REPORT NUMBER TR-P27148-01-NC

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

FORD MOTOR COMPANY
2007 FORD EXPLORER XLT
5-DOOR MPV

NHTSA NUMBER: F80200

PREPARED BY:
KARCO ENGINEERING, LLC
9270 HOLLY ROAD
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JUNE 8, 2007

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
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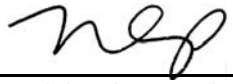
Reviewed by:  Date: June 8, 2007

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COTR, NCAP Frontal Impact Program

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Technical Report Documentation Page

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	14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS

15. Supplementary Notes

16. Abstract

A side impact test was conducted on the subject CRS Chico Keyfit in conjunction with side impact NCAP testing on a 2007 Ford Explorer XLT 5-Door MPV and in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at Karco Engineering, LLC on June 8, 2007.

Measurement Description	Units	Threshold	Right Rear (P3)
Head Injury Criteria (HIC15)	N/A	390	20.7
3 msec. Chest Clip	G's	50	17.9

17. Key Words	18. Distribution of Statement
New Car Assesment Program (Side Impact NCAP) Side Impact Moving Deformable Barrier (MDB) Final Report of a Chicco Keyfit CRS	Copies of this report available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE, W43-410 Washington, D.C. 20590

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Unclassified	Unclassified	44	

Form DOT F1700.7 (8-72)

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SECTION D-1

PURPOSE AND SUMMARY OF TEST F80200

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

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

SUMMARY

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

The right rear (Serial No. 022) CRABI was calibrated prior to this test. CRABI calibration information is found in Section D-4.

CHILD DUMMY VALUES		
Location	HIC15 Value	3 Msec. Chest Clip
CRABI (P3)	20.7	17.9

DATA SHEET NO.1

CRASH TEST SUMMARY

Test Vehicle: 2007 Ford Explorer XLT 5-Door MPV NHTSA No.: F80200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/8/07

CHILD RESTRAINT SYSTEM INFORMATION

Description	Position #3 CRS
Manufacturer	Chicco
Model Name	Keyfit
Model No.	04 060414 860 070
Type	Infant
Forward/Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

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

POST-TEST DOOR OPENINGS

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

CAMERAS

Description	Standard
High Speed	1
Real Time	0
Total	1

DATA CHANNELS

CRABI (P3) Sensors	13
Belt Sensors	2
CRS Sensors	6
Total	21

DATA SHEET NO.2

VEHICLE PARAMETER DATA

Test Vehicle: 2007 Ford Explorer XLT 5-Door MPV NHTSA No.: F80200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/8/07

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	552	406	958	607	619	1226
Right	kg	566	412	978	572	584	1156
Ratio	%	53.3	46.7	100	49.5	50.5	100
Totals	kg	1118	818	1936	1179	1203	2382

TARGET TEST WEIGHT CALCULATION

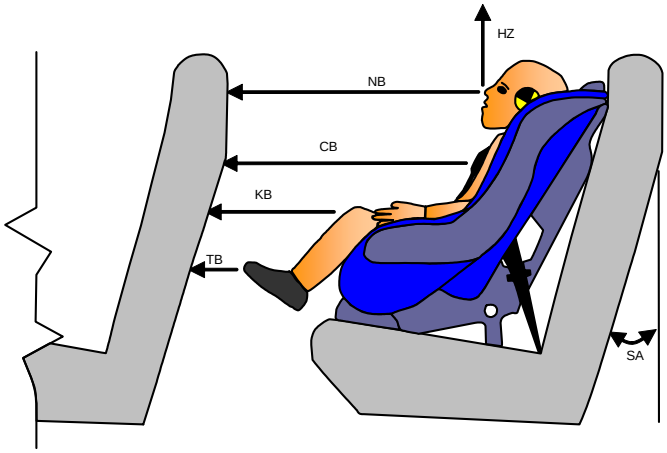
Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2094
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	136
Calculated Vehicle Target Wt. (TVTW)	kg	2391

DATA SHEET NO.3

CRABI POSITIONING IN VEHICLE

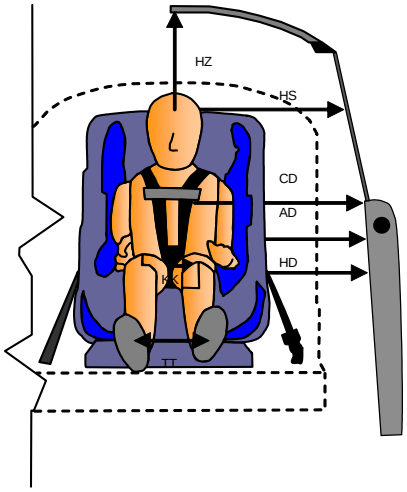
Test Vehicle: 2007 Ford Explorer XLT 5-Door MPV NHTSA No.: F80200

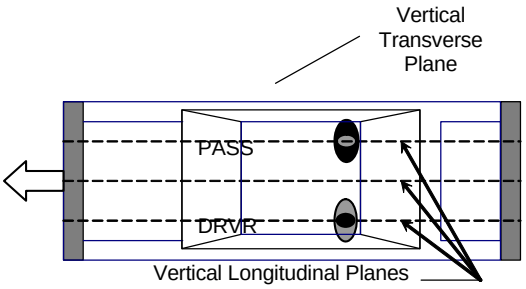
Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/8/07



AD	Arm to Door
CD	Chest to Door
HD	H-Point to Door
HS	Head to Side Window
KK	Knee to Knee
TT	Toe to Toe

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





DUMMY MEASUREMENTS FOR REAR SEAT OCCUPANTS

DATA SHEET NO.3

CRABI POSITIONING IN VEHICLE…(CONTINUED)

Test Vehicle: 2007 Ford Explorer XLT 5-Door MPV NHTSA No.: F80200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/8/07

CRABI POSITION MEASUREMENTS

Code	Measurement	P3 (Passenger's Side)	
		Length (mm)	Angle (°)
SA	Seat Back Angle		25.1
HZ	Head to Roof (Z)	460	
CD	Chest to Door	330	
KK	Knee to Knee (Y)	125	
HS	Head to Side Window	350	
HD	H-Point to Door (Y)	270	
AD	Arm to Door	220	
NB	Nose to Seat Back	490	
CB	Chest to Seat Back	462	
FF	Foot to Foot	120	
KB-Left	Knee to Seat Back	170	
KB-Right	Knee to Seat Back	182	
TB-Left	Toe to Seat Back	75	
TB-Right	Toe to Seat Back	80	

DATA SHEET NO.4

CRS PERFORMANCE DATA

Test Vehicle: 2007 Ford Explorer XLT 5-Door MPV NHTSA No.: F80200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/8/07

CRS PERFORMANCE DATA

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

DATA SHEET NO. 5…(CONTINUED)
CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Ford Explorer XLT 5-Door MPV NHTSA No.: F80200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/8/07

CRS ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	CRS	1954	640	955
2	CRS Base	1954	640	894

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

DATA SHEET NO.6

CRS CAMERA LOCATIONS AND DATA

Test Vehicle: 2007 Ford Explorer XLT 5-Door MPV NHTSA No.: F80200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/8/07

CAMERA LOCATIONS

No.	Camera View	Location(mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Passenger CRS (O.B.)	1000	2290	-1499	-2	n/a	10	1000

X = Barrier Face Y = Monorail Centerline Z = Ground DNR = Did Not Run NTM = No Time Marks

SECTION D2

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure D2-1: Position 3 CRS Label

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Figure D2-2: Pre-Test Frontal View of Position 3 CRS

Figure D2-3: Post-Test Frontal View of Position 3 CRS

Figure D2-4: Pre-Test Rear View of Position 3 CRS

Figure D2-5: Post-Test Rear View of Position 3 CRS

Figure D2-6: Pre-Test Left Side View of Position 3 CRS

Figure D2-7: Post-Test Left Side View of Position 3 CRS

Figure D2-8: Pre-Test Right Side View of Position 3 CRS

Figure D2-9: Post-Test Right Side View of Position 3 CRS

Figure D2-10: Pre-Test Position 3 Front View (Head and Seat Belt Position)

Figure D2-11: Post-Test Position 3 Front View (Head and Seat Belt Position)

Figure D2-12: Pre-Test Position 3 Front View (Seat Belt Position)

Figure D2-13: Post-Test Position 3 Front View (Seat Belt Position)

Figure D2-14: Pre-Test Position 3 Right Side View

Figure D2-15: Post-Test Position 3 Right Side View

Figure D2-16: Pre-Test Position 3 Right Side View (Through Window)

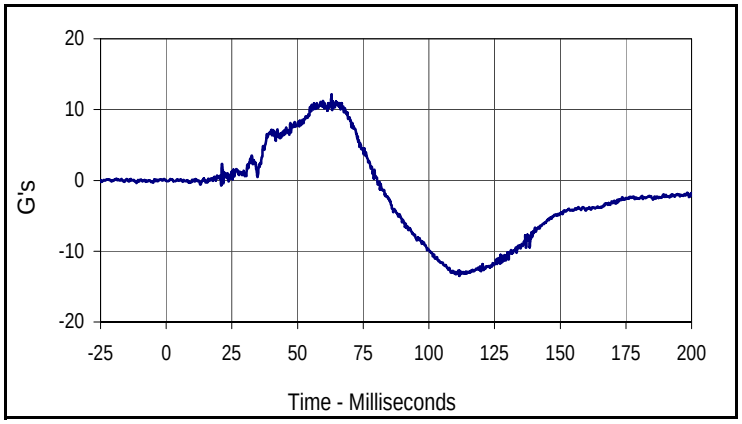
Figure D2-17: Post-Test Position 3 Right Side View (Through Window)

SECTION D3

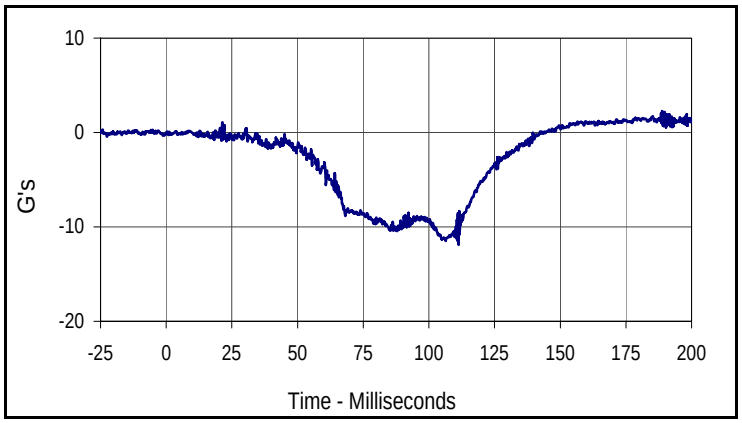
CRABI RESPONSE AND CRS DATA TRACES

LIST OF DATA PLOTS

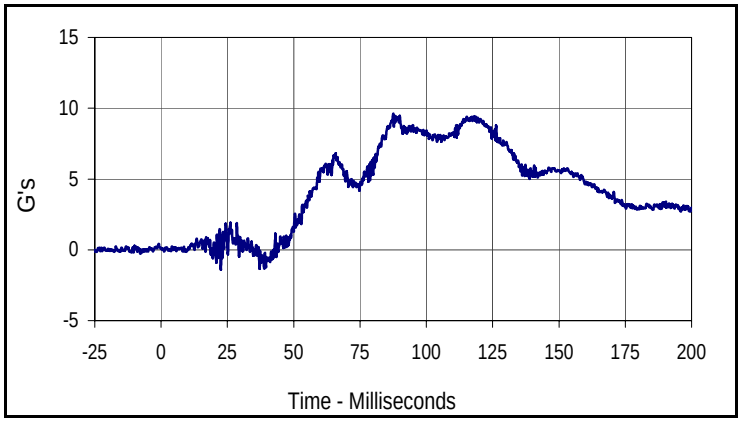
Test Vehicle:	2007 Ford Explorer XLT 5-Door MPV	Test Date:	6/8/07
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	F80200



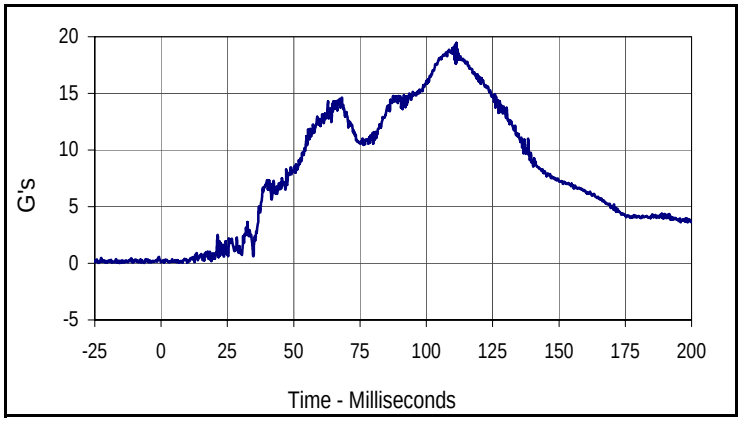
Curve Description			
CRABI Head X (P3)			
CURNO	Type	SAE Class	Units
072	FIL	1000	G's
Max	Time	Min	Time
12.2	62.9	-13.5	111.5



Curve Description			
CRABI Head Y (P3)			
CURNO	Type	SAE Class	Units
073	FIL	1000	G's
Max	Time	Min	Time
2.3	188.8	-11.8	111.3

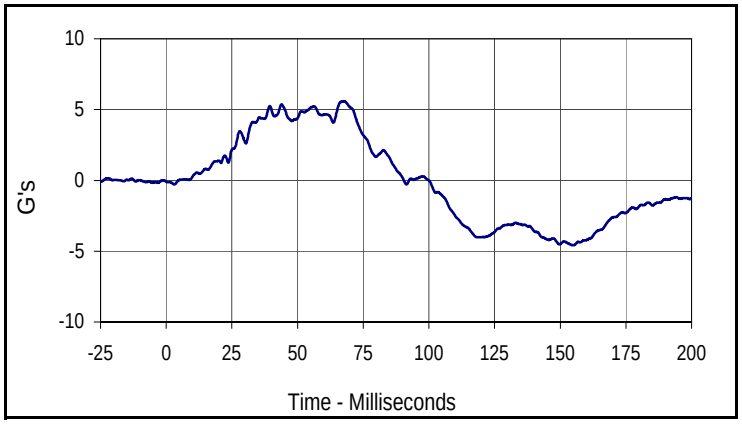


Curve Description			
CRABI Head Z (P3)			
CURNO	Type	SAE Class	Units
074	FIL	1000	G's
Max	Time	Min	Time
9.6	87.5	-1.4	22.5

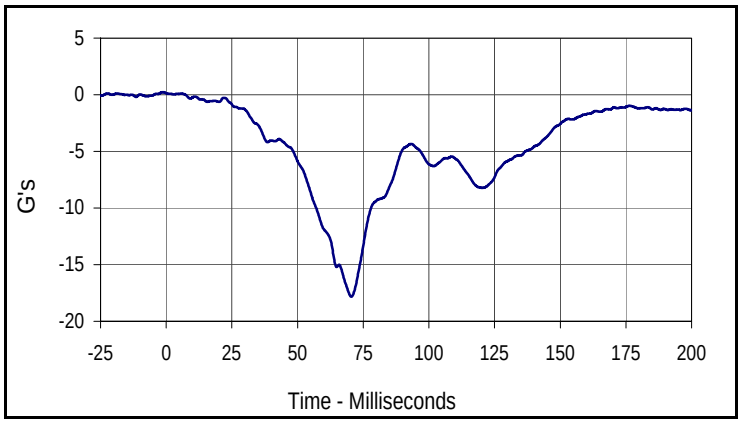


Curve Description			
CRABI Head Resultant (P3)			
CURNO	Type	SAE Class	Units
072	RES	1000	G's
Max	Time	Min	Time
19.5	111.3	0.1	6.9

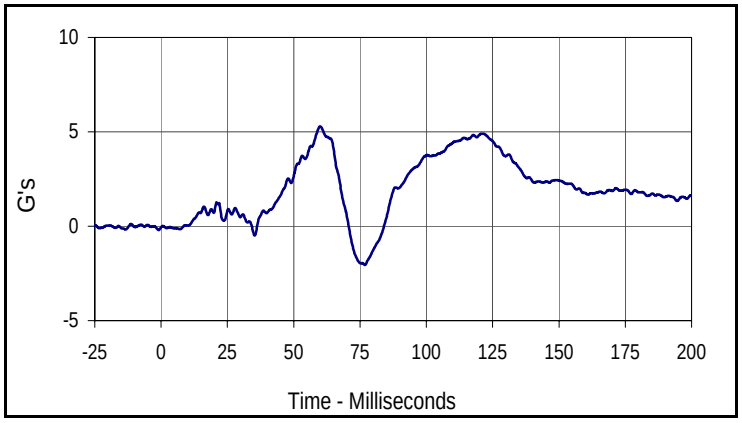
Test Vehicle:	2007 Ford Explorer XLT 5-Door MPV	Test Date:	6/8/07
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	F80200



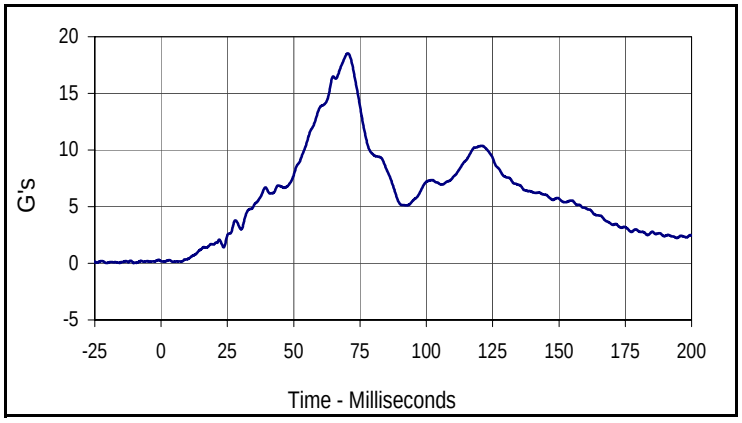
Curve Description			
CRABI Chest X (P3)			
CURNO	Type	SAE Class	Units
082	FIL	180	G's
Max	Time	Min	Time
5.6	67.7	-4.6	155.0



Curve Description			
CRABI Chest Y (P3)			
CURNO	Type	SAE Class	Units
083	FIL	180	G's
Max	Time	Min	Time
0.1	0.0	-17.8	70.5



Curve Description			
CRABI Chest Z (P3)			
CURNO	Type	SAE Class	Units
084	FIL	180	G's
Max	Time	Min	Time
5.3	60.0	-2.1	76.9



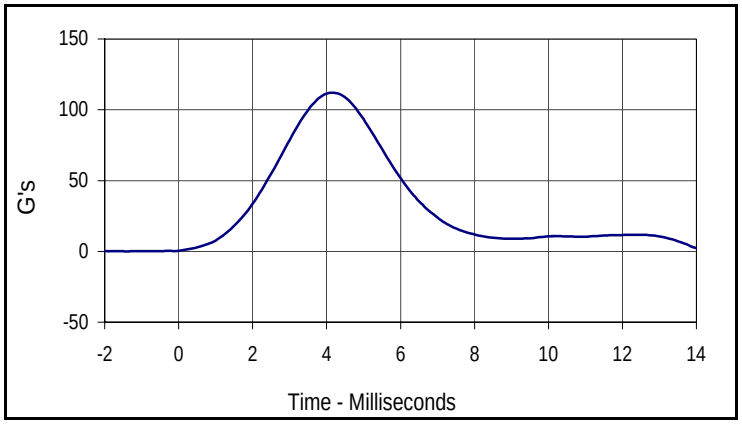
Curve Description			
CRABI Chest Resultant (P3)			
CURNO	Type	SAE Class	Units
082	RES	180	G's
Max	Time	Min	Time
18.5	70.4	0.1	4.6

SECTION D4

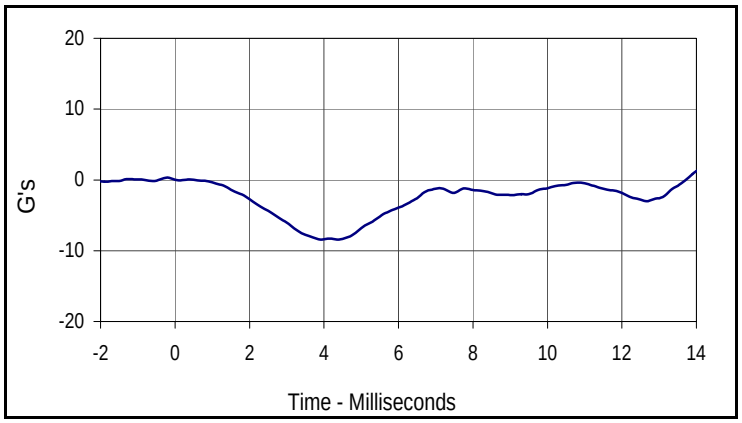
CRABI CALIBRATION INFORMATION

Test Program:	CRABI 12 Month Old Frontal Head Drop Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	FHD06E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	100.0 to 120.0	112.1	Pass
Peak Lateral Acceleration	G's	≤15.0	8.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
112.1	4.2	0.0	-1.4

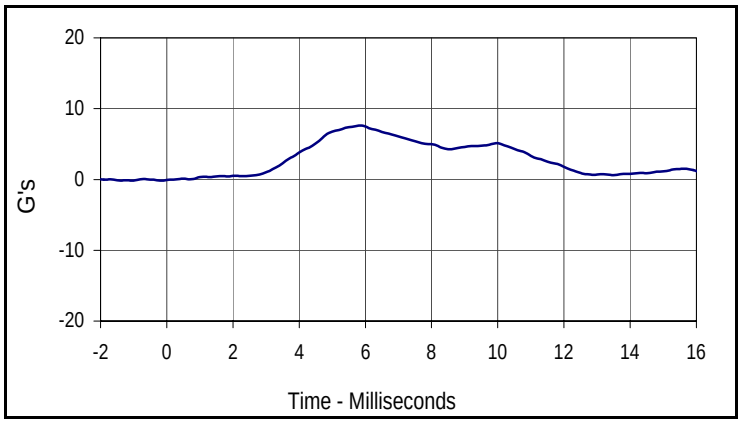


Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	-0.2	-8.4	4.4

Test Program:	CRABI 12 Month Old Rear Head Drop Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	RHD06E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	55.0 to 71.0	56.2	Pass
Peak Lateral Acceleration	G's	≤15.0	7.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

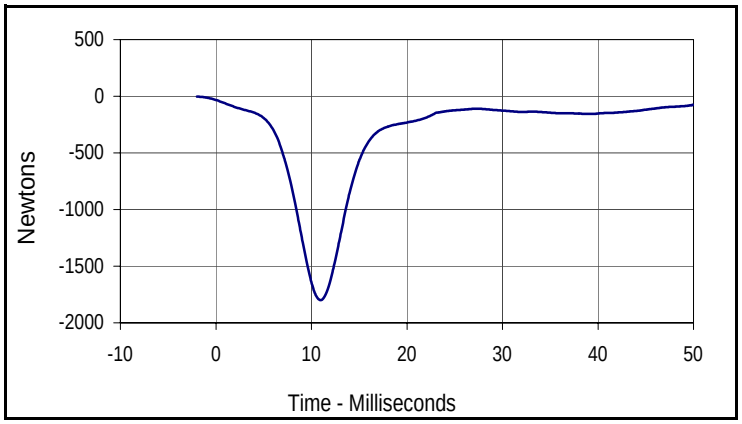
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
56.2	6.0	0.1	-0.9



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.6	5.8	-0.2	-1.4

Test Program:	CRABI 12 Month Old Thorax Impact Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	CH06E

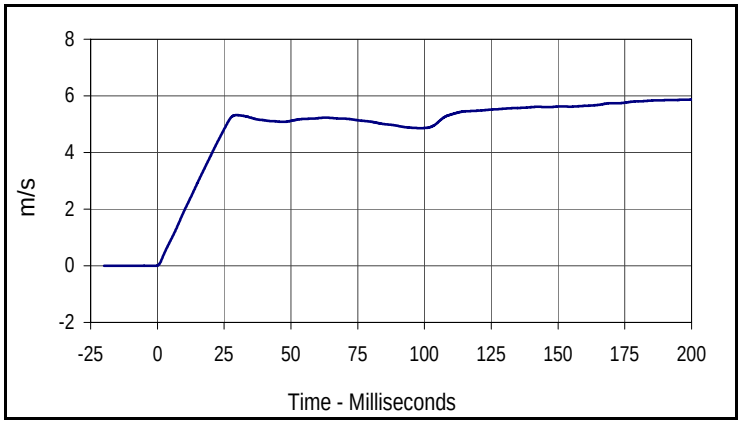
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	4.90 to 5.10	4.95	Pass
Peak Probe Force	Newtons	-1514 to -1796	-1641	Pass
		Overall Test Results		Pass



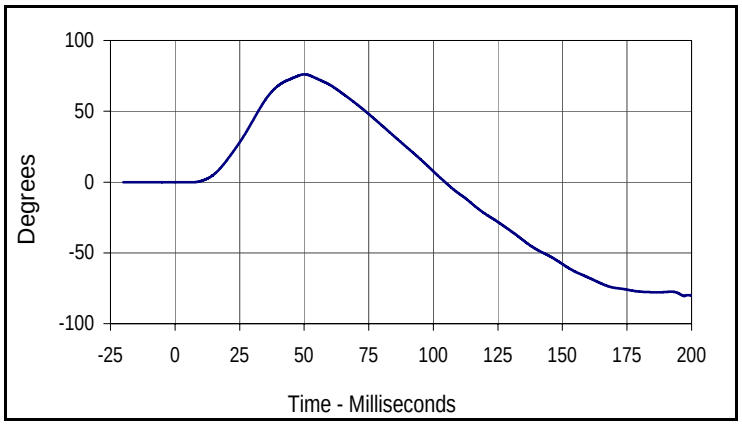
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	60	Newtons
Max	Time	Min	Time
-2.3	-2.0	-1640.6	10.0

Test Program:	CRABI 12 Month Old Neck Flexion Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	NF06E

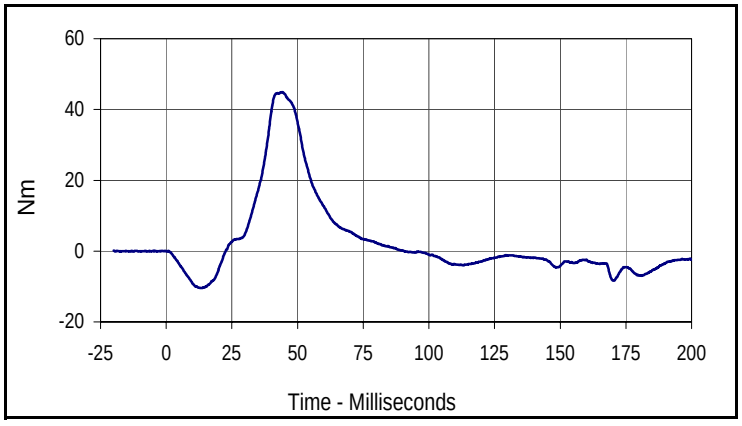
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.11	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	1.9	Pass
	20 Msec.	m/s	3.4 to 4.2	3.9	Pass
	25 Msec.	m/s	4.3 to 5.2	4.8	Pass
"D" Plane Rotation	Max	Degrees	75.0 to 86.0	76.1	Pass
Peak Moment in Rotation	Max	Nm	36.0 to 45.0	42.0	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	60.0 to 80.0	71.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
5.9	199.3	0.0	-0.7



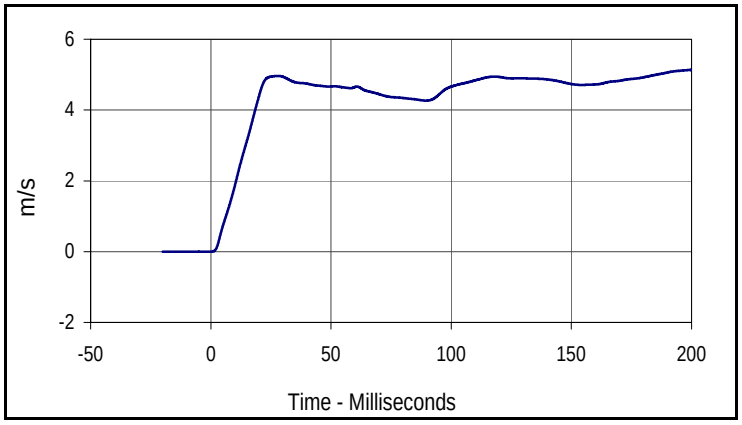
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.1	50.1	-80.5	197.1



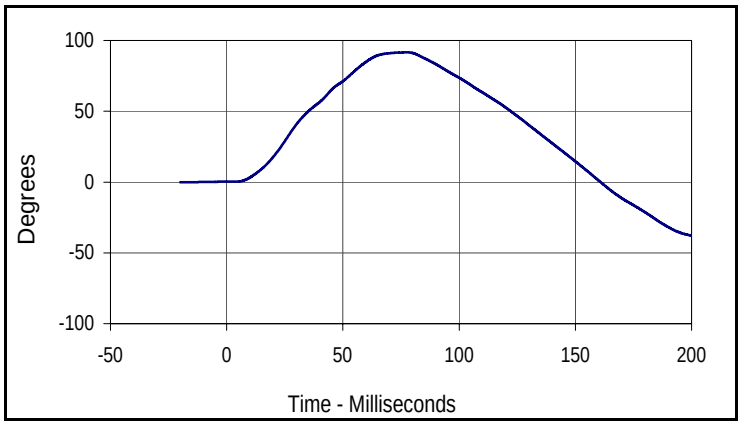
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
44.9	44.3	-10.4	13.5

Test Program:	CRABI 12 Month Old Neck Extension Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	NE06E

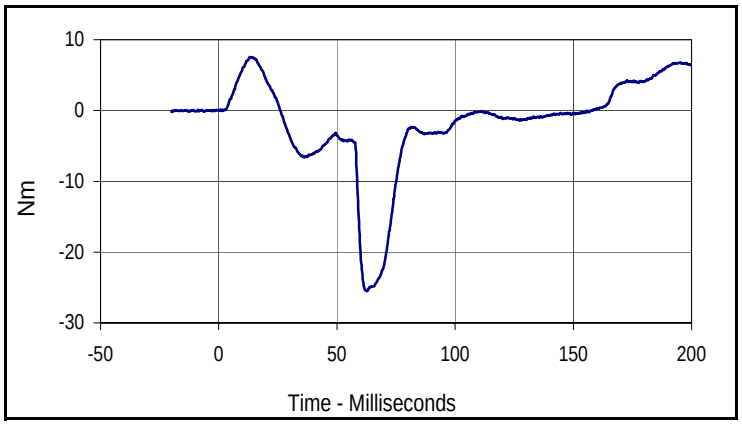
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.42	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	0.9	Pass
	10 Msec.	m/s	1.5 to 2.1	1.9	Pass
	14 Msec.	m/s	2.2 to 2.9	2.9	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	91.6	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-21.5	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	76.0 to 90.0	77.8	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
5.1	200.0	0.0	0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
91.6	77.5	-37.8	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
7.5	13.2	-25.5	62.8

Test Program:	CRABI 12 Month Old External Dimensions	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	456.0 to 471.2	460	Pass
B - Shoulder pivot height	mm	276.6 to 291.8	284	Pass
C - "H" point height	mm	27.9 to 38.1	36	Pass
D - "H" point from backline	mm	40.1 to 50.3	47	Pass
E - Shoulder pivot from back	mm	50.3 to 60.5	54	Pass
F - Thigh clearance	mm	63.0 to 73.2	66	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	185	Pass
I - Shoulder pivot to elbow pivot	mm	99.1 to 114.3	106	Pass
J - Elbow rest height	mm	150.1 to 165.3	160	Pass
K - Buttock to knee length	mm	202.7 to 217.9	205	Pass
L - Poplipteal length	mm	138.7 to 153.9	140	Pass
M - Knee pivot height	mm	165.1 to 180.3	170	Pass
N - Buttock poplipteal length	mm	144.8 to 160.0	155	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	108	Pass
P - Foot length	mm	92.4 to 102.6	101	Pass
Q- Stature	mm	727.7 to 753.1	N/A	N/A
R - Buttock to knee pivot length	mm	178.5 to 188.7	182	Pass
S - Head Breadth	mm	124.4 to 134.6	130	Pass
T - Head Depth	mm	149.9 to 165.1	152	Pass
U - Hip breadth	mm	158.5 to 173.7	161	Pass
V - Shoulder breadth	mm	200.7 to 215.9	213	Pass
W - Foot breadth	mm	39.1 to 49.3	45	Pass
Y - Chest circumference with jacket	mm	452.4 to 477.8	460	Pass
Z - Waist circumference	mm	447.0 to 472.4	452	Pass
AA - Refrence location for dimension Y & O	mm	256.5 to 266.7	262	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	107	Pass
CC - Shoulder Height	mm	299.7 to 314.9	300	Pass
DD - Chin Height	mm	289.6 to 304.8	299	Pass
		Overall Test Results		Pass