

REPORT NUMBER TR-P29018-03-NC

**SIDE AIRBAG OCCUPANT RISK PROGRAM
OCCUPANT OUT-OF-POSITION TESTS**

**HONDA MOTOR COMPANY LTD
2009 HONDA FIT
5-DOOR HATCHBACK**

NHTSA NUMBER: M95302TWG1

**PREPARED BY:
KARCO ENGINEERING, LLC
9270 HOLLY ROAD
ADELANTO, CALIFORNIA 92301**

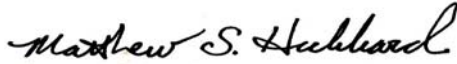
SEPTEMBER 25, 2009

FINAL REPORT

**PREPARED FOR:
ALPHA TECHNOLOGY ASSOCIATE, INC.
2810 OLD LEE HWY, SUITE 120
FAIRFAX, VA 22031**

This final test report was prepared for the U.S. Department of Transportation, Alpha Technology Associate, Inc., in response to Contract Number DTNH22-03-D-32005.

This publication is distributed by the U.S. Department of Transportation, Alpha Technology Associate, Inc., 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 Alpha Technology Associate, Inc. 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.



Prepared by: _____
Mr. Matthew S. Hubbard, Test Engineer
KARCO Engineering, LLC

Date: 09/25/09



Reviewed by: _____
Mr. Michael L. Dunlap, Director of Operations
KARCO Engineering, LLC

Date: 09/25/09



Approved by: _____
Mr. Frank D. Richardson, President
KARCO Engineering, LLC

Date: 09/25/09

FINAL REPORT ACCEPTED BY:

Manager, New Car Assessment Program

Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

TABLE OF CONTENTS

<u>Section</u>	<u>Description</u>	<u>Page</u>
1	Purpose and Summary of Test M95302TWG1	1
2	Occupant and Vehicle Information	3

<u>Data Sheet</u>	<u>Description</u>	<u>Page</u>
1	Test Summary	4
2	General Test and Vehicle Parameter Data	5
3	Test Vehicle Information	6
4	Dummy Positioning Information	7
5	Hybrid III ATD Injury Criteria and Sensor Data	8
6	Camera Locations	10

<u>Appendix</u>	<u>Description</u>	<u>Appendix</u>
A	Photographs	A
B	Data Plots	B
C	Instrumentation Data Channel Assignments	C

LIST OF PHOTOGRAPHS

<u>Figure</u>	<u>Description</u>	<u>Page</u>
A-1	Right Front $\frac{3}{4}$ View, As Received	A-1
A-2	Vehicle Certification Label	A-2
A-3	Post-Test Right Front $\frac{3}{4}$ View of Frontal NCAP Test	A-3
A-4	Post-Test Right Side View of Frontal NCAP Test	A-4
A-5	Pre-Test Dummy Position, Left Side View	A-5
A-6	Pre-Test Dummy Position, $\frac{3}{4}$ View	A-6
A-7	Pre-Test Dummy Position, Front View	A-7
A-8	Post-Test Dummy Position and Airbag, Left Side View	A-8
A-9	Post-Test Airbags, Left Side View	A-9
A-10	Post-Test Airbags, Close-up View	A-10

LIST OF DATA PLOTS

Data Plot		Page
B-1	Pass. (SID IIs) Head X	B-1
	Pass. (SID IIs) Head Y	B-1
	Pass. (SID IIs) Head Z	B-1
	Pass. (SID IIs) Head Resultant	B-1
B-2	Pass. (SID IIs) Upper Neck Force X	B-2
	Pass. (SID IIs) Upper Neck Force Y	B-2
	Pass. (SID IIs) Upper Neck Force Z	B-2
	Pass. (SID IIs) Upper Neck Force Resultant	B-2
B-3	Pass. (SID IIs) Upper Neck Moment X	B-3
	Pass. (SID IIs) Upper Neck Moment Y	B-3
	Pass. (SID IIs) Upper Neck Moment Z	B-3
	Pass. (SID IIs) Upper Neck Moment Resultant	B-3
B-4	Pass. (SID IIs) Lower Neck Force X	B-4
	Pass. (SID IIs) Lower Neck Force Y	B-4
	Pass. (SID IIs) Lower Neck Force Z	B-4
	Pass. (SID IIs) Lower Neck Force Resultant	B-4
B-5	Pass. (SID IIs) Lower Neck Moment X	B-5
	Pass. (SID IIs) Lower Neck Moment Y	B-5
	Pass. (SID IIs) Lower Neck Moment Z	B-5
	Pass. (SID IIs) Lower Neck Moment Resultant	B-5

SECTION 1

PURPOSE AND SUMMARY OF TEST M95302TWG1

1.1 PURPOSE

This occupant out-of-position static side airbag deployment test is part of the Technical Working Group Occupant Injury Risk from Deploying Side Airbags Testing Program sponsored by Alpha Technology Associate, Inc. under Contract No. DTNH22-03-D-32005. The purpose of this test was to obtain occupant injury data for a side airbag deployment.

The occupant out-of-position side airbag test was conducted in accordance with the Technical Working Group Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

1.2 SUMMARY

The effects of a roof mounted curtain airbag and a torso airbag deployment in a 2009 Honda Fit 5-Door Hatchback with an out-of-position SID IIs 5th percentile adult female dummy were evaluated. The test was performed at Karco Engineering, LLC on September 25, 2009. Pre- and post-test photographs of the vehicle and dummy can be found in Appendix A.

Three high-speed digital cameras and one real time camera were used to document the curtain and torso airbag deployment. Camera locations and other pertinent camera information can be found on Data Sheet No.1 and Data Sheet No.6.

SID IIs 5th percentile adult female anthropomorphic test device (ATD) was placed in the left front driver seating position facing forward according to the dummy placement instructions (3.3.3.6) in the July 2003 Revision of the Technical Working Group's 'Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags'.

The SID IIs 5th percentile adult female ATD was instrumented with head tri-axial accelerometers, and upper and lower neck transducers.

Fifteen (15) channels of data were recorded using an on-board data acquisition system. Appendix A contains Photographs. Appendix B contains dummy response data traces. Appendix C contains the Instrumentation Data Channel assignments.

The front driver side door remained closed during the deployment and was operable after the deployment.

The SID IIs 5th percentile adult female dummy's visible contact points were as follows: The curtain airbag contacted the ATD's head and the torso airbag contacted the ATD's back.

OUT OF POSITION OCCUPANT DATA SUMMARY

ATD Position	HIC ₁₅
Driver	3.9

Orientation of the SID IIs 5th percentile adult female dummy was in the inboard facing position leaning against the front driver door. The dummy's spine was aligned with the deploying trajectory of the curtain airbag. The lower legs were extended. This orientation complies with section 3.3.3.6 of the Technical Working Group (TWG) recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2009 Honda Fit 5-Door Hatchback NHTSA No.: M95302TWG1
Test Program: TWG 3.3.3.6. Test Date: 09/25/09

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(tf - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

* Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1

TEST SUMMARY

Test Vehicle: 2009 Honda Fit 5-Door Hatchback NHTSA No.: M95302TWG1
Test Program: TWG 3.3.3.6. Test Date: 09/25/09

TEST DUMMY INFORMATION

Description	Passenger Seat Forward Facing
Dummy Type / Serial No.	SID IIs / 294
Head Contact	Yes
Chest Contact	None
Abdomen Contact	None
Pelvis	None
Left Knee Contact	None
Right Knee Contact	None

MOVIE COVERAGE

High Speed Digital	3
Real Time	1
Total	4

DATA CHANNELS

SID IIs ATD Sensors	15
Belt Assessment Sensors	0
Vehicle Structure Accelerometers	0
Total	15

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2009 Honda Fit 5-Door Hatchback NHTSA No.: M95302TWG1
 Test Program: TWG 3.3.3.6. Test Date: 09/25/09

TEST VEHICLE INFORMATION

Make	Honda
Model	Fit
Body Style	5-Door Hatchback
NHTSA No.	M95302TWG1
VIN	JHMGE87439S000288
Color	Silver
Delivery Date	August 28, 2008
Odometer Reading (mile)	24
Dealer	Valley Hi Honda
Transmission	5 speed Manual
Final Drive	Front
Type/Number Cylinders	Inline 4
Engine Displacement (L)	1.5
Engine Placement	Transverse

TEST VEHICLE OPTIONS

Driver Front Airbag	Yes
Driver Side Airbag	Yes
Driver Side Curtain Airbag	Yes
Pass. Front Airbag	Yes
Pass.Side Airbag	Yes
Pass. Curtain Airbag	Yes
Power Brakes	Yes
Power Steering	Yes
Disc Brakes, Front	Yes
Disc Brakes, Rear	Yes
Anti-lock Brakes	Yes
Tilt Steering Wheel	Yes
Power Windows	Yes
Power Seats	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda Motor Co. LTD	GVWR (kg)	1594
Date of Manufacture	July-08	GAWR Front (kg)	872
		GAWR Rear (kg)	735

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	280	280
Cold Pressure (kPa)	230	230
Recommend Tire Size	P185/55R16	P185/55R16
Tire Size on Vehicle	P185/55R16	P185/55R16
Tire Manufacturer	Bridgestone	Bridgestone

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	Bench	
Number of Occupants	2	3	0	5
Capacity Wt. (VCW) (kg)				385

* Vehicle had undergone New Car Assessment Program Frontal Impact Testing on September 19, 2008

DATA SHEET NO. 3

TEST VEHICLE INFORMATION

Test Vehicle: 2009 Honda Fit 5-Door Hatchback NHTSA No.: M95302TWG1
Test Program: TWG 3.3.3.6. Test Date: 09/25/09

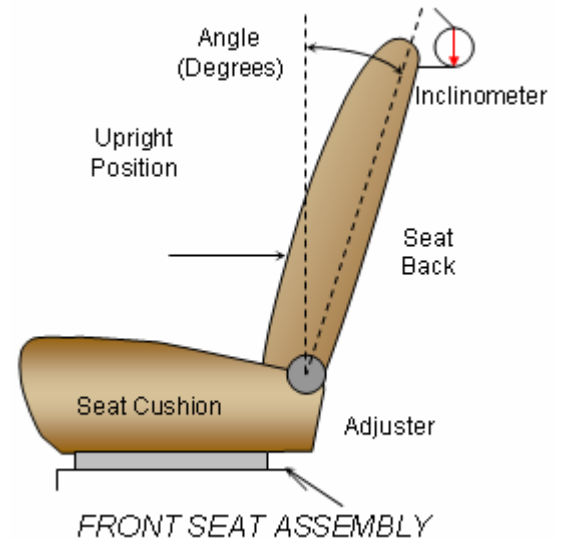
NOMINAL DESIGN RIDING POSITION

The driver seat back is positioned to section 3.3.3.6. of the Technical Working Group (TWG) recommendation in the Recommended Procedures for Evaluating Occupant Injury Risk from Deploying Side Airbags.

SEAT BACK ANGLES

Position	Deg.
Driver w/ Dummy	11

Seat upright is 0 degrees.



SEAT FORE/AFT POSITIONS

The first or forward most position is counted as number one (1). The fore/aft position is set aft of the middle position for the driver seat.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	25 detents	25th detent

DATA SHEET NO. 4

DUMMY POSITIONING INFORMATION

Test Vehicle: 2009 Honda Fit 5-Door Hatchback NHTSA No.: M95302TWG1
 Test Program: TWG 3.3.3.6. Test Date: 09/25/09

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	SID IIs 5th percentile female	
		Length (mm)	Angle (°)
SA	Seat Back Angle		11
AMW	Side Airbag Module Width (Torso / Curtain)	120 / 220	
ABW	Side Airbag Width (Torso / Curtain)	340 / 450	
AML	Side Airbag Module Length (Torso / Curtain)	35 / 45	
ABL	Side Airbag Length (Torso / Curtain)	300 / 1800	
AN	Top of Airbag Module to Head/Neck Junction	275	
HD	Head CG to Door Panel/ Window	215	
HSC	Head to Seat Back Centerline	88	
HB	Head to B-Pillar (first contact)	101	
HZ	Head to Roof (Z)	221	
HHD	Head to Header	430	
ND	Nose to Dash	756	
NS	Nose to Seat Back	125	
NR	Nose to Header	538	
CD	Chest to Dash	681	
CS	Chest to Seat Back	216	
RACL	Right Arm to Seat Back Centerline	150	
LACL	Left Arm to Seat Back Centerline	N/A	
RA	Right Arm to Door Panel	165	
LA	Left Arm to Door Panel	N/A	
KK	Knee to Knee	125	
TT	Toe to Toe	113	
KSCR	Right Knee to Seat Cushion Centerline	254	
KSCL	Left Knee to Seat Cushion Centerline	265	
TSCR	Right Toe to Seat Cushion Centerline	741	
TSCL	Left Toe to Seat Cushion Centerline	753	

DATA SHEET NO. 5
HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2009 Honda Fit Sport 5-Door Hatchback

NHTSA No.: M95302TWG1

Test Program: TWG 3.3.5.6

Test Date: 9/25/09

HEAD PEAK ACCELERATIONS

Location	Axis	Units	Driver SID-IIs			
			Max	Time	Min	Time
Head CG	X	G's	11.9	22.9	-2.3	113.8
Head CG	Y	G's	5.6	8.7	-5.3	13.6
Head CG	Z	G's	15.2	8.5	-6.2	16.0
Head CG Resultant	N/A	G's	16.2	8.4		

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver SID-IIs			
			Max	Time	Min	Time
Neck Force	X	Newtons	90.1	19.3	-84.4	31.8
Neck Force	Y	Newtons	21.2	99.2	-153.9	25.2
Neck Force	Z	Newtons	34.9	8.2	-432.1	15.4
Neck Force Resultant	N/A	Newtons	439.5	15.4		
Neck Moment	X	Nm	8.0	13.6	-4.9	37.3
Neck Moment	Y	Nm	5.5	19.1	-8.7	40.1
Neck Moment	Z	Nm	4.0	58.8	-2.9	121.3
Neck Moment Resultant	N/A	Nm	9.9	39.6		

LOWER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver SID-IIs			
			Max	Time	Min	Time
Neck Force	X	Newtons	83.9	15.7	-50.6	34.9
Neck Force	Y	Newtons	17.1	14.0	-74.4	11.9
Neck Force	Z	Newtons	18.0	84.0	-252.3	14.9
Neck Force Resultant	N/A	Newtons	260.7	14.9		
Neck Moment	X	Nm	4.3	98.6	-14.7	27.5
Neck Moment	Y	Nm	16.7	11.8	-16.7	20.5
Neck Moment	Z	Nm	5.0	59.7	-8.6	19.9
Neck Moment Resultant	N/A	Nm	20.7	20.7		

DATA SHEET NO. 5...(CONTINUED)Test Vehicle: 2009 Honda Fit Sport 5-Door HatchbackNHTSA No.: M95302TWG1Test Program: TWG 3.3.5.6Test Date: 9/25/09**HEAD INJURY CRITERIA (HIC 15)**

Location	Driver SID-IIs			
	HIC15	T ¹	T ²	Avg G
Head CG	3.9	14.2	28.3	9.5

UPPER NECK NIJ VALUES

Location	Driver SID-IIs			
	Ntf	Nte	Ncf	Nce
Upper Neck	0.03	0.06	0.11	0.16

DATA SHEET NO. 6**CAMERA LOCATIONS**Test Vehicle: 2009 Honda Fit 5-Door Hatchback NHTSA No.: M95302TWG1Test Program: TWG 3.3.3.6. Test Date: 09/25/09

No.	Camera View	Location (mm)			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
1	Real Time	-190	1630	-1175	-7.0	N/A	30
2	High Speed Side View	-190	1963	5	-3.0	20	1000
3	High Speed 3/4 View	-1682	1310	-1260	-7.0	35	1000
4	High Speed Front View	-1674	0	-1275	-8.0	35	1000

* All measurements are taken relative to CG of dummy's head.

APPENDIX A

PHOTOGRAPHS



Figure A-1: Left Front $\frac{3}{4}$ View, As Received

MFD IN JAPAN BY HONDA MOTOR CO., LTD; 07/1'08

GVWR 3512LBS GAWR F 1921LBS R 1619LBS

GVWR 1594KG GAWR F 872 KG R 735 KG

**THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY , BUMPER,
AND THEFT PREVENTION STANDARDS IN EFFECT
ON THE DATE OF MANUFACTURE SHOWN ABOVE.**

V.I.N.: JHMGE87439S000288 TYPE: PASSENGER CAR



TK6 9 ABO

- NH642M

- V - S

Figure A-2: Vehicle Certification Label

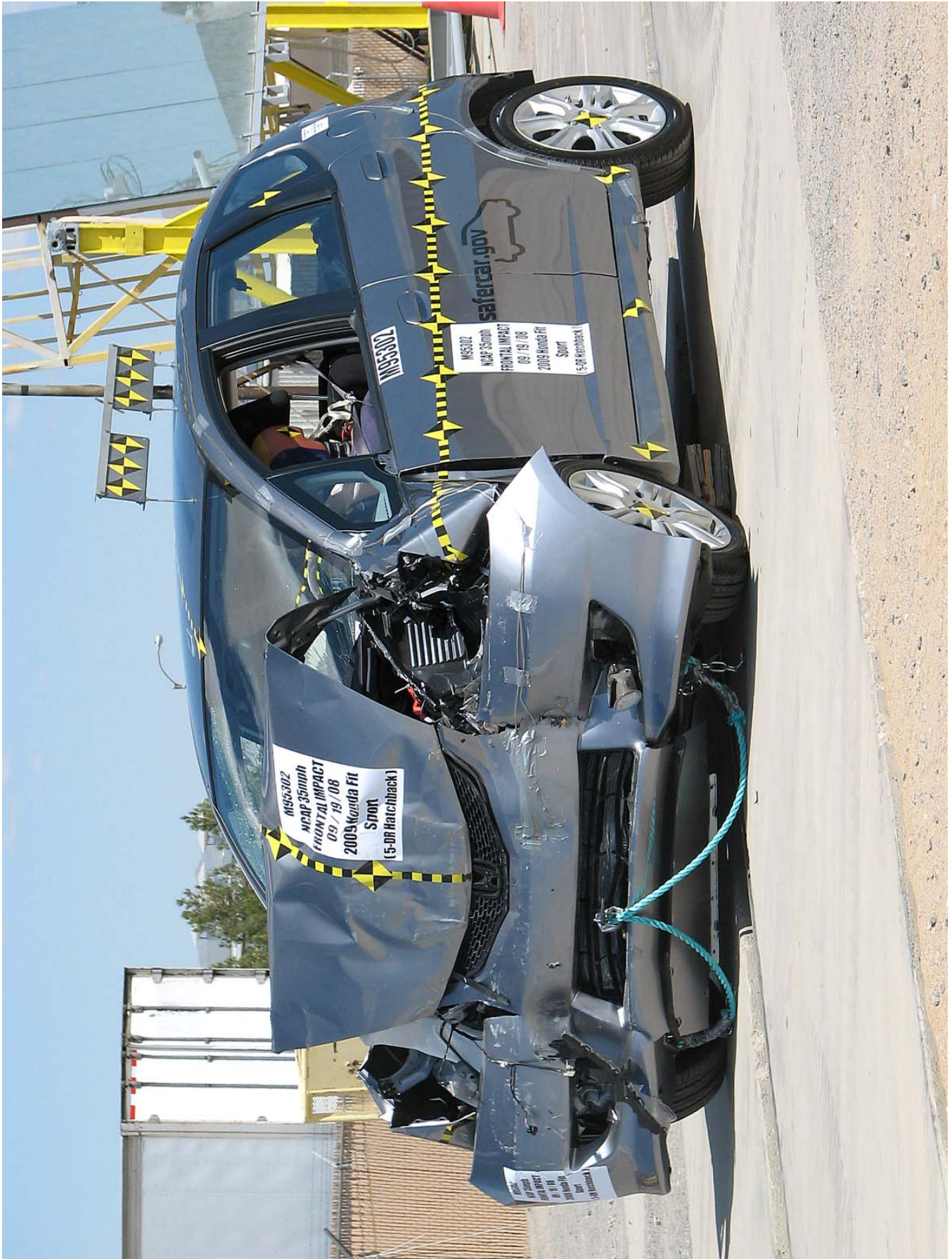


Figure A-3: Post-Test Left Front $\frac{3}{4}$ View of Frontal NCAP Test

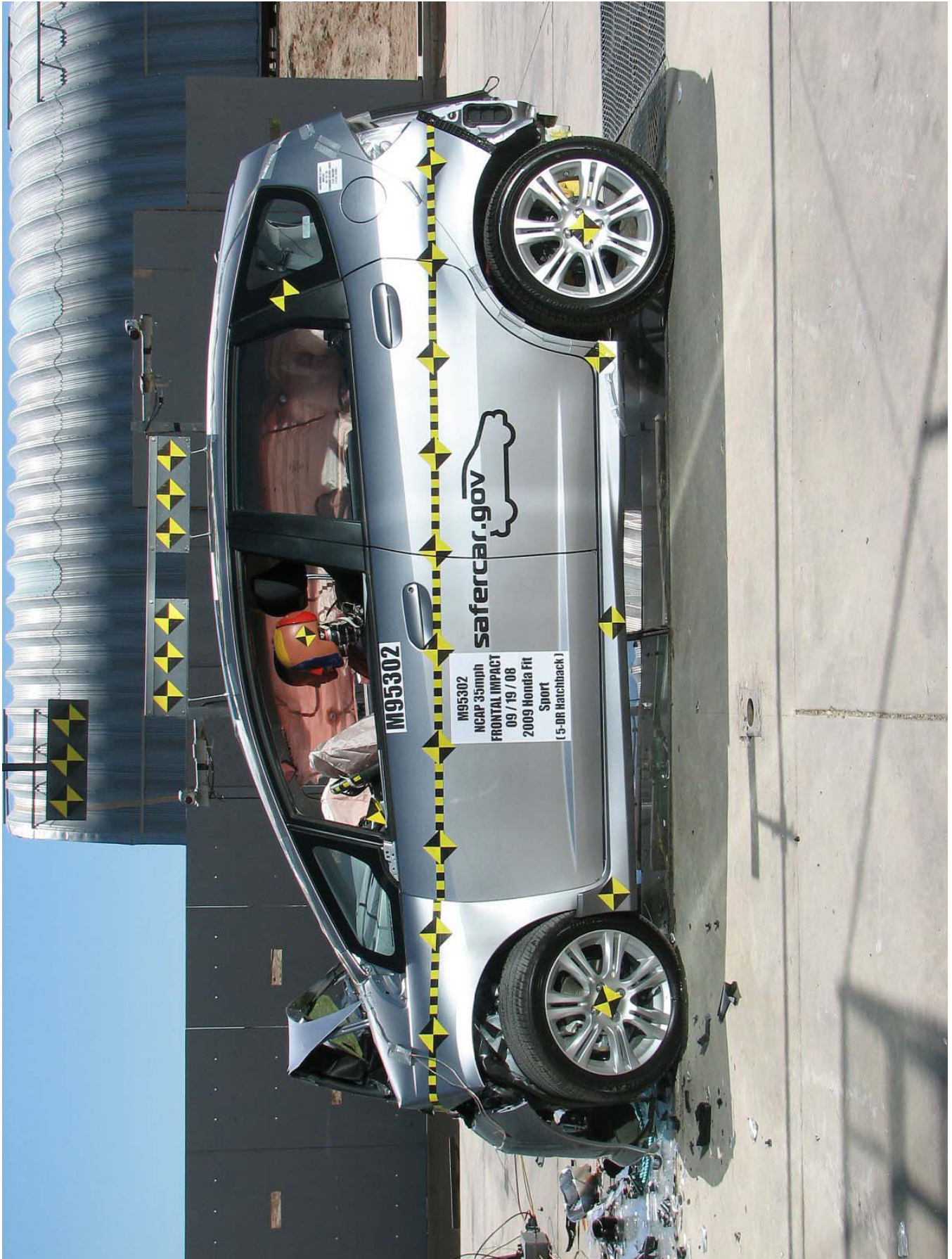


Figure A-4: Post-Test Left Side View of Frontal NCAP Test



Figure A-5: Pre-Test Dummy Position, Right Side View



Figure A-6: Pre-Test Dummy Position, 3/4 View



Figure A-7: Pre-Test Dummy Position, Front View



Figure A-8: Post-Test Dummy Position and Airbags, Right Side View



Figure A-9: Post-Test Airbags, Right Side View



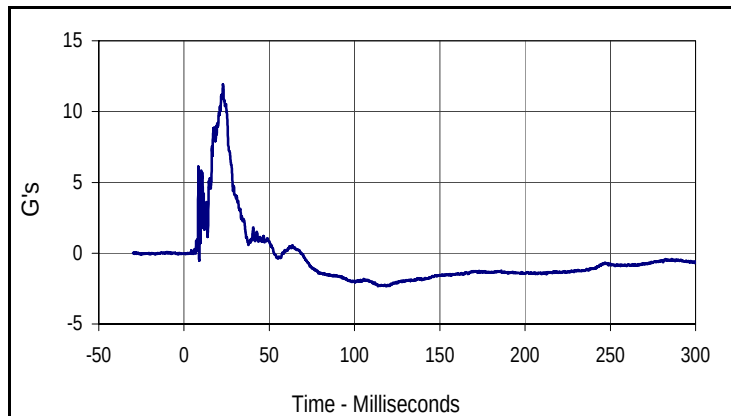
Figure A-10: Post-Test Airbags, Close-up View

APPENDIX B

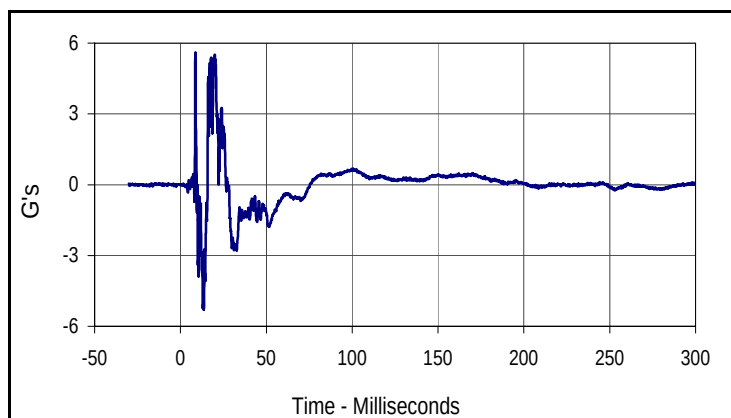
DATA PLOTS

Test Vehicle: 2009 Honda Fit Sport 5-Door Hatchback
 Test Program: TWG 3.3.5.6

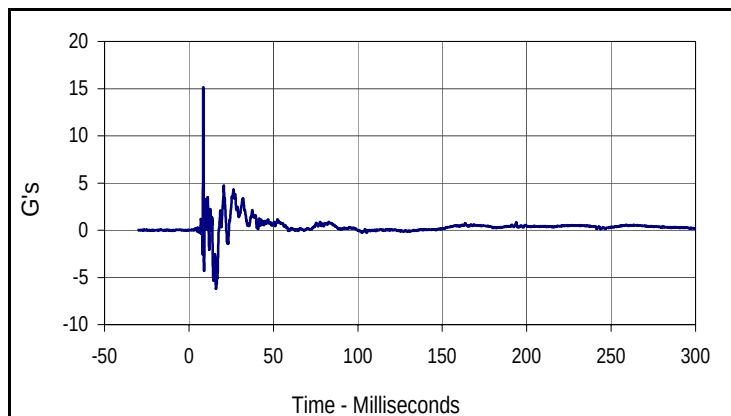
Test Date: 9/25/09
 NHTSA No.: M95302TWG1



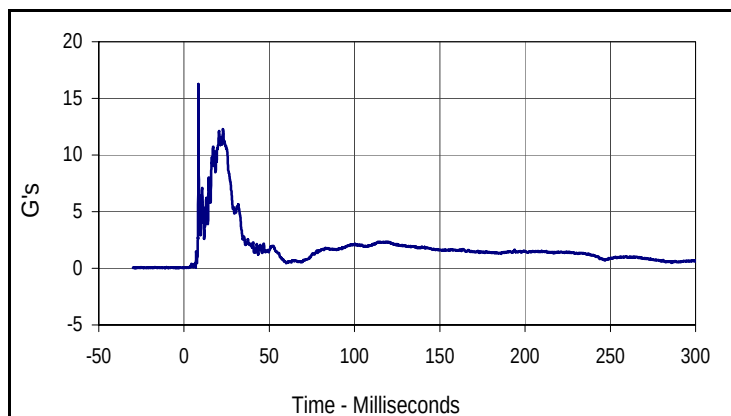
Curve Description			
Driver SID-Is Head X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
11.9	22.9	-2.3	113.8



Curve Description			
Driver SID-Is Head Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.6	8.7	-5.3	13.6



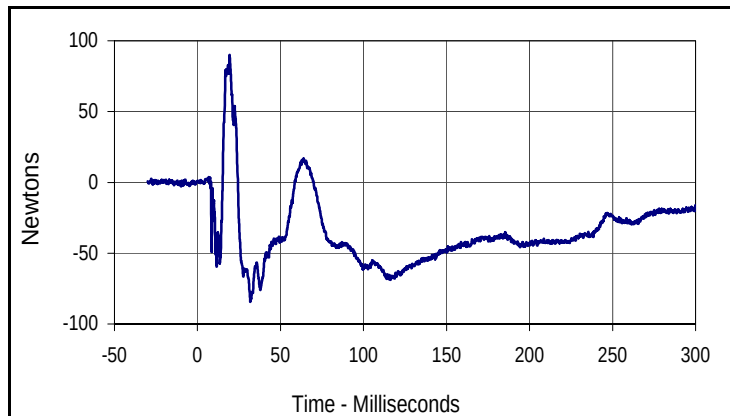
Curve Description			
Driver SID-Is Head Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
15.2	8.5	-6.2	16.0



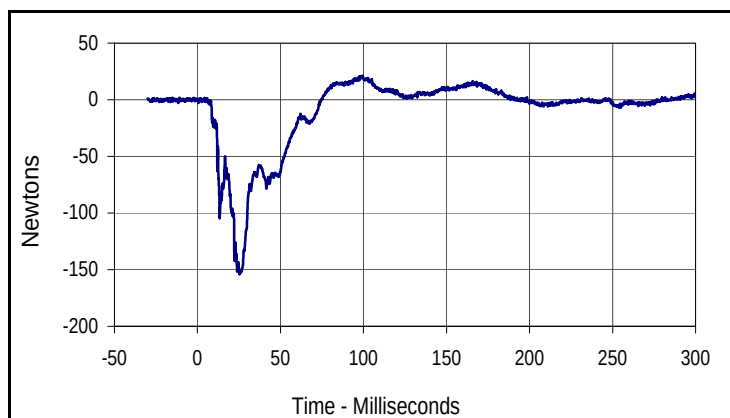
Curve Description			
Driver SID-Is Head Primary Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
16.2	8.4	0.0	0.0

Test Vehicle: 2009 Honda Fit Sport 5-Door Hatchback
 Test Program: TWG 3.3.5.6

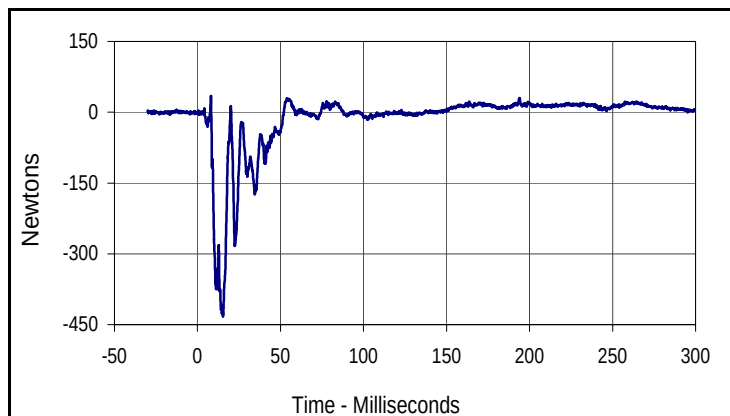
Test Date: 9/25/09
 NHTSA No.: M95302TWG1



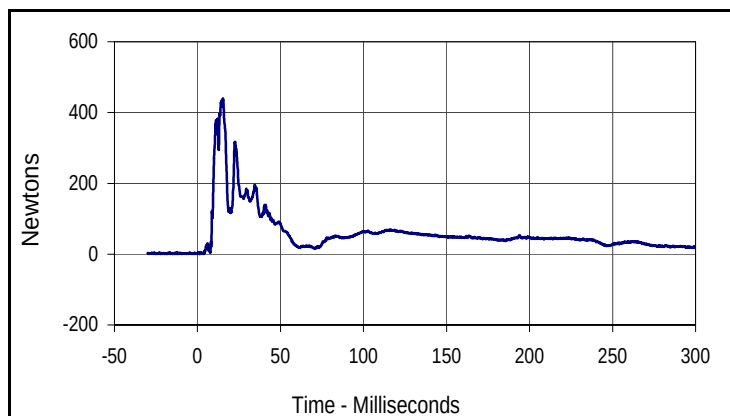
Curve Description			
Driver SID-Is Upper Neck Force X			
CURNO	Type	SAE Class	Units
004	FIL	1000	Newtons
Max	Time	Min	Time
90.1	19.3	-84.4	31.8



Curve Description			
Driver SID-Is Upper Neck Force Y			
CURNO	Type	SAE Class	Units
005	FIL	1000	Newtons
Max	Time	Min	Time
21.2	99.2	-153.9	25.2



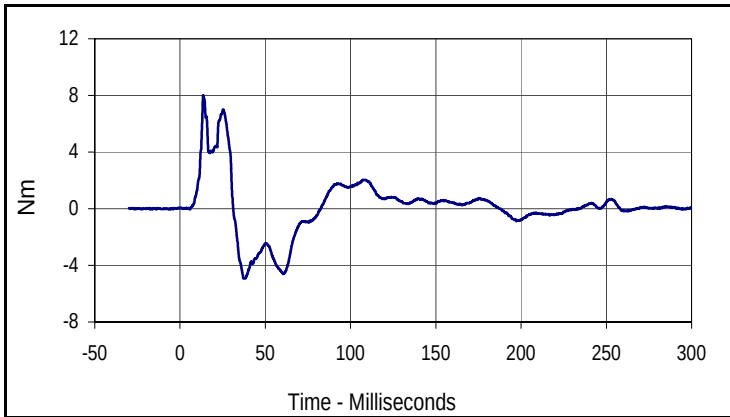
Curve Description			
Driver SID-Is Upper Neck Force Z			
CURNO	Type	SAE Class	Units
006	FIL	1000	Newtons
Max	Time	Min	Time
34.9	8.2	-432.1	15.4



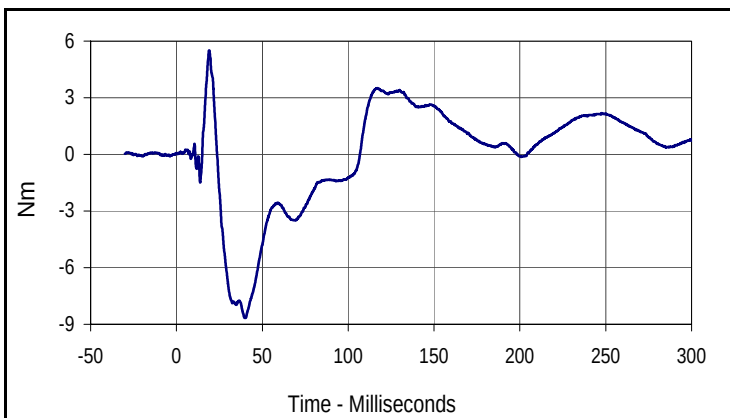
Curve Description			
Driver SID-Is Upper Neck Force Resultant			
CURNO	Type	SAE Class	Units
004	RES	1000	Newtons
Max	Time	Min	Time
439.5	15.4	0.3	3.1

Test Vehicle: 2009 Honda Fit Sport 5-Door Hatchback
 Test Program: TWG 3.3.5.6

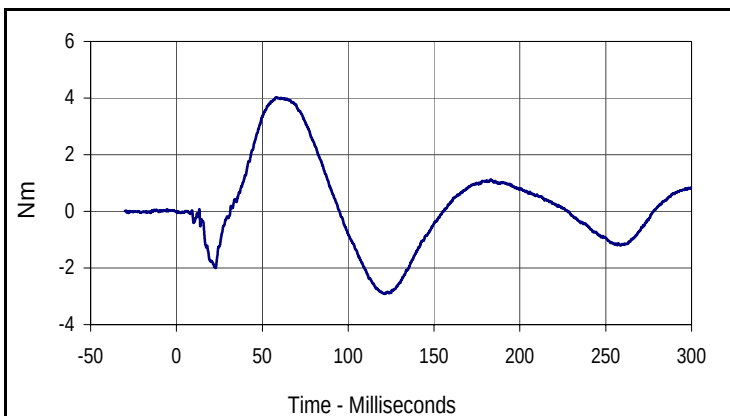
Test Date: 9/25/09
 NHTSA No.: M95302TWG1



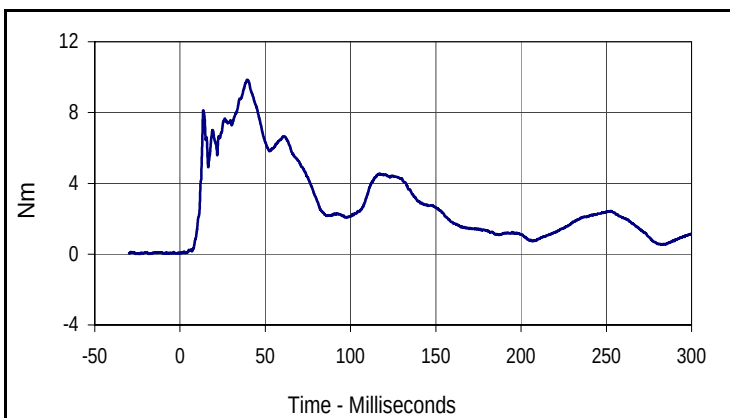
Curve Description			
Driver SID-Is Upper Neck Moment X			
CURNO	Type	SAE Class	Units
007	FIL	600	Nm
Max	Time	Min	Time
8.0	13.6	-4.9	37.3



Curve Description			
Driver SID-Is Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
008	FIL	600	Nm
Max	Time	Min	Time
5.5	19.1	-8.7	40.1



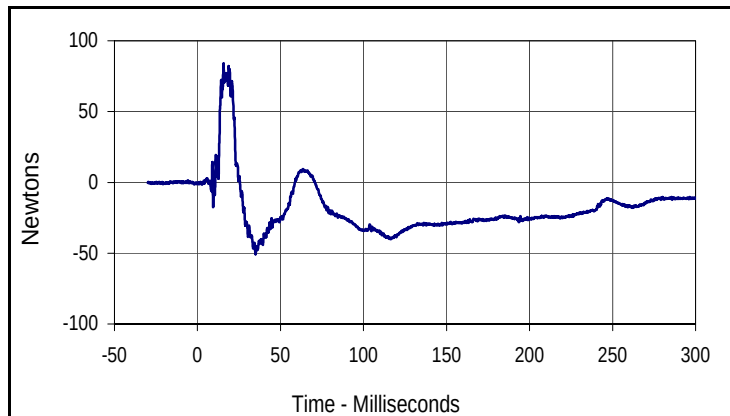
Curve Description			
Driver SID-Is Upper Neck Moment Z			
CURNO	Type	SAE Class	Units
009	FIL	600	Nm
Max	Time	Min	Time
4.0	58.8	-2.9	121.3



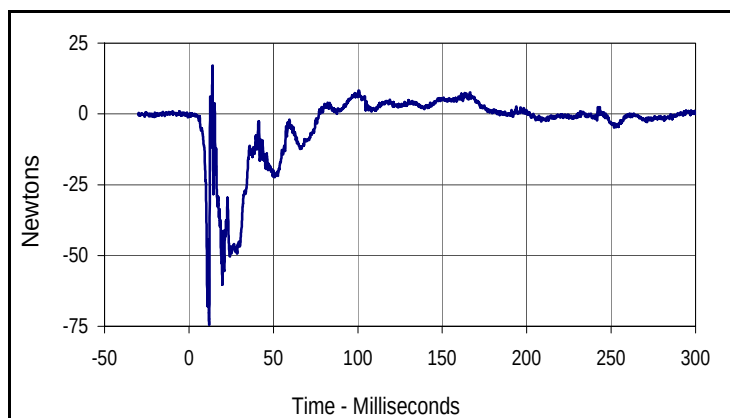
Curve Description			
Driver SID-Is Upper Neck Moment Resultant			
CURNO	Type	SAE Class	Units
007	RES	600	Nm
Max	Time	Min	Time
9.9	39.6	0.0	0.1

Test Vehicle: 2009 Honda Fit Sport 5-Door Hatchback
 Test Program: TWG 3.3.5.6

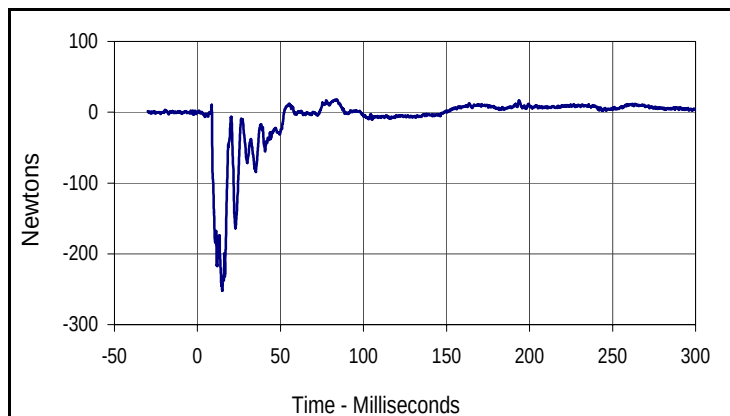
Test Date: 9/25/09
 NHTSA No.: M95302TWG1



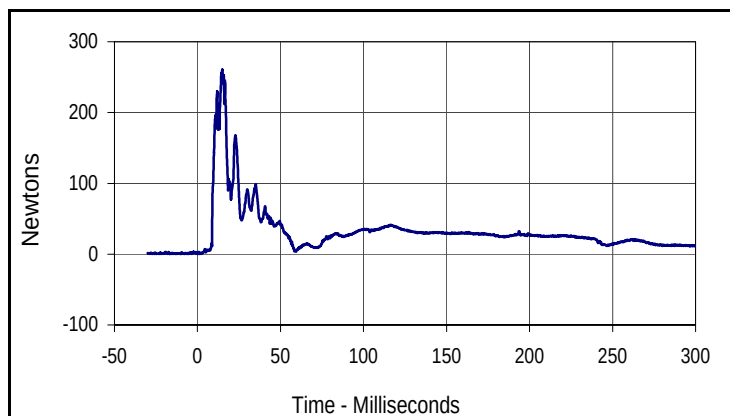
Curve Description			
Driver SID-IIs Lower Neck Force X			
CURNO	Type	SAE Class	Units
010	FIL	1000	Newtons
Max	Time	Min	Time
83.9	15.7	-50.6	34.9



Curve Description			
Driver SID-IIs Lower Neck Force Y			
CURNO	Type	SAE Class	Units
011	FIL	1000	Newtons
Max	Time	Min	Time
17.1	14.0	-74.4	11.9



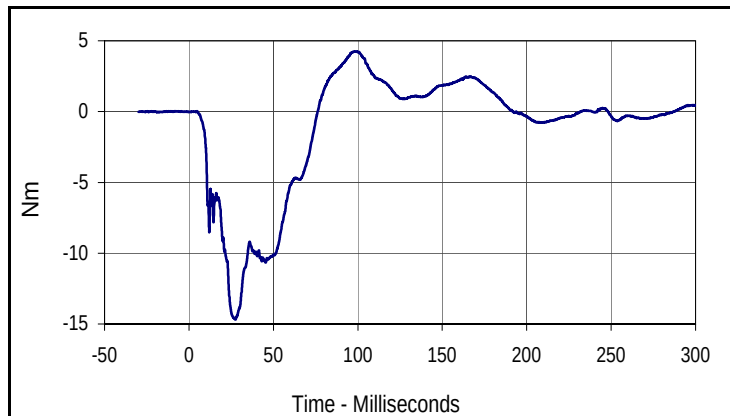
Curve Description			
Driver SID-IIs Lower Neck Force Z			
CURNO	Type	SAE Class	Units
012	FIL	1000	Newtons
Max	Time	Min	Time
18.0	84.0	-252.3	14.9



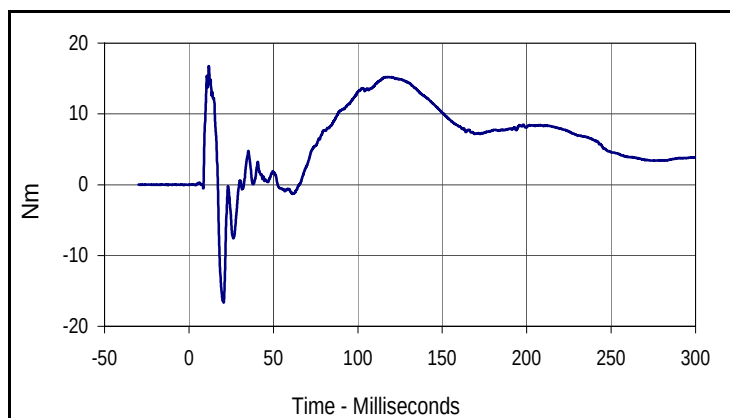
Curve Description			
Driver SID-IIs Lower Neck Force Resultant			
CURNO	Type	SAE Class	Units
010	RES	1000	Newtons
Max	Time	Min	Time
260.7	14.9	0.1	1.4

Test Vehicle: 2009 Honda Fit Sport 5-Door Hatchback
 Test Program: TWG 3.3.5.6

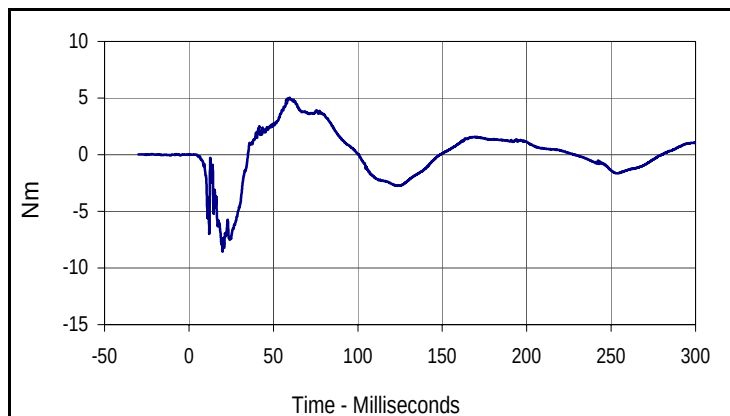
Test Date: 9/25/09
 NHTSA No.: M95302TWG1



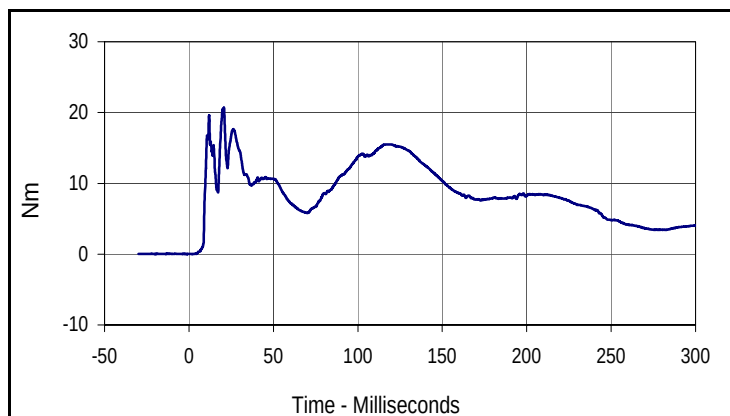
Curve Description			
Driver SID-IIs Lower Neck Moment X			
CURNO	Type	SAE Class	Units
013	FIL	600	Nm
Max	Time	Min	Time
4.3	98.6	-14.7	27.5



Curve Description			
Driver SID-IIs Lower Neck Moment Y			
CURNO	Type	SAE Class	Units
014	FIL	600	Nm
Max	Time	Min	Time
16.7	11.8	-16.7	20.5



Curve Description			
Driver SID-IIs Lower Neck Moment Z			
CURNO	Type	SAE Class	Units
015	FIL	600	Nm
Max	Time	Min	Time
5.0	59.7	-8.6	19.9



Curve Description			
Driver SID-IIs Lower Neck Moment Resultant			
CURNO	Type	SAE Class	Units
013	RES	600	Nm
Max	Time	Min	Time
20.7	20.7	0.0	2.0

APPENDIX C

INSTRUMENTATION DATA CHANNEL ASSIGNMENTS

TWG 3.3.5.6
Instrumentation Data Channel Assignments
A.T.D. Serial Number 294
9/25/09
2009 Honda Fit Sport 5-Door Hatchback

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	HEAD	X	P45011	Accel.,full bridge	ENDEVCO	7264-2000	G
2	HEAD	Y	P51696	Accel.,full bridge	ENDEVCO	7264-2000	G
3	HEAD	Z	P51708	Accel.,full bridge	ENDEVCO	7264-2000	G
4	UPPER NECK FORCE	X	157 FX	Load cell, six axis neck	R. A. Denton	IF-205	N
5	UPPER NECK FORCE	Y	157 FY	Load cell, six axis neck	R. A. Denton	IF-205	N
6	UPPER NECK FORCE	Z	157 FZ	Load cell, six axis neck	R. A. Denton	IF-205	N
7	UPPER NECK MOMENT	X	157 MX	Load cell, six axis neck	R. A. Denton	IF-205	Nm
8	UPPER NECK MOMENT	Y	157 MY	Load cell, six axis neck	R. A. Denton	IF-205	Nm
9	UPPER NECK MOMENT	Z	157 MZ	Load cell, six axis neck	R. A. Denton	IF-205	Nm
10	LOWER NECK FORCE	X	180 FX	Load cell, six axis neck	R. A. Denton	2430	N
11	LOWER NECK FORCE	Y	180 FY	Load cell, six axis neck	R. A. Denton	2430	N
12	LOWER NECK FORCE	Z	180 FZ	Load cell, six axis neck	R. A. Denton	2430	N
13	LOWER NECK MOMENT	X	180 MX	Load cell, six axis neck	R. A. Denton	2430	Nm
14	LOWER NECK MOMENT	Y	180 MY	Load cell, six axis neck	R. A. Denton	2430	Nm
15	LOWER NECK MOMENT	Z	180 MZ	Load cell, six axis neck	R. A. Denton	2430	Nm