

REPORT NUMBER: TO11-MGA-2002-003

FULL SCALE SIDE IMPACT POLE TESTS OF BASELINE VEHICLES

**NISSAN
2000 NISSAN MAXIMA
NHTSA NUMBER: RY5217**

**PREPARED BY:
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AUGUST 29, 2002

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
VOLPE NATIONAL TRANSPORTATION SYSTEM CENTER
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This final test report was prepared for the U.S. Department of Transportation, Volpe National Transportation System Center, in response to Contract Number DTRS57-98-D-00041.

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SECTION 1
PURPOSE AND TEST PROCEDURE

This Side Impact test is conducted as part of Contract No. DTRS57-98-D-00041, task order 11, sponsored by the U.S. Department of Transportation, Volpe National Transportation System Center. The purpose of this test is to evaluate the responses of the ES-2 and SID/HIII dummies in a 2000 Nissan Maxima, when subjected to a rigid pole side impact at 285 degrees.

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

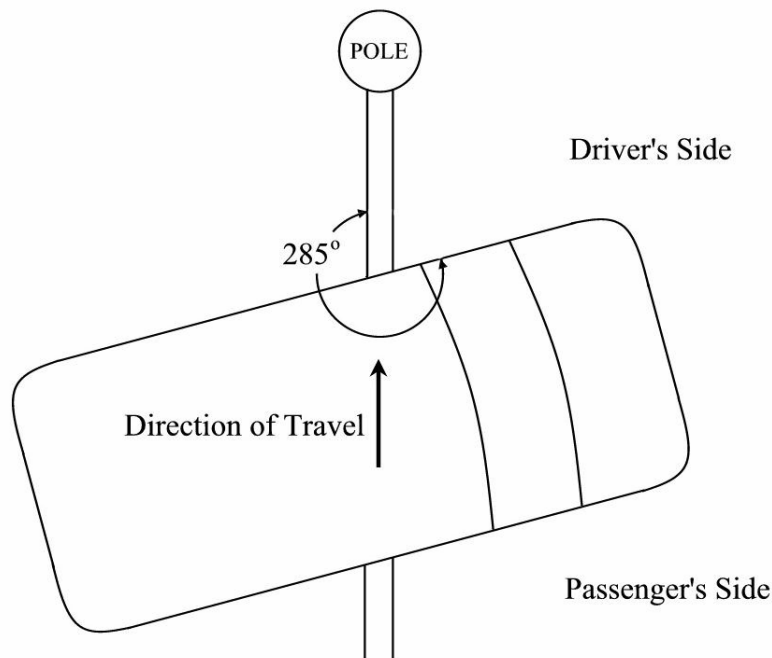
SECTION 2

SUMMARY OF SIDE IMPACT TEST

A rigid pole side impact test at 285 degrees was performed on a 2000 Nissan Maxima. The subject vehicle was towed into a rigid pole at a velocity of 32.5 km/h. The weight of the vehicle as tested was 1690 kg. The test was conducted at MGA Research Corporation in Burlington, Wisconsin, on August 29, 2002. Pre- and post-test photographs of the test vehicle and the dummies are included in Appendix A.

One ES-2 side impact dummy was placed in the left front designated seating position according to instructions specified in the FMVSS 201P Laboratory Test Procedure which is dated April 21, 2000 and Evaluation of Eurosid-1 Positioning Procedure Appendix A dated February 5, 1997. The side impact event was documented by nine high speed cameras. Camera locations and other pertinent camera information can be found in this report.

Appendix B contains the vehicle and dummy response data traces. A summary of the dummy configuration and performance verification test data is shown in Appendix C. Dummy and vehicle calibration data can be found in Appendix D of this report. The positioning procedure for the ES-2 dummy is located in Appendix E. Appendix F contains the dummy peak responses.



SECTION 2...continued
SUMMARY OF SIDE IMPACT TEST

The following table summarizes the results of the Left Side Impact Test:

Head Performance Criteria		Left Front
<1000	T1 (msec)	55.5
	T2 (msec)	56.2
	HPC	15591
Thorax Performance Criteria		
Chest Deflection <42 mm	Upper Rib Deflection	47.3
	Mid Rib Deflection	42.1
	Lower Rib Deflection	41.3
Viscous Criteria <1.0 (m/sec.)	Upper Rib	0.8
	Mid Rib	1.0
	Lower Rib	0.9
Abdominal Protection Criteria		
Sum < 2500 N	Front Abdominal Force	254.8
	Mid Abdominal Force	634.2
	Rear Abdominal Force	1138.6
	Sum of Abdominal Force	2014.3
Pelvis Performance Criteria		
< 6000 N	Pubic Symphysis Force	2495.3

HIC		Left Front
	T1 (msec)	55.5
	T2 (msec)	56.2
	T2 – T1 (msec)	0.7
	HIC	15590

Fir Filtered	Left Front
Upper Rib Y (g's)	92.2
Mid Rib Y (g's)	130.1
Lower Rib Y (g's)	169.8
Upper Spine (g's)	42.6
Lower Spine Y (g's)	80.5
Pelvis Y (g's)	62.4
TTI (g's)	125

Contacts	Left Front
Rib (msec)	34.7
Pelvis (msec)	25.1
Arm (msec)	22.7

TEST NOTES

The following data channels were found to have Questionable Data:

Left Mid A-Post Y

Left Upper A-Post Y

Left Front Door at Pelvis

SECTION 3
SIDE IMPACT DUMMY (ES-2) AND VEHICLE TEST DATA

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

TEST VEHICLE INFORMATION

Make	Nissan
Model	Maxima
Body Style	4 Dr Sedan
VIN	JN1CA31D1YT751327
Color	Maroon
Odometer Reading (mile)	37613
Transmission	3 sp automatic
Final Drive	front
Number of Cylinders	6
Engine Displacement (L)	3.0
Engine Placement	lateral

TEST VEHICLE OPTIONS

Front Airbag	yes
Side Airbags	no
Power Windows	yes
Power Steering	yes
Power Door	no
Tilt Wheel	yes
Air Conditioning	yes
Power Brakes	yes
Anti-lock Brakes	yes
AM/FM/CD	yes
Cruise Control	yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan	GVWR (kg)	1965.4
Date of Manufacture	1/00	GAWR Front (kg)	1072.8
		GAWR Rear (kg)	901.8

DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	252	252
Cold Pressure (kPa)	231	210
Recommended Tire Size	P215/55R16	P215/55R16
Tire Size on Vehicle	P215/55R16	P215/55R16
Tire Manufacturer	Toyo	Toyo

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Contour		
Number Of Occupants x 68.04 kg.	136.1	204.1		340.2
Capacity Wt. (VCW) (kg)				400.1
Cargo Wt. (RCLW) (kg)				59.9

DATA SHEET NO. 1... (continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2000 Nissan MaximaTest Date: August 29, 2002**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	449.1	287.6		497.6	359.7	
Right	kg	471.3	271.7		496.2	336.6	
Ratio	%	62.2	37.8		58.8	41.2	
Totals	kg	920.4	559.3	1479.7	993.8	696.3	1690.1

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Calculated Vehicle Target Weight (TVTW)	kg	1690

TEST VEHICLE ATTITUDES

	Unit	As Delivered	Fully Loaded	Ready for Test
Right Door Sill Angle	Deg	0.4 ND	0.0	0.1 ND
Left Door Sill Angle	Deg	0.4 ND	0.1 ND	0.1 ND
Front Bumper Angle	Deg	0.1 RD	0.2 LD	0.0
Rear Bumper Angle	Deg	0.3 RD	0.1 LD	0.0

ND=Nose down, BD = Back Down, LD = Left Down, RD = Right Down

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2760
Total Vehicle Length at Left Side	mm	4180
Total Vehicle Length at Centerline	mm	4810
Total Vehicle Length at Right Side	mm	4180
Total Vehicle Width	mm	1795
Weight of Ballast in Cargo Area	kg	0
Amount of Water in Fuel Tank	liters	64.3

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Actual Impact Point	mm	8 rear

DATA SHEET NO. 1... (continued)

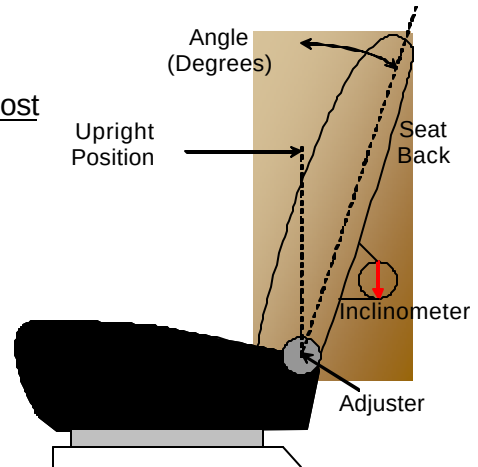
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

NORMAL DESIGN RIDING POSITION

Driver seat back angle: 11.0 Measured at headrest post



FRONT SEAT ASSEMBLY

SEAT FORE/AFT POSITIONS

The driver's seat is electronically operated. The fore/aft is set to the middle position for the driver's seat.

Driver seat fore/aft total travel: 235 mm

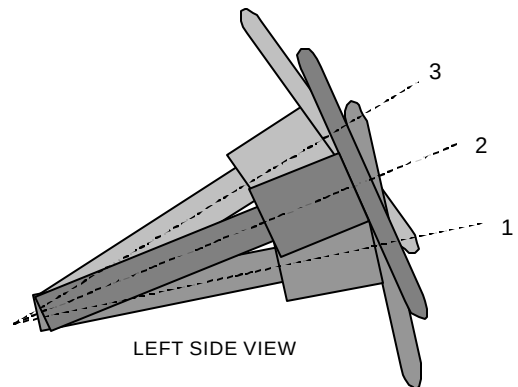
Driver seat fore/aft position: 117 mm

SEAT BELT UPPER ANCHORAGE

The test vehicle "D" ring anchorage for the driver's seat position was placed in the full up position.

STEERING COLUMN ADJUSTMENT

The steering column was placed in the mid position.



STEERING COLUMN ASSEMBLY

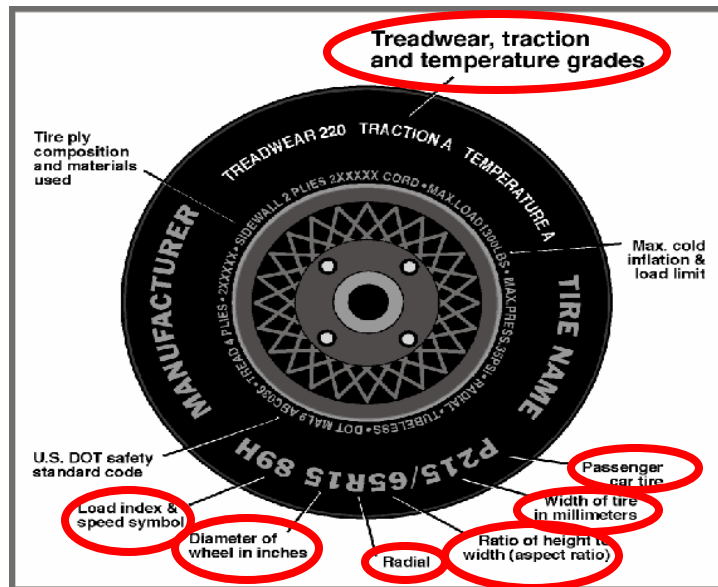
DATA SHEET NO. 2

TEST VEHICLE TIRE INFORMATION

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

Vehicle Year	2000	Vehicle Make	Nissan
Vin	JN1CA31D1YT751327	Vehicle Model	Maxima



	Front	Rear
Tire Manufacturer	Toyo	Toyo
Tire Name	Proxes A05	Proxes A05
Tire Type	Passenger	Passenger
Tire Width (mm)	215	215
Ratio of Height to Width (aspect ratio)	55	55
Radial	Radial	Radial
Wheel Diameter	16	16
Load Index & Speed Symbol	91H	91H
Treadwear	240	240
Traction Grade	A	A
Temperature Grade	A	A

DATA SHEET NO. 3
POST TEST OBSERVATIONS

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Left Front
Dummy Type	ES-2
Head Contact	Pole / headrest / left shoulder
Upper Torso Contact	Pole / upper door
Lower Torso Contact	Mid door
Left Knee Contact	Mid door
Right Knee Contact	Left knee

POST TEST DOOR OPENING

Description	Left Front	Left Rear
Left Side Door Opening	Remained latched and closed	Remained latched and closed
Right Side Door Opening	Remained latched and closed	Remained latched and closed

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No failure
Sill Separation	None
Windshield Damage	Left side cracked
Window Damage	Left side windows lowered for test
Other Notable Effects	None

AIRBAG DEPLOYMENT

	Driver
Front	No
Side	None
Curtain	None

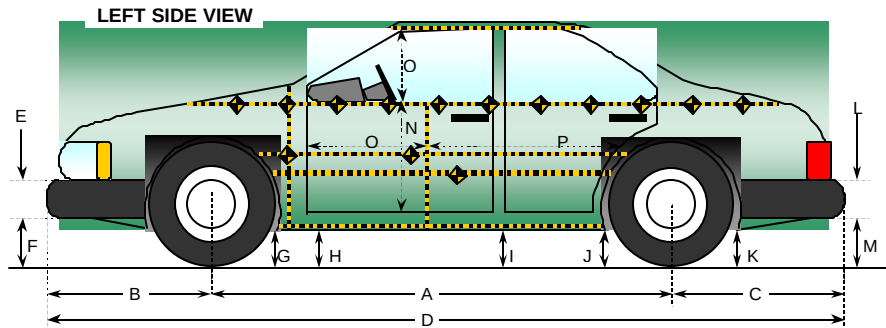
SECTION 4
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 4

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002



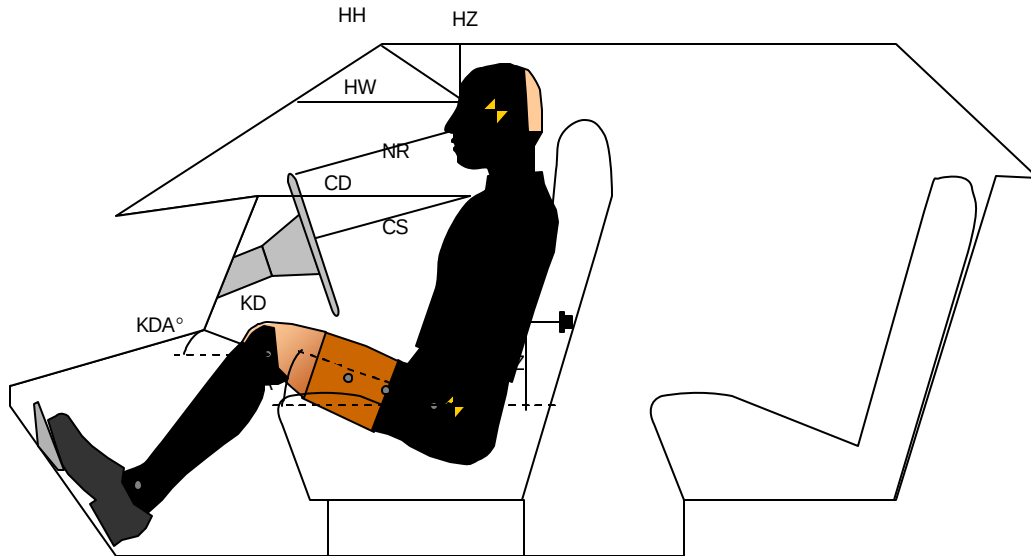
All Measurements in mm

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2760	2512	-248
B	Front Axle to FSOV	985	989	4
C	Rear Axle to RSOV	1065	1135	70
D	Total Length at Centerline	4810	4636	-174
E	Front Bumper Thickness	129	129	0
F	Front Bumper Bottom to Ground	403	487	84
G	Sill Height at Front Wheel Well	192	188	-4
H	Sill Height at Front Door Leading Edge	204	209	5
I	Sill Height at "B" Pillar	209	249	40
J1	Sill Height at Rear Wheel Well	220	226	6
J2	Pinch Weld Height at Rear Wheel Well	217	224	7
K	Sill Height Aft of Rear Wheel Well	285	271	-14
L	Rear Bumper Thickness	225	225	0
M	Rear Bumper Bottom to Ground	418	378	-40
N	Sill Height to Window Bottom Sill	658	632	-26
O	Front Door Leading Edge to Impact CL	860	868	8
P	Rear Door Trailing Edge to Impact CL	1137	1199	62
Q	Front Window Opening	468	416	-52
R	Right Side Length	4180	4214	34
S	Left Side Length	4180	3894	-286
T	Vehicle Width at "B" Post	1795	1571	-224

DATA SHEET NO. 5
ES-2 LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

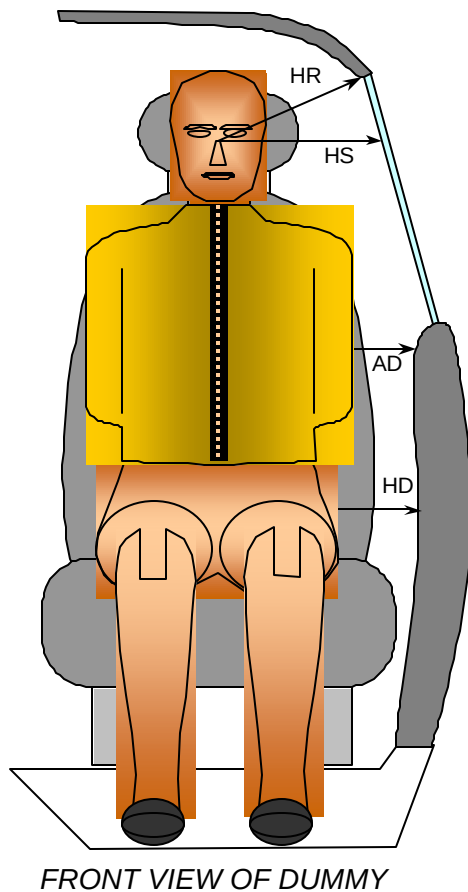


Driver Code	Measurement Description	Left Front	
		Length(mm)	Angle(°)
HH	Head to Header	297	
HW	Head to Windshield	475	
HZ	Head to Roof	128	
NR	Nose to Rim	433	
CD	Chest to Dash	558	
CS	Chest to Steering Wheel	352	
KDL	Left Knee to Dash	236	0
KDR	Right Knee to Dash	224	0
PA	Pelvic Angle (Longitudinal)		23.8
PA	Pelvic Angle (Lateral)		0.7
SA	Spine Angle (Longitudinal)		23.9
SA	Spine Angle (Lateral)		0.9
PHX	H-Point to Striker (X-Axis)	223	
PHZ	H-Point to Striker (Z-Axis)	124	

DATA SHEET NO. 6
ES-2 LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002



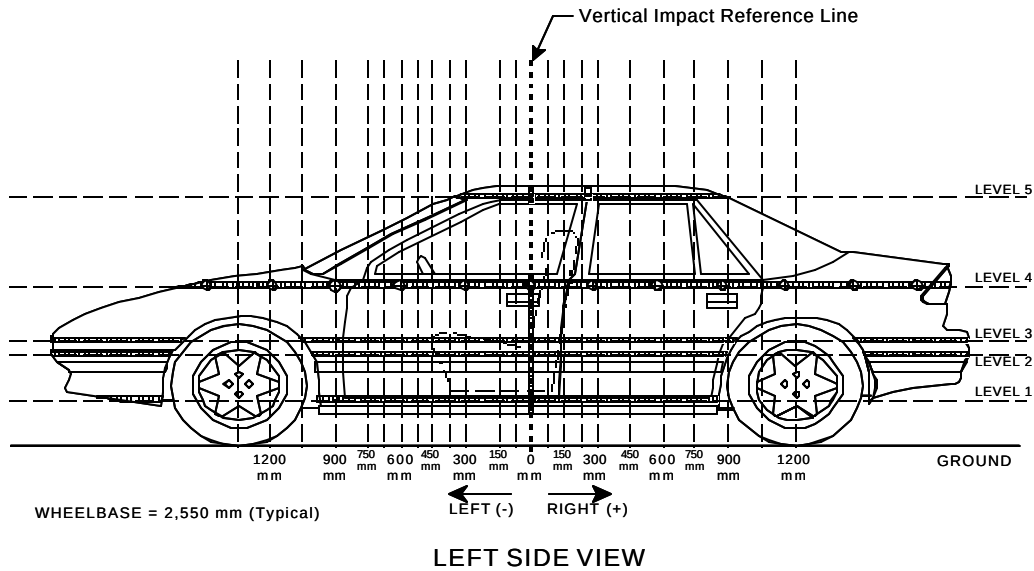
Code	Measurement Description	Units	Left Front
HR	Head to Side Header	mm	171
HS	Head to Side Window	mm	305
AD	Arm to Door	mm	87
HD	H-Point to Door	mm	139

DATA SHEET NO. 7 **VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

PRETEST AND POST TEST EXTERIOR PROFILE MEASUREMENTS



Measurements are taken with vehicle in the as tested condition.
Measurements along the vertical 0 mm.
All measurements below in mm.

Level	Measurement Description	Height Above Ground
5	Window	1470
4	Window Sill	1013
3	Mid Door	732
2	Occupant H-Point	620
1	Sill Top	401

DATA SHEET NO. 8
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1950				343					374					31	
-1800				321					363					42	
-1650				303					359					56	
-1500				291					363					72	
-1350				283					366					83	
-1200				283					364					81	
-1050	280	234	232	278		365	324	318	361		85	90	86	83	
-975	282	237	232	279		368	314	310	352		86	77	78	73	
-900	282	237	232	280		366	332	338	337		84	95	106	57	
-825	283	236	231	280		434	350	365	347		151	114	134	67	
-750	283	236	230	280		451	377	393	368		168	141	163	88	
-675	283	235	230	278		476	410	427	399		193	175	197	121	
-600	283	235	230	278		491	437	455	431		208	202	225	153	
-525	282	235	229	278		507	466	485	462		225	231	256	184	
-450	282	234	229	279		533	494	513	492		251	260	284	213	
-375	282	234	229	279		571	533	551	530		289	299	322	251	
-300	283	234	228	278	507	624	574	593	577	601	341	340	365	299	94
-225	284	233	228	278	503	678	622	636	624	655	394	389	408	346	152
-150	284	233	228	278	501	693	673	675	672	705	409	440	447	394	204
-75	283	233	228	278	502	672	696	698	699	740	389	463	470	421	238
0	284	233	229	278	502	630	678	680	683	719	346	445	451	405	217
75	284	233	228	278	504	588	625	625	630	695	304	392	397	352	191
150	284	233	228	277	505	541	554	557	592	682	257	321	329	315	177
225	283	233	228	277	505	489	514	518	560	667	206	281	290	283	162
300	285	233	228	278	507	423	471	469	526	674	138	238	241	248	167
450	284	233	228	280	506	409	392	407	473	625	125	159	179	193	119
600	283	234	229	281	507	309	302	325	397	555	26	68	96	116	48
750	284	236	231	283	508	276	264	289	365	531	-8	28	58	82	23
900	278	234	233	287	512	225	202	231	310	515	-53	-32	-2	23	3
1050			218	290	528			219	275	527			0	-15	0
1200				298					289					-9	
1350				304					300					-4	
1500				314					318					4	
1650				326					336					10	
1800				338					365					27	
1950				356					382					26	
2100				374					396					22	

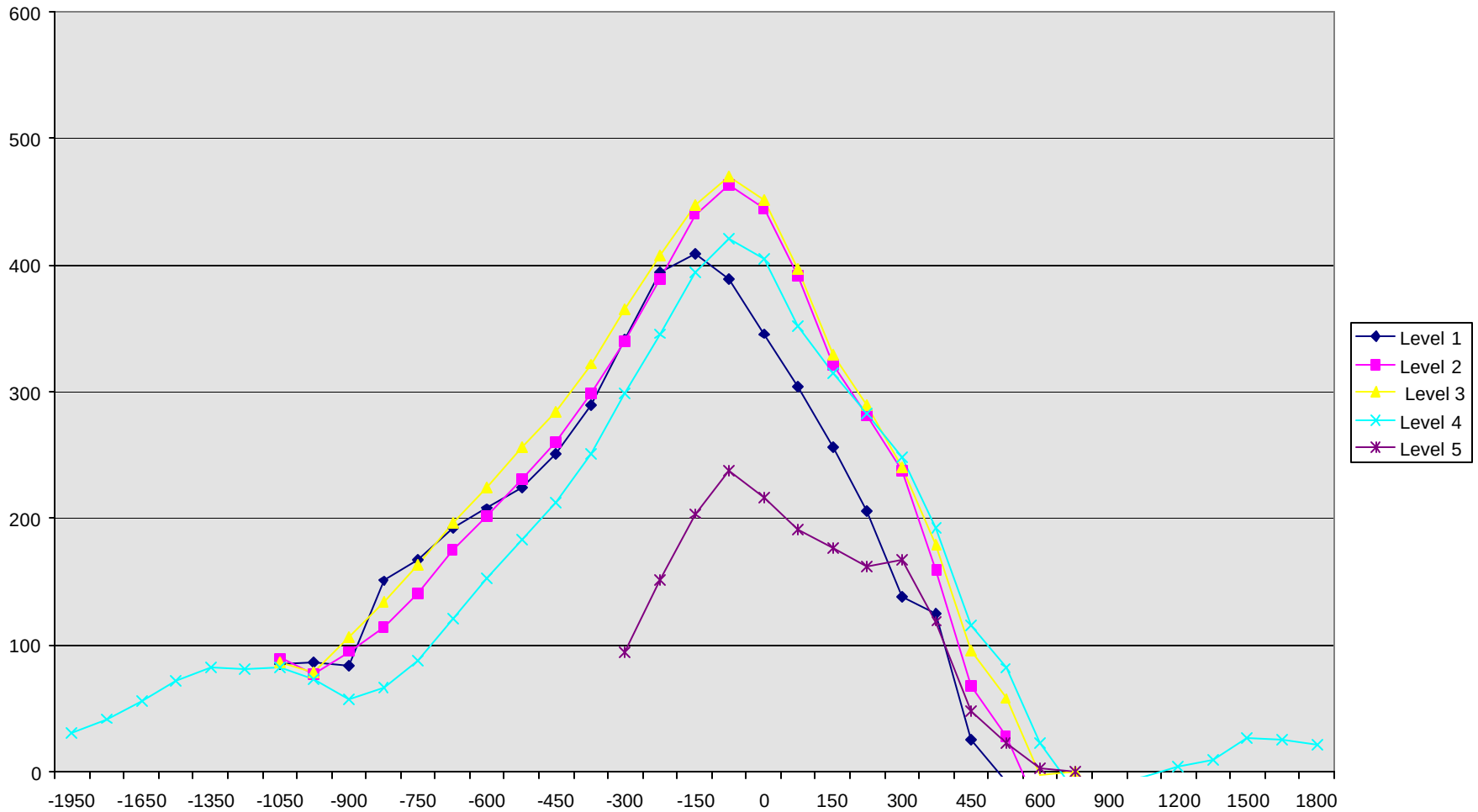
Reference plane is parallel to test vehicle longitudinal centerline.
 Given dimensions = Reference plane to car body.
 Measurements in mm.

DATA SHEET NO. 8... (continued)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

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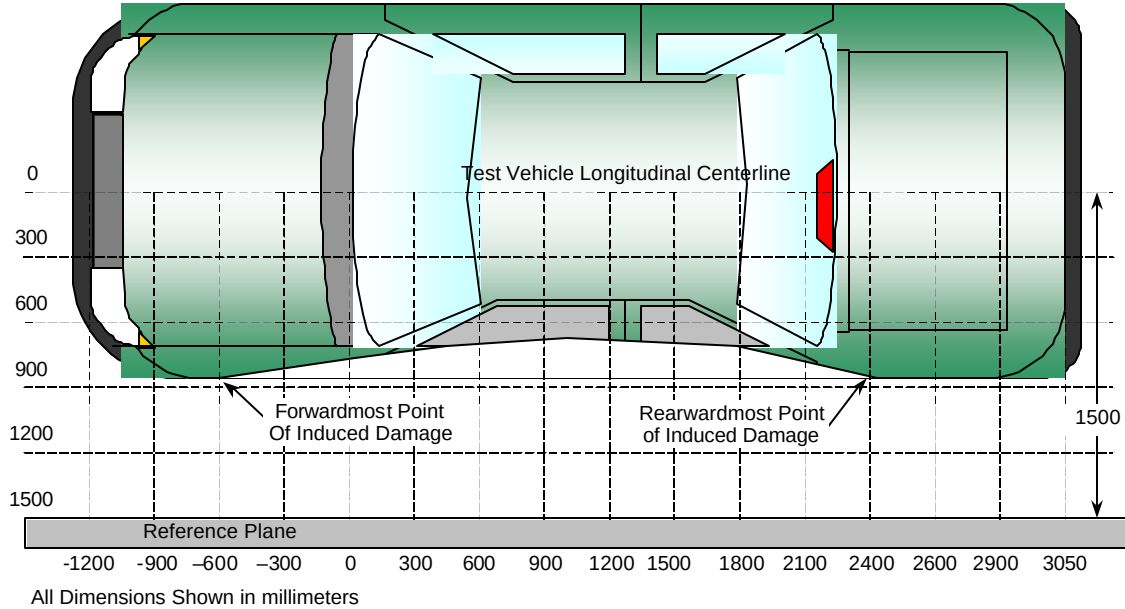


Measurement in mm.

DATA SHEET NO. 9
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002



TOP VIEW

Damage Profile Distances

DPD	Distance from Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max Static Crush (mm)
1	2100 mm	4	374	396	22
2	1340 mm	4	304	392	88
3	576 mm	4	281	584	303
4	-422 mm	3	229	692	463
5	-1200 mm	4	283	396	103
6	-1950 mm	4	343	374	31

Reference plane is parallel to test vehicle longitudinal centerline.

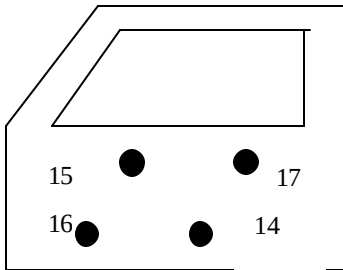
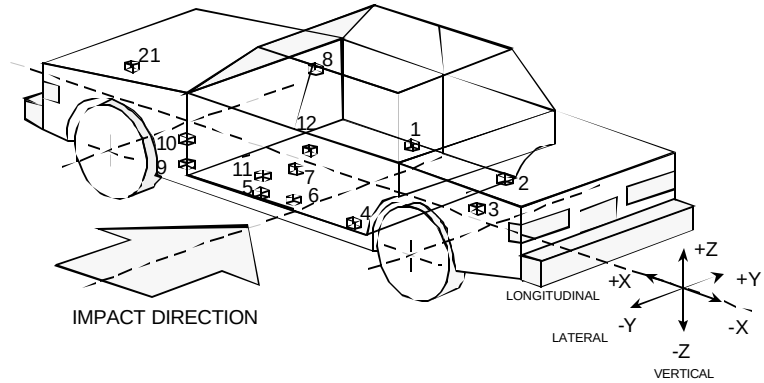
Given dimensions = Reference plane to car body.

DATA SHEET NO. 10

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002



No.	Location
1	Right Side Sill at Front Seat
2	Right Side Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Side Sill at Rear Door
5	Left Side Sill at Front Door
6	Left Lower B-Post
7	Left Mid B-Post
8	Left Upper B-Post
9	Left Lower A-Post
10	Left Mid A-Post
11	Driver Seat Track

No.	Location
12	Vehicle CG
13	Left A-Pillar @ Roof
14	Left Front Door @ Pelvis
15	Left Front Door @ Arm
16	Left Front Door @ Knee
17	Left Front Door @ Rib
19	Left Driver Seat Frame
20	Right Driver Seat Frame
21	Lower Center Radiator Support

DATA SHEET NO. 10... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Long (X) Maximums (g's) (CFC 60)		Lat. (Y) Maximums (g's) (CFC 60)		Vert. (Z) Maximums (g's) (CFC 60)		Resultant (g's) (CFC 60)
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Max.
1	Right Side Sill at Front Seat	0.6	3.0	9.3	0.8	4.6	5.2	9.4
2	Right Side Sill at Rear Seat	1.9	1.5	10.9	0.6	4.2	3.0	11.0
3	Rear Floorpan Above Axle	2.2	2.2	8.5	0.0	3.6	2.7	8.8
4	Left Side Sill at Rear Door			14.4	2.2			
5	Left Side Sill at Front Door			45.0	9.0			
6	Left Lower B-Post			46.7	6.6			
7	Left Mid B-Post			54.0	6.1			
8	Left Upper B-Post			40.1	17.9			
9	Left Upper A-Post*			74.4	8.7			
10	Left Lower A-Post			22.6	5.7			
11	Left Mid A-Post**			**	**			
12	Driver Left Seat Track			46.7	24.3			
13	Vehicle CG	9.4	12.7	39.0	39.1	19.4	19.1	41.5
14	Left Front Door at Pelvis***			133.8	50.0			
15	Left Front Door at Arm			130.2	42.6			
16	Left Front Door at Knee			86.3	43.4			
17	Left Front Door at Rib			116.2	18.2			
19	Left Driver Seat Frame			72.4	26.3			
20	Right Driver Seat Frame			64.6	18.3			
21	Lower Center Radiator Support	0.6	6.3	8.3	5.8	2.5	4.8	8.9

* = Questionable Data after approximately 72 msec.

** = No Valid Data

*** = Questionable Data after approximately 100 msec.

Sign Convention X - Test Vehicle Rear Bumper (+ forward)
 Y - Test Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 10... (continued)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002

VEHICLE ACCELEROMETER COORDINATES

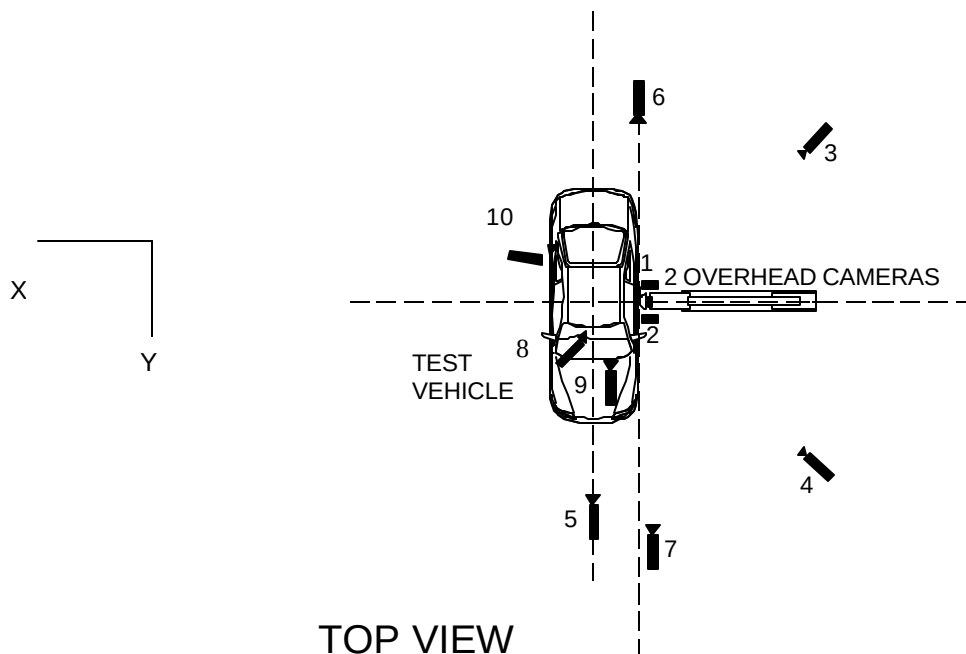
Loc. No.	Description	Coordinates (mm)		
		X	Y	Z
1	Right Side Sill at Front Seat	2944	705	210
2	Right Side Sill at Rear Seat	1929	705	216
3	Rear Floorpan Above Axle	1050	0	480
4	Left Side Sill at Rear Door	1616	-708	218
5	Left Side Sill at Front Door	2760	-705	214
6	Left Lower B-Post	2180	-700	400
7	Left Mid B-Post	2182	-700	892
8	Left Upper B-Post	2100	-496	1345
9	Left Lower A-Post	3233	-685	303
10	Left Mid A-Post	3310	-790	833
11	Driver Left Seat Track	2376	-540	352
12	Vehicle CG	2706	0	316
13	Left A-Pillar @ Roof	2650	535	1260
14	Left Door @ Pelvis	2429	-760	570
15	Left Door @ Arm	2649	-762	732
16	Left Door @ Knee	2845	-746	658
17	Left Door @ Rib	2429	-760	570
19	Left Driver Seat Frame	2227	-504	684
20	Right Driver Seat Frame	2227	-206	686
21	Lower Center Radiator Support	4560	25	278

Sign Convention X – Rear Bumper (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ up)

DATA SHEET NO. 11
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2000 Nissan Maxima

Test Date: August 29, 2002



No.	Camera View	Location (mm)			Lens (mm)	Film Speed (fps)
		X	Y	Z		
1	Overhead Overall	820	0	5000	8	1000
2	Overhead Close-up	0	0	5000	13	1000
3	Left Side 45 deg. Rearward Pole View	-3200	-6580	1360	50	1015
4	Left Side 45 deg. Forward Pole View	-3550	5000	1370	50	1000
5	Real Time					
6	Front Ground Level Vehicle Roof Targets and Vehicle/Pole Impact	570	8920	1450	25	1000
7	Rear Ground Level	340	-9230	1500	25	952
8	Test Vehicle Onboard Driver Side View				13	503
9	Test Vehicle Onboard Driver Front View				13	503
10	Test Vehicle Onboard Driver $\frac{3}{4}$ Rear View				13	513

Reference Points X - + Forward of Impact
Y - + Right of Impact
Z - + Up from Ground

APPENDIX A
PHOTOGRAPHS

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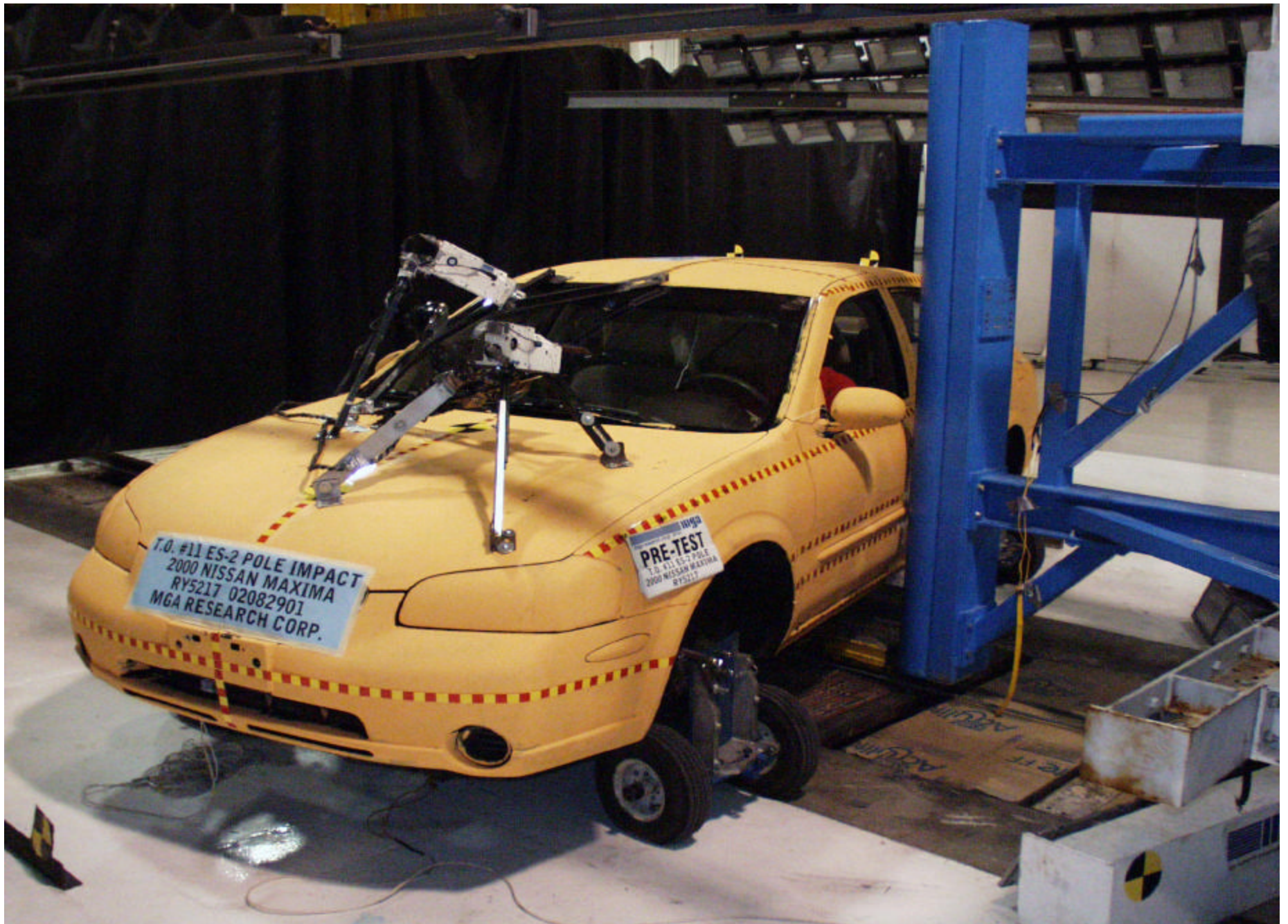
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Pre-Test Front View of Test Vehicle and Pole



Post-Test Front View of Test Vehicle and Pole



Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle and Pole



Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle and Pole



Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle and Pole



Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle and Pole



Pre-Test Rear View of Test Vehicle and Pole



Post-Test Rear View of Test Vehicle and Pole



Pre-Test Right Rear $\frac{3}{4}$ View of Test Vehicle and Pole



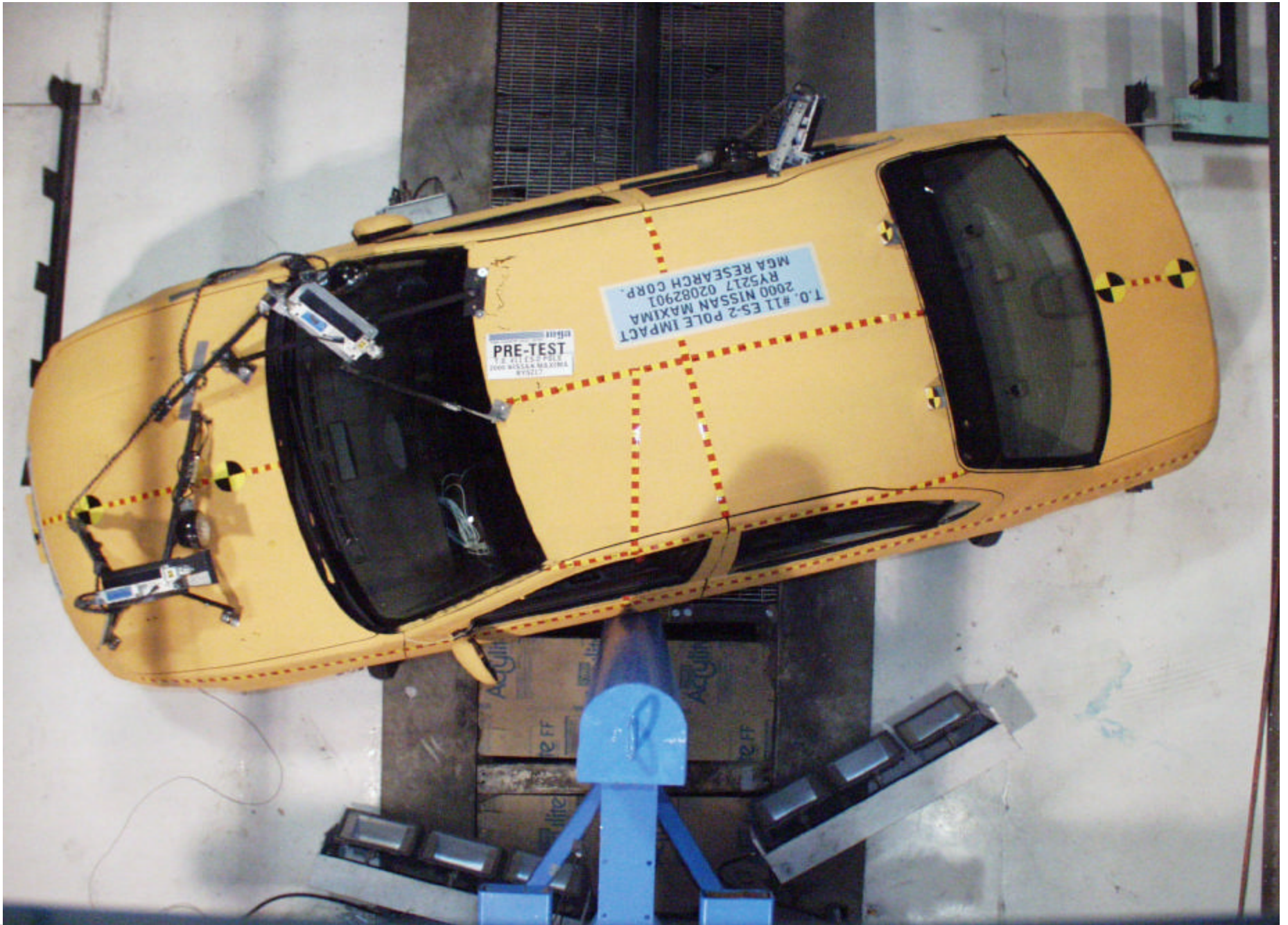
Post-Test Right Rear $\frac{3}{4}$ View of Test Vehicle and Pole



Pre-Test Right Front $\frac{3}{4}$ View of Test Vehicle and Pole



Post-Test Right Front $\frac{3}{4}$ View of Test Vehicle and Pole



Pre-Test Vehicle and Pole Overhead View



Post-Test Vehicle and Pole Overhead View



Pre-Test Driver Seat Position



Pre-Test Driver Dummy Left Side View



Post-Test Driver Dummy Left Side View



Pre-Test Driver Dummy Right Side View



Post-Test Driver Dummy Right Side View



Pre-Test Driver Dummy Left Side View (Door Open)



Pre-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Shoulder and Door Top View



Post-Test Driver Dummy Pole Contact



Post-Test Driver Dummy Contact



Post-Test Driver Dummy Head Contact



Pre-Test Impact Point on Vehicle



Post-Test Impact Point on Vehicle



Impact

MFD.BY **NISSAN MOTOR CO.,LTD**

DATE 01/00

GVWR/PNBV 4333 LBS.

GAWR/PNBE FR. 2365 LBS. RR. 1988 LBS.

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

JN1CA31D1YT751327

PASSENGER CAR/VOITURE DE TOURISME



JN1CA31D1YT751327



Left Front Attitude Point



Right Front Attitude Point



Left Rear Attitude Point



Right Rear Attitude Point

APPENDIX B

DUMMY AND VEHICLE RESPONSE DATA TRACES

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* = No Valid Data after approximately 72 msec.

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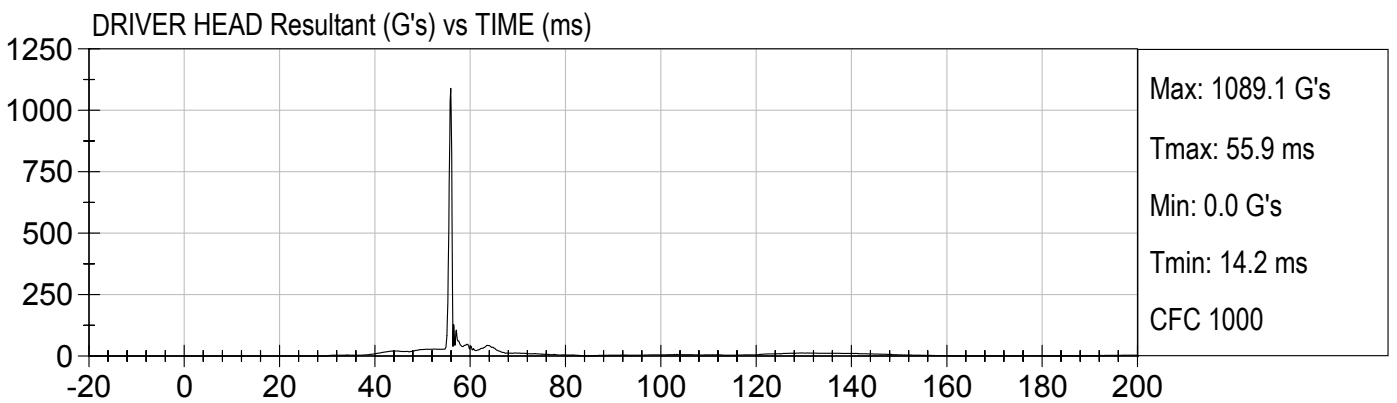
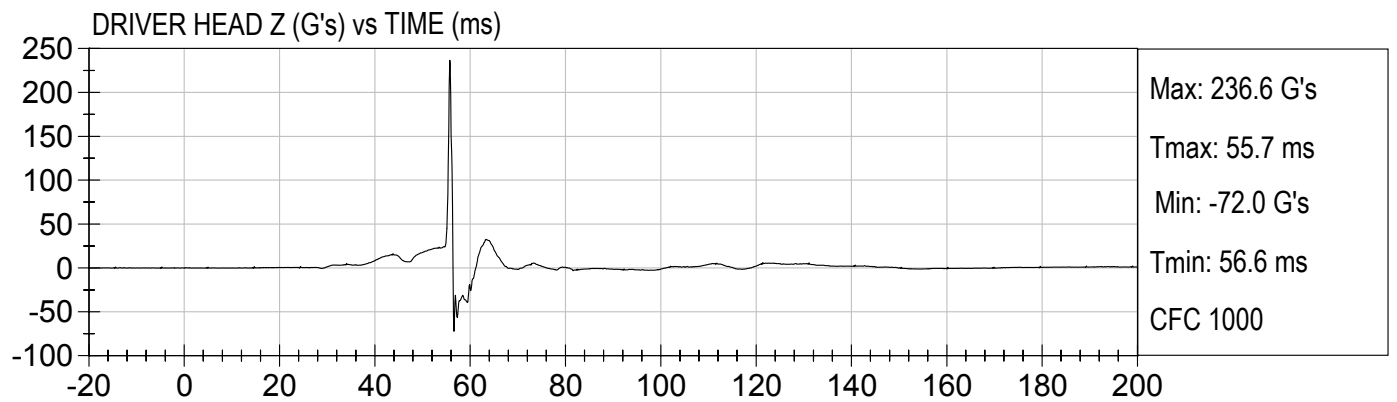
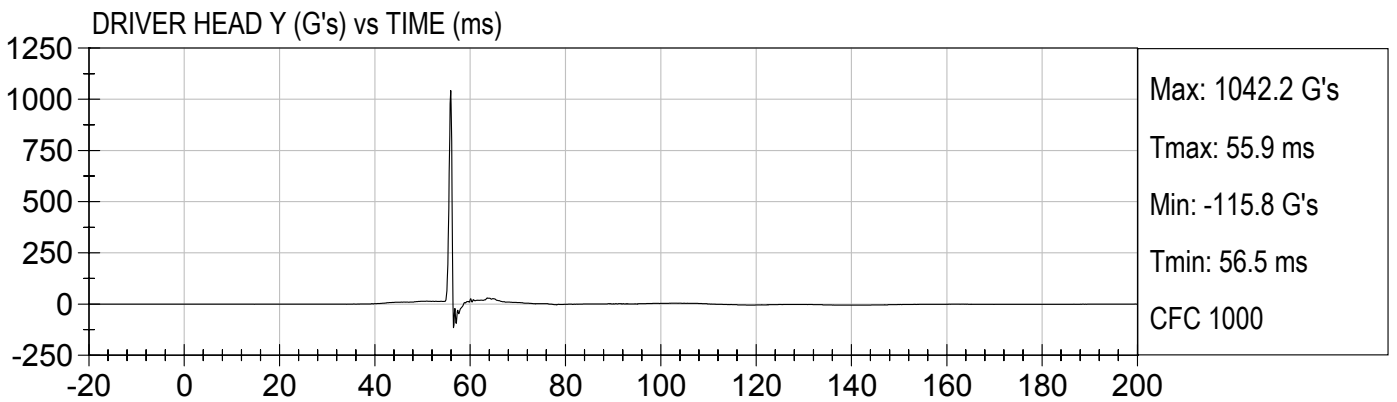
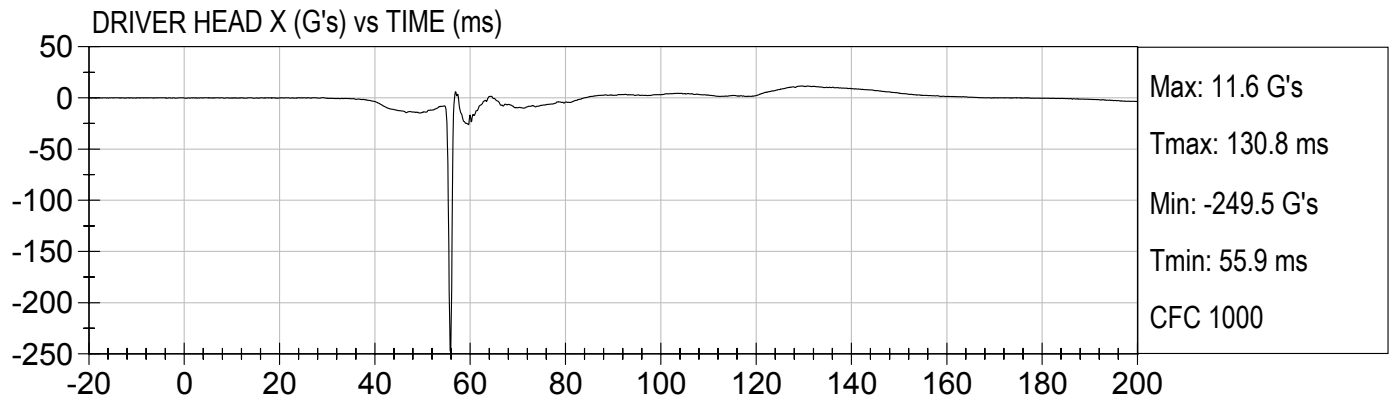
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20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

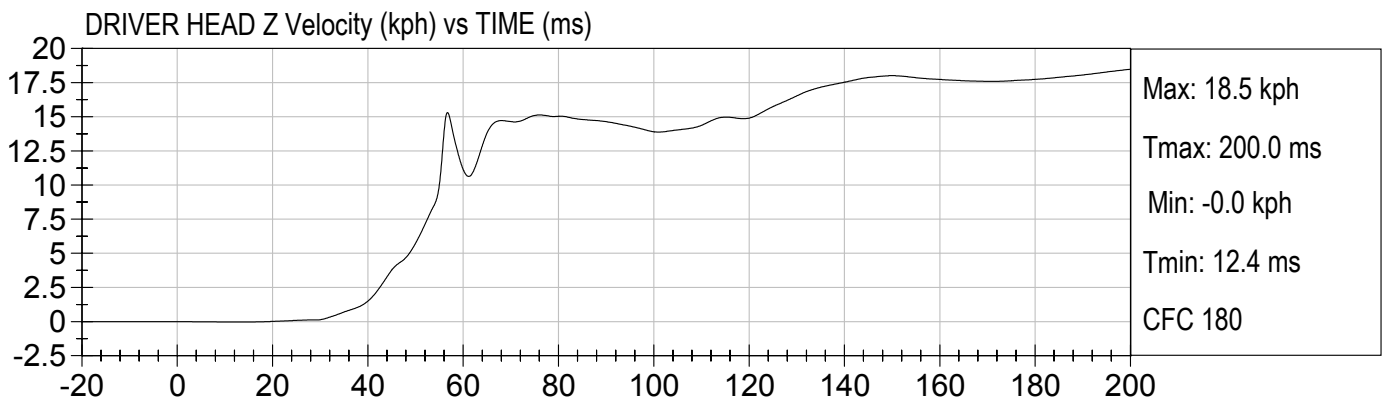
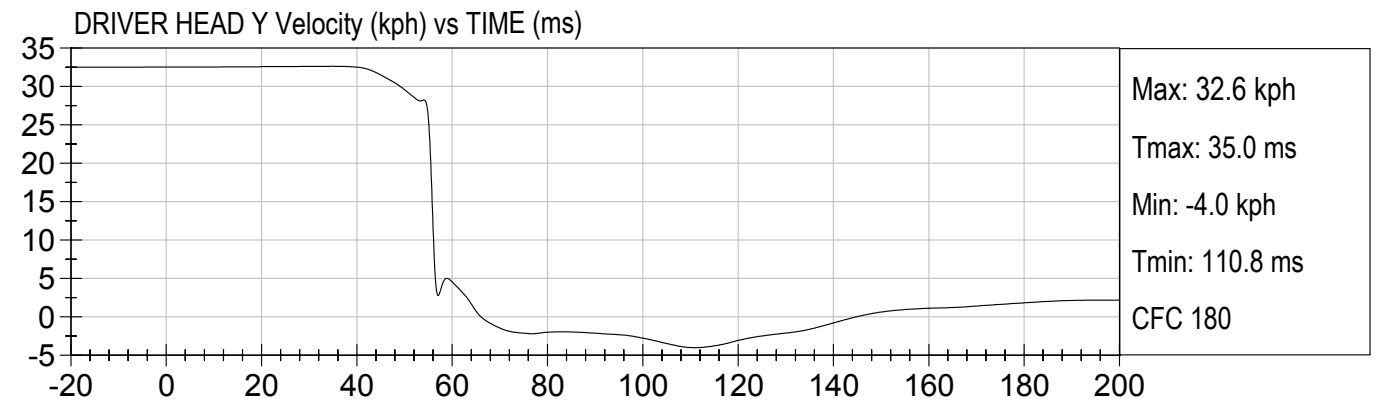
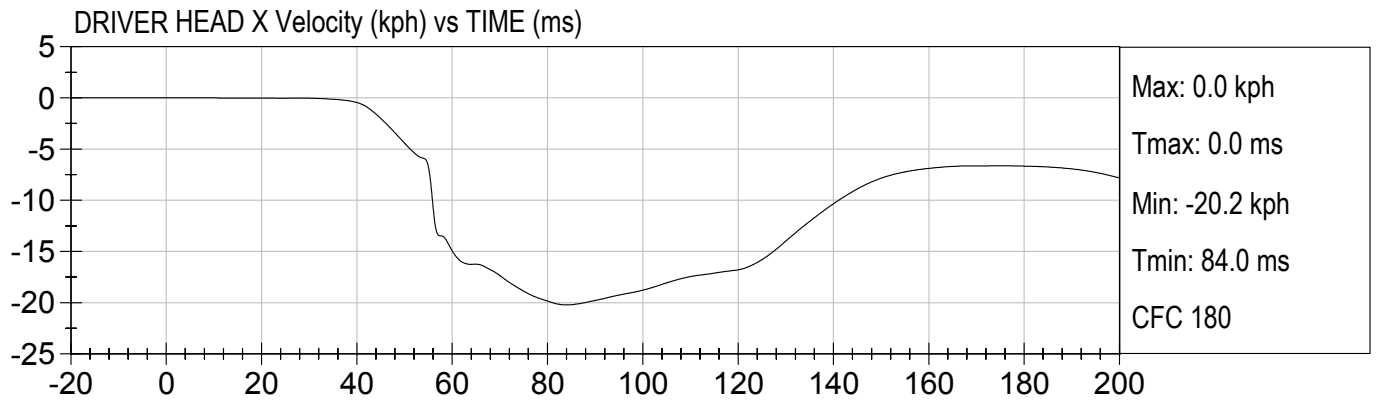
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Speed: 20.2 mph (32.5 km/h)

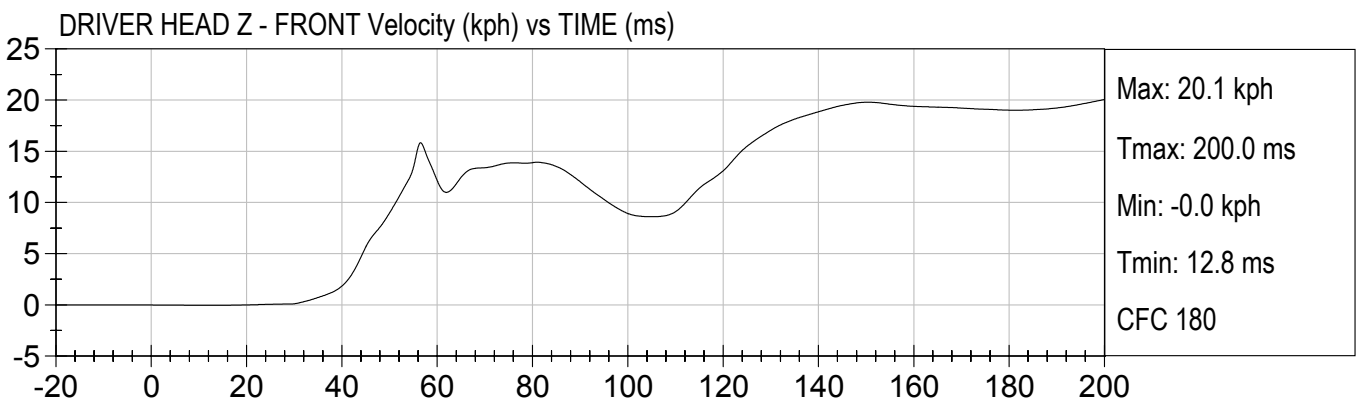
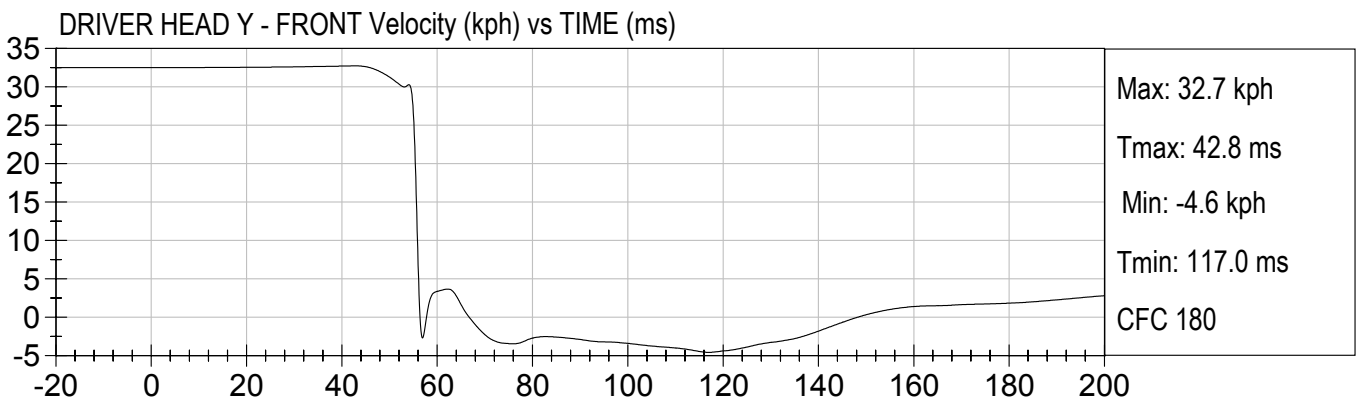
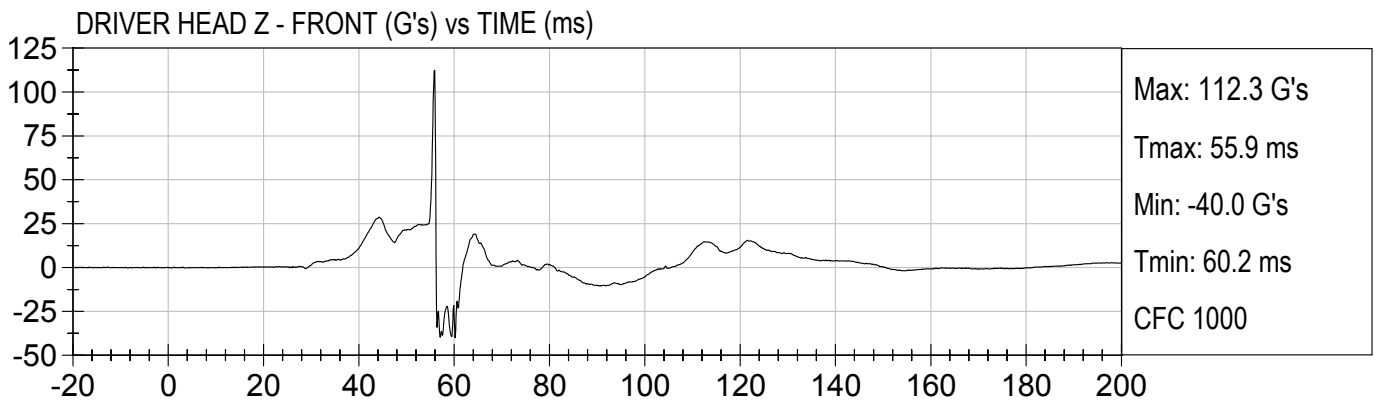
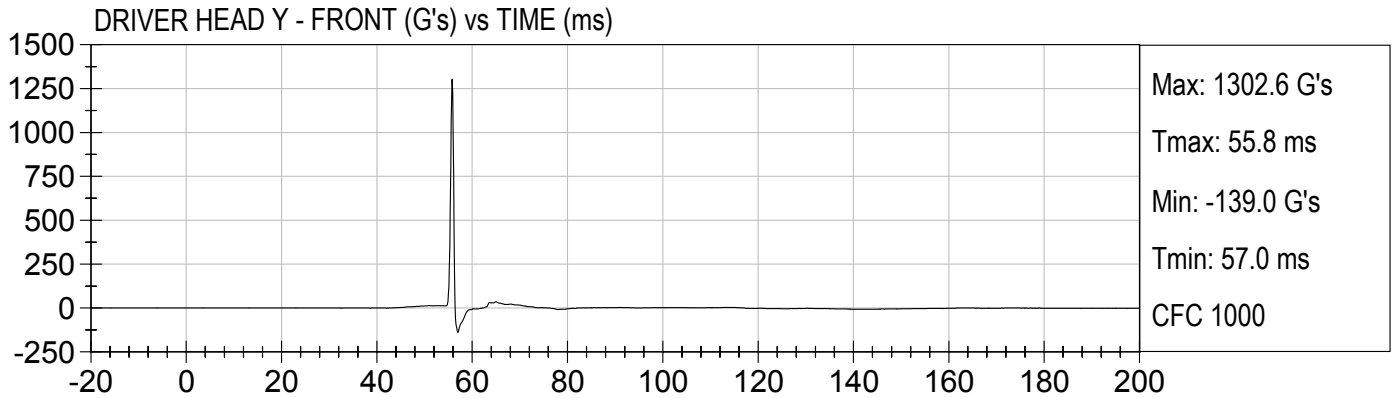


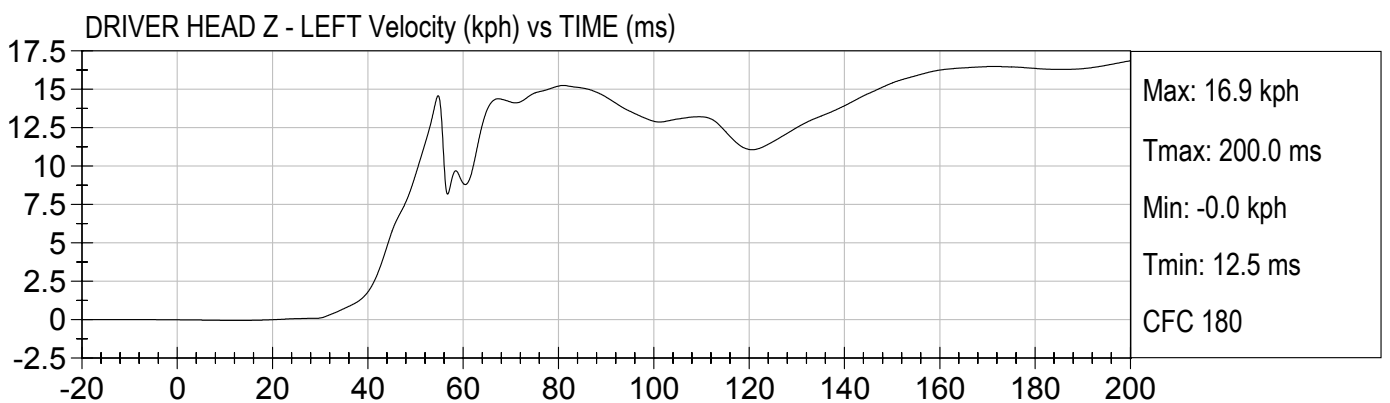
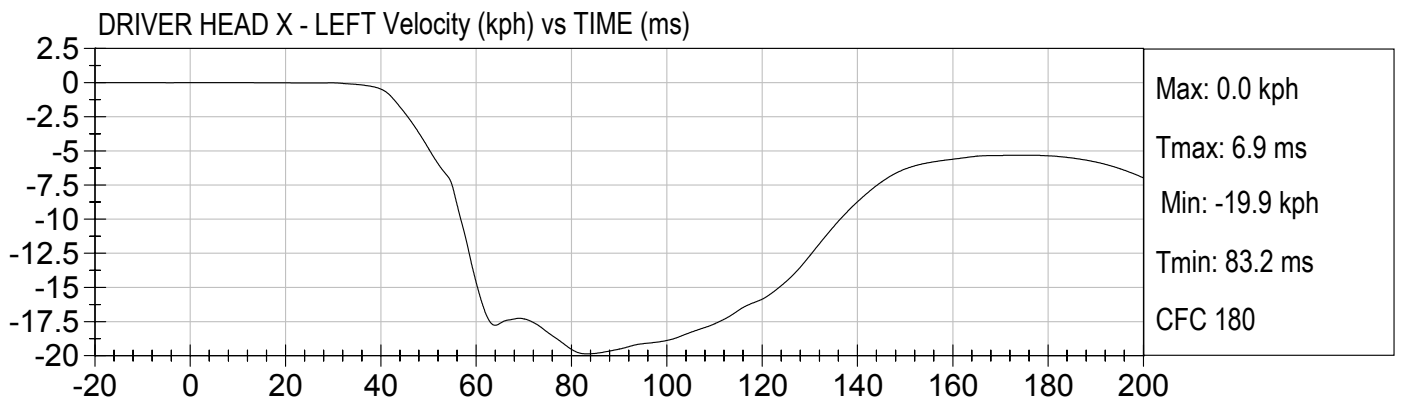
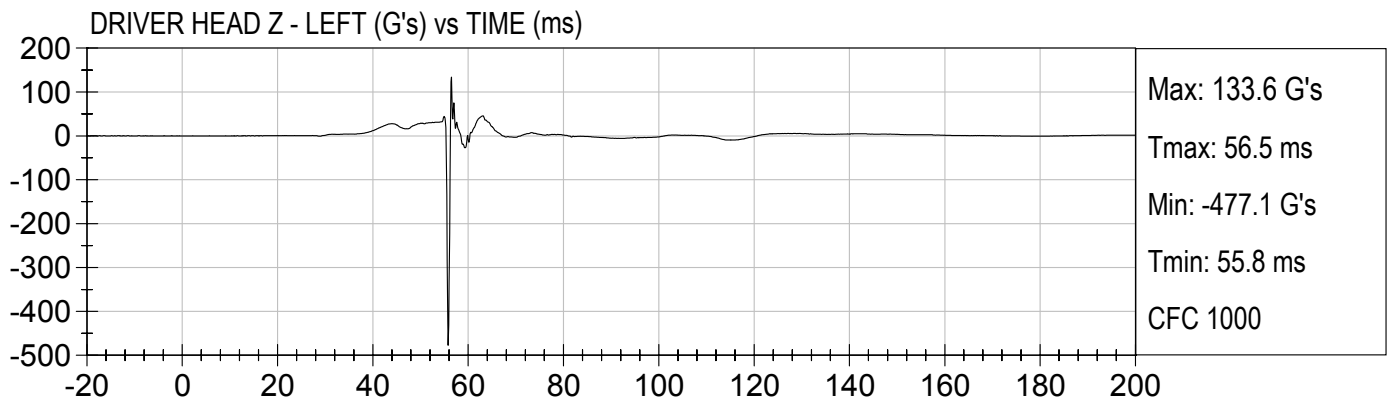
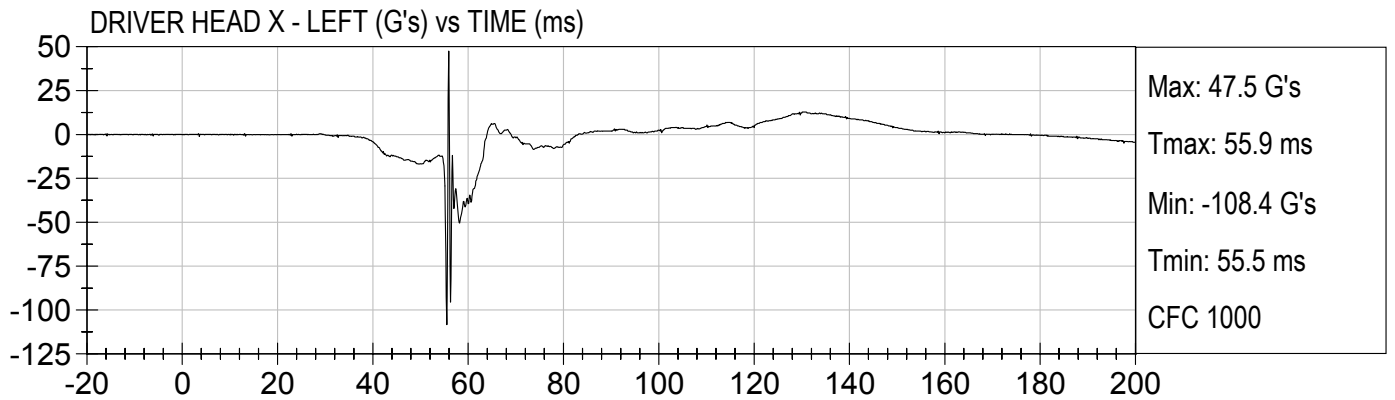


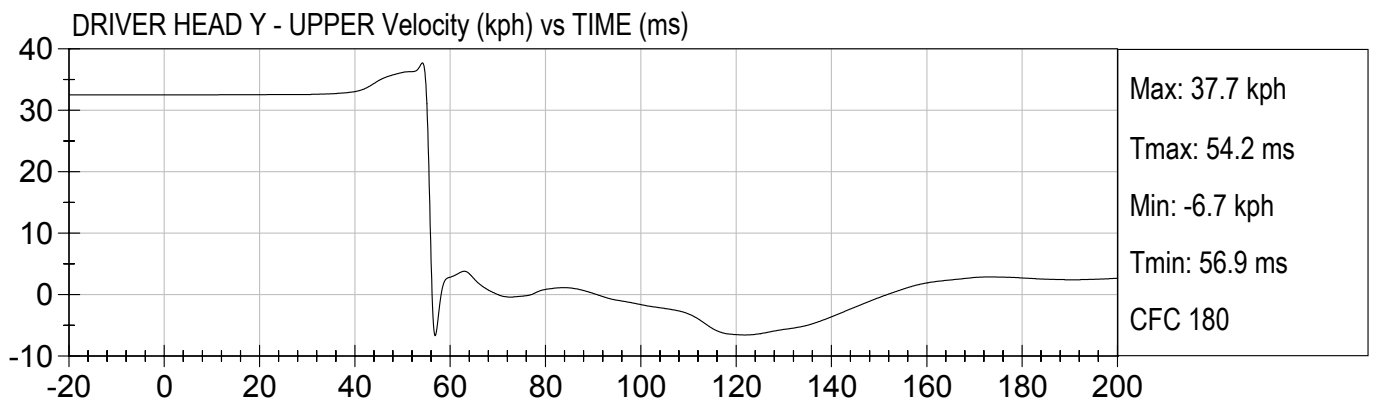
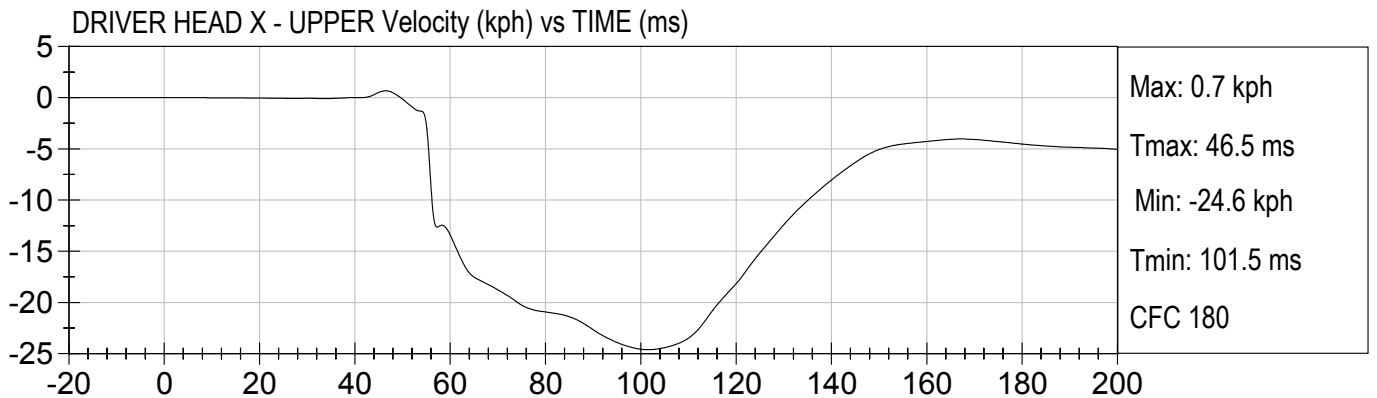
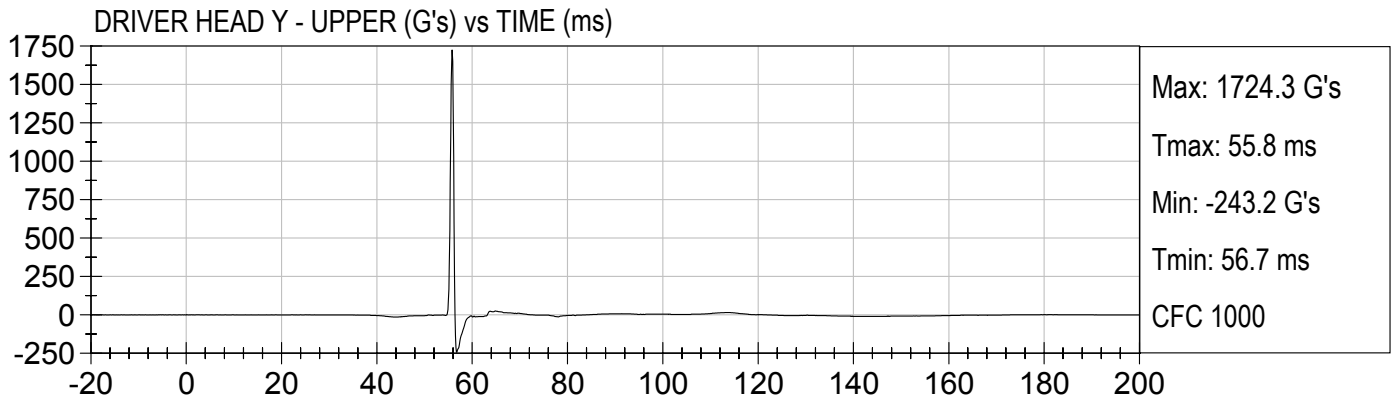
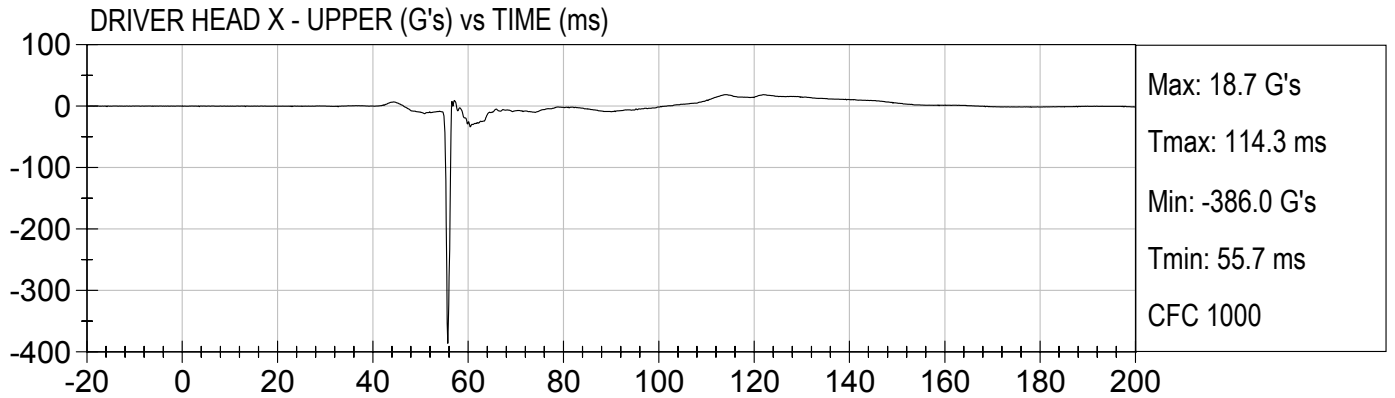
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)







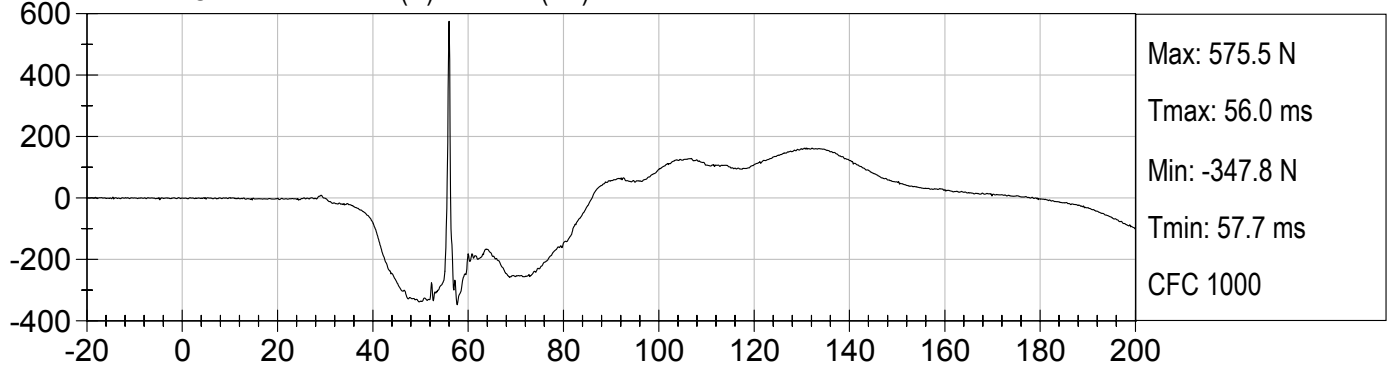




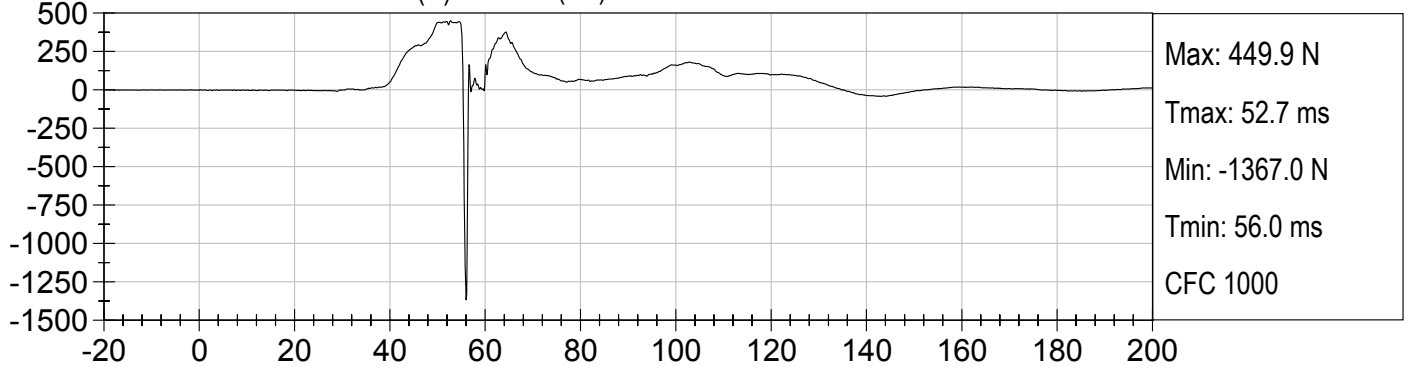
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

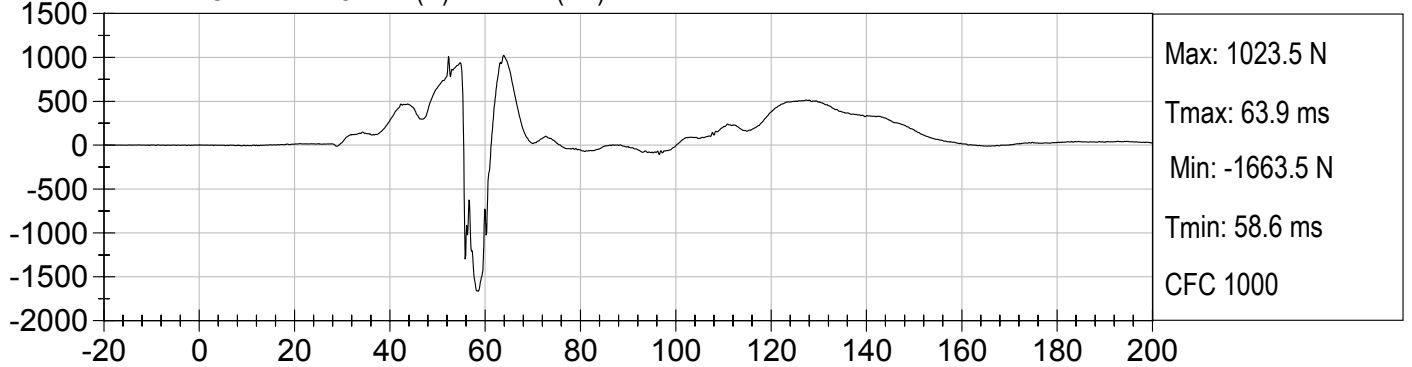
DRIVER UPPER NECK FX (N) vs TIME (ms)



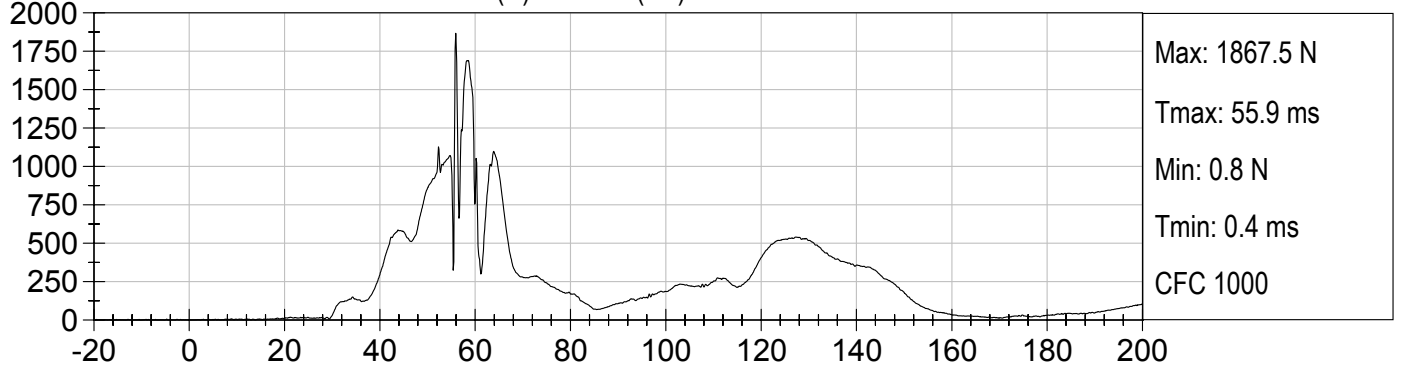
DRIVER UPPER NECK FY (N) vs TIME (ms)



DRIVER UPPER NECK FZ (N) vs TIME (ms)



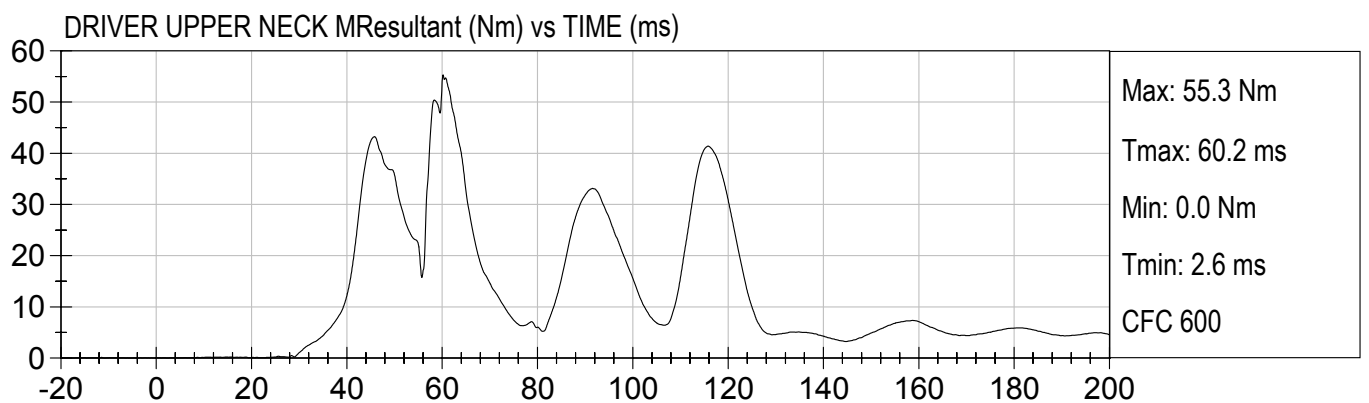
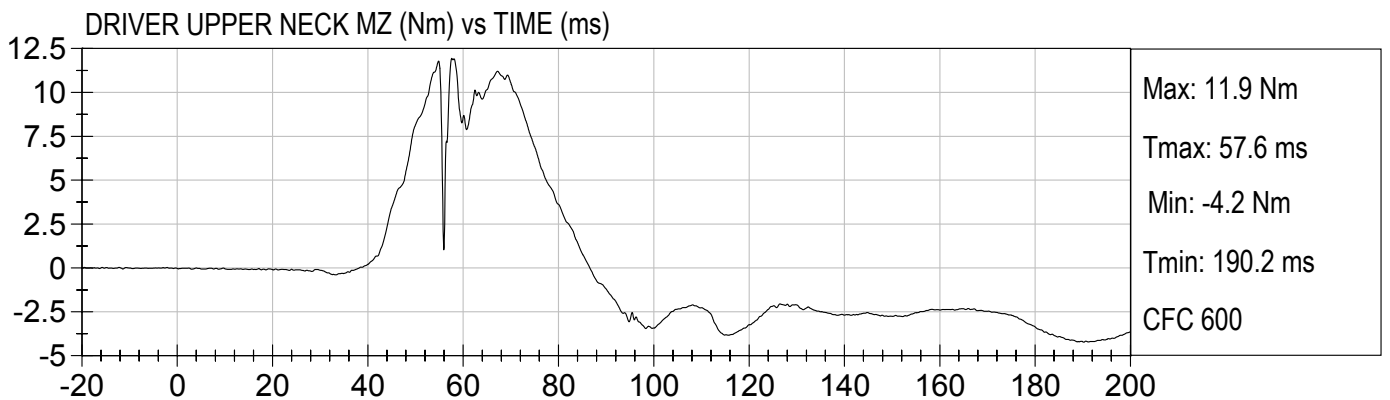
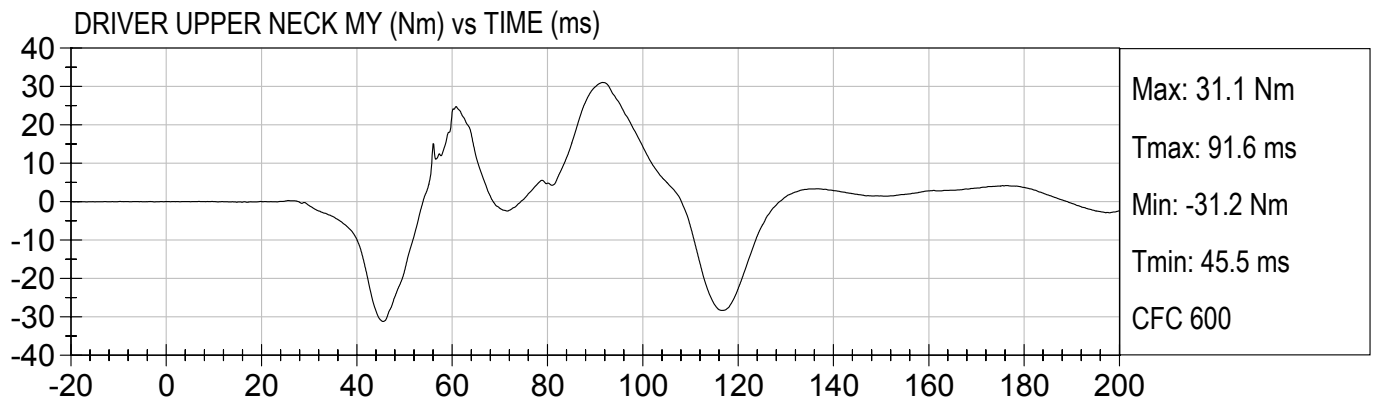
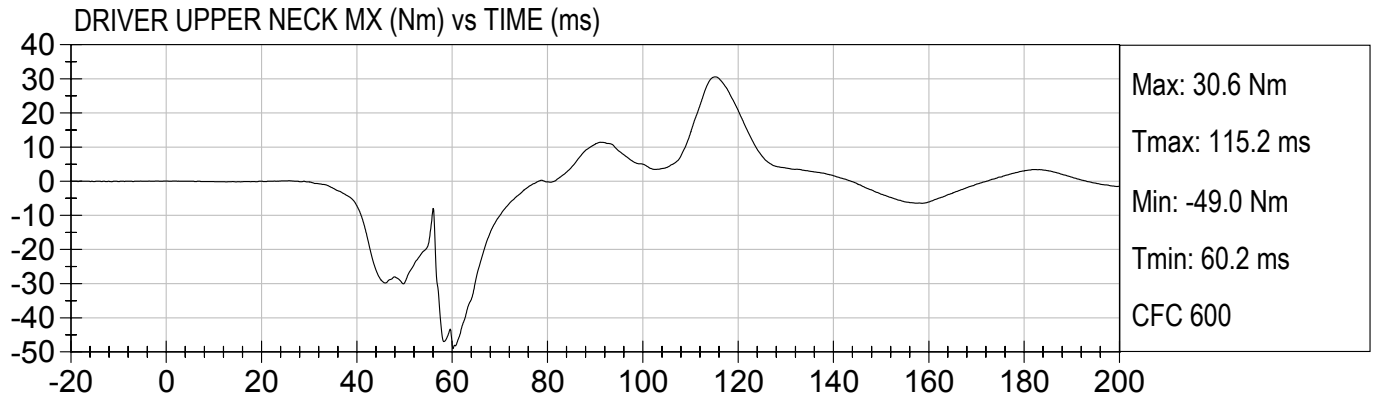
DRIVER UPPER NECK FResultant (N) vs TIME (ms)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

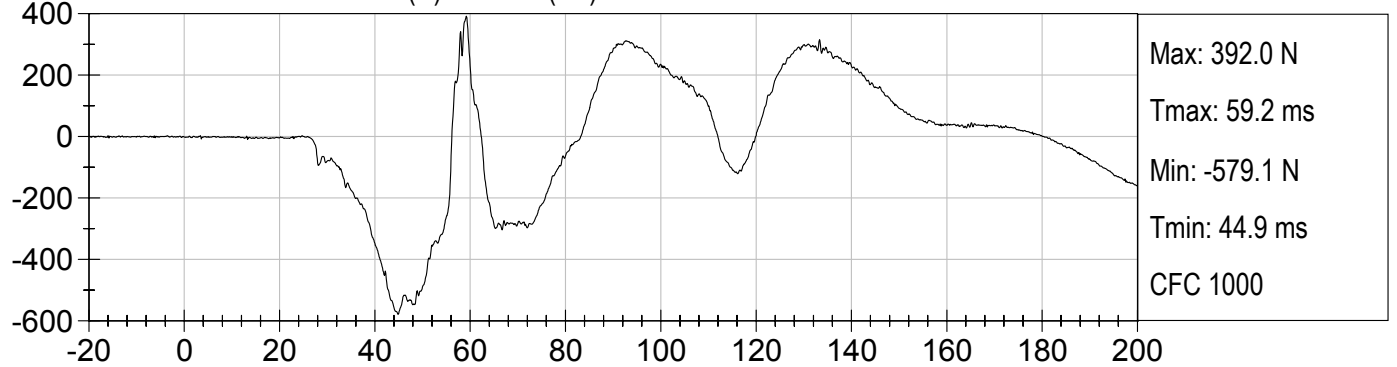




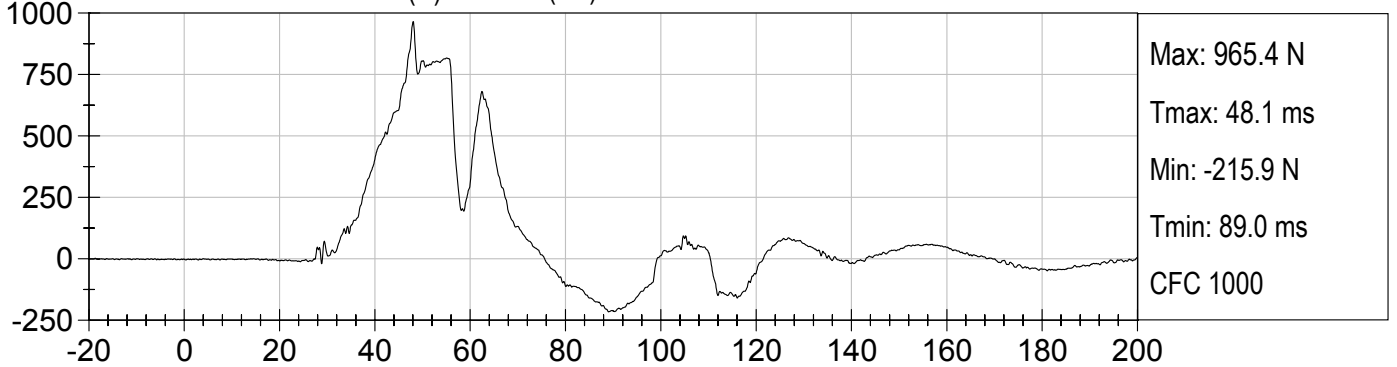
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

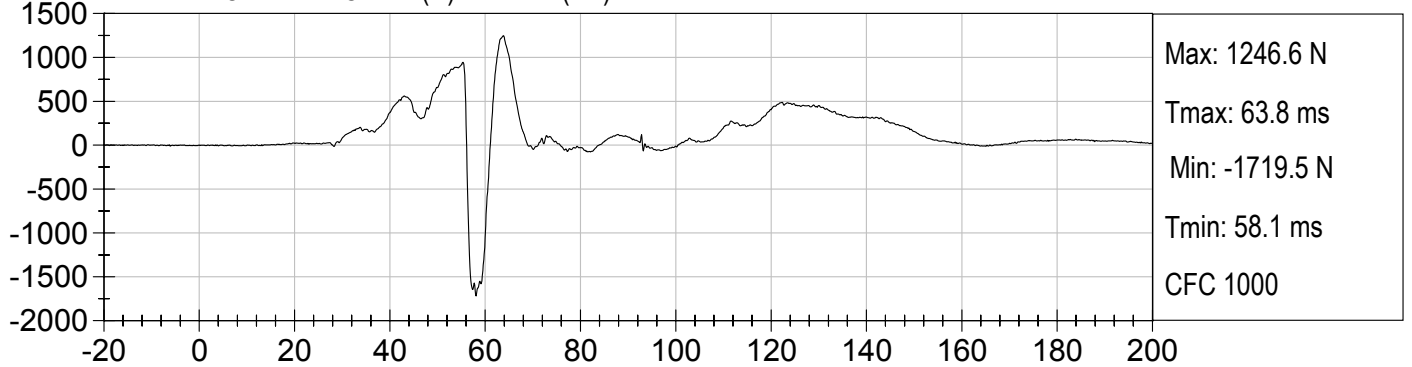
DRIVER LOWER NECK FX (N) vs TIME (ms)



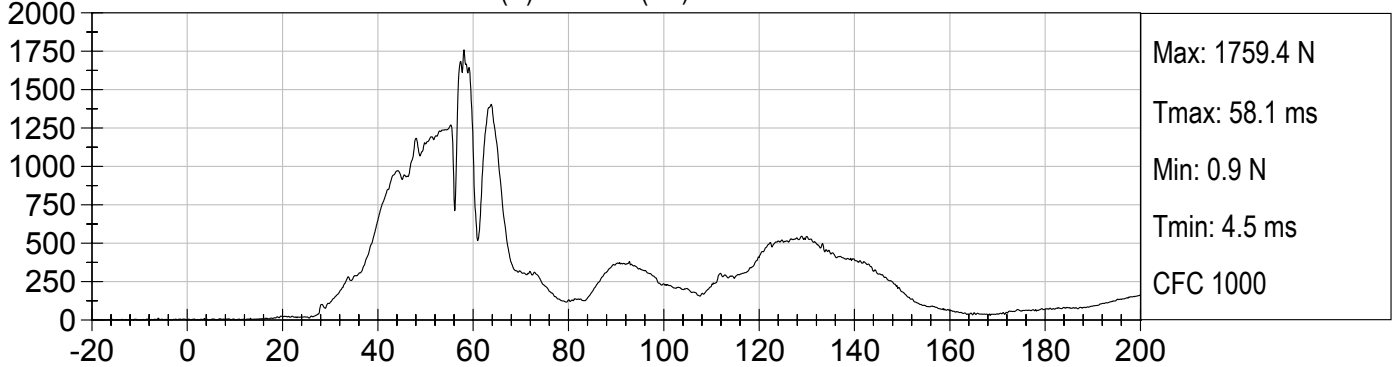
DRIVER LOWER NECK FY (N) vs TIME (ms)

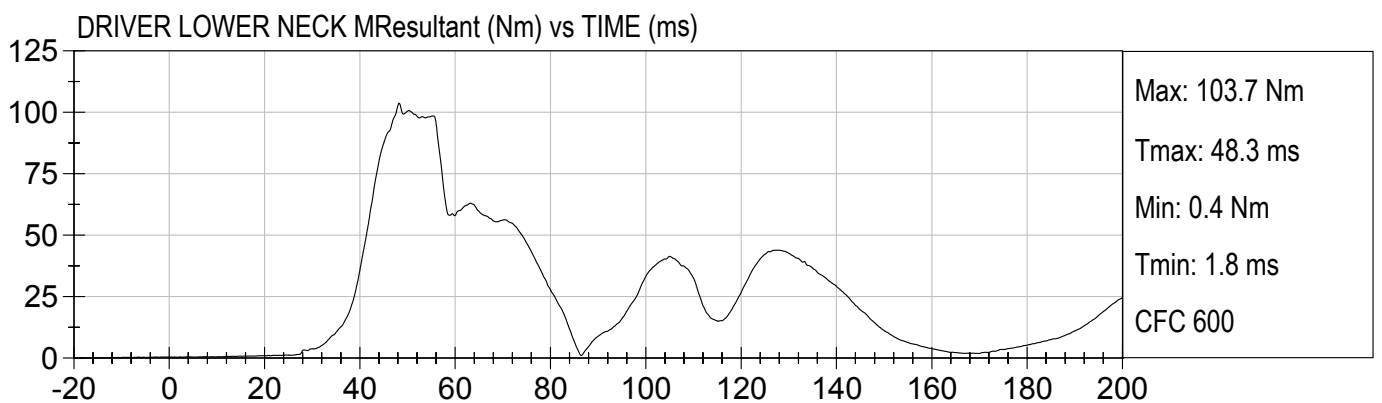
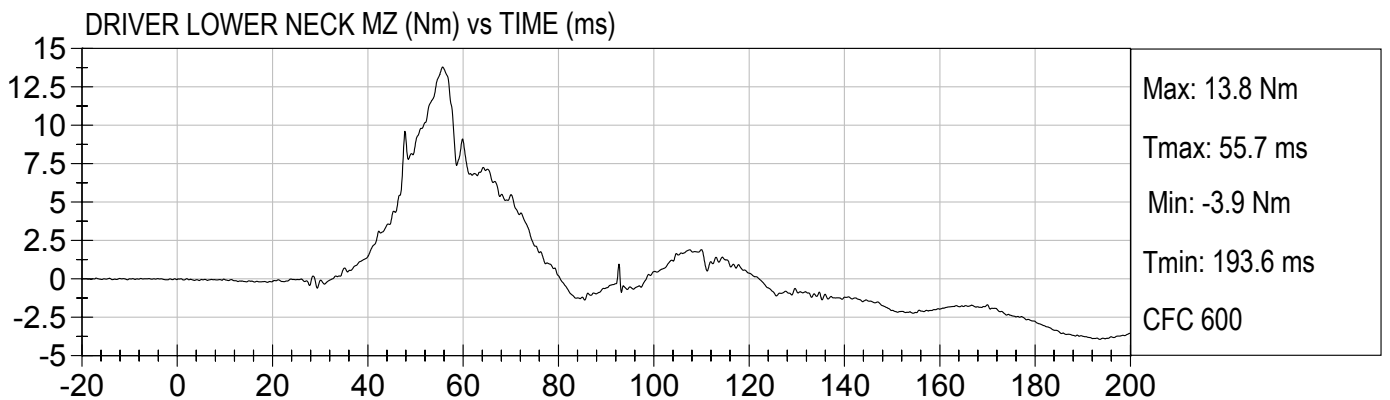
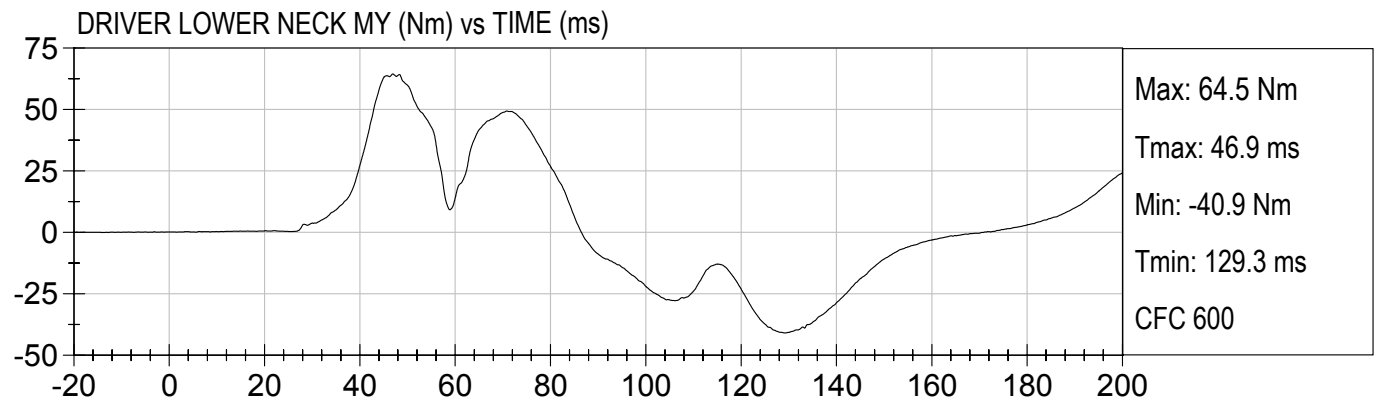
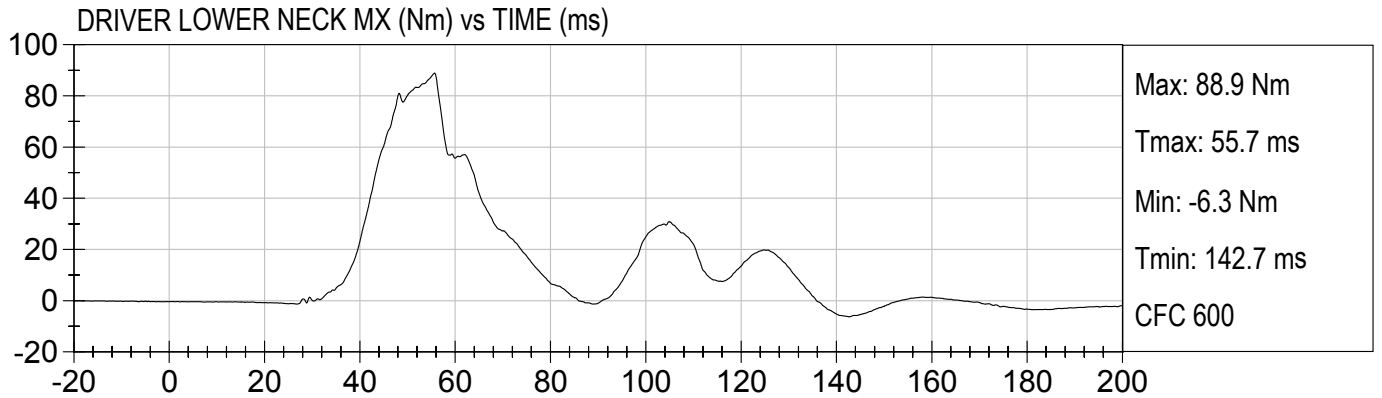


DRIVER LOWER NECK FZ (N) vs TIME (ms)



DRIVER LOWER NECK FResultant (N) vs TIME (ms)

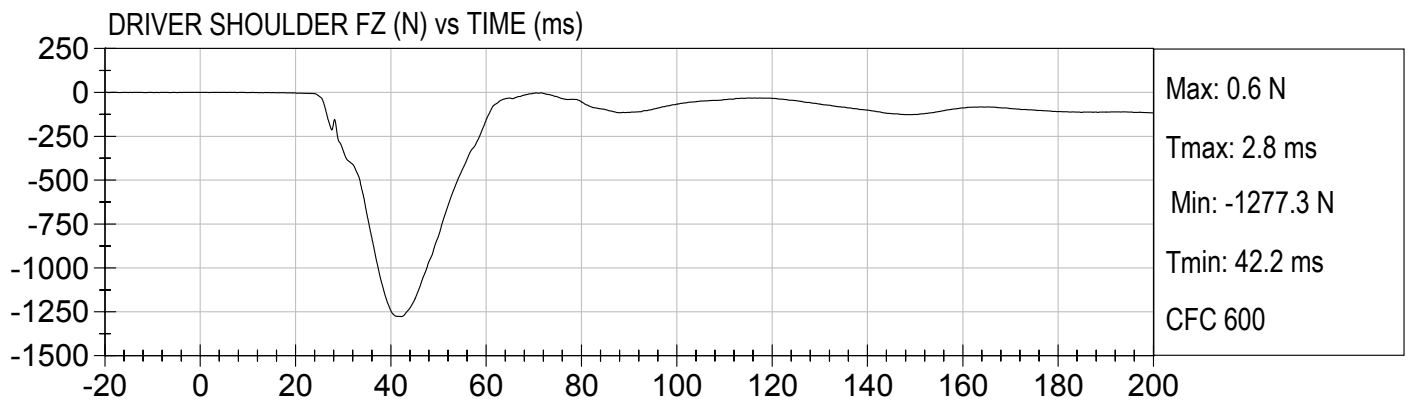
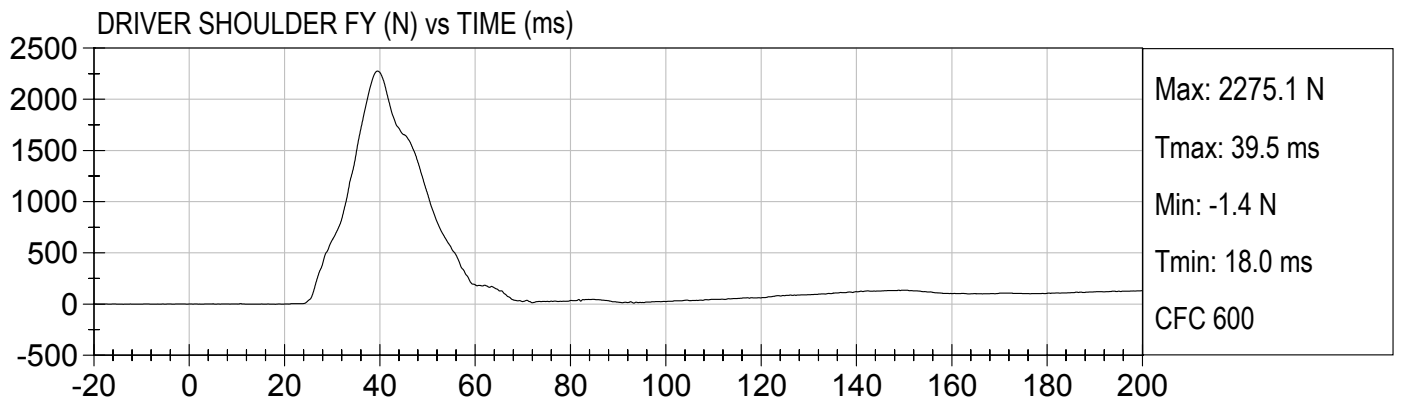
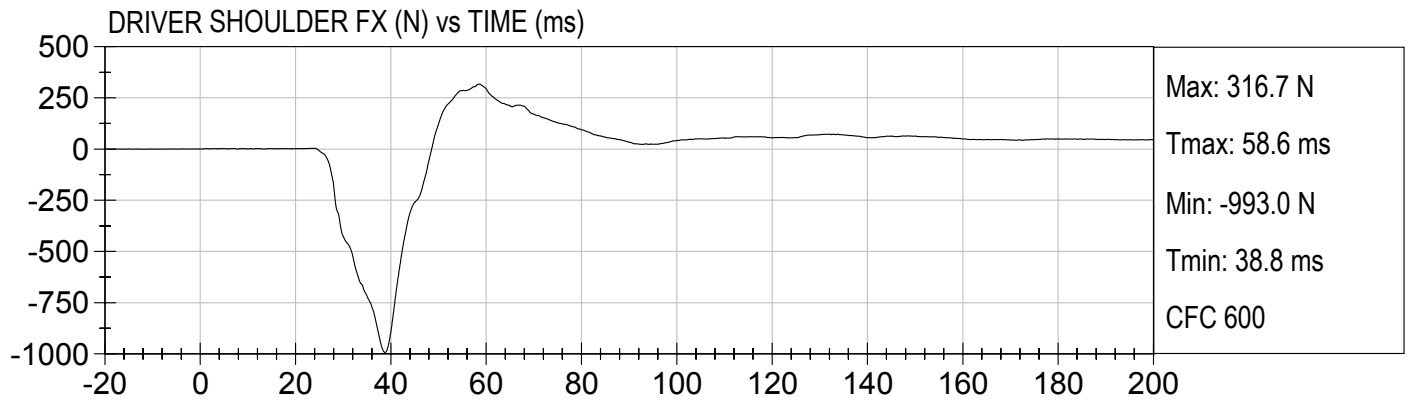






20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

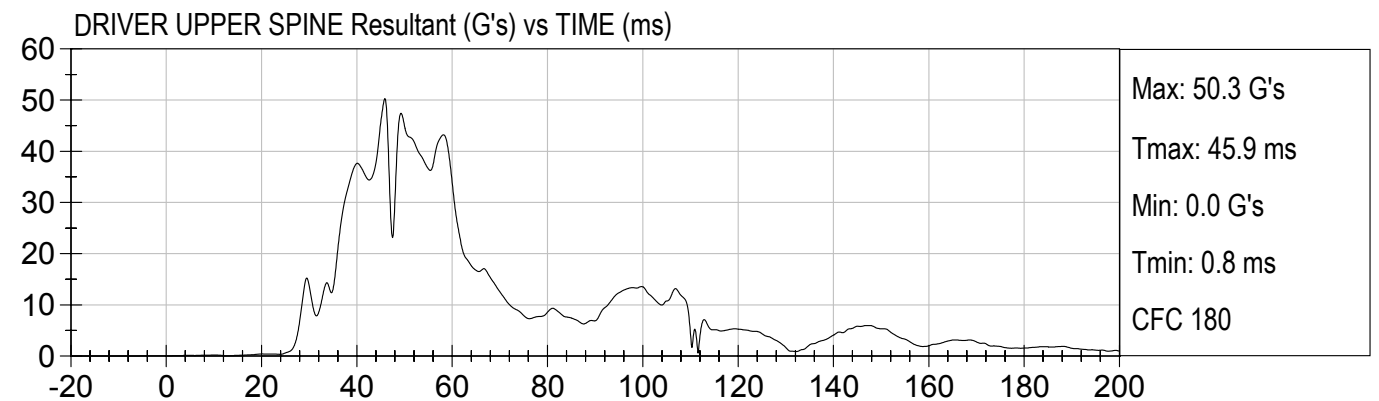
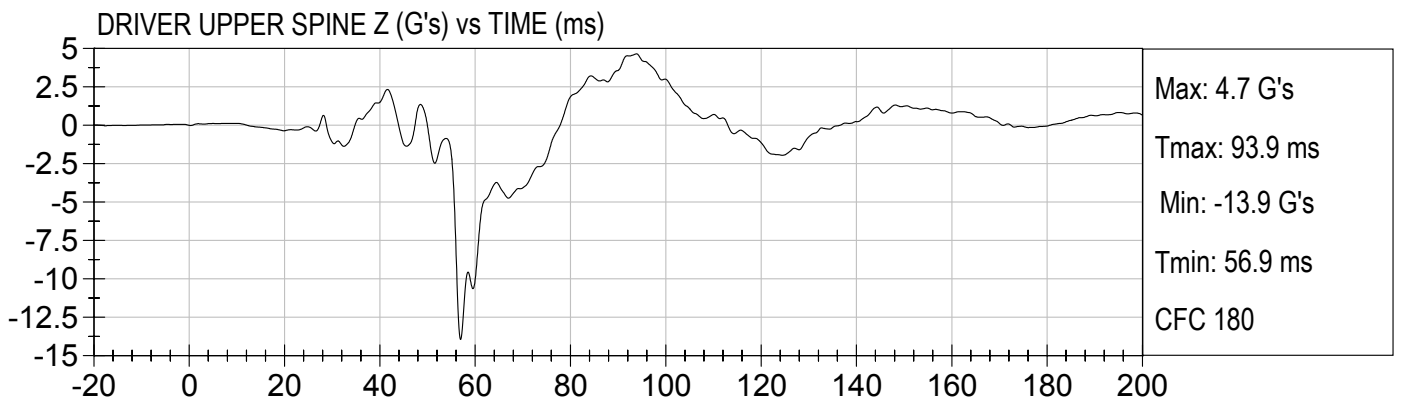
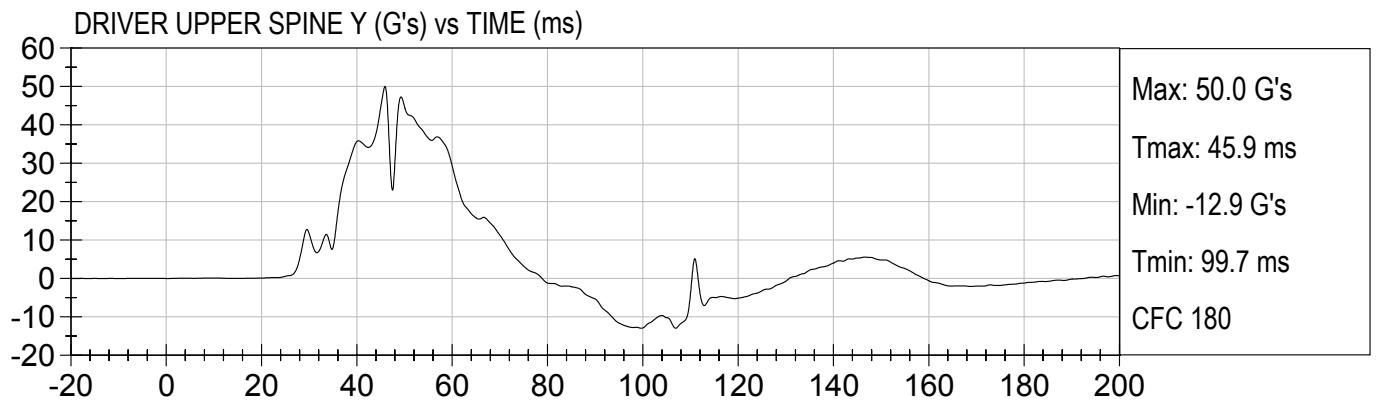
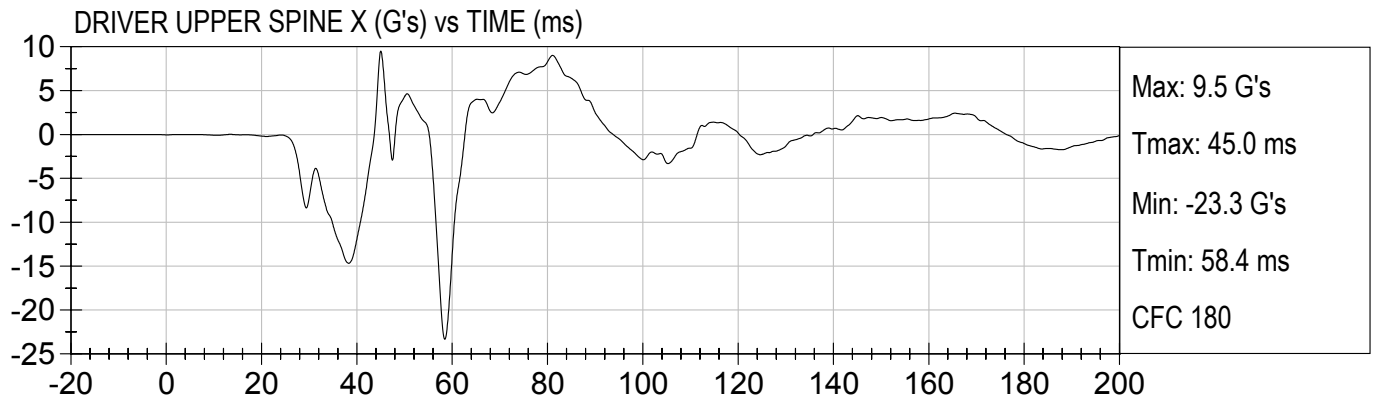
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

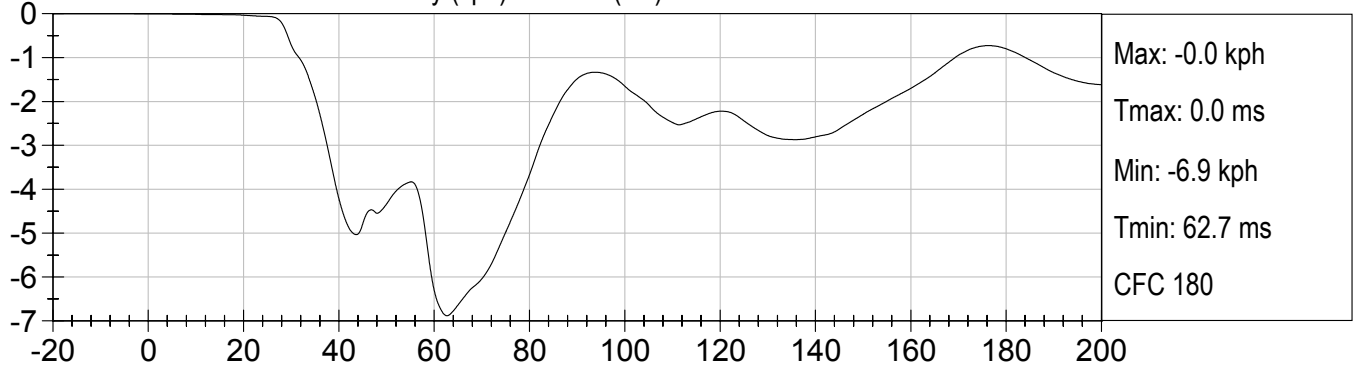




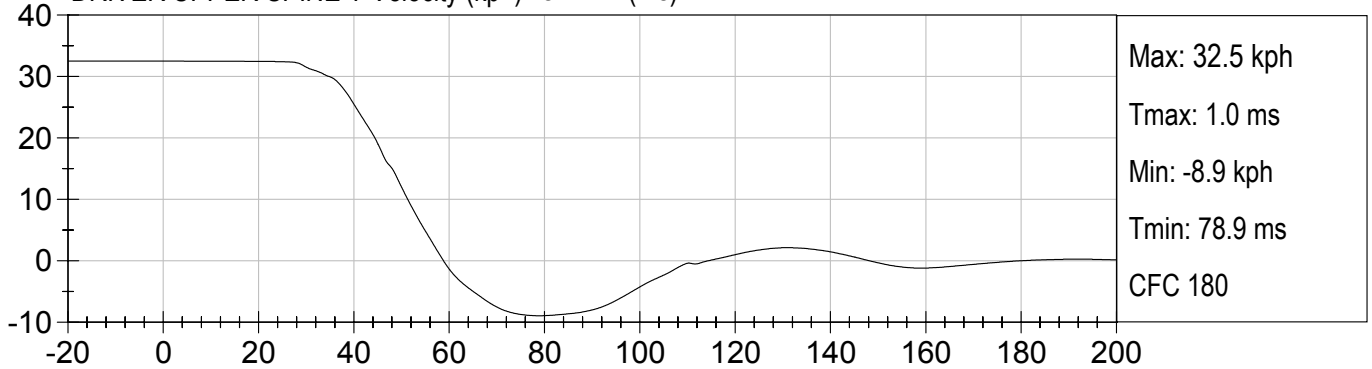
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

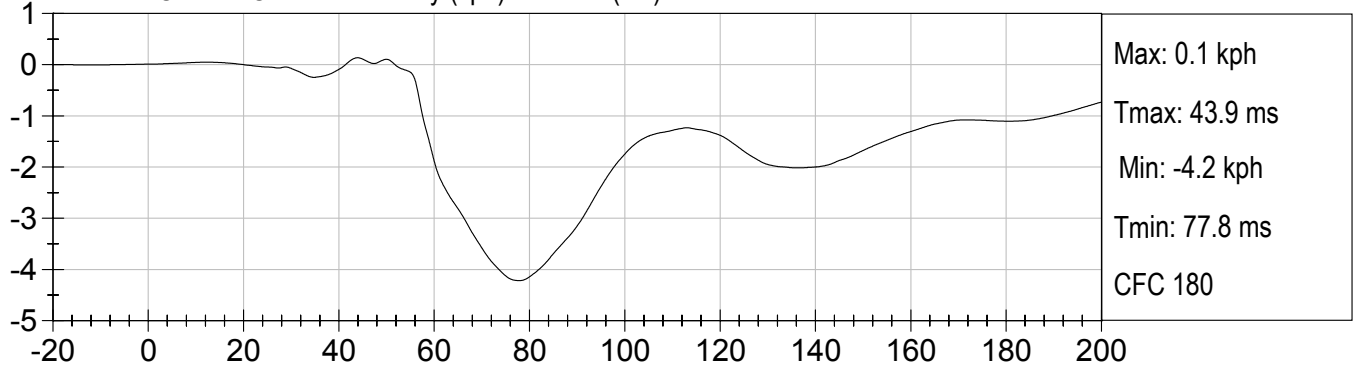
DRIVER UPPER SPINE X Velocity (kph) vs TIME (ms)



DRIVER UPPER SPINE Y Velocity (kph) vs TIME (ms)



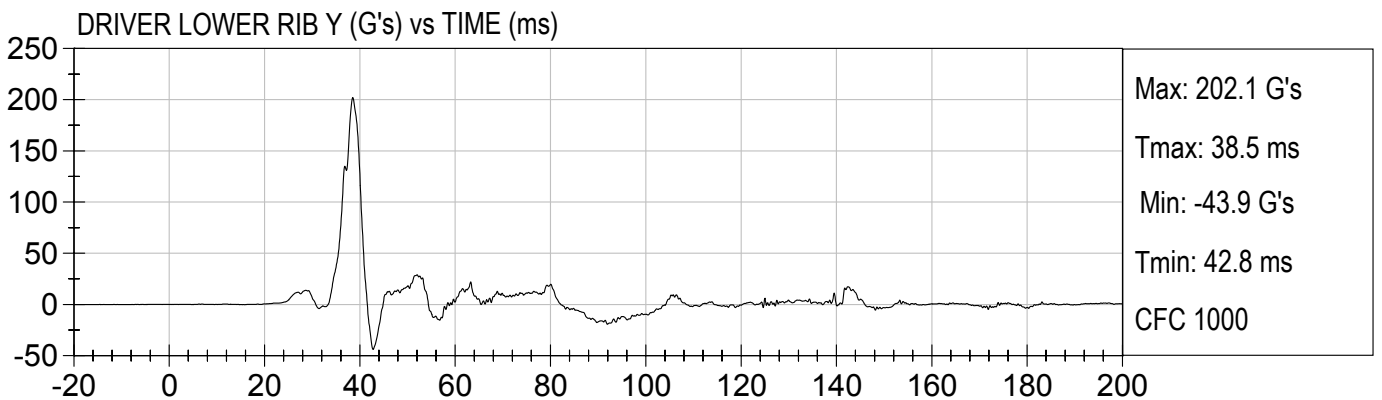
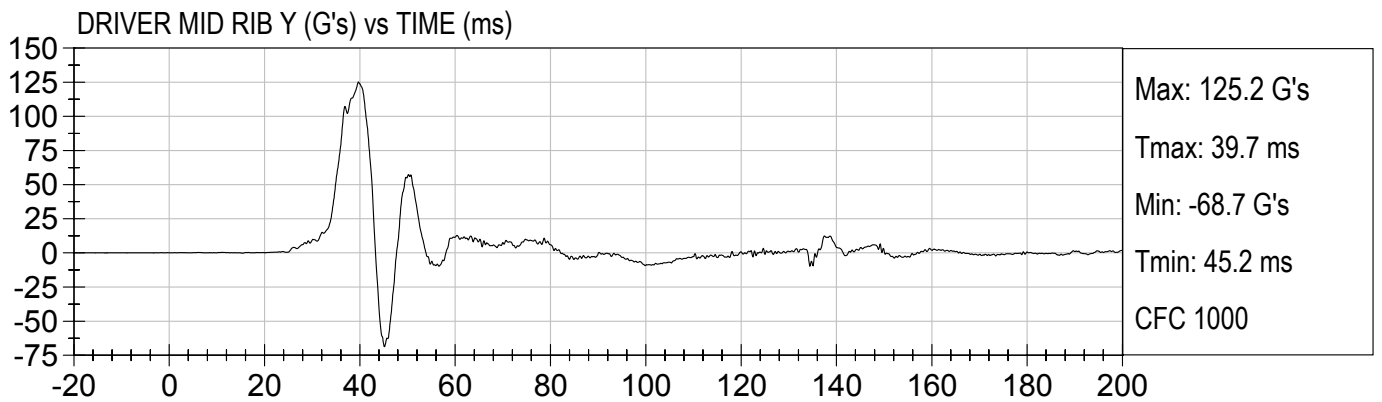
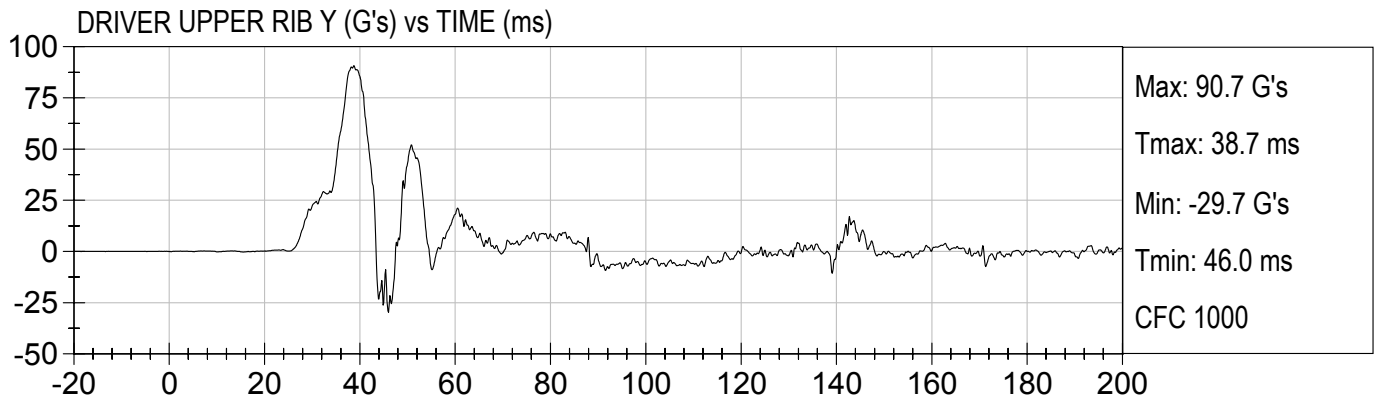
DRIVER UPPER SPINE Z Velocity (kph) vs TIME (ms)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

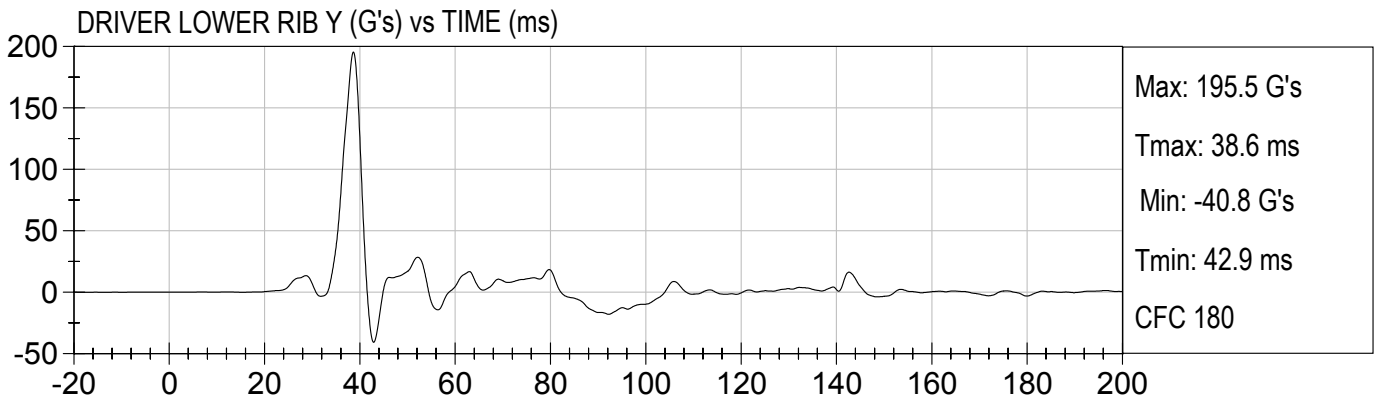
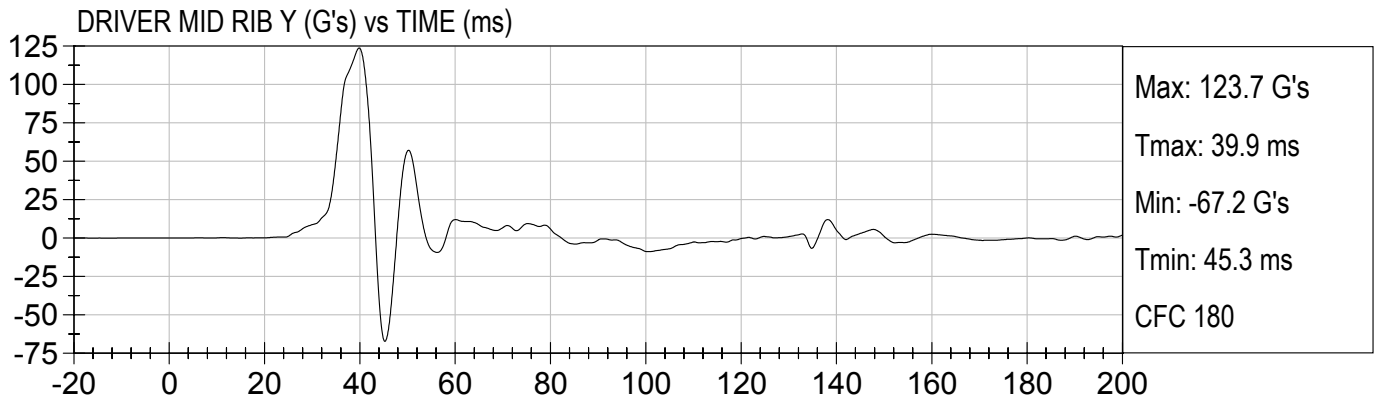
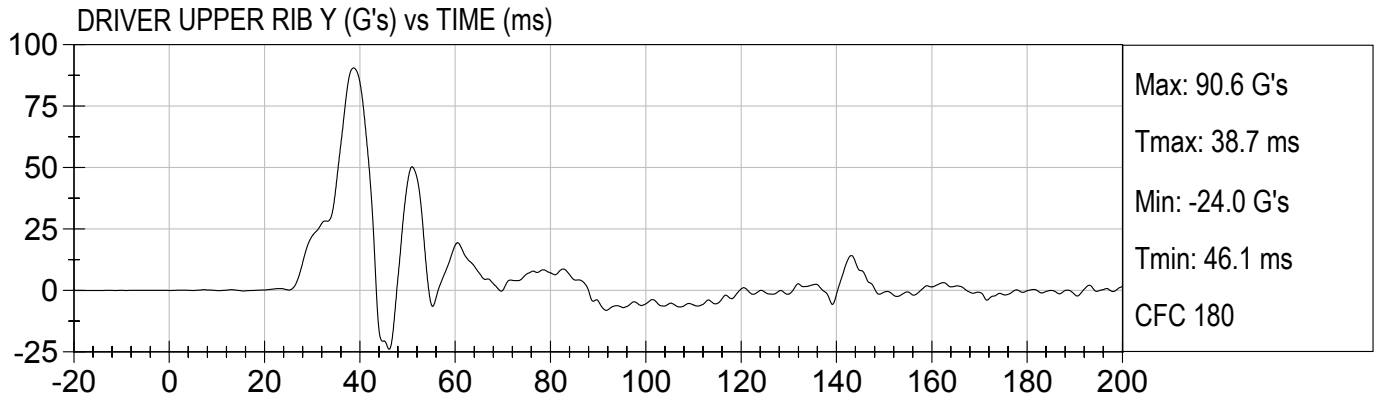
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

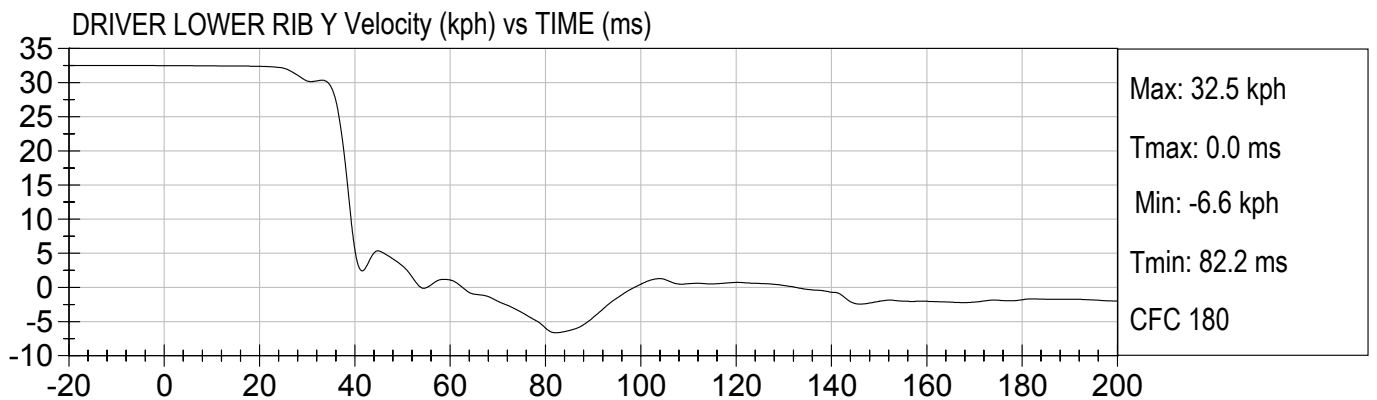
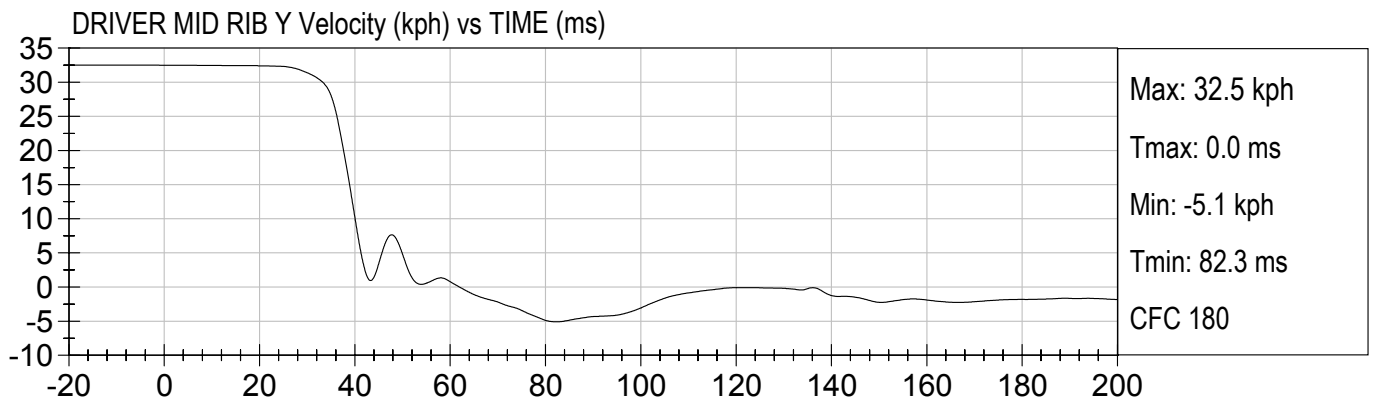
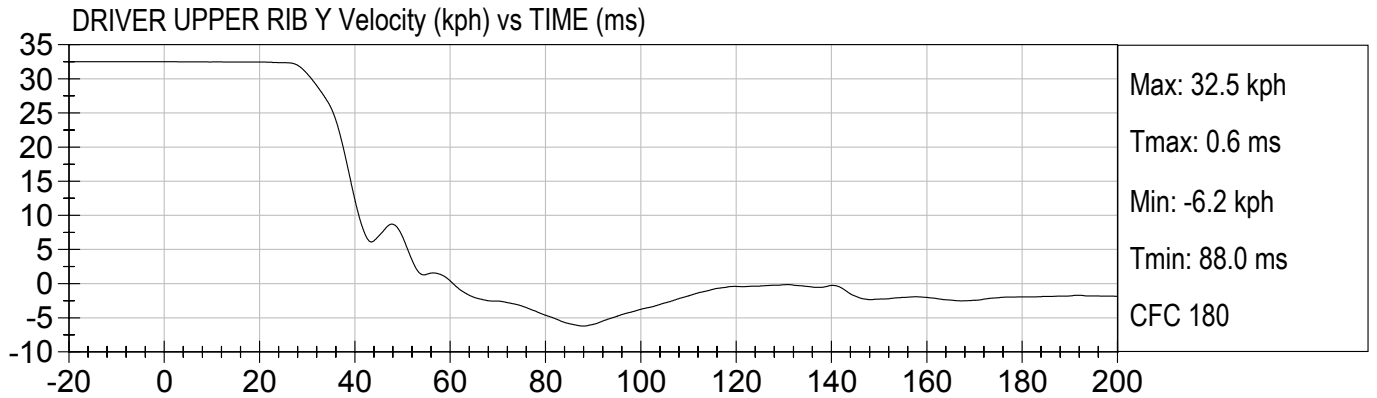
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





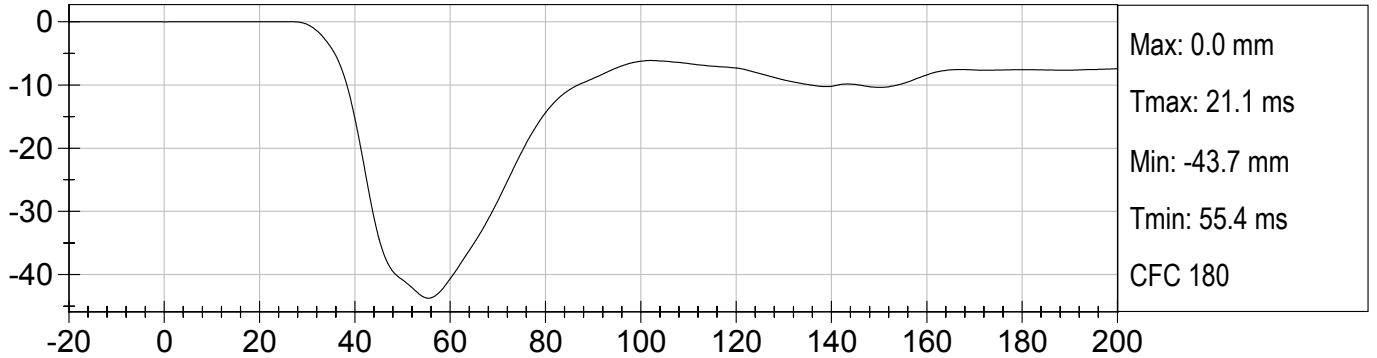
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

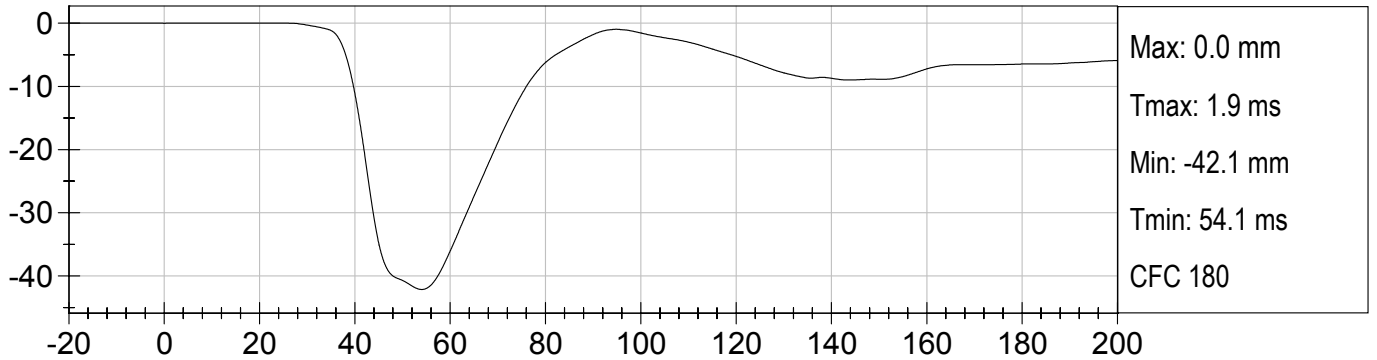




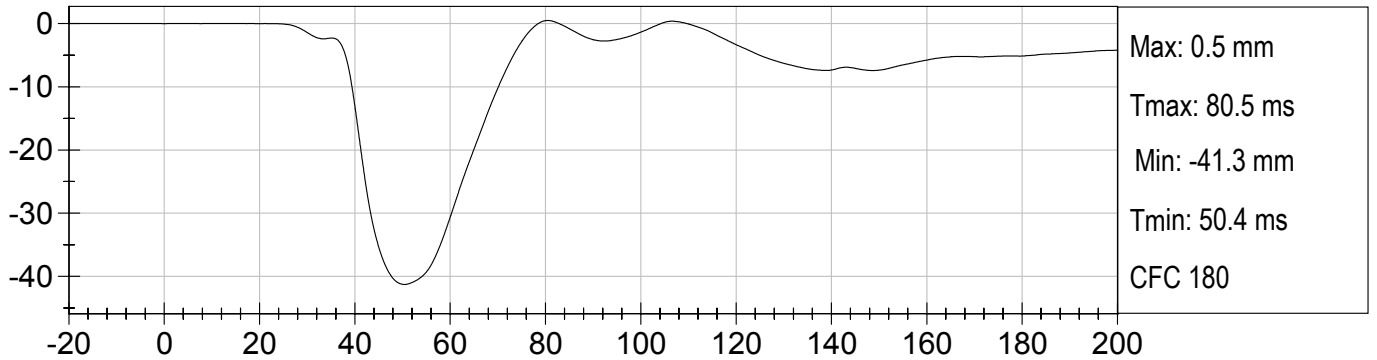
DR UPPER RIB DISPLACEMENT (mm) vs TIME (ms)



DR MID RIB DISPLACEMENT (mm) vs TIME (ms)



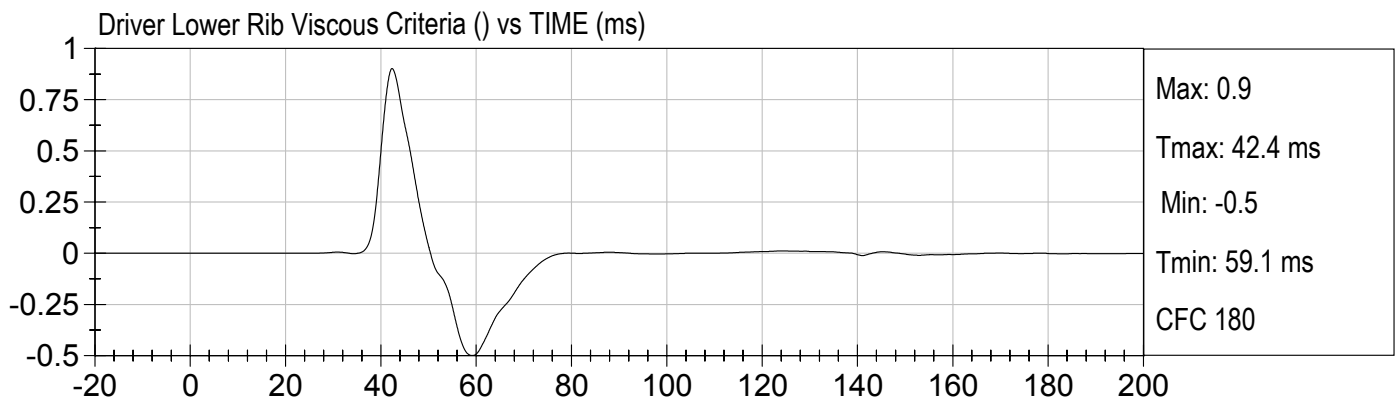
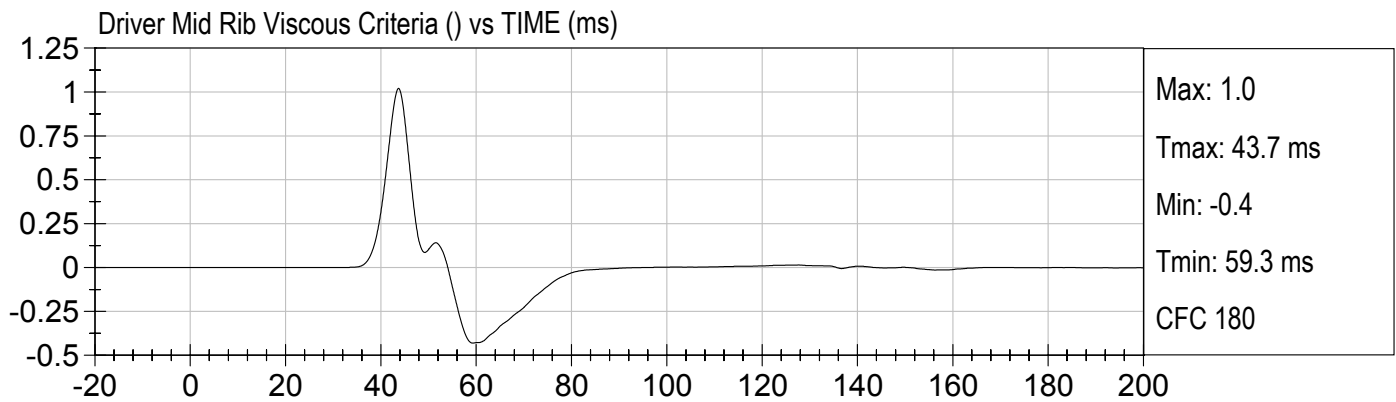
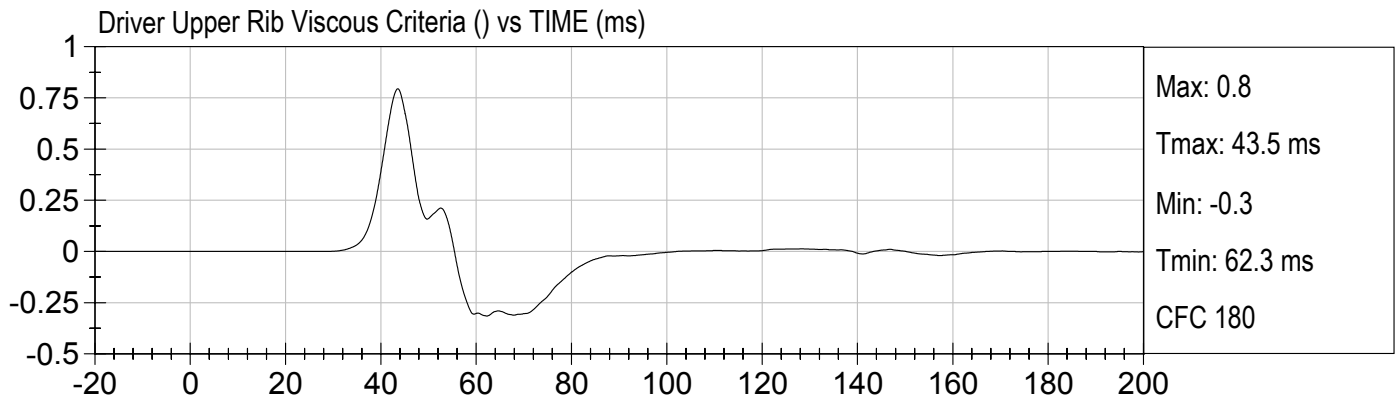
DR LOWER RIB DISPLACEMENT (mm) vs TIME (ms)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

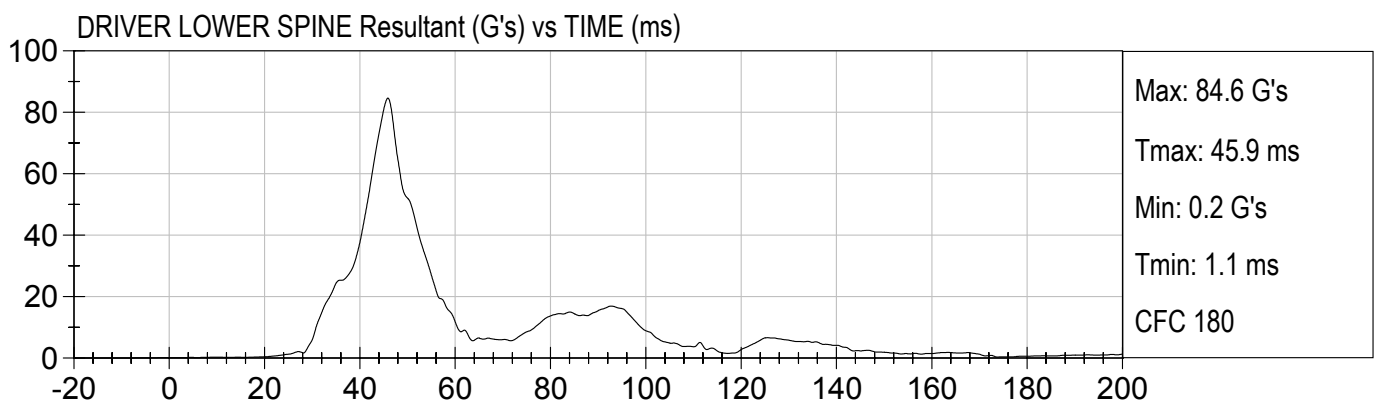
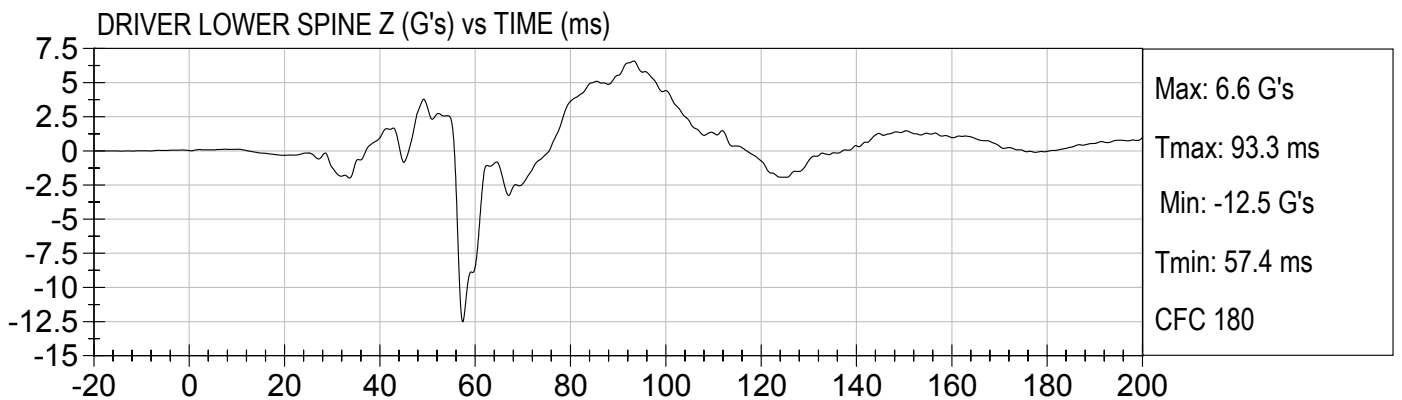
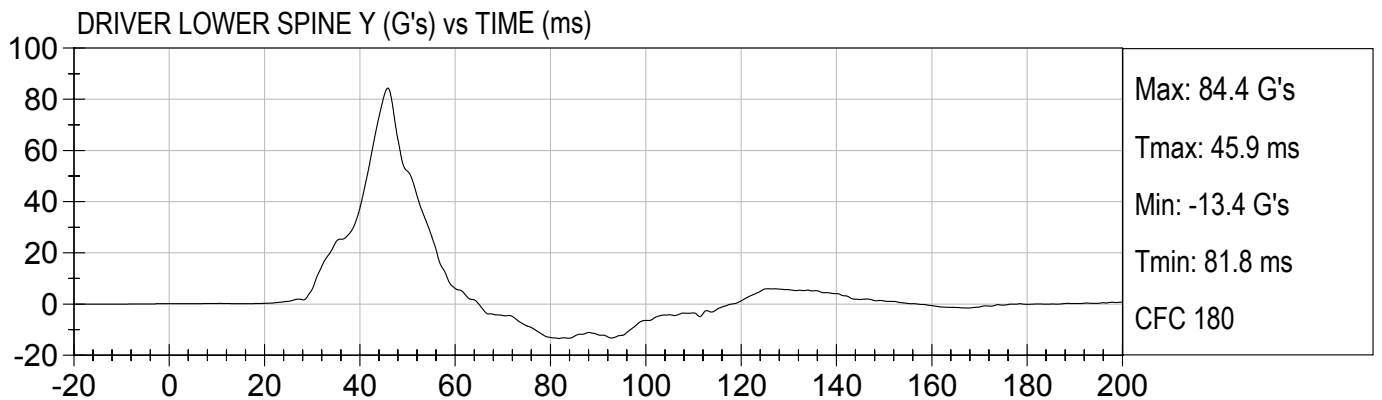
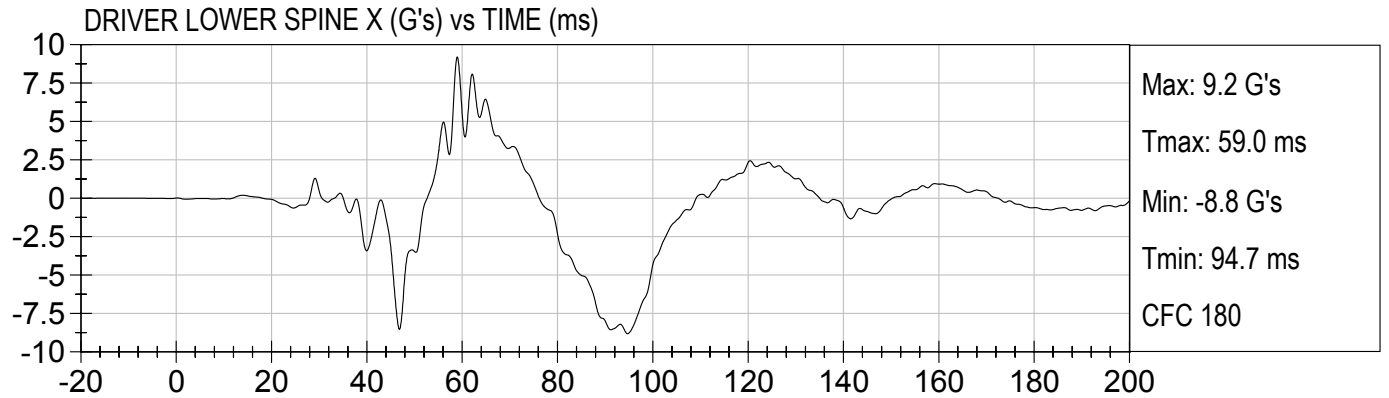
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

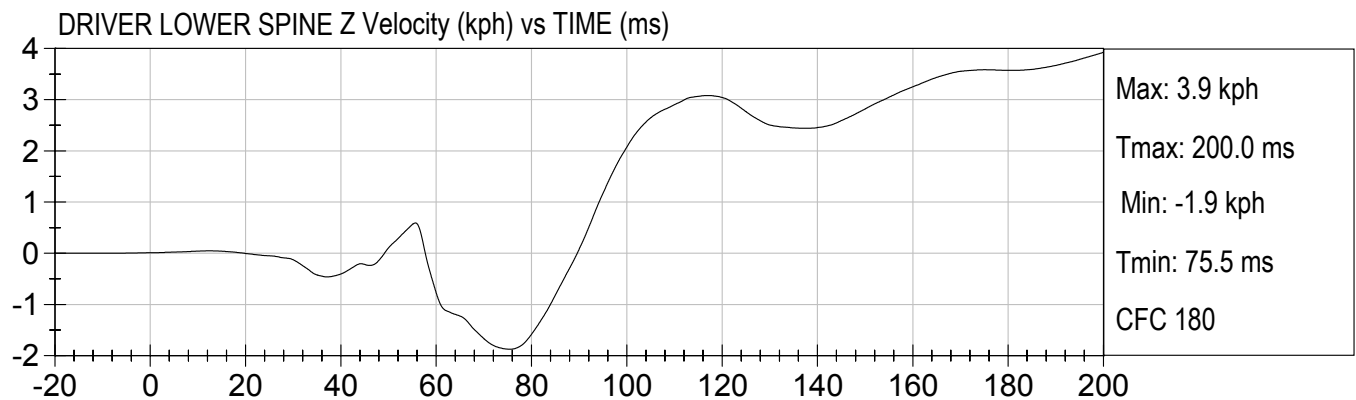
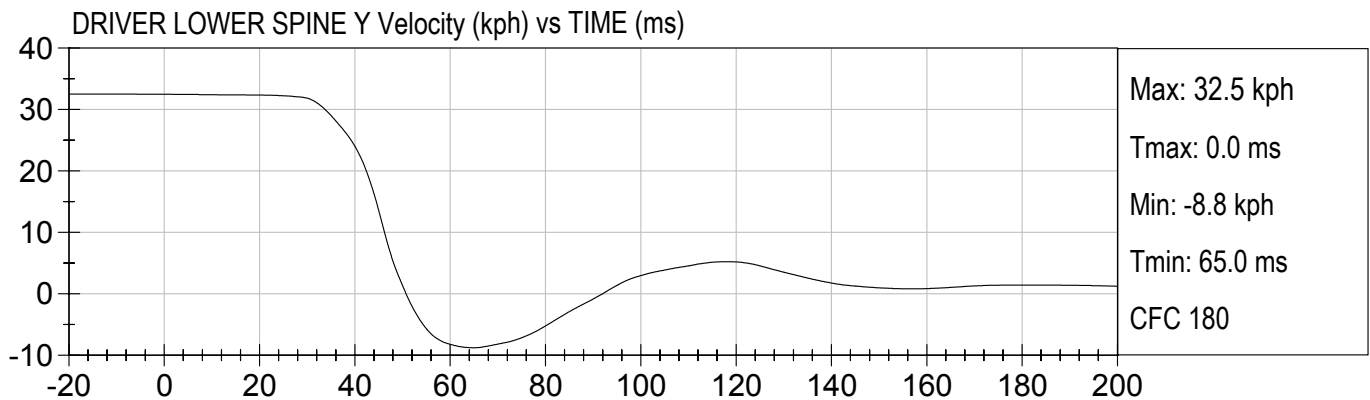
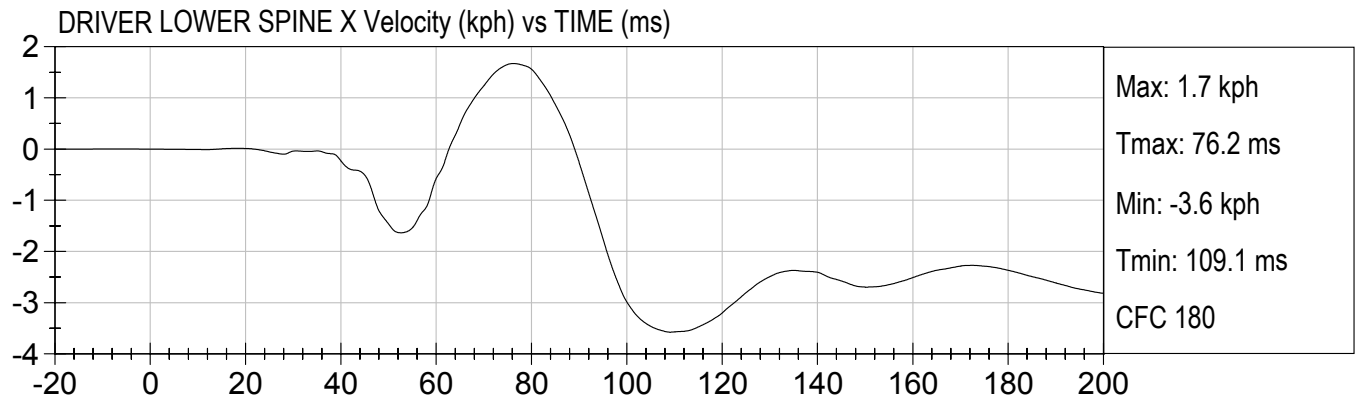
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

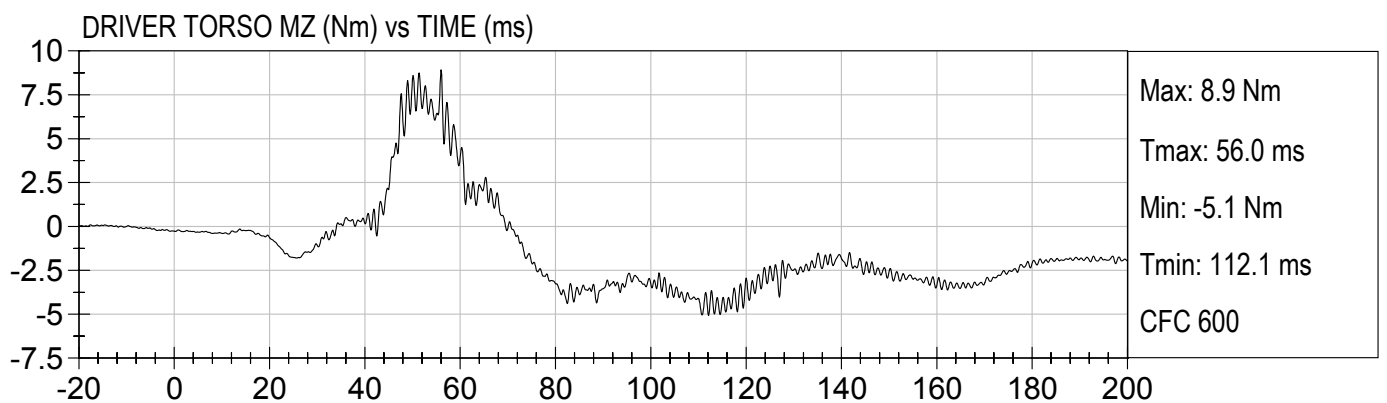
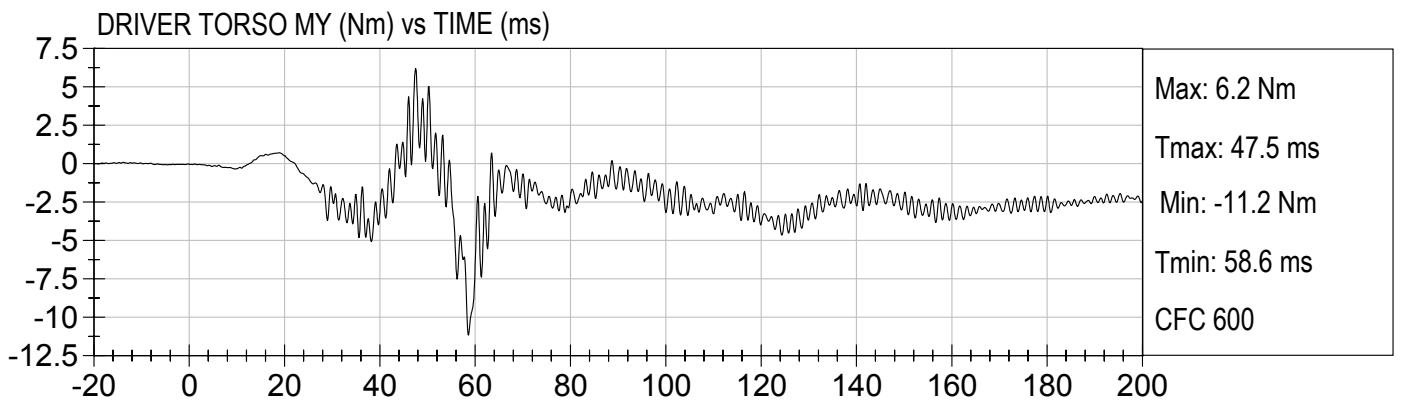
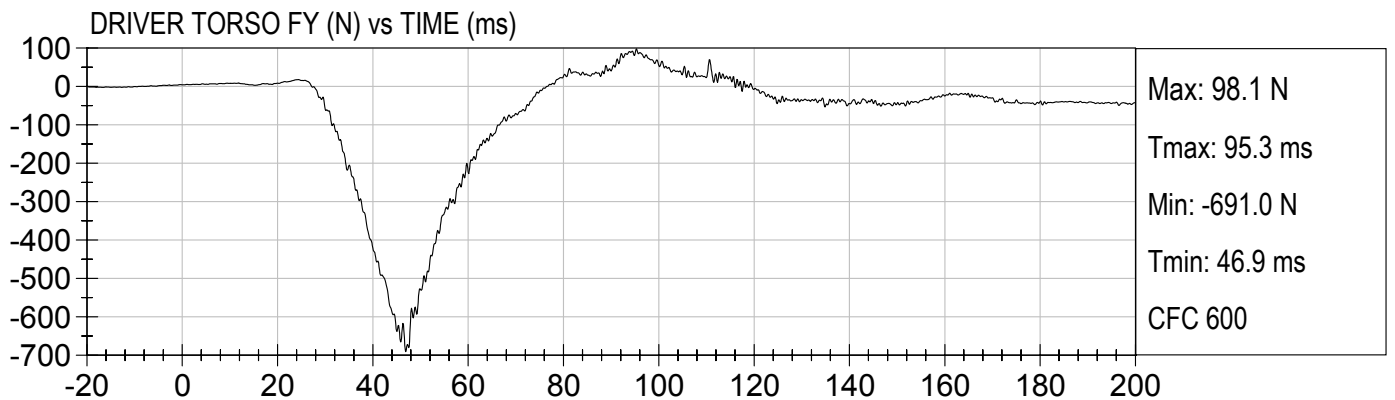
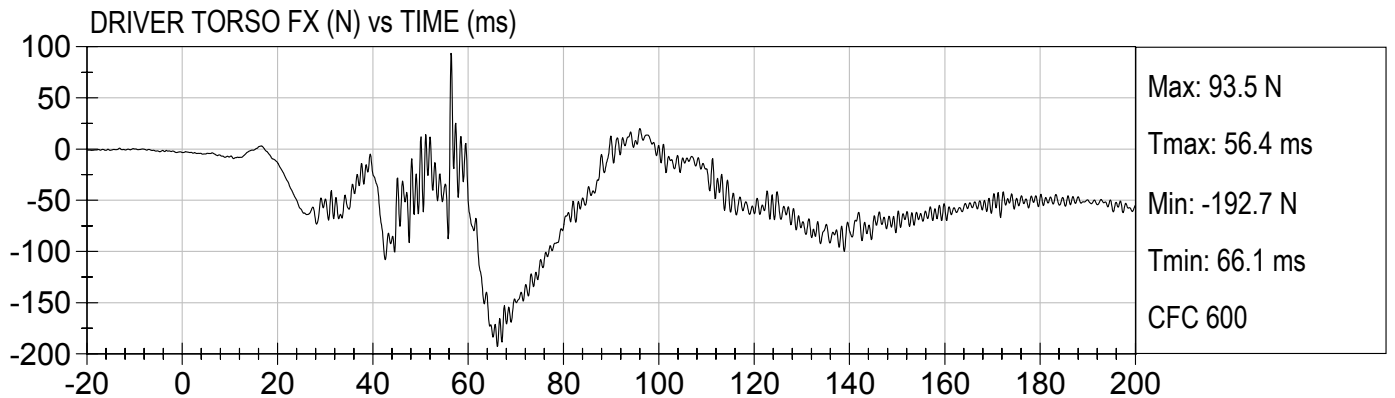




20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)



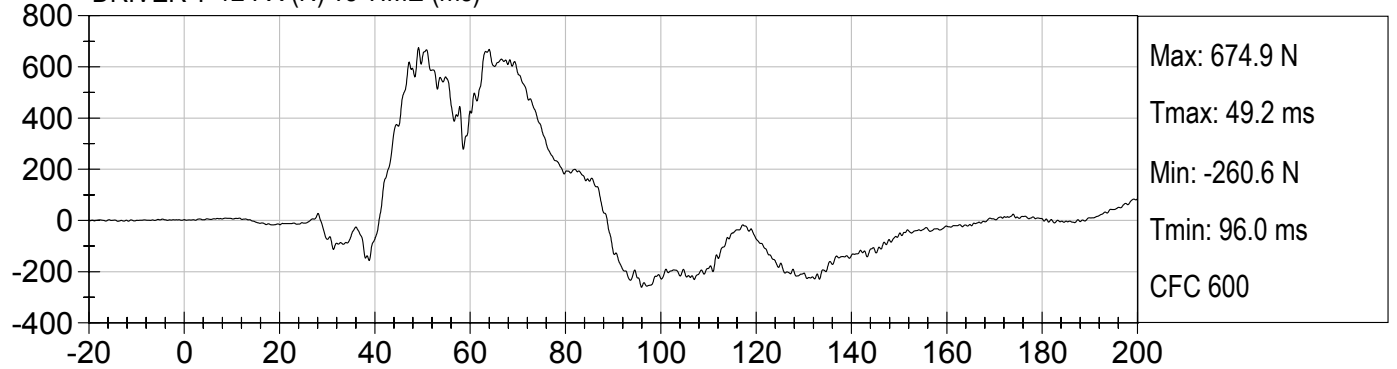




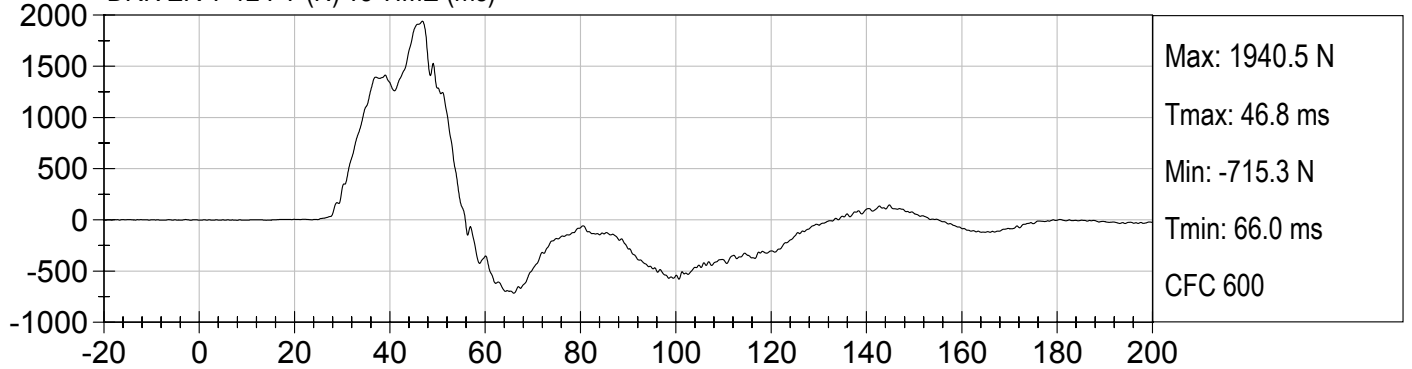
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

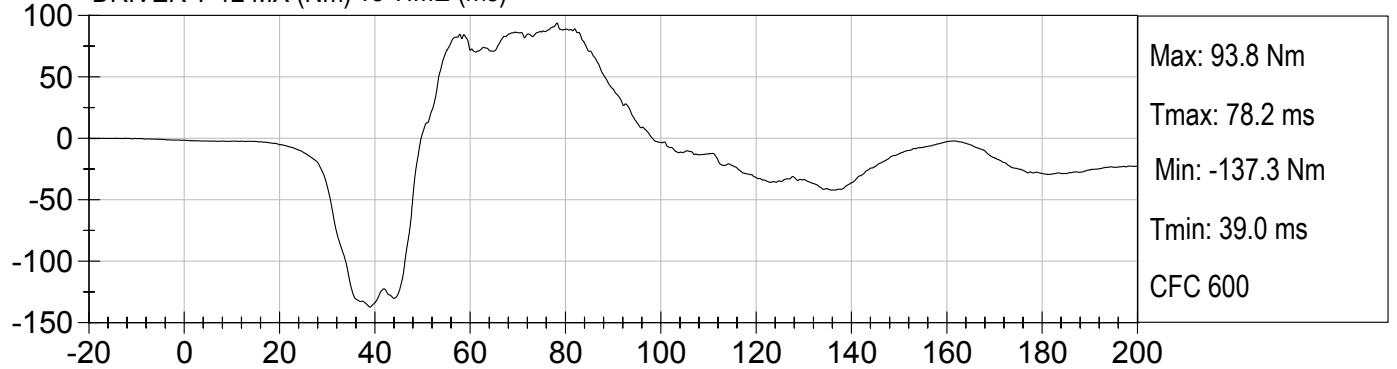
DRIVER T-12 FX (N) vs TIME (ms)



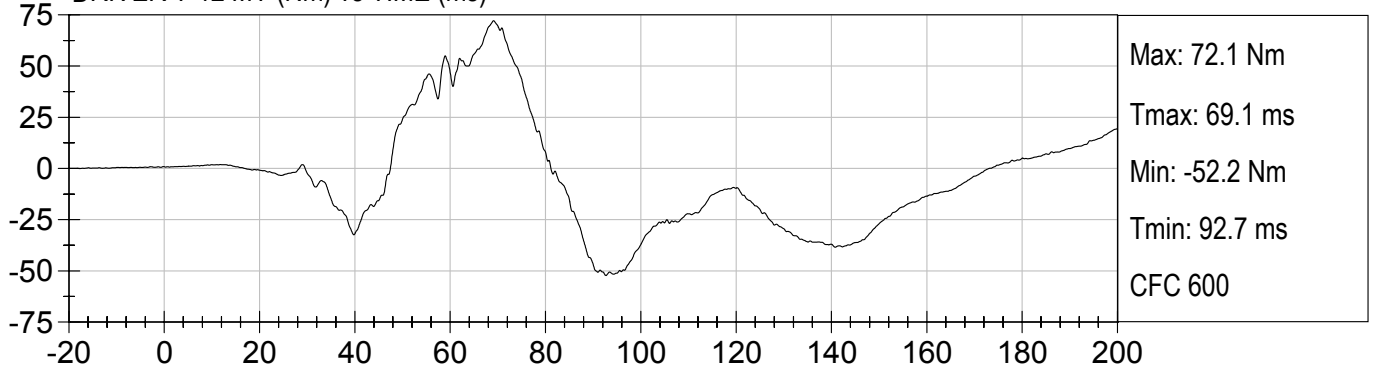
DRIVER T-12 FY (N) vs TIME (ms)



DRIVER T-12 MX (Nm) vs TIME (ms)



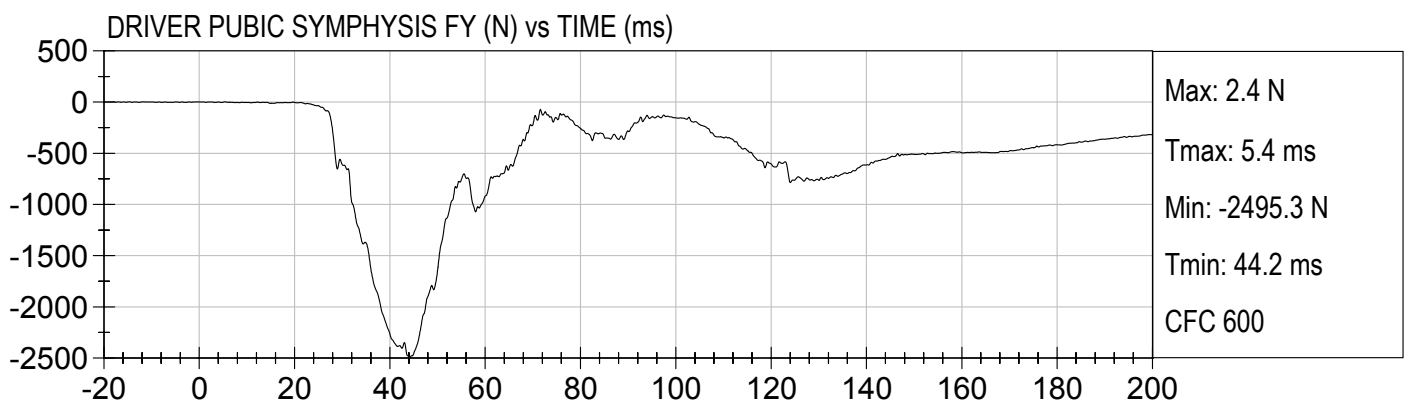
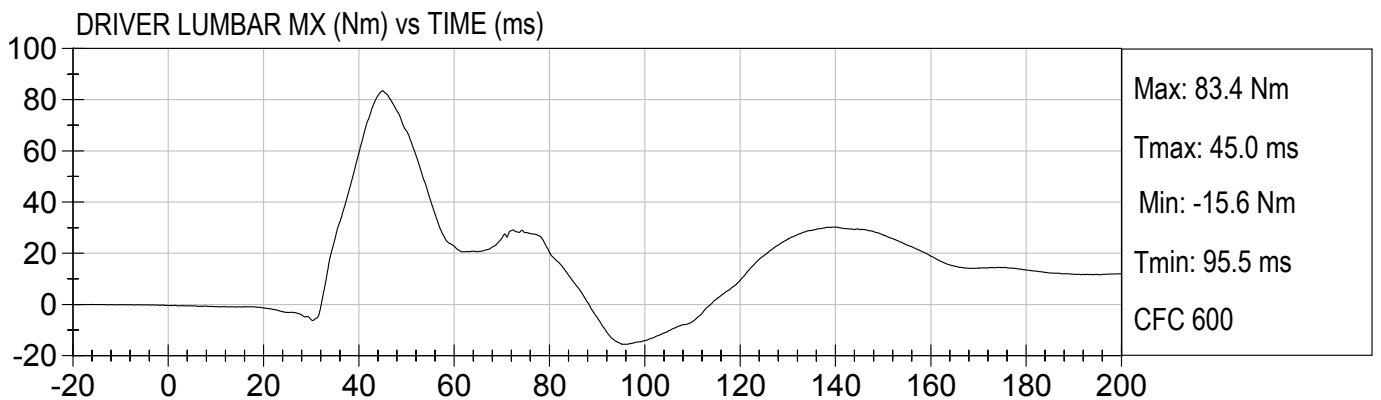
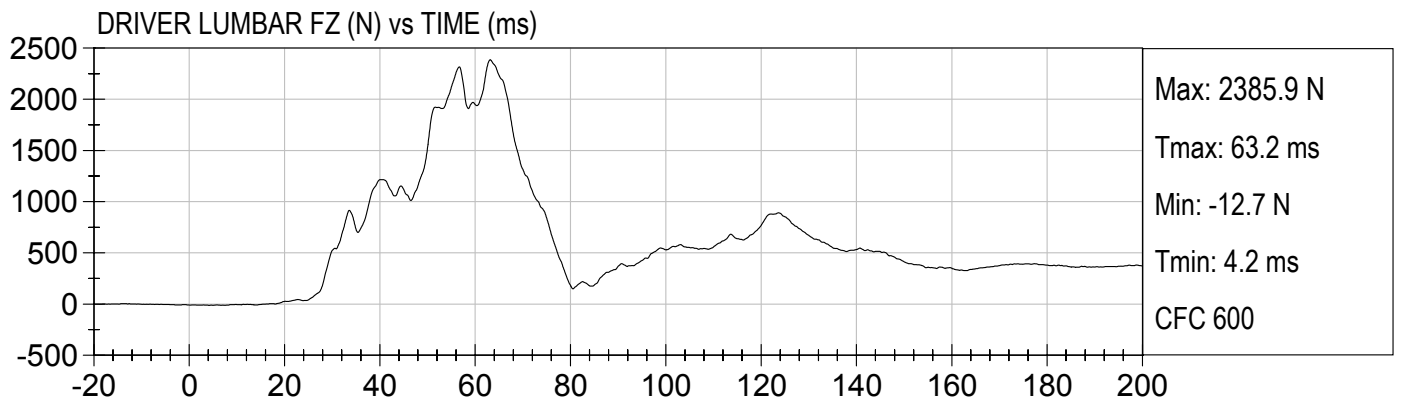
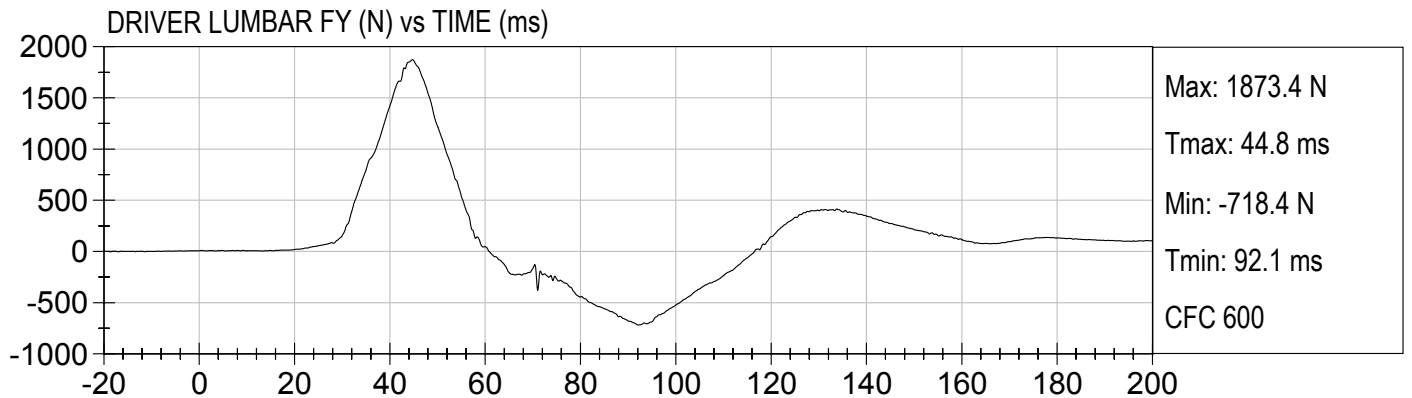
DRIVER T-12 MY (Nm) vs TIME (ms)

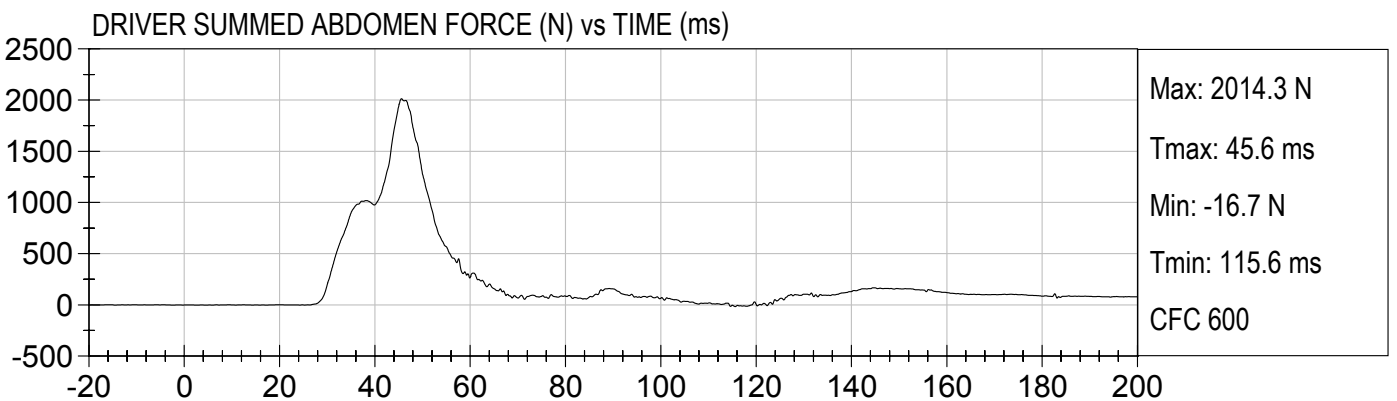
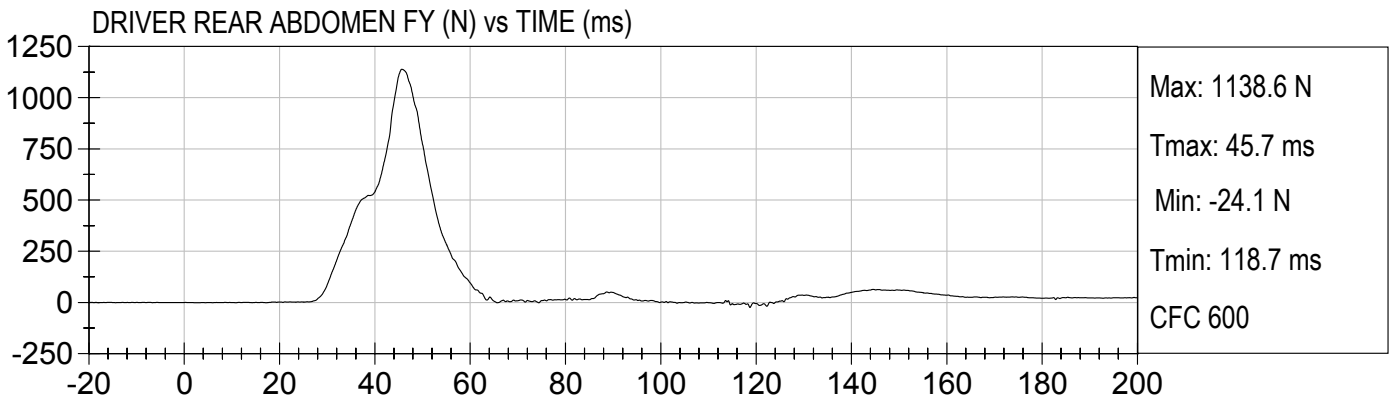
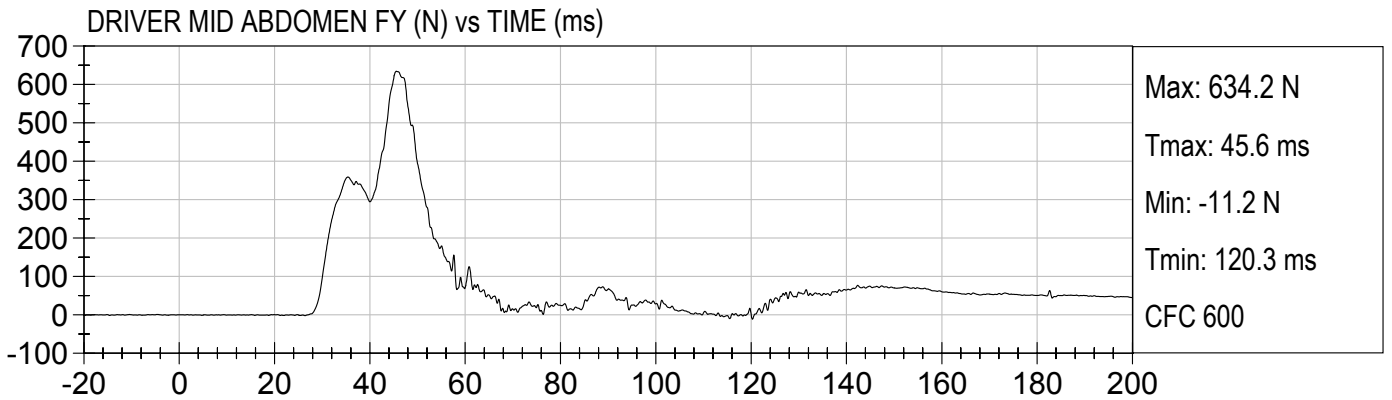
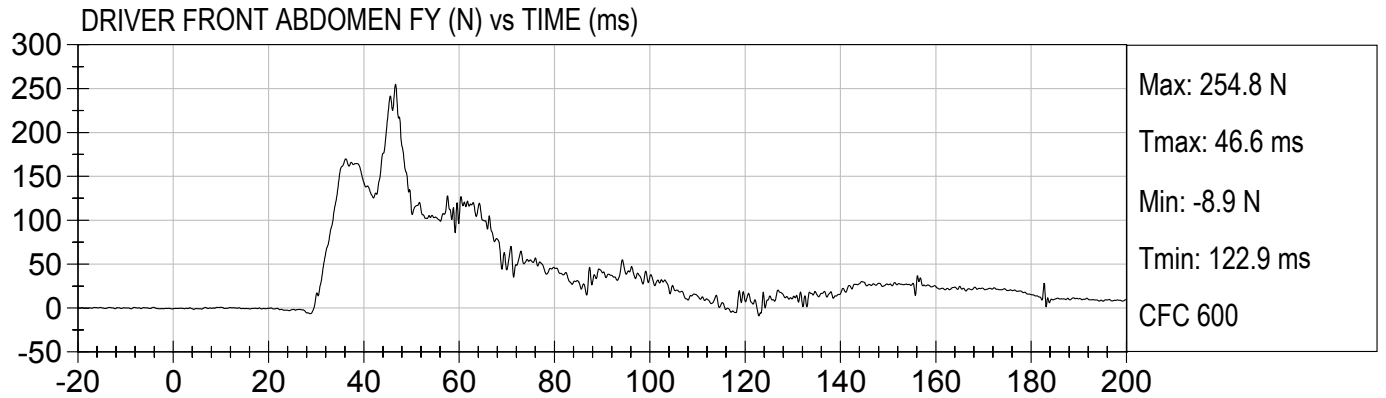




20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

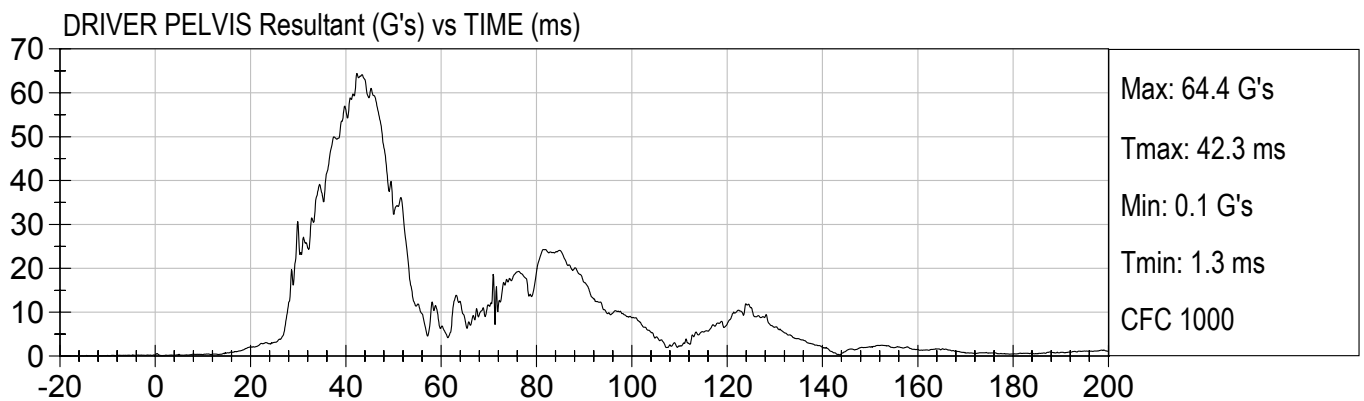
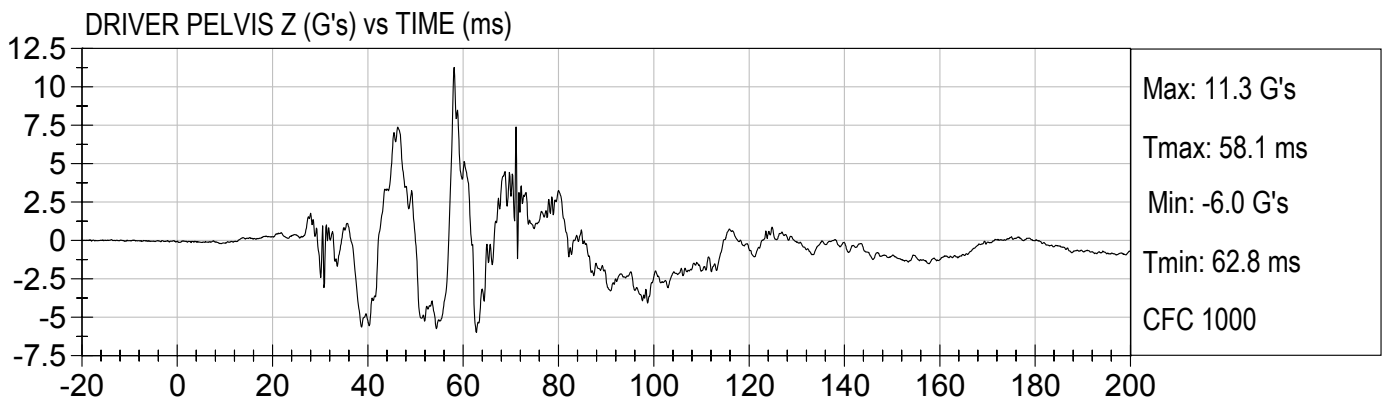
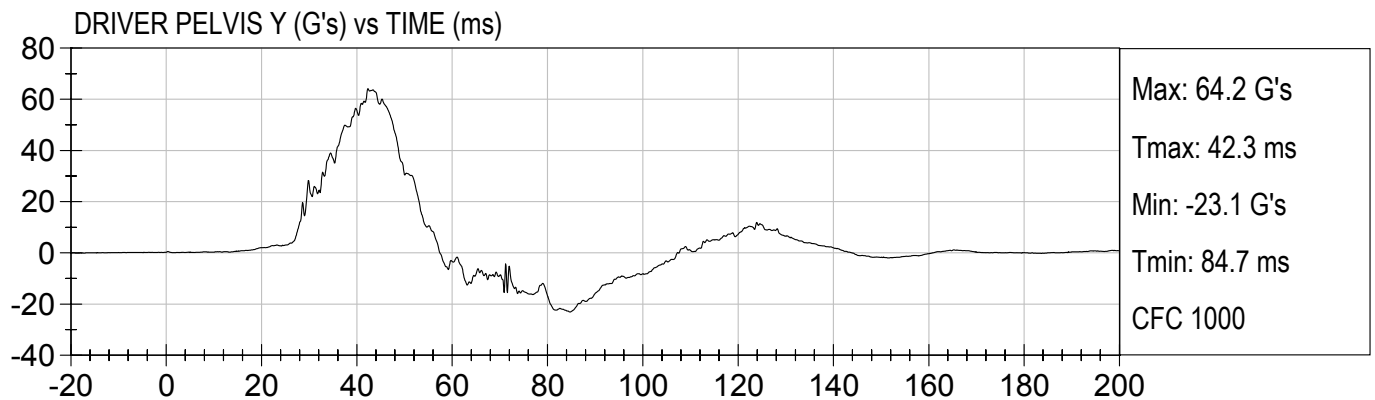
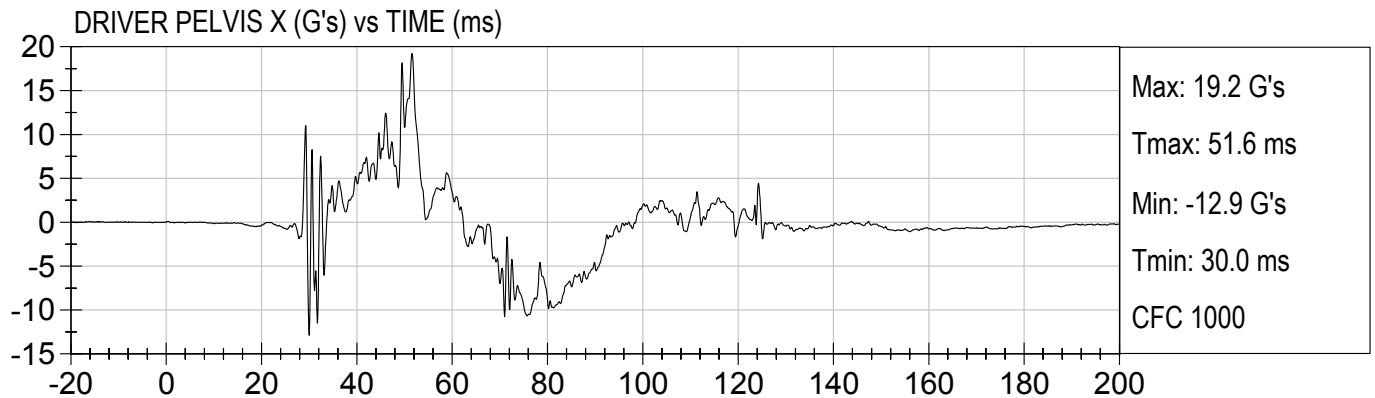






20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

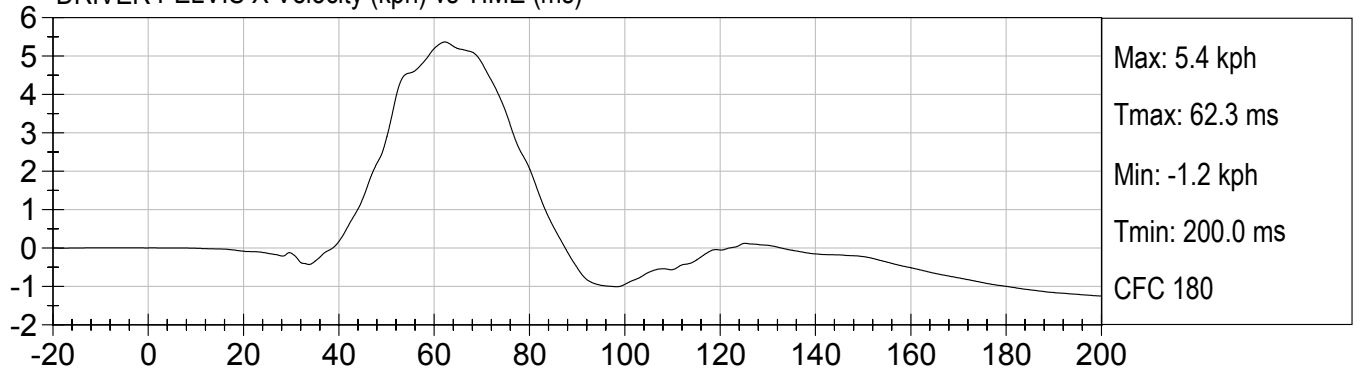




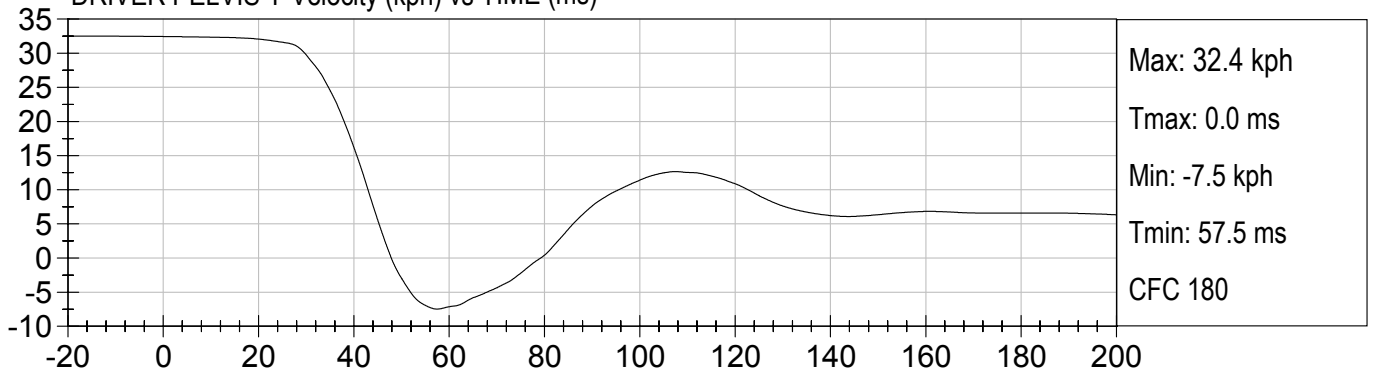
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

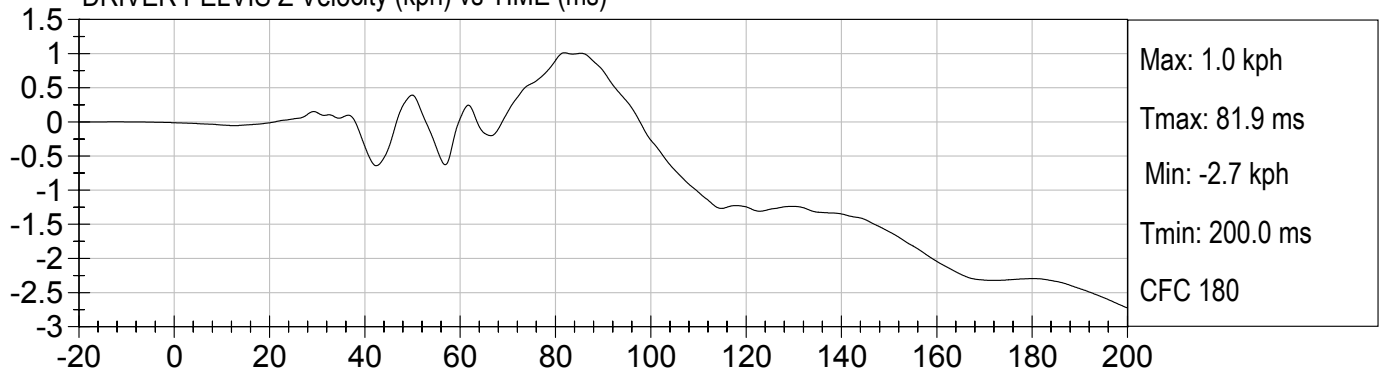
DRIVER PELVIS X Velocity (kph) vs TIME (ms)



DRIVER PELVIS Y Velocity (kph) vs TIME (ms)



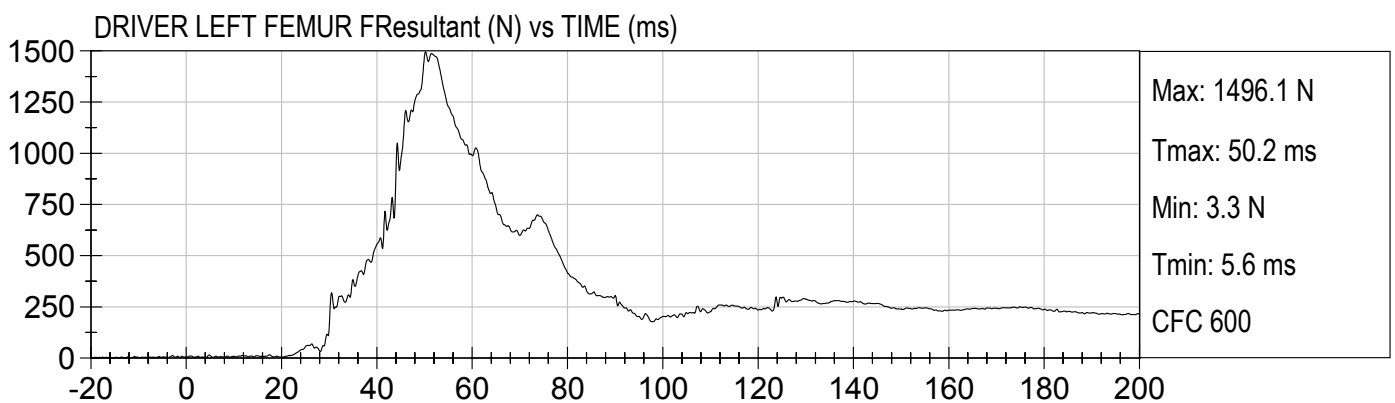
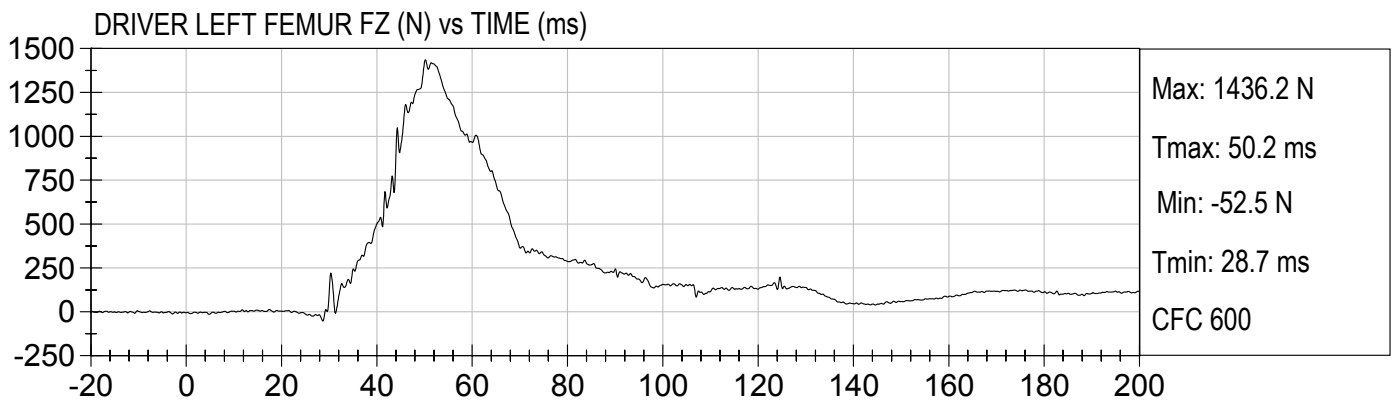
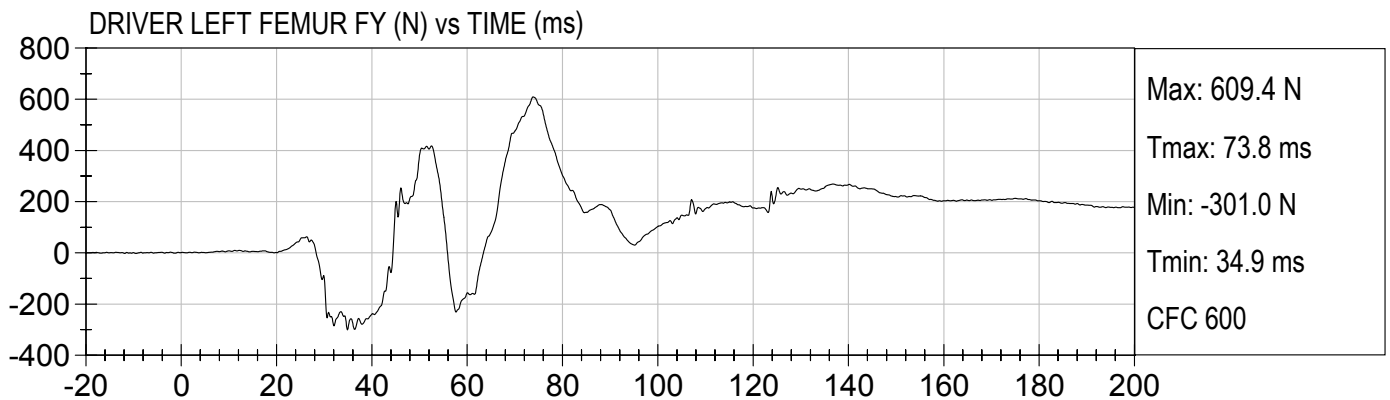
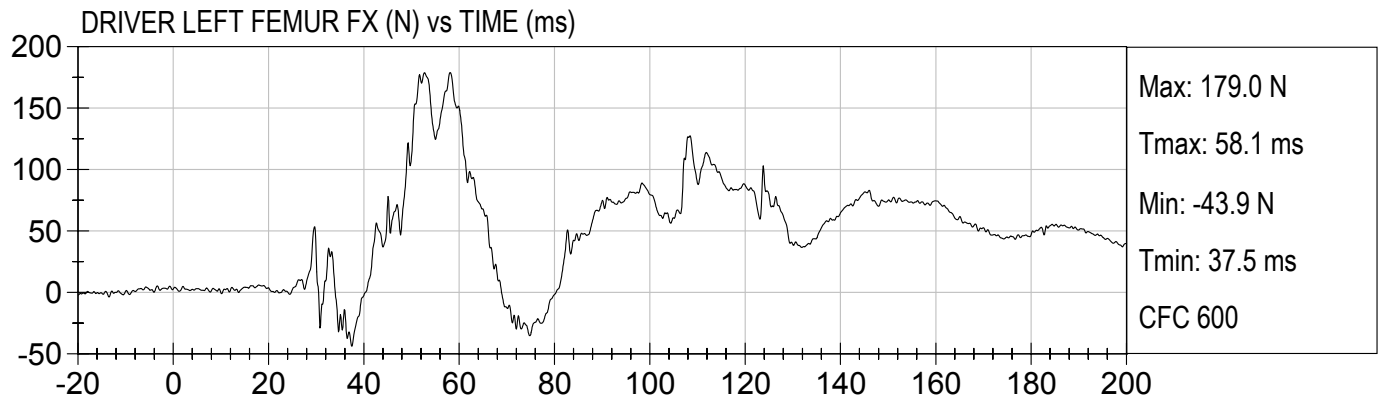
DRIVER PELVIS Z Velocity (kph) vs TIME (ms)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

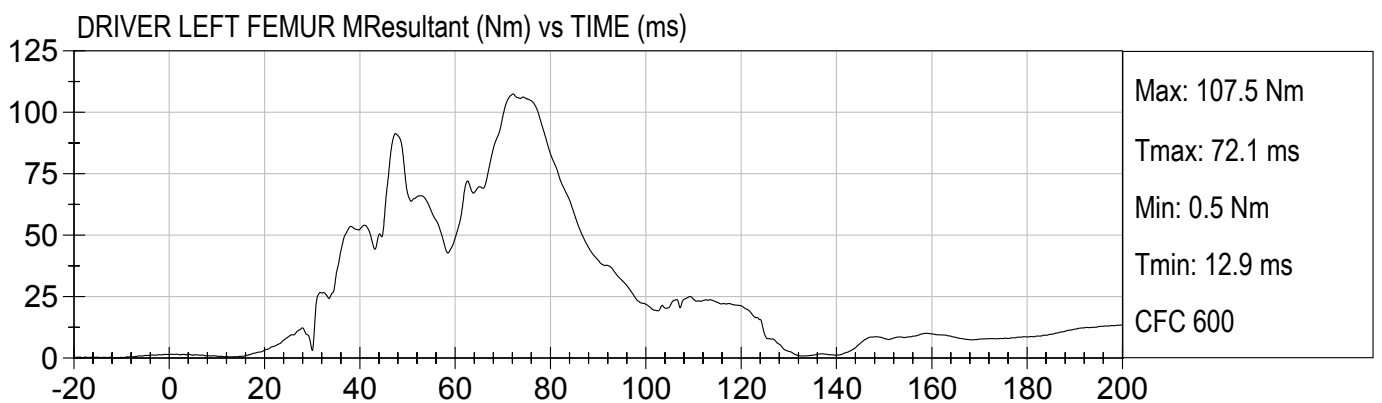
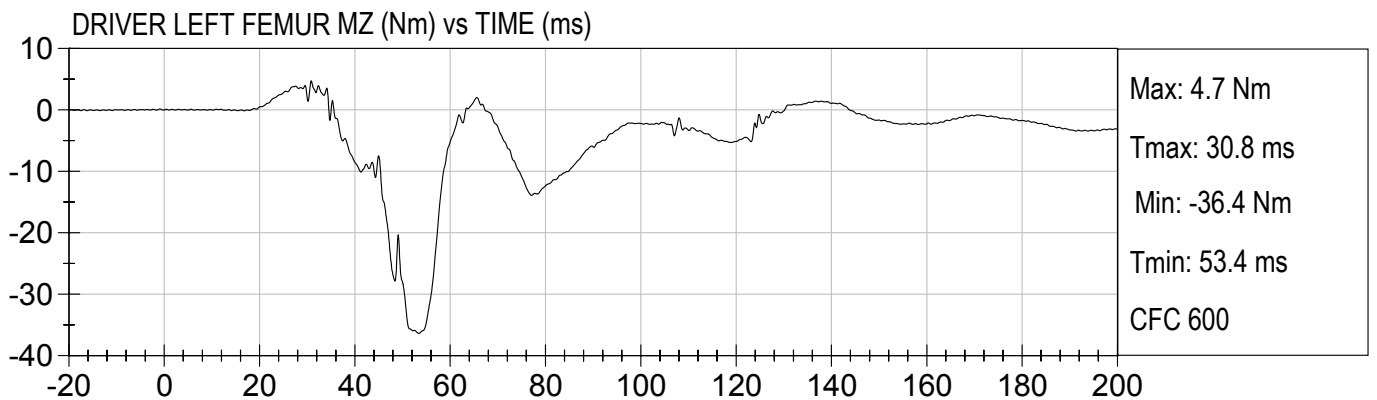
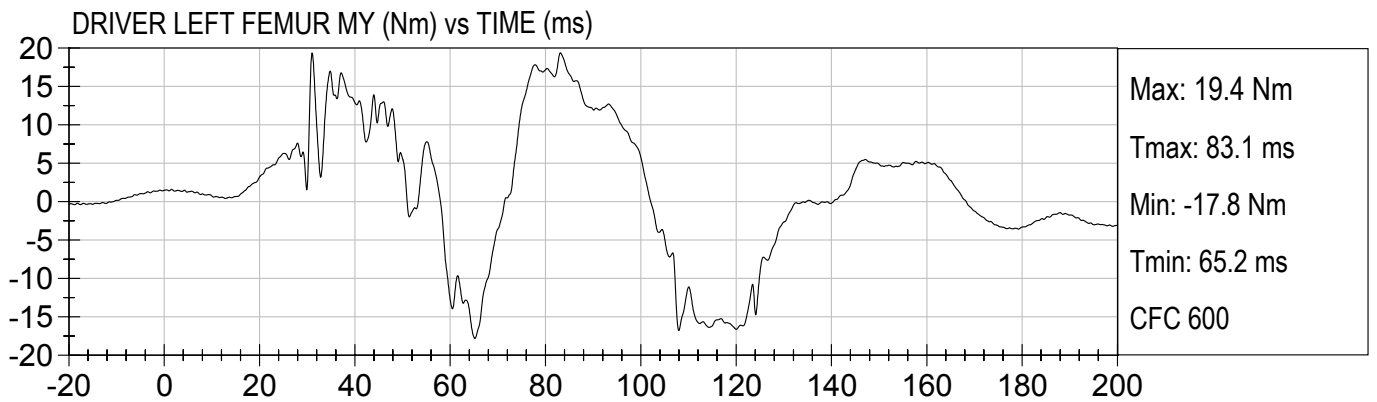
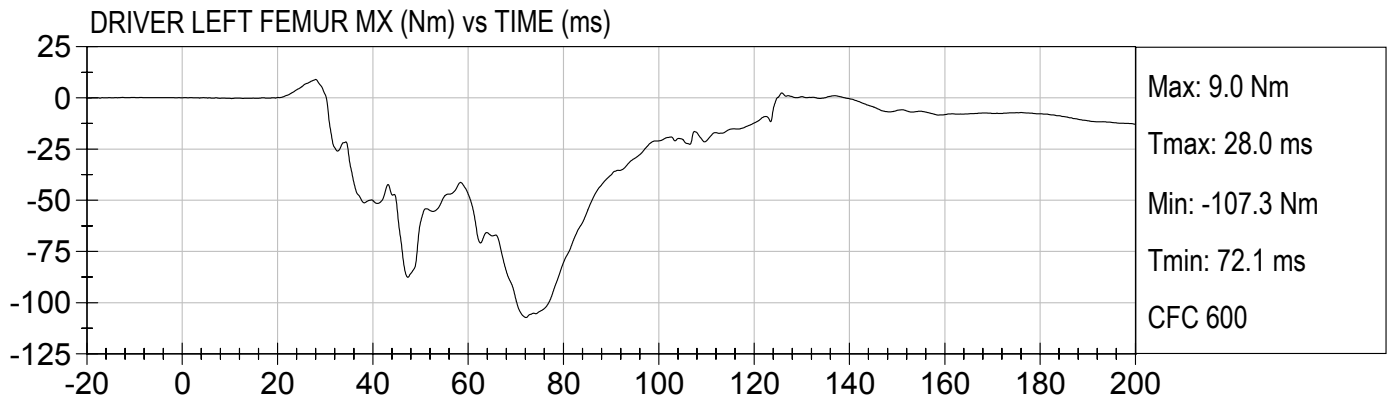
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

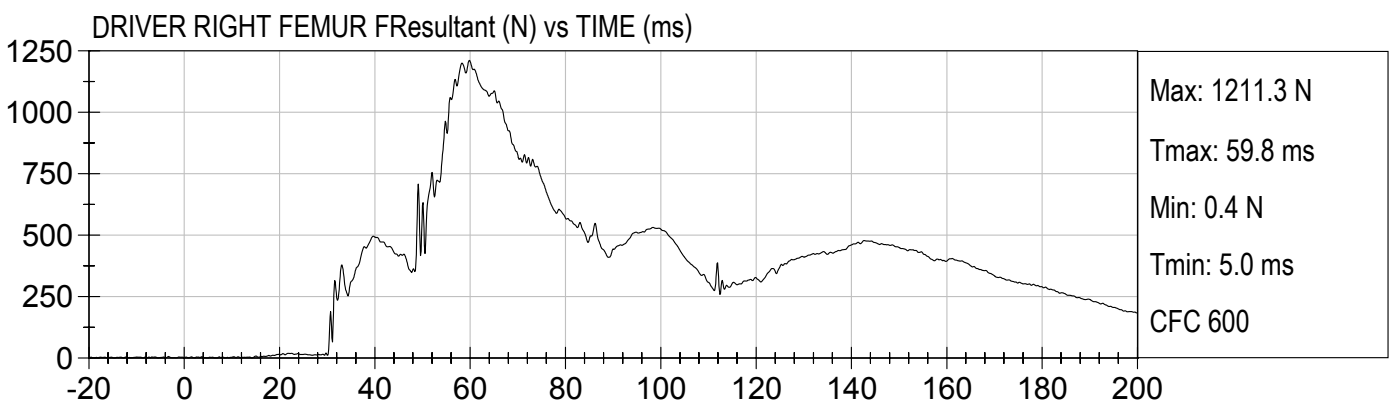
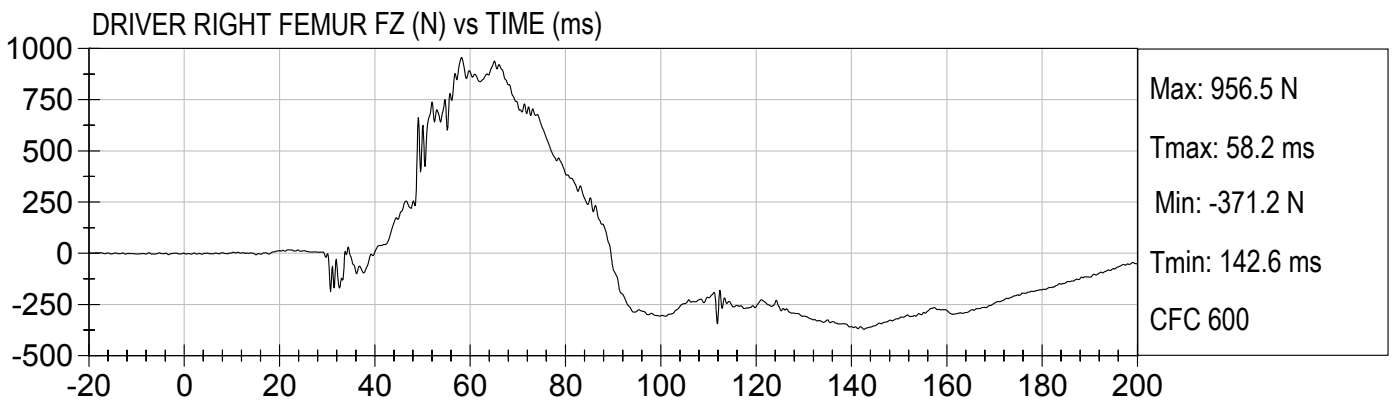
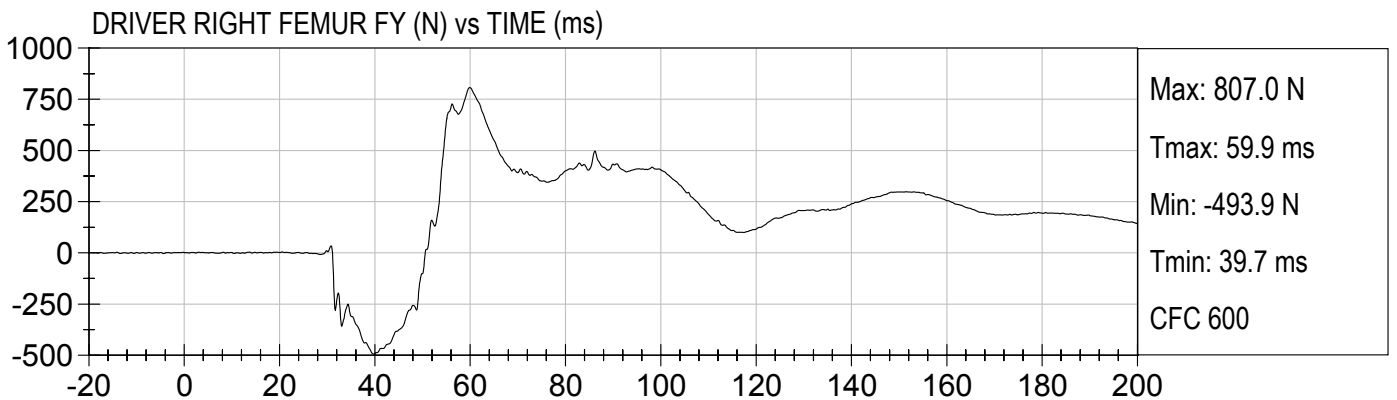
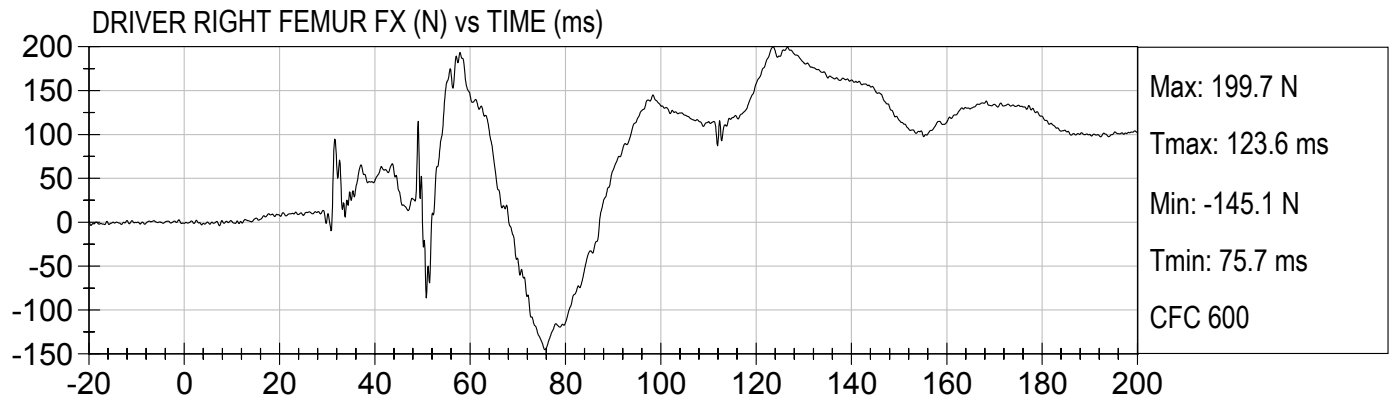
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

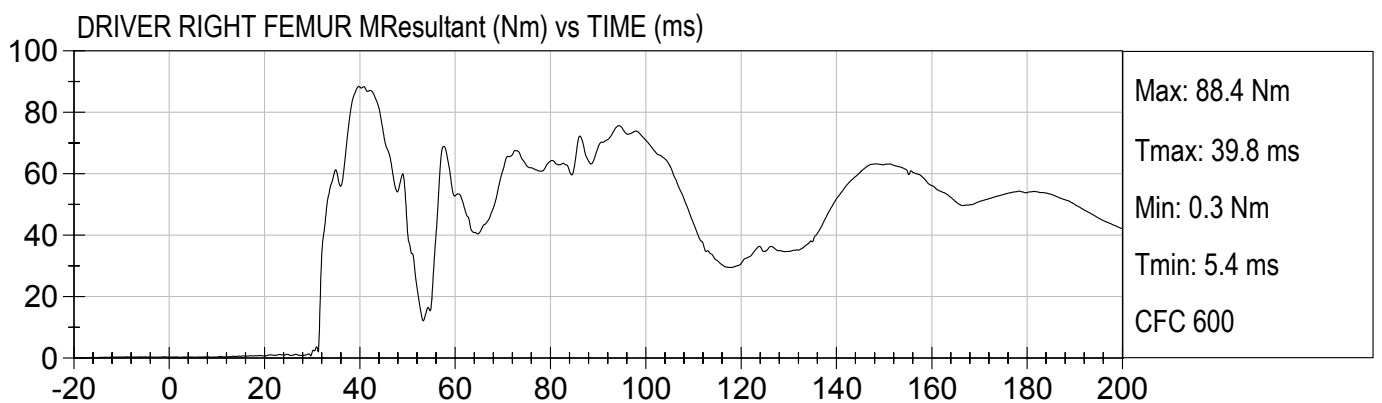
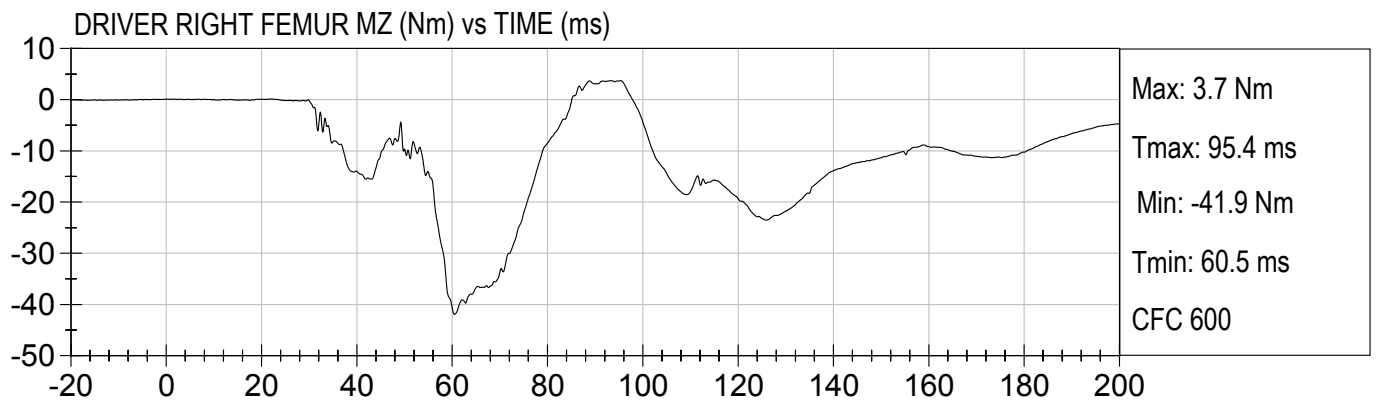
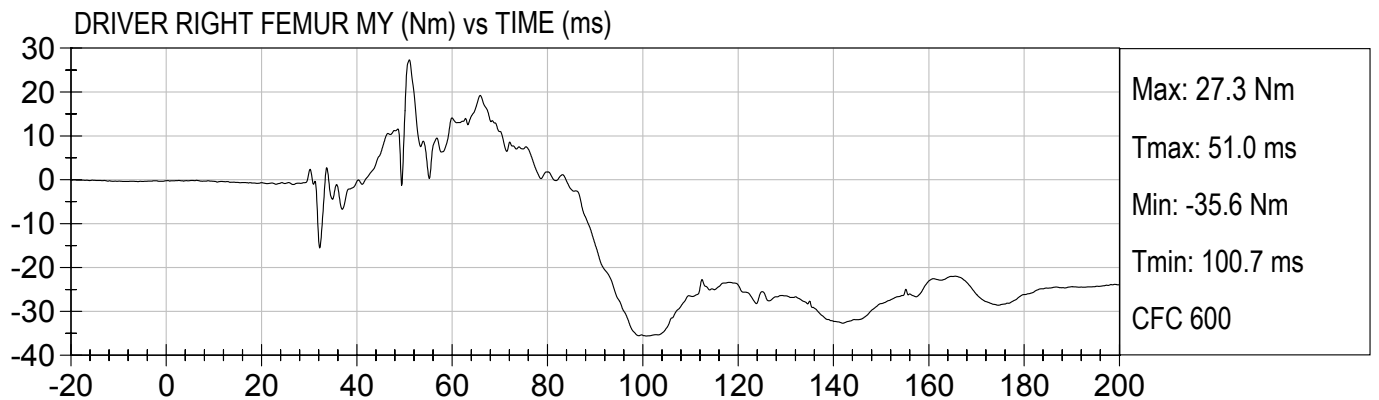
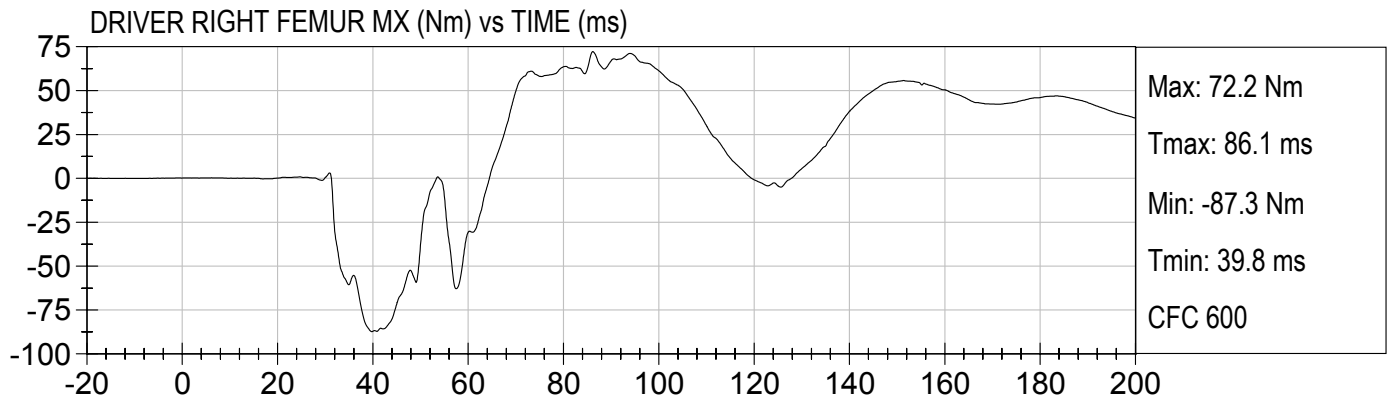
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

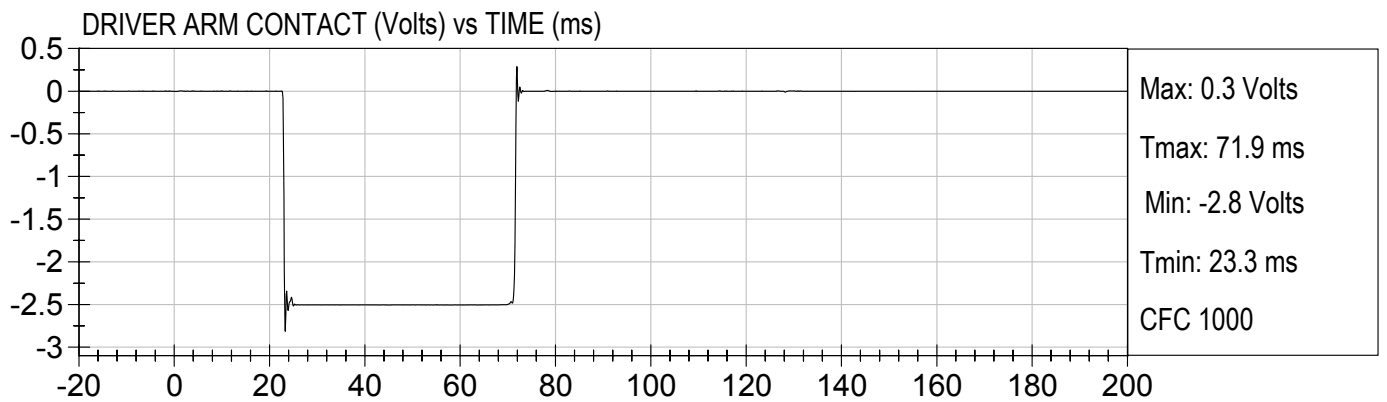
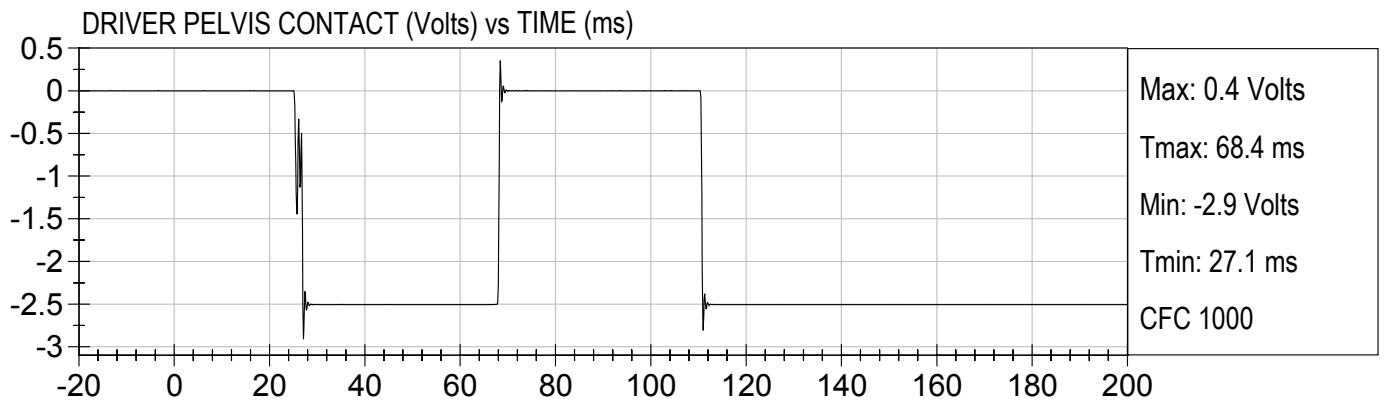
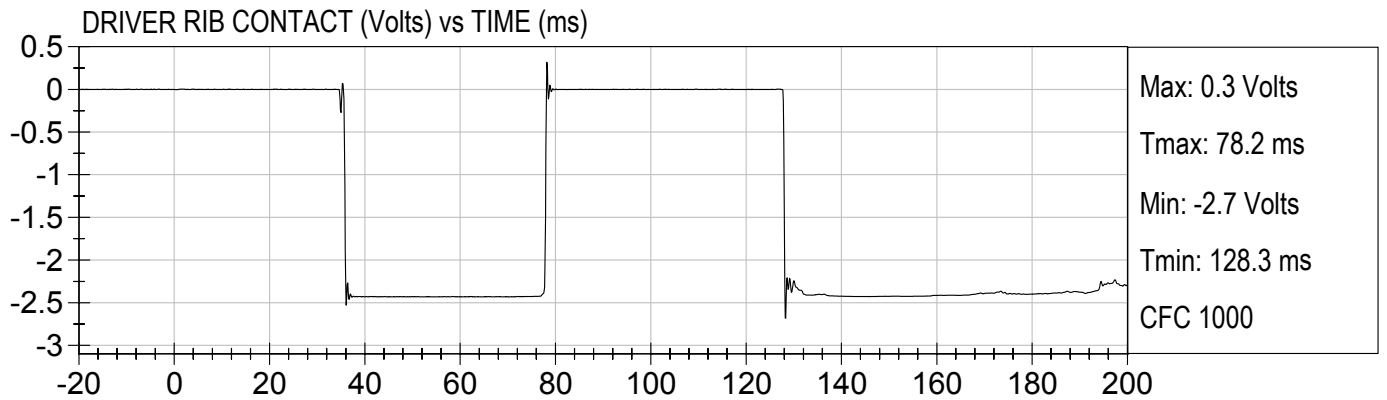
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

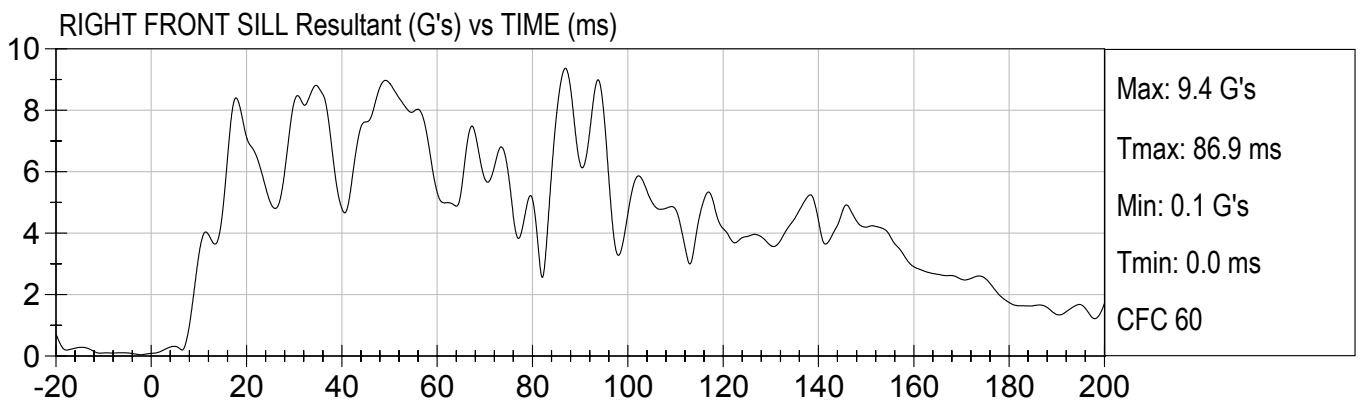
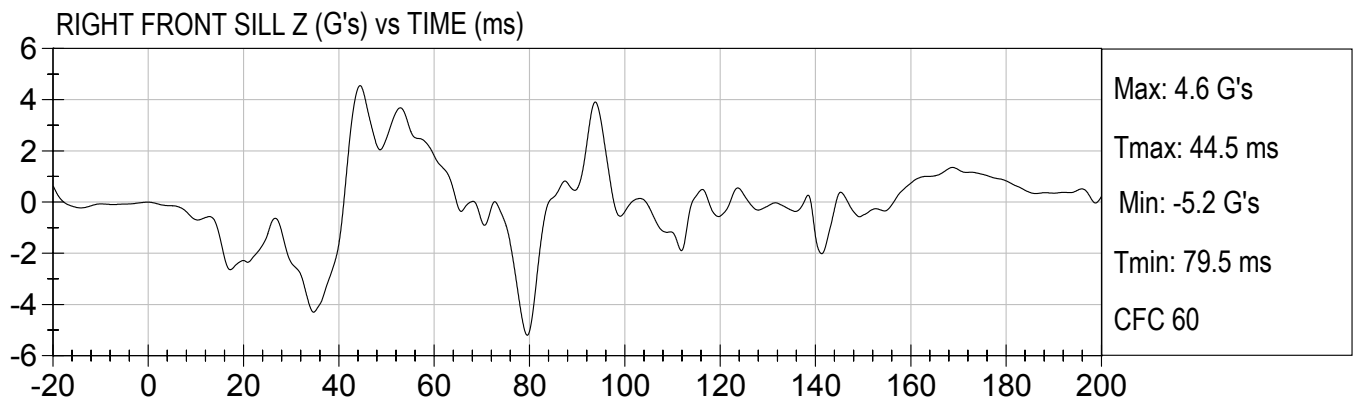
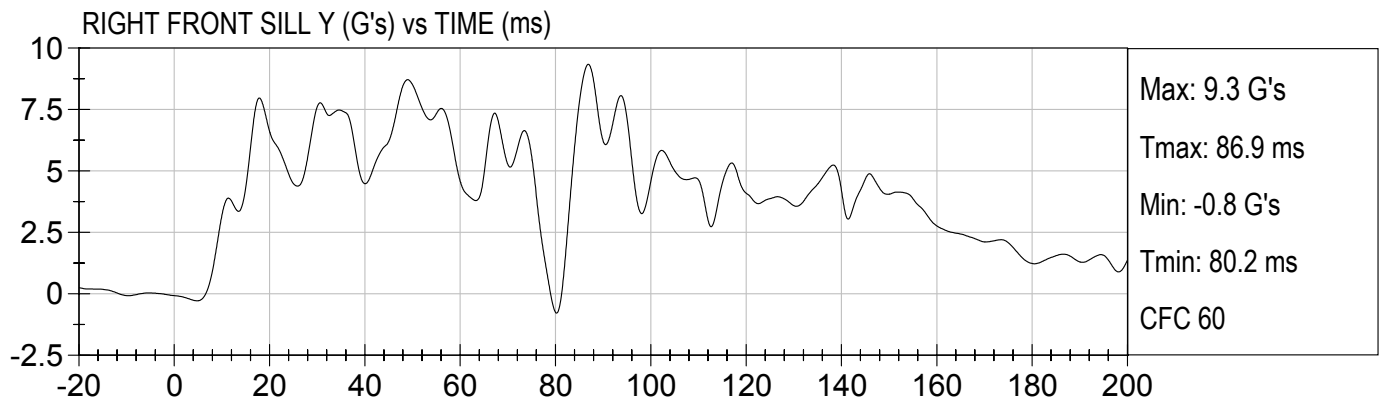
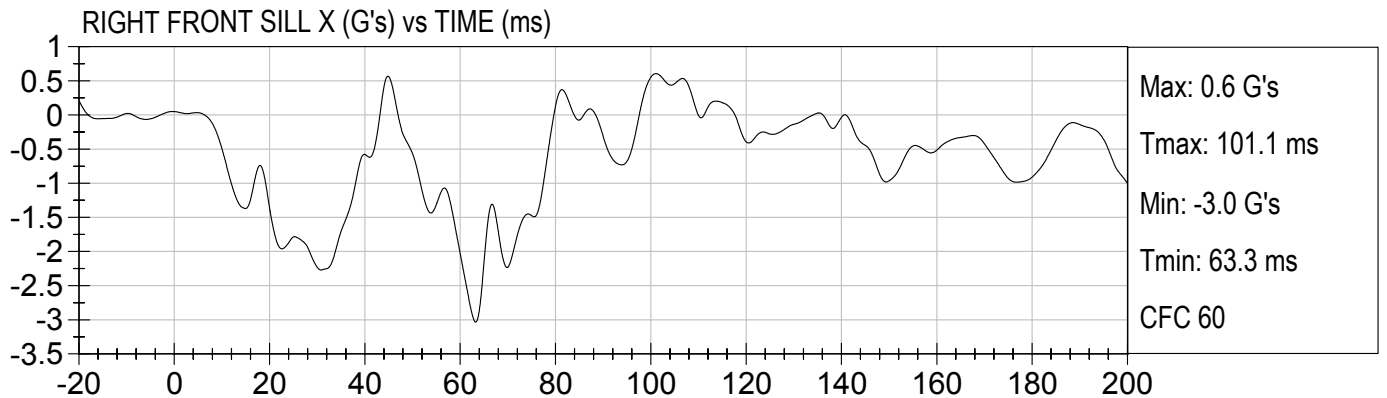
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

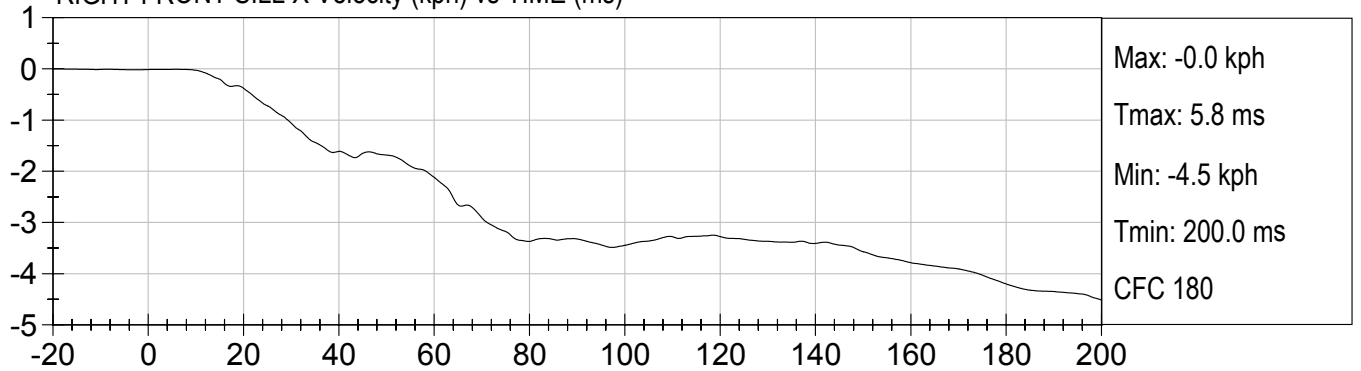




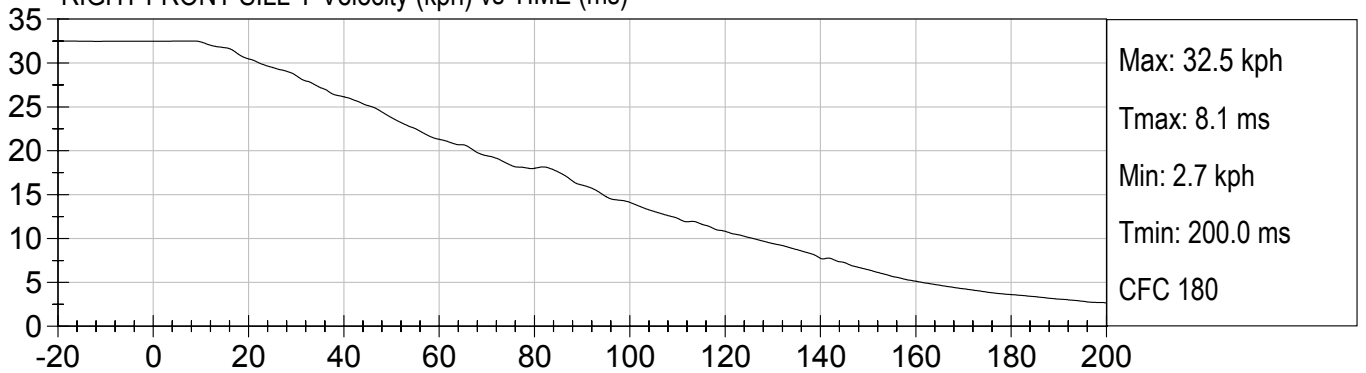
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

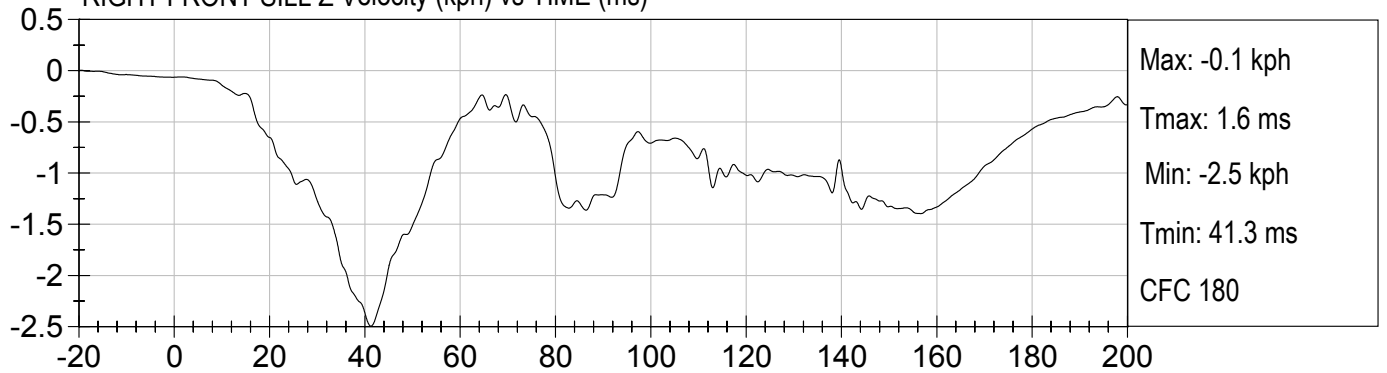
RIGHT FRONT SILL X Velocity (kph) vs TIME (ms)



RIGHT FRONT SILL Y Velocity (kph) vs TIME (ms)



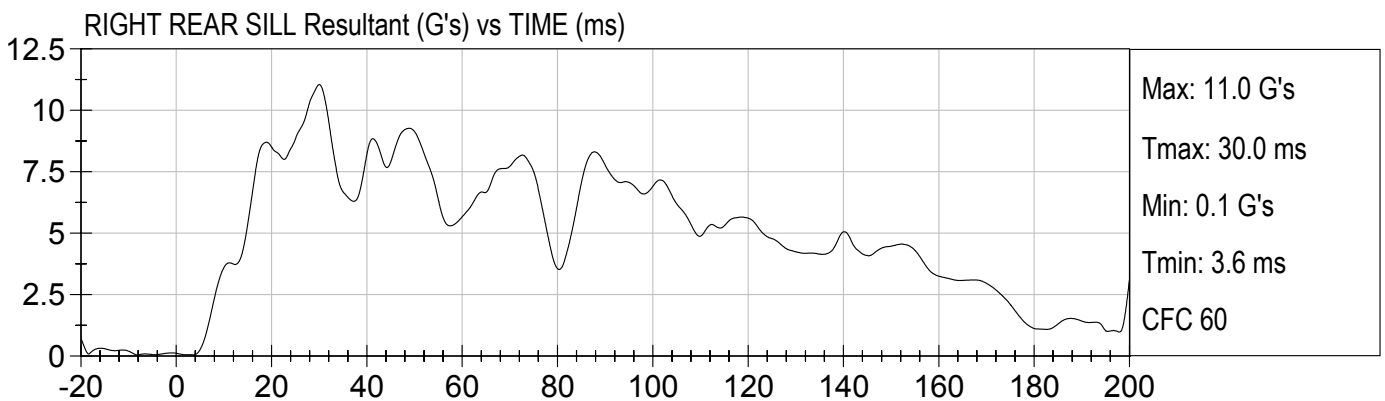
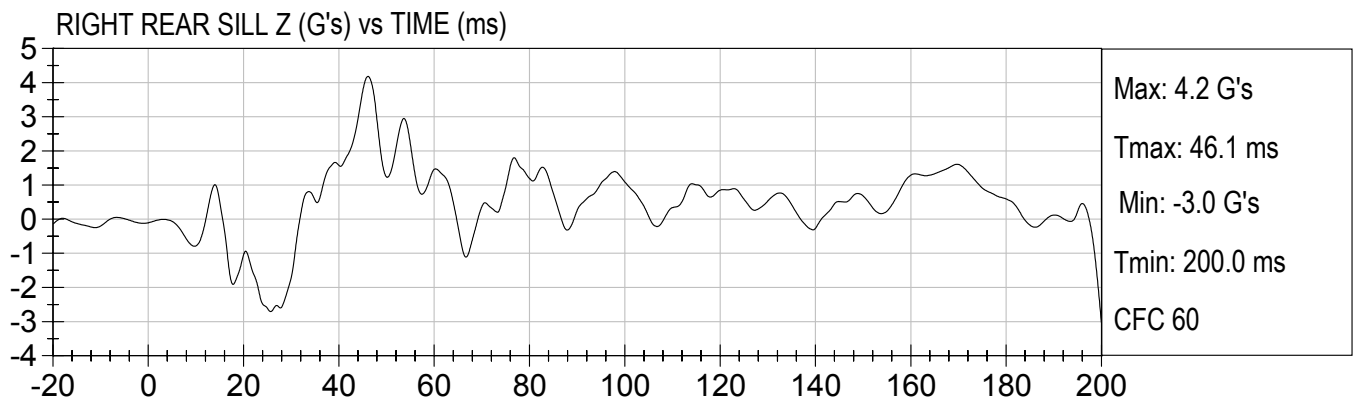
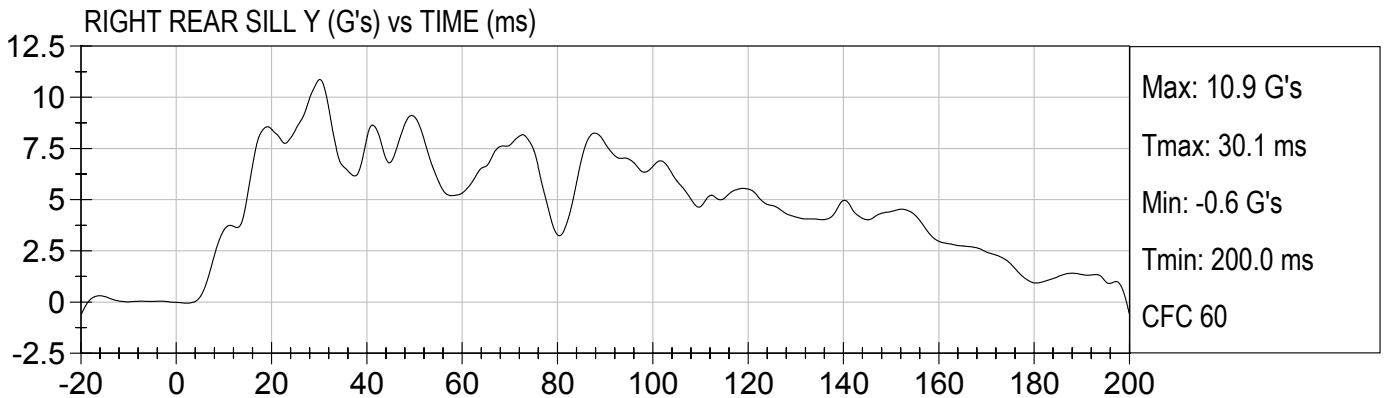
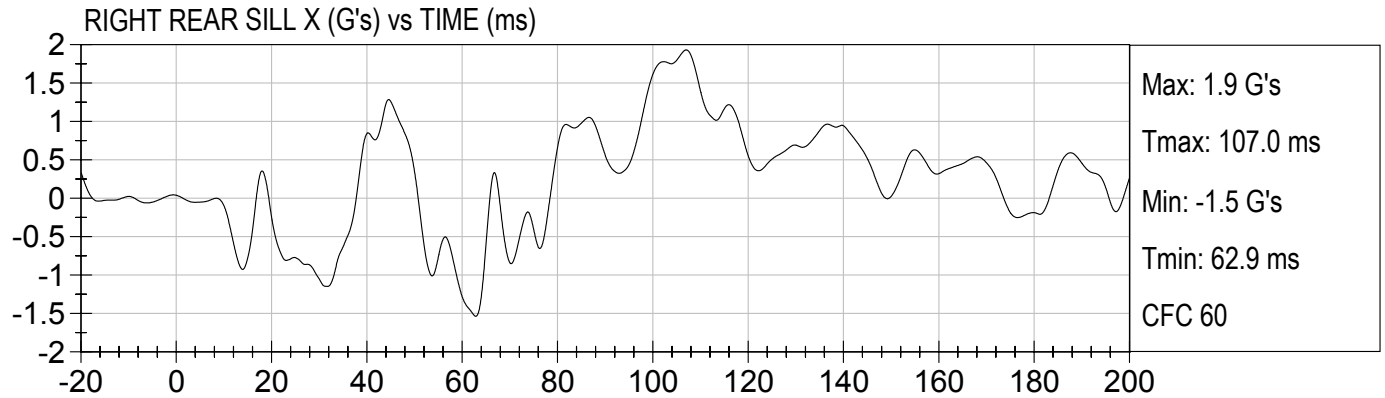
RIGHT FRONT SILL Z Velocity (kph) vs TIME (ms)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

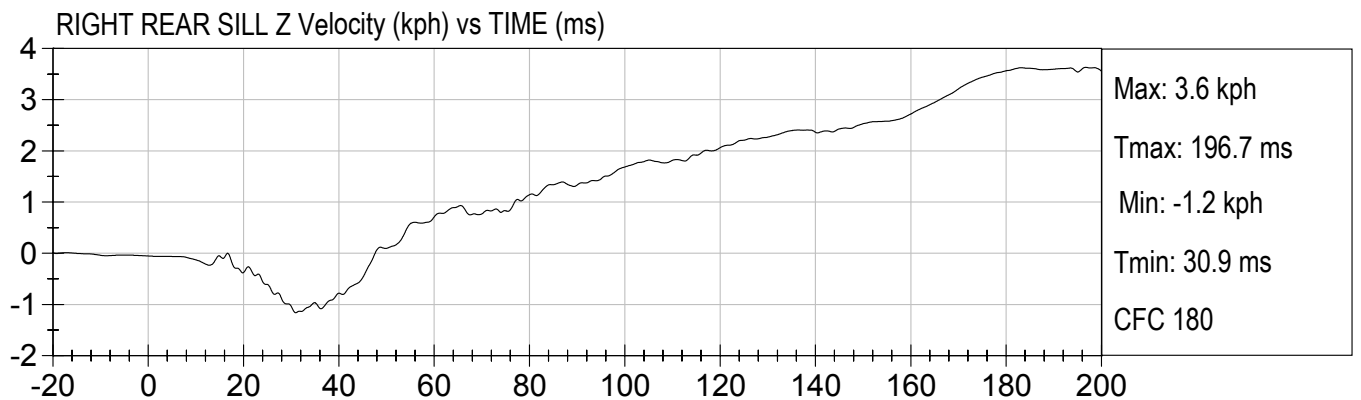
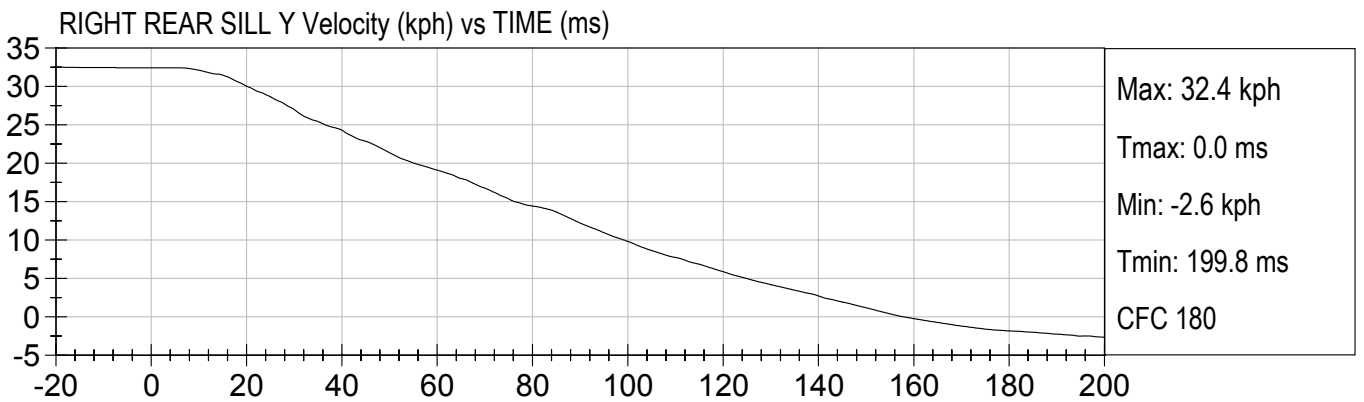
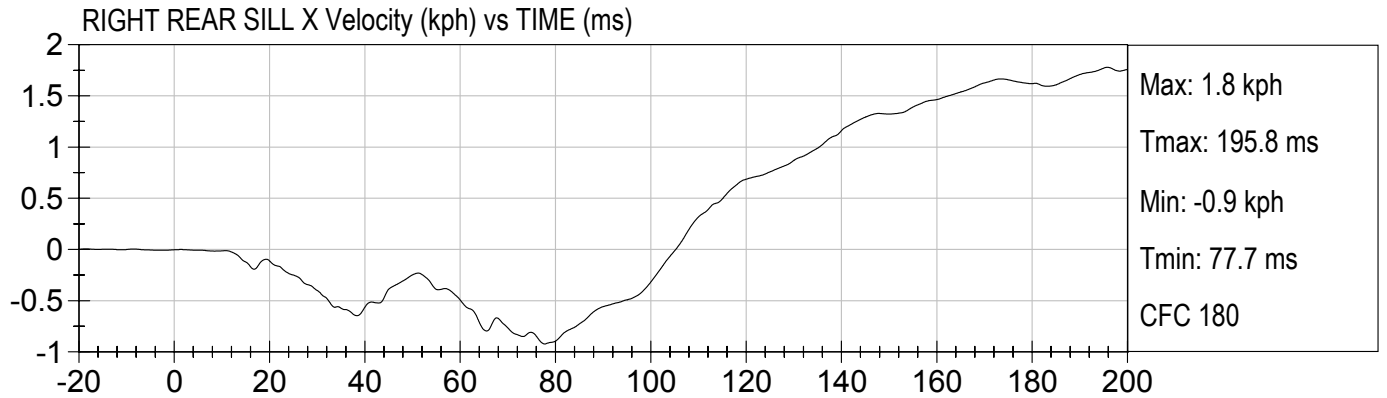
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

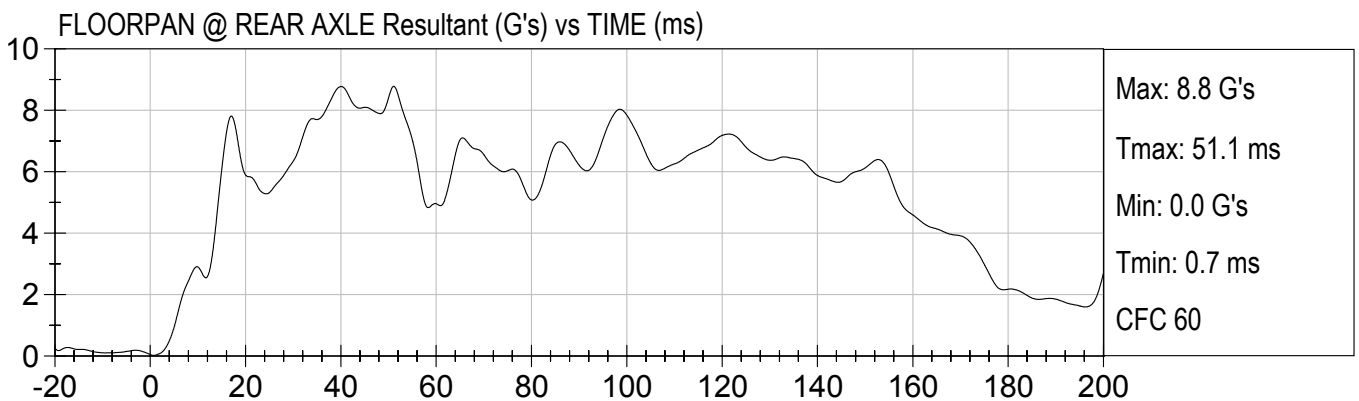
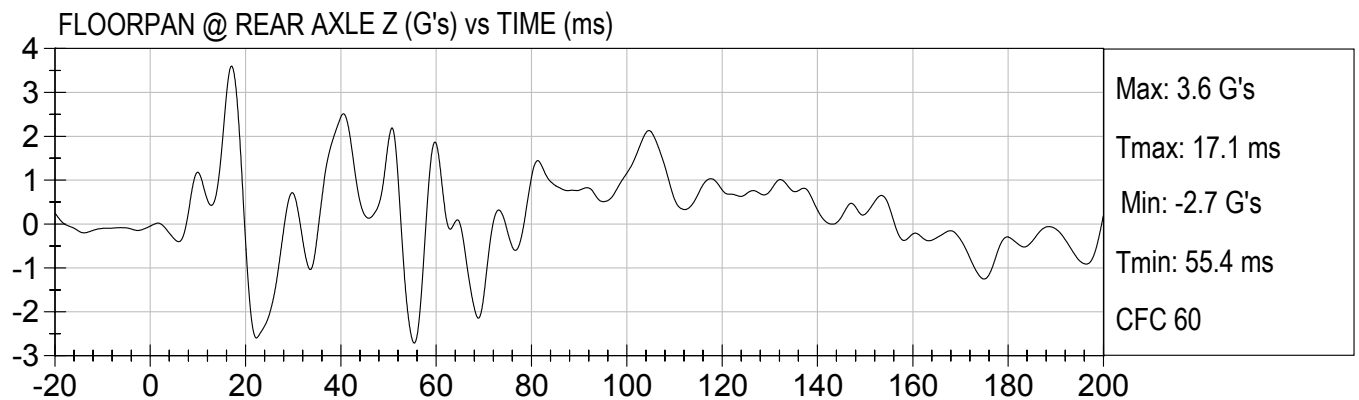
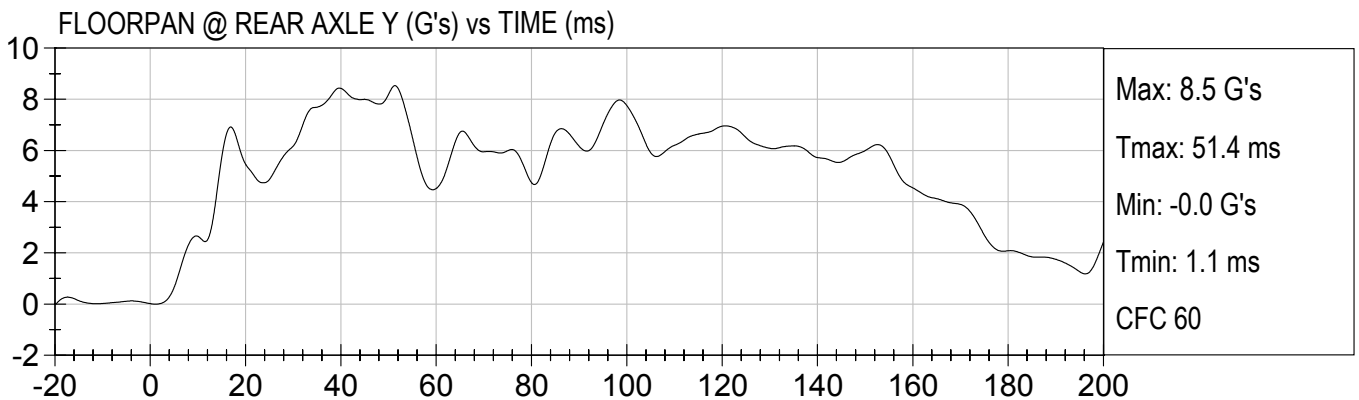
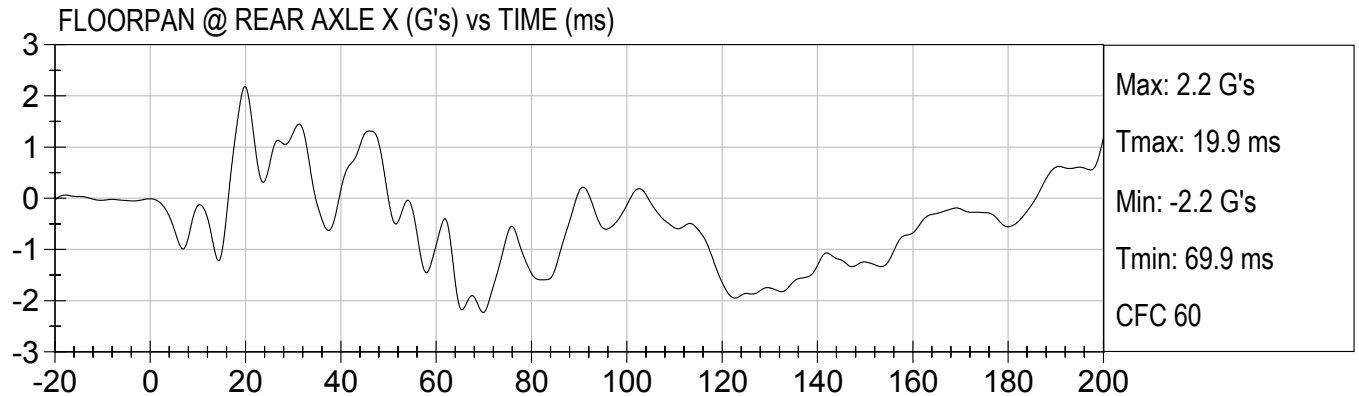
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

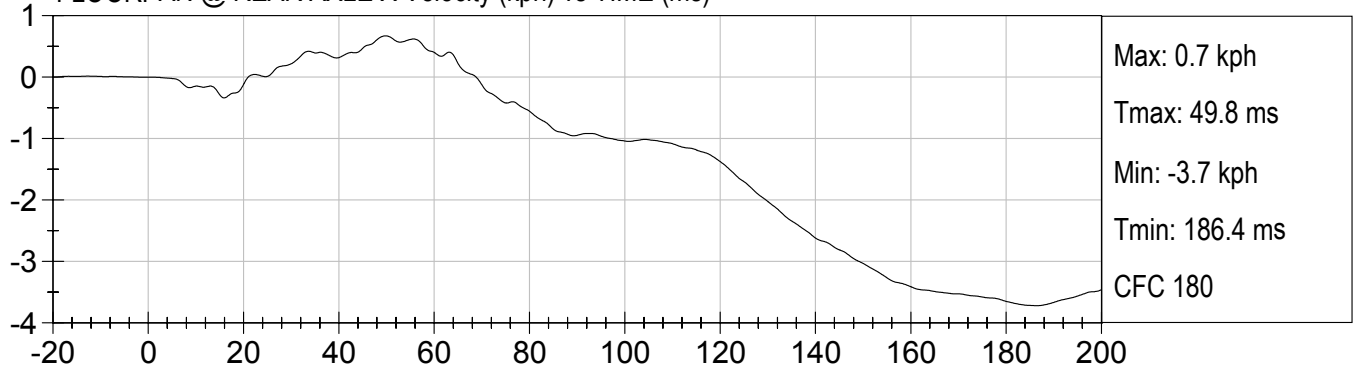




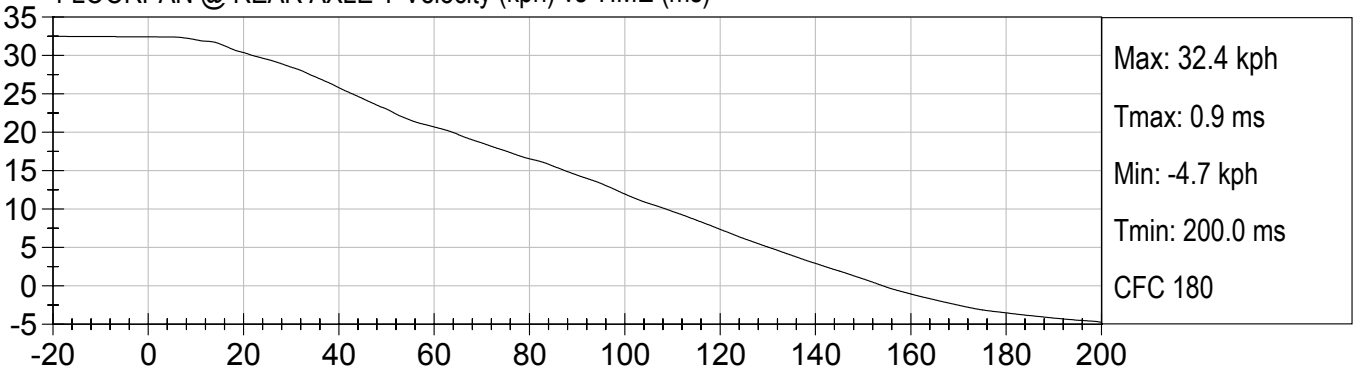
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

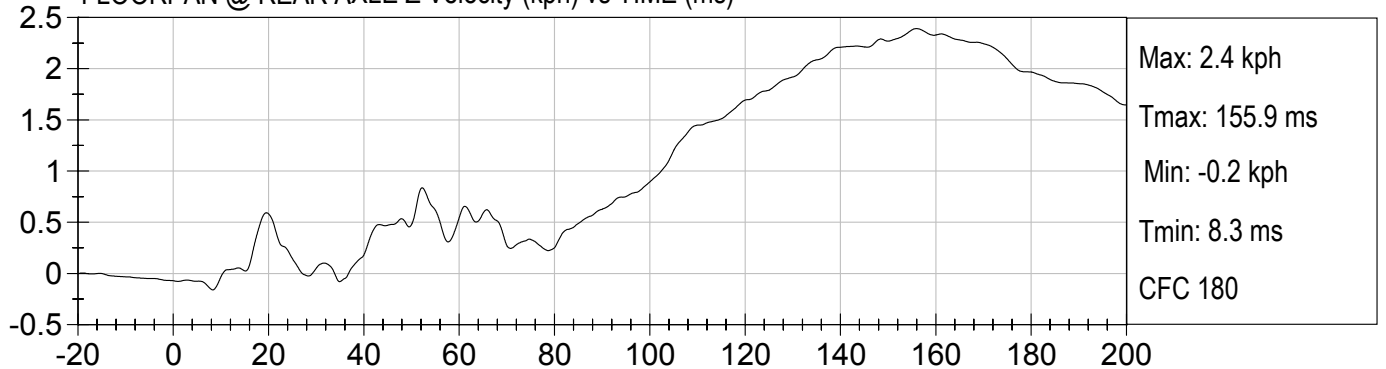
FLOORPAN @ REAR AXLE X Velocity (kph) vs TIME (ms)

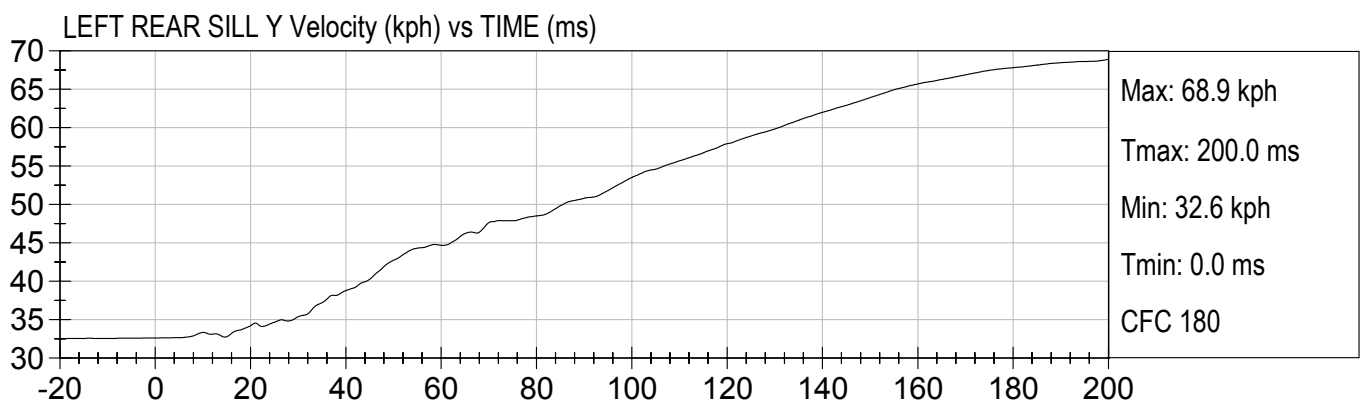
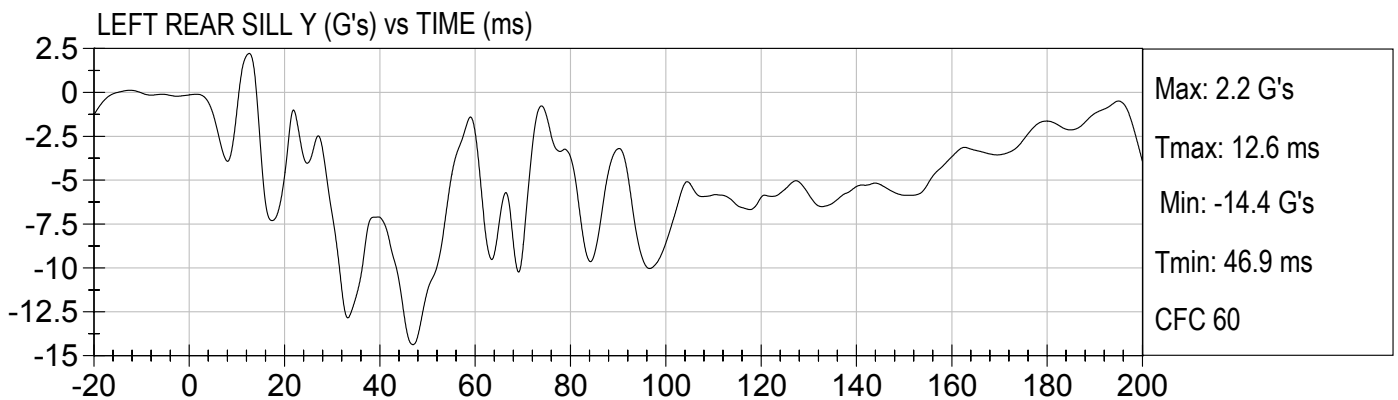
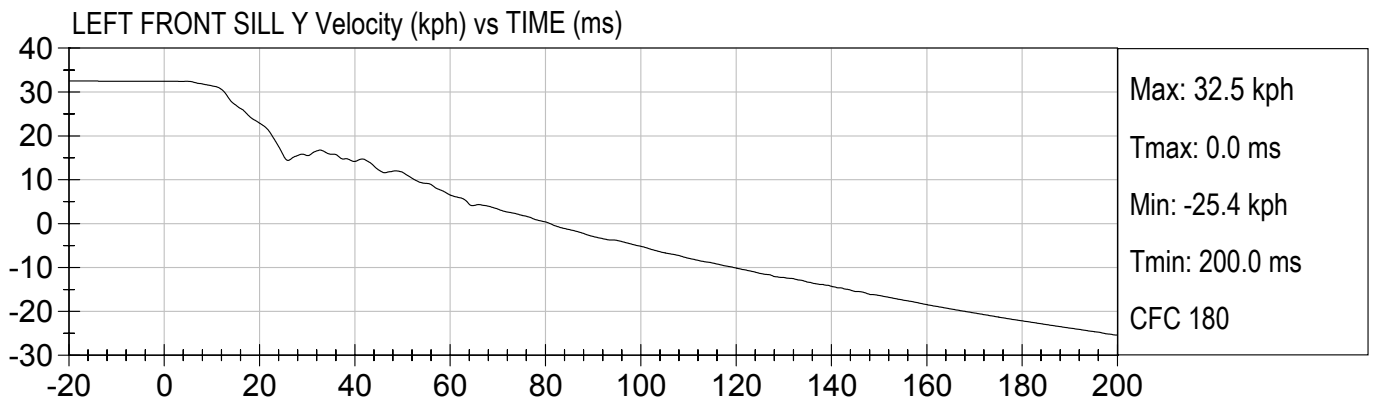
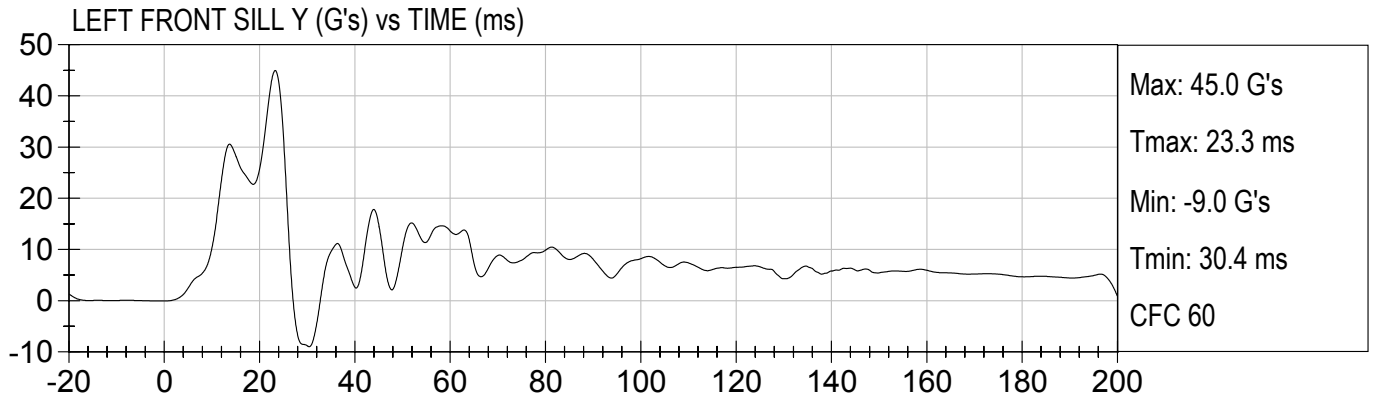


FLOORPAN @ REAR AXLE Y Velocity (kph) vs TIME (ms)



FLOORPAN @ REAR AXLE Z Velocity (kph) vs TIME (ms)

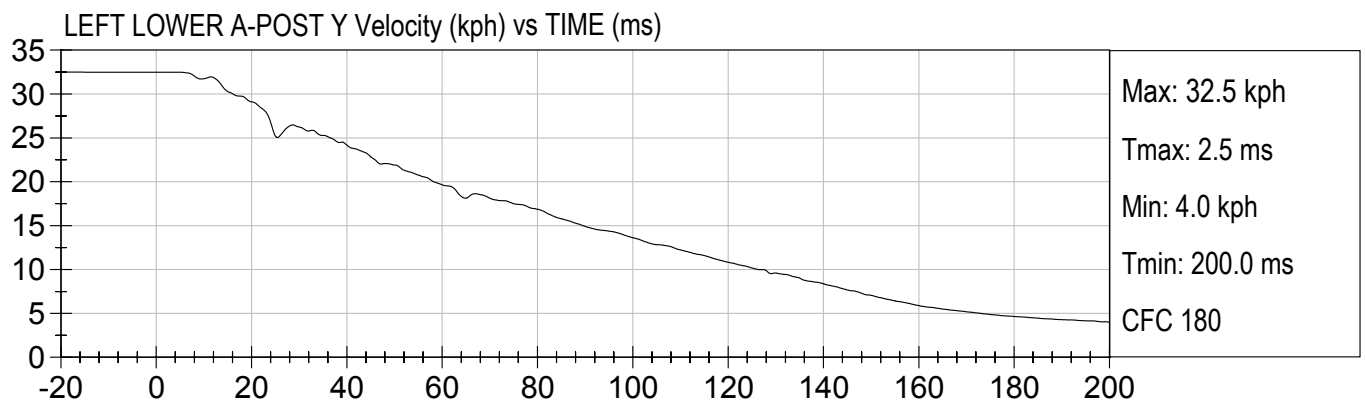
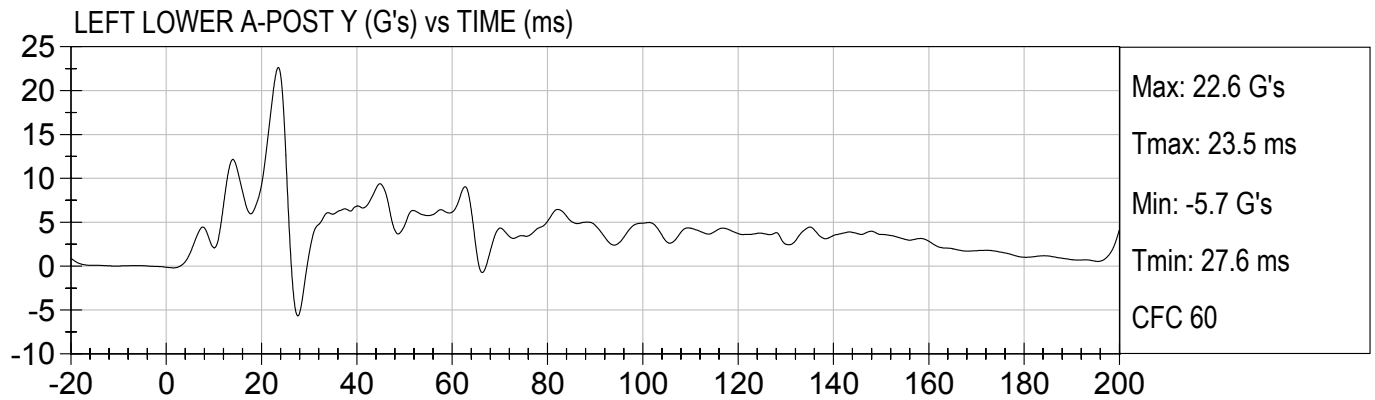


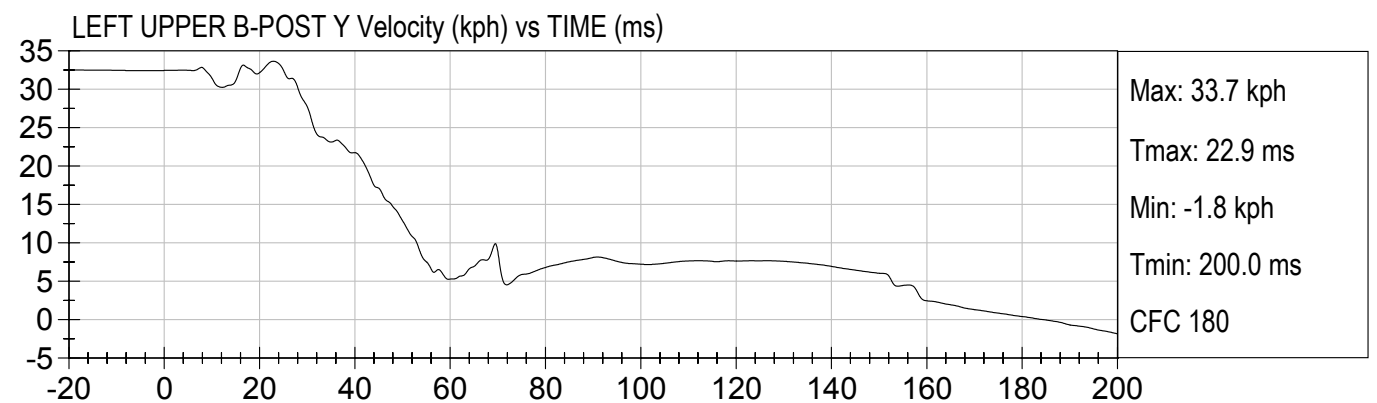
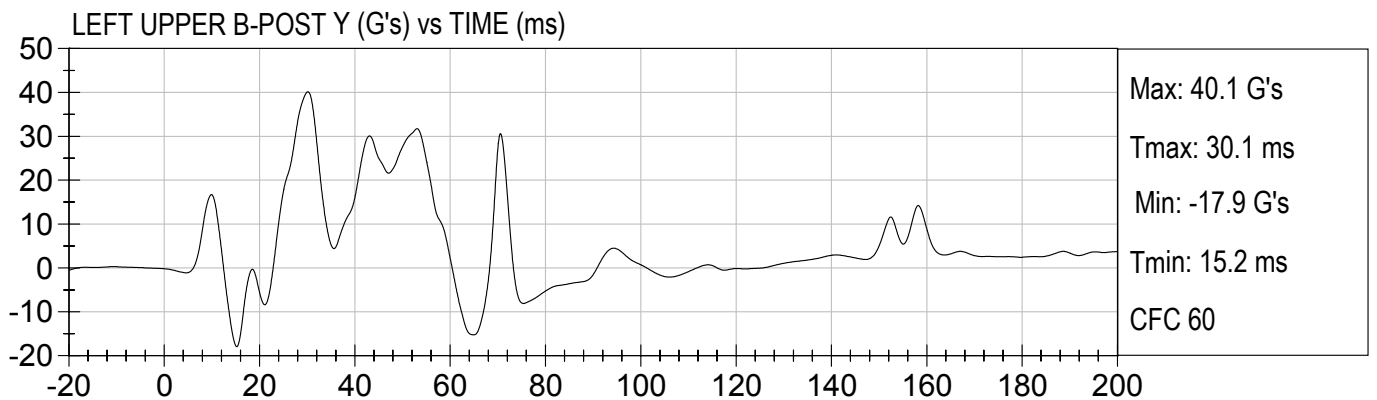
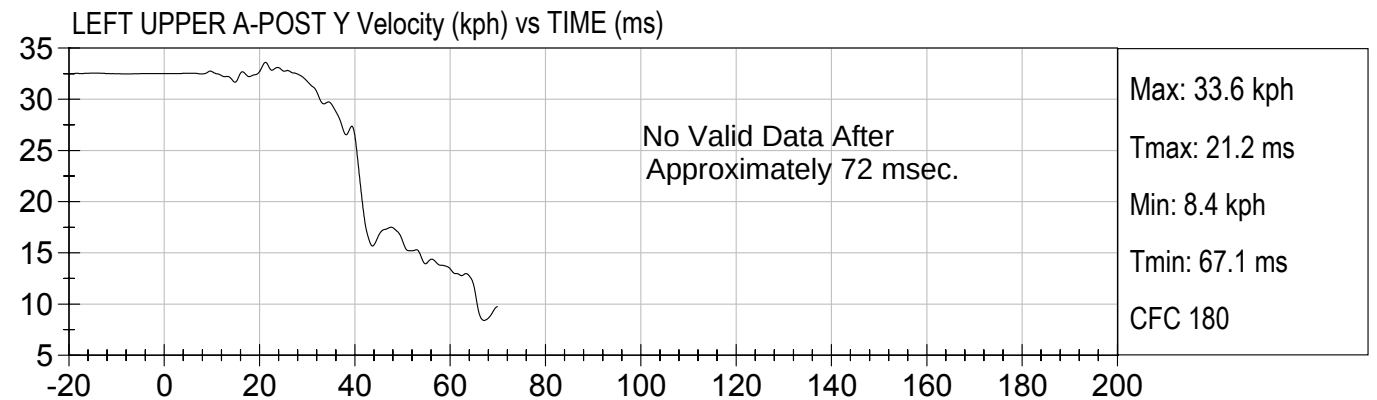
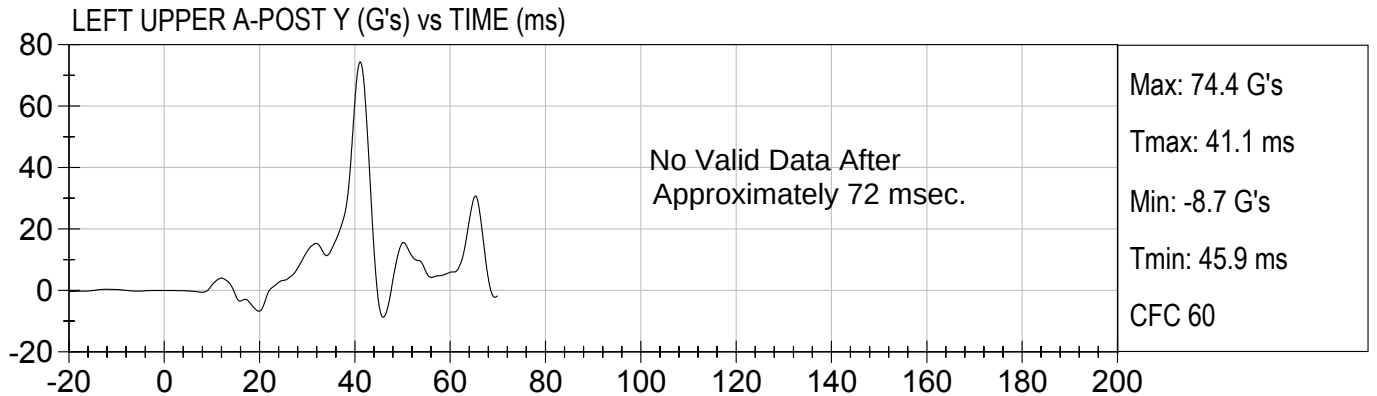




20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

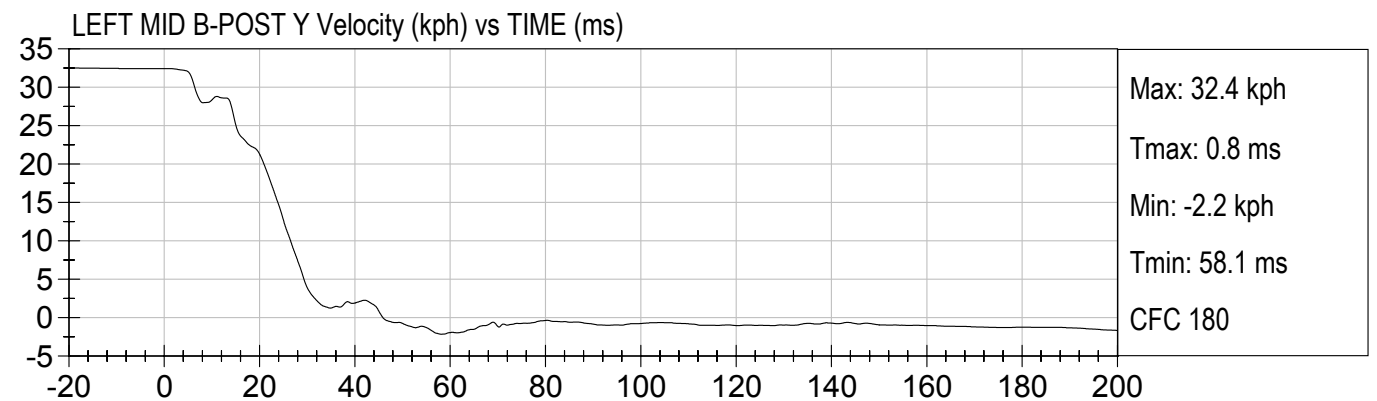
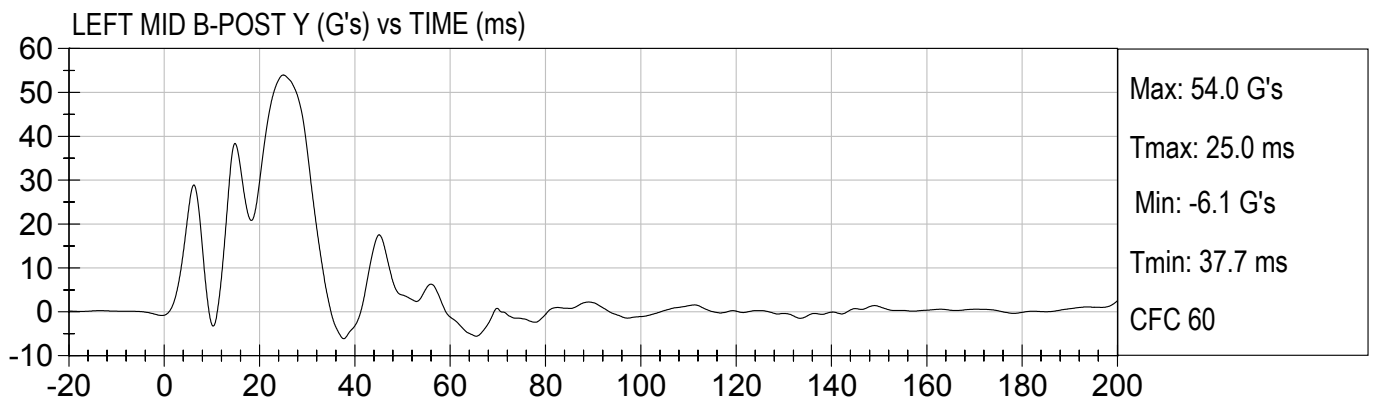
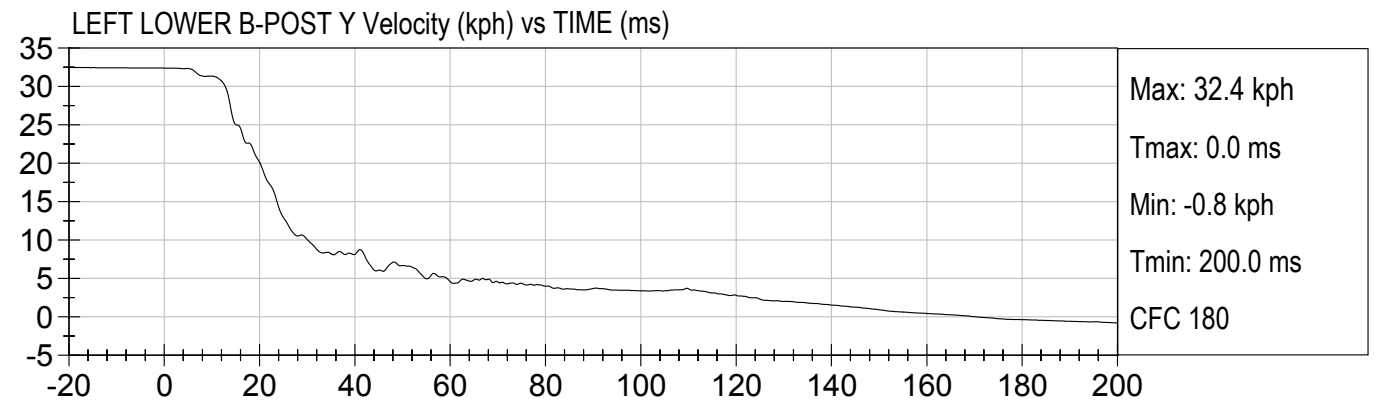
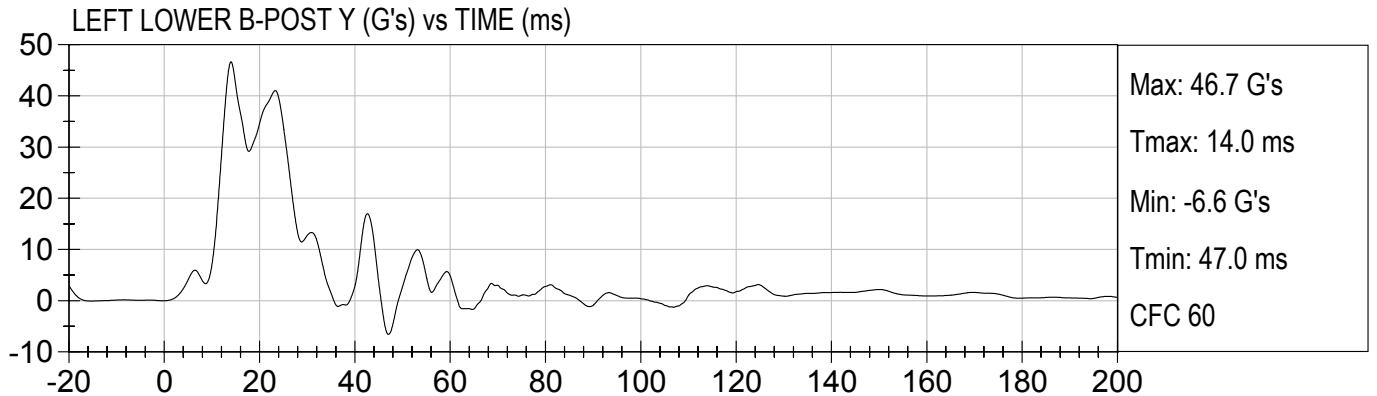






20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

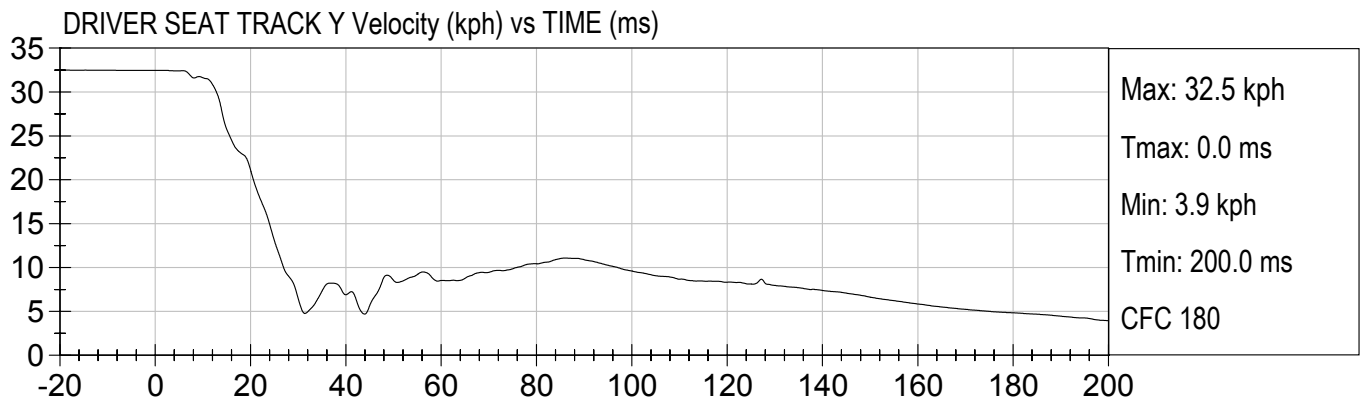
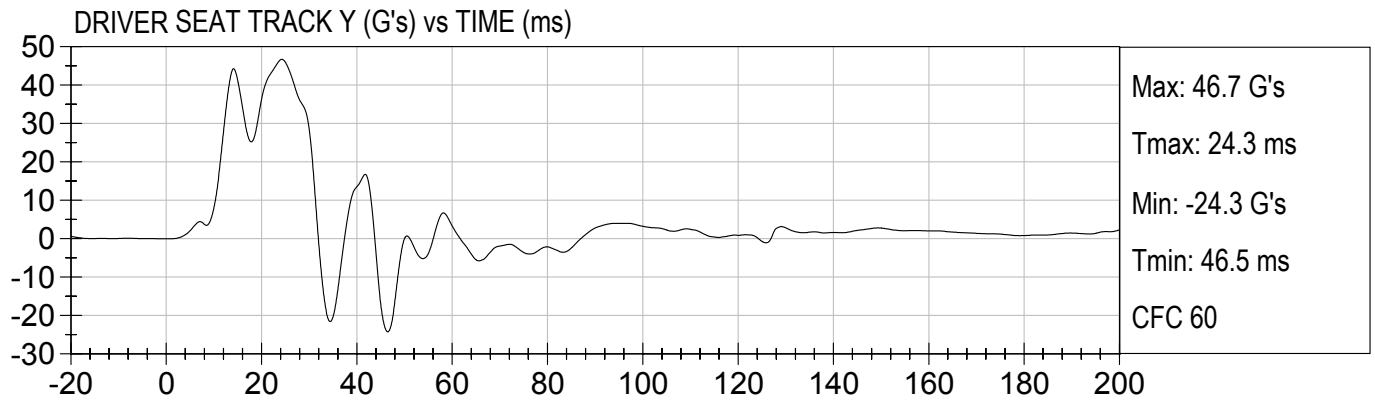
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

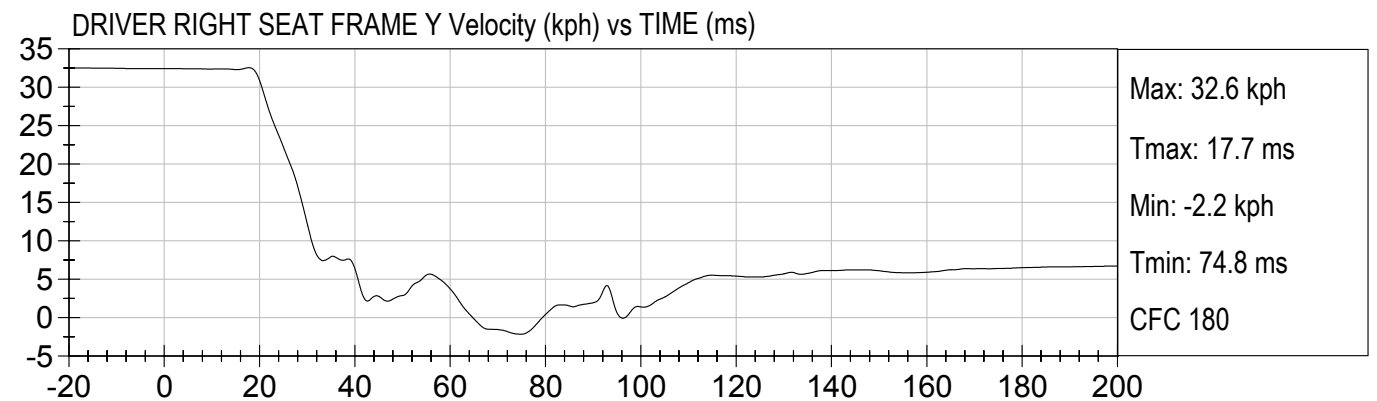
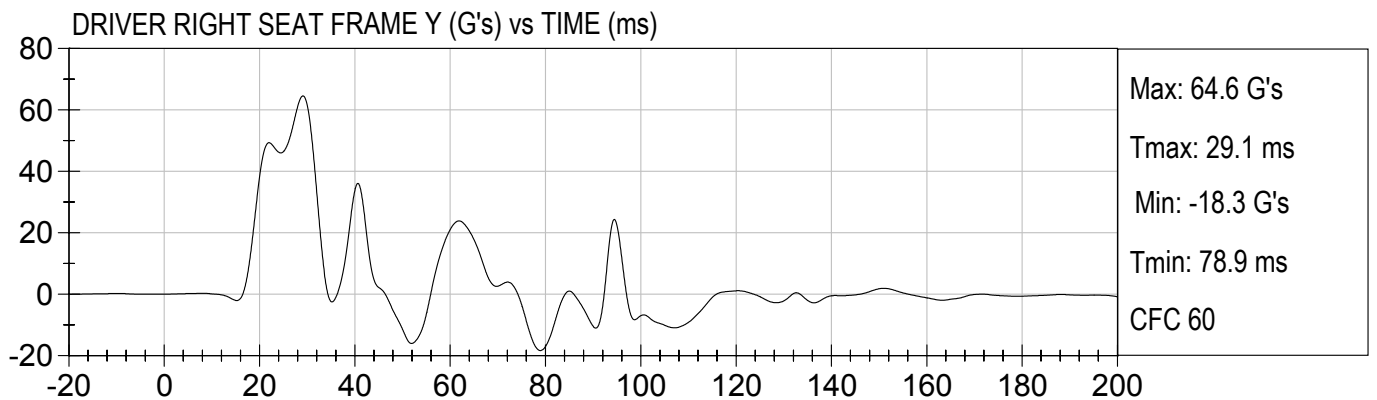
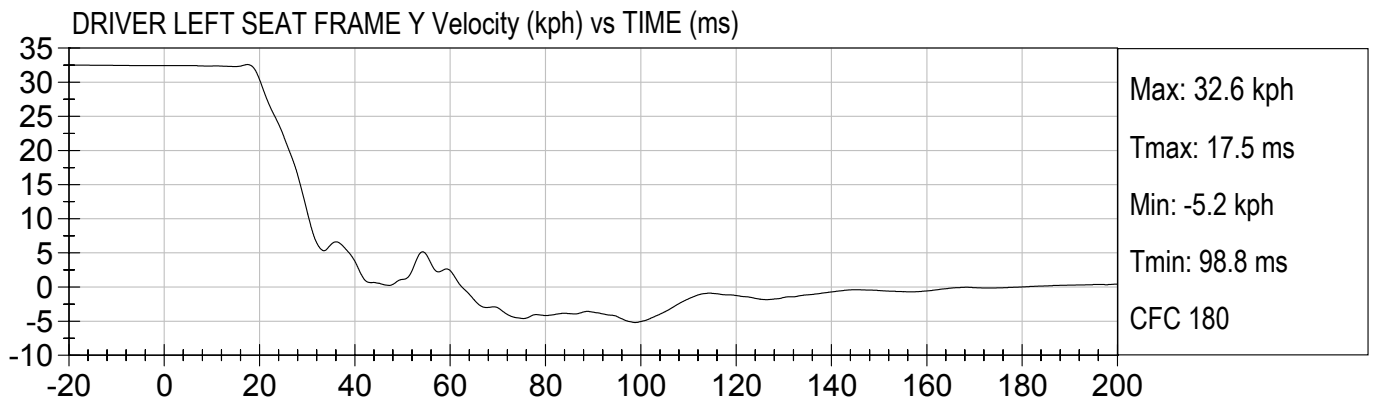
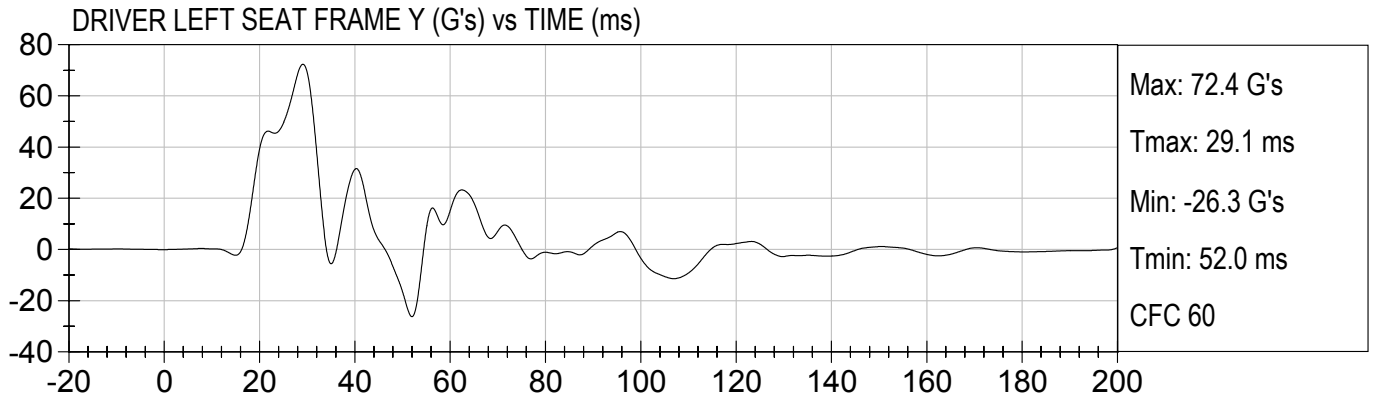




20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

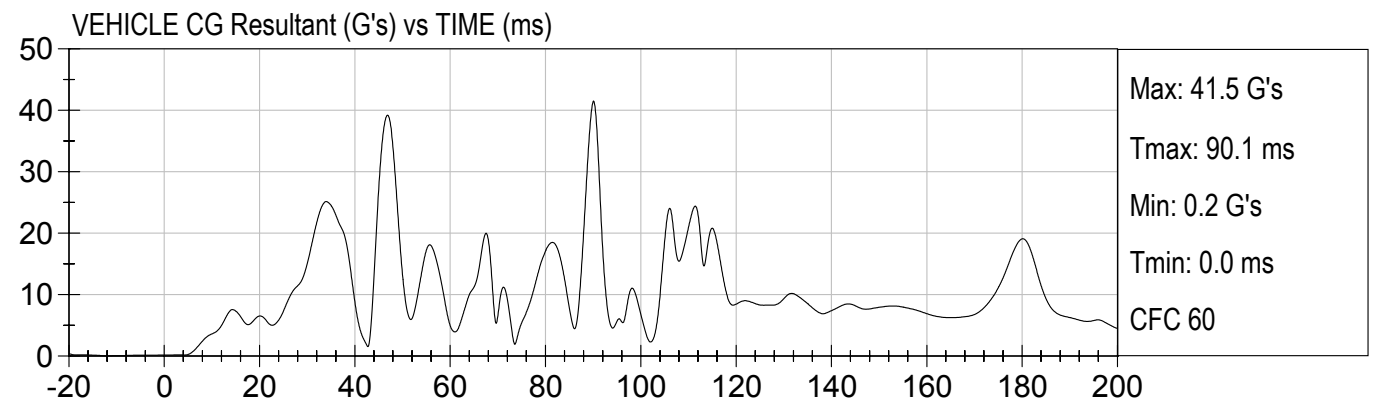
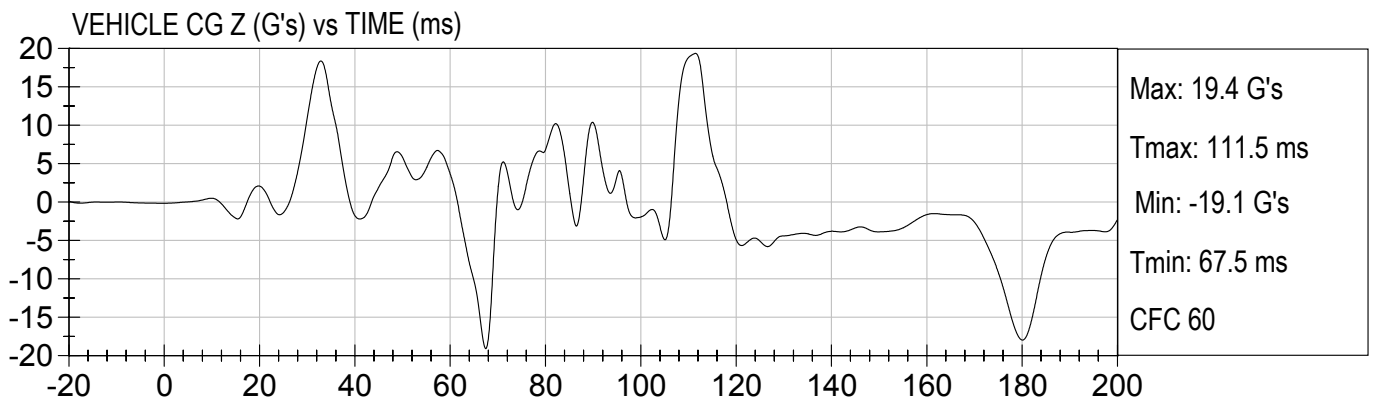
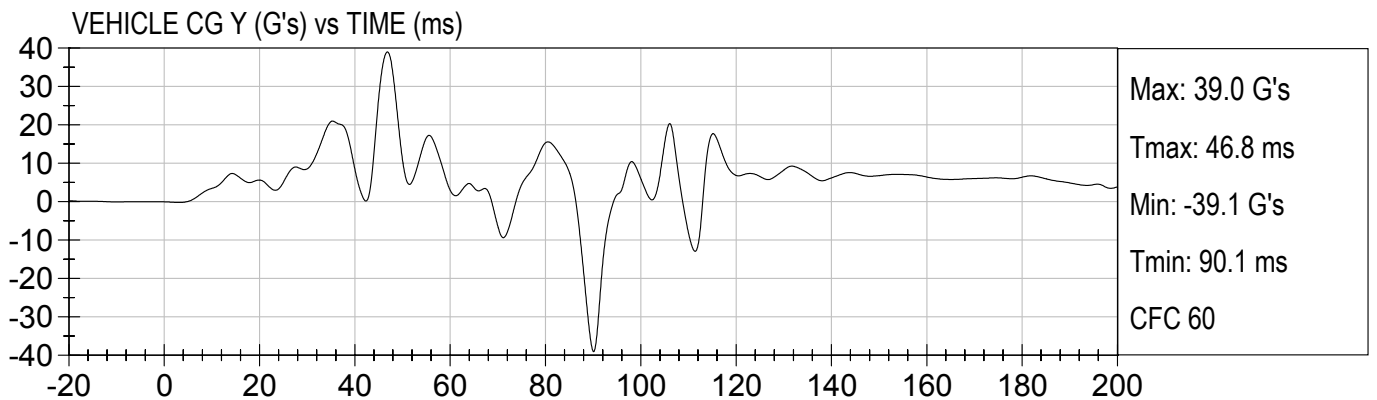
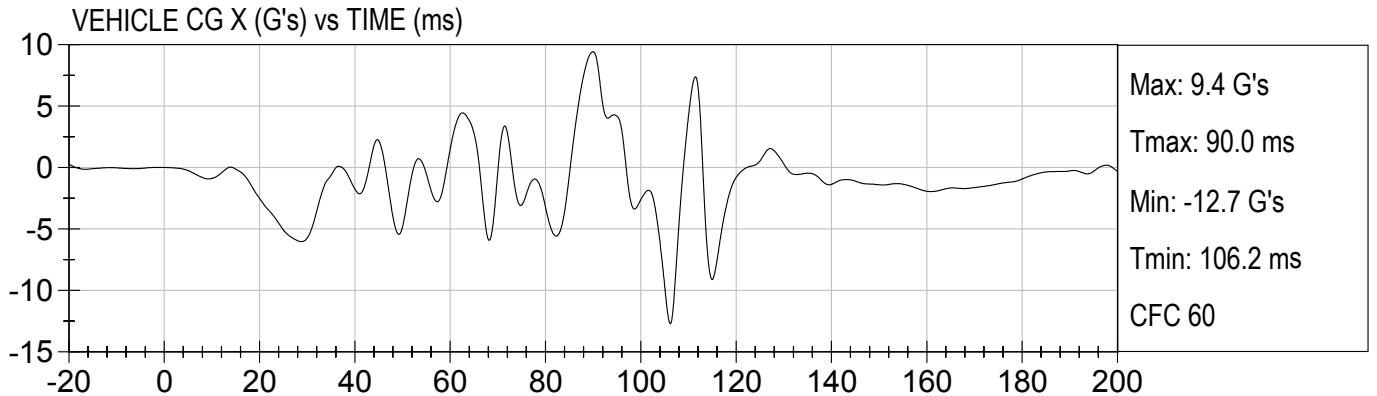






20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

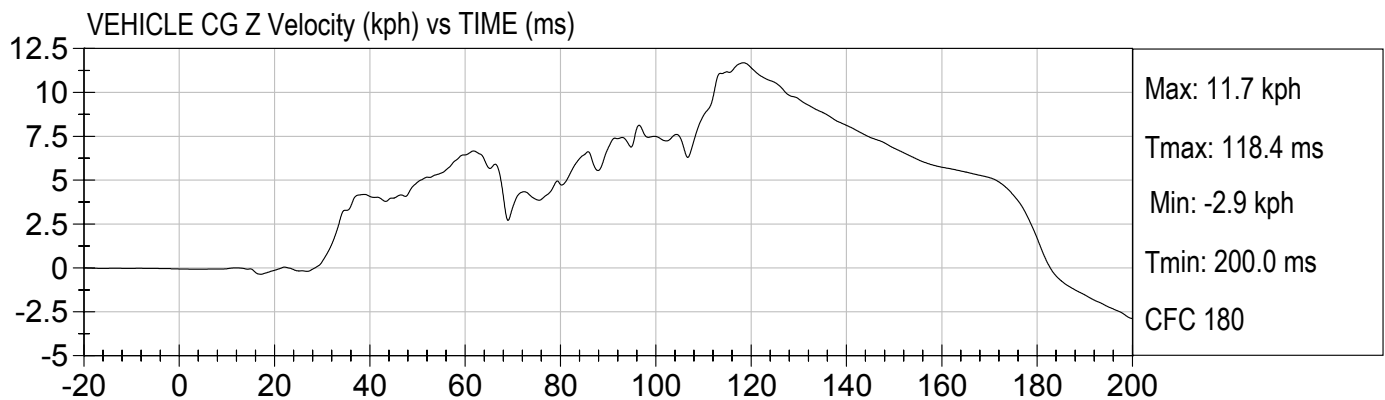
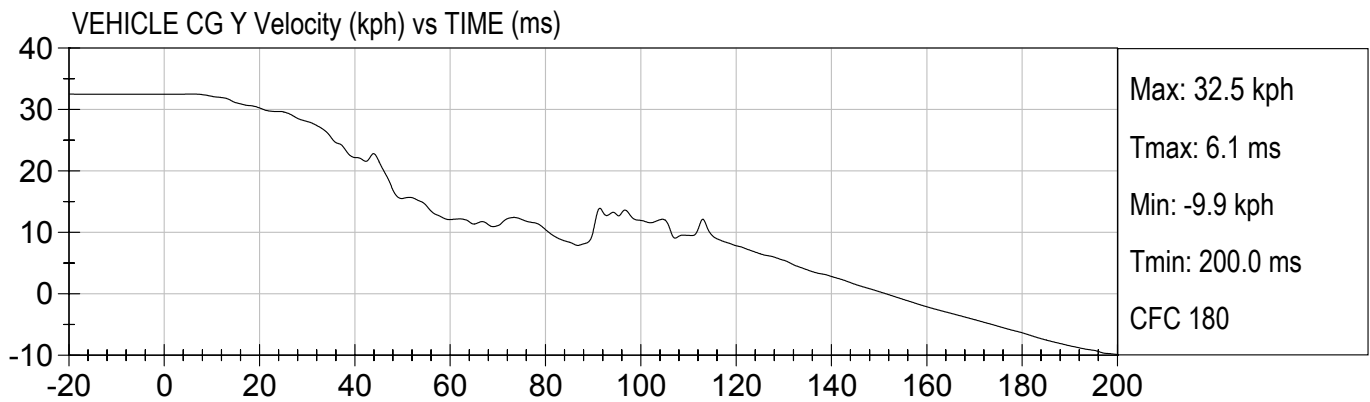
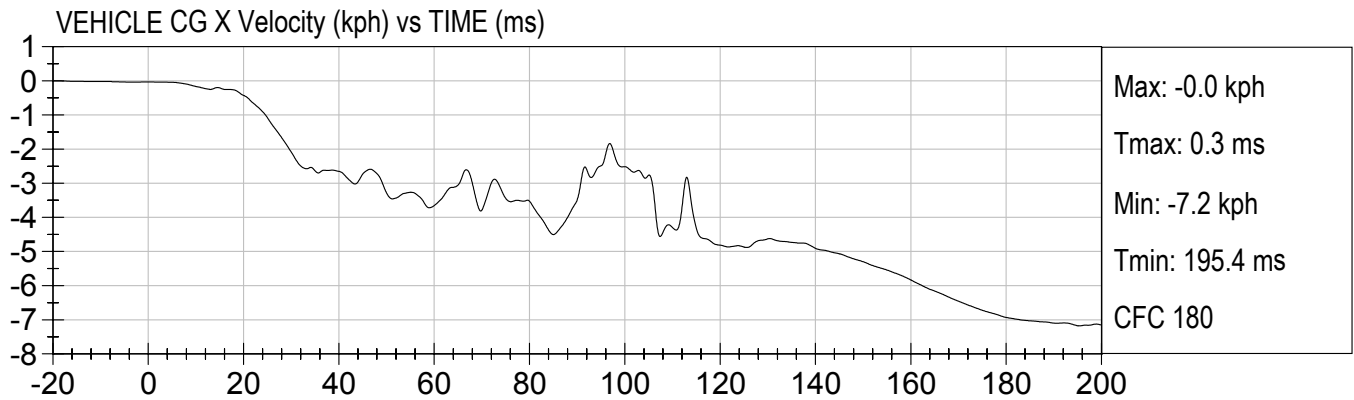
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

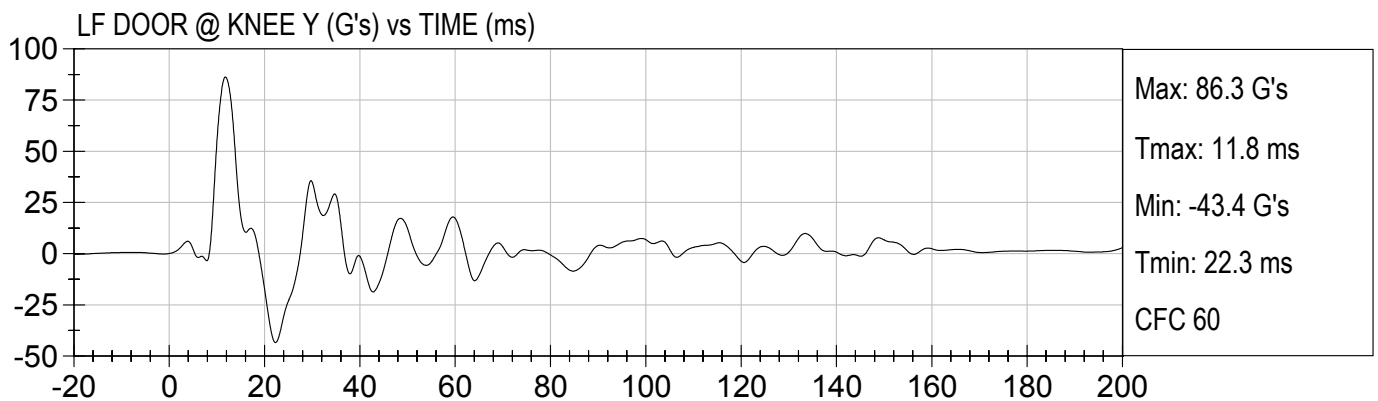
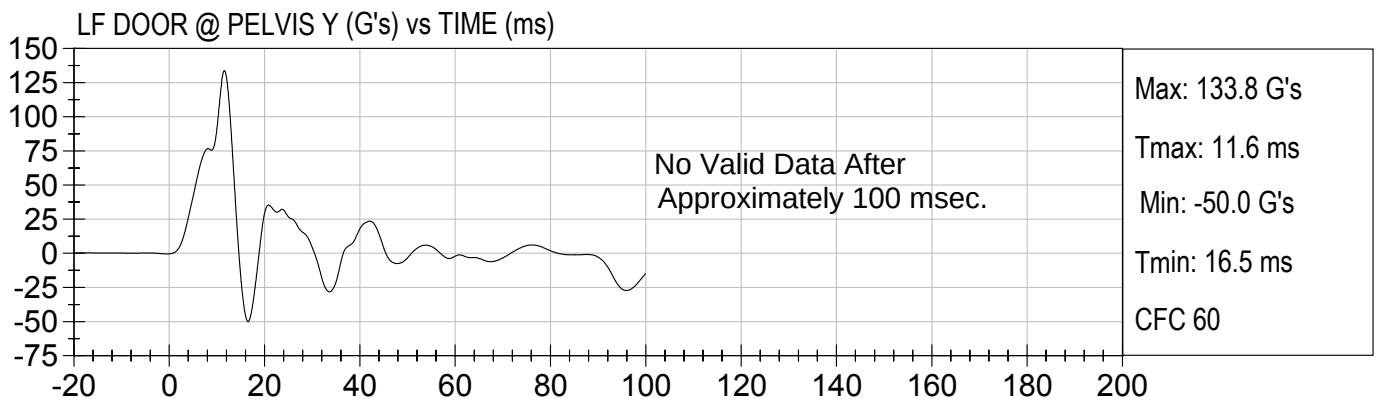
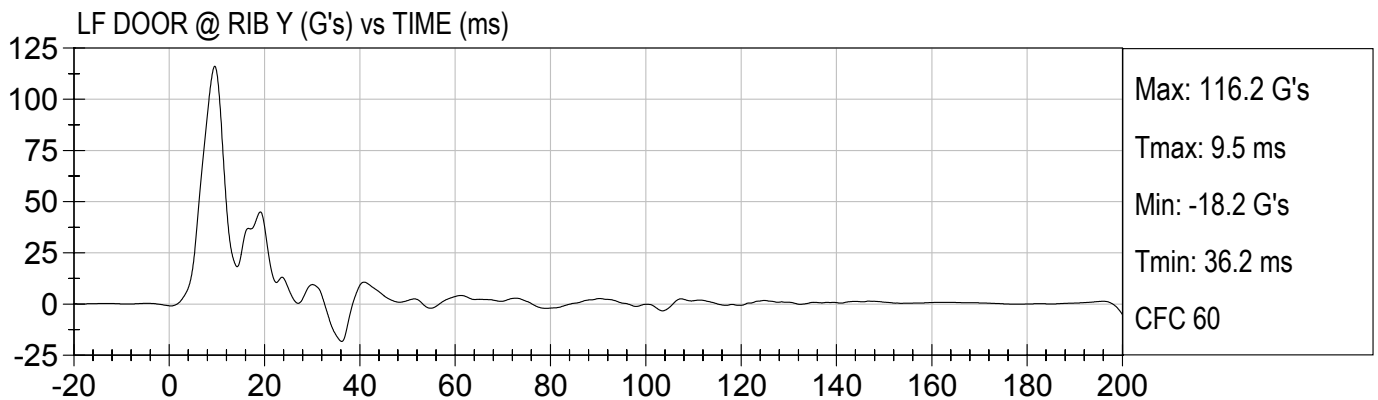
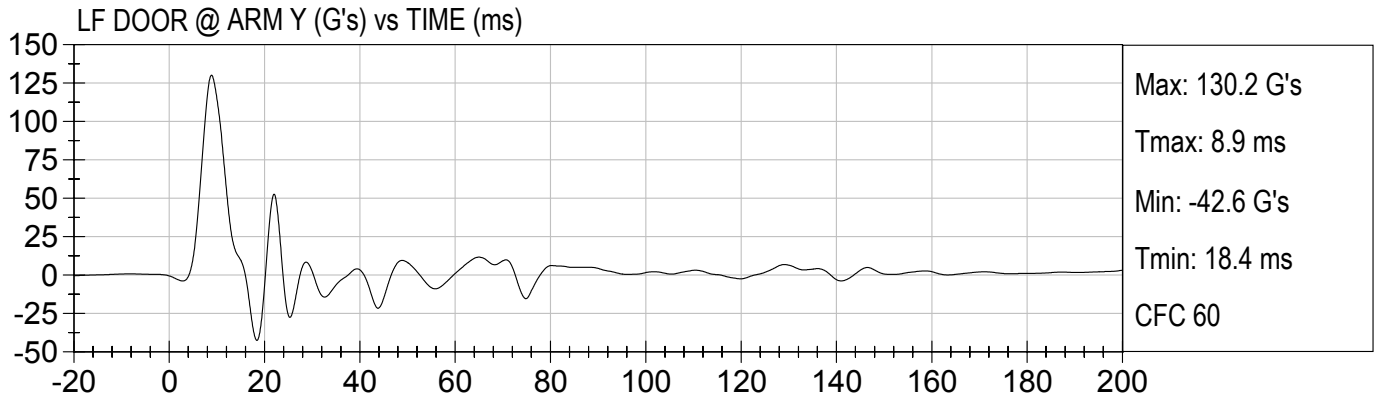




20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

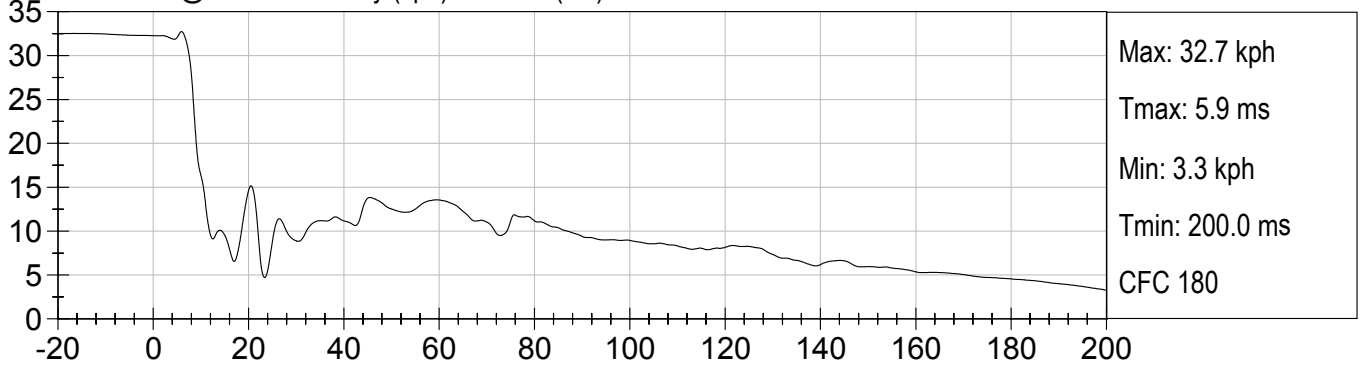
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)



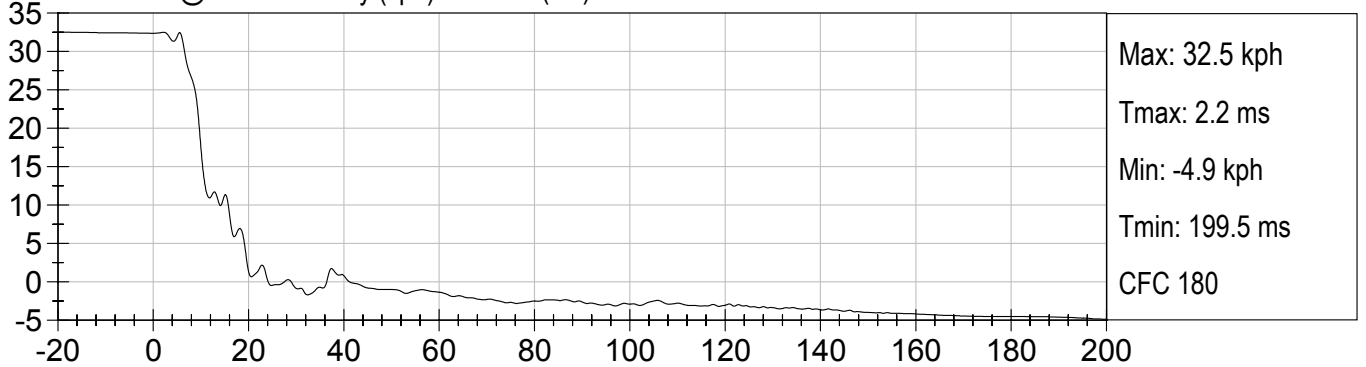




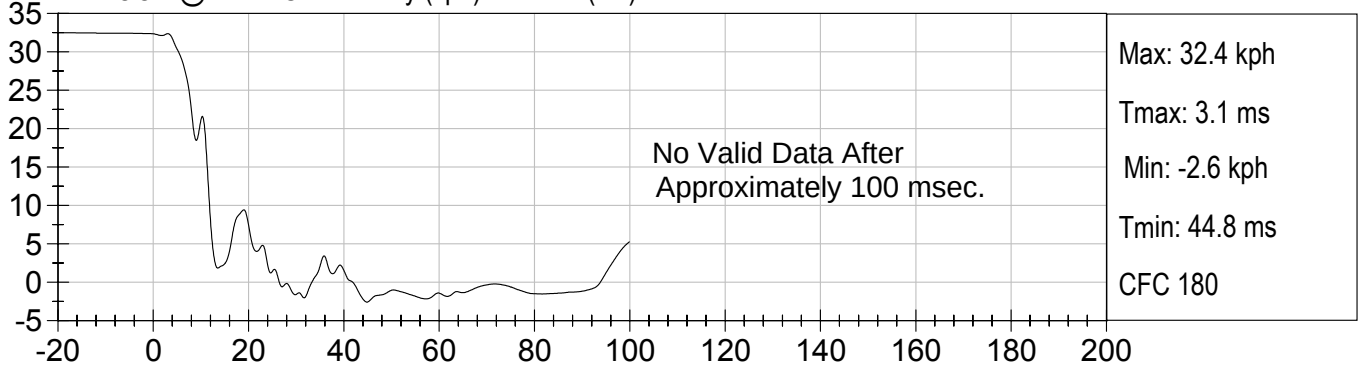
LF DOOR @ ARM Y Velocity (kph) vs TIME (ms)



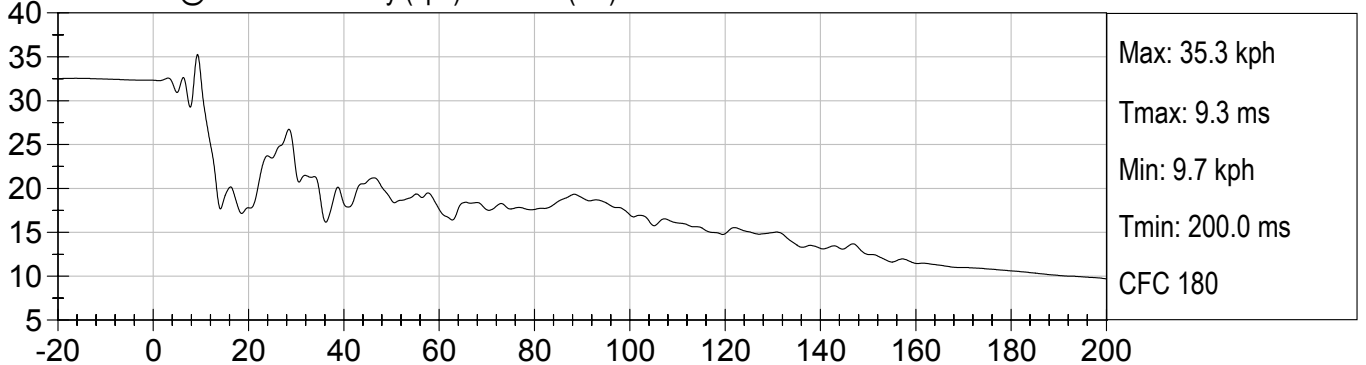
LF DOOR @ RIB Y Velocity (kph) vs TIME (ms)



LF DOOR @ PELVIS Y Velocity (kph) vs TIME (ms)



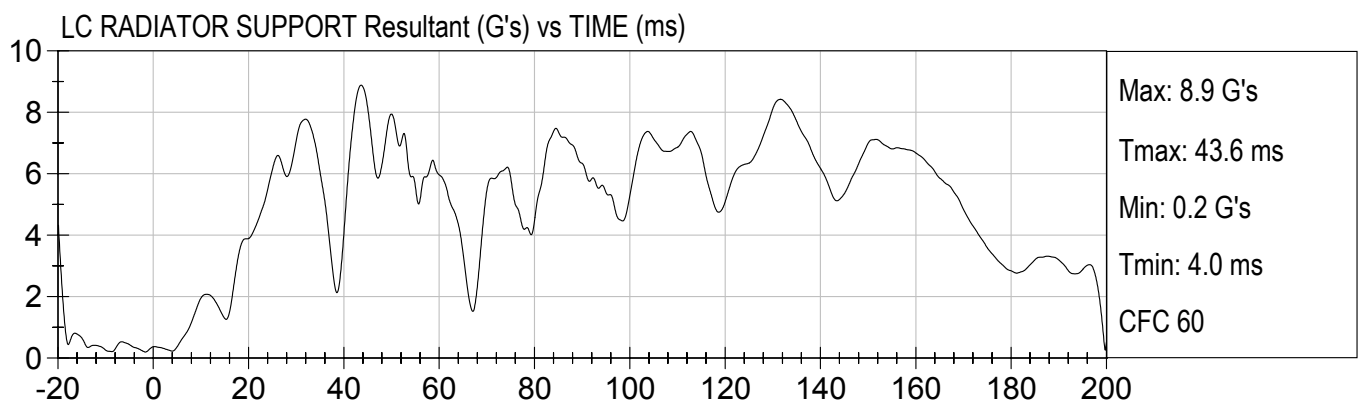
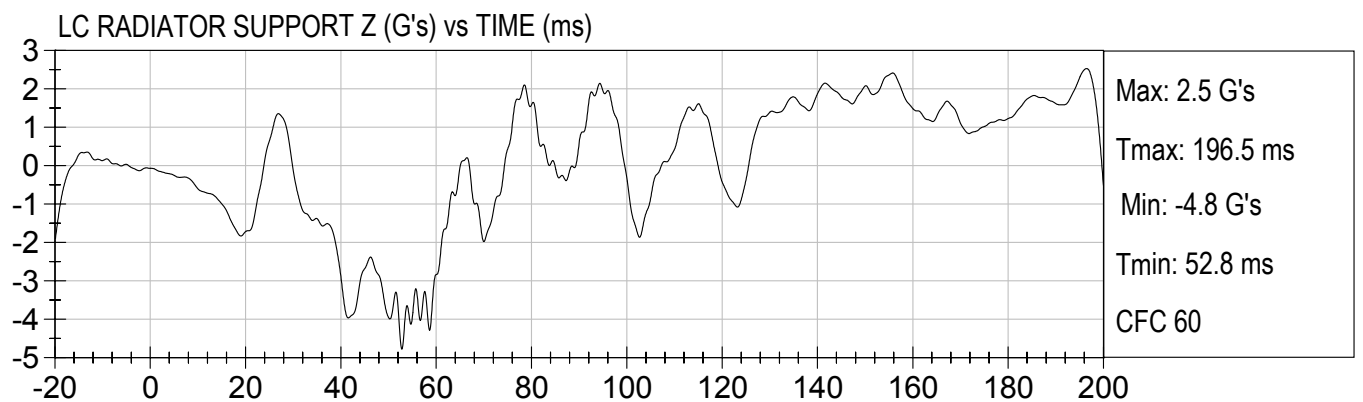
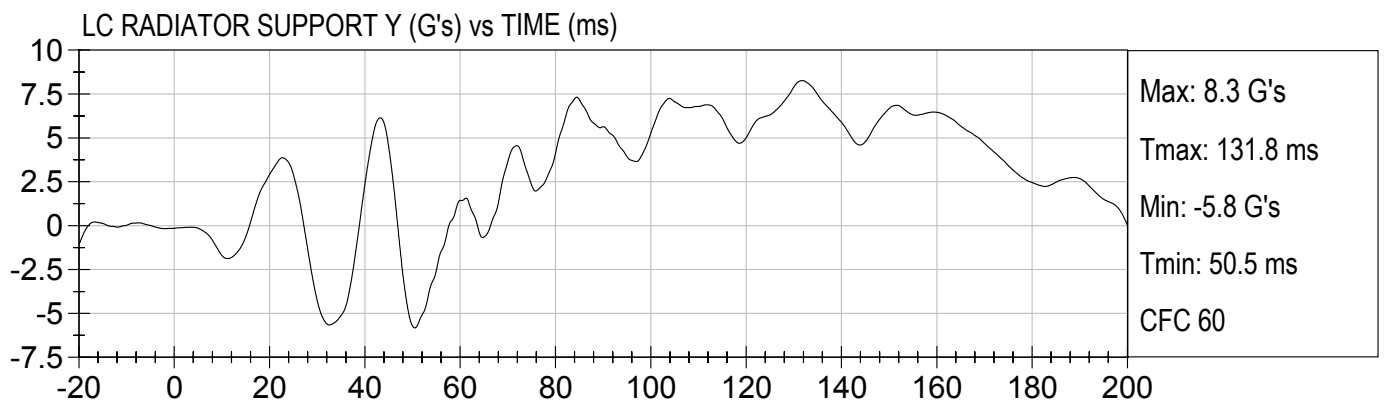
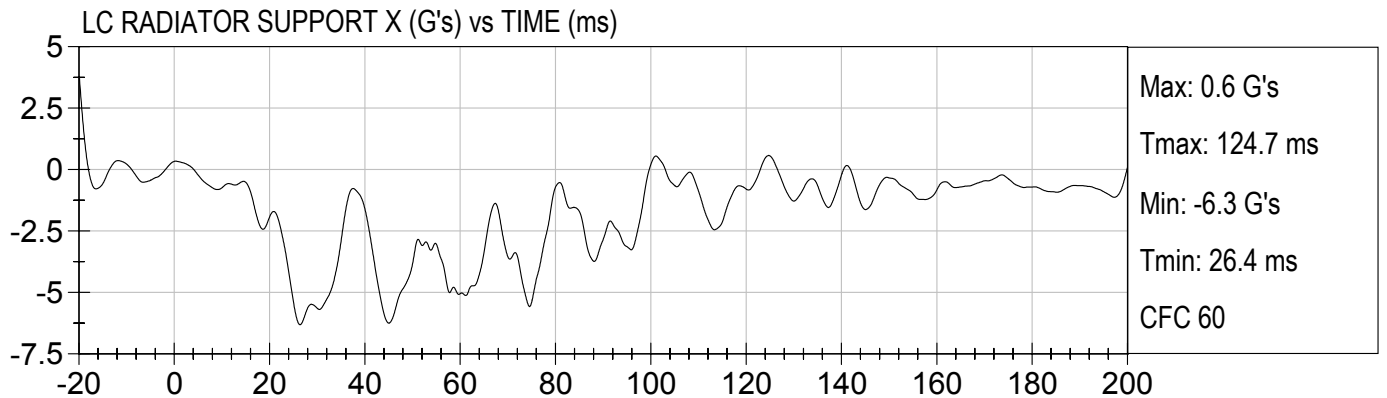
LF DOOR @ KNEE Y Velocity (kph) vs TIME (ms)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

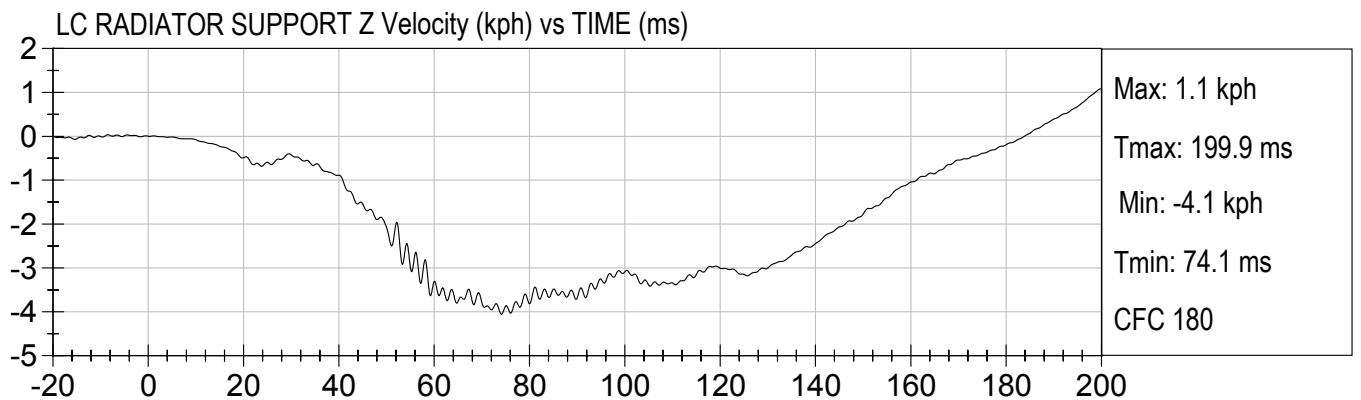
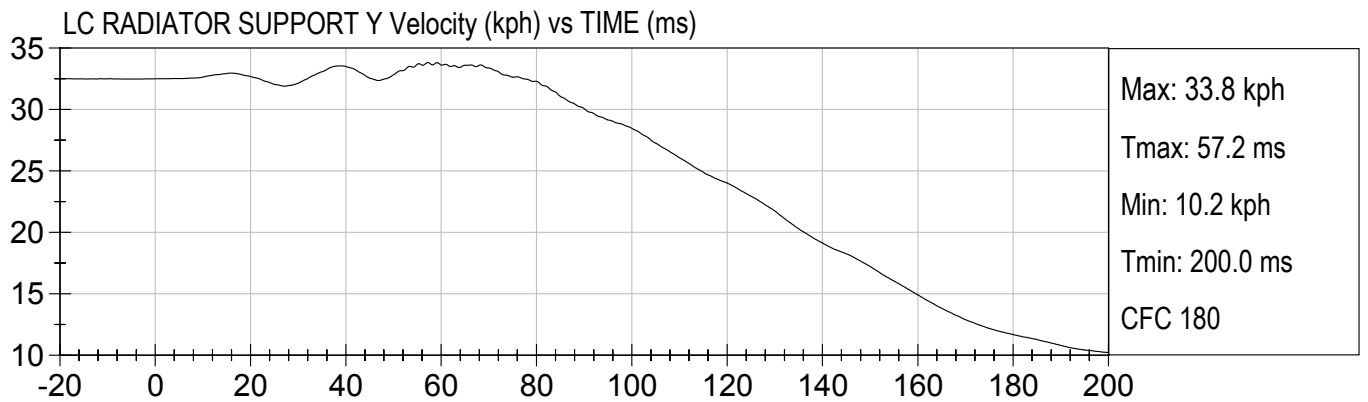
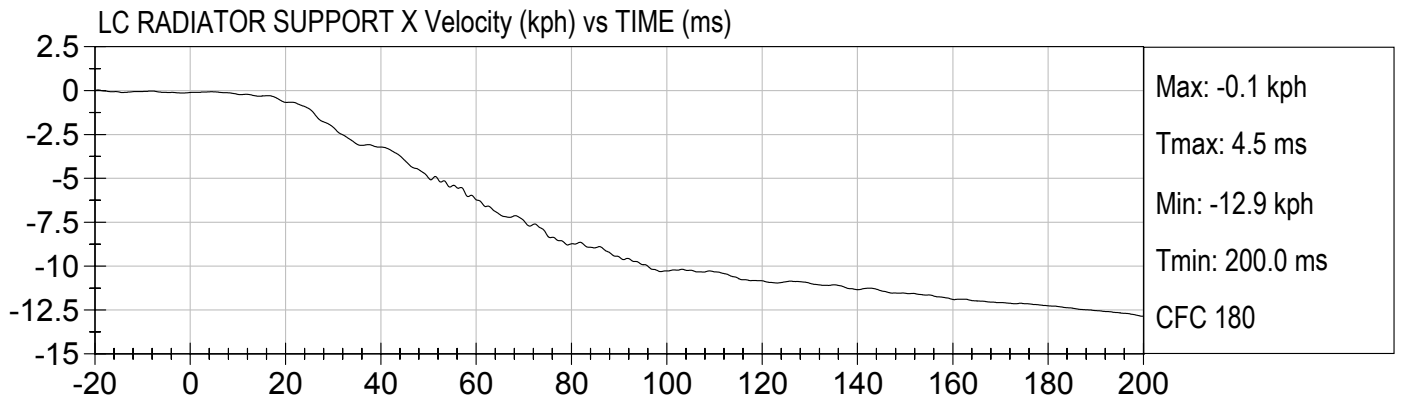
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

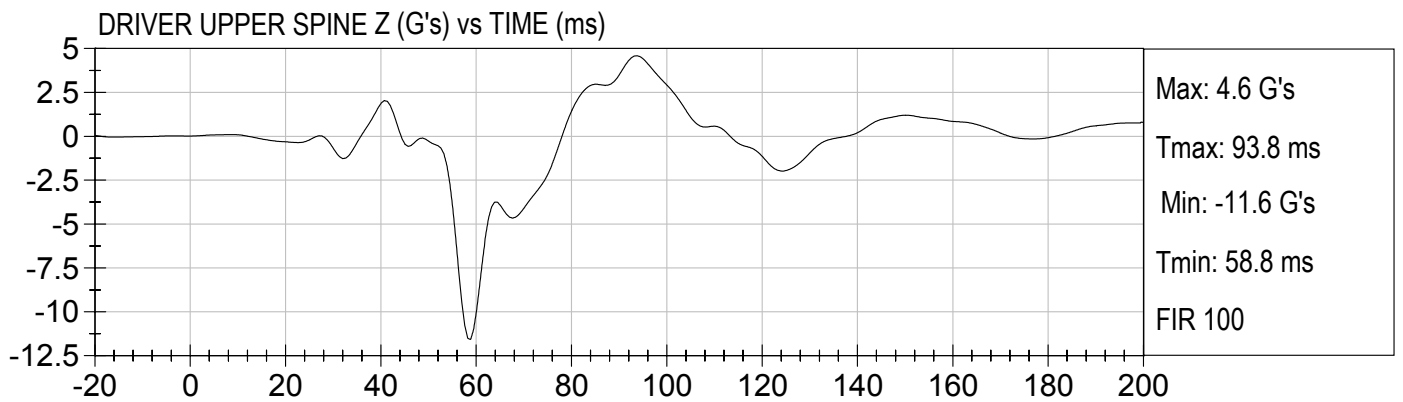
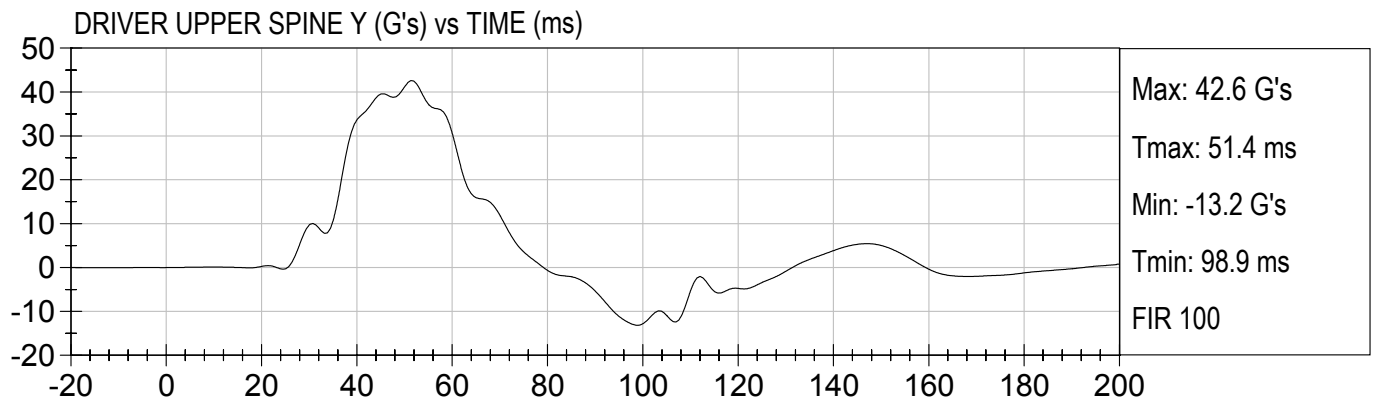
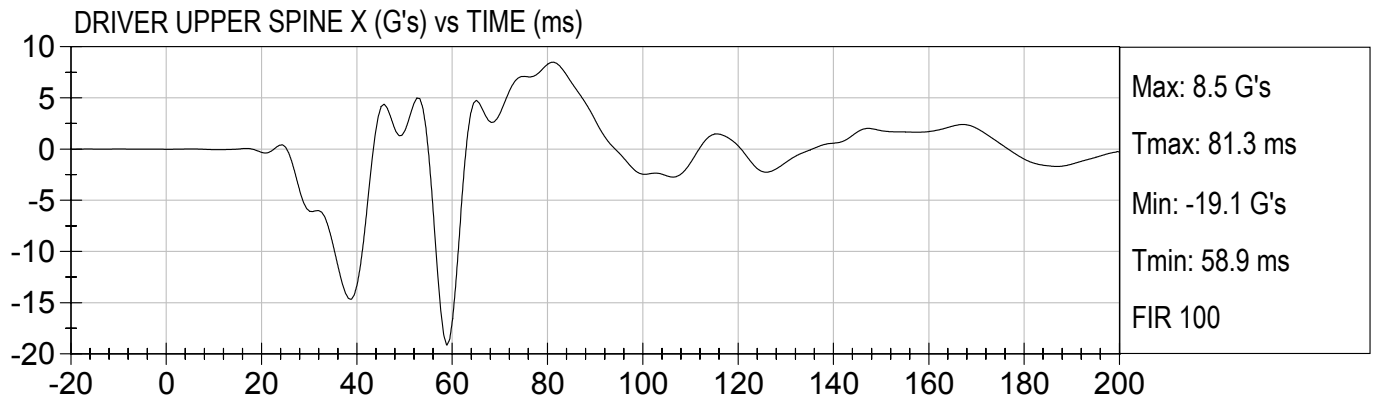
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

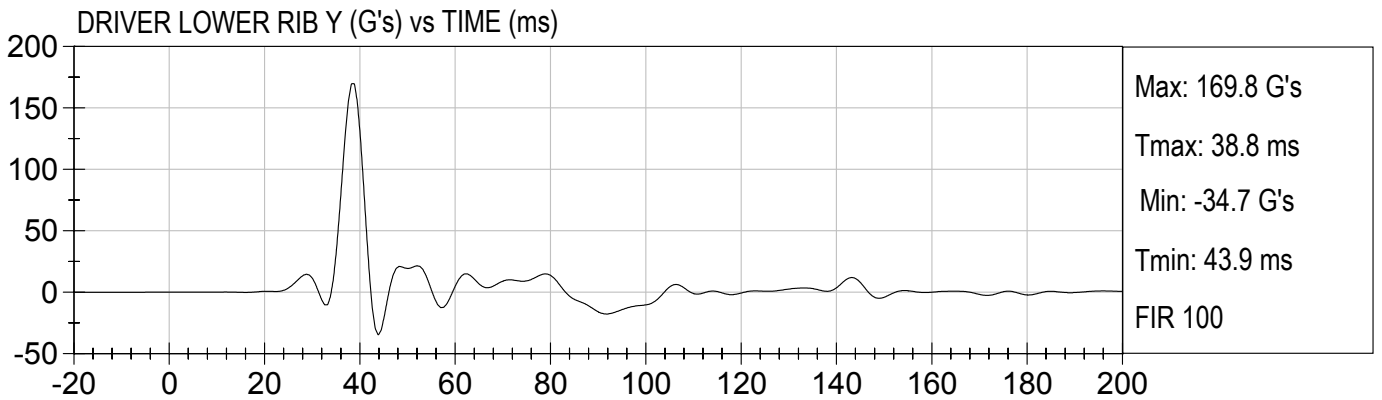
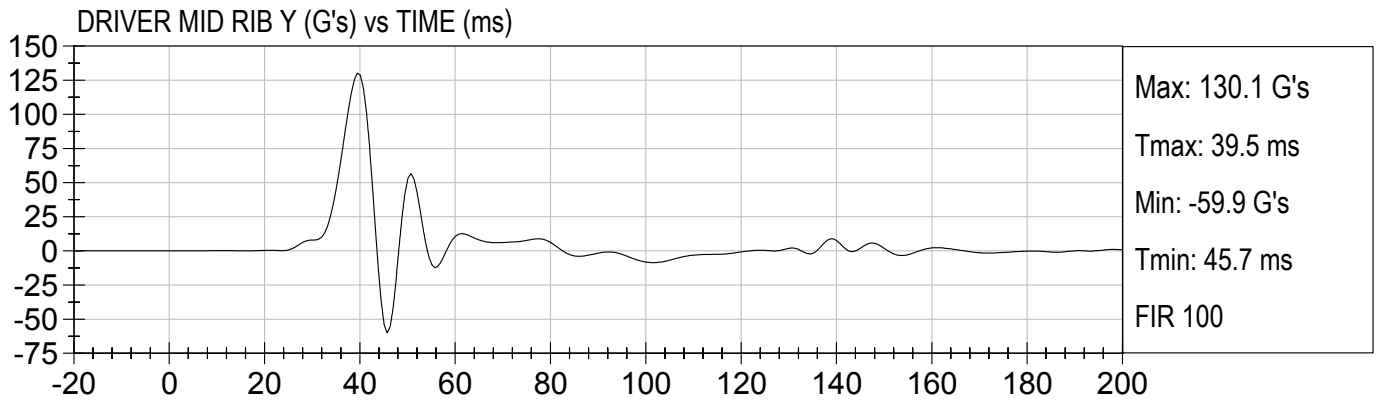
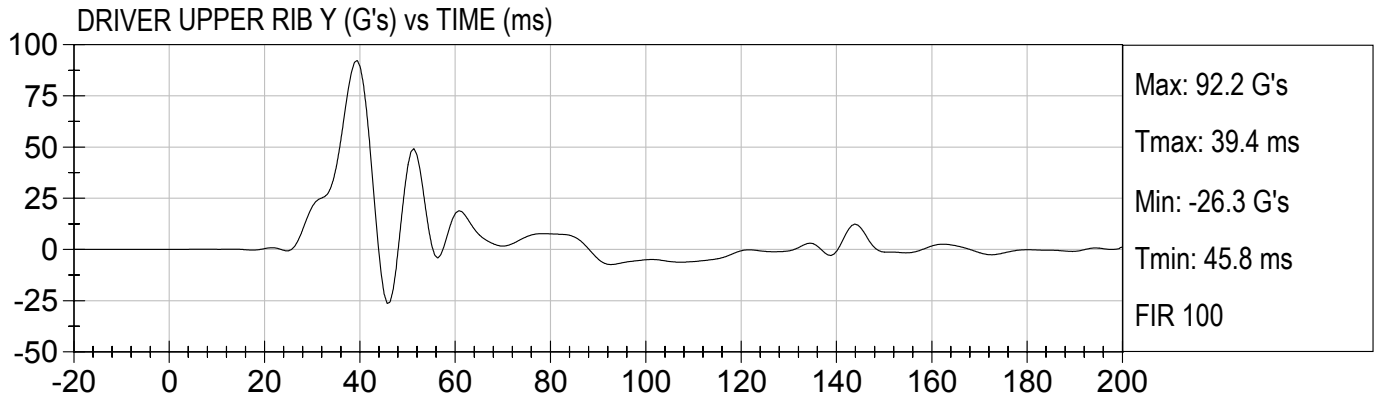
Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

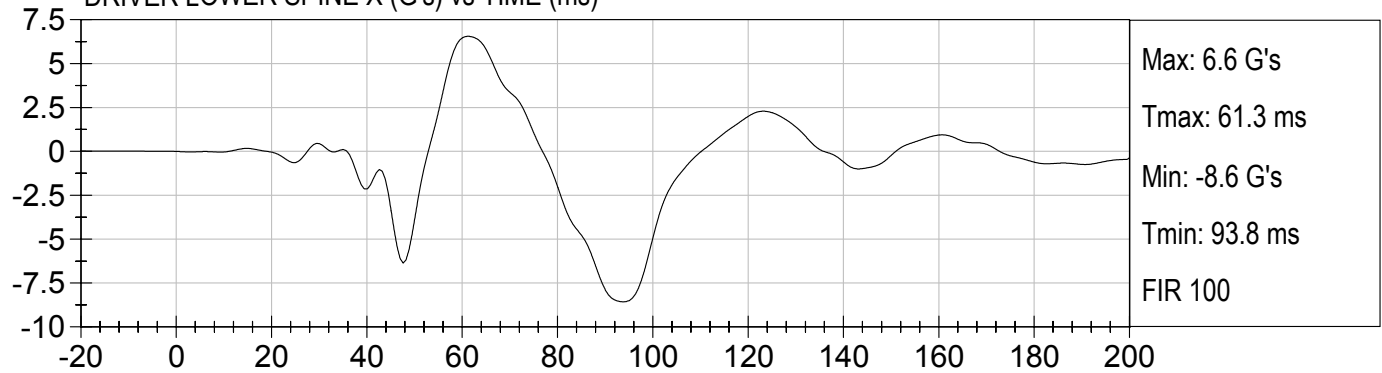




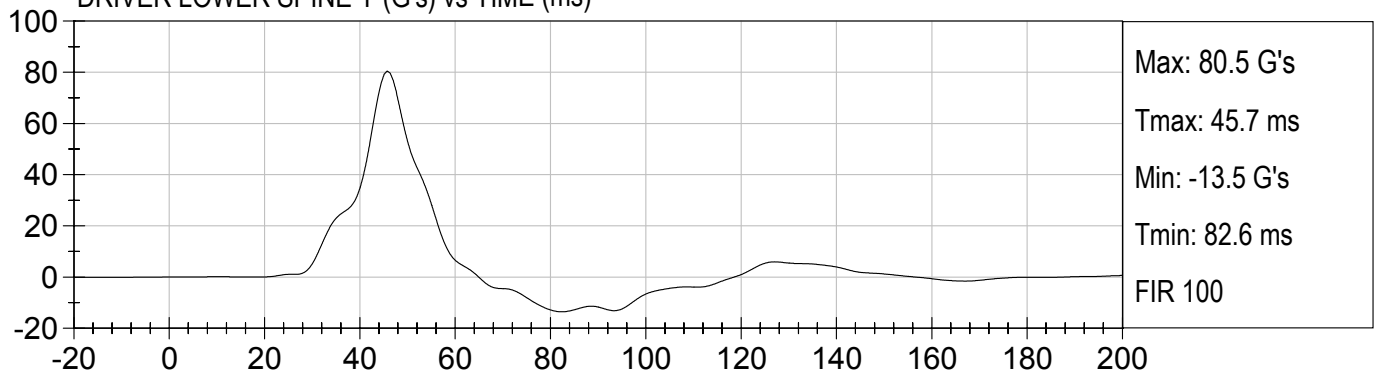
20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)

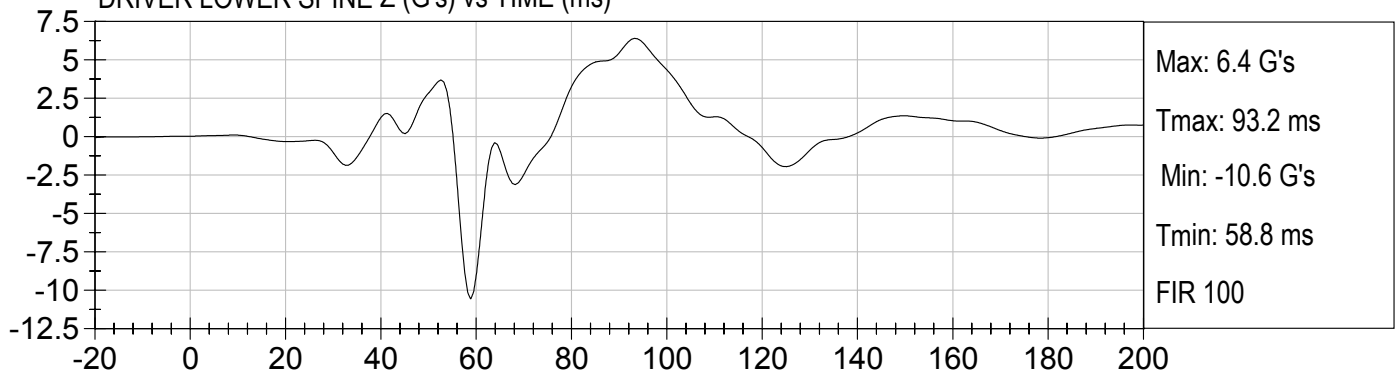
DRIVER LOWER SPINE X (G's) vs TIME (ms)



DRIVER LOWER SPINE Y (G's) vs TIME (ms)



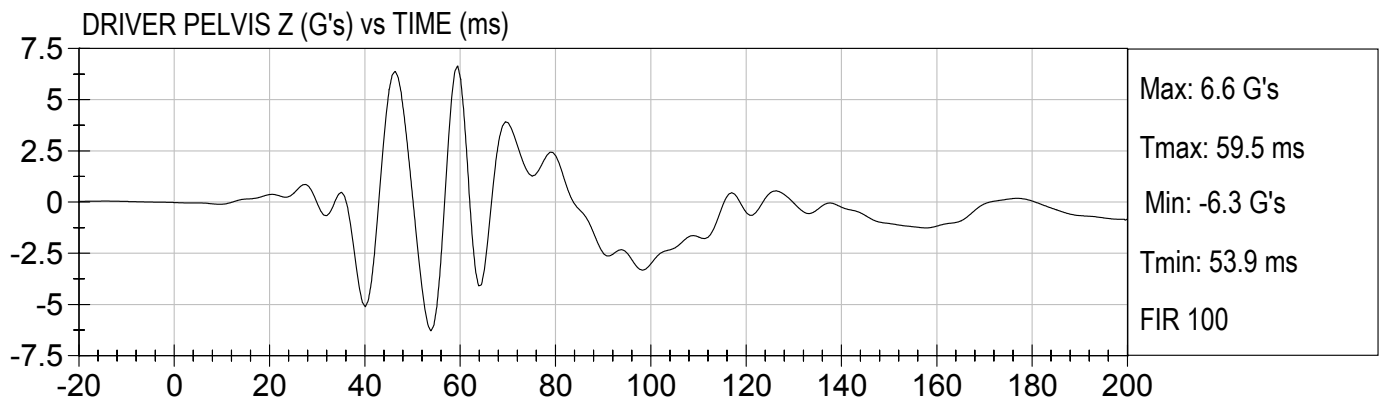
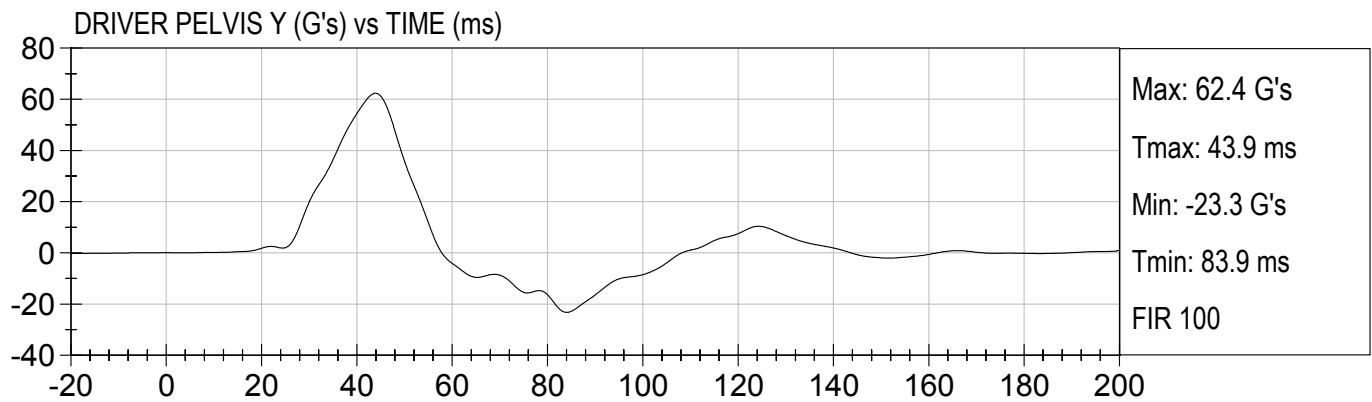
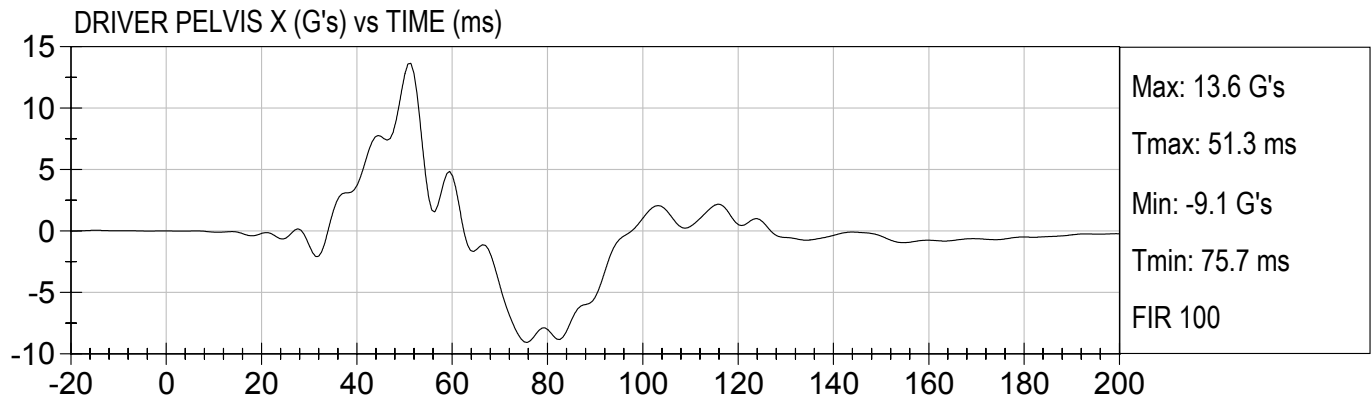
DRIVER LOWER SPINE Z (G's) vs TIME (ms)





20 MPH SIDE POLE
2000 NISSAN MAXIMA (RY5217)

Test Date: 8/29/2002
Speed: 20.2 mph (32.5 km/h)



APPENDIX C

ES-2 CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CERTIFICATION DATA

Dummy Serial Number: 009

Calibration Test Results Summary

Dummy Serial Number: 009

Pre-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 8/28/02
Dummy Serial Number: 009
Test Number: D021071

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	60
Peak Resultant Acceleration	100 – 150 g's	142
Time of Max. Res. Acceleration	msec	26.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

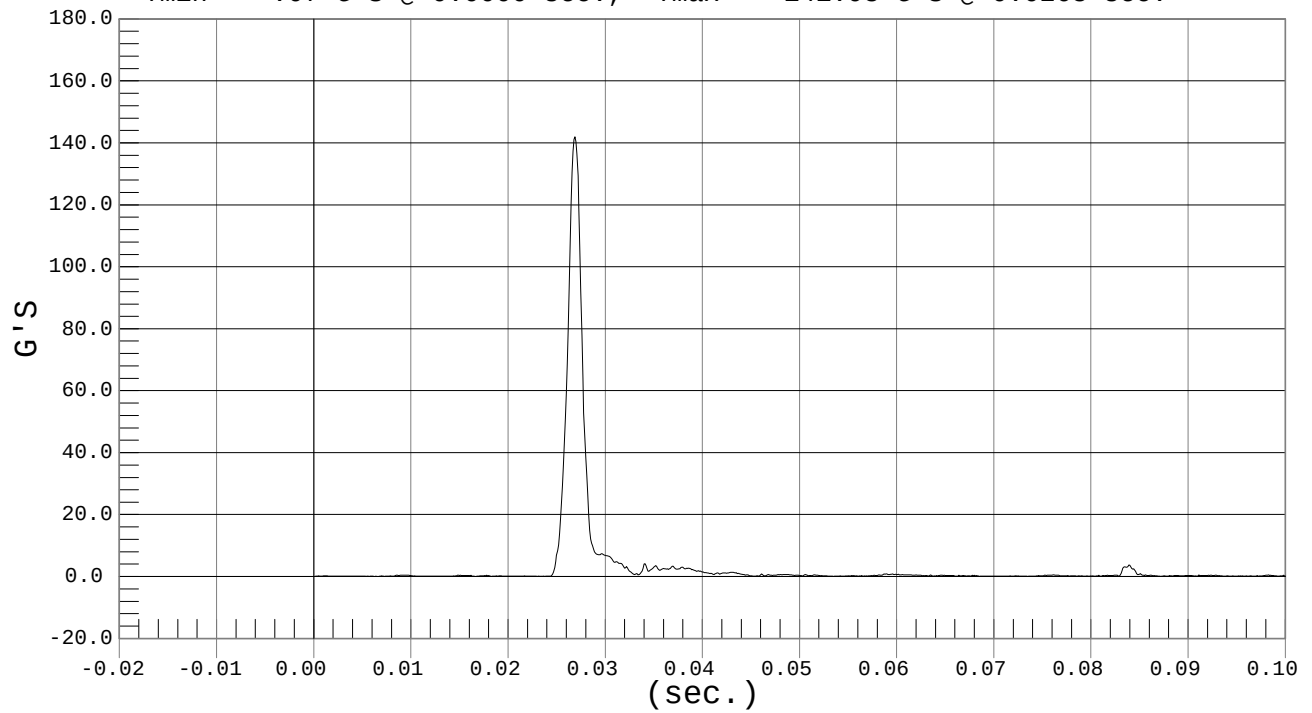


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 08-28-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .07 G'S @ 0.0000 sec., Ymax = 141.98 G'S @ 0.0268 sec.



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
EUROSID 2 DUMMY

Date: 8/27/02
Dummy Serial Number: 009
Test Number: D021072

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.2
Relative Humidity (%)		10 – 70	55
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.33
	8 msec	~1.59 - ~2.04 m/sec	-1.80
	14 msec	~3.20 - ~3.85 m/sec	-3.45
Maximum Flexion Angle		49.0 – 59.0 deg	54.3
Time of Max. Flexion Angle		54.0 – 66.0 ms	58.5
Maximum Angle Theta (A)		32.0 – 37.0 deg	34.4
Time of Max. Theta (A)		53.0 – 63.0 ms	57.5
Maximum Angle Theta (B)		29.70 – 32.20 deg	31.11
Time of Max. Theta (B)		54.0 – 64.0 ms	56.9

TEST MEETS SPECIFICATIONS

Technician: _____

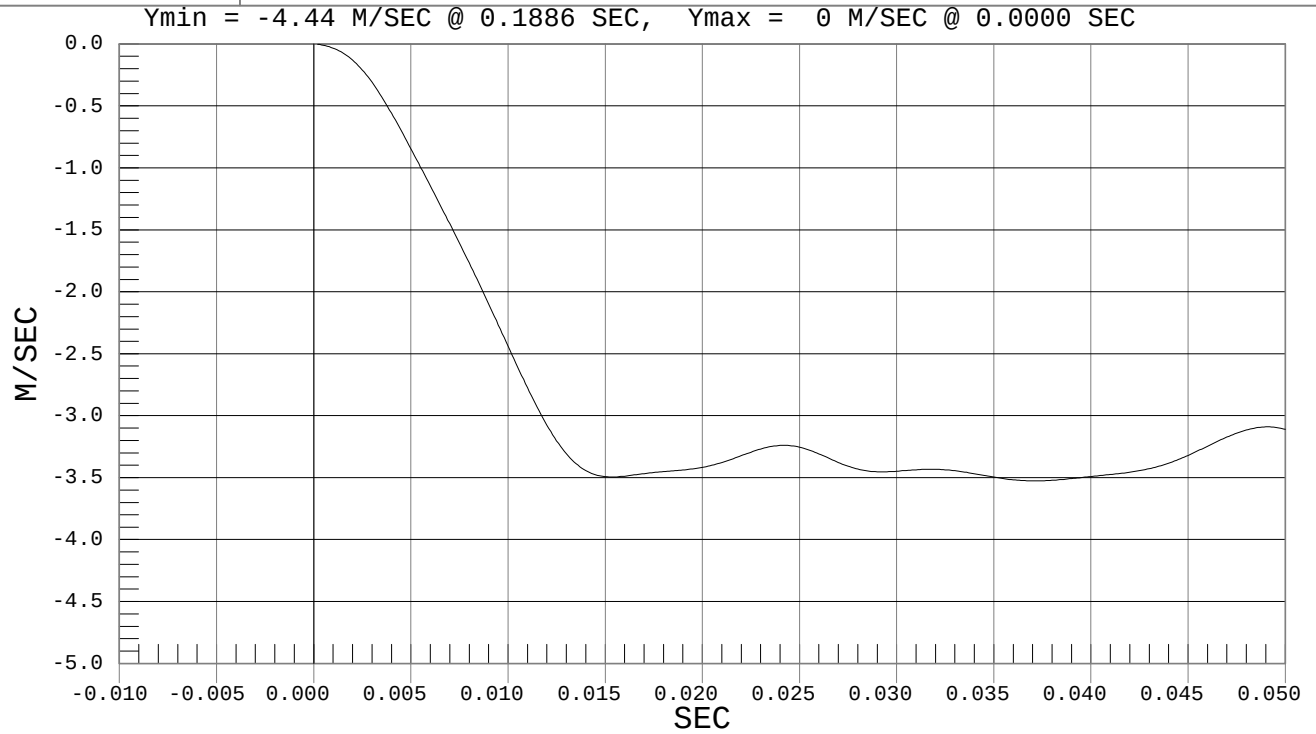
Approved By: _____



PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

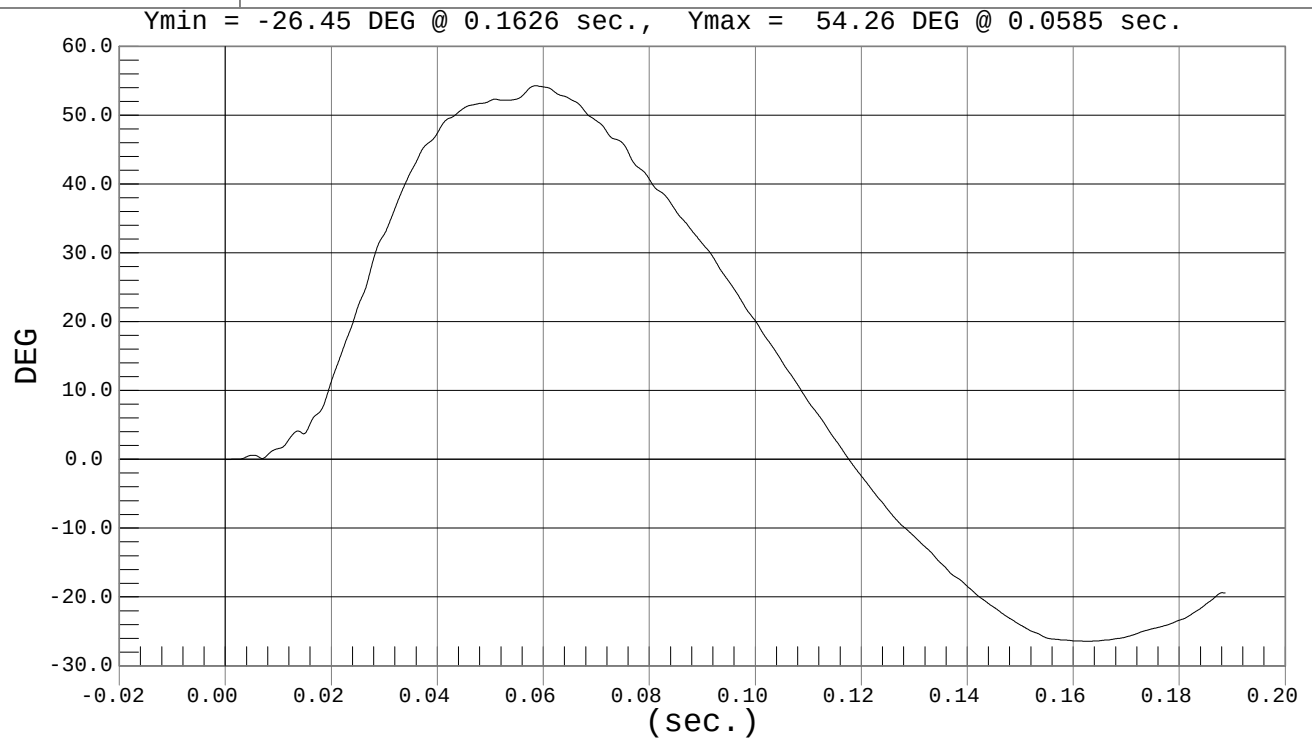
Test Date: 08-27-02
Speed: 11.1 fps, 3.38 M/s



FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 08-27-02
Speed: 11.1 fps, 3.38 M/s



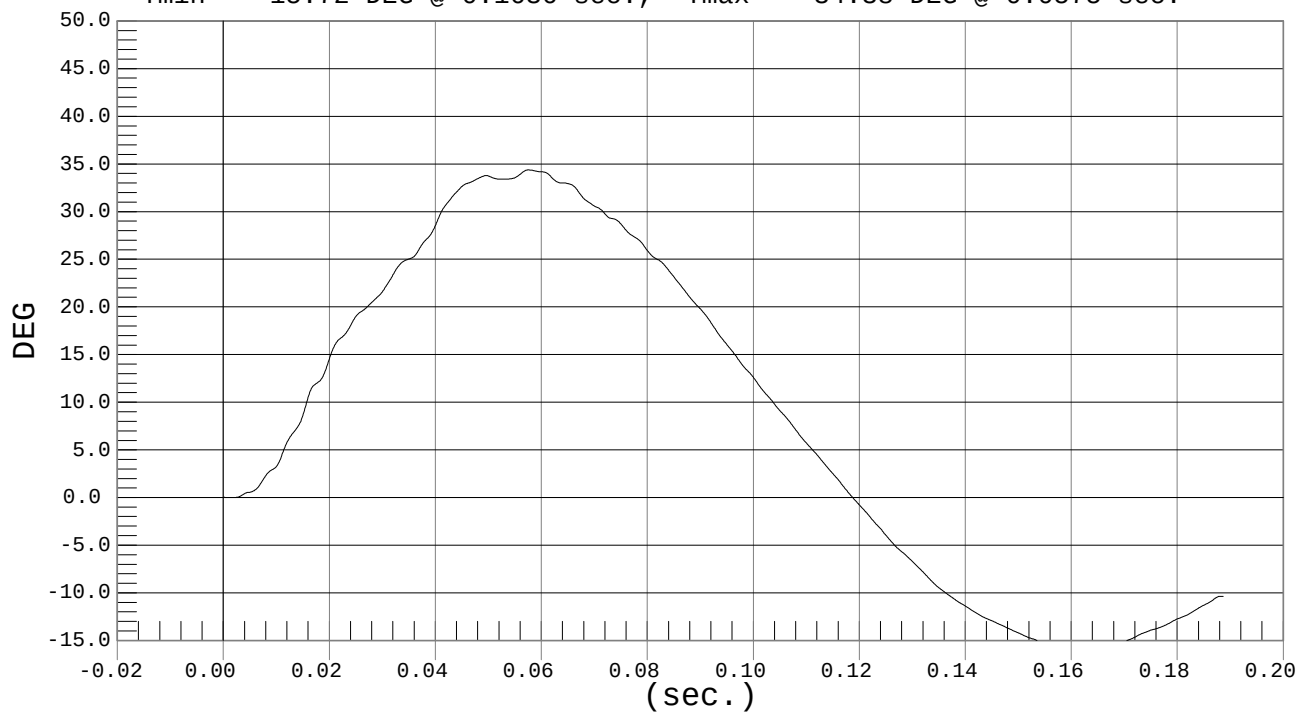


Test Desc.: Neck Bending
Component: Dummy #009

THETA A

Test Date: 08-27-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -15.72 DEG @ 0.1636 sec., Ymax = 34.38 DEG @ 0.0575 sec.

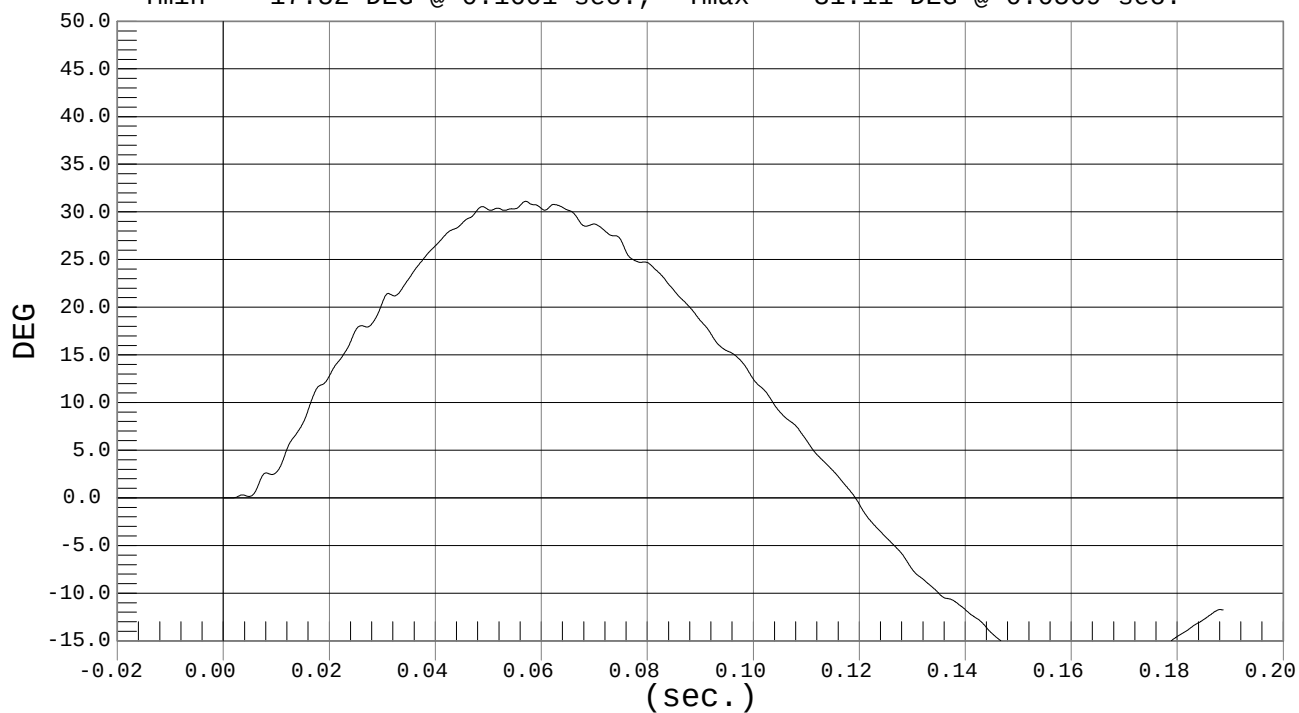


Test Desc.: Neck Bending
Component: Dummy #009

THETA B

Test Date: 08-27-02
Speed: 11.1 fps, 3.38 M/s

Ymin = -17.52 DEG @ 0.1601 sec., Ymax = 31.11 DEG @ 0.0569 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 8/23/02
Dummy Serial Number: 009
Test Number: D021073

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.3
Relative Humidity (%)	10 – 70	54
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	9.5
Time of Max. Pendulum Acceleration	msec	24.0

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

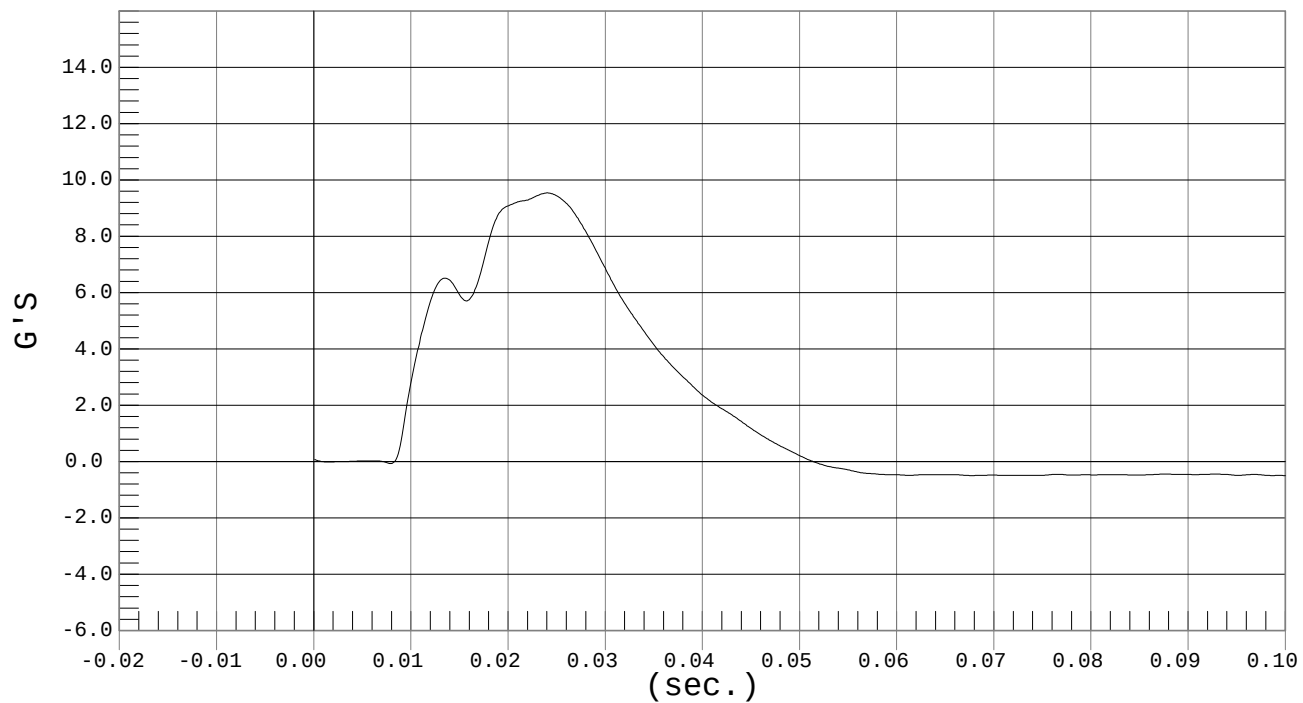


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #009

Test Date: 08-23-02
Speed: 14.1 fps, 4.29 M/s

Ymin = -.52 G'S @ 0.1081 sec., Ymax = 9.54 G'S @ 0.0240 sec.



MGA RESEARCH CORPORATION
UPPER/MIDDLE/LOWER RIB TESTS
EUROSID 2 DUMMY

Date: 8/26/02,8/27/02

Dummy Serial Number: 009

Test Number: D021074/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.6
Relative Humidity (%)	10 – 70	53
Displacement at 2 m/s	23.5 – 27.5 mm	24.9
Displacement at 3 m/s	36.0 – 40.0 mm	38.6
Displacement at 4 m/s	46.0 – 51.0 mm	51.0

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.6
Relative Humidity (%)	10 – 70	53
Displacement at 2 m/s	23.5 – 27.5 mm	25.7
Displacement at 3 m/s	36.0 – 40.0 mm	39.0
Displacement at 4 m/s	46.0 – 51.0 mm	50.6

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.9 – 25.5	21.4
Relative Humidity (%)	10 – 70	50
Displacement at 2 m/s	23.5 – 27.5 mm	24.6
Displacement at 3 m/s	36.0 – 40.0 mm	37.2
Displacement at 4 m/s	46.0 – 51.0 mm	48.8

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

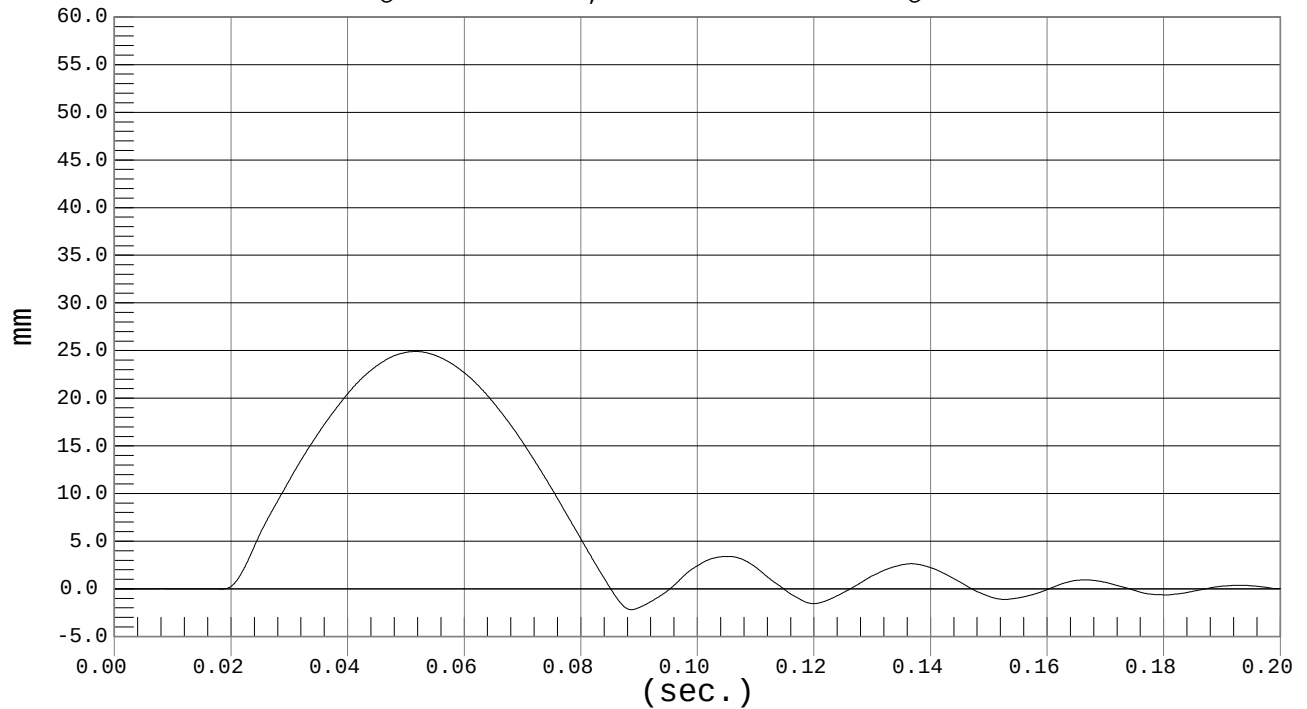


UPPER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #009

Test Date: 08-26-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.2 mm @ 0.0886 sec., Ymax = 24.91 mm @ 0.0517 sec.

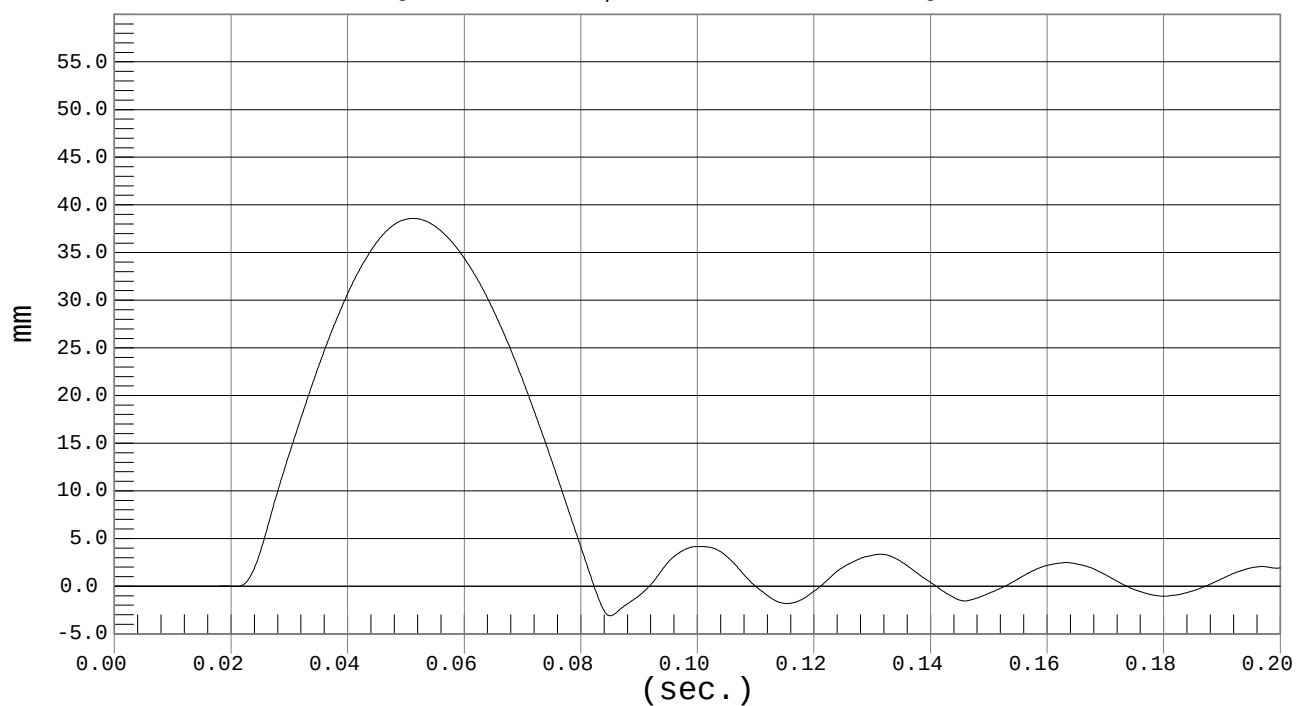


UPPER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #009

Test Date: 08-26-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -3.11 mm @ 0.0850 sec., Ymax = 38.58 mm @ 0.0511 sec.



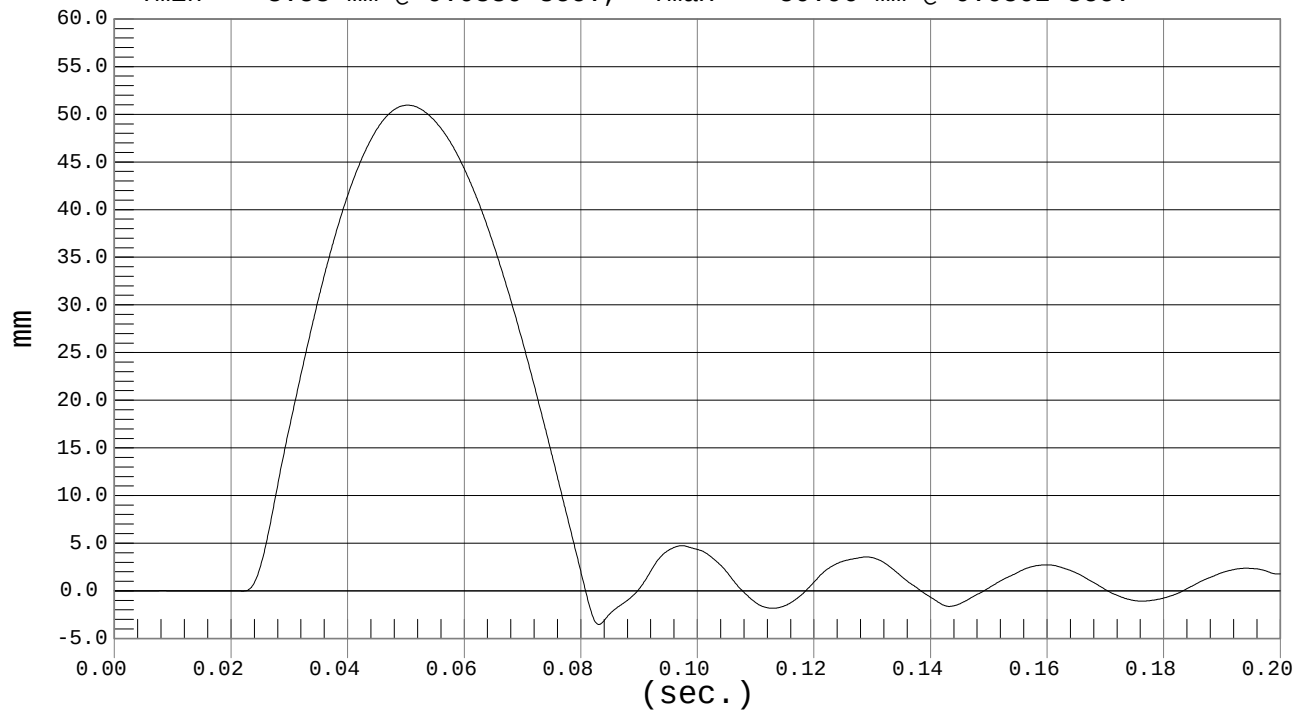


UPPER RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #009

Test Date: 08-26-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.53 mm @ 0.0830 sec., Ymax = 50.96 mm @ 0.0502 sec.



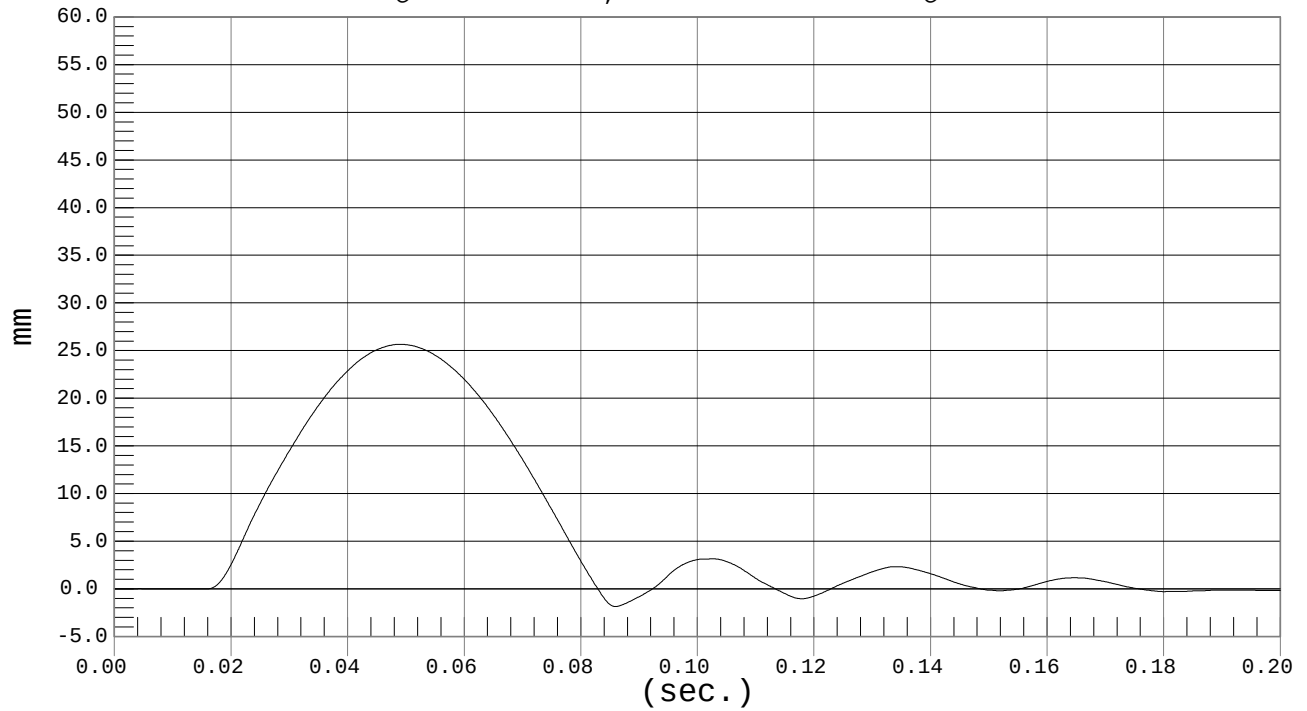


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #009

Test Date: 08-26-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -1.86 mm @ 0.0859 sec., Ymax = 25.65 mm @ 0.0488 sec.

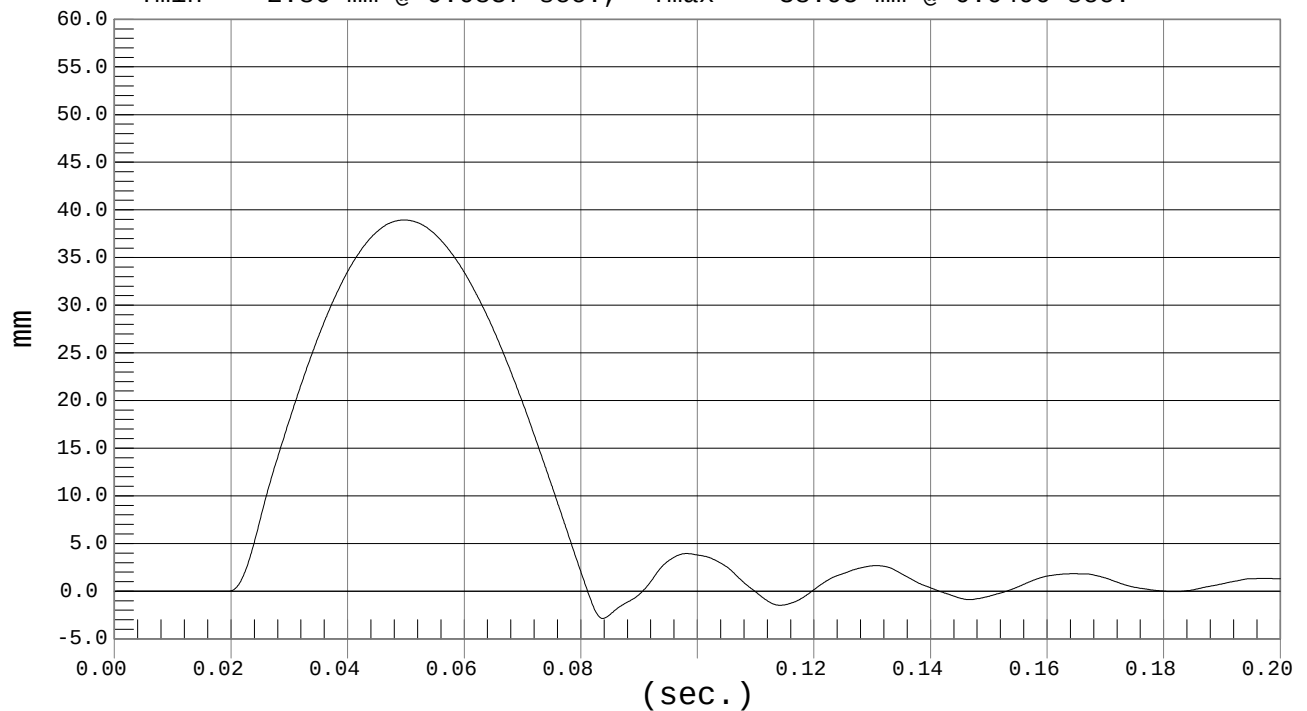


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #009

Test Date: 08-26-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -2.86 mm @ 0.0837 sec., Ymax = 38.95 mm @ 0.0496 sec.



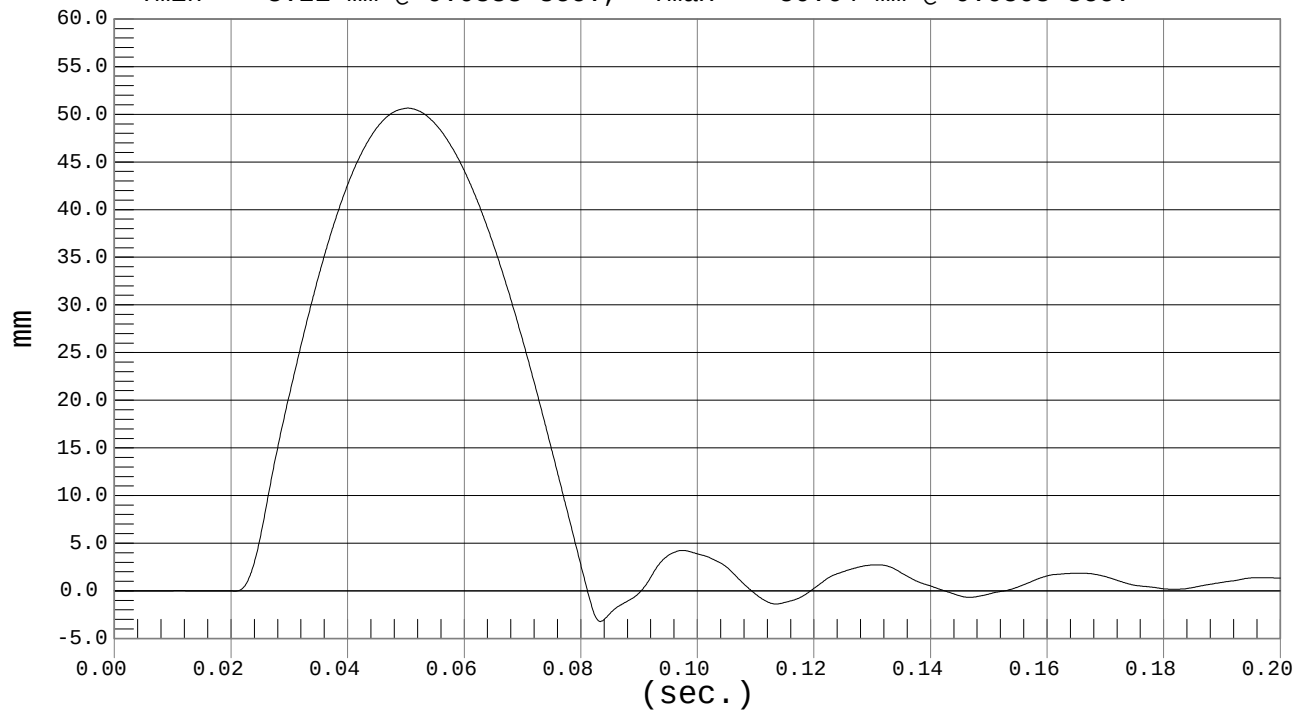


MIDDLE RIB DISPLACEMENT

Test Desc.: RIB MODULE
Component: Dummy #009

Test Date: 08-26-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.21 mm @ 0.0833 sec., Ymax = 50.64 mm @ 0.0503 sec.



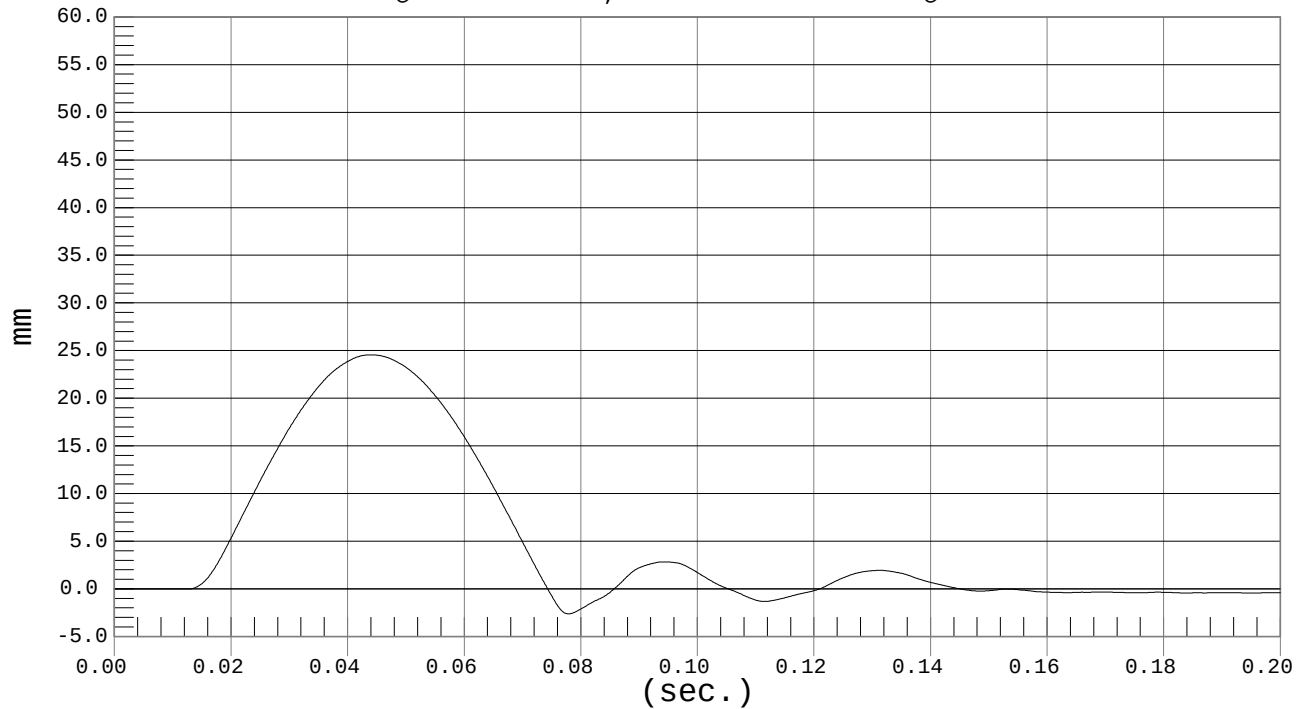


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 08-27-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.62 mm @ 0.0778 sec., Ymax = 24.55 mm @ 0.0439 sec.

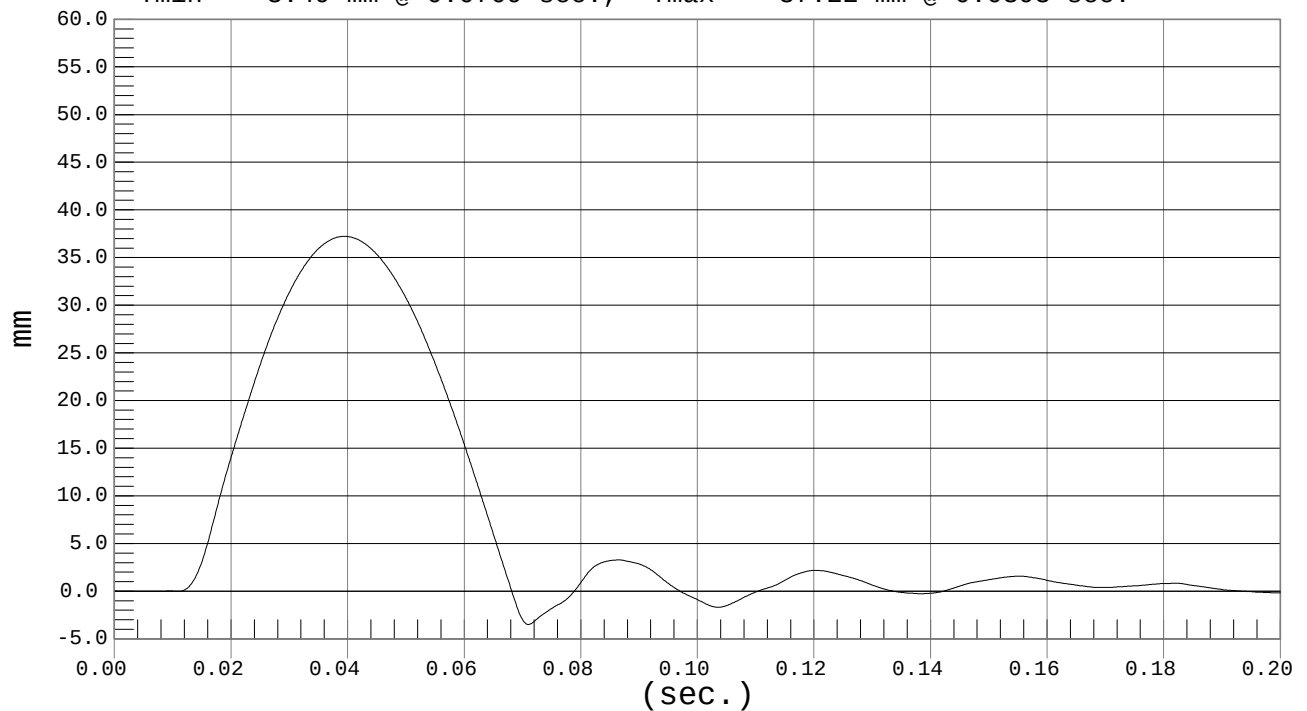


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 08-27-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -3.49 mm @ 0.0709 sec., Ymax = 37.22 mm @ 0.0393 sec.



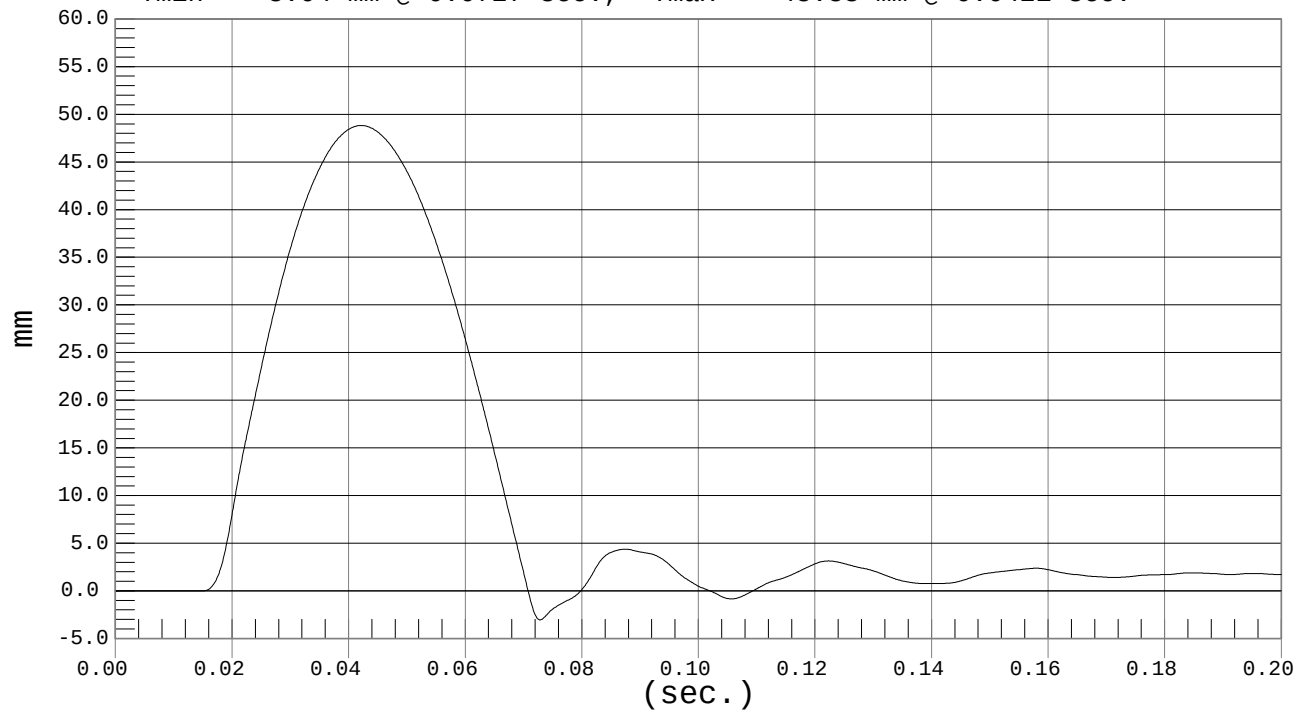


LOWER RIB DISPLACEMENT

Test Desc.: Rib Module
Component: Dummy #009

Test Date: 08-27-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.04 mm @ 0.0727 sec., Ymax = 48.83 mm @ 0.0421 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 8/23/02
Dummy Serial Number: 009
Test Number: D021077

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	52
Probe Speed (m/s)	3.90 – 4.10	3.99
Maximum Impact Force	4.00 – 4.80 kN	4.64
Time of Maximum Force	10.60 – 13.00 ms	11.70
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.25
Time of Max. Total Force	10.00 – 12.30 ms	11.40

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

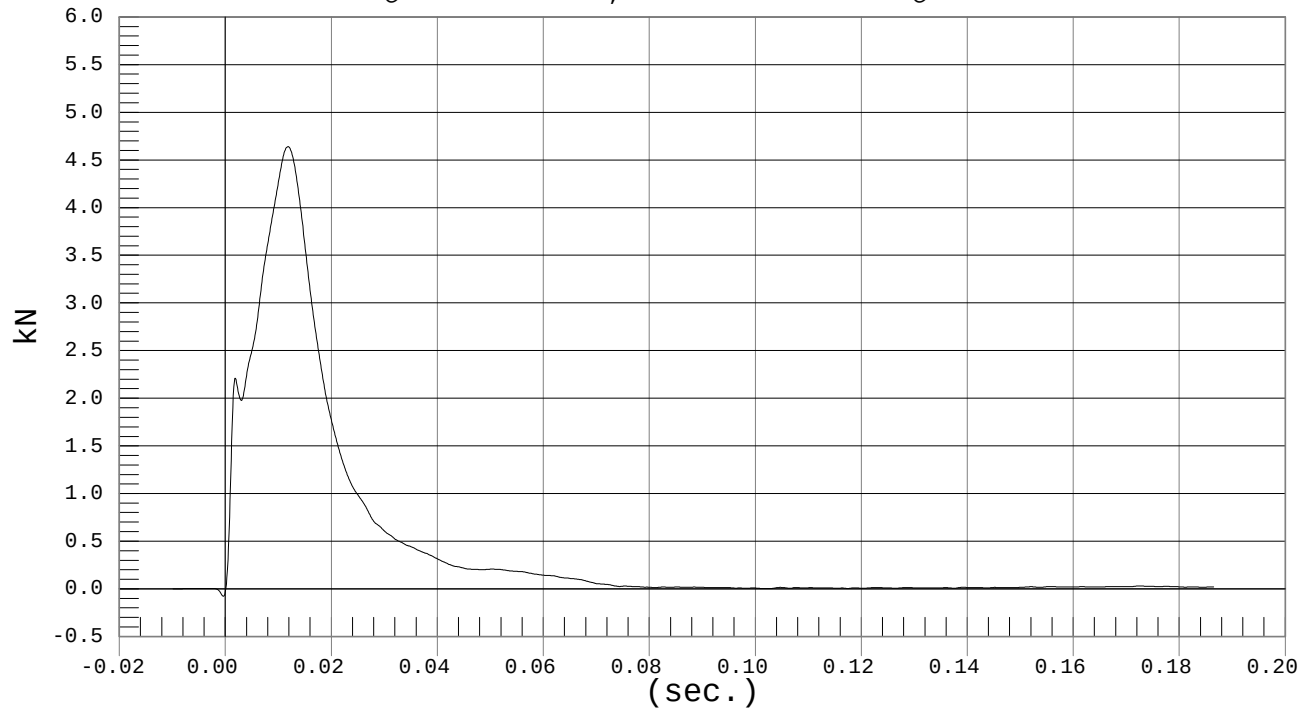


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 08-23-02
Speed: 13.1 fps, 3.99 M/s

Ymin = -.08 kN @ -0.0005 sec., Ymax = 4.64 kN @ 0.0117 sec.

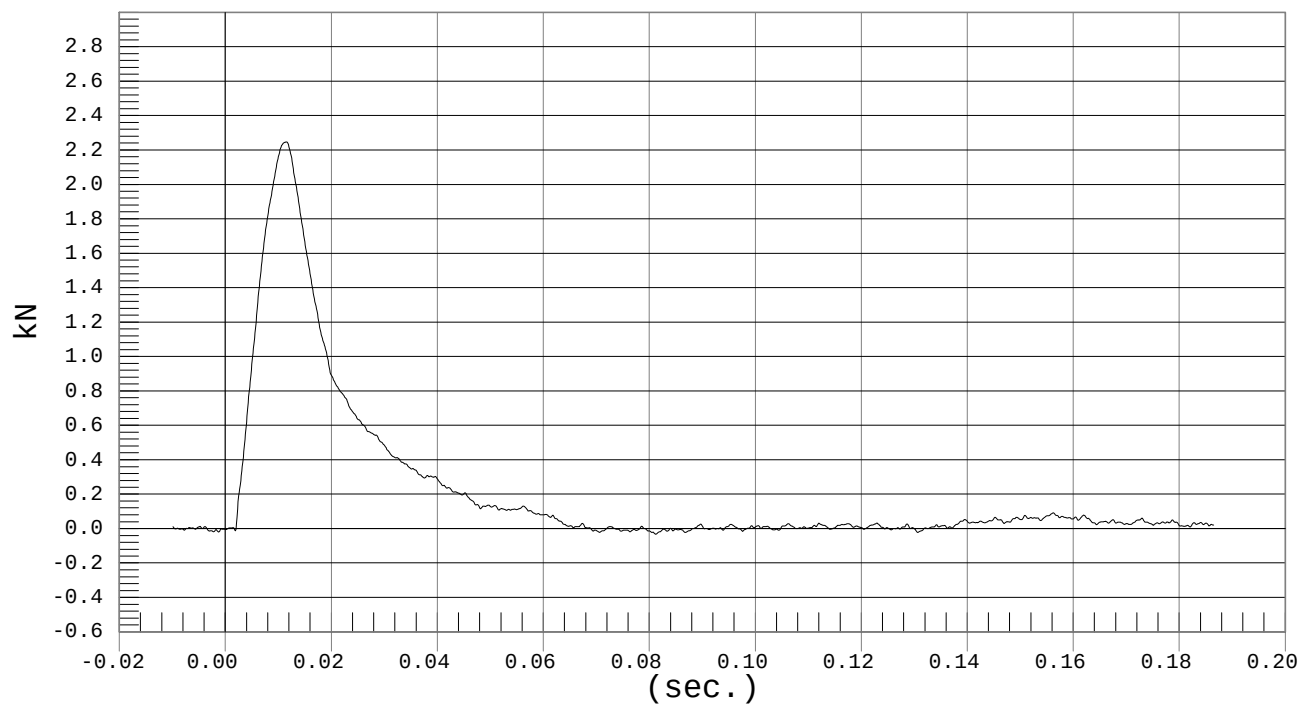


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 08-23-02
Speed: 13.1 fps, 3.99 M/s

Ymin = -.03 kN @ 0.0811 sec., Ymax = 2.25 kN @ 0.0114 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 8/27/02
Dummy Serial Number: 009
Test Number: D021078

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	21.2
Relative Humidity (%)		10 – 70	55
Pendulum Speed		5.95 – 6.15	6.09
Pendulum Deceleration	10 msec	$\bar{2}.46 - \bar{1}.59$ m/sec	-2.02
	20 msec	$\bar{5}.25 - \bar{4}.07$ m/sec	-4.55
	25 msec	$\bar{6}.64 - \bar{5}.30$ m/sec	-5.64
	30 msec	≥ -6.5 m/sec	-6.15
Maximum Flexion Angle		45.0 – 55.0 deg	51.8
Time of Max. Flexion Angle		39.0 – 53.0 ms	44.5
Maximum Angle Theta (A)		31.0 – 35.0 deg	34.2
Time of Max. Theta (A)		44.0 – 52.0 ms	44.4
Maximum Angle Theta (B)		29.36– 31.86 deg	30.41
Time of Max. Theta (B)		44.0 – 52.0 ms	46.9

TEST MEETS SPECIFICATIONS

Technician: _____

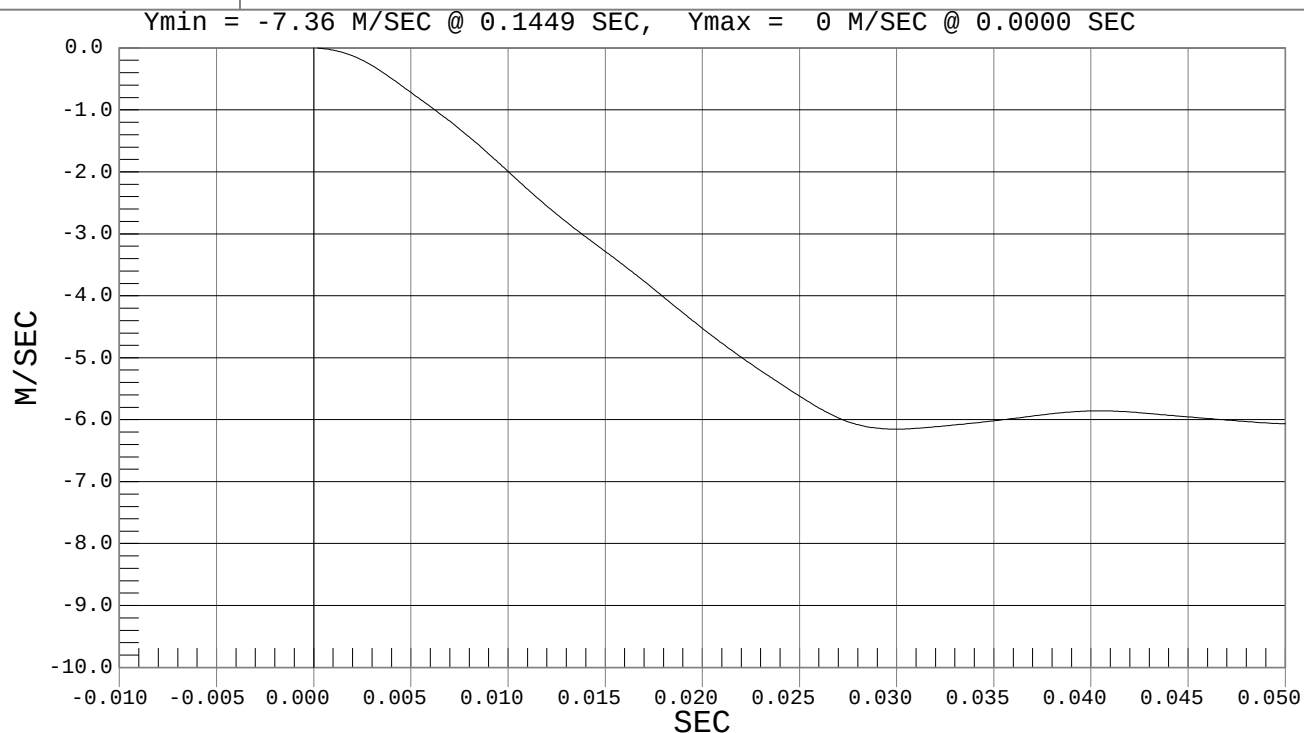
Approved By: _____



PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #009

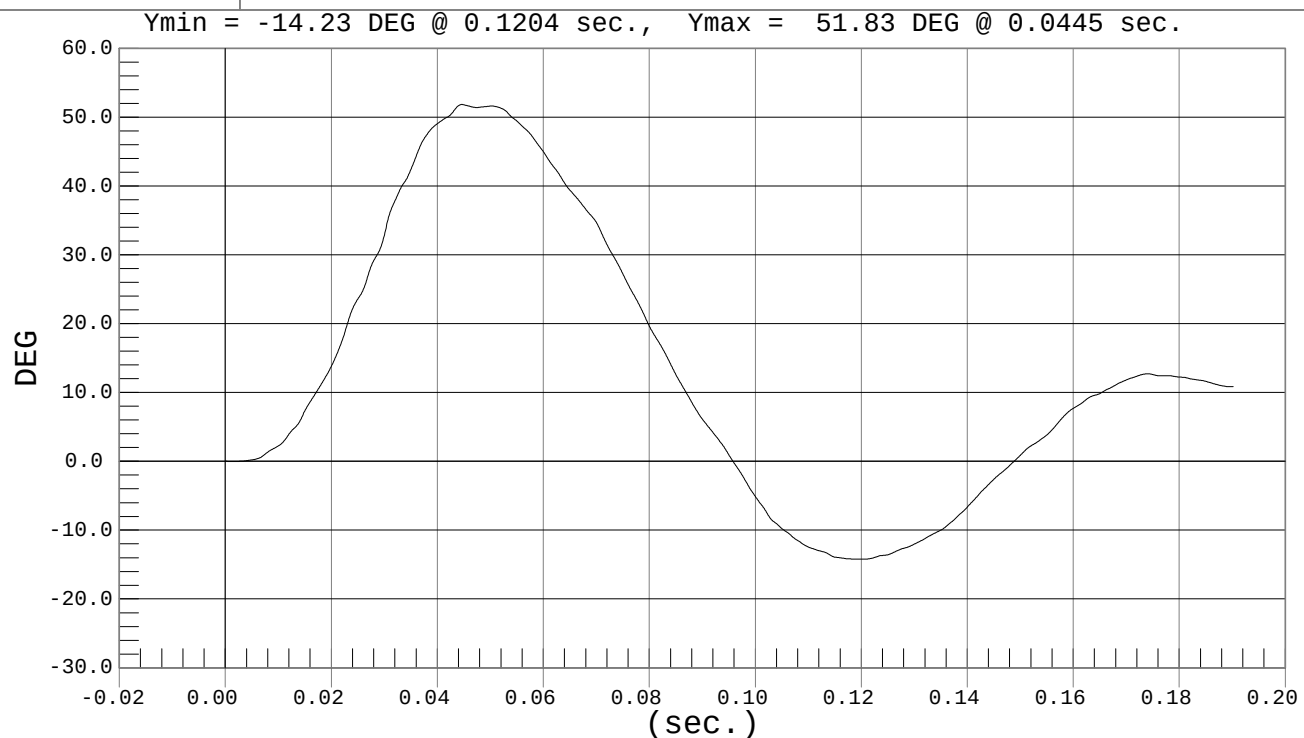
Test Date: 08-27-02
Speed: 20.0 fps, 6.09 M/s



FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #009

Test Date: 08-27-02
Speed: 20.0 fps, 6.09 M/s



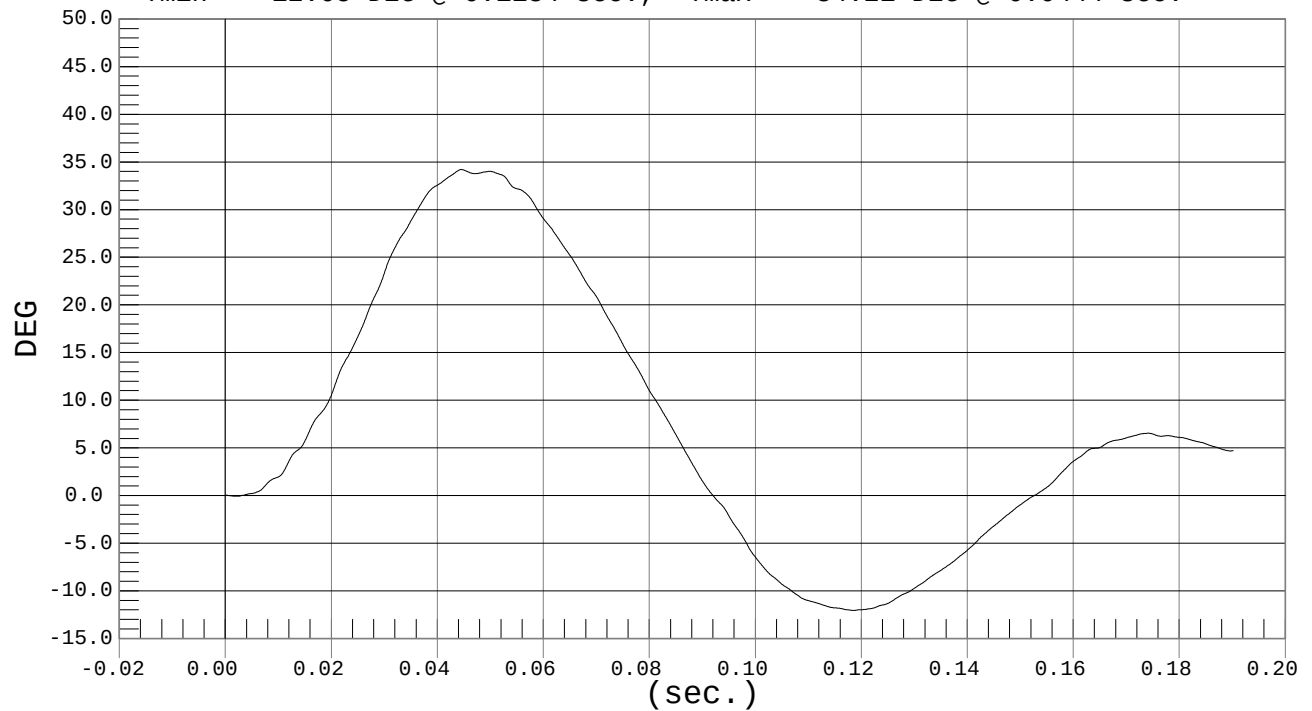


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA A

Test Date: 08-27-02
Speed: 20.0 fps, 6.09 M/s

Ymin = -12.05 DEG @ 0.1184 sec., Ymax = 34.21 DEG @ 0.0444 sec.

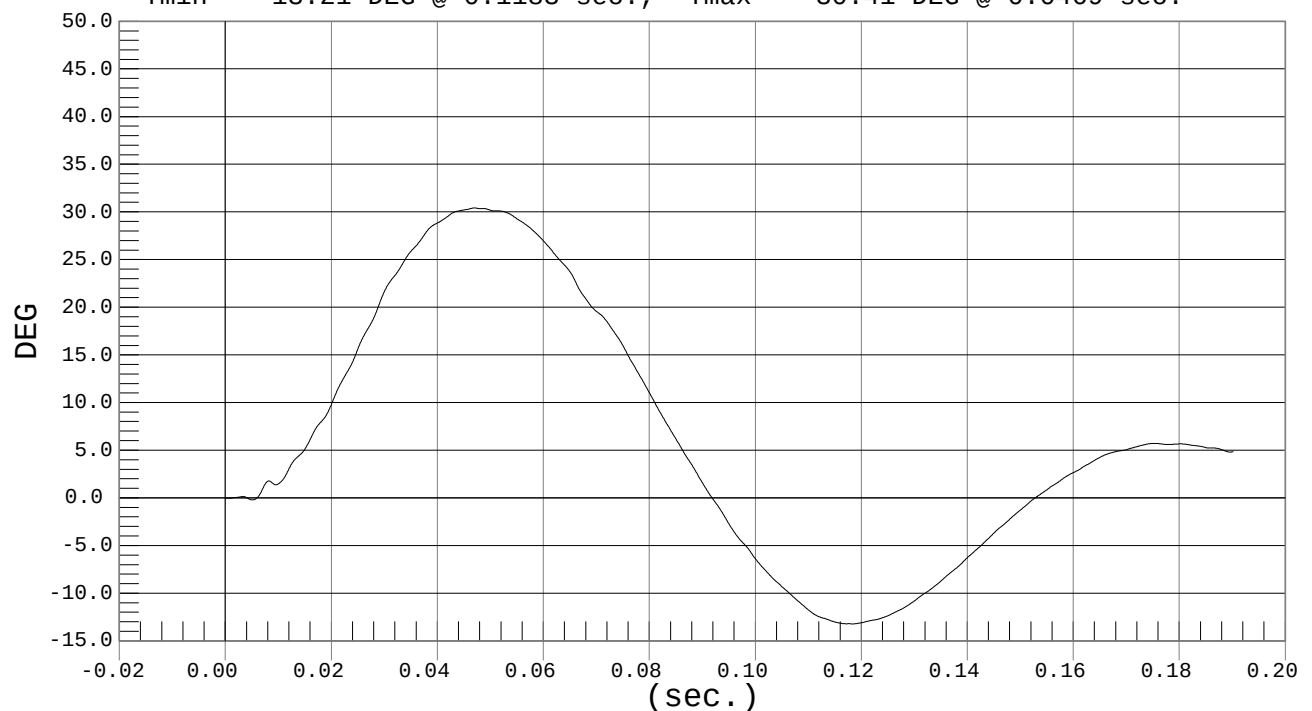


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA B

Test Date: 08-27-02
Speed: 20.0 fps, 6.09 M/s

Ymin = -13.21 DEG @ 0.1183 sec., Ymax = 30.41 DEG @ 0.0469 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 8/23/02
Dummy Serial Number: 009
Test Number: D021079

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	53
Pendulum Speed	6.20 – 6.30 m/s	6.25
Maximum Impactor Force	9.80 – 12.20 kN	10.76
Time of Max. Impactor Force	9.50 – 12.50 ms	11.40
Maximum Pubic Force	2.65 – 3.35 kN	3.08
Time of Max. Pubic Force	10.00 – 13.00 ms	11.40

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

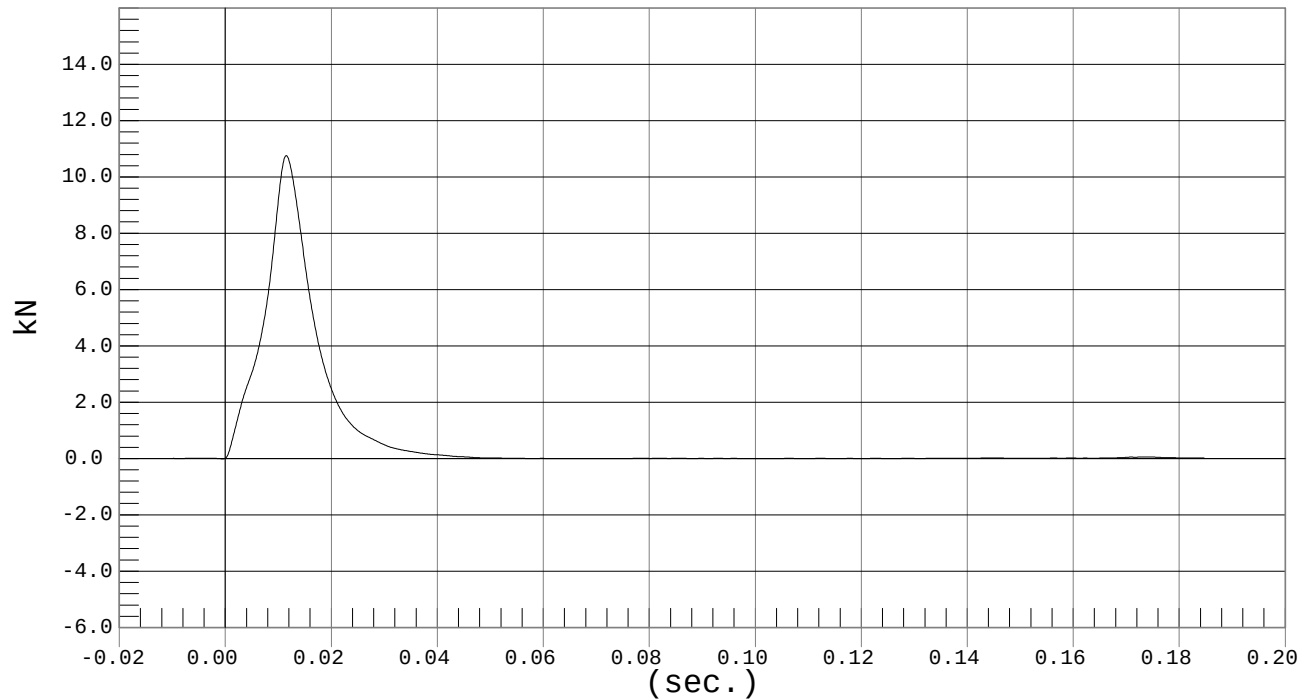


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 08-23-02
Speed: 20.5 fps, 6.25 M/s

Ymin = -.02 kN @ -0.0006 sec., Ymax = 10.76 kN @ 0.0114 sec.

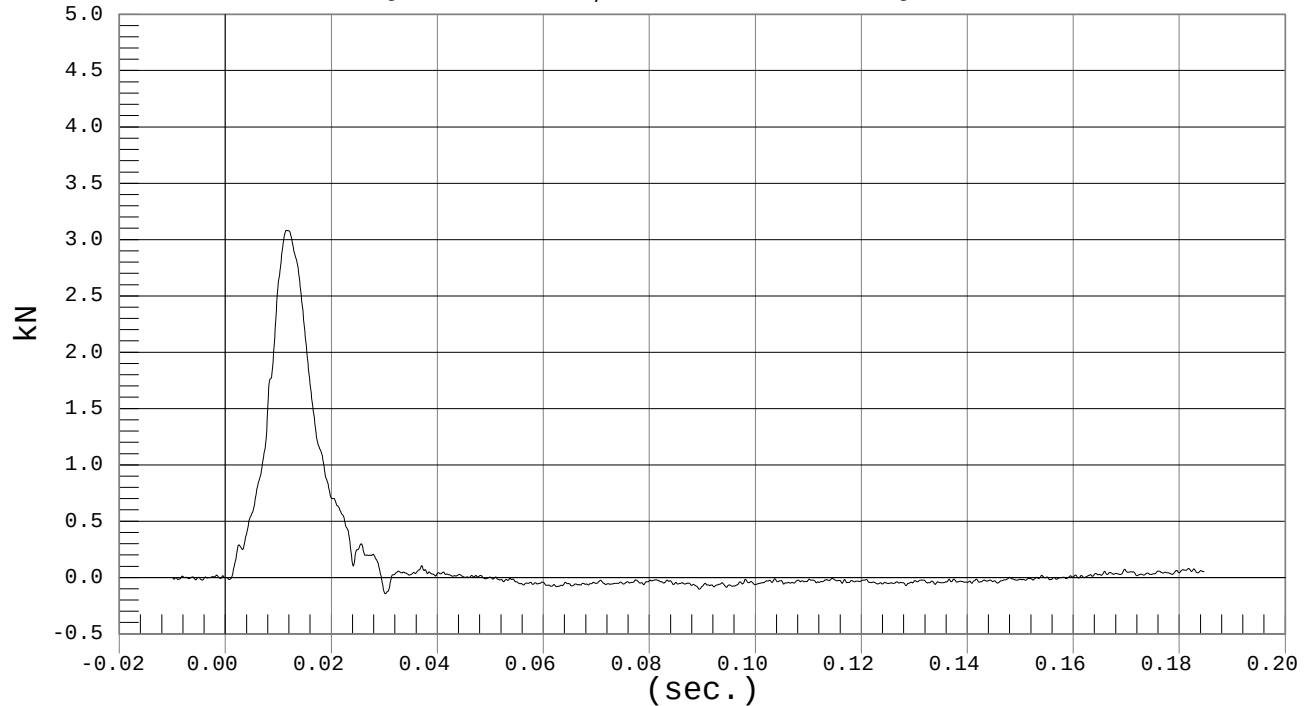


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 08-23-02
Speed: 20.5 fps, 6.25 M/s

Ymin = -.14 kN @ 0.0301 sec., Ymax = 3.08 kN @ 0.0114 sec.



CERTIFICATION DATA

Dummy Serial Number: 009

Calibration Test Results Summary

Dummy Serial Number: 009

Post-Test Calibration

Head Drop Test:	The head passed all drop test requirements.
Neck Pendulum Test:	The neck passed all impact test requirements.
Shoulder Impact Test:	The shoulder passed all impact test requirements.
Rib Tests:	All ribs passed all impact test requirements.
Abdomen Test:	The abdomen passed all impact test requirements.
Lumbar Spine Test:	The lumbar spine passed all impact test requirements.
Pelvis Test:	The pelvis passed all impact test requirements.

MGA RESEARCH CORPORATION
HEAD DROP TEST
EUROSID 2 DUMMY

Date: 9/3/02
Dummy Serial Number: 009
Test Number: D021181

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.5
Relative Humidity (%)	10 – 70	51
Peak Resultant Acceleration	100 – 150 g's	146
Time of Max. Res. Acceleration	msec	2.4

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

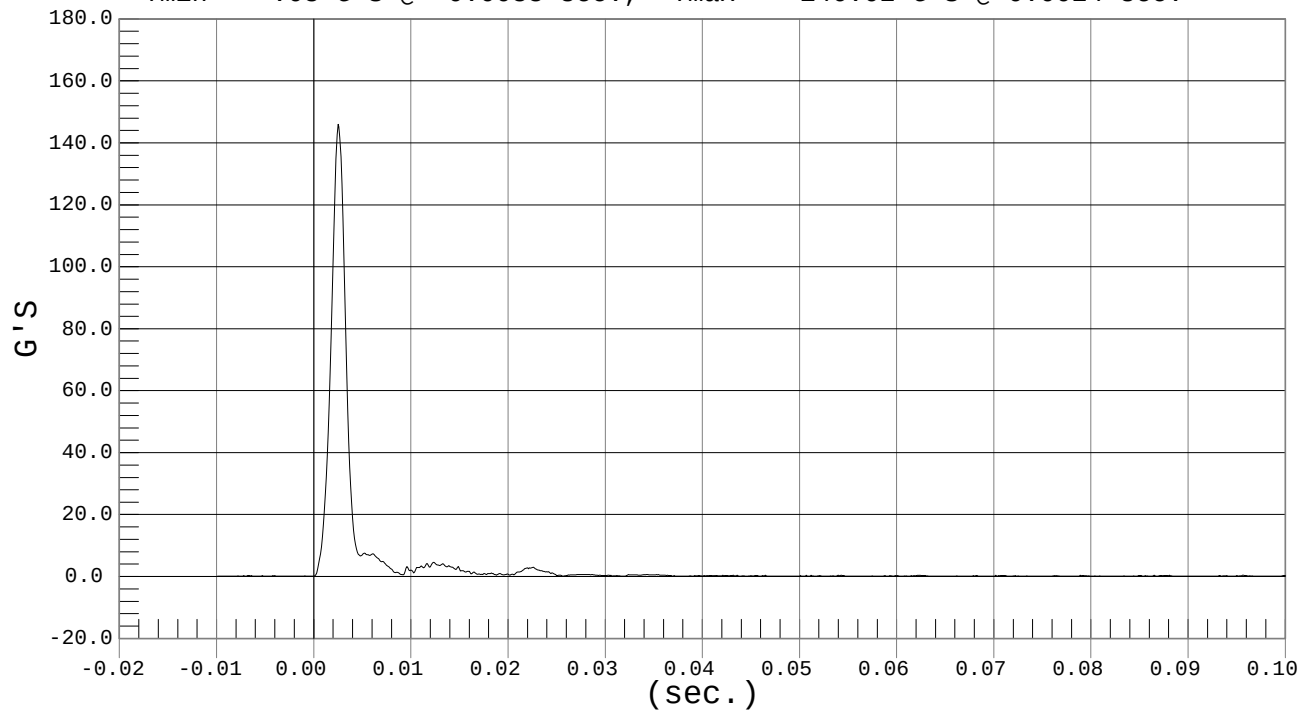


PEAK RESULTANT ACCELERATION

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 09-03-02
Speed: 0.0 fps, 0.00 M/s

Ymin = .08 G'S @ -0.0083 sec., Ymax = 146.02 G'S @ 0.0024 sec.



MGA RESEARCH CORPORATION
NECK PENDULUM TEST
EUROSID 2 DUMMY

Date: 9/4/02
Dummy Serial Number: 009
Test Number: D021182

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	20.8
Relative Humidity (%)		10 – 70	45
Pendulum Speed		3.3 - 3.5	3.4
Pendulum Deceleration	3 msec	~.25 - ~.53 m/sec	-.33
	8 msec	~1.59 - ~2.04 m/sec	-1.75
	14 msec	~3.20 - ~3.85 m/sec	-3.43
Maximum Flexion Angle		49.0 – 59.0 deg	53.5
Time of Max. Flexion Angle		54.0 – 66.0 ms	58.0
Maximum Angle Theta (A)		32.0 – 37.0 deg	35.1
Time of Max. Theta (A)		53.0 – 63.0 ms	57.7
Maximum Angle Theta (B)		30.18 – 32.68 deg	31.7
Time of Max. Theta (B)		54.0 – 64.0 ms	57.9

TEST MEETS SPECIFICATIONS

Technician: _____

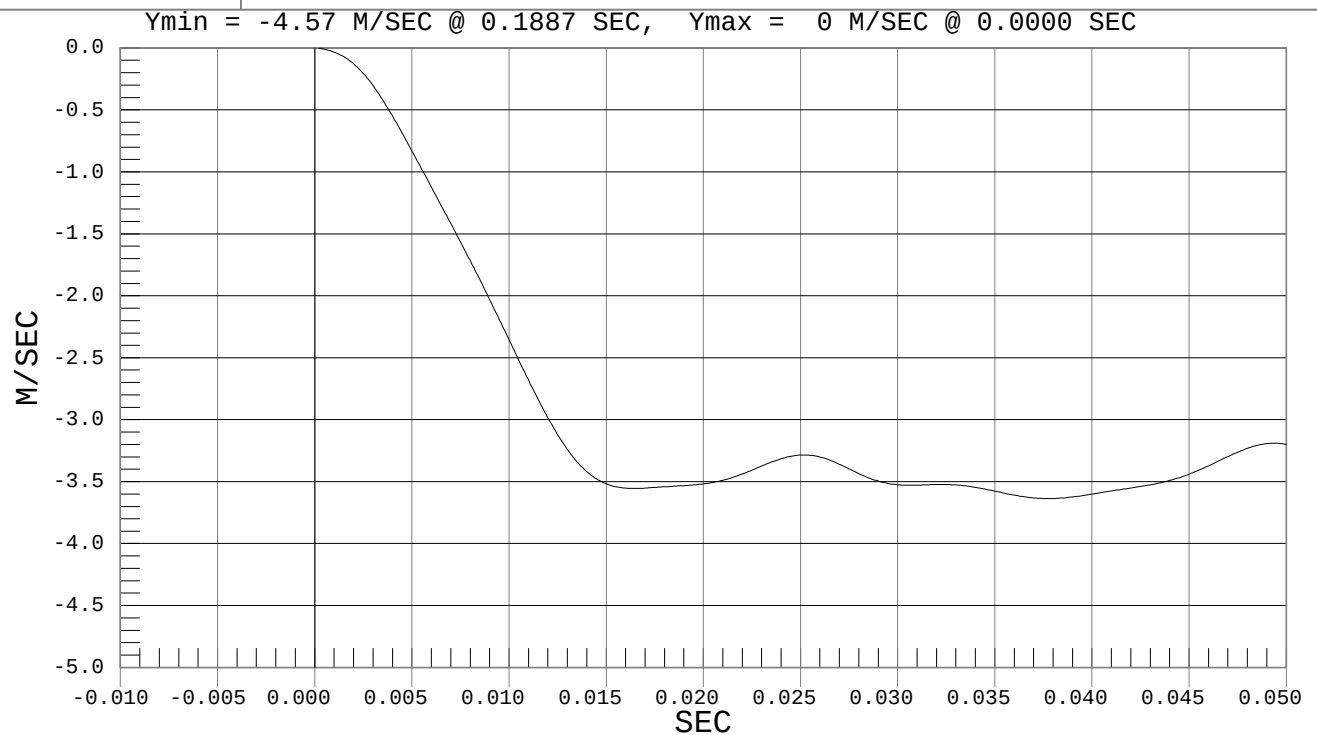
Approved By: _____



PENDULUM DECELERATION

Test Desc.: Neck Bending
Component: Dummy #009

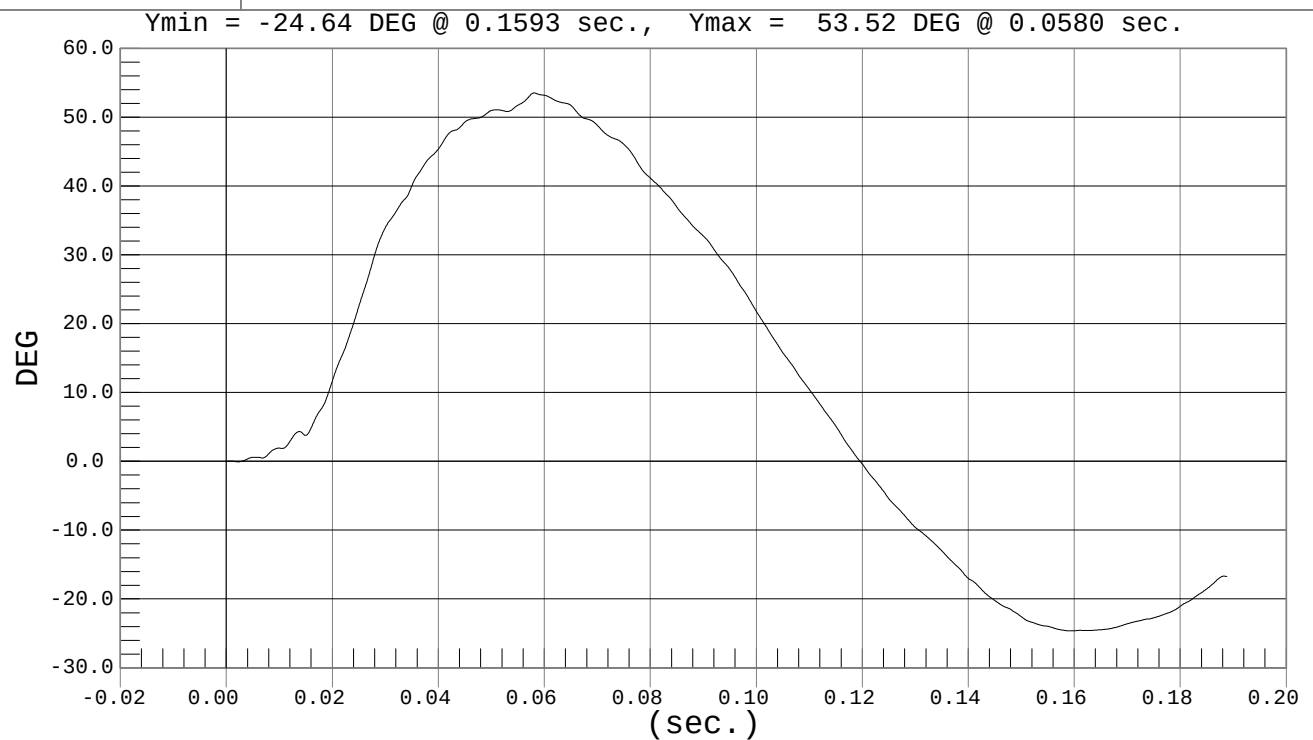
Test Date: 09-04-02
Speed: 11.2 fps, 3.42 M/s



FLEXION ANGLE

Test Desc.: Neck Bending
Component: Dummy #009

Test Date: 09-04-02
Speed: 11.2 fps, 3.42 M/s



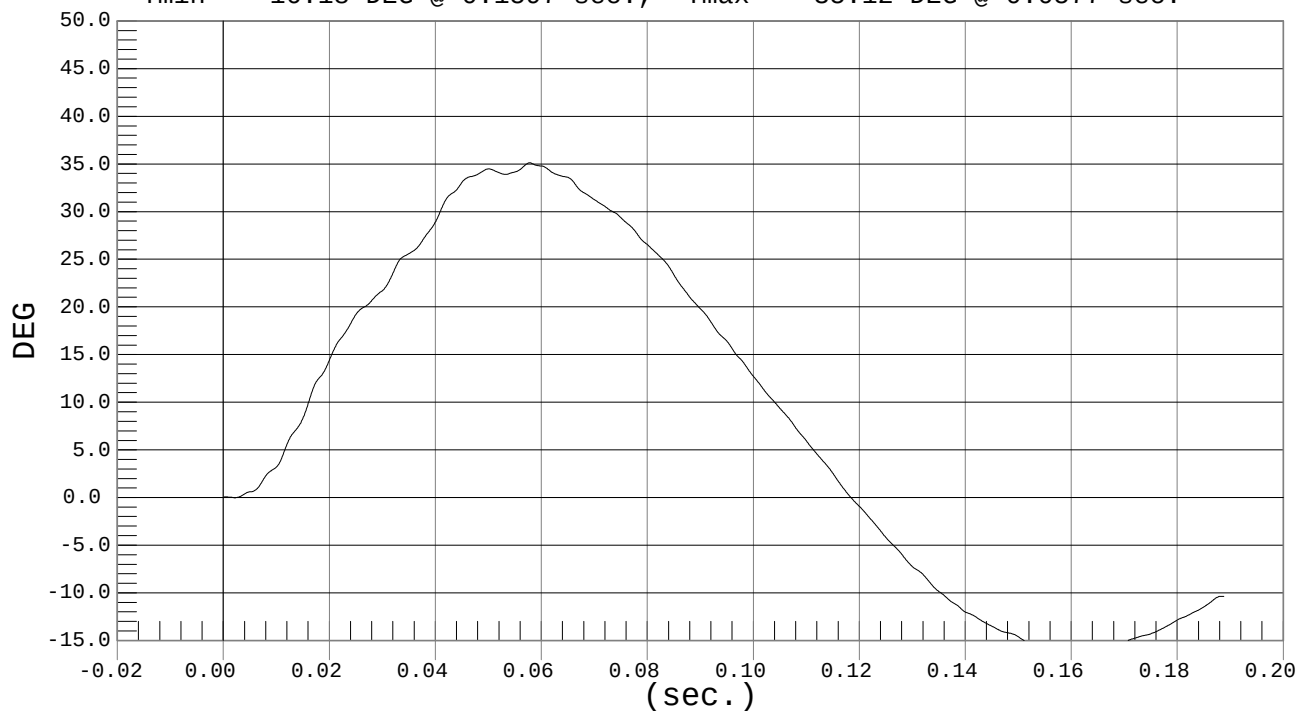


Test Desc.: Neck Bending
Component: Dummy #009

THETA A

Test Date: 09-04-02
Speed: 11.2 fps, 3.42 M/s

Ymin = -16.18 DEG @ 0.1597 sec., Ymax = 35.12 DEG @ 0.0577 sec.

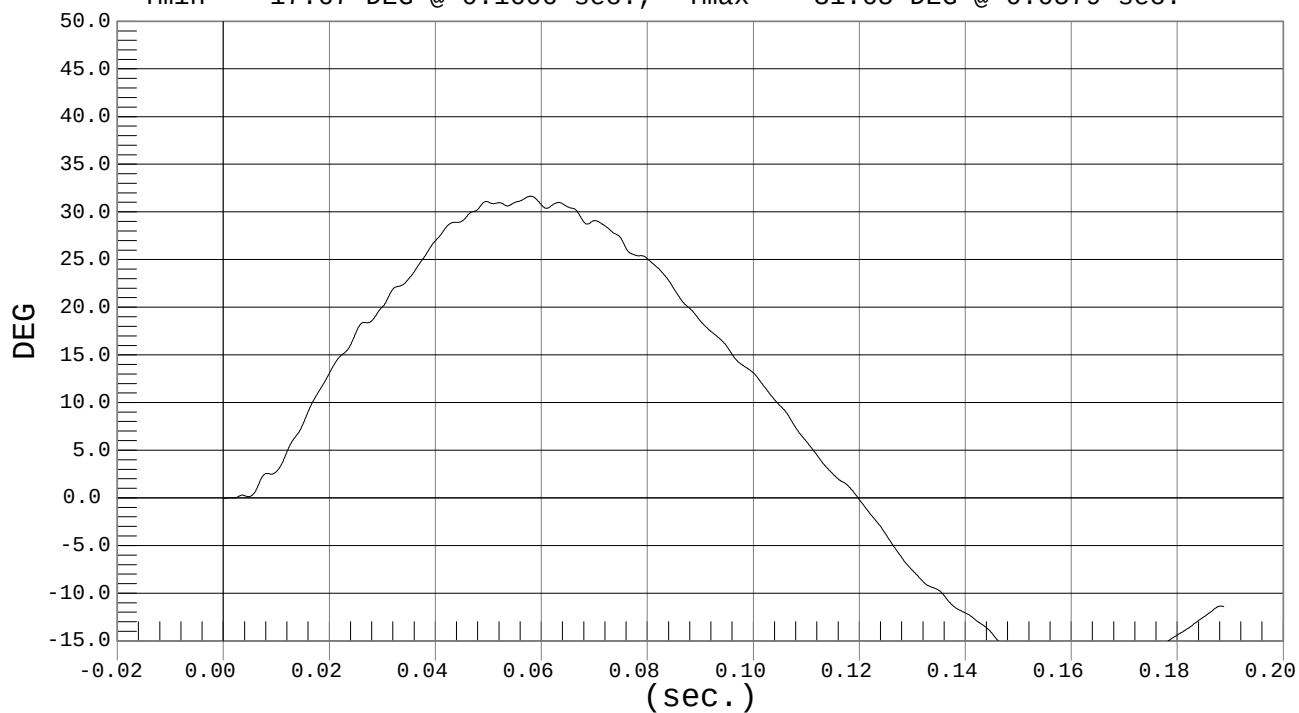


Test Desc.: Neck Bending
Component: Dummy #009

THETA B

Test Date: 09-04-02
Speed: 11.2 fps, 3.42 M/s

Ymin = -17.67 DEG @ 0.1606 sec., Ymax = 31.65 DEG @ 0.0579 sec.



MGA RESEARCH CORPORATION
SHOULDER IMPACT TEST
EUROSID 2 DUMMY

Date: 9/5/02
Dummy Serial Number: 009
Test Number: D021183

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.0
Relative Humidity (%)	10 – 70	54
Pendulum Speed	4.2 – 4.4 m/s	4.3
Max. Resultant Acceleration	7.5 – 10.5 g's	9.8
Time of Max. Pendulum Acceleration	msec	11.6

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

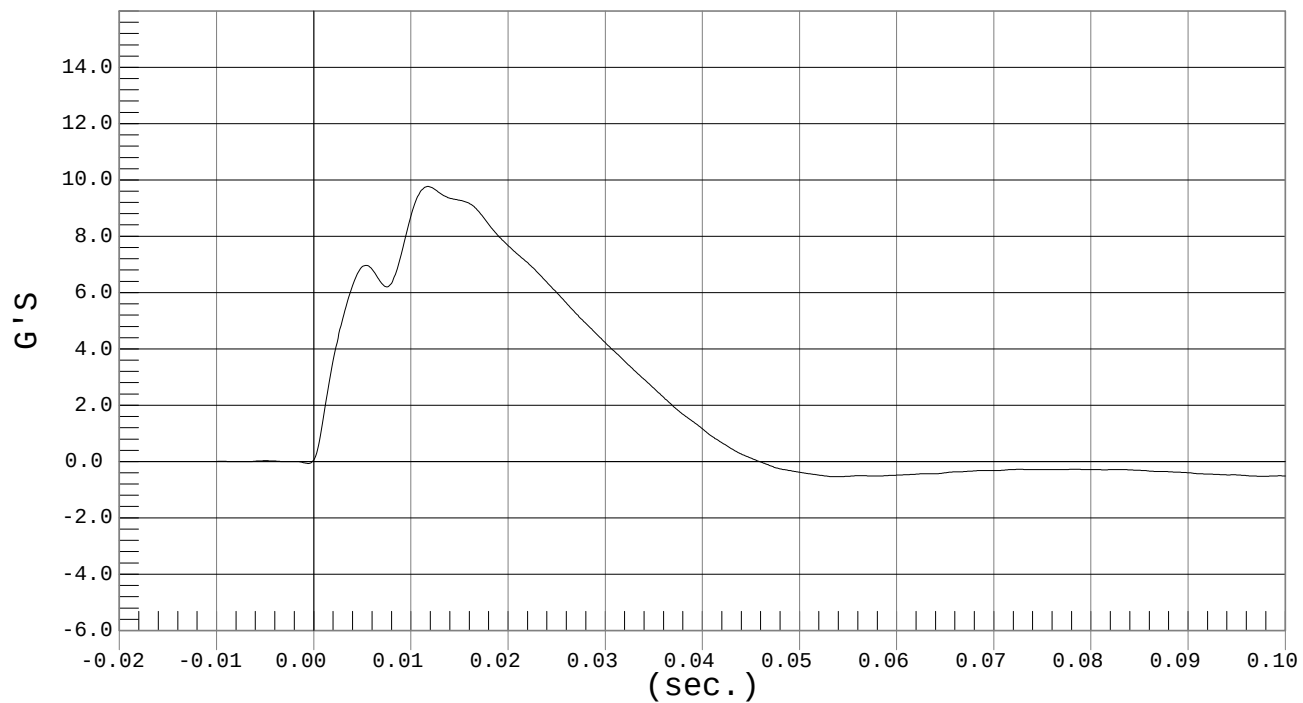


SHOULDER ACCELERATION

Test Desc.: Shoulder Impact
Component: Dummy #009

Test Date: 09-05-02
Speed: 14.0 fps, 4.27 M/s

Ymin = -.54 G'S @ 0.0535 sec., Ymax = 9.77 G'S @ 0.0116 sec.



MGA RESEARCH CORPORATION
UPPER/MIDDLE/LOWER RIB TESTS
EUROSID 2 DUMMY

Date: 9/4/02
Dummy Serial Number: 009
Test Number: D021184/5/6

UPPER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	26.0
Displacement at 3 m/s	36.0 – 40.0 mm	37.8
Displacement at 4 m/s	46.0 – 51.0 mm	48.4

MIDDLE RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	25.5
Displacement at 3 m/s	36.0 – 40.0 mm	39.0
Displacement at 4 m/s	46.0 – 51.0 mm	51.0

LOWER RIB - TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.4
Relative Humidity (%)	10 – 70	52
Displacement at 2 m/s	23.5 – 27.5 mm	24.7
Displacement at 3 m/s	36.0 – 40.0 mm	36.6
Displacement at 4 m/s	46.0 – 51.0 mm	48.1

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

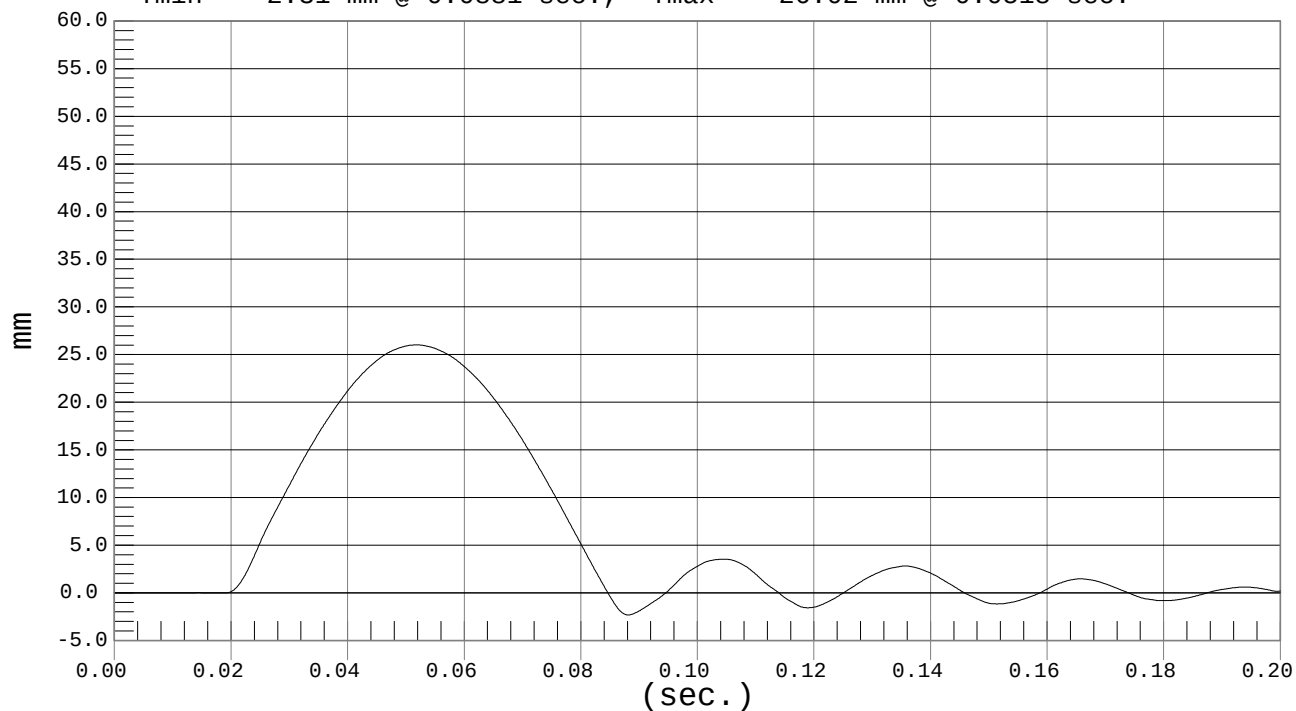


UPPER RIB DISPLACEMENT

Test Desc.: UPPER RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.31 mm @ 0.0881 sec., Ymax = 26.02 mm @ 0.0518 sec.

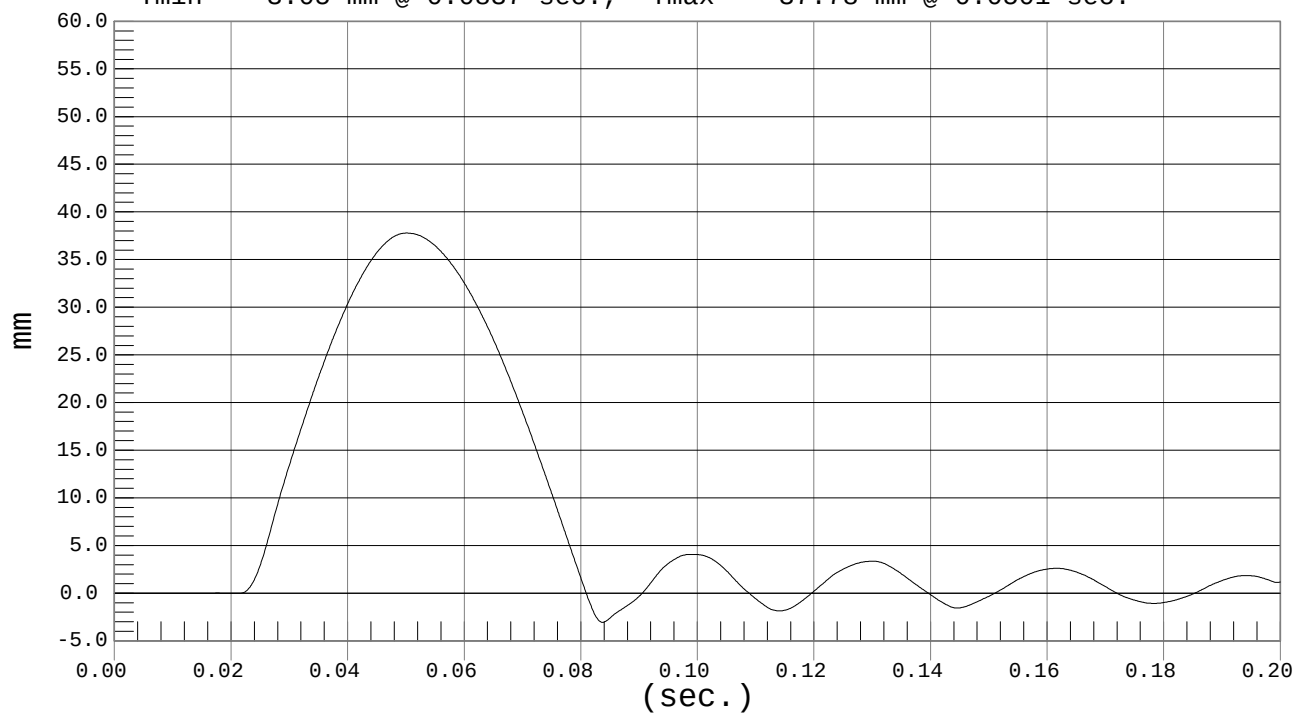


UPPER RIB DISPLACEMENT

Test Desc.: UPPER RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -3.05 mm @ 0.0837 sec., Ymax = 37.78 mm @ 0.0501 sec.



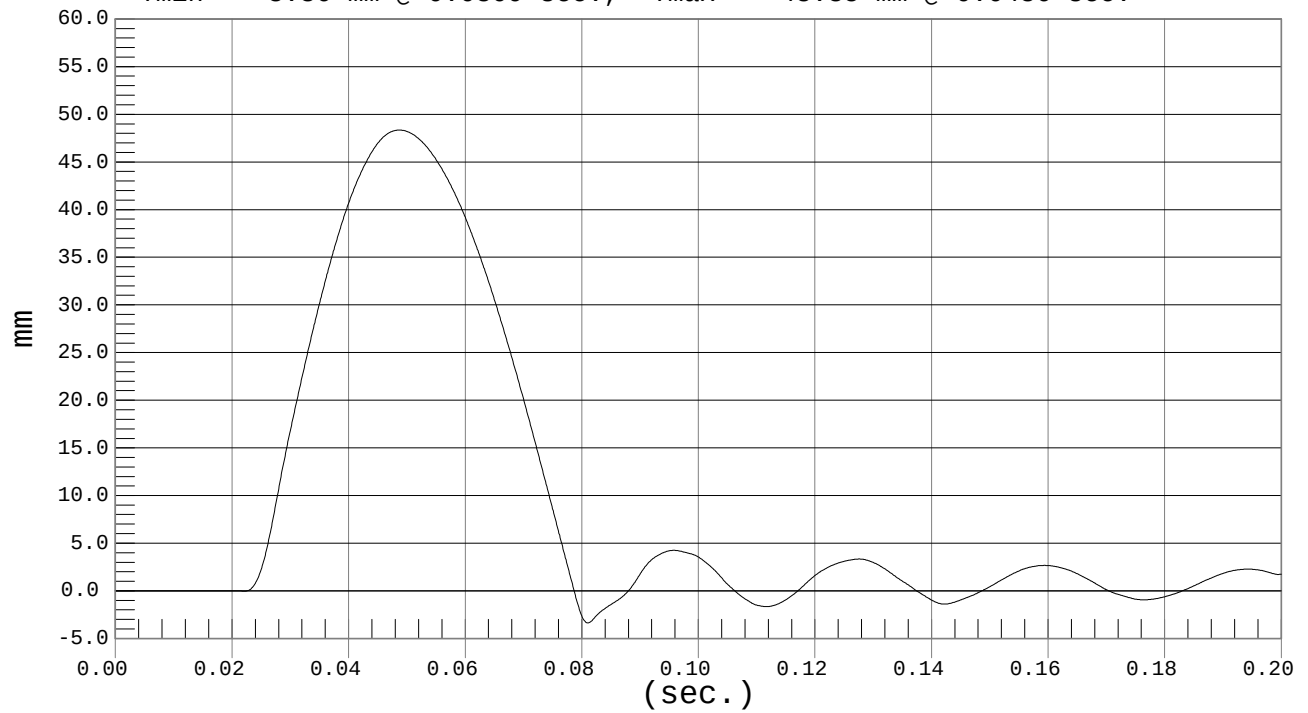


UPPER RIB DISPLACEMENT

Test Desc.: UPPER RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.36 mm @ 0.0809 sec., Ymax = 48.35 mm @ 0.0486 sec.



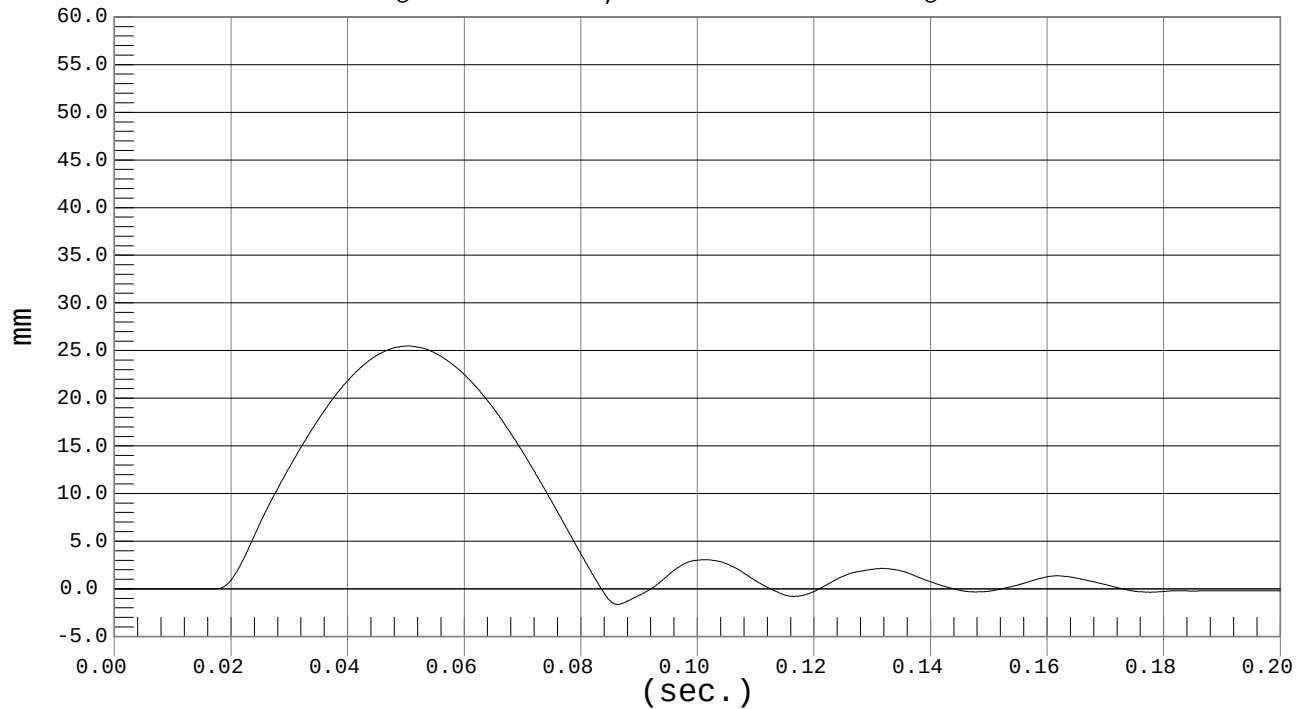


MIDDLE RIB DISPLACEMENT

Test Desc.: MIDDLE RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -1.63 mm @ 0.0862 sec., Ymax = 25.48 mm @ 0.0502 sec.

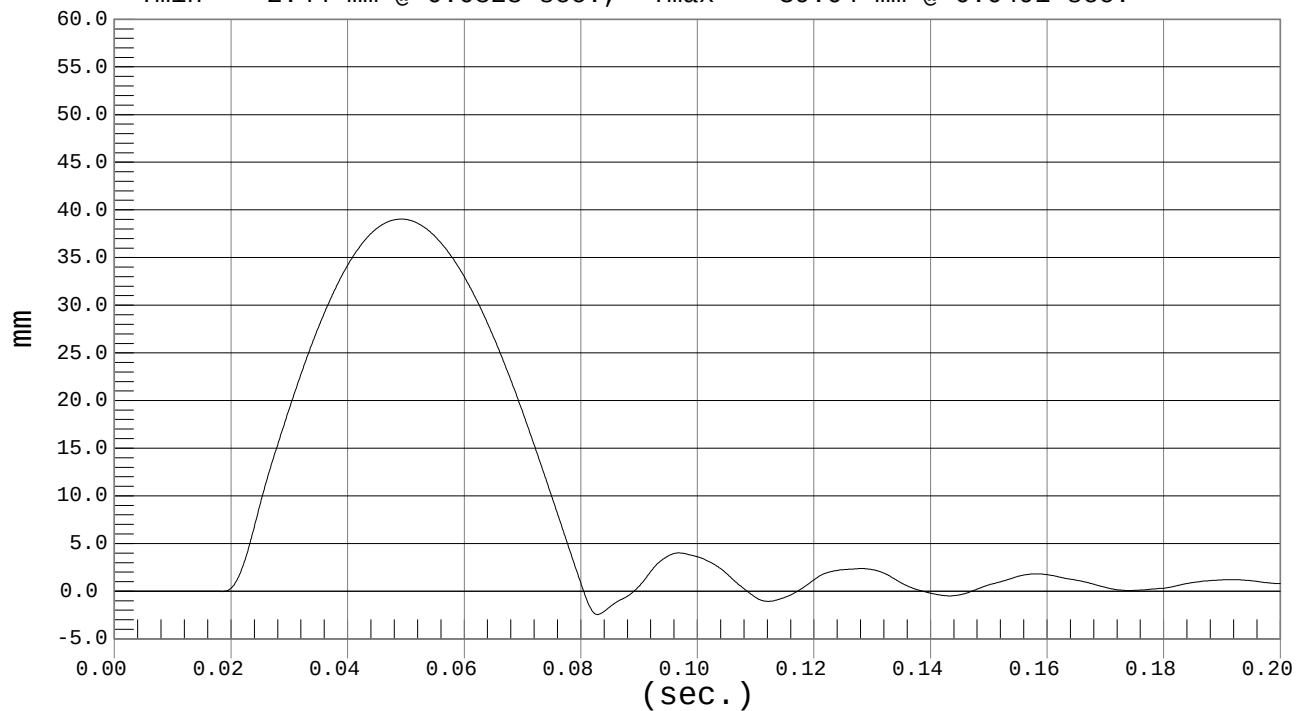


MIDDLE RIB DISPLACEMENT

Test Desc.: MIDDLE RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -2.44 mm @ 0.0828 sec., Ymax = 39.04 mm @ 0.0491 sec.



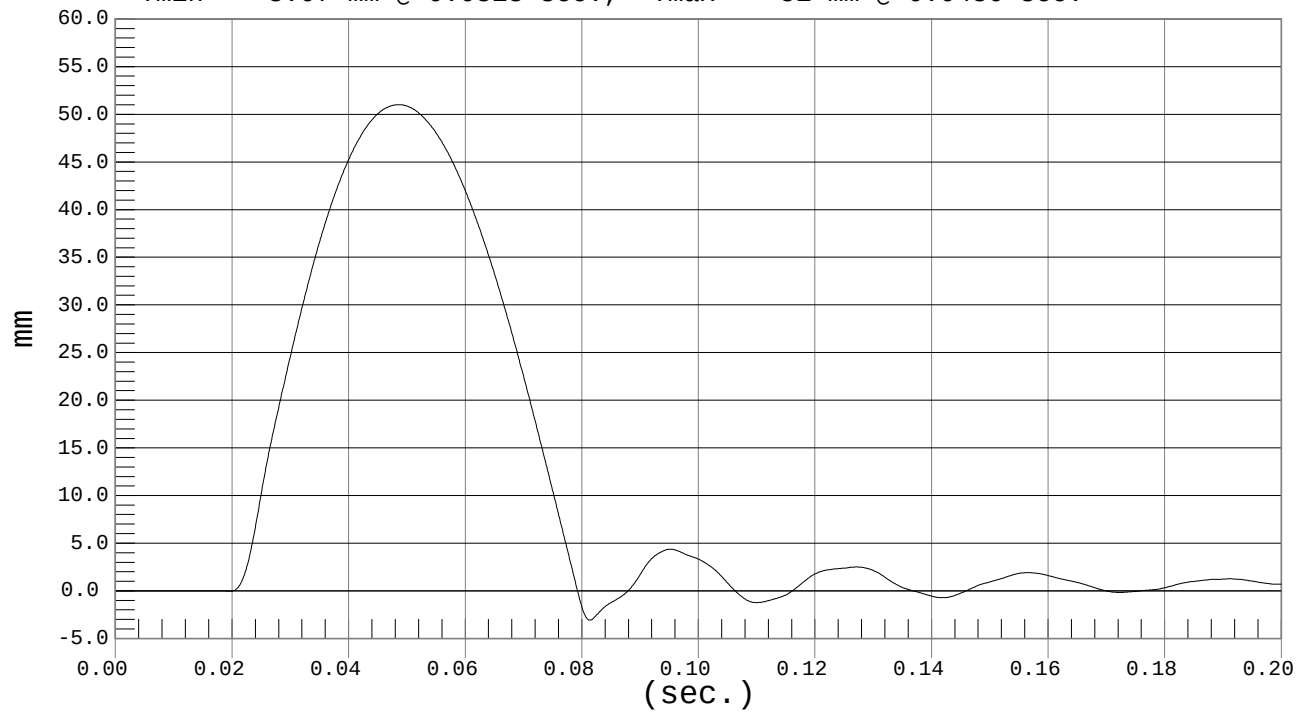


MIDDLE RIB DISPLACEMENT

Test Desc.: MIDDLE RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.07 mm @ 0.0813 sec., Ymax = 51 mm @ 0.0486 sec.



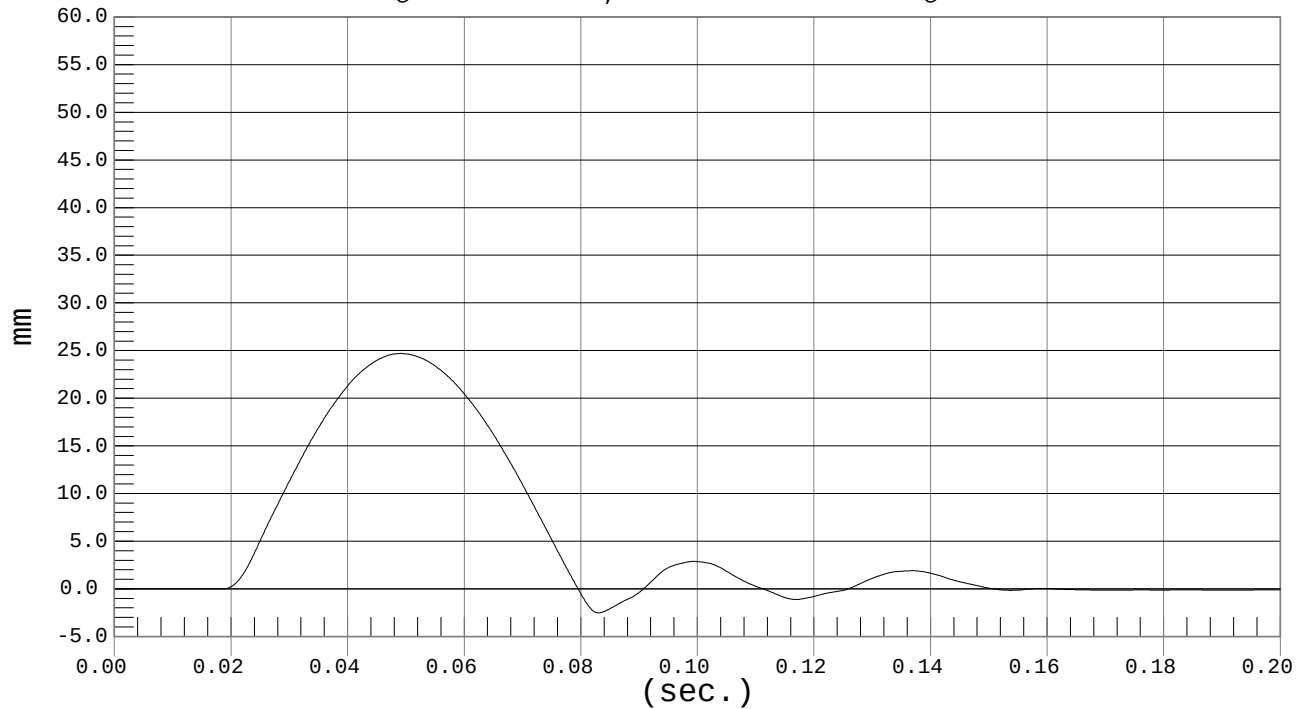


LOWER RIB DISPLACEMENT

Test Desc.: LOWER RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 6.6 fps, 2.00 M/s

Ymin = -2.52 mm @ 0.0830 sec., Ymax = 24.69 mm @ 0.0490 sec.

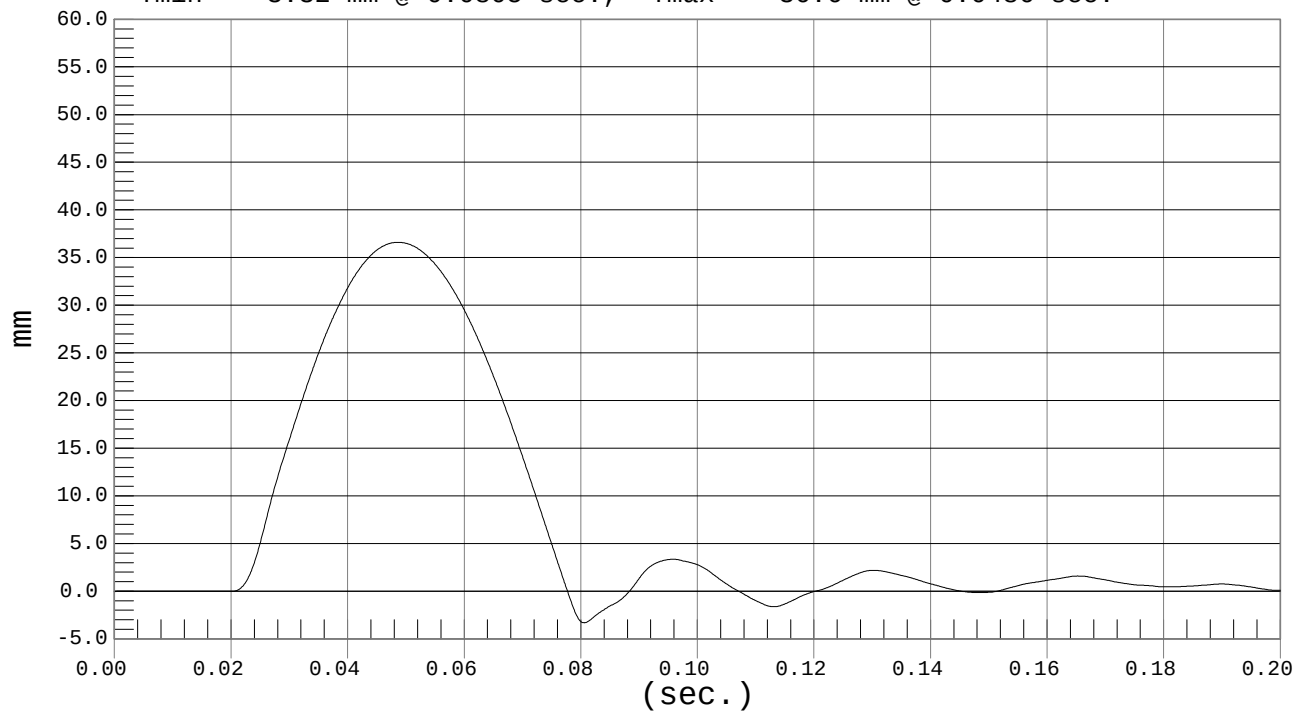


LOWER RIB DISPLACEMENT

Test Desc.: Head Drop
Component: Dummy #009

Test Date: 09-04-02
Speed: 9.8 fps, 3.00 M/s

Ymin = -3.32 mm @ 0.0805 sec., Ymax = 36.6 mm @ 0.0486 sec.



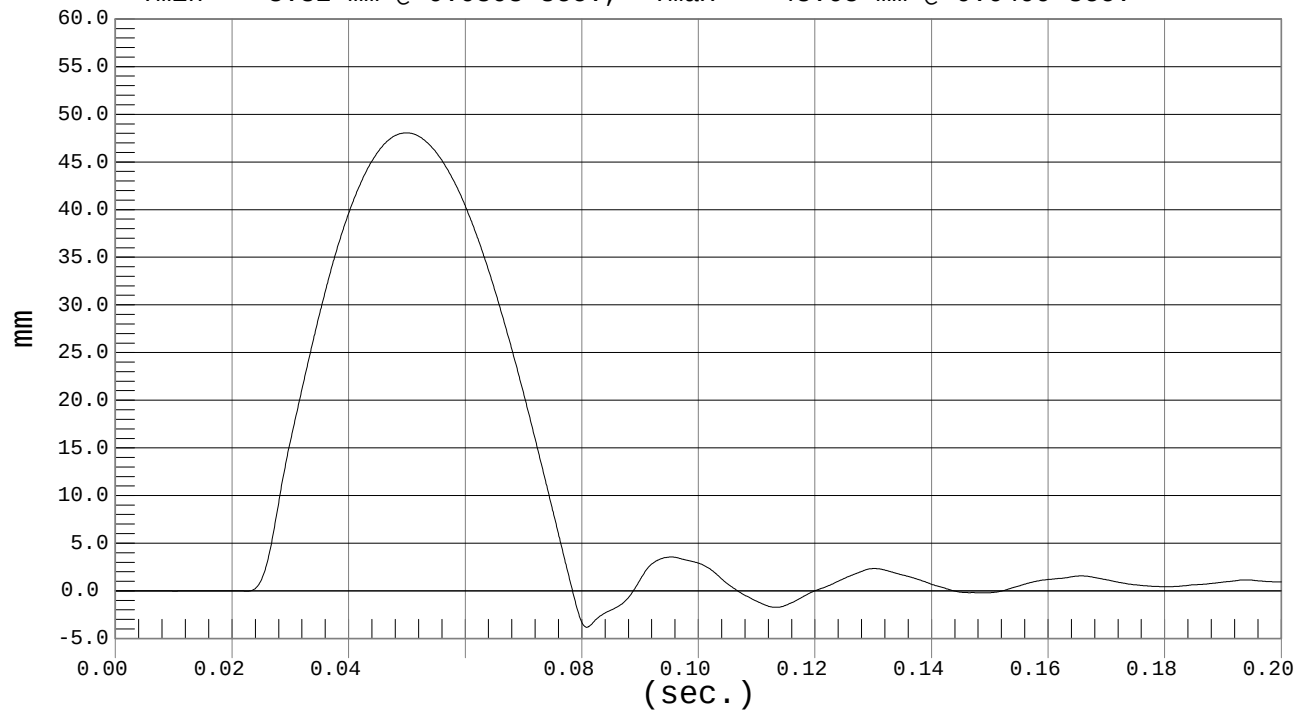


LOWER RIB DISPLACEMENT

Test Desc.: LOWER RIB
Component: Dummy #009

Test Date: 09-04-02
Speed: 13.1 fps, 4.00 M/s

Ymin = -3.82 mm @ 0.0808 sec., Ymax = 48.05 mm @ 0.0499 sec.



MGA RESEARCH CORPORATION
ABDOMEN TEST
EUROSID 2 DUMMY

Date: 9/5/02
Dummy Serial Number: 009
Test Number: D021187

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	21.1
Relative Humidity (%)	10 – 70	54
Probe Speed (m/s)	3.90 – 4.10	4.01
Maximum Impact Force	4.00 – 4.80 kN	4.59
Time of Maximum Force	10.60 – 13.00 ms	11.50
Maximum Total Abdomen Force	2.20 – 2.70 kN	2.39
Time of Max. Total Force	10.00 – 12.30 ms	11.20

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

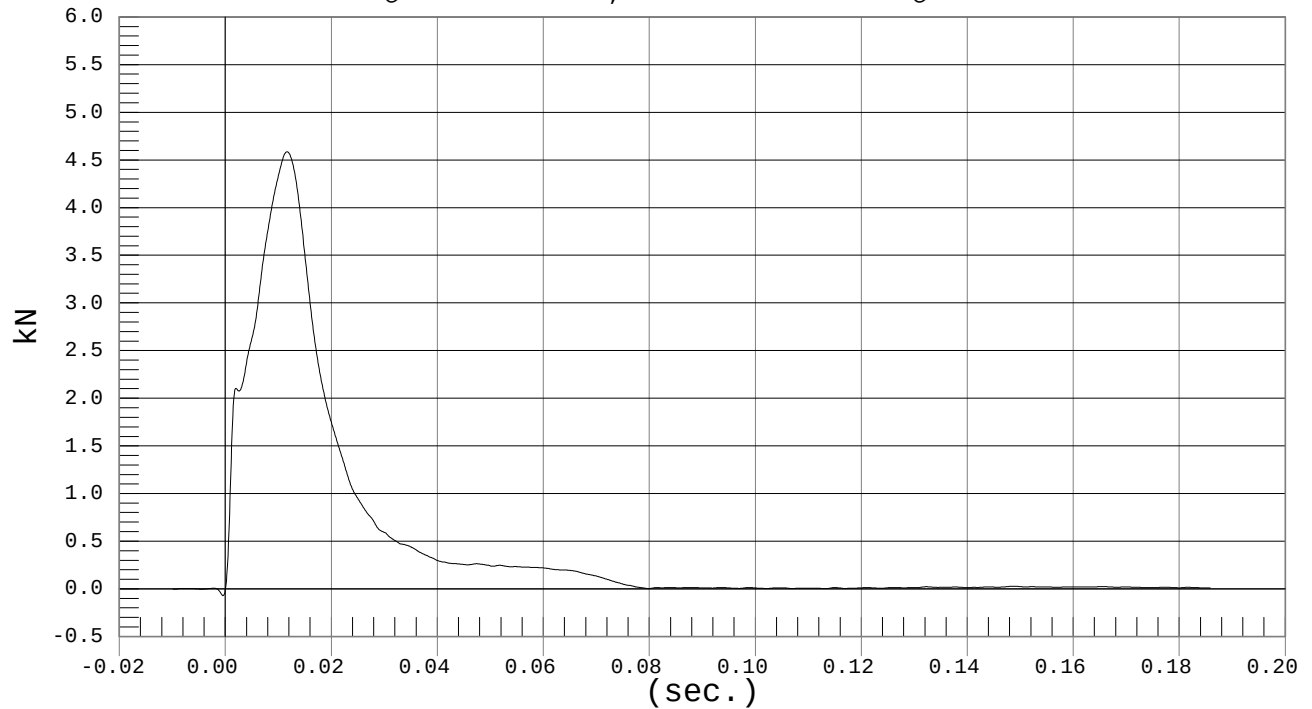


IMPACTOR FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 09-05-02
Speed: 13.1 fps, 4.01 M/s

Ymin = -.07 kN @ -0.0005 sec., Ymax = 4.59 kN @ 0.0115 sec.

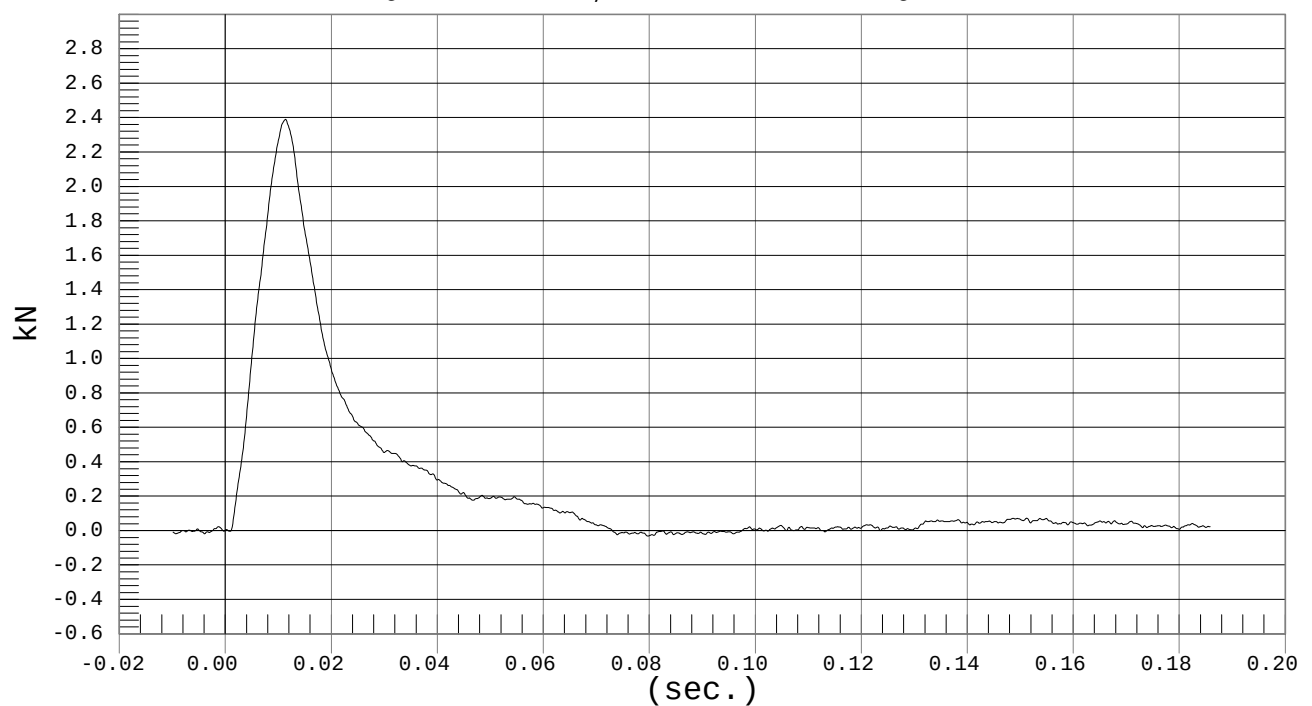


ABDOMEN FORCE

Test Desc.: Abdomen Impact
Component: Dummy #009

Test Date: 09-05-02
Speed: 13.1 fps, 4.01 M/s

Ymin = -.03 kN @ 0.0796 sec., Ymax = 2.39 kN @ 0.0112 sec.



MGA RESEARCH CORPORATION
LUMBAR SPINE TEST
EUROSID 2 DUMMY

Date: 9/4/02
Dummy Serial Number: 009
Test Number: D021188

TEST PARAMETER		SPECIFICATION	TEST RESULTS
Temperature (°C)		18.0 – 22.0	20.9
Relative Humidity (%)		10 – 70	46
Pendulum Speed		5.95 – 6.15	6.11
Pendulum Deceleration	10 msec	-2.46 - -1.59 m/sec	-2.07
	20 msec	-5.25 - -4.07 m/sec	-4.6
	25 msec	-6.64 - -5.30 m/sec	-5.82
	30 msec	≥ -6.5 m/sec	-6.29
Maximum Flexion Angle		45.0 – 55.0 deg	45.3
Time of Max. Flexion Angle		39.0 – 53.0 ms	44.4
Maximum Angle Theta (A)		31.0 – 35.0 deg	31.3
Time of Max. Theta (A)		44.0 – 52.0 ms	44.2
Maximum Angle Theta (B)		27.04– 29.54 deg	28.00
Time of Max. Theta (B)		44.0 – 52.0 ms	45.7

TEST MEETS SPECIFICATIONS

Technician: _____

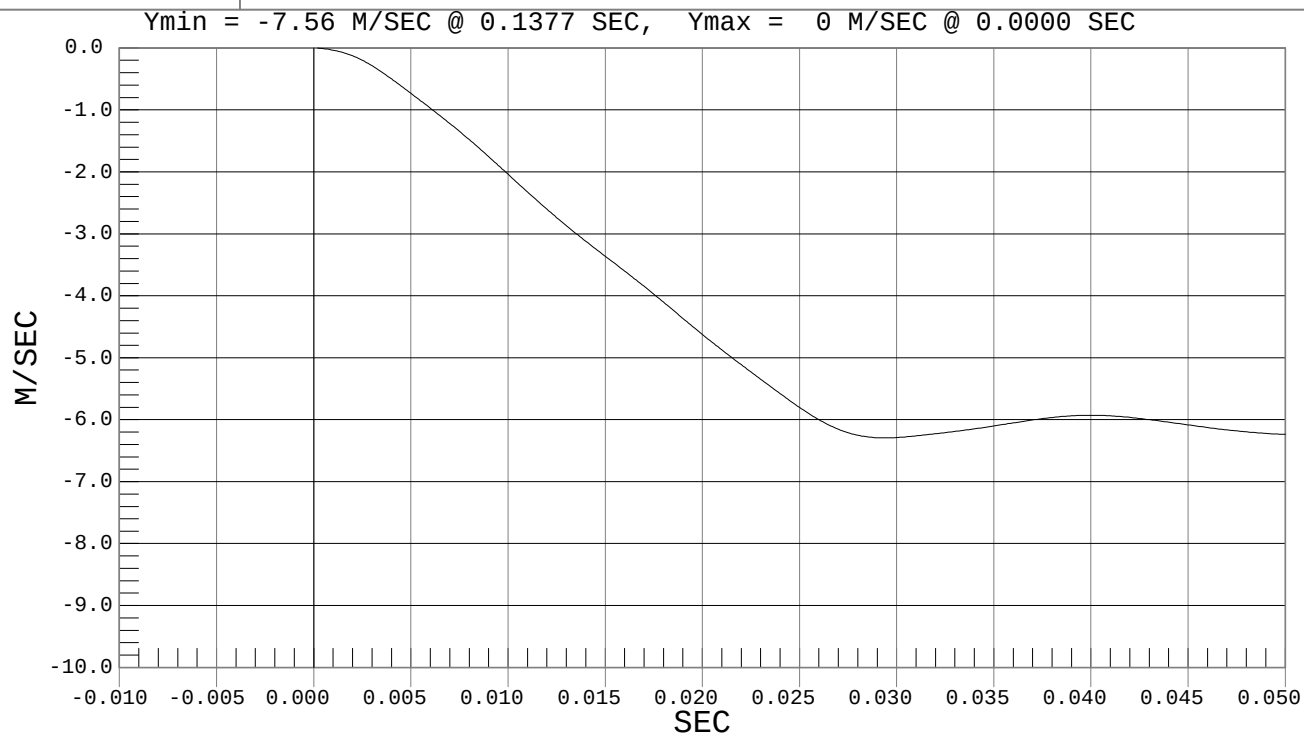
Approved By: _____



PENDULUM DECELERATION

Test Desc.: Lumbar Flexion
Component: Dummy #009

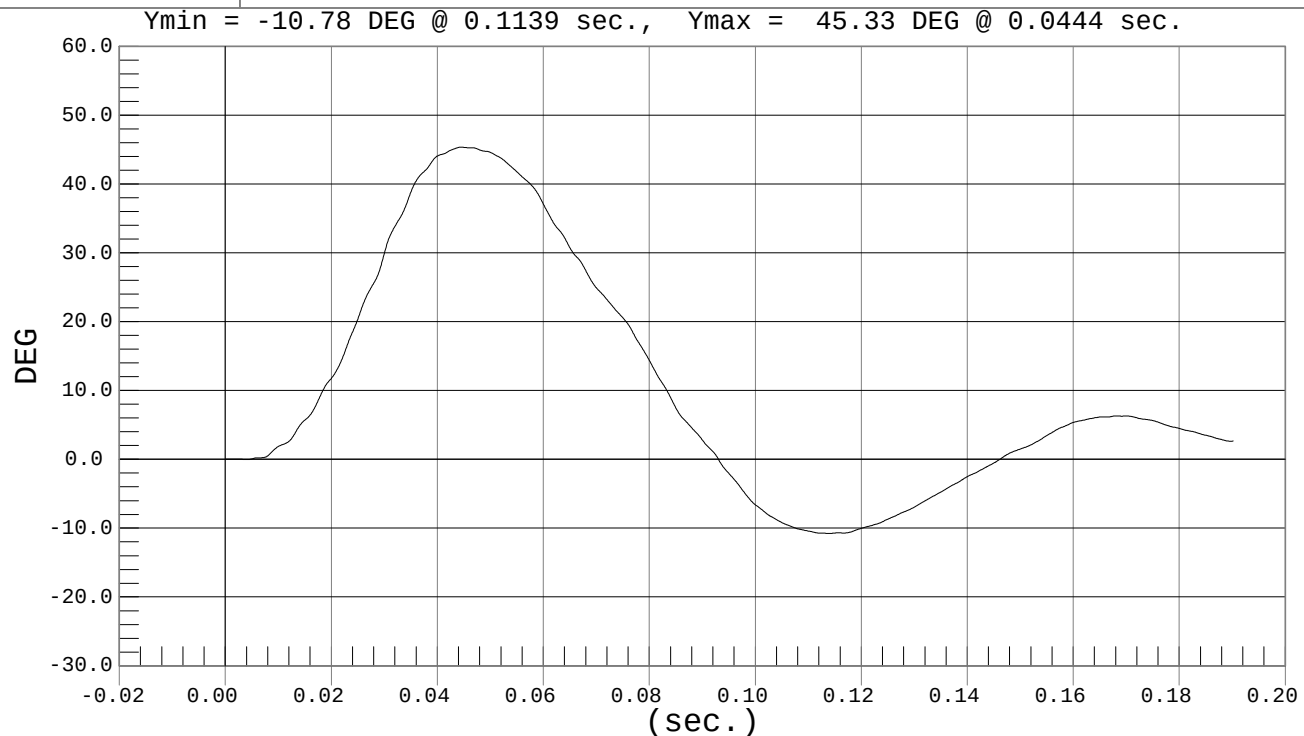
Test Date: 09-04-02
Speed: 20.0 fps, 6.11 M/s



FLEXION ANGLE

Test Desc.: Lumbar Flexion
Component: Dummy #009

Test Date: 09-04-02
Speed: 20.0 fps, 6.11 M/s



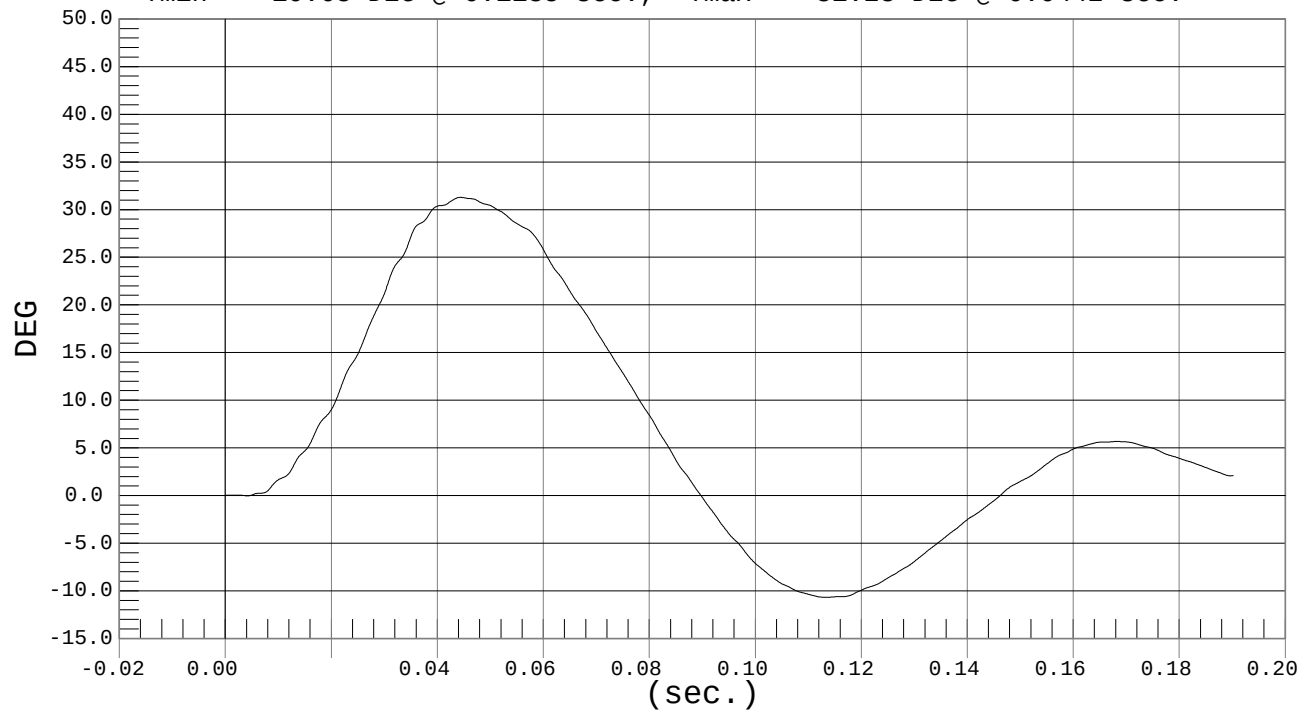


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA A

Test Date: 09-04-02
Speed: 20.0 fps, 6.11 M/s

Ymin = -10.68 DEG @ 0.1135 sec., Ymax = 31.28 DEG @ 0.0442 sec.

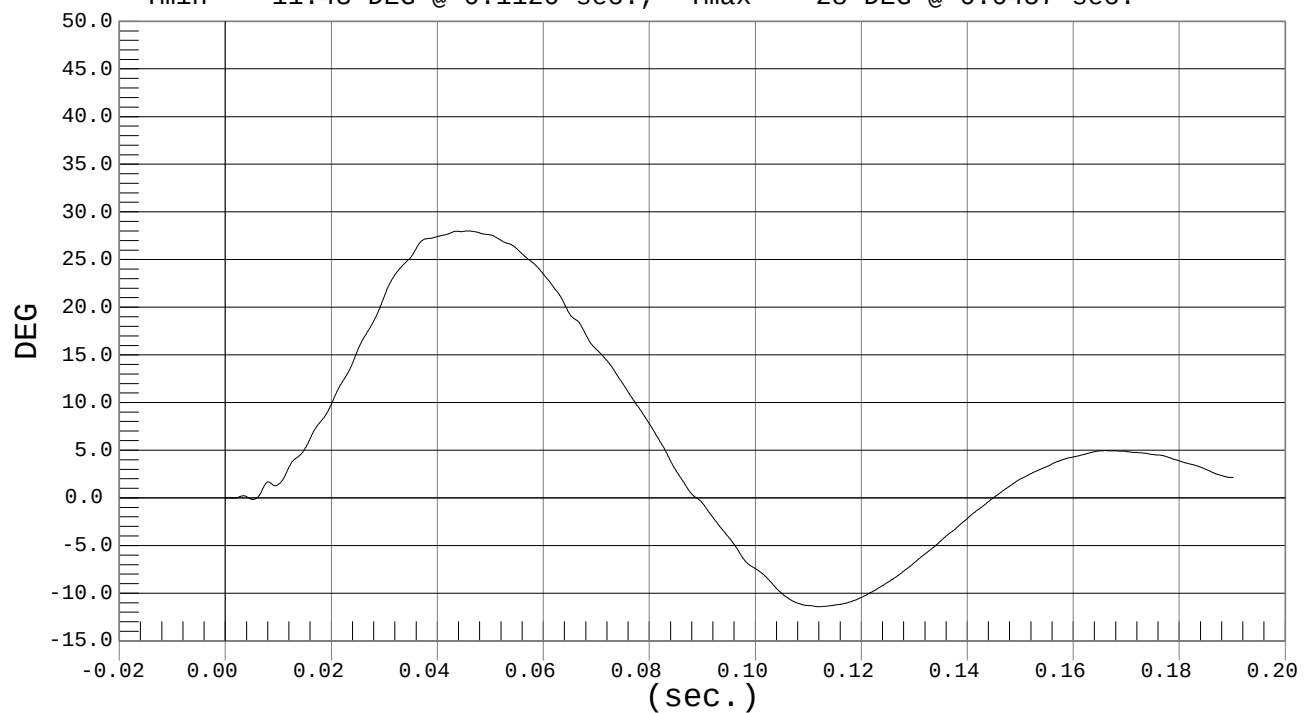


Test Desc.: Lumbar Flexion
Component: Dummy #009

THETA B

Test Date: 09-04-02
Speed: 20.0 fps, 6.11 M/s

Ymin = -11.43 DEG @ 0.1120 sec., Ymax = 28 DEG @ 0.0457 sec.



MGA RESEARCH CORPORATION
PELVIS TEST
EUROSID 2 DUMMY

Date: 9/5/02
Dummy Serial Number: 009
Test Number: D021189

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature (°C)	18.0 – 22.0	20.9
Relative Humidity (%)	10 – 70	51
Pendulum Speed	4.20 – 4.40 m/s	4.28
Maximum Impactor Force	4.40 – 5.40 kN	4.89
Time of Max. Impactor Force	10.30 – 15.50 ms	15.1
Maximum Pubic Force	1.04 – 1.64 kN	1.36
Time of Max. Pubic Force	9.90 – 15.90 ms	15.50

TEST MEETS SPECIFICATIONS

Technician: _____

Approved By: _____

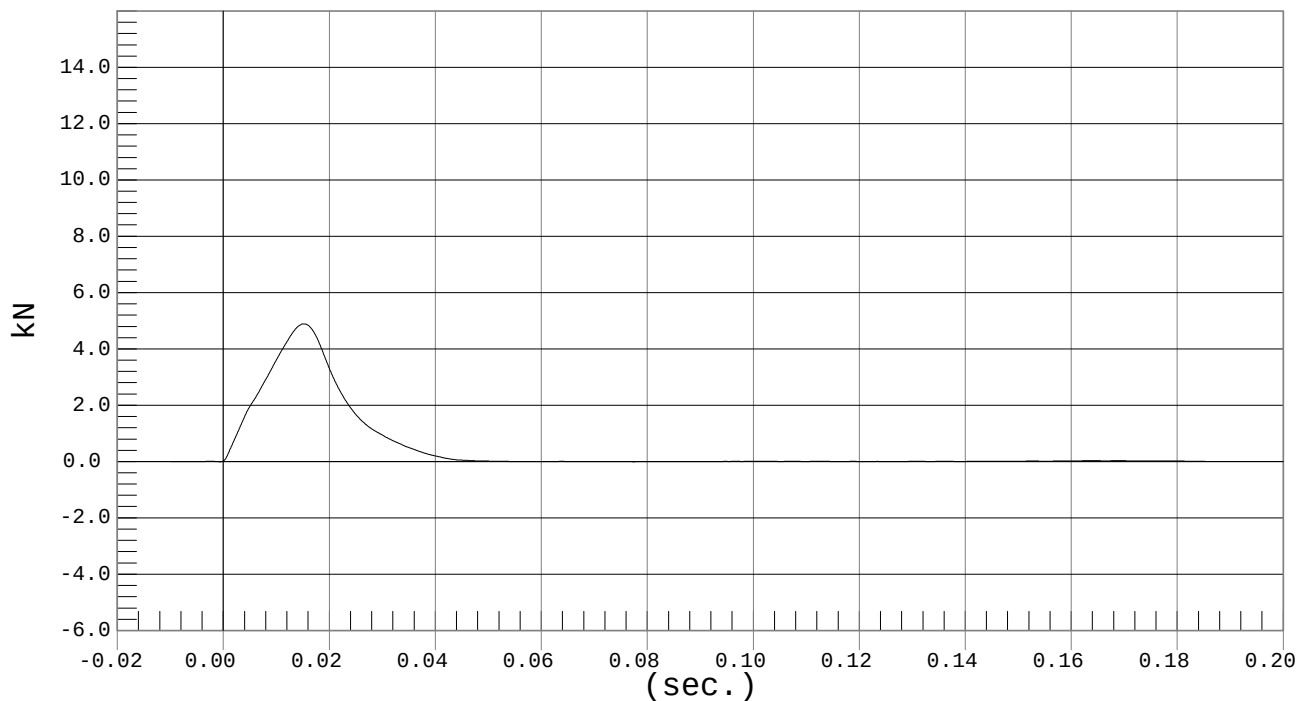


IMPACTOR FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 09-05-02
Speed: 14.1 fps, 4.28 M/s

Ymin = -.01 kN @ -0.0007 sec., Ymax = 4.89 kN @ 0.0151 sec.

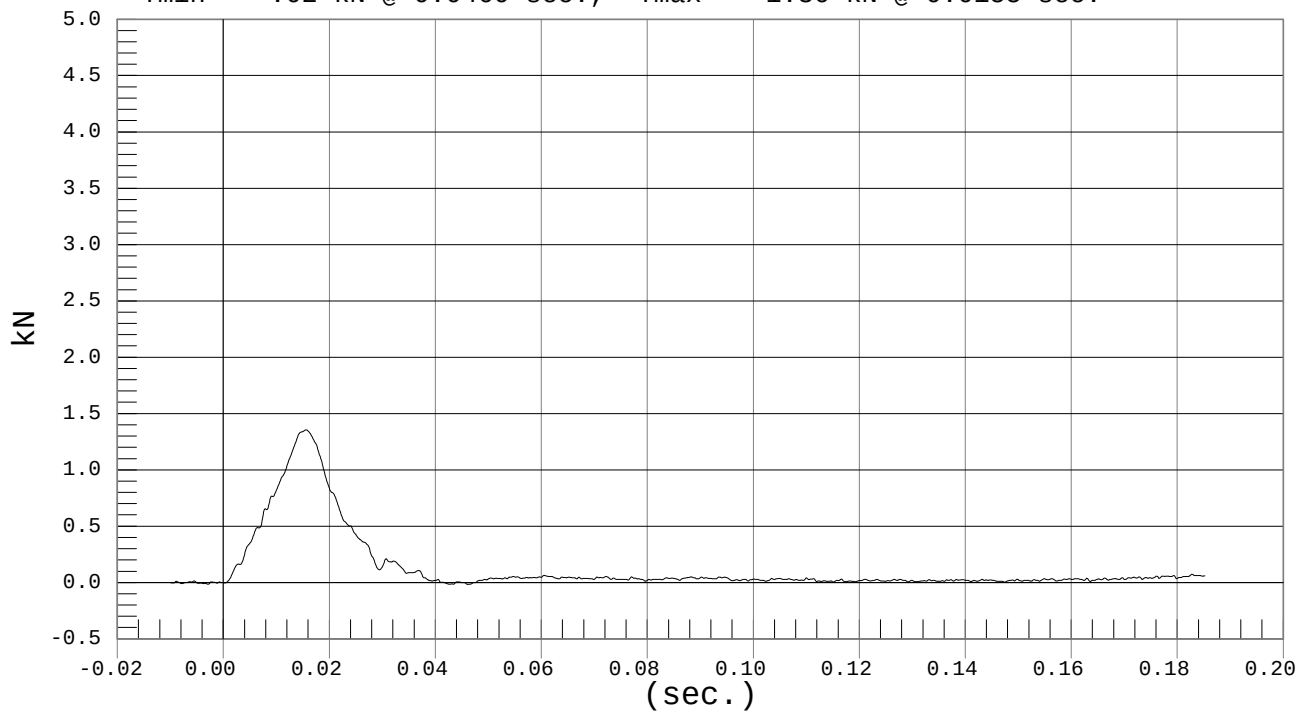


PUBIC FORCE

Test Desc.: Pelvis Impact
Component: Dummy #009

Test Date: 09-05-02
Speed: 14.1 fps, 4.28 M/s

Ymin = -.02 kN @ 0.0460 sec., Ymax = 1.36 kN @ 0.0155 sec.



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

DUMMY AND VEHICLE CALIBRATION DATA

	INSTRUMENTS FOR LEFT FRONT DUMMY NO.		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X Accelerometer	P22180	Endevco	7/23/02
Head Y Accelerometer	P22805	Endevco	7/23/02
Head Z Accelerometer	P23012	Endevco	7/23/02
Upper Rib Y Accelerometer	P22107	Endevco	7/22/02
Mid Rib Y Accelerometer	P22687	Endevco	7/22/02
Lower Rib Y Accelerometer	P22107	Endevco	7/22/02
Upper Spine X Accelerometer	P24216	Endevco	7/22/02
Upper Spine Y Accelerometer	P24226	Endevco	7/22/02
Upper Spine Z Accelerometer	P23059	Endevco	7/22/02
Upper Rib Displacement	009U	Honeywell	5/22/02
Mid Rib Displacement	009M	Honeywell	5/22/02
Lower Rib Displacement	009L	Honeywell	5/22/02
Lower Spine X Accelerometer	P21352	Endevco	7/22/02
Lower Spine Y Accelerometer	P22695	Endevco	7/22/02
Lower Spine Z Accelerometer	P22659	Endevco	7/22/02
Front Abdomen Load Cell	A122FY	FTSS	5/16/02
Mid Abdomen Load Cell	A123FY	FTSS	5/16/02
Rear Abdomen Load Cell	A124FY	FTSS	5/16/02
Pubic Symphysis Load Cell	P115FY	FTSS	5/16/02
Torso FX Load Cell	ET122FX	FTSS	5/13/02
Torso FY Load Cell	ET122FY	FTSS	5/13/02
Torso MY Load Cell	ET122MY	FTSS	5/13/02
Torso MZ Load Cell	ET122MZ	FTSS	5/13/02
T-12 FX Load Cell	LS103FX	FTSS	5/13/02
T-12 FY Load Cell	LS103 FY	FTSS	5/13/02
T-12 MX Load Cell	LS103MX	FTSS	5/13/02
T-12 MY Load Cell	LS103MY	FTSS	5/13/02
Lower Neck FX	N110FX	FTSS	5/16/02
Lower Neck FY	N110FY	FTSS	5/16/02
Lower Neck FZ	N110FZ	FTSS	5/16/02
Lower Neck MX	N110MX	FTSS	5/16/02
Lower Neck MY	N110MY	FTSS	5/16/02
Lower Neck MZ	N110MZ	FTSS	5/16/02
Upper Neck FX	N105 FX	FTSS	5/13/02
Upper Neck FY	N105FY	FTSS	5/13/02
Upper Neck FZ	N105FZ	FTSS	5/13/02
Upper Neck MX	N105MX	FTSS	5/13/02
Upper Neck MY	N105MY	FTSS	5/13/02
Upper Neck MZ	N105MZ	FTSS	5/13/02
Head Y-Front	P22692	Endevco	7/23/02

Head Z-Front	P24260	Endevco	7/23/02
Head X-Left	P22190	Endevco	7/23/02
Head Z-Left	P24154	Endevco	7/23/02
Head X-Upper	P22101	Endevco	7/23/02
Head Y-Upper	P22150	Endevco	7/23/02
Shoulder FX	S119FX	FTSS	5/10/02
Shoulder FY	S119FY	FTSS	5/10/02
Shoulder FZ	S119FZ	FTSS	5/10/02
Lumbar FY	L104FY	FTSS	5/10/02
Lumbar MX	L104MX	FTSS	8/15/02
Front Abdomen FY	A122FY	FTSS	5/16/02
Mid Abdomen FY	A123FY	FTSS	5/16/02
Rear Abdomen FY	A124FY	FTSS	5/16/02
Pelvis X Accelerometer	P22084	Endevco	7/23/02
Pelvis Y Accelerometer	P22099	Endevco	7/23/02
Pelvis Z Accelerometer	P22972	Endevco	7/23/02
Pubic Symphysis	P115FY	FTSS	5/16/02
Right Femur FX Load Cell	F135FX	FTSS	5/13/02
Right Femur FY Load Cell	F135FY	FTSS	5/13/02
Right Femur FZ Load Cell	F135FZ	FTSS	5/13/02
Right Femur MX Load Cell	F135MX	FTSS	5/13/02
Right Femur MY Load Cell	F135MY	FTSS	5/13/02
Right Femur MZ Load Cell	F135MZ	FTSS	5/13/02
Left Femur FX Load Cell	F136FX	FTSS	5/13/02
Left Femur FY Load Cell	F136FY	FTSS	5/13/02
Left Femur FZ Load Cell	F136FZ	FTSS	5/13/02
Right Femur MX Load Cell	F136MX	FTSS	5/13/02
Left Femur MY Load Cell	F136MY	FTSS	5/13/02
Left Femur MZ Load Cell	F136MZ	FTSS	5/13/02
Lumbar FZ Load Cell	L104FZ	FTSS	5/15/02

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Upper A-Post Y	G01-N22	ENTRAN	7/31/02
Left Mid A-Post Y	I12-F07	ENTRAN	6/25/02
Left Lower A-Post Y	G01-N10	ENTRAN	7/24/02
Left Upper B-Post Y	G01-N13	ENTRAN	7/24/02
Left Mid B-Post Y	G01-N16	ENTRAN	7/24/02
Left Lower B-Post Y	G01-N25	ENTRAN	7/24/02
Rear Floorpan Above Axle X	K21-N26	ENTRAN	6/25/02
Rear Floorpan Above Axle Y	K21-N04	ENTRAN	6/24/02
Rear Floorpan Above Axle Z	H14-N15	ENTRAN	6/17/02
Driver Seat Track Y	G01-N08	ENTRAN	7/24/02
Right Front Sill X	99F238	ENTRAN	4/22/02
Right Front Sill Y	K21-N05	ENTRAN	6/24/02
Right Front Sill Z	G03-N01	ENTRAN	7/31/02
Right Rear Sill X	K21-N15	ENTRAN	3/1/02
Right Rear Sill Y	G13-F02	ENTRAN	3/1/02
Right Rear Sill Z	99F348	ENTRAN	4/22/02
Left Rear Sill at Y	G01-N04	ENTRAN	7/23/02
Left Front Sill at Y	G01-N11	ENTRAN	7/31/02
Vehicle CG X	K21-N09	ENTRAN	6/25/02
Vehicle CG Y	K21-N17	ENTRAN	6/24/02
Vehicle CG Z	K21-N01	ENTRAN	6/25/02
Left Front Door @ Pelvis Y	G01-N21	ENTRAN	7/23/02
Left Front Door @ Knee Y	G01-N20	ENTRAN	7/31/02
Left Front Door @ Arm Y	G01-N02	ENTRAN	7/31/02
Left Rear Door @ Rib Y	G01-N18	ENTRAN	7/31/02
Lower Center Radiator Support X	G03-N06	ENTRAN	7/31/02
Lower Center Radiator Support Y	G01-N01	ENTRAN	7/31/02
Lower Center Radiator Support Z	K21-N18	ENTRAN	8/7/02

Note: All Endevco accelerometers are Model No. 7264-2000
All Entran accelerometers are Model No. EGE-72

APPENDIX E
PROCEDURE USED FOR ES-2 POSITIONING

Installation of the Side Impact Dummy (recommended practice)

1. GENERAL

- 1.1 The dummy to be used for the following installation procedure is described in Annex 6 to this regulation.
- 1.2 Adjust the knee joints so that they just support the leg when it is extended horizontally (1 to 2 g).
- 1.3 Clothe the dummy in form fitting cotton stretch mid-calf length pants. Each foot is equipped with a shoe.

2. INSTALLATION

- 2.1 Place the dummy in the outboard front seat of the impact side as described in the test specifications.
- 2.2 The mid-sagittal plane of the dummy shall coincide with the centerplane of the occupant (as determined according to Annex 3, paragraph 2.8) with a tolerance of 2°.
- 2.3 The pelvis of the dummy shall be positioned according to the following:
 - 2.3.1 The pelvis pitch angle shall be 20.0° +/- 2.5°.
 - 2.3.2 A line passing through the dummy H-points shall pass through an imaginary circle in the mid-sagittal plane of the dummy. This circle has a radius of 10 mm and is located 20 mm horizontally forward and 5 mm vertically above the reference H-point, determined by the 3D H-point machine.
- 2.4 The upper torso of the dummy shall be positioned according to the following:
 - 2.4.1 The upper torso shall be bent forward and then laid back against the seat back. The shoulder of the dummy shall be set fully rearward.
 - 2.4.2 The torso reference line pitch angle shall be 25.0° +/- 2.5°. The torso reference line is defined as the thoracic spine center line.
- 2.5 The arms shall be positioned in such a way that the angle between the projection of the arm centerline on the mid-sagittal plane of the dummy and the torso reference line is 40° +/- 5°.
- 2.6 For the driver's seating position, without inducing pelvis or torso movement, place the right foot of the dummy on the undepressed accelerator pedal with the heel resting as far forward as possible on the floorpan. Set the left foot perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel. Set the knees of the dummy such that their outside surfaces are 150 +/- 10mm from the plane of symmetry of the dummy. If possible, within these constraints, place the thighs of the dummy in contact with the seat cushion.
- 2.7 For other seating positions, without inducing pelvis or torso movement, place the heels of the dummy as far forward as possible on the floorpan without compressing the seat cushion more than the compression due to the weight of the leg. Set the knees of the dummy such that their outside surfaces are 150 +/- 10 mm from the plane of symmetry of the dummy.

APPENDIX F
ES-2 PEAK RESPONSE

Driver Dummy Peak Responses

Location	Peak Values (G's)						
	Class	Axis	Units	Maxima 6/13/02 ES-2		Maxima 8/29/02 ES-2	
				Peak	Time	Peak	Time
Head	1000	X	G	-197.7	58	-249.5	55.8
	1000	Y	G	922.7	58	1042.2	55.9
	1000	Z	G	286.8	58	236.6	55.7
	1000	Res	G	964.1	58	1089.1	55.9
Head injury Criteria (HIC)				11983		15591.0	
T1				57.8		55.5	
T2				58.5		56.2	
Upper Neck Force	1000	X	N	-480	60	576	56.0
	1000	Y	N	-977	58	-1367	56.0
	1000	Z	N	-1386	61	-1664	58.6
	1000	Res	N	1474	60	1868	55.9
Upper Neck Moment	600	X	Nm	-51.0	62	-49.0	60.2
	600	Y	Nm	-37.0	47	-31.2	45.5
	600	Z	Nm	13.6	61	11.9	57.6
	600	Res	Nm	59.5	63	55.3	60.2
Lower Neck Force	1000	X	N	-762	49	-579	44.9
	1000	Y	N	1103	57	965	48.1
	1000	Z	N	-1549	60	-1720	58.1
	1000	Res	N	1687	57	1759	58.1
Lower Neck Moment	600	X	Nm	115.1	58	88.9	55.7
	600	Y	Nm	83.9	49	64.5	46.9
	600	Z	Nm	13.2	58	13.8	55.7
	600	Res	Nm	130.5	58	103.7	48.3
Shoulder Force	600	X	N	-968	41	-993	38.8
	600	Y	N	2425	45	2275	39.5
	600	Z	N	-1503	43	-1277	42.2
Upper Spine	180	X	G	-21.8	61	-23.3	58.4
	180	Y	G	51.2	50	50.0	45.9
	180	Z	G	15.8	59	-13.9	56.9
	180	Res	G	51.3	50	50.3	45.9
Lower Spine	180	X	G	-12.1	48	9.2	59.0
	180	Y	G	82.8	46	84.4	45.9
	180	Z	G	14.3	60	-12.5	57.4
	180	Res	G	83.4	46	84.6	45.9
Upper Rib	180	Y	G	87.1	41	90.6	38.7
Mid Rib	180	Y	G	114.4	40	123.7	39.0
Lower Rib	180	Y	G	187.1	40	195.5	38.5

Driver Dummy Peak Responses

Location	Peak Values (G's)						
	Class	Axis	Units	Maxima 6/13/02 ES-2		Maxima 8/29/02 ES-2	
				Peak	Time	Peak	Time
Upper Rib Deflection	180	Y	mm	-41.5	51	-43.7	55.4
Mid Rib Deflection	180	Y	mm	-38.6	55	42.1	54.1
Lower Rib Deflection	180	Y	mm	-38.4	52	41.3	50.4
Upper Rib VC	180	Y	m/sec	0.85	46	0.8	43.5
Mid Rib VC	180	Y	m/sec	0.85	45	1.0	43.7
Lower Rib VC	180	Y	m/sec	0.83	44	0.9	42.4
Torso Force	600	X	N	-147	58	-193	66.1
	600	Y	N	-785	47	-691	46.9
Torso Moment	600	X	Nm	-12.1	60	-11.2	58.6
	600	Y	Nm	5.8	53	8.9	56.0
T-12 Force	600	X	N	594	49	675	49.2
	600	Y	N	2335	46	1941	46.8
T-12 Moment	600	X	Nm	-187.4	42	-137.3	39.0
	600	Y	Nm	-70.0	85	72.1	69.1
Abdomen Front Force	600	Y	N	335.9	45	255	46.6
Abdomen Mid Force	600	Y	N	733	46	634	45.6
Abdomen Rear Force	600	Y	N	1112	46	1139	45.7
Abdomen Summed Force	600	Y	N	2151	46	2014	45.6
Pubic Symphysis Force	600	Y	N	-2548	44	-2495	44.2
Right Femur Force	600	X	N	373	134	200	123.6
	600	Y	N	840	66	807	59.9
	600	Z	N	1062	65	957	58.2
	600	Res	N	1338	65	1211	59.8
Right Femur Moment	600	X	Nm	-91.1	42	-87.3	39.8
	600	Y	Nm	38.7	65	-35.6	100.7
	600	Z	Nm	-53.4	65	-41.9	60.5
	600	Res	Nm	93.0	42	88.4	39.8

Driver Dummy Peak Responses

Location	Peak Values (G's)						
	Class	Axis	Units	Maxima 6/13/02 ES-2		Maxima 8/29/02 ES-2	
				Peak	Time	Peak	Time
Left Femur Force	600	X	N	288	58	179	58.1
	600	Y	N	705	53	609	73.8
	600	Z	N	1539	51	1436	50.2
	600	Res	N	1651	53	1496	50.2
Left Femur Moment	600	X	Nm	-111.7	54	-107.3	72.1
	600	Y	Nm	-25.8	52	19.4	83.1
	600	Z	Nm	-24.3	53	-36.4	53.4
	600	Res	Nm	115.7	54	107.5	72.1
Pelvis	1000	X	G	20.6	52	19.2	51.6
	1000	Y	G	61.6	41	64.2	42.3
	1000	Z	G	17.1	75	11.3	58.1