

REPORT NUMBER: NCAP-TRC-2007-001

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**NISSAN MOTOR CO., LTD.
2008 NISSAN PATHFINDER SUV
NHTSA NUMBER: M85207**

**PREPARED BY:
TRANSPORTATION RESEARCH CENTER INC.
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Test Date: September 19, 2007

Report Date: October 3, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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Approval Date: 10/04/07

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16. Abstract <p>This frontal barrier impact was conducted on a 2008 Nissan Pathfinder SUV at Transportation Research Center Inc. in East Liberty, Ohio, on September 19, 2007. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The impact velocity was 56.4 km/h, and the ambient temperature at the barrier face at the time of impact was 25.5° C. The vehicle's post-test maximum static crush was 615 mm. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 20%; text-align: center;"><u>Driver ATD</u></th> <th style="width: 10%;"></th> <th style="width: 20%; text-align: center;"><u>Passenger ATD</u></th> <th style="width: 10%;"></th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC):</td> <td style="text-align: center;"><u>699</u></td> <td style="text-align: center;">g</td> <td style="text-align: center;"><u>549</u></td> <td style="text-align: center;">g</td> </tr> <tr> <td>Max. Thorax Accel (3ms Clip):</td> <td style="text-align: center;"><u>49.6</u></td> <td style="text-align: center;">g</td> <td style="text-align: center;"><u>47.5</u></td> <td style="text-align: center;">g</td> </tr> <tr> <td>Left Femur Force:</td> <td style="text-align: center;"><u>-4601</u></td> <td style="text-align: center;">N</td> <td style="text-align: center;"><u>-3613</u></td> <td style="text-align: center;">N</td> </tr> <tr> <td>Right Femur Force:</td> <td style="text-align: center;"><u>-1532</u></td> <td style="text-align: center;">N</td> <td style="text-align: center;"><u>-2985</u></td> <td style="text-align: center;">N</td> </tr> </tbody> </table>					<u>Driver ATD</u>		<u>Passenger ATD</u>		Head Injury Criteria (HIC):	<u>699</u>	g	<u>549</u>	g	Max. Thorax Accel (3ms Clip):	<u>49.6</u>	g	<u>47.5</u>	g	Left Femur Force:	<u>-4601</u>	N	<u>-3613</u>	N	Right Femur Force:	<u>-1532</u>	N	<u>-2985</u>	N
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SECTION 1
PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00029. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48.3 kph requirements.

The 56.4 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Indicant Test procedure.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2008 Nissan Pathfinder SUV at a velocity of 56.4 kph. The test was performed at Transportation Research Center, Inc. on September 19, 2007. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One (1) real-time camera and sixteen (16) high-speed digital cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

Two (2) Part 572E 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head (primary and redundant), chest (primary and redundant), and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, lower leg instrumentation, and right and left foot and toe accelerometers. Seat belt load cells were also on the driver's and passenger's lap and

shoulder belts to measure dummy torso and pelvic section loading. The driver and passenger seat belts were also instrumented to measure belt spool and elongation. The driver (position 1) ATD (Serial No. 037) and the right front passenger (position 2) ATD (Serial No. 352) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 169 channels of data were recorded on an onboard data acquisition system. Appendix B contains the vehicle, load cell barrier, and dummy response data plots.

There was 100 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 615 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver’s visible contact points were as follows: airbag, head restraint, and knee bolster. The passenger’s visible contact points were as follows: airbag, head restraint, and knee bolster.

The occupant data is summarized below.

ATD Position	HIC (36)	Clip (g)	Chest Displ. (mm)	Left Femur (N)	Right Femur (N)
Driver	699	49.6	35	-4601	-1532
Passenger	549	47.5	37	-3613	-2985

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

SECTION 2
OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

PRIMARY IMPACT DATA

Measured Parameter	Units	Value
Velocity at Impact	km/h	56.4
Test Weight	kg	2406.4
Impact Angle	degrees	0
Average Rebound	mm	910
Maximum Static Crush	mm	615

DOORING OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door Opening	Closed and latched; opened without tools	Closed and latched; opened without tools
Rear Door Opening	Closed and latched; opened without tools	Closed and latched; opened without tools
Seat Track Shift (mm)	None	None
Seat Back Failure	None	None

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type/Serial No.	50% Male Hybrid III No. 037	50% Male Hybrid III No. 352
Head Contact	Airbag, head restraint	Airbag, head restraint
Chest Contact	None	None
Abdomen Contact	None	None
Left Knee Contact	Knee bolster	Glove box
Right Knee Contact	Knee bolster	Glove box

MOVIE COVERAGE

Cameras	Standard
High-Speed	16
Real-Time	1
Total	17

DATA CHANNELS

Driver ATD Sensors	40
Passenger ATD Sensors	40
Belt Assessment Sensors	8
Vehicle Structure Accelerometers	9
Rigid Barrier Load Cells	36
Total	133

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

TEST VEHICLE INFORMATION AND OPTIONS

Make	Nissan	Anti-Lock Brakes	Yes
Model	Pathfinder	All Wheel Drive	No
Body Style	MPV	Power Steering	Yes
NHTSA No.	M85207	Driver Front Airbag	Yes
VIN	5N1AR18B38C617145	Driver Side Airbag	Yes
Color	Red Brawn	Driver Head Airbag	No
Delivery Date	08/28/2007	Driver Curtain Airbag	Yes
Odometer Reading	61 miles	Passenger Airbag	Yes
Dealer	Ricart Nissan, Inc.	Passenger Side Airbag	Yes
Transmission	Automatic	Passenger Head Airbag	No
Final Drive	Four wheel drive	Passenger Curtain Airbag	Yes
Number of Cylinders	6	Pre-Tensioners	Yes
Engine Displacement	5.0 L	Load Limiters	Yes
Engine Placement	Longitudinal	Bucket Seats	Yes
Roof Rack	Yes	Air Conditioning	Yes
Sunroof/T-Top	No	AM/FM CD	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	No	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	Yes
Rear Disc	Yes	Other	None

DATA FROM CERTIFICATION LABEL

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

GVWR (kg)	2772.8
GAWR Front (kg)	1279.1
GAWR Rear (kg)	1588.0

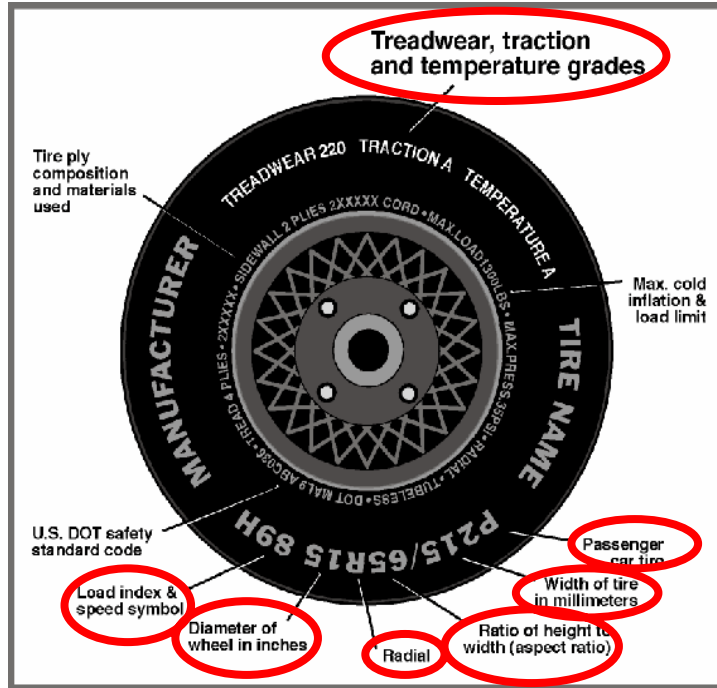
Measured Parameter	Front	Mid	Rear	Total
Type of Seats	Bucket	N/A	Bench	
Number Of Occupants	2	3	2	7
Capacity Wt. (VCW)				538
Cargo Wt. (RCLW) (kg)				62

DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	P265/65R17	P265/65R17
Tire Size on Vehicle	P265/65R17	P265/65R17
Tire Manufacturer	BF Goodrich	BF Goodrich
Tire Name	Radial Long	Radial Long
Tire Type	P	P
Tire Width (mm)	265	265
Ratio of Height to Width (aspect ratio)	65	65
Radial	R	R
Wheel Diameter	17	17
Load Index & Speed Symbol	110T	110T
Treadwear	440	440
Traction Grade	B	B
Temperature Grade	B	B

DATA SHEET NO. 3

POST-TEST IMPACT DATA

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

SPEED TRAP DATA

Measured Parameter	Units	Requirements	Value
Trap No. 1 Velocity (Primary)	km/h	55.5 to 57.1	56.4
Trap No. 2 Velocity (Redundant)	km/h	55.5 to 57.1	56.4

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4716	4337	379
Center	mm	4881	4266	615
Right Side	mm	4716	4437	279

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	910
Center	mm	910
Right Side	mm	910
Average	mm	910

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

NORMAL DESIGN RIDING POSITION

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

Driver: Total Number of detents: 25

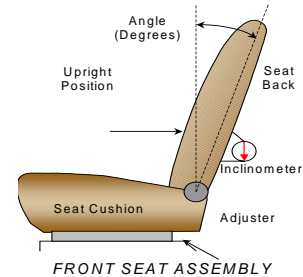
Test detent (with the forward-most detent defined as 0): 13

Passenger: Total Number of detents: 21

Test detent (with the forward-most detent defined as 0): 11

Driver seat back angle: 10.9° measured at the head restraint post

Passenger seat back angle: 675 mm from sun visor

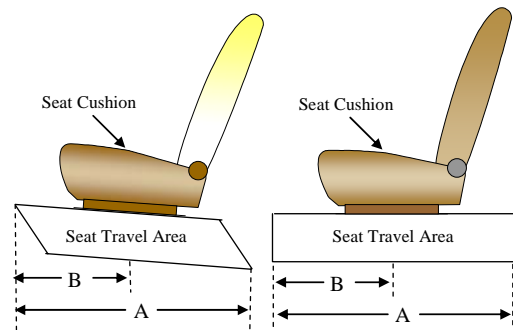


SEAT FORE/AFT POSITIONS

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	232 mm	119 mm
Pass. Seat	21 detents	11



SEAT BELT UPPER ANCHORAGE

	Total No. of Positions	Placed in Position No.
Driver Seat	3	1
Pass. Seat	3	1

Position number one is the uppermost adjustment position.

DATA SHEET NO. 4 (CONTINUED)

TEST VEHICLE INFORMATION

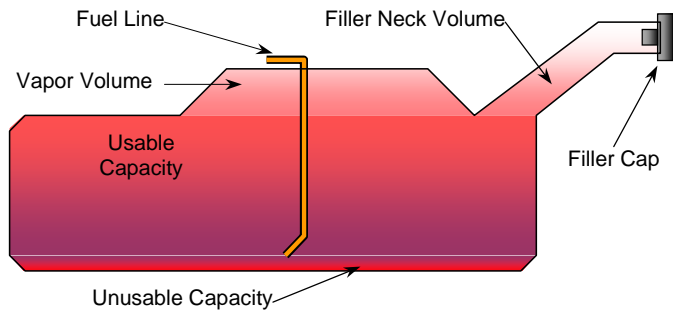
Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	79.9
Usable Capacity used for FMVSS301	79.9
Actual Amount of Solvent used	70.4

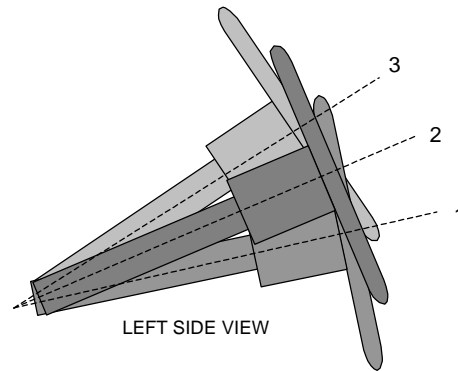
The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender. The standard fuel tank occupies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

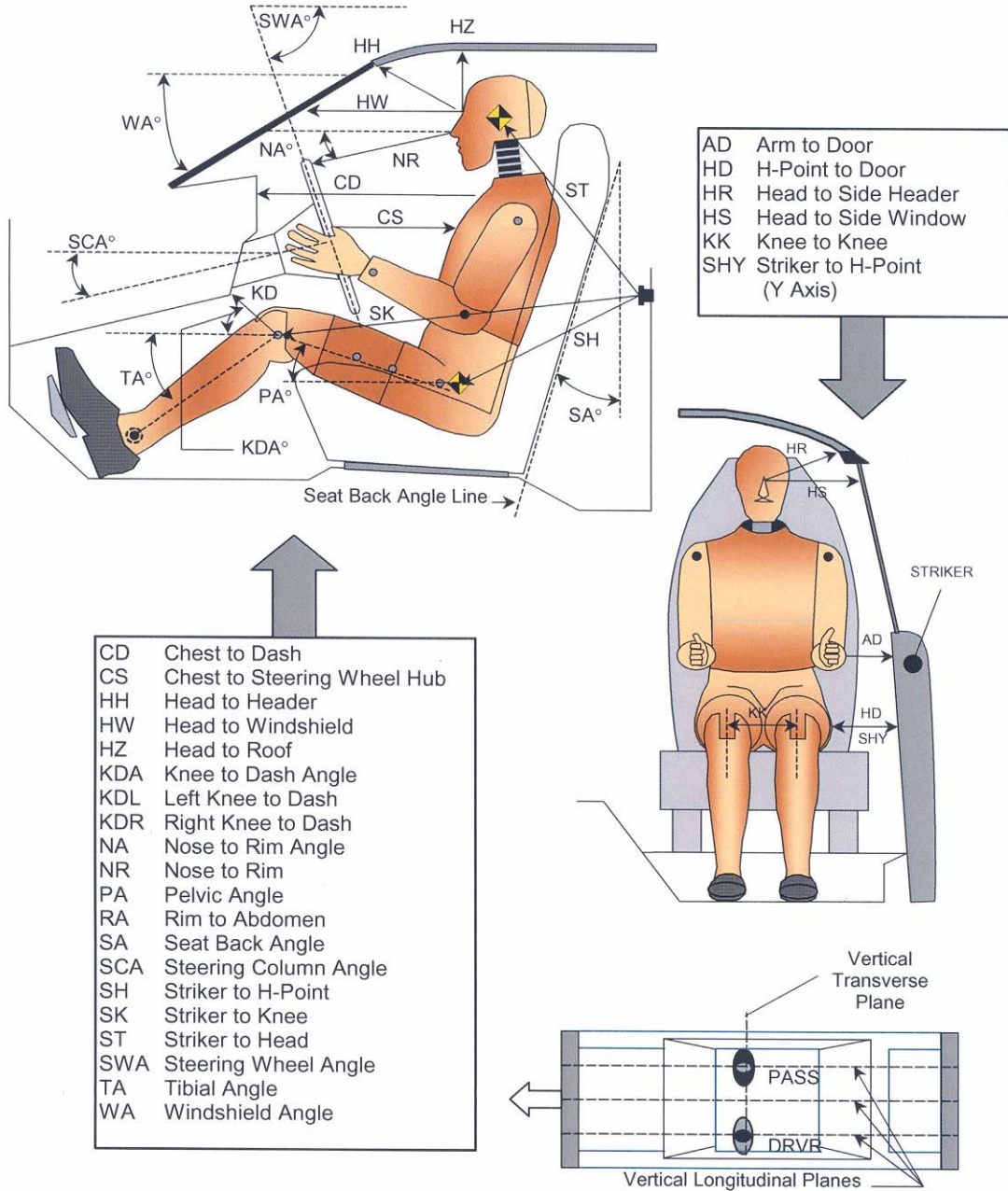
	Degrees	Fore/Aft Position, mm
Lowermost Position	15.3°	N/A
Geometric Center Position	24.5°	N/A
Uppermost Position	33.3°	N/A

DATA SHEET NO. 5

FRONT SEAT DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

DATA SHEET NO. 5 (CONTINUED)

FRONT SEAT DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

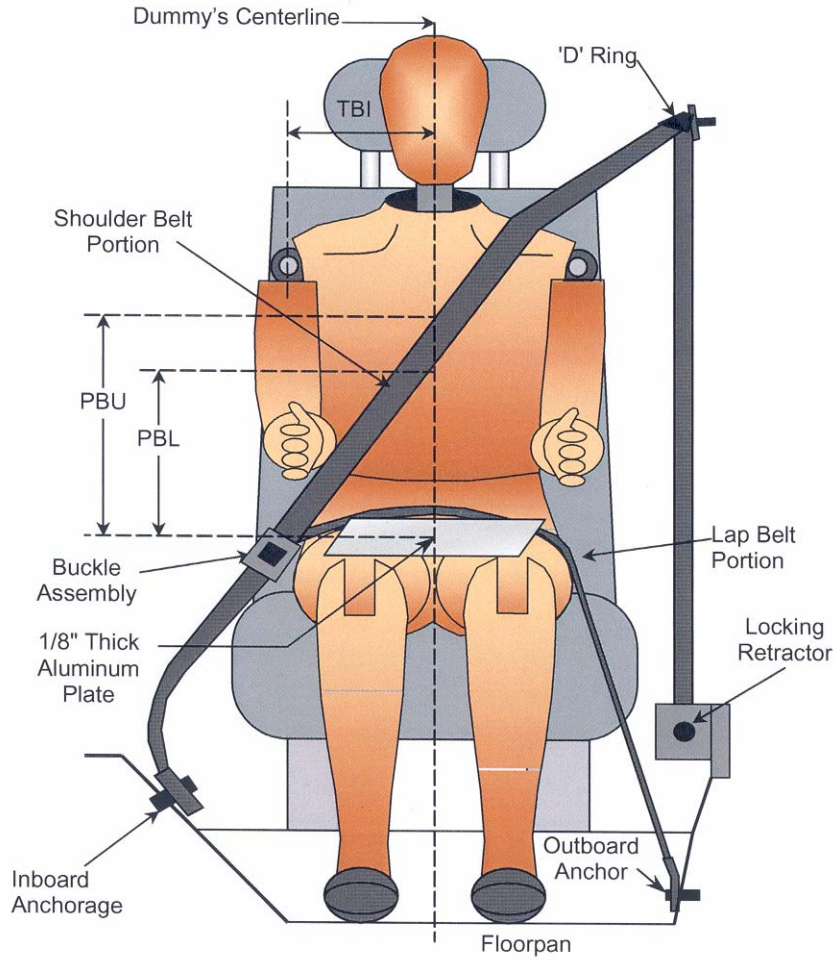
Code	Measurement Description	Driver S/N 037		Passenger S/N 352	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		33.5		
SWA	Steering Wheel Angle		24.5		
SCA	Steering Column Angle		65.5		
SA	Seat Back Angle		11.5		10.4
HZ	Head to Roof	170		170	
HW	Head to Windshield	618		595	
HH	Head to Header	360		360	
HR	Head to Side Header	210		225	
NR	Nose to Rim	392	12.4		
CD	Chest to Dash	543		515	
KDL	Left Knee to Dash	120	12.7	125	
KDR	Right Knee to Dash	128		130	14.5
PA	Pelvis Angle		23.1		21.2
TA	Tibia Angle		49.5		54.5
KK	Knee to Knee	340		270	
ST	Striker to Head	585	80.6	600	15.5
SK	Striker to Knee	635	6.5	626	1.4
SH	Striker to H-Point	260	13.4	256	21.6
SHY	Striker to H-Point (Y)	225		220	
HS	Head to Side Window	252		250	
HD	H-Point to Door	158		154	
AD	Arm to Door	102		103	

DATA SHEET NO. 6

SEAT BELT POSITIONING DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



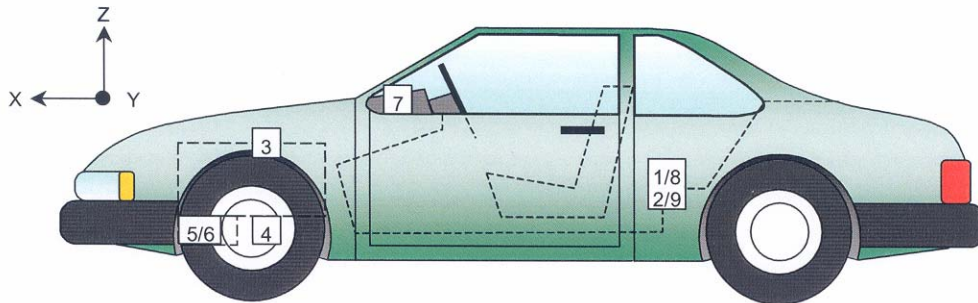
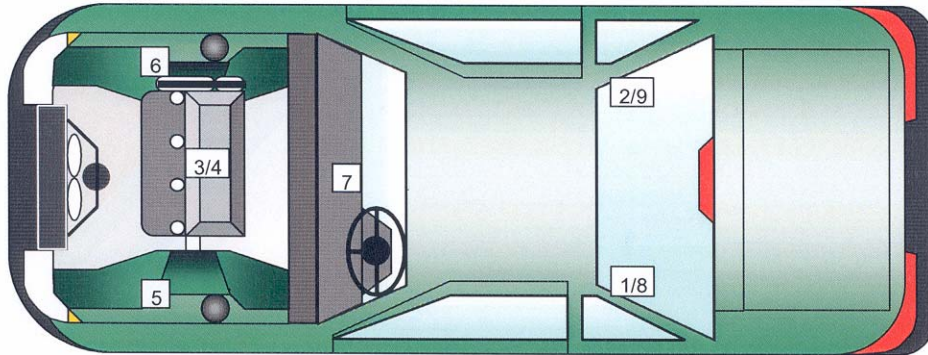
Measurement Parameter	Units	Driver S/N 037	Passenger S/N 352
PBU - Top surface of aluminum plate to belt upper edge	mm	340	335
PBL - Top surface of aluminum plate to belt lower edge	mm	260	255
Lap Belt Tension	N	N/A	N/A
Shoulder Belt Tension	N	N/A	N/A

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Seat Crossmember	2300	625	523
2	Right Rear Seat Crossmember	2331	625	527
3	Top of Engine	4280	0	997
4	Bottom of Engine	4246	0	218
5	Left Brake Caliper	4254	691	331
6	Right Brake Caliper	4254	691	333
7	Instrument Panel	3534	0	11302
8	Left Rear Seat Crossmember	2300	625	523
18	Right Rear Seat Crossmember	2331	625	527

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

DATA SHEET NO. 8

SEAT BELT ASSESSMENT TEST DATA

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
Shoulder Belt length as measured on ATD	mm	875	887
Lap Belt length as measured on ATD	mm	795	785
Shoulder Belt spool-off	mm	N/A	N/A
Total belt length for continuous webbing systems	mm	2830	2735

DATA SHEET NO. 9

SUMMARY OF FMVSS 212 DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

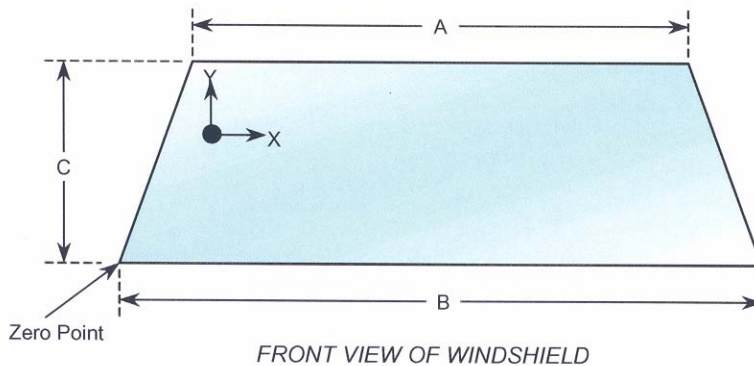
NHTSA No.: M85207
 Test Date: 09/19/07

Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. No molding covers the windshield periphery at any point.

The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of the windshield for vehicles equipped with automatic restraint systems for front occupants.

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2145	2145	100.0
Right Side	2145	2145	100.0
Total	4290	4290	100.0



WINDSHIELD DIMENSIONS

Item	Units	Segment Length	Molding Width
A	mm	1190	15
B	mm	1540	35
C-Left	mm	780	15
C-Right	mm	780	15

DATA SHEET NO. 10

WINDSHIELD ZONE INTRUSION FMVSS 214 (PARTIAL)

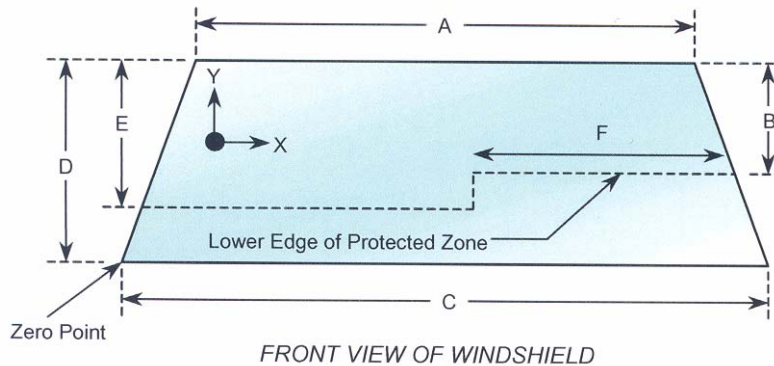
Test Vehicle: 2008 Nissan Pathfinder
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Protected Zone Lower Edge Requirement

The lower edge of the protected zone is determined by placing a 165 mm diameter rigid sphere weighing 6.8 kg in a position such that it simultaneously contacts the inner surface of the windshield and the top of the instrument panel including padding. The locus of points is drawn on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contactable points extend the locus line horizontally to the edges of the windshield; then draw a line on the inner surface of the windshield below and 13 mm distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection of this line onto the outer surface of the windshield.

FMVSS 219 Test Data



WINDSHIELD AND PROTECTED ZONE

Item	Units	Value
A	mm	1190
B	mm	480
C	mm	1540
D	mm	780
E	mm	475
F	mm	480

Details of Windshield Glass Penetration Greater Than 6 mm: None

DATA SHEET NO. 11

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

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

Stoddard Solvent Spillage Measurements

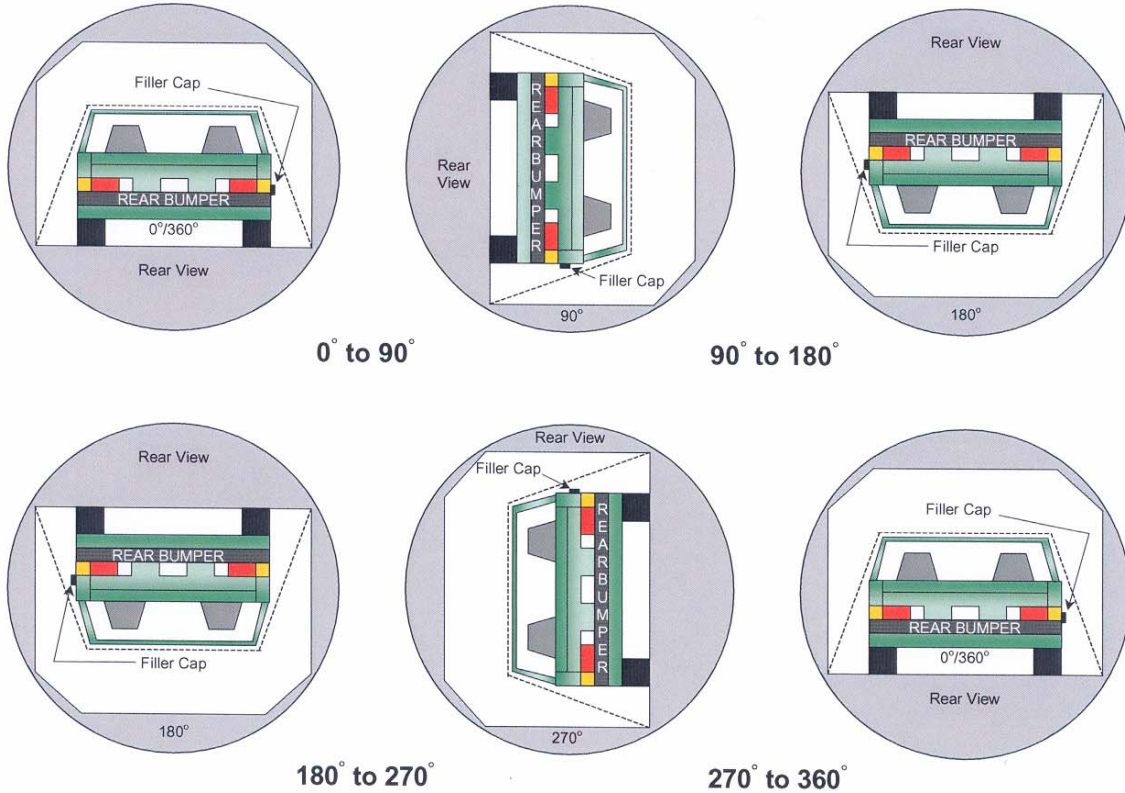
- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0
(Maximum allowable = 5 ounces)
- C. For the following 25 minutes: 0
(Maximum allowable = 1 oz./minute)
- D. Spillage Details: None

DATA SHEET NO. 12

FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. No solvent leakage occurred during rollover.

DETAILS OF STODDARD SOLVENT SPILLAGE LOCATIONS

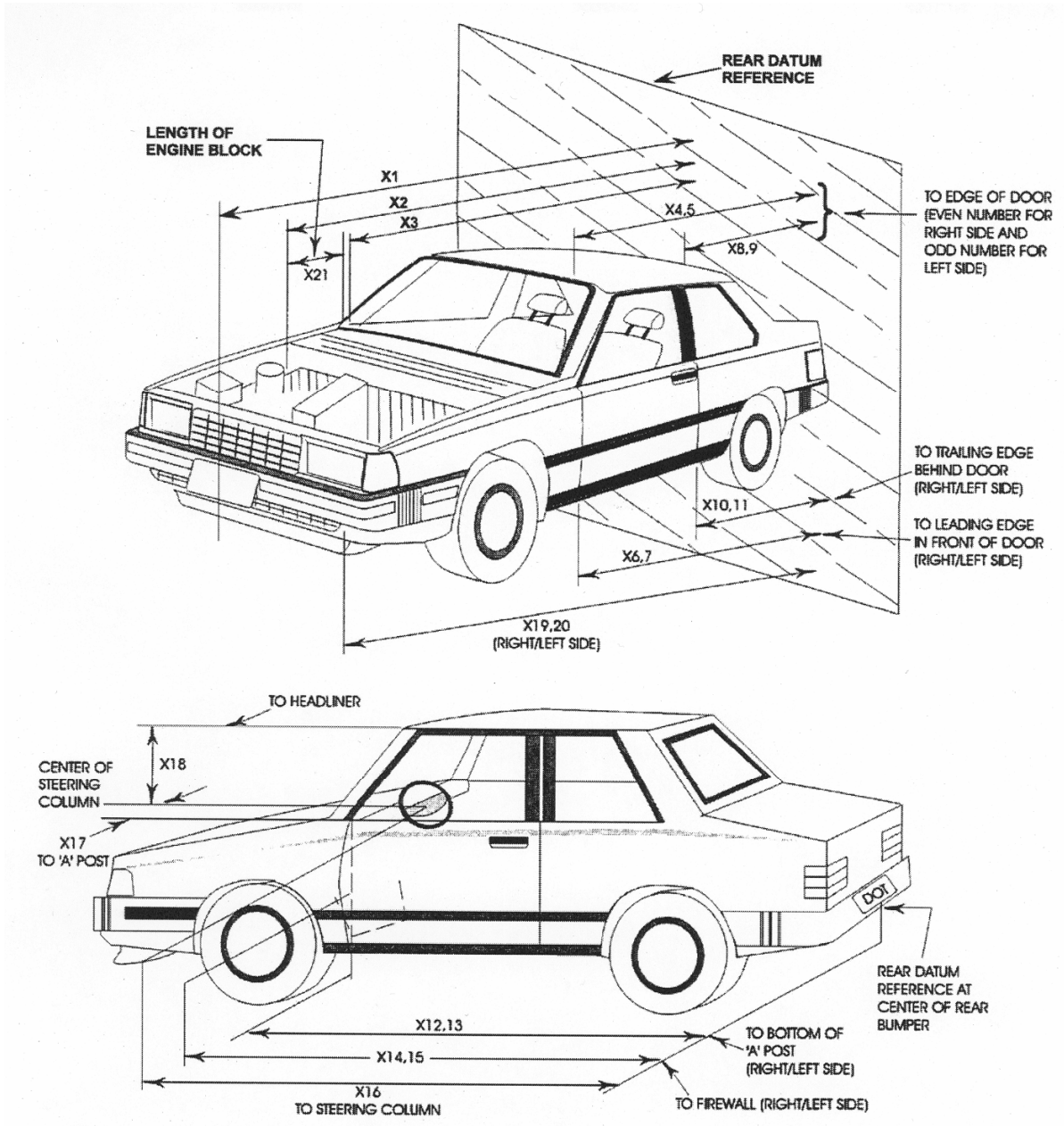
Test Phase	Rotation Time (sec.)	Hold Time (sec.)	Spillage Collection Time (min)	Spillage (oz.)	Spillage Collection Time (min)	Spillage (oz.)	Spillage Collection Time (min)	Spillage (oz.)
0° to 90°	60	300	First 5	0	Sixth	0	Seventh	0
90° to 180°	60	300	First 5	0	Sixth	0	Seventh	0
180° to 270°	60	300	First 5	0	Sixth	0	Seventh	0
270° to 360°	60	300	First 5	0	Sixth	0	Seventh	0

DATA SHEET NO. 13

VEHICLE MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



DATA SHEET NO. 13 (CONTINUED)

VEHICLE MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

VEHICLE MEASUREMENT TABLE

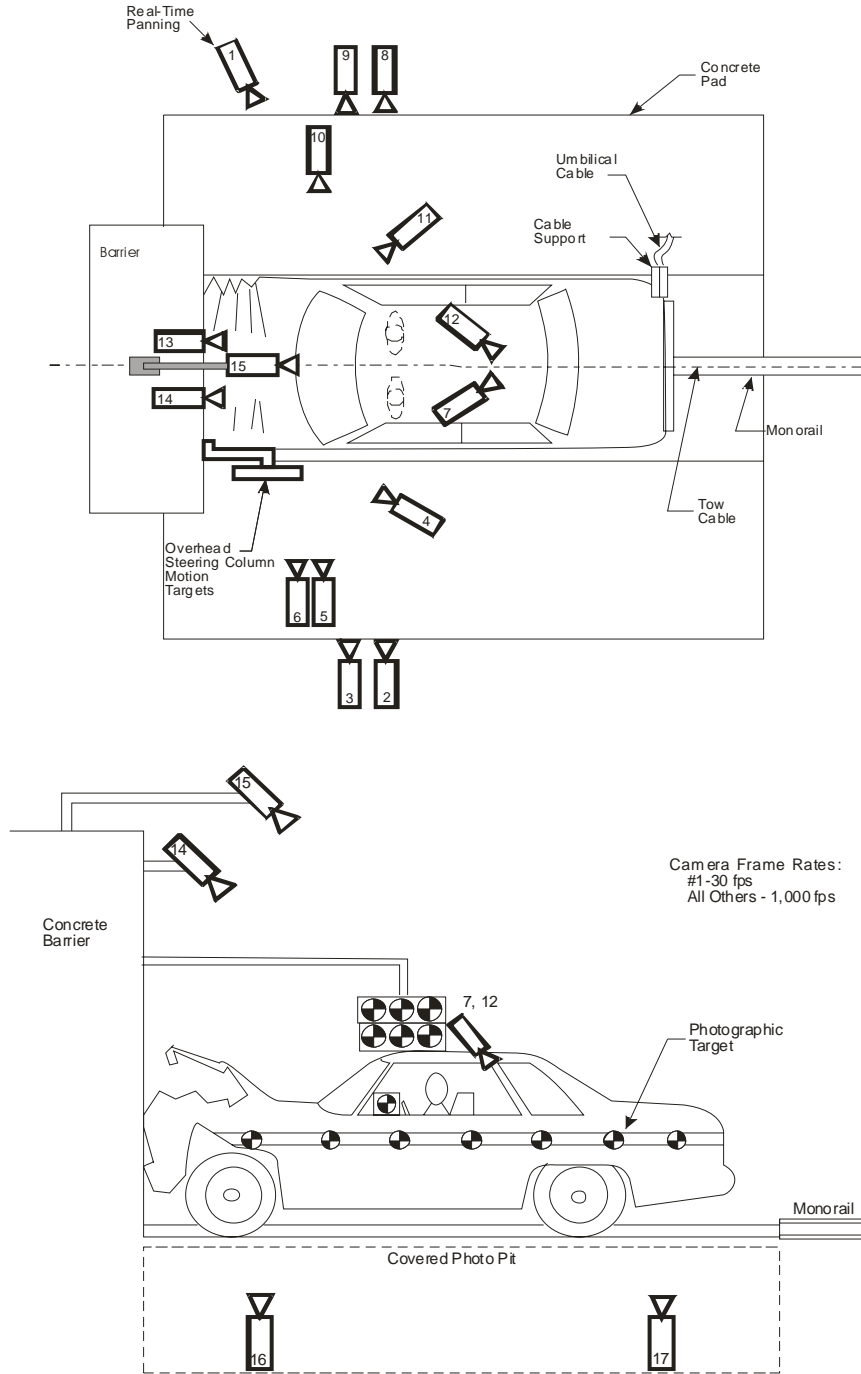
No.	Measurement Description	Pre-Test	Post-Test	Difference
X1	Total length of vehicle at centerline	4881	4266	615
X2	RSOV to front of engine block	4166	4136	30
X3	RSOV to firewall	3727	3737	-10
X4	RSOV to upper leading edge of right door	3388	3373	15
X5	RSOV to upper leading edge of left door	3373	3355	18
X6	RSOV to lower leading edge of right door	3300	3243	57
X7	RSOV to lower leading edge of left door	3311	3420	-109
X8	RSOV to upper trailing edge of right door	2330	2310	20
X9	RSOV to upper trailing edge of left door	2332	2316	16
X10	RSOV to lower trailing edge of right door	2291	2249	42
X11	RSOV to lower trailing edge of left door	2321	2251	70
X12	RSOV to bottom a "A" post on right side	3386	3325	61
X13	RSOV to bottom a "A" post on left side	3386	3348	38
X14	RSOV to firewall on right side	3786	3695	91
X15	RSOV to firewall on left side	3766	3744	22
X16	RSOV to steering wheel center	2906	2937	-31
X17	Center of steering column to "A" post	290	291	-1
X18	Center of steering column to headliner	460	445	15
X19	RSOV to right side of front bumper	4716	4437	279
X20	RSOV to left side of front bumper	4716	4337	379
X21	Length of engine block	500	500	0
RD	RSOV to right side of dash panel	3186	3150	36
CD	RSOV to center of dash panel	3166	3157	9
LD	RSOV to left side of dash panel	3181	3169	12

DATA SHEET NO. 14

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



DATA SHEET NO. 14 (CONTINUED)

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

VEHICLE CAMERA MEASUREMENT TABLE

No.	Camera View	Location (mm)			Angle (deg)	Film Plane to Head	Lens (mm)	Speed (fsp)
		X	Y	Z				
1	Real-time (Panning)						Zoom	30
2	Overall Left Side	1530	6290	1330	1.7	5950	12.5	1000
3	Left Side View	650	5320	1000	0.7	5200	25	1000
4	Driver and Interior View	4460	3220	1600	7.3	3350	25	1000
5	Steering Column Bottom	2300	6530	1340	0.0	6100	25	1000
6	Steering Column Top	2320	6860	2100	6.1	6500	25	1000
7	Onboard at Right Rear Dummy	2770	800	1670	14.1	1100	12.5	1000
8	Overall Right Side	1430	5670	130	3.3	5210	12.5	1000
9	Right Side View	550	5400	1140	2.4	5250	25	1000
10	Right Passenger View	1850	6640	1630	3.1	6140	50	1000
11	Passenger and Interior View	4570	3050	1670	2.6	3300	25	1000
12	Onboard at Left Rear Dummy	2770	800	1670	15.1	1100	12.5	1000
13	Passenger Front View	0	305	2100	31.4	2440	12.5	1000
14	Driver Front View	0	420	2100	31.4	2440	12.5	1000
15	Windshield View	0	0	2100	45.2	2440	6.5	1000
16	Pit View of Engine	3580	0	3270	90.0	4870	25	1000
17	Pit View of Fuel Tank	320	0	3270	90.0	4870	12.5	1000

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

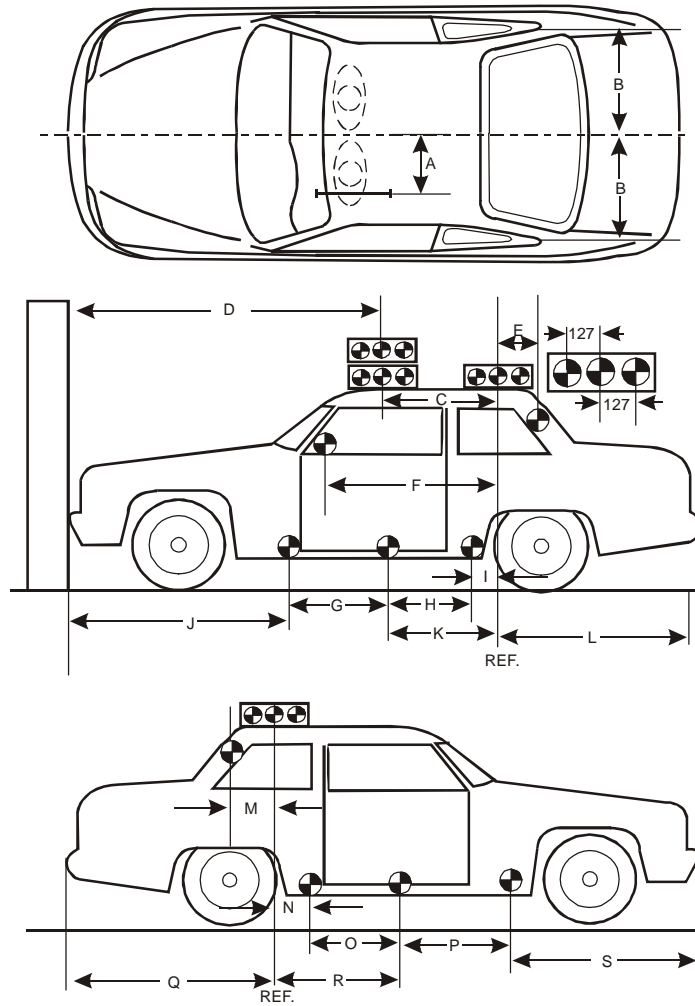
DATA SHEET NO. 15

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

All Dimensions in (mm)	
Item	Value
A	400
B	645
C	610
D	2487
E	479
F	1497
G	860
H	905
I	82
J	1255
K	982
L	1619
M	444
N	108
O	905
P	860
Q	1598
R	1013
S	1245



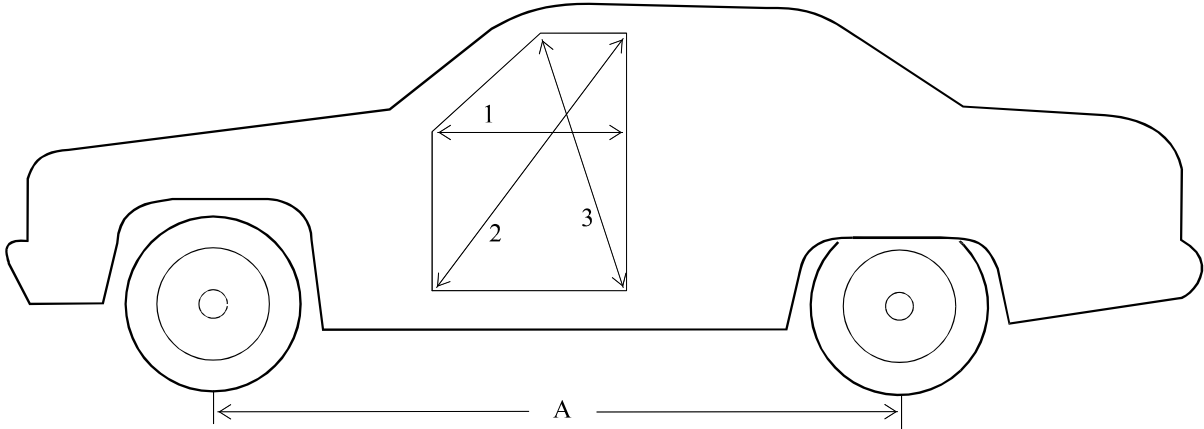
DATA SHEET NO. 16

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

DOOR OPENING WIDTH



Units (mm)	Left			Right		
Measurement	1	2	3	1	2	3
Before Test	1020	951	417	1020	932	409
After Test	1016	943	426	1017	926	412
Difference	4	8	-6	3	6	-3

Units (mm)	A = Wheelbase Left	A = Wheelbase Right
Before Test	2860	2860
After Test	2762	2787
Difference	98	73

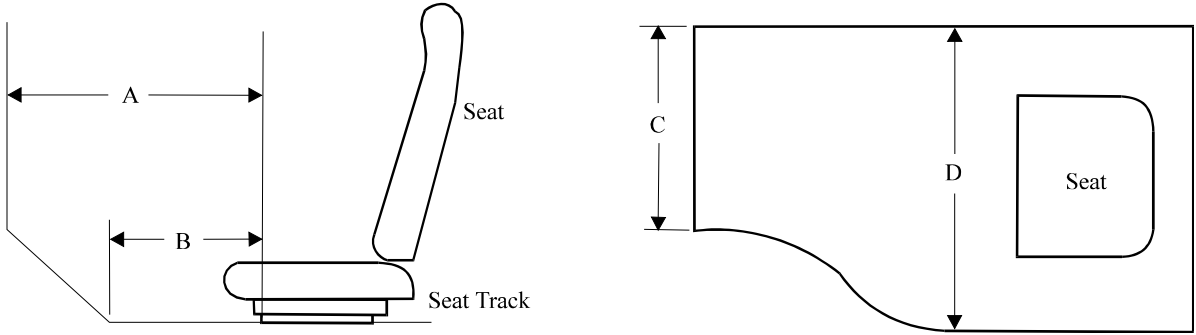
DATA SHEET NO. 16 (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

STATIC FOOTWELL DEFORMATION



DRIVER

Measurement	Pre-Test	Post-Test	Difference
A	656	638	18
B	454	389	65
C	424	417	7
D	395	394	1

All units in millimeters

PASSENGER

Measurement	Pre-Test	Post-Test	Difference
A	725	675	50
B	457	432	25
C	372	369	3
D	401	402	-1

All units in millimeters

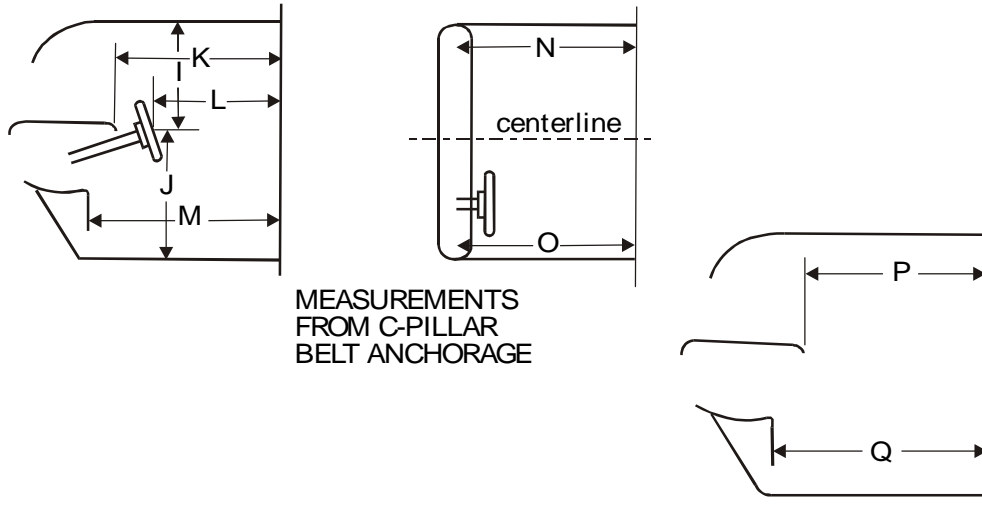
DATA SHEET NO. 16 (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

STATIC PASSENGER COMPARTMENT INTRUSION



Measurement	Pre-Test	Post-Test	Difference
I	465	430	35
J	655	687	-32
K	1884	1882	2
L	1655	1642	13
M	1975	1967	8
N	1875	1851	24
O	1880	1851	29
P = K (PASS.)	1885	1879	6
Q = M (PASS.)	1984	1974	10

All units in millimeters

DATA SHEET NO. 16 (CONTINUED)

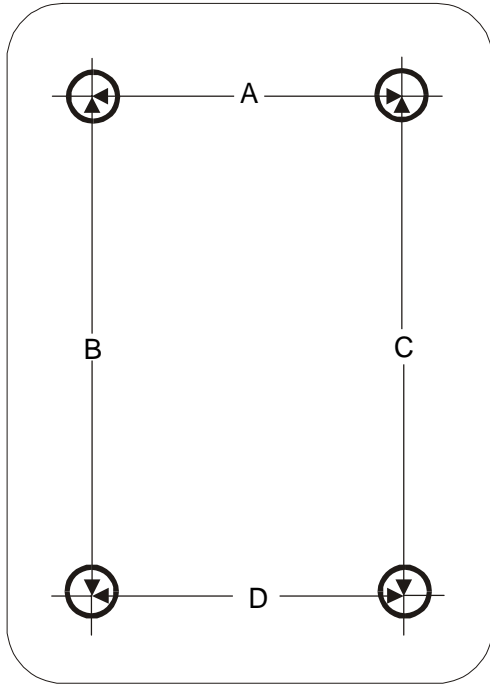
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

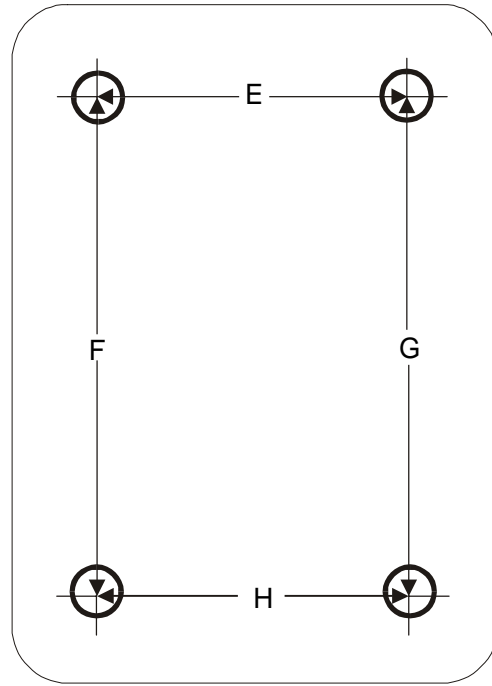
NHTSA No.: M85207
 Test Date: 09/19/07

FLOORBOARD DEFORMATION

DRIVERS SIDE



PASSENGERS SIDE



TOP VIEW THROUGH FLOOR PAN

Measurement	Pre-Test	Post-Test	Difference
A	424	417	7
B	393	389	4
C	408	391	17
D	395	394	1
E	372	369	3
F	461	437	24
G	427	425	2
H	401	402	-1

All units in millimeters

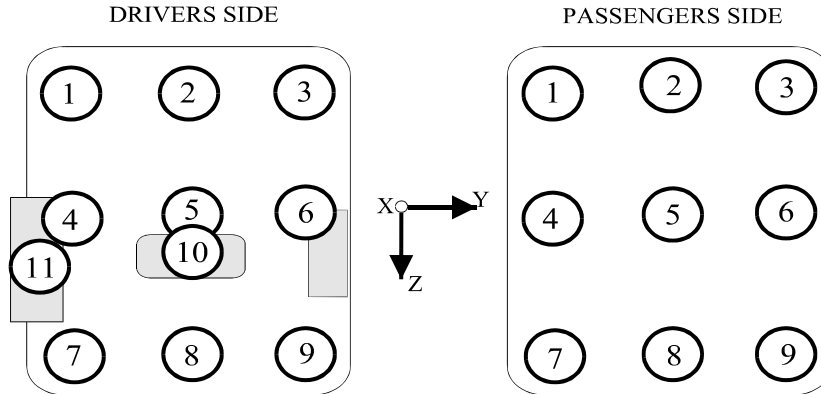
DATA SHEET NO. 16 (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

TOE PAN FLOORBOARD INTRUSION



Driver Side Toe Pan and Floorboard Measurements

Floorpan Location	X Deformation			Z Deformation		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3550	3536	-14	-157	-186	-29
2	3637	3566	-71	-107	-169	-62
3	3605	3546	-59	-107	-172	-65
4	3496	3490	-6	-26	-57	-31
5	3517	3458	-59	-34	-109	-75
6	3508	3459	-49	-40	-94	-54
7	3348	3346	-2	18	3	-15
8	3349	3330	-19	14	-18	-32
9	3357	3345	-12	19	-15	-34
10	3410	3472	62	-185	-174	11
11	3450	3451	1	-103	-114	-11

Passenger Side Toe Pan and Floorboard Measurements

Floorpan Location	X Deformation			Z Deformation		
	Pre-Test	Post-Test	Difference	Pre-Test	Post-Test	Difference
1	3621	3573	-48	-159	-214	-55
2	3648	3613	-35	-176	-217	-41
3	3553	3542	-11	-174	-197	-23
4	3554	3511	-43	-65	-125	-60
5	3573	3543	-30	-67	-111	-44
6	3520	3518	-2	-88	-109	-21
7	3411	3388	-23	4	-23	-27
8	3377	3362	-15	3	-20	-23
9	3381	3381	0	21	6	-15

Reference: X = Rear Bumper; Z = Ground
 All units in millimeters

DATA SHEET NO. 16 (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

Bottom of Front Bumper

Pre-Test				Post-Test			Difference		
Index	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm
1	4717	-750	-36	4361	-799	-130	-356	-49	-94
2	4826	-473	-42	4357	-499	-150	-469	-26	-108
3	4868	-167	-43	4408	-194	-147	-460	-27	-104
4	4870	155	-37	4422	126	-117	-448	-29	-80
5	4831	459	-43	4387	427	-75	-444	-32	-32
6	4722	740	-43	4518	685	-7	-204	-55	36

Top of Front Bumper

Pre-Test				Post-Test			Difference ¹		
Index	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm
1	4704	-751	-272	4390	-48	-219	-314	703	53
2	4830	-473	-251	4355	-501	-342	-475	-28	-91
3	4873	-167	-244	4396	-205	-267	-477	-38	-23
4	4872	161	-247	4443	116	-224	-429	-45	23
5	4835	461	-247	4485	414	-206	-350	-47	41
6	4708	741	-275	4457	814	-189	-251	73	86

Center of Grill

Pre-Test				Post-Test			Difference		
Index	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm
1	4588	-746	-434	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹
2	4683	-473	-430	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹
3	4748	-174	-421	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹
4	4749	161	-421	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹
5	4684	463	-433	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹
6	4596	741	-422	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹	N/A ¹

Front of Hood

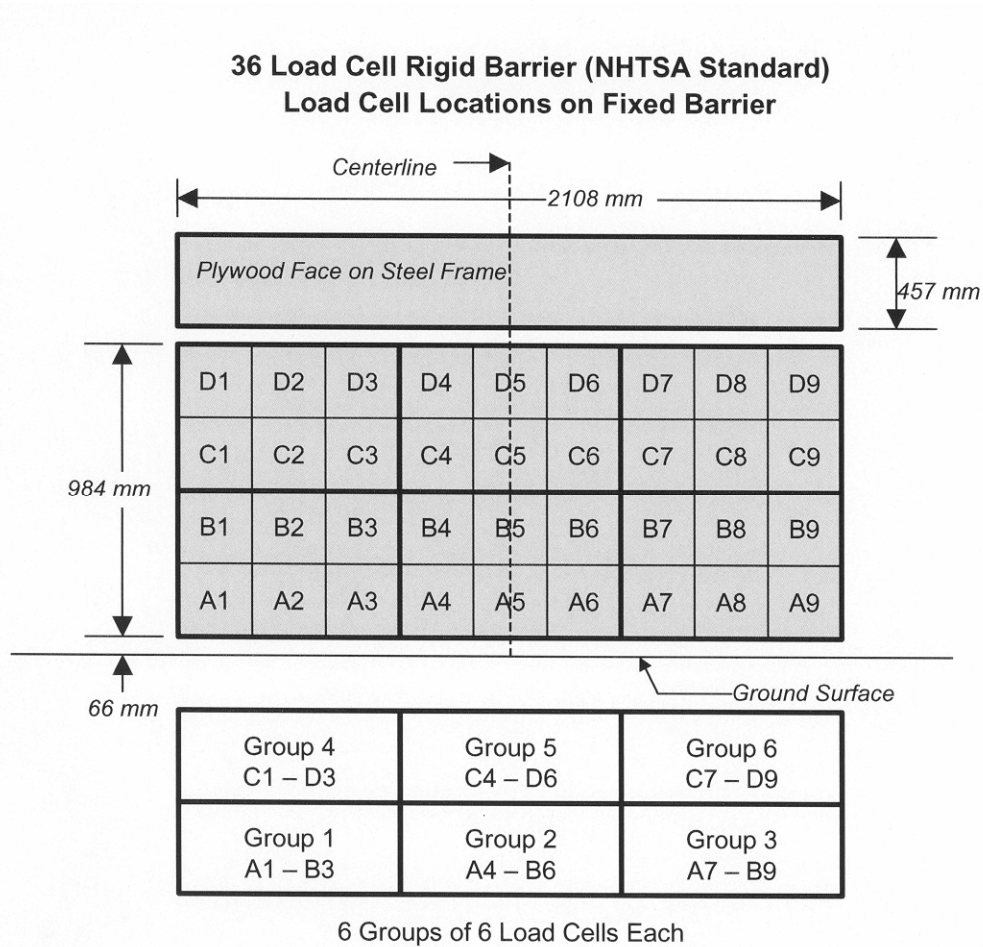
Pre-Test				Post-Test			Difference		
Index	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm	X, mm	Y, mm	Z, mm
1	4514	-752	-553	4243	-863	-584	-271	-111	-31
2	4652	-471	-557	4260	-493	-755	-392	-22	-198
3	4723	-162	-558	4308	-183	-729	-415	-21	-171
4	4724	153	-560	4306	118	-721	-418	-35	-161
5	4657	460	-559	4279	392	-753	-378	-68	-194
6	4519	741	-557	4247	805	-587	-272	64	-30

DATA SHEET NO. 17

FIXED BARRIER LOAD CELL LOCATIONS

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



The following data is presented in Appendix B:

- (1) Data from 36 individual load cells
- (2) Total or Sum of 36 individual load cells
- (3) Data from 6 Groupings shown above (6 cells/group)

DATA SHEET NO. 18

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

FOR FRONTAL BARRIER IMPACT

NHTSA Test No.: M85207 VIN: 5N1AR18B38C617145

Model Year: 2008 Build Date: 07/07 Test Date: 09/19/07

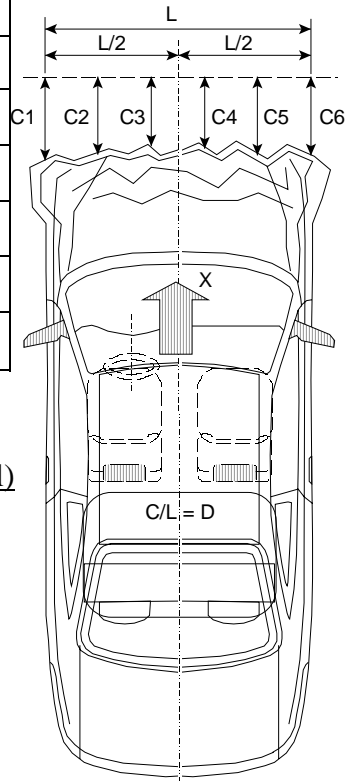
Vehicle Size Category: MVP Test Weight: 2406.4 kg

Vehicle Wheelbase: 2860 mm; Front Overhang: 845 mm; Overall Width: 1860 mm

Collision Deformation Classification (CDC) Code: 12FDEW2

Crush Depth Dimensions with Bumper

	PRE-TEST	POST-TEST	DIFFERENCE	
C1 =	4716	4337	379	mm
C2 =	4830	4355	475	mm
C3 =	4873	4396	477	mm
C4 =	4872	4443	429	mm
C5 =	4835	4485	350	mm
C6 =	4716	4437	279	mm



Midpoint of Damage: $D = \underline{\text{Vehicle Centerline (Longitudinal)}}$

Length of Damaged Region

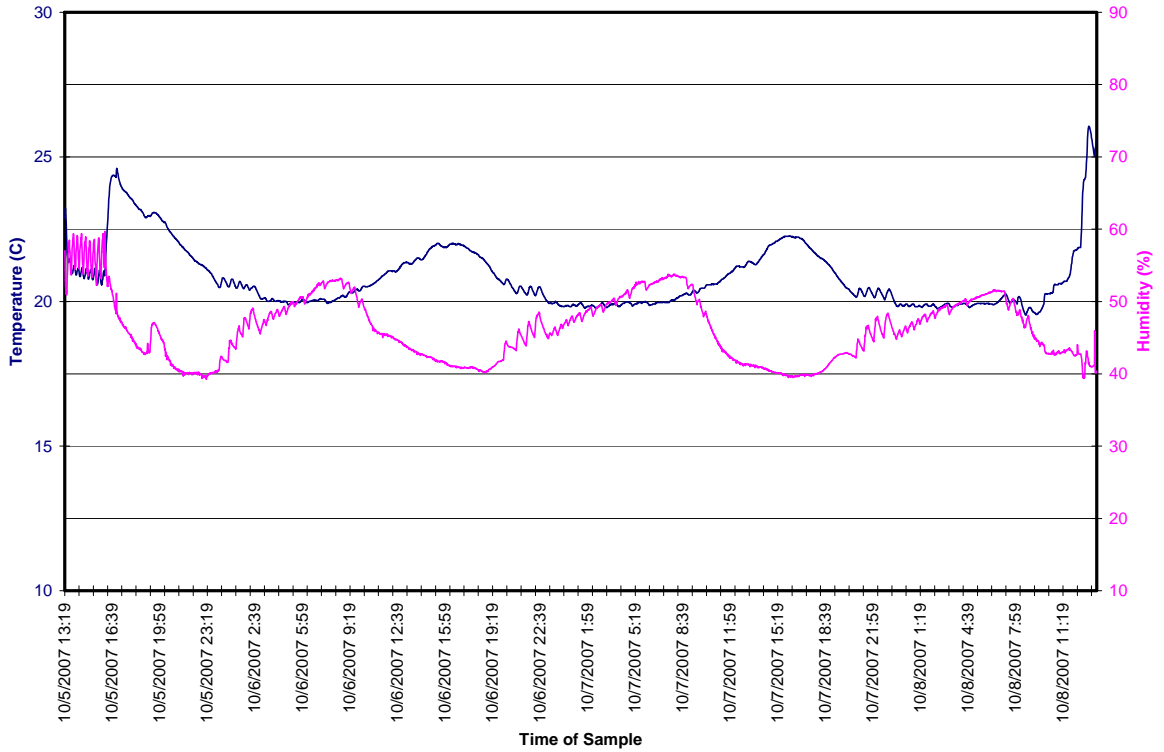
L1	1860	mm
=		
L2	930	mm
=		
L3	930	mm
=		

DATA SHEET NO. 19

DUMMY / VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07



APPENDIX A
PHOTOGRAPHS

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Figure A-1 Pre-Test Front View



Figure A-2 Post-Test Front View

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070919



Figure A-3 Pre-Test Left Front View

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070919



Figure A-4 Post-Test Left Front View



Figure A-5 Pre-Test Left Side View



Figure A-6 Post-Test Left Side View

A-10

070919



Figure A-7 Pre-Test Left Rear View

A-11

070919



Figure A-8 Post-Test Left Rear View

A-12

070919



Figure A-9 Pre-Test Rear View

A-13

070919



Figure A-10 Post-Test Rear View

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070919



Figure A-11 Pre-Test Right Rear View



Figure A-12 Post-Test Right Rear View

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070919



Figure A-13 Pre-Test Right Side View

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070919



Figure A-14 Post-Test Right Side View



Figure A-15 Pre-Test Right Front View

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070919



Figure A-16 Post-Test Right Front View

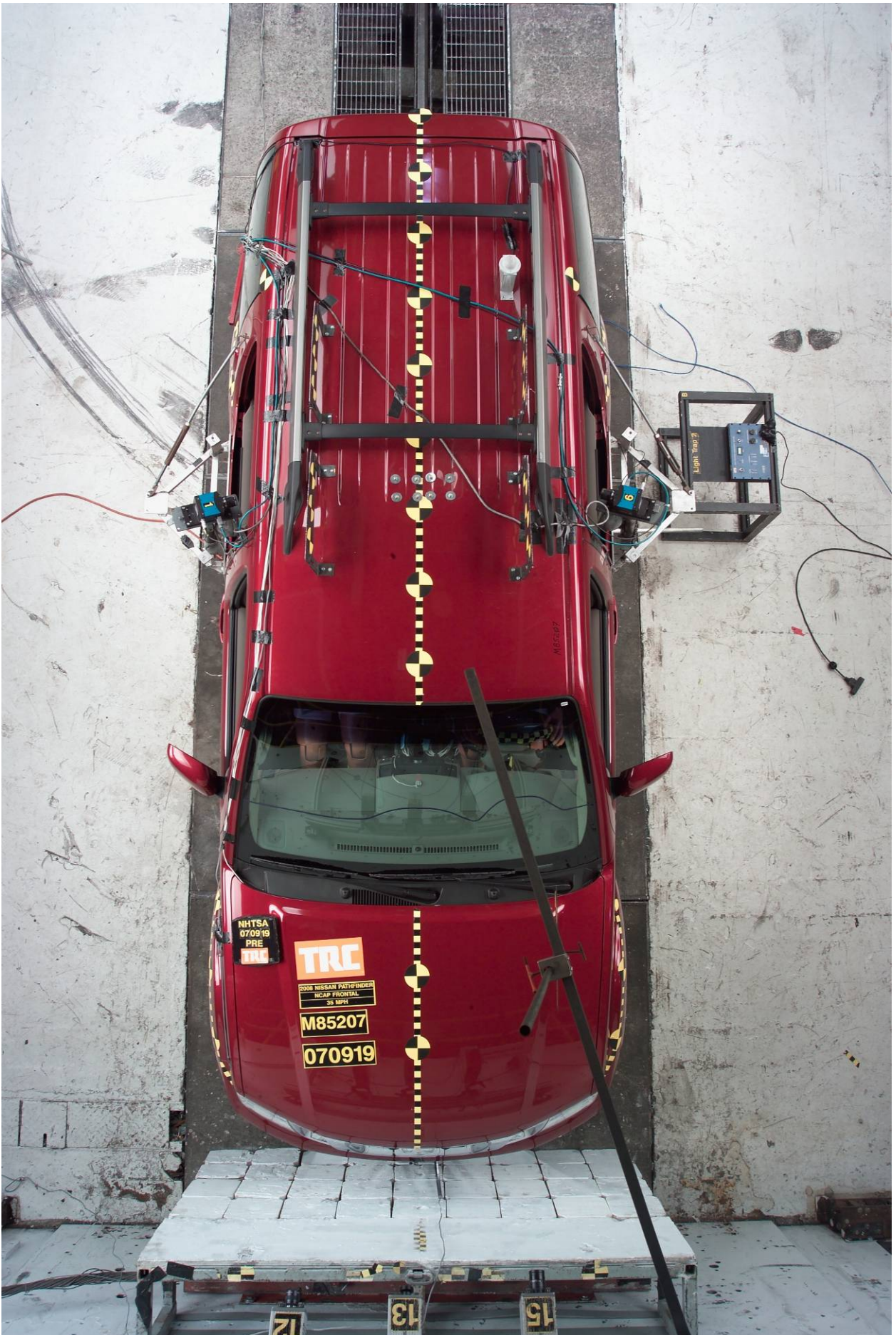


Figure A-17 Pre-Test Overhead View

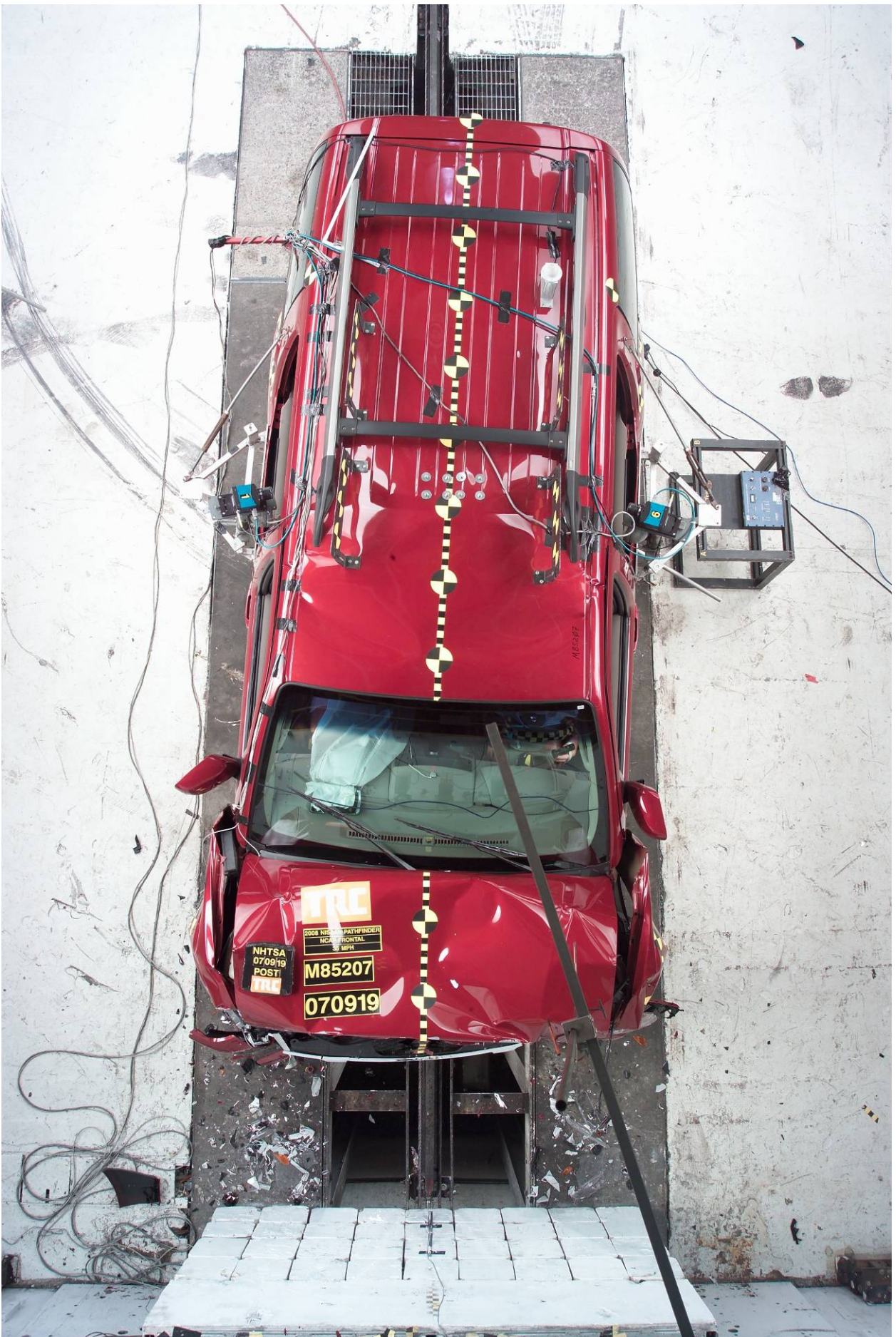


Figure A-18 Post-Test Overhead View

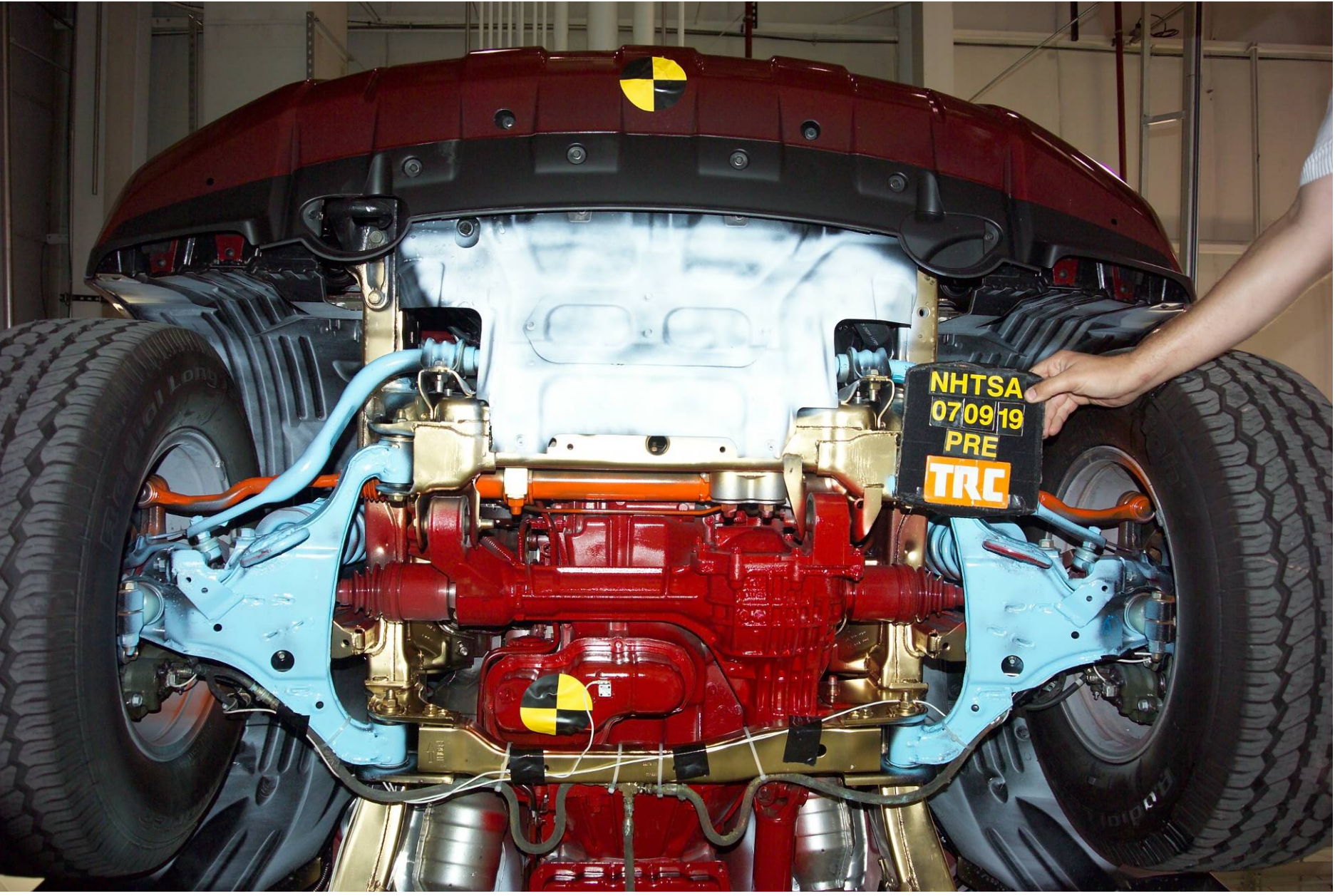


Figure A-19 Pre-Test Front Underbody View

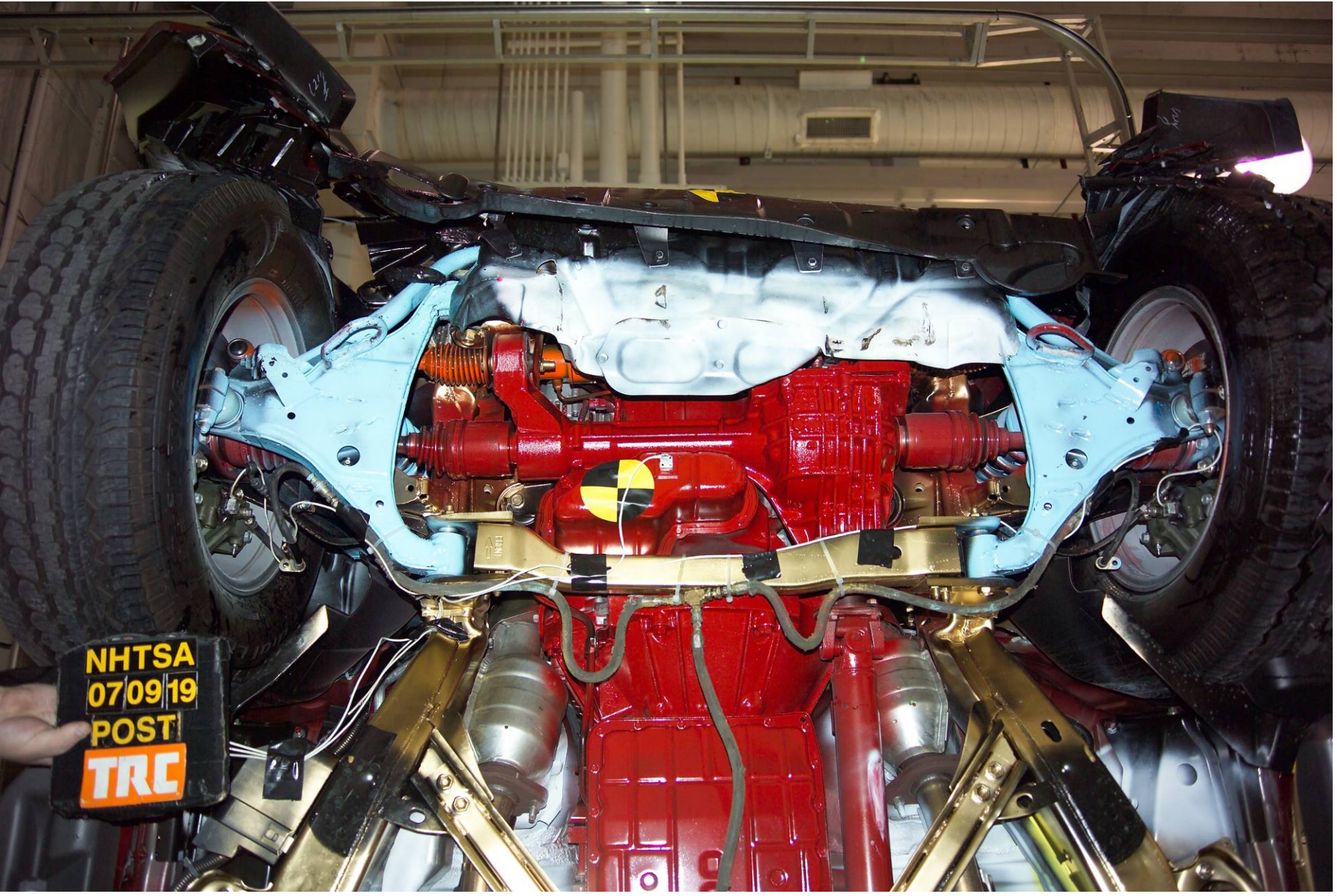


Figure A-20 Post-Test Front Underbody View

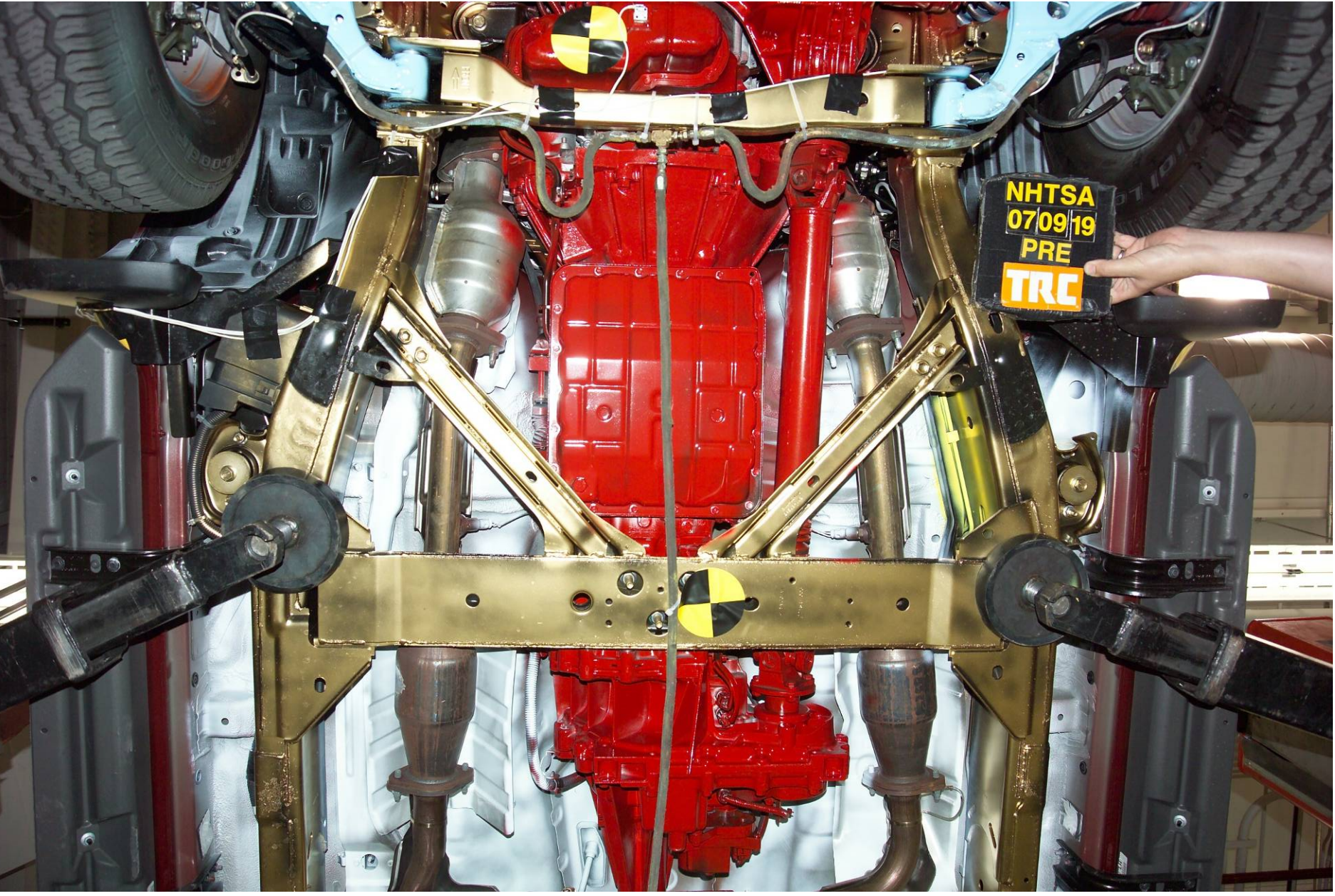


Figure A-21 Pre-Test Mid Front Underbody View

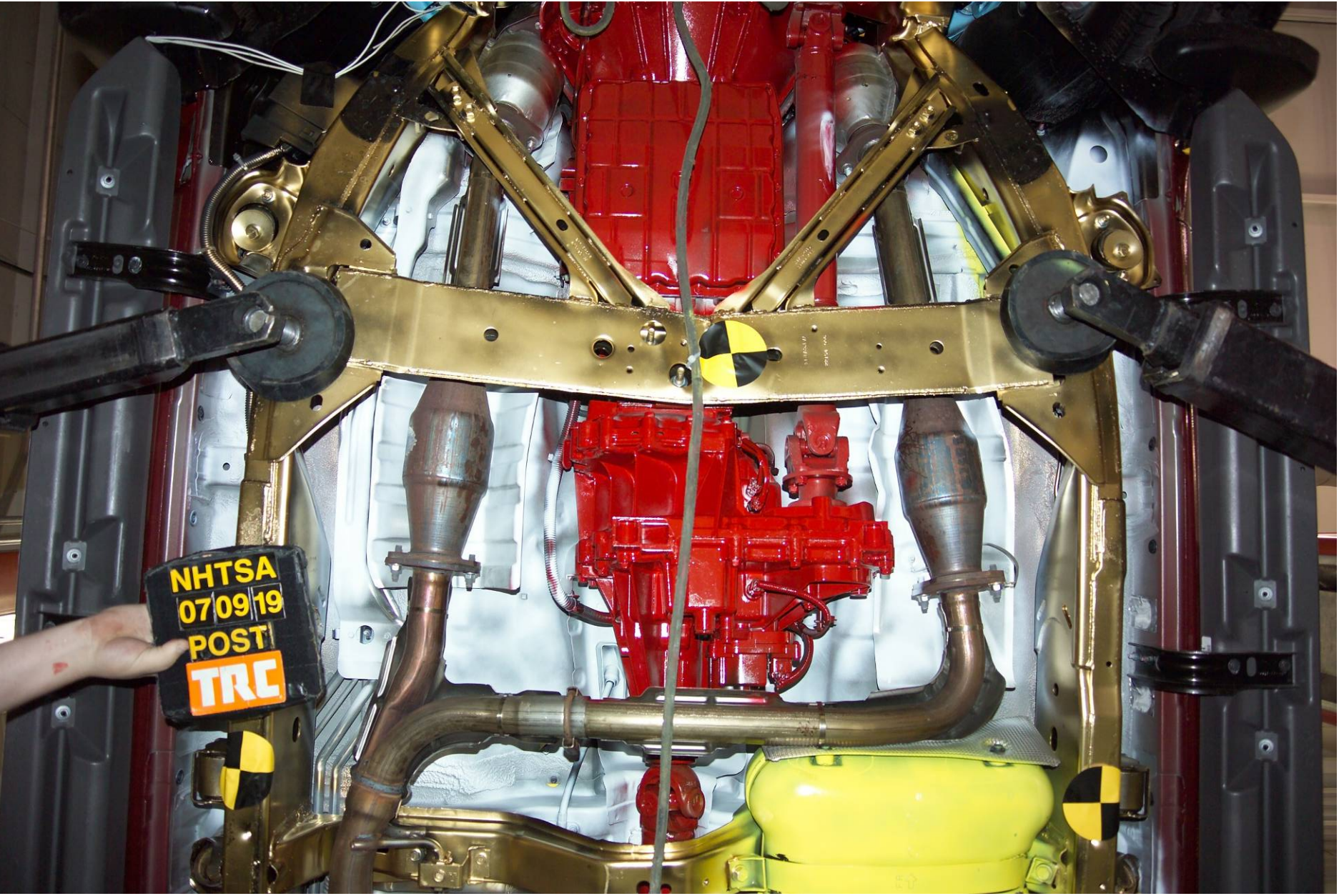


Figure A-22 Post-Test Mid Front Underbody View

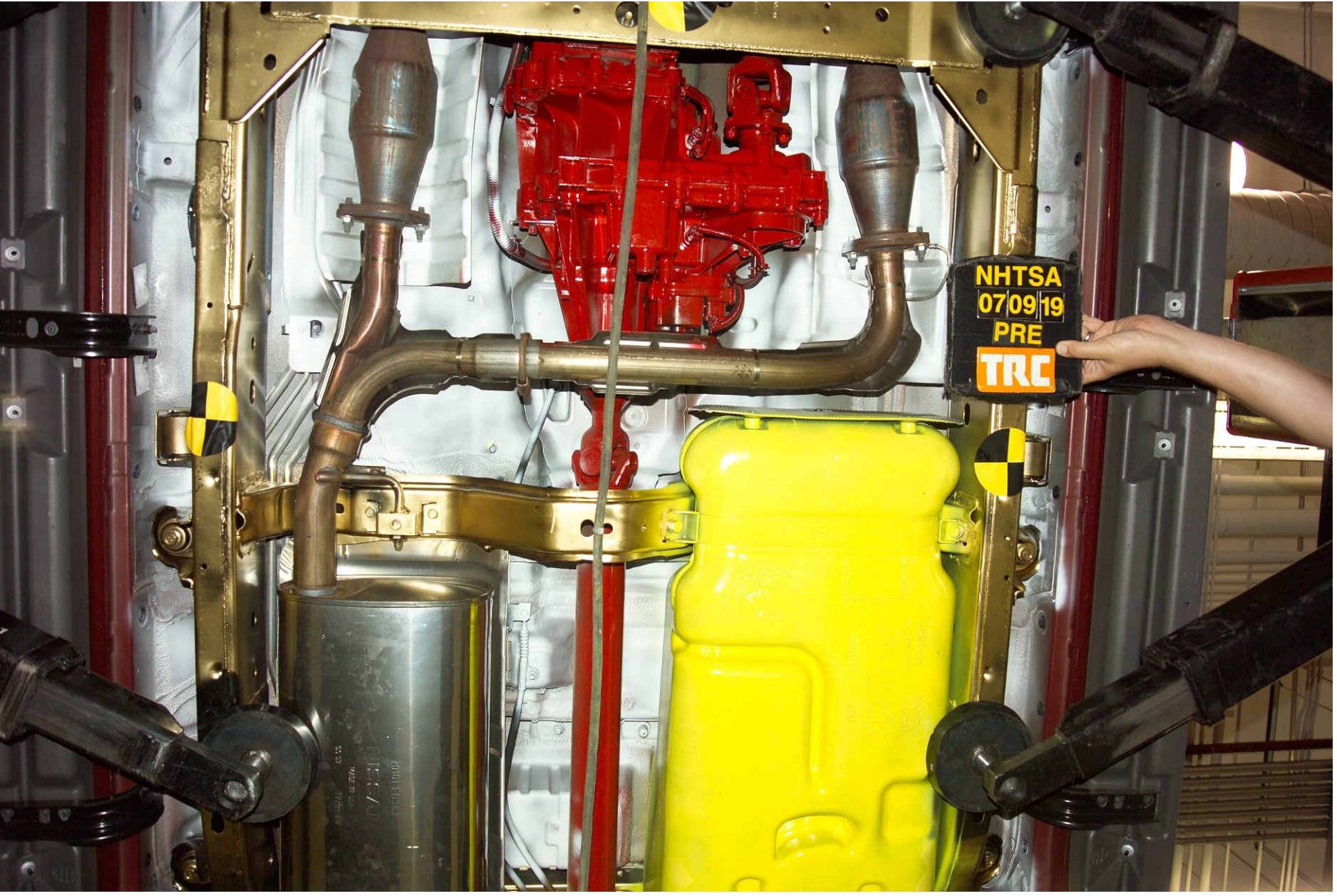


Figure A-23 Pre-Test Mid Underbody View

A-27

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Figure A-24 Post-Test Mid Underbody View

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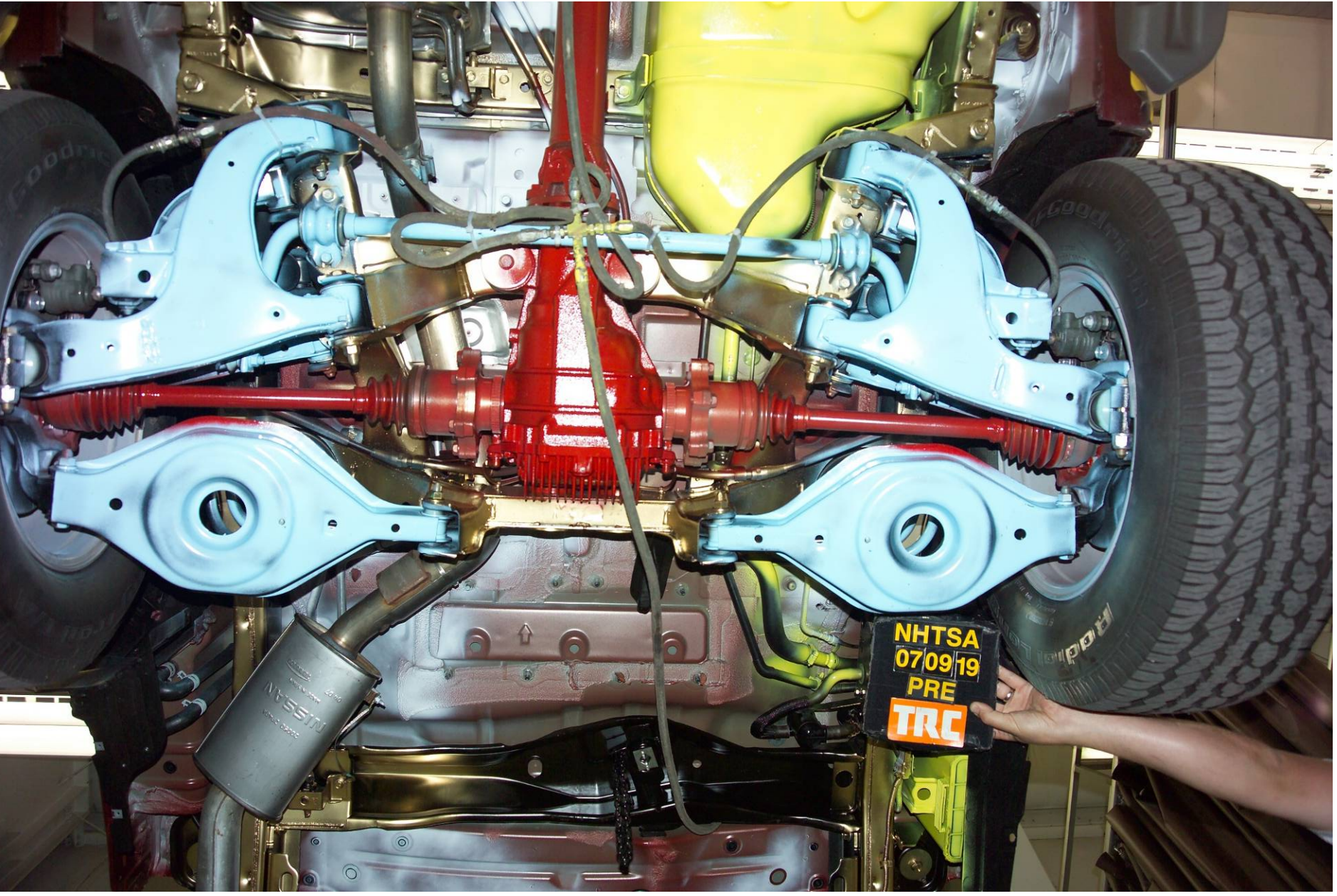


Figure A-25 Pre-Test Mid Rear Underbody View

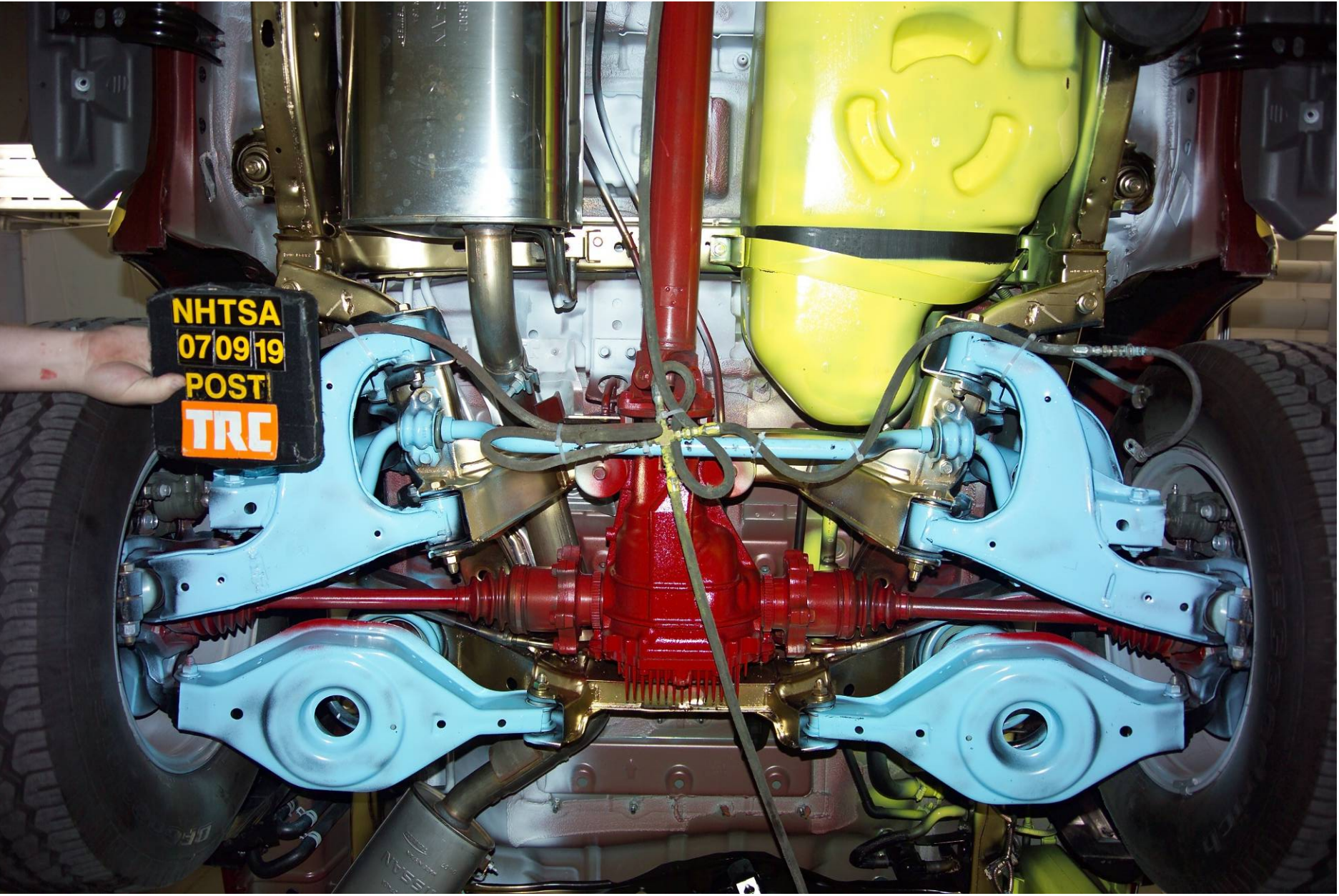


Figure A-26 Post-Test Mid Rear Underbody View

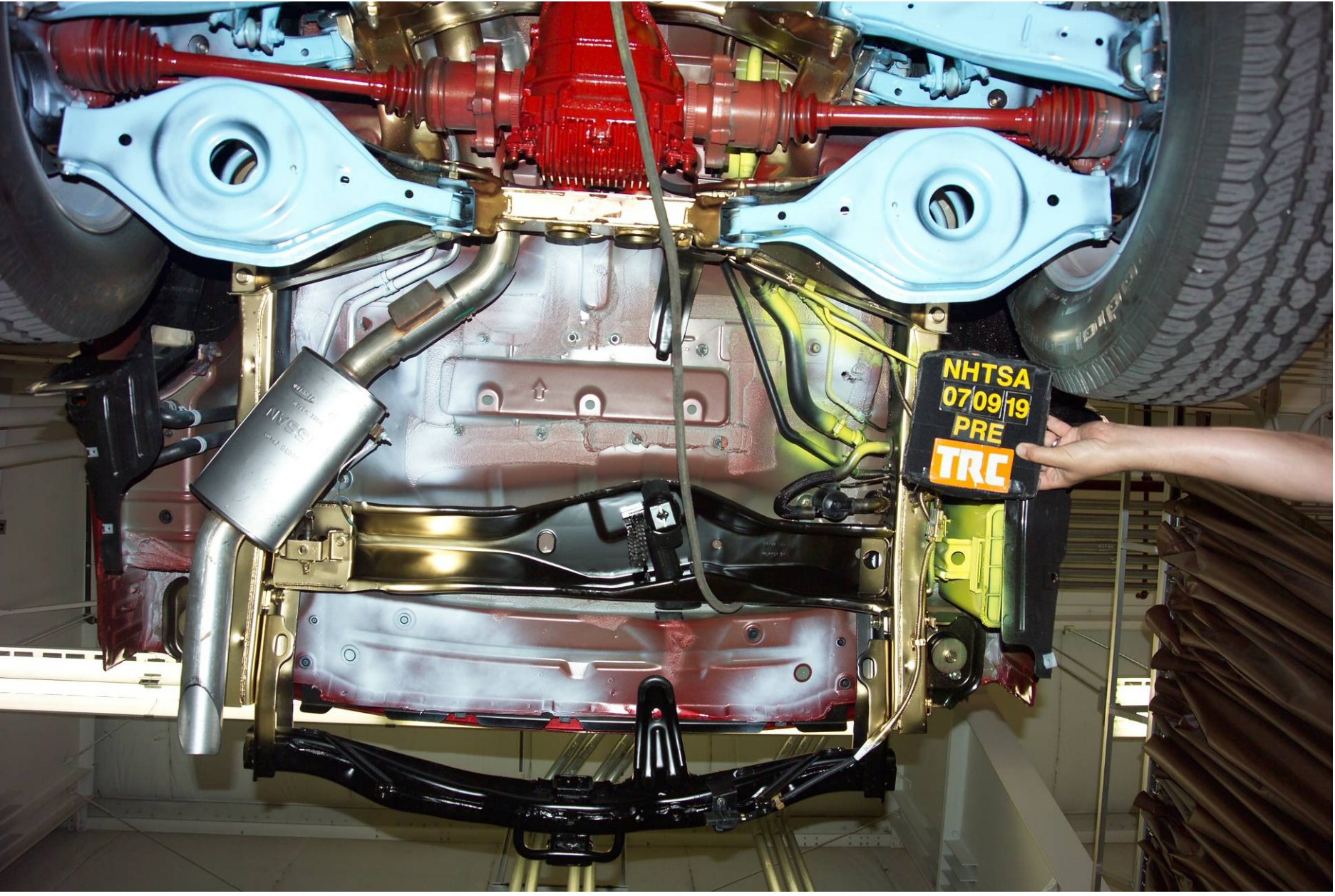


Figure A-27 Pre-Test Rear Underbody View

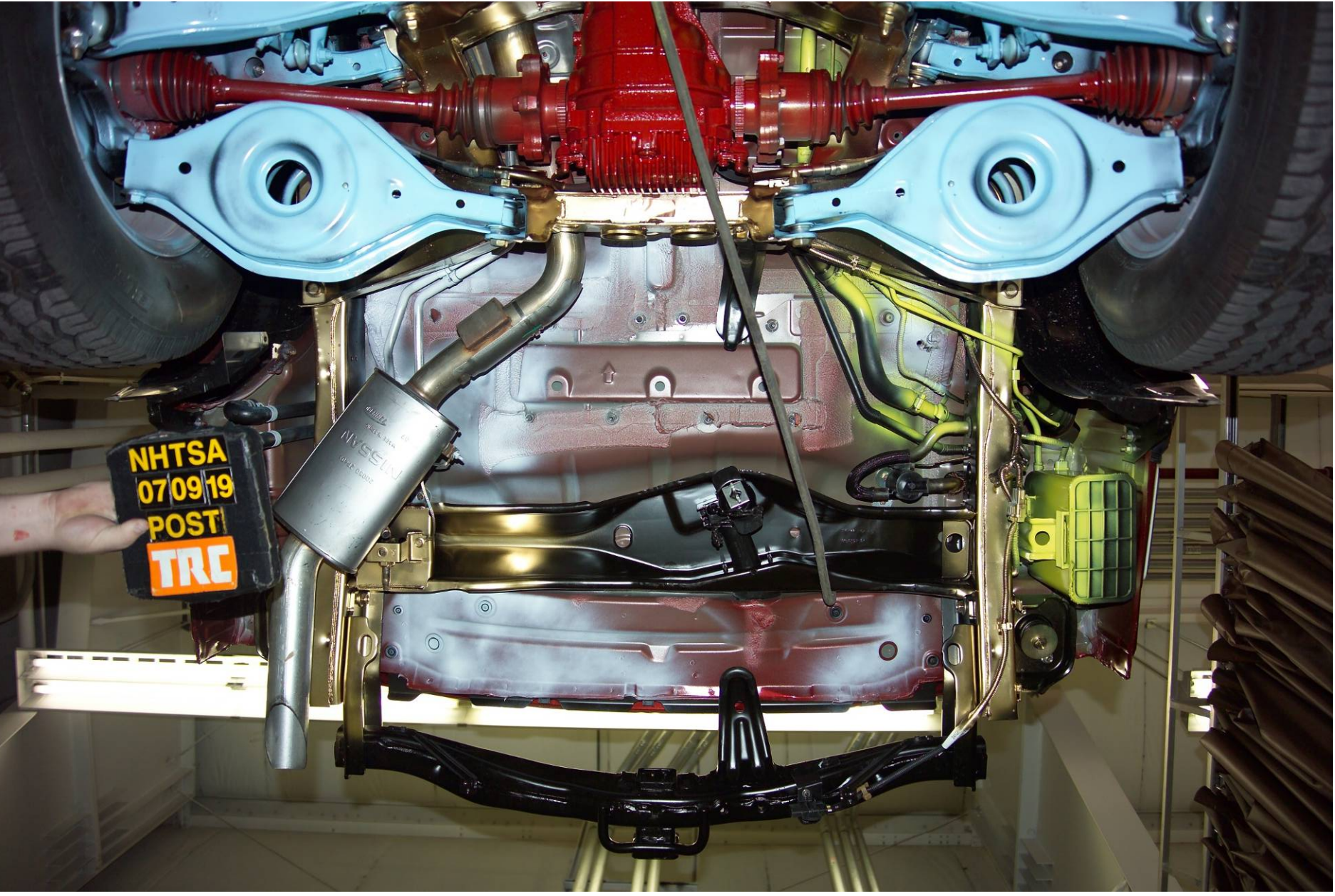


Figure A-28 Post-Test Rear Underbody View

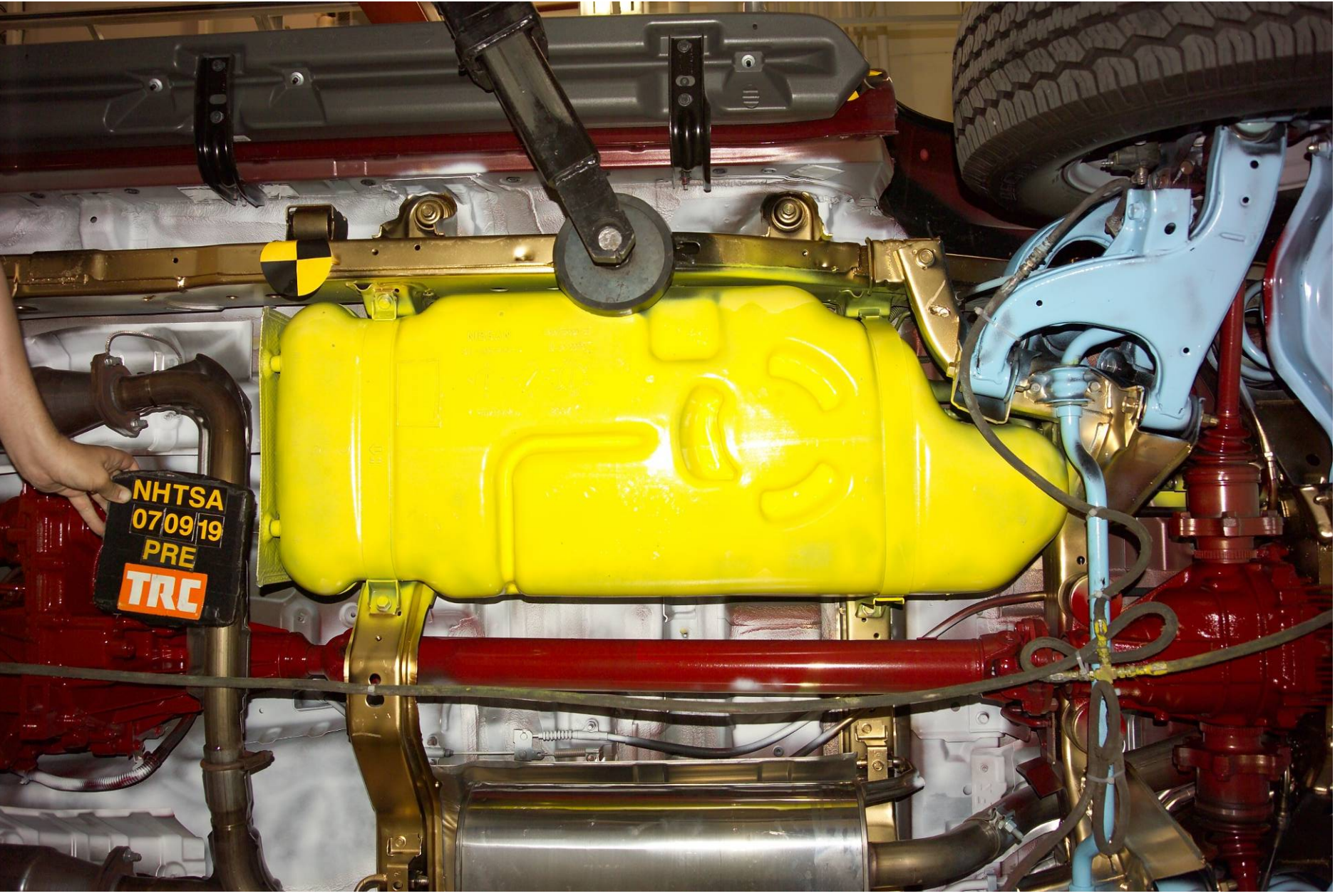


Figure A-29 Pre-Test Fuel Tank View

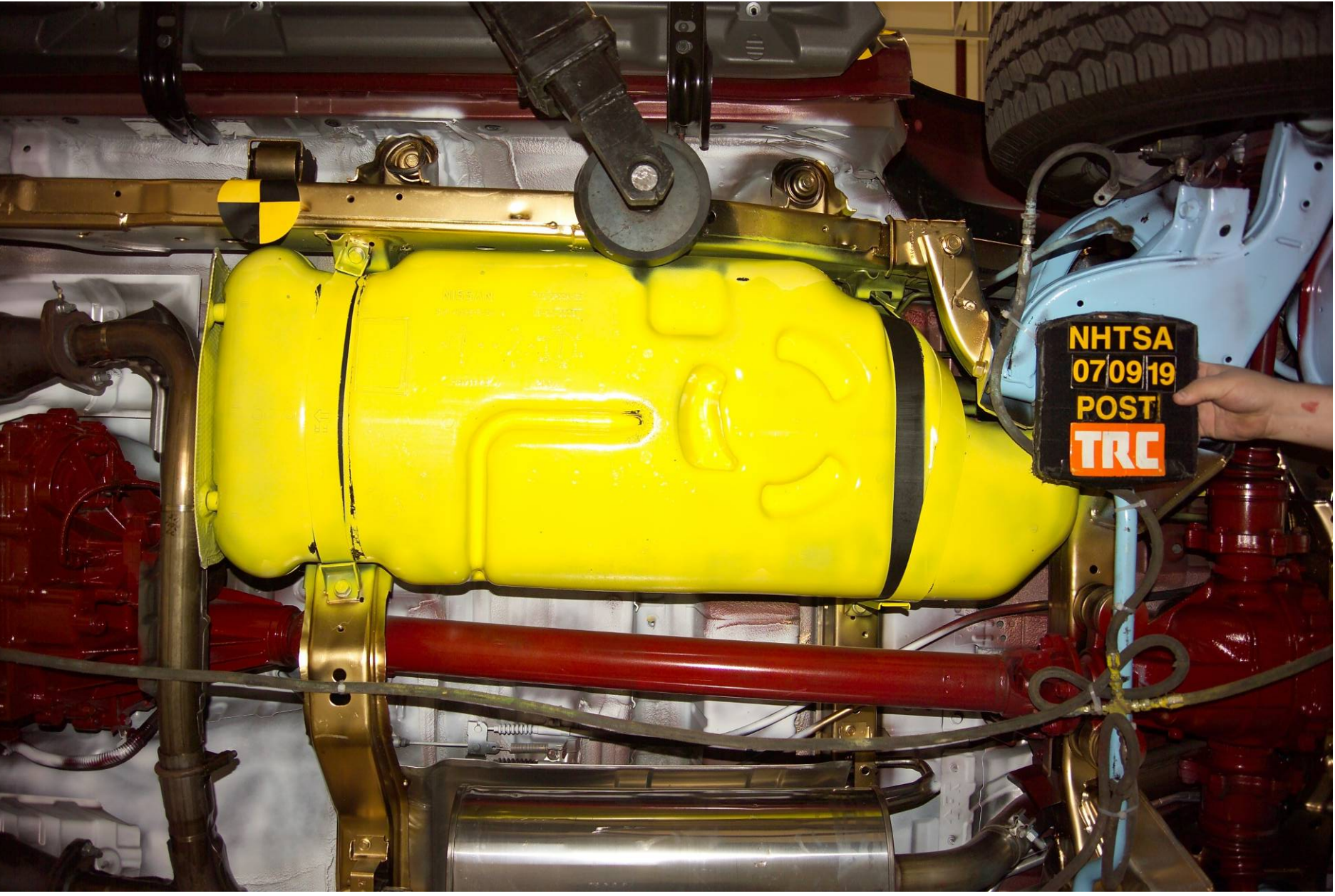


Figure A-30 Post-Test Fuel Tank View

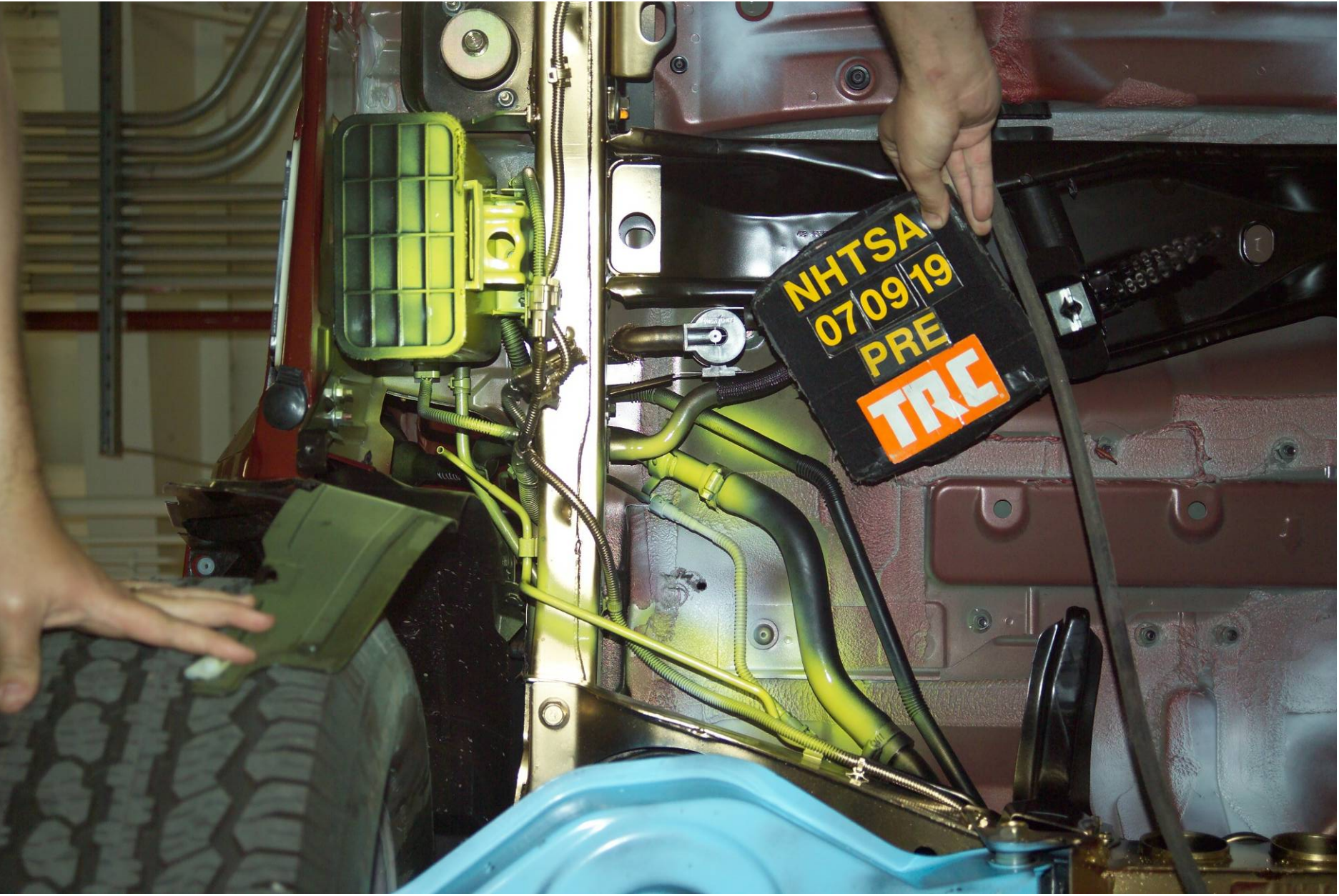


Figure A-31 Pre-Test Fuel Filler Neck View



Figure A-32 Post-Test Fuel Filler Neck View



Figure A-33 Pre-Test Fuel Filler Cap View



Figure A-34 Post-Test Fuel Filler Cap View



Figure A-35 Pre-Test Engine Compartment View

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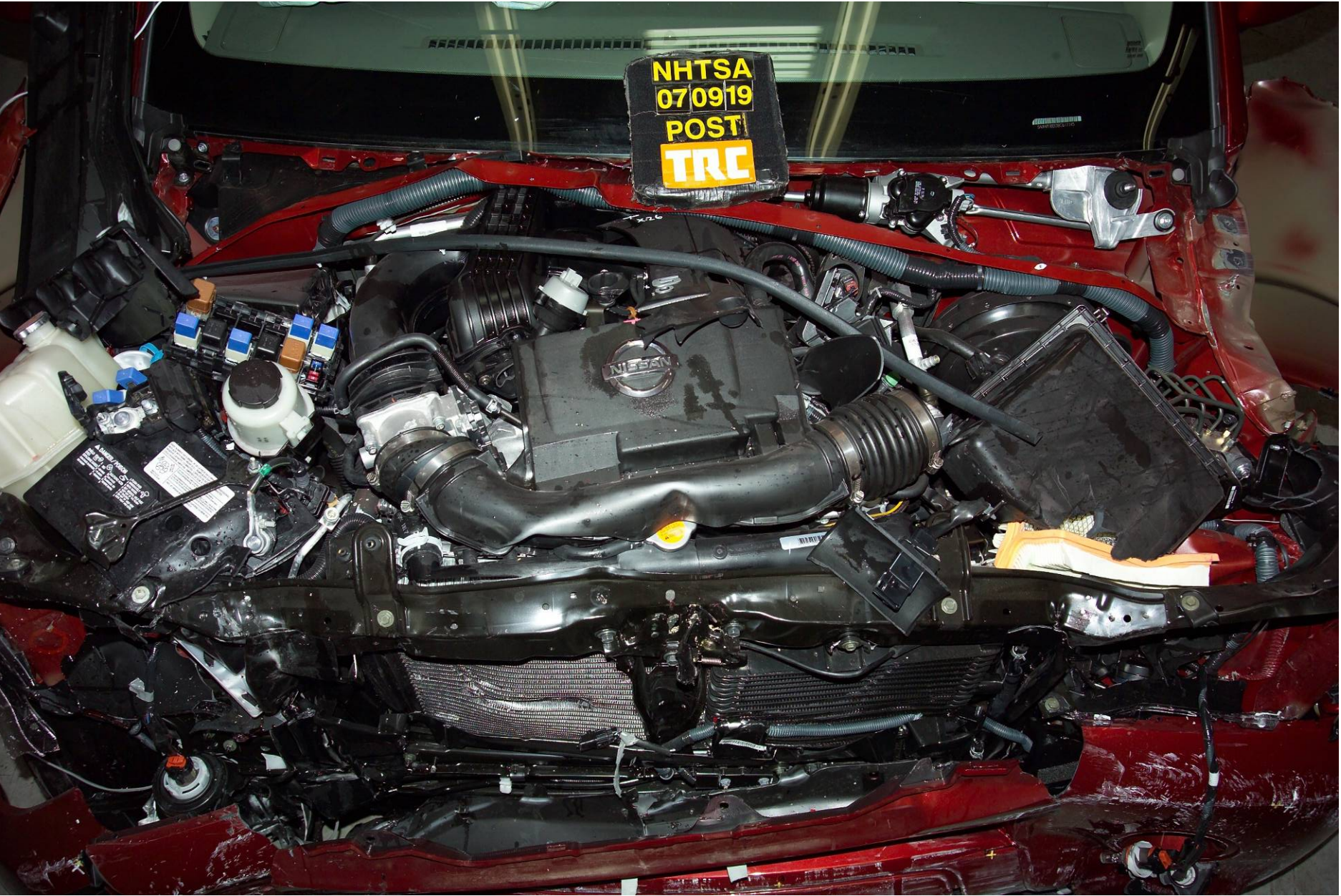


Figure A-36 Post-Test Engine Compartment View

A-40

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Figure A-37 Pre-Test Windshield View



Figure A-38 Post-Test Windshield View

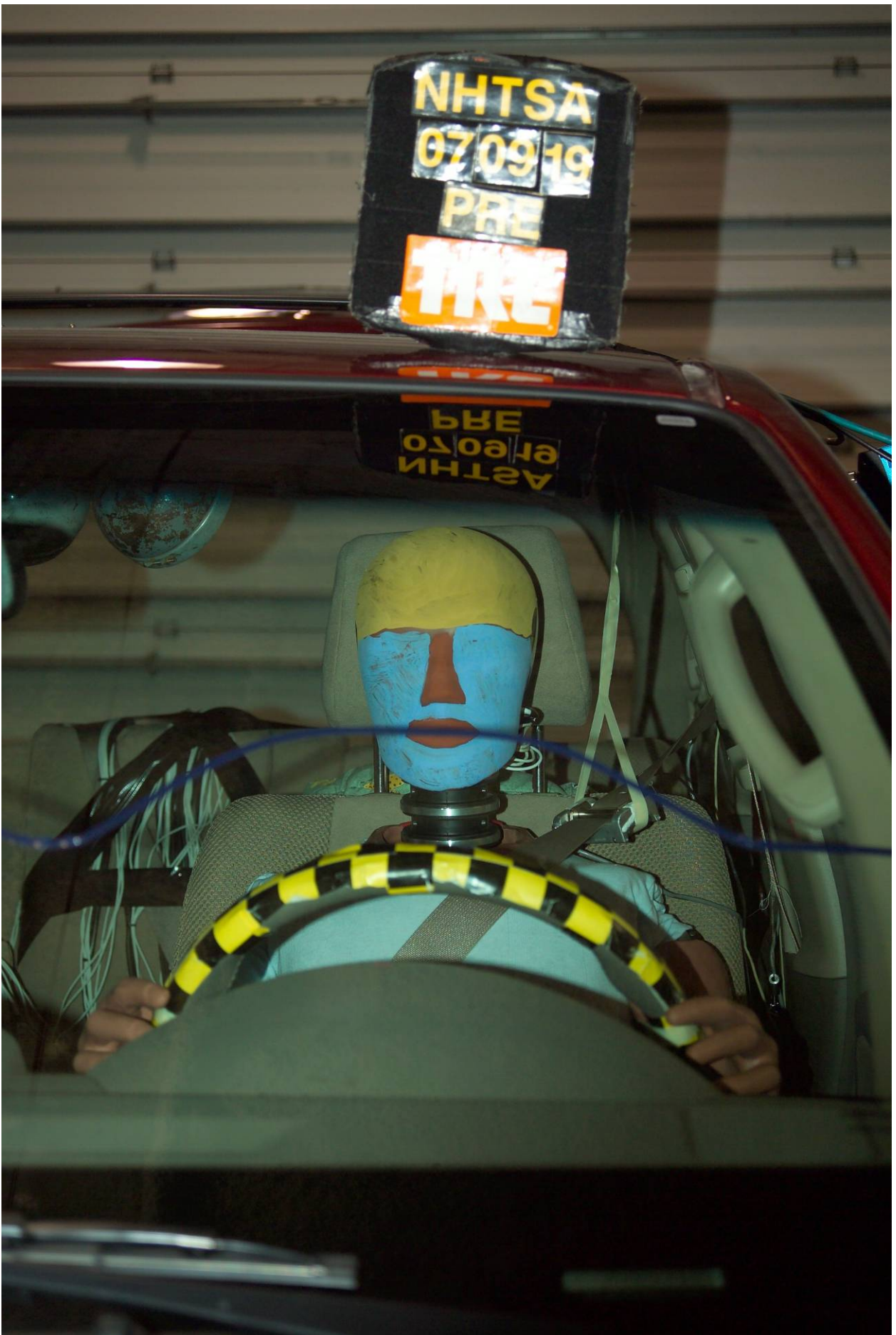


Figure A-39 Pre-Test Driver Dummy - View 1



Figure A-40 Post-Test Driver Dummy - View 1



Figure A-41 Pre-Test Driver Dummy - View 2



Figure A-42 Post-Test Driver Dummy - View 2



Figure A-43 Pre-Test Driver Dummy - View 3

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Figure A-44 Post-Test Driver Dummy - View 3



Figure A-45 Pre-Test Driver Dummy - View 4



Figure A-46 Post-Test Driver Dummy - View 4

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Figure A-47 Pre-Test Driver Seat Position View



Figure A-48 Post-Test Driver Seat Position View



Figure A-49 Pre-Test Driver Dummy Feet View



Figure A-50 Post-Test Driver Dummy Feet View



Figure A-51 Pre-Test Driver Dummy Head Position View



Figure A-52 Pre-Test Driver Knee Bolster View



Figure A-53 Post-Test Driver Knee Bolster View



Figure A-54 Post-Test Driver Dummy Overall View



Figure A-55 Post-Test Driver Dummy Head Contact - View 1



Figure A-56 Post-Test Driver Dummy Head Contact - View 2



Figure A-57 Post-Test Driver Floorboard Deformation View



Figure A-58 Post-Test Driver Toeboard Deformation View

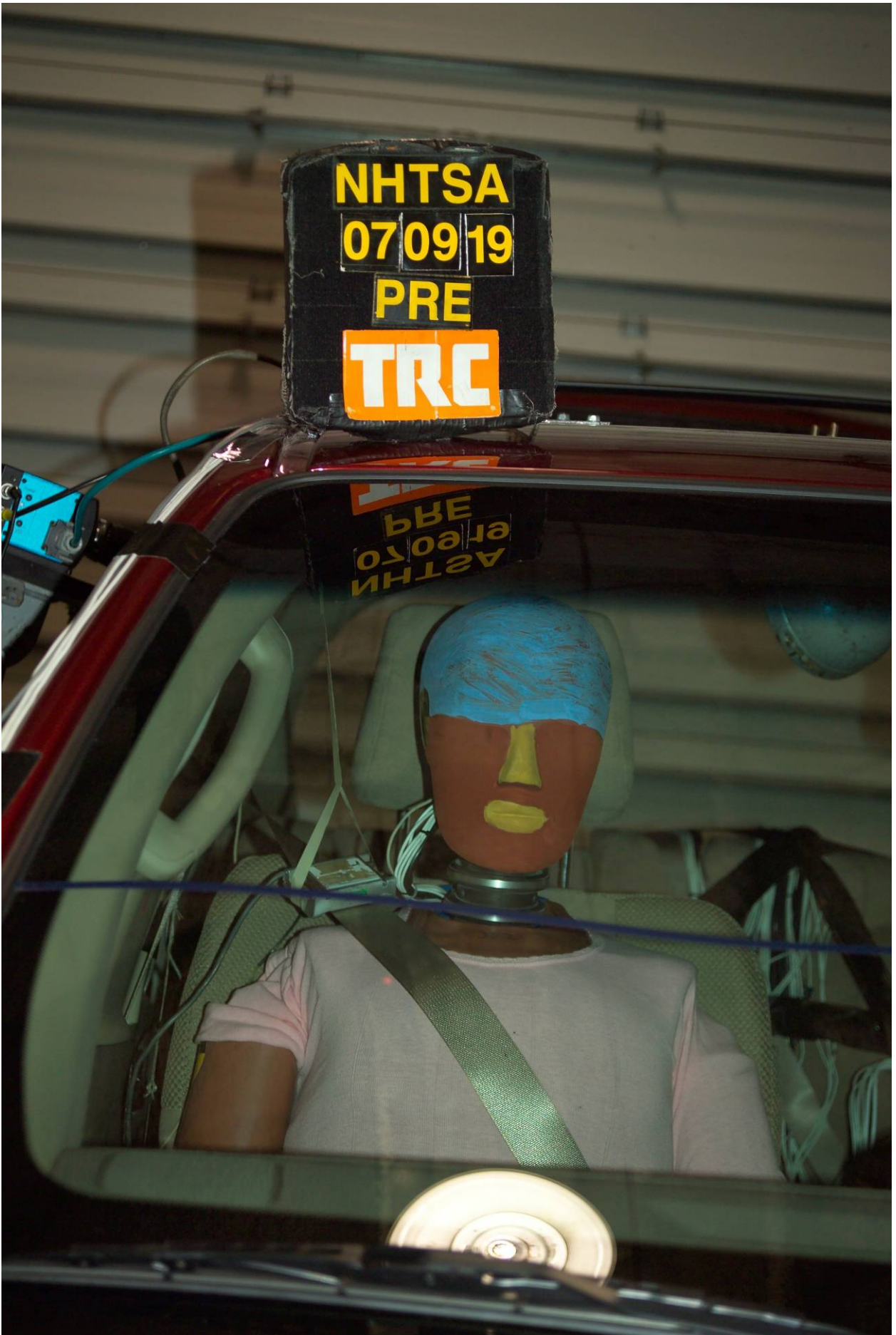


Figure A-59 Pre-Test Right Front Passenger Dummy - View 1



Figure A-60 Post-Test Right Front Passenger Dummy - View 1



Figure A-61 Pre-Test Right Front Passenger Dummy - View 2



Figure A-62 Post-Test Right Front Passenger Dummy - View 2

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Figure A-63 Pre-Test Right Front Passenger Dummy - View 3

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Figure A-64 Post-Test Right Front Passenger Dummy - View 3

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Figure A-65 Pre-Test Right Front Passenger Dummy - View 4



Figure A-66 Post-Test Right Front Passenger Dummy - View 4

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Figure A-67 Pre-Test Passenger Seat Position View

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Figure A-68 Post-Test Right Front Passenger Seat Position View



Figure A-69 Pre-Test Right Front Passenger Dummy Feet View



Figure A-70 Post-Test Right Front Passenger Dummy Feet View



Figure A-71 Pre-Test Right Front Passenger Dummy Head Position View



Figure A-72 Pre-Test Right Front Passenger Knee Bolster View



Figure A-73 Post-Test Right Front Passenger Dummy Overall View



Figure A-74 Post-Test Right Front Passenger Dummy Head Contact - View 1

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Figure A-75 Post-Test Right Front Passenger Dummy Head Contact - View 2

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Figure A-76 Post-Test Right Front Passenger Dummy Knee Contact View



Figure A-77 Post-Test Right Front Passenger Floorboard Deformation View



Figure A-78 Post-Test Right Front Passenger Toeboard Deformation View

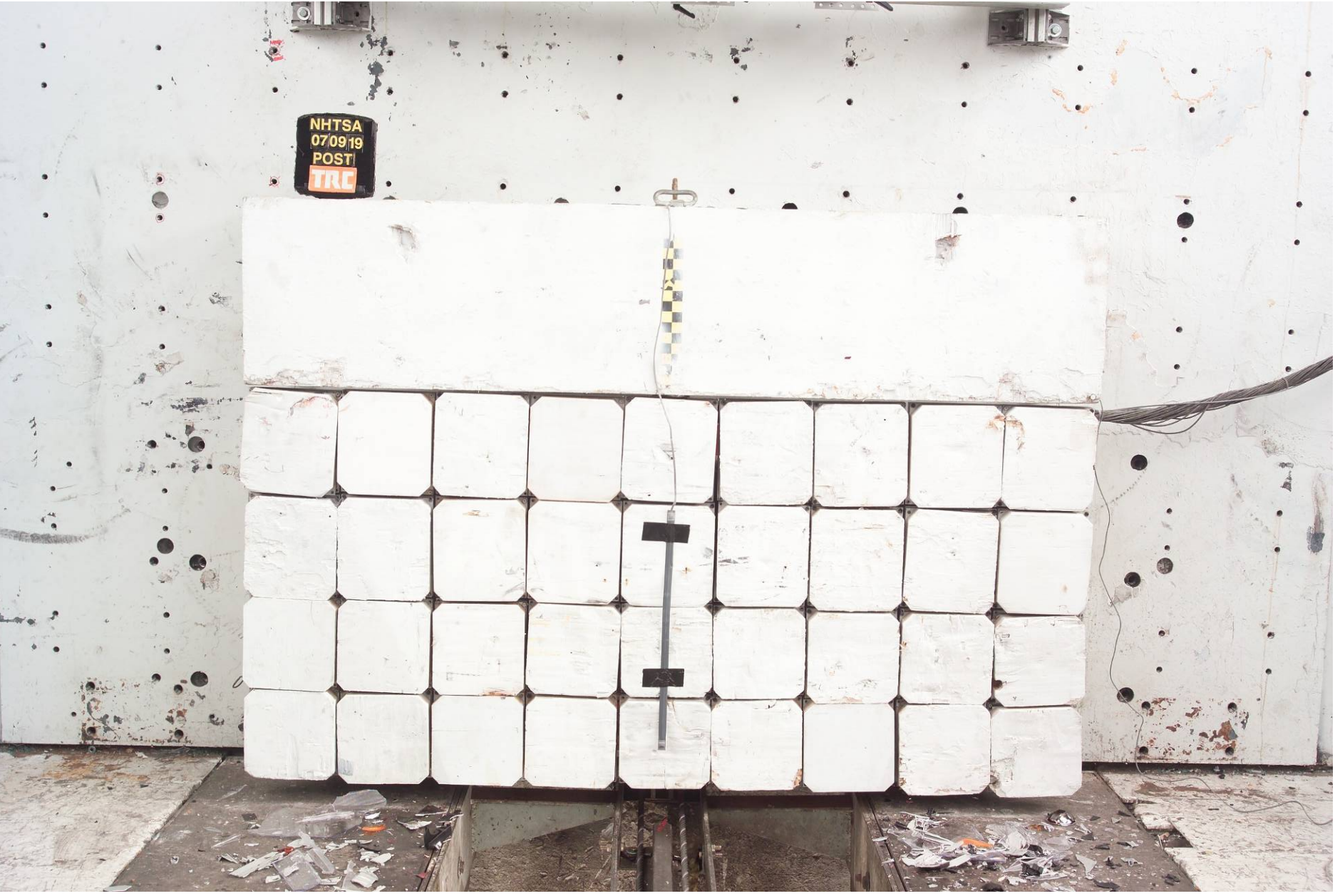


Figure A-79 Post-Test Barrier Front View

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MFD. BY NISSAN MOTOR CO., LTD.

DATE 07/07
GVWR 6113 LB
GAWR FR. 2820 LB
WITH P265/65R17 TIRES
17X7.5 RIMS AT 35 PSI
COLD SINGLE
GAWR RR. 3501 LB
WITH P265/65R17 TIRES
17X7.5 RIMS AT 35 PSI
COLD SINGLE

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

5N1AR18B38C 617145
TYPE: MPV 151
MODEL: JCKZLTN-EUA 0Z000
COLOR TRIM TRANS
A15 T C TRE5R05A
AXLE ENGINE
RC33 T VQ40DE 3954CC



Figure A-80 Vehicle Certification Label View



TIRE AND LOADING INFORMATION PNEU ET INFORMATION DE CHARGEMENT

SEATING CAPACITY NOMBRE DE PLACES	TOTAL TOTAL	7	FRONT AVANT	2	REAR ARRIÈRE	5
--------------------------------------	----------------	---	----------------	---	-----------------	---

THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED 1186 lbs OR 538 kg
LE POIDS COMBINÉ D'OCCUPANTS ET DE CARGAISON NE DEVRAIT JAMAIS EXCÉDER 1186 lbs OU 538 kg

TIRE PNEU	ORIGINAL TIRE SIZE TAILLE DU PNEU D'ORIGINE	COLD TIRE PRESSURE PRESSION DE GONFLAGE À FROIDS
FRONT AVANT	P265/65R17	240 kPa (35 psi)
REAR ARRIÈRE	P265/65R17	240 kPa (35 psi)
SPARE TIRE ROUE DE SECOURS	P265/65R17	240 kPa (35 psi)

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

Figure A-81 Vehicle Tire Load Label View



Figure A-82 FMVSS 301 Rollover View at 90°

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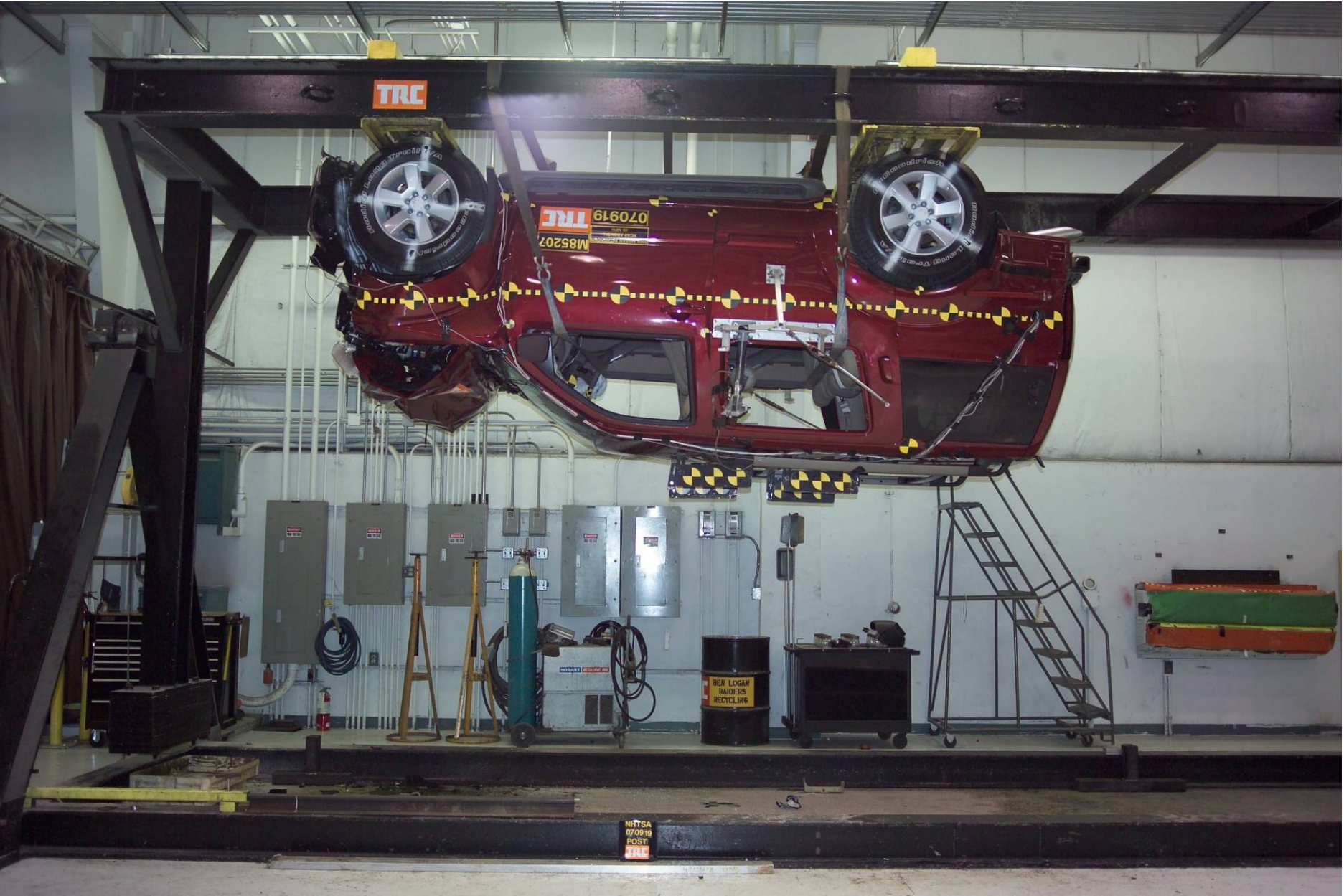


Figure A-83 FMVSS 301 Roll-over View at 180°

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070919

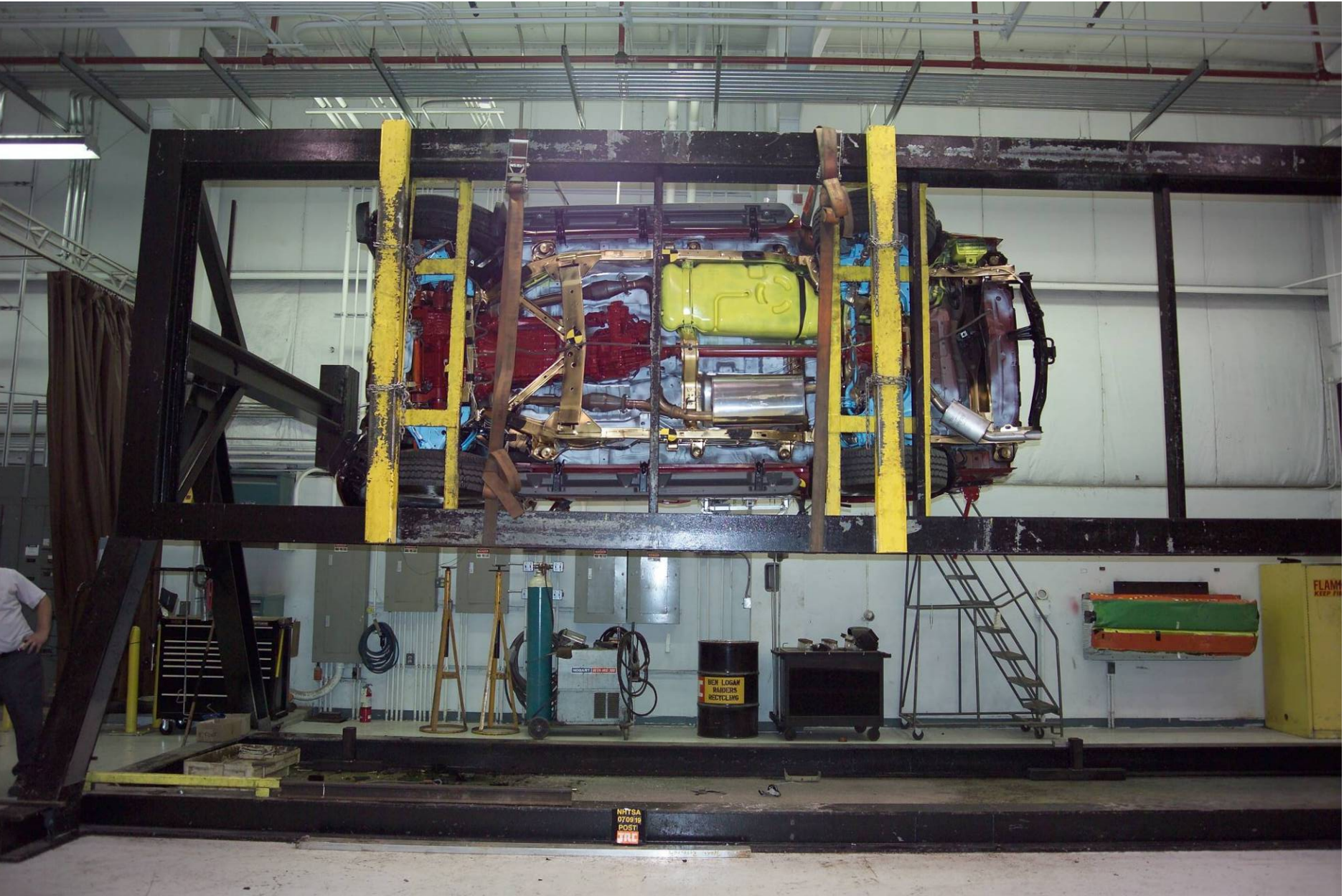


Figure A-84 FMVSS 301 Rollover View at 270°

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Figure A-85 FMVSS 301 Rollover View at 360°

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Figure A-86 Impact Event

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APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA

Data Plot	LIST OF DATA PLOTS PROVIDED IN THE TEST REPORT	Page
B-1	Driver Head Primary X	B-7
B-1	Driver Head Primary Y	B-7
B-1	Driver Head Primary Z	B-7
B-1	Driver Head Resultant Primary	B-7
B-2	Driver Chest Primary X	B-8
B-2	Driver Chest Primary Y	B-8
B-2	Driver Chest Primary Z	B-8
B-2	Driver Chest Resultant Primary	B-8
B-3	Driver Left Femur Force Z	B-9
B-3	Driver Right Femur Force Z	B-9
B-4	Left Rear Passenger Head Primary X	B-10
B-4	Left Rear Passenger Head Primary Y	B-10
B-4	Left Rear Passenger Head Primary Z	B-10
B-4	Left Rear Passenger Head Resultant Primary	B-10
B-5	Left Rear Passenger Chest Primary X	B-11
B-5	Left Rear Passenger Chest Primary Y	B-11
B-5	Left Rear Passenger Chest Primary Z	B-11
B-5	Left Rear Passenger Chest Resultant	B-11
B-6	Left Rear Passenger Left Femur Force Z	B-12
B-6	Left Rear Passenger Right Femur Force Z	B-12

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 Redundant
Driver Head Y Redundant
Driver Head Z Redundant
Driver Head Resultant 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 Chest X Redundant
Driver Chest Y Redundant
Driver Chest Z Redundant
Driver Chest Resultant Redundant
Driver Chest Displacement
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Pelvis Resultant
Driver Left Upper Tibia Moment X
Driver Left Upper Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Foot X
Driver Left Foot Z
Driver Left Toe Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Foot X

Driver Right Foot Z
Driver Right Toe Z
Passenger Head X Redundant
Passenger Head Y Redundant
Passenger Head Z Redundant
Passenger Head Resultant Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Chest X Redundant
Passenger Chest Y Redundant
Passenger Chest Z Redundant
Passenger Chest Resultant Redundant
Passenger Chest Displacement
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Pelvis Resultant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Foot X
Passenger Left Foot Z
Passenger Left Toe Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Foot X
Passenger Right Foot Z

Passenger Right Toe Z
Vehicle Left Rear Crossmember Z
Vehicle Right Rear Crossmember Z
Vehicle Top of Engine Block X
Vehicle Right Brake Caliper X
Vehicle Left Brake Caliper X
Vehicle Instrument Panel X
Vehicle Instrument Panel Velocity
Vehicle Instrument Panel Displacement
Driver Lap Belt Force
Driver Shoulder Belt Force
Passenger Lap Belt Force
Passenger Shoulder Belt Force
Driver Seat Belt String Pot
Passenger Seat Belt String Pot
Driver Belt Elongation
Passenger Belt Elongation
Barrier Load Cell A1
Barrier Load Cell A2
Barrier Load Cell A3
Barrier Load Cell A4
Barrier Load Cell A5
Barrier Load Cell A6
Barrier Load Cell A7
Barrier Load Cell A8
Barrier Load Cell A9
Barrier Load Cell B1
Barrier Load Cell B2
Barrier Load Cell B3
Barrier Load Cell B4
Barrier Load Cell B5
Barrier Load Cell B6
Barrier Load Cell B7
Barrier Load Cell B8
Barrier Load Cell B9
Barrier Load Cell C1

Data Plot LIST OF DATA PLOTS (CONTINUED)

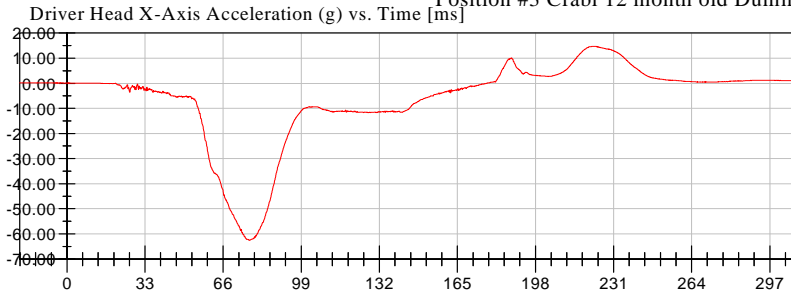
Barrier Load Cell C2
Barrier Load Cell C3
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Barrier Load Cell C8
Barrier Load Cell C9
Barrier Load Cell D1
Barrier Load Cell D2
Barrier Load Cell D3
Barrier Load Cell D4
Barrier Load Cell D5
Barrier Load Cell D6
Barrier Load Cell D7
Barrier Load Cell D8
Barrier Load Cell D9
Barrier Load Cell Group 1 Force
Barrier Load Cell Group 2 Force
Barrier Load Cell Group 3 Force
Barrier Load Cell Group 4 Force
Barrier Load Cell Group 5 Force
Barrier Load Cell Group 6 Force
Barrier Load Cell Total Force

NHTSA

Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)
Position #3 Crabi 12 month old Dummy (094)



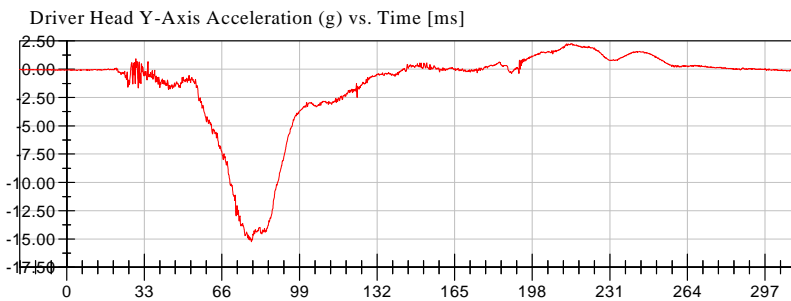
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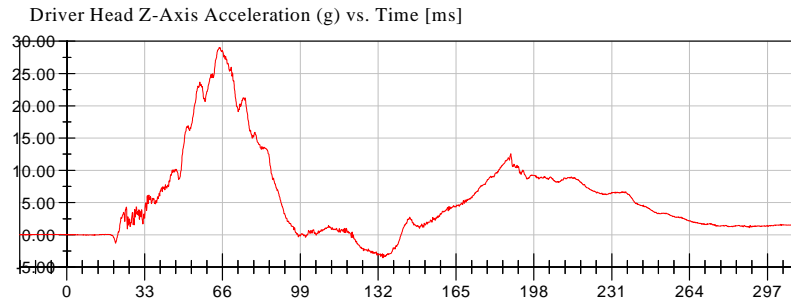
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-15.23 g at 78.56 ms

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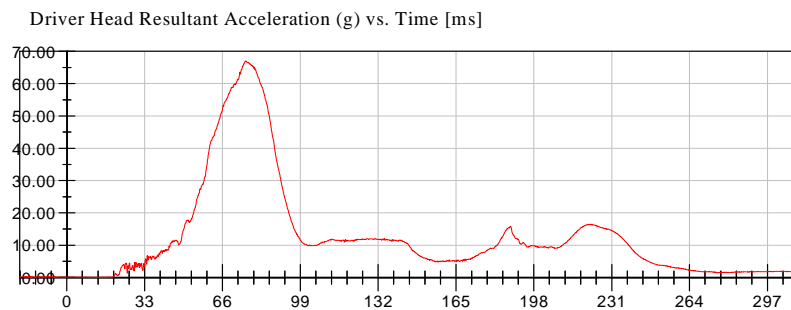
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29.02 g at 64.56 ms

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-3.57 g at 134.08 ms

CFC_1000



<Max>

67.06 g at 75.92 ms

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0.02 g at 12.16 ms

CFC_1000

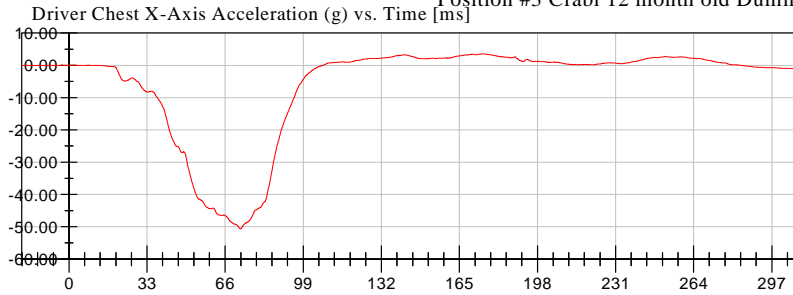


NHTSA

Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)
Position #3 Crabi 12 month old Dummy (094)



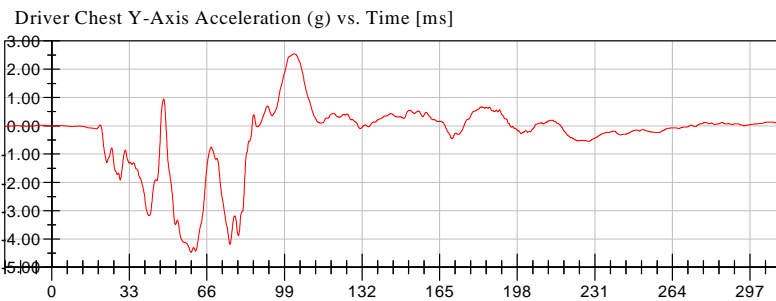
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-50.66 g at 72.48 ms

CFC_180



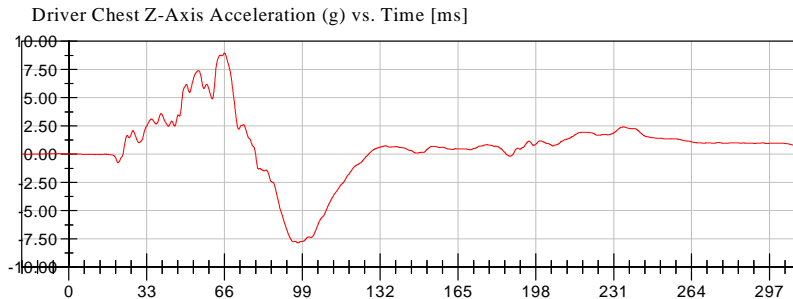
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2.54 g at 102.96 ms

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-4.47 g at 59.28 ms

CFC_180



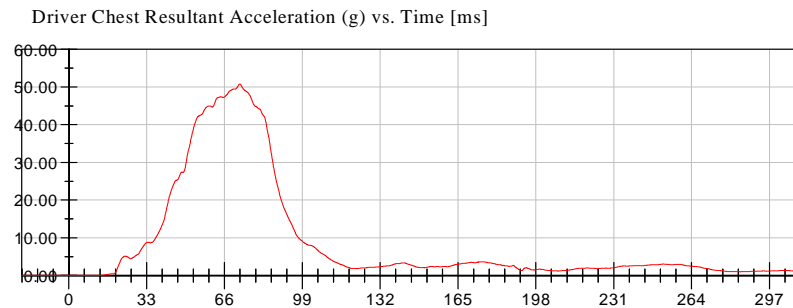
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8.96 g at 66.00 ms

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CFC_180



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CFC_180

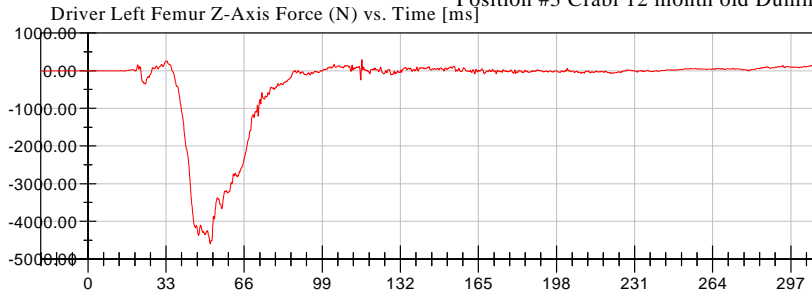


NHTSA

Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)
Position #3 Crabi 12 month old Dummy (094)



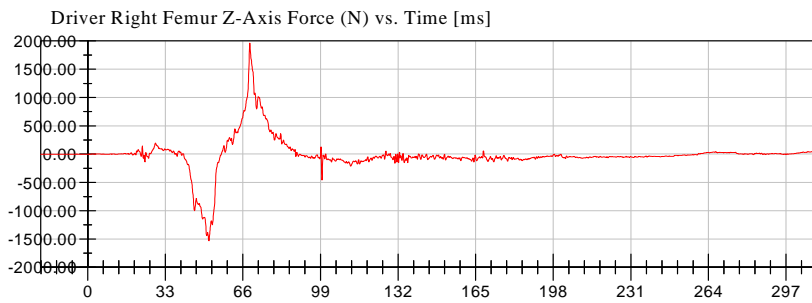
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-4,601.29 N at 51.68 ms

CFC_600



<Max>

1,962.77 N at 68.96 ms

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-1,531.65 N at 51.52 ms

CFC_600



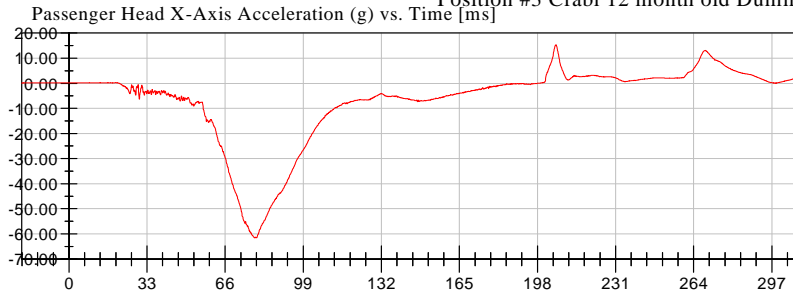
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Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)

Position #3 Crabi 12 month old Dummy (094)



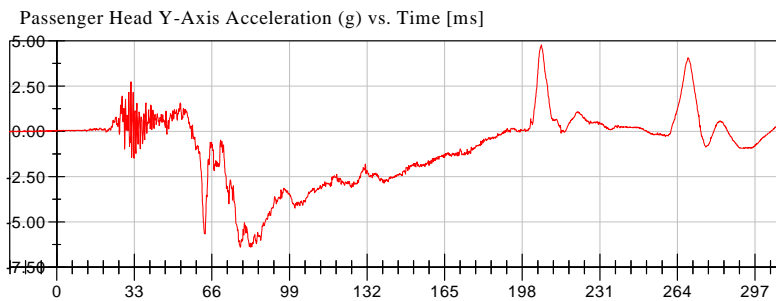
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-61.64 g at 78.48 ms

CFC_1000



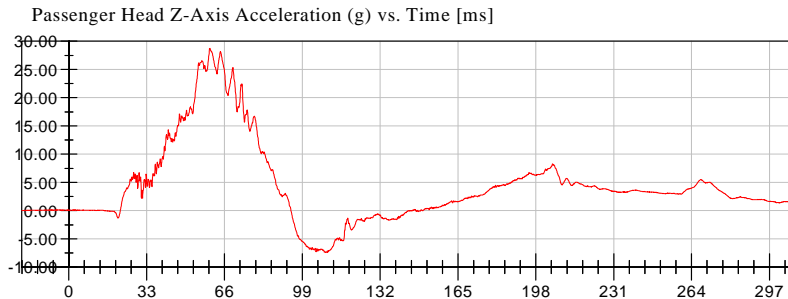
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4.78 g at 206.08 ms

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-6.39 g at 78.16 ms

CFC_1000



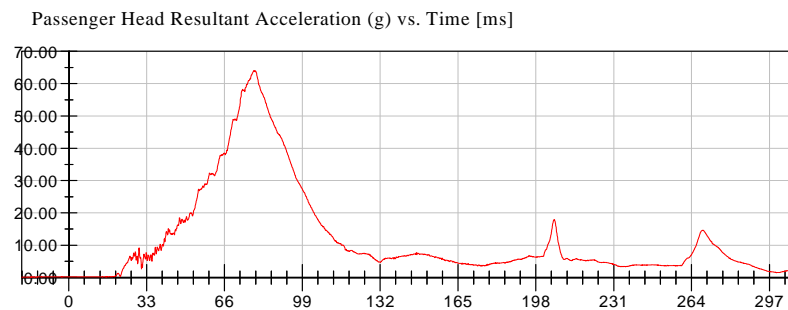
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CFC_1000



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64.12 g at 78.48 ms

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CFC_1000



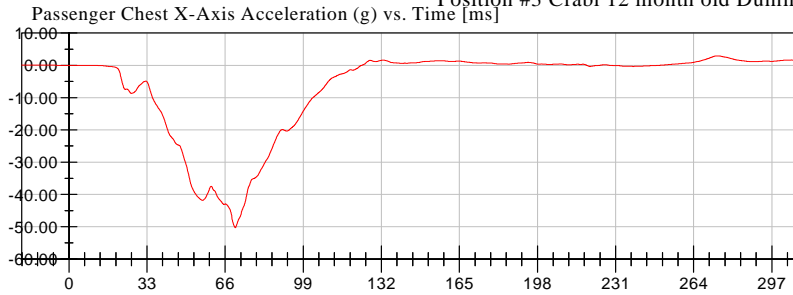
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Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
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Position #3 Crabi 12 month old Dummy (094)



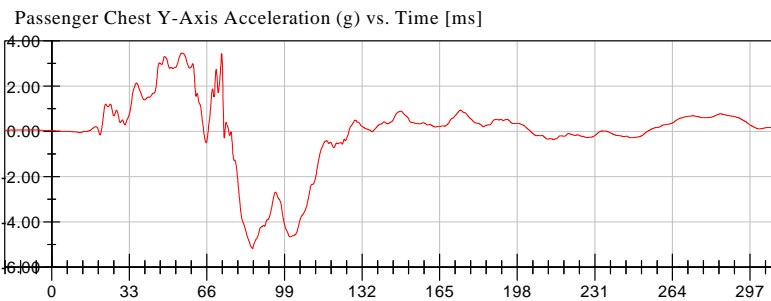
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-50.29 g at 70.32 ms

CFC_180



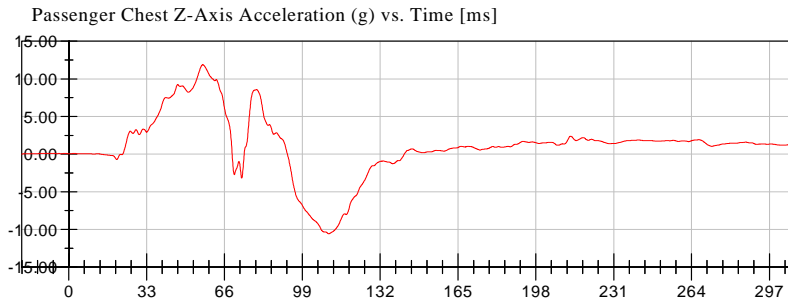
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-5.17 g at 85.44 ms

CFC_180



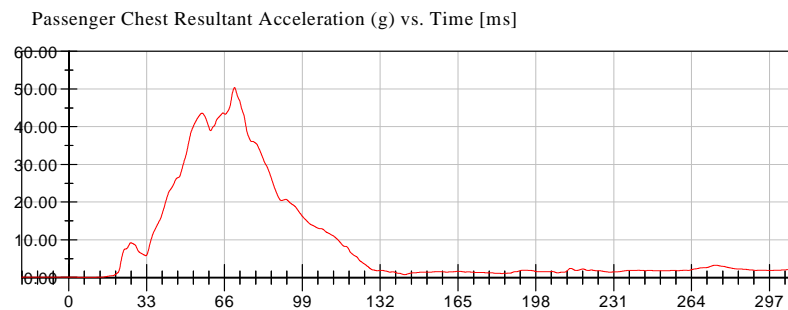
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11.89 g at 56.80 ms

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-10.56 g at 110.24 ms

CFC_180



<Max>

50.41 g at 70.32 ms

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0.05 g at 8.88 ms

CFC_180



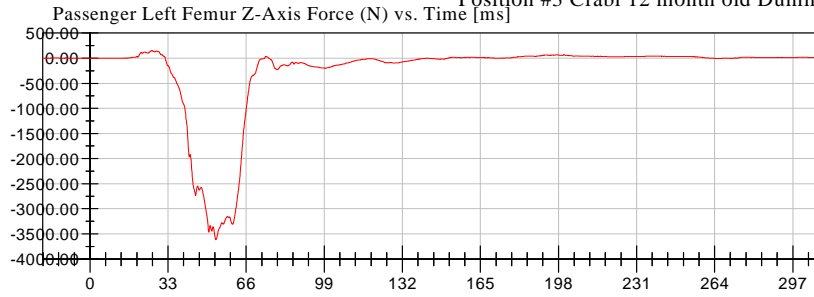
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Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)

Position #3 Crabi 12 month old Dummy (094)



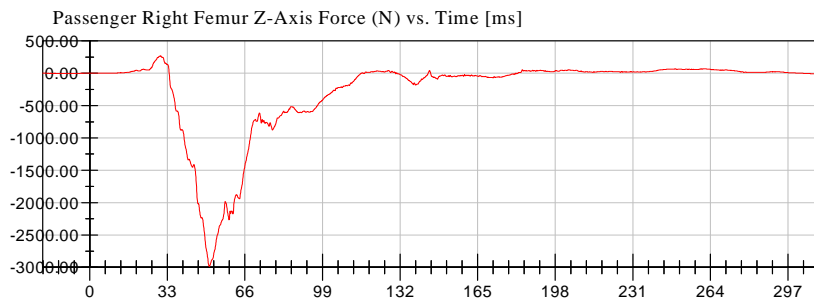
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149.21 N at 26.24 ms

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-3,613.38 N at 53.28 ms

CFC_600



<Max>

270.57 N at 30.24 ms

<Min>

-2,984.89 N at 50.96 ms

CFC_600



APPENDIX C
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID/HIII: 037

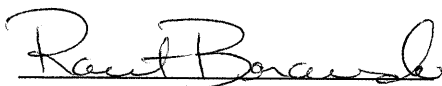
Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 37
Calibration No. 02

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	881	Yes
B	Shoulder Pivot Height	505.5 - 520.7	518	Yes
C	H-Point Height	83.8 - 88.9	86	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	90	Yes
F	Thigh Clearance	139.7 - 154.9	154	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	291	Yes
H	Skull Cap To Backline	40.6 - 45.7	43	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	339	Yes
J	Elbow Rest Height	190.5 - 210.8	193	Yes
K	Buttock Knee Length	579.1 - 604.5	601	Yes
L	Popliteal Height	429.3 - 454.7	430	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	225	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	430	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	975	Yes
Z	Waist Circumference	835.7 - 866.1	856	Yes
AA	Location For Chest Circumference	429.3 - 434.3	431	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Technician

Approved





Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 2-1

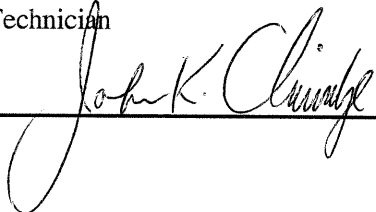
Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	255.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

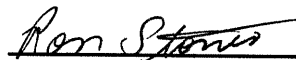
Test meets specifications.

Comments:

Technician



Approved





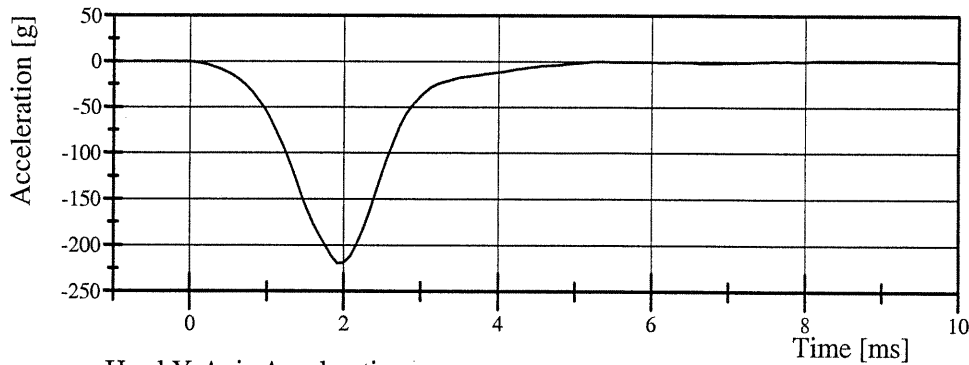
Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 2-1

Test Date: 9/13/2007

Head X-Axis Acceleration

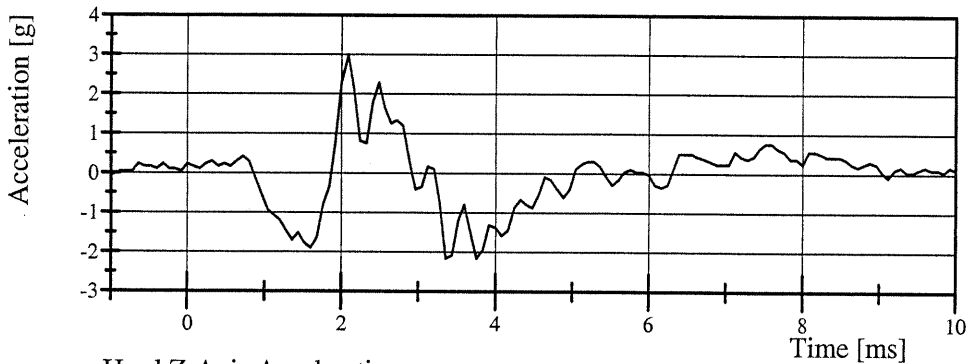


Filter Class: CFC_1000

Max: 1.2 g at 8.4 ms

Min: -219.3 g at 1.9 ms

Head Y-Axis Acceleration

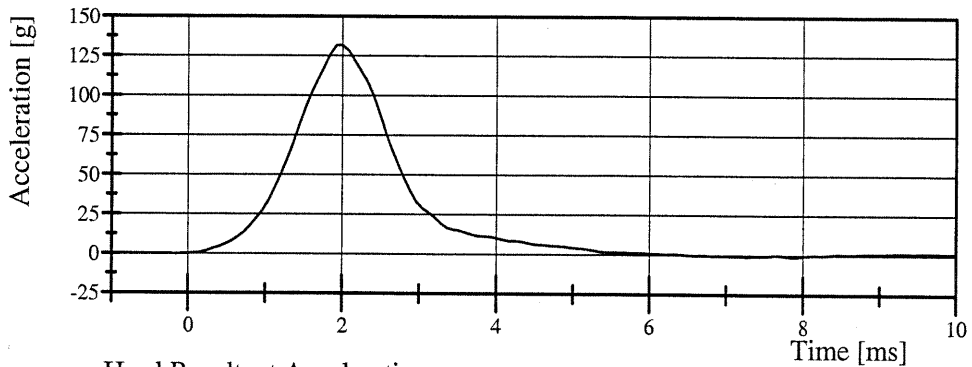


Filter Class: CFC_1000

Max: 3.0 g at 2.1 ms

Min: -2.2 g at 3.4 ms

Head Z-Axis Acceleration

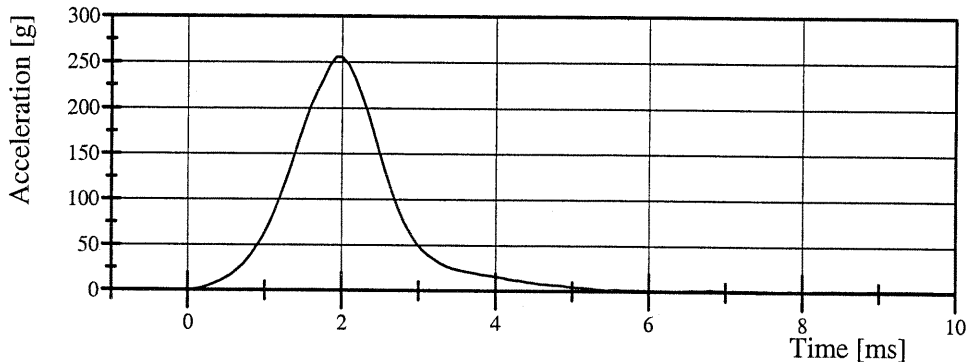


Filter Class: CFC_1000

Max: 132.0 g at 2.0 ms

Min: -0.8 g at 7.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 255.8 g at 2.0 ms

Min: 0.1 g at -1.0 ms

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 2-16

Test Date: 9/17/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.941 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	36.0 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.32 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-22.08 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.03 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.03 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-75.9 °	Yes
Time of Peak	57 - 64 ms	59.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	119.8 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	107.2 N·m	Yes
Time of Peak	47 - 58 ms	49.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.5 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



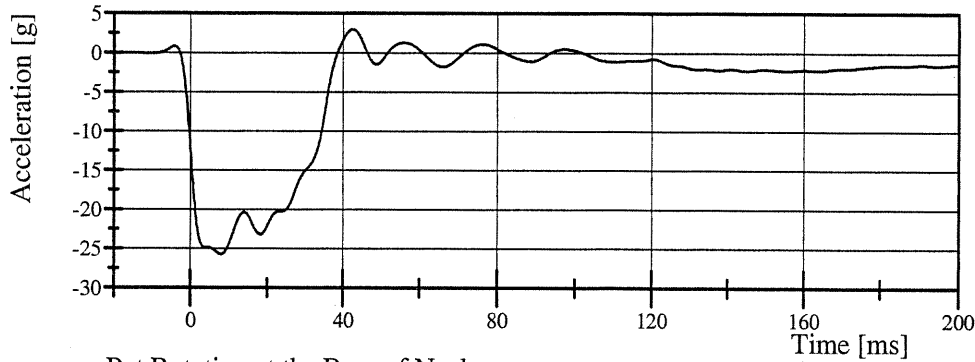
Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 2-16

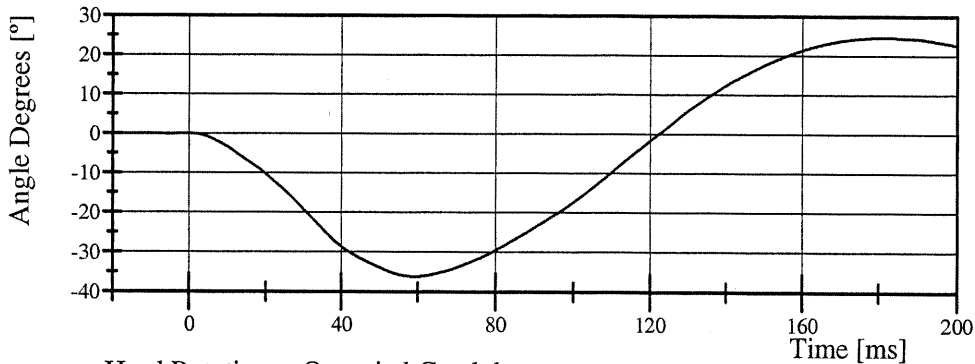
Test Date: 9/17/2007

Pendulum Acceleration



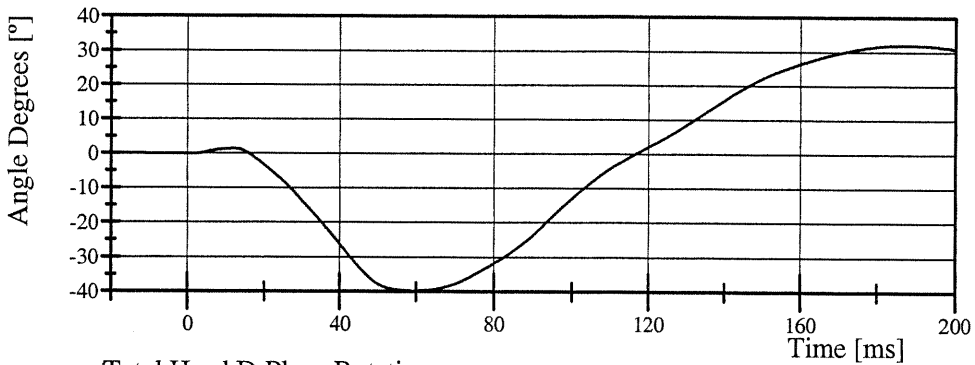
Filter Class: CFC_60
Max: 3.0 g at 42.5 ms
Min: -25.7 g at 7.9 ms

Pot Rotation at the Base of Neck



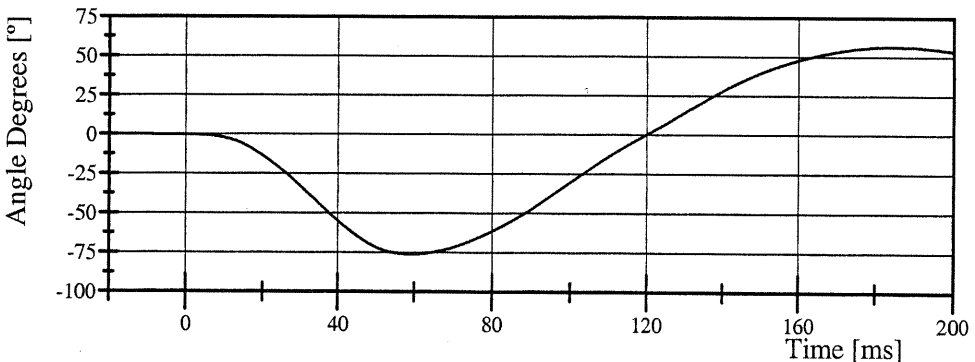
Filter Class: CFC_60
Max: 24.7 ° at 181.4 ms
Min: -36.2 ° at 59.3 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 32.0 ° at 187.8 ms
Min: -39.8 ° at 59.5 ms

Total Head D-Plane Rotation



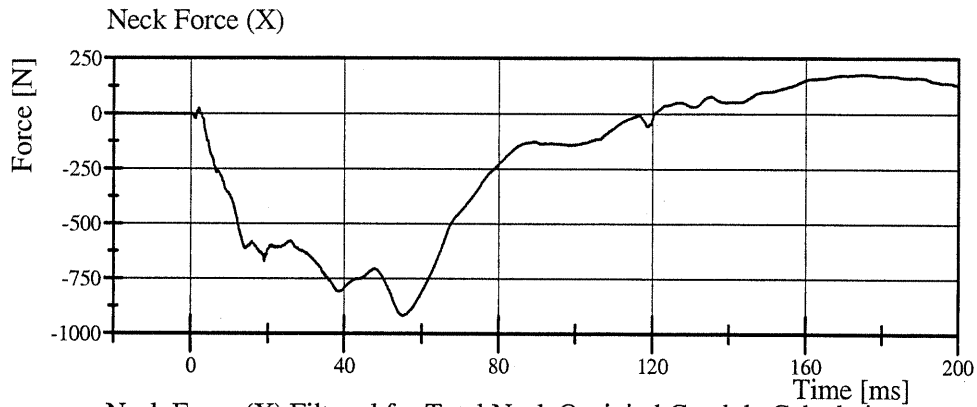
Filter Class: CFC_60
Max: 56.6 ° at 184.3 ms
Min: -75.9 ° at 59.4 ms

Transportation Research Center Inc.

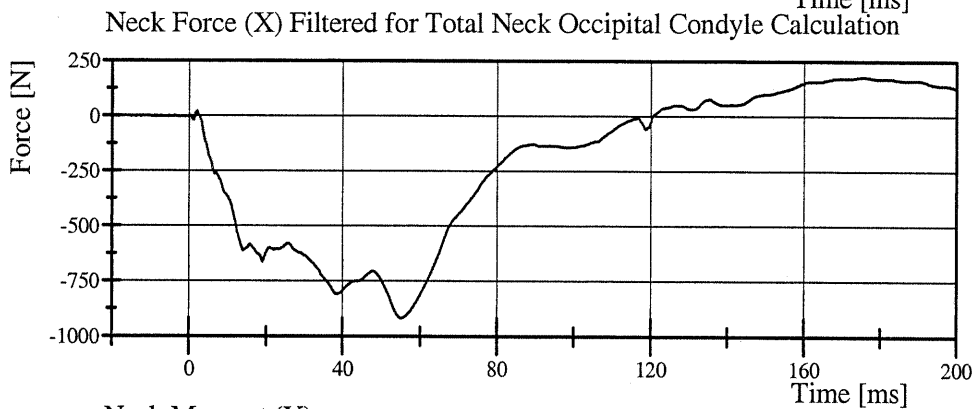
Neck Flexion

HIII 50th Serial No. 037 Certification No. 2-16

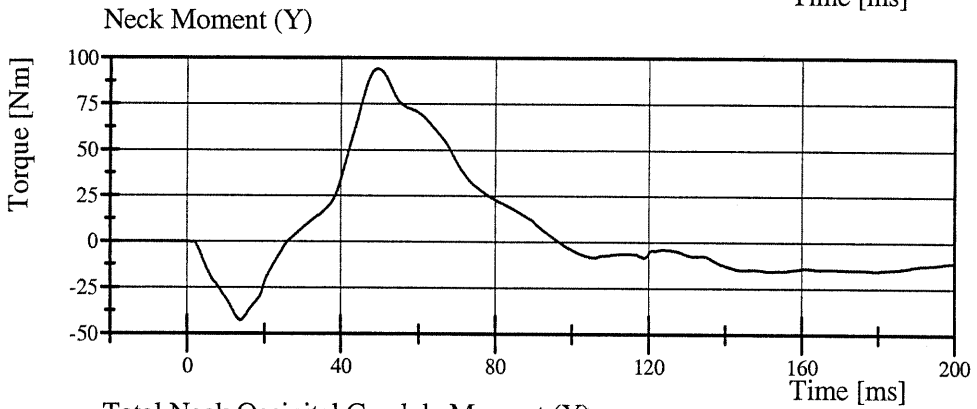
Test Date: 9/17/2007



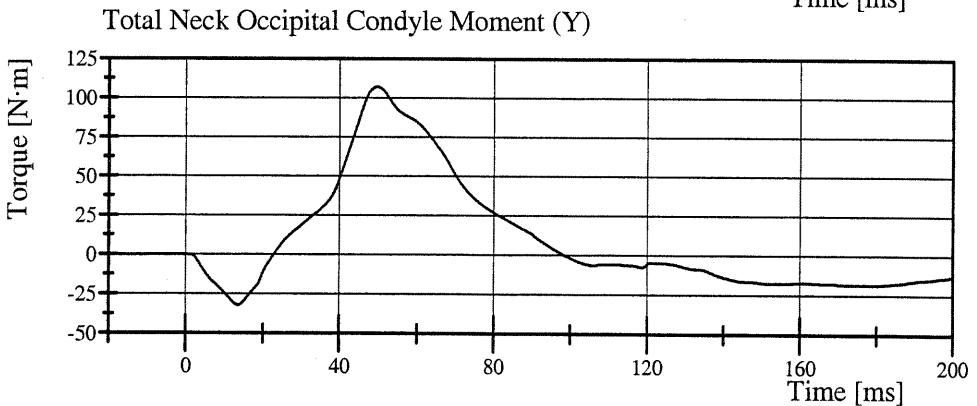
Filter Class: CFC_1000
Max: 179.7 N at 175.4 ms
Min: -918.5 N at 55.0 ms



Filter Class: CFC_600
Max: 179.0 N at 175.5 ms
Min: -918.2 N at 55.0 ms



Filter Class: CFC_600
Max: 94.2 Nm at 49.4 ms
Min: -42.8 Nm at 13.8 ms



Filter Class: CFC_600
Max: 107.2 N·m at 49.6 ms
Min: -32.1 N·m at 13.7 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 2-1

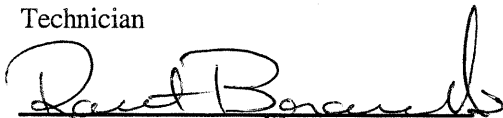
Test Date: 9/17/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.969 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	40.5 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.93 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.79 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	12.76 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	12.79 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	100.4 °	Yes
Time of Peak	72 - 82 ms	78.2 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	164.0 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-72.4 N·m	Yes
Time of Peak	65 - 79 ms	73.4 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	148.0 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

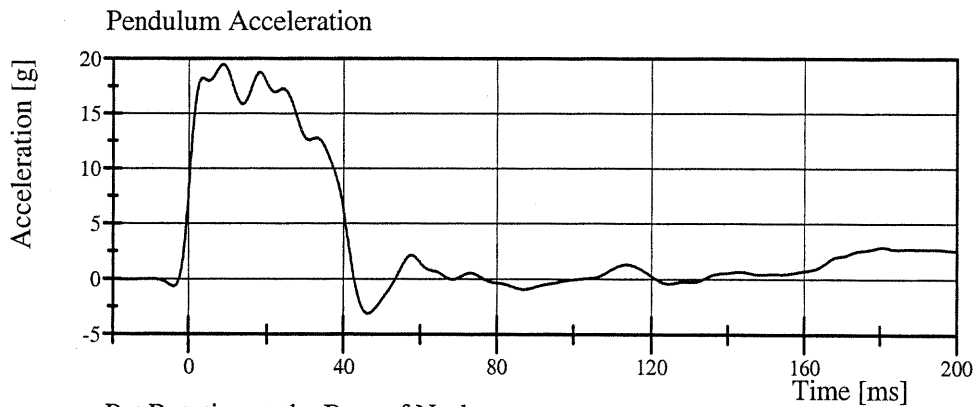


Transportation Research Center Inc.

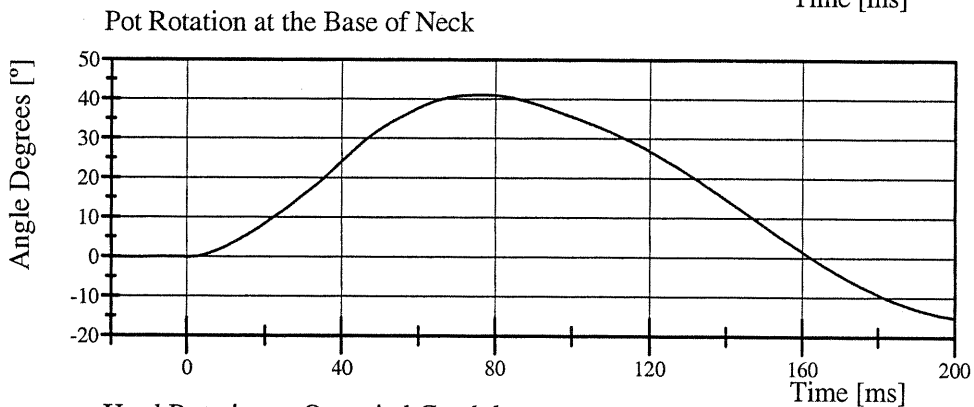
Neck Extension

HIII 50th Serial No. 037 Certification No. 2-1

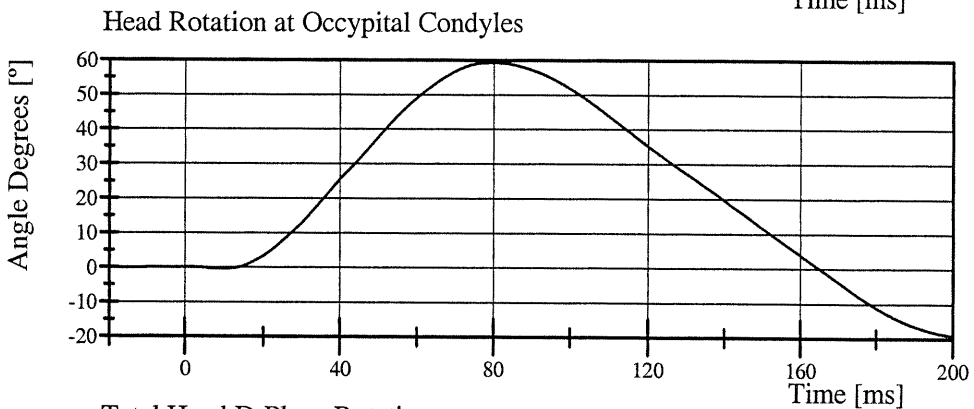
Test Date: 9/17/2007



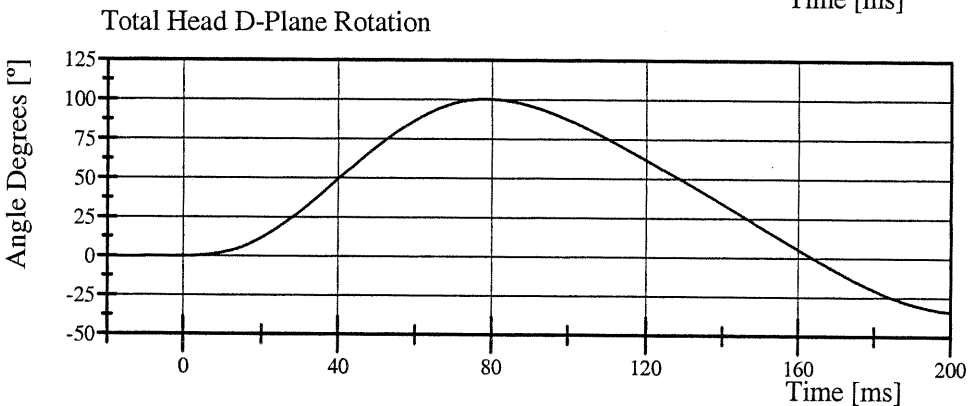
Filter Class: CFC_60
Max: 19.5 g at 8.7 ms
Min: -3.1 g at 46.3 ms



Filter Class: CFC_60
Max: 41.1 ° at 76.2 ms
Min: -15.0 ° at 200.0 ms



Filter Class: CFC_60
Max: 59.3 ° at 79.9 ms
Min: -19.0 ° at 200.0 ms



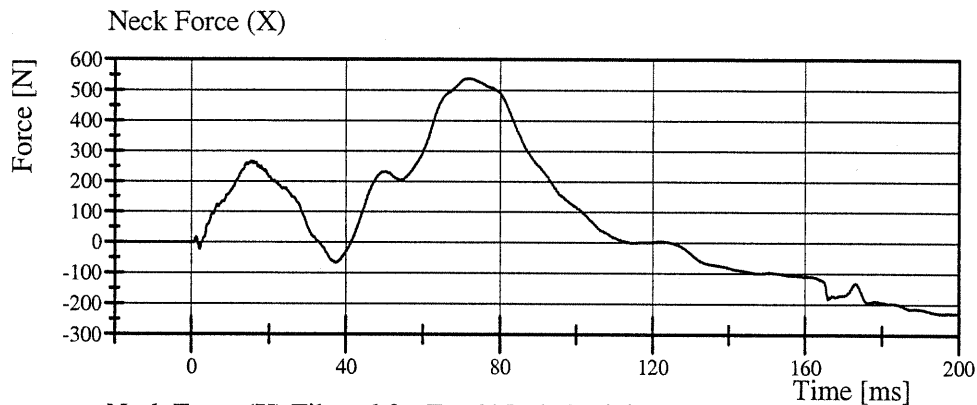
Filter Class: CFC_60
Max: 100.4 ° at 78.2 ms
Min: -34.1 ° at 200.0 ms

Transportation Research Center Inc.

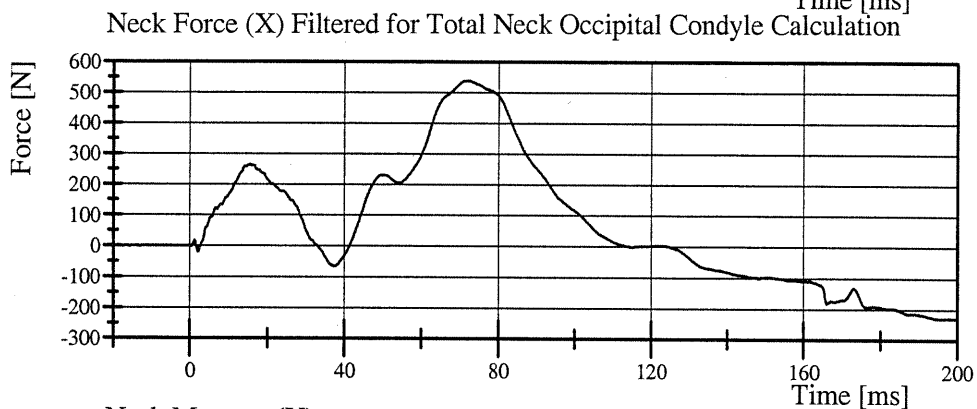
Neck Extension

HIII 50th Serial No. 037 Certification No. 2-1

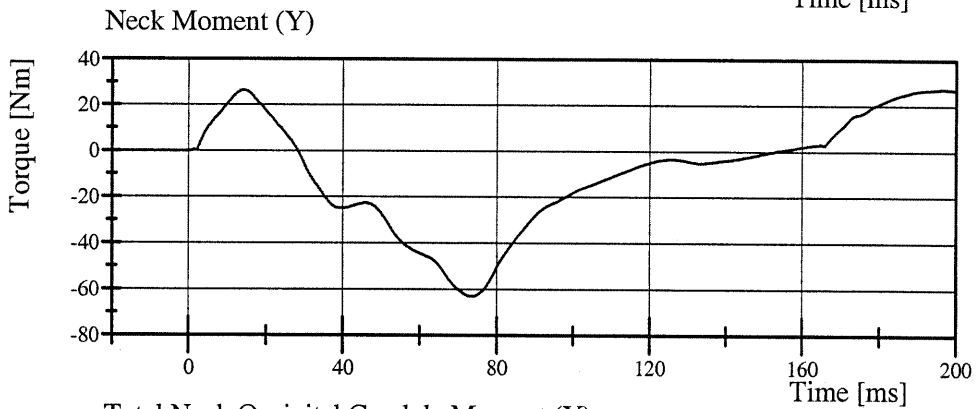
Test Date: 9/17/2007



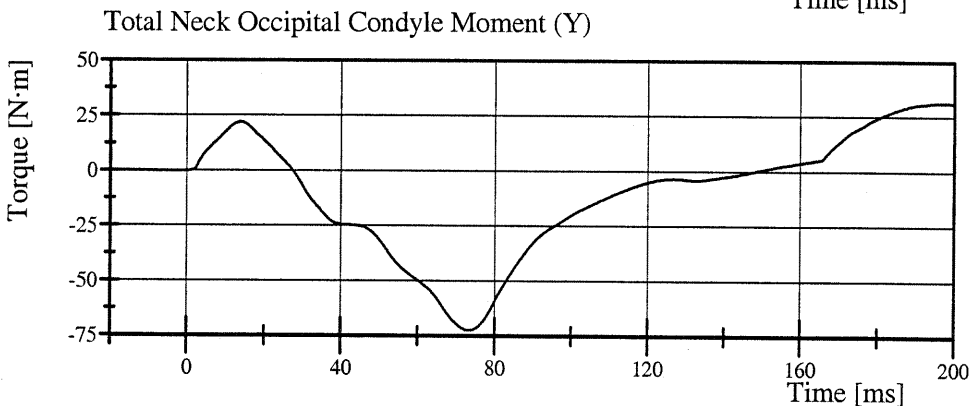
Filter Class: CFC_1000
Max: 539.1 N at 72.0 ms
Min: -230.8 N at 200.0 ms



Filter Class: CFC_600
Max: 538.9 N at 72.1 ms
Min: -230.6 N at 200.0 ms



Filter Class: CFC_600
Max: 27.4 Nm at 197.1 ms
Min: -63.0 Nm at 73.7 ms



Filter Class: CFC_600
Max: 31.4 N·m at 196.9 ms
Min: -72.4 N·m at 73.4 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 2-8

Test Date: 9/18/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.624 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,705.9 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-63.78 mm	Yes
Internal Hysteresis	65 - 85 %	77.3 %	Yes

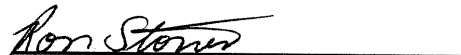
Test meets specifications.

Comments:

Technician



Approved



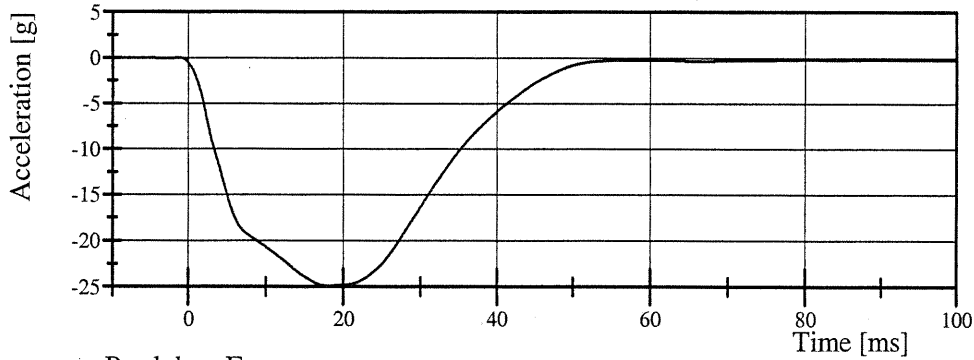
Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 2-8

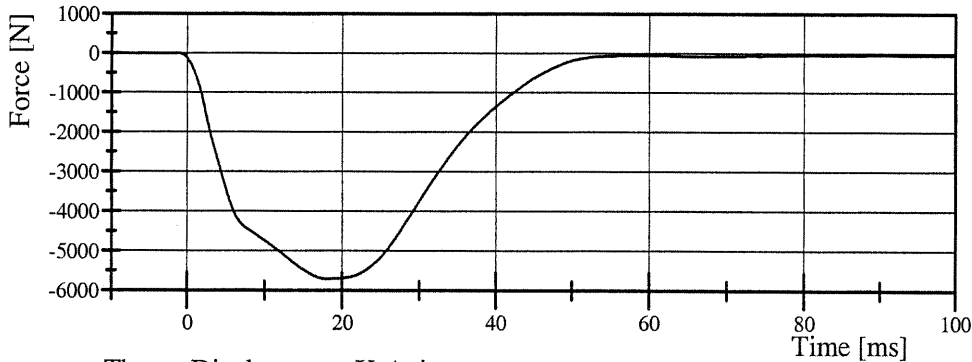
Test Date: 9/18/2007

Pendulum Acceleration



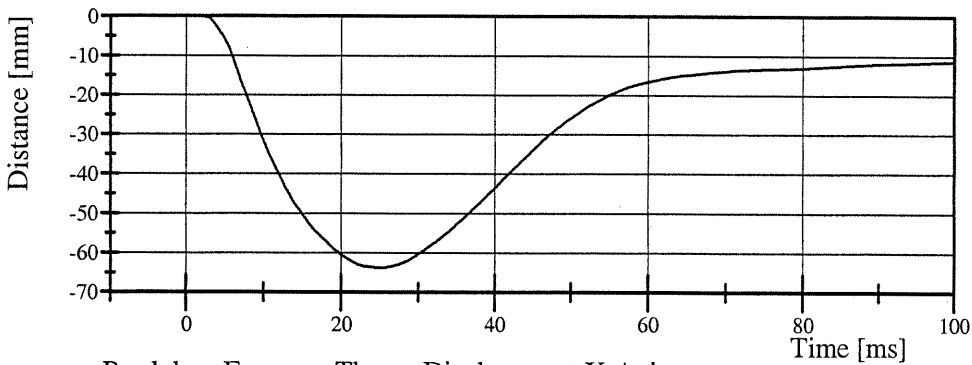
Filter Class: CFC_180
Max: 0.0 g at -10.0 ms
Min: -24.9 g at 18.1 ms

Pendulum Force



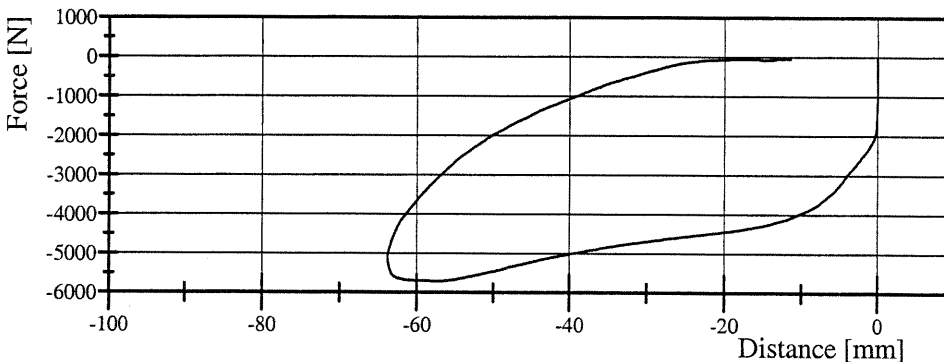
Filter Class: CFC_180
Max: 4.4 N at -10.0 ms
Min: -5,705.9 N at 18.1 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.3 ms
Min: -63.8 mm at 25.0 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 4.4 N at -0.0 mm
Min: -5,705.9 N at -57.3 mm

Applied Safety Technologies Corp.

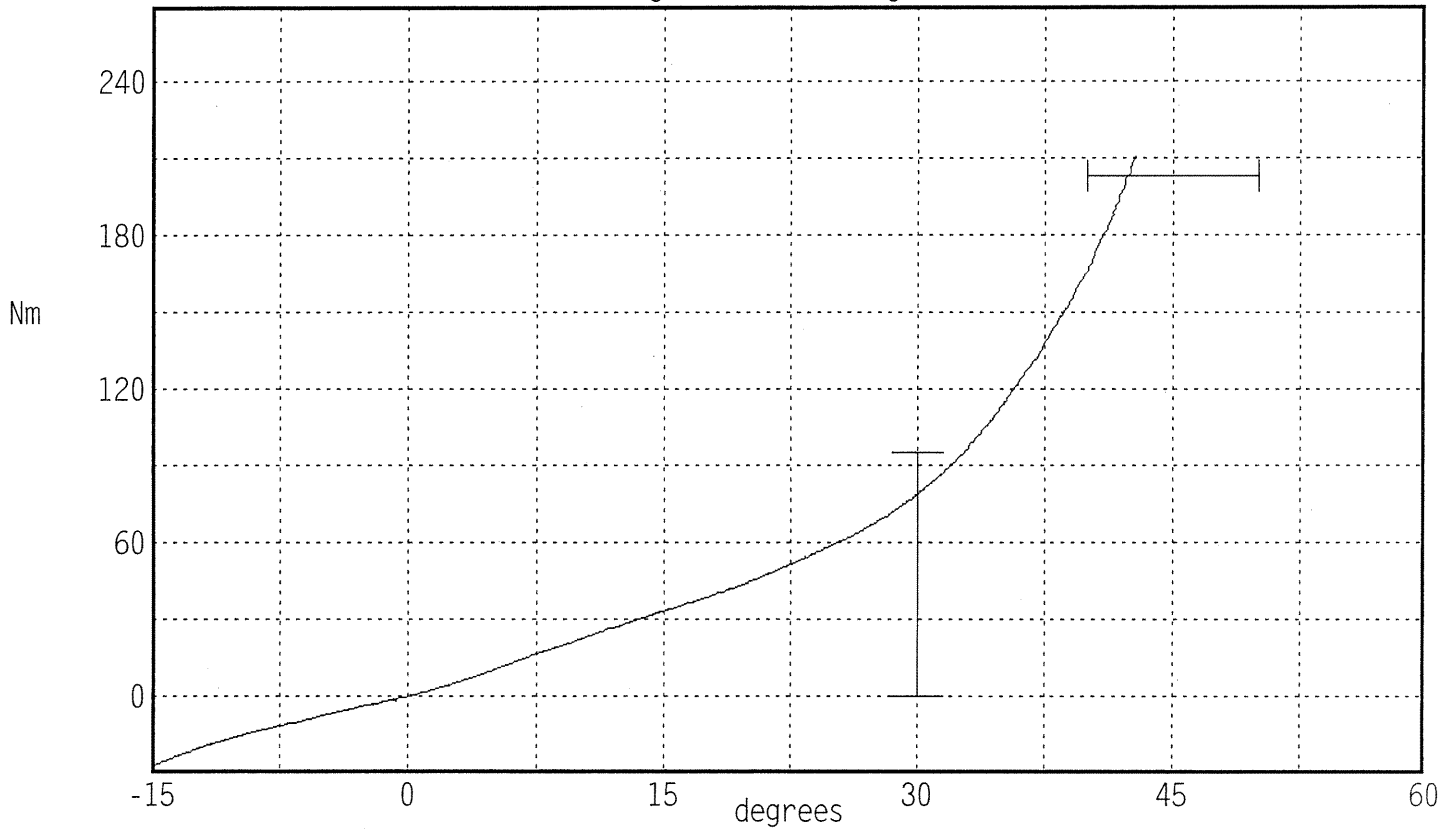
Hybrid III Hip Range of Motion

Serial Number: 037L
Test Number: 037C02
Comments:

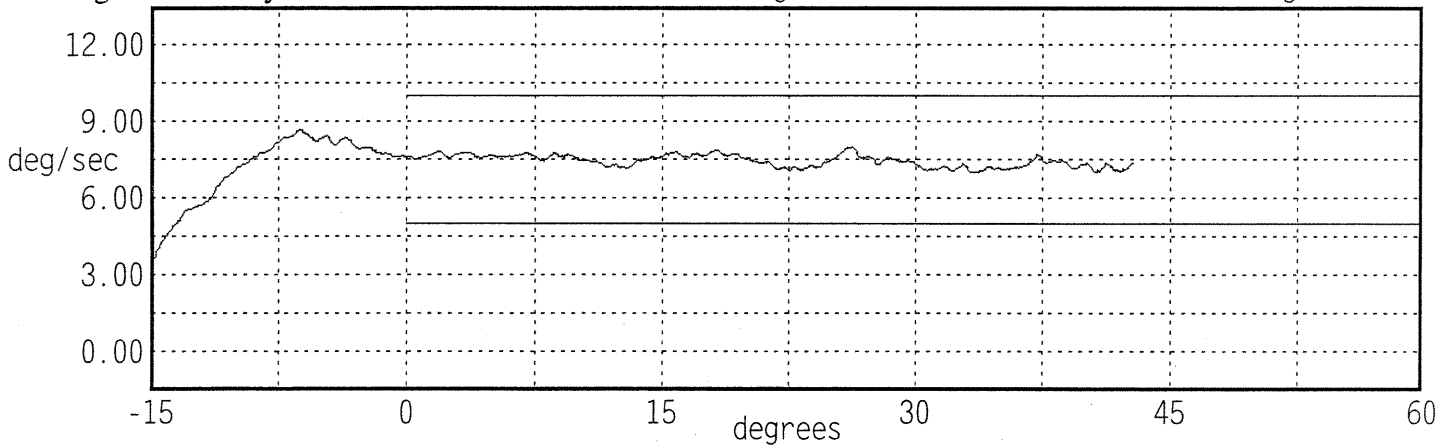
Date: 09/13/2007
Time: 09:22

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	20.9 °C	Pass
Humidity	10 - 70	50 %	Pass
Moment at 30 deg	<= 94.9	78.9 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.4 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point
Peak Moment: 210.3 Nm at 42.8 deg
Peak Angle: 42.8 deg at 210.3 Nm



Angular Velocity Max: 8.0 deg/sec Min: 7.0 deg/sec



Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

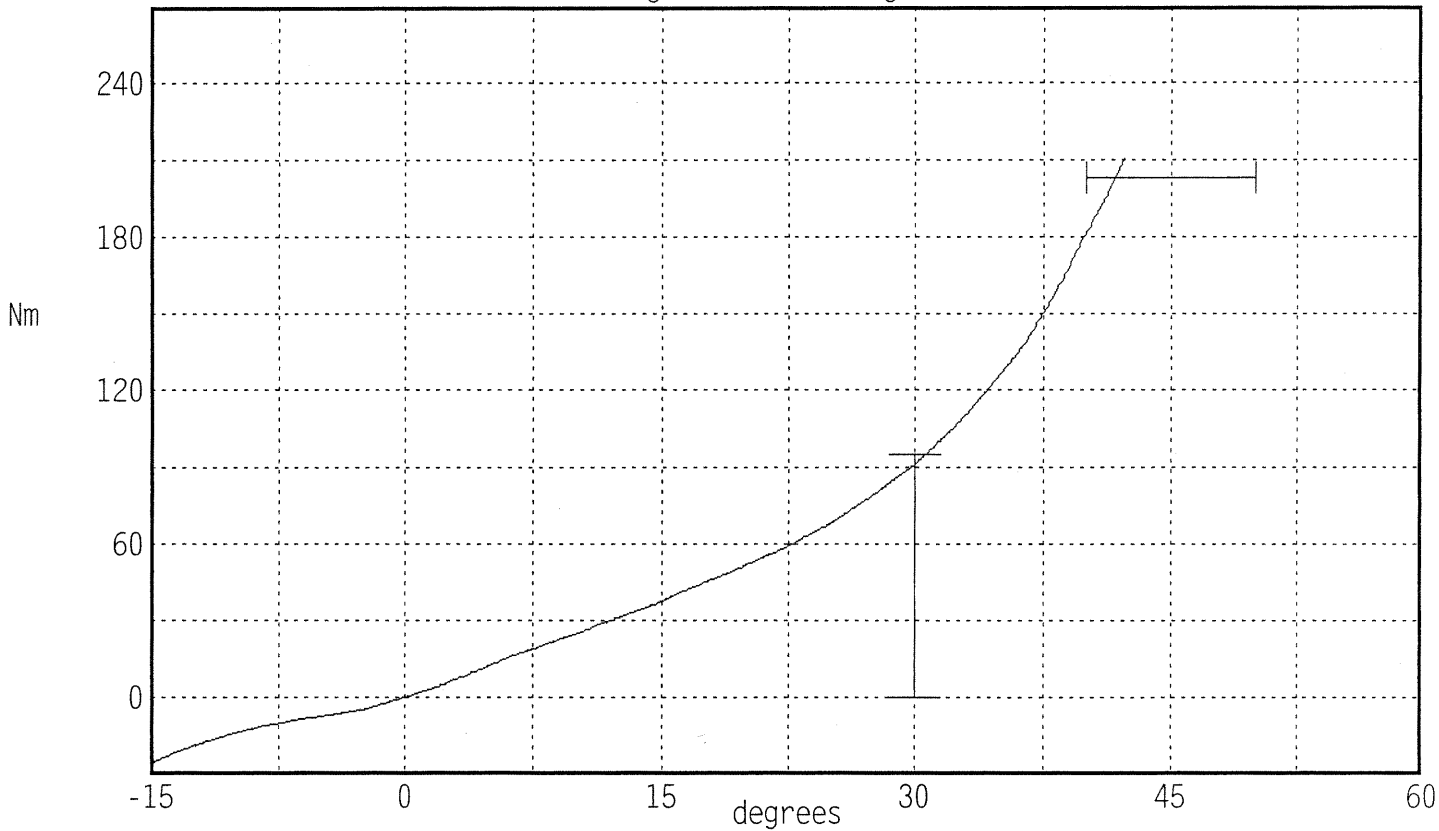
Serial Number: 037R
Test Number: 037C02

Date: 09/13/2007
Time: 09:10

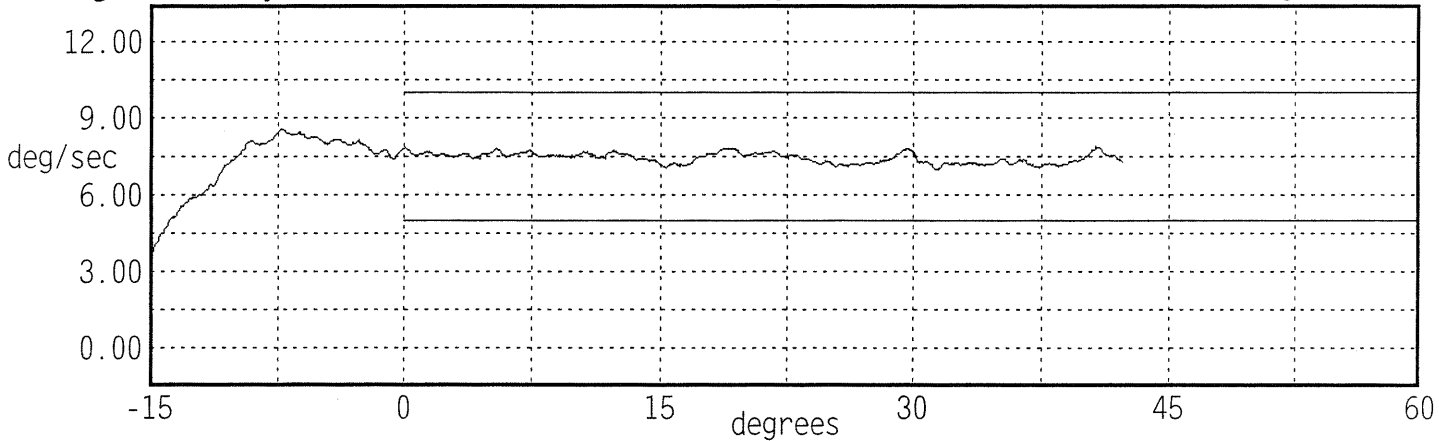
Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.7 °C Pass
Humidity	10 - 70	50 % Pass
Moment at 30 deg	<= 94.9	91.2 Nm Pass
Angle at 203 Nm	40.0 - 50.0	41.7 deg Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec Pass

Moment About H-Point
Peak Moment: 210.3 Nm at 42.2 deg
Peak Angle: 42.2 deg at 210.3 Nm



Angular Velocity Max: 7.9 deg/sec Min: 7.0 deg/sec



Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 2-2
Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.080 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,662.84 N	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bealy

Approved

Ron Stover

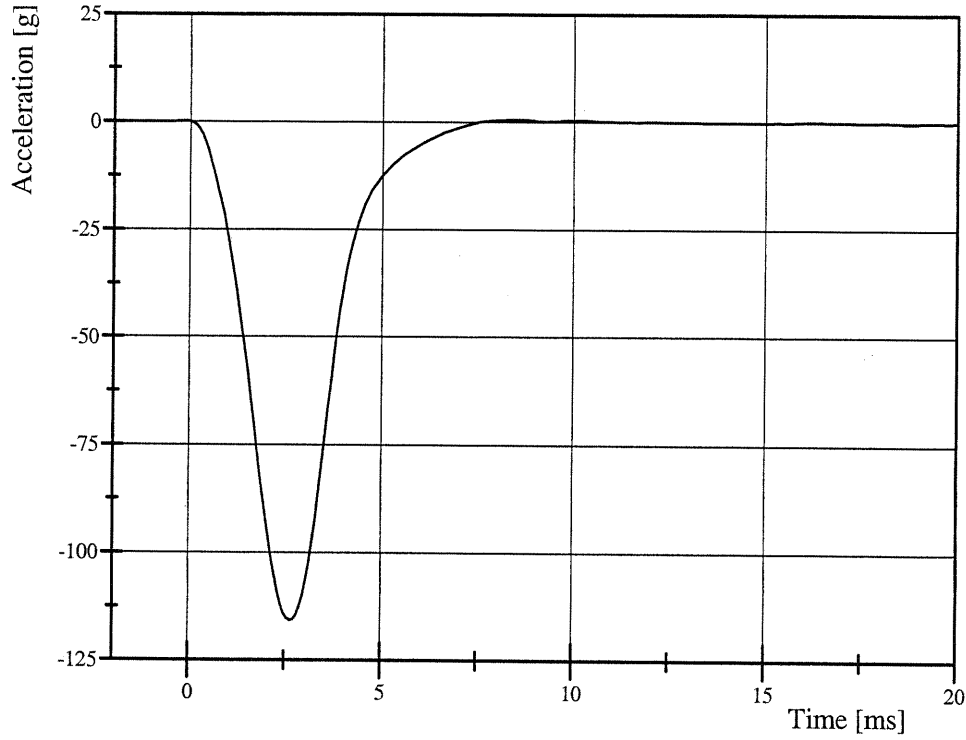
Transportation Research Center Inc.

Left Knee Femur Response Test

HIII 50th Serial No. 037 Certification No. 2-2

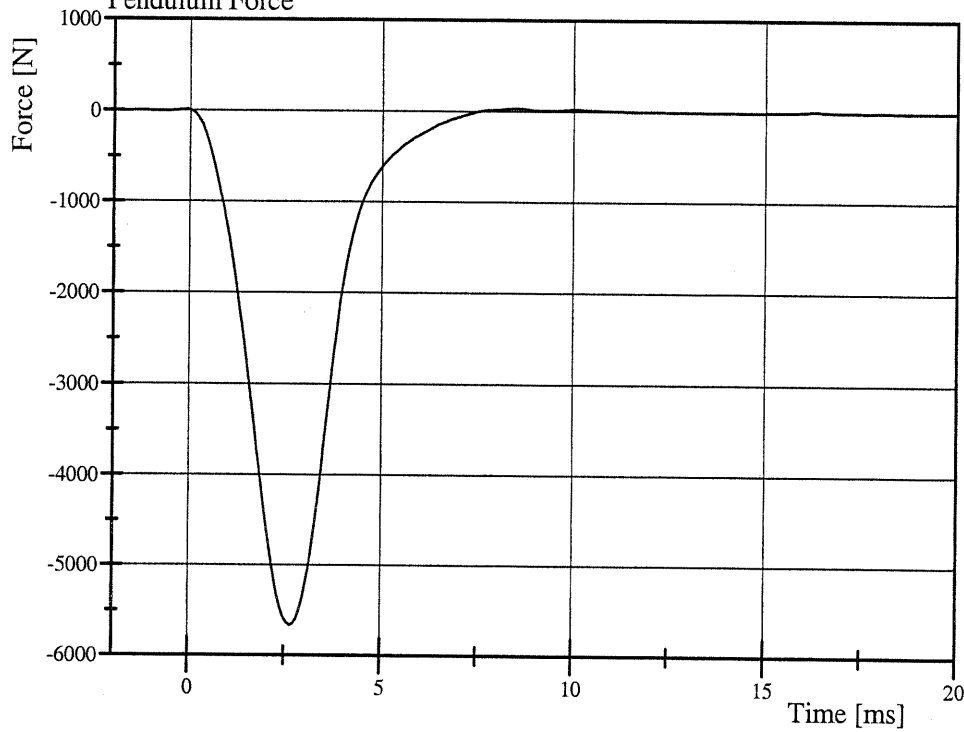
Test Date: 9/13/2007

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.7 g at 8.5 ms
Min: -115.7 g at 2.6 ms

Pendulum Force



Filter Class: CFC_600
Max: 32.0 N at 8.5 ms
Min: -5,662.8 N at 2.6 ms

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 2-1
Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.112 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,239.76 N	Yes

Test meets specifications.

Comments:

Technician

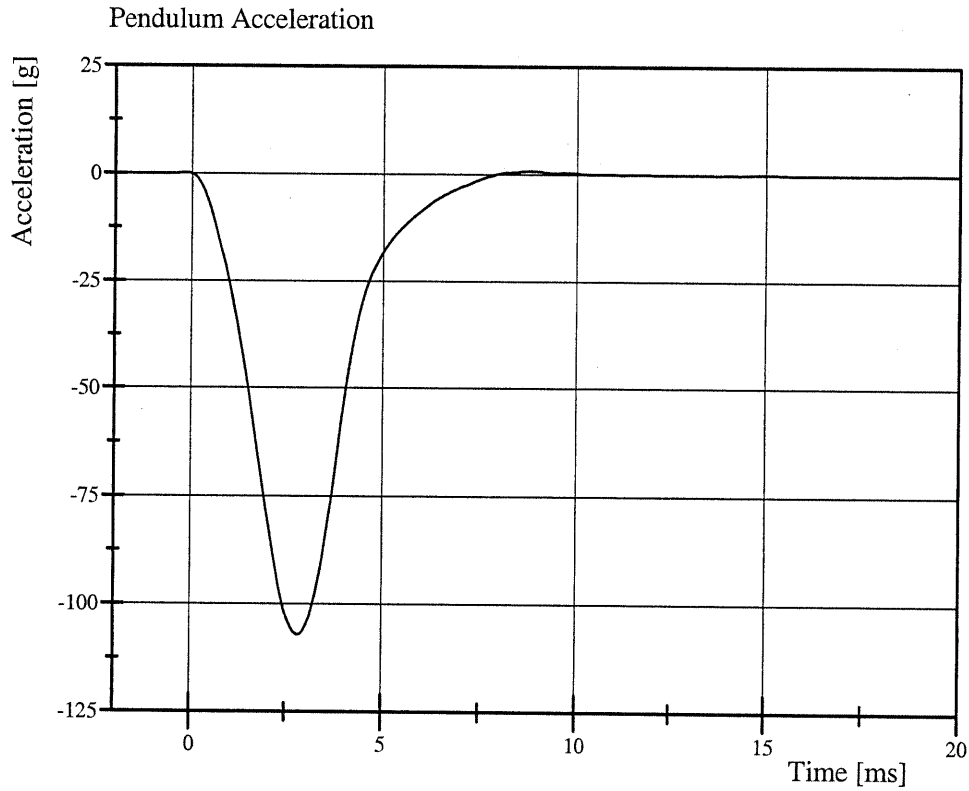
Charles W. Bell

Approved

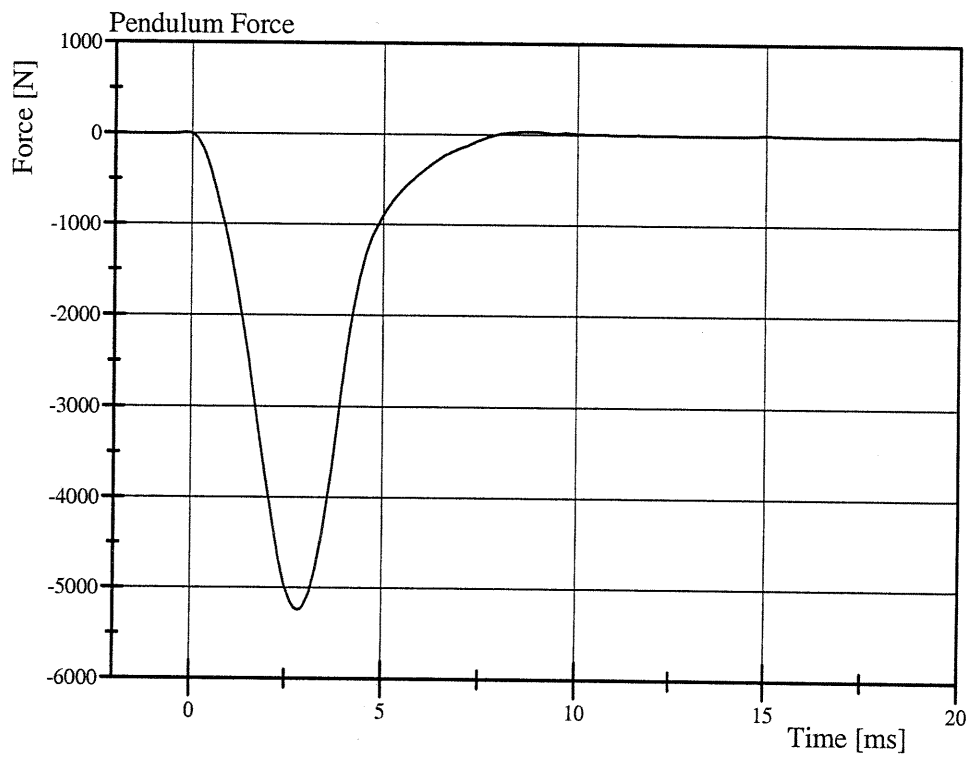
Ron Stone

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 2-1
Test Date: 9/13/2007



Filter Class: CFC_600
Max: 0.8 g at 8.8 ms
Min: -107.1 g at 2.8 ms



Filter Class: CFC_600
Max: 38.6 N at 8.8 ms
Min: -5,239.8 N at 2.8 ms

CALIBRATION TEST RESULTS

POST-TEST

SID/HIII: 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 37
Calibration No. 03

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	882	Yes
B	Shoulder Pivot Height	505.5 - 520.7	519	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	92	Yes
F	Thigh Clearance	139.7 - 154.9	152	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	292	Yes
H	Skull Cap To Backline	40.6 - 45.7	43	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	340	Yes
J	Elbow Rest Height	190.5 - 210.8	195	Yes
K	Buttock Knee Length	579.1 - 604.5	600	Yes
L	Popliteal Height	429.3 - 454.7	430	Yes
M	Knee Pivot Height	485.1 - 500.4	498	Yes
N	Buttock Popliteal Length	452.1 - 477.5	469	Yes
O	Chest Depth	213.4 - 228.6	225	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	432	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	977	Yes
Z	Waist Circumference	835.7 - 866.1	855	Yes
AA	Location For Chest Circumference	429.3 - 434.3	431	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Technician

Approved

Charles W. Ball

Ron Stover

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 3-1

Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	252.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-1.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Beck

Approved

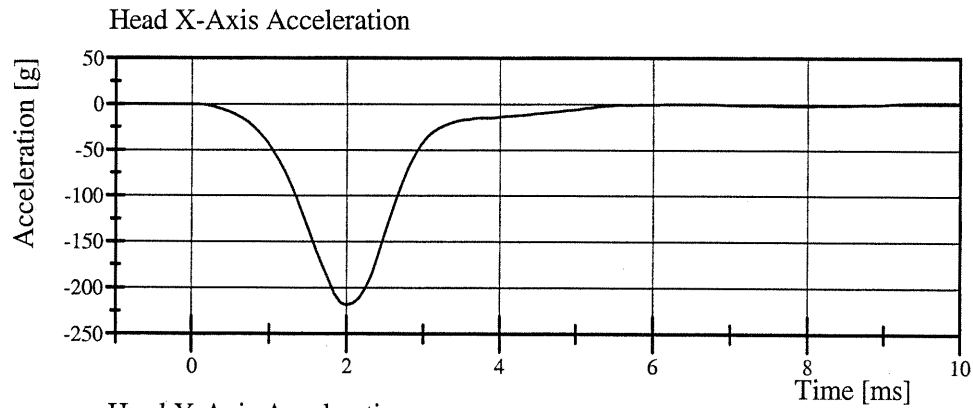
Ron Stoner

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 037 Certification No. 3-1

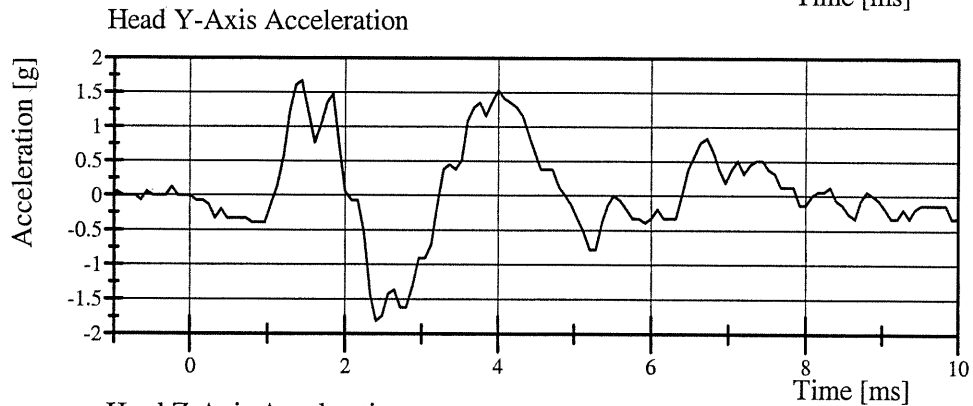
Test Date: 9/27/2007



Filter Class: CFC_1000

Max: 1.9 g at 9.4 ms

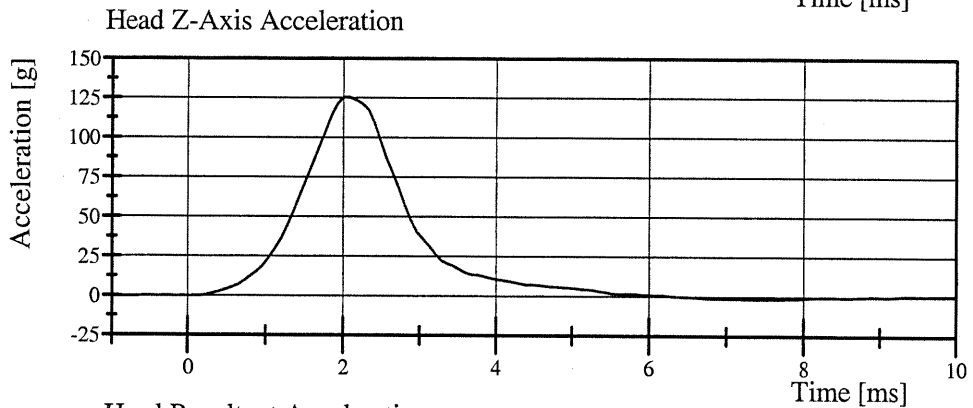
Min: -219.1 g at 2.0 ms



Filter Class: CFC_1000

Max: 1.7 g at 1.4 ms

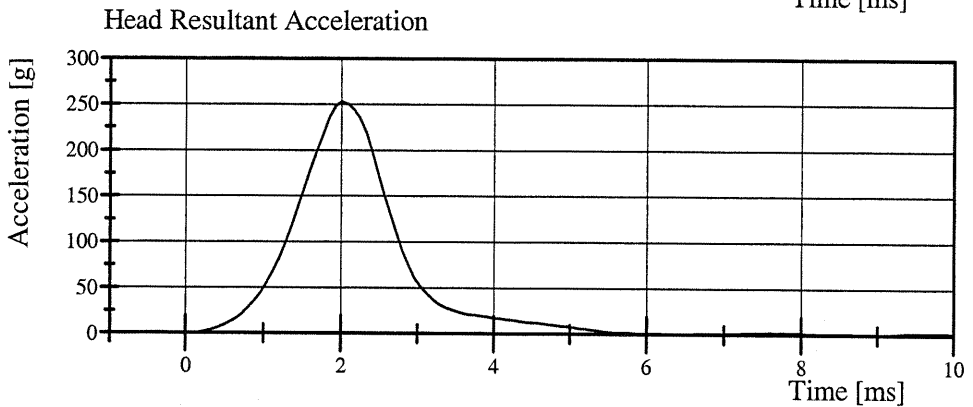
Min: -1.8 g at 2.4 ms



Filter Class: CFC_1000

Max: 125.4 g at 2.0 ms

Min: -1.6 g at 7.4 ms



Filter Class: CFC_1000

Max: 252.5 g at 2.0 ms

Min: 0.0 g at 6.4 ms

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 3-3

Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.948 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.9 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.14 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.79 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.25 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.25 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-68.8 °	Yes
Time of Peak	57 - 64 ms	59.1 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	119.6 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	105.3 N·m	Yes
Time of Peak	47 - 58 ms	51.0 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.8 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Stoner



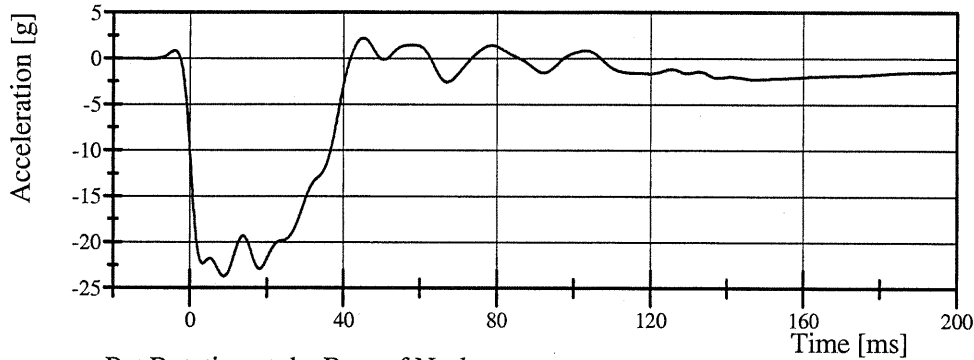
Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 037 Certification No. 3-3

Test Date: 9/27/2007

Pendulum Acceleration

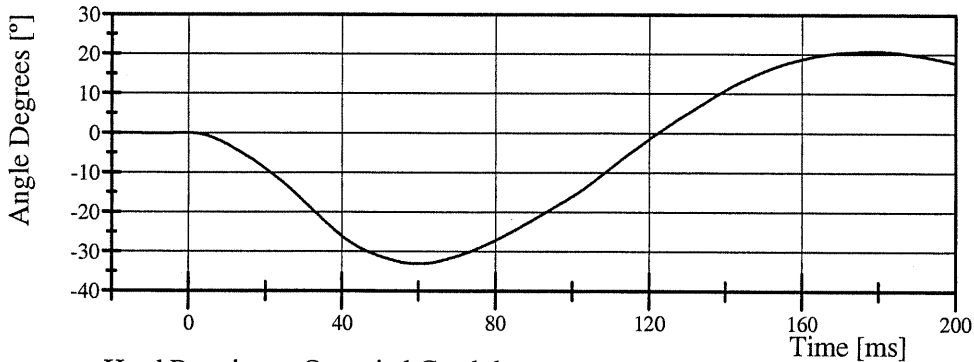


Filter Class: CFC_60

Max: 2.2 g at 45.0 ms

Min: -23.7 g at 8.8 ms

Pot Rotation at the Base of Neck

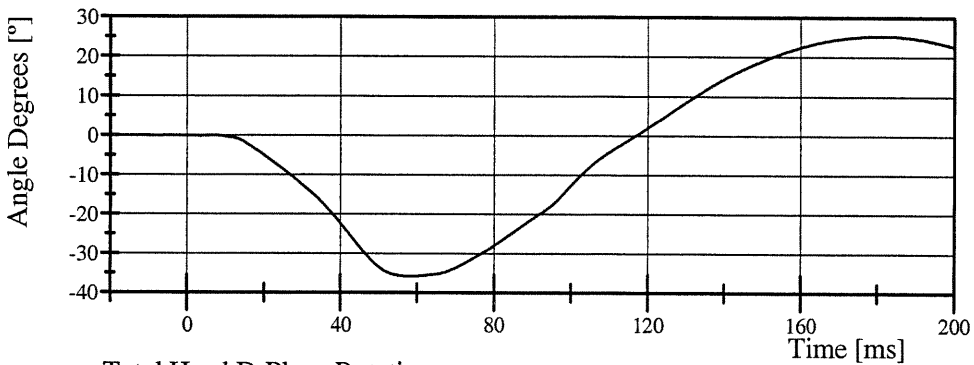


Filter Class: CFC_60

Max: 20.8 ° at 178.7 ms

Min: -33.1 ° at 59.9 ms

Head Rotation at Occipital Condyles

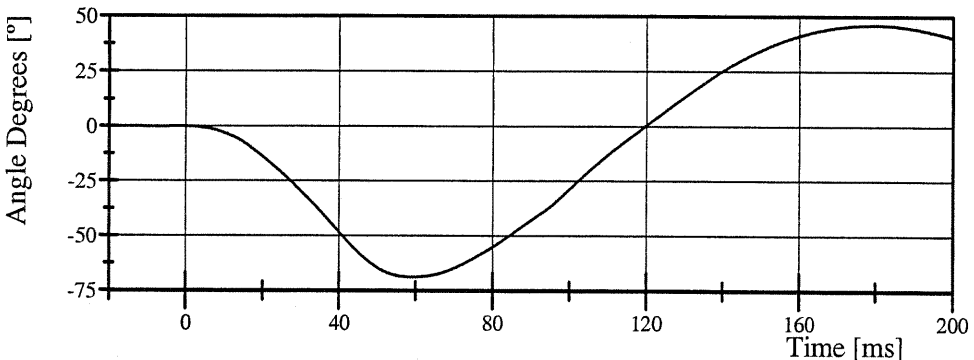


Filter Class: CFC_60

Max: 25.4 ° at 181.7 ms

Min: -35.8 ° at 58.4 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 46.1 ° at 180.0 ms

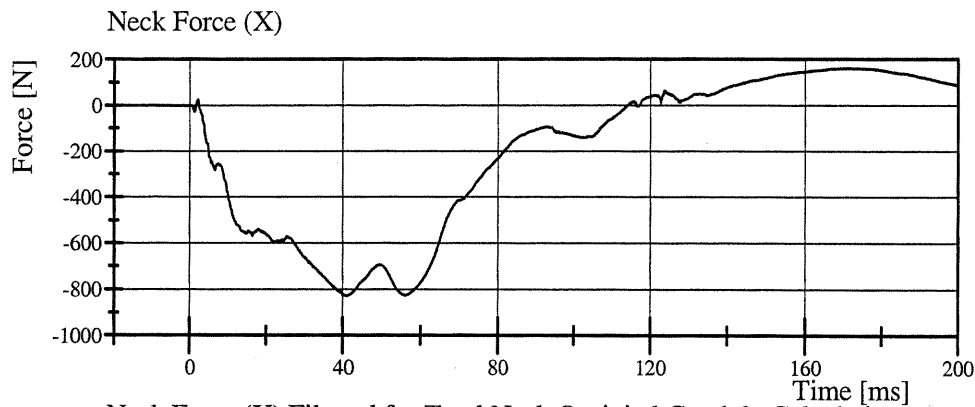
Min: -68.8 ° at 59.1 ms

Transportation Research Center Inc.

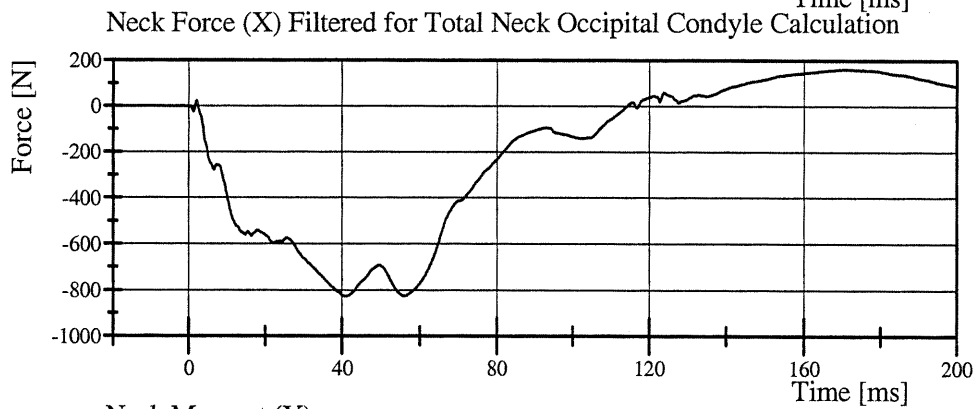
Neck Flexion

HIII 50th Serial No. 037 Certification No. 3-3

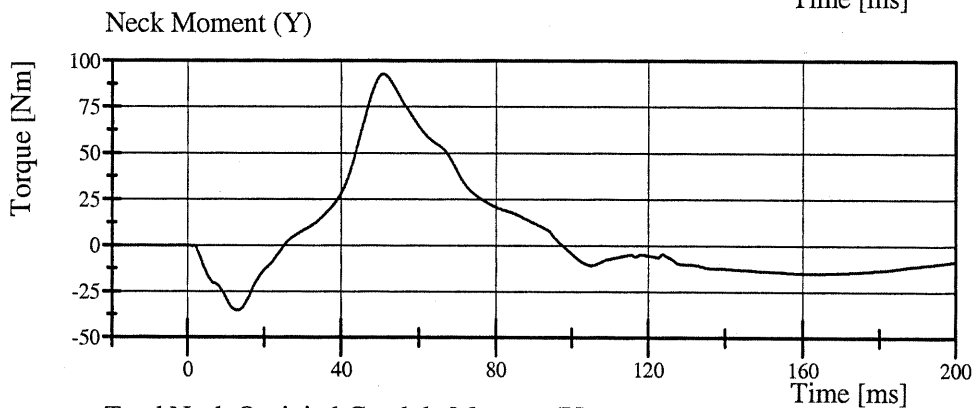
Test Date: 9/27/2007



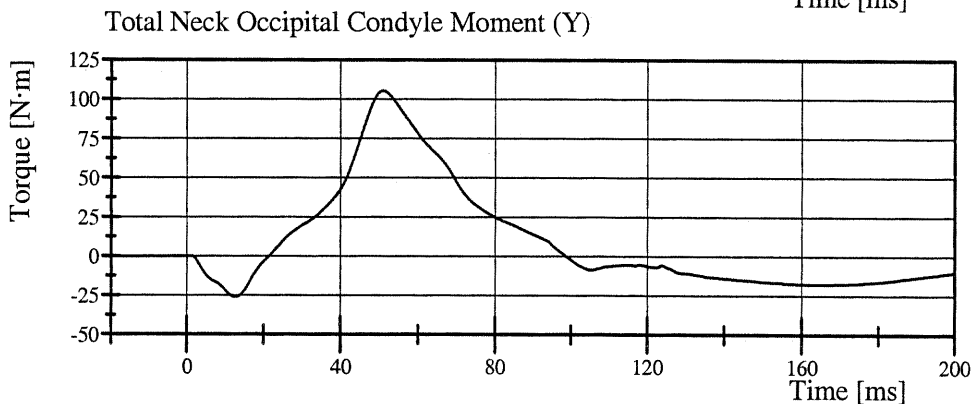
Filter Class: CFC_1000
Max: 161.6 N at 170.9 ms
Min: -828.2 N at 40.6 ms



Filter Class: CFC_600
Max: 161.2 N at 170.1 ms
Min: -827.8 N at 40.7 ms



Filter Class: CFC_600
Max: 92.8 Nm at 50.8 ms
Min: -35.1 Nm at 13.4 ms



Filter Class: CFC_600
Max: 105.3 N·m at 51.0 ms
Min: -25.8 N·m at 12.6 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 3-1

Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.984 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	38.4 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.96 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.53 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	15.12 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	15.12 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	96.1 °	Yes
Time of Peak	72 - 82 ms	77.6 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	166.0 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-71.8 N·m	Yes
Time of Peak	65 - 79 ms	71.0 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	143.6 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

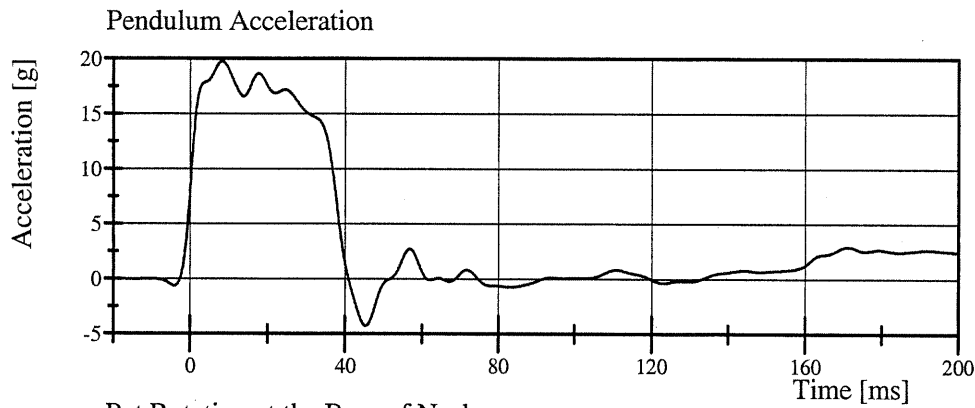
Ron Stoner

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 037 Certification No. 3-1

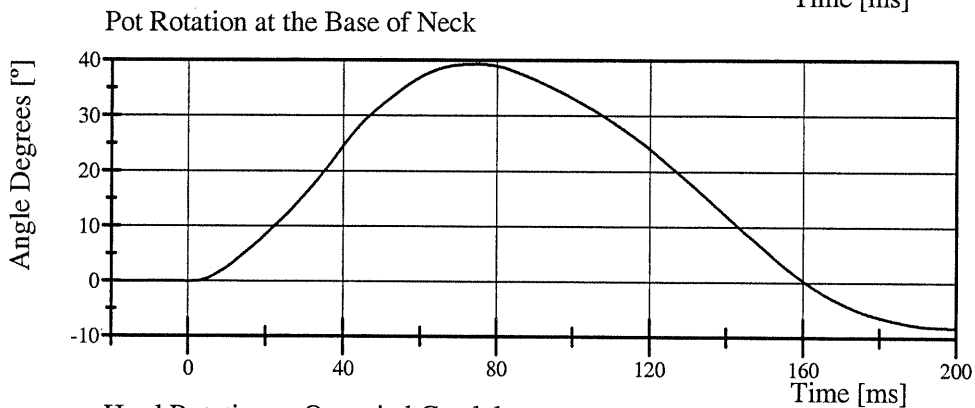
Test Date: 9/27/2007



Filter Class: CFC_60

Max: 19.8 g at 8.2 ms

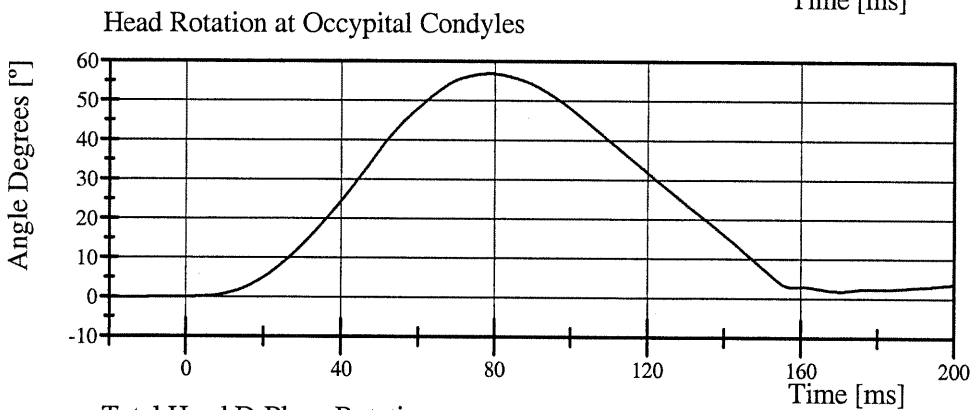
Min: -4.3 g at 45.3 ms



Filter Class: CFC_60

Max: 39.3 ° at 75.0 ms

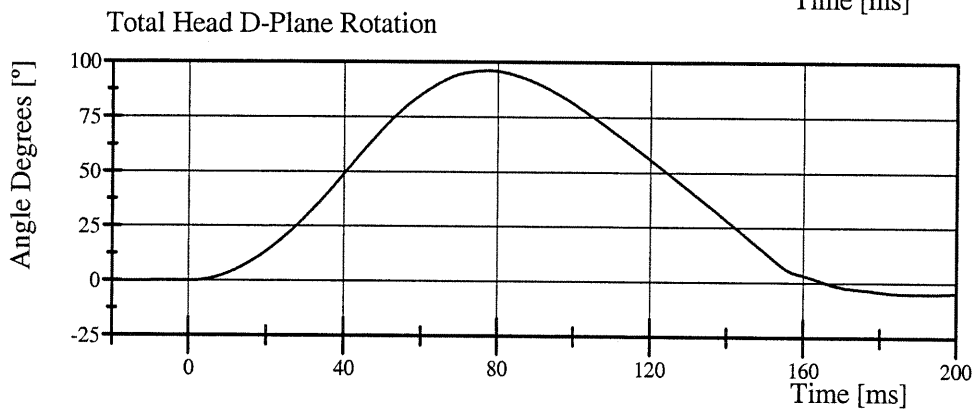
Min: -8.2 ° at 199.7 ms



Filter Class: CFC_60

Max: 56.9 ° at 78.8 ms

Min: -0.0 ° at -20.0 ms



Filter Class: CFC_60

Max: 96.1 ° at 77.6 ms

Min: -5.0 ° at 192.7 ms

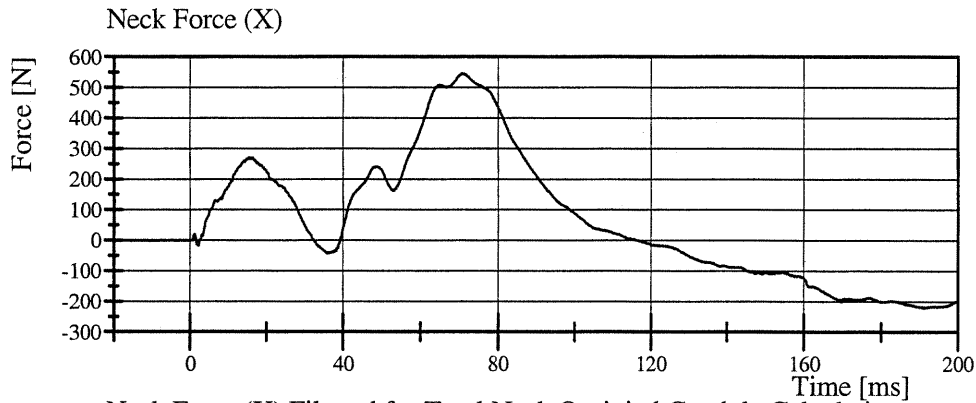


Transportation Research Center Inc.

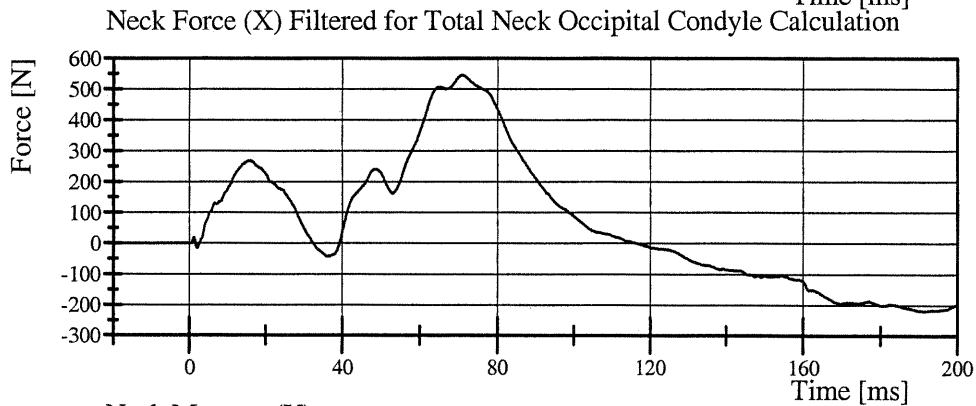
Neck Extension

HIII 50th Serial No. 037 Certification No. 3-1

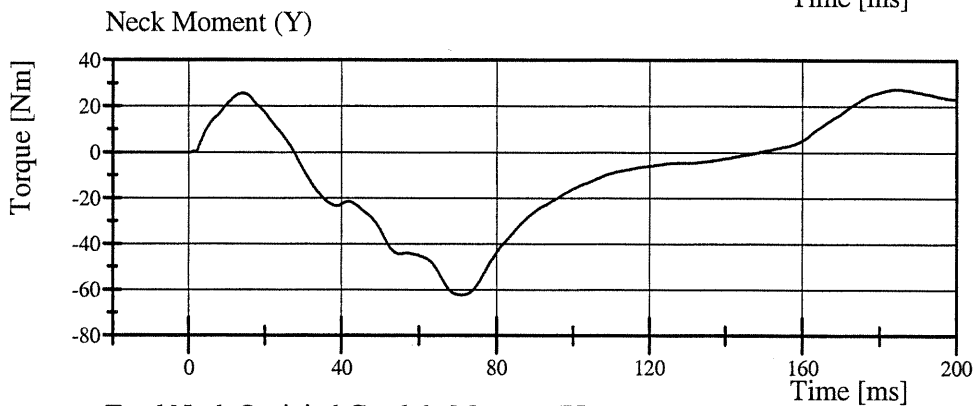
Test Date: 9/27/2007



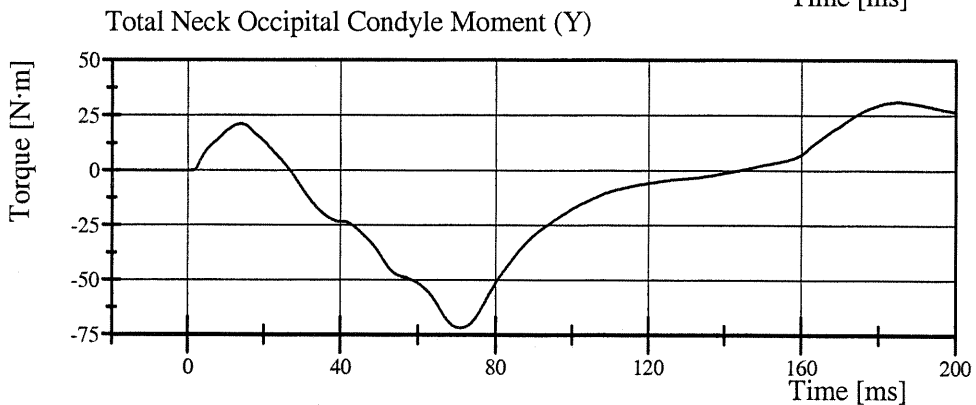
Filter Class: CFC_1000
Max: 545.8 N at 70.8 ms
Min: -220.3 N at 191.1 ms



Filter Class: CFC_600
Max: 545.4 N at 70.9 ms
Min: -219.9 N at 191.1 ms



Filter Class: CFC_600
Max: 27.6 Nm at 184.8 ms
Min: -62.2 Nm at 71.0 ms



Filter Class: CFC_600
Max: 31.1 N·m at 184.9 ms
Min: -71.8 N·m at 71.0 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 3-2

Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.653 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,772.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-64.00 mm	Yes
Internal Hysteresis	65 - 85 %	77.1 %	Yes

Test meets specifications.

Comments:

Technician

Chad W. Bell

Approved

Ron Stone

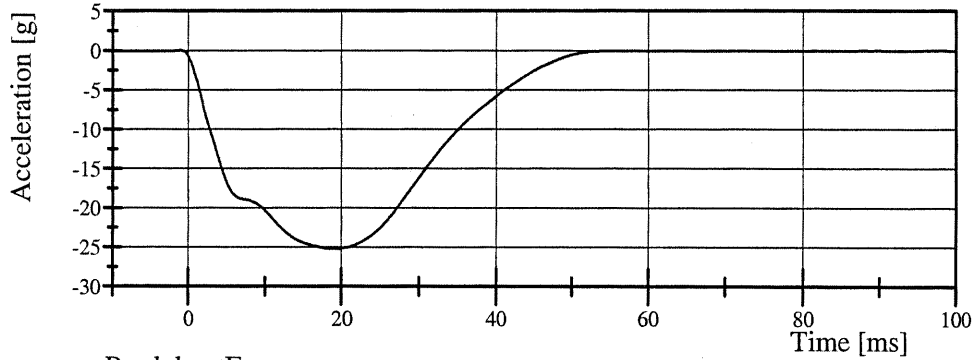
Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 037 Certification No. 3-2

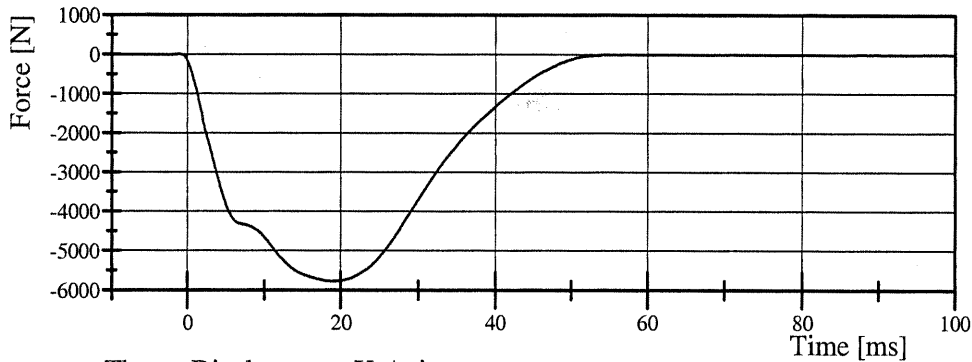
Test Date: 9/27/2007

Pendulum Acceleration



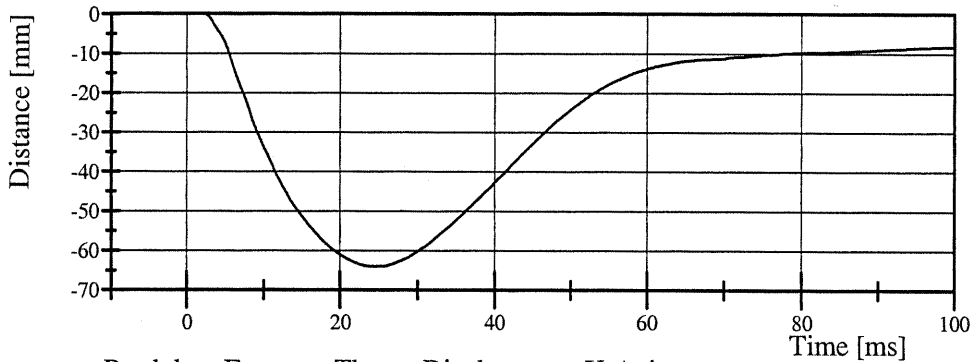
Filter Class: CFC_180
Max: 0.1 g at -1.0 ms
Min: -25.2 g at 19.0 ms

Pendulum Force



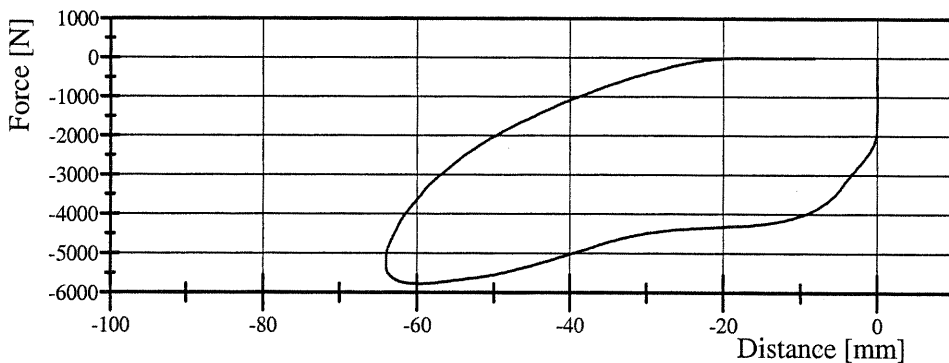
Filter Class: CFC_180
Max: 13.1 N at -1.0 ms
Min: -5,772.5 N at 19.0 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.5 ms
Min: -64.0 mm at 24.6 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 13.1 N at -0.0 mm
Min: -5,772.5 N at -59.6 mm



Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

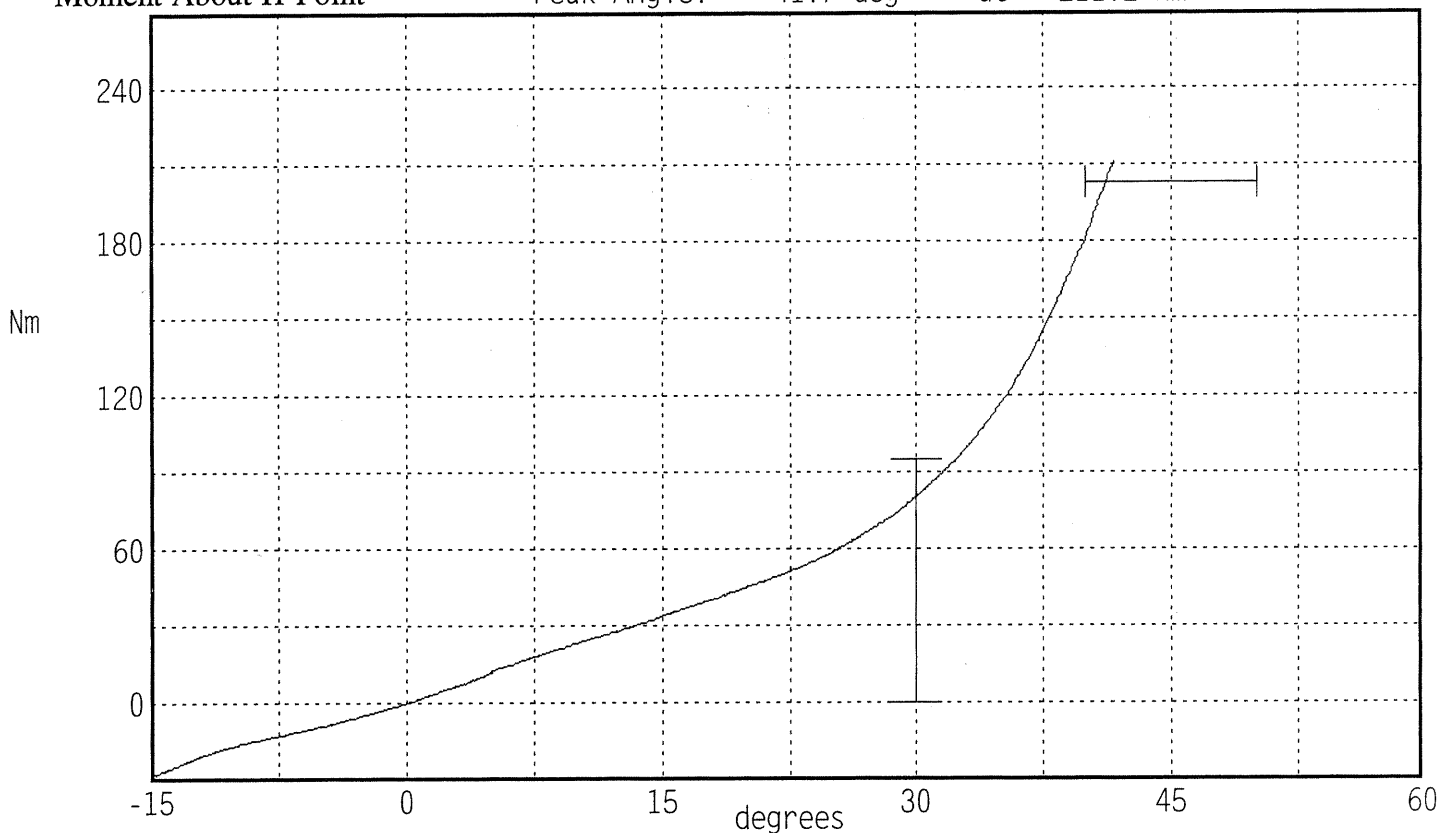
Serial Number: 037L
Test Number: 037C03
Comments:

Date: 09/27/2007
Time: 10:49

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.3 °C Pass
Humidity	10 - 70	60 % Pass
Moment at 30 deg	<= 94.9	80.6 Nm Pass
Angle at 203 Nm	40.0 - 50.0	41.3 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

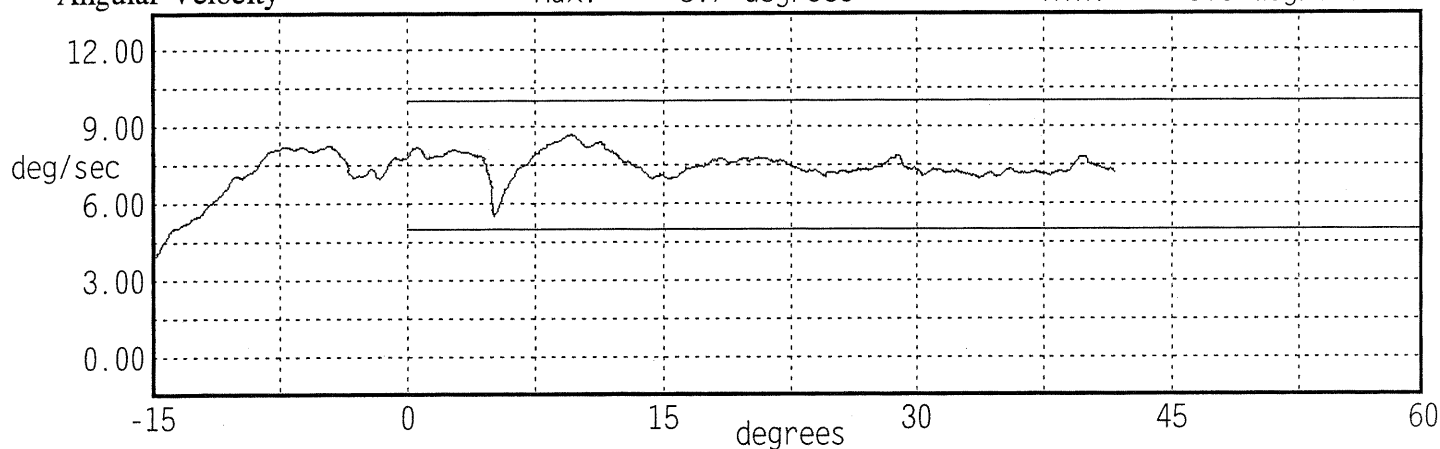
Peak Moment: 211.2 Nm at 41.7 deg
Peak Angle: 41.7 deg at 211.2 Nm

Moment About H-Point



Angular Velocity

Max: 8.7 deg/sec Min: 5.5 deg/sec



Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

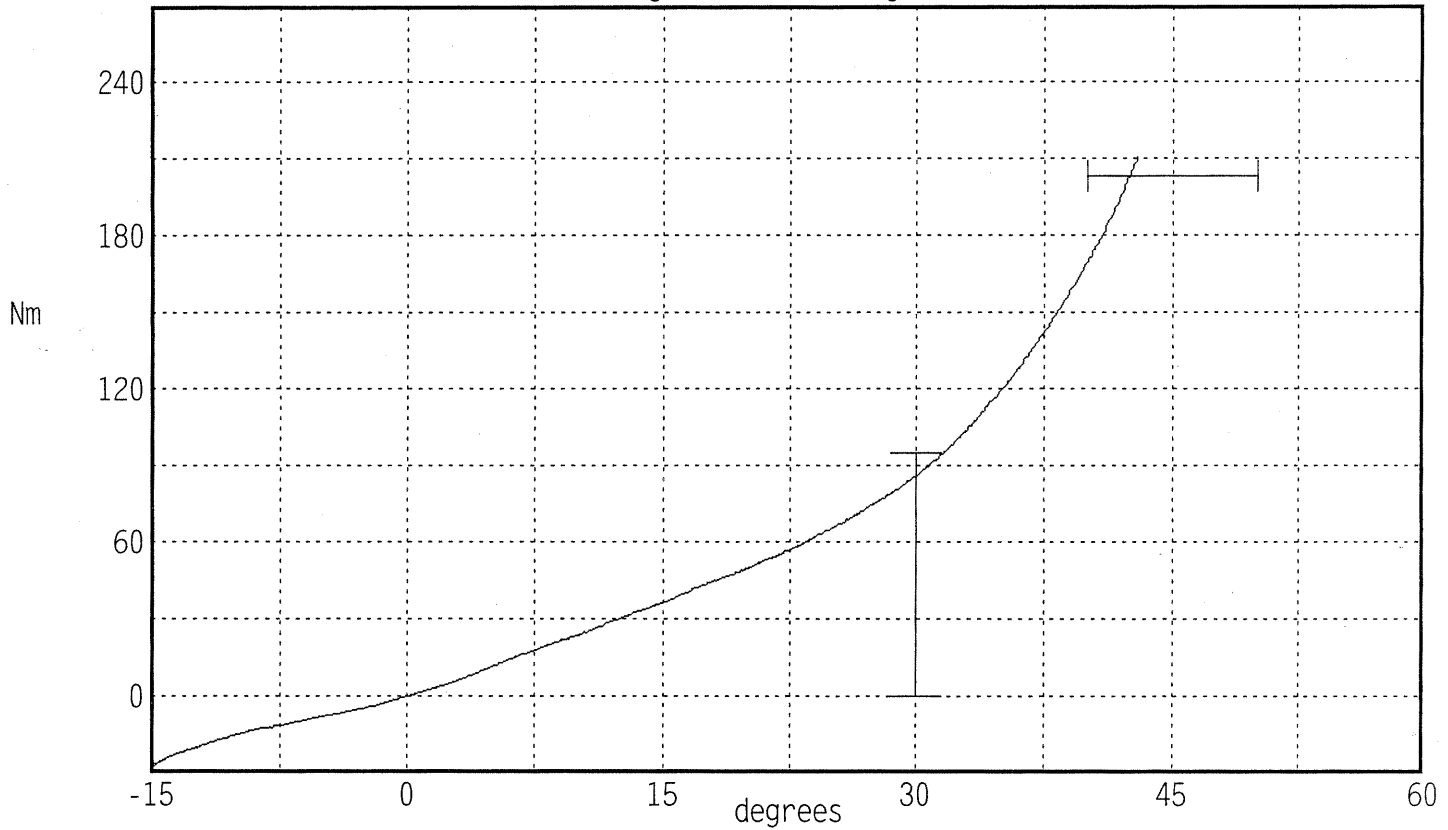
Serial Number: 037R
Test Number: 037C03

Date: 09/27/2007
Time: 10:43

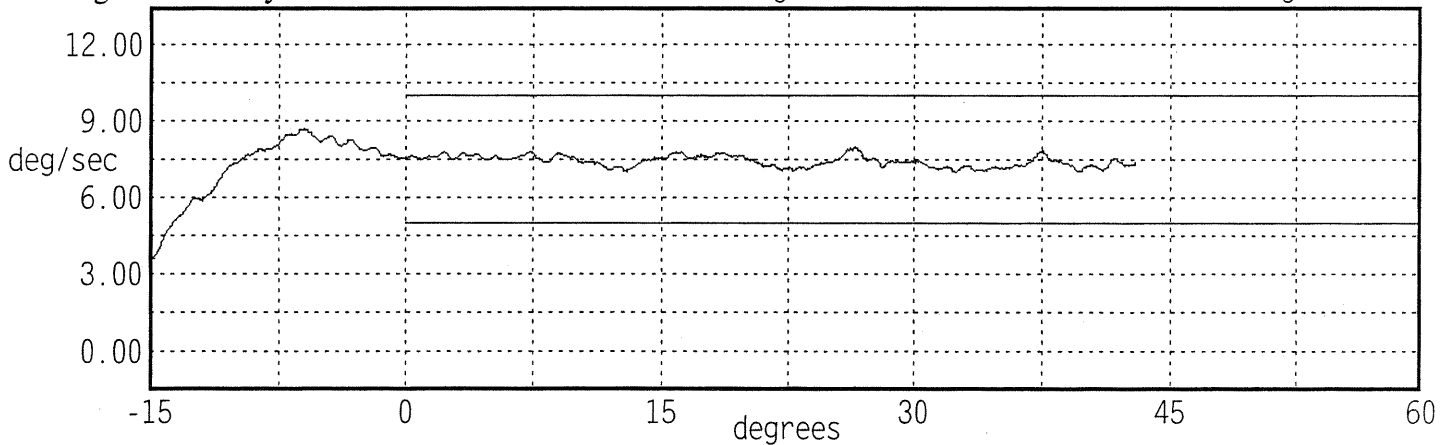
Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.3 °C	Pass
Humidity	10 - 70	60 %	Pass
Moment at 30 deg	<= 94.9	86.1 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.5 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point
Peak Moment: 210.4 Nm at 42.9 deg
Peak Angle: 42.9 deg at 210.4 Nm



Angular Velocity Max: 8.0 deg/sec Min: 7.0 deg/sec



Transportation Research Center Inc.

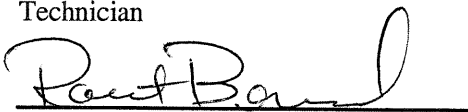
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 3-3
Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.086 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,291.99 N	Yes

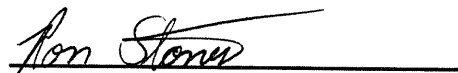
Test meets specifications.

Comments:

Technician



Approved

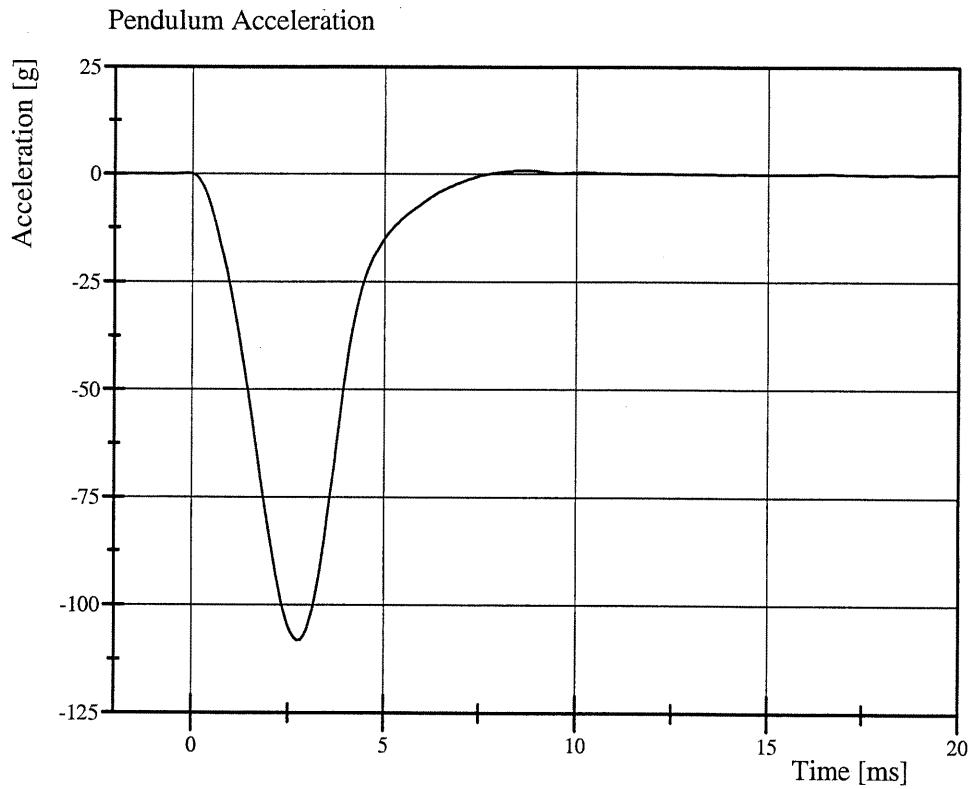


Transportation Research Center Inc.

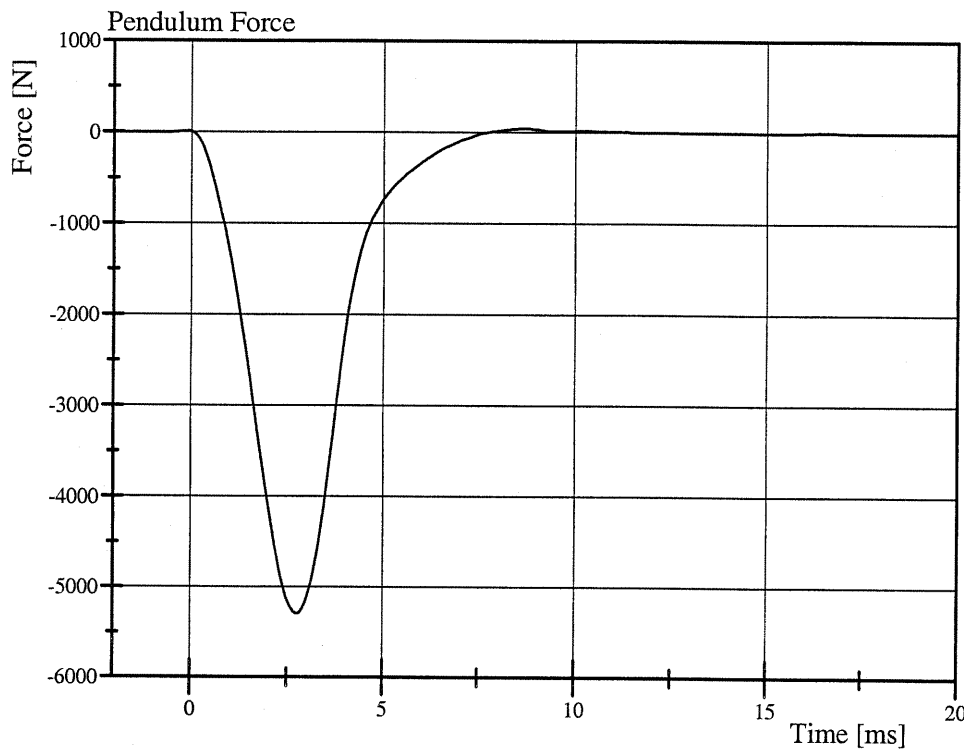
Left Knee Femur Response Test

HIII 50th Serial No. 037 Certification No. 3-3

Test Date: 9/27/2007



Filter Class: CFC_600
Max: 0.8 g at 8.6 ms
Min: -108.2 g at 2.7 ms



Filter Class: CFC_600
Max: 40.9 N at 8.6 ms
Min: -5,292.0 N at 2.7 ms

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 3-1
Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.115 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,218.70 N	Yes

Test meets specifications.

Comments:

Technician

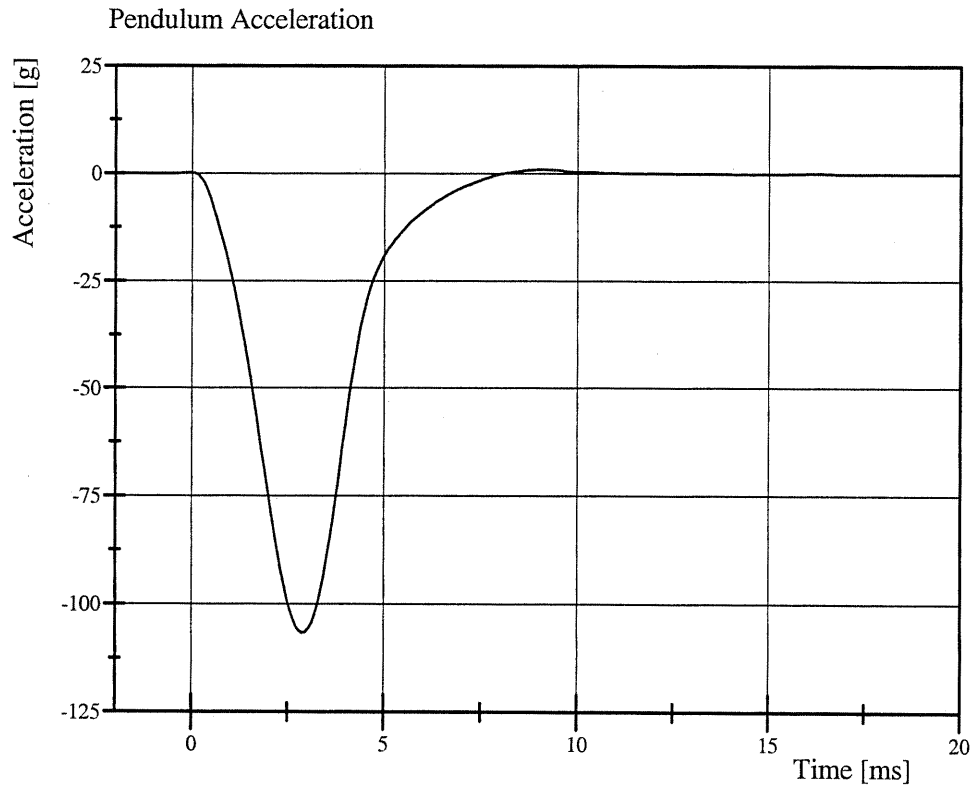
Charles W. Bell

Approved

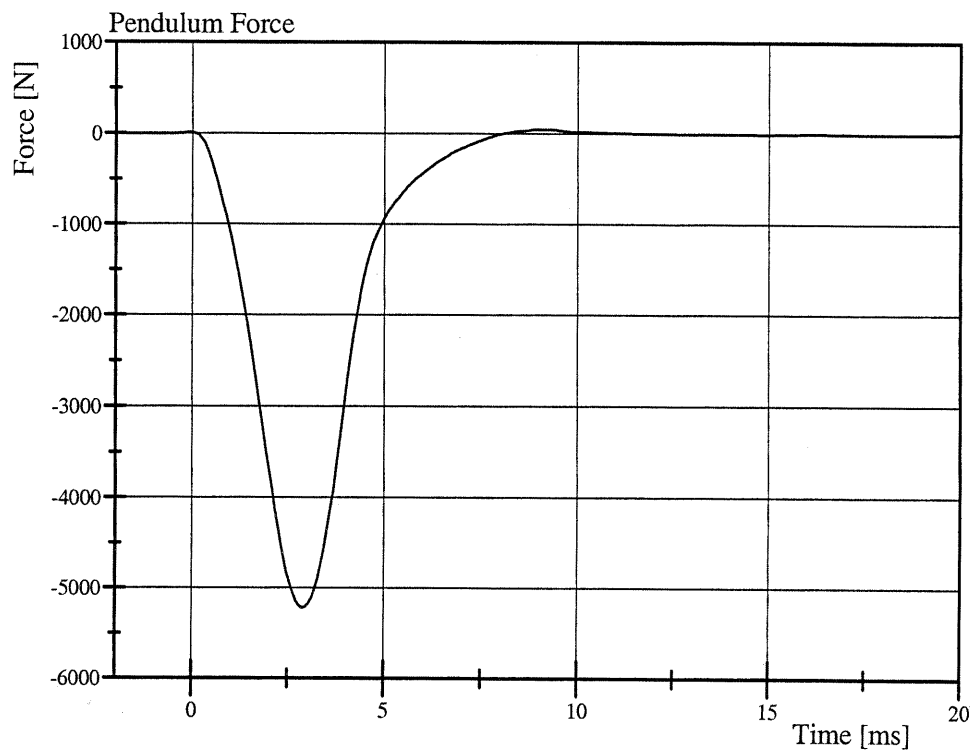
Ren Stone

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 3-1
Test Date: 9/27/2007



Filter Class: CFC_600
Max: 1.0 g at 9.0 ms
Min: -106.7 g at 2.9 ms



Filter Class: CFC_600
Max: 47.2 N at 9.0 ms
Min: -5,218.7 N at 2.9 ms



Test Date: 09/19/07

Type: HIII 50th S/N: 037 Mfg.: First Technologies

Proj./Seg. No.: 20050906-1100 Test Eng: Emad Al-Tabakha

ITEM	PRE-USE	POST-USE
HEAD:		
Skull Cap Bolts: tight and no wires pinched	X	
Head Skin Condition	X	X
* Neck Load Cell Cables: secure, taped, and with strain relief	X	
NECK:		
Bracket at specified setting, Serration Alignment, Bolt Actual: <u>0</u>	X	X
Condyle Pin, Set Screws	X	
* Rubber Condition	X	X
* Neck Cable Torque (5 th /50 th /95 th : 10-14 in-lb) (6YO: 1.8 - 2.2 in-lb) Actual: <u>10</u>		
* Nodding Blocks Condition and Position (Nodding Joint Function)	X	X
ARMS AND HANDS:		
Clavicle and Shoulder Bumpers Condition	X	
Range of Motion Stops: Elbow, Top and Rear Shoulder		X
THORAX:		
Front and Rear Rib Bolts, Rib Ends Position, Rib Spacing	X	
Chest Pot Arm, Ball Movement, Set Screws	X	X
Sternum Bolts and Sternum Bumpers Condition	X	X
Jacket Condition	X	X
Abdominal Insert Condition	X	X
Rib Damping Material and Stiffeners Condition	X	X
Accel. Mount Bolts	X	
Lumbar Spine Rubber Condition, Spine Angle (10YO), 4 Attachment Bolts	X	X
LUMBAR/PELVIS:		
Iliac Crest Bone	X	X
Flesh Condition	X	X
Accel. Mount Bolt	X	
10YO: Lumbar Block Adjustment Position as requested. Actual:	N/A	
Lumbar Block Bolts	X	
Range of Motion Bumpers & Leg Cavity	X	X
LEGS AND FEET:		
Femur Load Cell Bolts (5 th /50 th /95 th : 30 ft-lb / 6YO: 16 ft-lb)	X	
Knee Joint Function and Range of Motion	X	
Knee Skins, Casting, and Inserts Condition	X	X
Knee Slider Zero Position	N/A	
Ankle Range of Motion, Bumper Condition	X	
Foot Condition	X	X
OTHER:		
Cleanliness / Skin Condition & Position	X	
Target Position	X	
Clothes and Shoes		
One G Joint Adjustments	X	
Verify channels against assembly and Check connectors (intact & labeled)	X	
ATTACH TEMPERATURE LOGGER TO DUMMY / DOWNLOAD	X	X

* Items checked during calibration; these items need checked when the dummy is used without recalibration

Pre Test Inspection Completed By: J. Clarridge Date: 09/18/07

Post Test Inspection Completed By: J. Clarridge Date: 09/21/07

CALIBRATION TEST RESULTS

PRE-TEST

SID/HIII: 352

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 352
Calibration No. 02

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	886	Yes
B	Shoulder Pivot Height	505.5 - 520.7	520	Yes
C	H-Point Height	83.8 - 88.9	86	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	93	Yes
F	Thigh Clearance	139.7 - 154.9	153	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	295	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	333	Yes
J	Elbow Rest Height	190.5 - 210.8	208	Yes
K	Buttock Knee Length	579.1 - 604.5	604	Yes
L	Popliteal Height	429.3 - 454.7	432	Yes
M	Knee Pivot Height	485.1 - 500.4	498	Yes
N	Buttock Popliteal Length	452.1 - 477.5	471	Yes
O	Chest Depth	213.4 - 228.6	218	Yes
P	Foot Length	251.5 - 266.7	260	Yes
V	Shoulder Breadth	421.6 - 436.9	426	Yes
W	Foot Breadth	91.4 - 106.7	98	Yes
Y	Chest Circumference	970.3 - 1000.8	999	Yes
Z	Waist Circumference	835.7 - 866.1	863	Yes
AA	Location For Chest Circumference	429.3 - 434.3	433	Yes
BB	Location For Waist Circumference	226.1 - 231.1	231	Yes

Comments: Partial Set

Technician



Approved



Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 352 Certification No. 2-1

Test Date: 9/12/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	264.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	7.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Raul Baranda

Approved

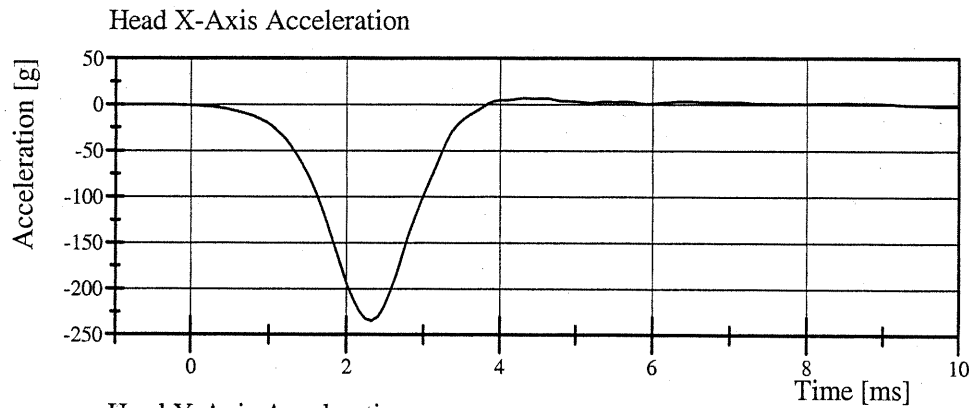
Ron Stover

Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 352 Certification No. 2-1

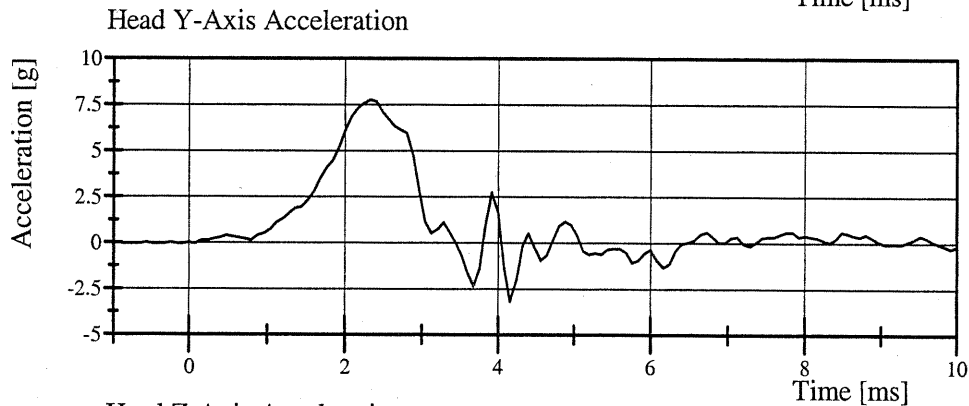
Test Date: 9/12/2007



Filter Class: CFC_1000

Max: 6.8 g at 4.3 ms

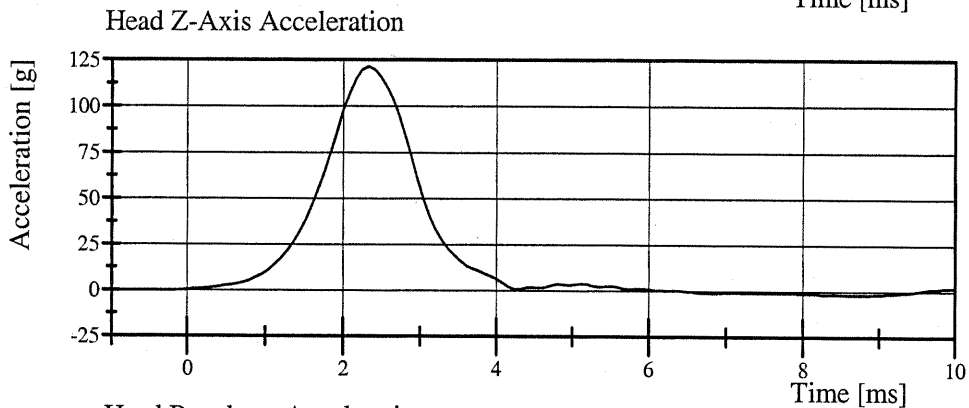
Min: -234.7 g at 2.3 ms



Filter Class: CFC_1000

Max: 7.8 g at 2.3 ms

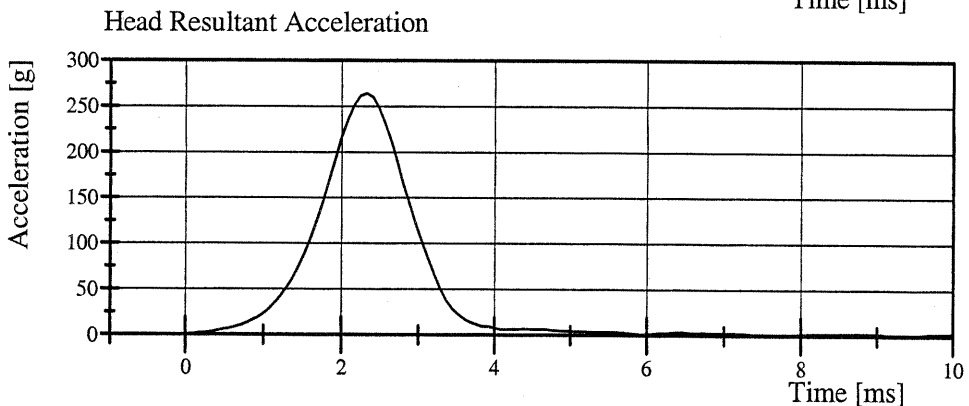
Min: -3.2 g at 4.2 ms



Filter Class: CFC_1000

Max: 121.4 g at 2.3 ms

Min: -2.0 g at 8.6 ms



Filter Class: CFC_1000

Max: 264.4 g at 2.3 ms

Min: 0.0 g at -0.8 ms

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 352 Certification No. 2-4

Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.991 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	36.6 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.50 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.63 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-16.00 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-16.00 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-69.9 °	Yes
Time of Peak	57 - 64 ms	57.7 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	113.6 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	99.4 N·m	Yes
Time of Peak	47 - 58 ms	49.5 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.2 ms	Yes

Test meets specifications.

Comments:

Technician

Rout Barab

Approved

Ron Storn

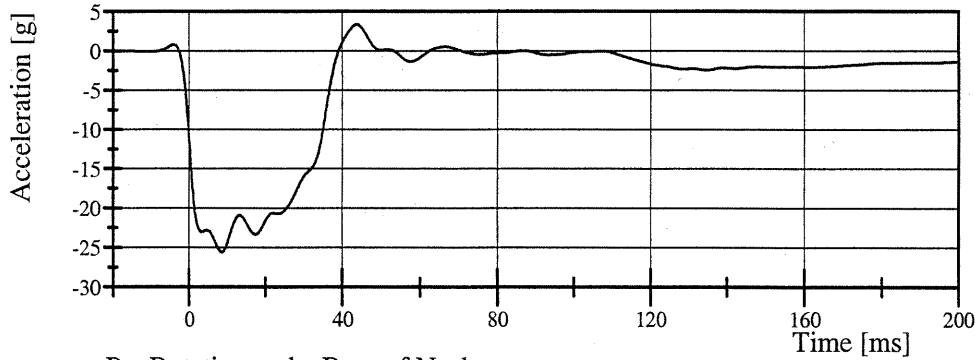
Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 352 Certification No. 2-4

Test Date: 9/13/2007

Pendulum Acceleration

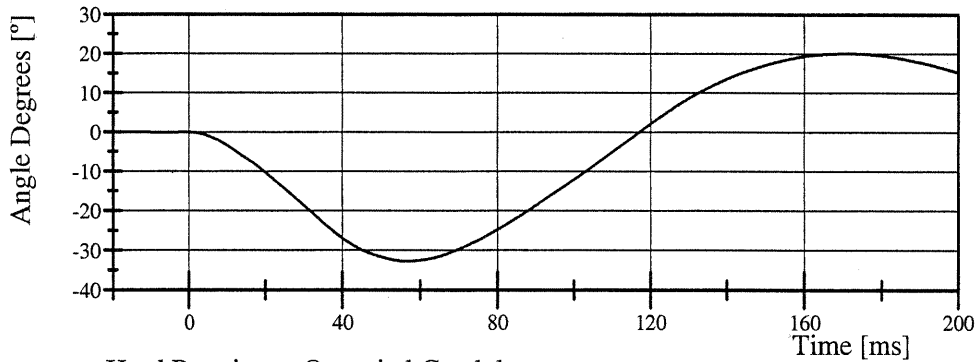


Filter Class: CFC_60

Max: 3.4 g at 43.7 ms

Min: -25.6 g at 8.6 ms

Pot Rotation at the Base of Neck

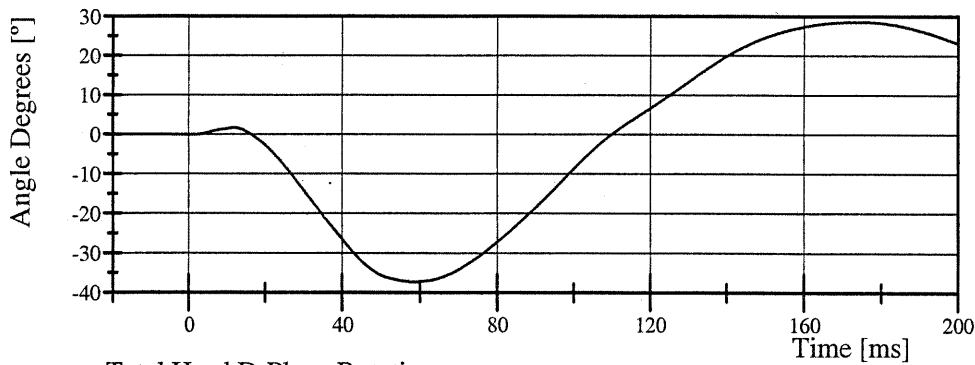


Filter Class: CFC_60

Max: 20.1 ° at 170.9 ms

Min: -32.7 ° at 56.7 ms

Head Rotation at Occypital Condyles

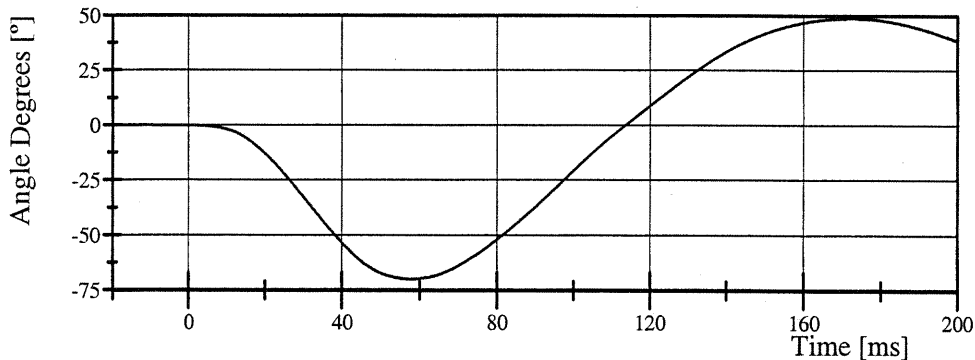


Filter Class: CFC_60

Max: 28.7 ° at 173.8 ms

Min: -37.2 ° at 58.4 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 48.8 ° at 172.5 ms

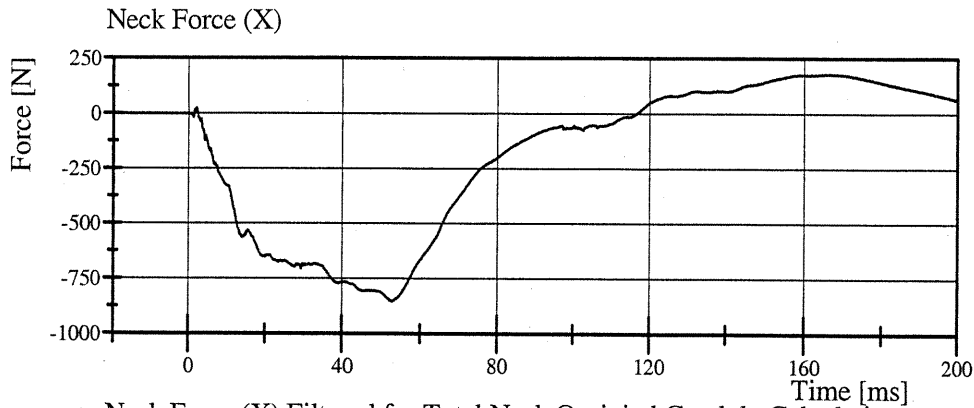
Min: -69.9 ° at 57.7 ms

Transportation Research Center Inc.

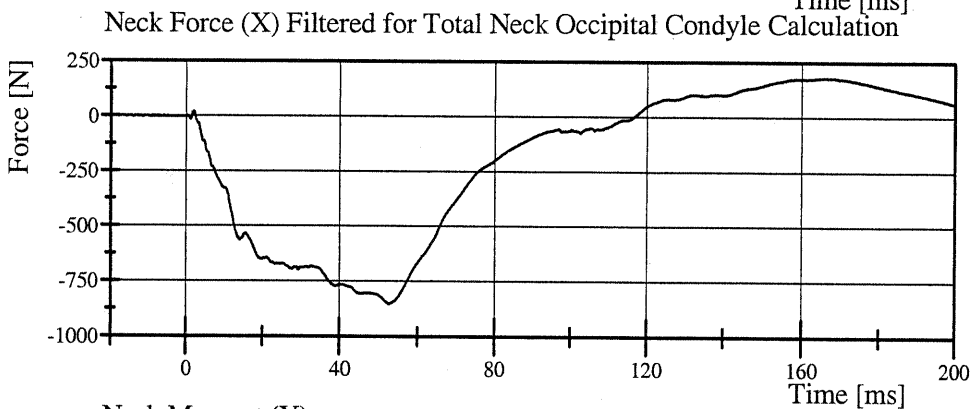
Neck Flexion

HIII 50th Serial No. 352 Certification No. 2-4

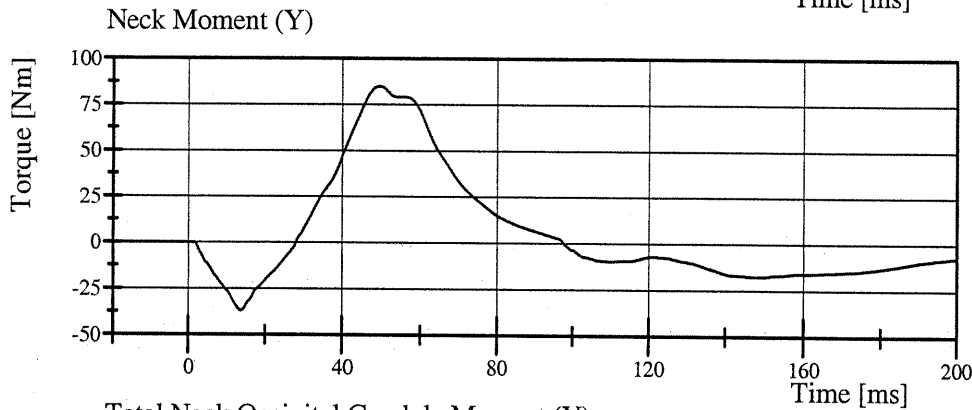
Test Date: 9/13/2007



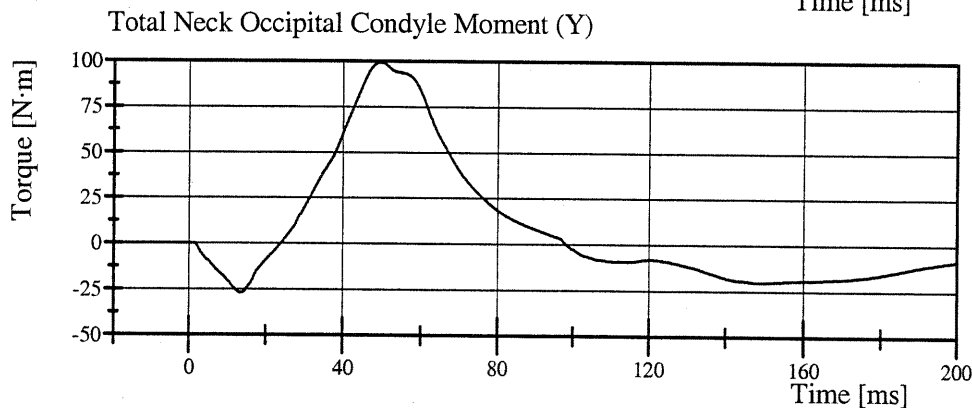
Filter Class: CFC_1000
Max: 180.6 N at 165.3 ms
Min: -853.4 N at 52.7 ms



Filter Class: CFC_600
Max: 180.4 N at 166.5 ms
Min: -853.0 N at 52.7 ms



Filter Class: CFC_600
Max: 85.1 Nm at 49.4 ms
Min: -36.8 Nm at 13.7 ms



Filter Class: CFC_600
Max: 99.4 N·m at 49.5 ms
Min: -27.0 N·m at 13.5 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 352 Certification No. 2-1

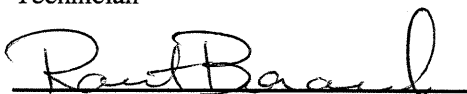
Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.990 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	41.6 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.54 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.18 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.25 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.25 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	91.6 °	Yes
Time of Peak	72 - 82 ms	78.1 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	156.6 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-60.8 N·m	Yes
Time of Peak	65 - 79 ms	72.4 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	139.5 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

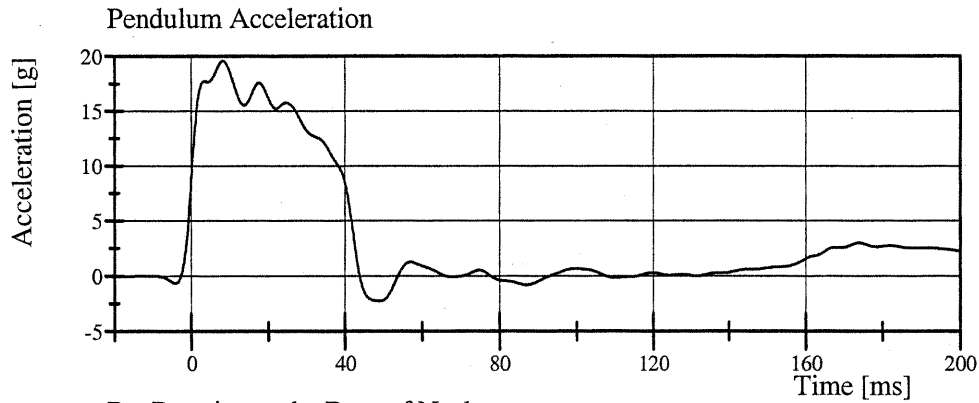


Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 352 Certification No. 2-1

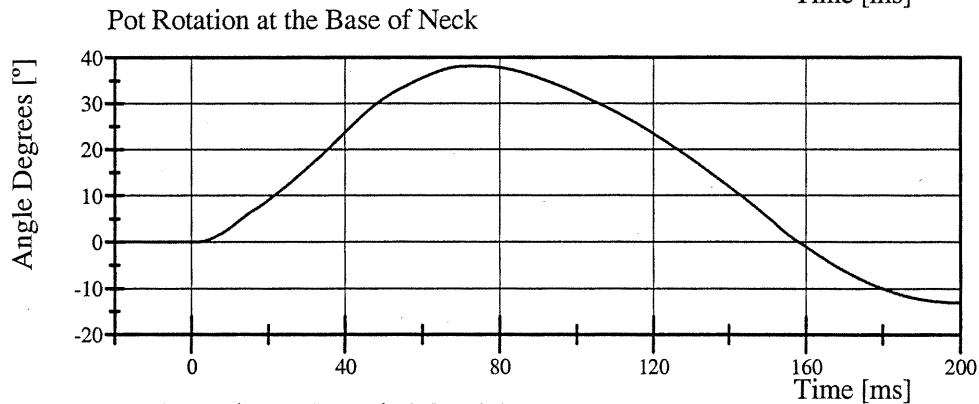
Test Date: 9/13/2007



Filter Class: CFC_60

Max: 19.6 g at 8.2 ms

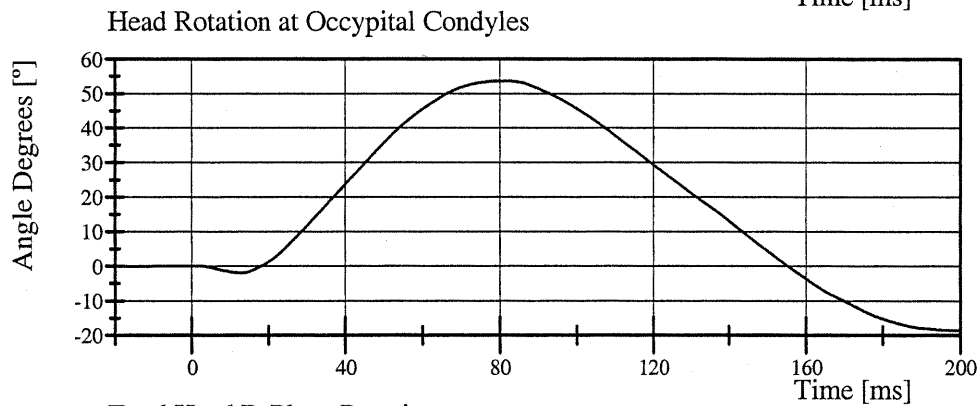
Min: -2.3 g at 48.9 ms



Filter Class: CFC_60

Max: 38.1 ° at 72.9 ms

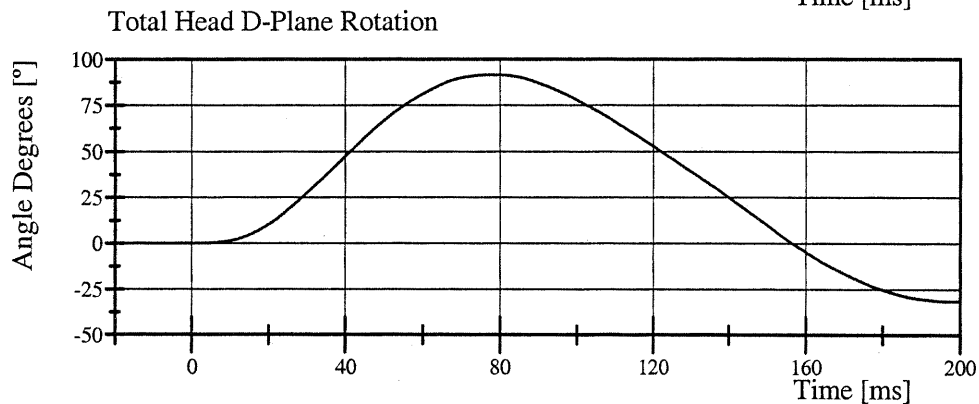
Min: -13.0 ° at 199.4 ms



Filter Class: CFC_60

Max: 53.7 ° at 80.3 ms

Min: -18.6 ° at 199.5 ms



Filter Class: CFC_60

Max: 91.6 ° at 78.1 ms

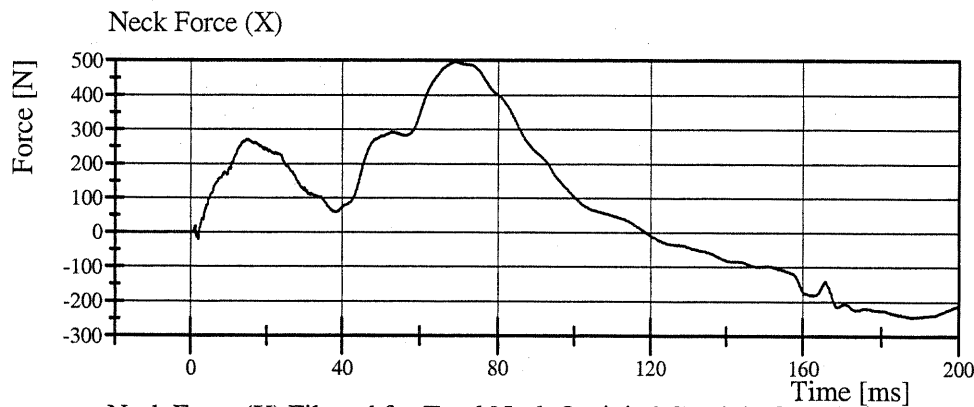
Min: -31.6 ° at 199.4 ms

Transportation Research Center Inc.

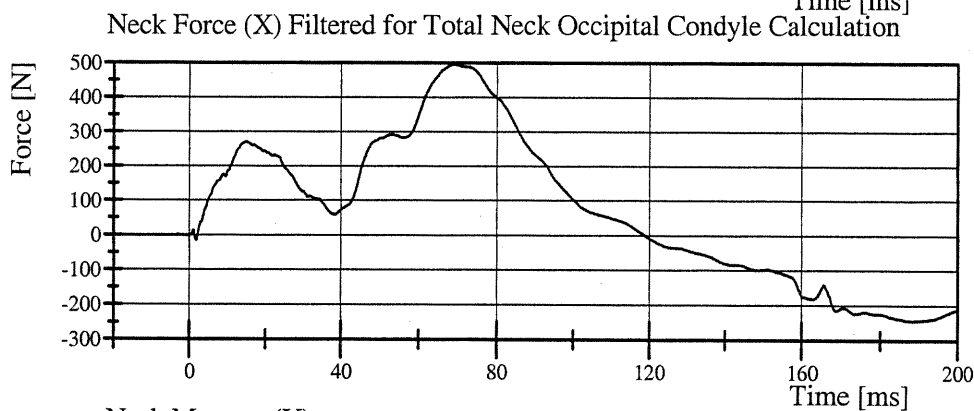
Neck Extension

HIII 50th Serial No. 352 Certification No. 2-1

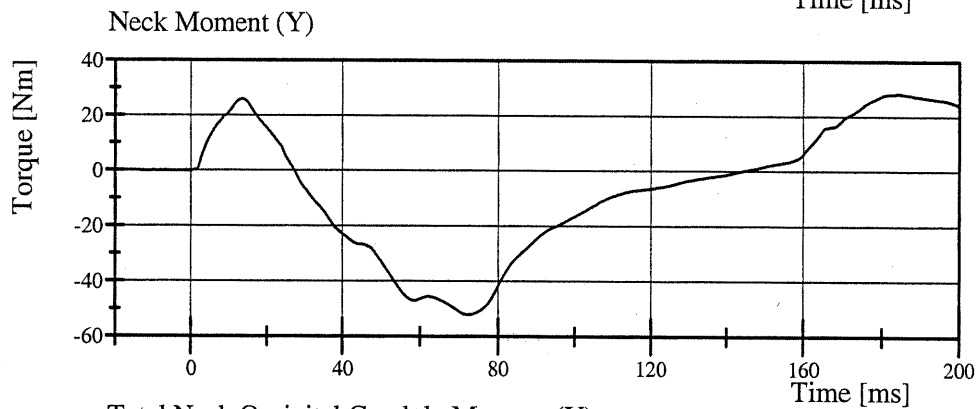
Test Date: 9/13/2007



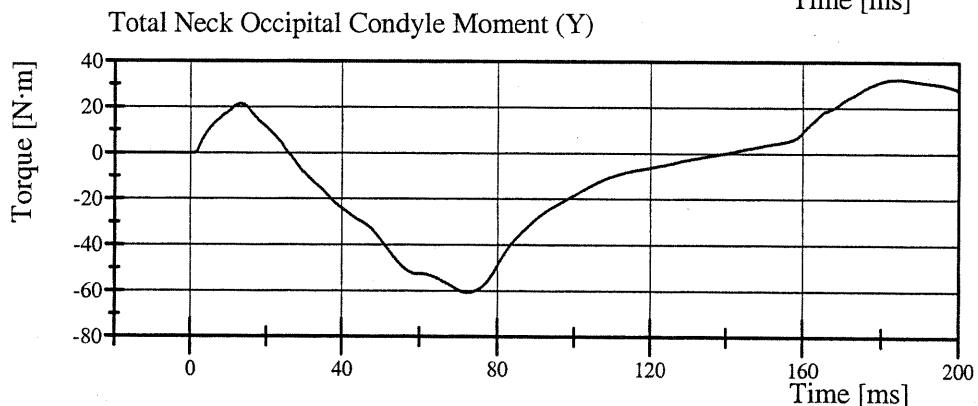
Filter Class: CFC_1000
Max: 496.3 N at 68.7 ms
Min: -244.1 N at 187.7 ms



Filter Class: CFC_600
Max: 496.0 N at 68.8 ms
Min: -244.1 N at 188.3 ms



Filter Class: CFC_600
Max: 28.3 Nm at 184.4 ms
Min: -52.1 Nm at 72.3 ms



Filter Class: CFC_600
Max: 32.5 N·m at 184.4 ms
Min: -60.8 N·m at 72.4 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 352 Certification No. 2-1


Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.630 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,415.6 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-64.04 mm	Yes
Internal Hysteresis	65 - 85 %	75.4 %	Yes

Test meets specifications.

Comments:

Technician



Approved





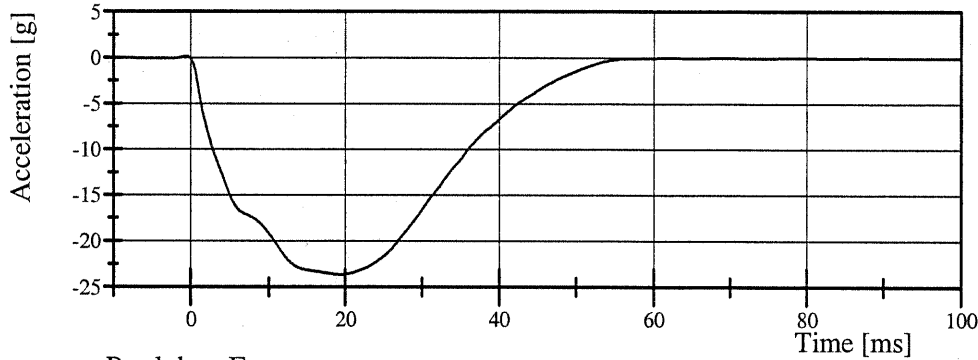
Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 352 Certification No. 2-1

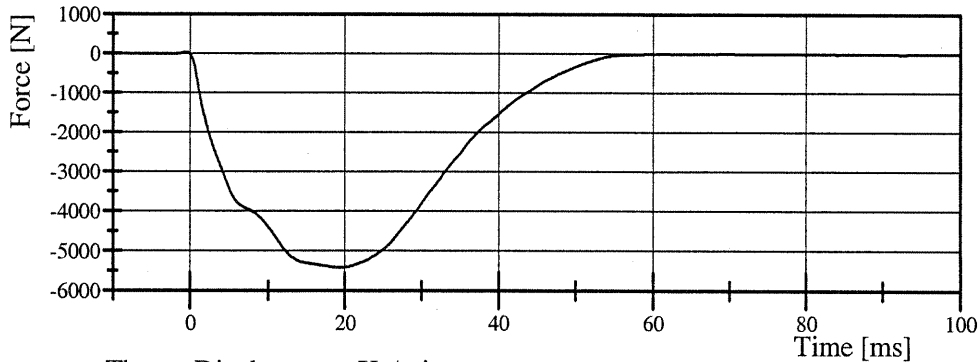
Test Date: 9/13/2007

Pendulum Acceleration



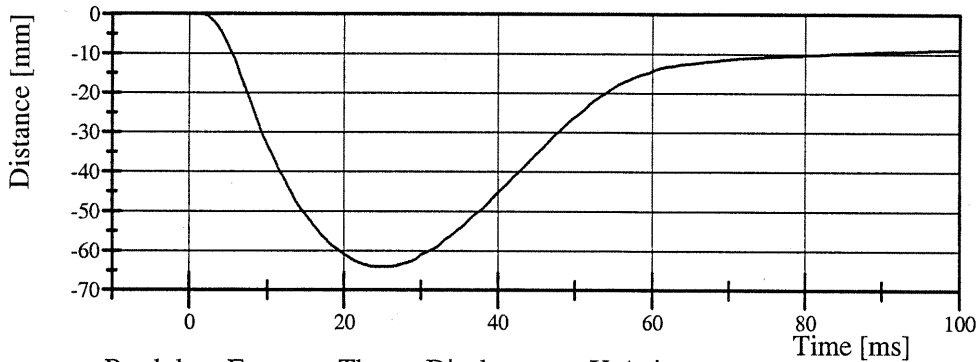
Filter Class: CFC_180
Max: 0.2 g at -0.5 ms
Min: -23.6 g at 19.4 ms

Pendulum Force



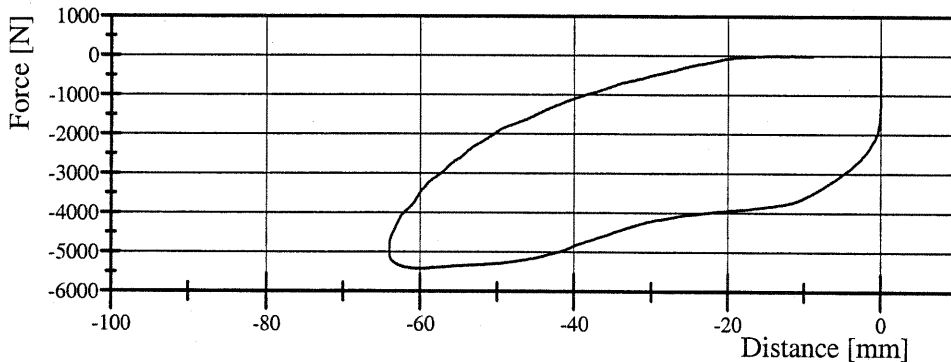
Filter Class: CFC_180
Max: 35.9 N at -0.5 ms
Min: -5,415.6 N at 19.4 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -4.0 ms
Min: -64.0 mm at 25.8 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 35.9 N at 0.0 mm
Min: -5,415.6 N at -60.0 mm

Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

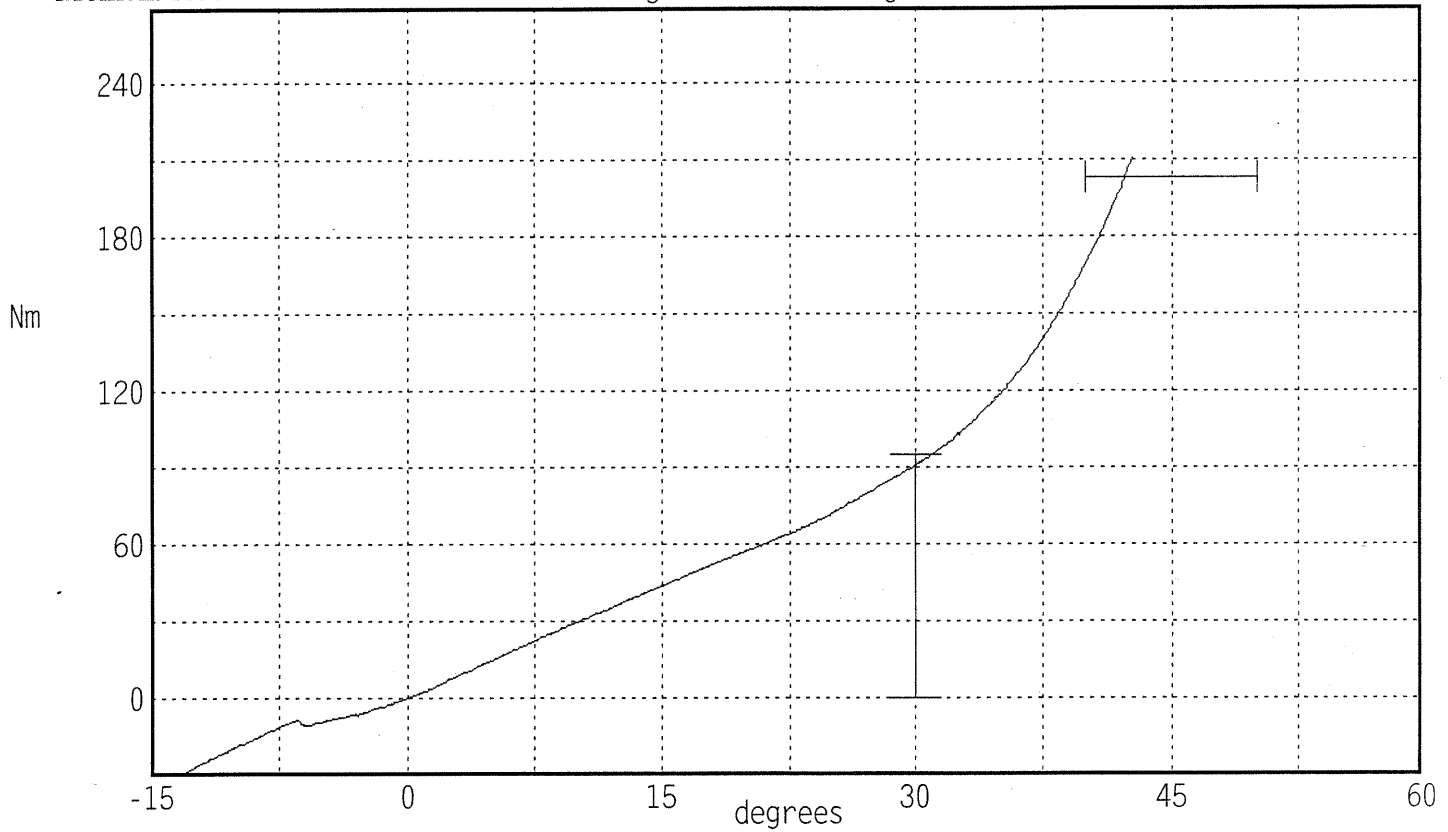
Serial Number: 352L
Test Number: 352C02
Comments:

Date: 09/12/2007
Time: 12:09

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	21.1 °C	Pass
Humidity	10 - 70	43 %	Pass
Moment at 30 deg	<= 94.9	90.6 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.2 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Peak Moment: 210.7 Nm at 42.7 deg
Peak Angle: 42.7 deg at 210.7 Nm

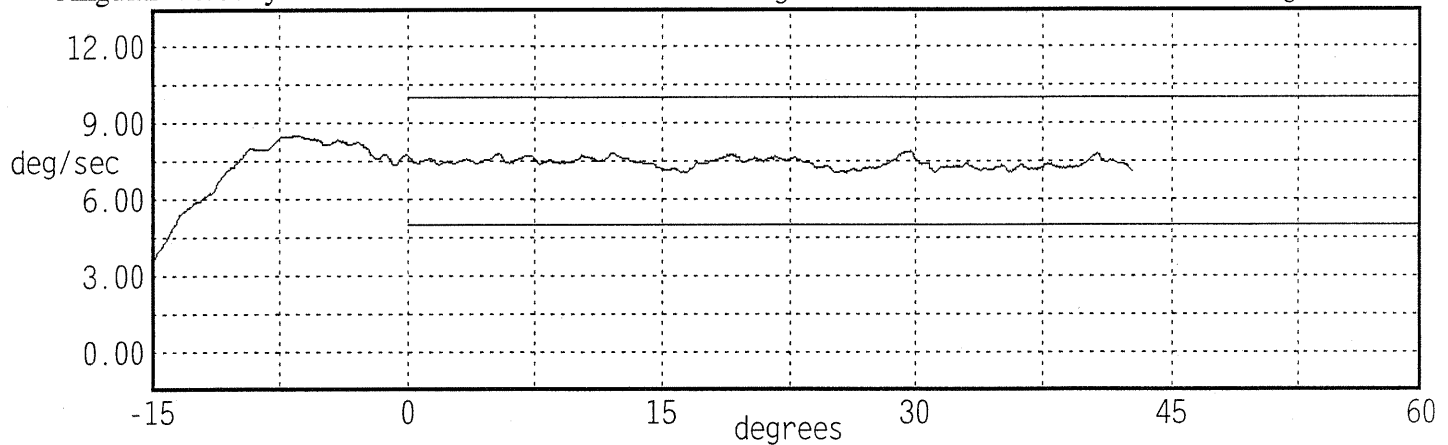
Moment About H-Point



Angular Velocity

Max: 7.9 deg/sec

Min: 7.0 deg/sec



Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

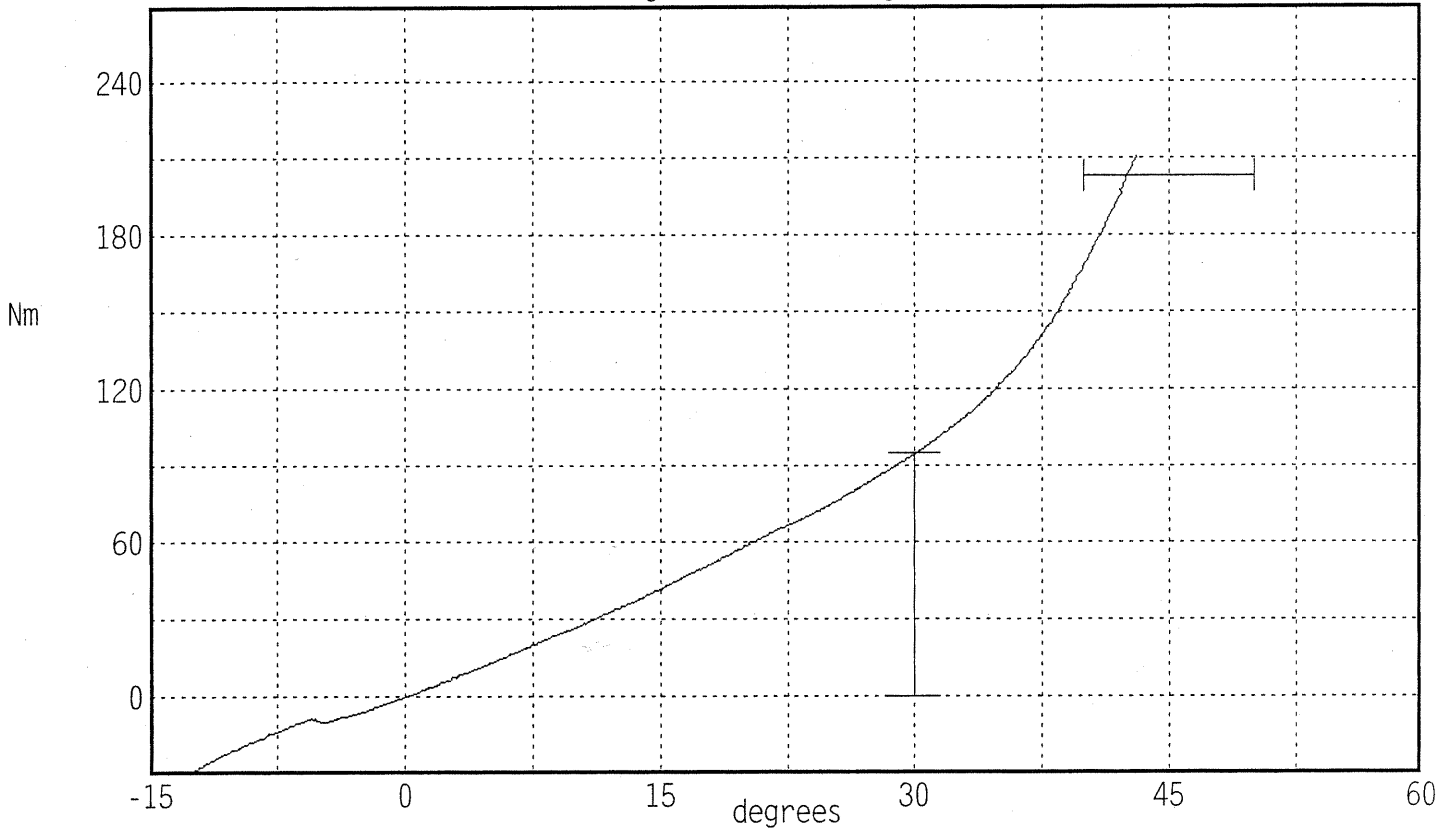
Serial Number: 352R
Test Number: 352C02

Date: 09/12/2007
Time: 12:18

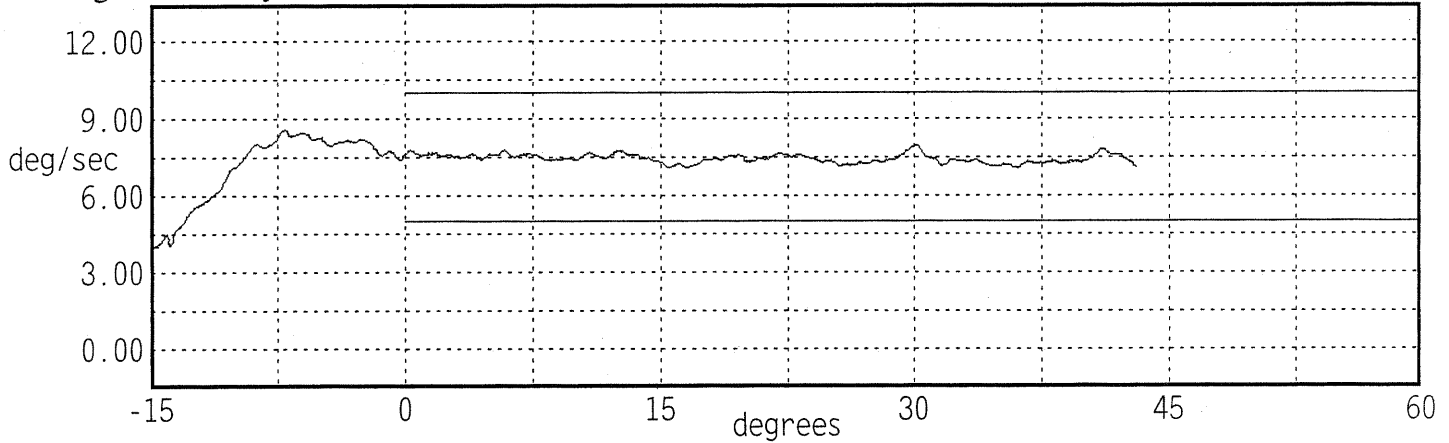
Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	18.9 - 25.6	20.8 °C	Pass
Humidity	10 - 70	45 %	Pass
Moment at 30 deg	<= 94.9	94.6 Nm	Pass
Angle at 203 Nm	40.0 - 50.0	42.6 deg	Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec	Pass

Moment About H-Point
Peak Moment: 210.4 Nm at 43.0 deg
Peak Angle: 43.0 deg at 210.4 Nm



Angular Velocity Max: 8.0 deg/sec Min: 7.1 deg/sec



Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 352 Certification No. 2-1
Test Date: 9/12/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.117 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,304.02 N	Yes

Test meets specifications.

Comments:

Technician



Approved



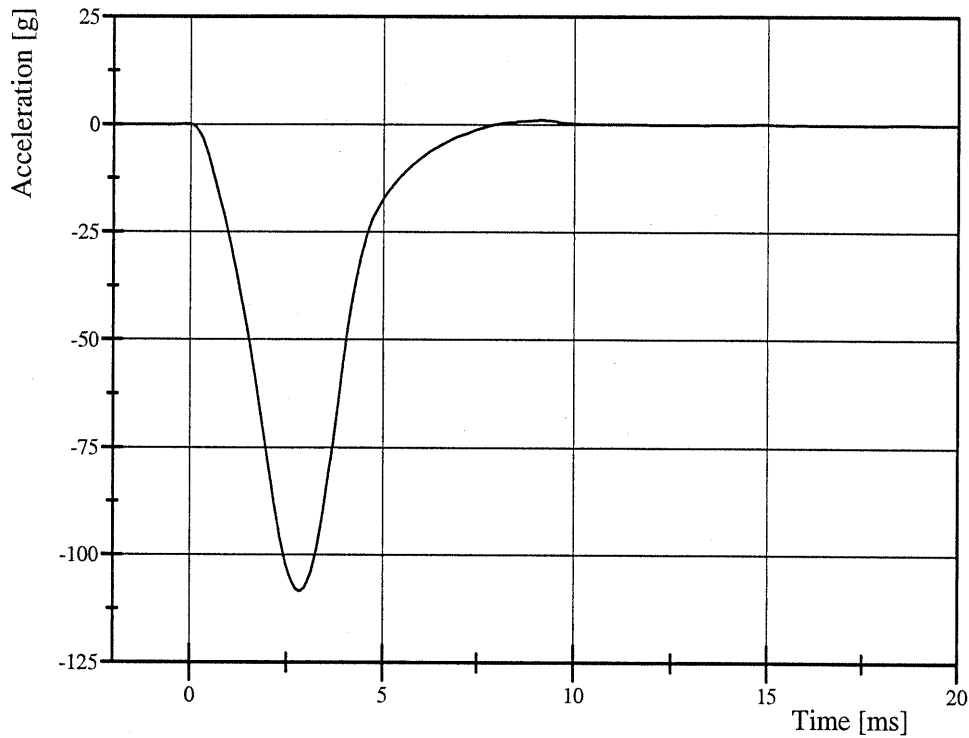
Transportation Research Center Inc.

Left Knee Femur Response Test

HIII 50th Serial No. 352 Certification No. 2-1

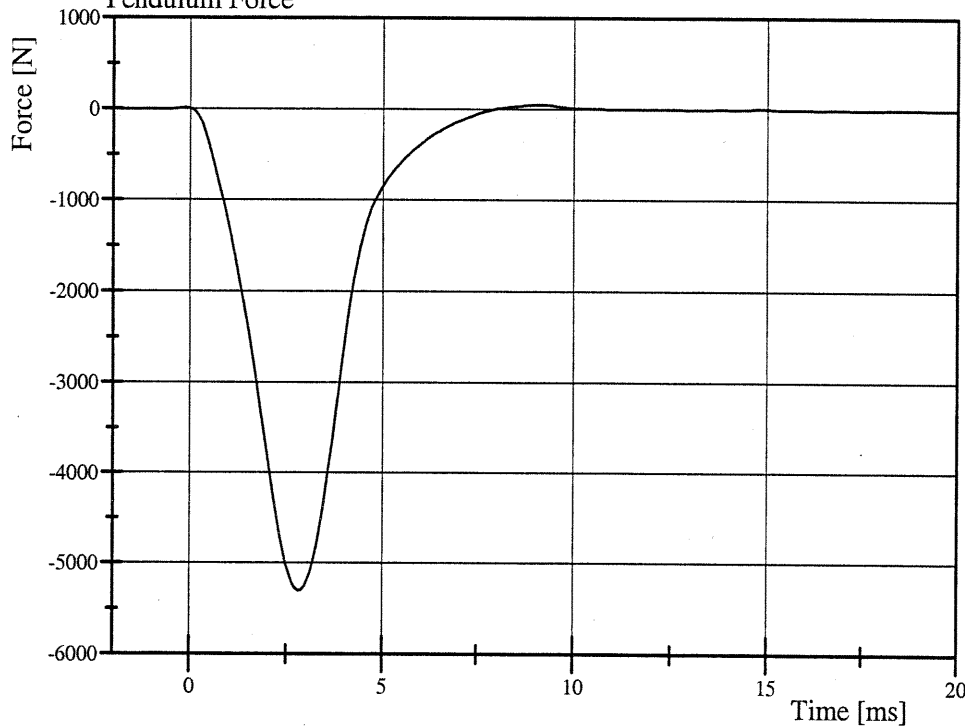
Test Date: 9/12/2007

Pendulum Acceleration



Filter Class: CFC_600
Max: 1.0 g at 9.2 ms
Min: -108.4 g at 2.8 ms

Pendulum Force



Filter Class: CFC_600
Max: 51.0 N at 9.2 ms
Min: -5,304.0 N at 2.8 ms

Transportation Research Center Inc.

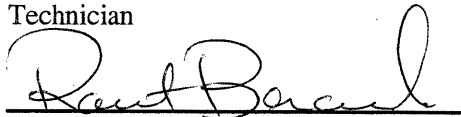
Right Knee Femur Response Test
HIII 50th Serial No. 352 Certification No. 2-1
Test Date: 9/12/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.117 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,429.96 N	Yes

Test meets specifications.

Comments:

Technician

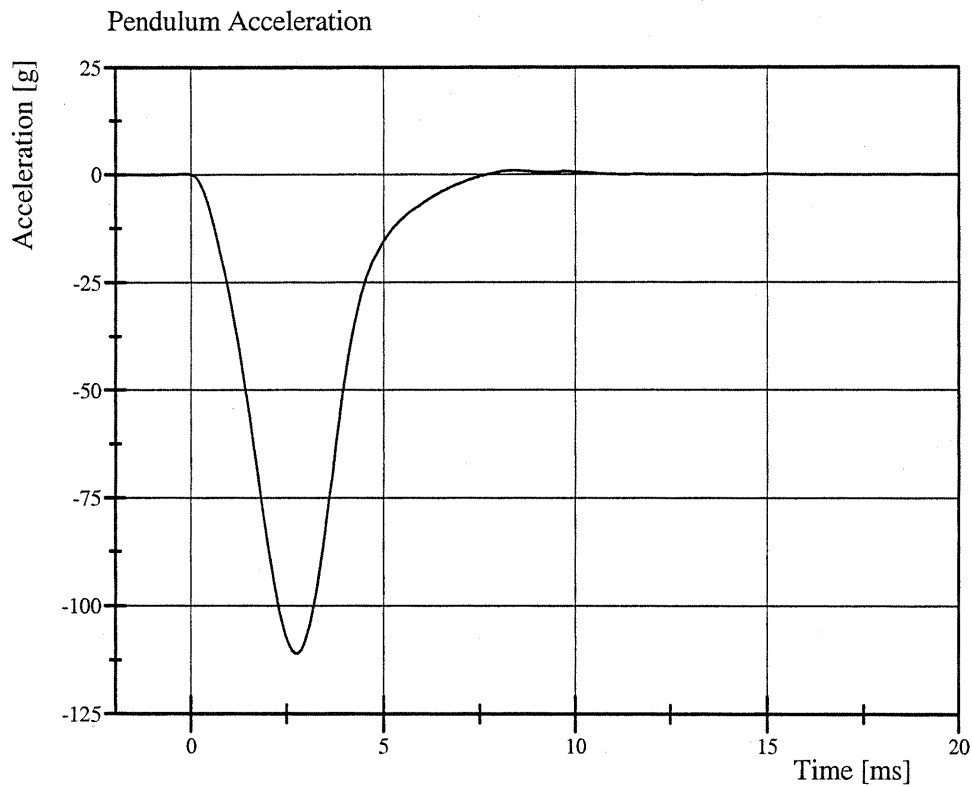


Approved

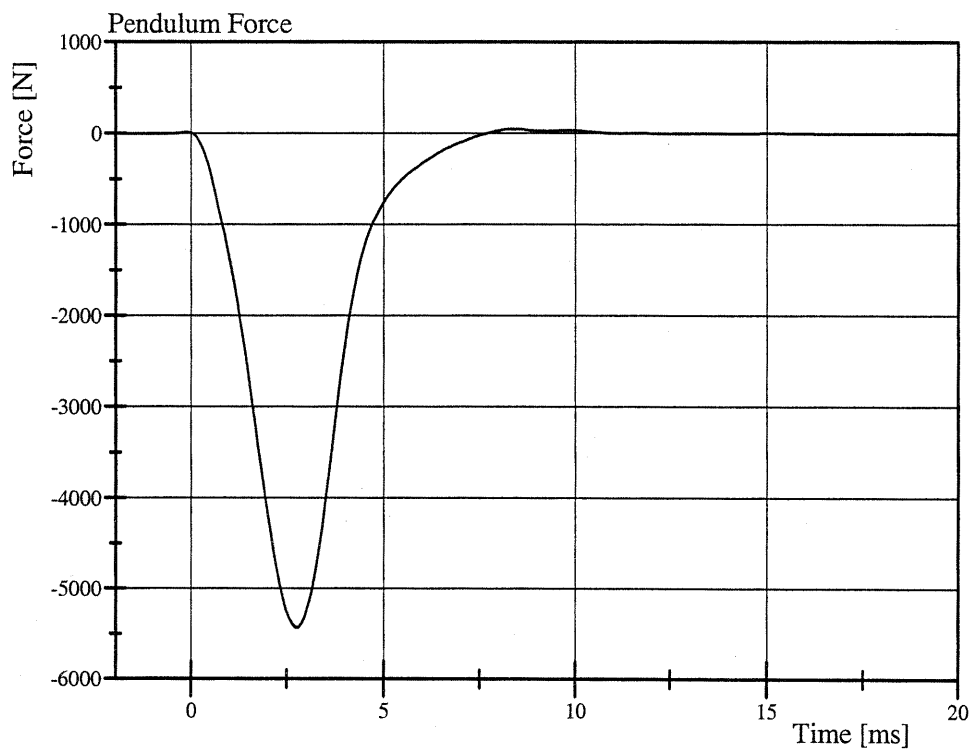


Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 352 Certification No. 2-1
Test Date: 9/12/2007



Filter Class: CFC_600
Max: 1.0 g at 8.4 ms
Min: -111.0 g at 2.7 ms



Filter Class: CFC_600
Max: 46.8 N at 8.4 ms
Min: -5,430.0 N at 2.7 ms

CALIBRATION TEST RESULTS

POST-TEST

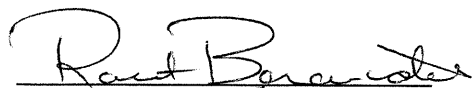
SID/HIII: 352

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 352
Calibration No. 03

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	887	Yes
B	Shoulder Pivot Height	505.5 - 520.7	519	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	92	Yes
F	Thigh Clearance	139.7 - 154.9	151	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	295	Yes
H	Skull Cap To Backline	40.6 - 45.7	44	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	335	Yes
J	Elbow Rest Height	190.5 - 210.8	209	Yes
K	Buttock Knee Length	579.1 - 604.5	602	Yes
L	Popliteal Height	429.3 - 454.7	435	Yes
M	Knee Pivot Height	485.1 - 500.4	498	Yes
N	Buttock Popliteal Length	452.1 - 477.5	471	Yes
O	Chest Depth	213.4 - 228.6	220	Yes
P	Foot Length	251.5 - 266.7	260	Yes
V	Shoulder Breadth	421.6 - 436.9	425	Yes
W	Foot Breadth	91.4 - 106.7	98	Yes
Y	Chest Circumference	970.3 - 1000.8	998	Yes
Z	Waist Circumference	835.7 - 866.1	862	Yes
AA	Location For Chest Circumference	429.3 - 434.3	433	Yes
BB	Location For Waist Circumference	226.1 - 231.1	231	Yes

Comments: Partial Set

Technician



Approved



Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 352 Certification No. 3-2

Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	251.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-6.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

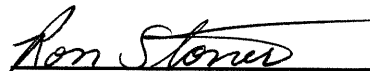
Test meets specifications.

Comments:

Technician



Approved

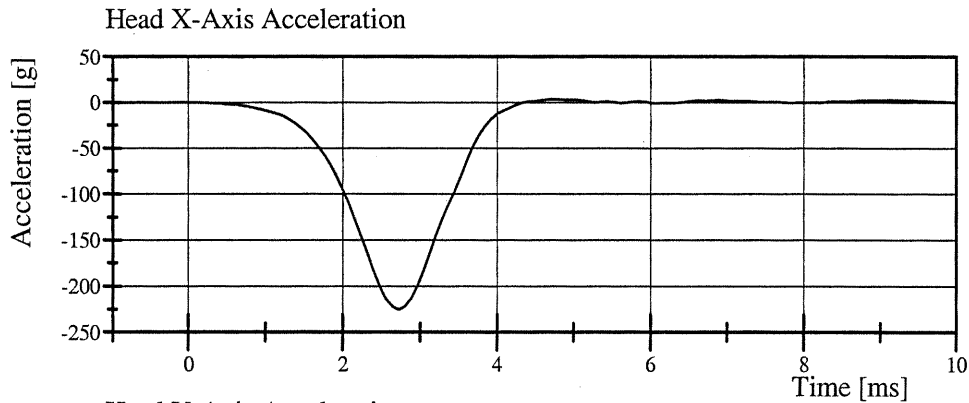


Transportation Research Center Inc.

Front Head Drop

HIII 50th Serial No. 352 Certification No. 3-2

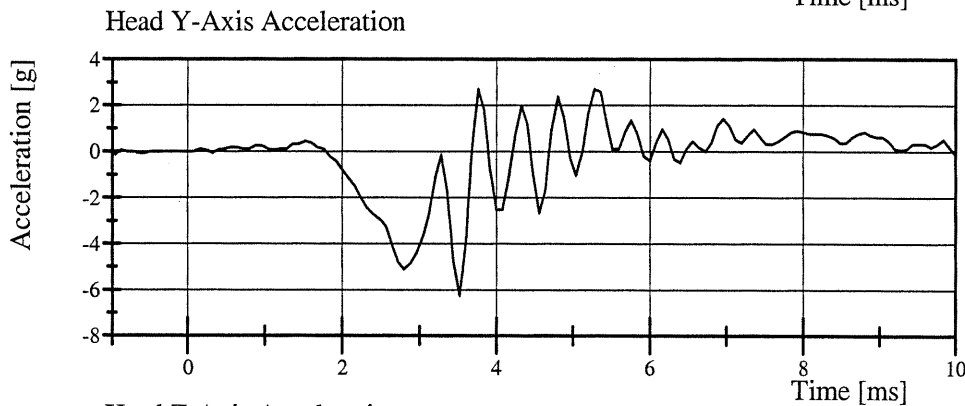
Test Date: 9/27/2007



Filter Class: CFC_1000

Max: 3.8 g at 4.7 ms

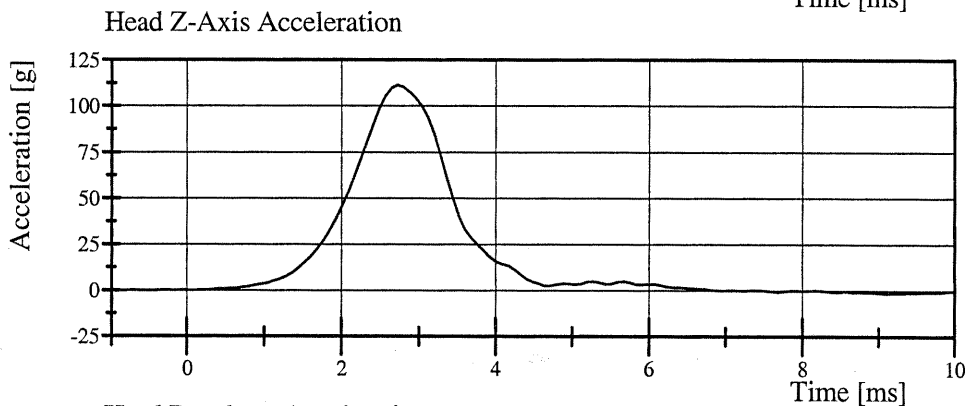
Min: -225.5 g at 2.7 ms



Filter Class: CFC_1000

Max: 2.7 g at 3.8 ms

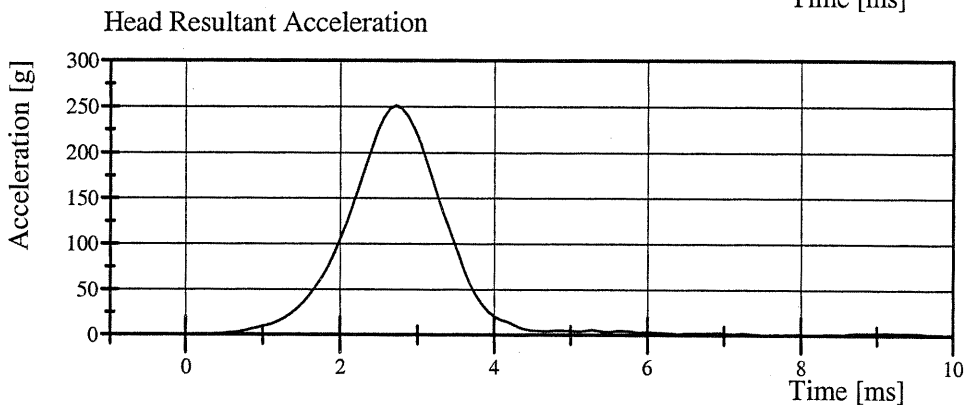
Min: -6.3 g at 3.5 ms



Filter Class: CFC_1000

Max: 111.4 g at 2.7 ms

Min: -1.5 g at 9.1 ms



Filter Class: CFC_1000

Max: 251.5 g at 2.7 ms

Min: 0.0 g at -0.8 ms

Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 352 Certification No. 3-3

Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.998 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	37.8 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.01 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.84 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-17.62 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-17.62 g	Yes
Total Head D-Plane Rotation Peak	(-64) - (-78) °	-68.7 °	Yes
Time of Peak	57 - 64 ms	58.3 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	113.8 ms	Yes
Total Neck Occipital Condyles Moment Peak	88 - 108 N·m	99.5 N·m	Yes
Time of Peak	47 - 58 ms	49.9 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	100.2 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



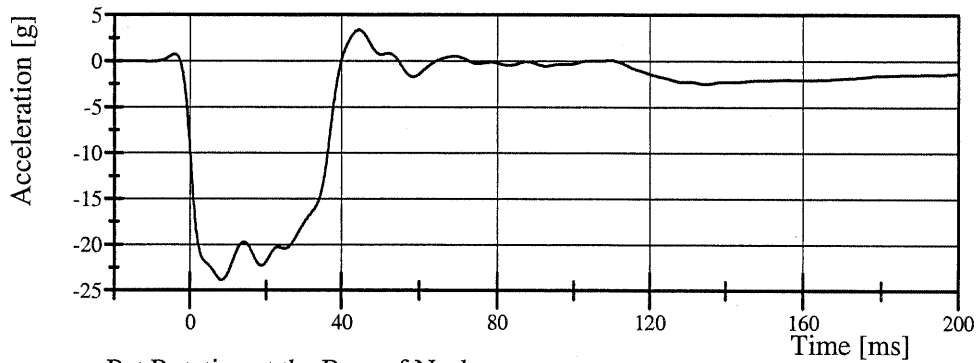
Transportation Research Center Inc.

Neck Flexion

HIII 50th Serial No. 352 Certification No. 3-3

Test Date: 9/27/2007

Pendulum Acceleration

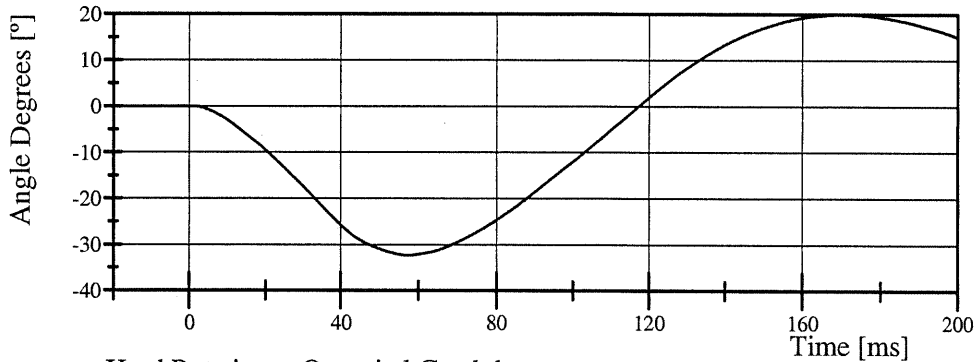


Filter Class: CFC_60

Max: 3.4 g at 44.5 ms

Min: -23.9 g at 8.3 ms

Pot Rotation at the Base of Neck

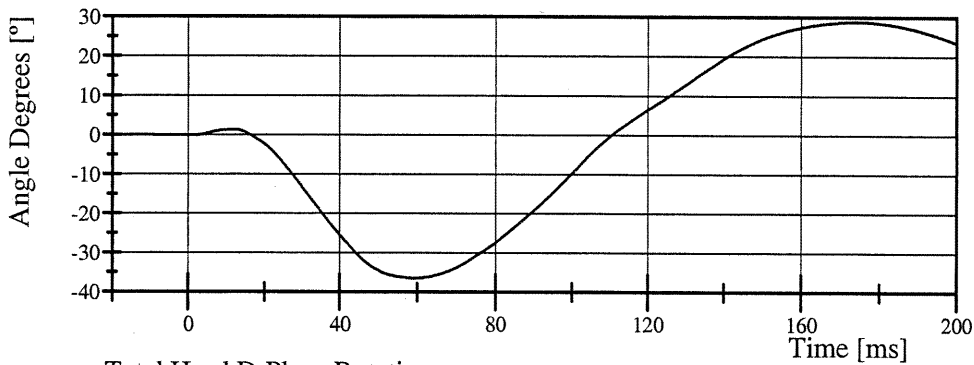


Filter Class: CFC_60

Max: 20.0 ° at 170.9 ms

Min: -32.3 ° at 57.4 ms

Head Rotation at Occipital Condyles

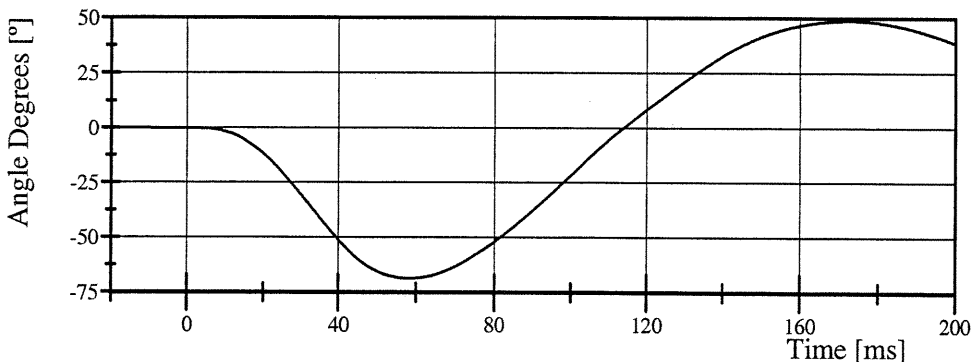


Filter Class: CFC_60

Max: 28.9 ° at 174.0 ms

Min: -36.4 ° at 59.4 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 48.8 ° at 172.6 ms

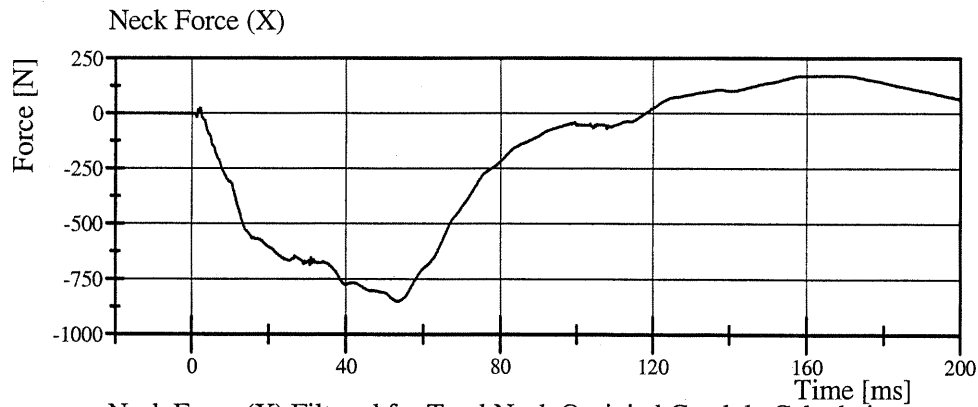
Min: -68.7 ° at 58.3 ms

Transportation Research Center Inc.

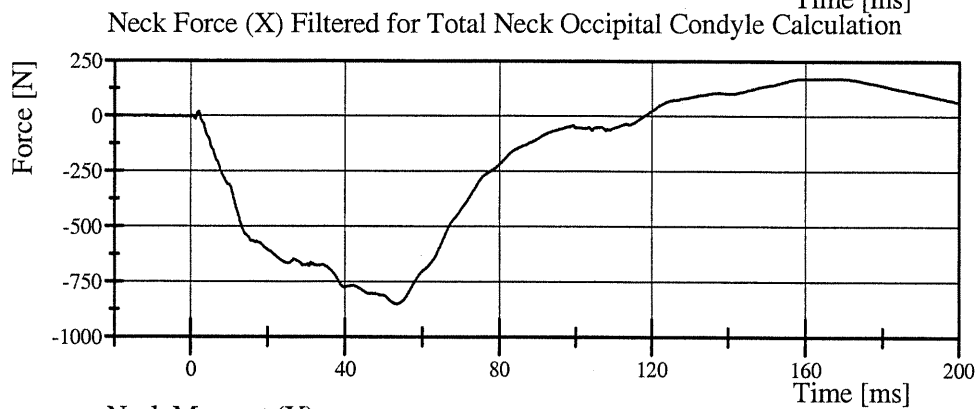
Neck Flexion

HIII 50th Serial No. 352 Certification No. 3-3

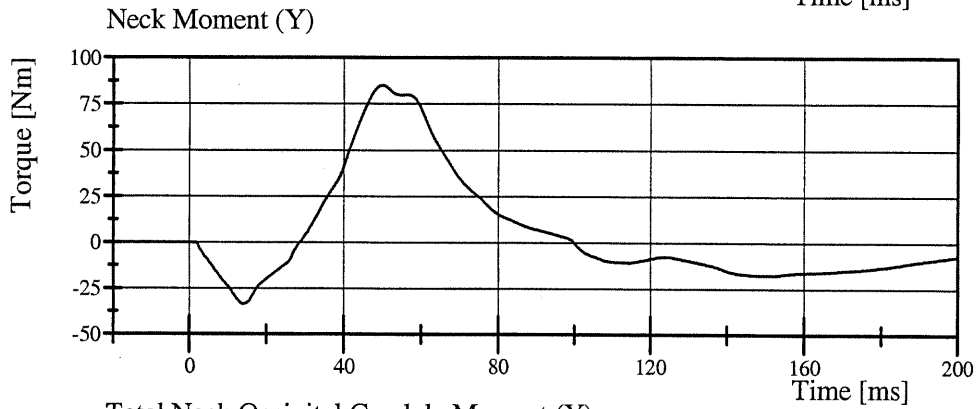
Test Date: 9/27/2007



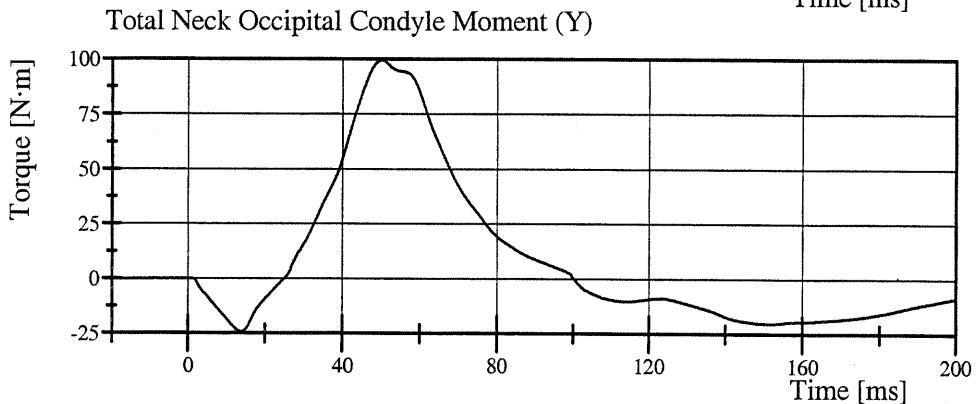
Filter Class: CFC_1000
Max: 172.8 N at 164.1 ms
Min: -850.4 N at 53.4 ms



Filter Class: CFC_600
Max: 172.6 N at 164.2 ms
Min: -850.2 N at 53.4 ms



Filter Class: CFC_600
Max: 85.2 Nm at 49.9 ms
Min: -33.5 Nm at 14.0 ms



Filter Class: CFC_600
Max: 99.5 N·m at 49.9 ms
Min: -24.2 N·m at 13.8 ms

Transportation Research Center Inc.

Neck Extension

HIII 50th Serial No. 352 Certification No. 3-1

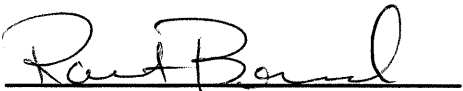
Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-6.000 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	38.8 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.13 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.72 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	15.03 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	15.03 g	Yes
Total Head D-Plane Rotation Peak	81 - 106 °	93.3 °	Yes
Time of Peak	72 - 82 ms	76.9 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	156.2 ms	Yes
Total Neck Occipital Condyles Moment Peak	(-53) - (-80) N·m	-63.9 N·m	Yes
Time of Peak	65 - 79 ms	72.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	141.0 ms	Yes

Test meets specifications.

Comments:

Technician



Approved

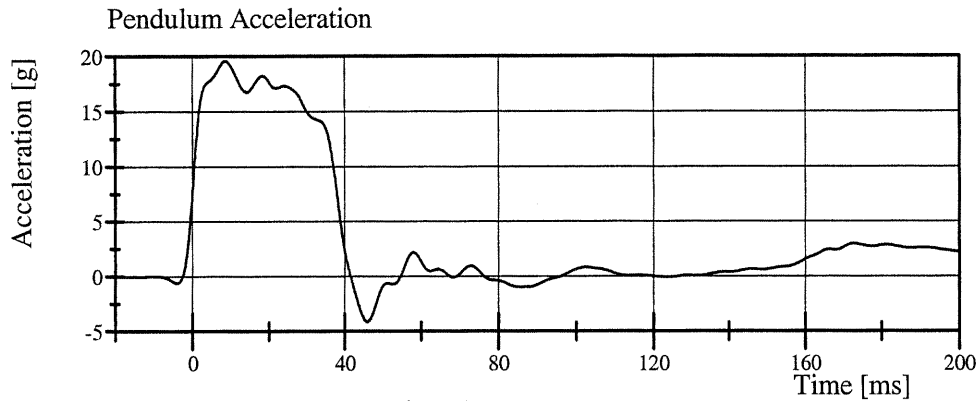


Transportation Research Center Inc.

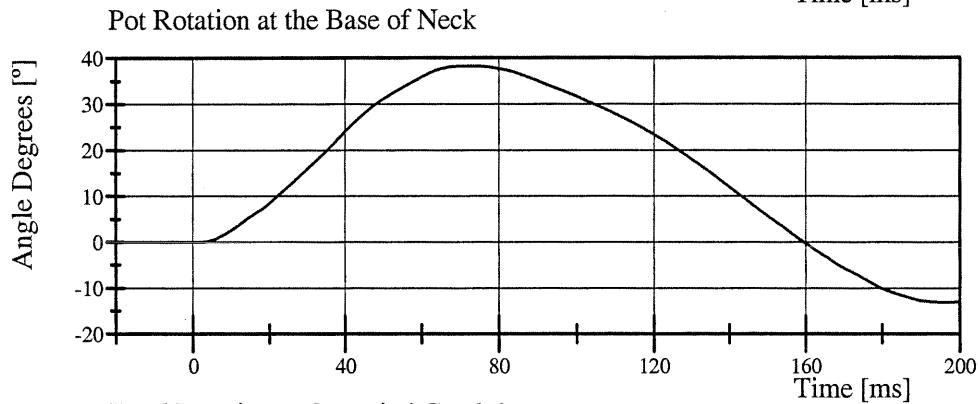
Neck Extension

HIII 50th Serial No. 352 Certification No. 3-1

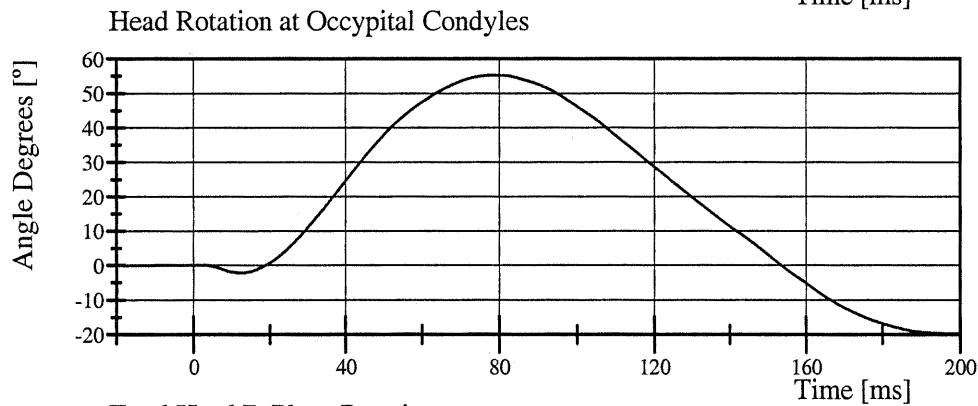
Test Date: 9/27/2007



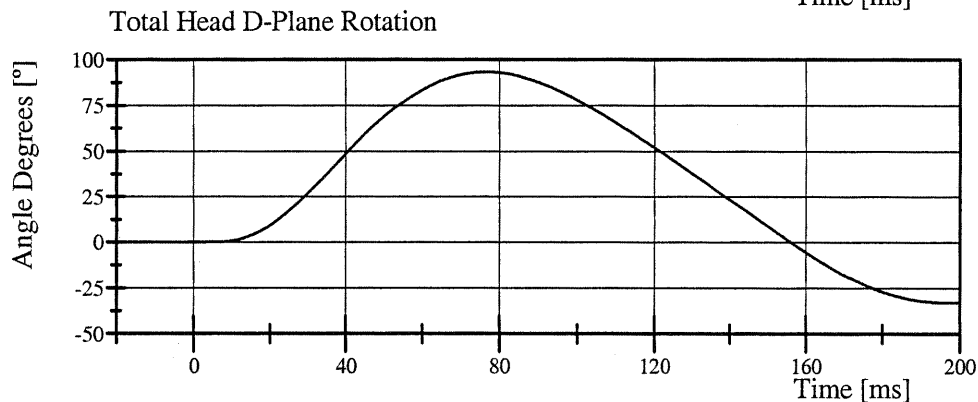
Filter Class: CFC_60
Max: 19.6 g at 8.6 ms
Min: -4.1 g at 45.8 ms



Filter Class: CFC_60
Max: 38.3 ° at 72.0 ms
Min: -13.1 ° at 196.6 ms



Filter Class: CFC_60
Max: 55.3 ° at 79.2 ms
Min: -19.8 ° at 198.9 ms



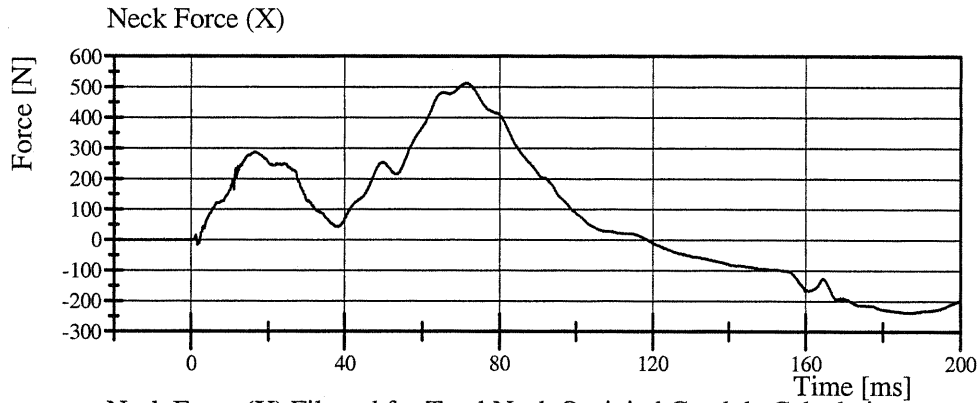
Filter Class: CFC_60
Max: 93.3 ° at 76.9 ms
Min: -32.8 ° at 197.7 ms

Transportation Research Center Inc.

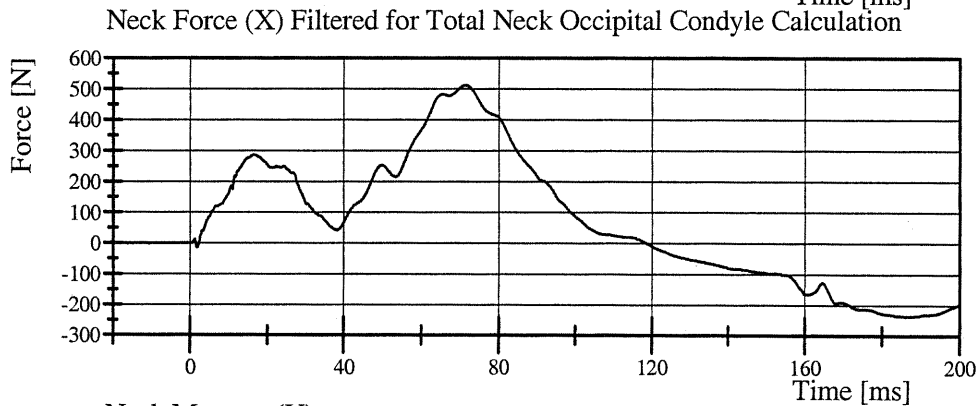
Neck Extension

HIII 50th Serial No. 352 Certification No. 3-1

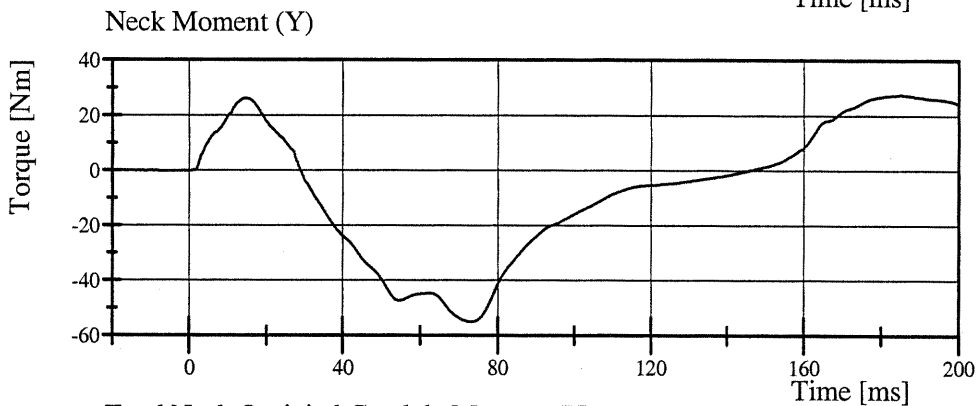
Test Date: 9/27/2007



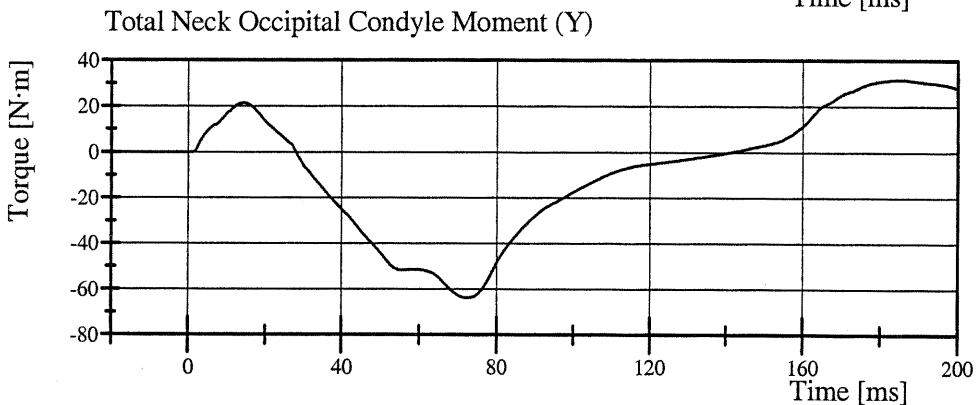
Filter Class: CFC_1000
Max: 512.8 N at 71.4 ms
Min: -237.4 N at 186.0 ms



Filter Class: CFC_600
Max: 512.5 N at 71.4 ms
Min: -237.0 N at 186.0 ms



Filter Class: CFC_600
Max: 27.6 Nm at 184.9 ms
Min: -55.0 Nm at 72.9 ms



Filter Class: CFC_600
Max: 31.8 N·m at 185.1 ms
Min: -63.9 N·m at 72.6 ms

Transportation Research Center Inc.

Front Thorax

HIII 50th Serial No. 352 Certification No. 3-1

Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.611 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,486.0 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-64.80 mm	Yes
Internal Hysteresis	65 - 85 %	74.5 %	Yes

Test meets specifications.

Comments:

Technician

Raeel Barakat

Approved

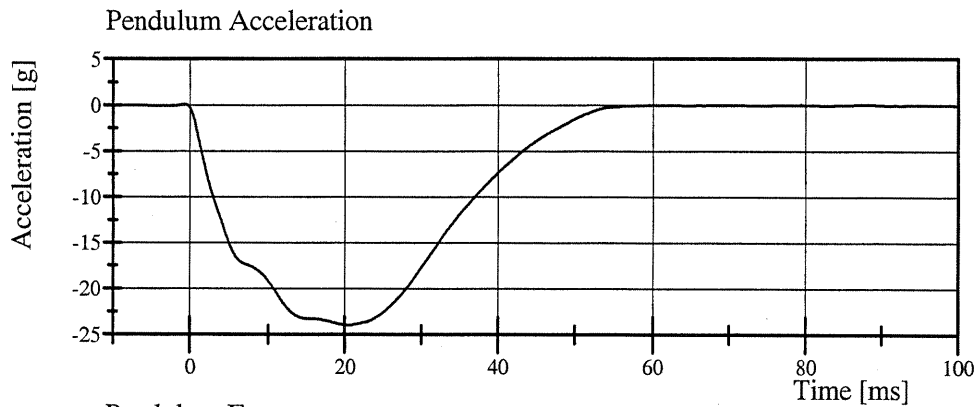
Ron Stoner

Transportation Research Center Inc.

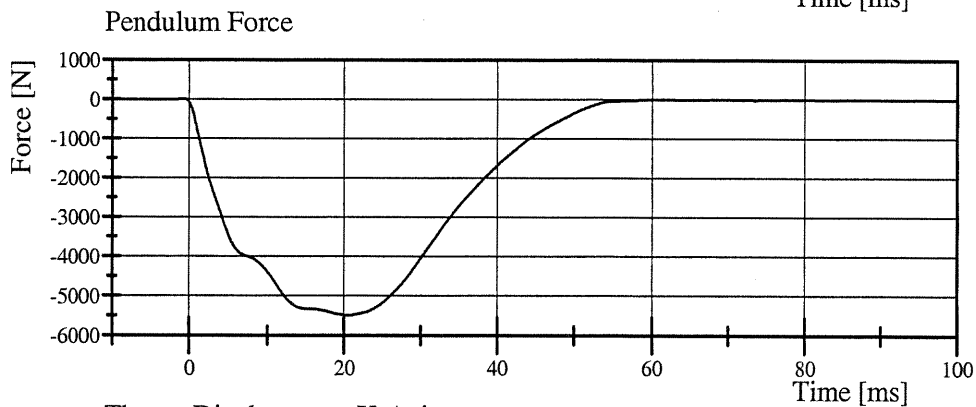
Front Thorax

HIII 50th Serial No. 352 Certification No. 3-1

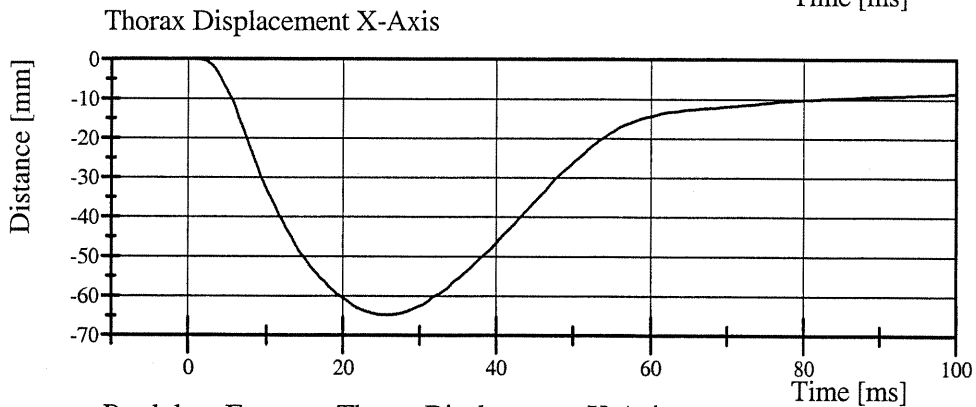
Test Date: 9/27/2007



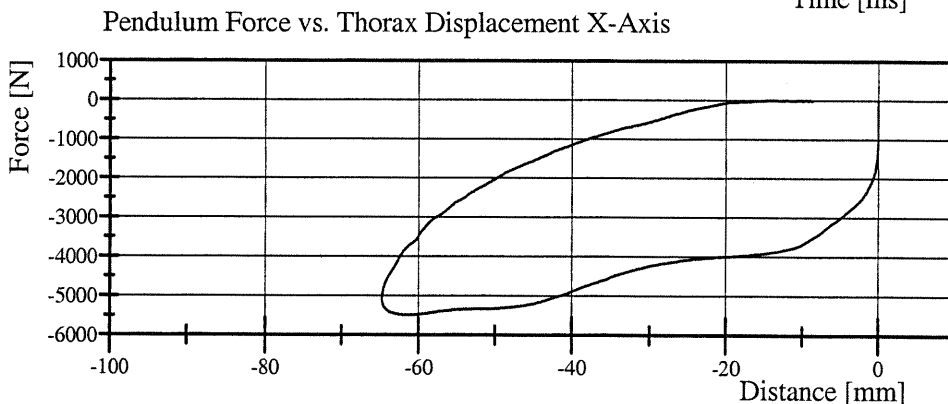
Filter Class: CFC_180
Max: 0.1 g at -0.7 ms
Min: -23.9 g at 20.6 ms



Filter Class: CFC_180
Max: 19.0 N at -0.7 ms
Min: -5,486.0 N at 20.6 ms



Filter Class: CFC_600
Max: 0.0 mm at 1.0 ms
Min: -64.8 mm at 25.4 ms



Filter Class: CFC_180
Max: 19.0 N at -0.0 mm
Min: -5,486.0 N at -61.5 mm

Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

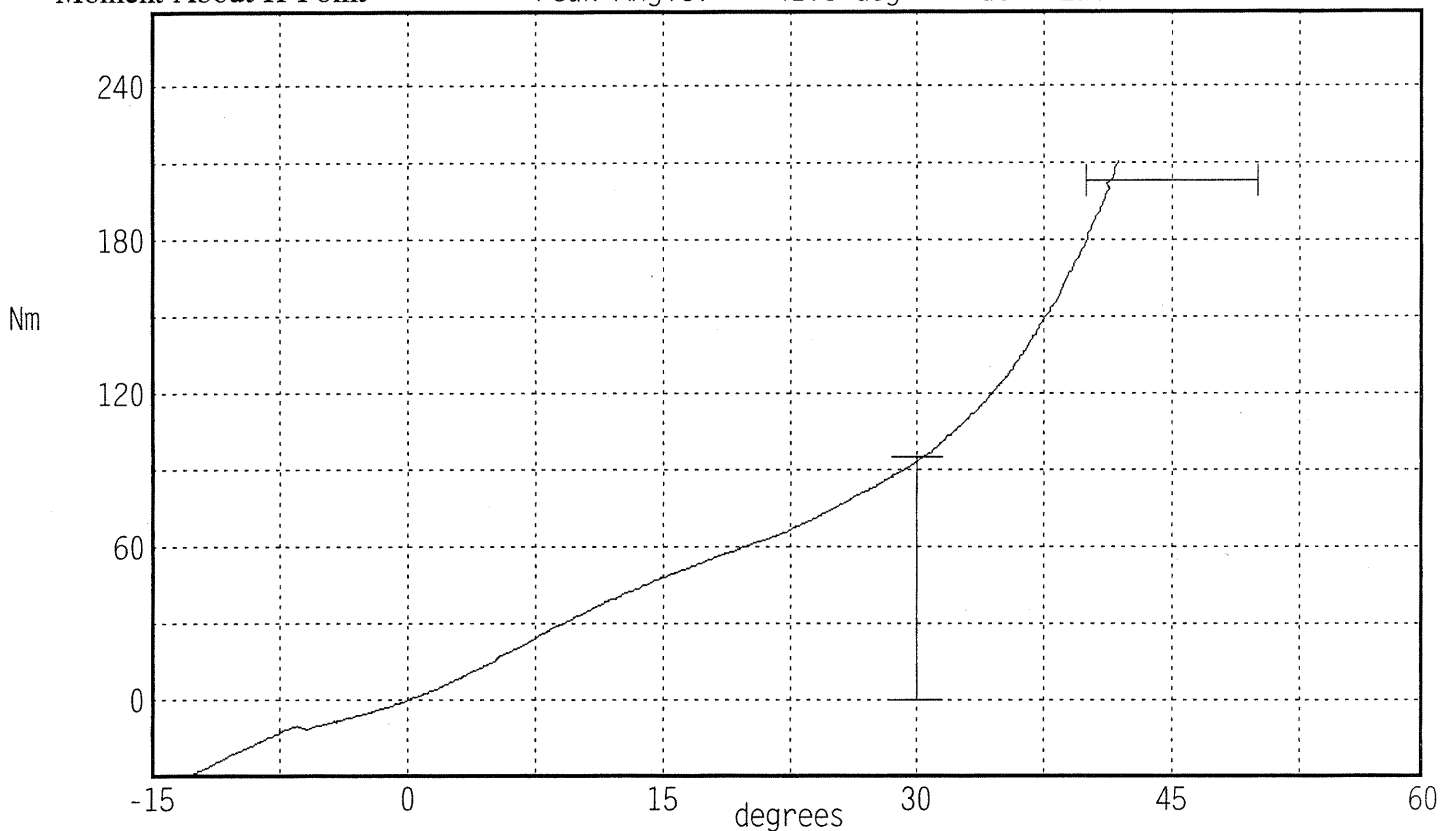
Serial Number: 352L
Test Number: 352C03
Comments:

Date: 09/27/2007
Time: 08:05

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.1 °C Pass
Humidity	10 - 70	59 % Pass
Moment at 30 deg	<= 94.9	93.0 Nm Pass
Angle at 203 Nm	40.0 - 50.0	41.4 deg Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec Pass

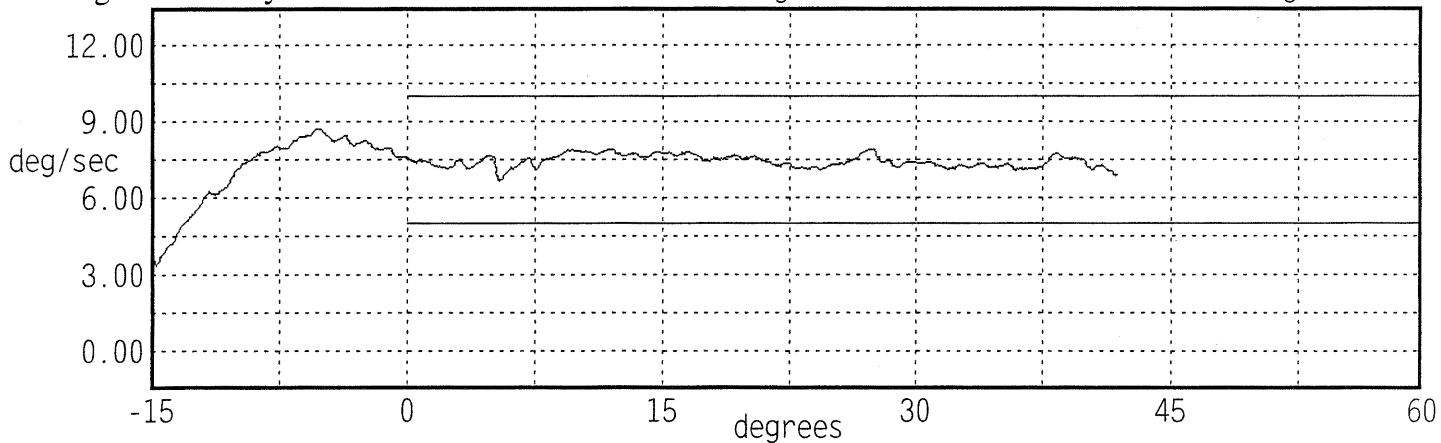
Peak Moment: 210.7 Nm at 41.8 deg
Peak Angle: 41.8 deg at 210.7 Nm

Moment About H-Point



Angular Velocity

Max: 7.9 deg/sec Min: 6.7 deg/sec



Applied Safety Technologies Corp.

Hybrid III Hip Range of Motion

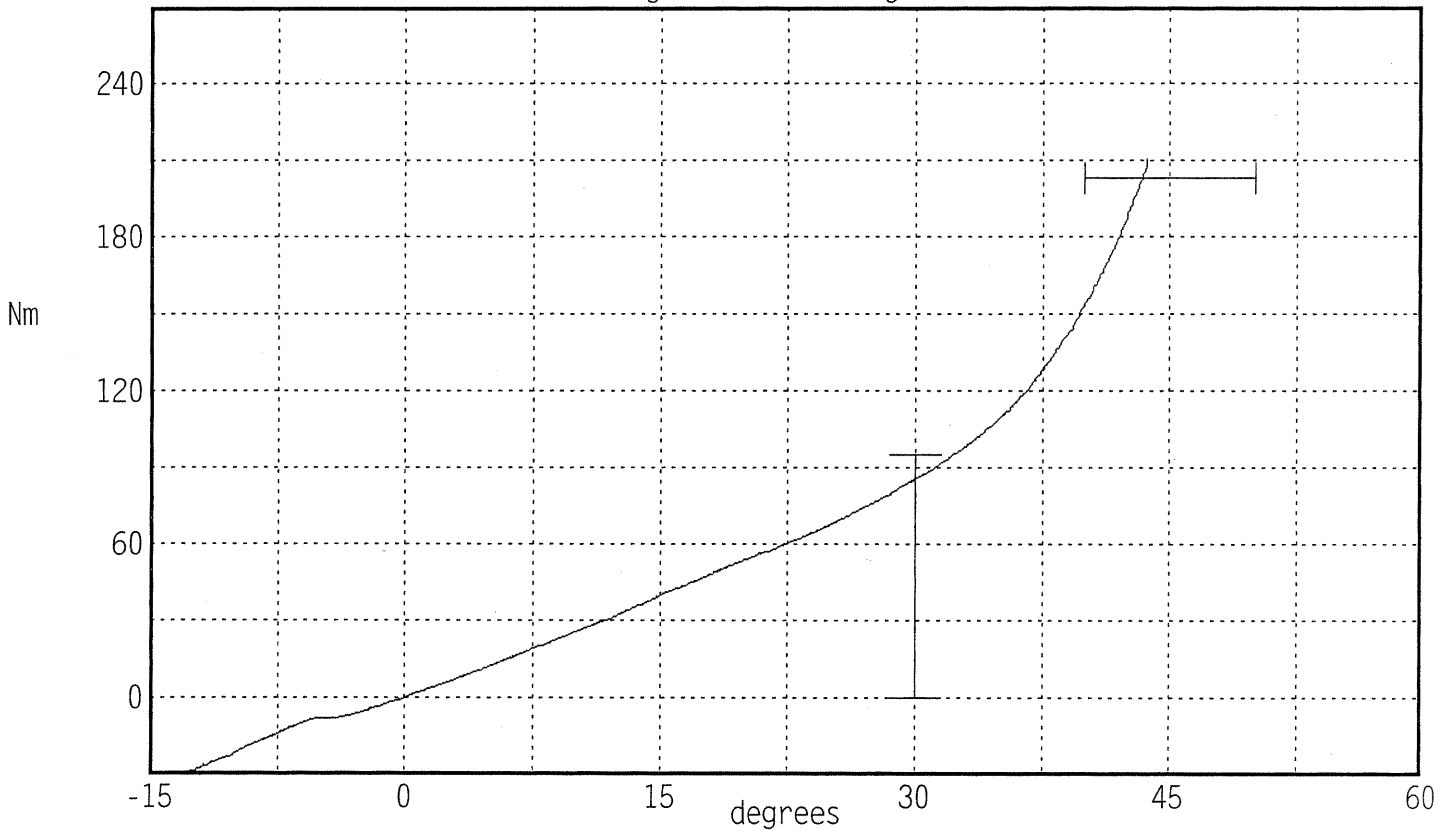
Serial Number: 352R
Test Number: 352C03

Date: 09/27/2007
Time: 08:30

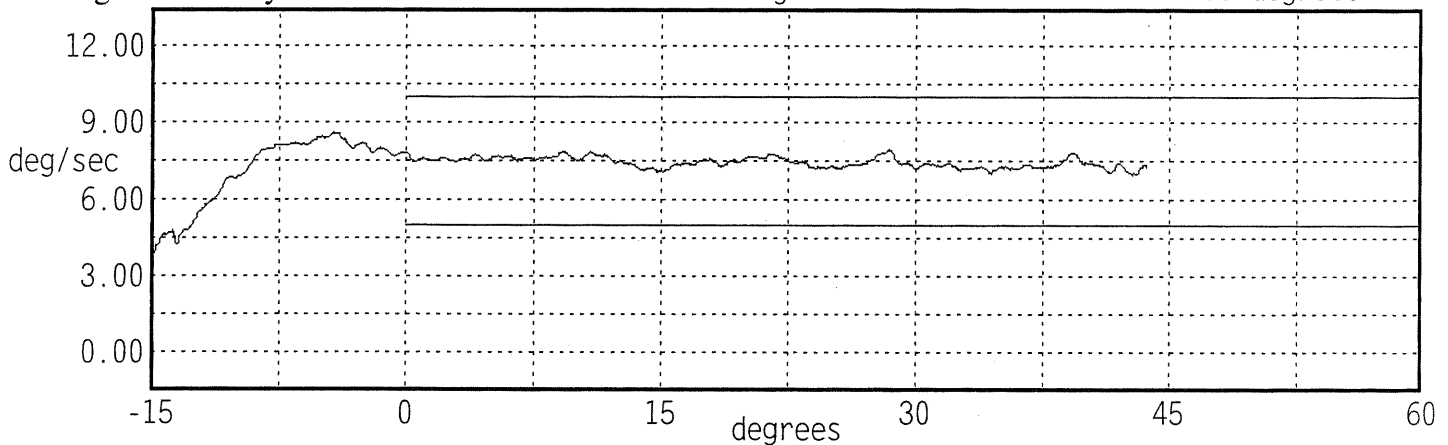
Comments:

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	18.9 - 25.6	21.1 °C Pass
Humidity	10 - 70	58 % Pass
Moment at 30 deg	<= 94.9	85.9 Nm Pass
Angle at 203 Nm	40.0 - 50.0	43.5 deg Pass
Average Velocity	5.0 - 10.0	7.4 deg/sec Pass

Moment About H-Point
Peak Moment: 210.7 Nm at 43.7 deg
Peak Angle: 43.7 deg at 209.2 Nm



Angular Velocity Max: 7.9 deg/sec Min: 7.0 deg/sec



Transportation Research Center Inc.

Left Knee Femur Response Test

HIII 50th Serial No. 352 Certification No. 3-1

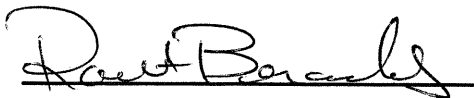
Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.113 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,064.73 N	Yes

Test meets specifications.

Comments:

Technician

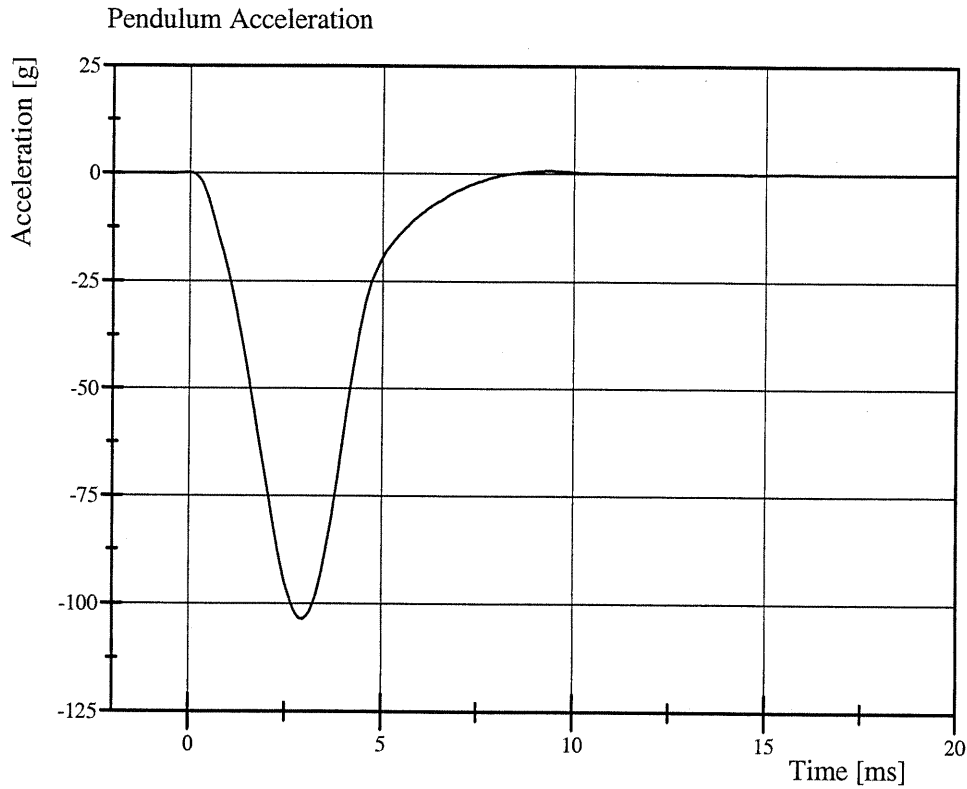


Approved

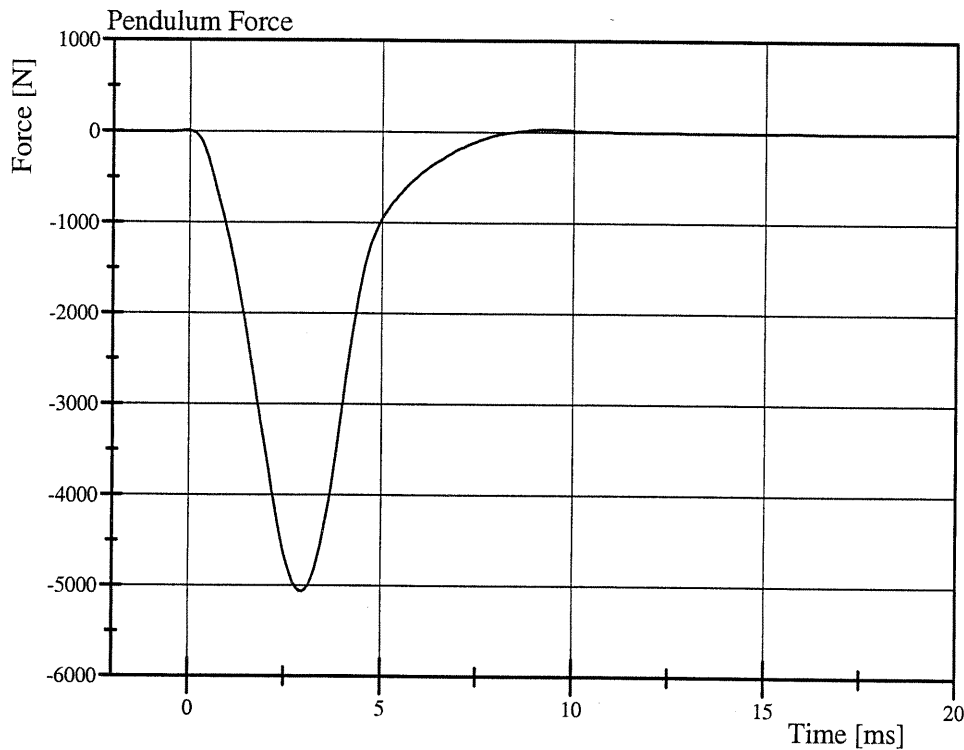


Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 352 Certification No. 3-1
Test Date: 9/27/2007



Filter Class: CFC_600
Max: 0.7 g at 9.4 ms
Min: -103.5 g at 3.0 ms



Filter Class: CFC_600
Max: 33.4 N at 9.4 ms
Min: -5,064.7 N at 3.0 ms

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 352 Certification No. 3-1
Test Date: 9/27/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.115 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,404.11 N	Yes

Test meets specifications.

Comments:

Technician

Rand Bomb

Approved

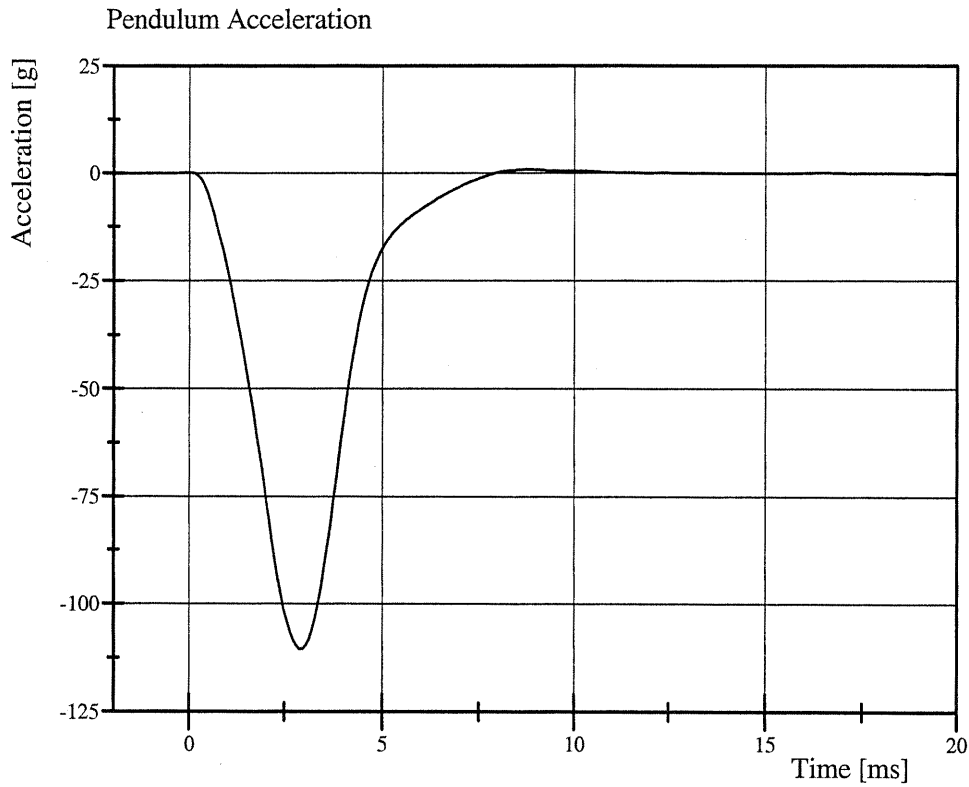
Ron Stoner

Transportation Research Center Inc.

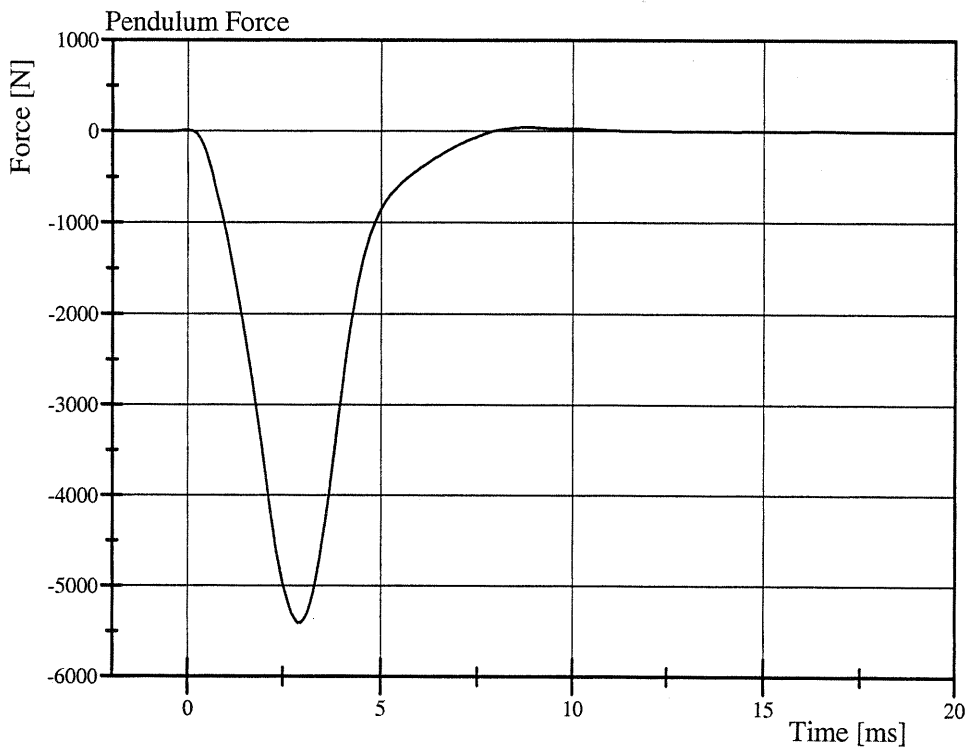
Right Knee Femur Response Test

HIII 50th Serial No. 352 Certification No. 3-1

Test Date: 9/27/2007



Filter Class: CFC_600
Max: 0.9 g at 8.8 ms
Min: -110.4 g at 3.0 ms



Filter Class: CFC_600
Max: 42.8 N at 8.8 ms
Min: -5,404.1 N at 3.0 ms



Hybrid III Dummy

(5th%, 50th%, 95th%, 10 YO and 6YO)

Test Date: 09/19/07

Type: HIII 50th S/N: 352 Mfg.: Denton

Proj./Seg. No.: 20050906-1100 Test Eng: Emad Al-Tabakha

ITEM	PRE-USE	POST-USE
HEAD:		
Skull Cap Bolts: tight and no wires pinched	X	
Head Skin Condition	X	X
* Neck Load Cell Cables: secure, taped, and with strain relief	X	
NECK:		
Bracket at specified setting, Serration Alignment, Bolt Actual: <u>0</u>	X	X
Condyle Pin, Set Screws	X	
* Rubber Condition	X	X
* Neck Cable Torque (5 th /50 th /95 th : 10-14 in-lb) (6YO: 1.8 - 2.2 in-lb) Actual: <u>10</u>		
* Nodding Blocks Condition and Position (Nodding Joint Function)	X	X
ARMS AND HANDS:		
Clavicle and Shoulder Bumpers Condition	X	
Range of Motion Stops: Elbow, Top and Rear Shoulder		X
THORAX:		
Front and Rear Rib Bolts, Rib Ends Position, Rib Spacing	X	
Chest Pot Arm, Ball Movement, Set Screws	X	X
Sternum Bolts and Sternum Bumpers Condition	X	X
Jacket Condition	X	X
Abdominal Insert Condition	X	X
Rib Damping Material and Stiffeners Condition	X	X
Accel. Mount Bolts	X	
Lumbar Spine Rubber Condition, Spine Angle (10YO), 4 Attachment Bolts	X	X
LUMBAR/PELVIS:		
Iliac Crest Bone	X	X
Flesh Condition	X	X
Accel. Mount Bolt	X	
10YO: Lumbar Block Adjustment Position as requested. Actual:	N/A	
Lumbar Block Bolts	X	
Range of Motion Bumpers & Leg Cavity	X	X
LEGS AND FEET:		
Femur Load Cell Bolts (5 th /50 th /95 th : 30 ft-lb / 6YO: 16 ft-lb)	X	
Knee Joint Function and Range of Motion	X	
Knee Skins, Casting, and Inserts Condition	X	X
Knee Slider Zero Position	N/A	
Ankle Range of Motion, Bumper Condition	X	
Foot Condition	X	X
OTHER:		
Cleanliness / Skin Condition & Position	X	
Target Position	X	
Clothes and Shoes		
One G Joint Adjustments	X	
Verify channel s against assembly and Check connectors (intact & labeled)	X	
ATTACH TEMPERATURE LOGGER TO DUMMY / DOWNLOAD		

* Items checked during calibration; these items need checked when the dummy is used without recalibration

Pre Test Inspection Completed By: J. Clarridge Date: 09/18/07

Post Test Inspection Completed By: J. Clarridge Date: 09/21/07

APPENDIX D
CHILD RESTRAINT SYSTEM

REPORT NUMBER: NCAP-TRC-2007-001

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**NISSAN MOTOR CO., LTD.
2008 NISSAN PATHFINDER SUV
NHTSA NUMBER: M85207**

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



Test Date: September 19, 2007

Report Date: October 3, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
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. DTNH22-06-D-00029. 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: Michael S. Postle, Engineering Technician

Report Approved By: Emad Al-Tabakha

Emad Al-Tabakha, Test Engineer
Transportation Research Center Inc.

Approval Date: 10/04/07

FINAL REPORT ACCEPTANCE BY OCWS:

Accepted By: _____

Acceptance Date: _____

1. Report No. NCAP-TRC-2007-001	2. Government Accession No.	3. Recipient's Catalog No.													
4. Title and Subtitle Final Report of a Graco Snugride CRS Final Report of a Safety 1 st Starter CRS NHTSA No.: M85207		5. Report Date October 3, 2007													
		6. Performing Organization Code TRC Inc.													
7. Author(s) Emad Al-Tabakha, Test Engineer Transportation Research Center Inc.		8. Performing Organization Report No. 070919													
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. DTNH22-06-D-00029													
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 September - October 2007													
		14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS													
15. Supplemental Notes															
16. Abstract A side impact test was conducted on one (1) CRS Graco Snugride and one (1) CRS Safety 1 st Starter in conjunction with side impact NCAP testing on a 2008 Nissan Pathfinder SUV 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="width: 100%; border: none;"> <tr> <td style="width: 50%;"></td> <td style="text-align: center; border-bottom: 1px solid black;"><u>Left Rear</u></td> <td style="width: 20%;"></td> <td style="text-align: center; border-bottom: 1px solid black;"><u>Right Rear</u></td> </tr> <tr> <td>Head Injury Criteria (HIC15):</td> <td style="text-align: center;"><u>188.3</u></td> <td style="text-align: center;">g's</td> <td style="text-align: center;"><u>644.6</u></td> </tr> <tr> <td>3 ms Chest Clip:</td> <td style="text-align: center;"><u>47.5</u></td> <td style="text-align: center;">g's</td> <td style="text-align: center;"><u>69.2</u></td> </tr> </table>					<u>Left Rear</u>		<u>Right Rear</u>	Head Injury Criteria (HIC15):	<u>188.3</u>	g's	<u>644.6</u>	3 ms Chest Clip:	<u>47.5</u>	g's	<u>69.2</u>
	<u>Left Rear</u>		<u>Right Rear</u>												
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3 ms Chest Clip:	<u>47.5</u>	g's	<u>69.2</u>												
17. Key Words New Car Assessment Program (NCAP) Frontal Barrier Impact Test Final Report of a Graco Snugride CRS Final Report of a Safety 1 st Starter CRS		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 126	22. Price												

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D-2	Photographs	D2-1
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D-4	CRABI Calibration Information	D4-1

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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 frontal barrier impact NCAP Test.

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

SUMMARY

Two 12-month old CRABIs (P3 & P4) were instrumented with head, chest, pelvis, and six-axis upper neck load cells. A tri-axial accelerometer was installed on the CRS base.

The left rear (Serial No. 094) and right rear (Serial No. 095) CRABIs were 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)	644.6	69.2
CRABI (P4)	188.6	47.5

DATA SHEET NO. 1
CRASH TEST SUMMARY

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

CHILD RESTRAINT SYSTEM INFORMATION

Description	Position #4 CRS	Position #3 CRS
Manufacturer	Graco Children's Products, Inc.	Dorel Juvenile Group, Inc.
Model Name	Snugride	Safety 1 st Starter
Model No.	8645FMT3	22311-WAL
Type	Infant	Infant
Forward/Rearward	Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

Description	Position #4 CRS	Position #3 CRS
Head Contact	None	None
Chest Contact	None	None
Abdomen Contact	None	None
Left Knee Contact	None	None
Right Knee Contact	None	None
Left Foot Contact	Left rear seat back	Right rear seat back
Right Foot Contact	Left rear seat back	Right rear seat back

POST-TEST DOOR OPENINGS

Description	Position #4 CRS	Position #3 CRS
Right Rear Door	Opened without tools. Remained closed during test.	Opened without tools. Remained closed during test.

CAMERAS

Description	Standard
High Speed	2
Real Time	0
Total	2

DATA CHANNELS

CRABI (P3 & P4) Sensors	30
CRS Sensors	6
Total	36

DATA SHEET NO. 2

VEHICLE PARAMETER DATA

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	538.8	547.6		584.0	617.0	
Right	kg	561.0	519.0		599.6	605.8	
Ratio	%	50.8	49.2		49.2	50.8	
Totals	kg	1099.8	1066.6	2166.4	1183.6	1222.8	2406.4

TARGET TEST WEIGHT CALCULATION

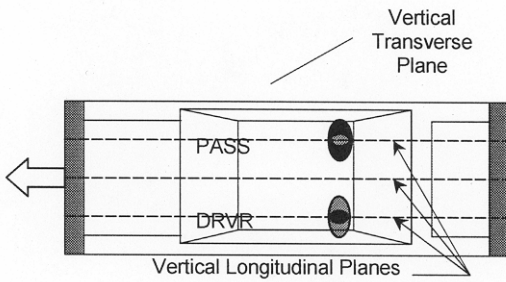
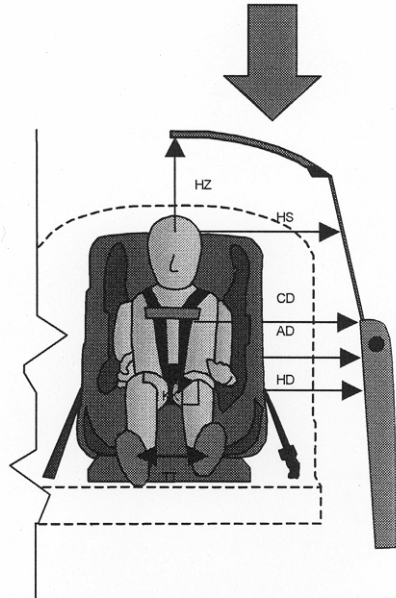
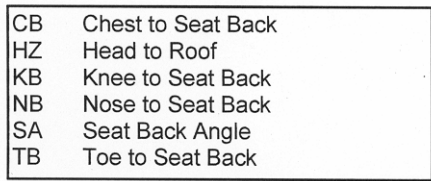
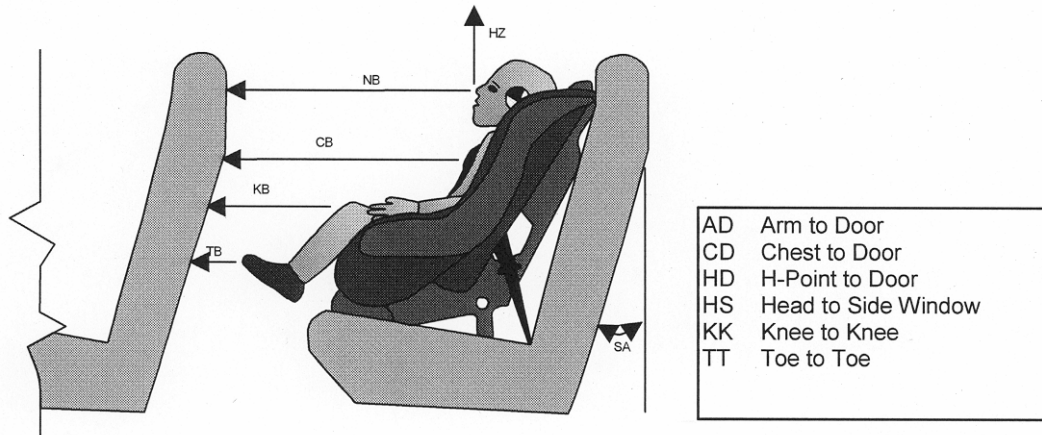
Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2166.4
Weight of 2 P572M ATDs	kg	152.0
Rated Cargo/Luggage Weight (RCLW)	kg	N/A
Calculated Vehicle Target Weight (TVTW)	kg	2417.5

DATA SHEET NO. 3

CRABI POSITIONING IN VEHICLE

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07



Note: Child seat was rearward facing.

DATA SHEET NO. 3

CRABI POSITIONING IN VEHICLE, (Continued)

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

Code	Measurement Description	P4 (Driver's Side)		P3 (Passenger's Side)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
SA	Seat Back Angle		40.0		33.8
HZ	Head to Roof	365		400	
CB	Chest to Seatback	470		457	
KB	Left Knee to Seatback	210		190	
NB	Nose to Seatback	530		505	
TB	Toe to Seatback	90		40	

DATA SHEET NO. 4

CRS PERFORMANCE DATA

Test Vehicle: 2008 Nissan Pathfinder
 Test Program: NCAP Frontal Impact

NHTSA No.: M85207
 Test Date: 09/19/07

CRS PERFORMANCE DATA

Location	CRS (P4)		CRS (P3)	
	Damage	Post-Test	Damage	Post-Test
Upper Tether Strap				
Upper Tether Buckle				
Upper Tether Hook				
Vehicle Upper Tether Anchor				
Lower Anchor Strap				
Lower Anchor Buckle				
Lower Anchor Hooks	No	None	No	None
Vehicle Lower CRS Anchors	No	None	No	None
5-Point Harness Connections	No	None	No	None
Cracks on CRS	No	None	No	None
Fabric Tears on CRS	No	None	No	None
Vehicle Seat Structure	No	None	No	None
Vehicle Seat Fabric Tears	No	None	No	None

DATA SHEET NO. 5

CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2008 Nissan Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

CRS ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	CRS CG (P4)	--- ¹	--- ¹	--- ¹
2	CRS CG (P3)	--- 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 Pathfinder
Test Program: NCAP Frontal Impact

NHTSA No.: M85207
Test Date: 09/19/07

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Frame Speed (fps)
		X	Y	Z				
1	Onboard at Right Rear Dummy View	2770	800	1670	14.1	1100	12.5	1000
2	Onboard at Left Rear Dummy View	2770	800	1670	15.1	1100	12.5	1000

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

APPENDIX D2
PHOTOGRAPHS

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Figure D-4	Post-Test Front View of Left Rear CRS	D2-7
Figure D-5	Pre-Test Rear View of Left Rear CRS	D2-8
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Figure D-13	Pre-Test Left View of Left Rear Child Dummy	D2-16
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Figure D-18	Pre-Test Left Rear CRS Intrusion into Driver Seat - View 2	D2-21
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Figure D-24	Pre-Test Rear View of Right Rear CRS	D2-27
Figure D-25	Post-Test Rear View of Right Rear CRS	D2-28
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Figure D-33	Post-Test Left View of Right Rear Child Dummy	D2-36
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Figure D-36	Pre-Test Right Rear CRS Intrusion into Driver Seat - View 1	D2-39
Figure D-37	Pre-Test Right Rear CRS Intrusion into Driver Seat - View 2	D2-40
Figure D-38	Post-Test Right Rear Child Dummy Foot Contact View	D2-41

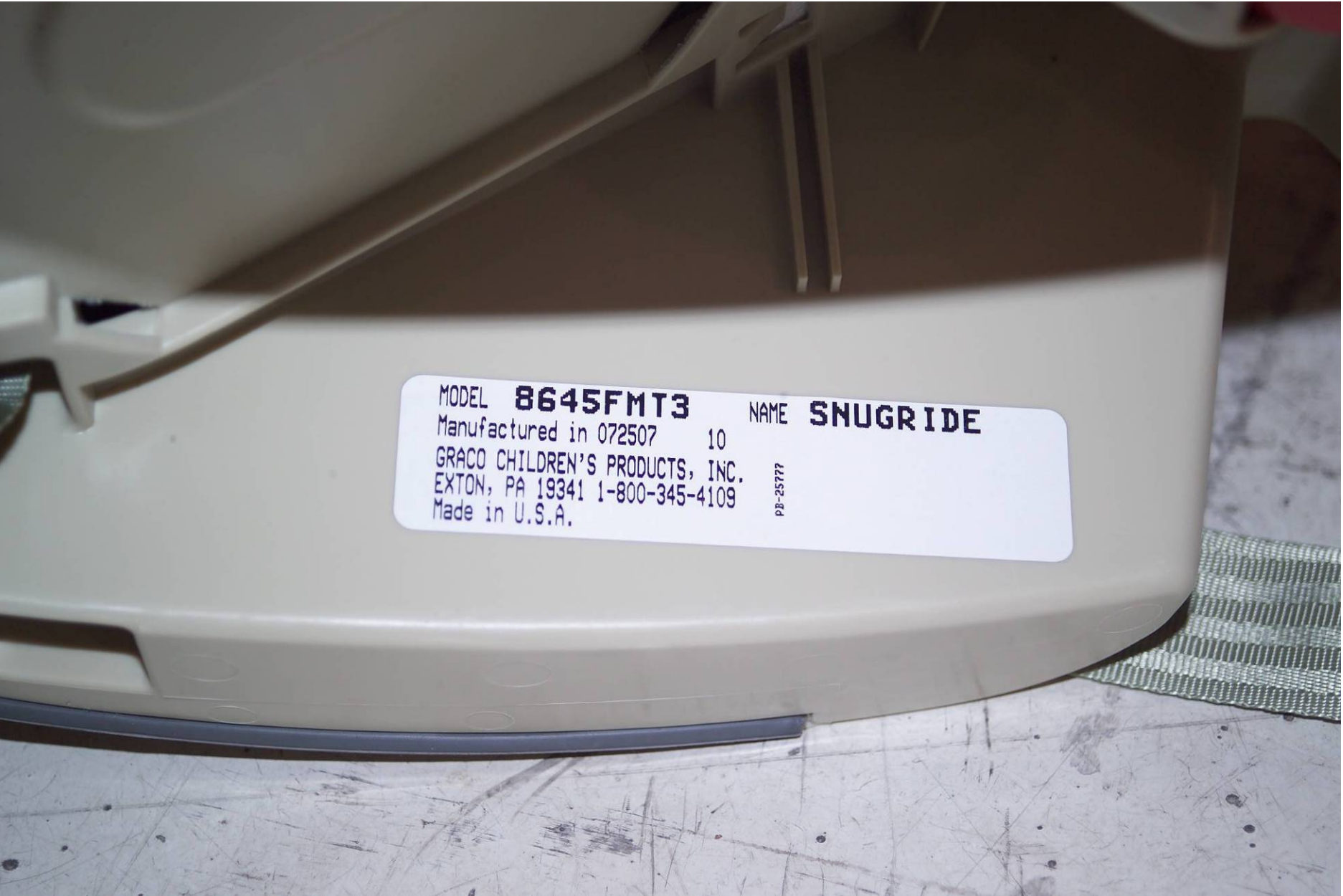
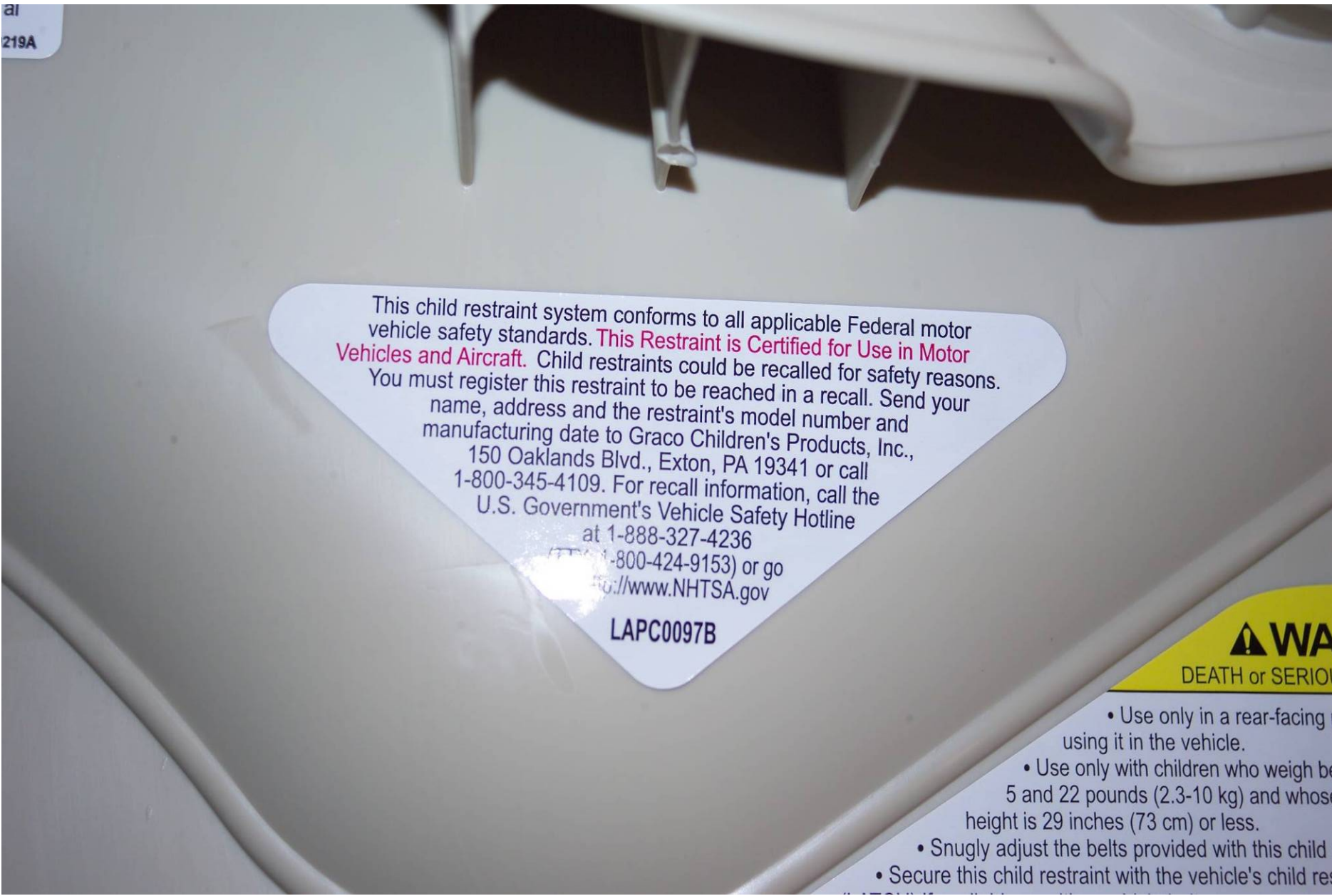


Figure D2-1 Left Rear CRS Certification Label View

D2-4

070919



al
219A

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 (TDD 1-800-424-9153) or go to www.NHTSA.gov

LAPC0097B

WA
DEATH or SERIOUS INJURY

- Use only in a rear-facing position when using it in the vehicle.
- Use only with children who weigh between 5 and 22 pounds (2.3-10 kg) and whose height is 29 inches (73 cm) or less.
- Snugly adjust the belts provided with this child restraint.
- Secure this child restraint with the vehicle's child restraint anchorage system.

Figure D2-2 Left Rear CRS Information Label View



Figure D2-3 Pre-Test Front View of Left Rear CRS



Figure D2-4 Post-Test Front View of Left Rear CRS



Figure D2-5 Pre-Test Rear View of Left Rear CRS



Figure D2-6 Post-Test Rear View of Left Rear CRS



Figure D2-7 Pre-Test Left Side View of Left Rear CRS

D2-10

070919



Figure D2-8 Post-Test Left Side View of Left Rear CRS

D2-11

070919



Figure D2-9 Pre-Test Right Side View of Left Rear CRS

D2-12

070919



Figure D2-10 Post-Test Right Side View of Left Rear CRS

D2-13

070919



Figure D2-11 Pre-Test Front View of Left Rear Dummy



Figure D2-12 Post-Test Front View of Left Rear Dummy



Figure D2-13 Pre-Test Left View of Left Rear Dummy

D2-16

070919



Figure D2-14 Post-Test Left View of Left Rear Dummy

D2-17

070919



Figure D2-15 Pre-Test Right View of Left Rear Dummy

D2-18

070919



Figure D2-16 Post-Test Right View of Left Rear Dummy

D2-19

070919



Figure D2-17 Pre-Test Left Rear CRIS Intrusion into Driver Seat - View 1

D2-20

070919



Figure D2-18 Pre-Test Left Rear CRS Intrusion into Driver Seat - View 2

D2-21

070919

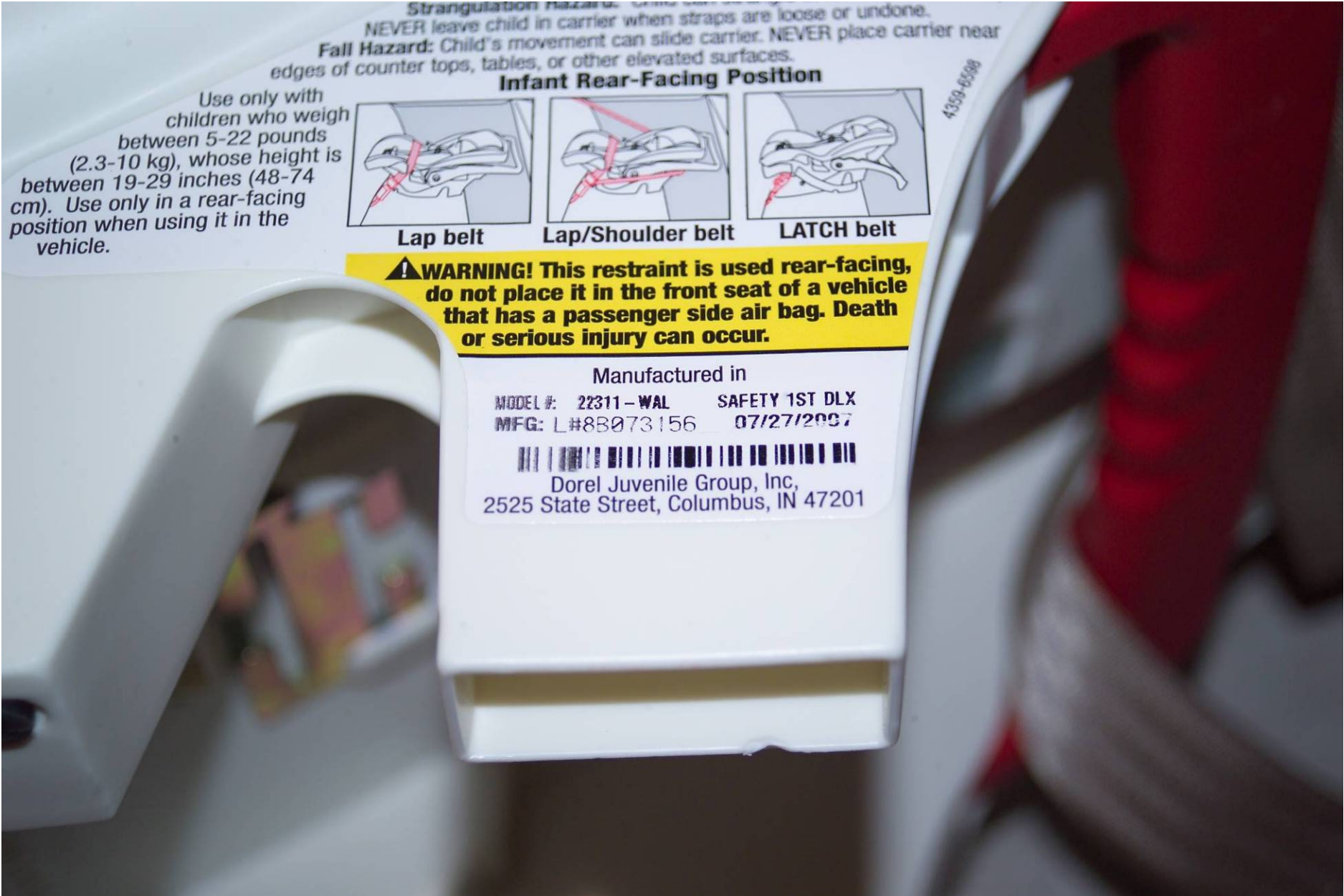


Figure D2-19 Post-Test Left Rear Dummy Foot Contact View

D2-22

070919

Figure D2-20 Right Rear CRS Certification Label View



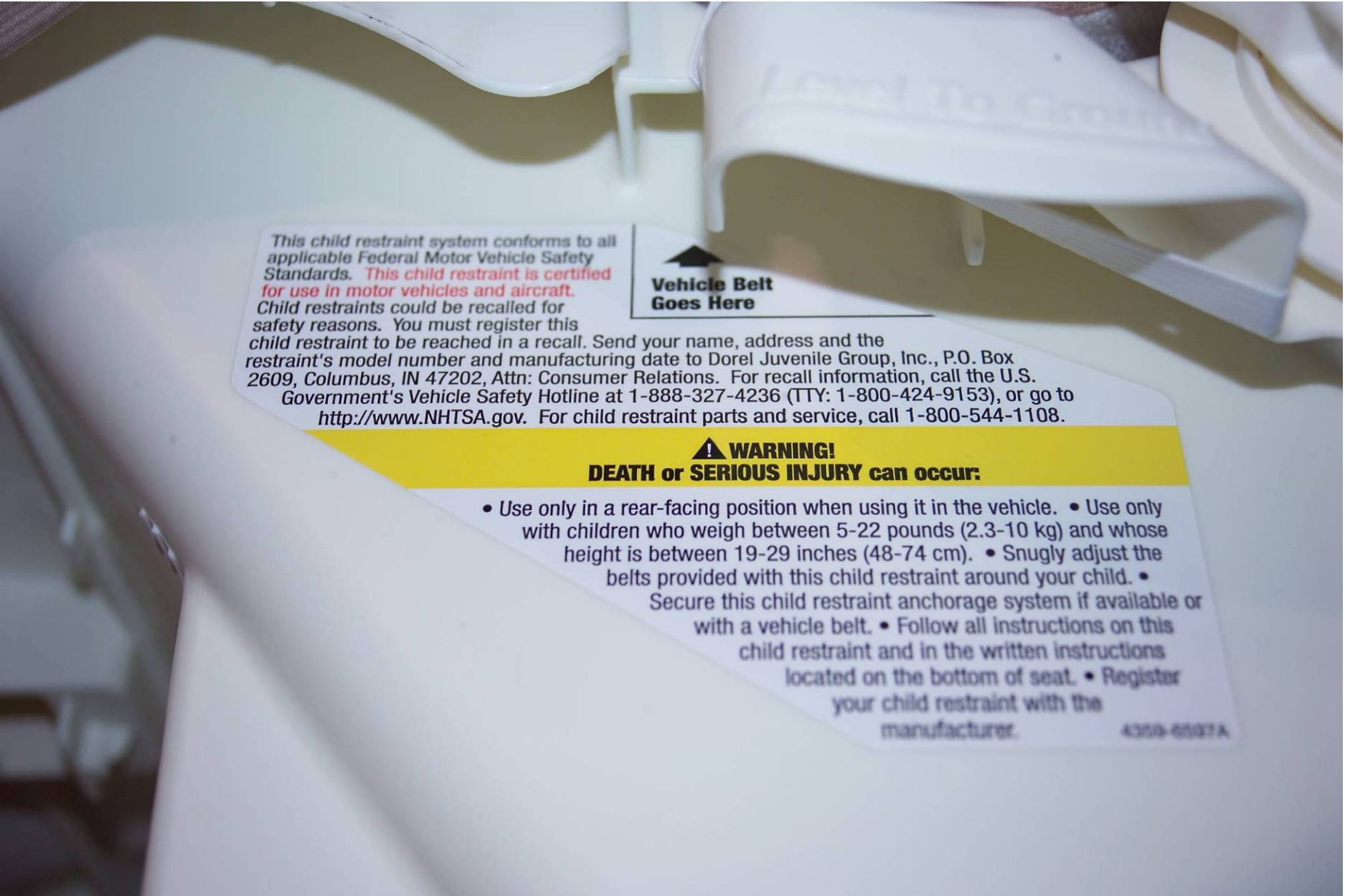


Figure D2-21 Right Rear CRS Information Label View



Figure D2-22 Pre-Test Front View of Right Rear CRS



Figure D2-23 Post-Test Front View of Right Rear CRS



Figure D2-24 Pre-Test Rear View of Right Rear CRS



Figure D2-25 Post-Test Rear View of Right Rear CRS



Figure D2-26 Pre-Test Left Side View of Right Rear CRS

D2-29

070919



Figure D2-27 Post-Test Left Side View of Right Rear CRS

D2-30

070919



Figure D2-28 Pre-Test Right Side View of Right Rear CRS

D2-31

070919



Figure D2-29 Post-Test Right Side View of Right Rear CRS

D2-32

070919



Figure D2-30 Pre-Test Front View of Right Rear Dummy



Figure D2-31 Post-Test Front View of Right Rear Dummy



Figure D2-32 Pre-Test Left View of Right Rear Dummy

D2-35

070919



Figure D2-33 Post-Test Left View of Right Rear Dummy

D2-36

070919



Figure D2-34 Pre-Test Right View of Right Rear Dummy

D2-37

070919



Figure D2-35 Post-Test Right View of Right Rear Dummy

D2-38

070919



Figure D2-36 Pre-Test Right Rear CRS to Front Passenger Seat Clearance - View 1

D2-39

070919



Figure D2-37 Pre-Test Right Rear CRS to Front Passenger Seat Clearance - View 2



Figure D2-38 Post-Test Right Rear Dummy Foot Contact View

D2-41

070919

APPENDIX D3
CRABI RESPONSE AND CRS DATA

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D3-1 Left Rear CRABI Head Y	D3-3
D3-1 Left Rear CRABI Head Z	D3-3
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D3-3 Right Rear CRABI Head Z	D3-5
D3-3 Right Rear CRABI Head Resultant	D3-5
D3-4 Right Rear CRABI Chest X	D3-6
D3-4 Right Rear CRABI Chest Y	D3-6
D3-4 Right Rear CRABI Chest Z	D3-6
D3-4 Right Rear CRABI Chest Resultant	D3-6

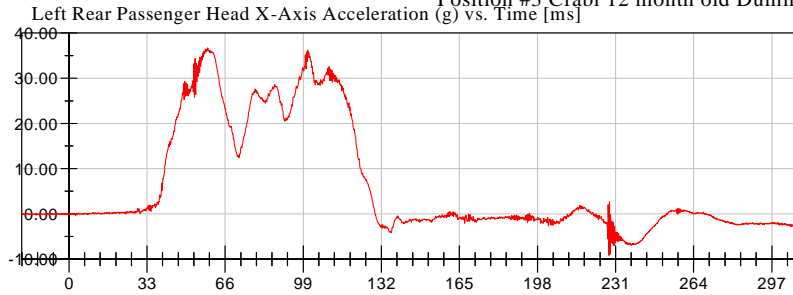
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Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)

Position #3 Crabi 12 month old Dummy (094)



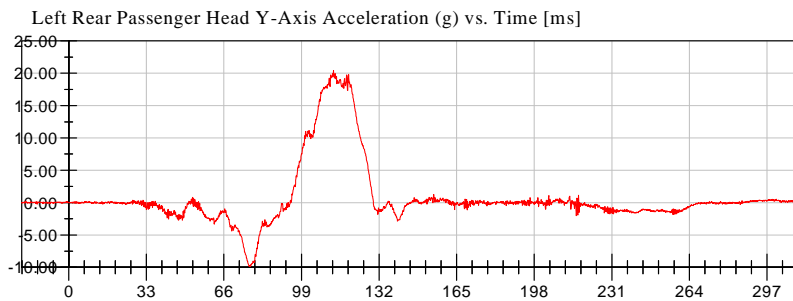
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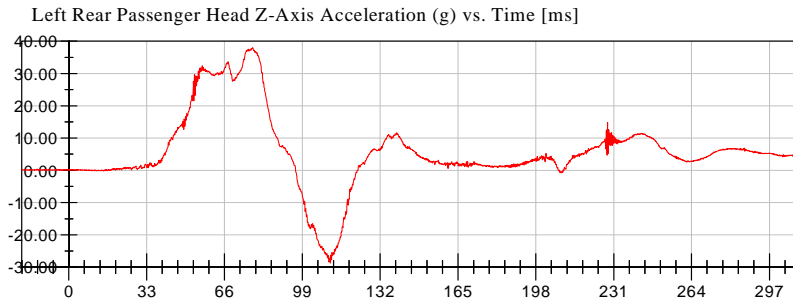
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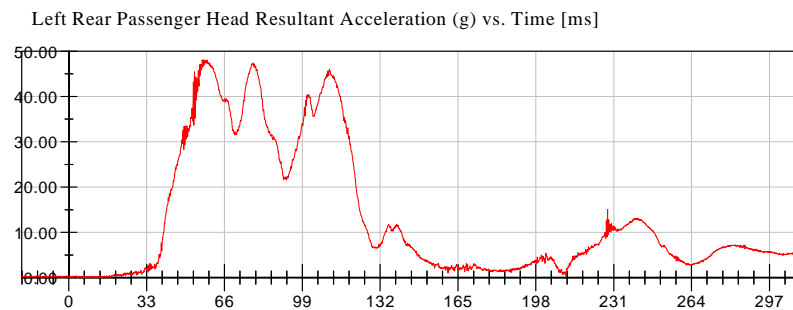
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-28.72 g at 110.88 ms

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0.04 g at 10.80 ms

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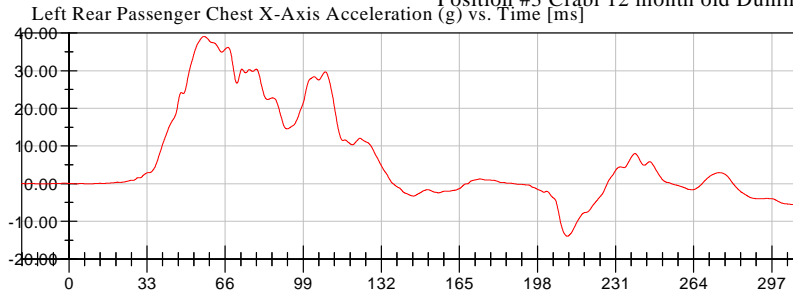
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Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
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Position #3 Crabi 12 month old Dummy (094)



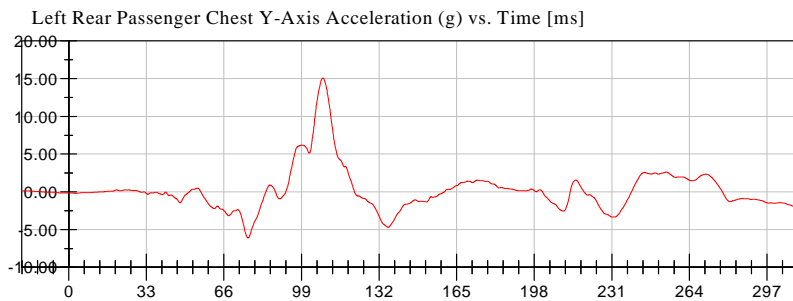
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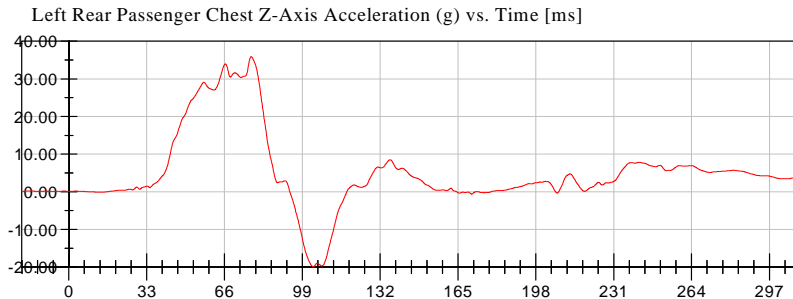
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-6.11 g at 76.24 ms

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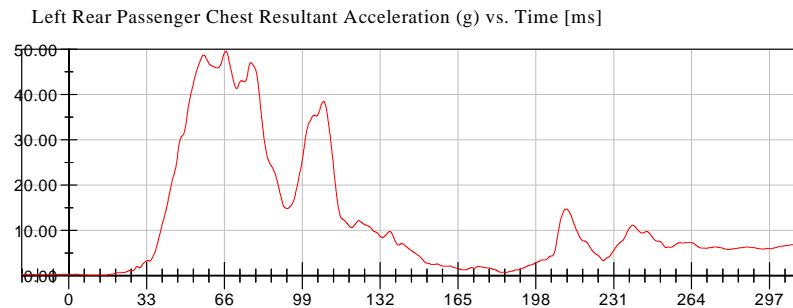
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CFC_180



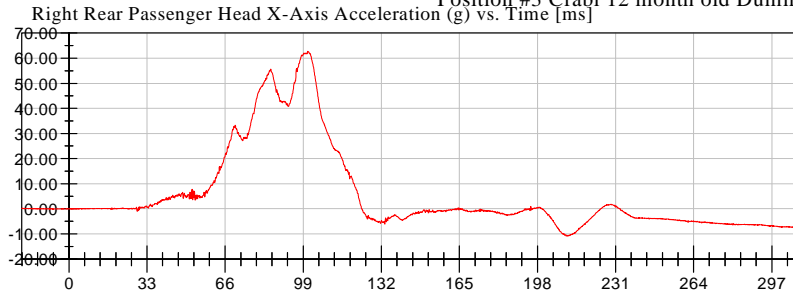
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Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)

Position #3 Crabi 12 month old Dummy (094)



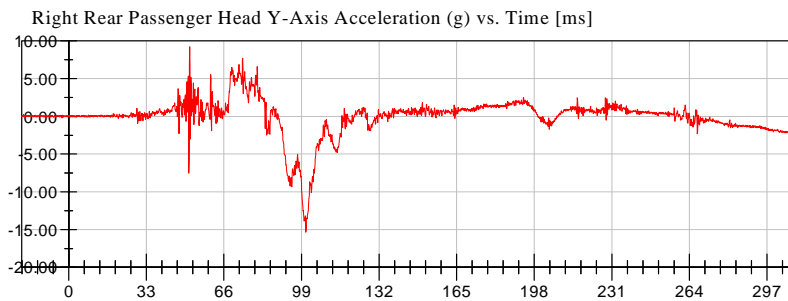
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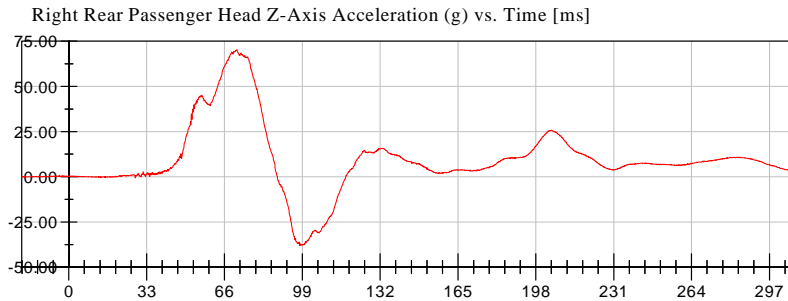
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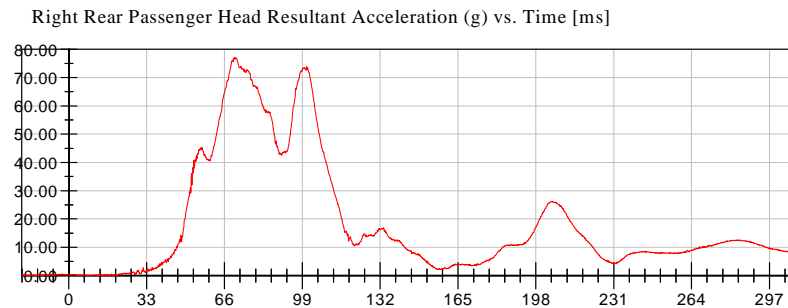
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CFC_1000



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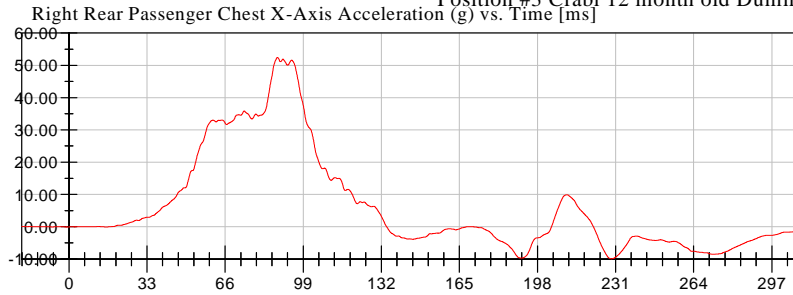
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Test Lab: CTF
Test Number: 070919 (M85207)

Test Date: 09/19/2007

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)
Position #2 Hybrid III Mid-Sized Adult Male Dummy (352)
Position #4 Crabi 12 month old Dummy (095)

Position #3 Crabi 12 month old Dummy (094)



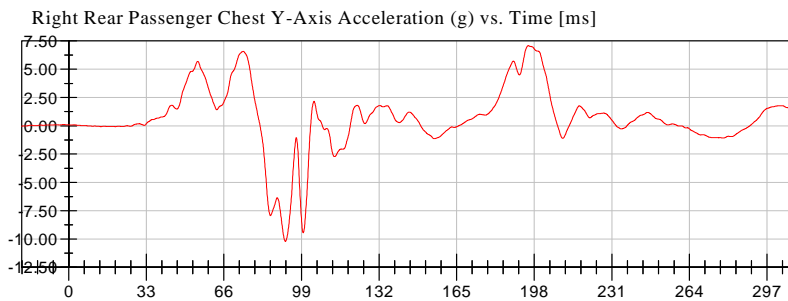
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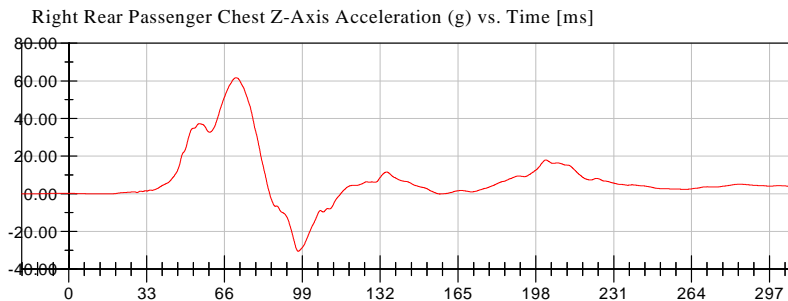
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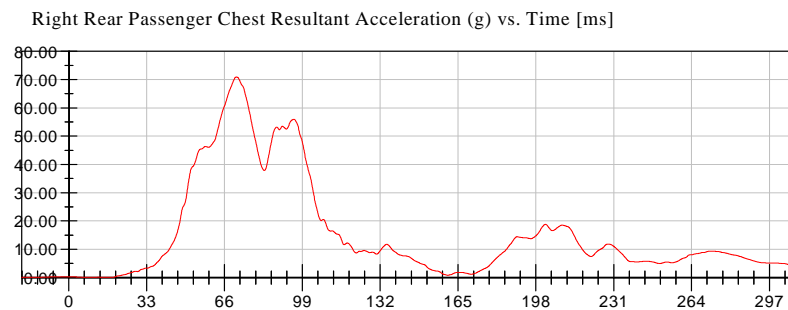
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-30.51 g at 97.36 ms

CFC_180



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70.91 g at 71.04 ms

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0.02 g at 8.48 ms

CFC_180



APPENDIX D4
DUMMY CALIBRATION DATA

CALIBRATION TEST RESULTS

PRE-TEST LEFT REAR

CRABI: 095

Transportation Research Center Inc.
572R CRABI 12-Month-Old Dummy
External Dimensions
Serial No. 095 Calibration No. 05
Date: 08-Sept-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	35 mm	Yes
Hip Pivot from Backline	D	40.1 - 50.3 mm	48 mm	Yes
Shoulder Pivot from Backline	E	50.3 - 60.5 mm	55 mm	Yes
Thigh Clearance	F	63.0 - 73.2 mm	71 mm	Yes
Elbow Pivot to Fingertip	G	176.6 - 191.8 mm	184 mm	Yes
Shoulder to Elbow Pivot	I	99.1 - 114.3 mm	111 mm	Yes
Elbow Rest Height	J	150.1 - 165.3 mm	160 mm	Yes
Buttock to Knee Length	K	202.7 - 217.9 mm	210 mm	Yes
Popliteal Height (Reference to Seat)	L	138.7 - 153.9 mm	151 mm	Yes
Knee Pivot Height	M	165.1 - 180.3 mm	168 mm	Yes
Buttock Popliteal Length	N	144.8 - 160.0 mm	152 mm	Yes
Chest Depth with Jacket	O	107.5 - 122.7 mm	121 mm	Yes
Foot Length	P	92.4 - 102.6 mm	96 mm	Yes
Stature	Q	727.7 - 753.1 mm	750 mm	Yes
Buttock to Knee Pivot Length	R	178.5 - 188.7 mm	181 mm	Yes
Head Breadth	S	124.4 - 134.6 mm	125 mm	Yes
Head Depth (REF)	T	149.9 - 165.1 mm	150 mm	Yes
Hip Breadth	U	158.5 - 173.7 mm	170 mm	Yes
Shoulder Breadth	V	200.7 - 215.9 mm	209 mm	Yes
Foot Breadth	W	39.1 - 49.3 mm	44 mm	Yes
Chest Circumference with Jacket	Y	452.4 - 477.8 mm	473 mm	Yes
Waist Circumference	Z	447.0 - 472.4 mm	450 mm	Yes
Reference Location for Chest Circumference	AA	256.5 - 266.7 mm	260 mm	Yes
Reference Location for Waist Circumference	BB	106.7 - 116.9 mm	110 mm	Yes
Shoulder Height	CC	299.7 - 314.9 mm	310 mm	Yes
Chin Height	DD	289.6 - 304.8 mm	313 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. Bell

Ron Stoner

Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 095 Certification No. 5-2

Test Date: 9/14/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Peak Head Resultant Acceleration	100 - 120 g	107.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	1.5 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Beah

Approved

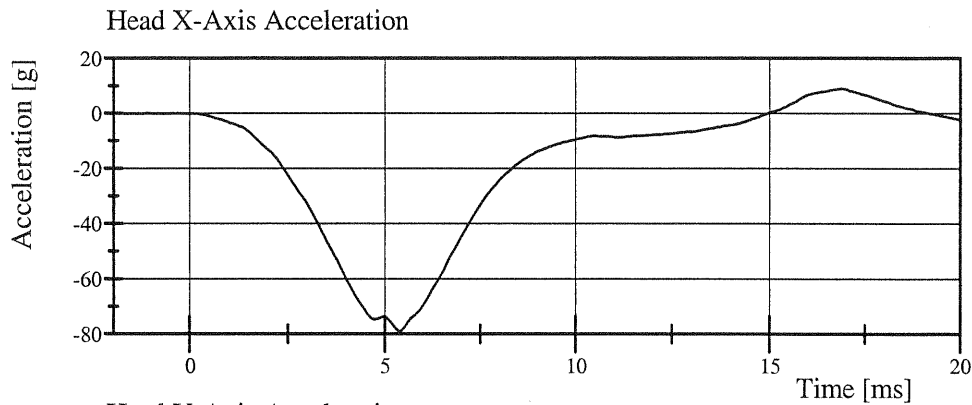
Ron. Stone

Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 095 Certification No. 5-2

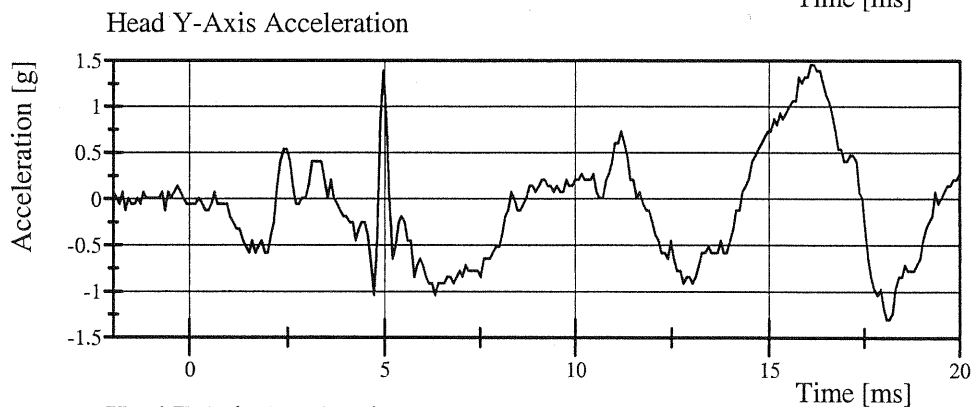
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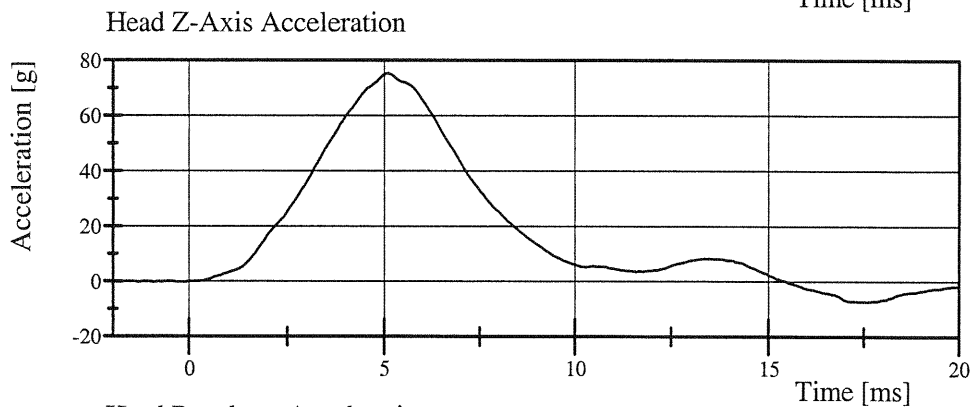
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Filter Class: CFC_1000

Max: 1.5 g at 16.1 ms

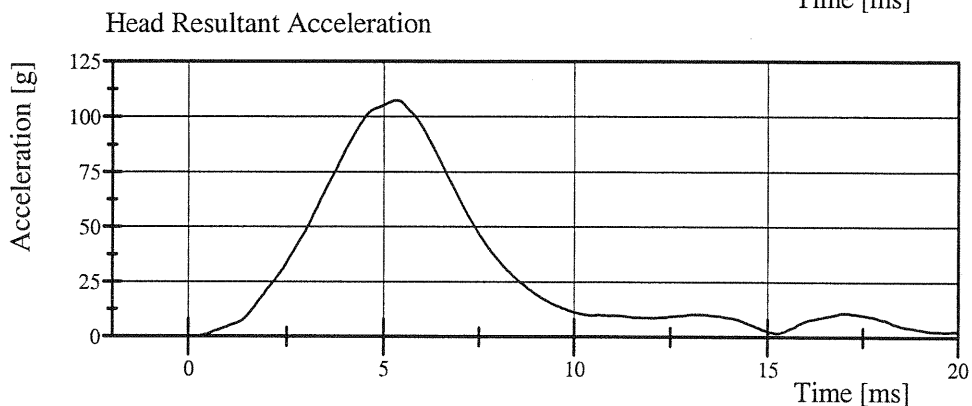
Min: -1.3 g at 18.1 ms



Filter Class: CFC_1000

Max: 75.3 g at 5.1 ms

Min: -7.3 g at 17.6 ms



Filter Class: CFC_1000

Max: 107.5 g at 5.4 ms

Min: 0.0 g at -1.6 ms

Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 095 Certification No. 5-3

Test Date: 9/14/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Peak Head Resultant Acceleration	55 - 71 g	64.6 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	1.7 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

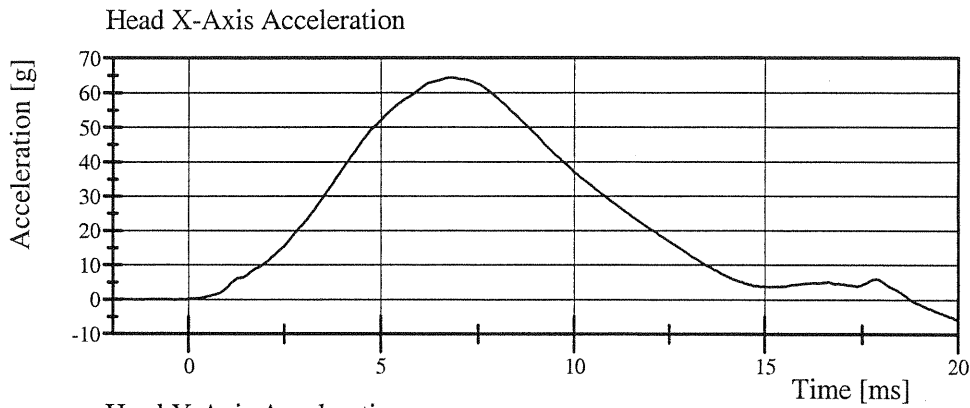
Ron Stone

Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 095 Certification No. 5-3

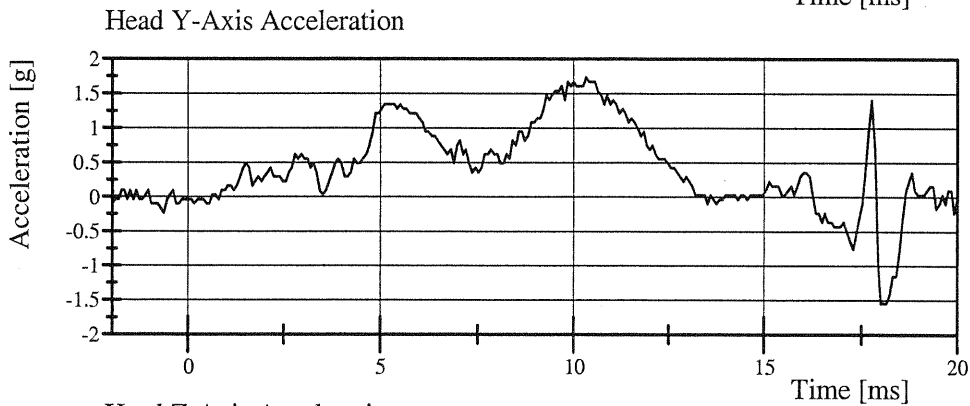
Test Date: 9/14/2007



Filter Class: CFC_1000

Max: 64.4 g at 6.8 ms

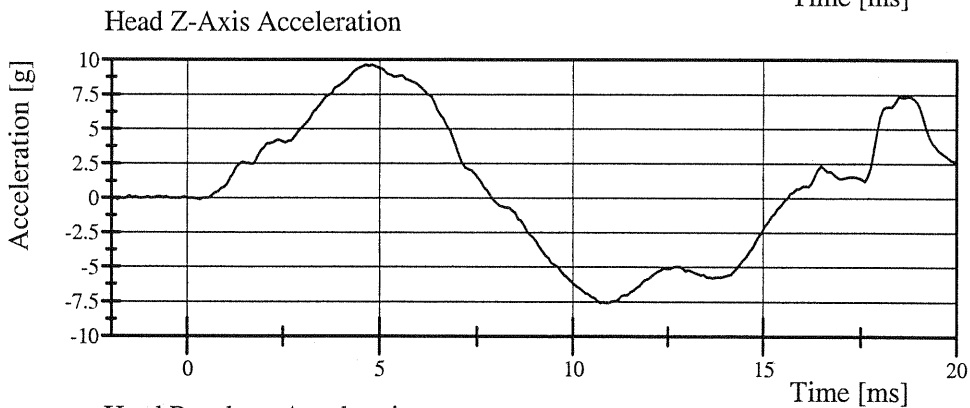
Min: -5.9 g at 20.0 ms



Filter Class: CFC_1000

Max: 1.7 g at 10.3 ms

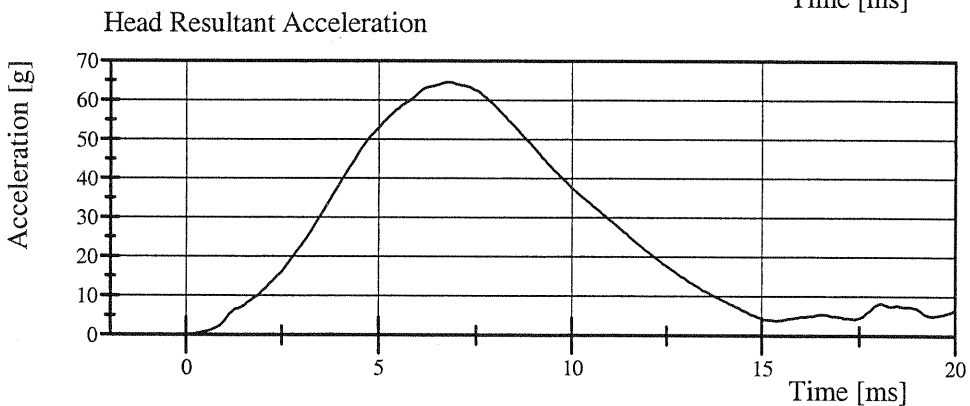
Min: -1.5 g at 18.0 ms



Filter Class: CFC_1000

Max: 9.6 g at 4.6 ms

Min: -7.6 g at 10.7 ms



Filter Class: CFC_1000

Max: 64.6 g at 6.8 ms

Min: 0.0 g at -1.4 ms

Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 5-2

Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.26 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-1.6) - (-2.3) m/s	-2.12 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-3.4) - (-4.2) m/s	-4.15 m/s	Yes
Pendulum Integrated Velocity Change at 25ms	(-4.3) - (-5.2) m/s	-5.03 m/s	Yes
Total Head D-Plane Rotation	(-75) - (-86) °	-82.6 °	Yes
Total Neck Occipital Condyles Moment	36 - 45 N·m	44.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 5 Nm	60 - 80 ms	73.7 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

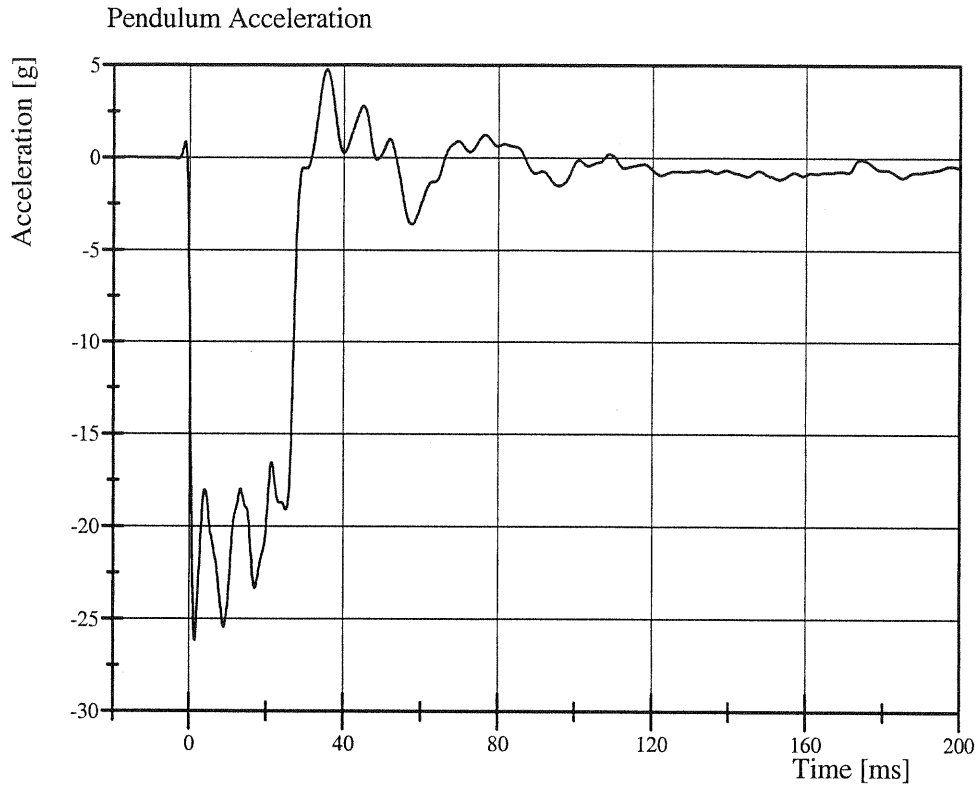
Ron Stone

Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 5-2

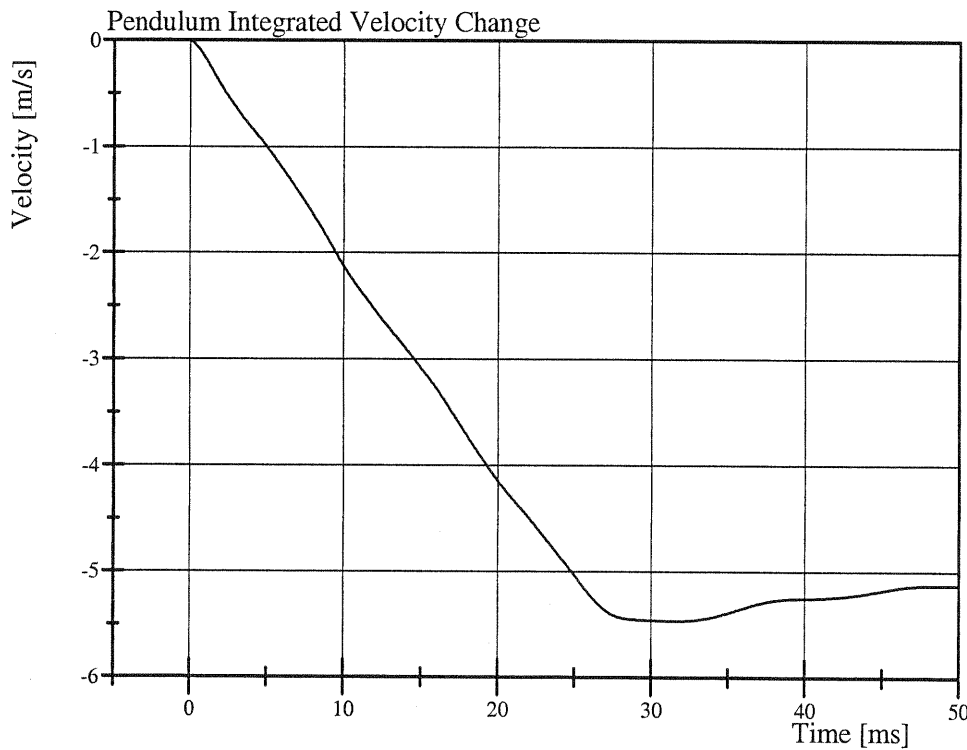
Test Date: 9/13/2007



Filter Class: CFC_180

Max: 4.8 g at 35.8 ms

Min: -26.2 g at 1.5 ms



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -5.5 m/s at 31.6 ms



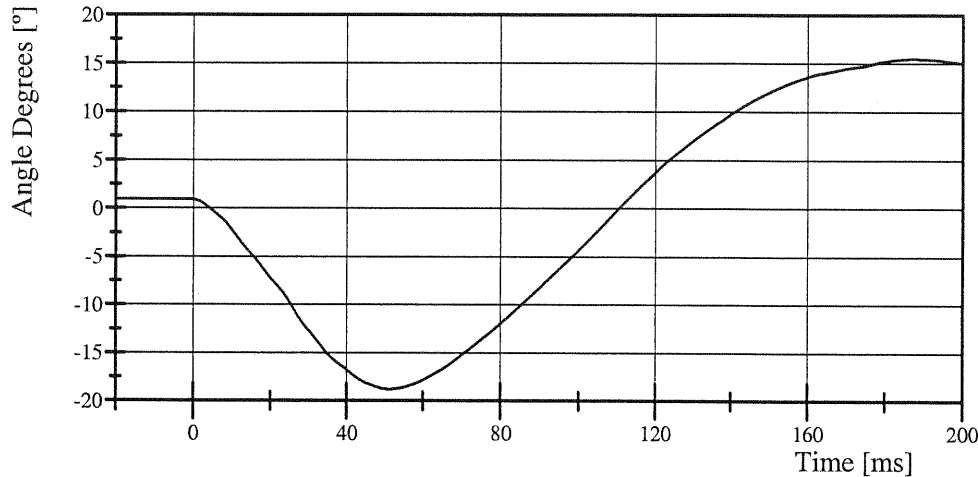
Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 5-2

Test Date: 9/13/2007

Forward Pot Rotation at Base of Pendulum

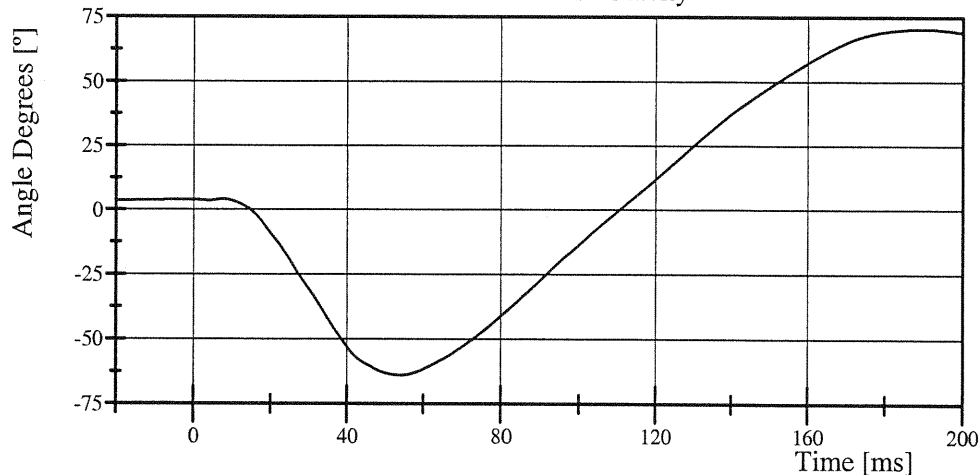


Filter Class: CFC_60

Max: 15.5 ° at 187.0 ms

Min: -18.8 ° at 51.4 ms

Center Headform Pot Rotation at Center of Gravity

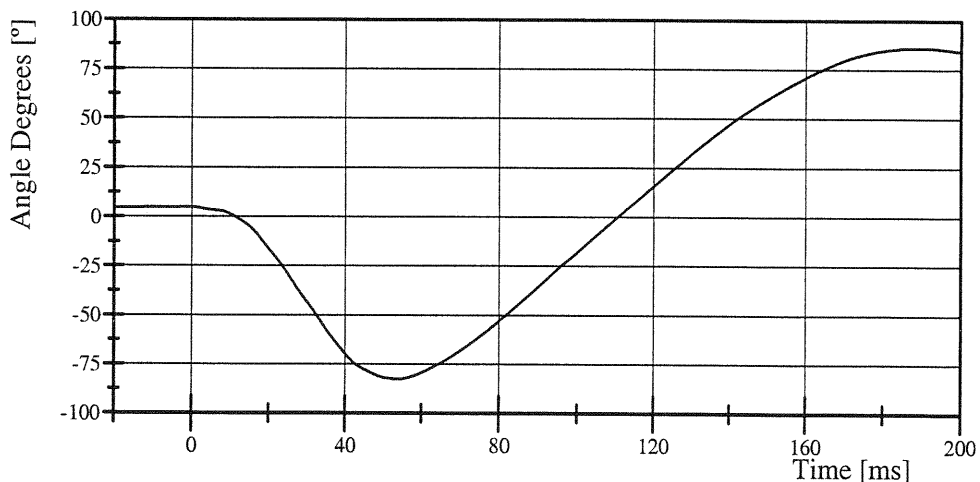


Filter Class: CFC_60

Max: 70.6 ° at 189.8 ms

Min: -64.0 ° at 54.3 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 86.0 ° at 188.9 ms

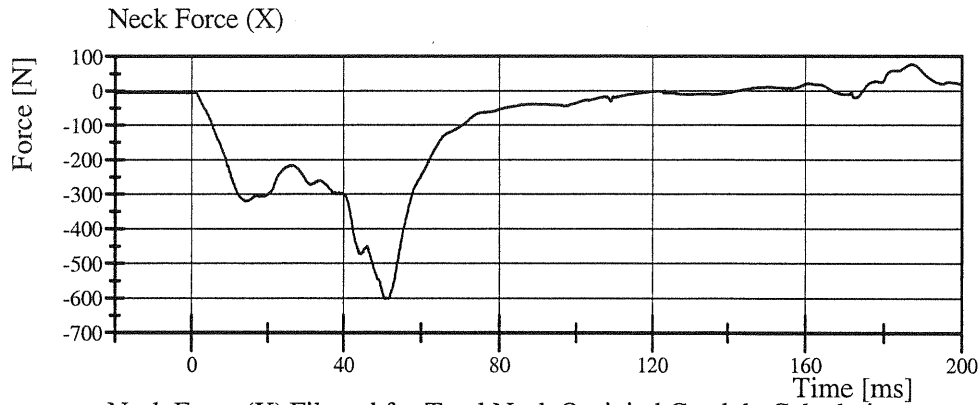
Min: -82.6 ° at 53.9 ms

Transportation Research Center Inc.

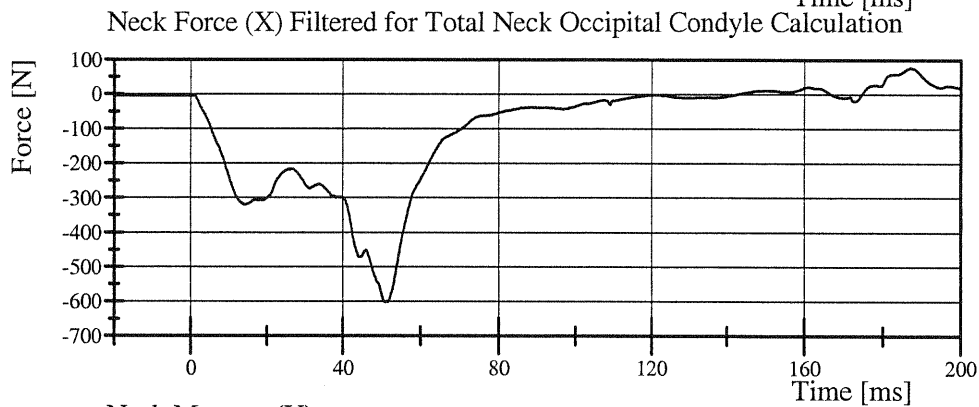
Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 5-2

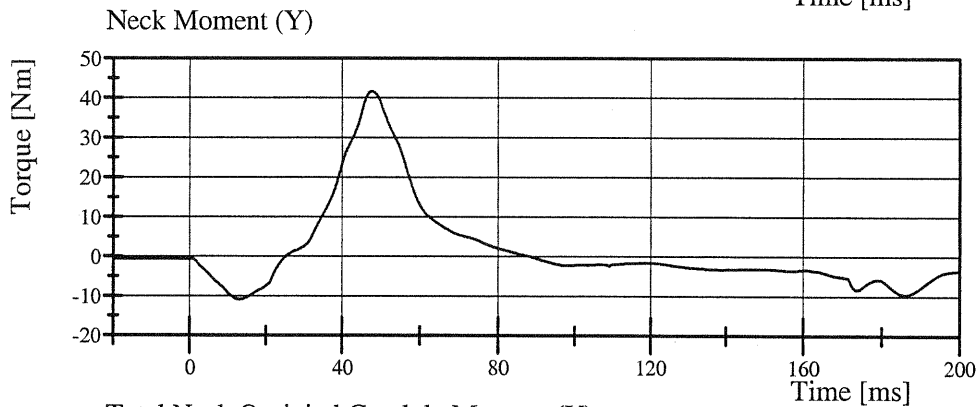
Test Date: 9/13/2007



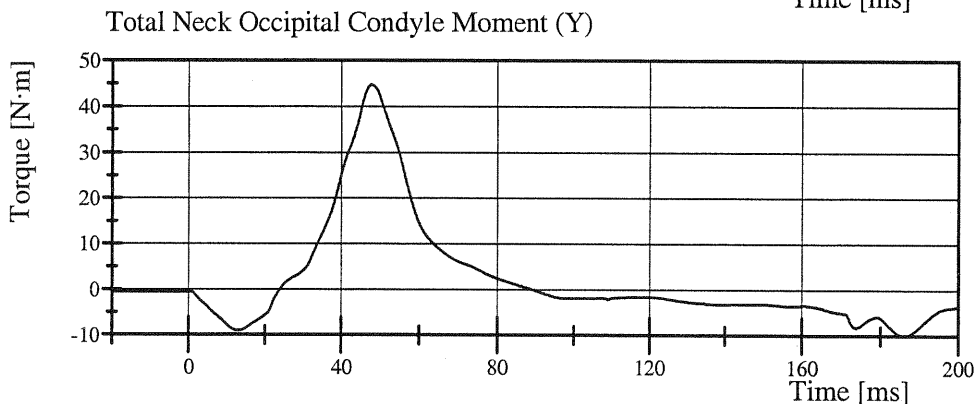
Filter Class: CFC_1000
Max: 77.2 N at 186.9 ms
Min: -601.4 N at 50.8 ms



Filter Class: CFC_600
Max: 77.3 N at 187.0 ms
Min: -601.2 N at 50.8 ms



Filter Class: CFC_600
Max: 41.8 Nm at 47.7 ms
Min: -10.8 Nm at 13.3 ms



Filter Class: CFC_600
Max: 44.7 N·m at 47.8 ms
Min: -9.9 N·m at 186.1 ms

Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 5-3

Test Date: 9/14/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	(-2.4) - (-2.6) m/s	-2.52 m/s	Yes
Pendulum Integrated Velocity Change at 6ms	0.8 - 1.2 m/s	0.94 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 2.1 m/s	1.70 m/s	Yes
Pendulum Integrated Velocity Change at 14ms	2.2 - 2.9 m/s	2.40 m/s	Yes
Total Head D-Plane Rotation	80 - 92 °	88.4 °	Yes
Total Neck Occipital Condyles Moment (-12) - (-23) N·m		-16.8 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -5 Nm	76 - 90 ms	82.7 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Hall

Approved

Ron Storer

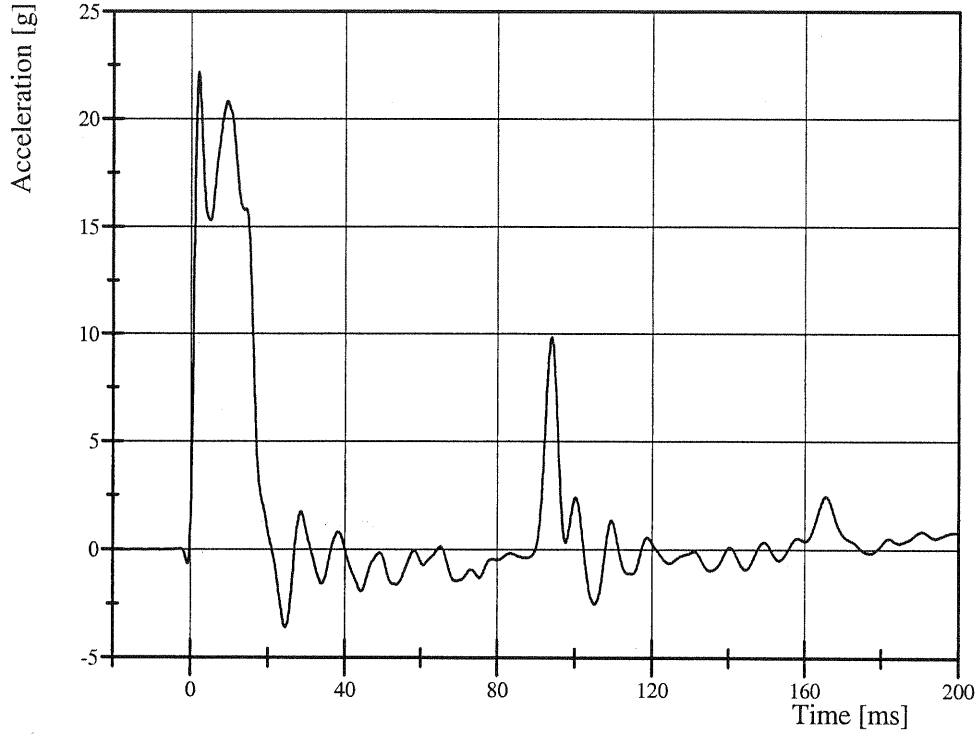
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 5-3

Test Date: 9/14/2007

Pendulum Acceleration

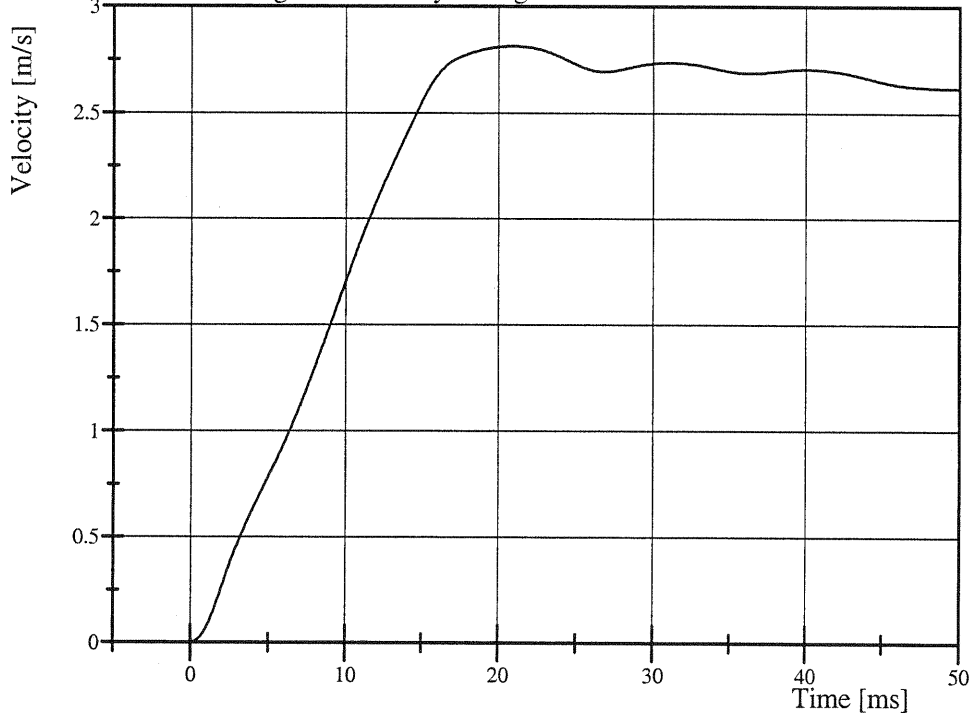


Filter Class: CFC_180

Max: 22.2 g at 2.0 ms

Min: -3.6 g at 24.5 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 2.8 m/s at 21.0 ms

Min: 0.0 m/s at 0.0 ms

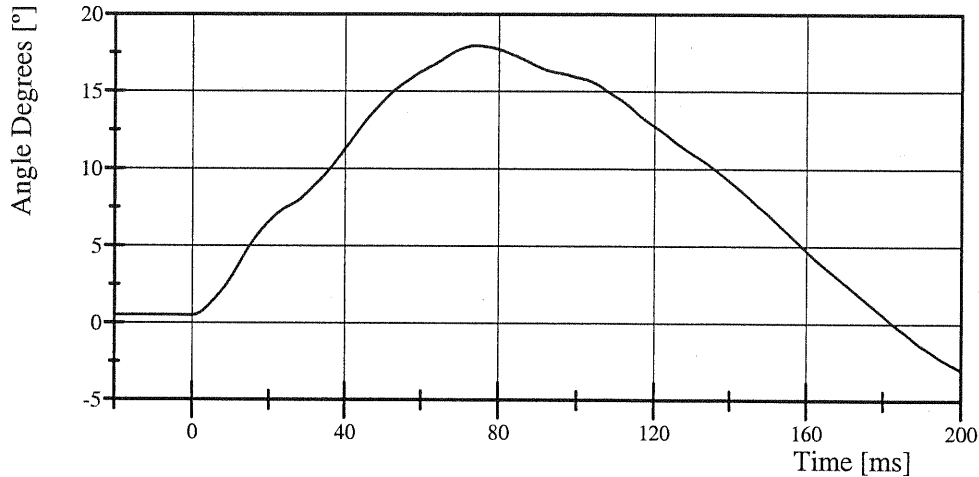
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 5-3

Test Date: 9/14/2007

Forward Pot Rotation at Base of Pendulum

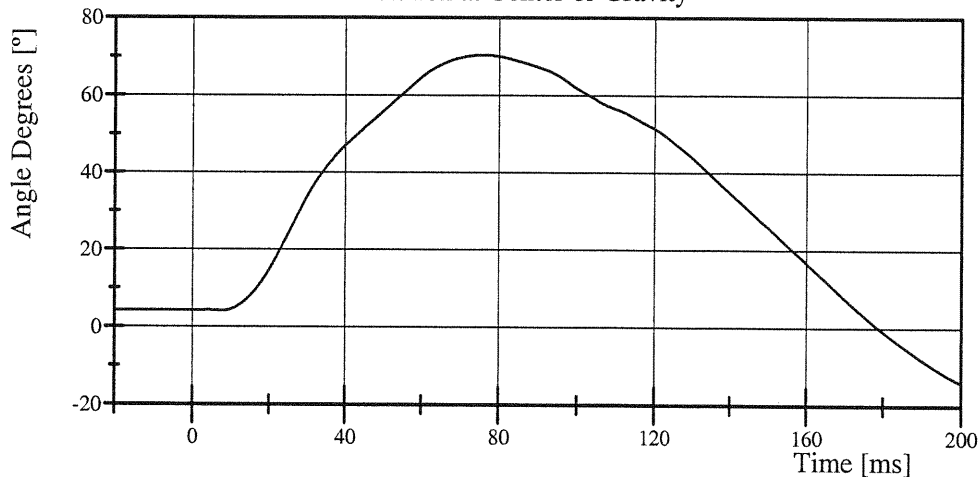


Filter Class: CFC_60

Max: 18.0 ° at 74.2 ms

Min: -3.0 ° at 200.0 ms

Center Headform Pot Rotation at Center of Gravity

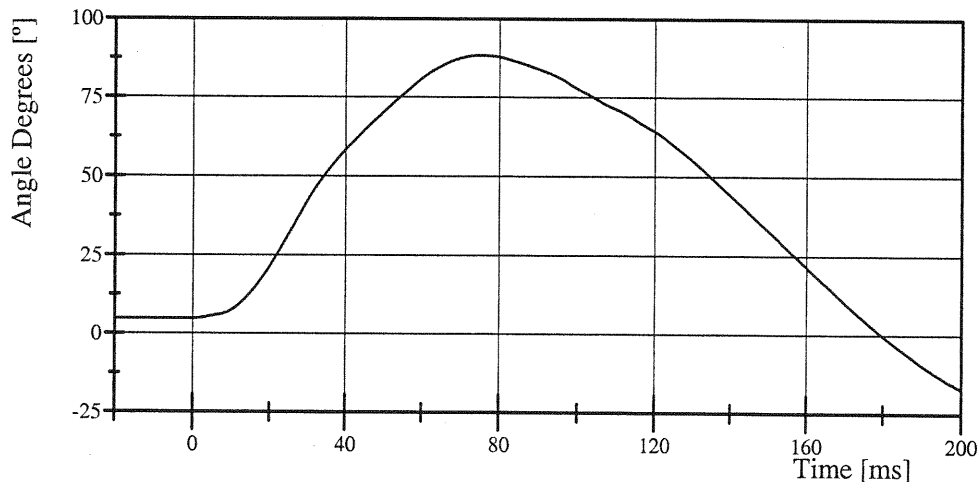


Filter Class: CFC_60

Max: 70.4 ° at 75.8 ms

Min: -14.0 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 88.4 ° at 75.0 ms

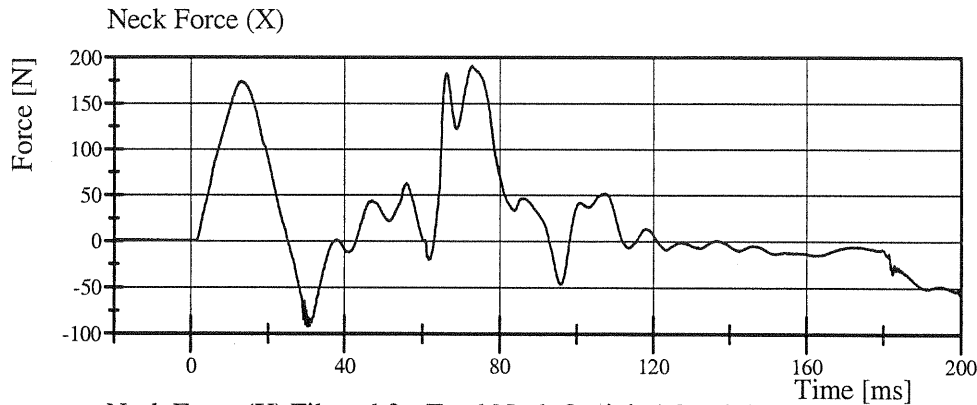
Min: -17.0 ° at 200.0 ms

Transportation Research Center Inc.

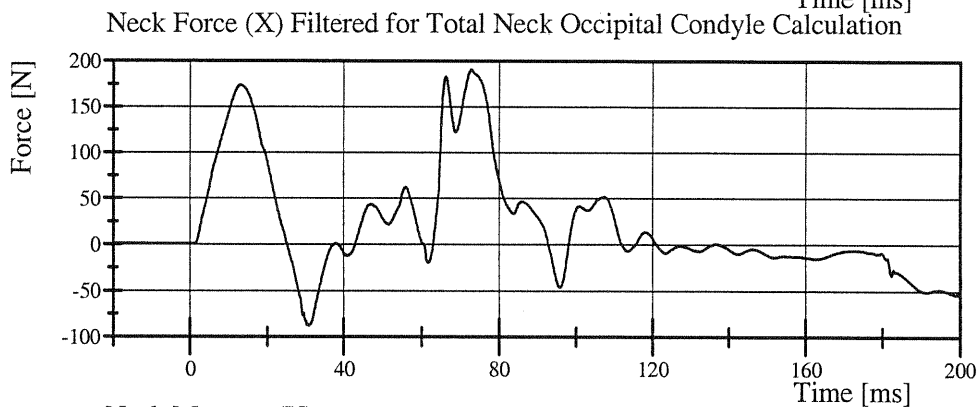
Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 5-3

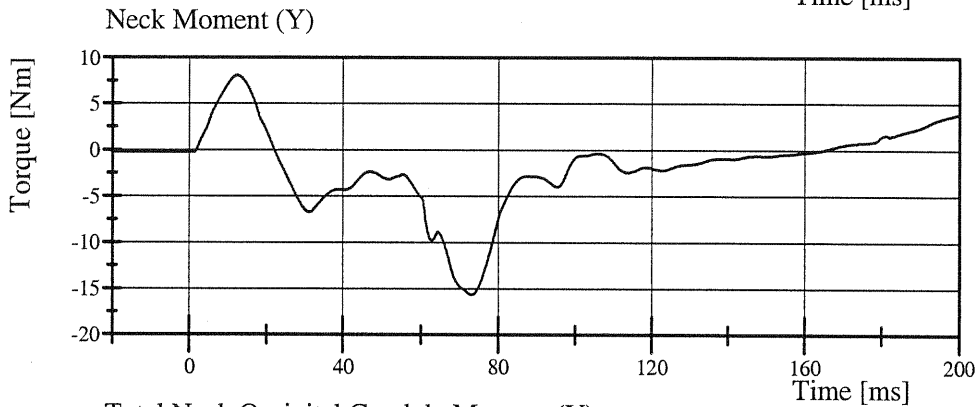
Test Date: 9/14/2007



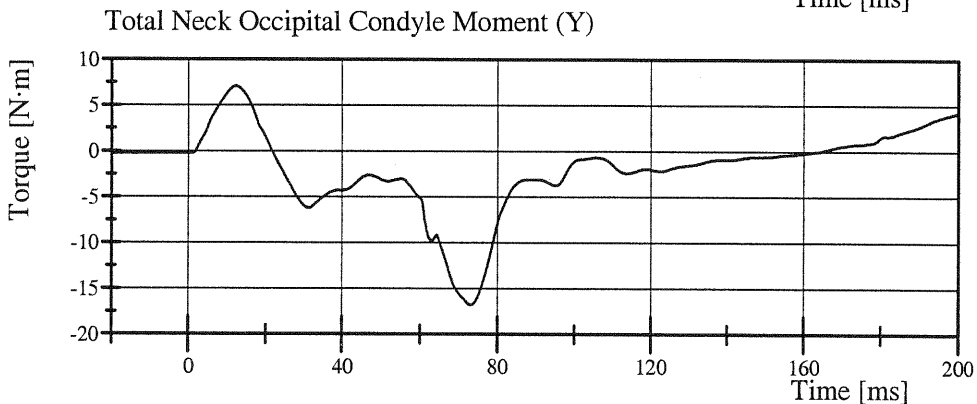
Filter Class: CFC_1000
Max: 191.2 N at 72.8 ms
Min: -92.2 N at 30.3 ms



Filter Class: CFC_600
Max: 190.9 N at 72.8 ms
Min: -88.2 N at 30.8 ms



Filter Class: CFC_600
Max: 8.1 Nm at 12.3 ms
Min: -15.7 Nm at 73.1 ms



Filter Class: CFC_600
Max: 7.1 N·m at 12.2 ms
Min: -16.8 N·m at 73.1 ms

Transportation Research Center Inc.

Front Thorax

CRABI 12 MO Serial No. 095 Certification No. 5-1

Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Impactor Velocity	4.9 - 5.1 m/s	5.07 m/s	Yes
Impactor Force	(-1,514) - (-1,796) N	-1,704.8 N	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

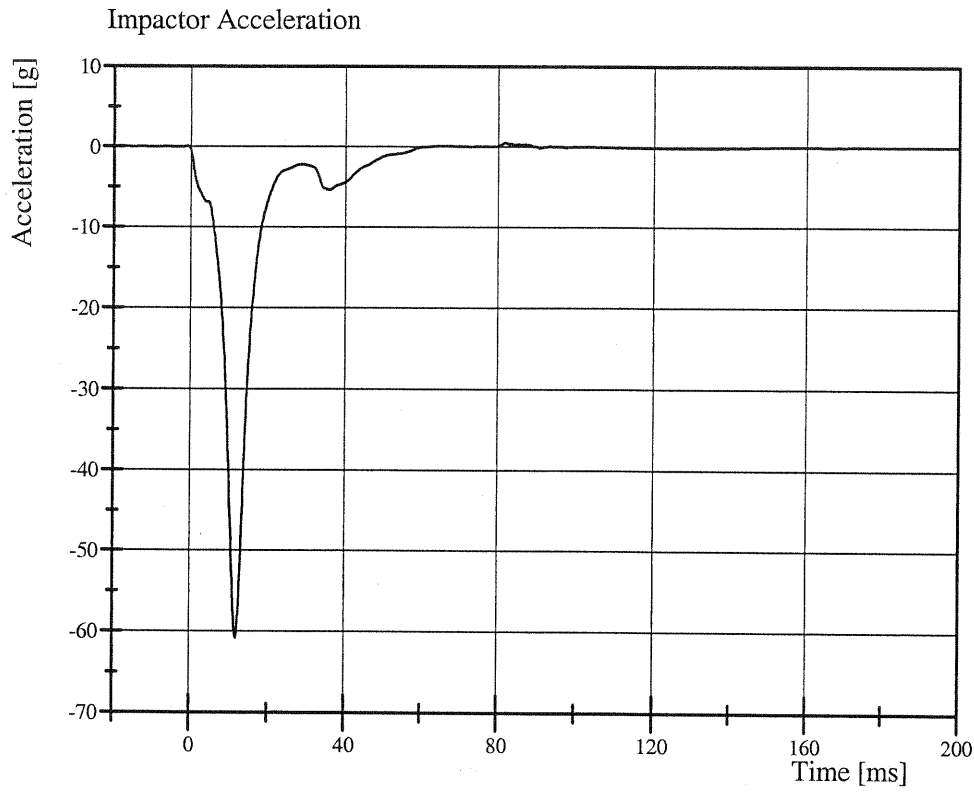
Ken Stoner

Transportation Research Center Inc.

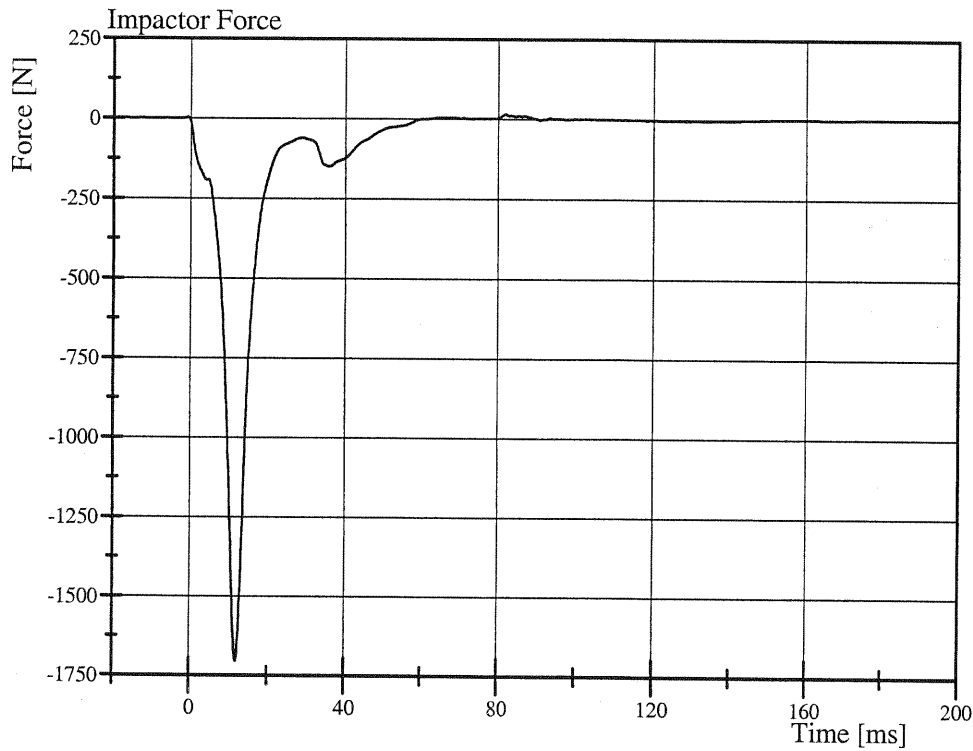
Front Thorax

CRABI 12 MO Serial No. 095 Certification No. 5-1

Test Date: 9/13/2007



Filter Class: CFC_180
Max: 0.5 g at 81.9 ms
Min: -60.8 g at 11.9 ms



Filter Class: CFC_180
Max: 15.3 N at 81.9 ms
Min: -1,704.8 N at 11.9 ms

CALIBRATION TEST RESULTS

POST-TEST LEFT REAR

CRABI: 095

Transportation Research Center Inc.
572R CRABI 12-Month-Old Dummy
External Dimensions
Serial No. 095 Calibration No. 06
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	288 mm	Yes
Hip Pivot Height	C	27.9 - 38.1 mm	35 mm	Yes
Hip Pivot from Backline	D	40.1 - 50.3 mm	48 mm	Yes
Shoulder Pivot from Backline	E	50.3 - 60.5 mm	53 mm	Yes
Thigh Clearance	F	63.0 - 73.2 mm	72 mm	Yes
Elbow Pivot to Fingertip	G	176.6 - 191.8 mm	185 mm	Yes
Shoulder to Elbow Pivot	I	99.1 - 114.3 mm	110 mm	Yes
Elbow Rest Height	J	150.1 - 165.3 mm	160 mm	Yes
Buttock to Knee Length	K	202.7 - 217.9 mm	210 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	170 mm	Yes
Buttock Popliteal Length	N	144.8 - 160.0 mm	151 mm	Yes
Chest Depth with Jacket	O	107.5 - 122.7 mm	120 mm	Yes
Foot Length	P	92.4 - 102.6 mm	96 mm	Yes
Stature	Q	727.7 - 753.1 mm	750 mm	Yes
Buttock to Knee Pivot Length	R	178.5 - 188.7 mm	180 mm	Yes
Head Breadth	S	124.4 - 134.6 mm	125 mm	Yes
Head Depth (REF)	T	149.9 - 165.1 mm	150 mm	Yes
Hip Breadth	U	158.5 - 173.7 mm	171 mm	Yes
Shoulder Breadth	V	200.7 - 215.9 mm	210 mm	Yes
Foot Breadth	W	39.1 - 49.3 mm	44 mm	Yes
Chest Circumference with Jacket	Y	452.4 - 477.8 mm	471 mm	Yes
Waist Circumference	Z	447.0 - 472.4 mm	452 mm	Yes
Reference Location for Chest Circumference	AA	256.5 - 266.7 mm	260 mm	Yes
Reference Location for Waist Circumference	BB	106.7 - 116.9 mm	110 mm	Yes
Shoulder Height	CC	299.7 - 314.9 mm	311 mm	Yes
Chin Height	DD	289.6 - 304.8 mm	315 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. Ball

Ron Starnes

Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 095 Certification No. 6-1

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	104.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	2.8 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	Yes	Yes	Yes

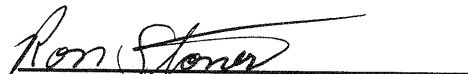
Test meets specifications.

Comments:

Technician



Approved

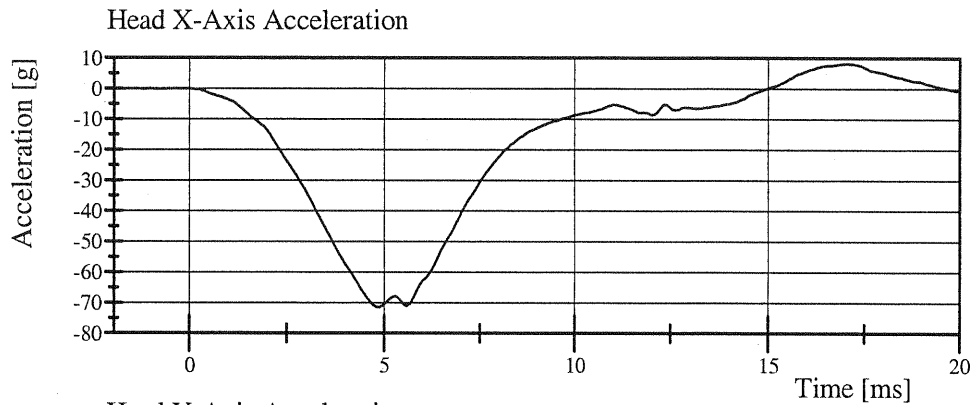


Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 095 Certification No. 6-1

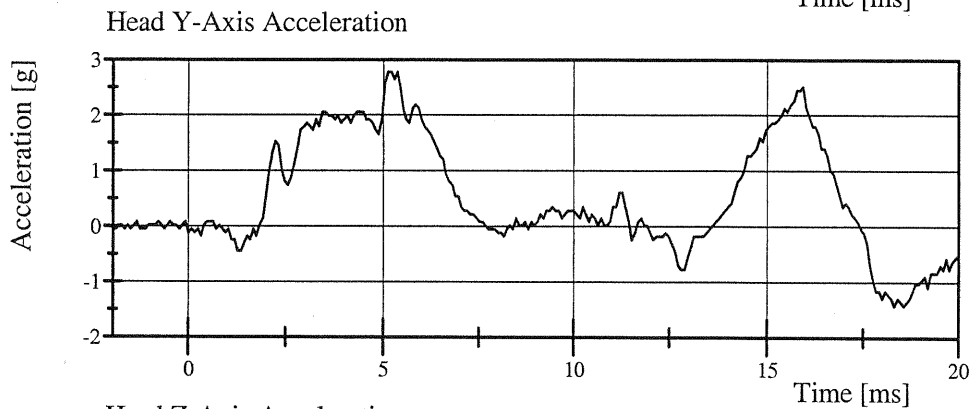
Test Date: 9/28/2007



Filter Class: CFC_1000

Max: 8.2 g at 17.0 ms

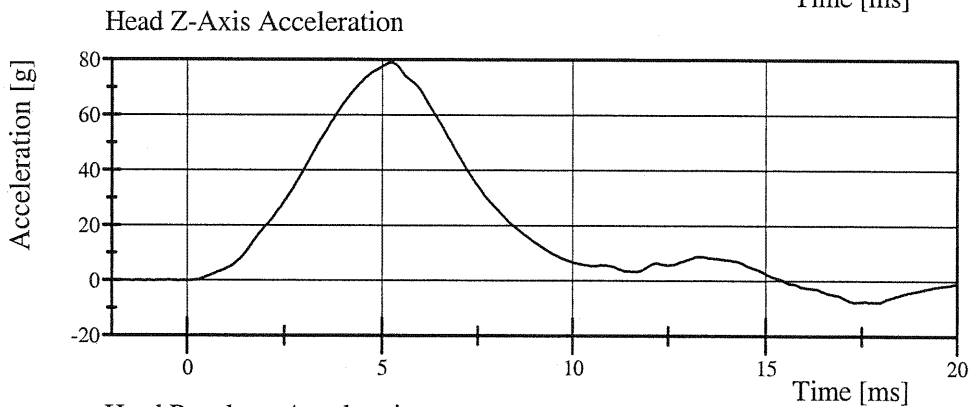
Min: -71.5 g at 4.9 ms



Filter Class: CFC_1000

Max: 2.8 g at 5.1 ms

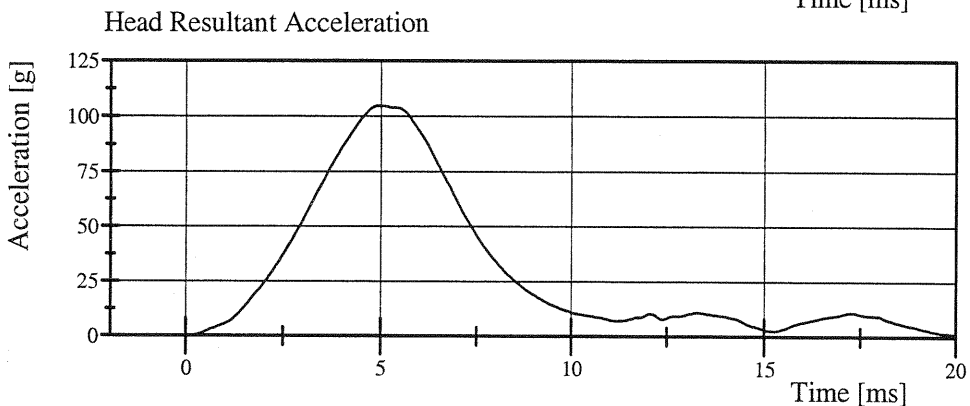
Min: -1.4 g at 18.3 ms



Filter Class: CFC_1000

Max: 78.9 g at 5.2 ms

Min: -7.6 g at 17.3 ms



Filter Class: CFC_1000

Max: 104.8 g at 5.0 ms

Min: 0.0 g at -1.0 ms

Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 095 Certification No. 6-1

Test Date: 9/28/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Peak Head Resultant Acceleration	55 - 71 g	64.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-2.0 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician



Approved



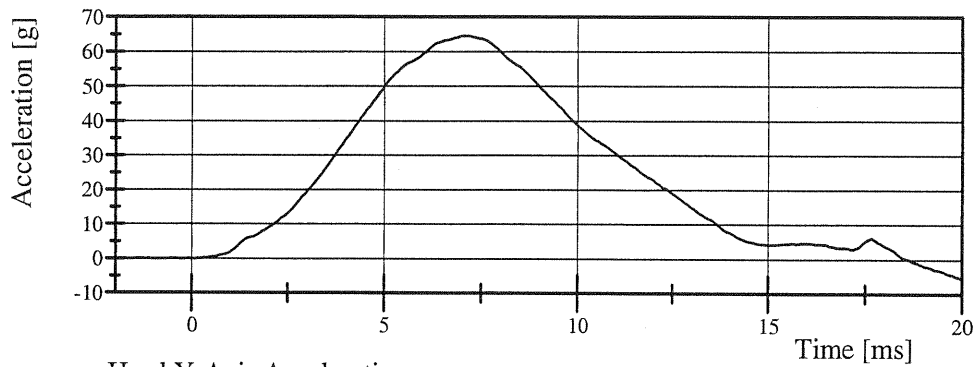
Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 095 Certification No. 6-1

Test Date: 9/28/2007

Head X-Axis Acceleration

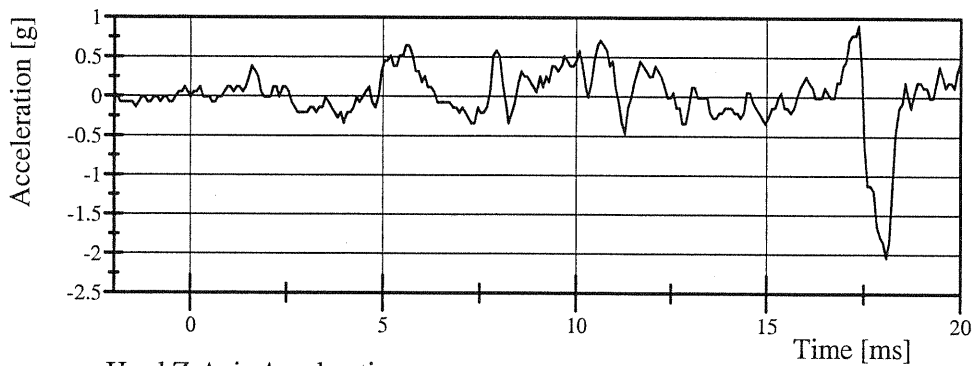


Filter Class: CFC_1000

Max: 64.6 g at 7.0 ms

Min: -5.3 g at 20.0 ms

Head Y-Axis Acceleration

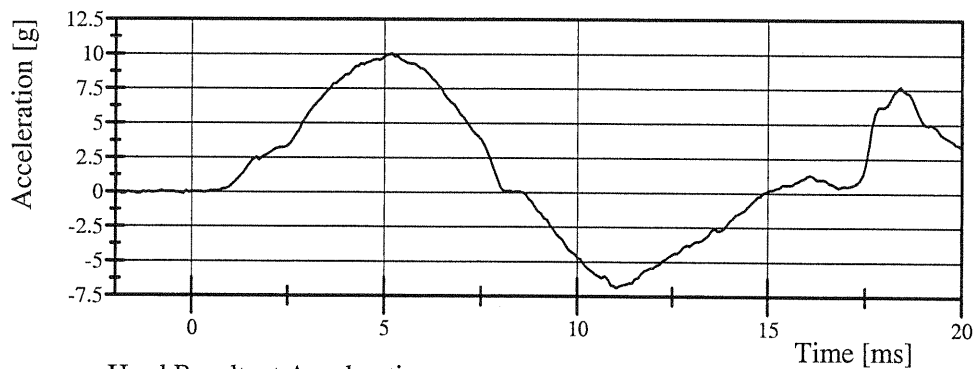


Filter Class: CFC_1000

Max: 0.9 g at 17.4 ms

Min: -2.0 g at 18.1 ms

Head Z-Axis Acceleration

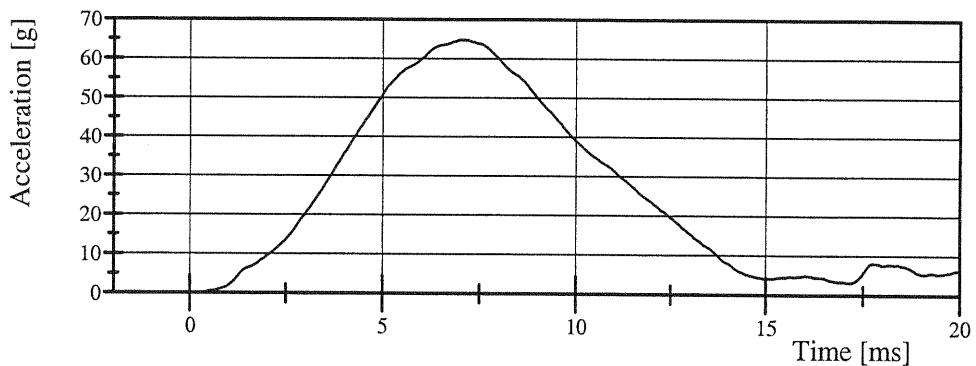


Filter Class: CFC_1000

Max: 10.0 g at 5.2 ms

Min: -6.9 g at 11.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 64.8 g at 7.0 ms

Min: 0.0 g at -0.9 ms

Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 6-5

Test Date: 9/28/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	51 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.26 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-1.6) - (-2.3) m/s	-1.97 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-3.4) - (-4.2) m/s	-3.92 m/s	Yes
Pendulum Integrated Velocity Change at 25ms	(-4.3) - (-5.2) m/s	-4.82 m/s	Yes
Total Head D-Plane Rotation	(-75) - (-86) °	-80.5 °	Yes
Total Neck Occipital Condyles Moment	36 - 45 N·m	43.8 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 5 Nm	60 - 80 ms	74.4 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Hall

Approved

Ron Starn

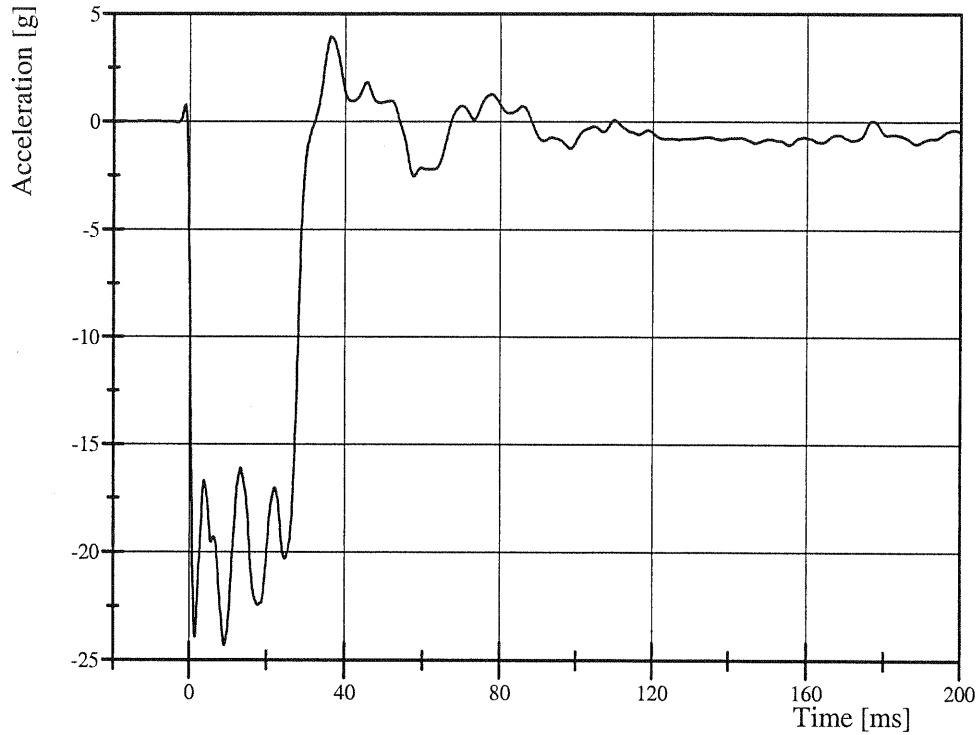
Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 6-5

Test Date: 9/28/2007

Pendulum Acceleration

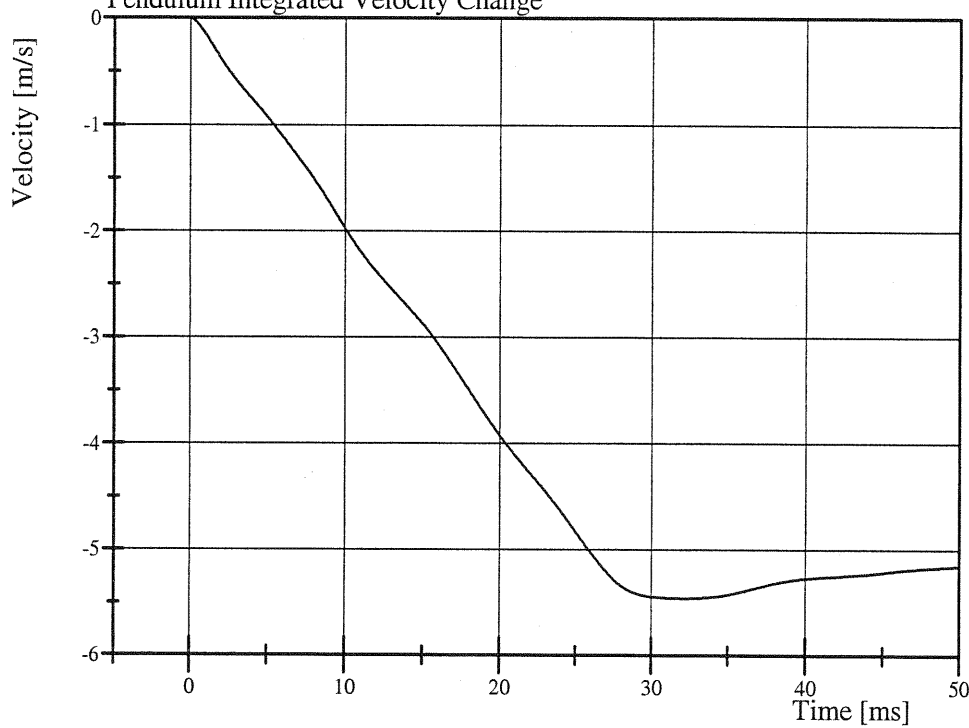


Filter Class: CFC_180

Max: 3.9 g at 36.4 ms

Min: -24.3 g at 9.2 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -5.5 m/s at 32.2 ms

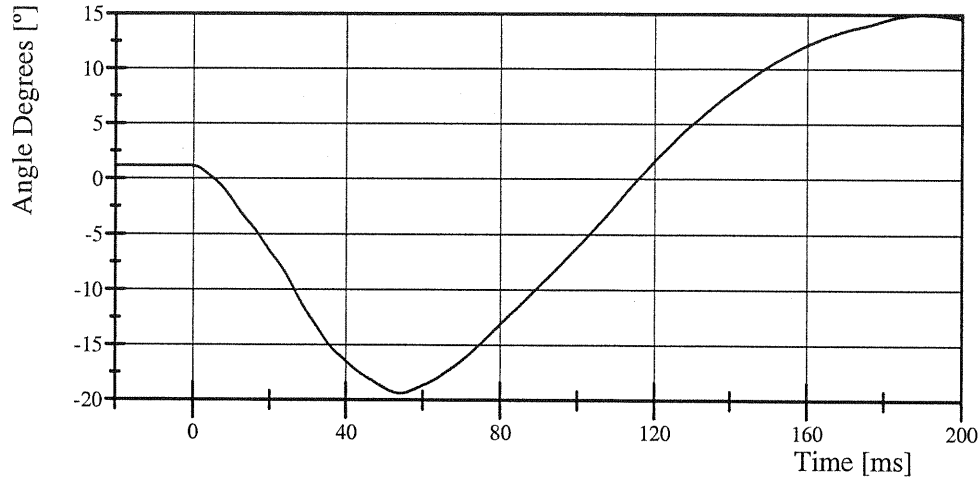
Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 6-5

Test Date: 9/28/2007

Forward Pot Rotation at Base of Pendulum

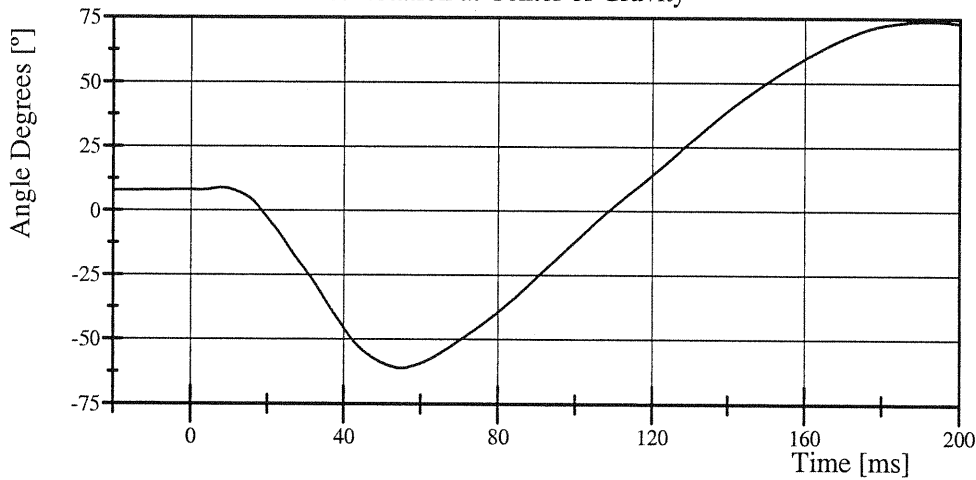


Filter Class: CFC_60

Max: 15.0 ° at 189.5 ms

Min: -19.4 ° at 54.2 ms

Center Headform Pot Rotation at Center of Gravity

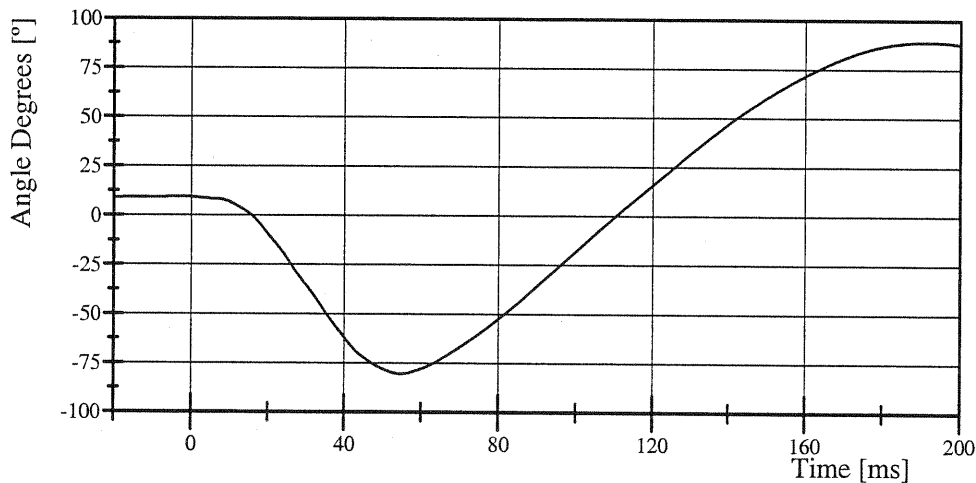


Filter Class: CFC_60

Max: 74.0 ° at 192.2 ms

Min: -61.2 ° at 55.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 89.0 ° at 191.3 ms

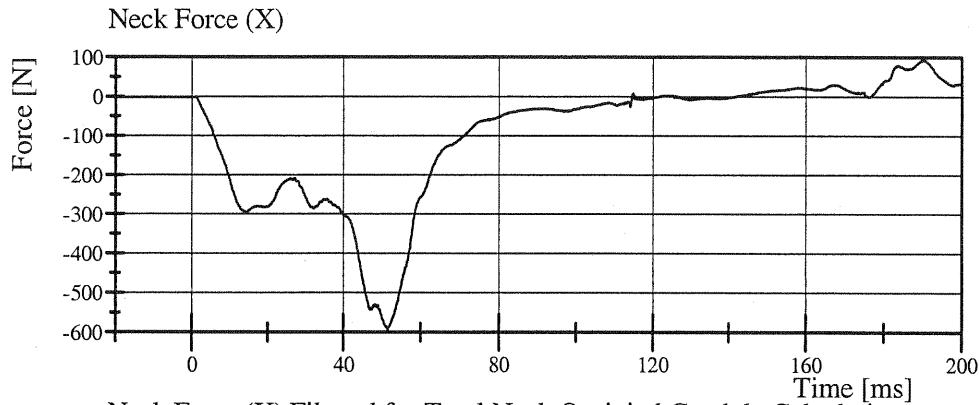
Min: -80.5 ° at 54.8 ms

Transportation Research Center Inc.

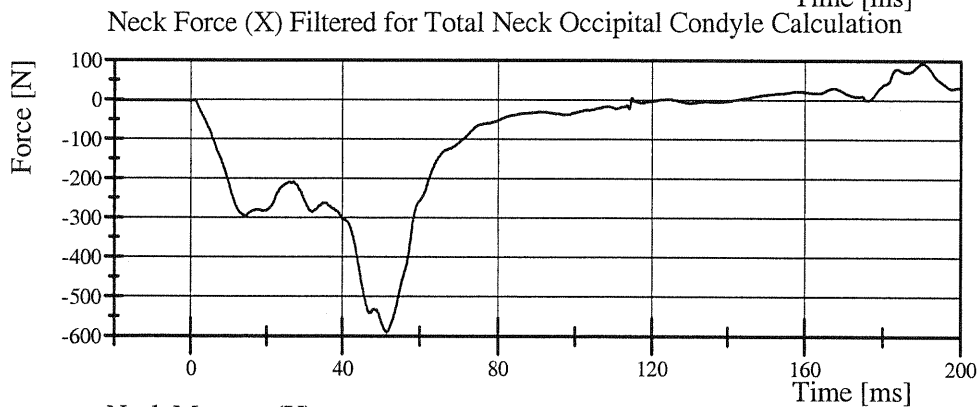
Neck Flexion

CRABI 12 MO Serial No. 095 Certification No. 6-5

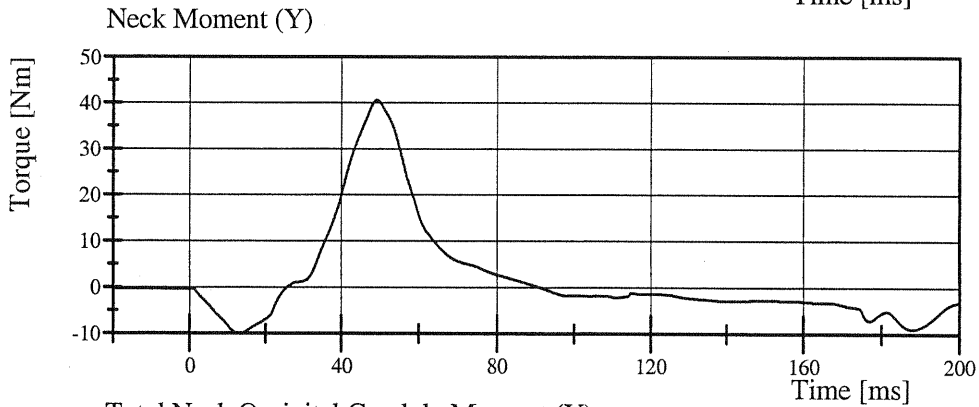
Test Date: 9/28/2007



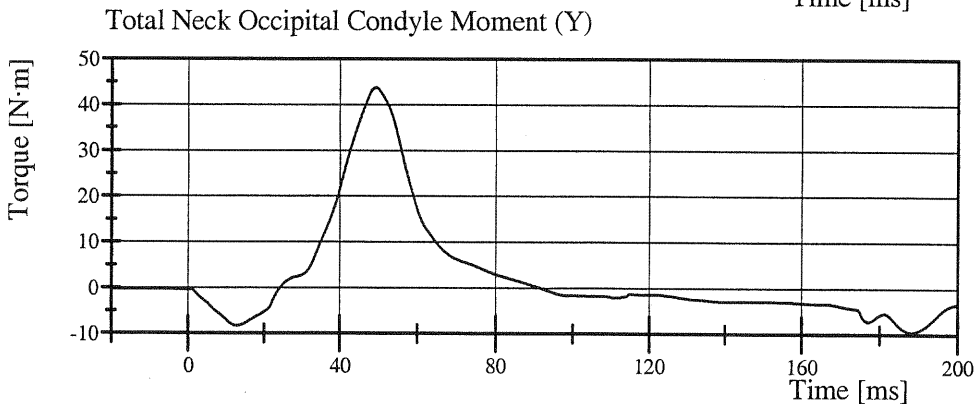
Filter Class: CFC_1000
Max: 93.1 N at 190.0 ms
Min: -592.9 N at 51.6 ms



Filter Class: CFC_600
Max: 93.1 N at 190.2 ms
Min: -590.9 N at 51.6 ms



Filter Class: CFC_600
Max: 40.7 Nm at 49.1 ms
Min: -10.0 Nm at 13.0 ms



Filter Class: CFC_600
Max: 43.8 N·m at 49.1 ms
Min: -9.4 N·m at 188.1 ms

Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 6-4

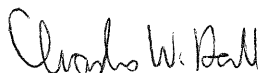
Test Date: 9/28/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Pendulum Velocity	(-2.4) - (-2.6) m/s	-2.53 m/s	Yes
Pendulum Integrated Velocity Change at 6ms	0.8 - 1.2 m/s	1.09 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 2.1 m/s	1.95 m/s	Yes
Pendulum Integrated Velocity Change at 14ms	2.2 - 2.9 m/s	2.63 m/s	Yes
Total Head D-Plane Rotation	80 - 92 °	89.9 °	Yes
Total Neck Occipital Condyles Moment (-12) - (-23) N·m		-17.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -5 Nm	76 - 90 ms	81.0 ms	Yes

Test meets specifications.

Comments:

Technician



Approved



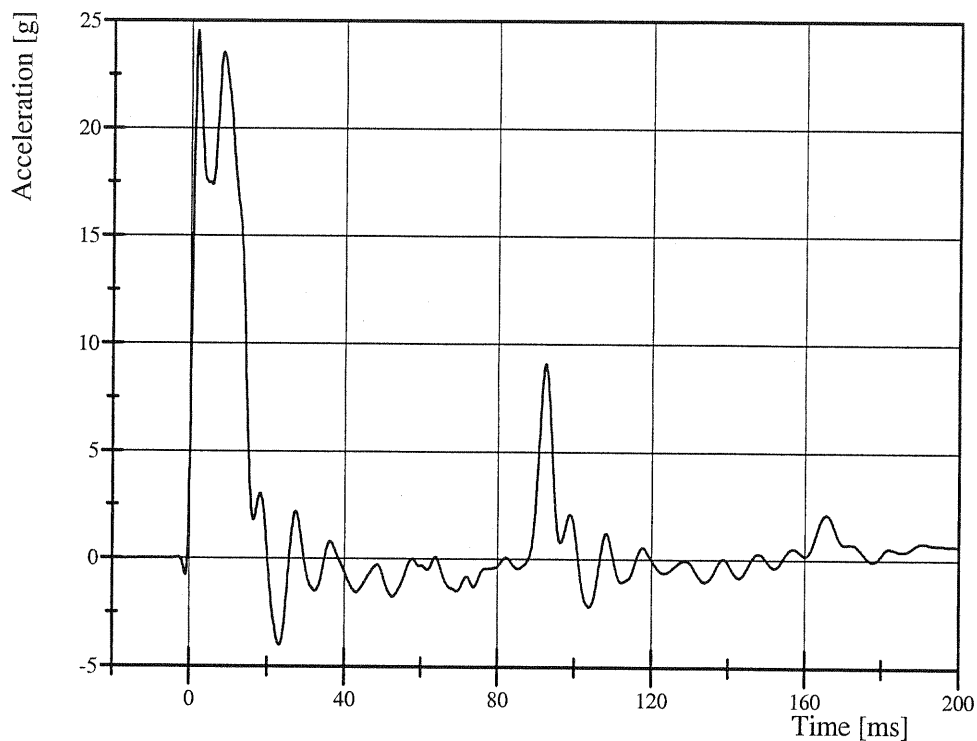
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 6-4

Test Date: 9/28/2007

Pendulum Acceleration

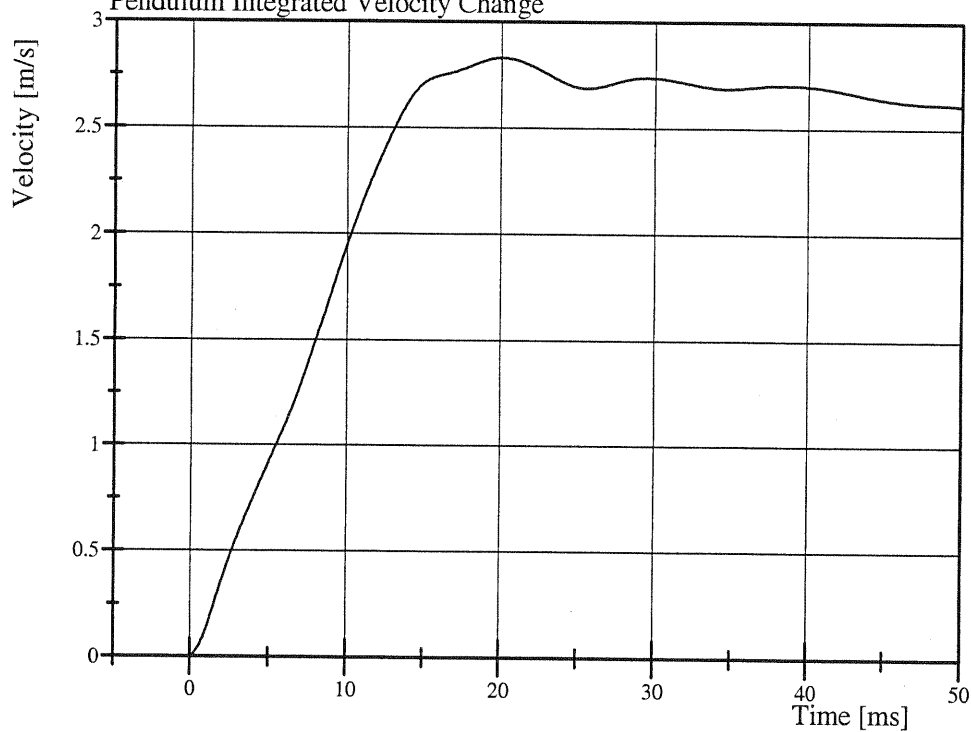


Filter Class: CFC_180

Max: 24.5 g at 1.6 ms

Min: -4.0 g at 23.1 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 2.8 m/s at 20.1 ms

Min: 0.0 m/s at 0.0 ms

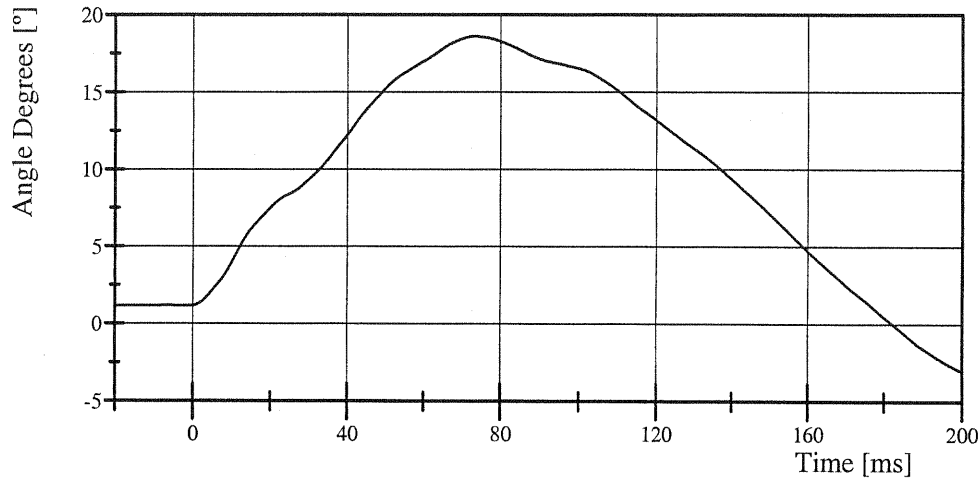
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 6-4

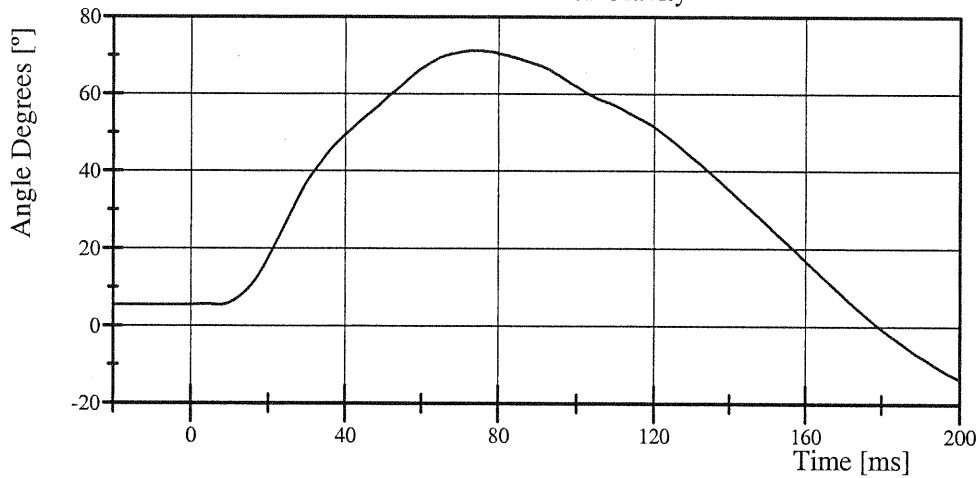
Test Date: 9/28/2007

Forward Pot Rotation at Base of Pendulum



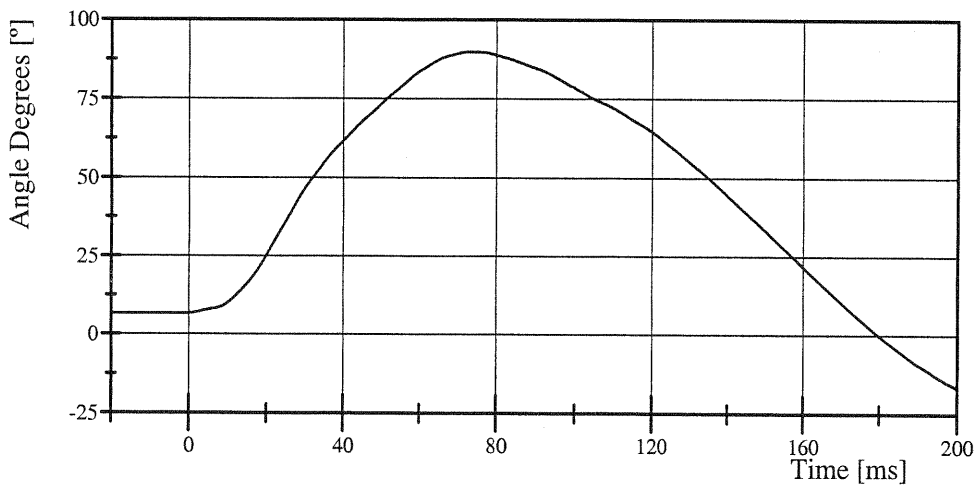
Filter Class: CFC_60
Max: 18.6 ° at 73.3 ms
Min: -3.0 ° at 200.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 71.3 ° at 73.5 ms
Min: -13.5 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 89.9 ° at 73.4 ms
Min: -16.6 ° at 200.0 ms

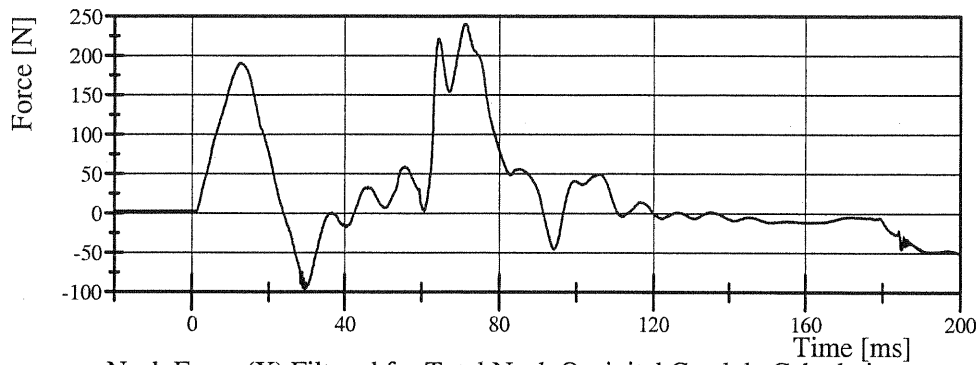
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 095 Certification No. 6-4

Test Date: 9/28/2007

Neck Force (X)

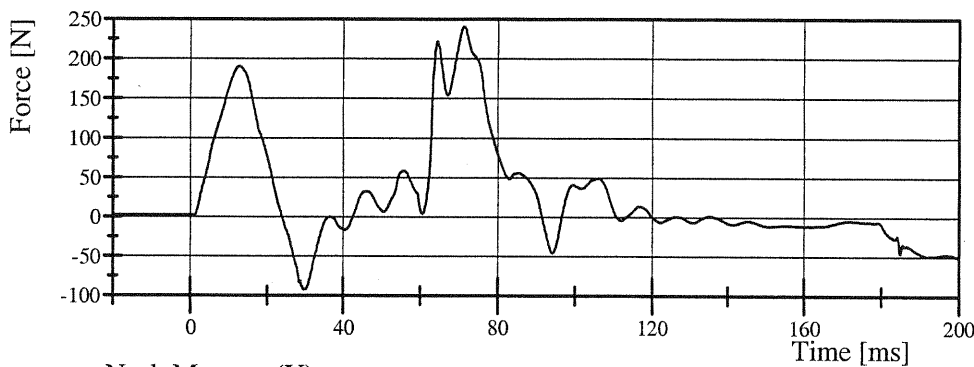


Filter Class: CFC_1000

Max: 240.1 N at 71.4 ms

Min: -96.5 N at 29.5 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation

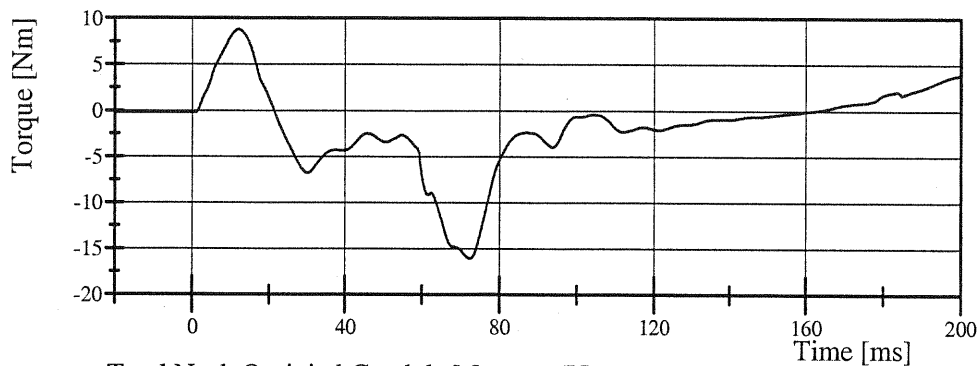


Filter Class: CFC_600

Max: 240.3 N at 71.3 ms

Min: -92.3 N at 29.5 ms

Neck Moment (Y)

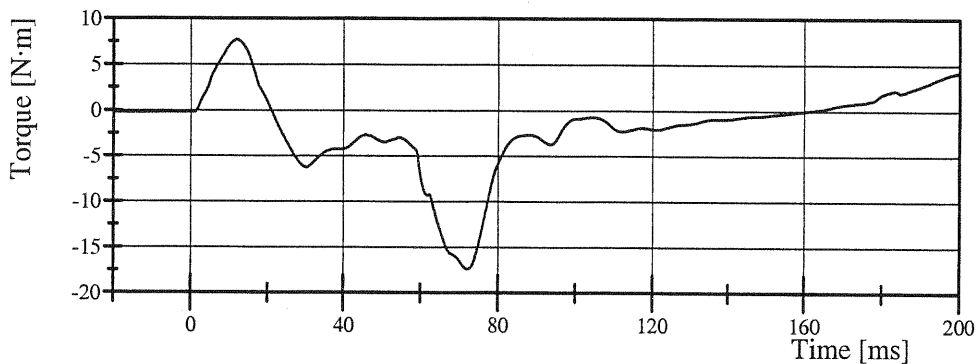


Filter Class: CFC_600

Max: 8.8 Nm at 12.0 ms

Min: -16.0 Nm at 72.3 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: CFC_600

Max: 7.7 N·m at 11.9 ms

Min: -17.4 N·m at 72.1 ms

Transportation Research Center Inc.

Front Thorax

CRABI 12 MO Serial No. 095 Certification No. 6-1

Test Date: 9/28/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Impactor Velocity	4.9 - 5.1 m/s	5.07 m/s	Yes
Impactor Force	(-1,514) - (-1,796) N	-1,595.0 N	Yes

Test meets specifications.

Comments:

Technician

Rant Baruel

Approved

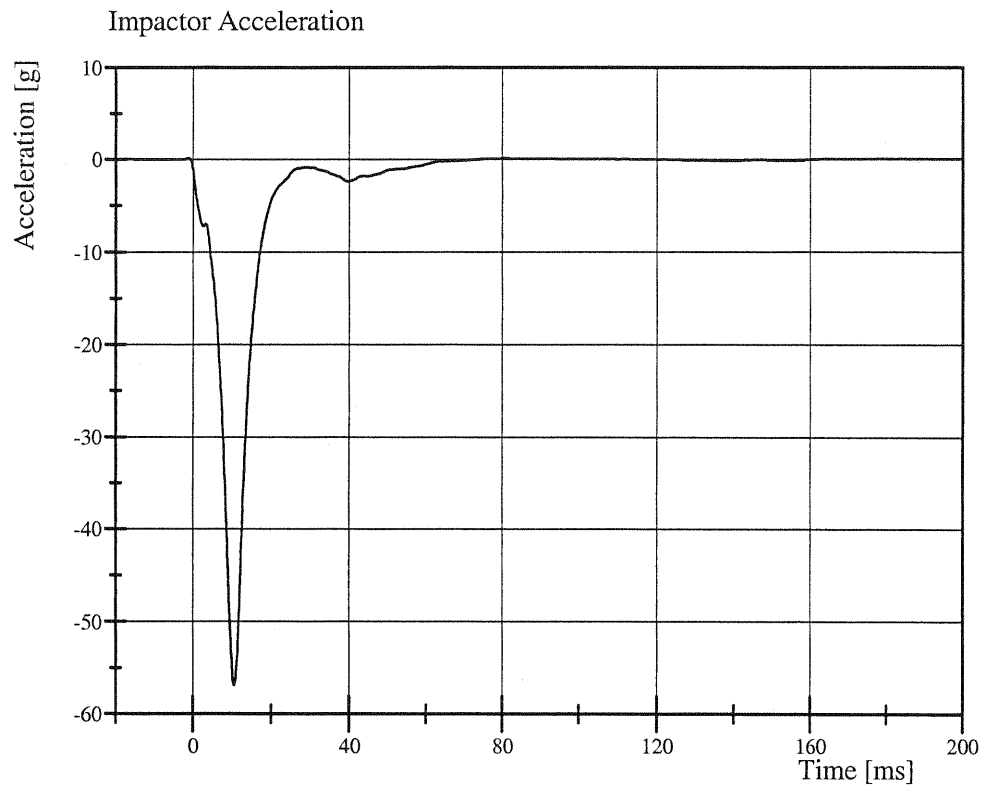
Ron Stover

Transportation Research Center Inc.

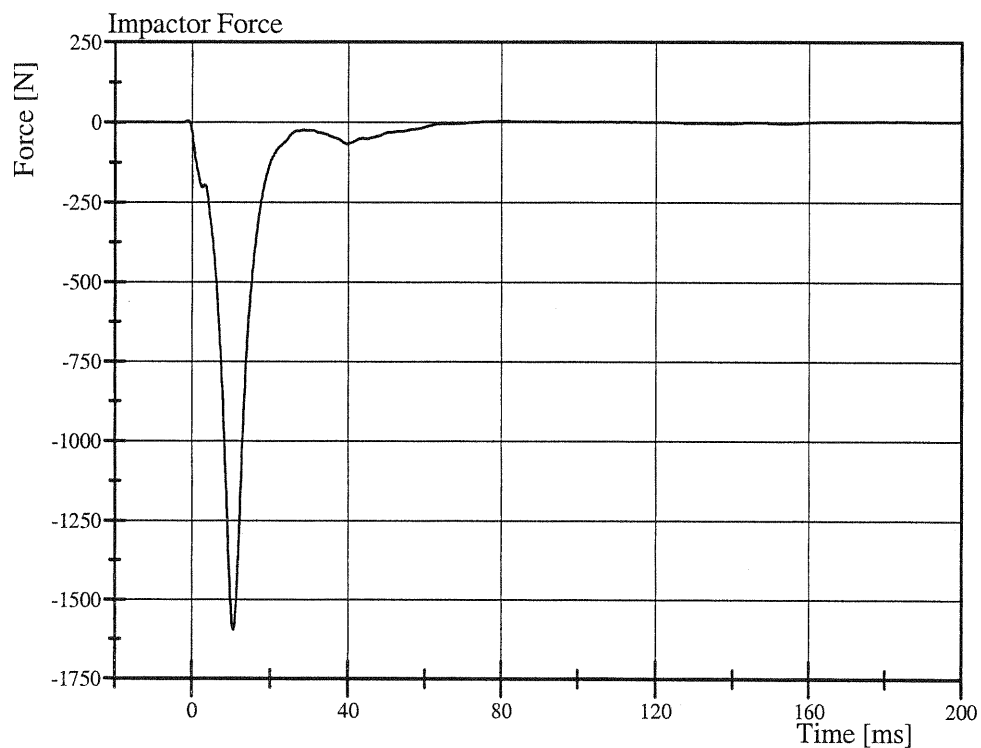
Front Thorax

CRABI 12 MO Serial No. 095 Certification No. 6-1

Test Date: 9/28/2007



Filter Class: CFC_180
Max: 0.1 g at -1.0 ms
Min: -56.9 g at 10.6 ms



Filter Class: CFC_180
Max: 3.7 N at -1.0 ms
Min: -1,595.0 N at 10.6 ms



Test Date: 09/19/07

Type: CRABI 12 month S/N: 095 Mfg.: First Technologies

Proj./Seg. No.: 20050906-1100 Test Eng: Emad Al-Tabakha

ITEM	PRE-USE	POST-USE
HEAD:		
Skull Bolts; No Wires Pinched	X	
Skull Cap – 3 Year Old Only	N/A	
Head Skin Condition	X	X
* Neck Load Cell Cables: secure, taped, and with strain relief	X	
NECK:		
*Neck Cable Torqued, Tape Installed (1.8-2.2 in-lbs.) Actual: <u>2</u>	X	
Rubber Condition	X	X
ARMS AND HANDS:		
Skin Condition	X	X
Isolation Damper Condition	X	X
THORAX:		
Front and Rear Rib Bolts, Rib Ends Position – 3 Year Old Only	N/A	
Chest Pot Arm and Ball Movement – 3 Year Old Only	N/A	X
Sternum Bolts and Sternum Bumpers Condition	X	
Jacket Condition	X	X
Abdominal Insert Condition	X	X
Rib Damping Material and Stiffeners Condition – 3 Year Old Only	N/A	X
Rib Minimum Depth – 3 Year Old Only (#1-#2 = 4.137 & #2-#3 = 4.082)	N/A	
Accel Mount Bolts	X	
Lumbar Spine Rubber Condition	X	X
PELVIS:		
Hip Isolation Damper Condition	X	X
LEGS AND FEET:		
Leg Skin Condition	X	X
Knee Joint Function and Range of Motion	X	
Ankle Joint Function and Range of Motion	X	
Foot Condition	X	X
OTHER:		
Cleanliness	X	
Target Position	X	
Clothes and Shoes	X	
One G Joint Adjustments	X	
Verify channels against assembly and Check connectors (intact & labeled)	X	
ATTACH TEMPERATURE LOGGER TO DUMMY / DOWNLOAD		

* Items checked during calibration; these items need checked when the dummy is used without recalibration

Pre Test Inspection Completed By: J. Clarridge Date: 09/18/07

Post Test Inspection Completed By: J. Clarridge Date: 09/24/07

CALIBRATION TEST RESULTS

PRE-TEST RIGHT REAR

CRABI: 094

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

Test Parameter	Dimension	Specification	Results	Pass
Total Sitting Height	A	456.0 - 471.2 mm	469 mm	Yes
Shoulder Pivot Height	B	276.6 - 291.8 mm	287 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	71 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	105 mm	Yes
Elbow Rest Height	J	150.1 - 165.3 mm	160 mm	Yes
Buttock to Knee Length	K	202.7 - 217.9 mm	204 mm	Yes
Popliteal Height (Reference to Seat)	L	138.7 - 153.9 mm	149 mm	Yes
Knee Pivot Height	M	165.1 - 180.3 mm	173 mm	Yes
Buttock Popliteal Length	N	144.8 - 160.0 mm	146 mm	Yes
Chest Depth with Jacket	O	107.5 - 122.7 mm	118 mm	Yes
Foot Length	P	92.4 - 102.6 mm	99 mm	Yes
Stature	Q	727.7 - 753.1 mm	747 mm	Yes
Buttock to Knee Pivot Length	R	178.5 - 188.7 mm	180 mm	Yes
Head Breadth	S	124.4 - 134.6 mm	126 mm	Yes
Head Depth (REF)	T	149.9 - 165.1 mm	159 mm	Yes
Hip Breadth	U	158.5 - 173.7 mm	171 mm	Yes
Shoulder Breadth	V	200.7 - 215.9 mm	209 mm	Yes
Foot Breadth	W	39.1 - 49.3 mm	44 mm	Yes
Chest Circumference with Jacket	Y	452.4 - 477.8 mm	463 mm	Yes
Waist Circumference	Z	447.0 - 472.4 mm	454 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. Ball

Ron Storn

Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 094 Certification No. 7-2

Test Date: 9/12/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	47 %	Yes
Peak Head Resultant Acceleration	100 - 120 g	111.9 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





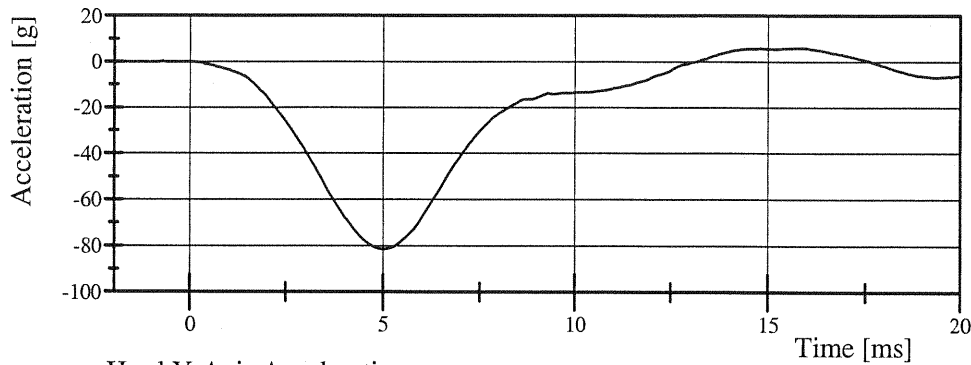
Transportation Research Center Inc.

Front Head Drop

CRABI 12 MO Serial No. 094 Certification No. 7-2

Test Date: 9/12/2007

Head X-Axis Acceleration

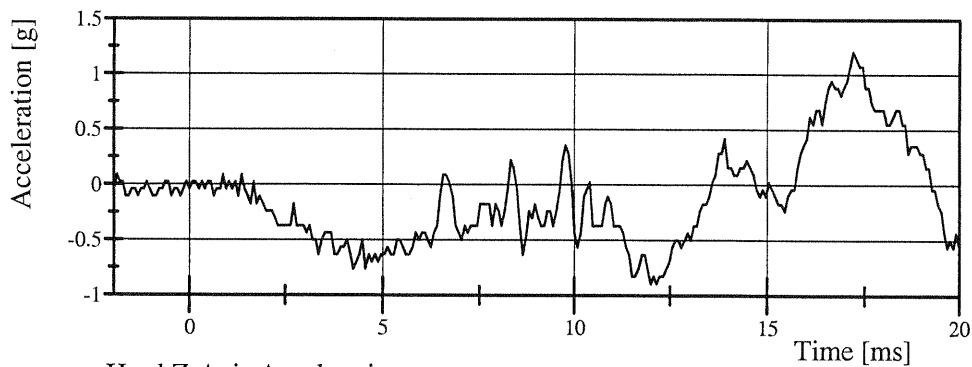


Filter Class: CFC_1000

Max: 6.1 g at 15.7 ms

Min: -81.5 g at 5.0 ms

Head Y-Axis Acceleration

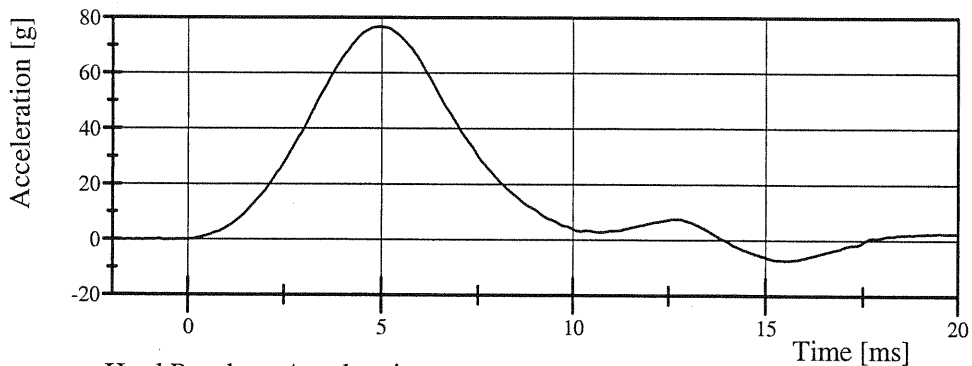


Filter Class: CFC_1000

Max: 1.2 g at 17.2 ms

Min: -0.9 g at 12.0 ms

Head Z-Axis Acceleration

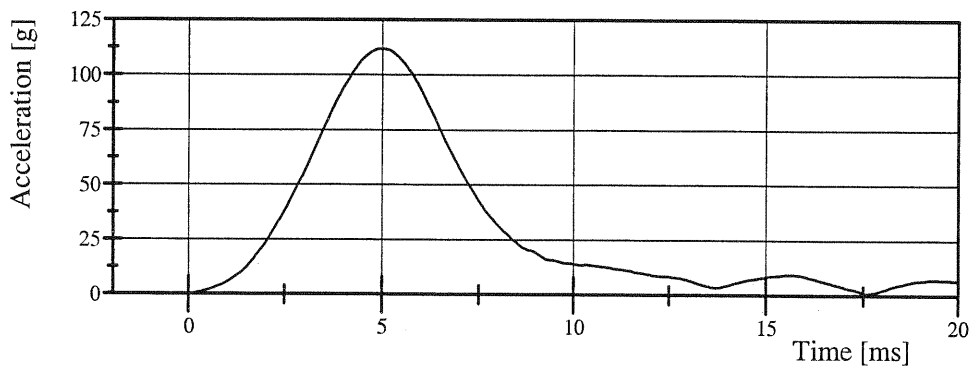


Filter Class: CFC_1000

Max: 76.8 g at 5.0 ms

Min: -7.3 g at 15.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 111.9 g at 5.0 ms

Min: 0.0 g at -1.8 ms

Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 094 Certification No. 7-5

Test Date: 9/12/2007

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Peak Head Resultant Acceleration	55 - 71 g	68.1 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	1.5 g	Yes
Is Acceleration Curve Unimodal within 17% of Peak?	Yes	Yes	Yes

Test meets specifications.

Comments:

Technician

Rand Beraud

Approved

Ron Stone

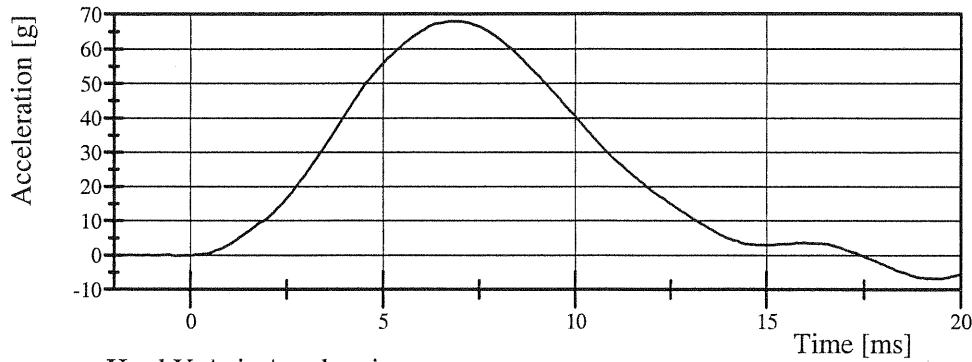
Transportation Research Center Inc.

Rear Head Drop

CRABI 12 MO Serial No. 094 Certification No. 7-5

Test Date: 9/12/2007

Head X-Axis Acceleration

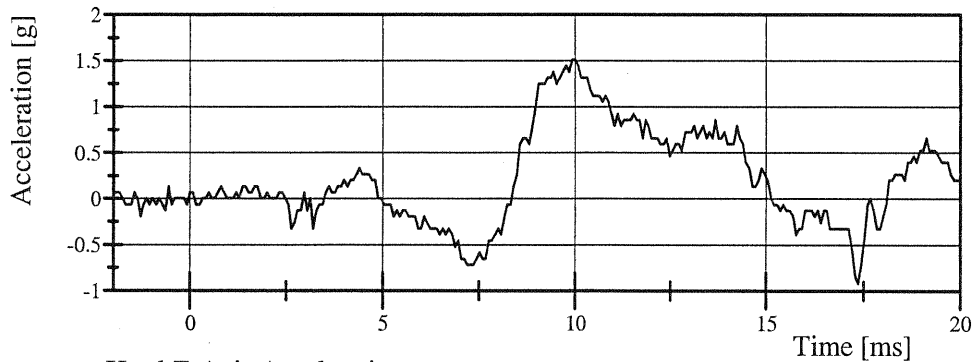


Filter Class: CFC_1000

Max: 68.0 g at 6.7 ms

Min: -6.8 g at 19.3 ms

Head Y-Axis Acceleration

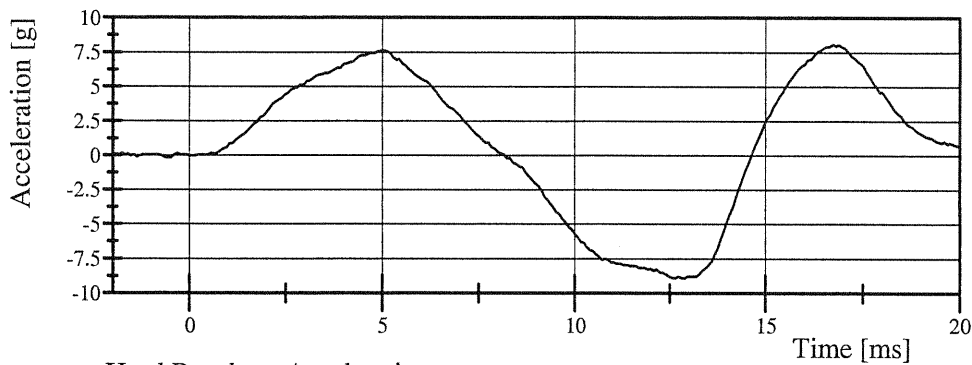


Filter Class: CFC_1000

Max: 1.5 g at 9.9 ms

Min: -0.9 g at 17.4 ms

Head Z-Axis Acceleration

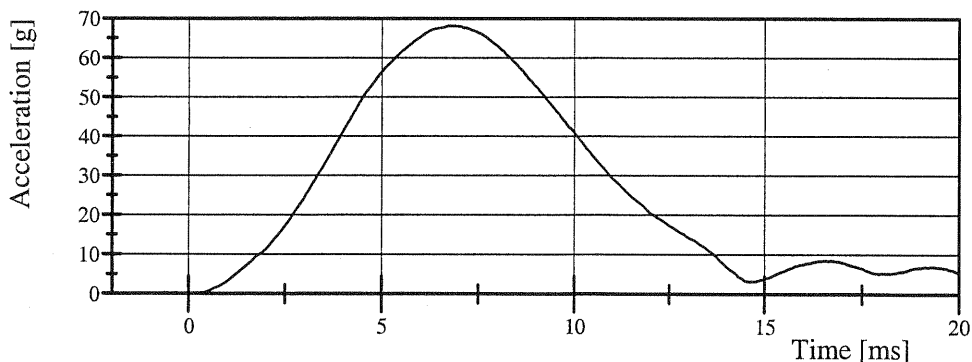


Filter Class: CFC_1000

Max: 8.1 g at 16.7 ms

Min: -8.9 g at 12.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000

Max: 68.1 g at 6.7 ms

Min: 0.0 g at -0.8 ms

Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 7-7

Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.14 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-1.6) - (-2.3) m/s	-2.03 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-3.4) - (-4.2) m/s	-4.01 m/s	Yes
Pendulum Integrated Velocity Change at 25ms	(-4.3) - (-5.2) m/s	-4.85 m/s	Yes
Total Head D-Plane Rotation	(-75) - (-86) °	-81.6 °	Yes
Total Neck Occipital Condyles Moment	36 - 45 N·m	44.6 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 5 Nm	60 - 80 ms	69.8 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Hall

Approved

Ron Starnes

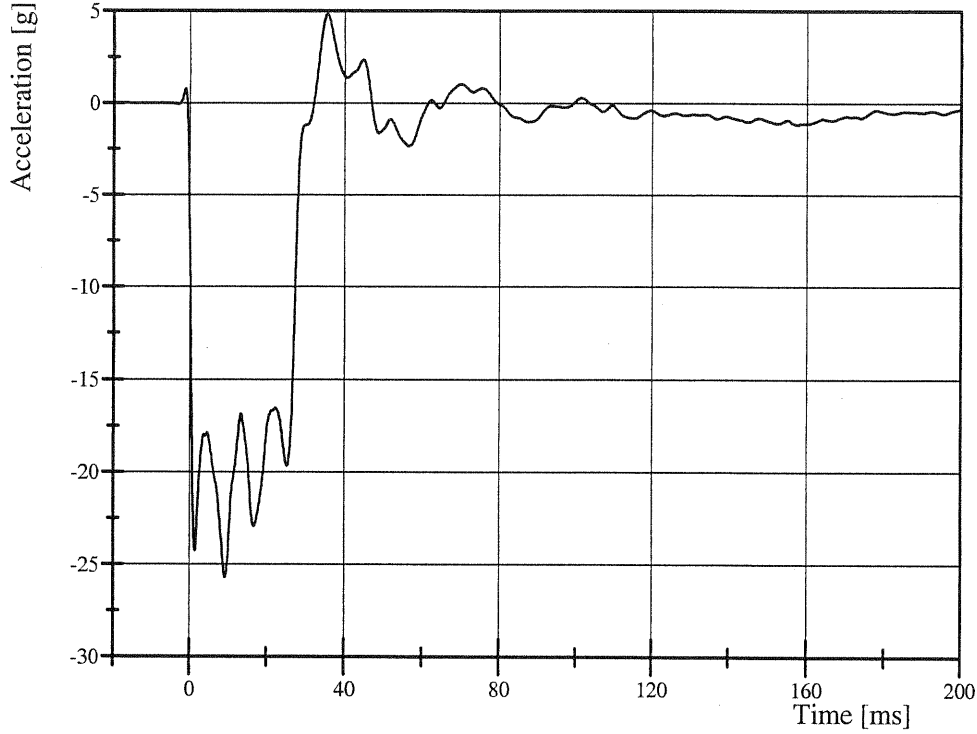
Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 7-7

Test Date: 9/13/2007

Pendulum Acceleration

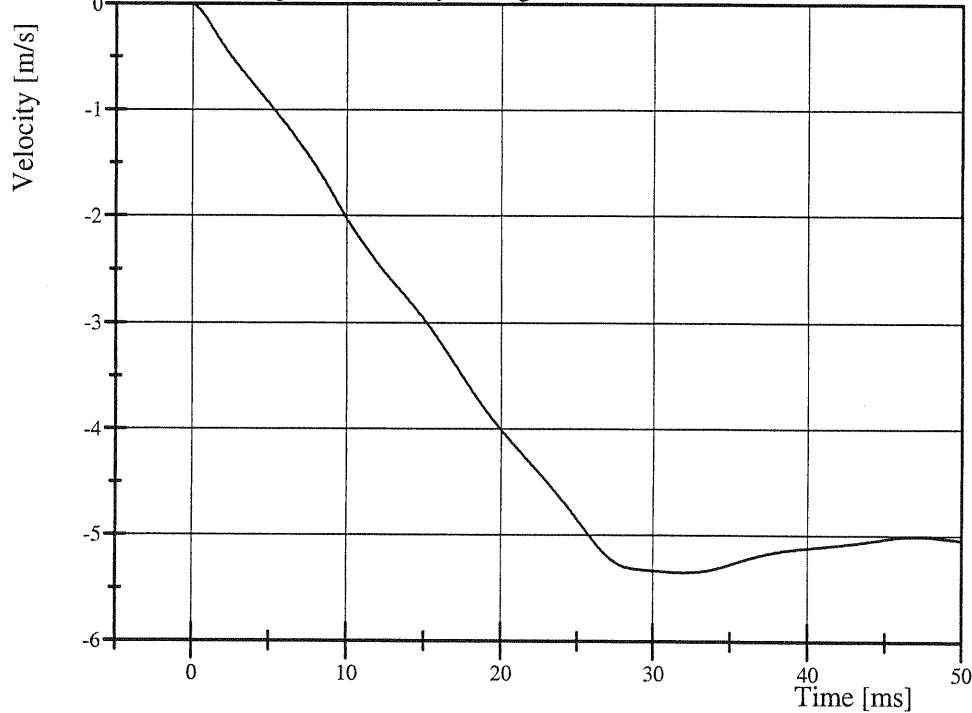


Filter Class: CFC_180

Max: 4.8 g at 35.5 ms

Min: -25.7 g at 9.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -5.4 m/s at 32.0 ms

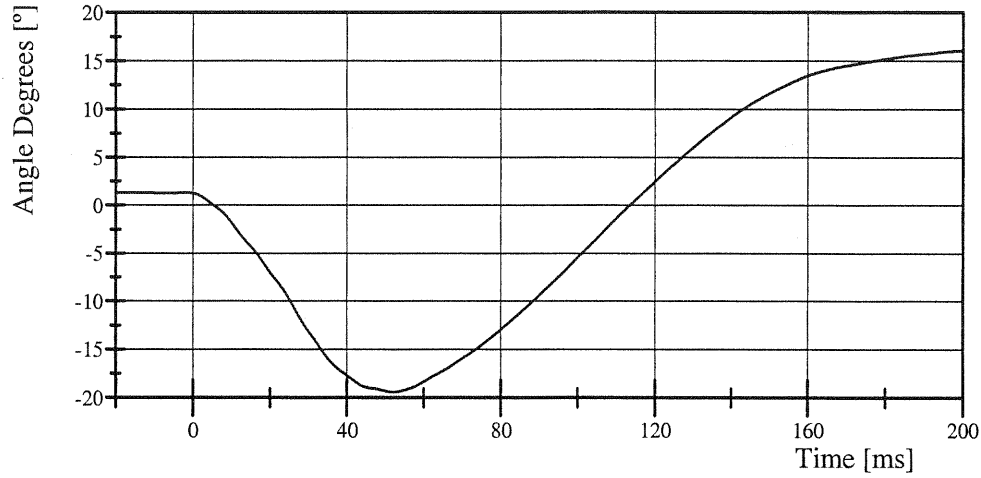
Transportation Research Center Inc.

Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 7-7

Test Date: 9/13/2007

Forward Pot Rotation at Base of Pendulum

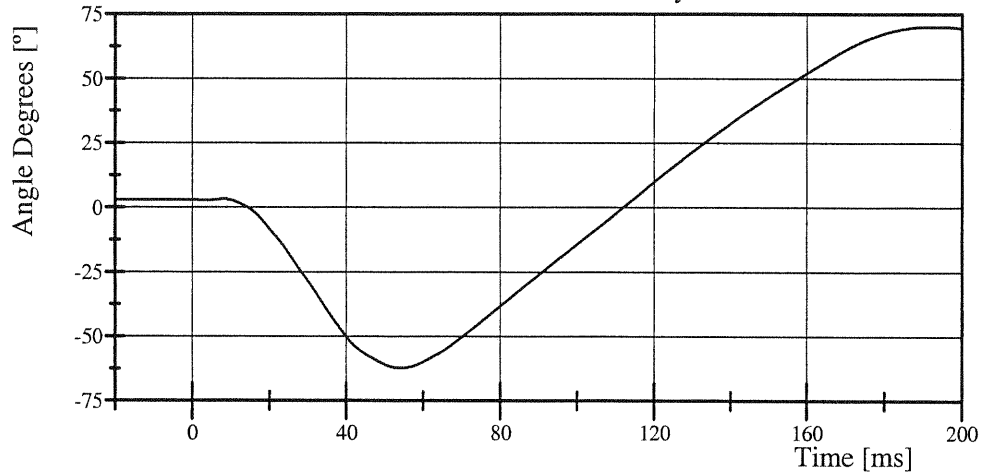


Filter Class: CFC_60

Max: 16.0 ° at 199.8 ms

Min: -19.4 ° at 52.2 ms

Center Headform Pot Rotation at Center of Gravity

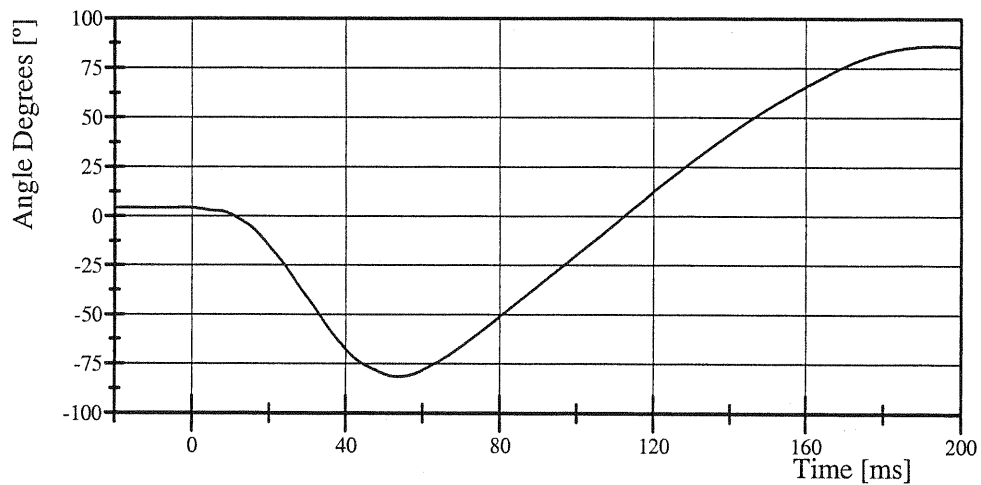


Filter Class: CFC_60

Max: 70.3 ° at 193.4 ms

Min: -62.3 ° at 54.1 ms

Total Head D-Plane Rotation



Filter Class: CFC_60

Max: 86.2 ° at 195.4 ms

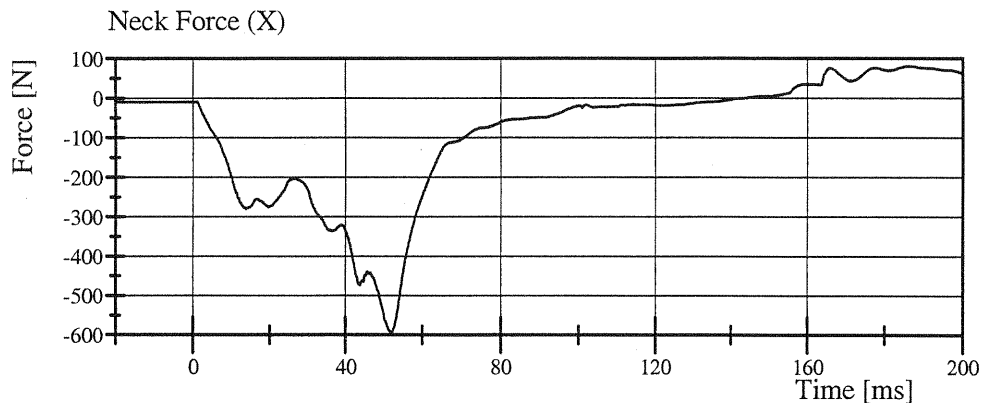
Min: -81.6 ° at 53.7 ms

Transportation Research Center Inc.

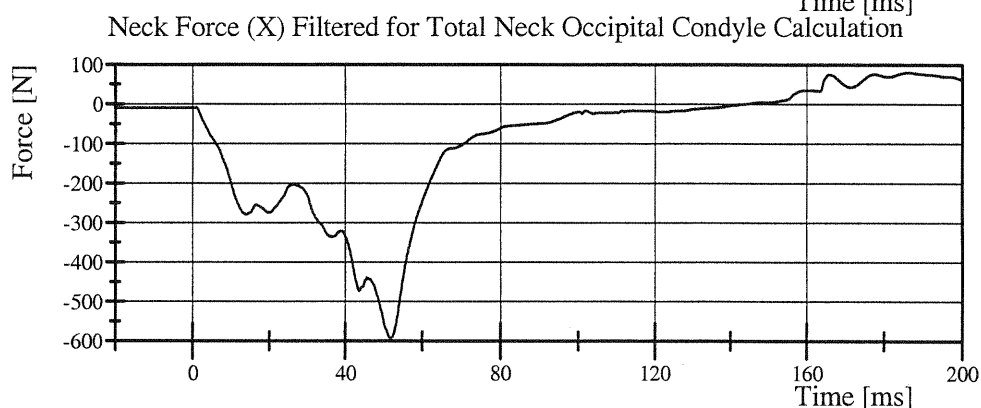
Neck Flexion

CRABI 12 MO Serial No. 094 Certification No. 7-7

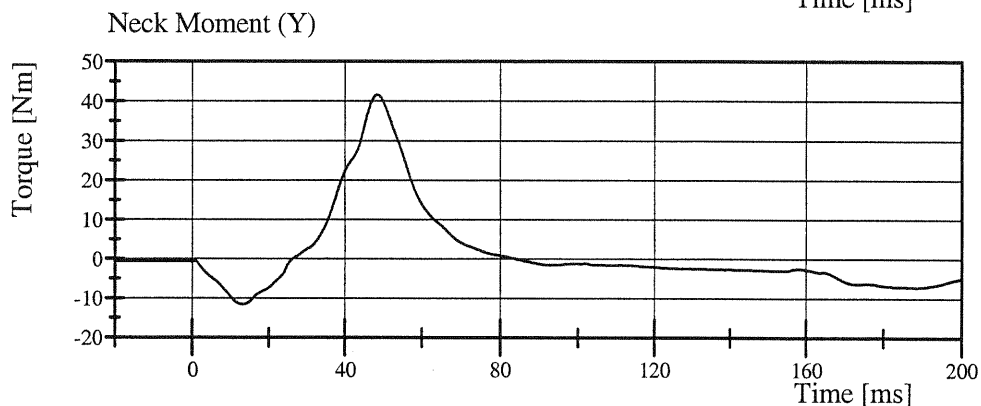
Test Date: 9/13/2007



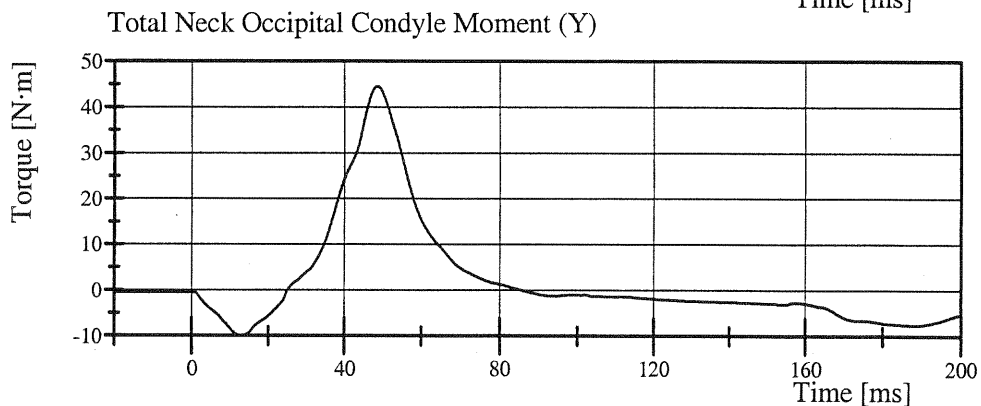
Filter Class: CFC_1000
Max: 80.9 N at 185.8 ms
Min: -592.3 N at 52.1 ms



Filter Class: CFC_600
Max: 80.9 N at 186.0 ms
Min: -592.3 N at 52.0 ms



Filter Class: CFC_600
Max: 41.7 Nm at 48.5 ms
Min: -11.5 Nm at 13.2 ms



Filter Class: CFC_600
Max: 44.6 N·m at 48.6 ms
Min: -9.9 N·m at 13.0 ms

Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 7-1

Test Date: 9/13/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Pendulum Velocity	(-2.4) - (-2.6) m/s	-2.50 m/s	Yes
Pendulum Integrated Velocity Change at 6ms	0.8 - 1.2 m/s	0.97 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 2.1 m/s	1.71 m/s	Yes
Pendulum Integrated Velocity Change at 14ms	2.2 - 2.9 m/s	2.36 m/s	Yes
Total Head D-Plane Rotation	80 - 92 °	88.1 °	Yes
Total Neck Occipital Condyles Moment (-12) - (-23) N·m		-18.3 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -5 Nm	76 - 90 ms	87.4 ms	Yes

Test meets specifications.

Comments:

Technician

Charles W. Hill

Approved

Ron Storer

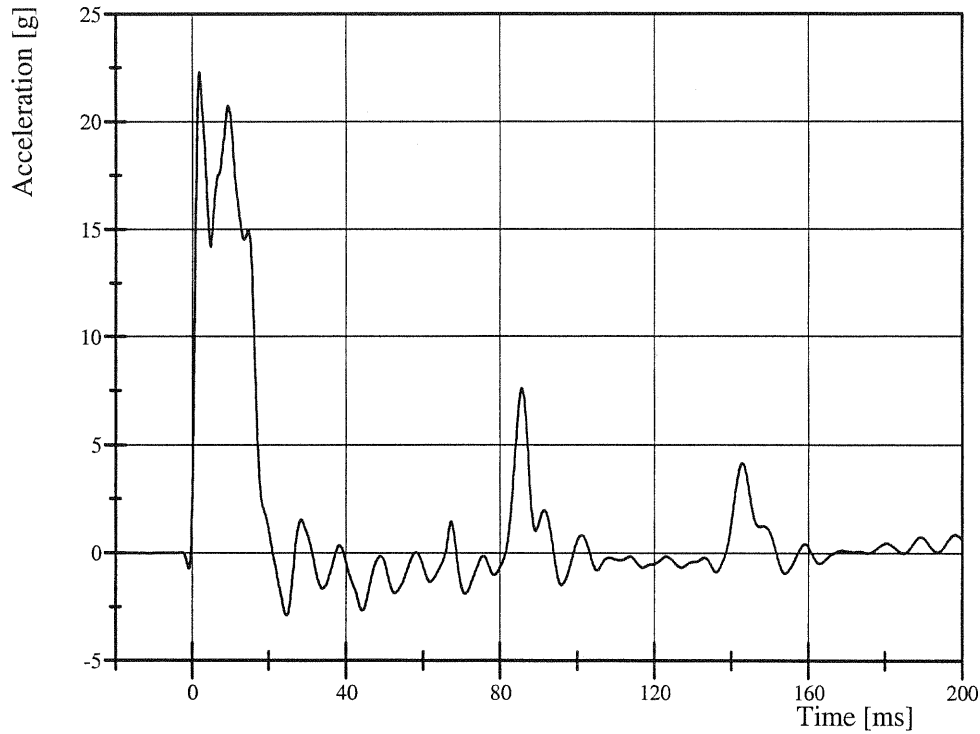
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 7-1

Test Date: 9/13/2007

Pendulum Acceleration

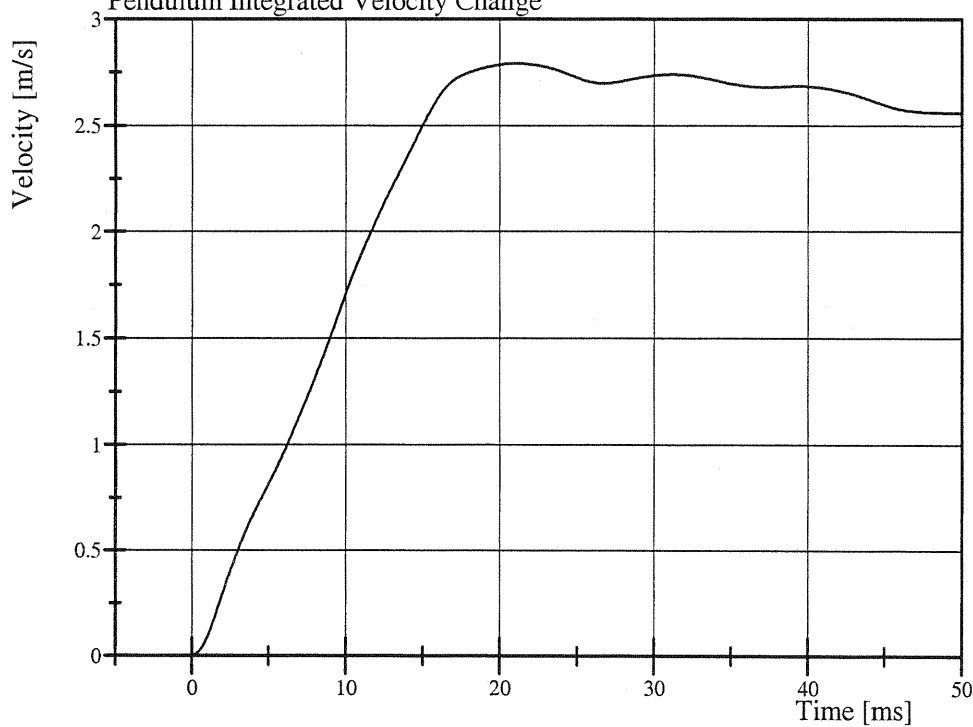


Filter Class: CFC_180

Max: 22.3 g at 1.8 ms

Min: -2.9 g at 24.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 2.8 m/s at 21.1 ms

Min: 0.0 m/s at 0.0 ms

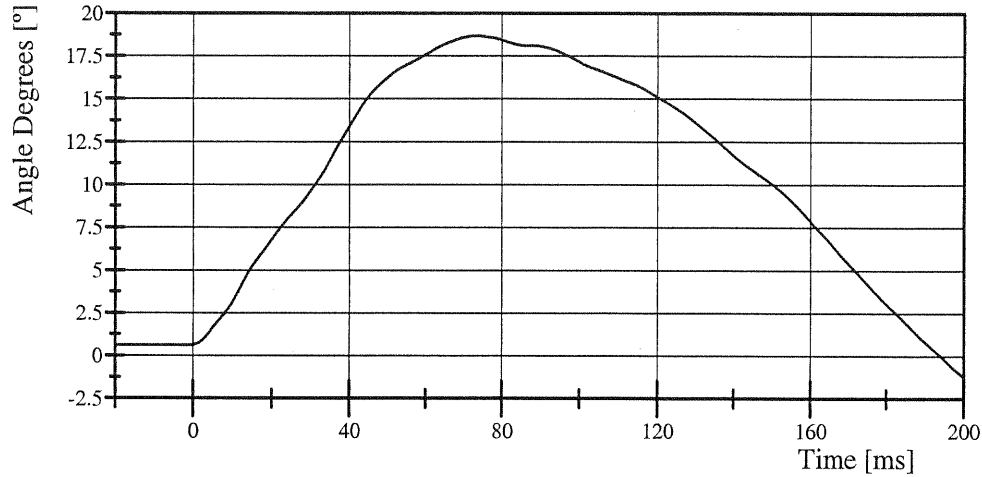
Transportation Research Center Inc.

Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 7-1

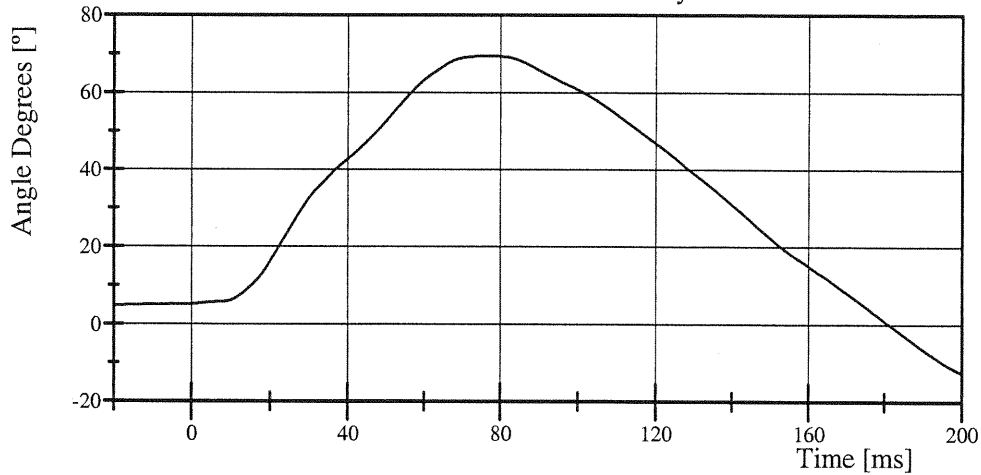
Test Date: 9/13/2007

Forward Pot Rotation at Base of Pendulum



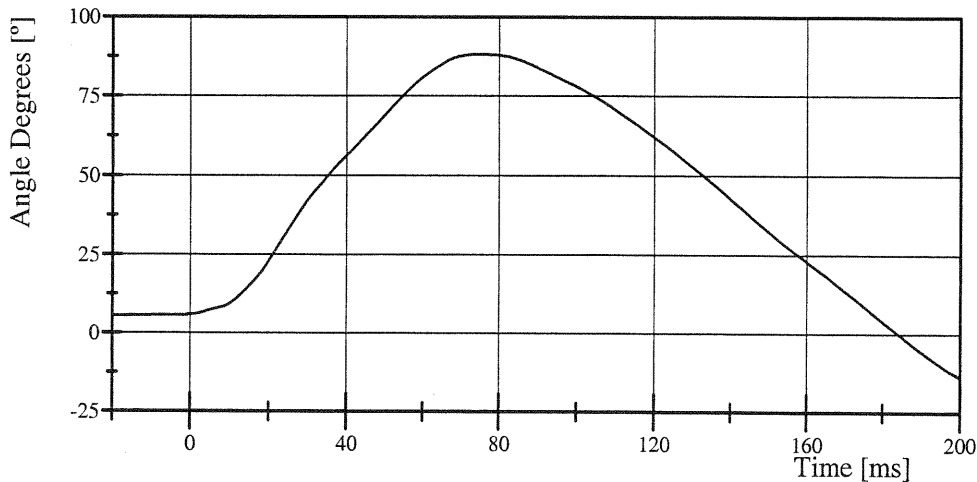
Filter Class: CFC_60
Max: 18.7 ° at 73.1 ms
Min: -1.2 ° at 200.0 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_60
Max: 69.5 ° at 77.9 ms
Min: -12.5 ° at 200.0 ms

Total Head D-Plane Rotation



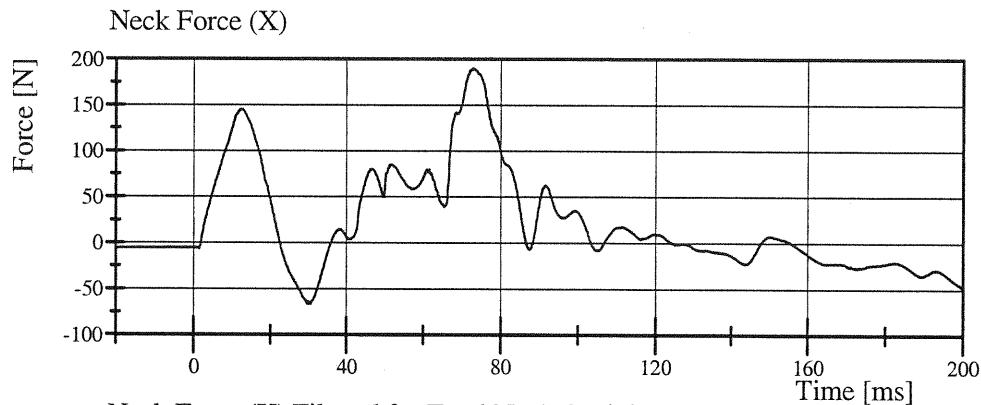
Filter Class: CFC_60
Max: 88.1 ° at 74.5 ms
Min: -13.8 ° at 200.0 ms

Transportation Research Center Inc.

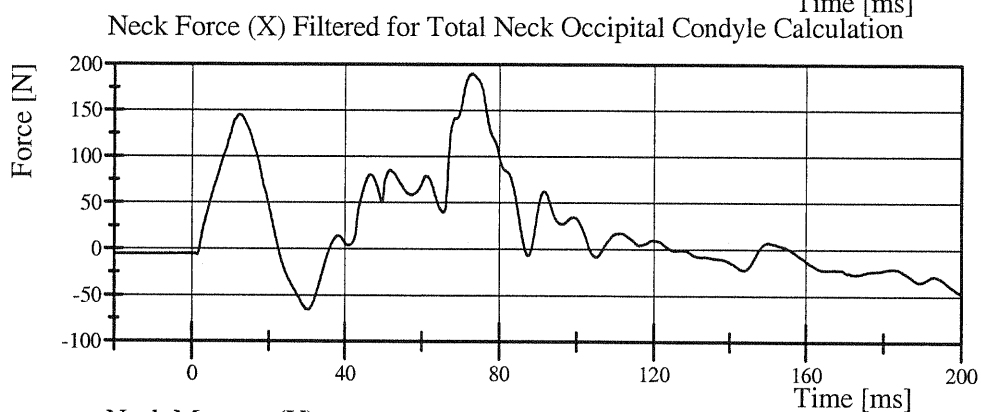
Neck Extension

CRABI 12 MO Serial No. 094 Certification No. 7-1

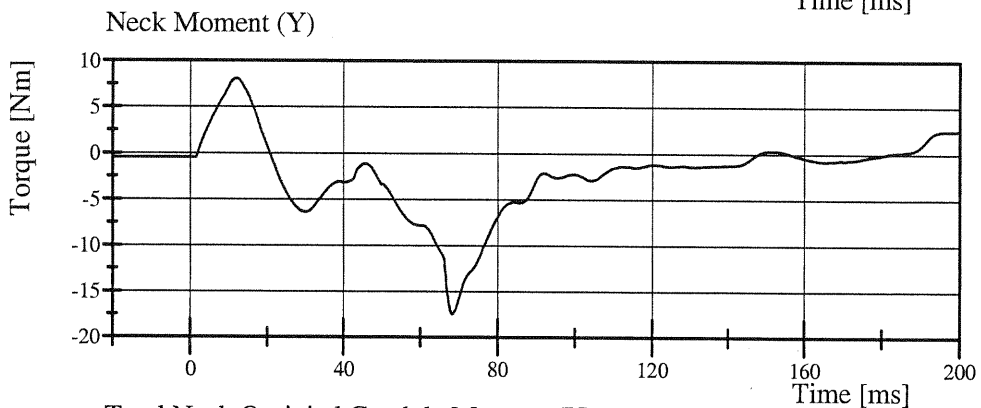
Test Date: 9/13/2007



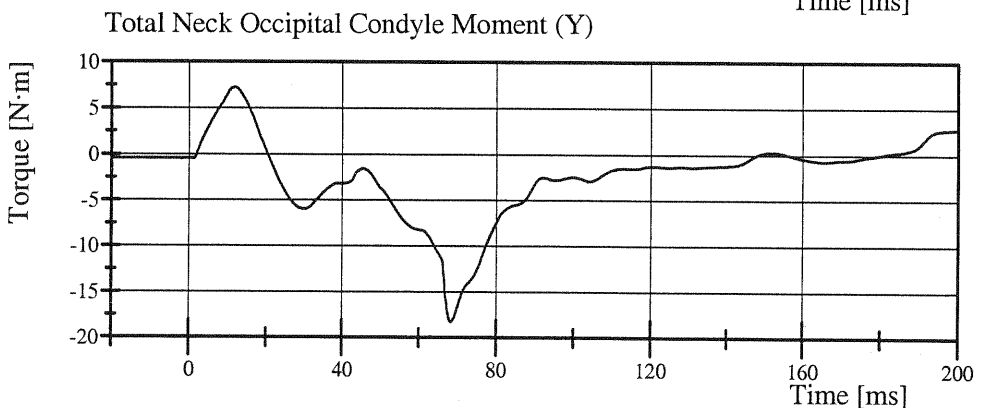
Filter Class: CFC_1000
Max: 190.5 N at 73.0 ms
Min: -66.5 N at 30.1 ms



Filter Class: CFC_600
Max: 190.1 N at 73.0 ms
Min: -65.6 N at 30.2 ms



Filter Class: CFC_600
Max: 8.1 Nm at 11.8 ms
Min: -17.5 Nm at 68.2 ms



Filter Class: CFC_600
Max: 7.3 N·m at 11.8 ms
Min: -18.3 N·m at 68.2 ms

Transportation Research Center Inc.

Front Thorax

CRABI 12 MO Serial No. 094 Certification No. 7-1

Test Date: 9/14/2007

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Impactor Velocity	4.9 - 5.1 m/s	5.06 m/s	Yes
Impactor Force	(-1,514) - (-1,796) N	-1,642.3 N	Yes

Test meets specifications.

Comments:

Technician

Charles W. Bell

Approved

Ron Stoner

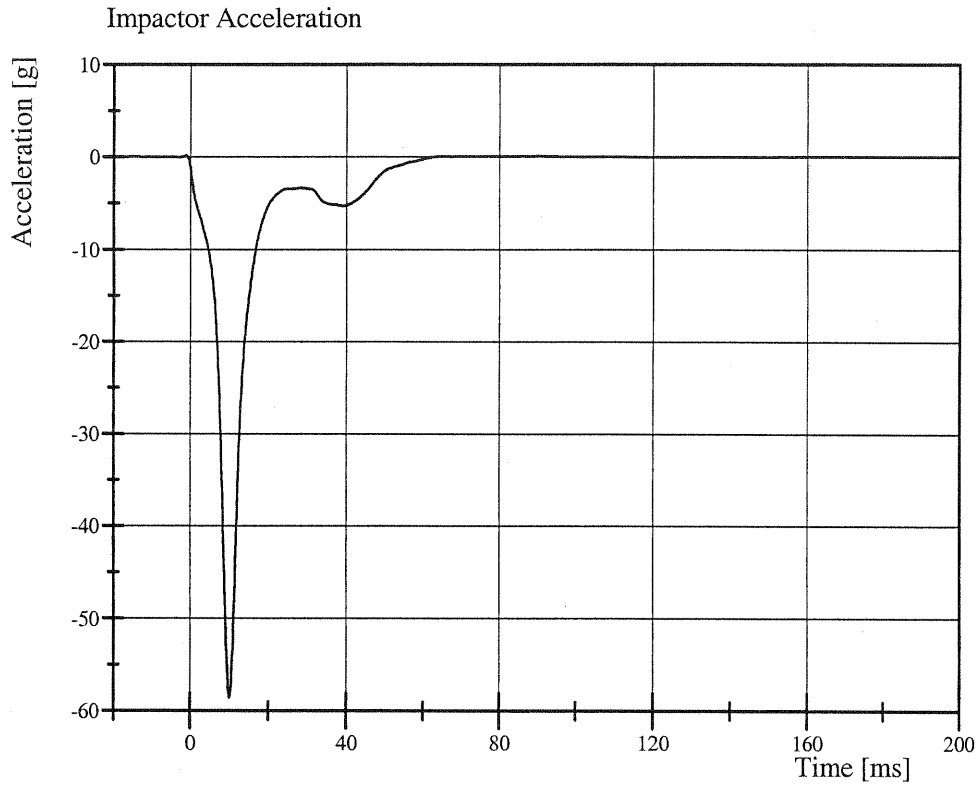


Transportation Research Center Inc.

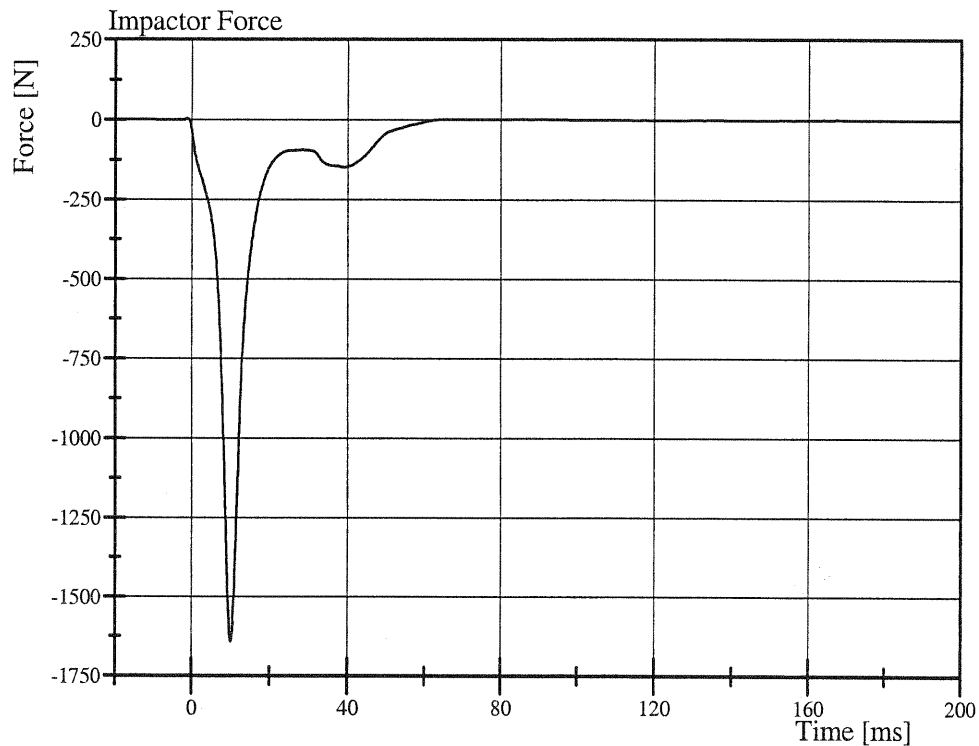
Front Thorax

CRABI 12 MO Serial No. 094 Certification No. 7-1

Test Date: 9/14/2007



Filter Class: CFC_180
Max: 0.1 g at -1.1 ms
Min: -58.6 g at 10.1 ms



Filter Class: CFC_180
Max: 3.2 N at -1.1 ms
Min: -1,642.3 N at 10.1 ms



CALIBRATION TEST RESULTS

POST-TEST RIGHT REAR

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. Bell

Ron Stover

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

Raet Banda

Approved

Ken Stoner

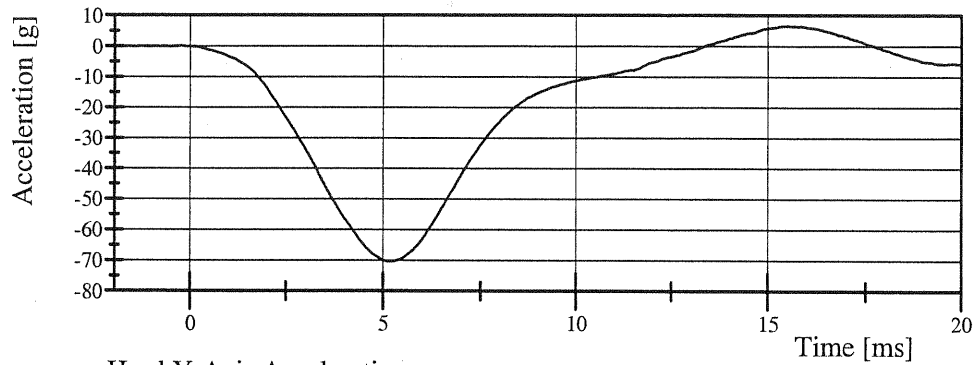
Transportation Research Center Inc.

Front Head Drop

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

Test Date: 9/28/2007

Head X-Axis Acceleration

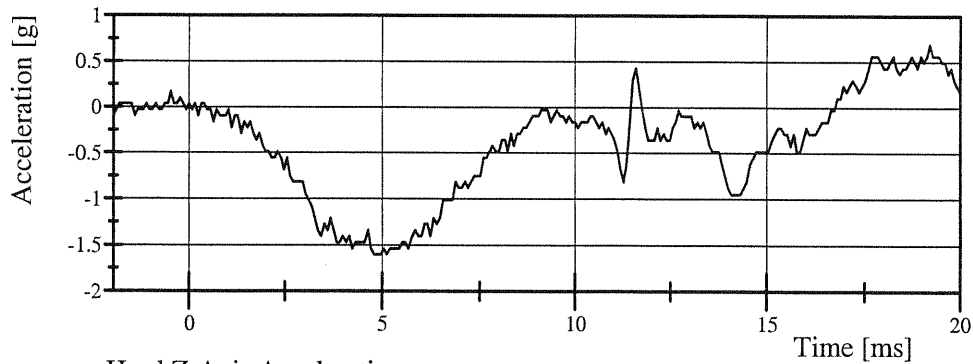


Filter Class: CFC_1000

Max: 6.6 g at 15.4 ms

Min: -70.4 g at 5.1 ms

Head Y-Axis Acceleration

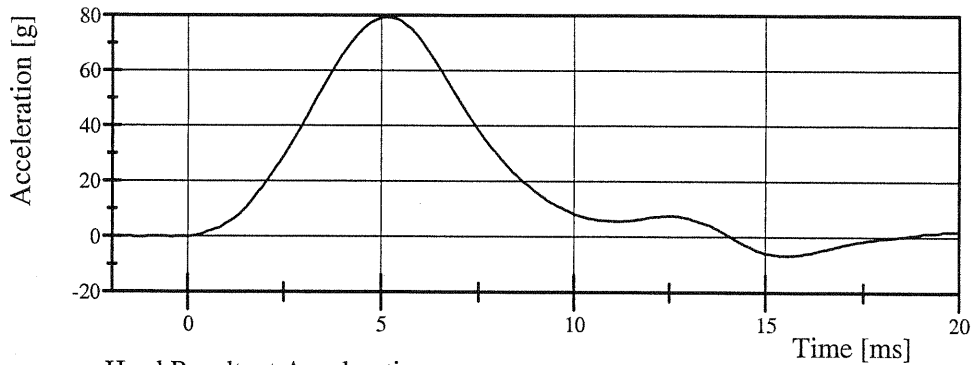


Filter Class: CFC_1000

Max: 0.7 g at 19.2 ms

Min: -1.6 g at 4.8 ms

Head Z-Axis Acceleration

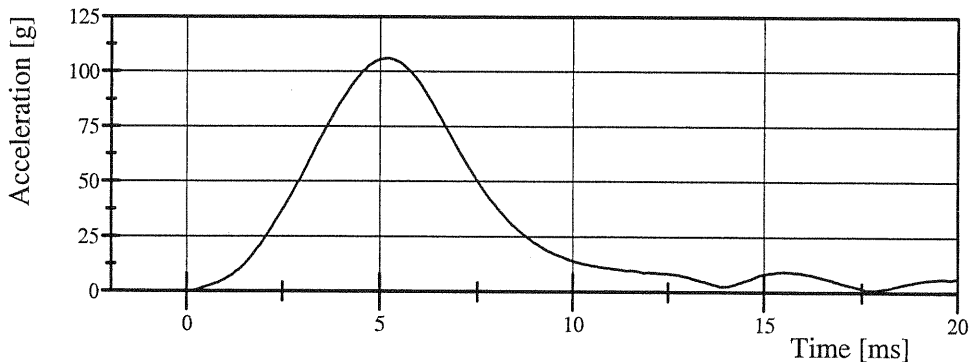


Filter Class: CFC_1000

Max: 79.4 g at 5.2 ms

Min: -6.6 g at 15.4 ms

Head Resultant Acceleration



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



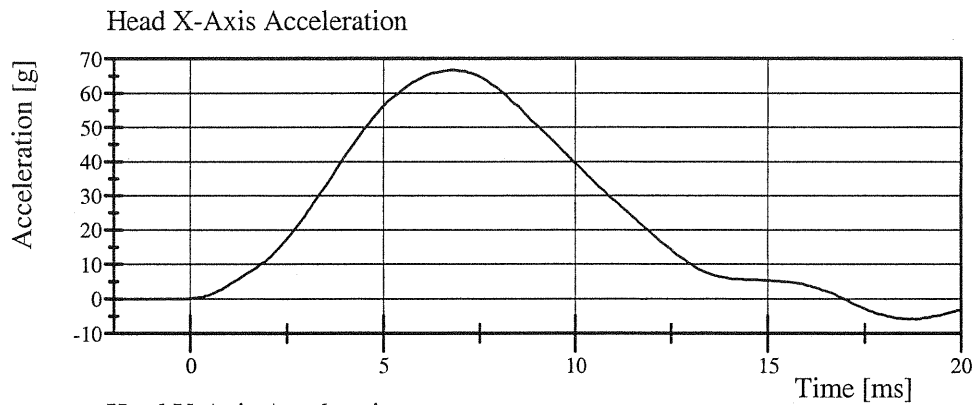


Transportation Research Center Inc.

Rear Head Drop

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

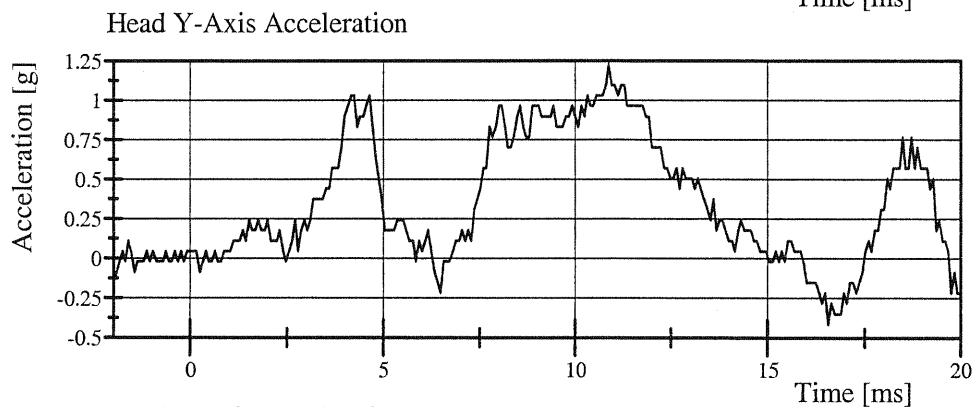
Test Date: 9/28/2007



Filter Class: CFC_1000

Max: 66.7 g at 6.8 ms

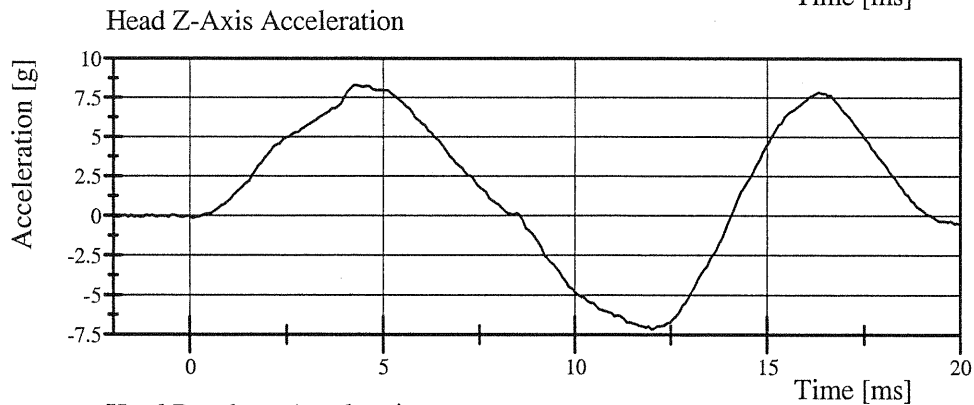
Min: -5.8 g at 18.6 ms



Filter Class: CFC_1000

Max: 1.2 g at 10.9 ms

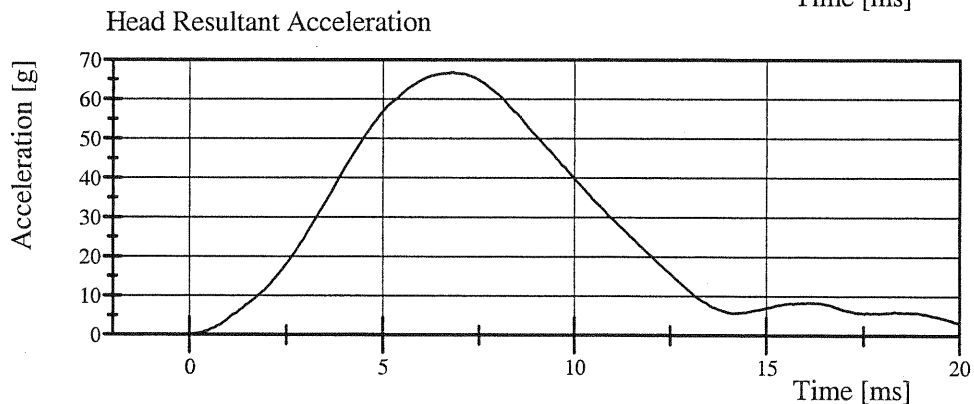
Min: -0.4 g at 16.6 ms



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. Dell

Approved

Non Storvick

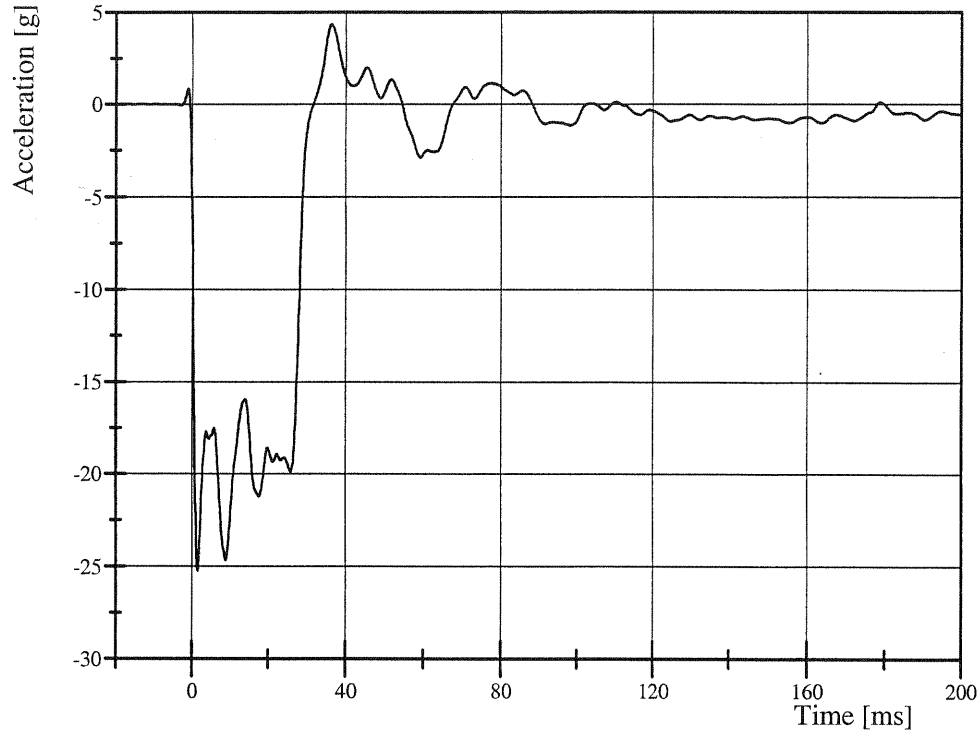
Transportation Research Center Inc.

Neck Flexion

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

Test Date: 10/1/2007

Pendulum Acceleration

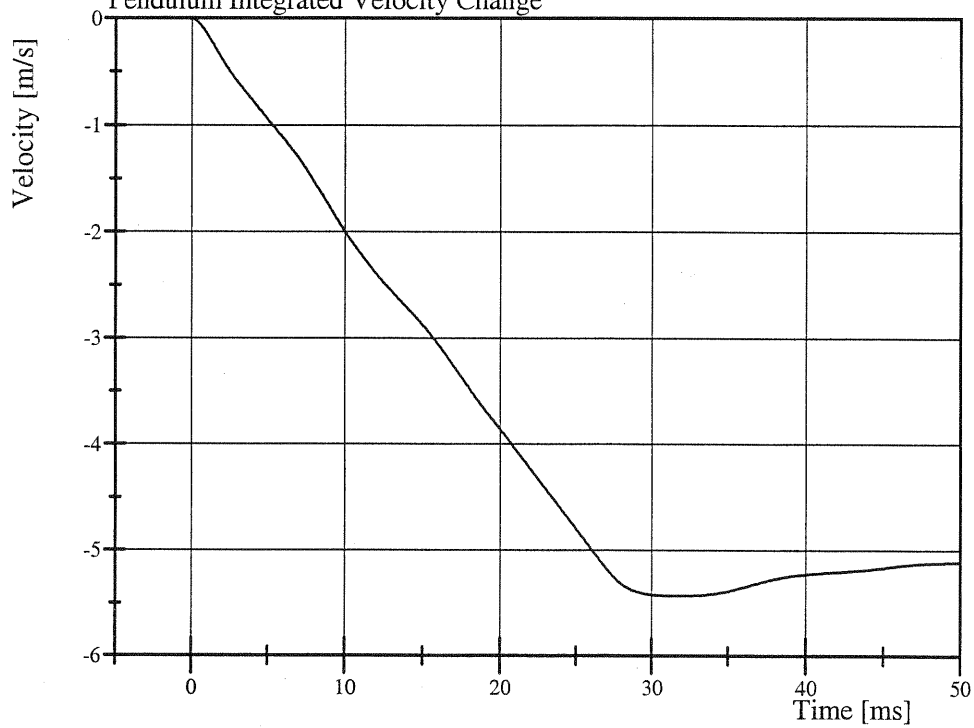


Filter Class: CFC_180

Max: 4.3 g at 36.3 ms

Min: -25.2 g at 1.5 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180

Max: 0.0 m/s at 0.0 ms

Min: -5.4 m/s at 31.8 ms

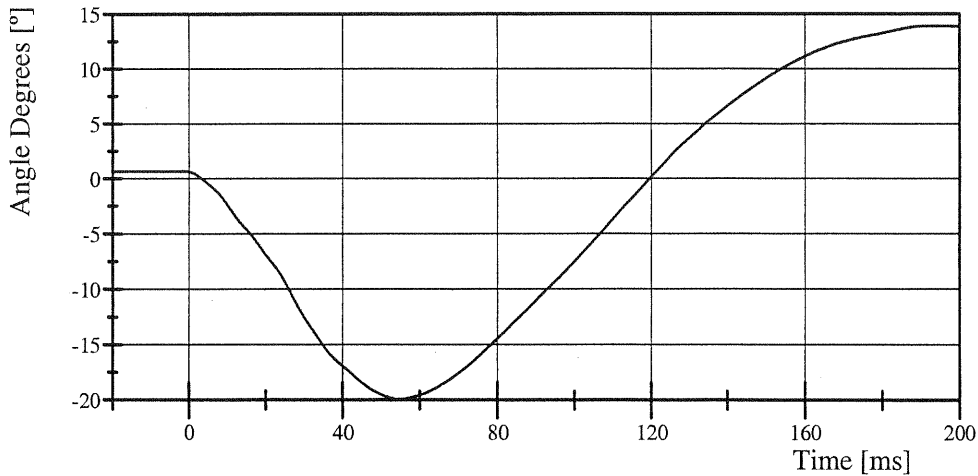
Transportation Research Center Inc.

Neck Flexion

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

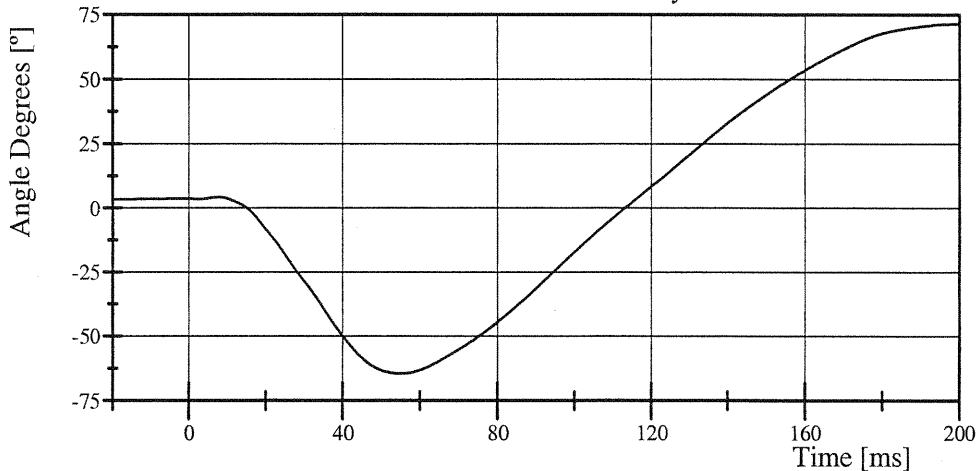
Test Date: 10/1/2007

Forward Pot Rotation at Base of Pendulum



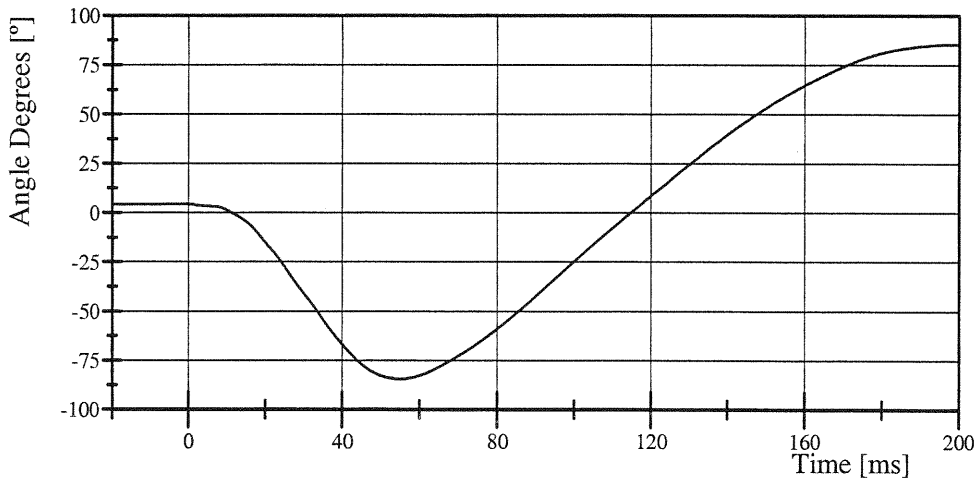
Filter Class: CFC_60
Max: 13.9 ° at 192.6 ms
Min: -19.9 ° at 54.9 ms

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

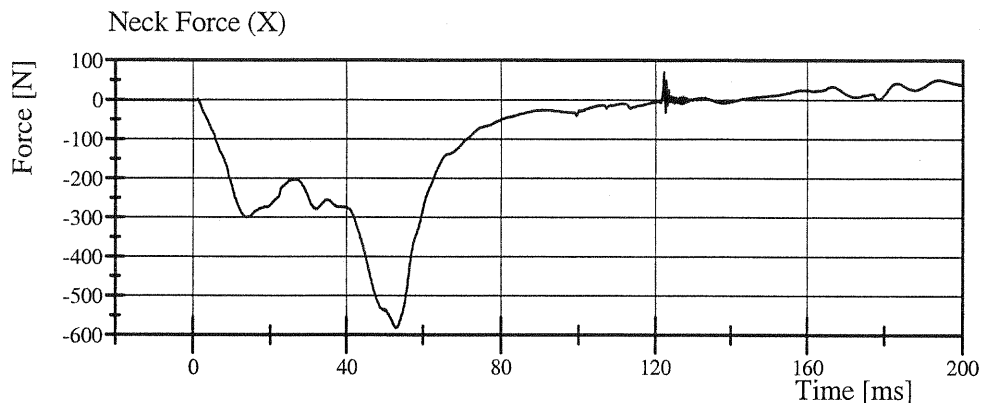


Transportation Research Center Inc.

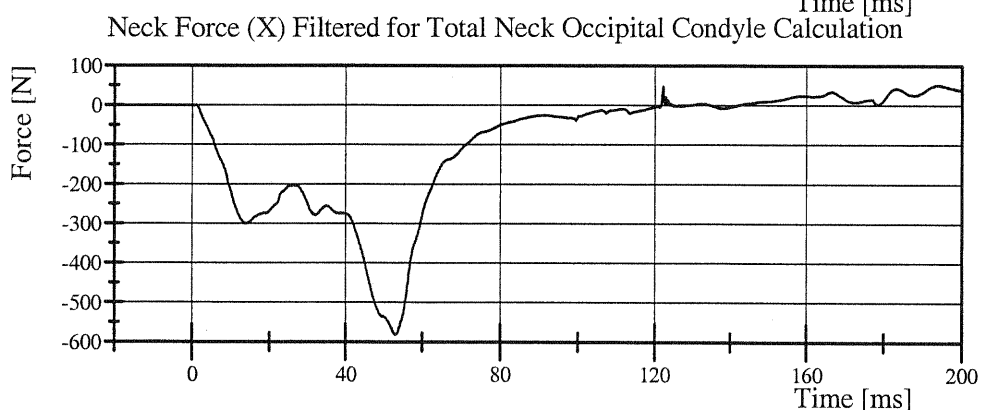
Neck Flexion

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

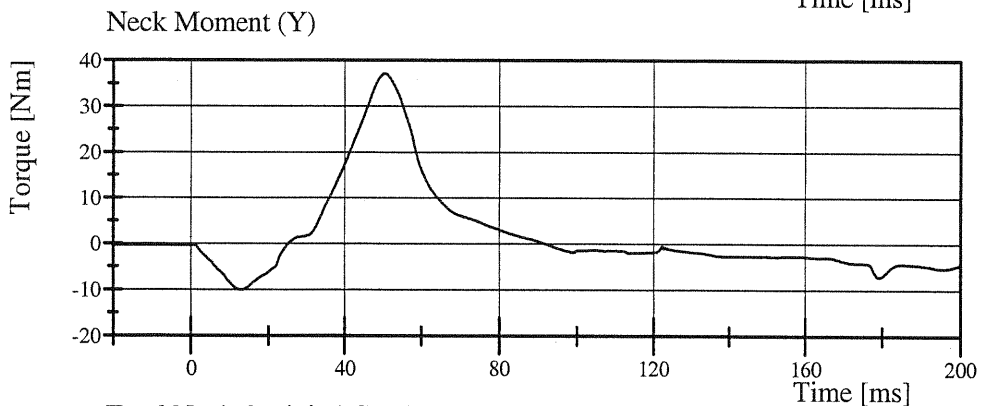
Test Date: 10/1/2007



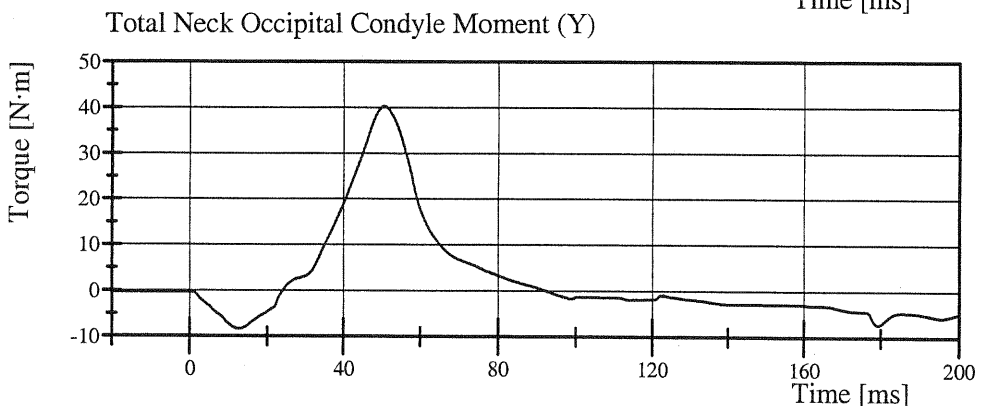
Filter Class: CFC_1000
Max: 70.8 N at 122.3 ms
Min: -581.8 N at 52.9 ms



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



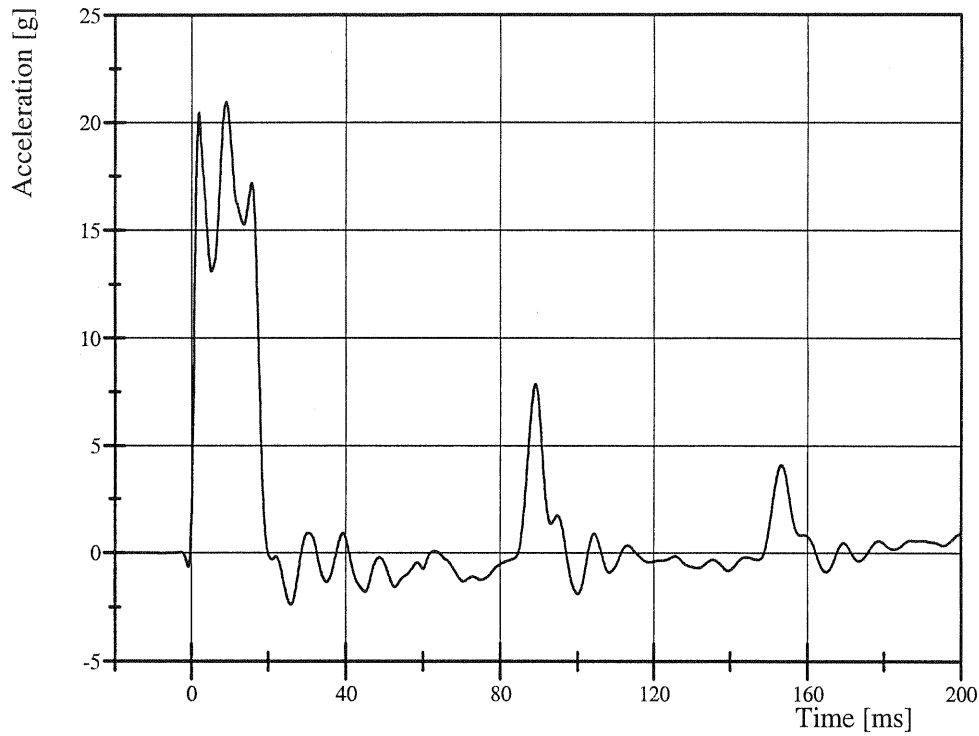
Transportation Research Center Inc.

Neck Extension

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

Test Date: 10/1/2007

Pendulum Acceleration

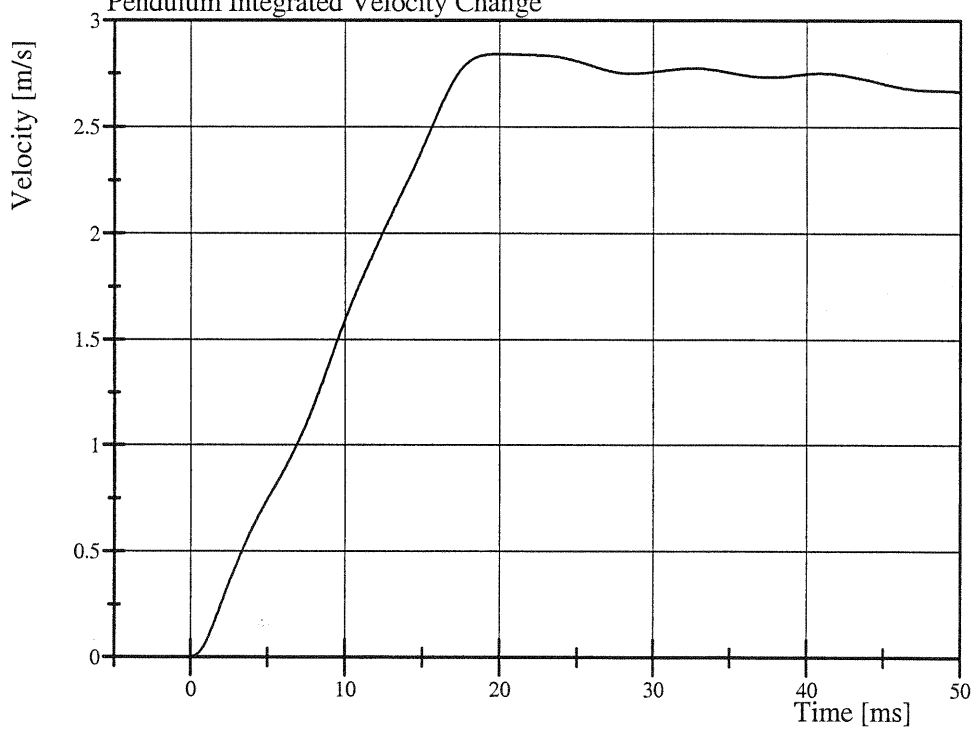


Filter Class: CFC_180

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

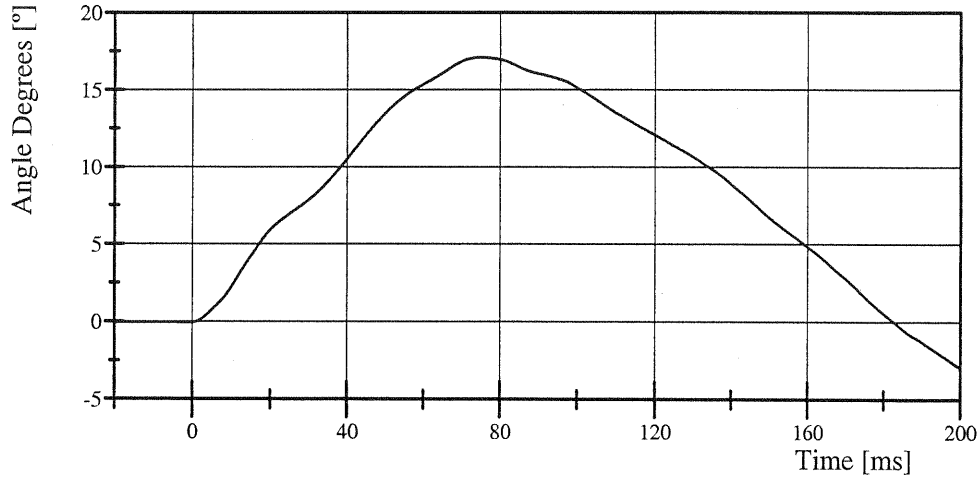
Transportation Research Center Inc.

Neck Extension

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

Test Date: 10/1/2007

Forward Pot Rotation at Base of Pendulum

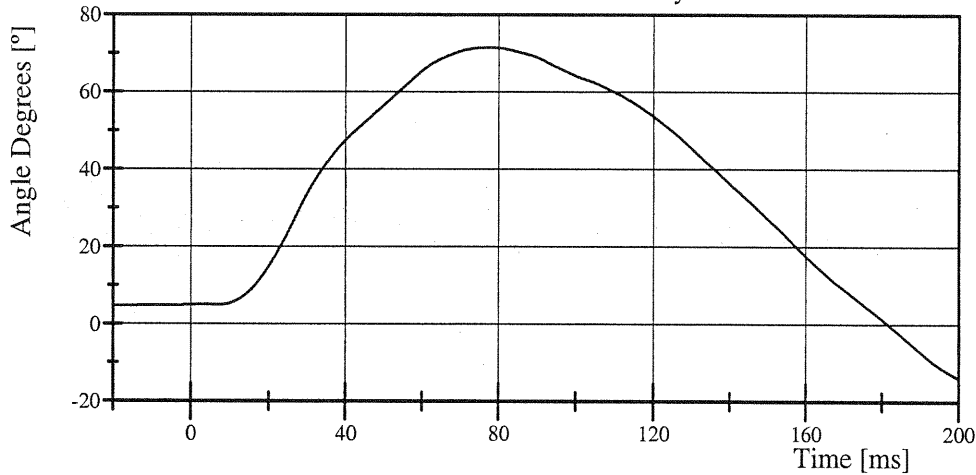


Filter Class: CFC_60

Max: 17.1 ° at 75.0 ms

Min: -2.9 ° at 200.0 ms

Center Headform Pot Rotation at Center of Gravity

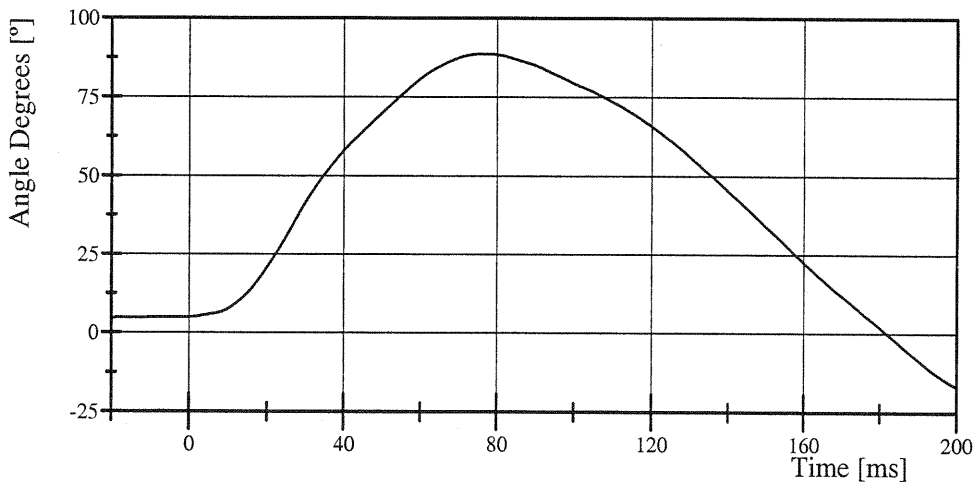


Filter Class: CFC_60

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

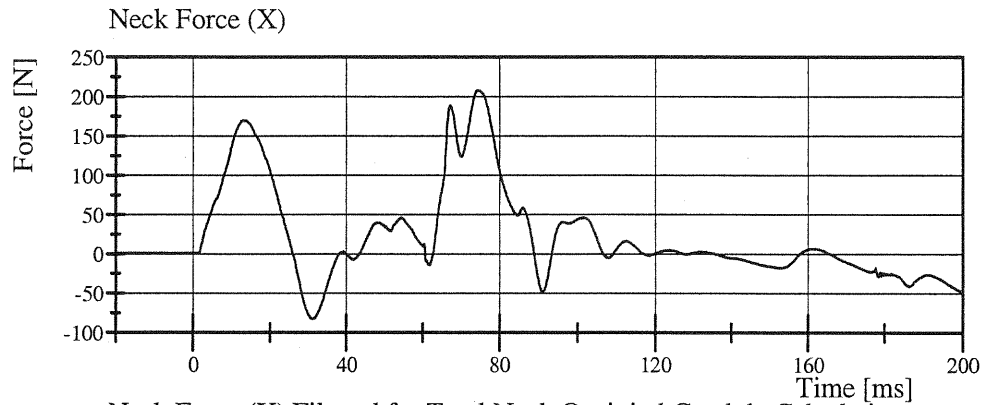
Min: -16.9 ° at 200.0 ms

Transportation Research Center Inc.

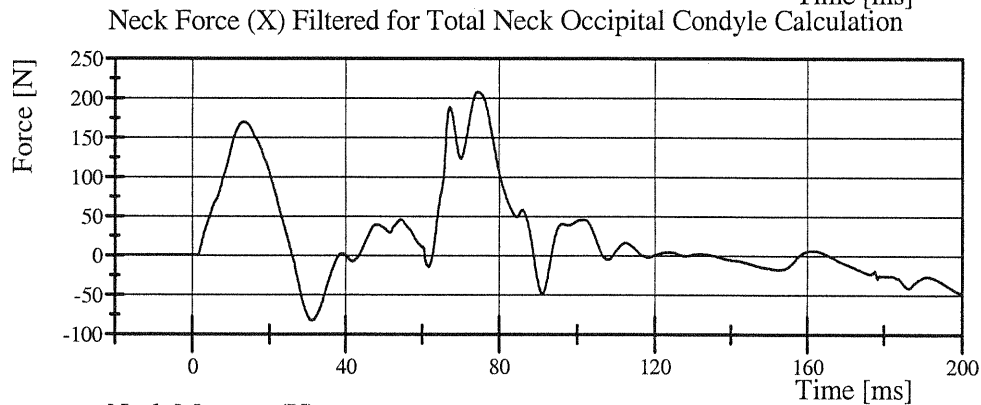
Neck Extension

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

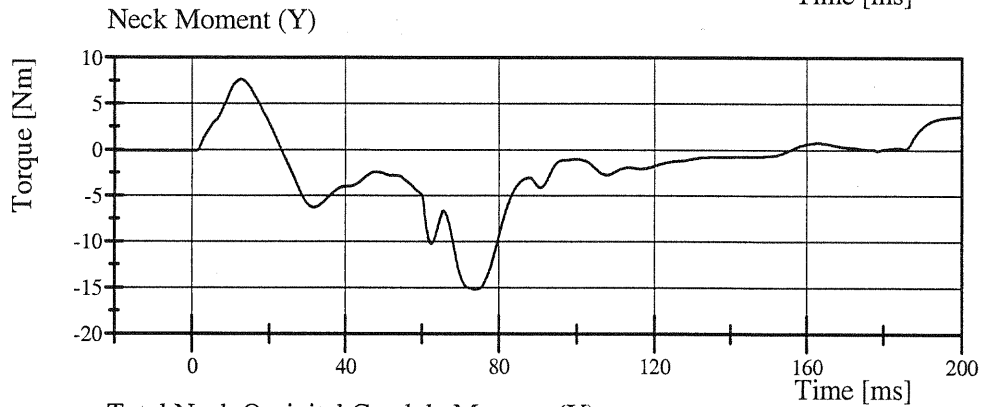
Test Date: 10/1/2007



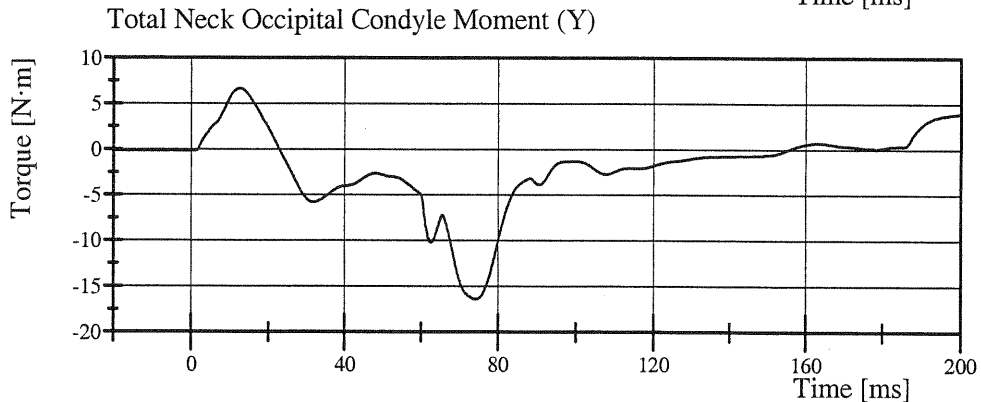
Filter Class: CFC_1000
Max: 208.0 N at 74.6 ms
Min: -82.3 N at 31.0 ms



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

Rant B...

Approved

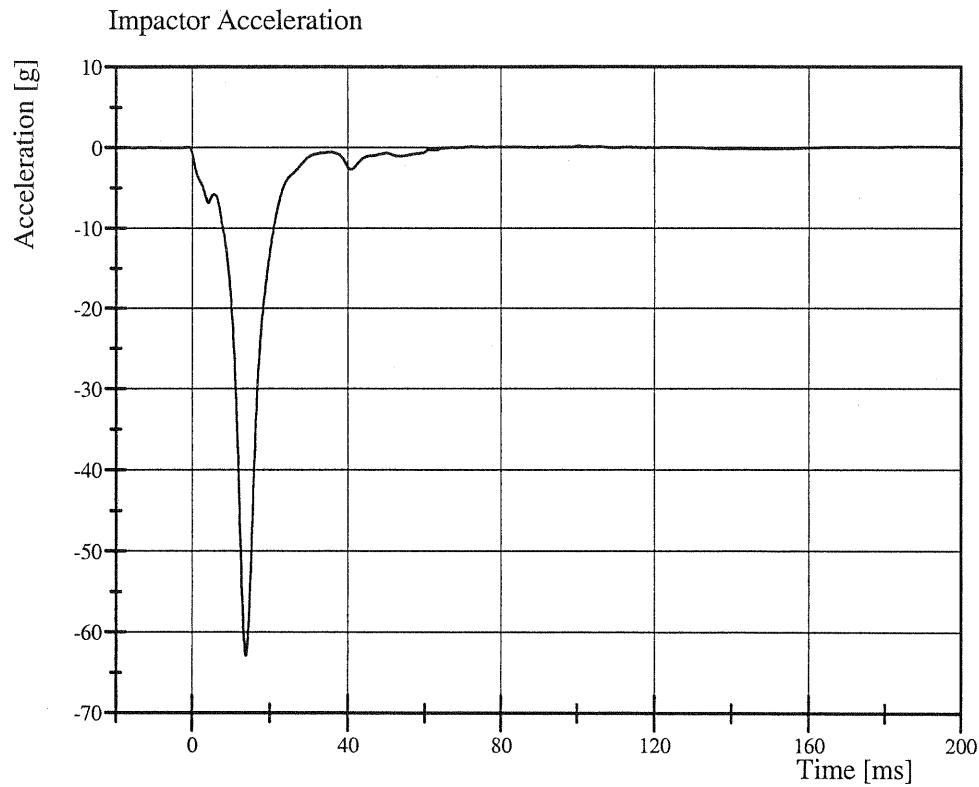
Ron Stoner

Transportation Research Center Inc.

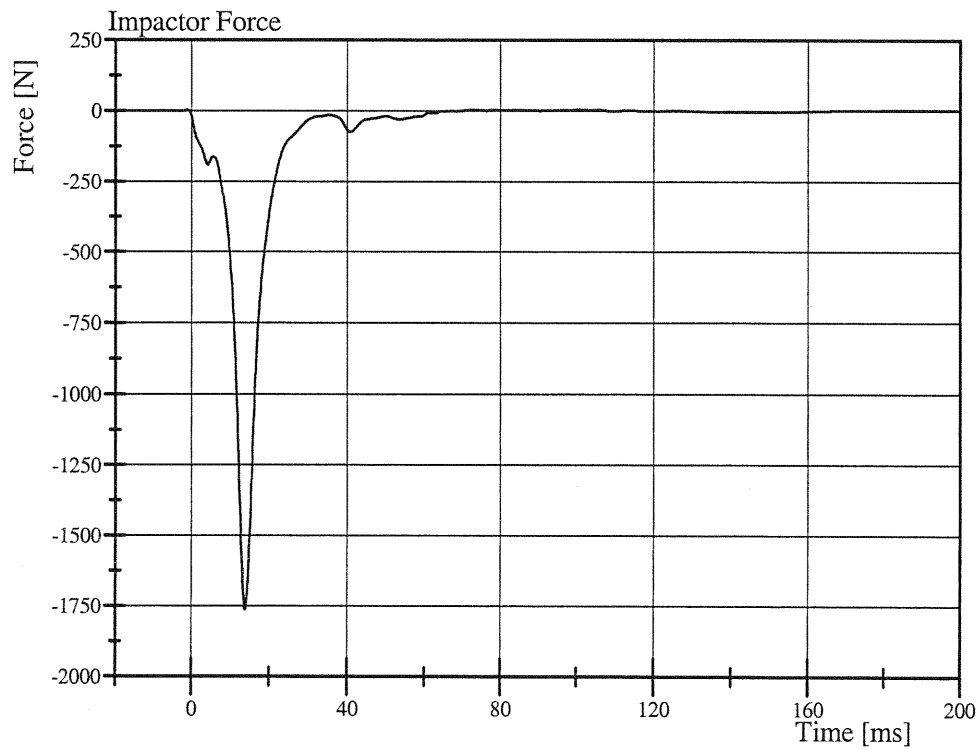
Front Thorax

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



Test Date: 09/19/07

Type: CRABI 12 month S/N: 094 Mfg.: First Technologies

Proj./Seg. No.: 20050906-1100 Test Eng: Emad Al-Tabakha

ITEM	PRE-USE	POST-USE
HEAD:		
Skull Bolts; No Wires Pinched	X	
Skull Cap – 3 Year Old Only	N/A	
Head Skin Condition	X	X
* Neck Load Cell Cables: secure, taped, and with strain relief	X	
NECK:		
*Neck Cable Torqued, Tape Installed (1.8-2.2 in-lbs.) Actual: <u>2</u>	X	
Rubber Condition	X	X
ARMS AND HANDS:		
Skin Condition	X	X
Isolation Damper Condition	X	X
THORAX:		
Front and Rear Rib Bolts, Rib Ends Position – 3 Year Old Only	N/A	
Chest Pot Arm and Ball Movement – 3 Year Old Only	N/A	X
Sternum Bolts and Sternum Bumpers Condition	X	
Jacket Condition	X	X
Abdominal Insert Condition	X	X
Rib Damping Material and Stiffeners Condition – 3 Year Old Only	N/A	X
Rib Minimum Depth – 3 Year Old Only (#1-#2 = 4.137 & #2-#3 = 4.082)	N/A	
Accel Mount Bolts	X	
Lumbar Spine Rubber Condition	X	X
PELVIS:		
Hip Isolation Damper Condition	X	X
LEGS AND FEET:		
Leg Skin Condition	X	X
Knee Joint Function and Range of Motion	X	
Ankle Joint Function and Range of Motion	X	
Foot Condition	X	X
OTHER:		
Cleanliness	X	
Target Position	X	
Clothes and Shoes	X	
One G Joint Adjustments	X	
Verify channels against assembly and Check connectors (intact & labeled)	X	
ATTACH TEMPERATURE LOGGER TO DUMMY / DOWNLOAD		

* Items checked during calibration; these items need checked when the dummy is used without recalibration

Pre Test Inspection Completed By: J. Clarridge Date: 09/18/07

Post Test Inspection Completed By: J. Clarridge Date: 09/21/07