class: CFC_600

Max: 693.0 N at 46.0 mm

Min: 8.2 N at -4.2 mm

TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 02-Oct-07

TRC, INC.

TEST NO: LUFL-01

572B SN 059 TORSO FLEX CAL 23

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TIME	NA	1345
TEMPERATURE	18.9 – 25.6° C	21.4 C
RELATIVE HUMIDITY	10 – 70 %	56 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	2.22 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	133.45 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	195.72 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	235.76 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	5 °

TEST MEETS SPECIFICATIONS

TECHNICIAN Charles W. Bell

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 059 Certification No. 23-1

Test Date: 10/3/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.282 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	6.6 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	42.1 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

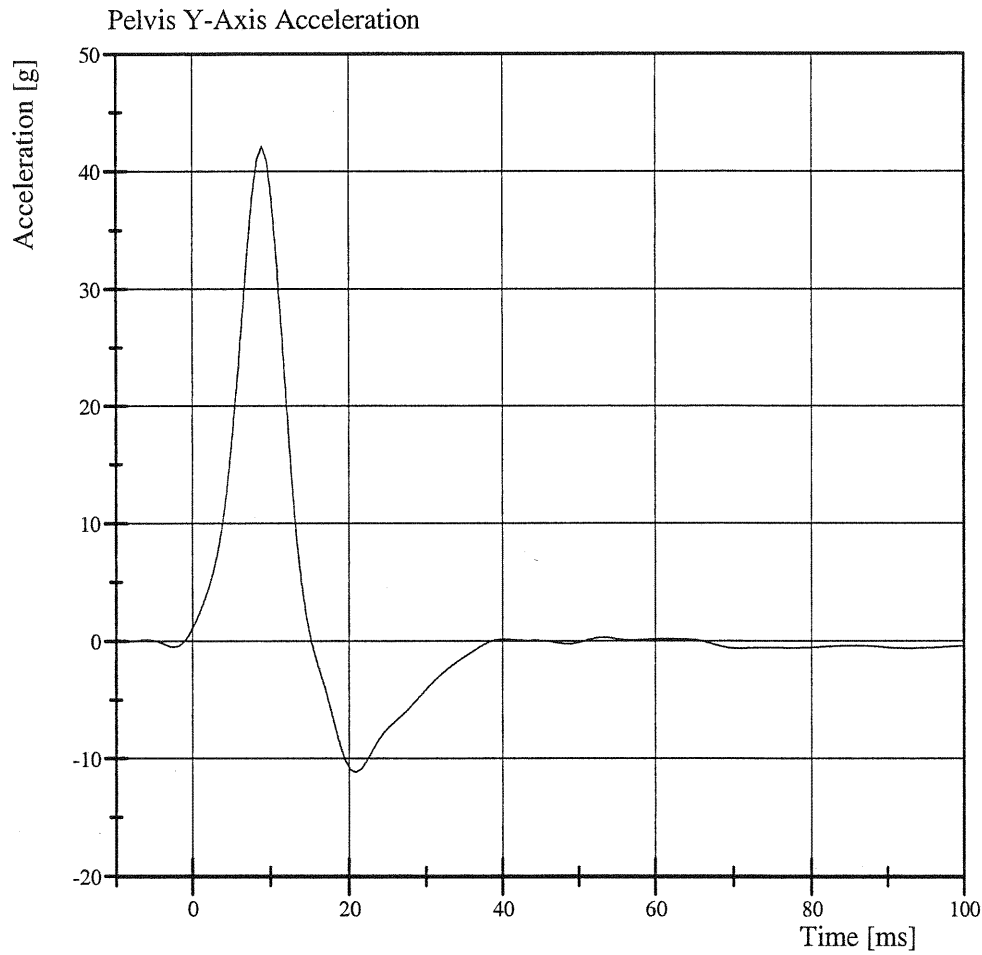
Ron Stoner

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 059 Certification No. 23-1

Test Date: 10/3/2007



Filter Class: FIR_100
Max: 42.1 g at 9.0 ms
Min: -11.2 g at 20.8 ms



Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 059 Certification No. 23-1
Test Date: 10/1/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Maximum Force at Test Velocity	848 - 1,136 N	906.3 N	Yes
Maximum Displacement at Test Velocity	30.18 - 35.16 mm	31.319 mm	Yes

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 3.063

Damper Setting: 5.5

Technician

Charles W. Beall

Approved

Ron Stone

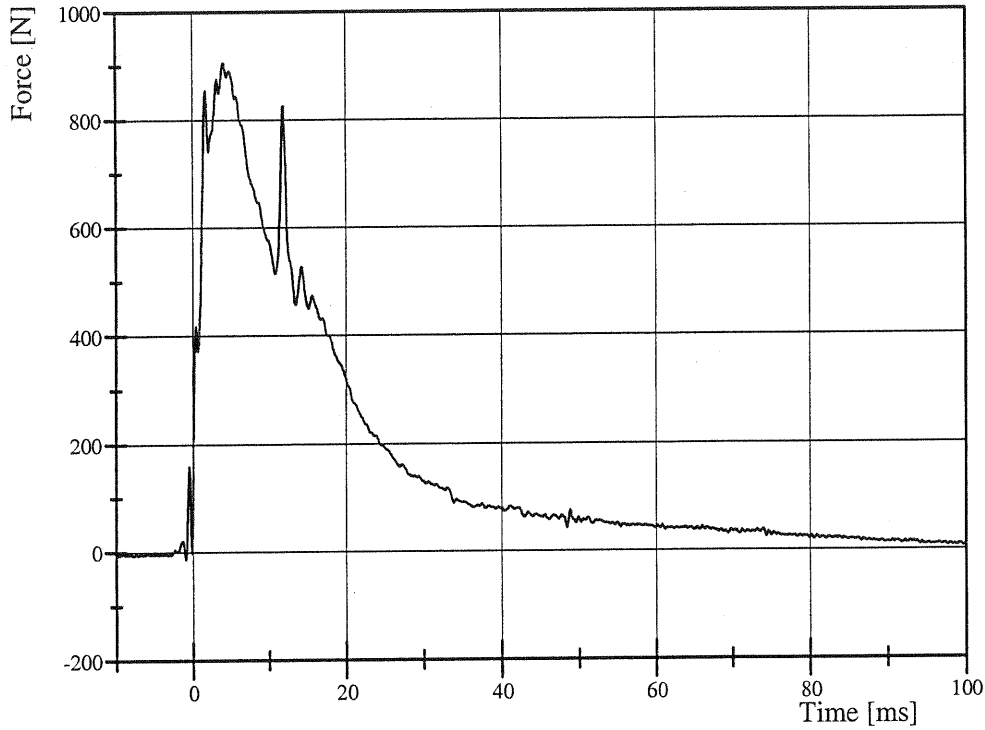
Transportation Research Center Inc.

3.05 m/s Thoracic Shock Absorber Compression

SID-HIII Serial No. 059 Certification No. 23-1

Test Date: 10/1/2007

Shock Absorber Resistive Force

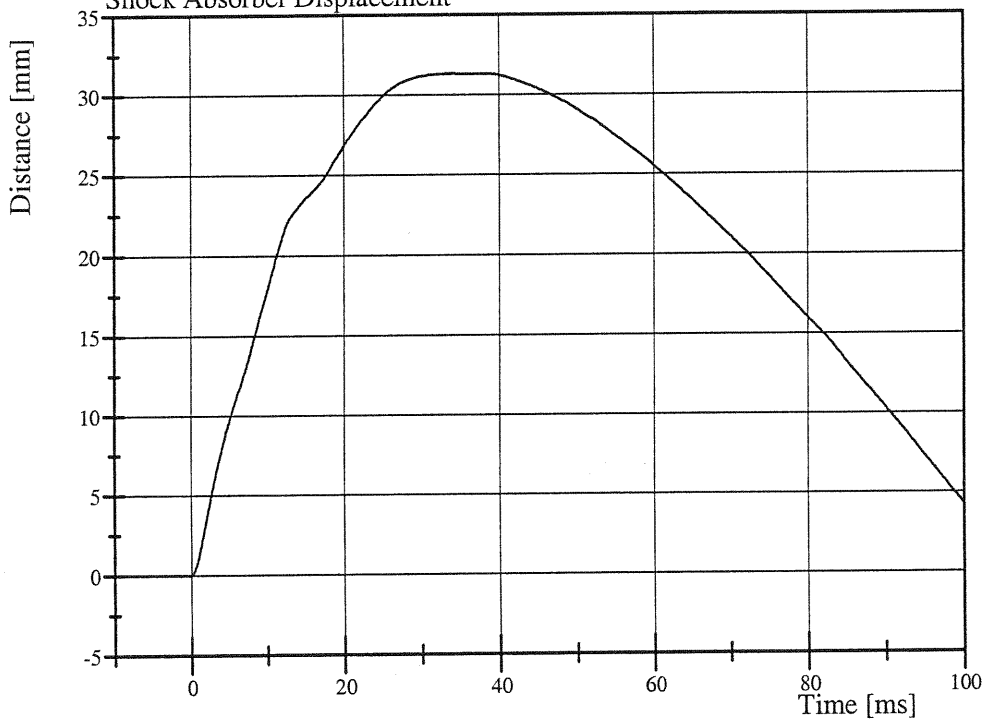


Filter Class: CFC_1000

Max: 906.3 N at 4.1 ms

Min: -12.9 N at -1.0 ms

Shock Absorber Displacement



Filter Class: CFC_1000

Max: 31.3 mm at 33.7 ms

Min: -0.0 mm at -8.6 ms

Transportation Research Center Inc.

4.27 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 059 Certification No. 23-1
Test Date: 10/1/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Maximum Force at Test Velocity	1,749 - 2,114 N	1,803.2 N	Yes
Maximum Displacement at Test Velocity	31.69 - 37.25 mm	34.412 mm	Yes

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 4.283

Damper Setting: 5.5

Technician

Approved

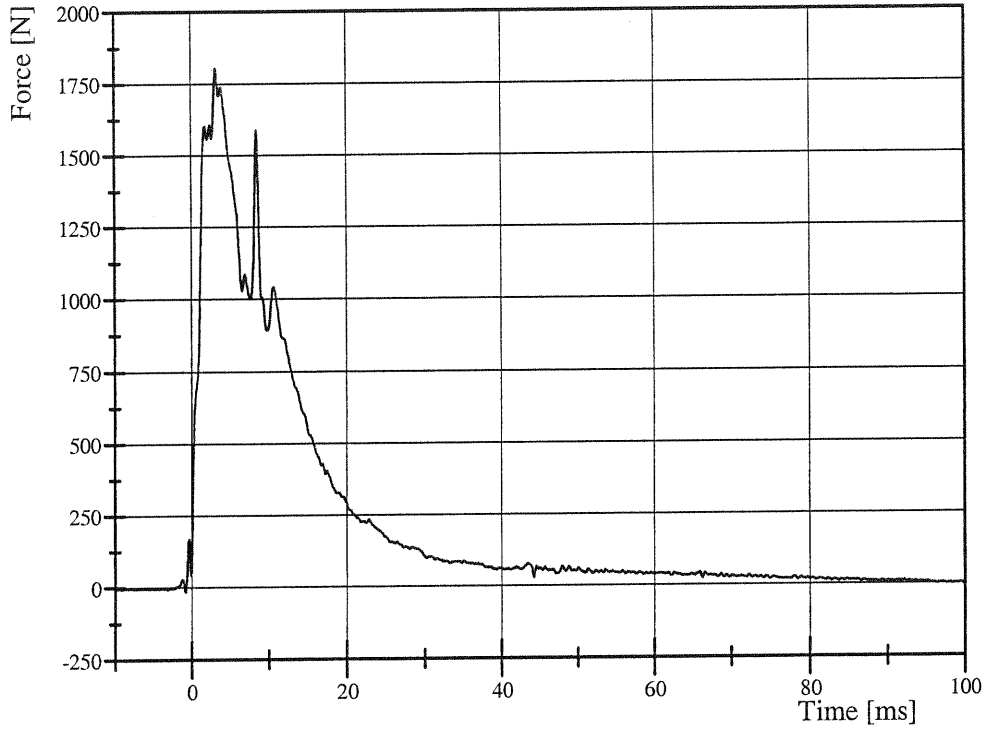
Ron Stoner



Transportation Research Center Inc.

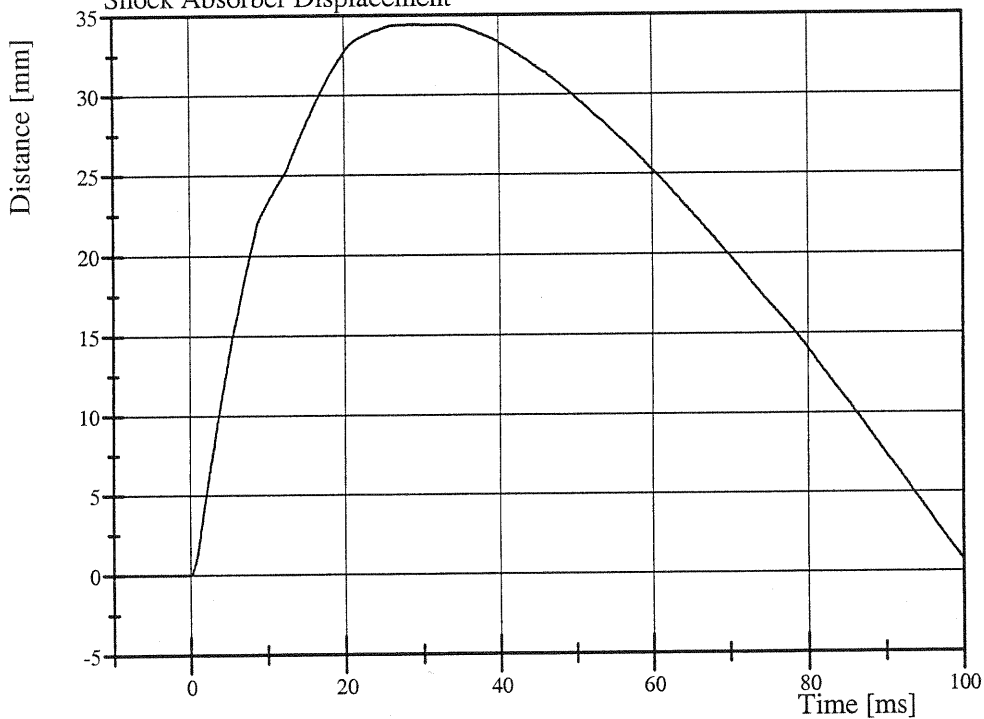
4.27 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 059 Certification No. 23-1
Test Date: 10/1/2007

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 1,803.2 N at 3.2 ms
Min: -14.1 N at -0.8 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 34.4 mm at 28.6 ms
Min: -0.0 mm at -4.6 ms



Transportation Research Center Inc.

6.10 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 059 Certification No. 23-2
Test Date: 10/1/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Maximum Force at Test Velocity	3,810 - 4,515 N	3,926.2 N	Yes
Maximum Displacement at Test Velocity	33.4 - 39.62 mm	37.892 mm	Yes

Test meets specifications.

Comments:

Actual Impactor Velocity (m/s): 6.145

Damper Setting: 5.5

Technician

Charles W. Bell

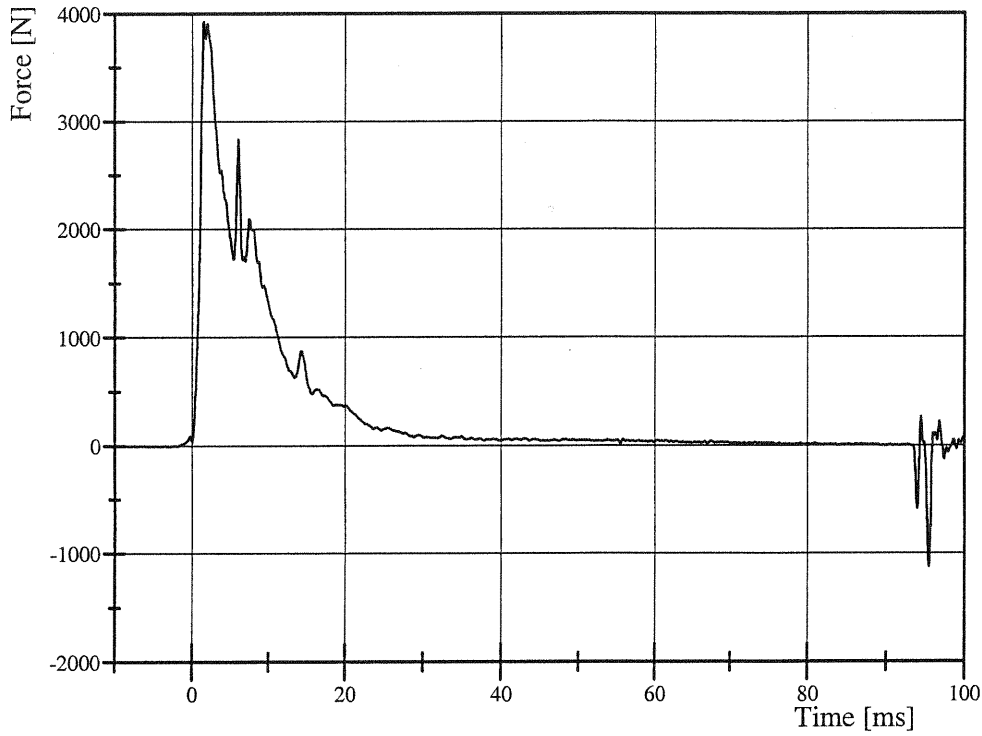
Approved

Ron Stoner

Transportation Research Center Inc.

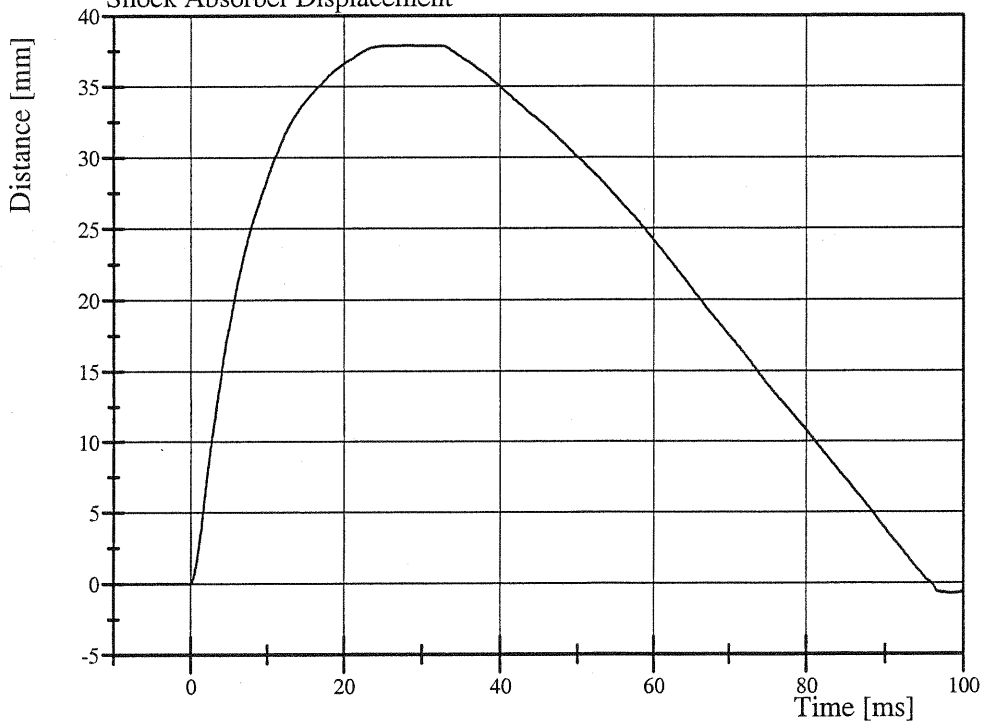
6.10 m/s Thoracic Shock Absorber Compression
SID-HIII Serial No. 059 Certification No. 23-2
Test Date: 10/1/2007

Shock Absorber Resistive Force



Filter Class: CFC_1000
Max: 3,926.2 N at 1.5 ms
Min: -1,125.5 N at 95.4 ms

Shock Absorber Displacement



Filter Class: CFC_1000
Max: 37.9 mm at 27.7 ms
Min: -0.7 mm at 98.4 ms

CALIBRATION TEST RESULTS

POST-TEST

SID/HIII: 059

Transportation Research Center Inc.
SID/HIII Dummy Post-Test
External Dimensions
Serial No. 059 Calibration No. 24

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	511 mm	Yes
Hip Pivot Height	HP	99.1 REF mm	99.1 mm	
Knee Pivot From Backline	KH	510.5 - 525.8 mm	523 mm	Yes
Knee Pivot From Floor	KV	490.2 - 505.5 mm	500 mm	Yes
Hip Width	HW	355.6 - 391.2 mm	367 mm	Yes
Top Rib Width From CL	RW-1	165.1 - 180.3 mm	173 mm	Yes
Bottom Rib Width From CL	RW-2	165.1 - 180.3 mm	173 mm	Yes
Difference Between Top & Bottom Rib Width from CL		<= 2.5 mm	0.0 mm	Yes

Technician

Ronald Barab

Approved

Ron Stoner



Transportation Research Center Inc.

Left Lateral Head Drop
SID-HIII Serial No. 059 Certification No. 24-2
Test Date: 10/12/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	42 %	Yes
Peak Head Resultant Acceleration	120 - 150 g	148.8 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	7.8 g	Yes
Is Head Resultant Acceleration Curve Unimodal Within 15% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Ball

Approved

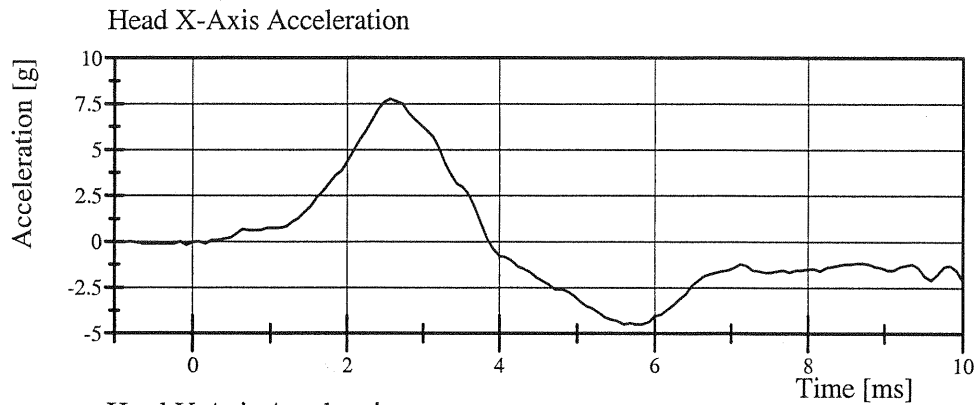
Ron Stone

Transportation Research Center Inc.

Left Lateral Head Drop

SID-HIII Serial No. 059 Certification No. 24-2

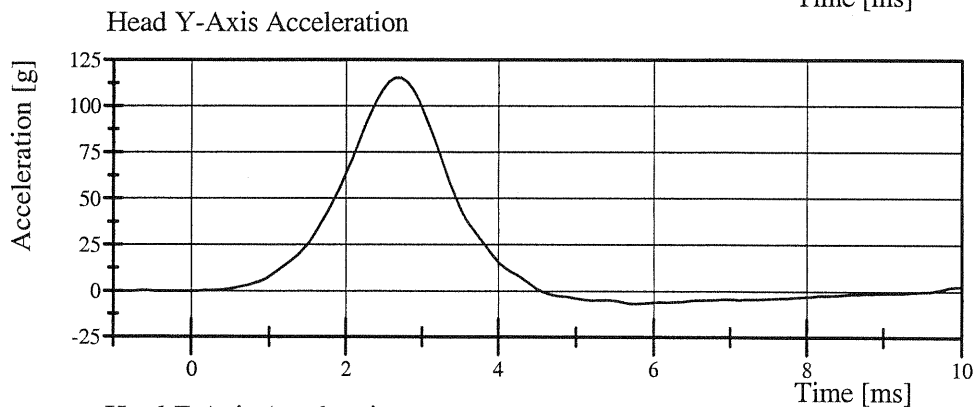
Test Date: 10/12/2007



Filter Class: CFC_1000

Max: 7.8 g at 2.6 ms

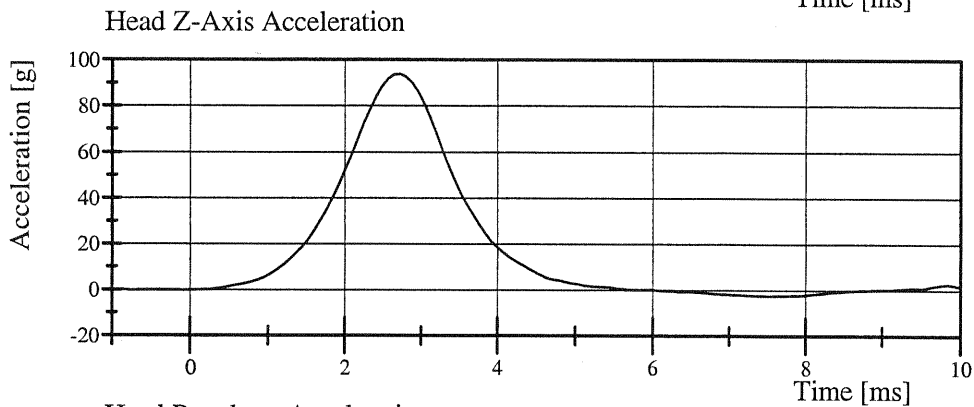
Min: -4.5 g at 5.6 ms



Filter Class: CFC_1000

Max: 115.2 g at 2.6 ms

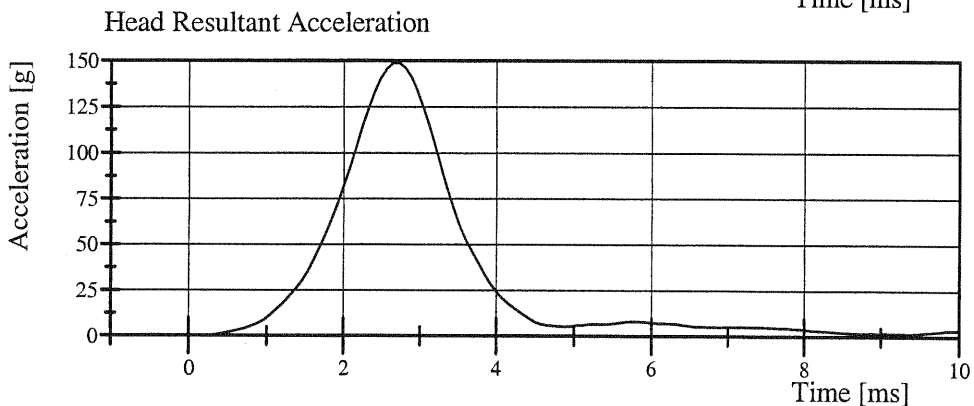
Min: -6.8 g at 5.8 ms



Filter Class: CFC_1000

Max: 93.9 g at 2.7 ms

Min: -2.6 g at 7.5 ms



Filter Class: CFC_1000

Max: 148.8 g at 2.7 ms

Min: 0.0 g at -0.8 ms

Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 24-1

Test Date: 10/12/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	(-6.89) - (-7.13) m/s	-6.948 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	1.96 - 2.55 m/s	2.284 m/s	Yes
Pendulum Integrated Velocity Change at 20 ms	4.12 - 5.10 m/s	4.525 m/s	Yes
Pendulum Integrated Velocity Change at 30 ms	5.73 - 7.01 m/s	6.501 m/s	Yes
Pendulum Integrated Velocity Change at 40 to 70 ms	6.27 - 7.64 m/s	7.172 m/s	Yes
Total Head D-Plane Rotation	(-66) - (-82) °	-72.9 °	Yes
Total Head D-Plane Rotation Time to 0° after Peak Rotation	58 - 67 ms	59.6 ms	Yes
Total Neck Occipital Condyle Moment	73 - 88 N·m	85.5 N·m	Yes
Total Neck Occipital Condyle Moment Time to 0 N·m after Peak Moment	49 - 64 ms	53.6 ms	Yes
Time from Peak Moment to Peak Rotation	2 - 16 ms	9.9 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Storer

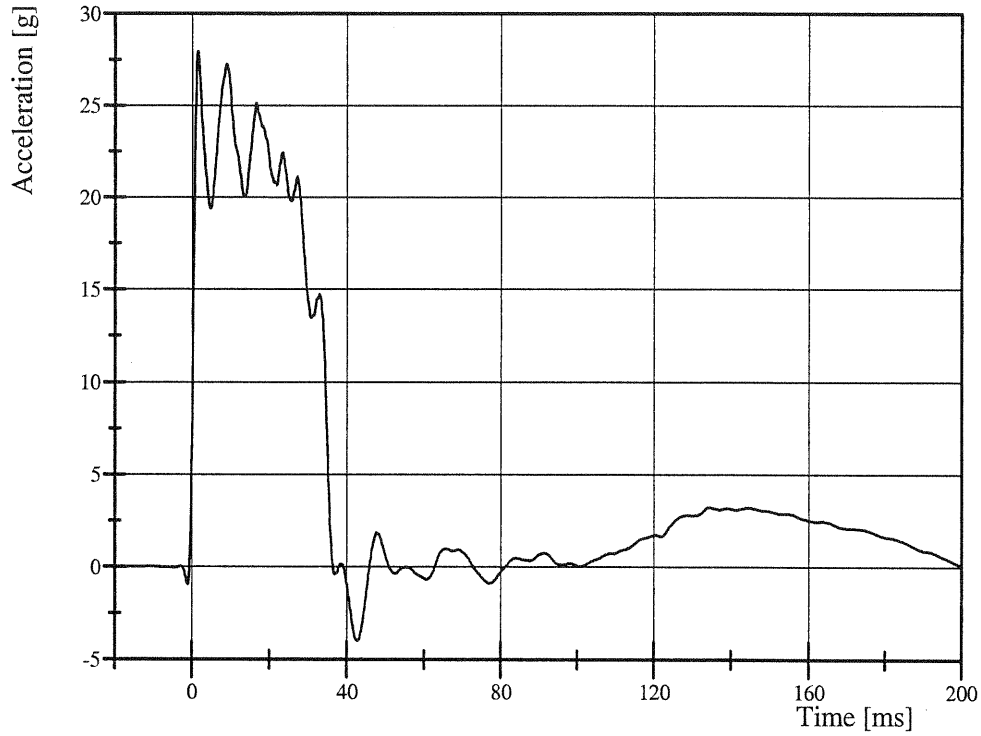
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 24-1

Test Date: 10/12/2007

Pendulum Acceleration

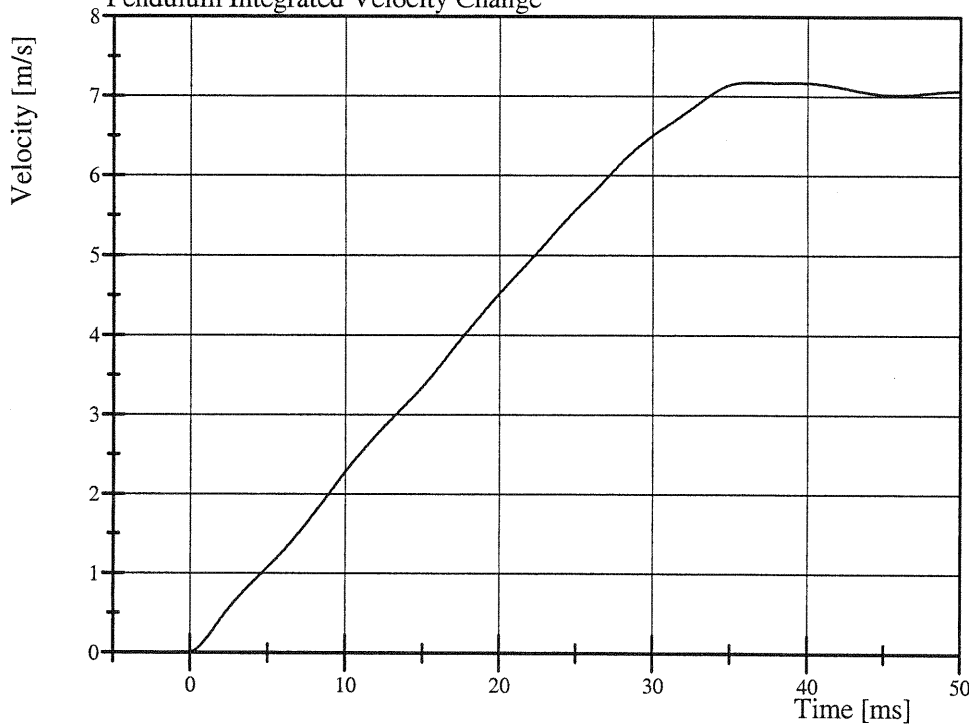


Filter Class: CFC_180

Max: 27.9 g at 1.5 ms

Min: -4.0 g at 42.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 7.2 m/s at 36.4 ms

Min: 0.0 m/s at 0.0 ms

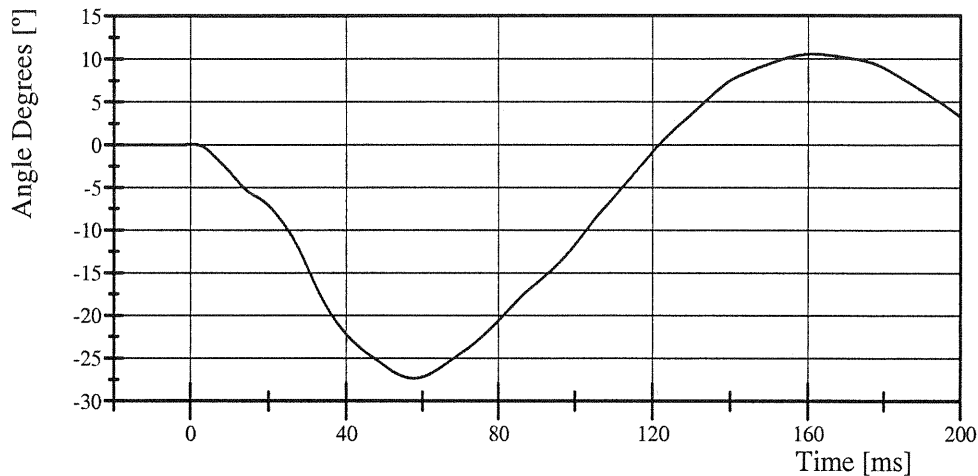
Transportation Research Center Inc.

Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 24-1

Test Date: 10/12/2007

Pot Rotation at the Base of Neck

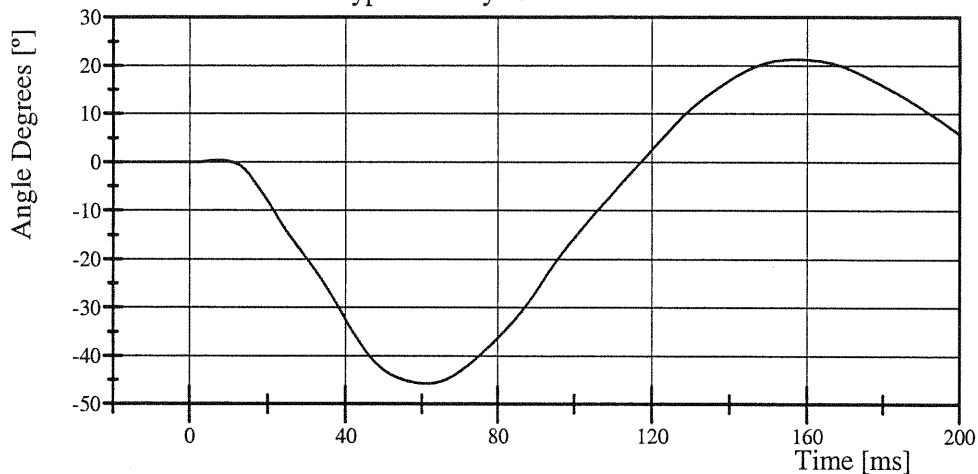


Filter Class: CFC_60

Max: 10.6 ° at 161.4 ms

Min: -27.3 ° at 57.8 ms

Head Rotation at Occypital Condyles

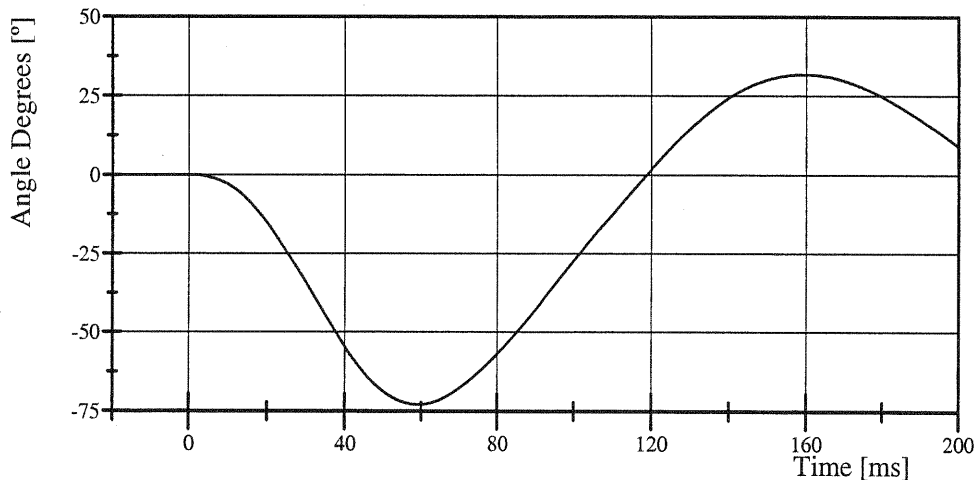


Filter Class: CFC_60

Max: 21.3 ° at 157.2 ms

Min: -45.7 ° at 61.3 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 31.8 ° at 159.2 ms

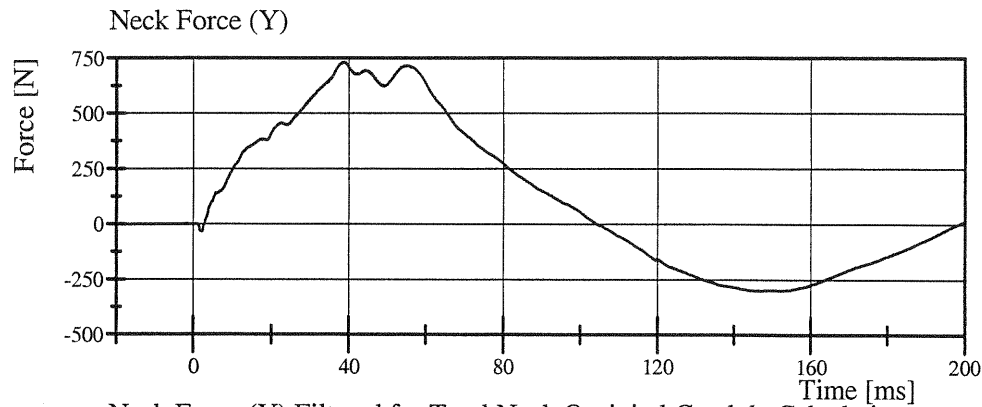
Min: -72.9 ° at 59.3 ms

Transportation Research Center Inc.

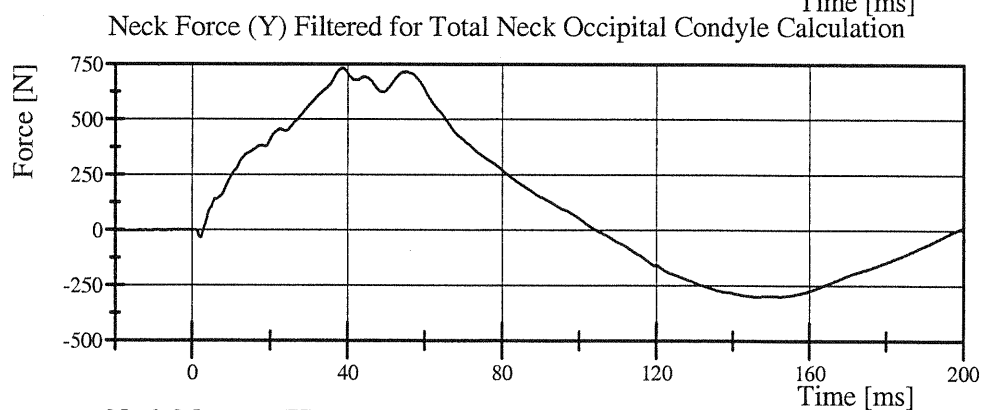
Left Lateral Neck

SID-HIII Serial No. 059 Certification No. 24-1

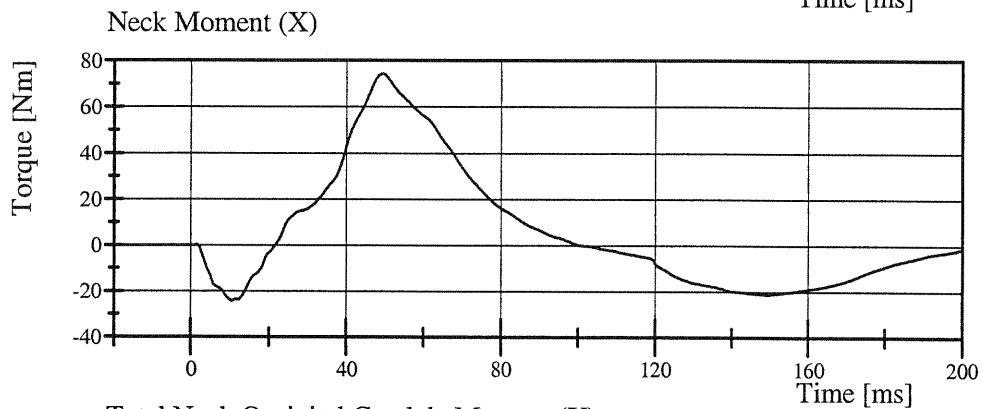
Test Date: 10/12/2007



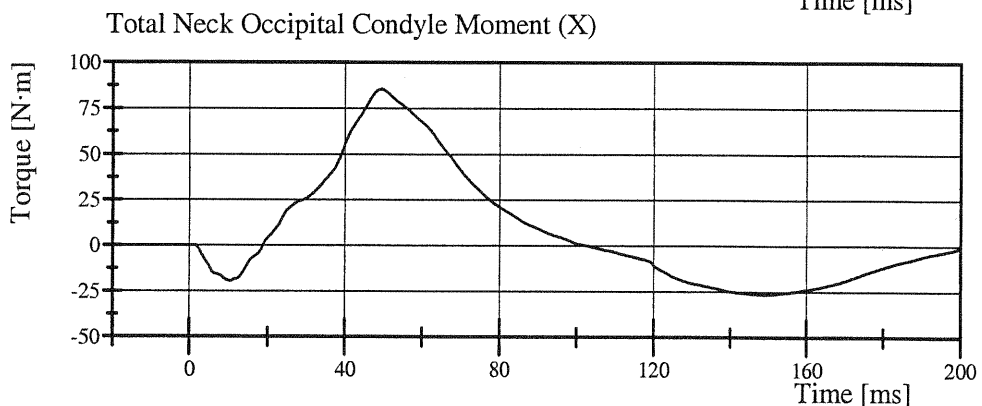
Filter Class: CFC_1000
Max: 732.4 N at 38.7 ms
Min: -299.4 N at 147.3 ms



Filter Class: CFC_600
Max: 732.0 N at 38.6 ms
Min: -298.9 N at 147.2 ms



Filter Class: CFC_600
Max: 74.4 Nm at 49.3 ms
Min: -24.1 Nm at 10.6 ms



Filter Class: CFC_600
Max: 85.5 N·m at 49.4 ms
Min: -26.5 N·m at 149.0 ms

Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 059 Certification No. 24-1

Test Date: 10/16/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	61 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.279 m/s	Yes
Upper Rib Lateral Acceleration	37 - 46 g	42.7 g	Yes
Lower Rib Lateral Acceleration	37 - 46 g	41.9 g	Yes
Lower Spine Lateral Acceleration	15 - 22 g	20.7 g	Yes

Test meets specifications.

Comments:

Technician

Rand Baras

Approved

Ron Stover

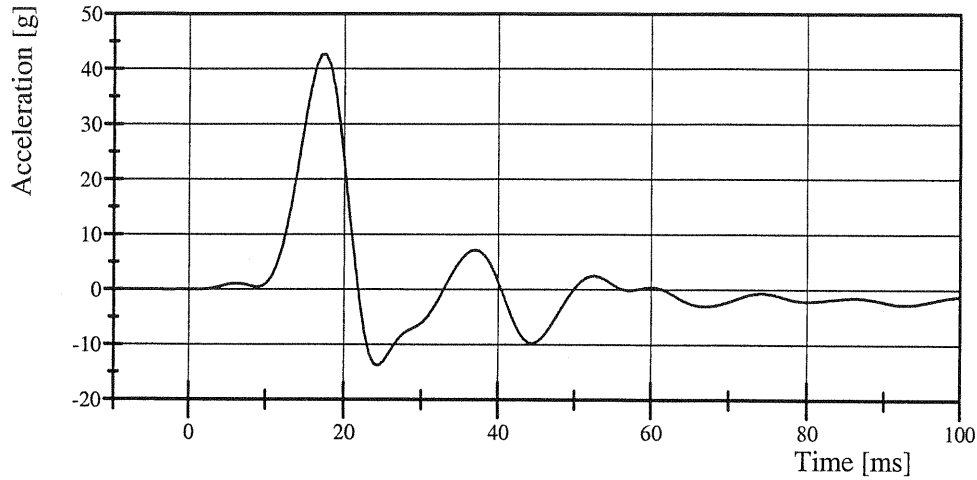
Transportation Research Center Inc.

Left Lateral Thorax

SID-HIII Serial No. 059 Certification No. 24-1

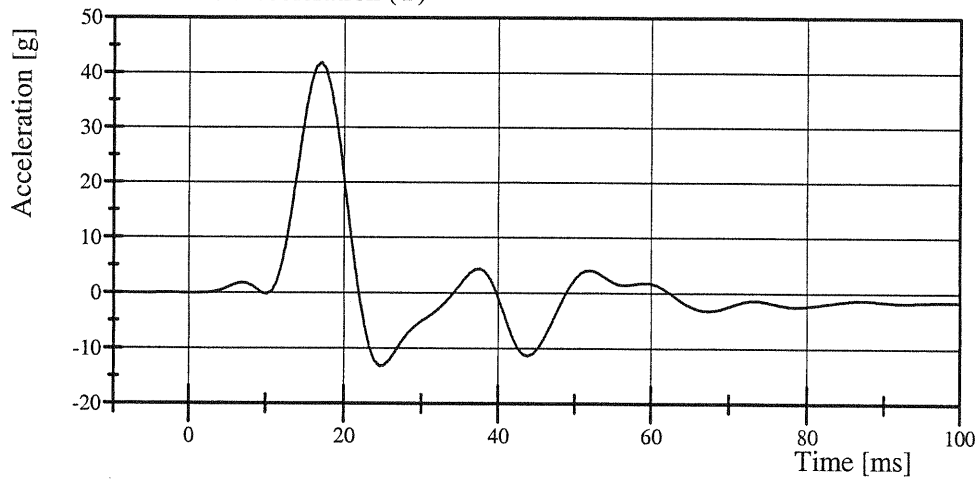
Test Date: 10/16/2007

Upper Rib Acceleration (Y)



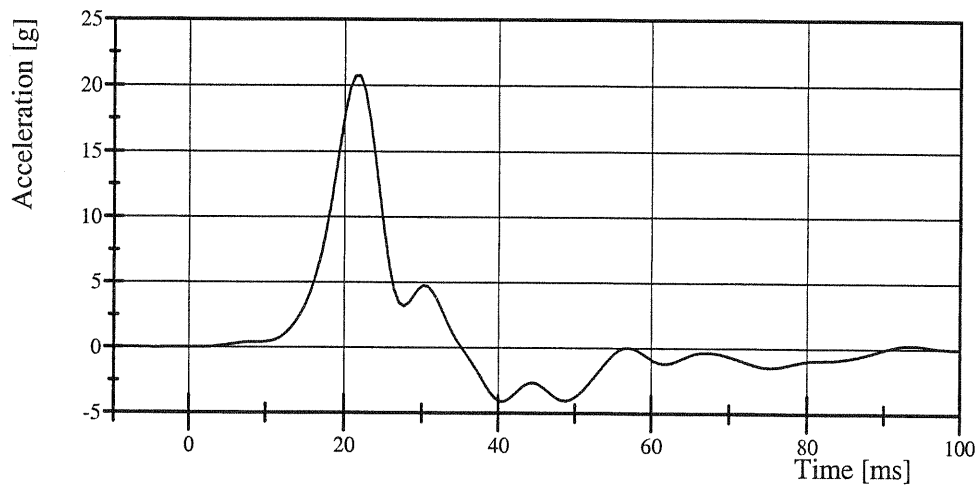
Filter Class: FIR_100
Max: 42.7 g at 17.6 ms
Min: -13.8 g at 24.5 ms

Lower Rib Acceleration (Y)



Filter Class: FIR_100
Max: 41.9 g at 17.0 ms
Min: -13.2 g at 24.6 ms

Lower Spine Acceleration (Y)



Filter Class: FIR_100
Max: 20.7 g at 21.4 ms
Min: -4.1 g at 40.7 ms

Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 059 Certification No. 24-18

Test Date: 10/16/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Probe Force within Corridor	Yes	Yes	Yes
Probe Velocity	6.35 - 8.89 mm/s	7.807 mm/s	Yes

Test meets specifications.

Comments:

Technician

Rand Barnd

Approved

Ron Stener

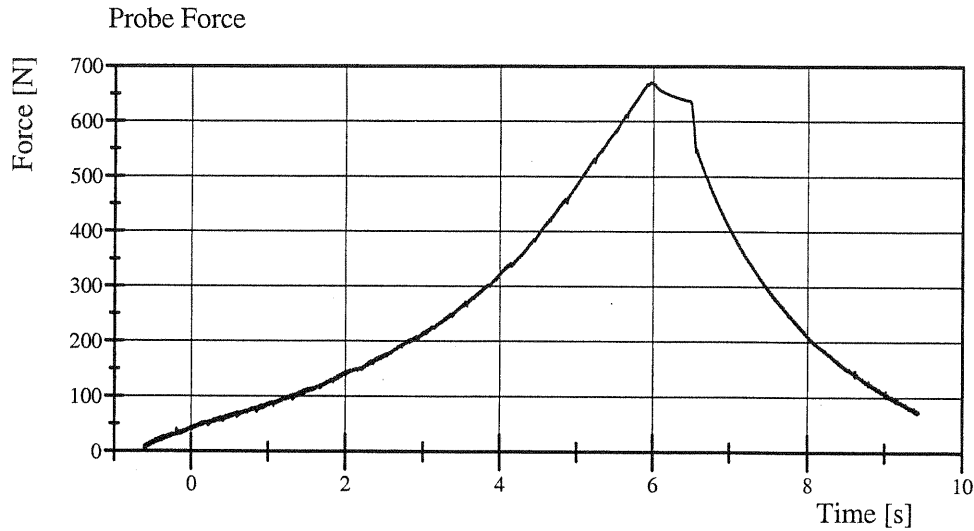


Transportation Research Center Inc.

Abdomen Compression

SID-HIII Serial No. 059 Certification No. 24-18

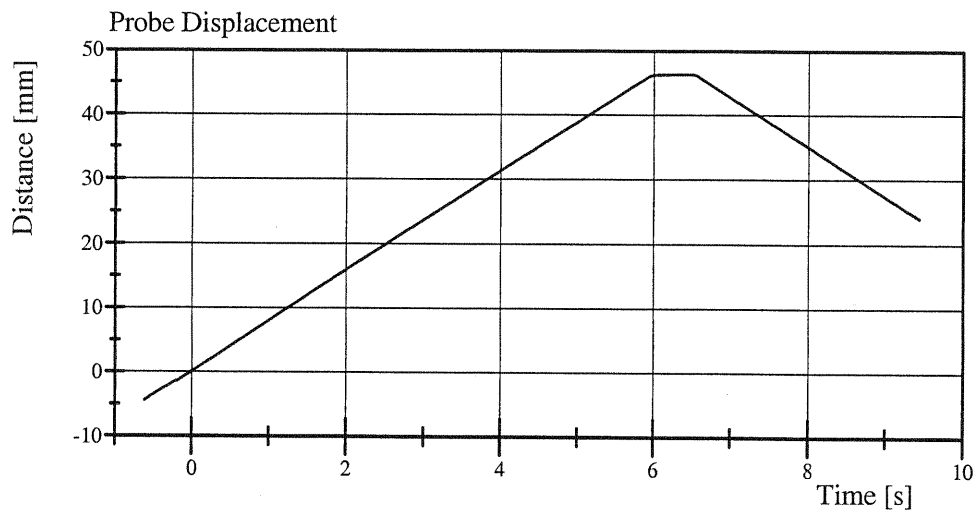
Test Date: 10/16/2007



Filter Class: CFC_600

Max: 670.3 N at 6.0 s

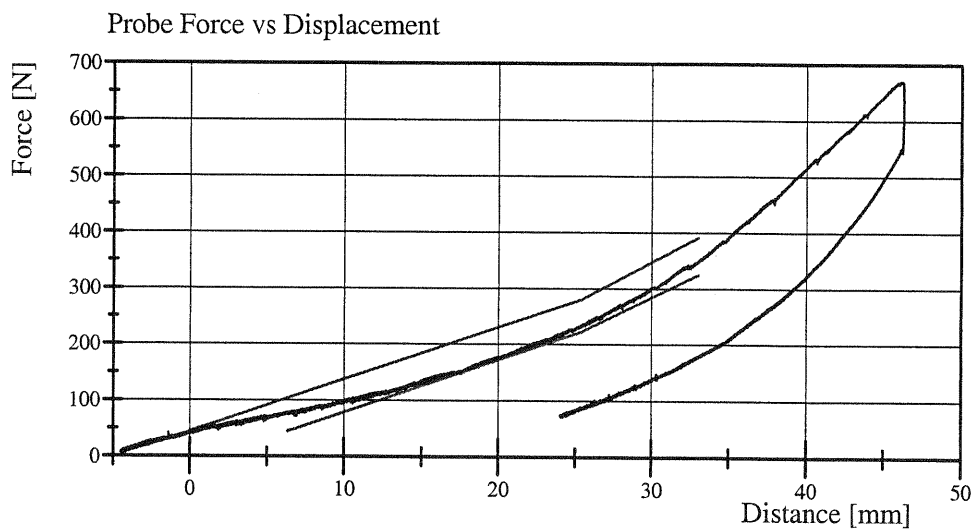
Min: 6.3 N at -0.6 s



Filter Class: CFC_180

Max: 46.3 mm at 6.5 s

Min: -4.5 mm at -0.6 s



Filter Class: CFC_600

Max: 670.3 N at 46.1 mm

Min: 6.3 N at -4.3 mm

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 059 Certification No. 24-1

Test Date: 10/16/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	63 %	Yes
Impactor Velocity	4.27 - 4.33 m/s	4.285 m/s	Yes
Pelvis Lateral Acceleration Duration above 20g	3 - 7 ms	6.4 ms	Yes
Pelvis Lateral Acceleration	40 - 60 g	43.2 g	Yes
Is Acceleration Curve Unimodal Above 20g?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Rouel Beranides

Approved

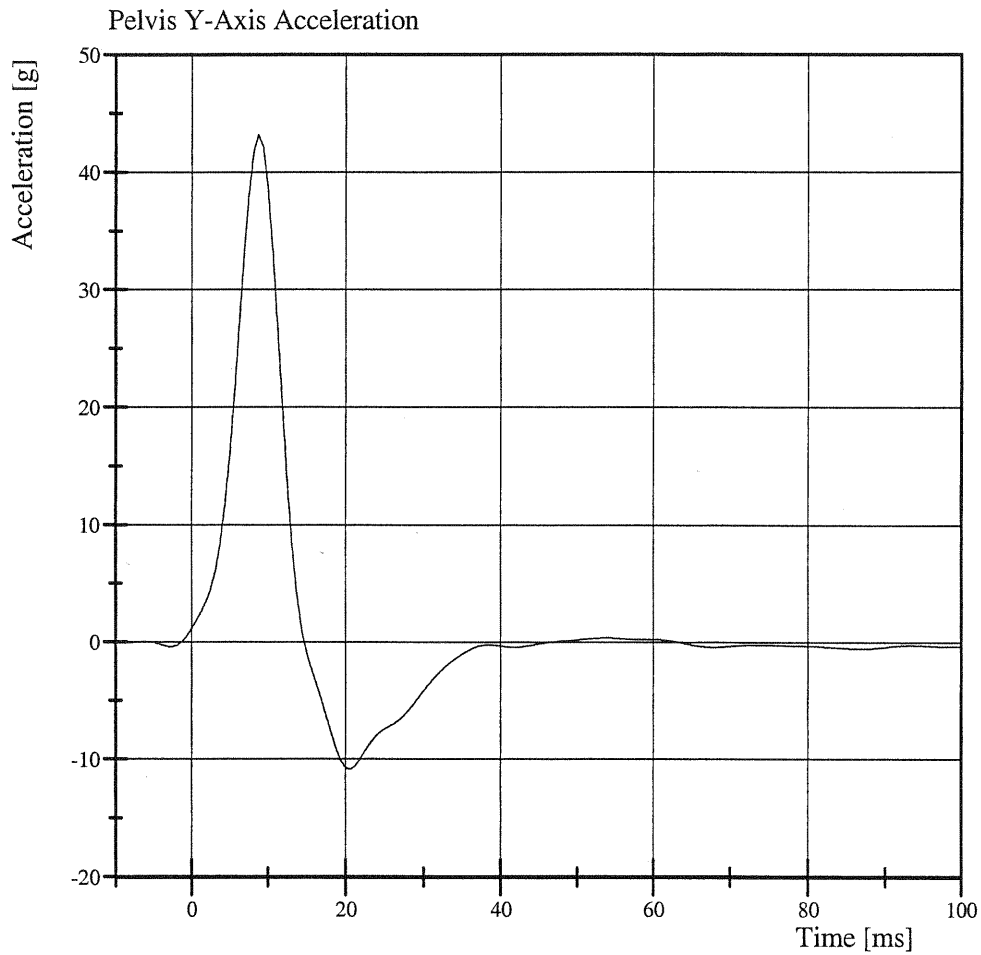
Ren Stener

Transportation Research Center Inc.

Left Lateral Pelvis

SID-HIII Serial No. 059 Certification No. 24-1

Test Date: 10/16/2007



Filter Class: FIR_100
Max: 43.2 g at 8.7 ms
Min: -10.9 g at 20.6 ms



TRANSPORTATION RESEARCH CENTER INC.

LUMBAR FLEXION TEST

SID PART 572B

CAL DATE: 15-Oct-07

TRC, INC.

TEST NO: LUFL-01

572B SN 059 TORSO FLEX CAL 24

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TIME	NA	850
TEMPERATURE	18.9 – 25.6° C	21.0 C
RELATIVE HUMIDITY	10 – 70 %	48 %
FORCE AT 0 DEG. FLEXION	-27 – 27 N	2.66 N
FORCE AT 20 DEG OF FLEXION	98 – 151 N	133.44 N
FORCE AT 30 DEG OF FLEXION	151 – 205 N	191.27 N
FORCE AT 40 DEG OF FLEXION	205 – 258 N	244.65 N
NET RETURN ANGLE AFTER 3 MINUTES	< 12 °	7 °

TEST MEETS SPECIFICATIONS

TECHNICIAN Charles W. Deall

APPENDIX D
CHILD RESTRAINT SYSTEM

REPORT NUMBER: NCAPSIDE-TRC-2007-001

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**NISSAN MOTOR CO., LTD.
2008 NISSAN SENTRA 4-DOOR SEDAN
NHTSA NUMBER: M85210**

**PREPARED BY:
TRANSPORTATION RESEARCH CENTER INC.
10820 STATE ROUTE 347
P. O. BOX B-67
EAST LIBERTY, OH 43319**



Test Date: October 8, 2007

Report Date: October 19, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVENUE, S.E., ROOM W43-410
WASHINGTON, D.C. 20590**

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-03-D-02005. This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Test Performed By: John Shultz, Supervisor

Report Approved By: Emad Al-Tabakha
Emad Al-Tabakha, Test Engineer
Transportation Research Center Inc.

Approval Date: 10/19/2007

FINAL REPORT ACCEPTANCE BY OCWS:

Accepted By: _____

Acceptance Date: _____

1. Report No. NCAPSIDE-TRC-2007-001	2. Government Accession No.	3. Recipient's Catalog No.										
4. Title and Subtitle Final Report of a Graco Snugride CRS NHTSA No.: M85210		5. Report Date October 19, 2007										
		6. Performing Organization Code TRC Inc.										
7. Author(s) Emad Al-Tabakha, Test Engineer Transportation Research Center Inc.		8. Performing Organization Report No. 071008										
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319		10. Work Unit No. (TRAIS)										
		11. Contract or Grant No. DTNH22-03-D-02005										
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Rulemaking, Office of Crashworthiness Standards 1200 New Jersey Avenue, S.E., Room W43-410 Washington, DC 20590		13. Type of Report and Period Covered Final Report October 2007										
		14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS										
15. Supplemental Notes												
16. Abstract A side impact test was conducted on the subject CRS Graco Snugride in conjunction with side impact NCAP testing on a 2008 Nissan Sentra 4-door sedan and in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on October 8, 2007. <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;"><u>Right Rear</u></td> <td></td> </tr> <tr> <td>Head Injury Criteria (HIC15):</td> <td style="text-align: center;"><u>162.3</u></td> <td>g's</td> </tr> <tr> <td>3 ms Chest Clip:</td> <td style="text-align: center;"><u>24.7</u></td> <td>g's</td> </tr> </table>					<u>Right Rear</u>		Head Injury Criteria (HIC15):	<u>162.3</u>	g's	3 ms Chest Clip:	<u>24.7</u>	g's
	<u>Right Rear</u>											
Head Injury Criteria (HIC15):	<u>162.3</u>	g's										
3 ms Chest Clip:	<u>24.7</u>	g's										
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> NHTSA Technical Information Services (TIS) 1200 New Jersey Avenue, S.E., Room W43-410 Washington, DC 20590 Telephone No. (202) 366-4946 Attn: Robert Hornicle										
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. Number of Pages 47	22. Price									

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D-3	CRABI Response and CRS Data	D3-1
D-4	CRABI Calibration Information	D4-1

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2	Vehicle Parameter Data	D1-3
3	CRABI Positioning in Vehicle	D1-4
4	CRS Performance Data	D1-6
5	CRS Accelerometer Locations	D1-7
6	CRS Camera Locations and Data	D1-8

SECTION D1
PURPOSE AND SUMMARY OF TEST M85210

PURPOSE

The purpose of this test is to obtain CRS performance data during a 55/28 km/h 90 degree Moving Deformable Barrier Side Impact NCAP Test.

The Side Impact NCAP test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

One 12-month old CRABI (P3) was instrumented with head, chest, pelvis, and six-axis upper neck load cells. A tri-axial accelerometer was installed on the CRS base. Seat belt load cells were placed on the inboard and outboard lower tethers.

The right rear (Serial No. 094) CRABI was calibrated prior to this test. CRABI calibration information is found in Section D-4.

CHILD DUMMY VALUES		
Location	HIC15 Value	3 ms Chest Clip
CRABI (P3)	162.3	24.7

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07

CHILD RESTRAINT SYSTEM INFORMATION

Description	Position #3 CRS
Manufacturer	Graco Children's Products, Inc.
Model Name	Snugride
Model No.	8465GIS3
Type	Infant
Forward/Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

Description	Position #3 CRS
Head Contact	Left of CRS
Chest Contact	None
Abdomen Contact	None
Left Knee Contact	None
Right Knee Contact	None
Left Toe Contact	None
Right To Contact	None

POST-TEST DOOR OPENINGS

Description	Position #3 CRS
Right Rear Door	Opened without tools. Remained closed during test.

CAMERAS

Description	Standard
High Speed	1
Real Time	0
Total	1

DATA CHANNELS

CRABI (P3) Sensors	15
CRS Sensors	3
Total	18

DATA SHEET NO. 2

VEHICLE PARAMETER DATA

Test Vehicle: 2008 Nissan Sentra
Test Program: NCAP Side Impact

NHTSA No.: M85210
Test Date: 10/08/07

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	424.0	261.6		457.0	350.5	
Right	kg	411.0	242.2		425.0	318.8	
Ratio	%	62.4	37.6		56.9	43.1	
Totals	kg	835.0	503.8	1338.8	882.0	669.3	1551.3

TARGET TEST WEIGHT CALCULATION

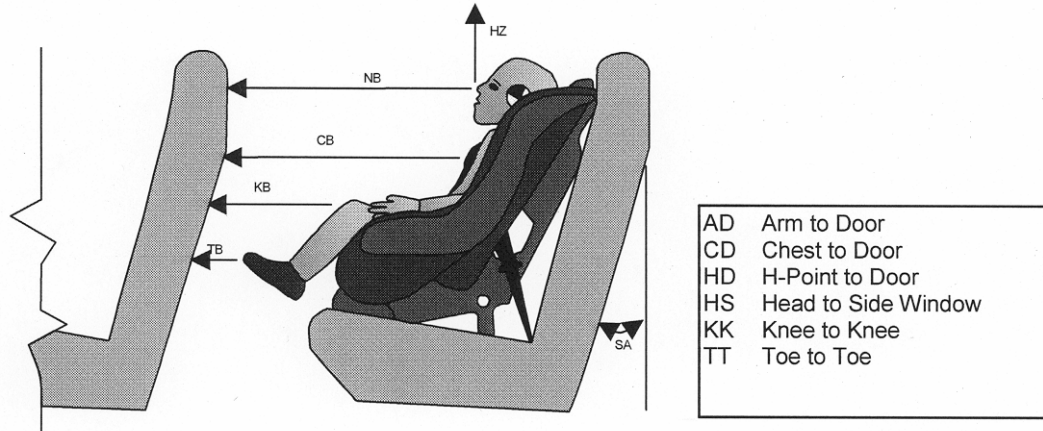
Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1338.0
Weight of 2 P572M ATDs	kg	168.0
Rated Cargo/Luggage Weight (RCLW)	kg	45.0
Calculated Vehicle Target Weight (TVTW)	kg	1551.0

DATA SHEET NO. 3

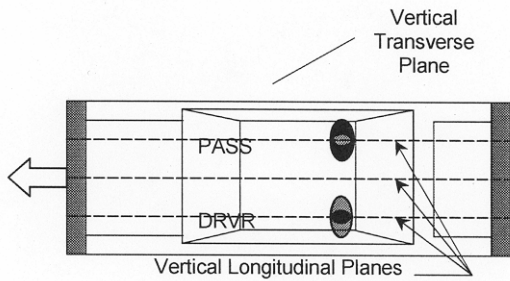
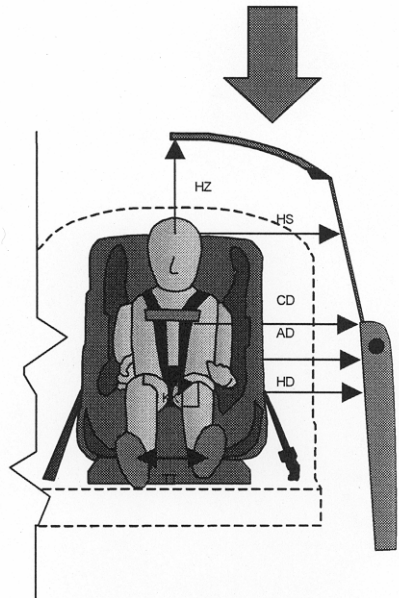
CRABI POSITIONING IN VEHICLE

Test Vehicle: 2008 Nissan Sentra
 Test Program: NCAP Side Impact

NHTSA No.: M85210
 Test Date: 10/08/07



CB Chest to Seat Back
 HZ Head to Roof
 KB Knee to Seat Back
 NB Nose to Seat Back
 SA Seat Back Angle
 TB Toe to Seat Back



Note: Child seat was rearward facing.

DATA SHEET NO. 3

CRABI POSITIONING IN VEHICLE, (Continued)

Test Vehicle: 2008 Nissan Sentra
Test Program: NCAP Side Impact

NHTSA No.: M85210
Test Date: 10/08/07

Code	Measurement Description	P3 (Passenger's Side)	
		Length (mm)	Angle (°)
SA	Seat Back Angle		41.6
HZ	Head to Roof	403	
CB	Chest to Seatback	492	
KB	Left Knee to Seatback	210	
NB	Nose to Seatback	546	
TB	Toe to Seatback	60	

DATA SHEET NO. 4

CRS PERFORMANCE DATA

Test Vehicle: 2008 Nissan Sentra
Test Program: NCAP Side Impact

NHTSA No.: M85210
Test Date: 10/08/07

CRS PERFORMANCE DATA

Location	CRS (P3)	
	Damage	Post-Test
Upper Tether Strap		
Upper Tether Buckle		
Upper Tether Hook		
Vehicle Upper Tether Anchor		
Lower Anchor Strap	No	None
Lower Anchor Buckle	No	None
Lower Anchor Hooks	No	None
Vehicle Lower CRS Anchors	No	None
5-Point Harness Connections	No	None
Cracks on CRS	No	None
Fabric Tears on CRS	No	None
Vehicle Seat Structure	No	None
Vehicle Seat Fabric Tears	No	None

DATA SHEET NO. 5

CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2008 Nissan Sentra
Test Program: NCAP Side Impact

NHTSA No.: M85210
Test Date: 10/08/07

CRS ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	CRS CG	--- ¹	--- ¹	--- ¹

Reference Points: X - From Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

¹ Measurements not taken.

DATA SHEET NO. 6

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2008 Nissan Sentra
Test Program: NCAP Side Impact

NHTSA No.: M85210
Test Date: 10/08/07

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	Vehicle Onboard Rear SID/HIII, Side	1620	790	-1230	6.5	1000

Reference Points: X - Impact Line
Y - MDB Left Edge Impact Point
Z - Ground Plane

APPENDIX D2
PHOTOGRAPHS

List of Photographs

<u>Figure</u>	<u>Description</u>	<u>Page</u>
Figure D-1	Pre-Test Front View of Right Rear Dummy	D2-3
Figure D-2	Post-Test Front View of Right Rear Dummy	D2-4
Figure D-3	Pre-Test Left Side View of Test Right Rear Dummy	D2-5
Figure D-4	Post-Test Left Side View of Right Rear Dummy	D2-6
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Figure D-8	Pre-Test Child Restraint Model Information Label View	D2-10



Figure D-1 Pre-Test Front View of Right Rear Dummy



Figure D-2 Post-Test Front View of Right Rear Dummy



Figure D-3 Pre-Test Left Side View of Right Rear Dummy



Figure D-4 Post-Test Left Side View of Right Rear Dummy



Figure D-5 Pre-Test Right Side View of Right Rear Dummy



Figure D-6 Post-Test Right Side View of Right Rear Dummy

This child restraint system conforms to all applicable Federal motor vehicle safety standards. **This Restraint is Certified for Use in Motor Vehicles and Aircraft.** Child restraints could be recalled for safety reasons. You must register this restraint to be reached in a recall. Send your name, address and the restraint's model number and manufacturing date to Graco Children's Products, Inc., 150 Oaklands Blvd., Exton, PA 19341 or call 1-800-345-4109. For recall information, call the U.S. Government's Vehicle Safety Hotline at 1-888-327-4236 (TTY: 1-800-424-9153) or go to <http://www.NHTSA.gov>

LAPC0097B

- Use only with a height of 5 and 22 pounds
- Snugly adjust the belts
- Use only with a height is 29 inches (74 cm)
- Snugly adjust the belts on this child restraint with a

Figure D-7 Pre-Test Child Restraint Certification Label View



Figure D-8 Pre-Test Child Restraint Model Information Label View

APPENDIX D3
CRABI RESPONSE AND CRS DATA

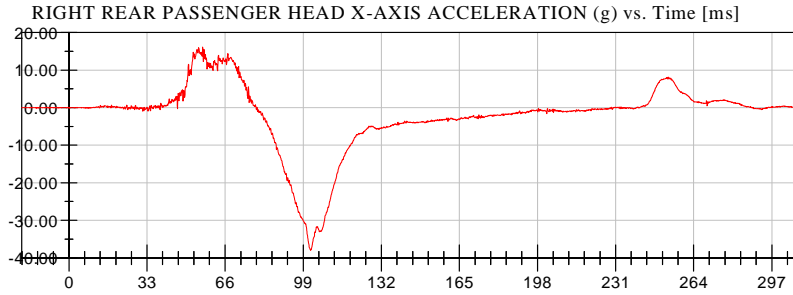
Data Plot	LIST OF DATA PLOTS PROVIDED IN THE TEST REPORT	Page
D3-1	Right Rear CRABI Head X	D3-3
D3-1	Right Rear CRABI Head Y	D3-3
D3-1	Right Rear CRABI Head Z	D3-3
D3-1	Right Rear CRABI Head Resultant	D3-3
D3-2	Right Rear CRABI Chest X	D3-4
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D3-3	Right Rear CRABI Neck Force X	D3-5
D3-3	Right Rear CRABI Neck Force Y	D3-5
D3-3	Right Rear CRABI Neck Force Z	D3-5
D3-4	Right Rear CRABI Neck Moment About X	D3-6
D3-4	Right Rear CRABI Neck Moment About Y	D3-6
D3-4	Right Rear CRABI Neck Moment About Z	D3-6
D3-5	Right Rear CRABI Pelvis X	D3-7
D3-5	Right Rear CRABI Pelvis Y	D3-7
D3-5	Right Rear CRABI Pelvis Z	D3-7
D3-5	Right Rear CRABI Pelvis Resultant	D3-7
D3-6	Right Rear Child Seat CG X	D3-8
D3-6	Right Rear Child Seat CG Y	D3-8
D3-6	Right Rear Child Seat CG Z	D3-8
D3-6	Right Rear Child Seat CG Resultant	D3-8

NHTSA

Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

Test Date: 10/08/2007



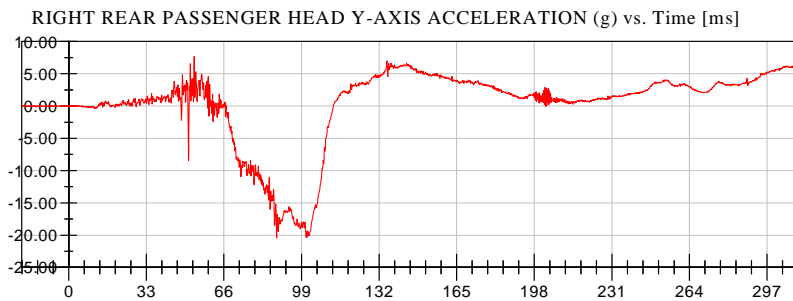
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16.16 g at 56.48 ms

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-37.98 g at 102.08 ms

CFC_1000



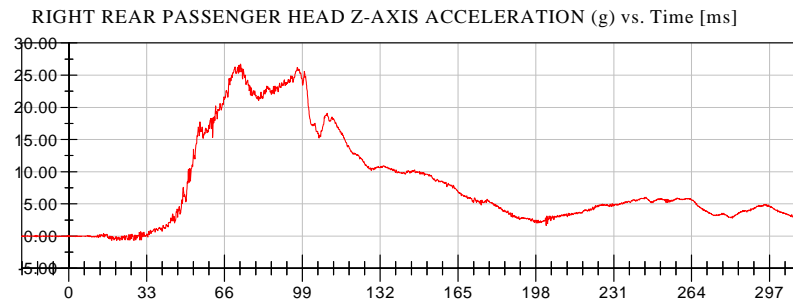
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7.66 g at 53.36 ms

<Min>

-20.40 g at 88.48 ms

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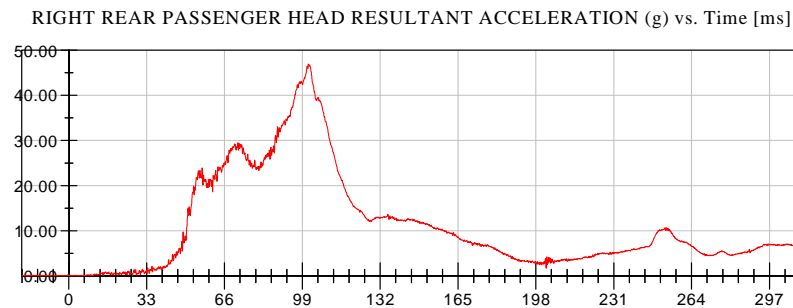
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26.73 g at 72.80 ms

<Min>

-0.69 g at 20.32 ms

CFC_1000



<Max>

46.91 g at 101.60 ms

<Min>

0.01 g at -18.96 ms

CFC_1000



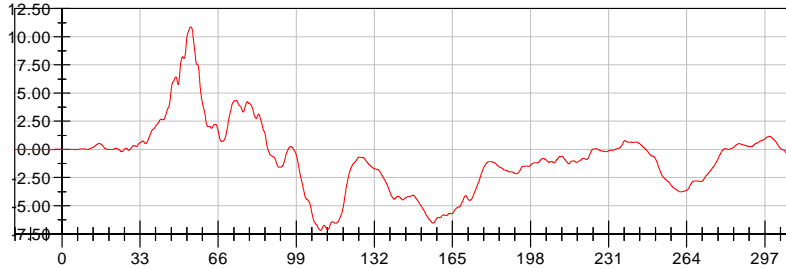
NHTSA

Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

Test Date: 10/08/2007

RIGHT REAR PASSENGER CHEST X-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

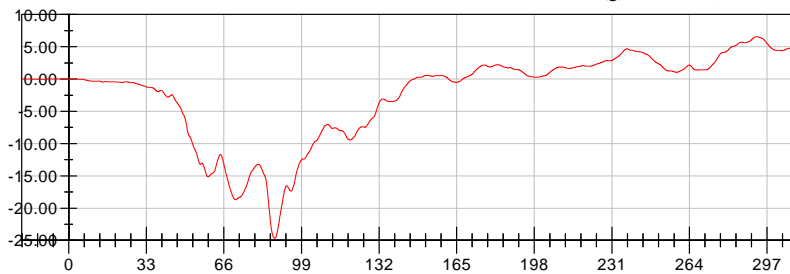
10.86 g at 54.40 ms

<Min>

-7.18 g at 109.28 ms

CFC_180

RIGHT REAR PASSENGER CHEST Y-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

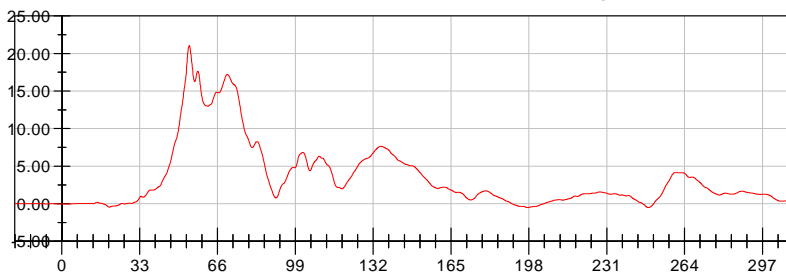
6.57 g at 292.40 ms

<Min>

-24.66 g at 87.68 ms

CFC_180

RIGHT REAR PASSENGER CHEST Z-AXIS ACCELERATION (g) vs. Time [ms]



<Max>

21.07 g at 54.00 ms

<Min>

-0.49 g at 248.64 ms

CFC_180

RIGHT REAR PASSENGER CHEST RESULTANT ACCELERATION (g) vs. Time [ms]



<Max>

26.21 g at 54.08 ms

<Min>

0.00 g at -17.04 ms

CFC_180



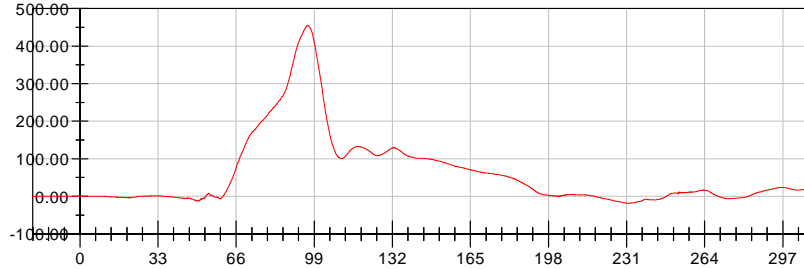
NHTSA

Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

Test Date: 10/08/2007

RIGHT REAR PASSENGER NECK X-AXIS SHEAR FORCE (N) vs. Time [ms]



<Max>

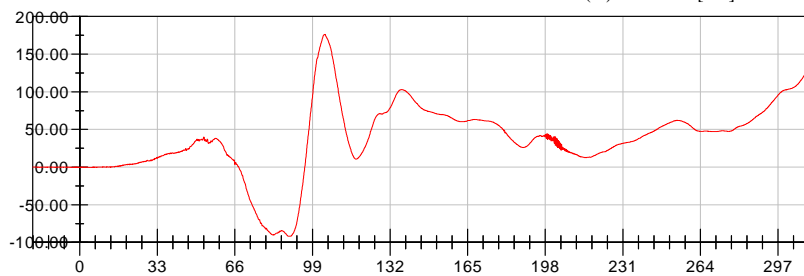
455.02 N at 96.08 ms

<Min>

-18.54 N at 231.92 ms

CFC_1000

RIGHT REAR PASSENGER NECK Y-AXIS SHEAR FORCE (N) vs. Time [ms]



<Max>

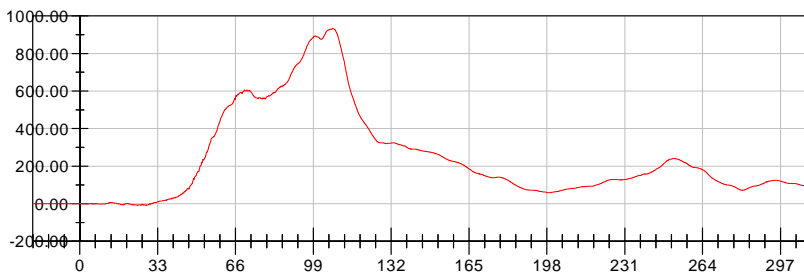
176.31 N at 104.32 ms

<Min>

-91.92 N at 89.44 ms

CFC_1000

RIGHT REAR PASSENGER NECK Z-AXIS AXIAL FORCE (N) vs. Time [ms]



<Max>

933.11 N at 107.28 ms

<Min>

-8.41 N at 28.16 ms

CFC_1000

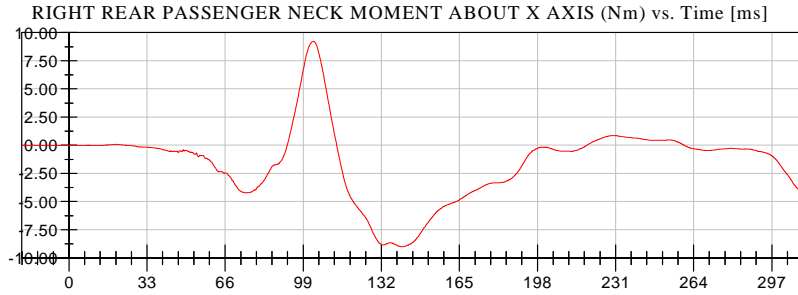


NHTSA

Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

Test Date: 10/08/2007



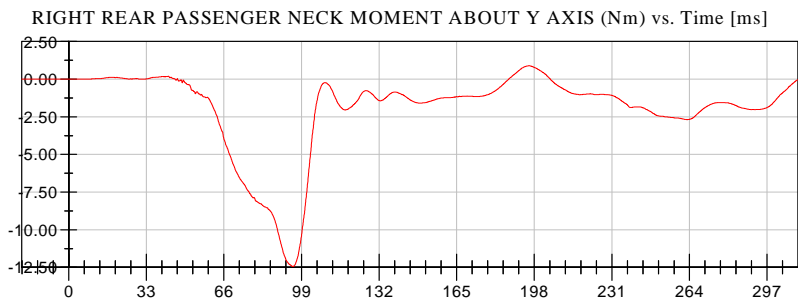
<Max>

9.22 Nm at 103.36 ms

<Min>

-9.00 Nm at 140.88 ms

CFC_600



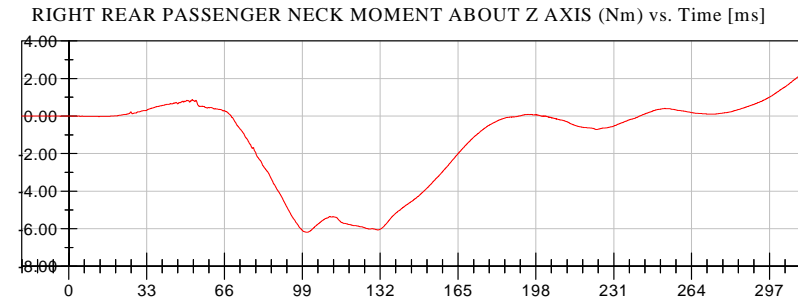
<Max>

0.89 Nm at 195.60 ms

<Min>

-12.44 Nm at 95.36 ms

CFC_600



<Max>

2.17 Nm at 310.00 ms

<Min>

-6.18 Nm at 101.28 ms

CFC_600

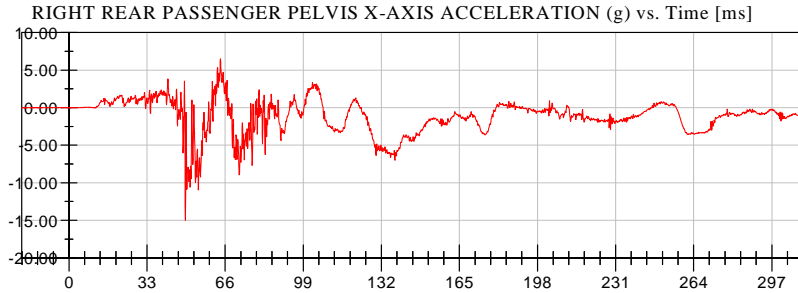


NHTSA

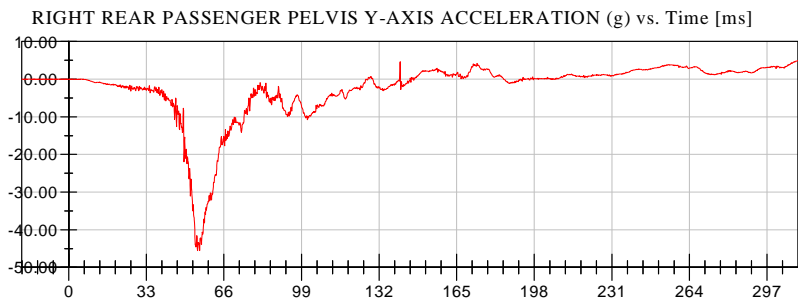
Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

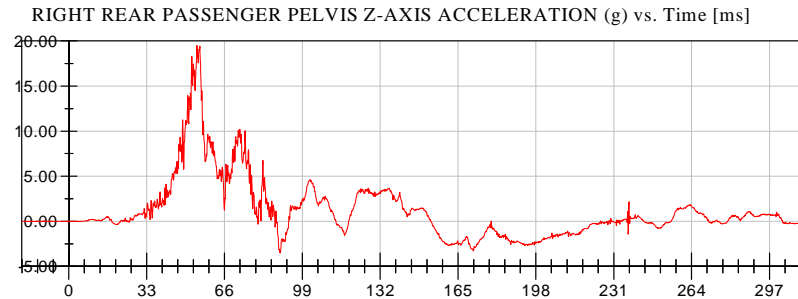
Test Date: 10/08/2007



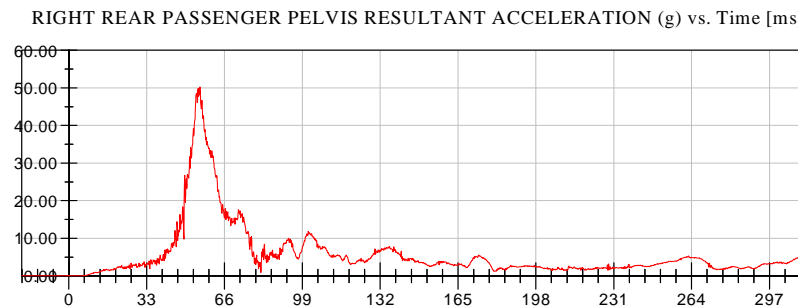
<Max>
6.50 g at 64.00 ms
<Min>
-15.01 g at 49.20 ms
CFC_1000



<Max>
4.97 g at 310.00 ms
<Min>
-45.53 g at 54.80 ms
CFC_1000



<Max>
19.51 g at 54.32 ms
<Min>
-3.51 g at 89.68 ms
CFC_1000



<Max>
50.26 g at 55.60 ms
<Min>
0.00 g at -19.84 ms
CFC_1000

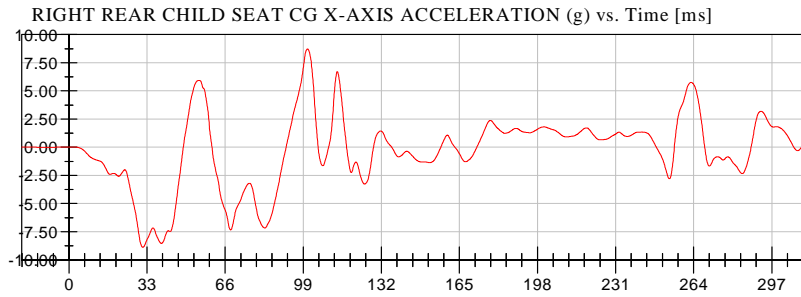


NHTSA

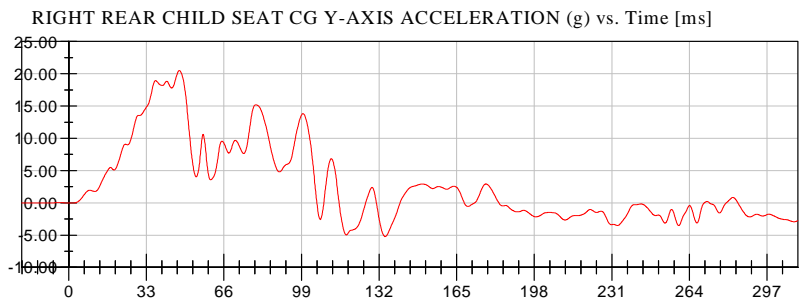
Test Lab: CTF
Test Number: 071008 (M85210)

Position #1 SID H3 Dummy (066)
Position #4 SID H3 Dummy (059)
Position #3 Crabi 12 month old Dummy (094)

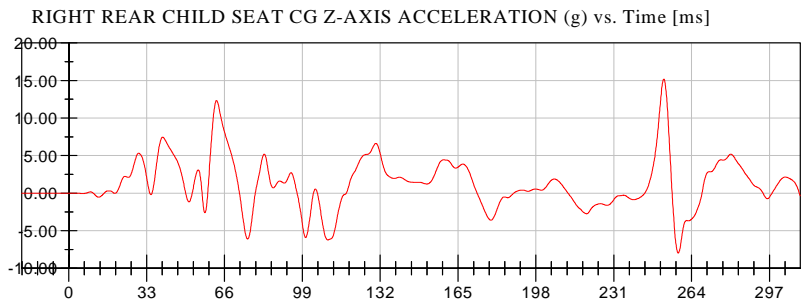
Test Date: 10/08/2007



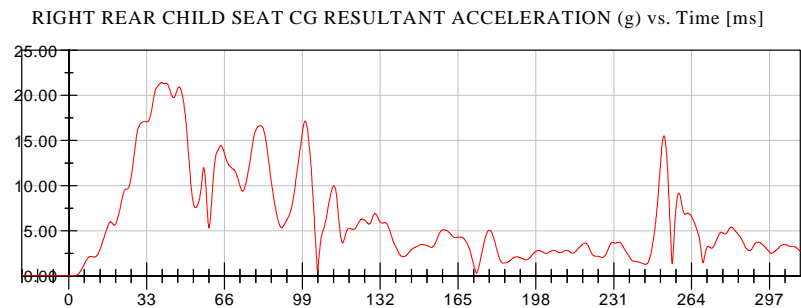
<Max>
8.72 g at 100.80 ms
<Min>
-8.88 g at 31.20 ms
CFC_60



<Max>
20.49 g at 47.04 ms
<Min>
-5.22 g at 134.56 ms
CFC_60



<Max>
15.20 g at 252.24 ms
<Min>
-7.96 g at 258.32 ms
CFC_60



<Max>
21.42 g at 39.36 ms
<Min>
0.01 g at -20.00 ms
CFC_60



APPENDIX D4
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

CRABI: 094

Transportation Research Center Inc.
572R CRABI 12-Month-Old Dummy
External Dimensions
Serial No. 094 Calibration No. 08
Date: 01-Oct-07

Test Parameter	Dimension	Specification	Results	Pass
Total Sitting Height	A	456.0 - 471.2 mm	470 mm	Yes
Shoulder Pivot Height	B	276.6 - 291.8 mm	286 mm	Yes
Hip Pivot Height	C	27.9 - 38.1 mm	32 mm	Yes
Hip Pivot from Backline	D	40.1 - 50.3 mm	45 mm	Yes
Shoulder Pivot from Backline	E	50.3 - 60.5 mm	52 mm	Yes
Thigh Clearance	F	63.0 - 73.2 mm	70 mm	Yes
Elbow Pivot to Fingertip	G	176.6 - 191.8 mm	180 mm	Yes
Shoulder to Elbow Pivot	I	99.1 - 114.3 mm	104 mm	Yes
Elbow Rest Height	J	150.1 - 165.3 mm	158 mm	Yes
Buttock to Knee Length	K	202.7 - 217.9 mm	205 mm	Yes
Popliteal Height (Reference to Seat)	L	138.7 - 153.9 mm	150 mm	Yes
Knee Pivot Height	M	165.1 - 180.3 mm	171 mm	Yes
Buttock Popliteal Length	N	144.8 - 160.0 mm	147 mm	Yes
Chest Depth with Jacket	O	107.5 - 122.7 mm	119 mm	Yes
Foot Length	P	92.4 - 102.6 mm	99 mm	Yes
Stature	Q	727.7 - 753.1 mm	749 mm	Yes
Buttock to Knee Pivot Length	R	178.5 - 188.7 mm	182 mm	Yes
Head Breadth	S	124.4 - 134.6 mm	127 mm	Yes
Head Depth (REF)	T	149.9 - 165.1 mm	159 mm	Yes
Hip Breadth	U	158.5 - 173.7 mm	170 mm	Yes
Shoulder Breadth	V	200.7 - 215.9 mm	210 mm	Yes
Foot Breadth	W	39.1 - 49.3 mm	465 mm	No
Chest Circumference with Jacket	Y	452.4 - 477.8 mm	463 mm	Yes
Waist Circumference	Z	447.0 - 472.4 mm	453 mm	Yes
Reference Location for Chest Circumference	AA	256.5 - 266.7 mm	263 mm	Yes
Reference Location for Waist Circumference	BB	106.7 - 116.9 mm	112 mm	Yes
Shoulder Height	CC	299.7 - 314.9 mm	310 mm	Yes
Chin Height	DD	289.6 - 304.8 mm	312 mm	No

Comments:

Chin height (DD) measured 300 mm with the head unsupported, and the buttocks and upper torso against the seat back.

Technician

Approved

Charles W. Kelly

Ron Storer

Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 094 Certification No. 8-1

Test Date: 9/28/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Peak Head Resultant Acceleration	100 - 120 g	106.1 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-1.6 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Rand B...

Approved

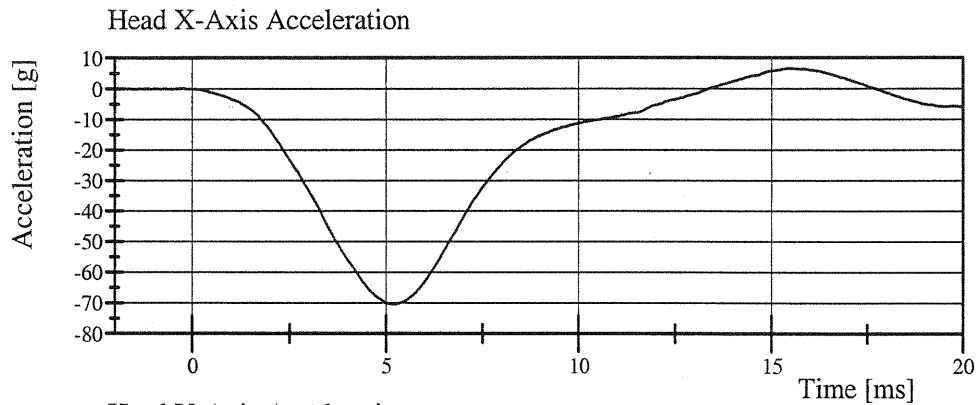
Ken Stoner

Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 094 Certification No. 8-1

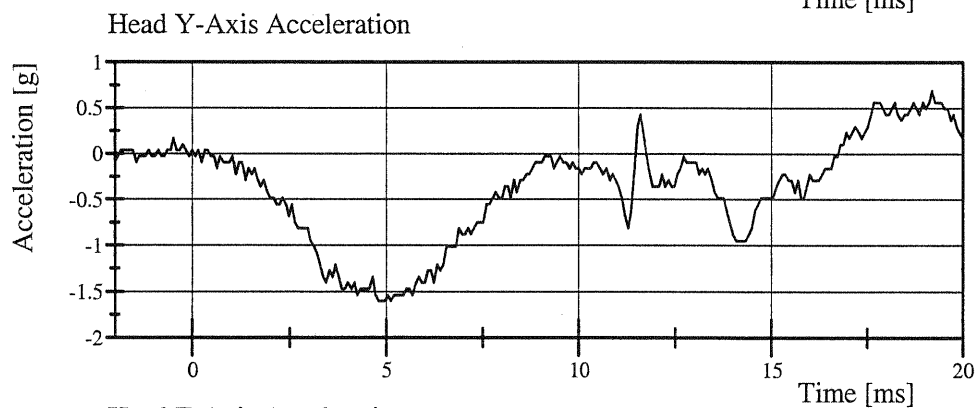
Test Date: 9/28/2007



Filter Class: CFC_1000

Max: 6.6 g at 15.4 ms

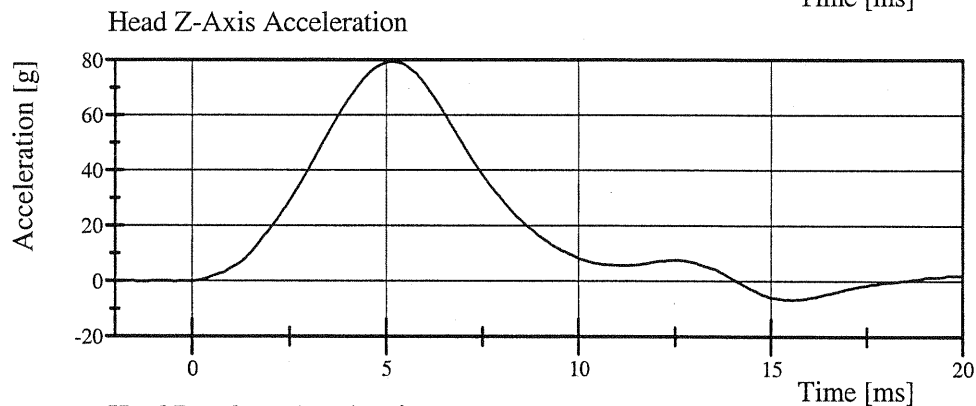
Min: -70.4 g at 5.1 ms



Filter Class: CFC_1000

Max: 0.7 g at 19.2 ms

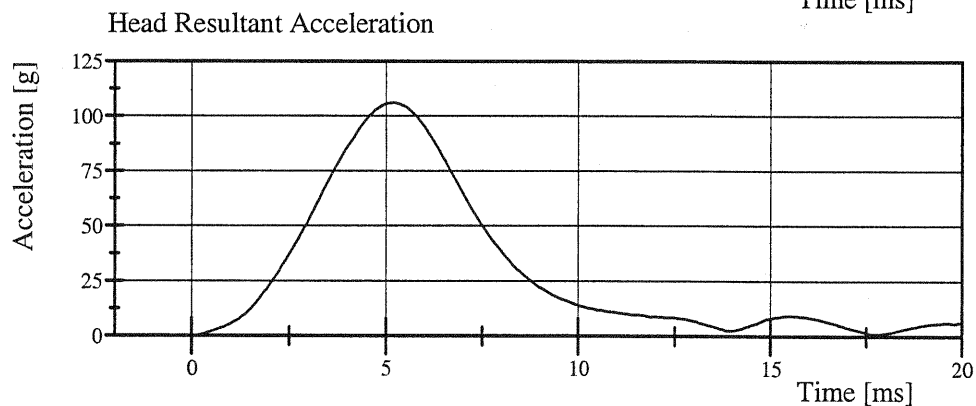
Min: -1.6 g at 4.8 ms



Filter Class: CFC_1000

Max: 79.4 g at 5.2 ms

Min: -6.6 g at 15.4 ms



Filter Class: CFC_1000

Max: 106.1 g at 5.2 ms

Min: 0.0 g at -1.0 ms

Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 094 Certification No. 8-2

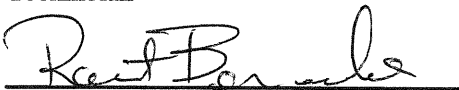
Test Date: 9/28/2007

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	55 - 71 g	66.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	1.2 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved

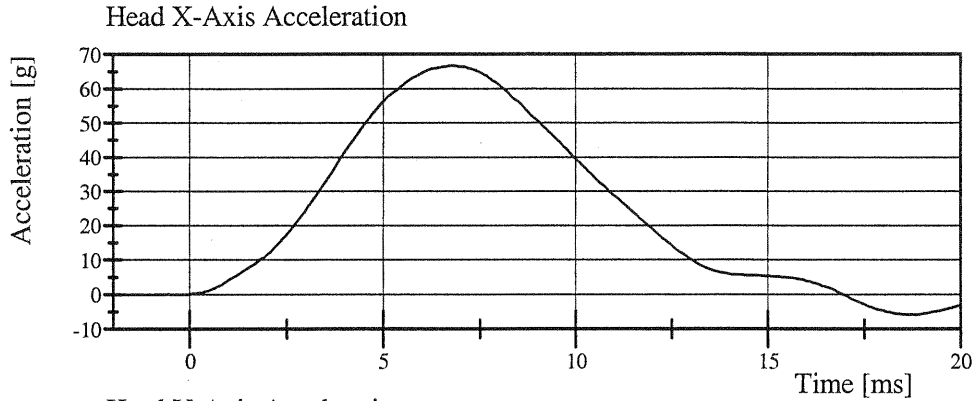


Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 094 Certification No. 8-2

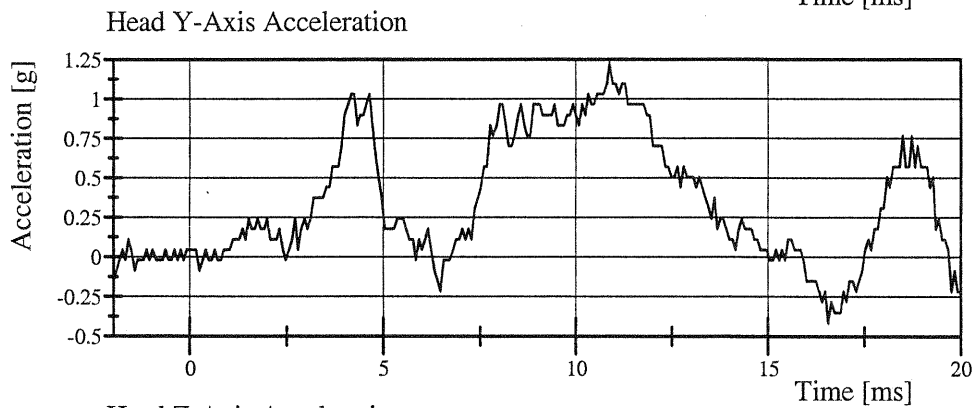
Test Date: 9/28/2007



Filter Class: CFC_1000

Max: 66.7 g at 6.8 ms

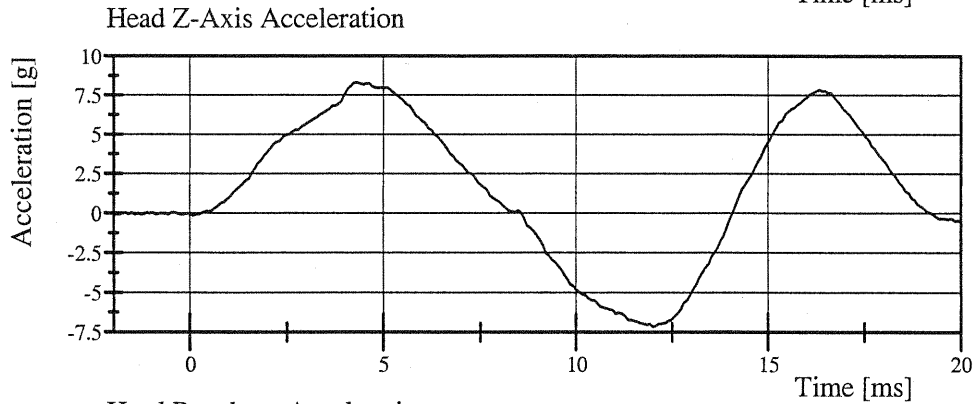
Min: -5.8 g at 18.6 ms



Filter Class: CFC_1000

Max: 1.2 g at 10.9 ms

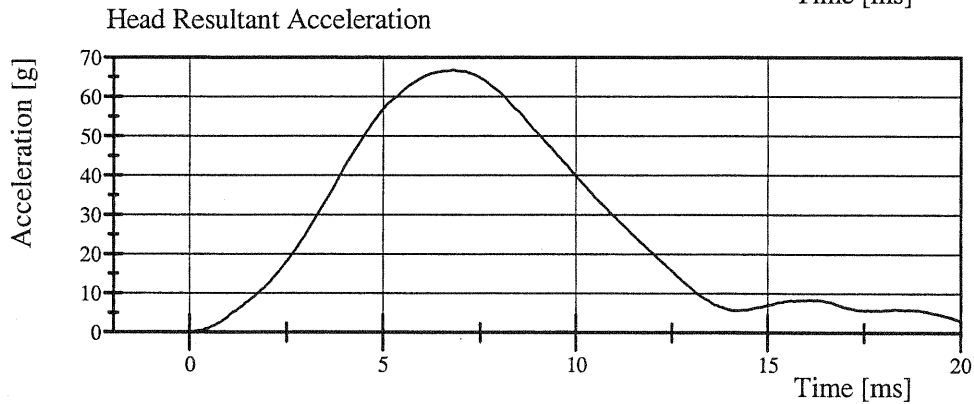
Min: -0.4 g at 16.6 ms



Filter Class: CFC_1000

Max: 8.3 g at 4.2 ms

Min: -7.2 g at 12.0 ms



Filter Class: CFC_1000

Max: 66.8 g at 6.8 ms

Min: 0.0 g at -1.4 ms

Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 8-3

Test Date: 10/1/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.21 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-1.6) - (-2.3) m/s	-2.00 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-3.4) - (-4.2) m/s	-3.86 m/s	Yes
Pendulum Integrated Velocity Change at 25ms	(-4.3) - (-5.2) m/s	-4.79 m/s	Yes
Total Head D-Plane Rotation	(-75) - (-86) °	-84.5 °	Yes
Total Neck Occipital Condyles Moment	36 - 45 N·m	40.3 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 5 Nm	60 - 80 ms	75.4 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Tom Storer

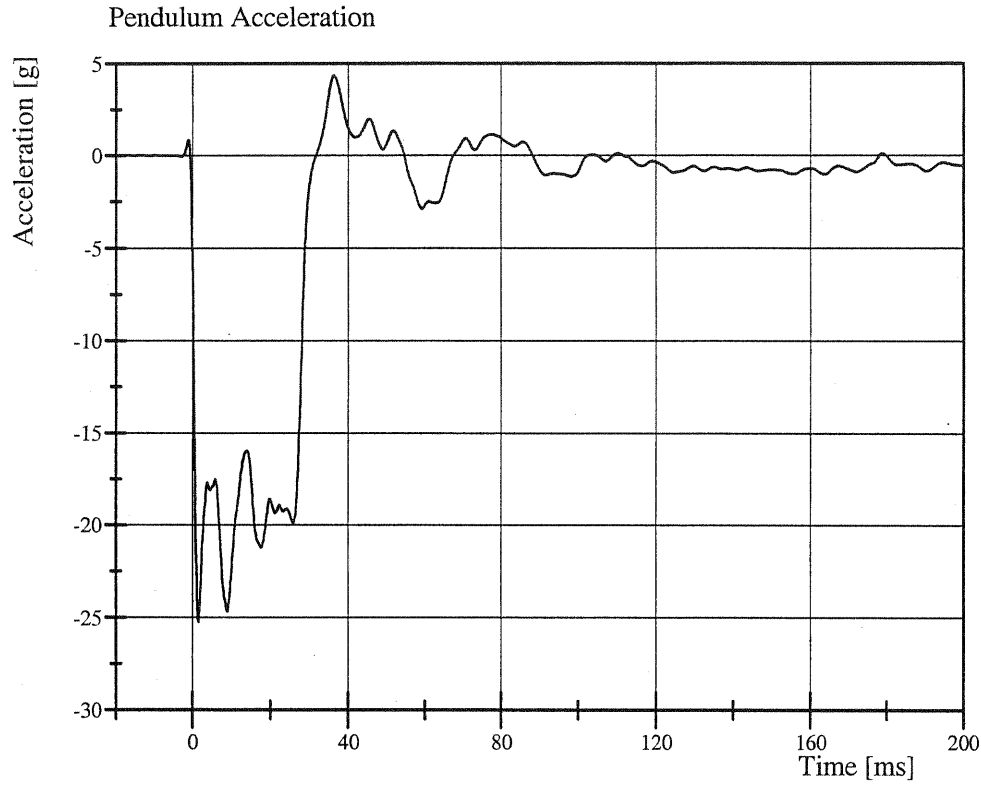


Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 8-3

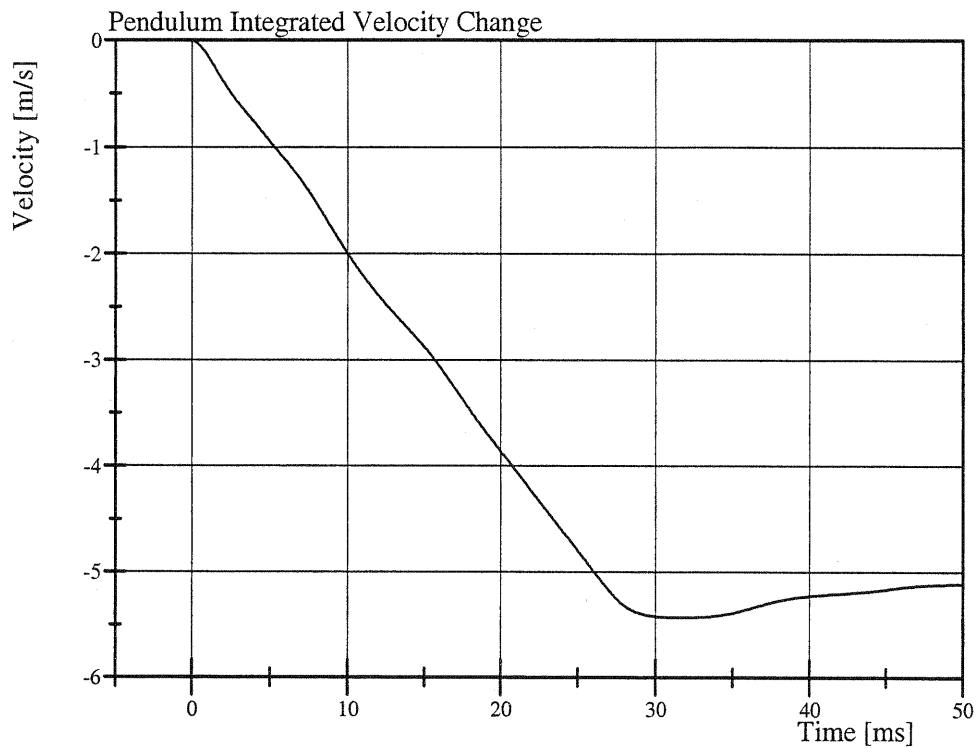
Test Date: 10/1/2007



Filter Class: CFC_180

Max: 4.3 g at 36.3 ms

Min: -25.2 g at 1.5 ms



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -5.4 m/s at 31.8 ms



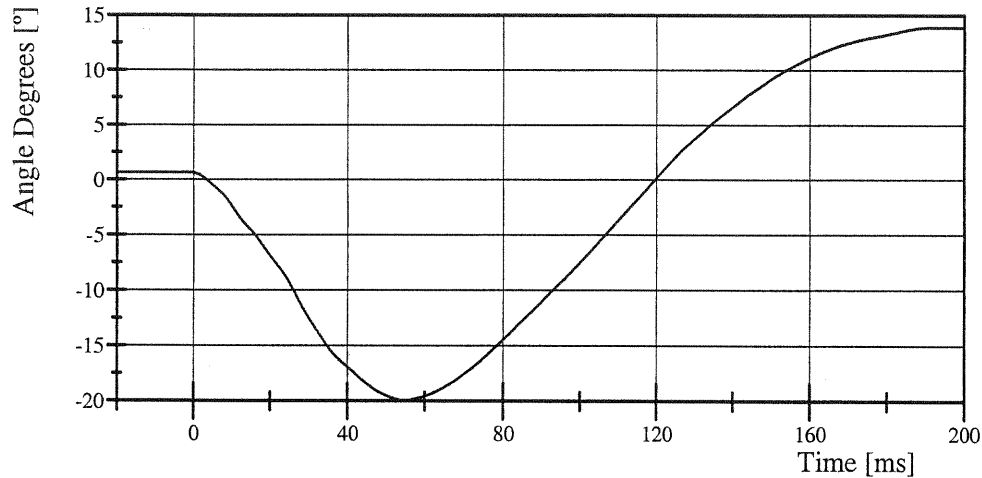
Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 8-3

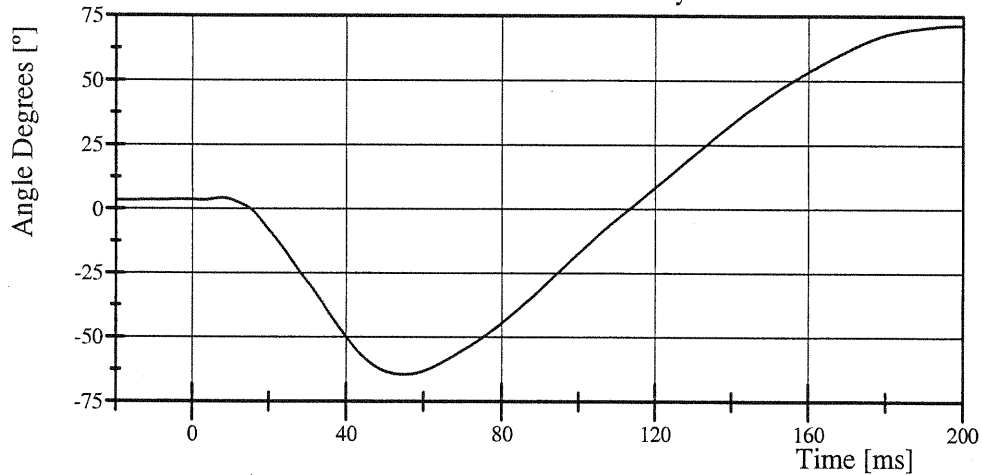
Test Date: 10/1/2007

Forward Pot Rotation at Base of Pendulum



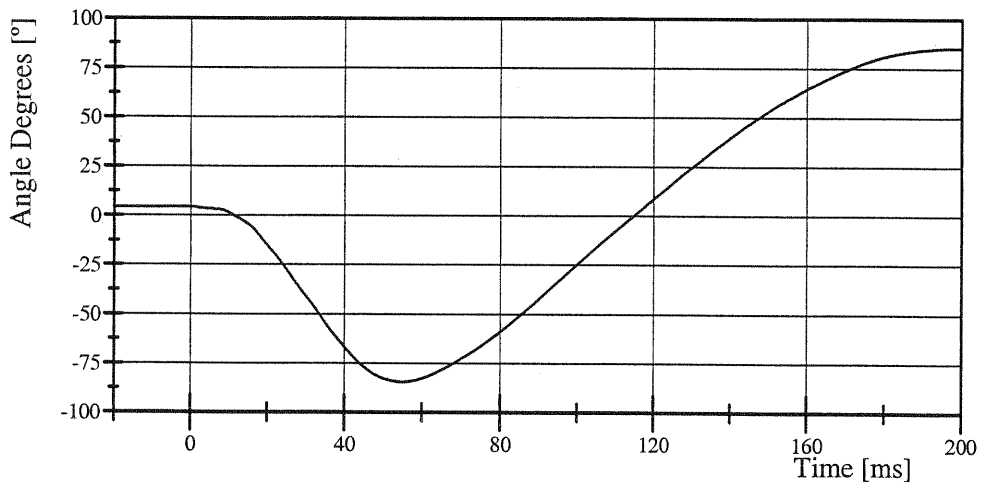
Filter Class: CFC_60
Max: 13.9 ° at 192.6 ms
Min: -19.9 ° at 54.9 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 71.5 ° at 199.7 ms
Min: -64.6 ° at 55.1 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 85.4 ° at 199.0 ms
Min: -84.5 ° at 55.0 ms

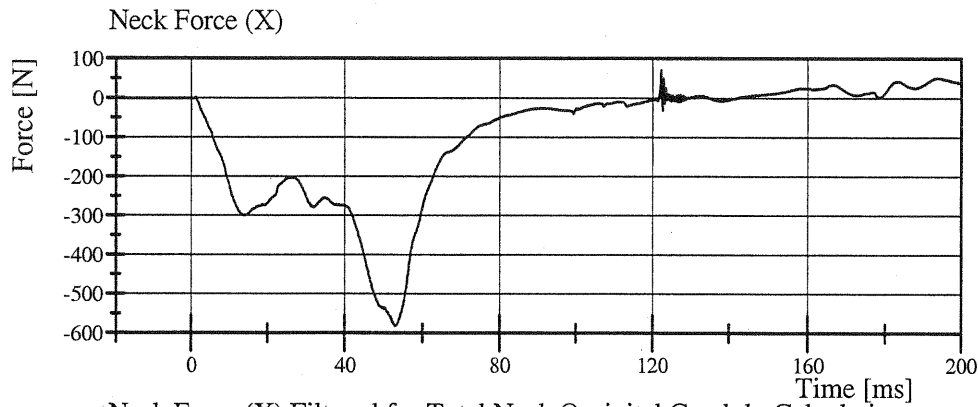


Transportation Research Center Inc.

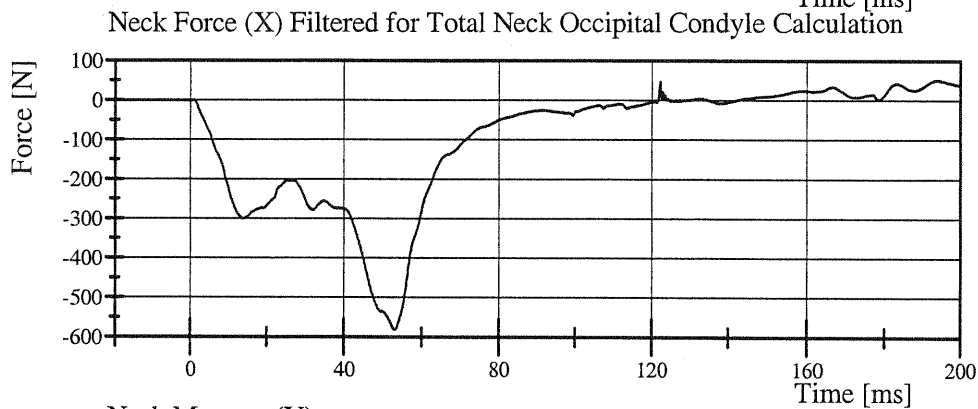
Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 8-3

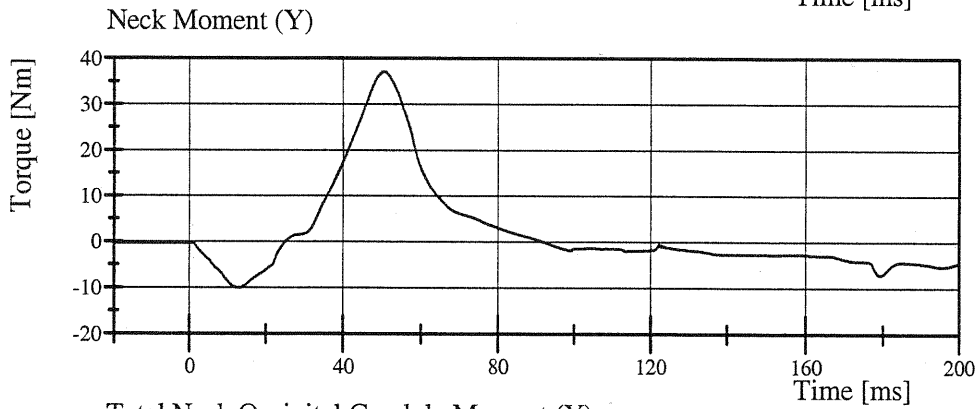
Test Date: 10/1/2007



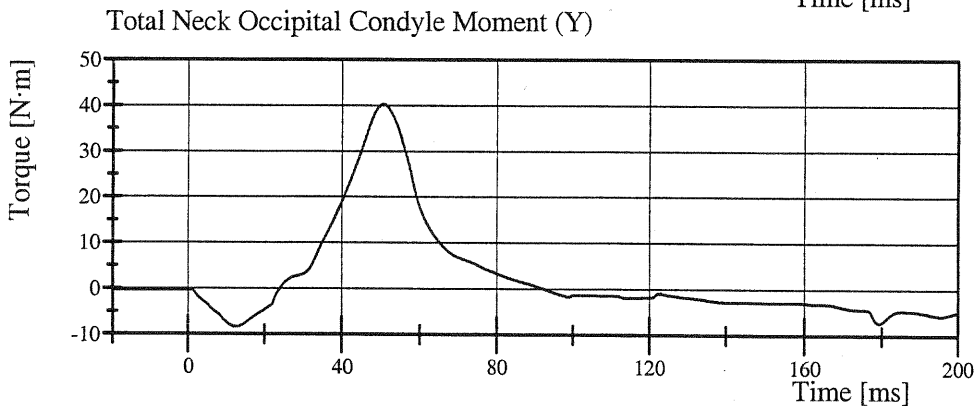
Filter Class: CFC_1000
Max: 70.8 N at 122.3 ms
Min: -581.8 N at 52.9 ms



Filter Class: CFC_600
Max: 51.4 N at 193.9 ms
Min: -581.5 N at 53.0 ms



Filter Class: CFC_600
Max: 37.2 Nm at 50.4 ms
Min: -10.0 Nm at 13.0 ms



Filter Class: CFC_600
Max: 40.3 N·m at 50.5 ms
Min: -8.3 N·m at 12.6 ms

Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 8-5

Test Date: 10/1/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Pendulum Velocity	(-2.4) - (-2.6) m/s	-2.58 m/s	Yes
Pendulum Integrated Velocity Change at 6ms	0.8 - 1.2 m/s	0.87 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 2.1 m/s	1.59 m/s	Yes
Pendulum Integrated Velocity Change at 14ms	2.2 - 2.9 m/s	2.24 m/s	Yes
Total Head D-Plane Rotation	80 - 92 °	88.6 °	Yes
Total Neck Occipital Condyles Moment (-12) - (-23) N·m		-16.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -5 Nm	76 - 90 ms	83.7 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



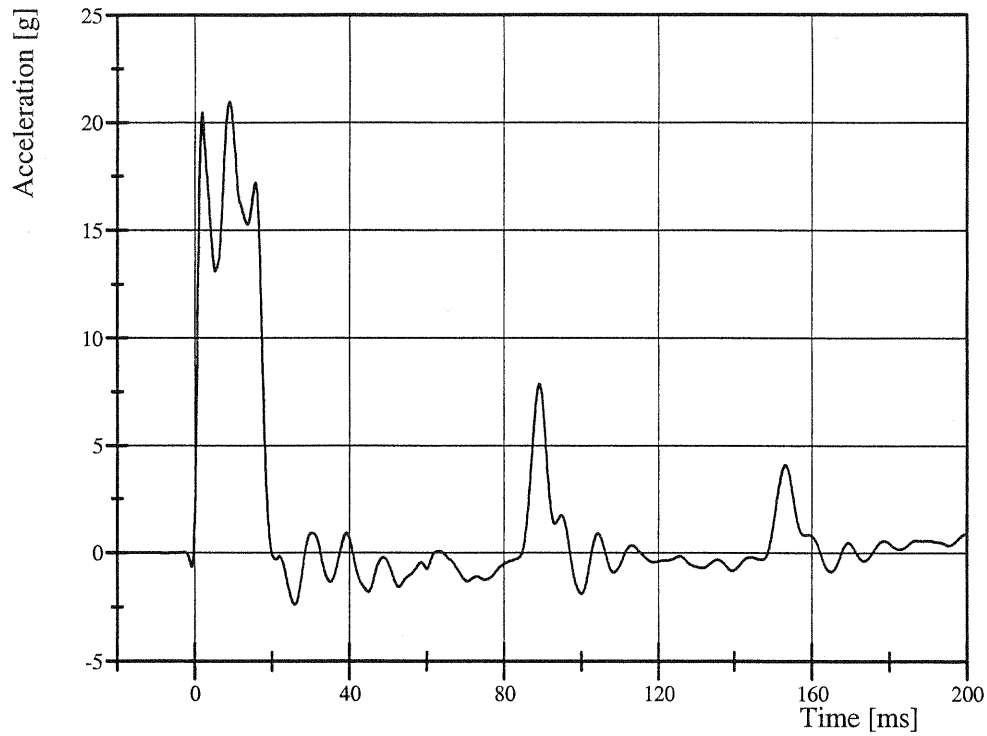
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 8-5

Test Date: 10/1/2007

Pendulum Acceleration

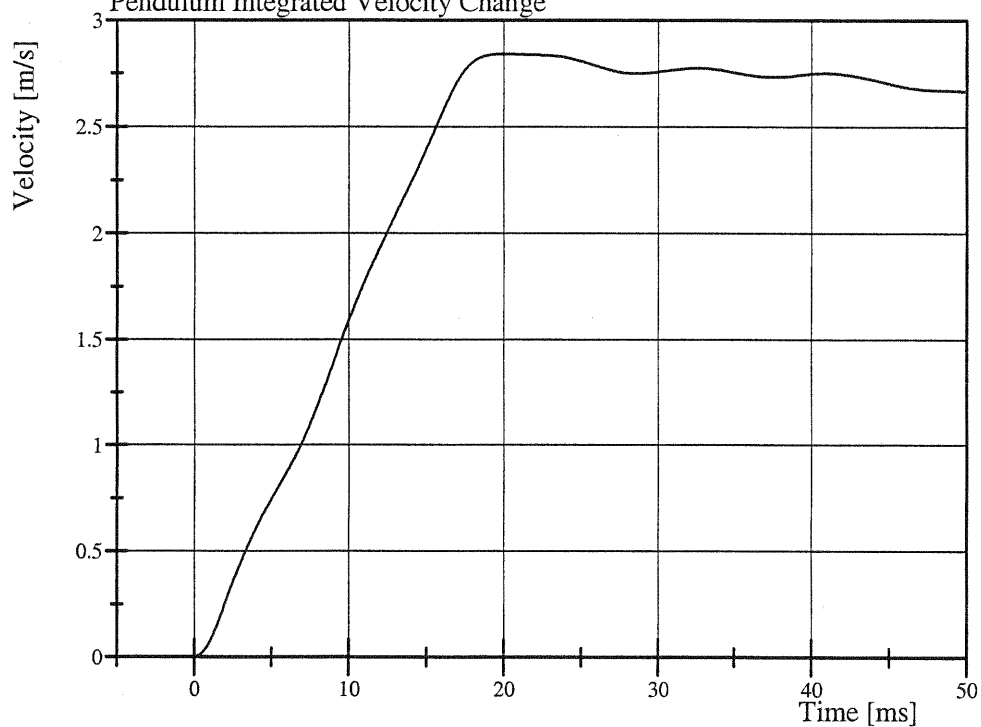


Filter Class: CFC_180

Max: 21.0 g at 9.0 ms

Min: -2.4 g at 25.9 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 2.8 m/s at 20.0 ms

Min: 0.0 m/s at 0.0 ms

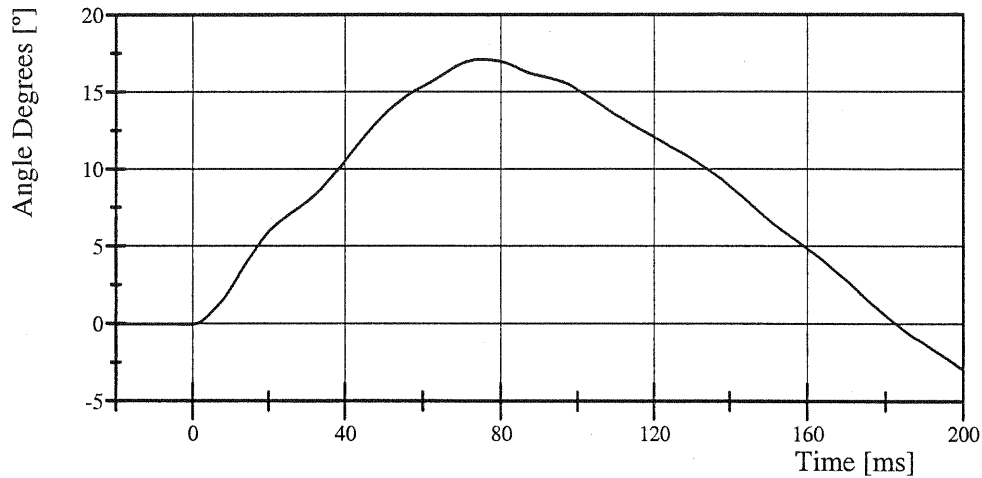
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 8-5

Test Date: 10/1/2007

Forward Pot Rotation at Base of Pendulum

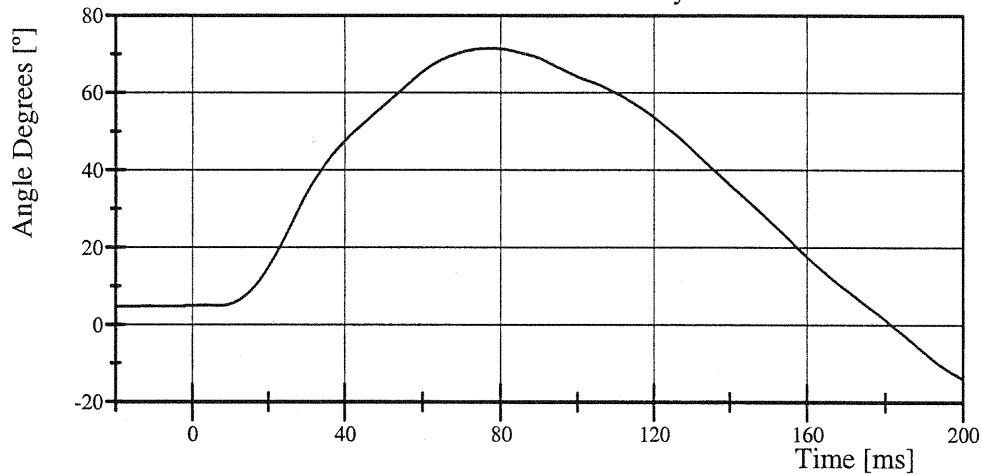


Filter Class: CFC_60

Max: 17.1 ° at 75.0 ms

Min: -2.9 ° at 200.0 ms

Center Headform Pot Rotation at Center of Gravity

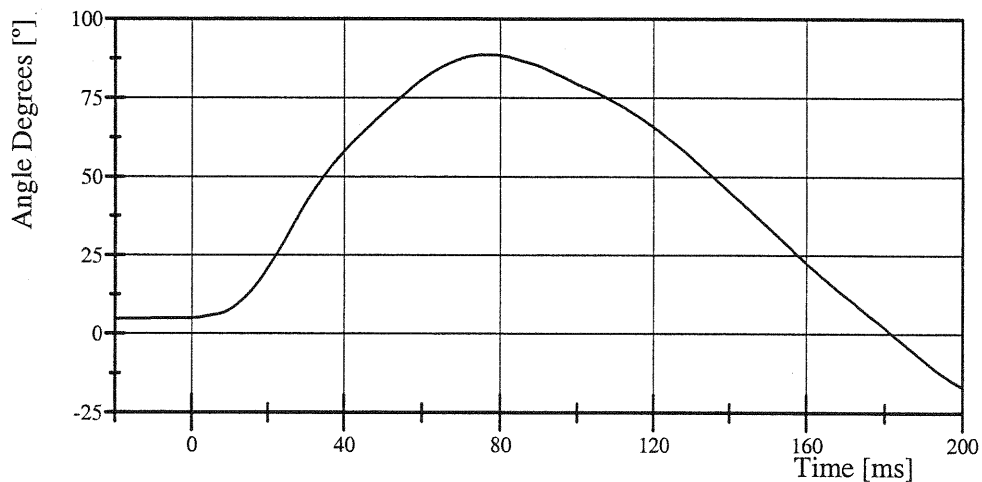


Filter Class: CFC_60

Max: 71.6 ° at 77.8 ms

Min: -13.9 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 88.6 ° at 77.0 ms

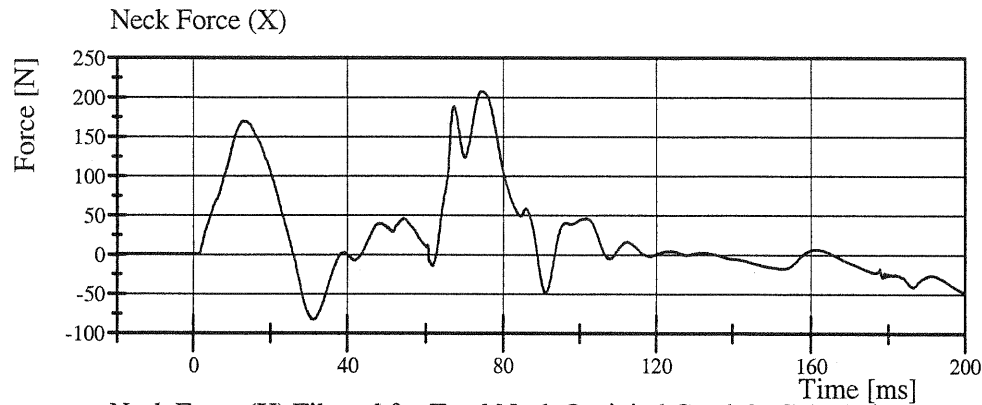
Min: -16.9 ° at 200.0 ms

Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 8-5

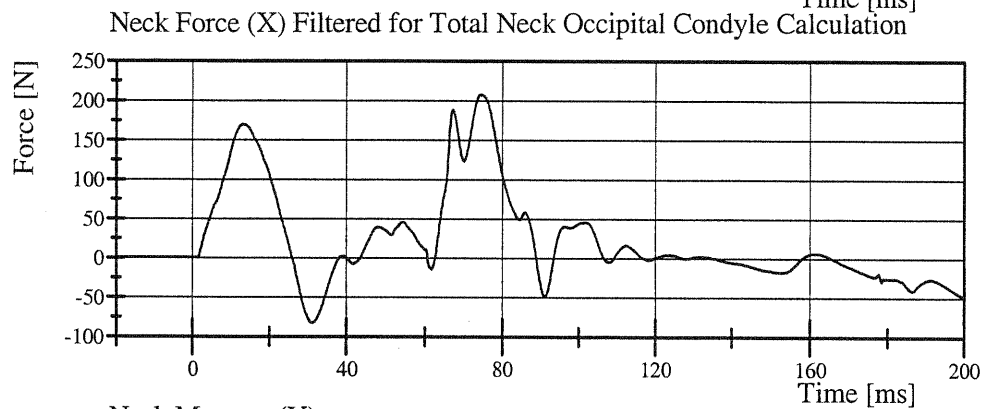
Test Date: 10/1/2007



Filter Class: CFC_1000

Max: 208.0 N at 74.6 ms

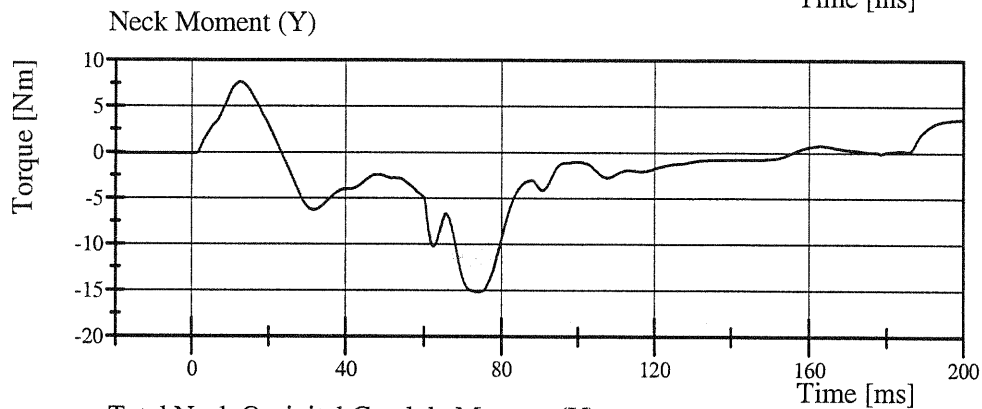
Min: -82.3 N at 31.0 ms



Filter Class: CFC_600

Max: 208.0 N at 74.6 ms

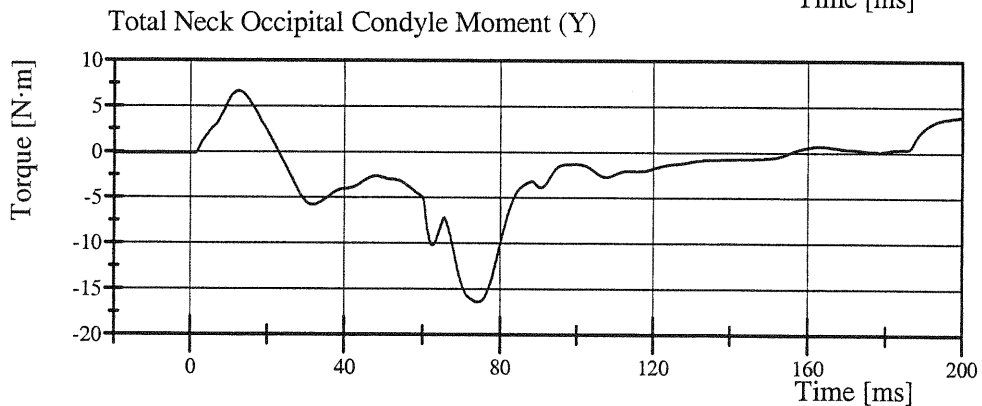
Min: -82.3 N at 31.1 ms



Filter Class: CFC_600

Max: 7.6 Nm at 12.6 ms

Min: -15.2 Nm at 74.3 ms



Filter Class: CFC_600

Max: 6.7 N·m at 12.5 ms

Min: -16.4 N·m at 74.3 ms

Transportation Research Center Inc.

Front Thorax

CRABI 12 MO Serial No. 094 Certification No. 8-1

Test Date: 9/28/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	4.9 - 5.1 m/s	5.06 m/s	Yes
Impactor Force	(-1,514) - (-1,796) N	-1,762.3 N	Yes

Test meets specifications.

Comments:

Technician

Rent Bond

Approved

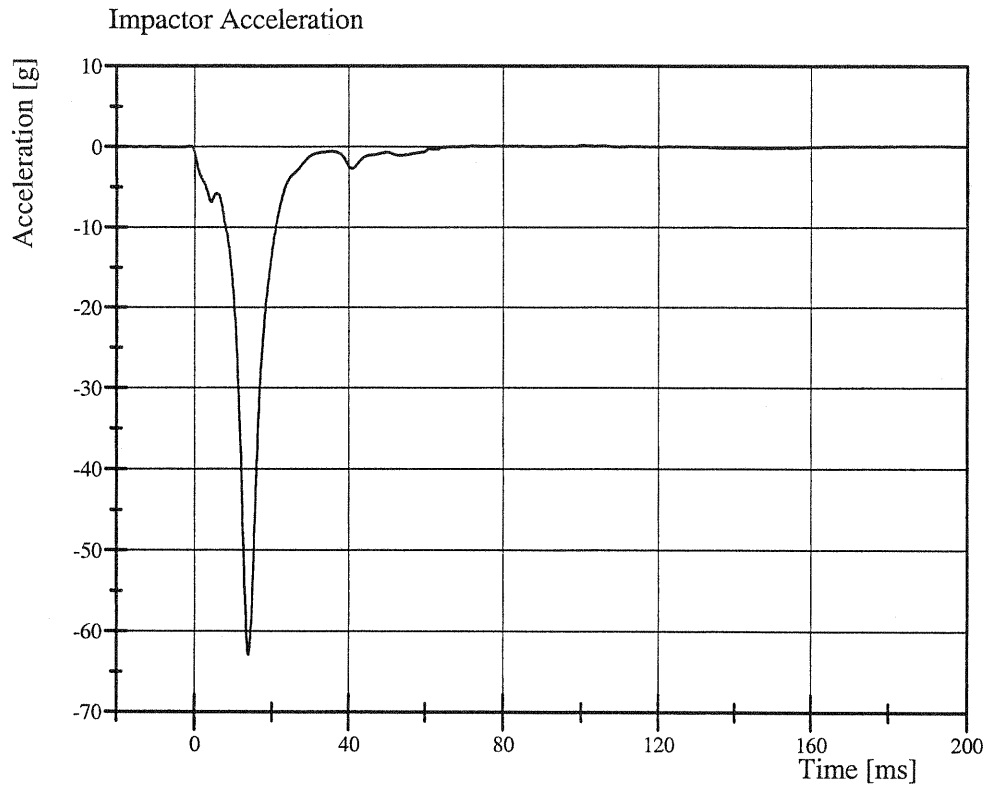
Ron Stoner

Transportation Research Center Inc.

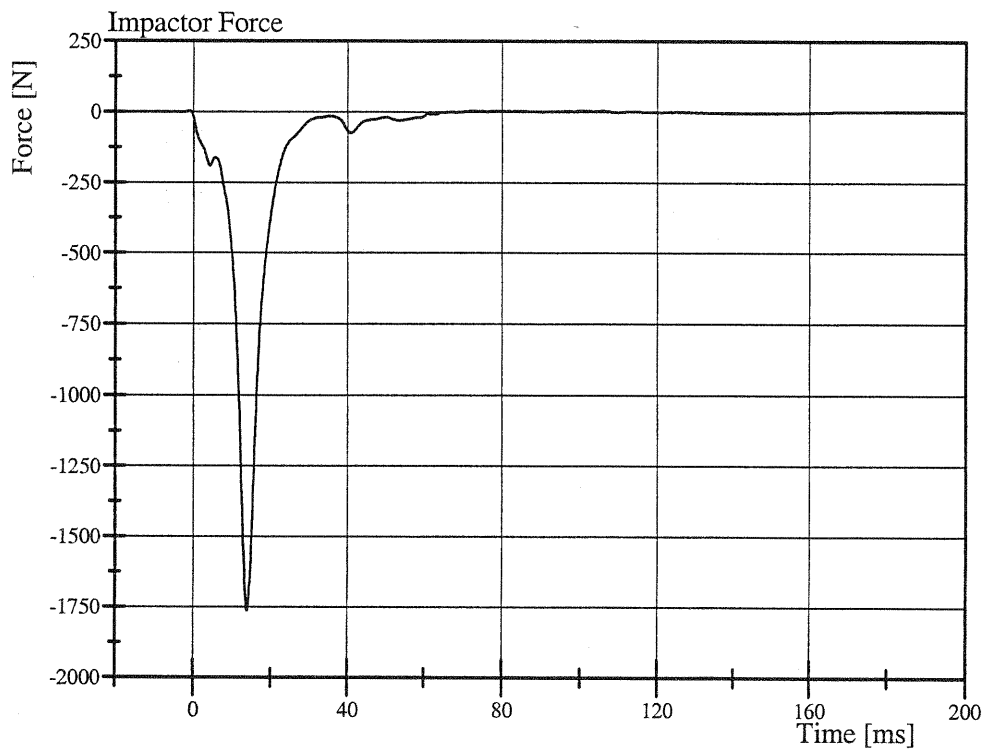
Front Thorax

CRABI 12 MO Serial No. 094 Certification No. 8-1

Test Date: 9/28/2007



Filter Class: CFC_180
Max: 0.2 g at 100.5 ms
Min: -62.8 g at 13.9 ms



Filter Class: CFC_180
Max: 6.2 N at 100.5 ms
Min: -1,762.3 N at 13.9 ms