V2090

REPORT NO.: MGA-93-21404

SAFETY COMPLIANCE TESTING FOR FMVSS 214 "SIDE IMPACT PROTECTION STUDY - PASSENGER CARS"

GENERAL MOTORS CORPORATION
1994 BUICK REGAL 4 DOOR SEDAN
NHTSA NO: CR0108

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105

MGA Ref. No.: G93A-02

Test Date: June 1, 1994

Report Date: August 19, 1994

FINAL REPORT

Prepared For:

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15. Supplementary Notes

16. Abstract

Compliance tests were conducted on the subject 1994 Buick Regal 4 Door Sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure for the determination of FMVSS 214 compliance. The test was conducted at the MGA Research Proving Grounds and crash Test Center in Burlington, Wisconsin on June 1, 1994.

The impact velocity of the Moving Barrier (MDB) was 32.8 mph and the ambient temperature of the struck side (driver's) of the target vehicle at the time of impact was 70°F.

The test or target vehicle's performance is given below:

	Driver's SID	Left Rear SID
Thoracic Trauma Index (TTI)	66 g's	65 g's
Pelvis Acceleration	59 g's	77 g's
Upper Rib Acceleration	66.1 g's	64.1 g's
Lower Rib	59.8 g's	64.7 g's
Lower Spine	65.6 g's	65.8 g's

17. Key Words	18. Distribution Statement
Side Impact Dummy (SID) Compliance Test FMVSS 214 Side Impact Protection	Copies of this report are available from: NHTSA Technical Reference Division, Room 5108 (NAD-52), 400 Seventh Street, S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 Attn: Robert Hornickle

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Approved by:

John Fleck

Date: 9-22-94

John Fleck, Project Engineer

FINAL REPORT ACCEPTED BY:

Date: 9/28/94

Contract Technical Manager

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SECTION 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the FY 94 FMVSS 214 "Dynamic" compliance test program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-93-C-02047. The purpose of this test was to evaluate side impact protection in a 1994 Buick Regal 4 Door Sedan.

This test was conducted using the Office of Vehicle Safety Compliance's FMVSS 214 test procedure (TP-214D-03, dated May 17, 1993).

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

SECTION 2

SUMMARY OF SIDE IMPACT TEST

A stationary 1994 Buick Regal 4 Door Sedan was impacted on the left or driver's side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the monorail at a velocity of 32.8 mph on June 1, 1994. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. Pre- and post-test photographs of the test vehicle, the moving deformable barrier (MDB), and the side impact dummies (SIDs) are shown in Appendix A.

Two restrained Side Impact Dummies (SIDs) were placed in the driver (Pos. #1) and left rear (Pos. #4) designated seating positions according to instructions specified in the Laboratory Test Procedure which is dated May 17, 1993. 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.

The SIDs were instrumented with the following accelerometers.

1. Left Upper Rib (LUR) uniaxial accelerometer (Y-direction)
2. Left Lower Rib (LLR) uniaxial accelerometer (Y-direction)
3. Lower Thoracic Spine (T_{12}) uniaxial accelerometer (Y-direction)
4. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

The summary of the side impact dummy (SID) configuration and performance verification test data are shown in Appendix C.

The driver's Thoracic Trauma Index (TTI) was 66 g's. Maximum pelvic Y acceleration was 59 g's.

The left rear passenger's TTI was 65 g's. Maximum pelvic Y acceleration was 77 g's.

TEST NOTES

The left rear sill Y-axis accelerometer lost data after 35 milliseconds as a result of the accelerometer's cable being cut by the vehicle's crush on impact.

SECTION 3
SUMMARY OF TEST DATA

TABLE 1

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 VIN: 2G4WB55L8R1435429

Vehicle Body Color: White Month & Year of Manufacture: 11-93

Engine Data: 6 cylinders; ___ CID; 3.8 Liter; ___cc

Placement ___ Longitudinal; or X Lateral

Transmission: 4 speed; ___ Manual; X Automatic; X Overdrive

Final Drive: ___ Rear Wheel Drive; X Frt. Wheel Drive; ___ Four Wheel Drive

Odometer Reading 141 miles

Options: X A/C; X Pwr. Steering.; X Pwr. Brakes; X Pwr. Windows

X Power Seats; X Tilt Wheel; X Power Door Locks; ___Self Leveling System

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 30 psi FRONT

30 psi REAR

Recommended Tire Size: P205/70R15

Tires on Test Vehicle: P205/70R15 Manufacturer: Goodyear

Vehicle Capacity Data:

Number of Occupants: 2 Front; 3 Rear; N/A 3rd Seat 5 Total

Type of Front Seats: X Bucket; ___ Bench; ___ Split Bench

Type of Front Seat Back: ___ Fixed; X Adjustable with X Lever

Vehicle Maximum Capacity Loading = 908 lbs (A)

No. of Occupants x 150 lbs. = 750 lbs (B)

Cargo Capacity (A-B) = 158 lbs

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front	= 1048 lbs	Right Rear	= 549 lbs
Left Front	= 1095 lbs	Left Rear	= 578 lbs
TOTAL FRONT	= 2143 lbs	TOTAL REAR	= 1127 lbs

% of Total Vehicle Weight = 65.5 %; % of Total Weight = 34.5 %

TOTAL WEIGHT = 3270 lbs

TABLE 2

TEST VEHICLE DATA

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	= 3270 lbs
Maximum Cargo Carrying Capacity of Test Vehicle	= 158 lbs
Weight of 2 Side Impact Dummies (2 x 168 lbs.)	= 336 lbs
TEST VEHICLE TARGET WEIGHT:	= 3764 lbs

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO:

Right Front	= 1135 lbs	Right Rear	= 658 lbs
Left Front	= 1241 lbs	Left Rear	= 722 lbs
TOTAL FRONT	= 2376 lbs	TOTAL REAR	= 1380 lbs
% of Total Weight	= 63.3 %	% of Total Weight	= 36.7 %

TOTAL TEST WEIGHT = 3756 lbs

TEST VEHICLE ATTITUDE (all dimensions in inches):

CURB WEIGHT ATTITUDE: (in)

Right Front 30.0 Left Front 30.0 Right Rear 31.0 Left Rear 30.6

FULLY LOADED WEIGHT ATTITUDE: (in)

Right Front 29.4 Left Front 28.5 Right Rear 28.8 Left Rear 27.9

TEST ATTITUDE: (in)

Right Front 29.4 Left Front 28.7 Right Rear 28.9 Left Rear 29.2

Test Vehicle Wheelbase: 107.5 inches

C.G. = 39.5 inches rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side	= 184.5 in
Centerline	= 191.8 in
Left Side	= 184.8 in

FIGURE 1

PRE-TEST CONDITIONS

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 7.9 in

Total Number of Adjustment Positions or Detents: Adjusted to mid position (power seat)

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Angle = 25.0° degrees

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: Non Adjustable

Seat Back Adjustment Position: Non Adjustable

ADJUSTABLE STEERING COLUMN POSITION:

Adjusted to mid position (3rd position from full down)

WINDOW POSITIONS: Left Front closed Left Rear closed

Right Front removed Right Rear removed

Note: Windows will be in closed position on struck side of test vehicle and in open position on opposite side.

AMOUNT OF STODDARD SOLVENT IN FUEL TANK: Fuel system usable capacity = 16.5 gallons

Test Volume: 15.3 gallons (92.7% of capacity)

LOCATIONS OF IMPACT POINT ON TEST VEHICLE SIDE TO BE IMPACTED:

Wheelbase: = 107.5 in

Impact Point is 16.8 in rearward of front axle centerline (which is 37 inches forward of the wheelbase midpoint)

TABLE 3

CRASH TEST SUMMARY FOR TEST VEHICLE

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

Overall Length = 191.8 in; Overall Width = 71.5 in

TEST WEIGHT:

Right Front	= 1135 lbs	Right Rear	= 658 lbs
Left Front	= 1241 lbs	Left Rear	= 722 lbs
TOTAL FRONT	= 2376 lbs	TOTAL REAR	= 1380 lbs

TOTAL VEHICLE WEIGHT 3756 lbs

Wheelbase = 107.5 in

Longitudinal C.G. front Center of Front Axle = 39.5 in

Impact Angle with Respect to Impactor = 90° degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (10.5 in above ground) = 5.1 in
2. LEVEL 2 (20.0 in above ground) = 12.6 in
3. LEVEL 3 (22.5 in above ground) = 11.4 in
4. LEVEL 4 (33.6 in above ground) = 9.5 in
5. LEVEL 5 (53.4 in above ground) = 2.0 in

Maximum Post-Test Intrusion = 12.6 in

OCCUPANTS:	Front Passenger	Rear Passenger
Type of Dummy	SID	SID
Restraints Used	3 pt. lap & shoulder belt with airbag	3 pt. lap & shoulder belt

INSTRUMENTATION:

Number of Vehicle Data Channels:		= 17
Number of Cameras:	Onboard Vehicle	= 3
	Offboard Vehicle	= 4
	Deformable Barrier	= 2
	TOTAL	= 9

TABLE 4

CRASH TEST SUMMARY FOR SIDE IMPACTOR

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	= 49.3 in
Overall Length of MDB (incl. honeycomb impact face)	= 162 in
Wheelbase of Framework Carriage	= 102 in
Tread of Framework Carriage (Front & Rear)	= 74 in
C.G. Location Rearward of Front Axle	= 43.4 in
C.G. Location From Center Line	= -.3 in
C.G. Location Above Ground Level	= 19.2 in

MDB WEIGHT:

Left Front	= 1095 lbs	Left Rear	= 413 lbs
Right Front	= 624 lbs	Right Rear	= 858 lbs
TOTAL FRONT	= 1719 lbs	TOTAL REAR	= 1271 lbs

TOTAL MDB WEIGHT = 2990 lbs

Impact Angle (MDB C/L to Target Vehicle C/L) = 90° degrees

Impact Speed = Primary: 32.8 mph Secondary: 32.7 mph

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1.	Row A Top of Stack (33 in)	= 6.1 in
2.	Row B Mid Stack (27 in)	= 4.1 in
3.	Row C Top of Bumper (21 in)	= 0.8 in
4.	Row D Center of Bumper (17 in)	= 3.6 in

INSTRUMENTATION:

Number of MDB Data Channels = 7

TABLE 5

POST-TEST OBSERVATIONS

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CRØ1Ø8 TEST DATE: June 1, 1994

VISIBLE DUMMY CONTACT POINTS:

	LEFT FRONT SID	LEFT REAR SID
Head	none	to "C" Post
Arm	to door trim panel	to door trim panel
Pelvis	to door trim panel	to door trim panel
Left Knee	to door trim panel	to door trim panel
Right Knee	to left knee	to left knee

DOOR OPENING:

	LEFT SIDE	RIGHT SIDE
Front	remained closed	remained closed
Rear	remained closed	remained closed

MDB DISTANCE FROM TARGET IMPACT POINT:

Horizontal: 1.Ø in rearward Vertical: Ø.9 in high

ARM REST LOCATIONS:

Front: 7.3 inches below window sill

Rear: 8.Ø inches below window sill

SEAT CRUSH:

Driver Seat Back: 2.5 inches Driver Seat Cushion: 3.5 inches

Passenger Seat Back: 5.Ø inches Passenger Seat Cushion: 3.8 inches

GLAZING DAMAGE:

Windshield cracked, both front and rear door glass broken

PILLAR PERFORMANCE:

No "A" or "B" pillar separation evident

SILL SEPARATION:

No sill separation noted

OTHER NOTABLE IMPACT EFFECTS:

None

SECTION 4
OCCUPANT AND VEHICLE INFORMATION

TABLE 6

SIDE IMPACT DUMMY (SID) TEST DATA SUMMARY

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

	Front Dummy ID # 270					Rear Dummy ID # 272			
	Pos. Direct.		Neg. Direct			Pos. Direct.		Neg. Direct	
	Max (g)	Time (msec)	Max (g)	Time (msec)		Max (g)	Time (msec)	Max (g)	Time (msec)
RIB ACCELERATIONS:									
Upper Rib Lateral.....Y	66.1	40	-10.4	86		64.1	42	-5.4	116
Upper Rib Lateral....Y(R)	67.5	40	-10.4	86		63.5	42	-5.6	116
Lower Rib Lateral.....Y	59.8	40	-10.3	89		64.7	41	-13.5	70
Lower Rib Lateral.....Y(R)	60.6	39	-9.8	88		64.2	41	-15.0	70
SPINE ACCELERATIONS:									
Lower Lateral.....Y	65.6	41	-7.2	108		65.8	46	-22.3	75
Lower Lateral.....Y(R)	65.9	41	-7.0	109		65.7	46	-22.5	75
PELVIC ACCELERATIONS:									
Lateral.....Y	59.3	39	-12.2	103		77.3	43	-12.2	89
Lateral.....Y(R)	58.4	39	-12.1	103		78.5	43	-12.1	90

REFERENCE:

Positive Direction - Longitudinal (X) = forward

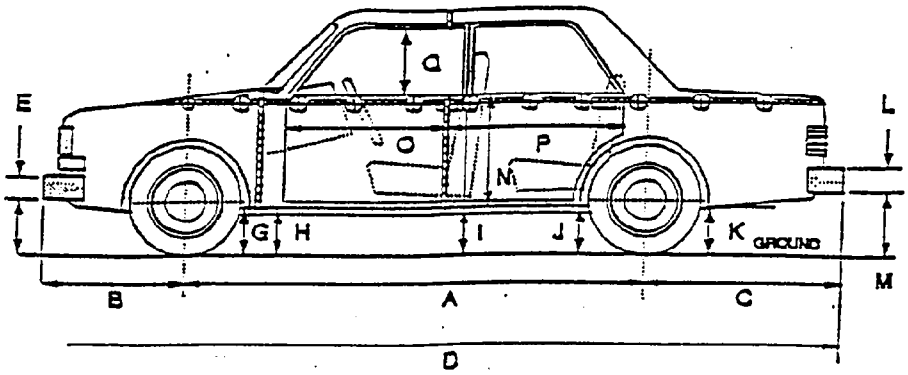
Lateral (Y) = to right

Vertical (Z) = up

Note: Y(R) denotes redundant Y direction accelerometer.

FIGURE 2

PRE- AND POST-TEST MEASUREMENTS



LEFT SIDE VIEW

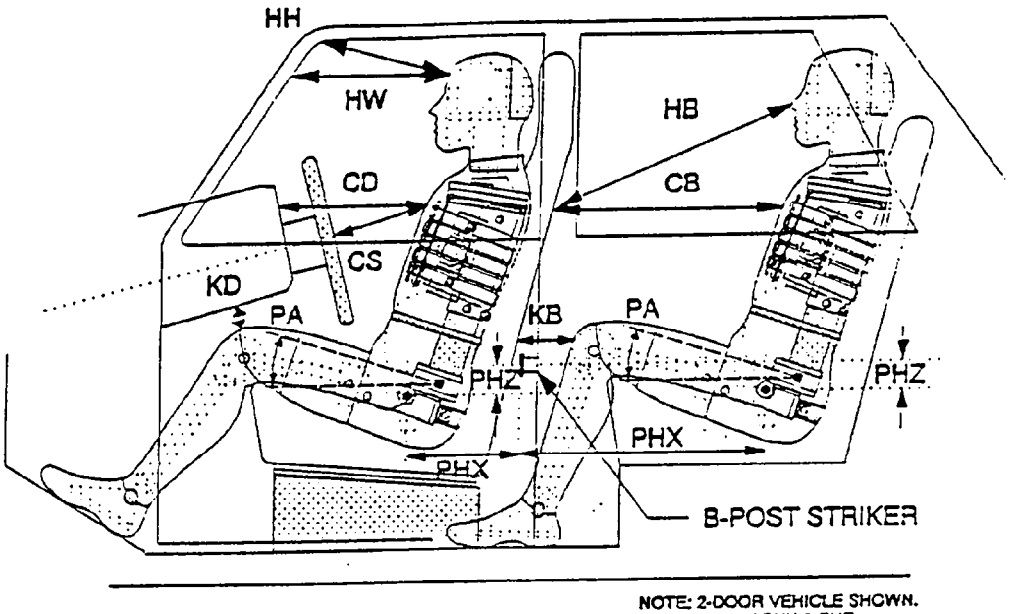
D = Length at Centerline
R = Right Side Length
S = Left Side Length
T = Width at B Post
E & L = Bumper Thickness
U = A Post to Outer Door Skin
J1 = To Pinch Weld
J2 = To Sill

Units: in

LOCATION	PRE-TEST	POST-TEST	Δ CHANGE
A	107.5	106.5	-1.0
B	43.0	44.7	1.7
C	41.3	43.6	2.3
D	191.8	194.8	3.0
E	11.1	7.3	-3.8
F	14.1	15.0	0.9
G	8.8	9.9	1.1
H	8.9	10.3	1.4
I	9.3	9.5	0.2
J1/J2	9.0/8.9	9.9/9.5	0.9/0.6
K	11.3	13.1	1.8
L	8.8	8.9	0.1
M	13.8	15.3	1.5
N	24.9	21.6	-3.3
O	31.8	31.5	-0.3
P	42.1	37.5	-4.6
Q	18.0	17.5	-0.5
R	184.5	185.9	1.4
S	184.8	183.6	-1.2
T	71.5	62.4	-9.1
U	4.3	1.5	-2.8

FIGURE 3

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS



LEFT SIDE VIEW

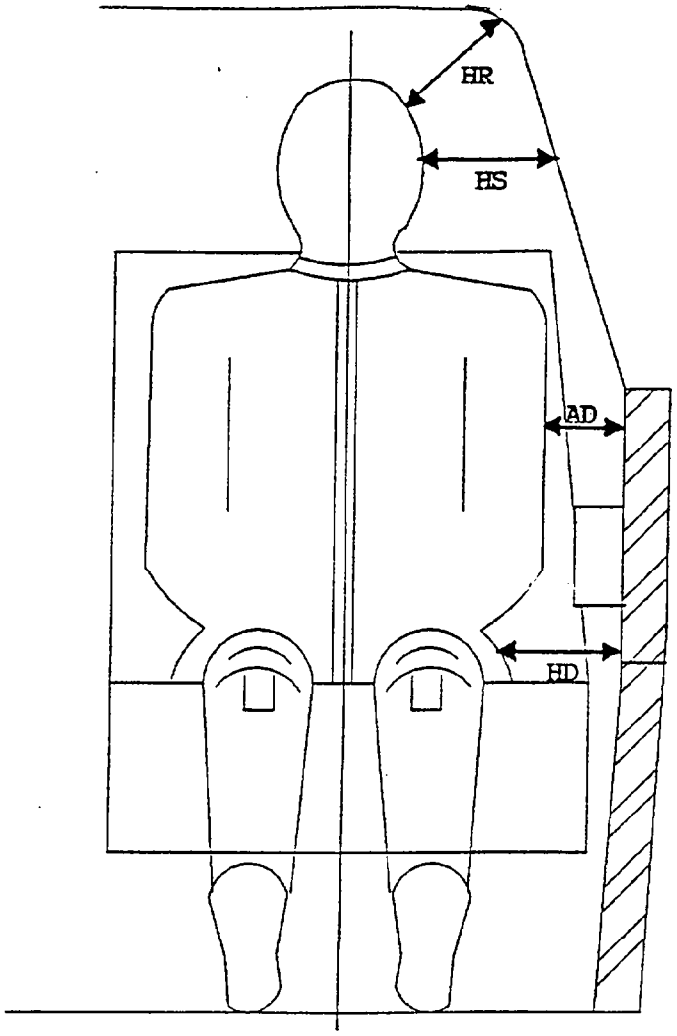
NOTE: All dimensions are in inches

	DRIVER ID #270	LEFT REAR PASSENGER ID #272	
HH	14.3	N/A	
HW	24.8	N/A	
HB	N/A	23.8	
CD	23.0	CB	19.3
CS	11.0	N/A	
KDL	5.8	KBL	7.4
KDR	6.1	KBR	7.6
PA°	24.0°	24.4°	
PHX	8.0	9.6	
PHZ	2.0	10.9	

NOTE: 2-door vehicle shown. Rear dummy PHX & PHZ measurements for 4-door vehicle would use the C-post striker as reference point.

FIGURE 4

SIDE IMPACT DUMMY (SID) LATERAL CLEARANCE DIMENSIONS



NOTE: All dimensions are in inches

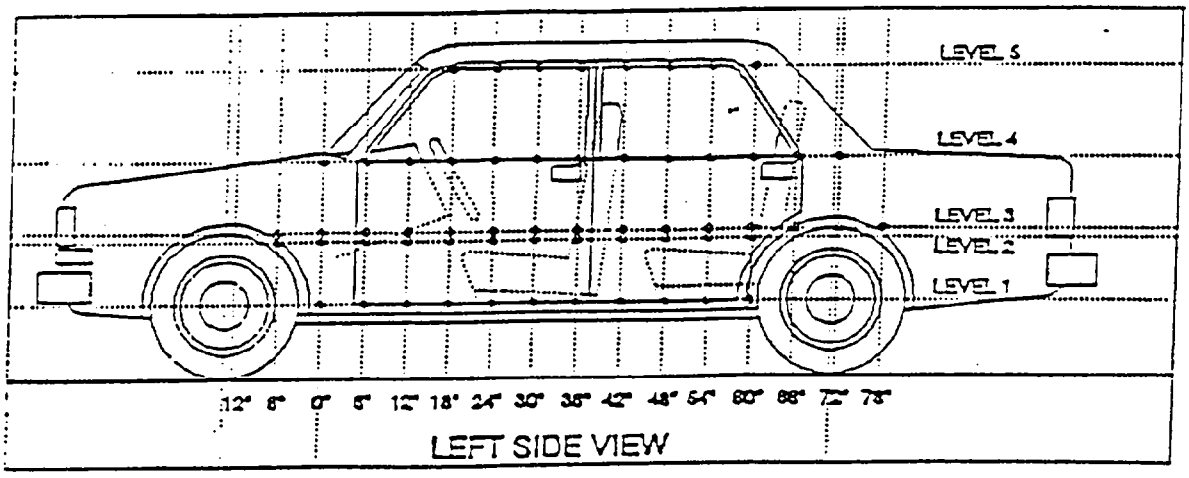
	DRIVER ID #270	LEFT REAR PASSENGER ID #272
HR	6.4	5.0
HS	12.1	11.1
AD	5.4	5.1
HD	4.8	6.4

FIGURE 5

VEHICLE SIDE MEASUREMENTS

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CRØ1Ø8 TEST DATE: June 1, 1994



As Tested Height measurements are with respect to ground along the vertical 33" line shown above:

	33" Side Profile
Level 5 @ Window Top	= 53.4 in
Level 4 @ Window Sill	= 33.6 in
Level 3 @ Mid Door	= 22.5 in
Level 2 @ Occupant H-Point	= 2Ø.Ø in
Level 1 @ Axle Centerline Height (or Sill Top Height	= 1Ø.5 in

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

LEVEL 1 AT AXLE CENTER LINE

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

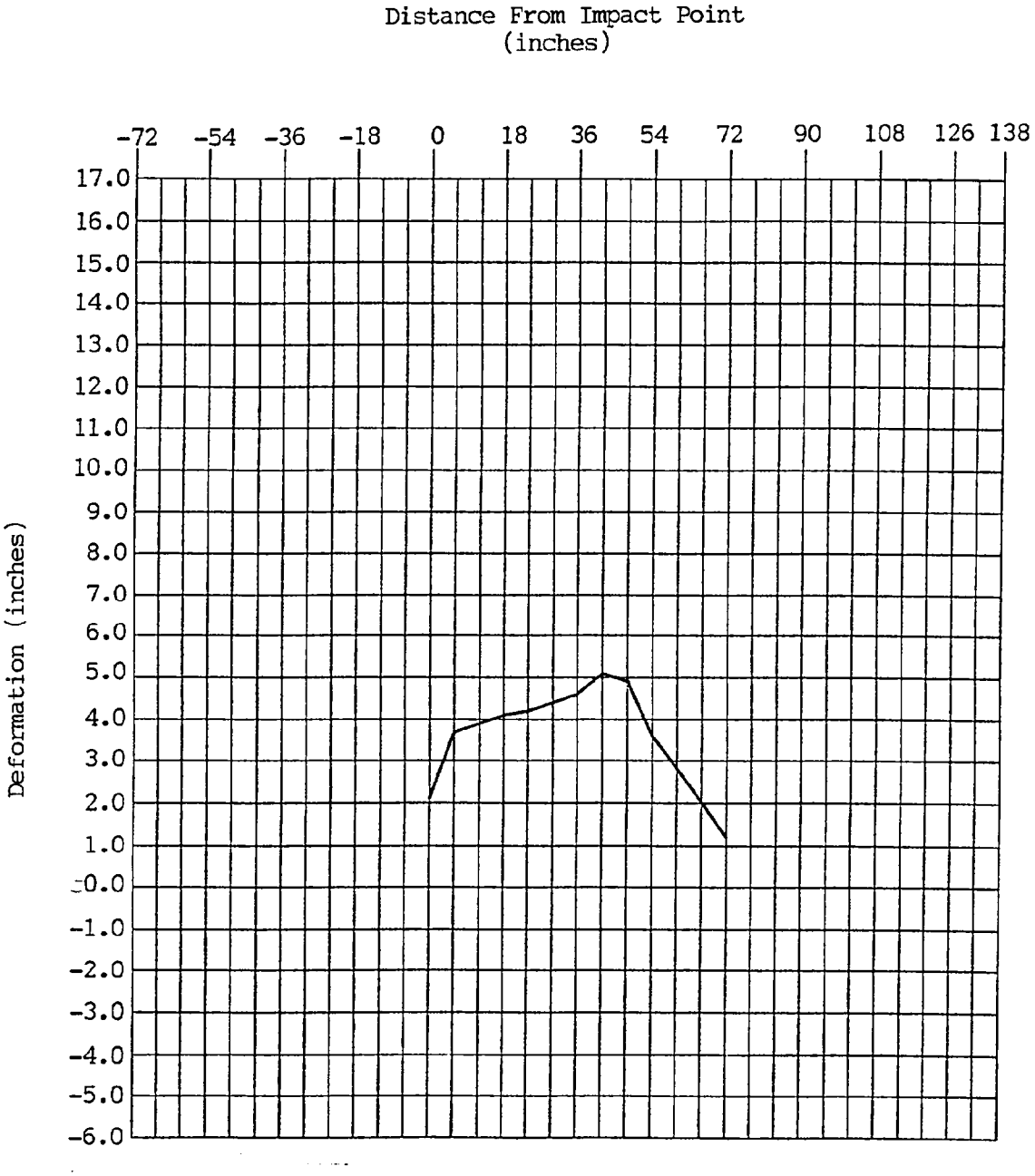
Vehicle NHTSA No.: CRØ1Ø8 TEST DATE: June 1, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)	
-72	---	---	---	
-66	---	---	---	
-6Ø	---	---	---	
-54	---	---	---	
-48	---	---	---	
-42	---	---	---	
-36	---	---	---	
-3Ø	---	---	---	
-24	---	---	---	
-18	---	---	---	
-12	---	---	---	
-6	---	---	---	
Ø	37.Ø	39.1	2.1	(impact point)
6	37.Ø	4Ø.7	3.7	
12	36.7	4Ø.6	3.9	
18	36.7	4Ø.8	4.1	
24	36.6	4Ø.8	4.2	
3Ø	36.5	4Ø.9	4.4	
36	36.4	41.Ø	4.6	
42	36.4	41.5	5.1	
48	36.5	41.4	4.9	
54	36.5	4Ø.1	3.6	
6Ø	36.5	39.3	2.8	
66	36.5	38.5	2.Ø	
72	36.6	37.8	1.2	
78	---	---	---	
84	---	---	---	
9Ø	---	---	---	
96	---	---	---	
1Ø2	---	---	---	
1Ø8	---	---	---	
114	---	---	---	
12Ø	---	---	---	
126	---	---	---	
132	---	---	---	
138	---	---	---	

Reference plane is parallel to test vehicle longitudinal centerline
Given dimensions = reference plane to car body

FIGURE 6

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 1 AT AXLE CENTER LINE

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

LEVEL 2 AT OCCUPANT H-POINT

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

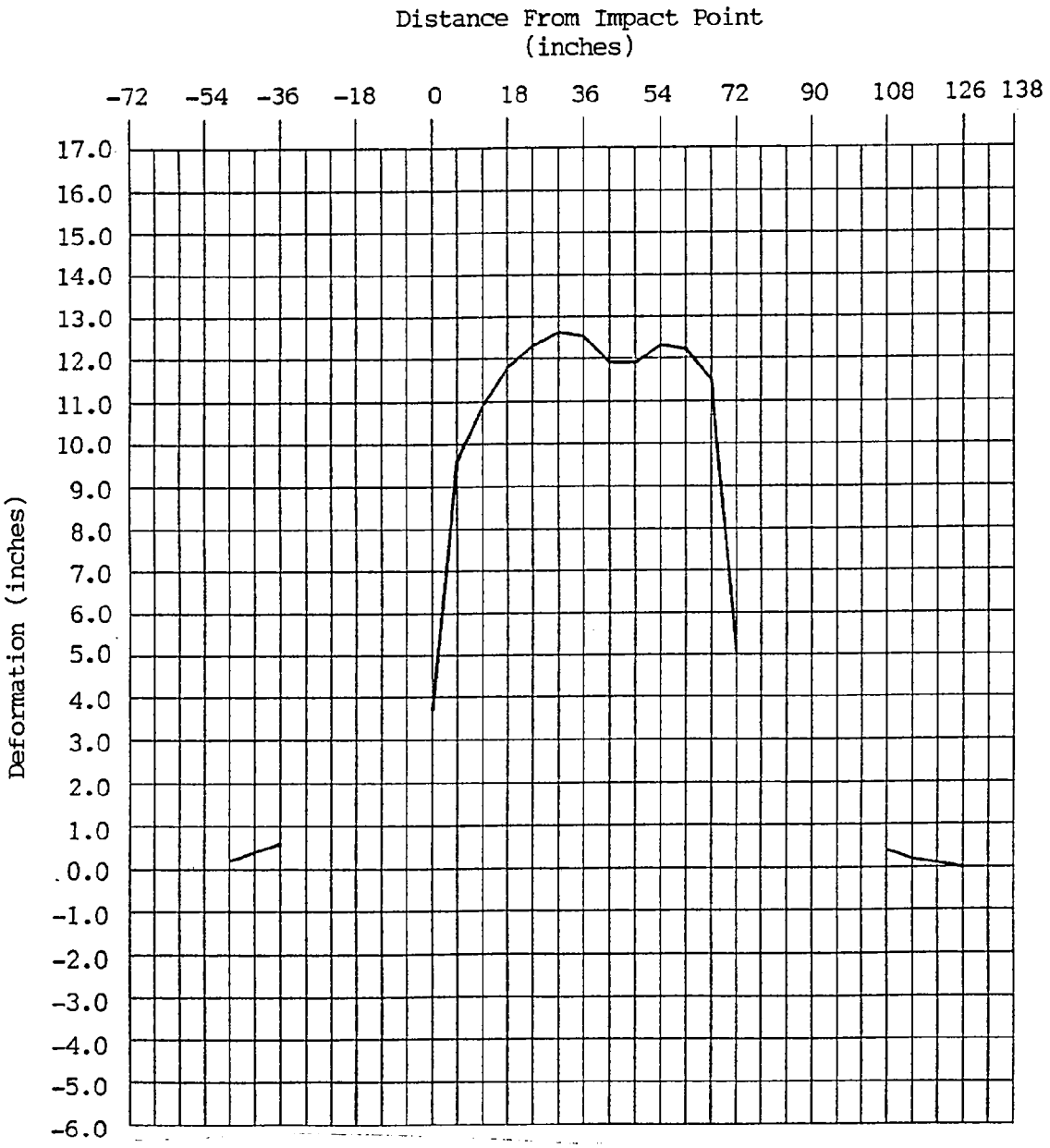
Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)	
-72	---	---	---	
-66	---	---	---	
-60	---	---	---	
-54	---	---	---	
-48	39.8	40.0	0.2	
-42	38.5	38.9	0.4	
-36	37.8	38.4	0.6	
-30	---	---	---	
-24	---	---	---	
-18	---	---	---	
-12	---	---	---	
-6	---	---	---	
0	34.1	37.8	3.7	(impact point)
6	33.9	43.5	9.6	
12	33.8	44.7	10.9	
18	33.7	45.5	11.8	
24	33.5	45.8	12.3	
30	33.3	45.9	12.6	
36	33.1	45.6	12.5	
42	33.2	45.1	11.9	
48	33.1	45.0	11.9	
54	33.1	45.4	12.3	
60	33.1	45.3	12.2	
66	33.3	44.8	11.5	
72	33.3	38.3	5.0	
78	---	---	---	
84	---	---	---	
90	---	---	---	
96	---	---	---	
102	---	---	---	
108	35.4	35.8	0.4	
114	35.7	35.9	0.2	
120	36.2	36.3	0.1	
126	37.0	37.0	0	
132	---	---	---	
138	---	---	---	

Reference plane is parallel to test vehicle longitudinal centerline
Given dimensions = reference plane to car body

FIGURE 6 (Cont'd)

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 2 AT OCCUPANT H-POINT

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

LEVEL 3 AT MID-DOOR

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

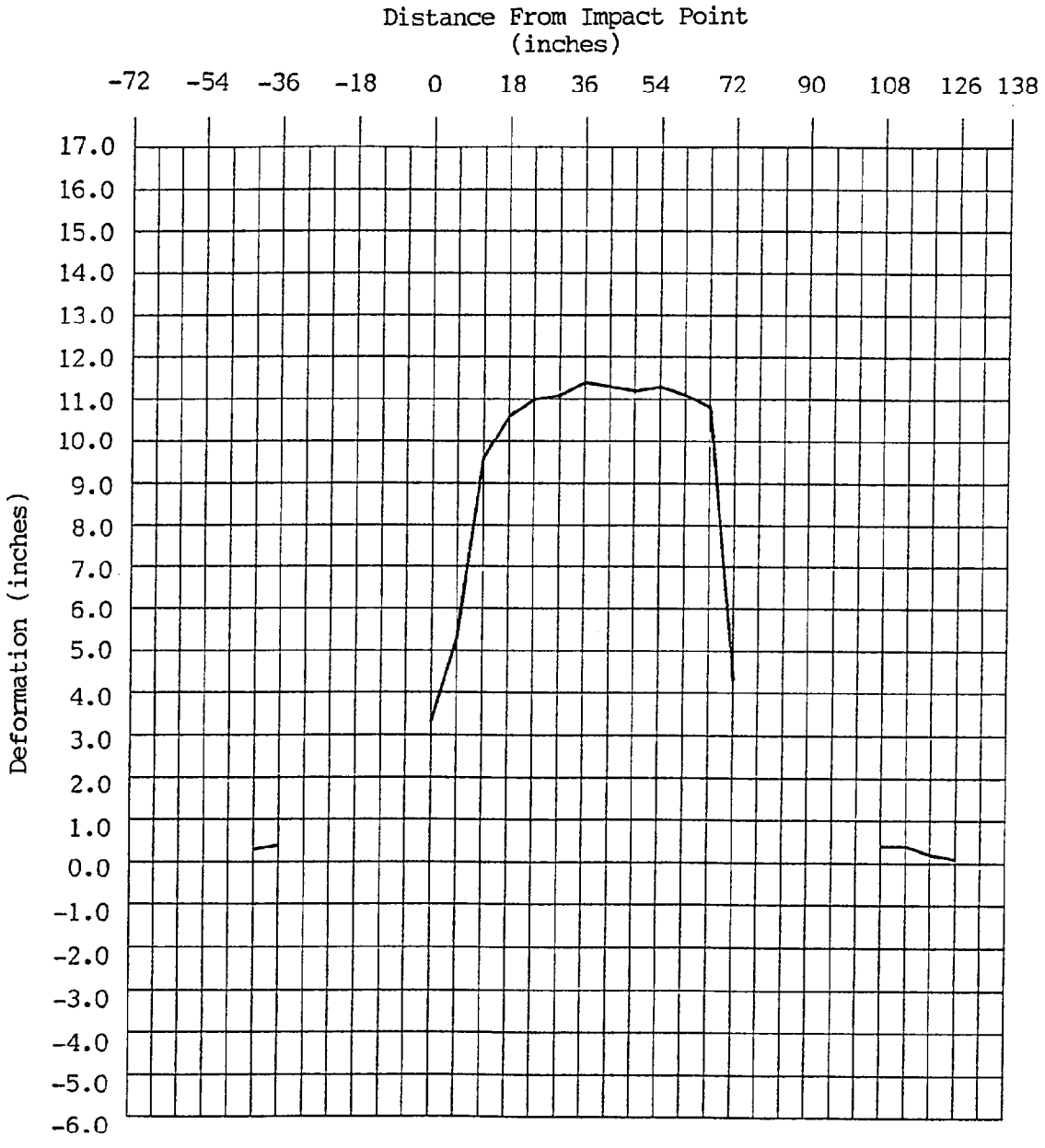
Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)	
-72	---	---	---	
-66	---	---	---	
-60	---	---	---	
-54	---	---	---	
-48	---	---	---	
-42	39.0	39.3	0.3	
-36	38.0	38.4	0.4	
-30	---	---	---	
-24	---	---	---	
-18	---	---	---	
-12	---	---	---	
-6	---	---	---	
0	34.3	37.6	3.3	(impact point)
6	34.2	39.5	5.3	
12	34.1	43.7	9.6	
18	33.9	44.5	10.6	
24	33.7	44.7	11.0	
30	33.5	44.6	11.1	
36	33.4	44.8	11.4	
42	33.3	44.6	11.3	
48	33.4	44.6	11.2	
54	33.4	44.7	11.3	
60	33.5	44.6	11.1	
66	33.5	44.3	10.8	
72	33.6	37.9	4.3	
78	---	---	---	
84	---	---	---	
90	---	---	---	
96	---	---	---	
102	---	---	---	
108	35.4	35.8	0.4	
114	36.0	36.4	0.4	
120	37.0	37.2	0.2	
126	39.1	39.2	0.1	
132	---	---	---	
138	---	---	---	

Reference plane is parallel to test vehicle longitudinal centerline
Given dimensions = reference plane to car body

FIGURE 6

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 3 AT MID-DOOR

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

LEVEL 4 AT WINDOW SILL

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

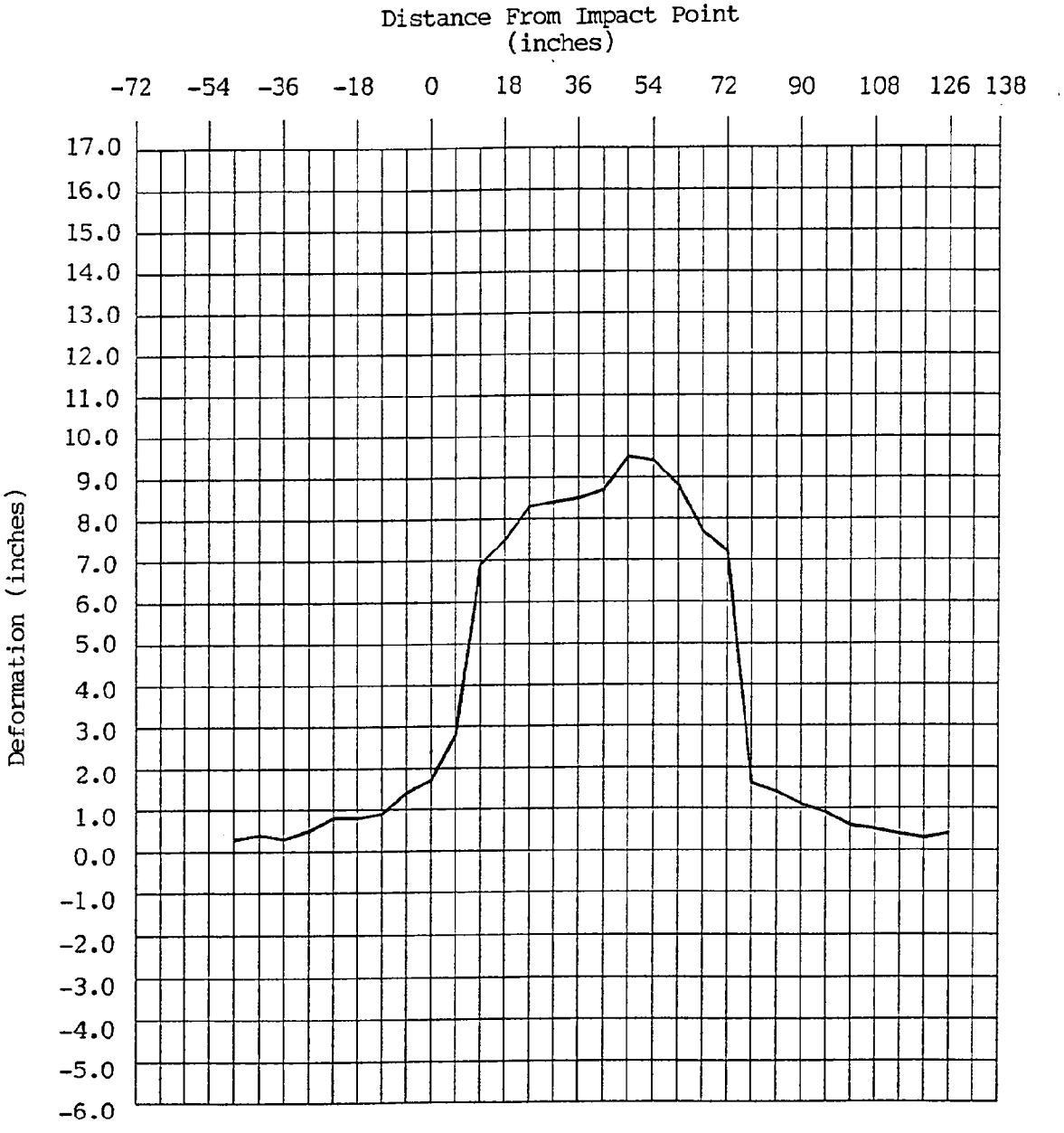
Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)	
-72	---	---	---	
-66	---	---	---	
-60	---	---	---	
-54	---	---	---	
-48	43.3	43.6	0.3	
-42	41.6	42.0	0.4	
-36	40.1	40.4	0.3	
-30	39.1	39.6	0.5	
-24	38.1	38.9	0.8	
-18	37.5	38.3	0.8	
-12	36.9	37.8	0.9	
-6	36.4	37.8	1.4	
0	36.1	37.8	1.7	(impact point)
6	35.9	38.7	2.8	
12	35.7	42.6	6.9	
18	35.6	43.1	7.5	
24	35.2	43.5	8.3	
30	35.1	43.5	8.4	
36	35.1	43.6	8.5	
42	35.0	43.7	8.7	
48	35.0	44.5	9.5	
54	35.0	44.4	9.4	
60	35.0	43.8	8.8	
66	35.2	42.9	7.7	
72	35.4	42.6	7.2	
78	35.4	37.0	1.6	
84	35.6	37.0	1.4	
90	35.8	36.9	1.1	
96	36.1	37.0	0.9	
102	36.5	37.1	0.6	
108	37.0	37.5	0.5	
114	37.6	38.0	0.4	
120	38.5	38.8	0.3	
126	40.0	40.4	0.4	
132	---	---	---	
138	---	---	---	

Reference plane is parallel to test vehicle longitudinal centerline
Given dimensions = reference plane to car body

FIGURE 6

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 4 AT WINDOW SILL

TABLE 7

TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

LEVEL 5 AT WINDOW TOP

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

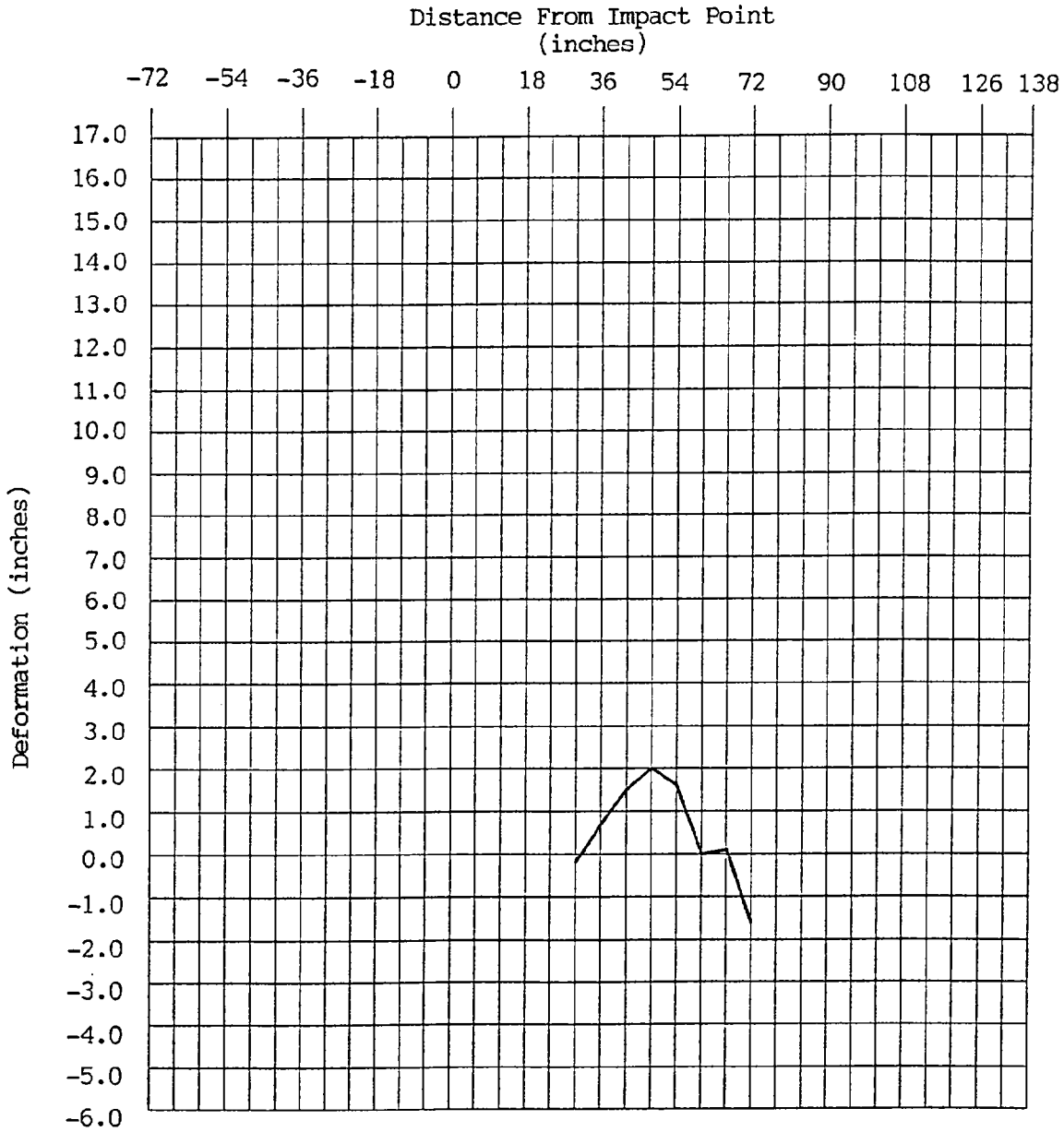
Vehicle NHTSA No.: CRØ1Ø8 TEST DATE: June 1, 1994

Longitudinal Distance (in)	PRE-TEST (in)	POST-TEST (in)	STATIC CRUSH (in)	
-72	---	---	---	
-66	---	---	---	
-6Ø	---	---	---	
-54	---	---	---	
-48	---	---	---	
-42	---	---	---	
-36	---	---	---	
-3Ø	---	---	---	
-24	---	---	---	
-18	---	---	---	
-12	---	---	---	
-6	---	---	---	
Ø	---	---	---	(impactpoint)
6	---	---	---	
12	---	---	---	
18	---	---	---	
24	---	---	---	
3Ø	45.3	45.1	-Ø.2	
36	45.2	45.9	Ø.7	
42	45.2	46.7	1.5	
48	45.3	47.3	2.Ø	
54	45.3	46.9	1.6	
6Ø	45.3	45.3	Ø	
66	43.9	44.Ø	Ø.1	
72	43.9	42.3	-1.6	
78	---	---	---	
84	---	---	---	
9Ø	---	---	---	
96	---	---	---	
1Ø2	---	---	---	
1Ø8	---	---	---	
114	---	---	---	
12Ø	---	---	---	
126	---	---	---	
132	---	---	---	
138	---	---	---	

Reference plane is parallel to test vehicle longitudinal centerline
Given dimensions = reference plane to car body

FIGURE 6

VEHICLE EXTERIOR STATIC CRUSH



LEVEL 5 AT WINDOW TOP

FIGURE 7

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CRØ1Ø8 TEST DATE: June 1, 1994

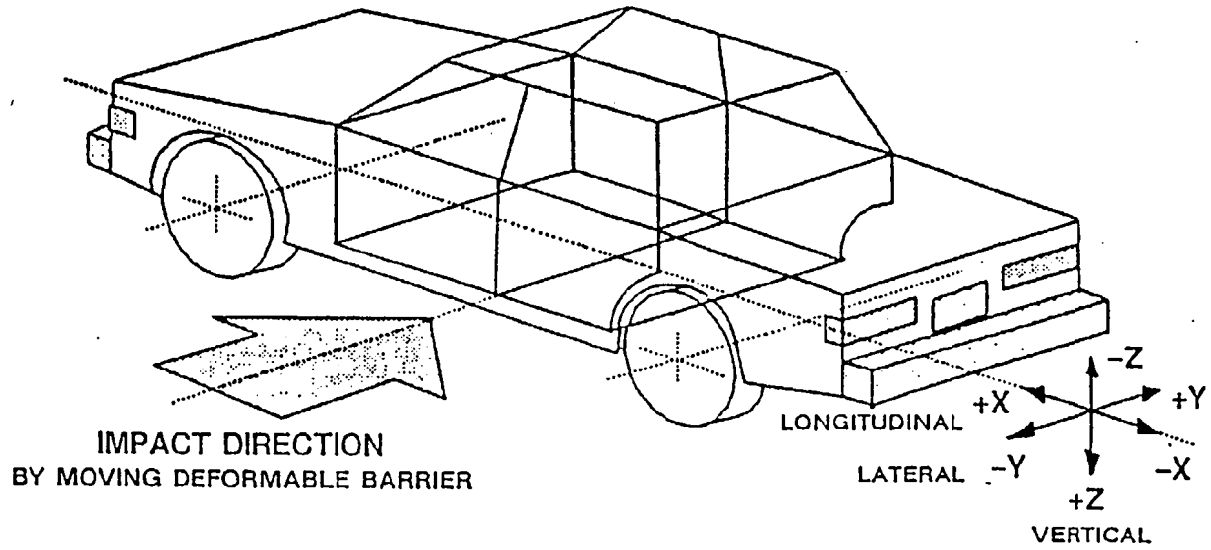


FIGURE 8

MDB FACE DIMENSIONS

Measurements in inches

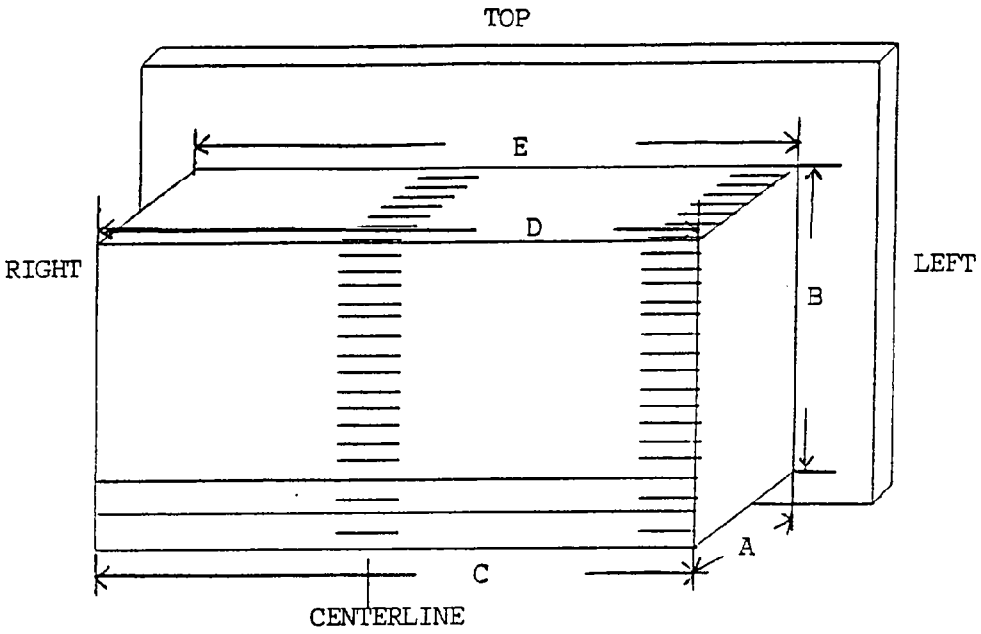
A = 14.9

B = 21.8

C = 66.1

D = 66.1

E = 66.1



Measurements in inches

A = 11.0

B = 13.0

C = 21.0

D = 33.0

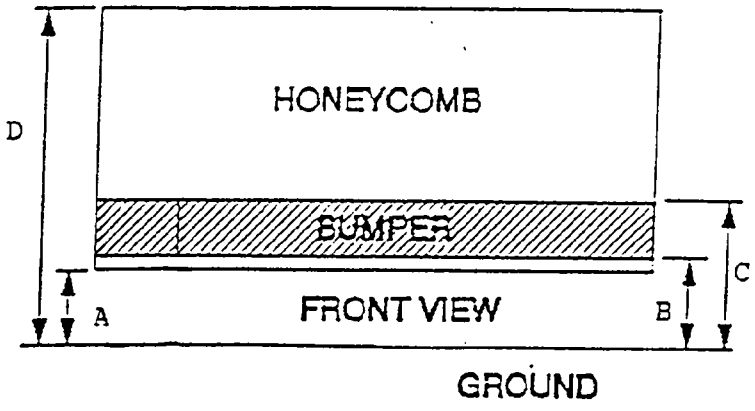


TABLE 8

EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CRØ108 TEST DATE: June 1, 1994

Location	Top of Stack (33 inches)	Mid-Stack (27 inches)	Top of Bumper (21 inches)	Center of Bumper (17 inches)	
Horizontal Distance From Center	Crush (inches)	Crush (inches)	Crush (inches)	Crush (inches)	
32"	2.3	1.Ø	-Ø.4	---	Left Side
28"	Ø.8	Ø.1	-Ø.5	---	
24"	Ø	Ø	-Ø.7	---	
2Ø"	Ø	Ø.1	-Ø.8	---	
16"	Ø	Ø.1	-Ø.6	---	
12"	Ø.1	Ø.1	-Ø.4	2.3	
8"	Ø.3	Ø.3	-Ø.4	2.8	
4"	Ø.3	Ø.3	-Ø.5	2.3	
Ø"	Ø.3	Ø.3	-Ø.8	1.8	
4"	Ø.3	Ø.3	-1.Ø	1.5	Right Side
8"	Ø.4	Ø.3	-1.3	1.4	
12"	Ø.6	Ø.4	-1.1	1.5	
16"	Ø.9	Ø.4	-Ø.8	1.8	
2Ø"	1.4	Ø.4	-Ø.5	2.1	
24"	1.9	Ø.5	-Ø.3	2.8	
28"	3.7	1.5	Ø.5	3.6	
32"	6.1	4.1	Ø.8	N/A	

TABLE 9

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CRØ1Ø8 TEST DATE: June 1, 1994

Accel. No.	Description	Coordinates (in)			Long. (X) Maximums		Lat. (Y) Maximums		Vert. (Z) Maximums		Resultant
		X	Y	Z	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Max.
1	Rt. Side Sill @ Front Seat	117.1	27.8	12.5	3.8	-5.9	22.Ø	-1.8	4.1	-8.6	22.6
2	Rt. Side Sill @ Rear Seat	83.3	28.3	11.4	4.2	-5.Ø	2Ø.2	-1.8	3.3	-6.8	21.7
3	Rr. Floorpan Above Axle	52.5	Ø	18.5	3.2	-12.6	24.7	-2.2	17.9	-12.5	3Ø.1
4	Left Side Sill @ Rr. Seat*	81.6	-29.Ø	1Ø.Ø	---	---	34.5	-Ø.9	---	---	---
5	Left Side Sill @ Frt. Seat*	1Ø8.Ø	-29.Ø	1Ø.2	---	---	37.9	-9.5	---	---	---
6	A-Post Lower	13Ø.Ø	-28.8	11.Ø	---	---	45.2	-34.9	---	---	---
7	A-Post Mid	13Ø.Ø	-29.Ø	22.Ø	---	---	44.Ø	-2Ø.7	---	---	---
8	B-Post Lower	89.3	-29.1	19.Ø	---	---	169.2	-98.6	---	---	---
9	B-Post Mid	89.4	-29.5	3Ø.8	---	---	13Ø.8	-34.2	---	---	---
1Ø	Right Rear Occupant Compartment	8Ø.4	12.8	9.8	---	---	22.Ø	-1.8	---	---	---
11	Driver Left Seat Track	95.3	-2Ø.1	11.9	---	---	36.2	-18.8	---	---	---

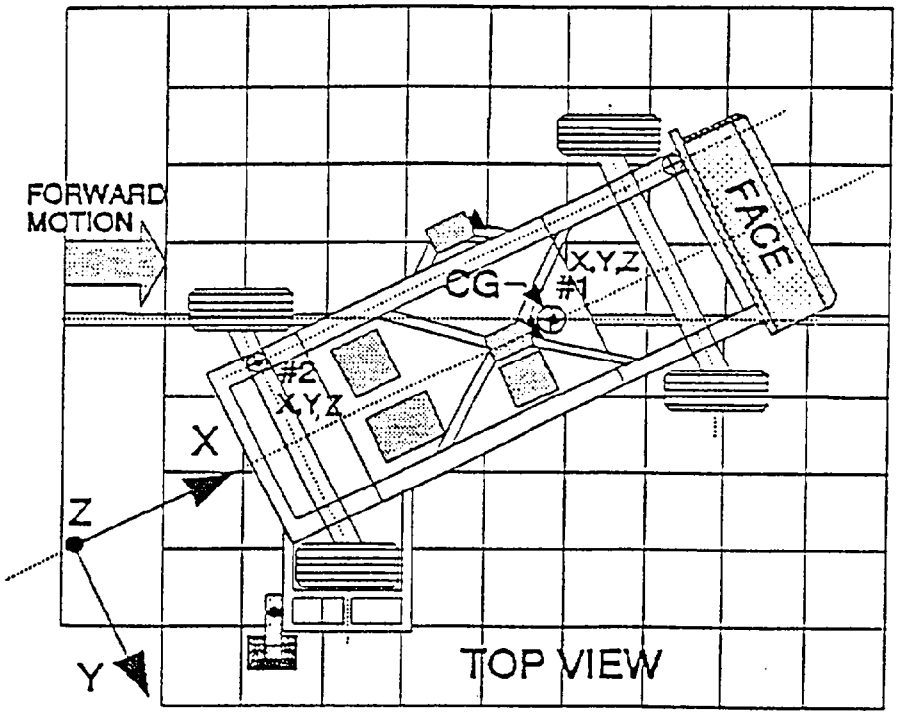
*Reference: X - Rear Bumper (+ Forward)
Y - Vehicle Centerline (+ To right)
Z - Ground Level (+ Up)

FIGURE 9

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994



Accel. No.	Location	Coordinates (in)			Pos. Direct.		Neg. Direct.	
		X	Y	Z	Max (g)	Time (msec)	Max (g)	Time (msec)
1	MDB Center of Gravity Longitudinal ... X Lateral ..... Y Vertical ..... Z Resultant ..... R	-43.0	0	19.0	 1.6 6.6 14.7 23.3	 114 162 39 39	 -18.4 -10.1 -13.0	 37 32 34
2	Rear Frame Member Longitudinal ... X Lateral ..... Y	-102.0	-24.6	24.5	 4.6 4.4	 199 28	 -22.5 -5.8	 35 3.1

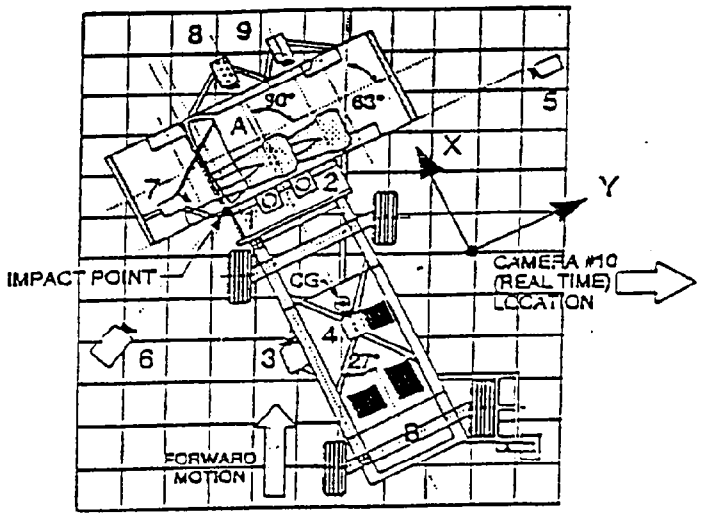
* Reference: X = Front Axle (+Forward)
Y = Vehicle Centerline (+ To Right)
Z = Ground Level (+ Up)

FIGURE 10

HIGH SPEED CAMERA LOCATIONS AND DATA

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994



Camera No.	View	Coordinates (in)			Angle	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
	Real Time					10	24
1	Top Pointer	0	15.0	193.7		13	1143
2	Top Wide	15.7	0	211.0		8	1230
3	Cart Pointer					35	980
4	Cart					13	1015
5	Right Impact	63.8	348.4	44.9	45°	35	870
6	Left Impact	-138.6	152.0	65.2	45°	13	1053
7	Onboard Hood					13	1000
8	Onboard Driver					7.5	877
9	Onboard Passenger					8	930

* Reference: (from point of impact)
+X = Forward
+Y = To Right
+Z = Upward

TABLE 10

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

Test vehicle fuel tank filled to 92% to 94% of manufacturer's "useable" capacity and with electric fuel pump operating (if it will operate without engine operation). Part 572 test dummies located at each front designated seating position.

TEST VEHICLE IMPACT TYPE: X Side Impact MDB (32.8 mph)

FUEL SPILLAGE MEASUREMENT:

	ACTUAL	MAX ALLOWED
1. From impact until vehicle motion ceases	0	1 oz.
2. For 5 minute period after vehicle motion ceases	0	5 oz.
3. For next 25 minutes	0	1 oz./1 MIN

SOLVENT SPILLAGE DETAILS:

None

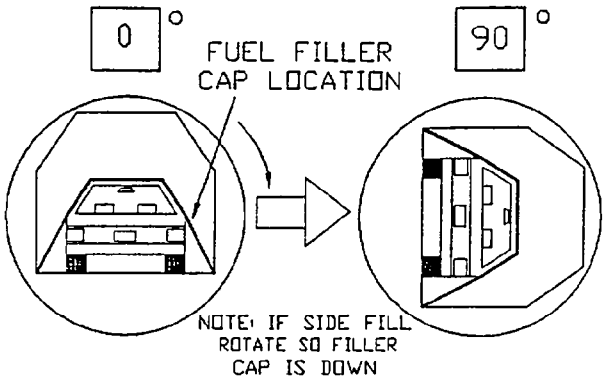
TABLE 11

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

TEST PHASE: 0° - 90°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 56 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 56 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

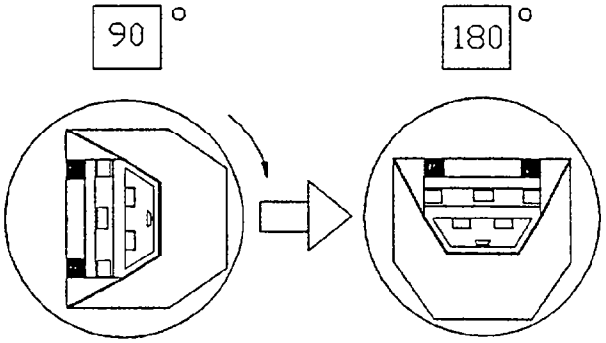
TABLE 11

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

TEST PHASE: 90° - 180°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 32 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 32 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

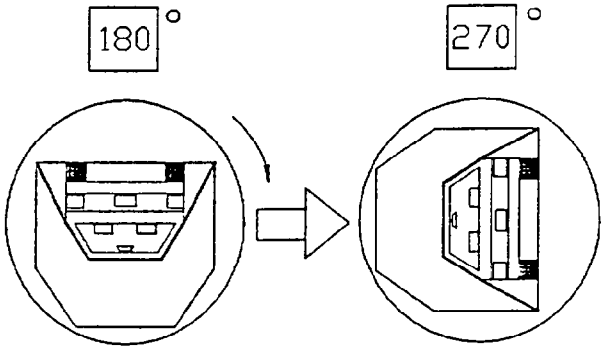
TABLE 11

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

TEST PHASE: 180° - 270°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 26 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 26 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

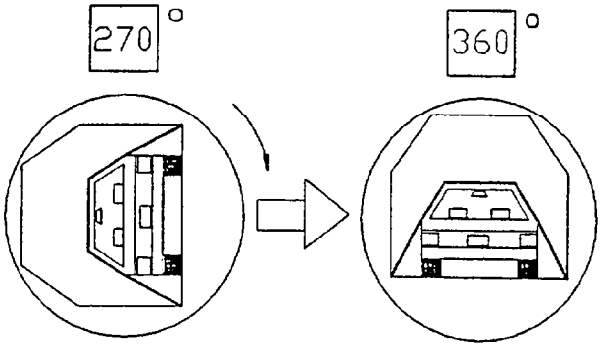
TABLE 11

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET (cont.)

Year/Make/Model/Body Style: 1994/Buick/Regal/4 Door Sedan

Vehicle NHTSA No.: CR0108 TEST DATE: June 1, 1994

TEST PHASE: 270° - 360°



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 36 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 36 seconds

Next whole minute interval 8 minutes

II. FMVSS 301 REQUIREMENTS:

(1) Time Period

First 5 min FROM onset of rotation	6th min.	7th min.	8th min. if reqd.

(2) Maximum Allowable Solvent Spillage

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE:

0	0	0	0

Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S): None

APPENDIX A - PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

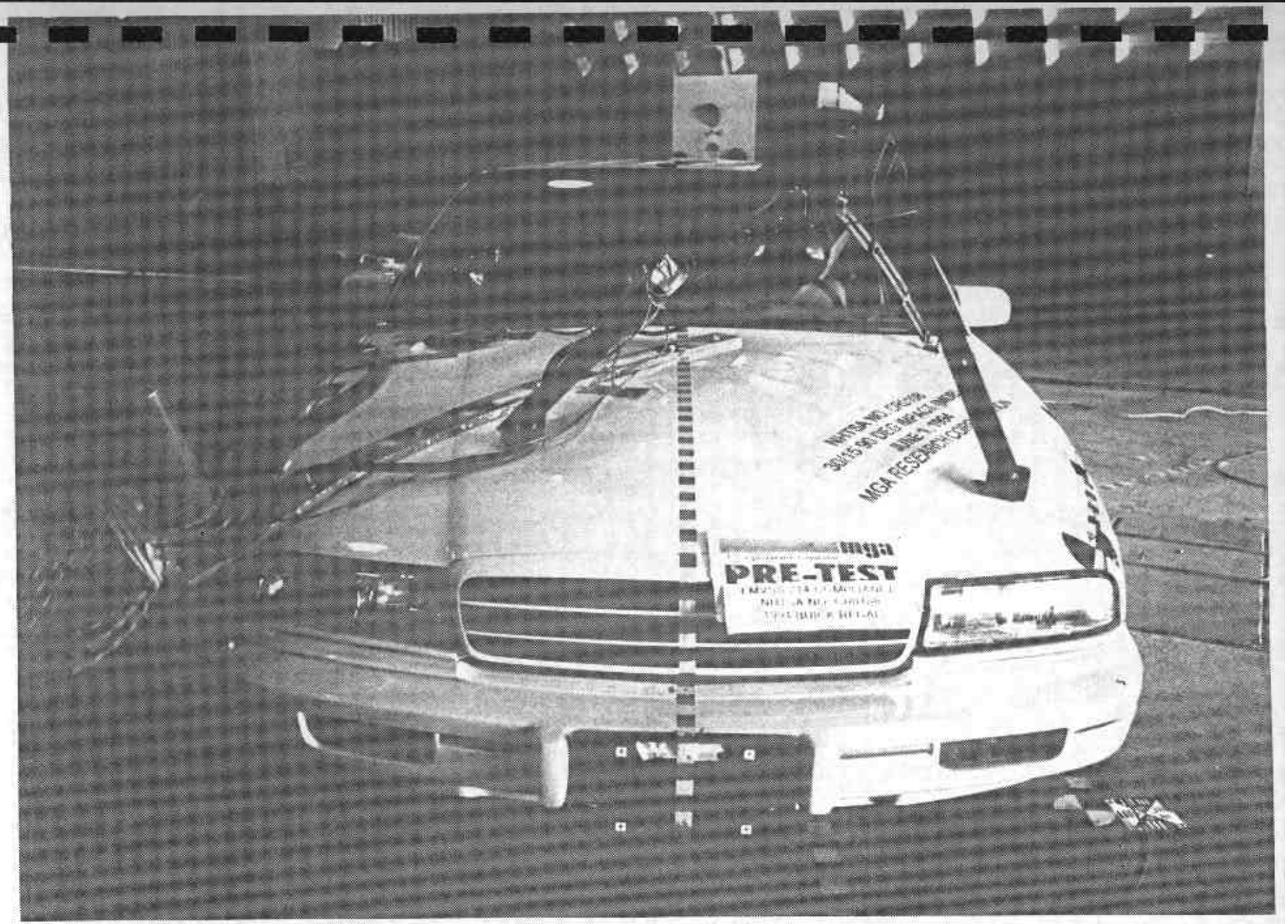


Photo No. A-1 - Pre-Test Front View of Test Vehicle

Photo No. A-2 - Post-Test Front View of Test Vehicle

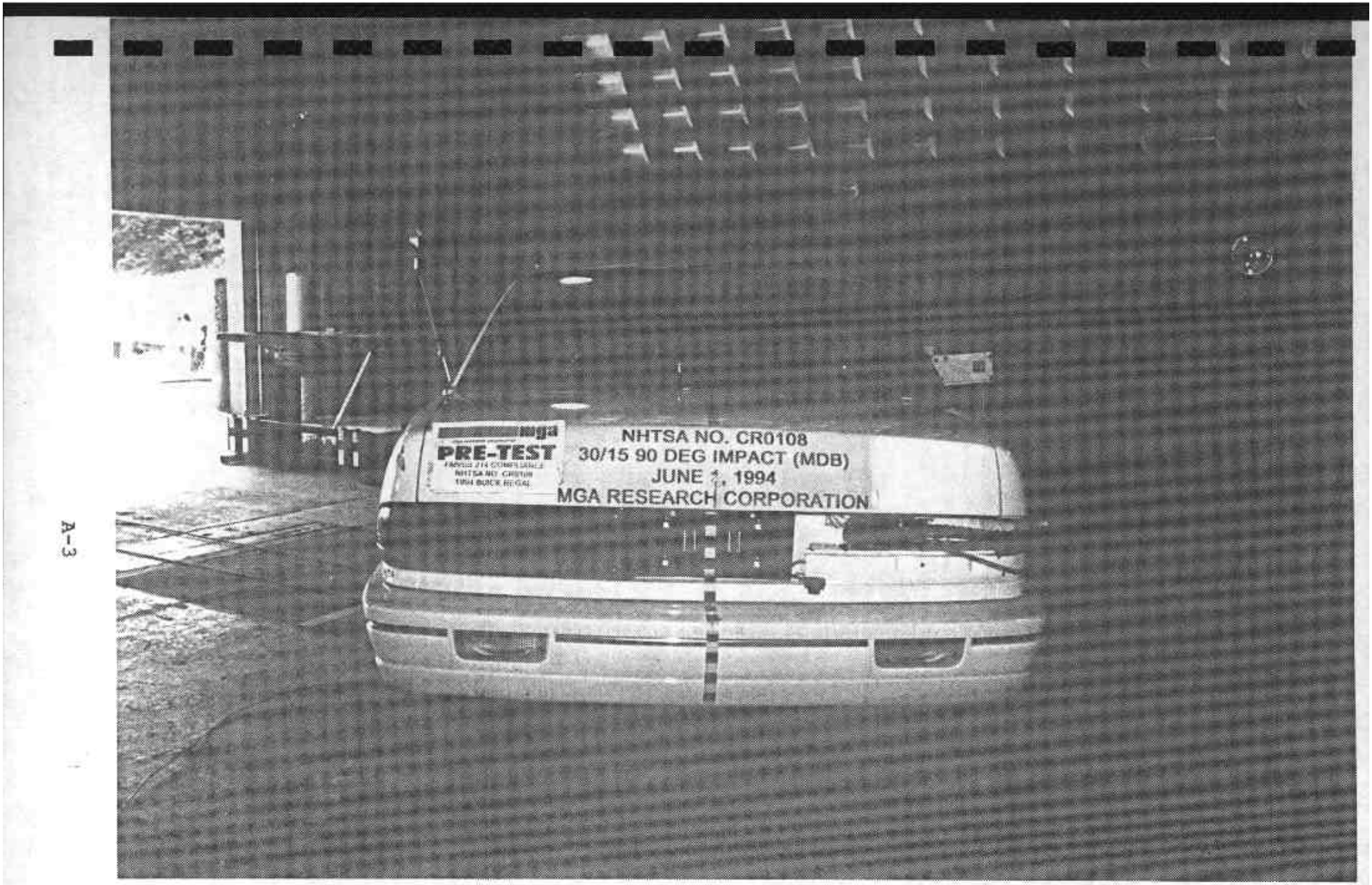


Photo No. A-3 - Pre-Test Rear View of Test Vehicle

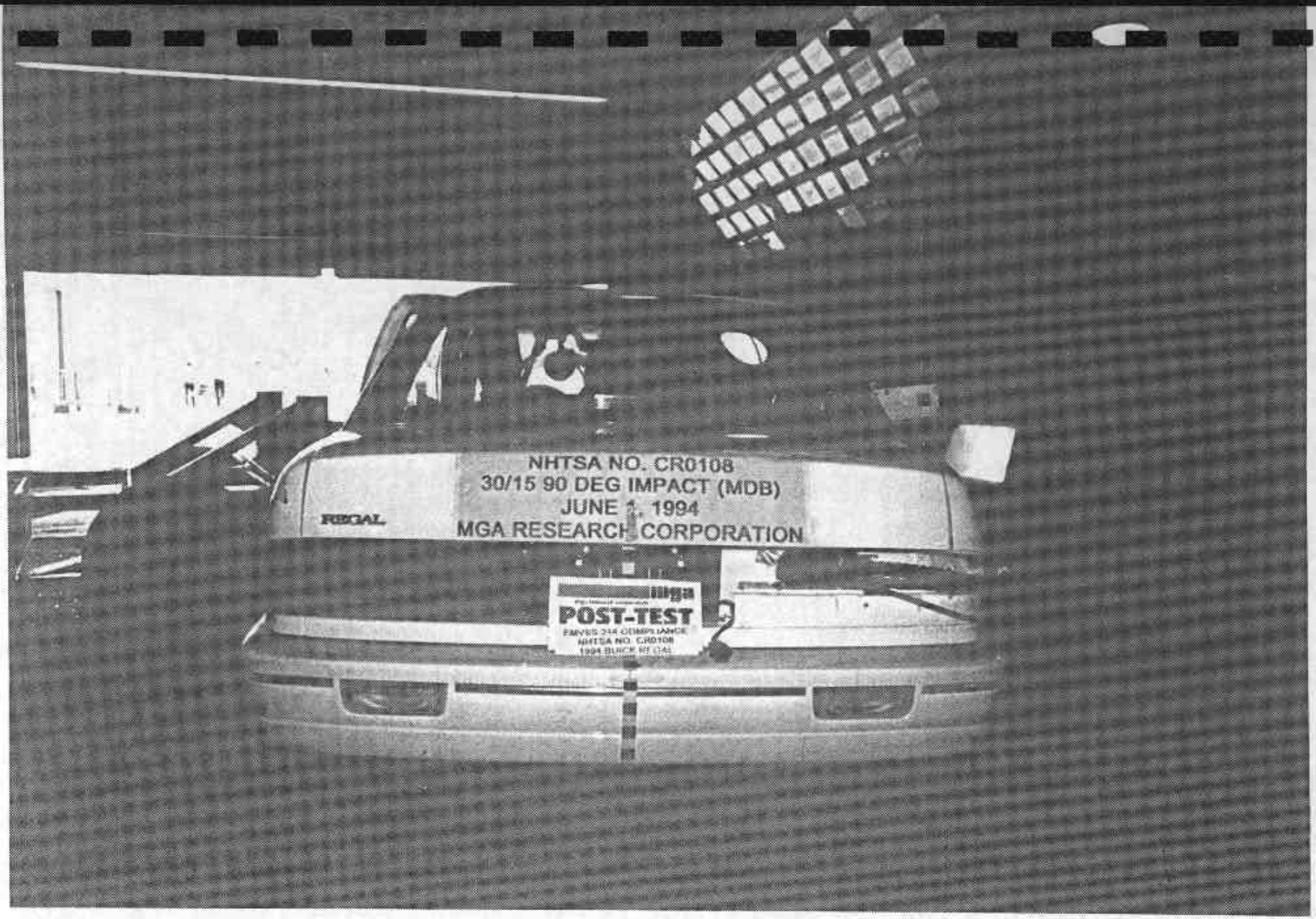


Photo No. A-4 - Post-Test Rear View of Test Vehicle

Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

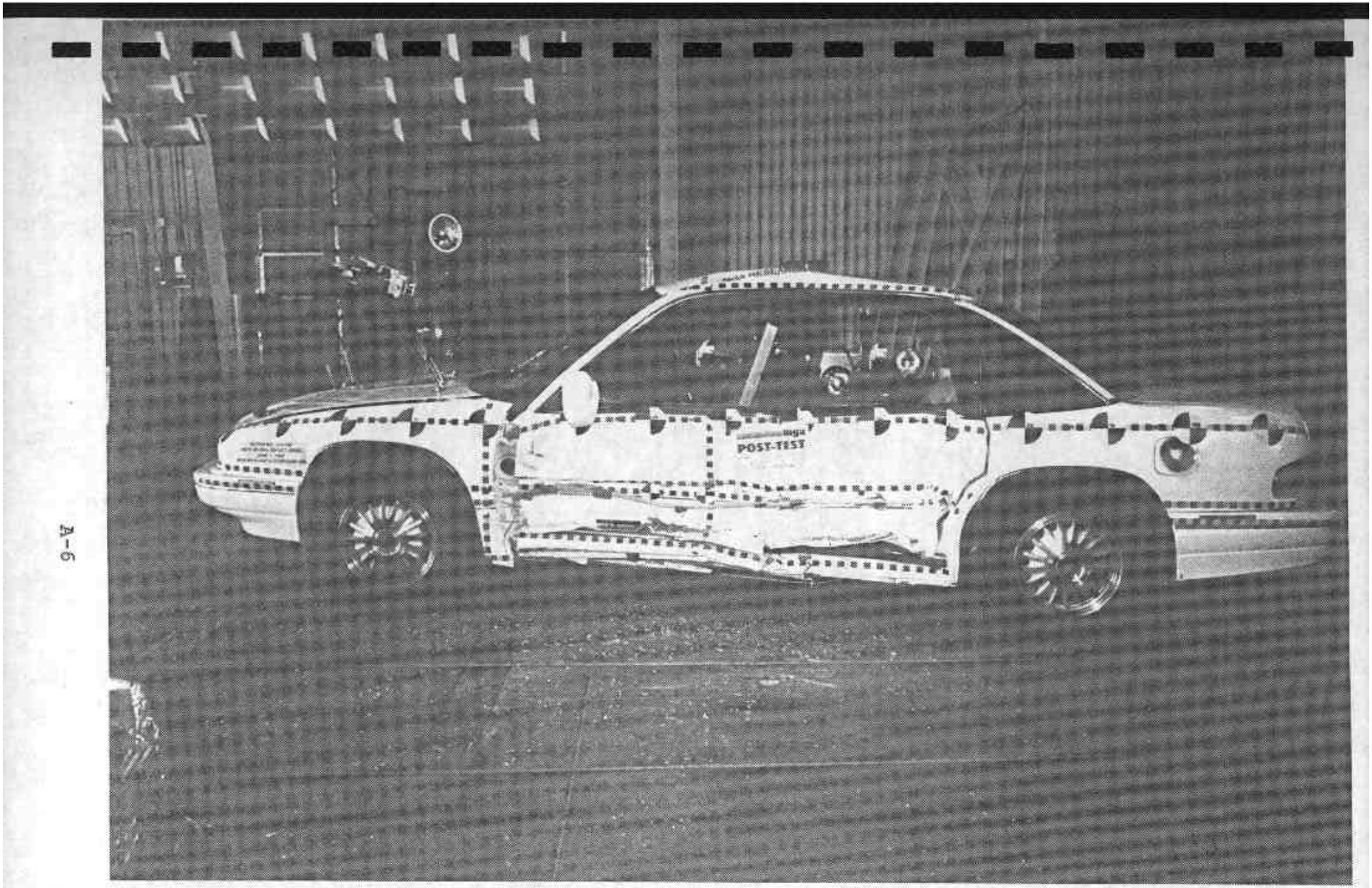


Photo No. A-6 - Post-Test Left Side View of Test Vehicle

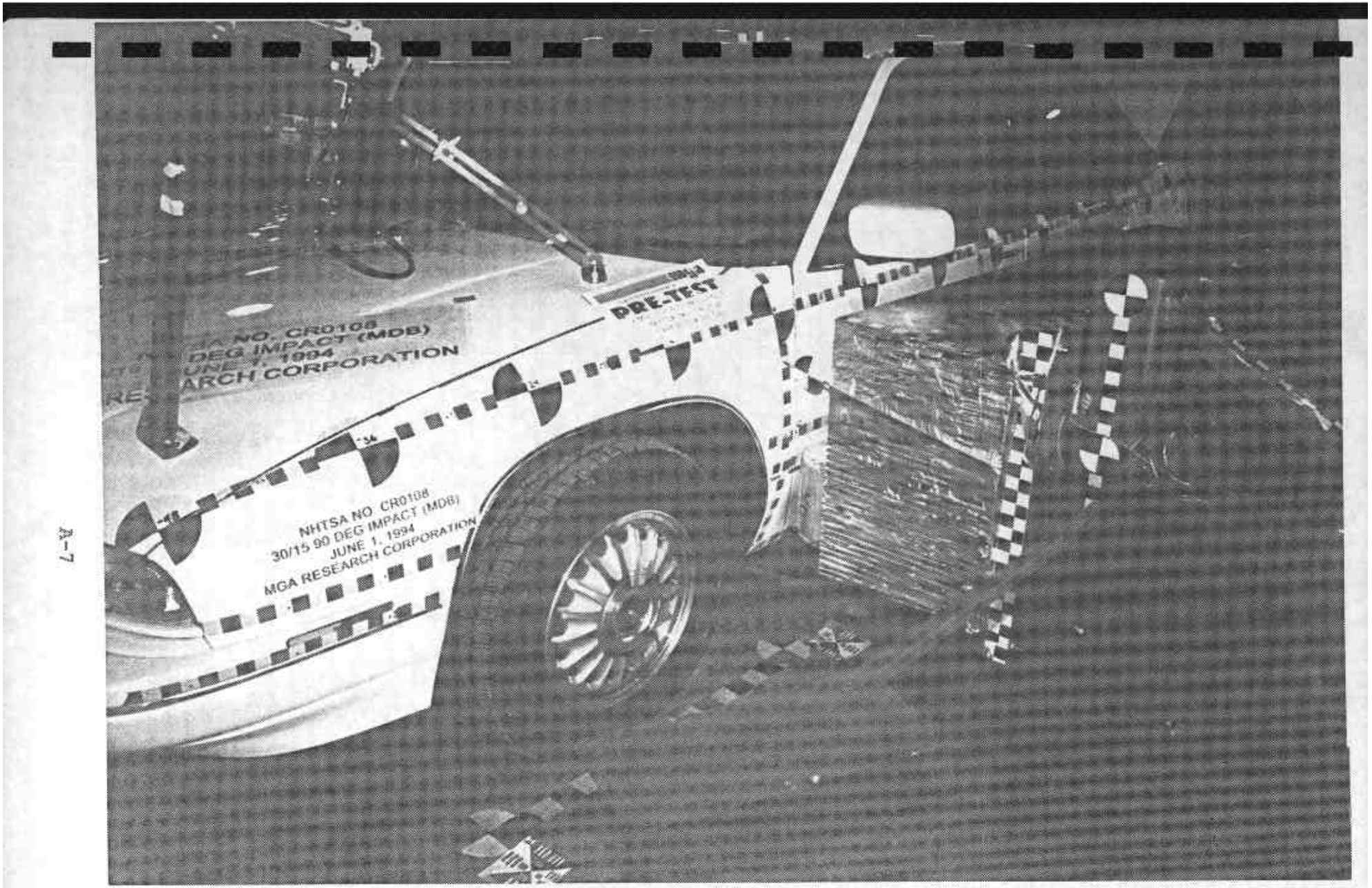


Photo No. A-7 - Pre-Test MDB Positioned Against Vehicle (left side)

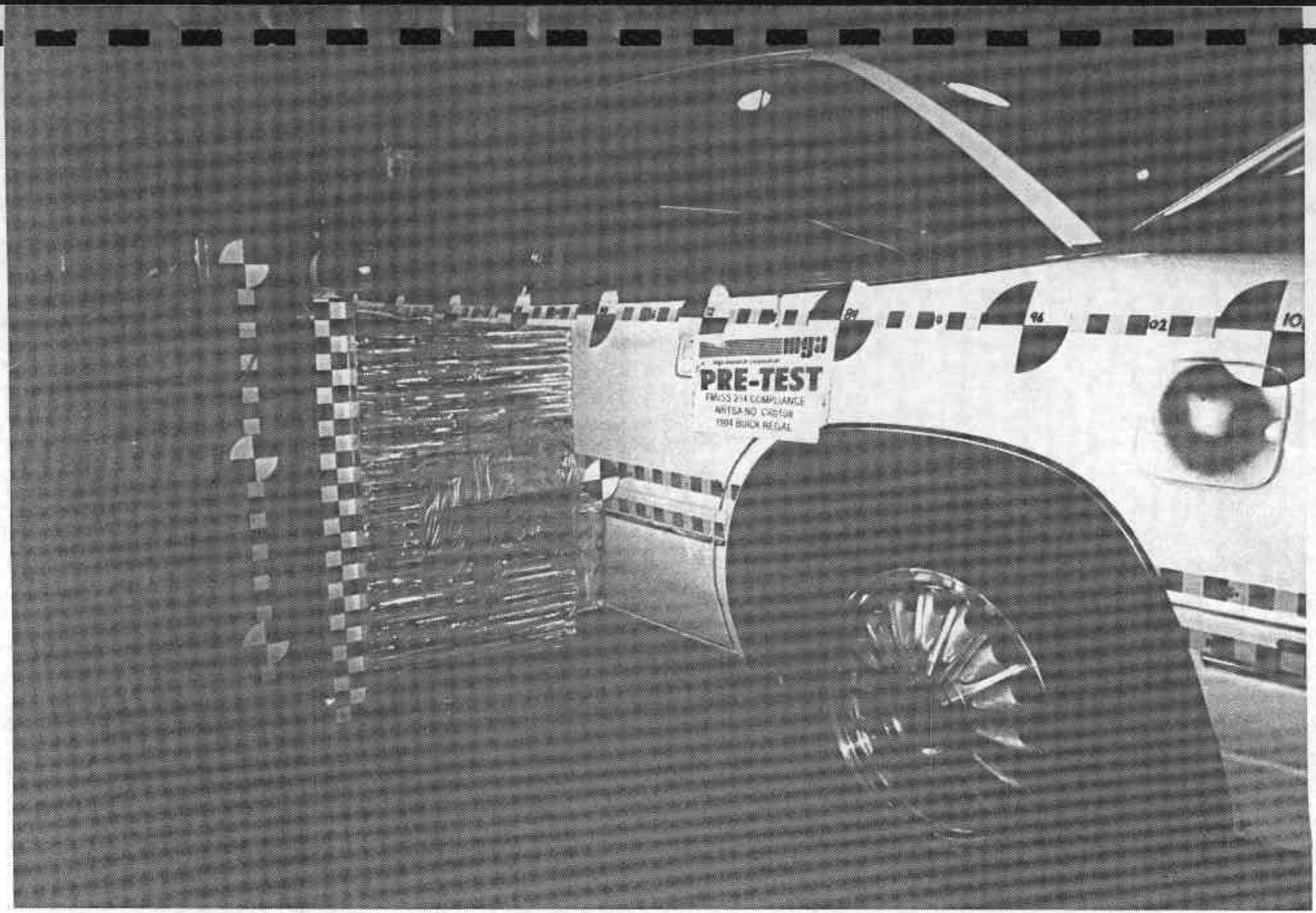


Photo No. A-8 - Pre-Test MDB Positioned Against Vehicle (right side)

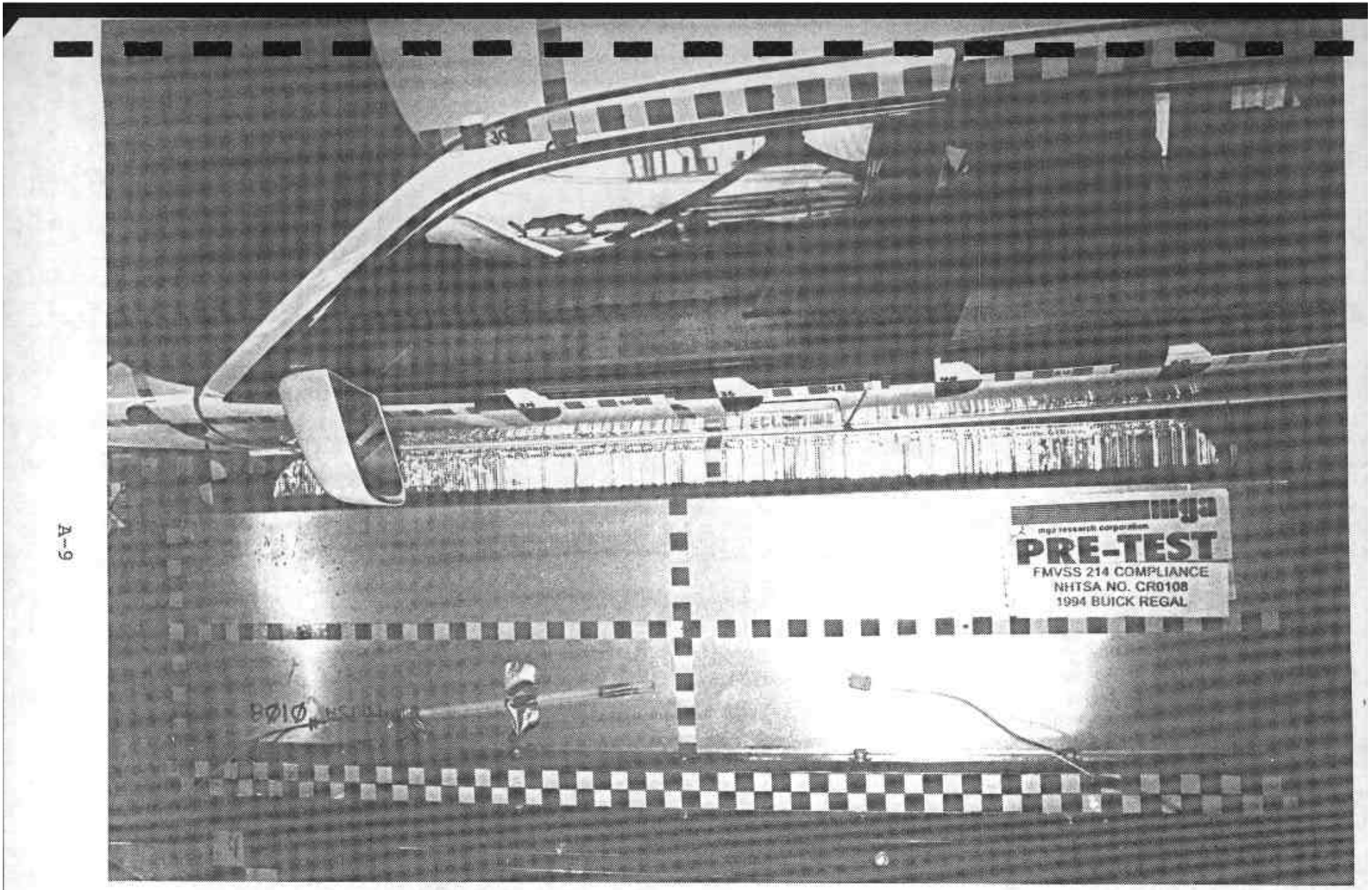


Photo No. A-9 - Pre-Test MDB Position Against Vehicle Overhead View

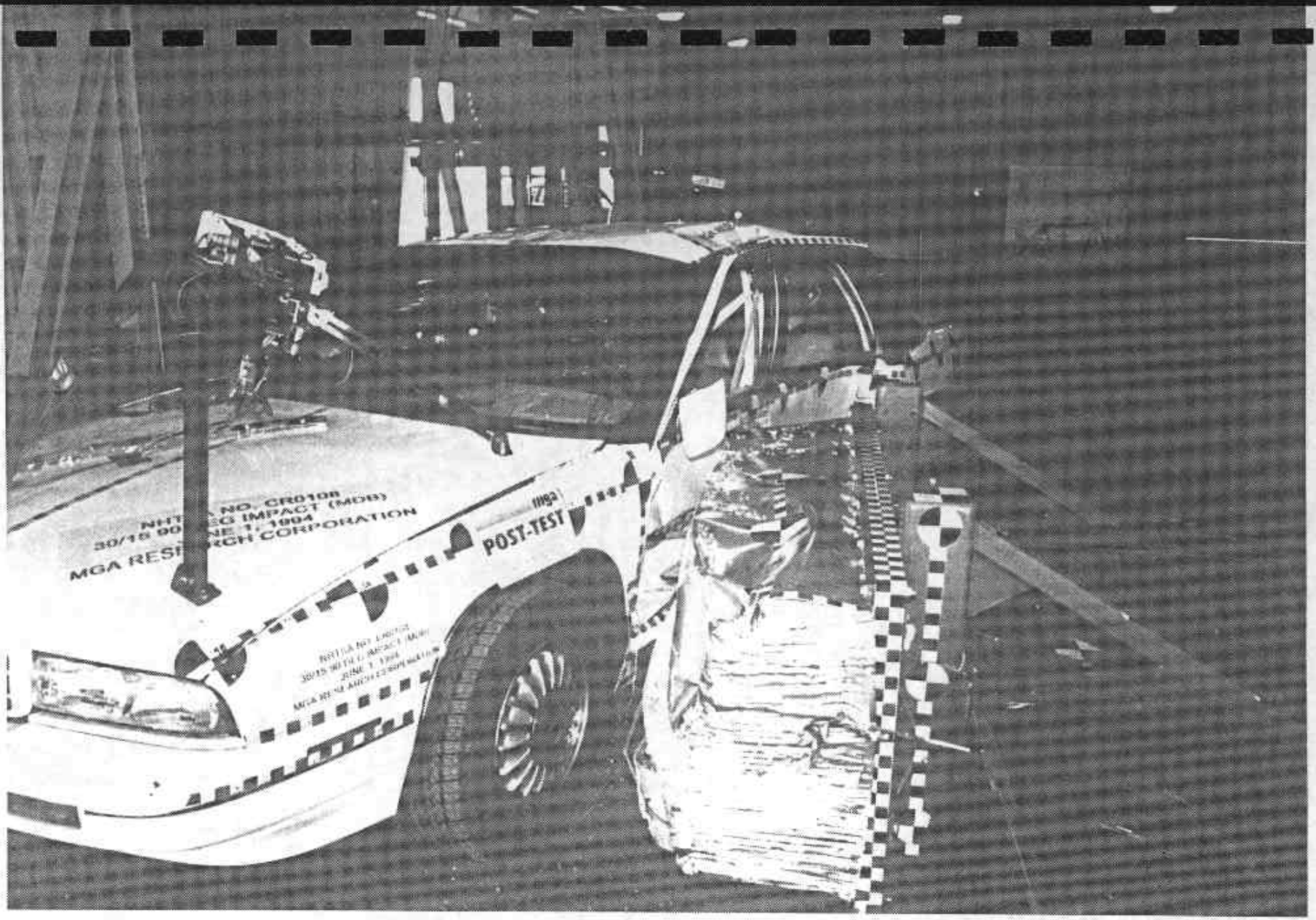


Photo No. A-10 - Post-Test MDB and Vehicle Left Side Front View

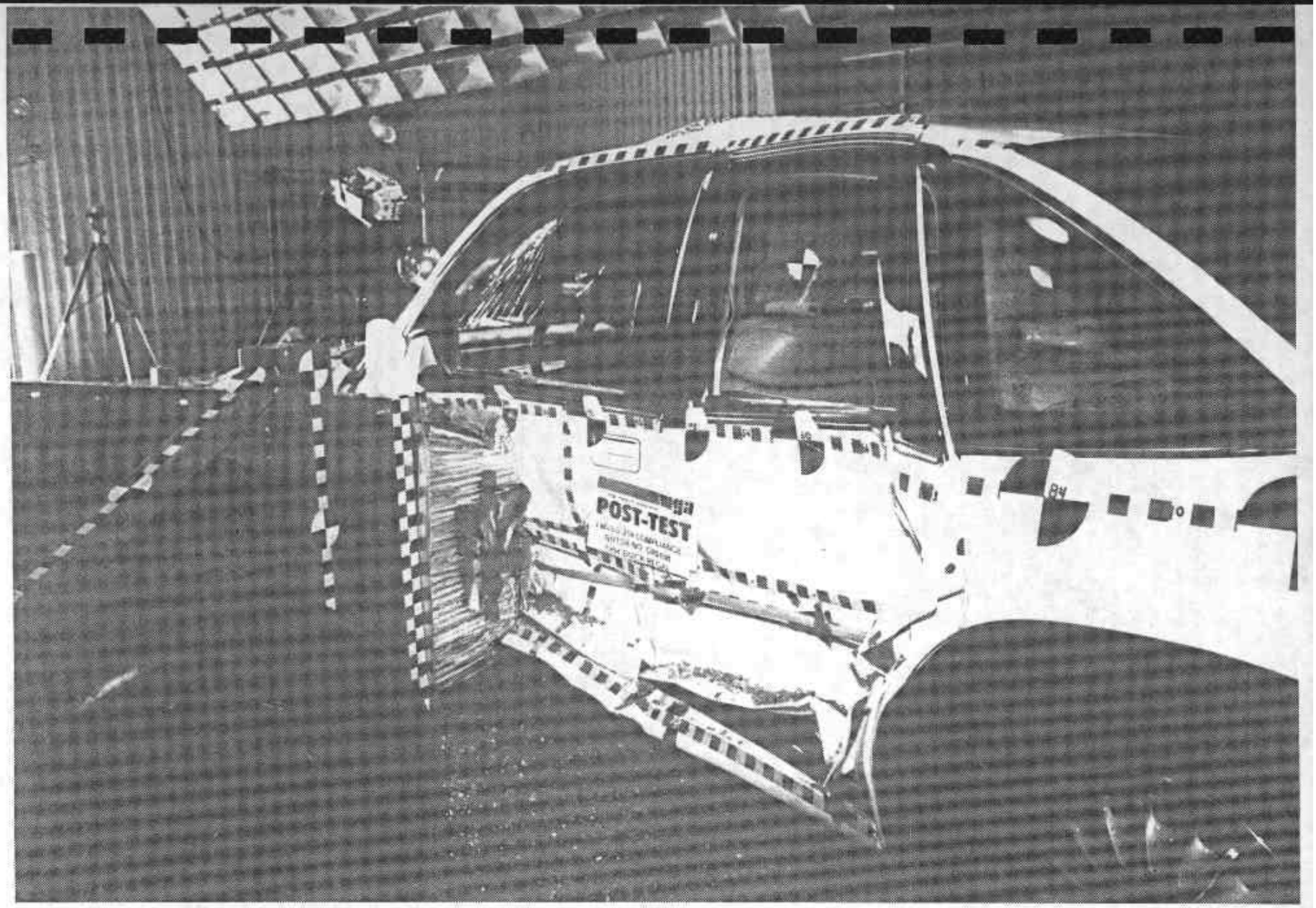


Photo No. A-11 - Post-Test MDB and Vehicle Right Side Rear View

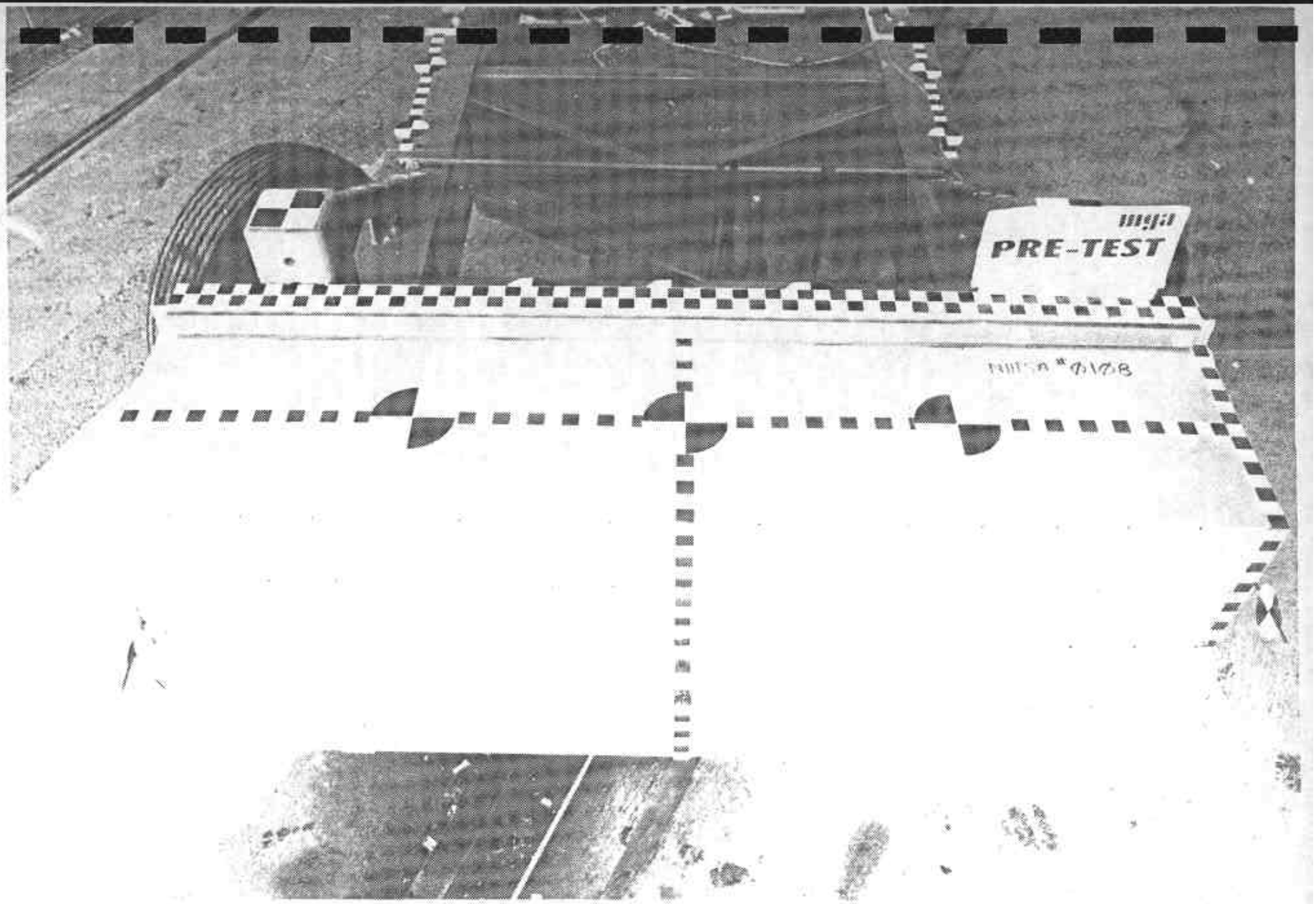


Photo No. A-12 - Pre-Test MDB Top View

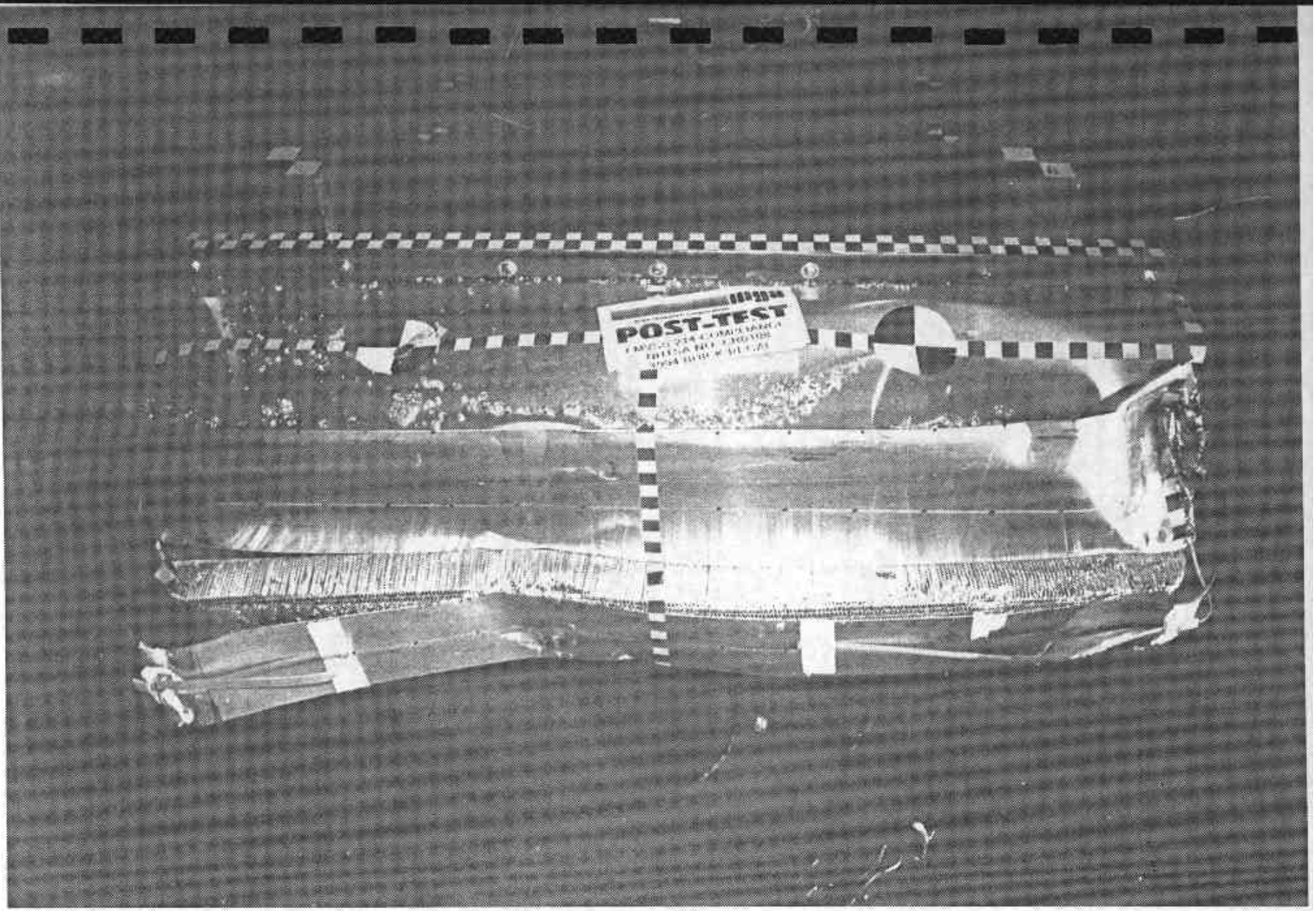


Photo No. A-13 - Post-Test MDB Top View

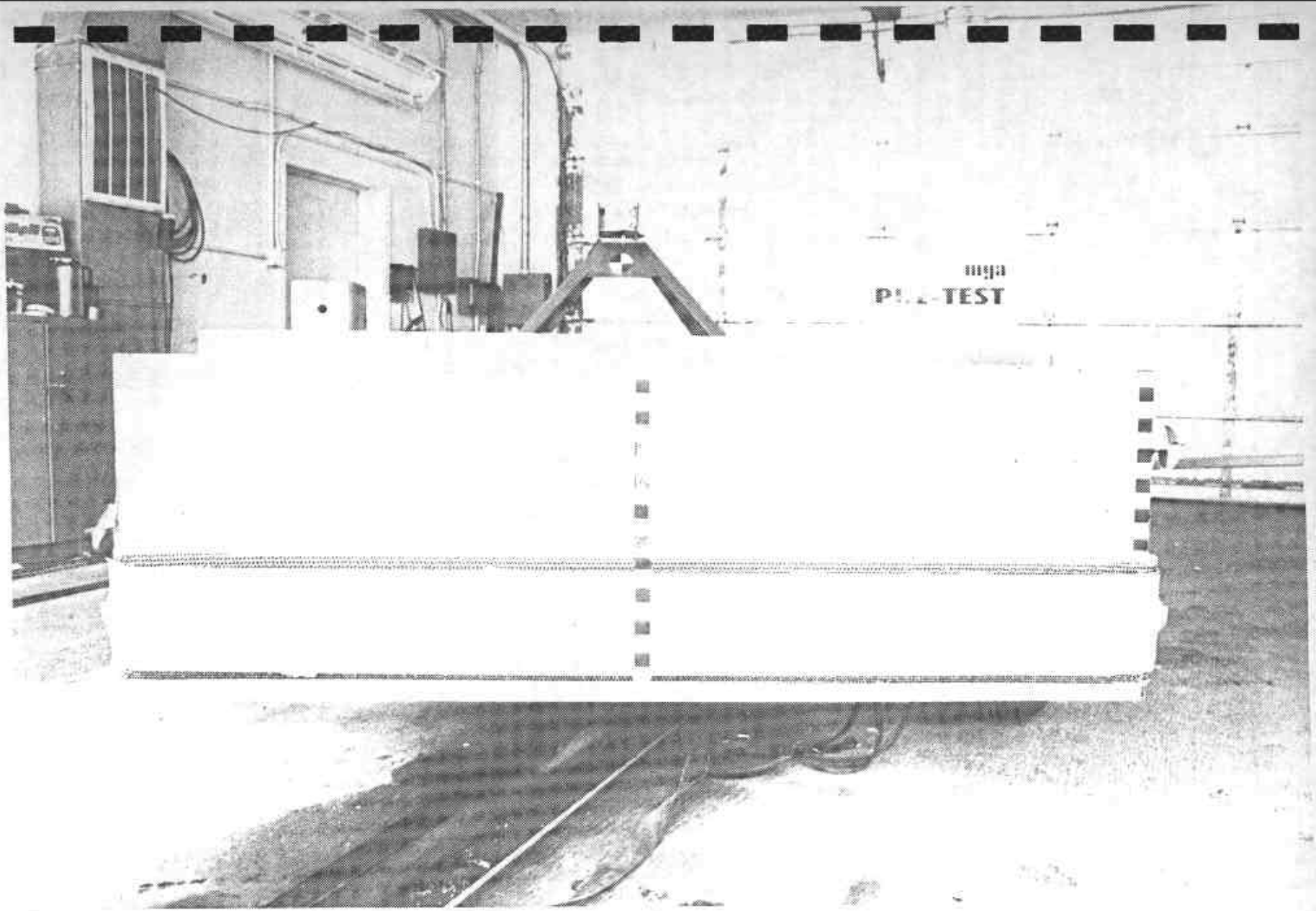


Photo No. A-14 - Pre-Test MDB Front View

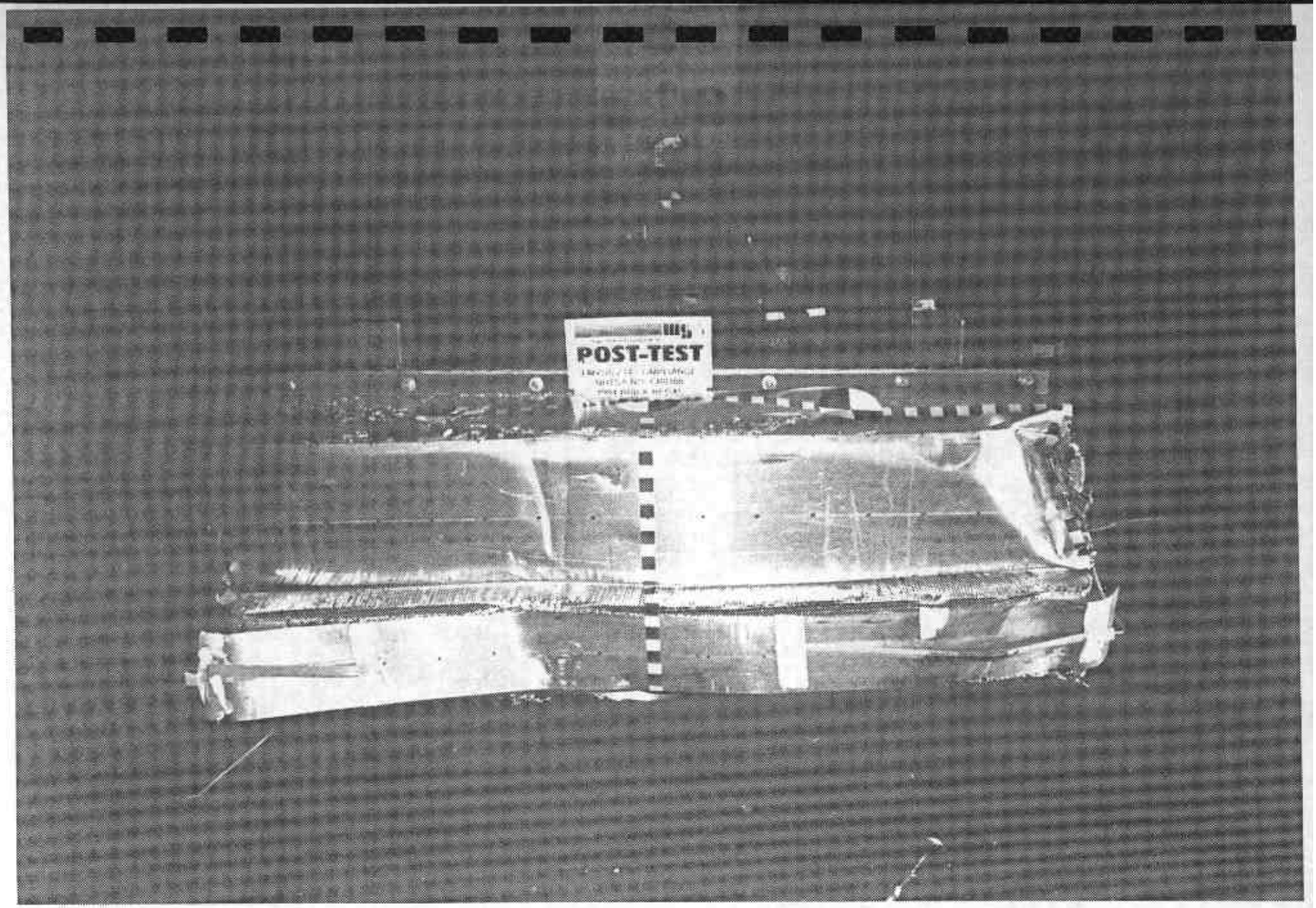


Photo No. A-15 - Post-Test MDB Front View

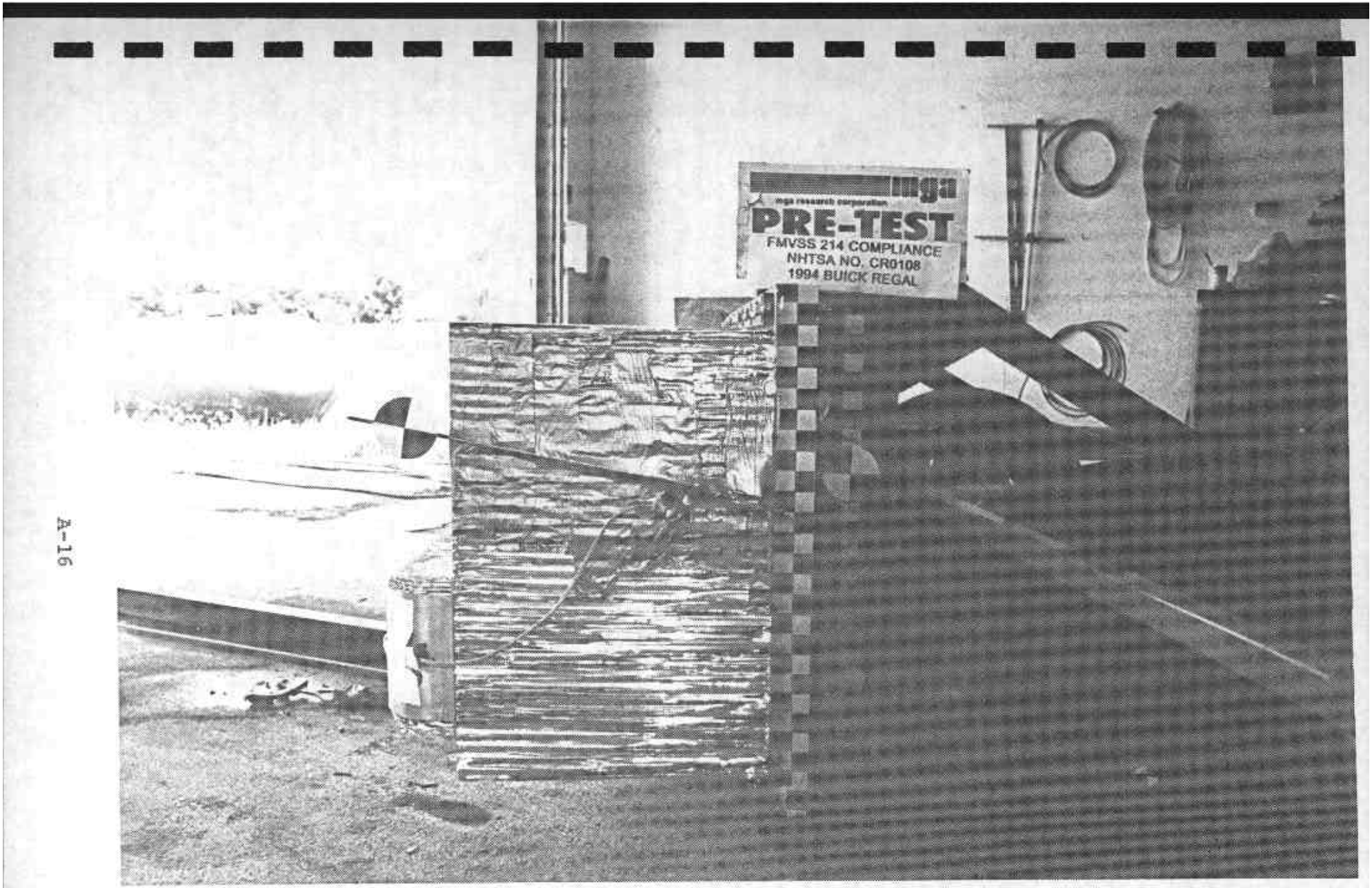


Photo No. A-16 - Pre-Test MDB Left Side View

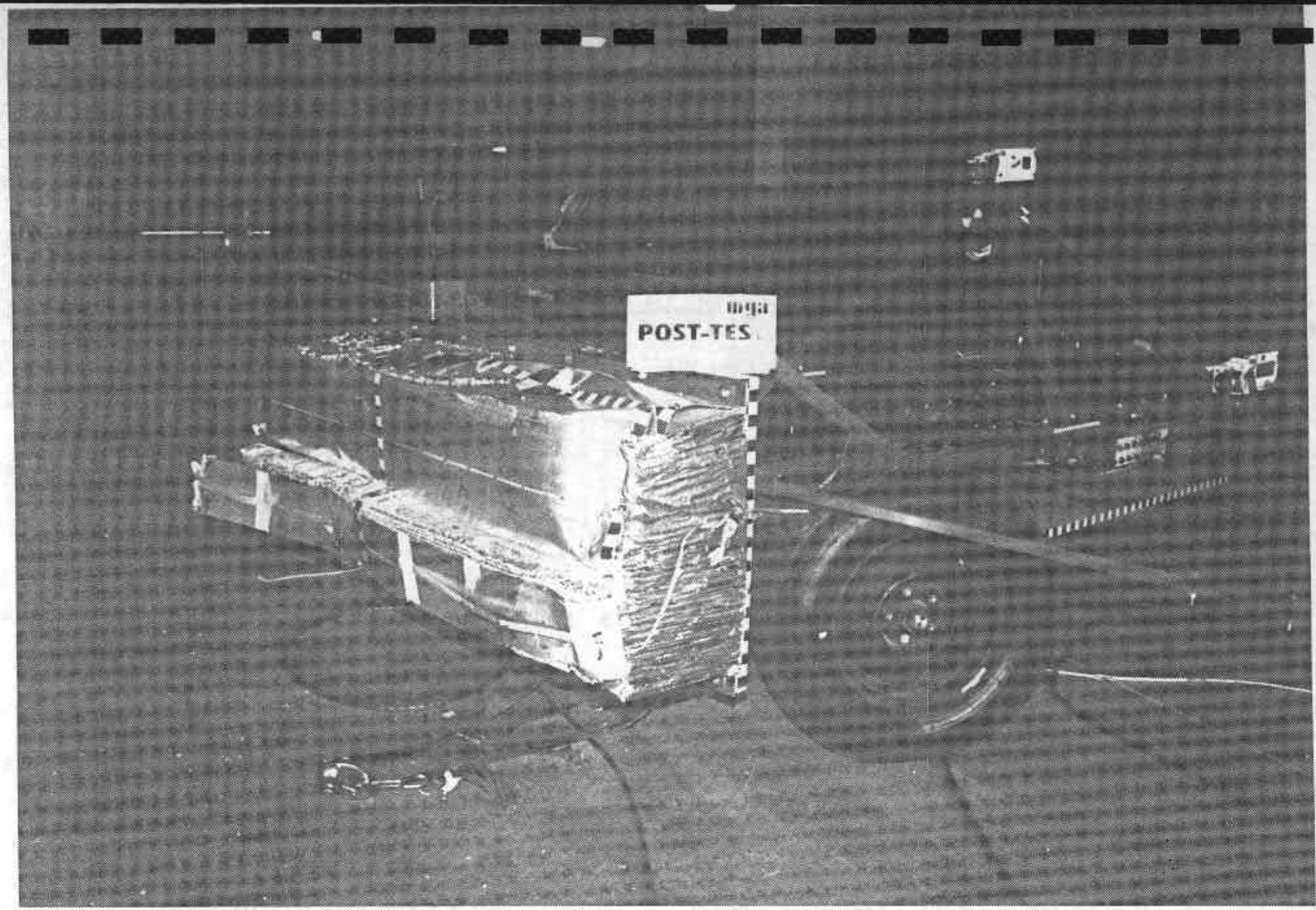


Photo No. A-17 - Post-Test MDB Left Side View

Photo No. A-18 - Pre-Test MDB Right Side View

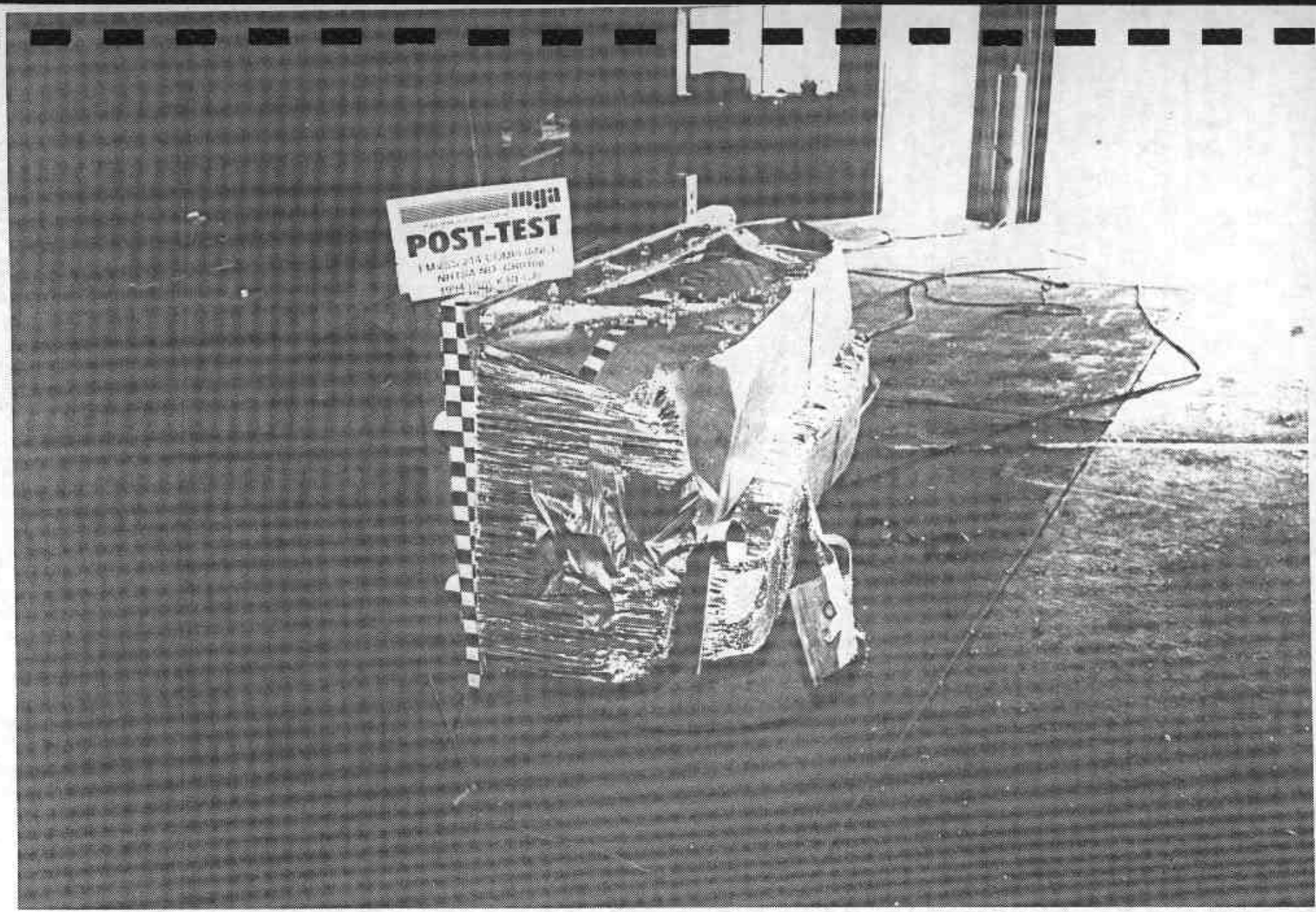


Photo No. A-19 - Post-Test MDB Right Side View

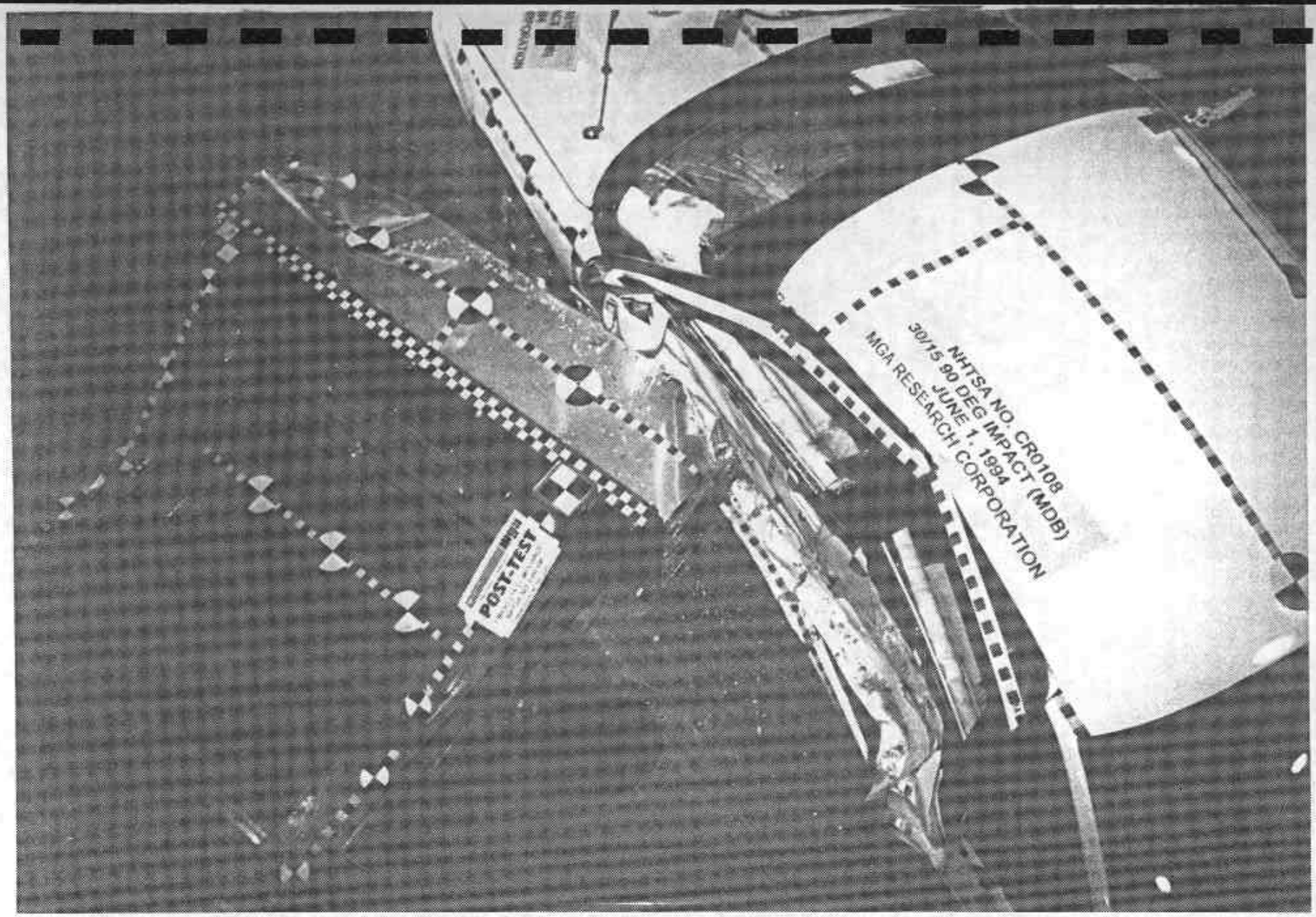


Photo No. A-20 - Post-Test MDB and Vehicle Overhead View

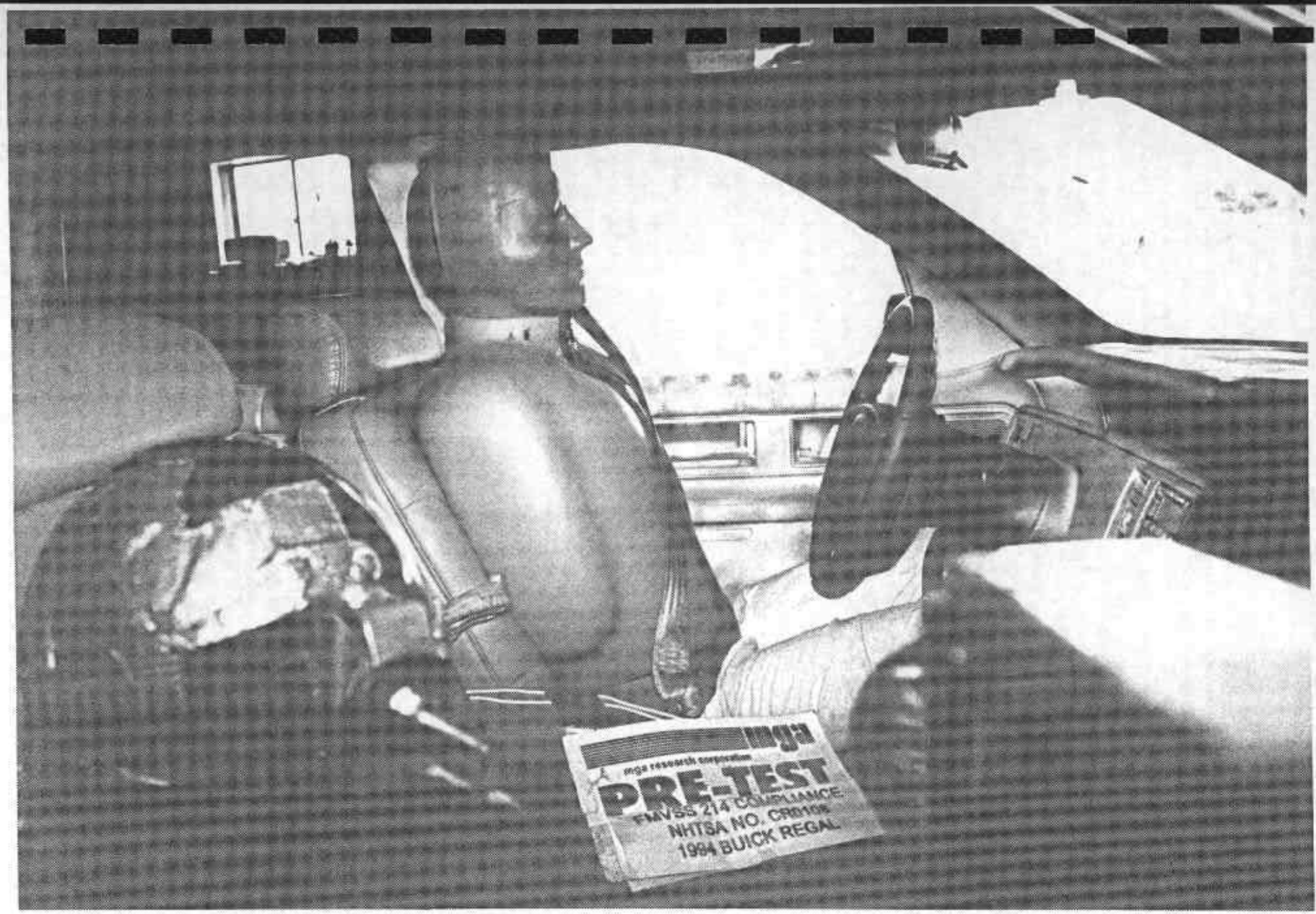


Photo No. A-21 - Pre-Test Driver Dummy Right Side View

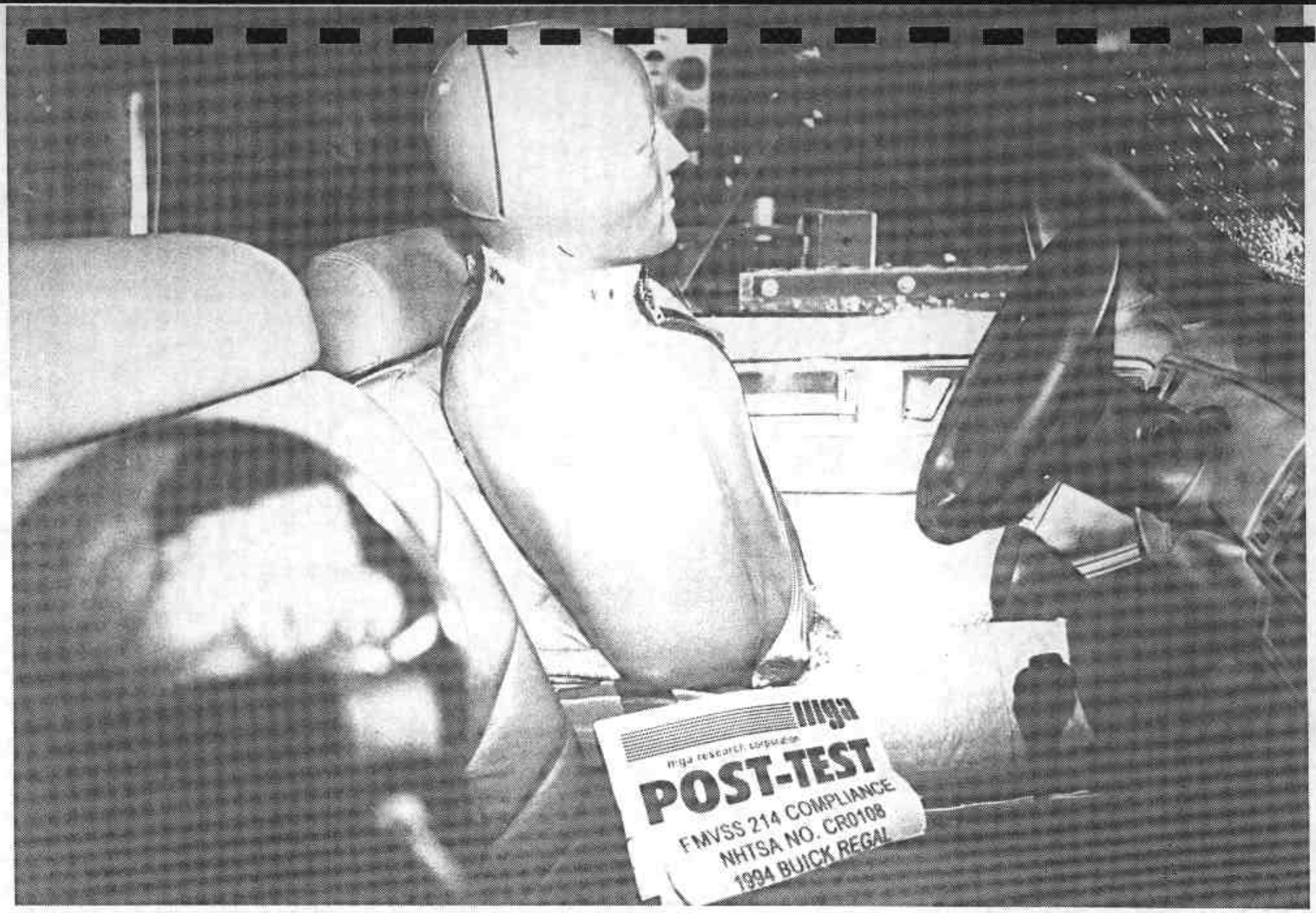


Photo No. A-22 - Post-Test Driver Dummy Right Side View

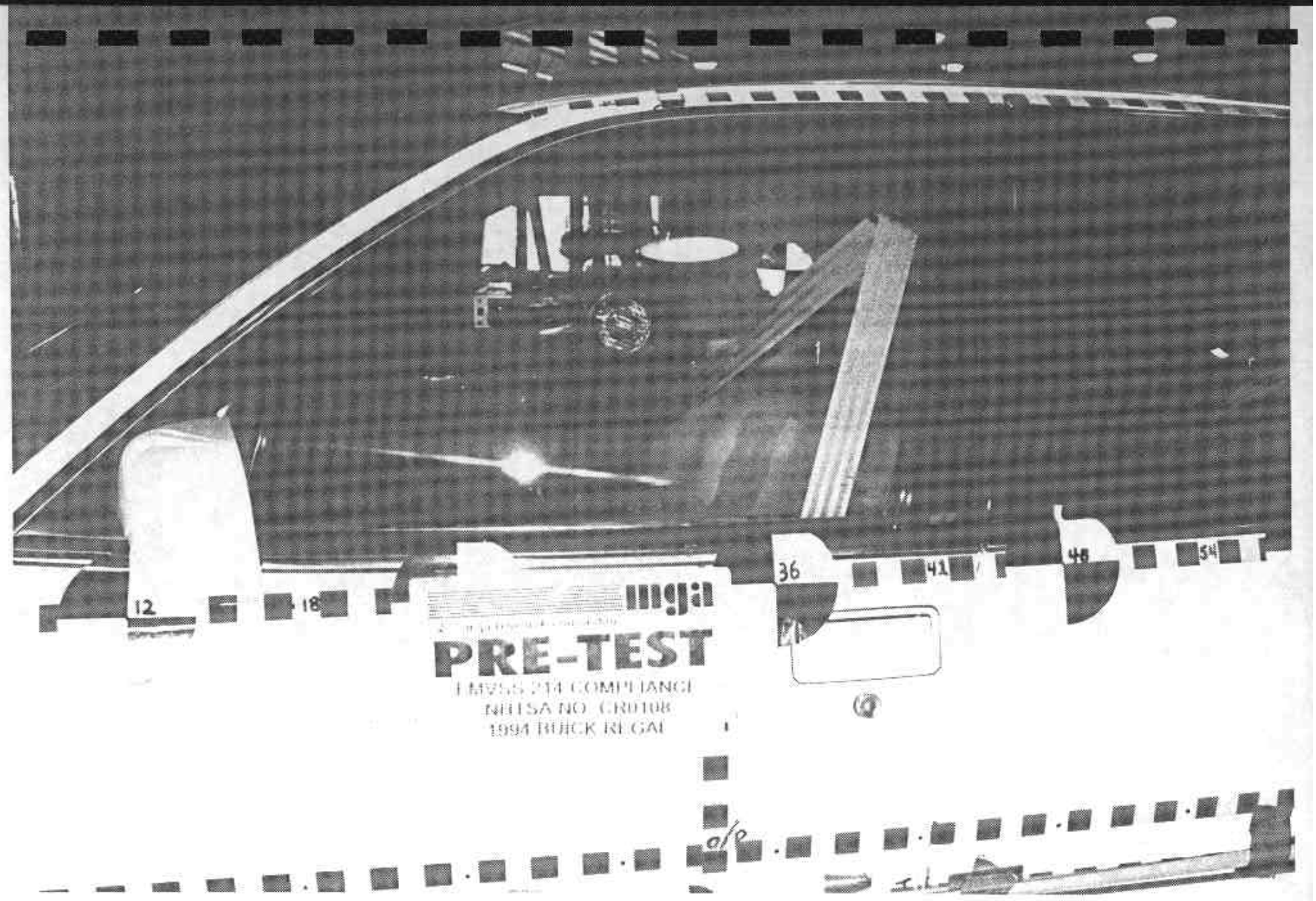


Photo No. A-23 - Pre-Test Driver Dummy Left Side View

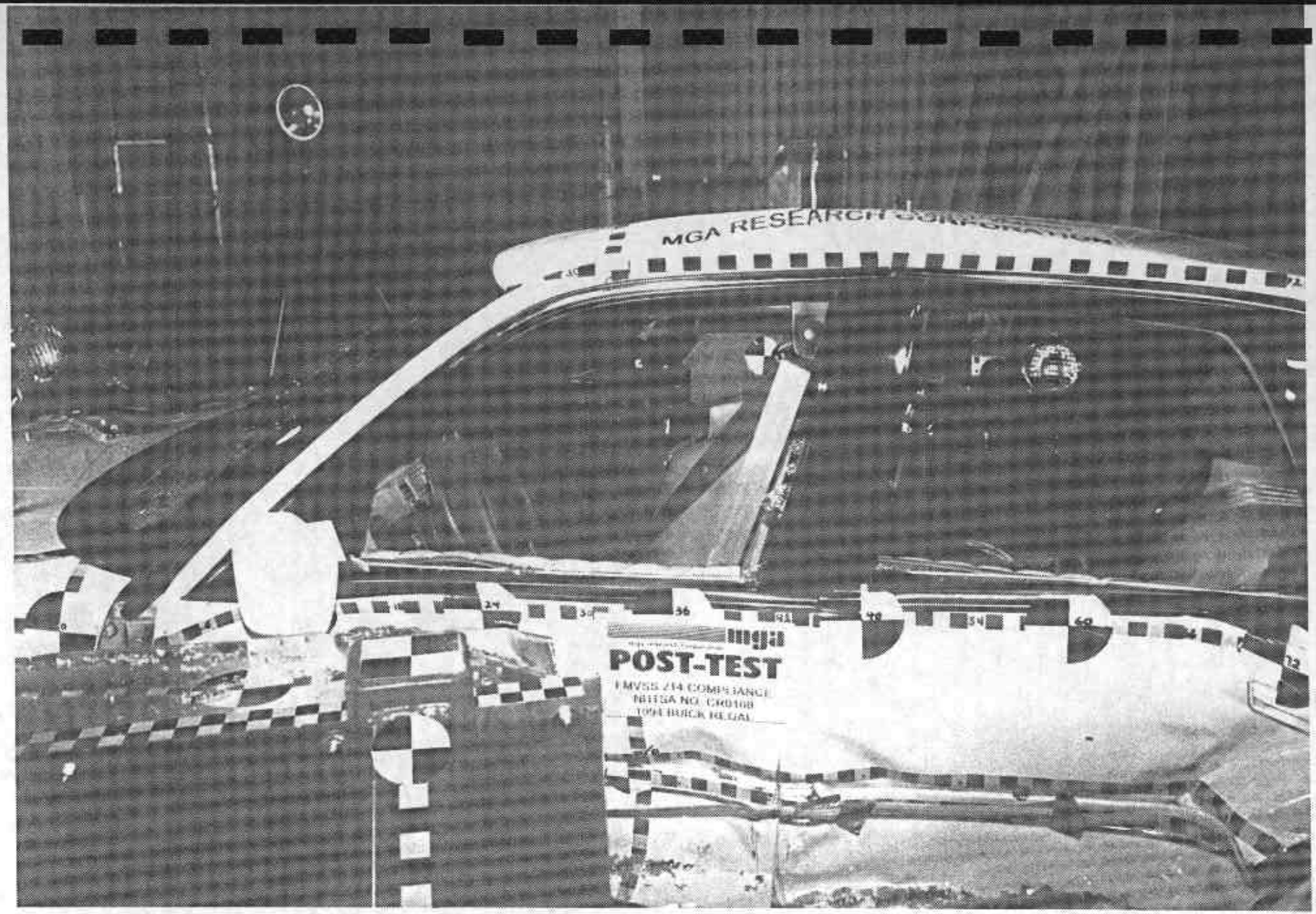


Photo No. A-24 - Post-Test Driver Dummy Left Side View

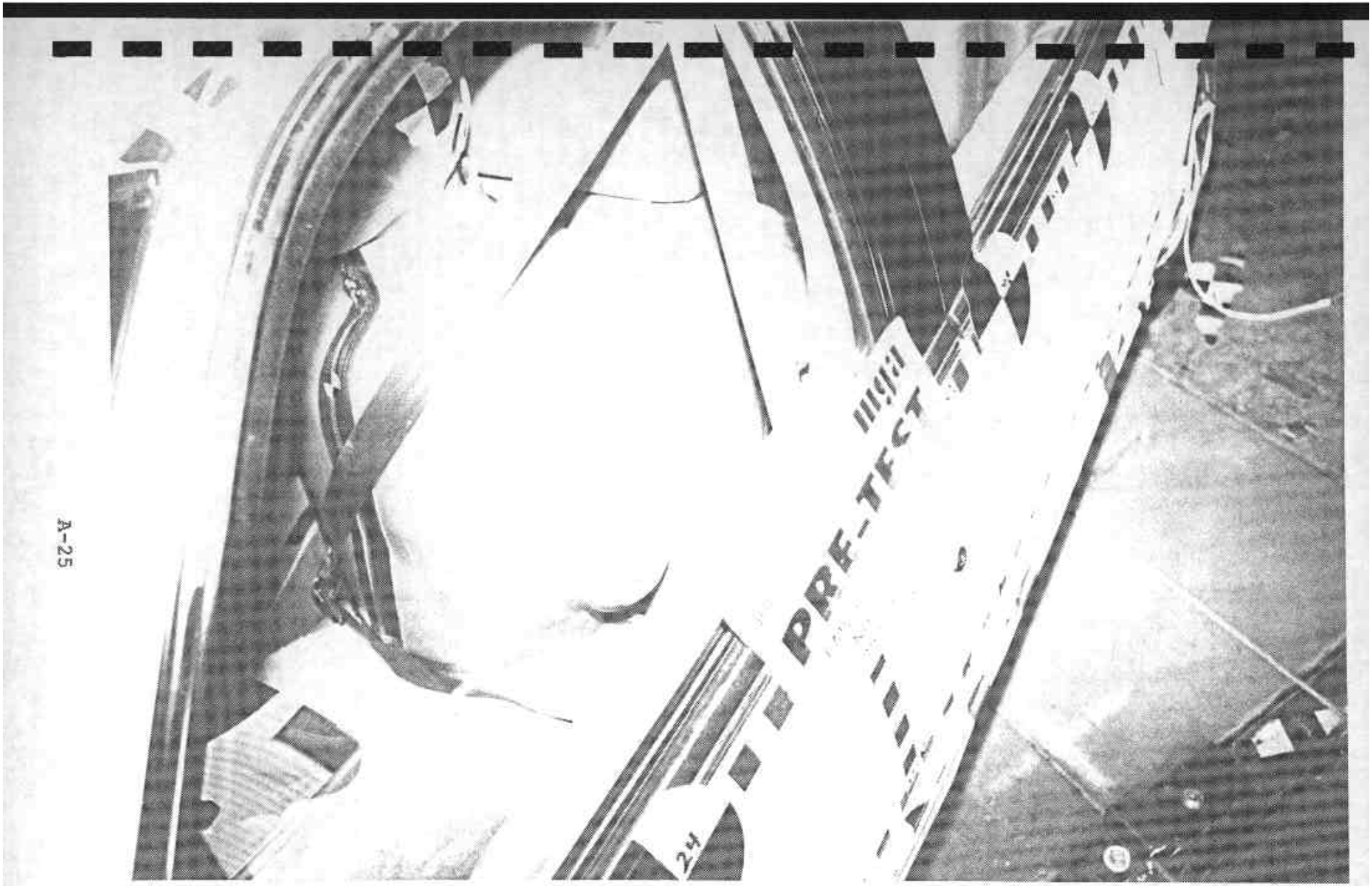


Photo No. A-25 - Pre-Test Driver Dummy Front Oblique View

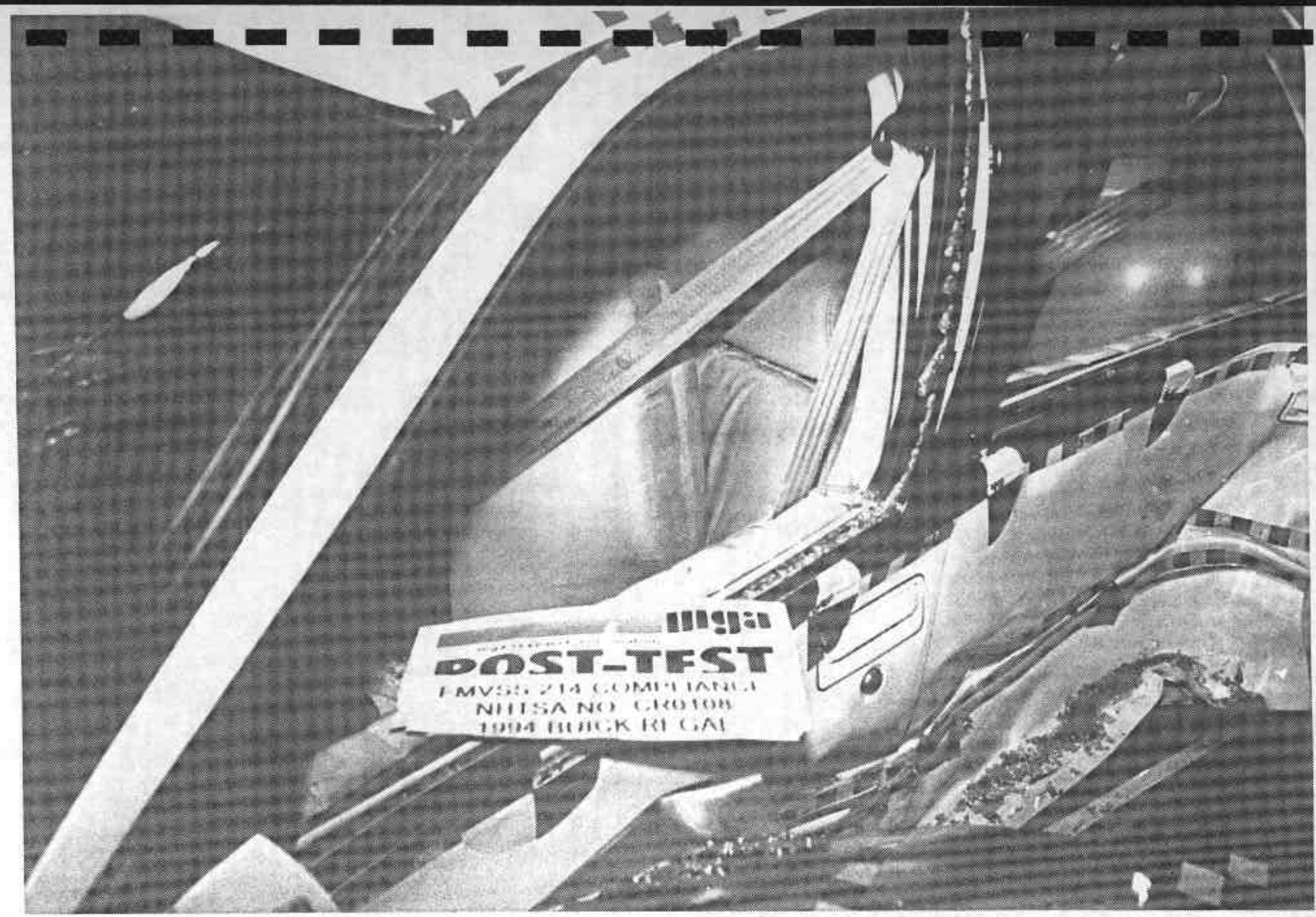


Photo No. A-26 - Post-Test Driver Dummy Front Oblique View

Photo No. A-27 - Pre-Test Driver Dummy Left Side View (Door Open)

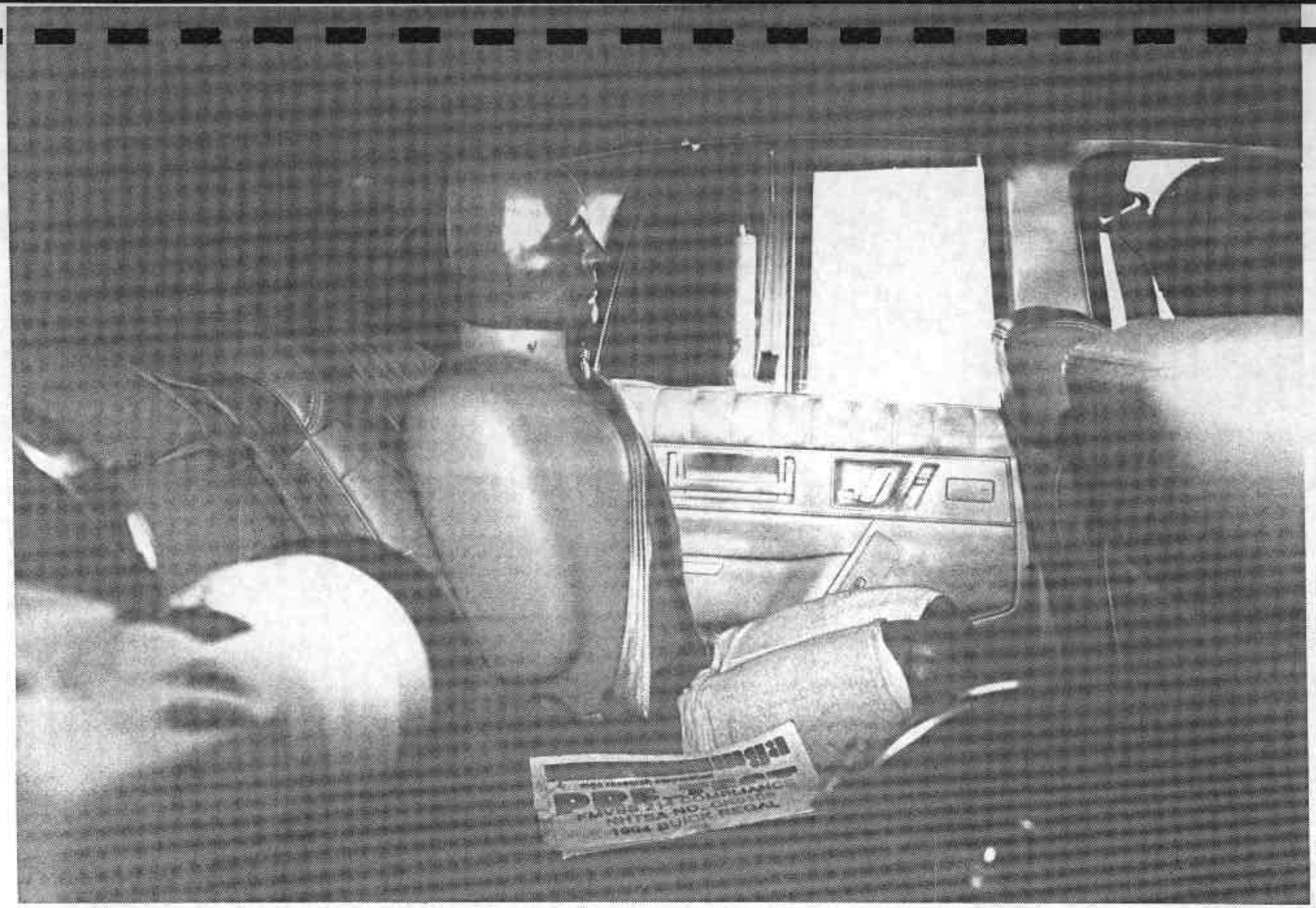
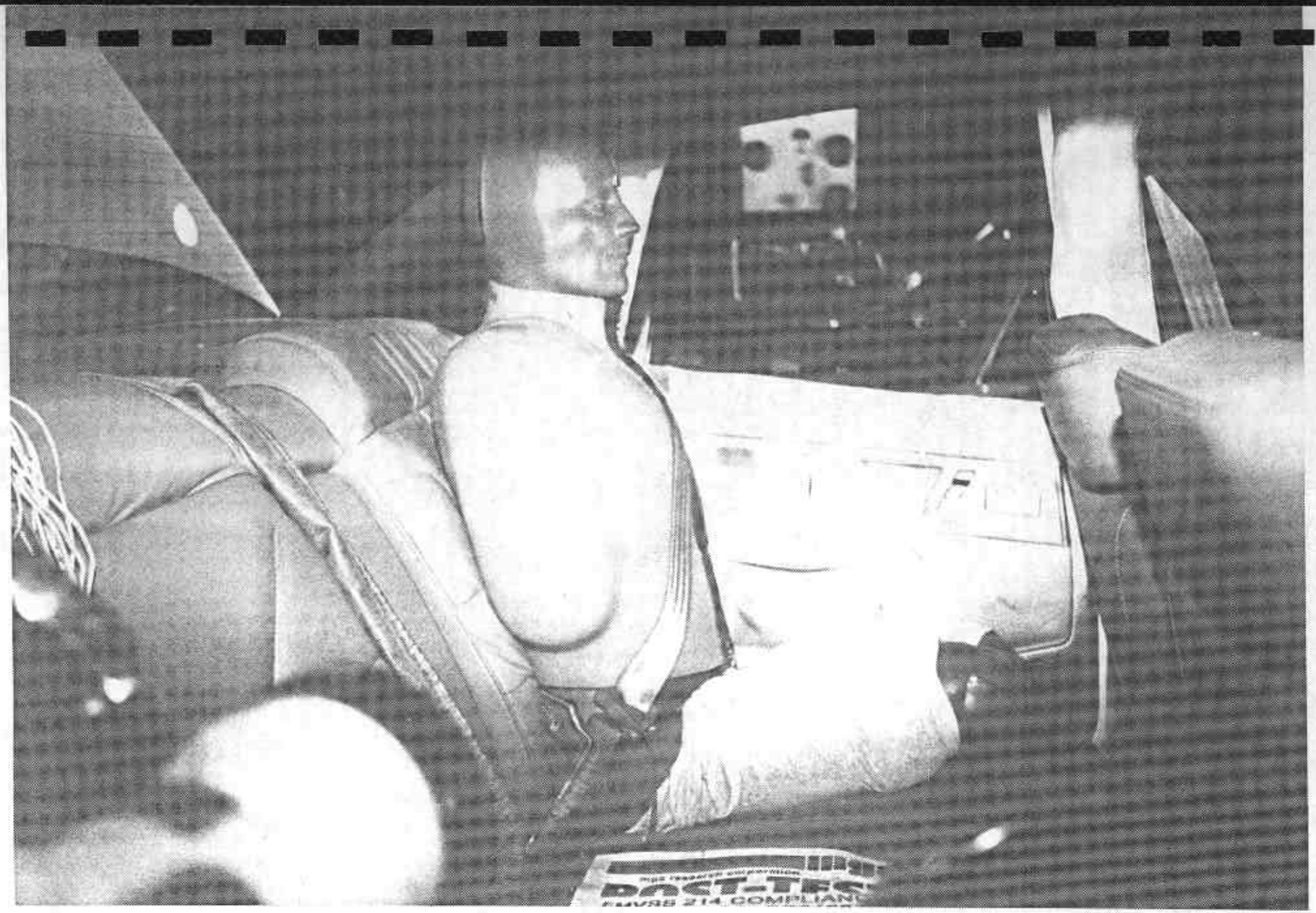


Photo No. A-28 - Pre-Test Passenger Dummy Right Side View



A-29

Photo No. A-29 - Post-Test Passenger Dummy Right Side View

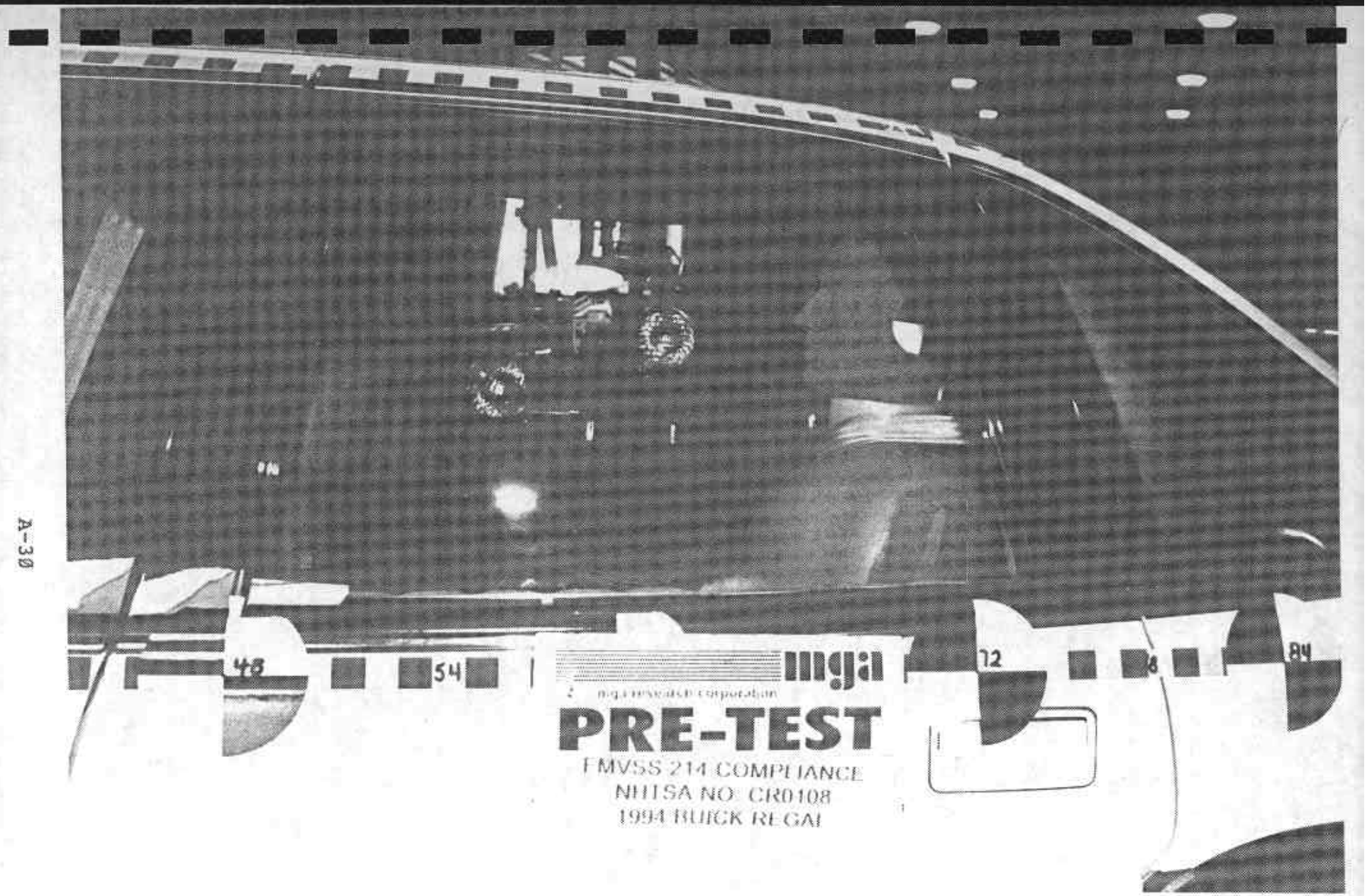


Photo No. A-30 - Pre-Test Passenger Dummy Left Side View

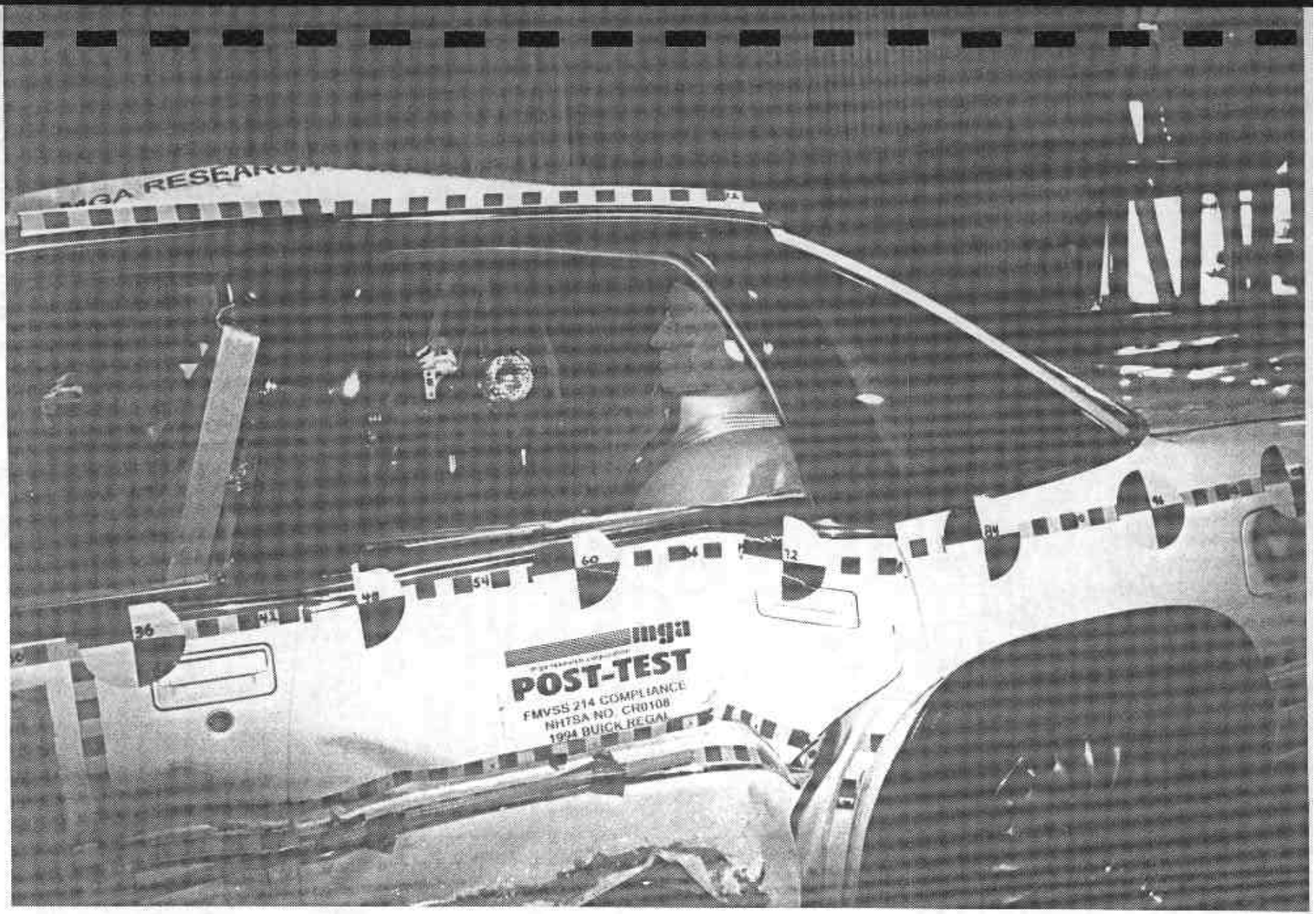


Photo No. A-31 - Post-Test Passenger Dummy Left Side View

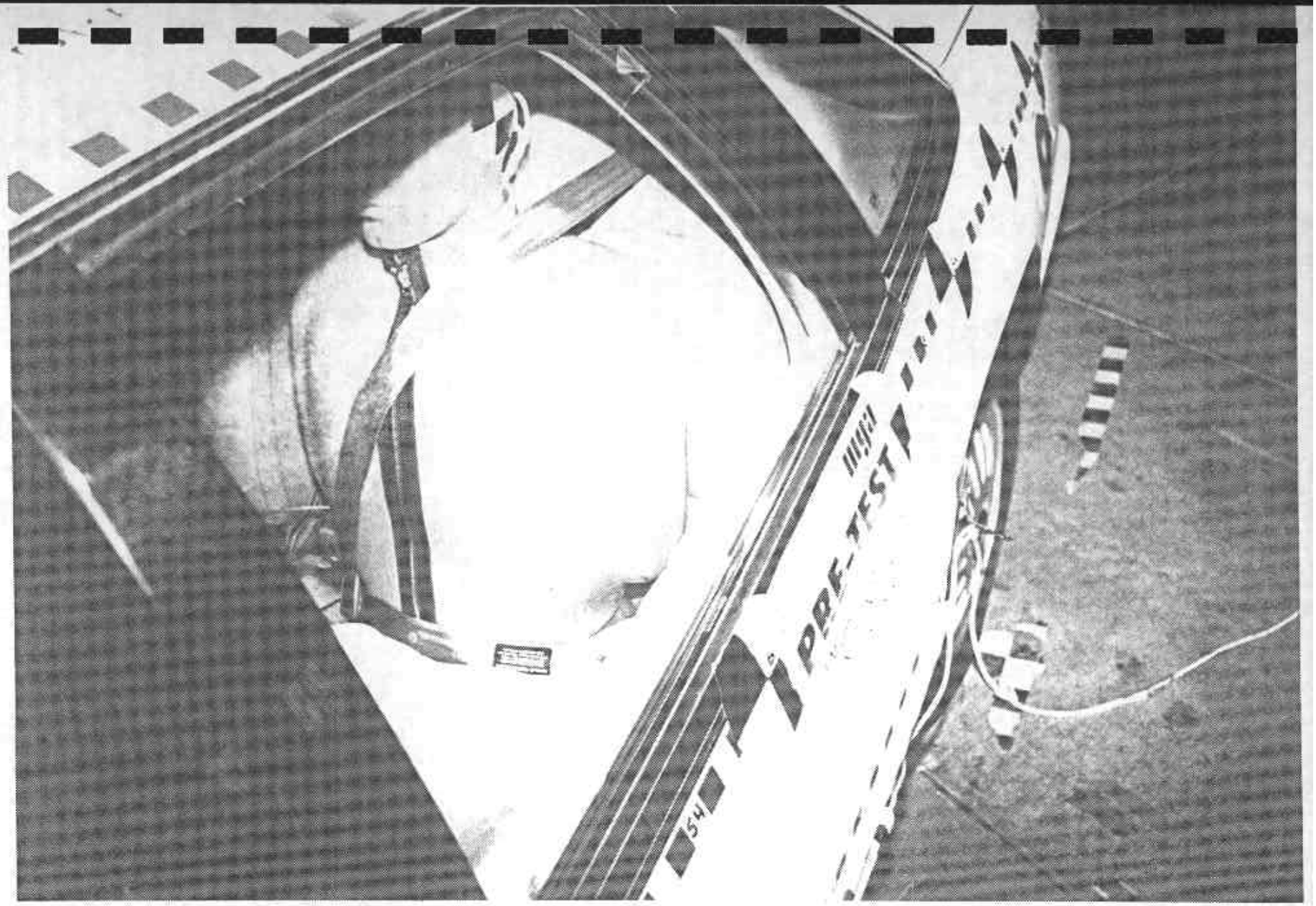


Photo No. A-32 - Pre-Test Passenger Dummy Front Oblique View

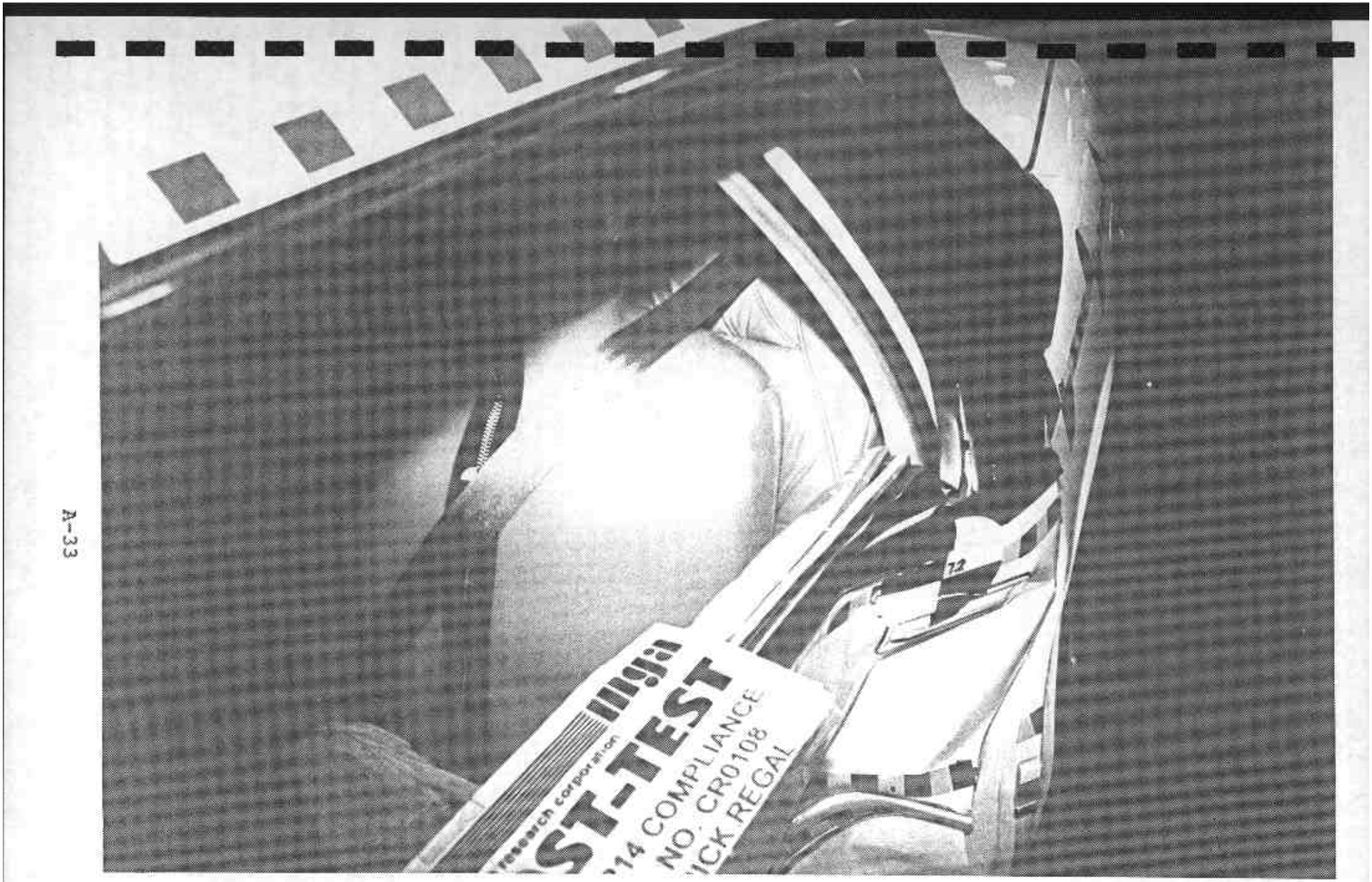


Photo No. A-33 - Post-Test Passenger Dummy Front Oblique View

Photo No. A-34 - Pre-Test Passenger Dummy Left Side View (Door Open)

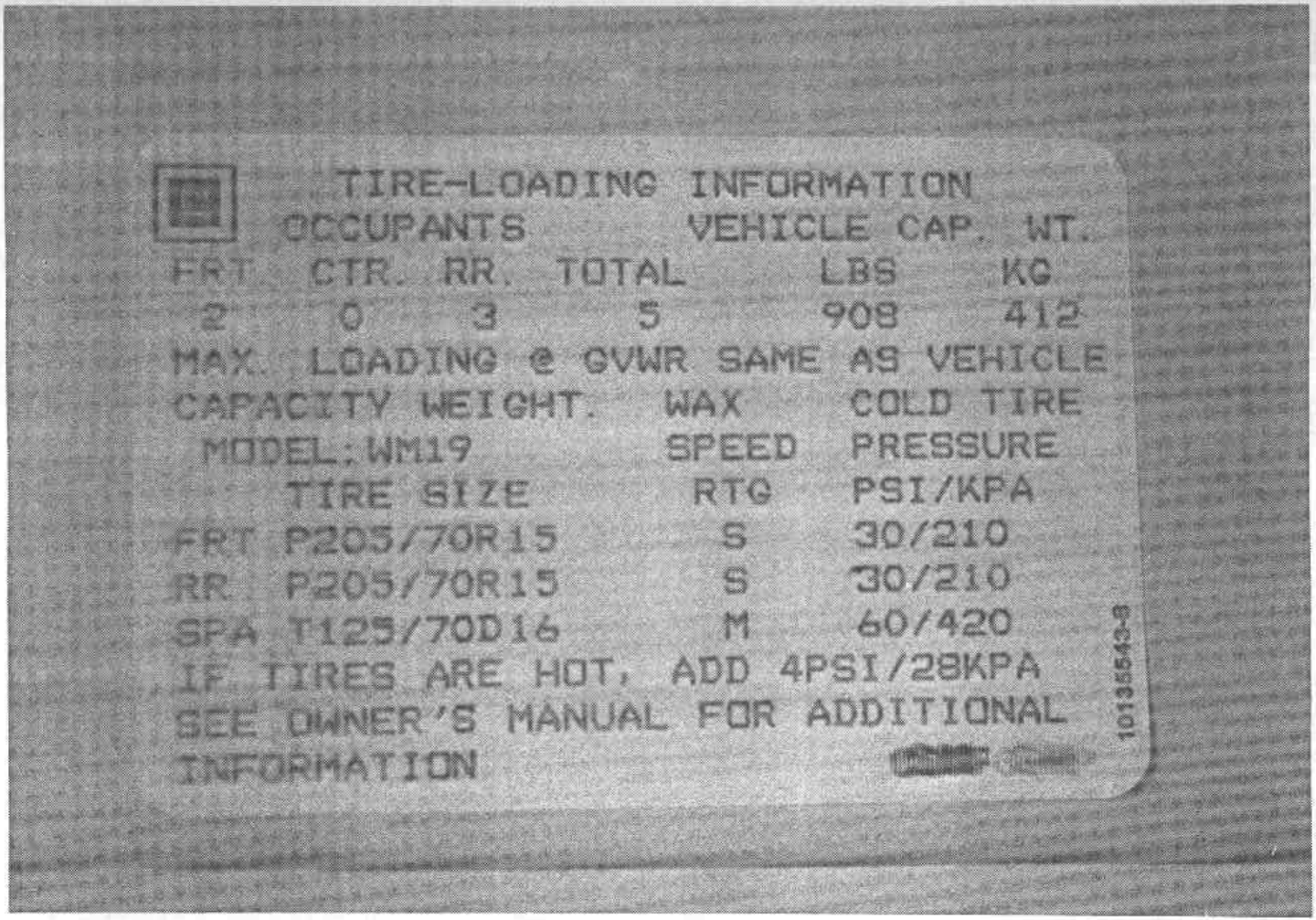
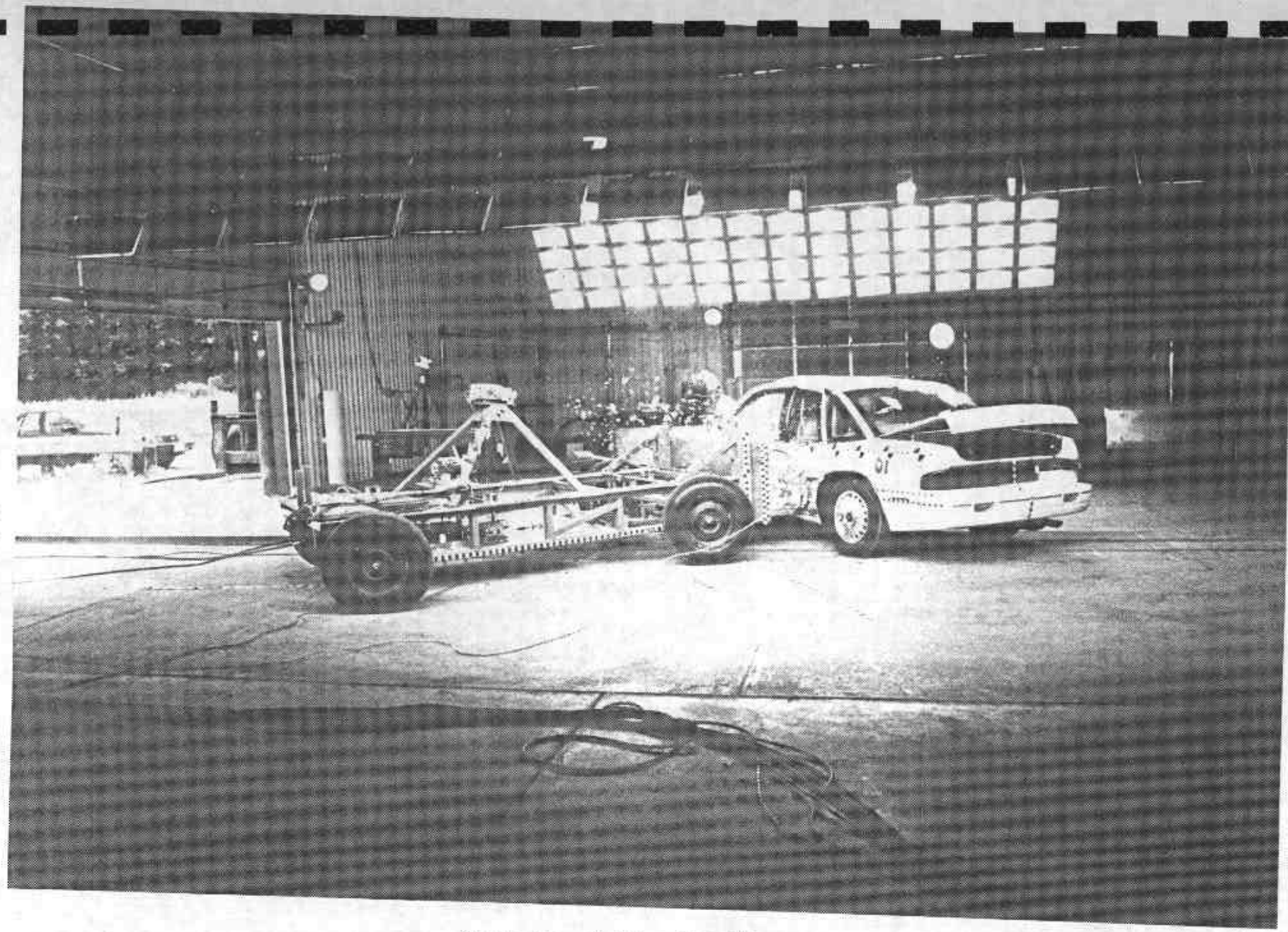


Photo No. A-35 - Tire Placard

PHOTOGRAPH NOT AVAILABLE

Photo No. A-36 - Vehicle Certification Label



A-37

Photo No. A-37 - Impact

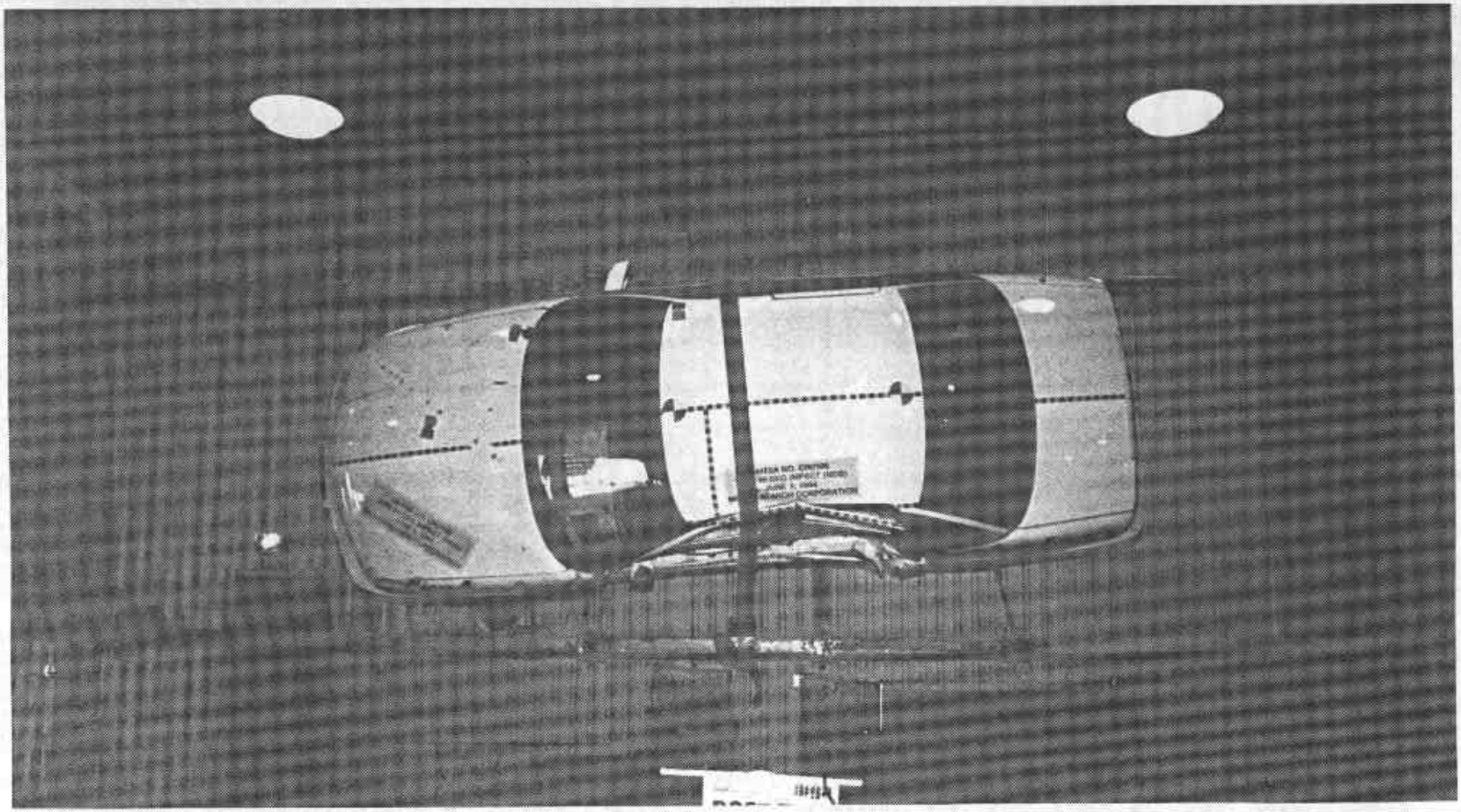


Photo No. A-38 - Rollover 90°

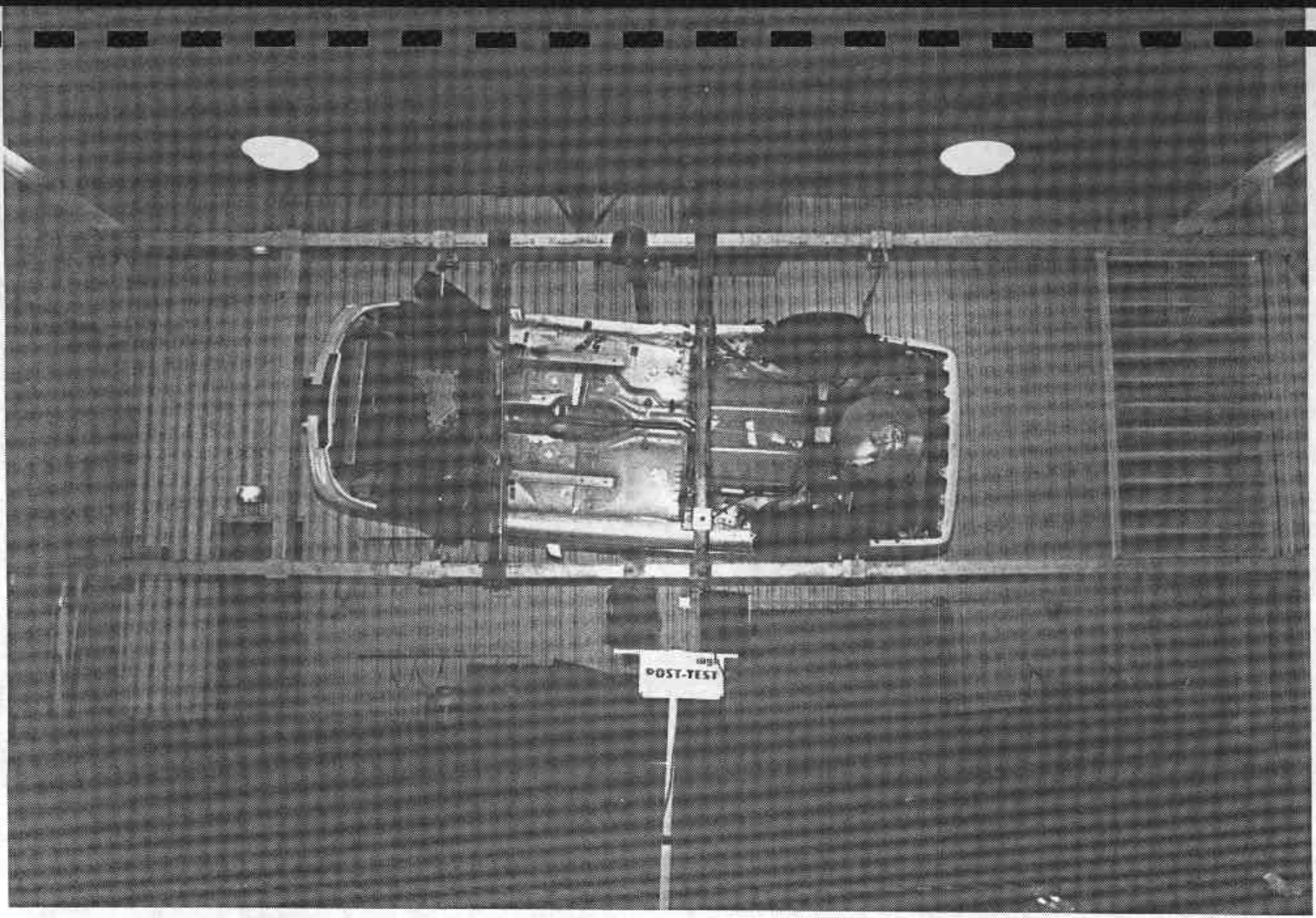


Photo No. A-40 - Rollover 270°

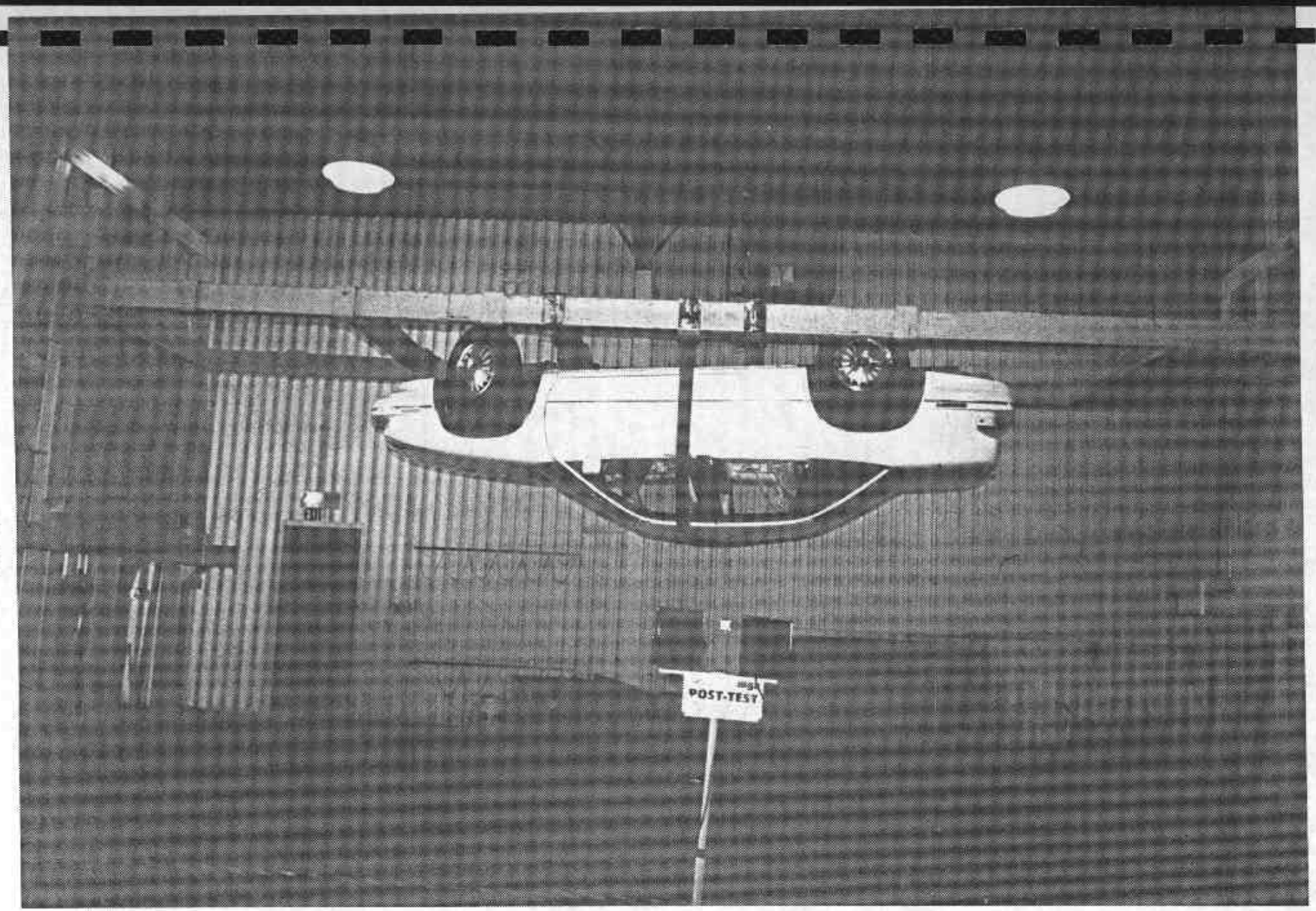


Photo No. A-39 - Rollover 180°

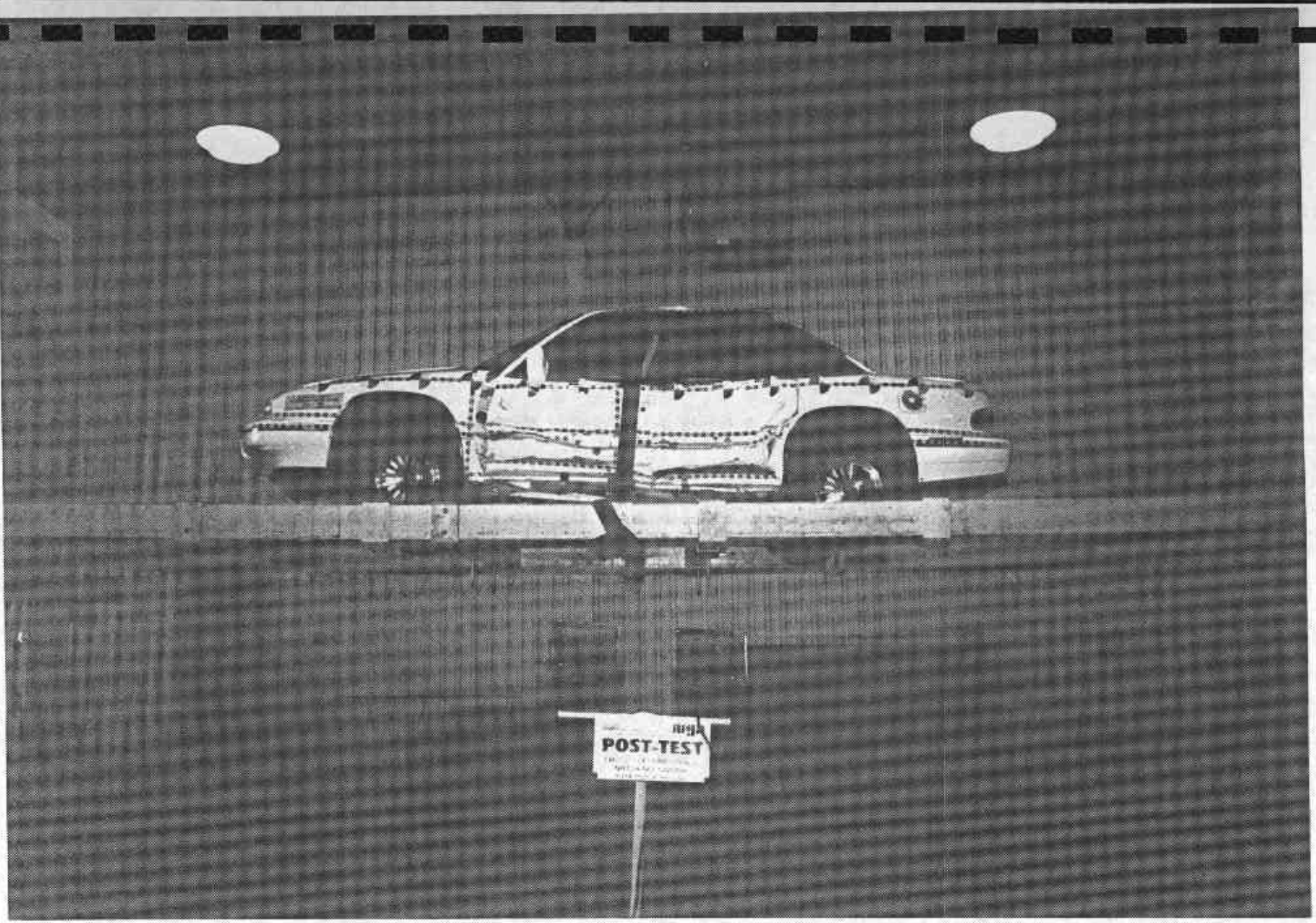


Photo No. A-41 - Rollover 360°

APPENDIX B - DATA PLOTS

Table of Data Plots

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Filter: Class 180 (300 Hz)

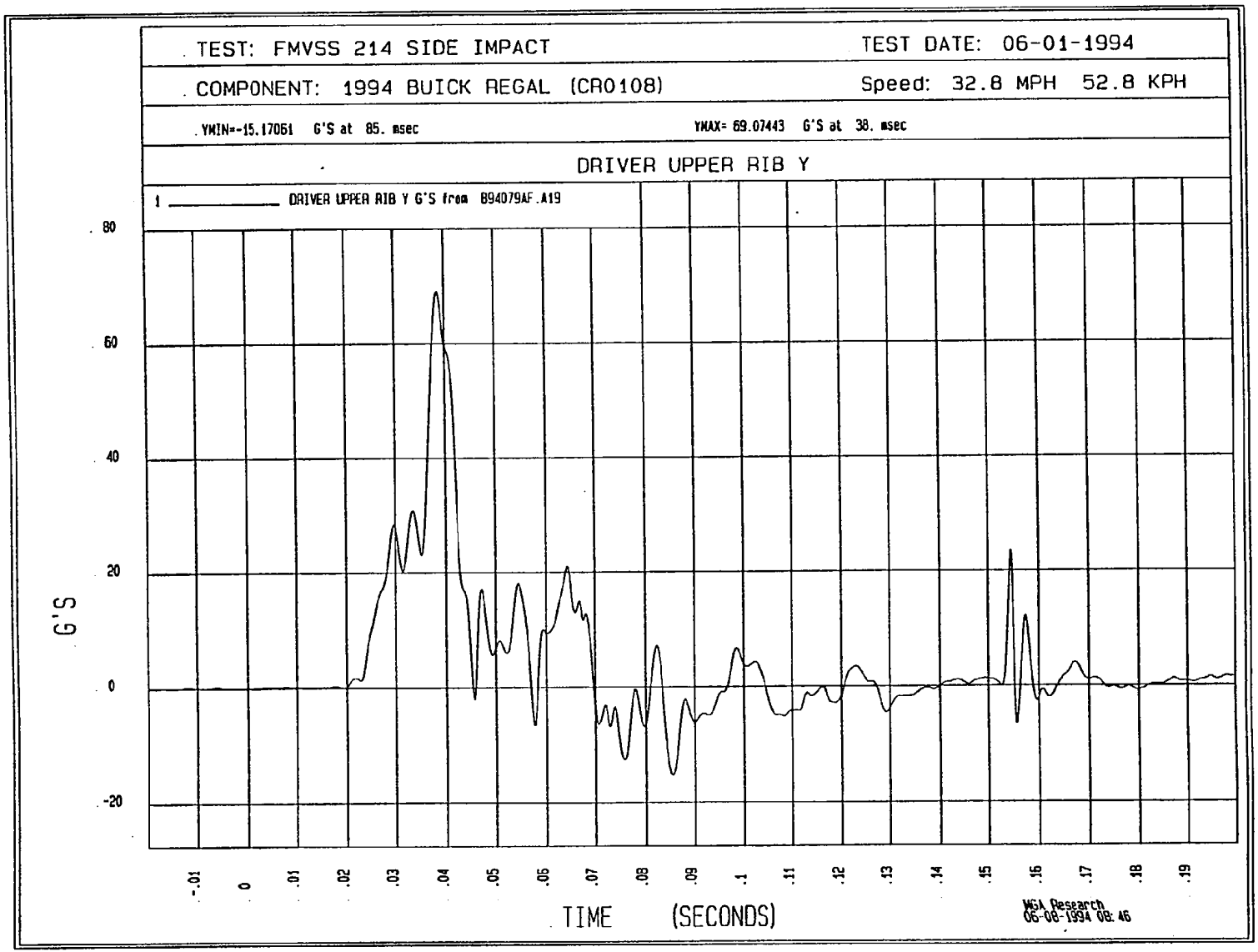


Figure B-1 - Driver Upper Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

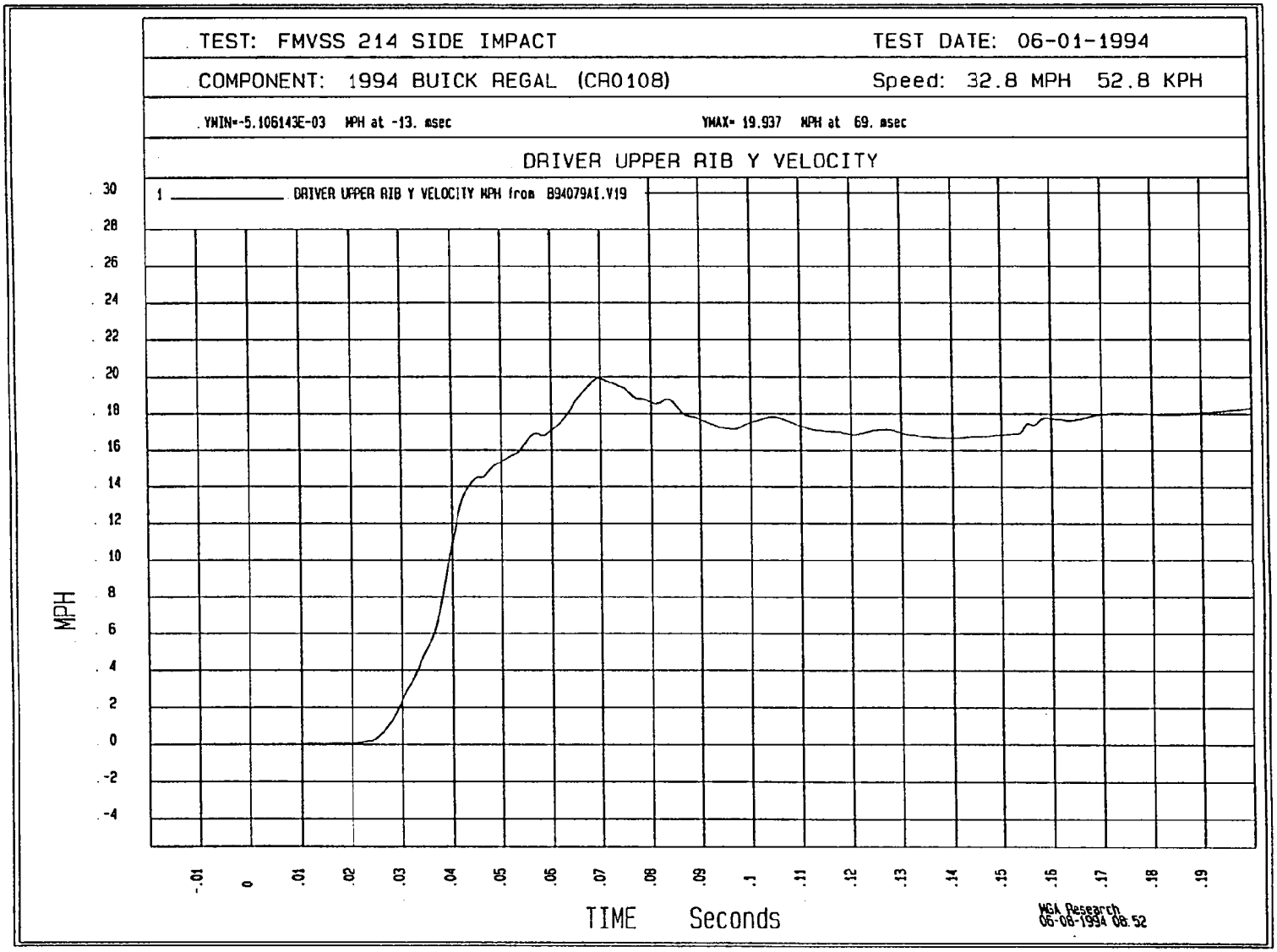


Figure B-2 - Driver Upper Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

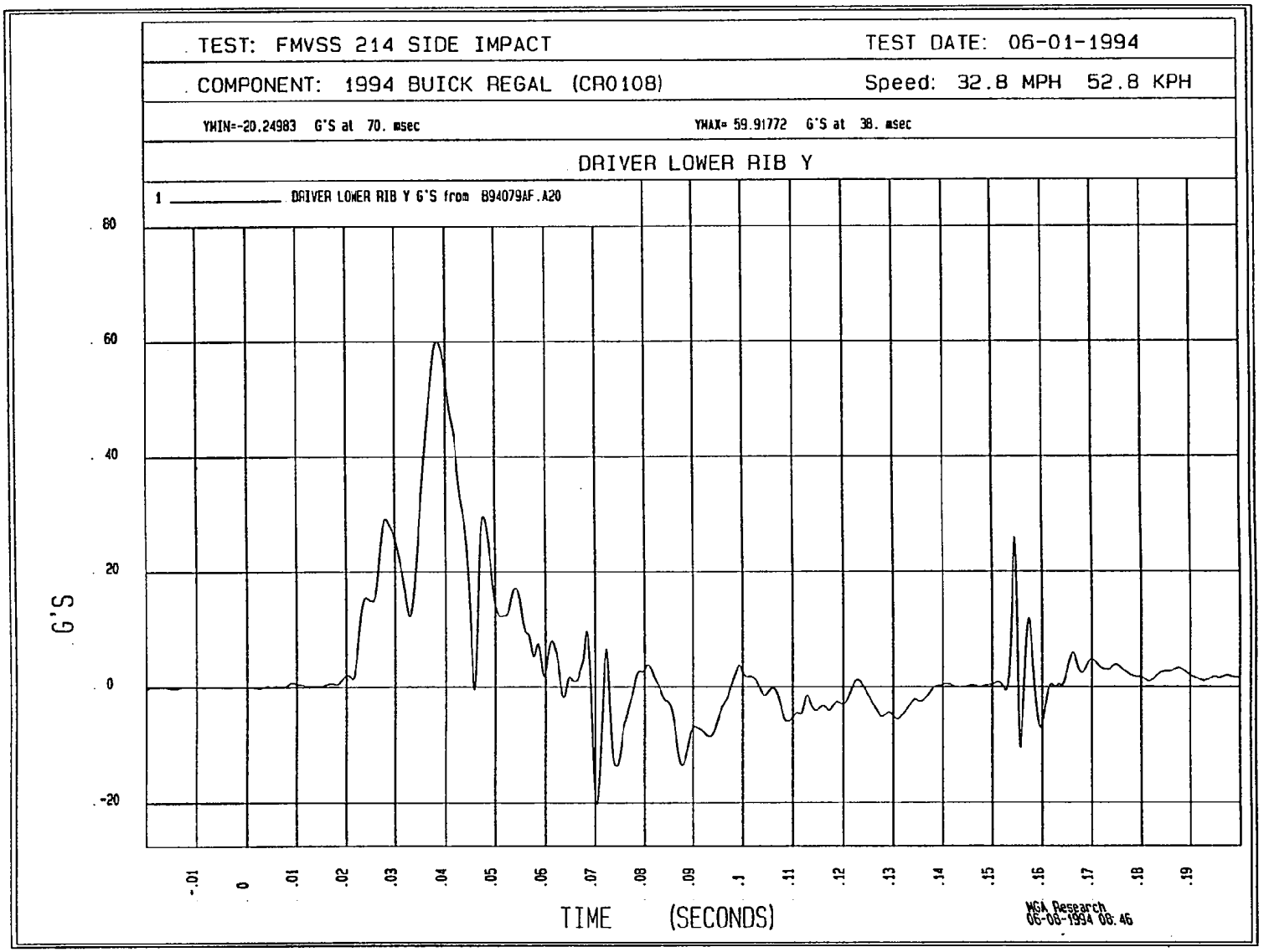


Figure B-3 - Driver Lower Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

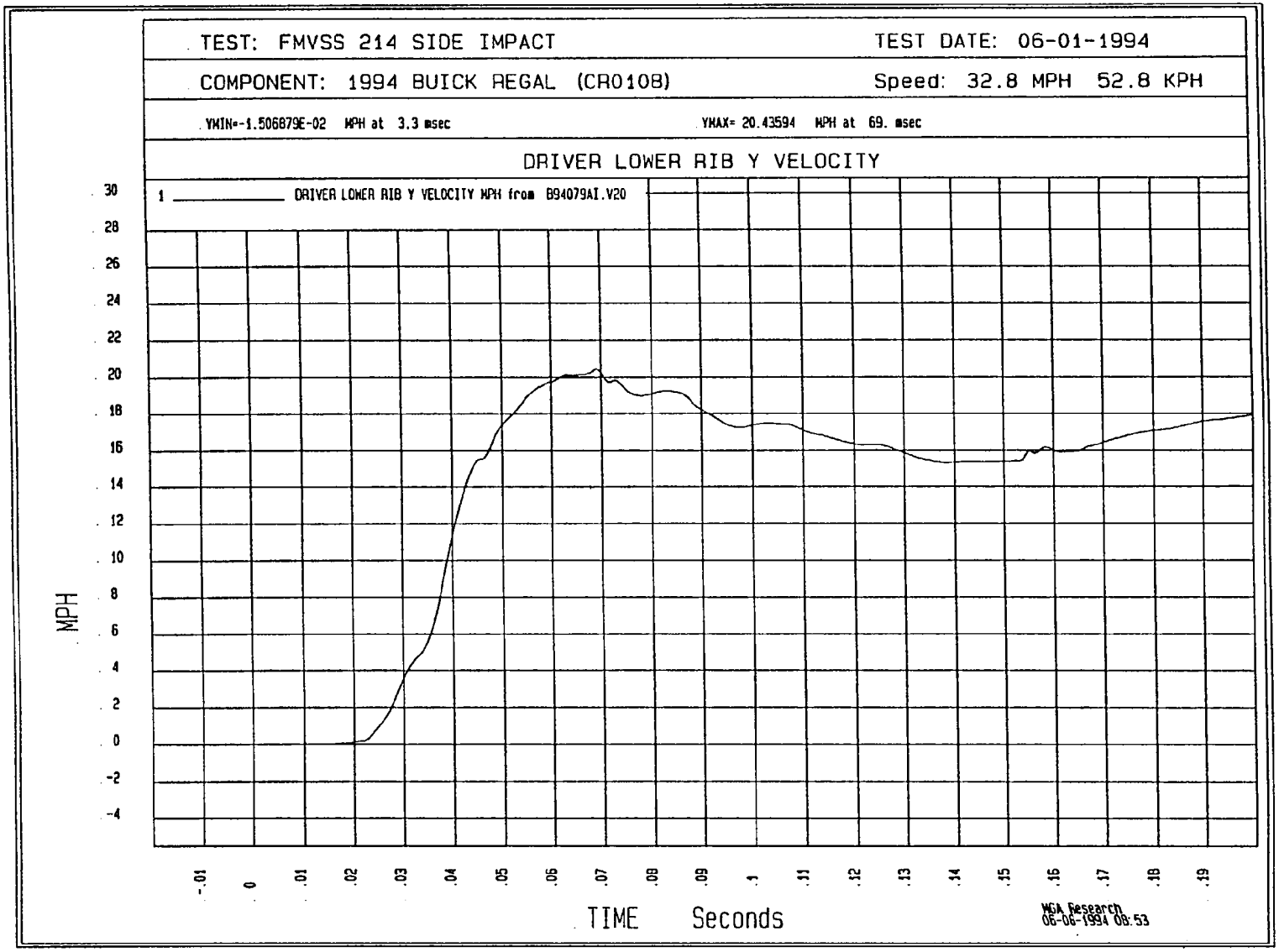


Figure B-4 - Driver Lower Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

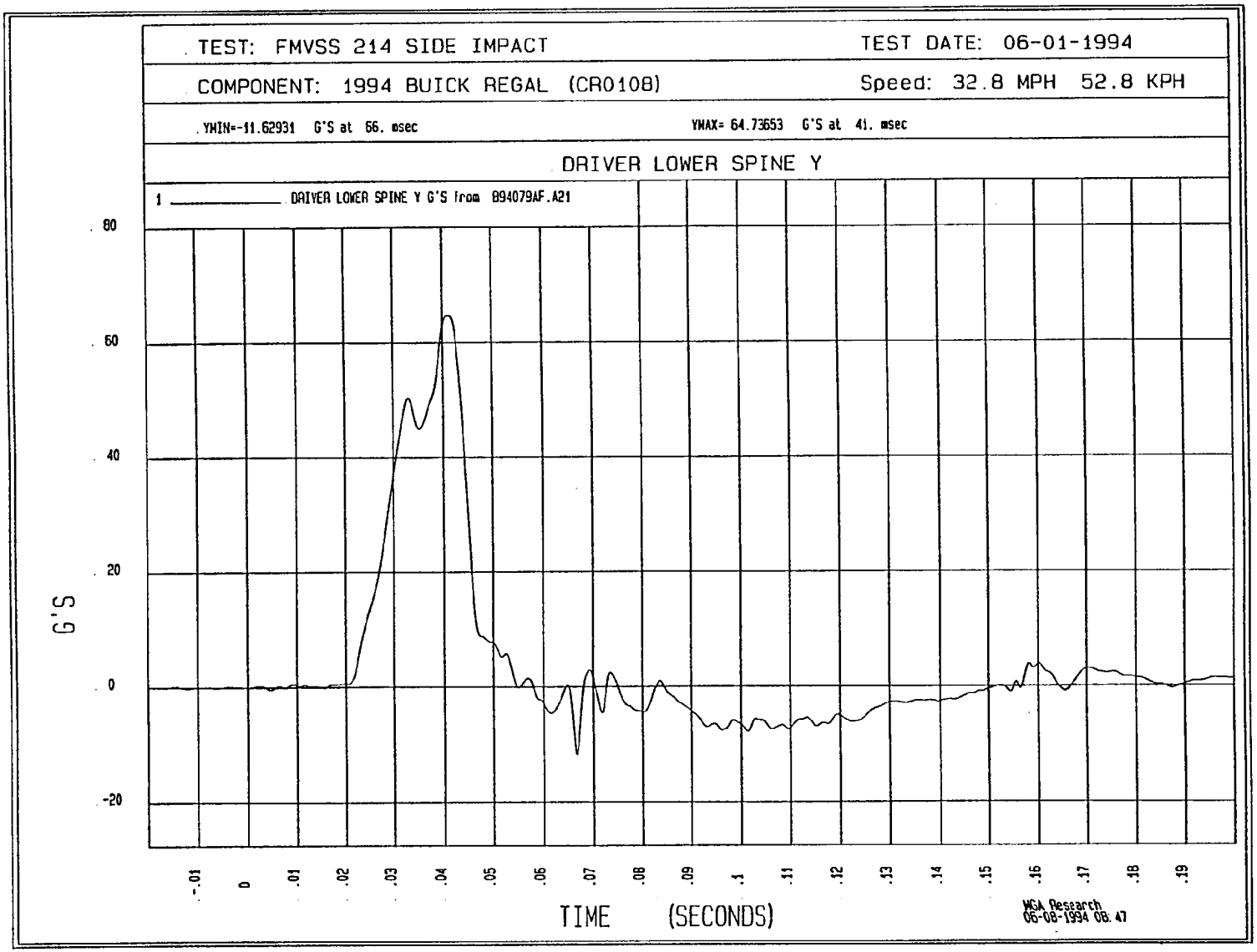


Figure B-5 - Driver Lower Spine Y Acceleration vs. Time

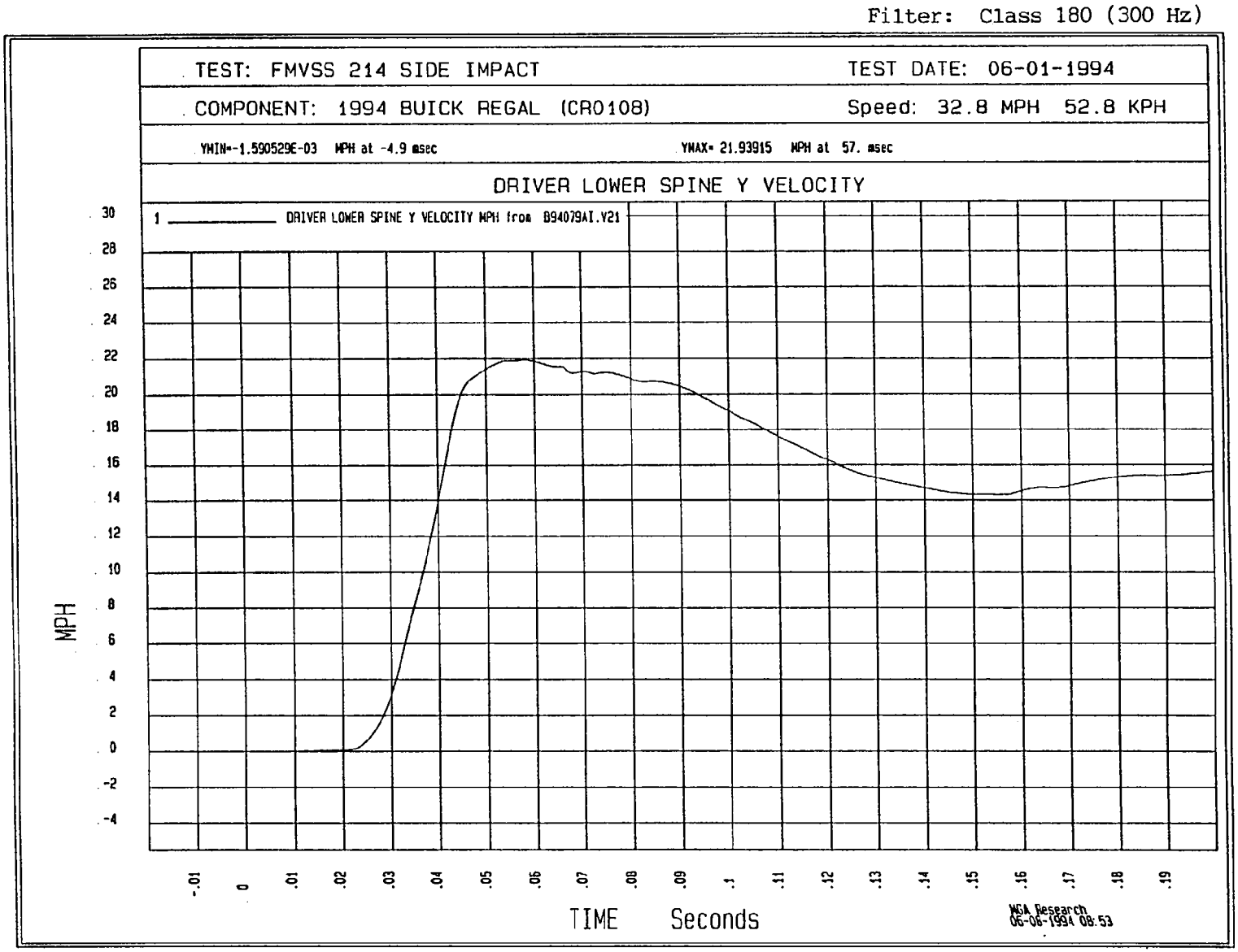


Figure B-6 - Driver Lower Spine Y Velocity vs. Time

Filter: Class 180 (300 Hz)

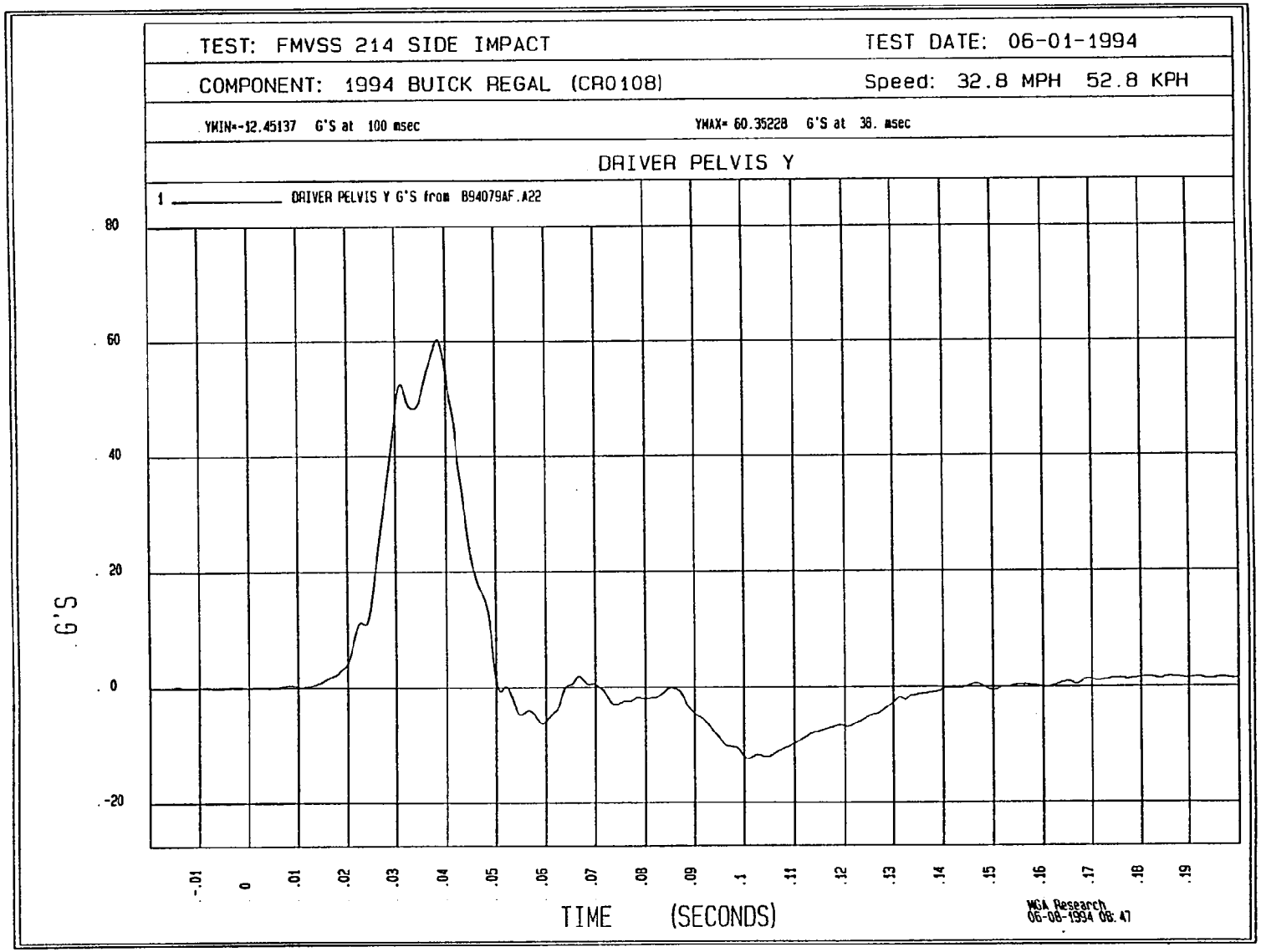


Figure B-7 - Driver Pelvis Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

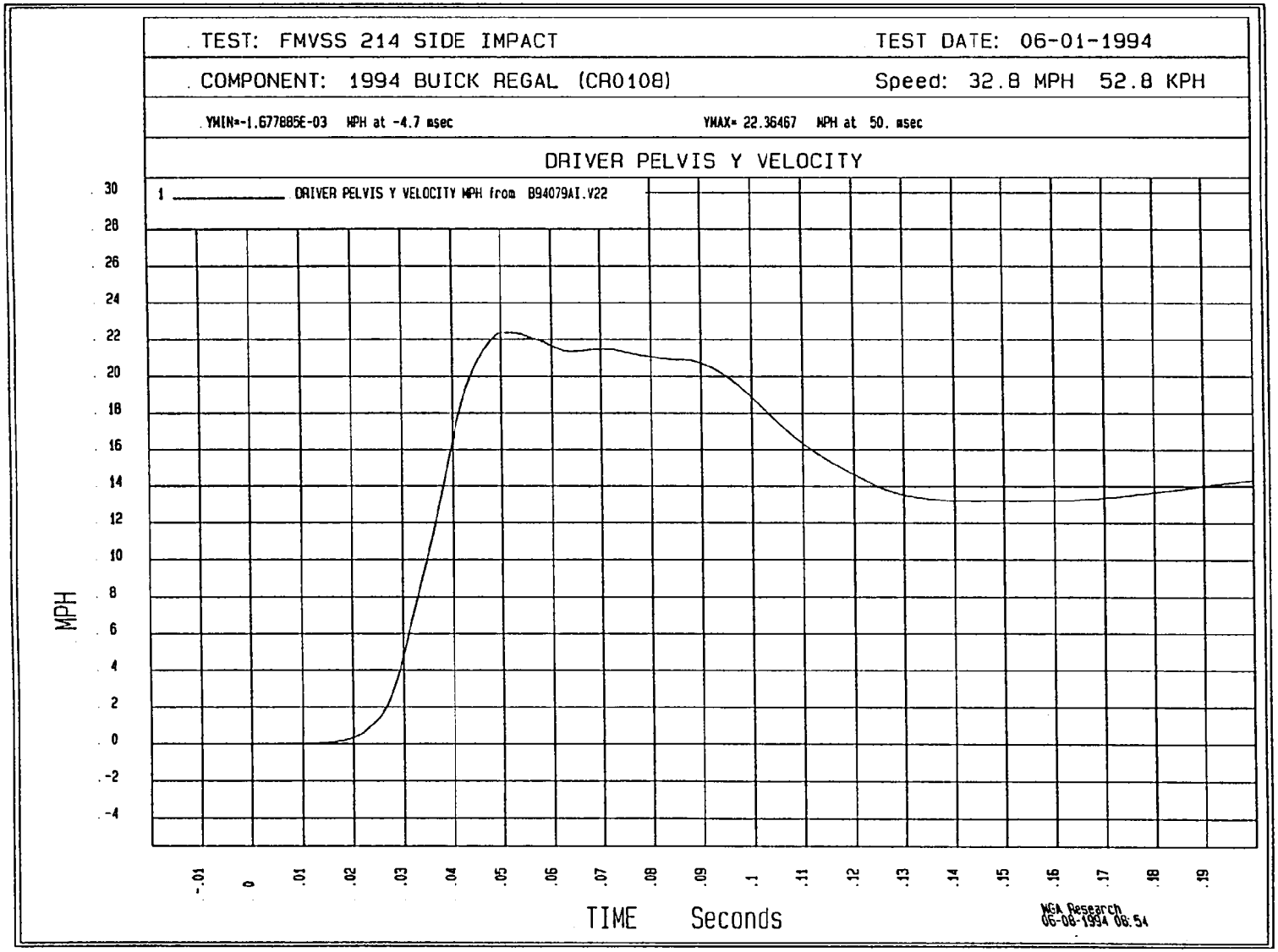


Figure B-8 - Driver Pelvis Y Velocity vs. Time

Filter: Class 180 (300 Hz)

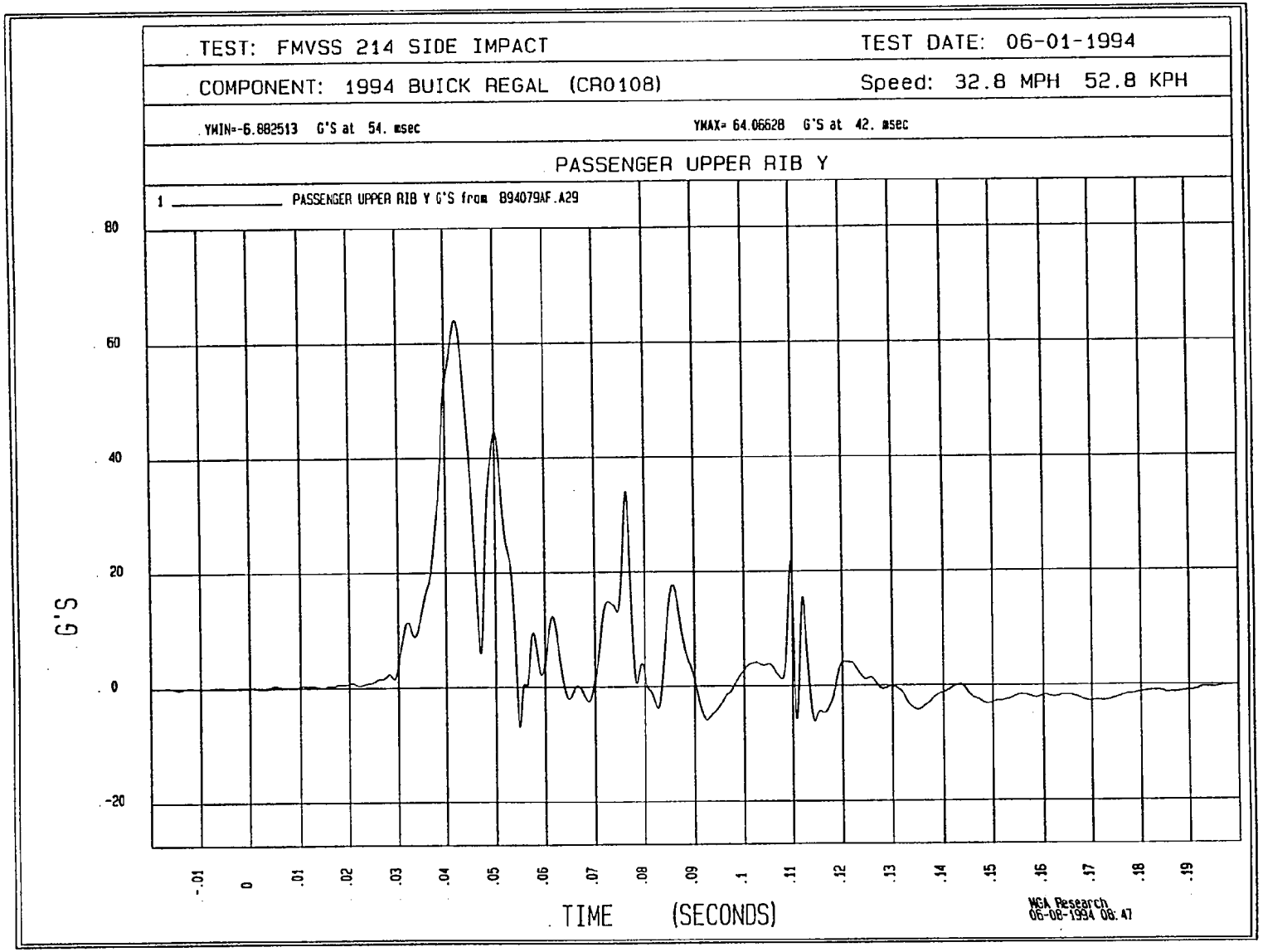


Figure B-9 - Passenger Upper Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

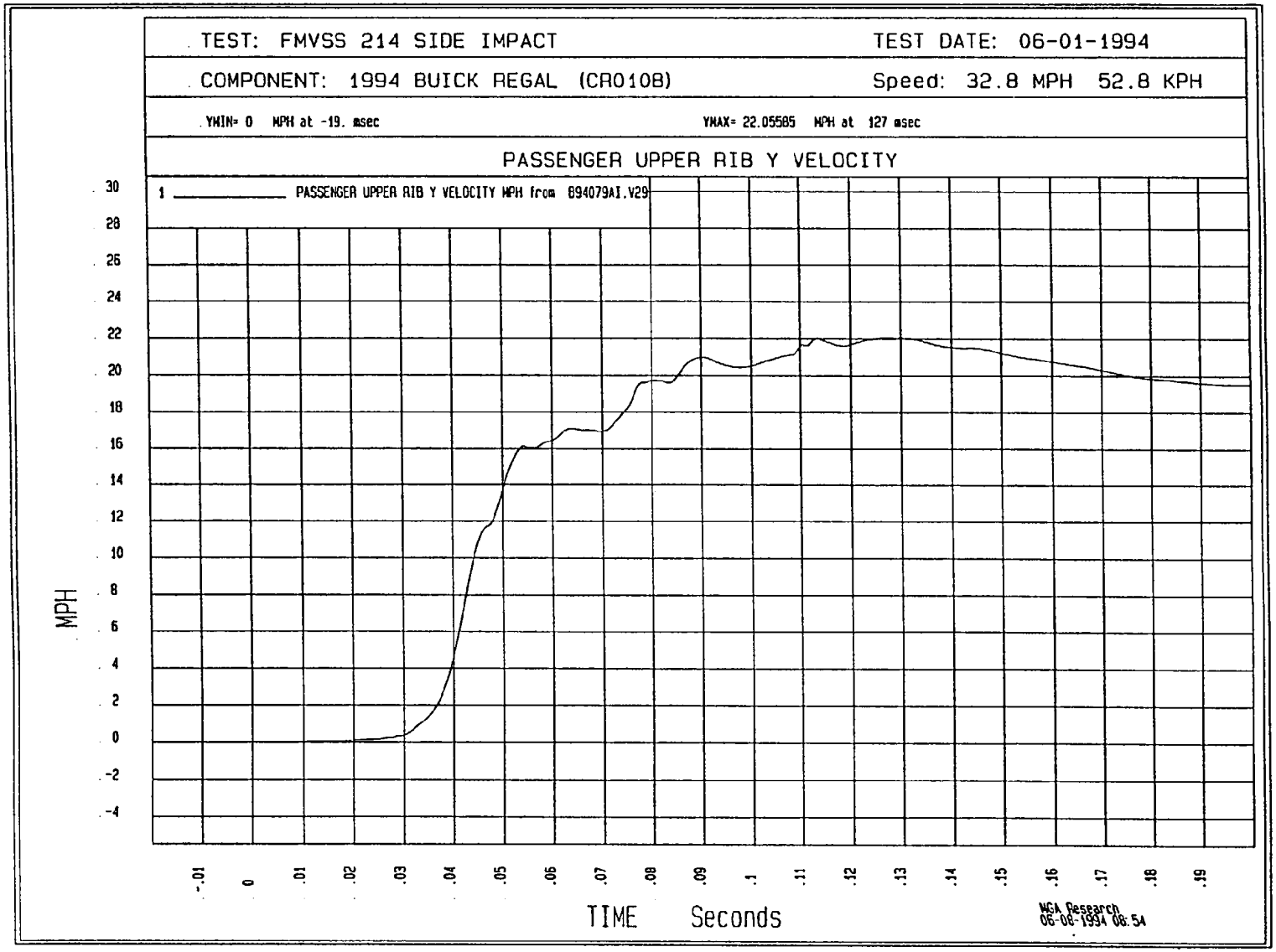


Figure B-10 - Passenger Upper Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

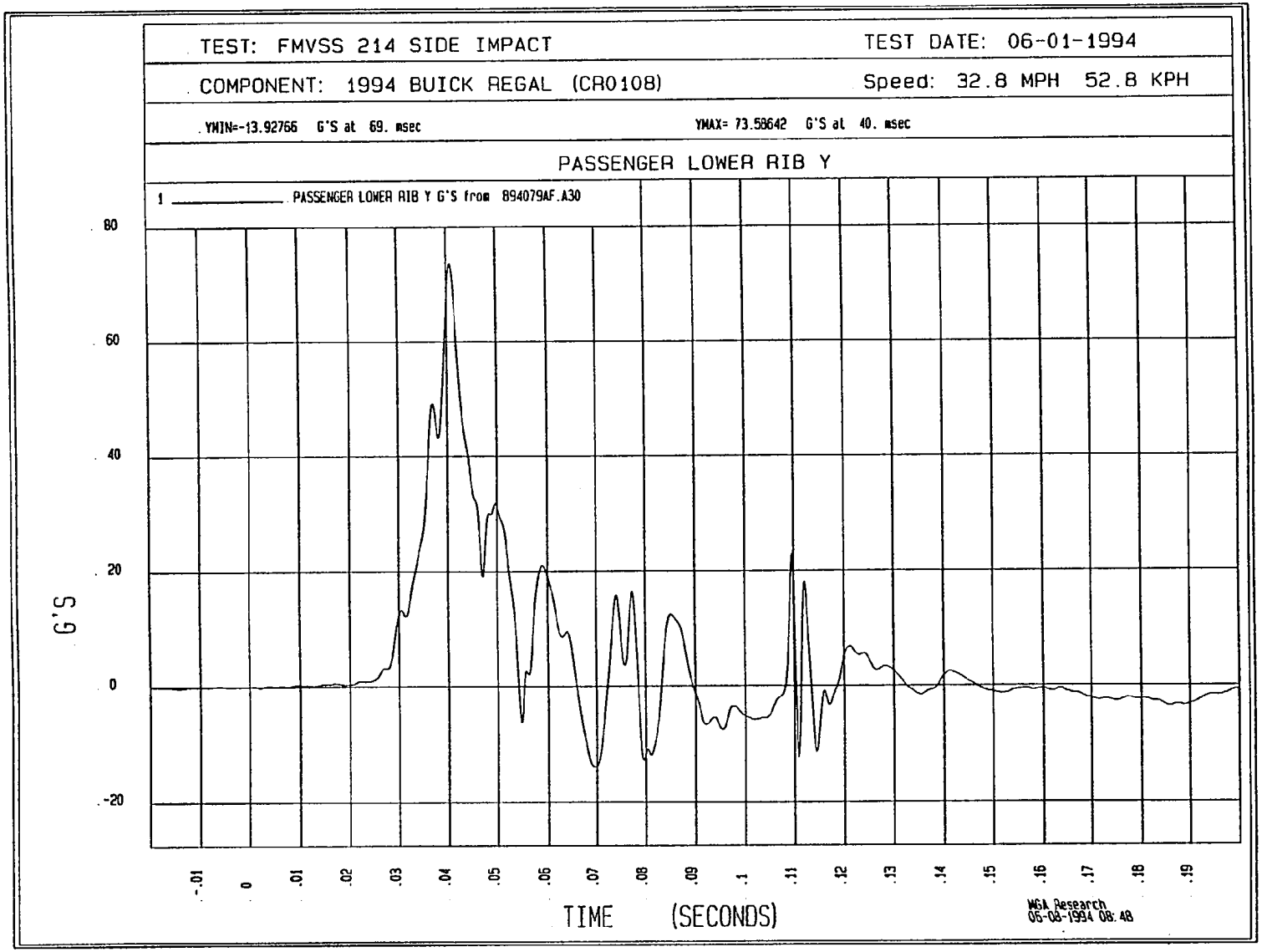


Figure B-11 - Passenger Lower Rib Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

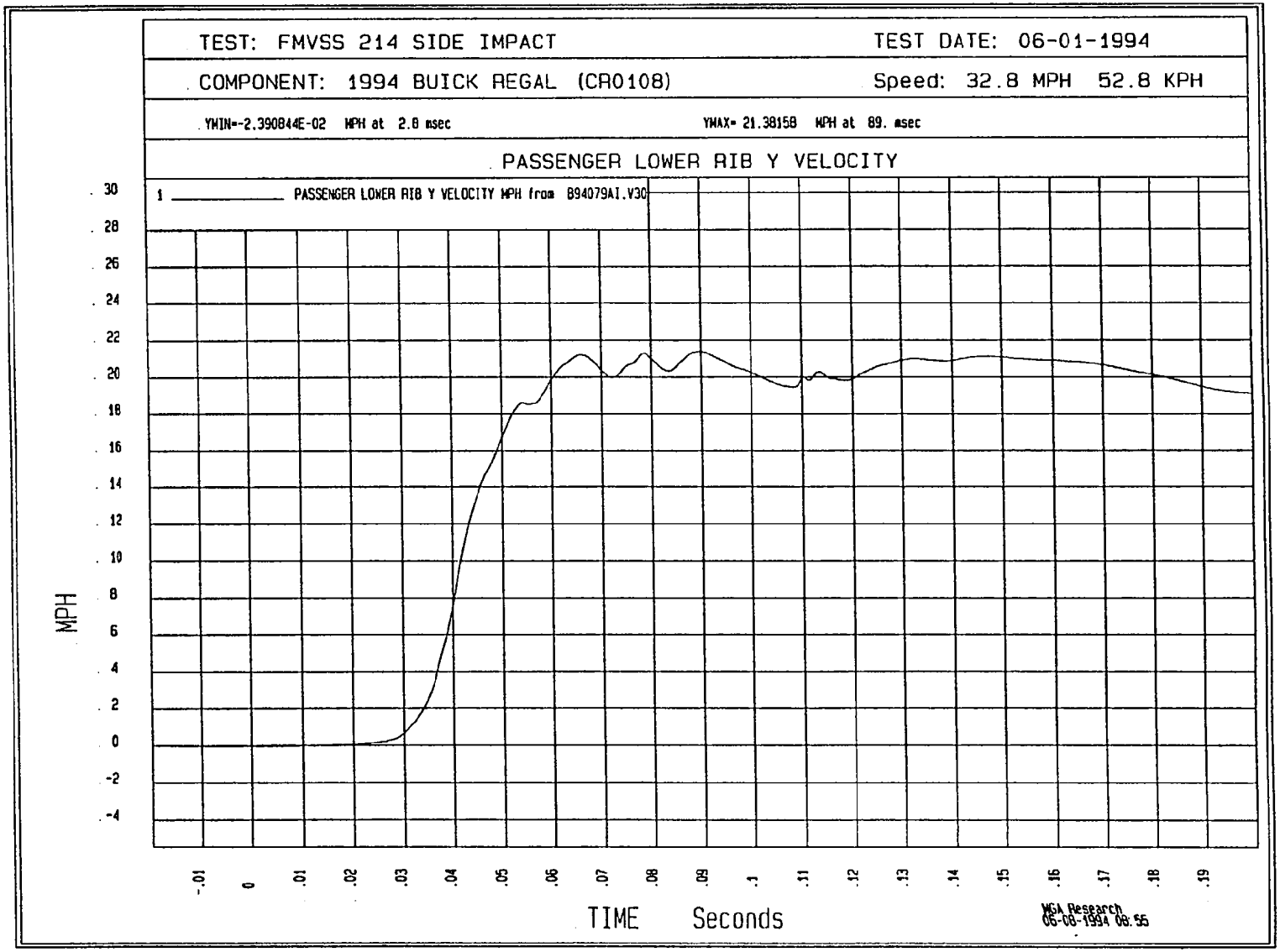


Figure B-12 - Passenger Lower Rib Y Velocity vs. Time

Filter: Class 180 (300 Hz)

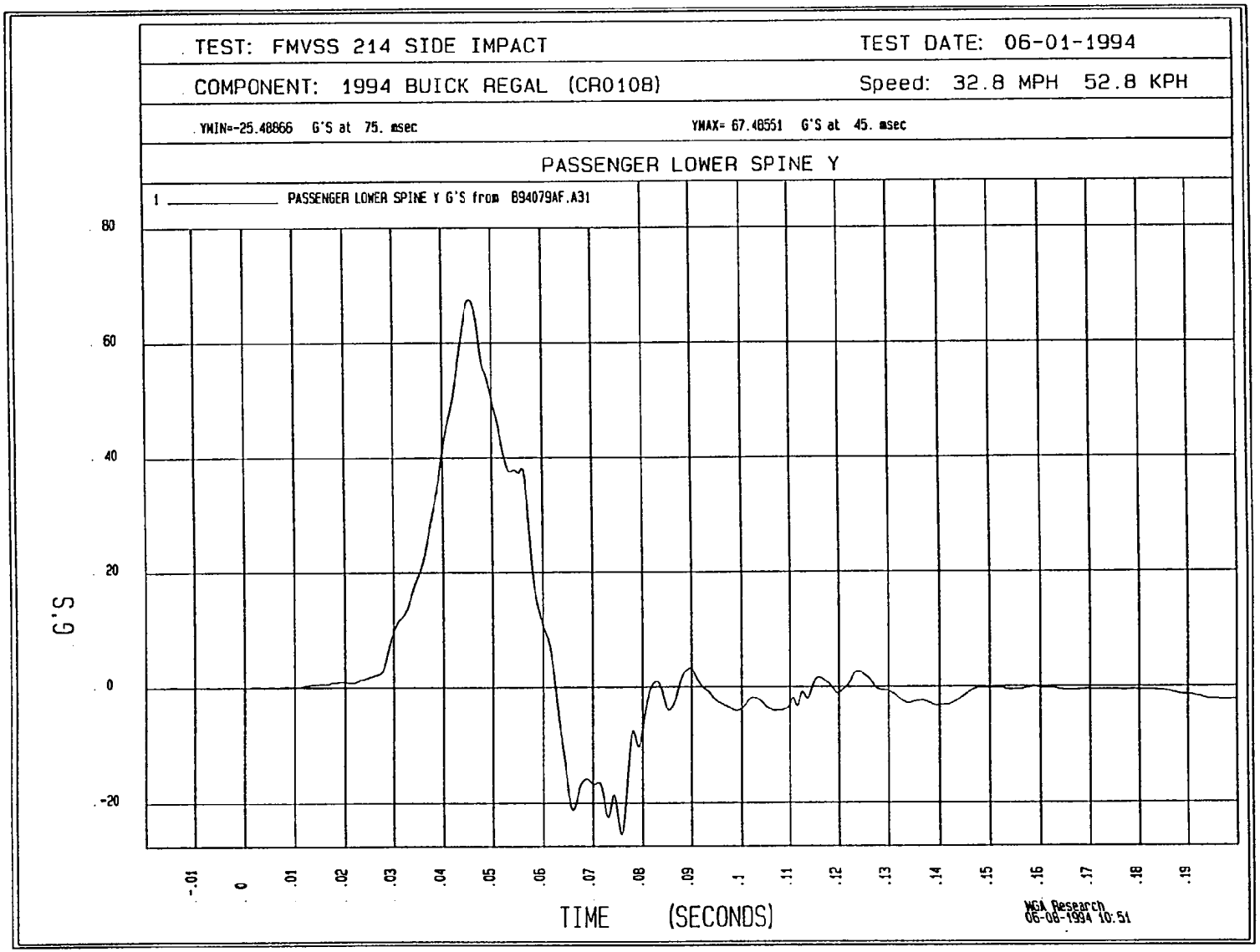


Figure B-13 - Passenger Lower Spine Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

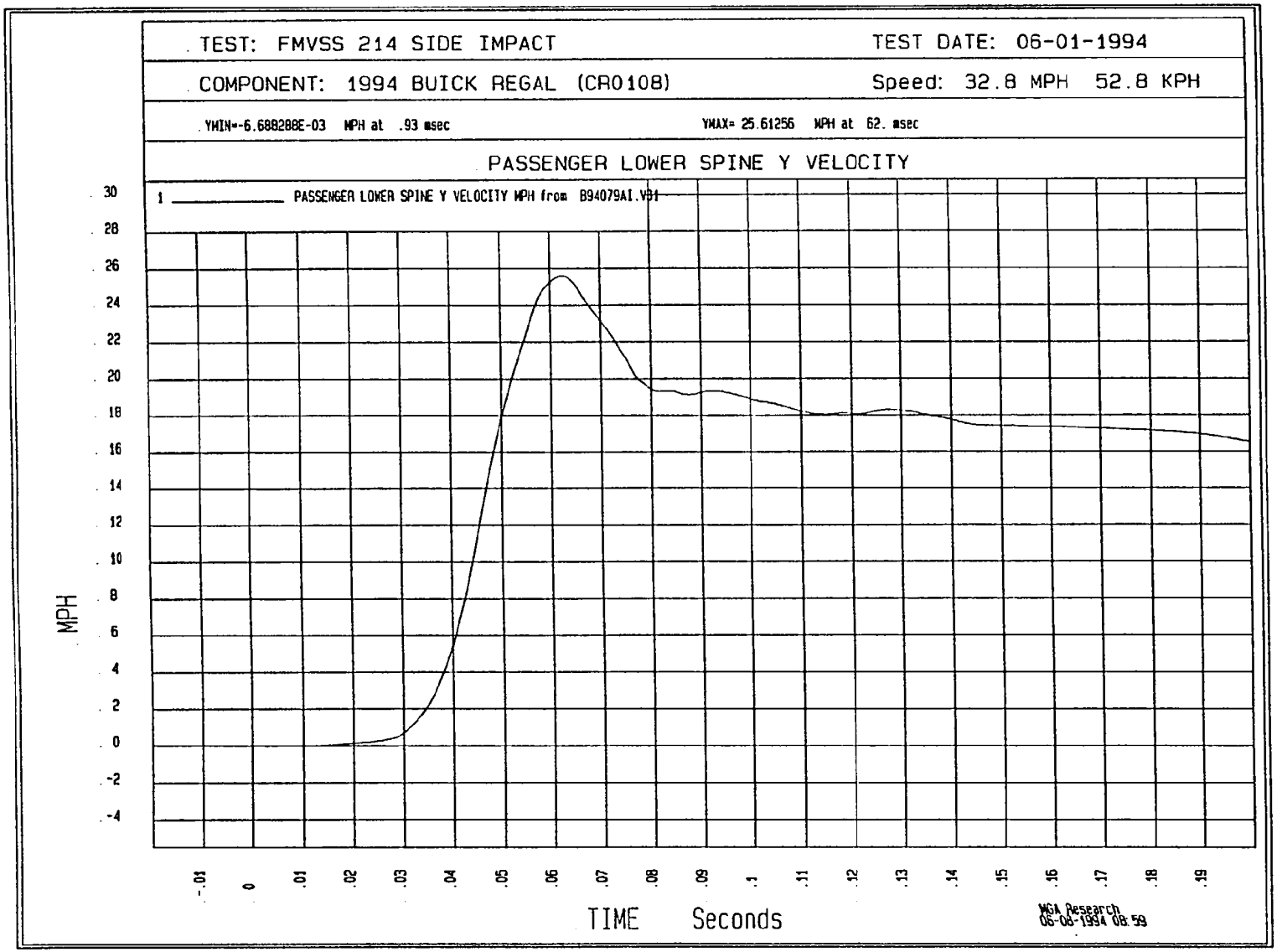


Figure B-14 - Passenger Lower Spine Y Velocity vs. Time

Filter: Class 180 (300 Hz)

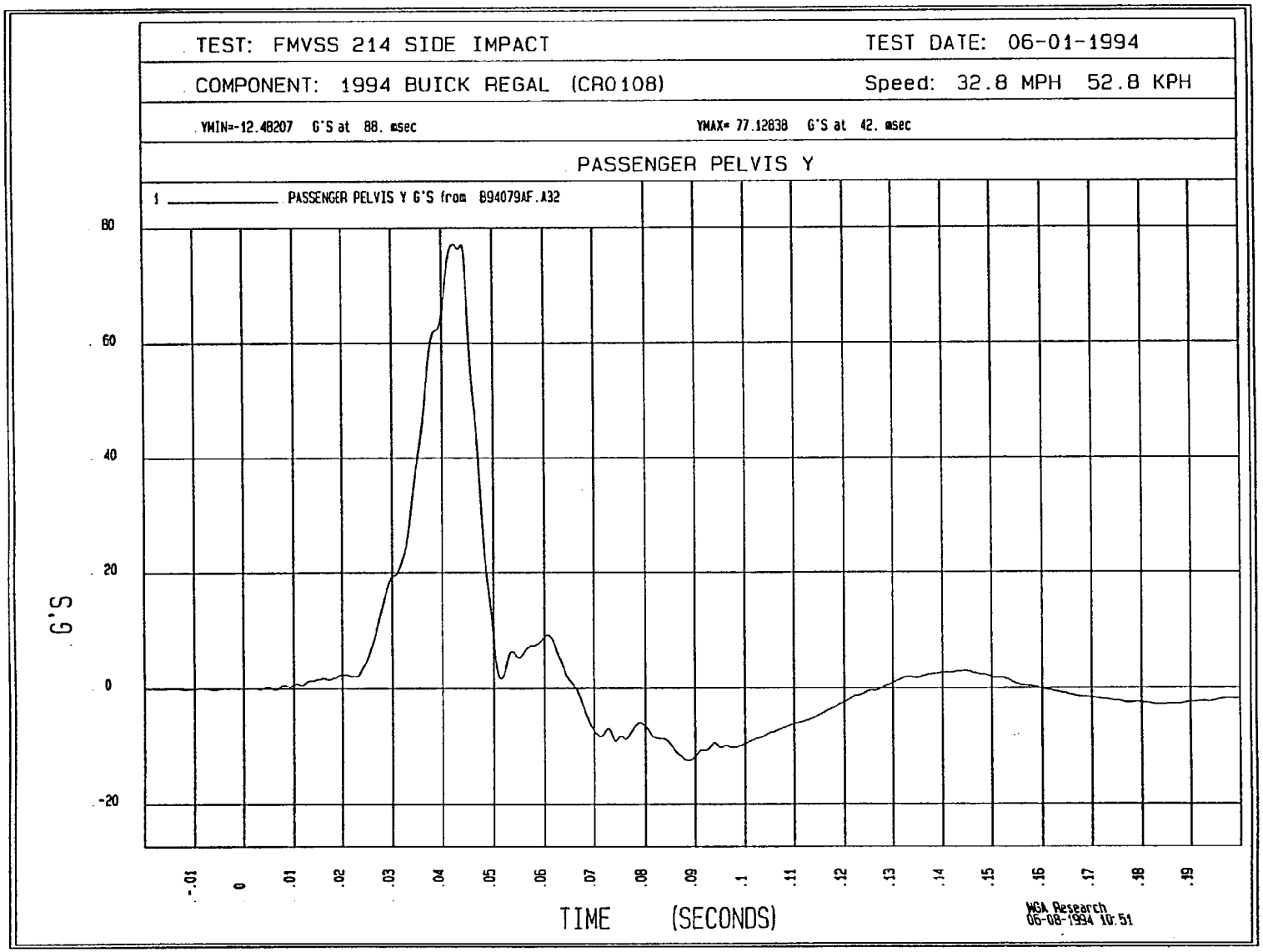


Figure B-15 - Passenger Pelvis Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

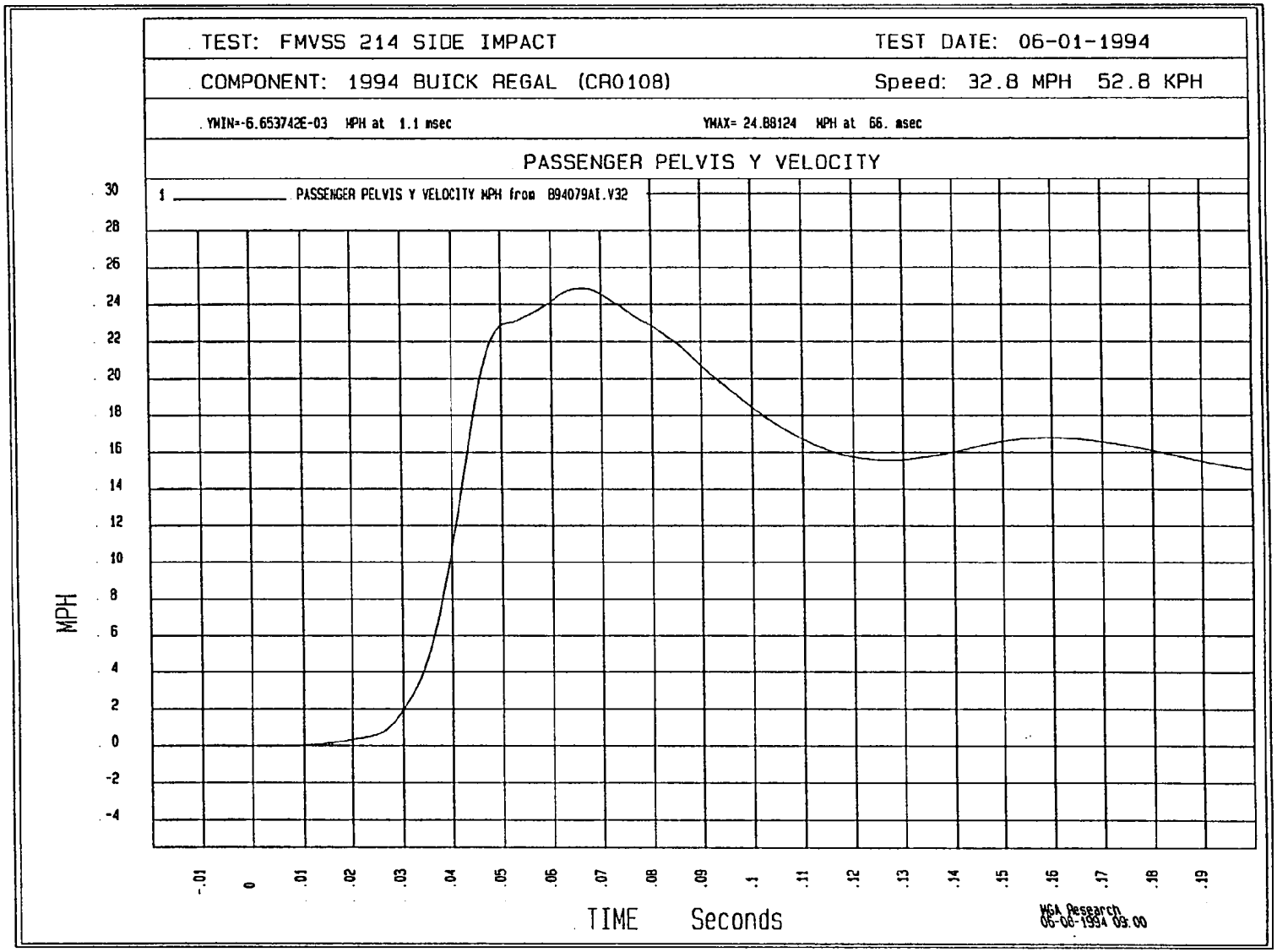


Figure B-16 - Passenger Pelvis Y Velocity vs. Time

Filter: Class 60 (100 Hz)

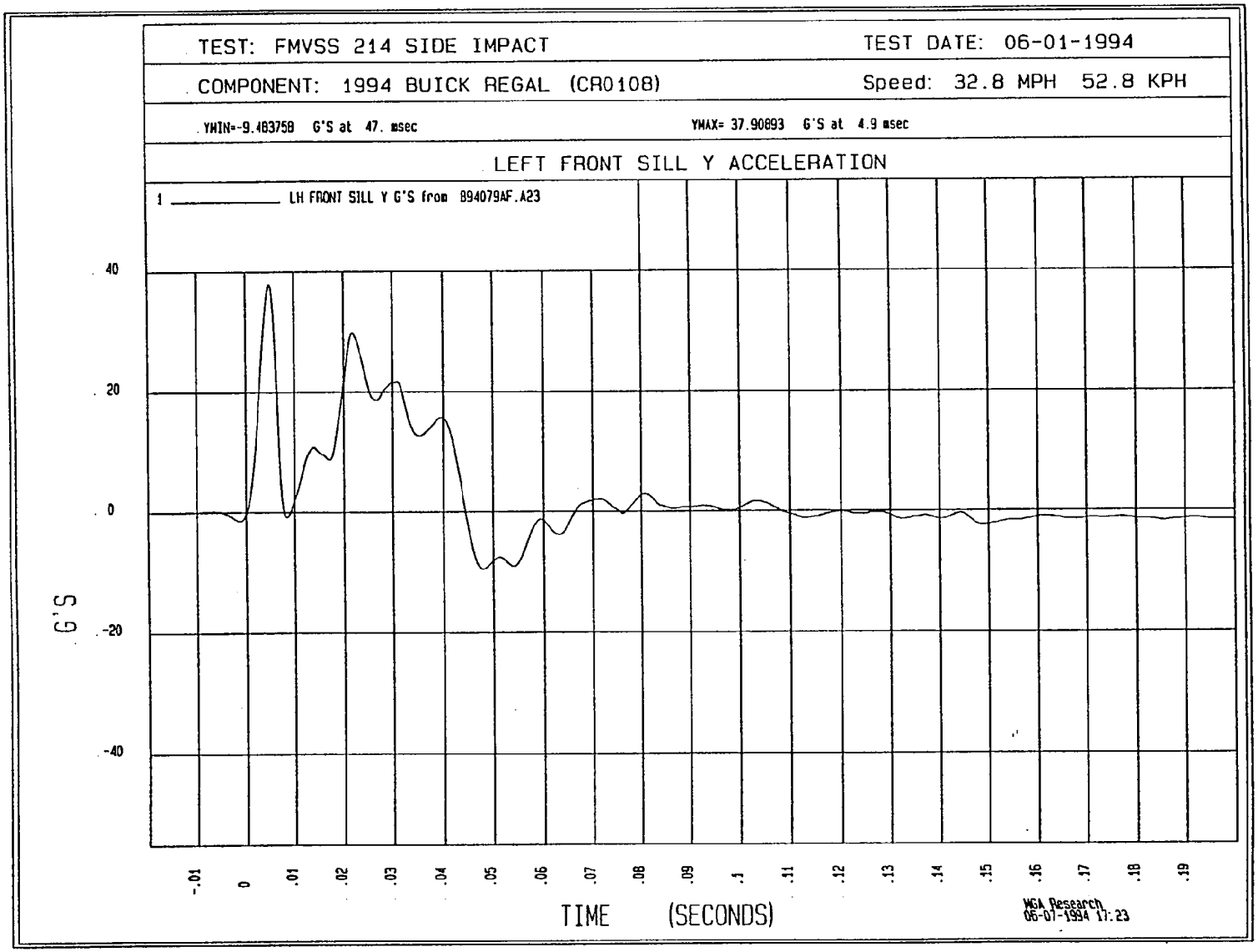


Figure B-17 - Left Front Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

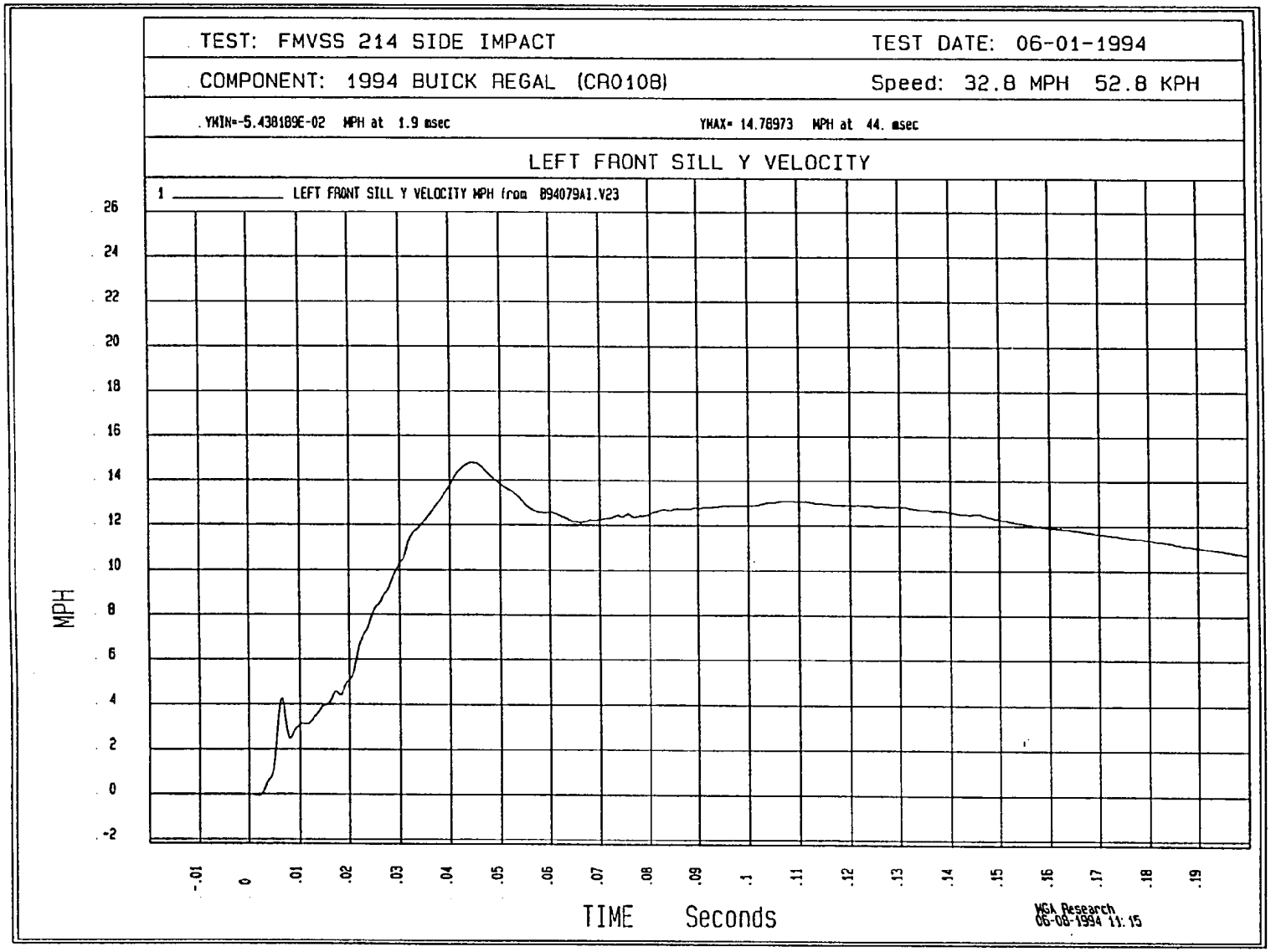


Figure B-18 - Left Front Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

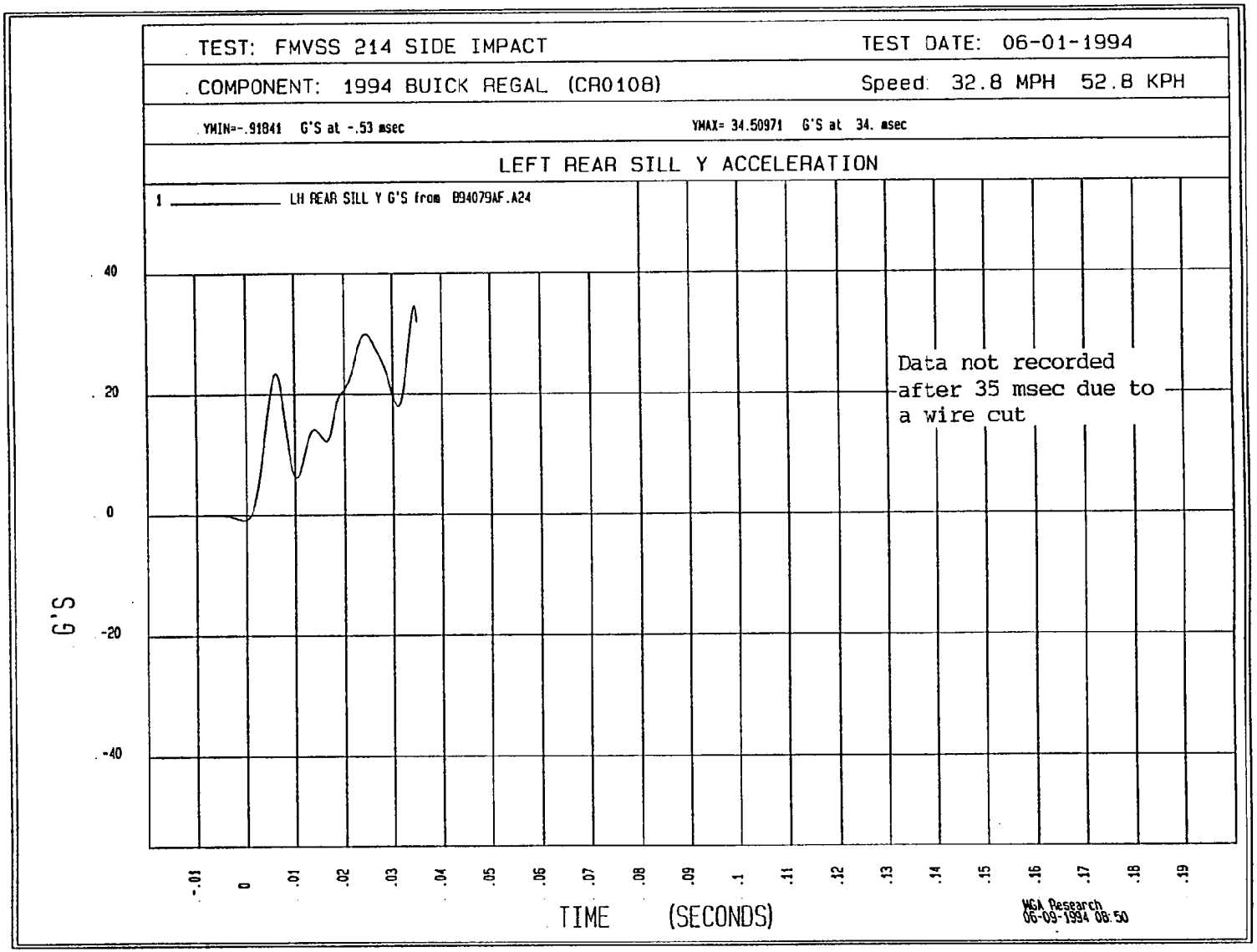


Figure B-19 - Left Rear Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

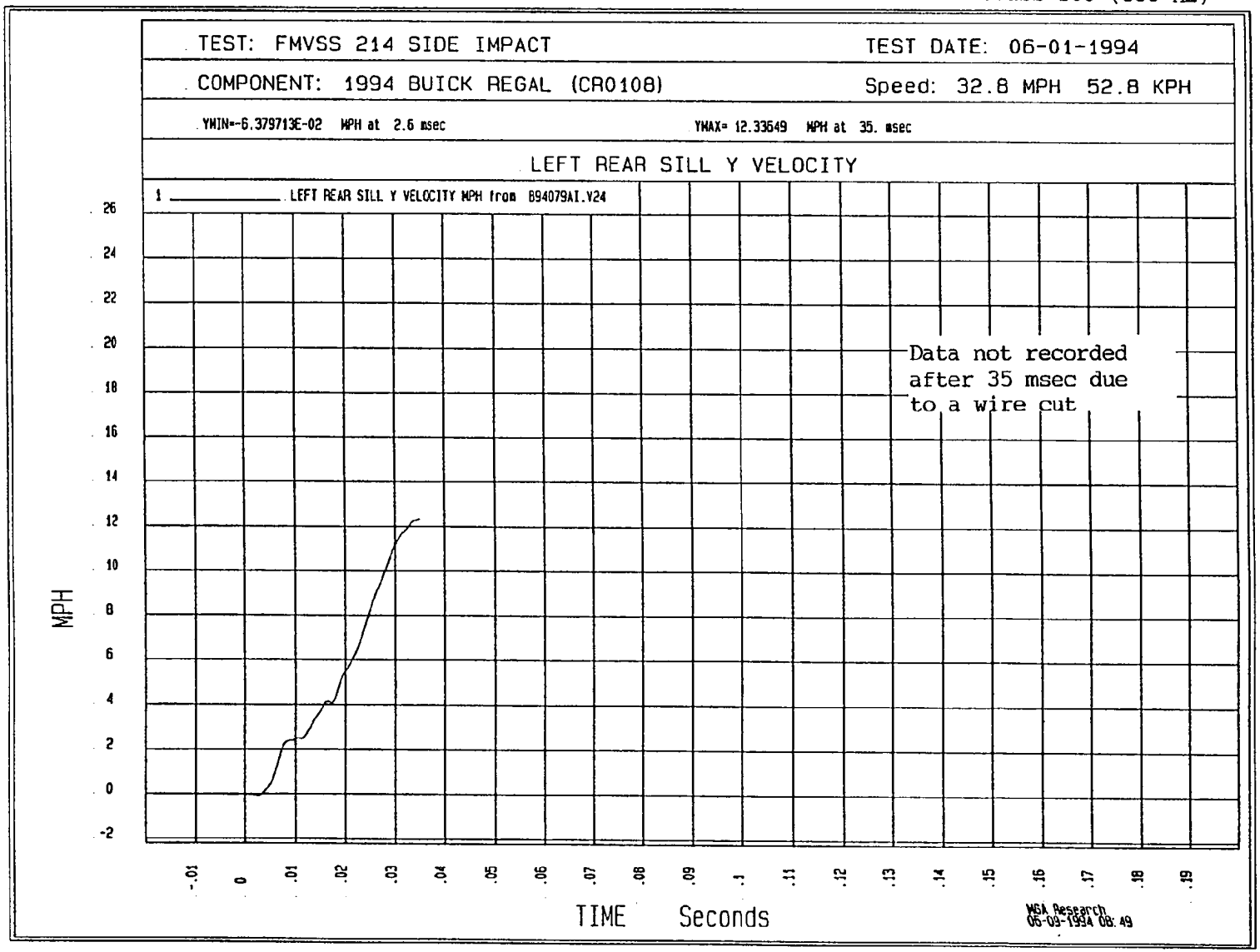


Figure B-2Ø - Left Rear Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

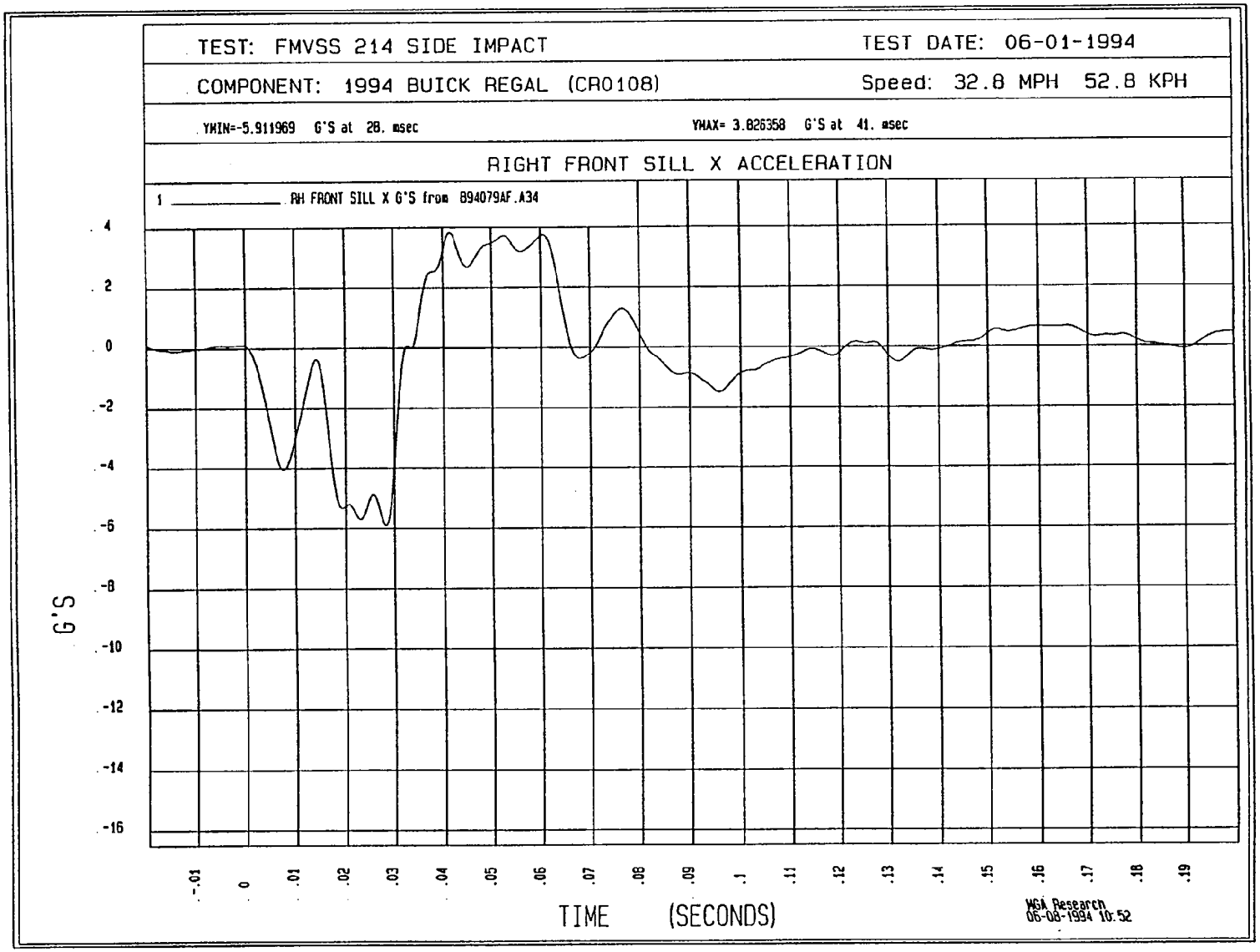


Figure B-21 - Right Front Sill X Acceleration vs. Time

Filter: Class 180 (300 Hz)

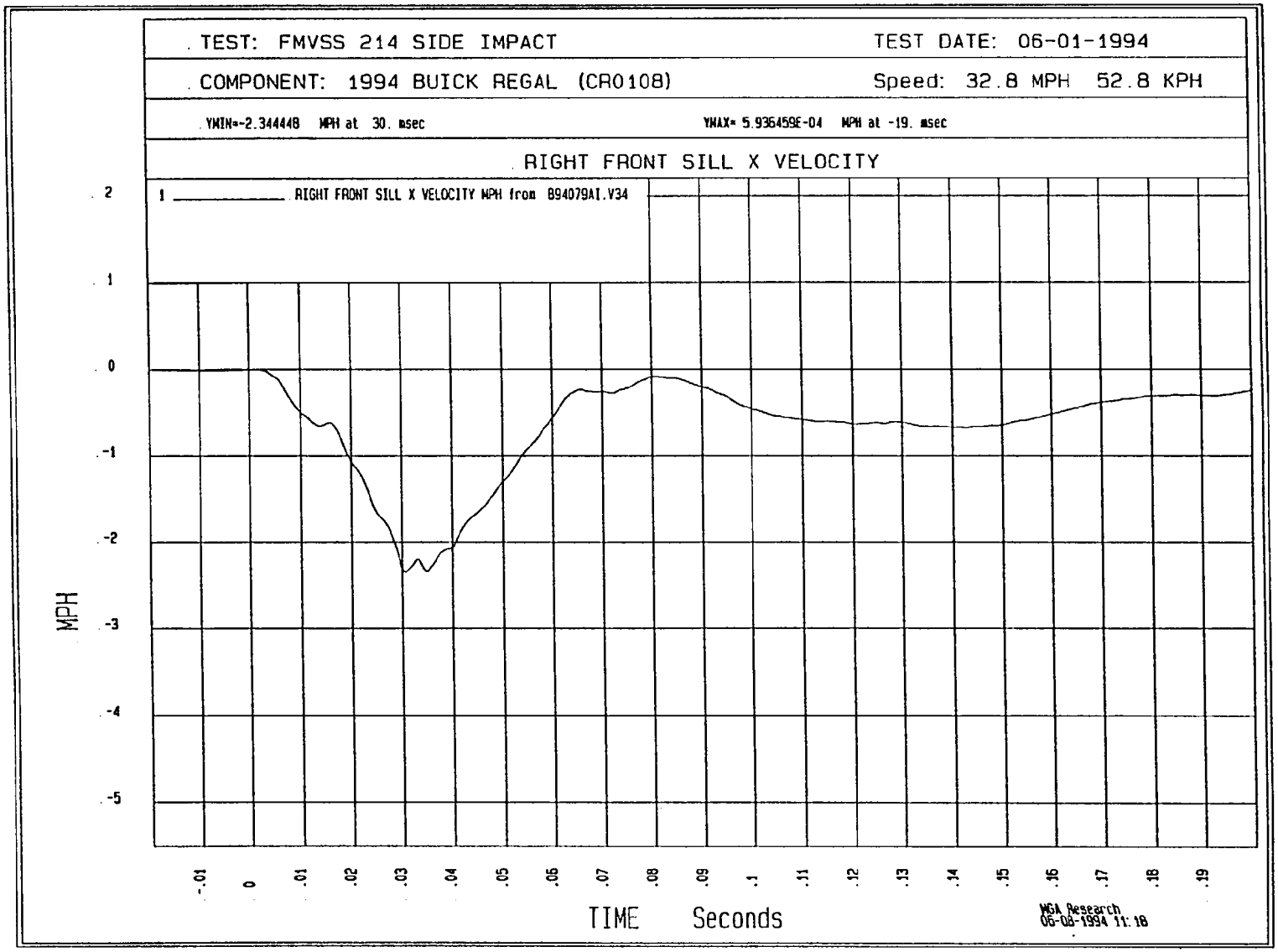


Figure B-22 - Right Front Sill X Velocity vs. Time

Filter: Class 60 (100 Hz)

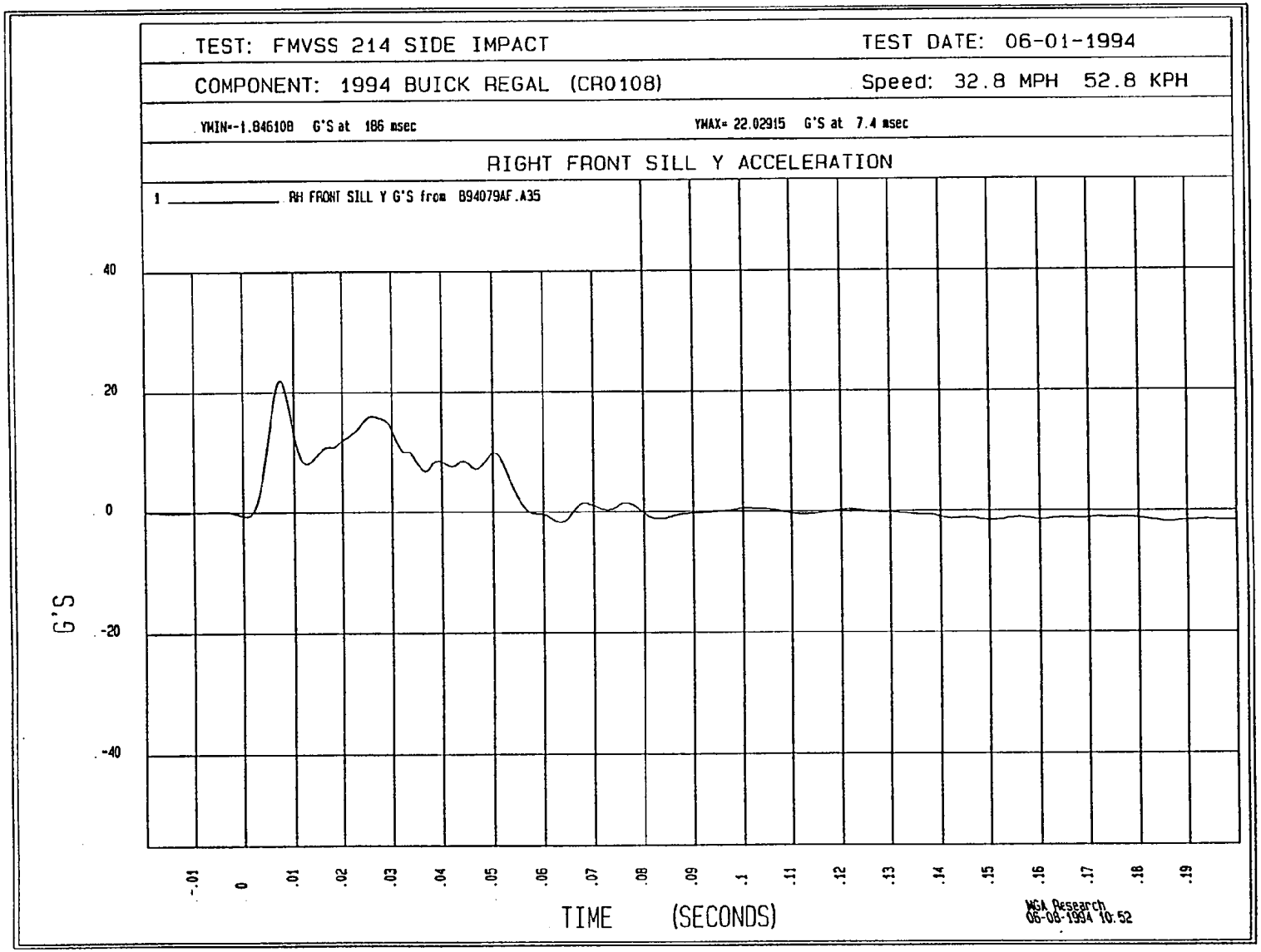


Figure B-23 - Right Front Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

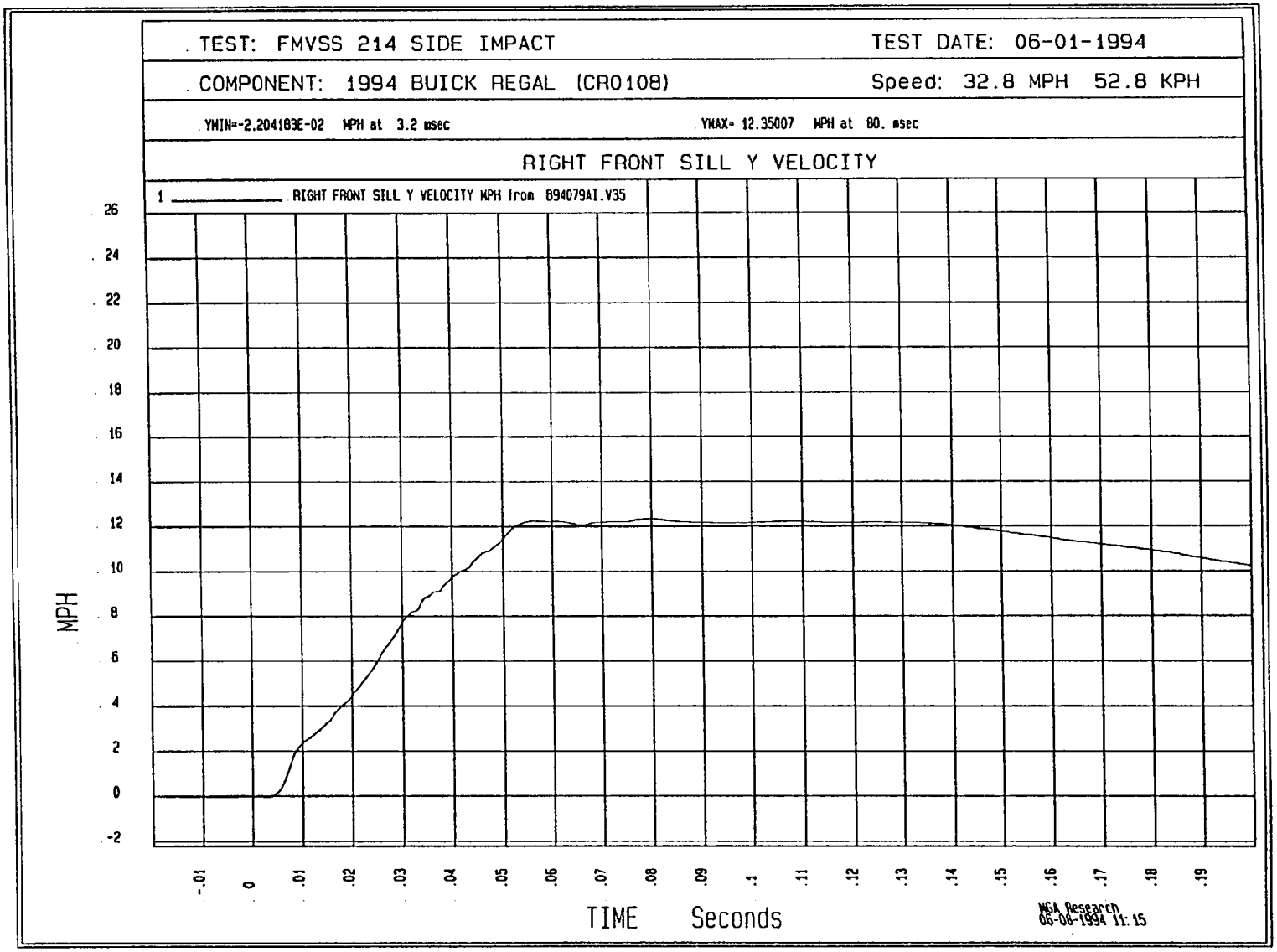


Figure B-24 - Right Front Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

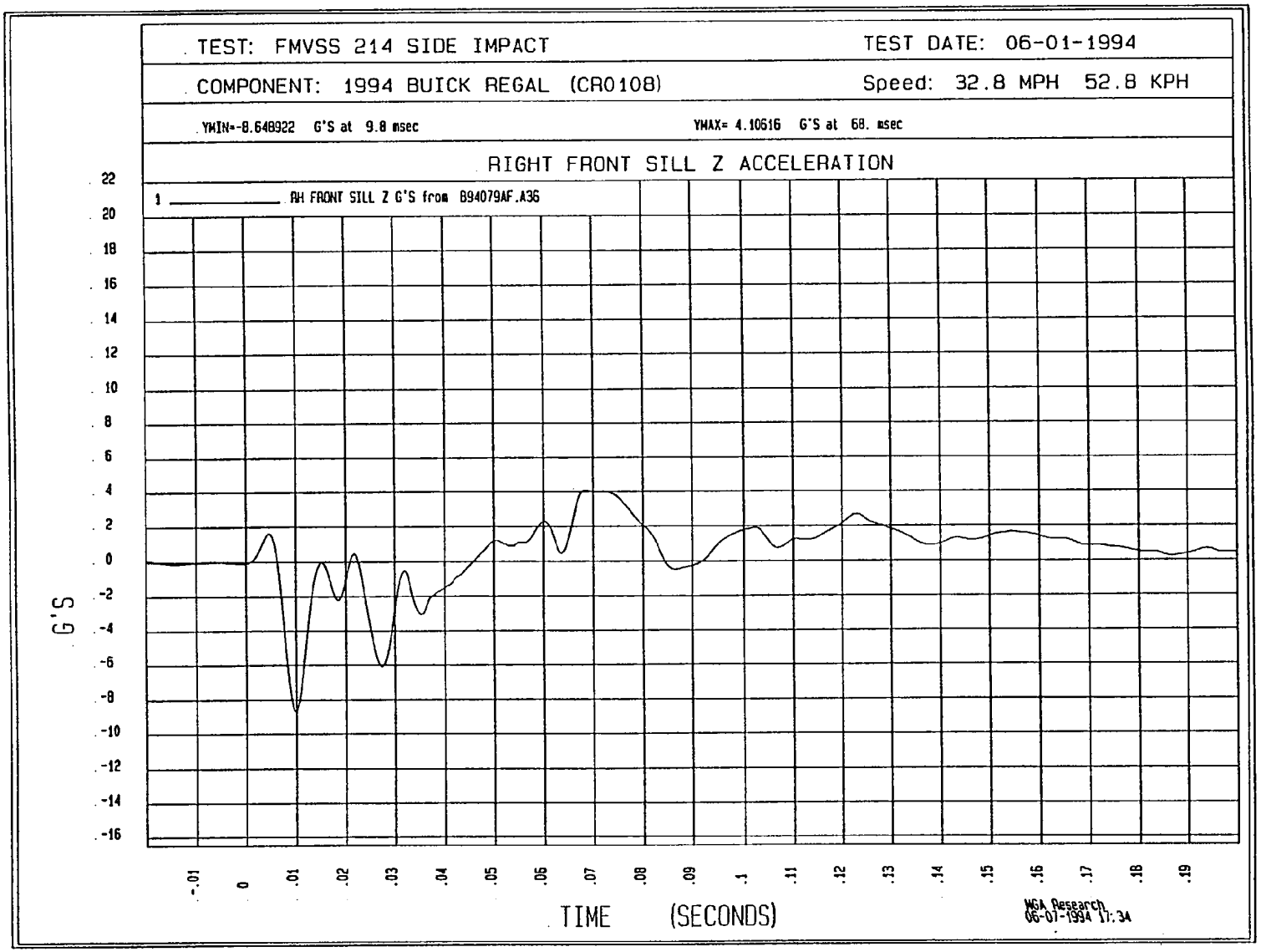


Figure B-25 - Right Front Sill Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

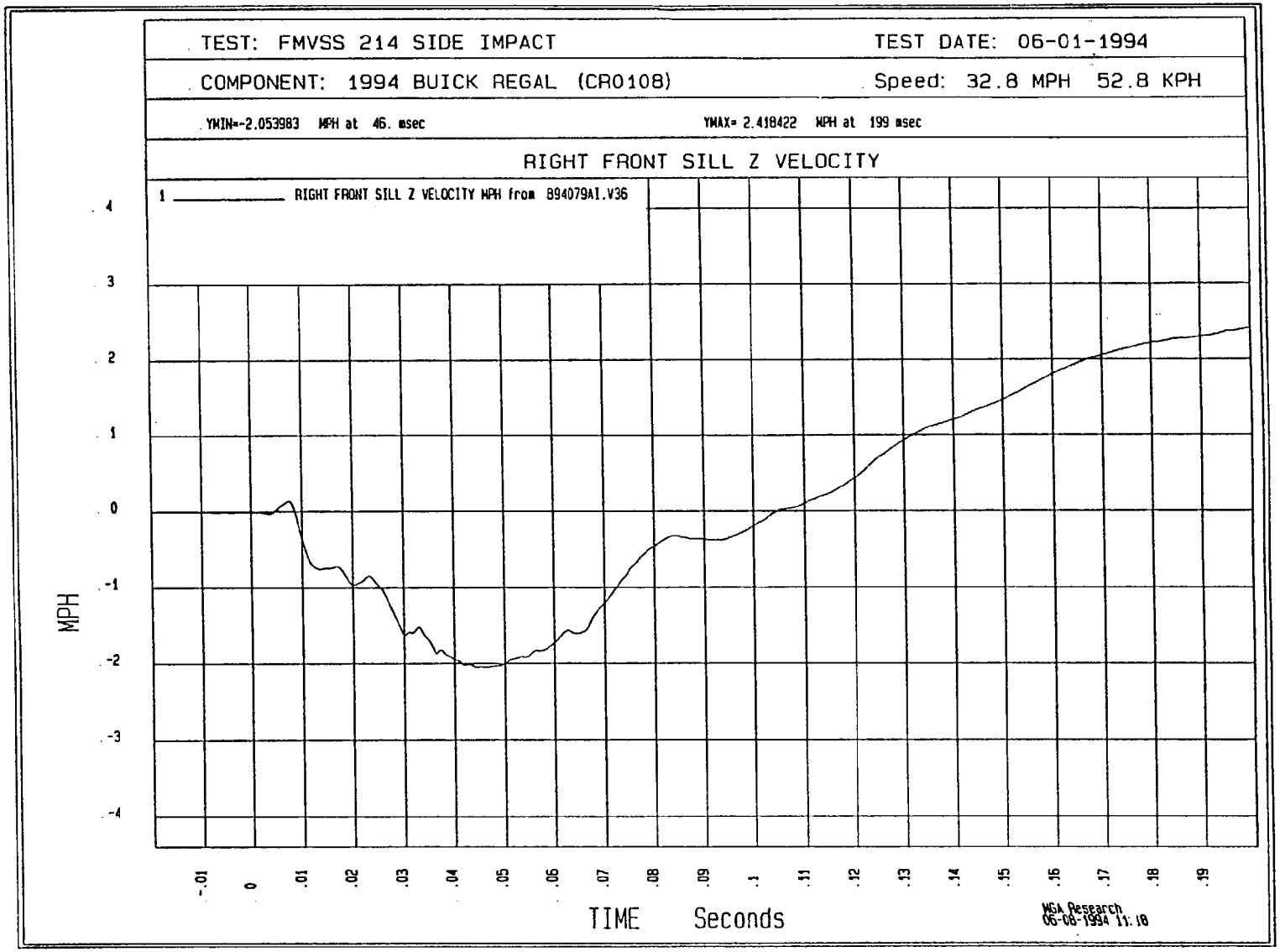


Figure B-26 - Right Front Sill Z Velocity vs. Time

Filter: Class 60 (100 Hz)

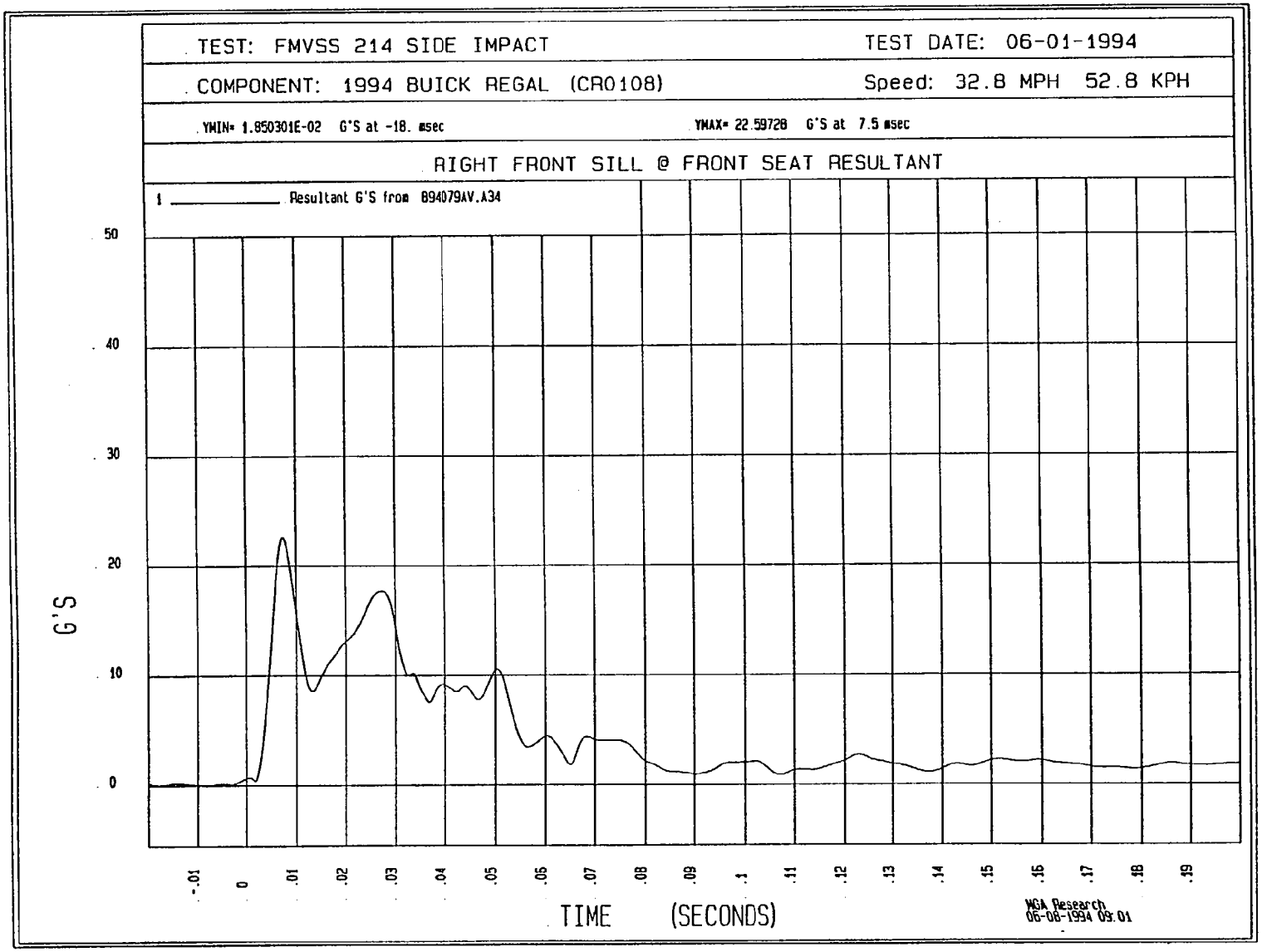


Figure B-27 - Right Front Sill at Front Seat Resultant vs. Time

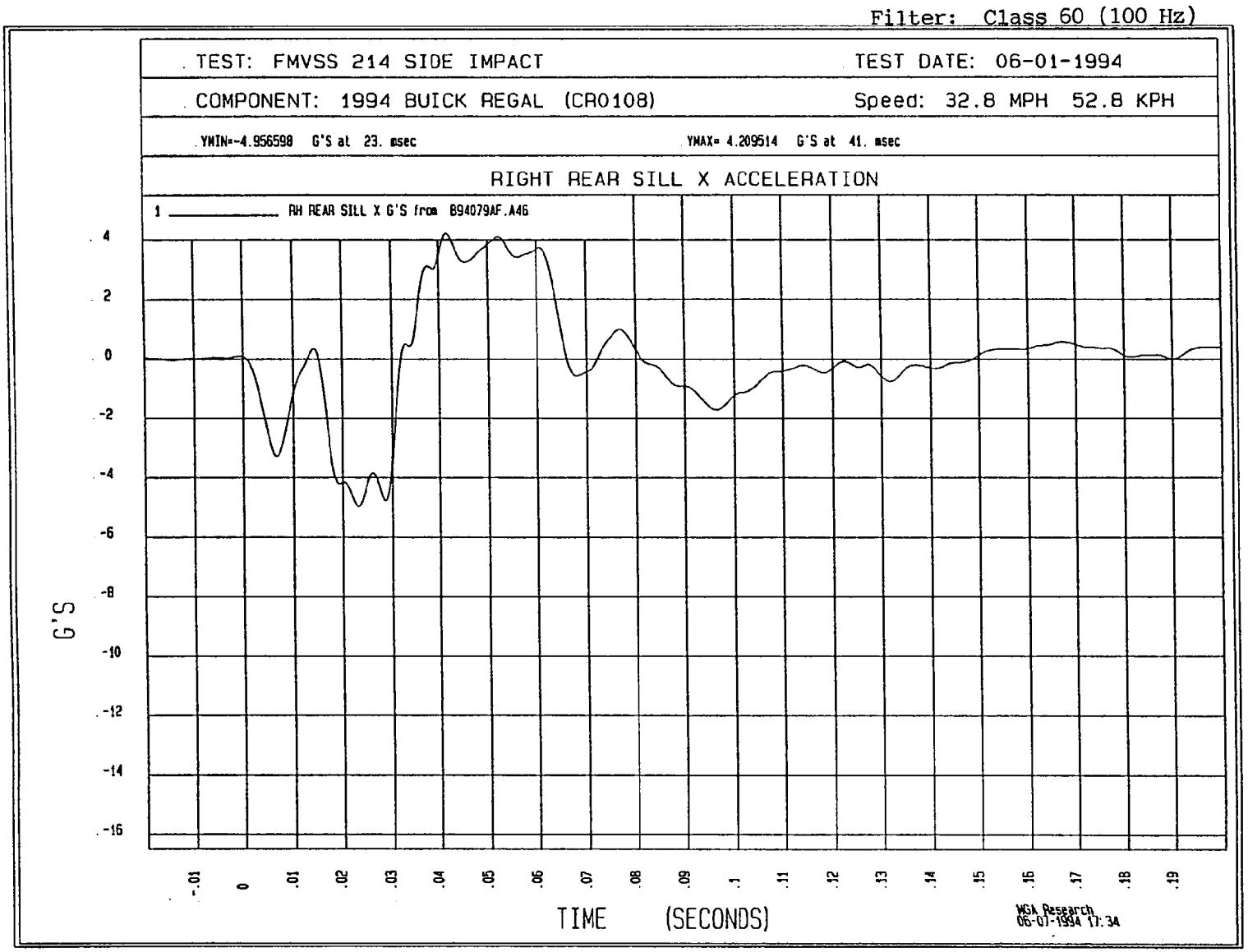


Figure B-28 - Right Rear Sill X Acceleration vs. Time

Filter: Class 180 (300 Hz)

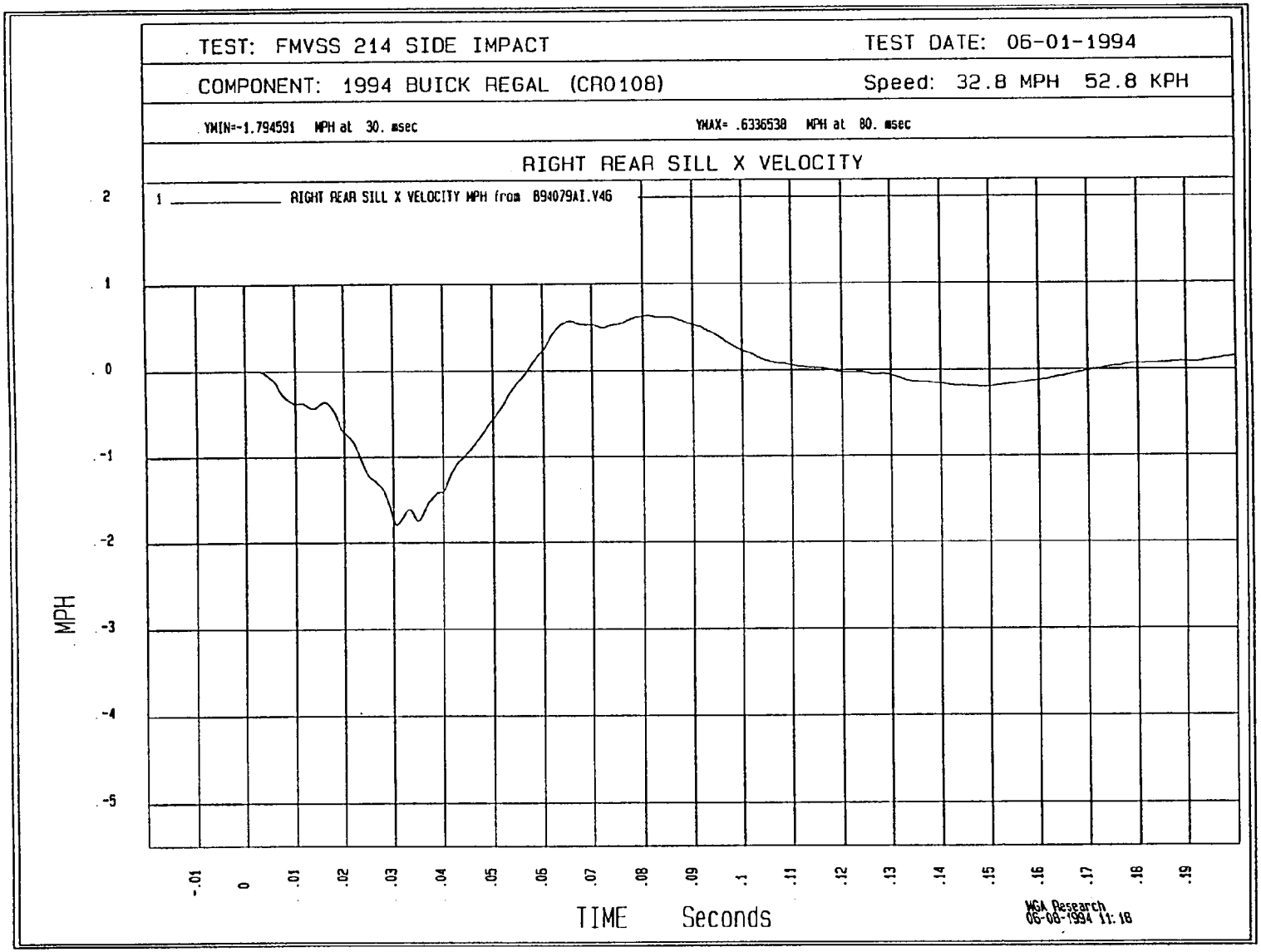


Figure B-29 - Right Rear Sill X Velocity vs. Time

Filter: Class 60 (100 Hz)

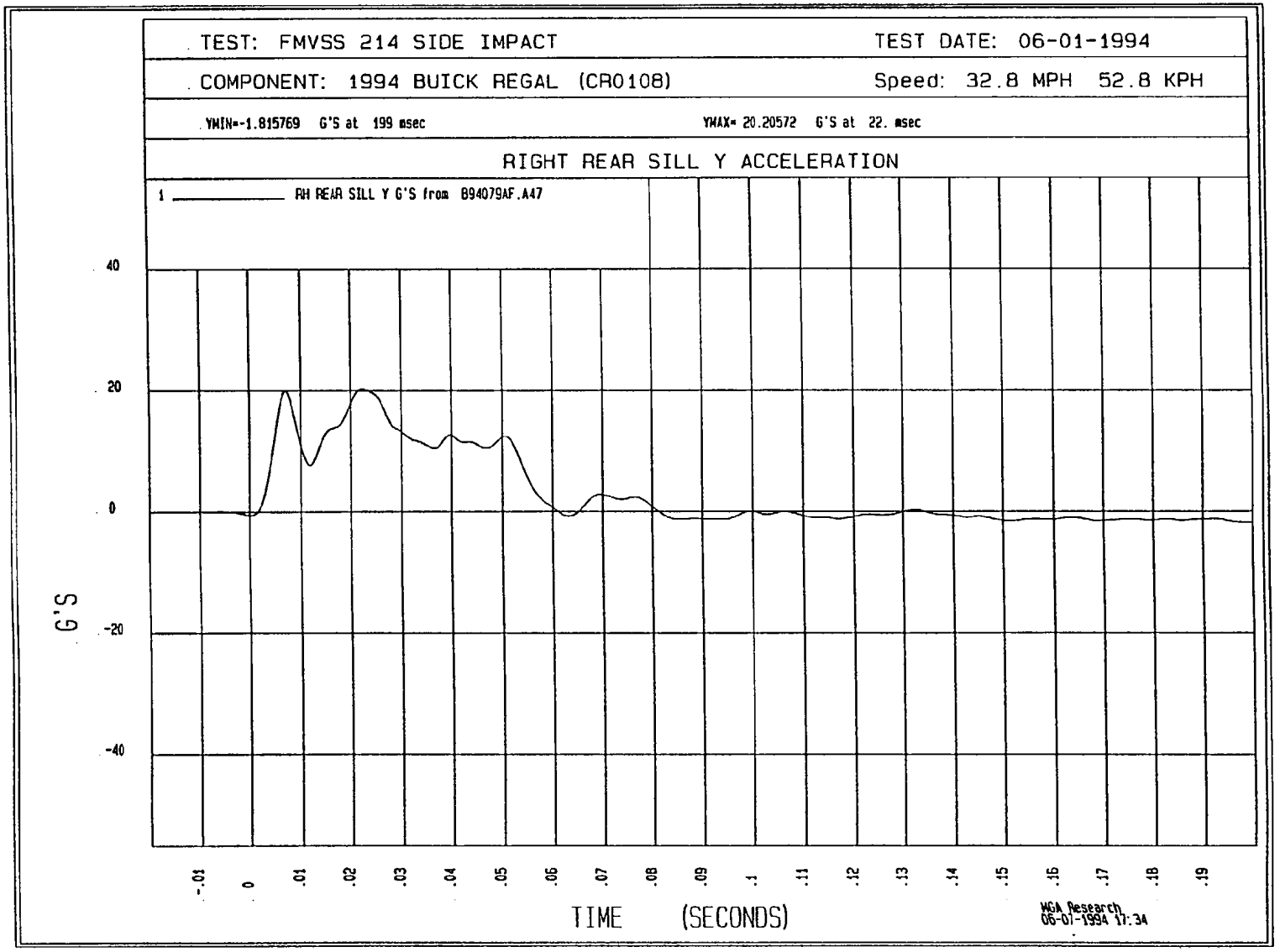


Figure B-30 - Right Rear Sill Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

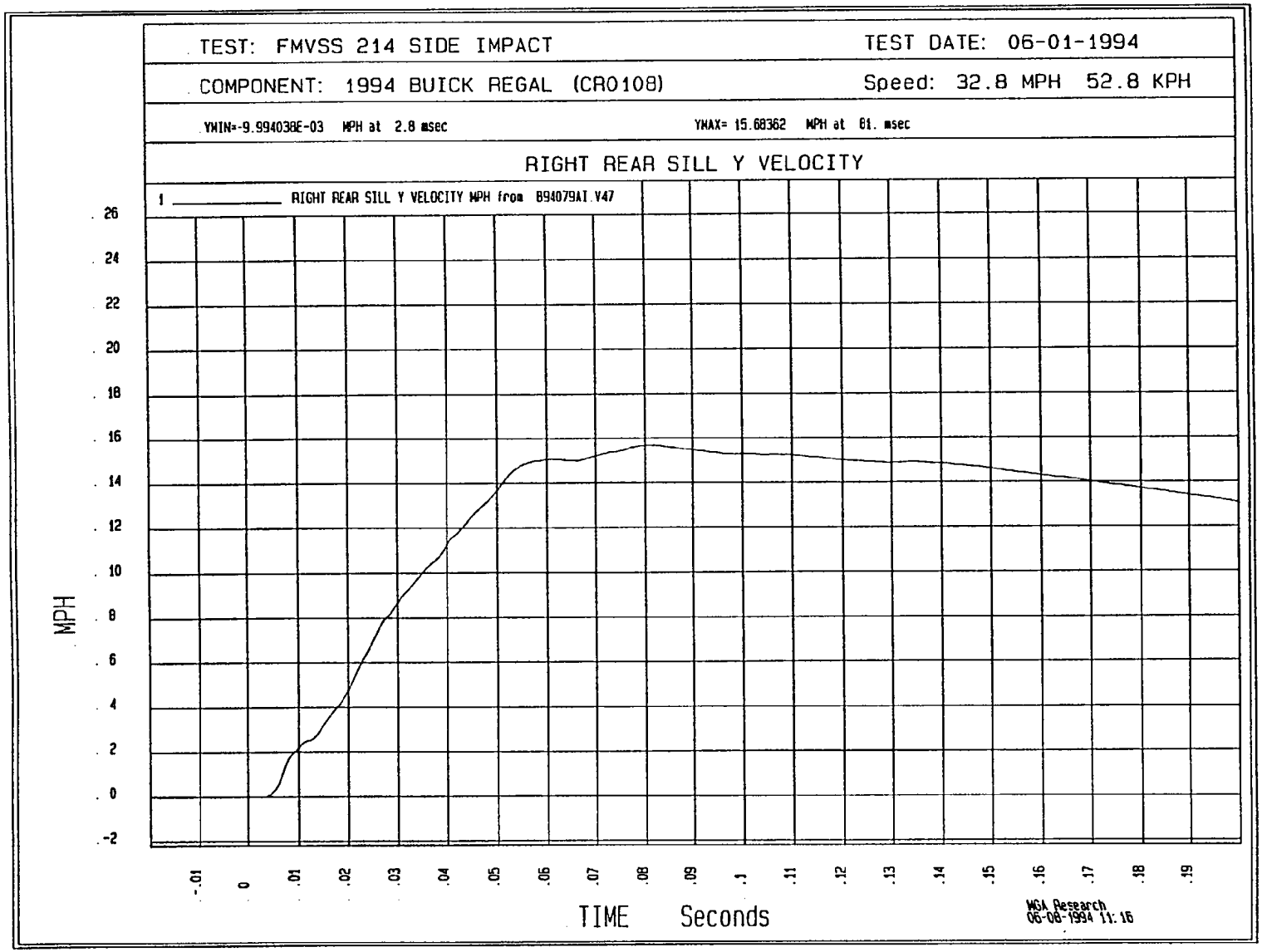


Figure B-31 - Right Rear Sill Y Velocity vs. Time

Filter: Class 60 (100 Hz)

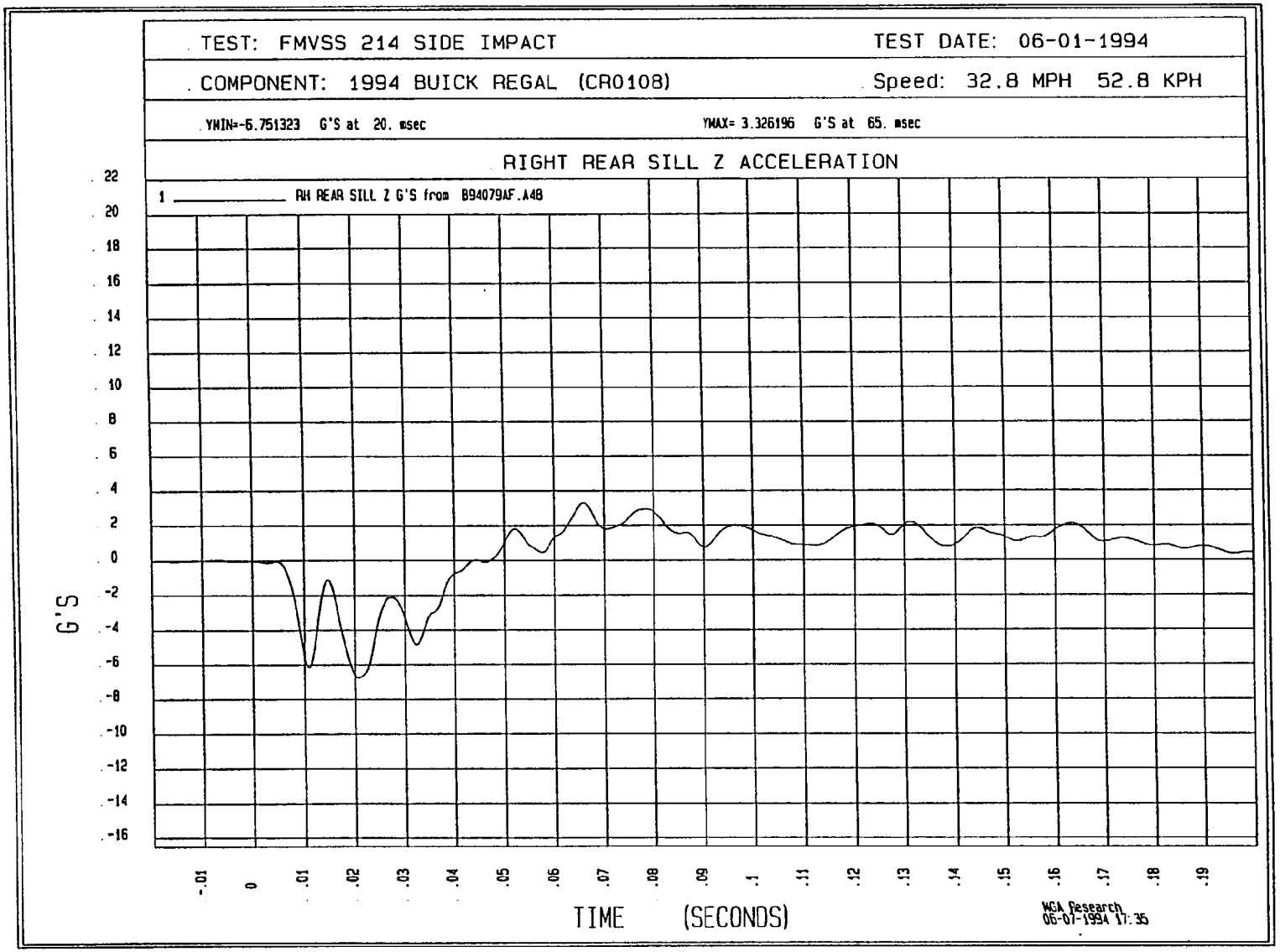


Figure B-32 - Right Rear Sill Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

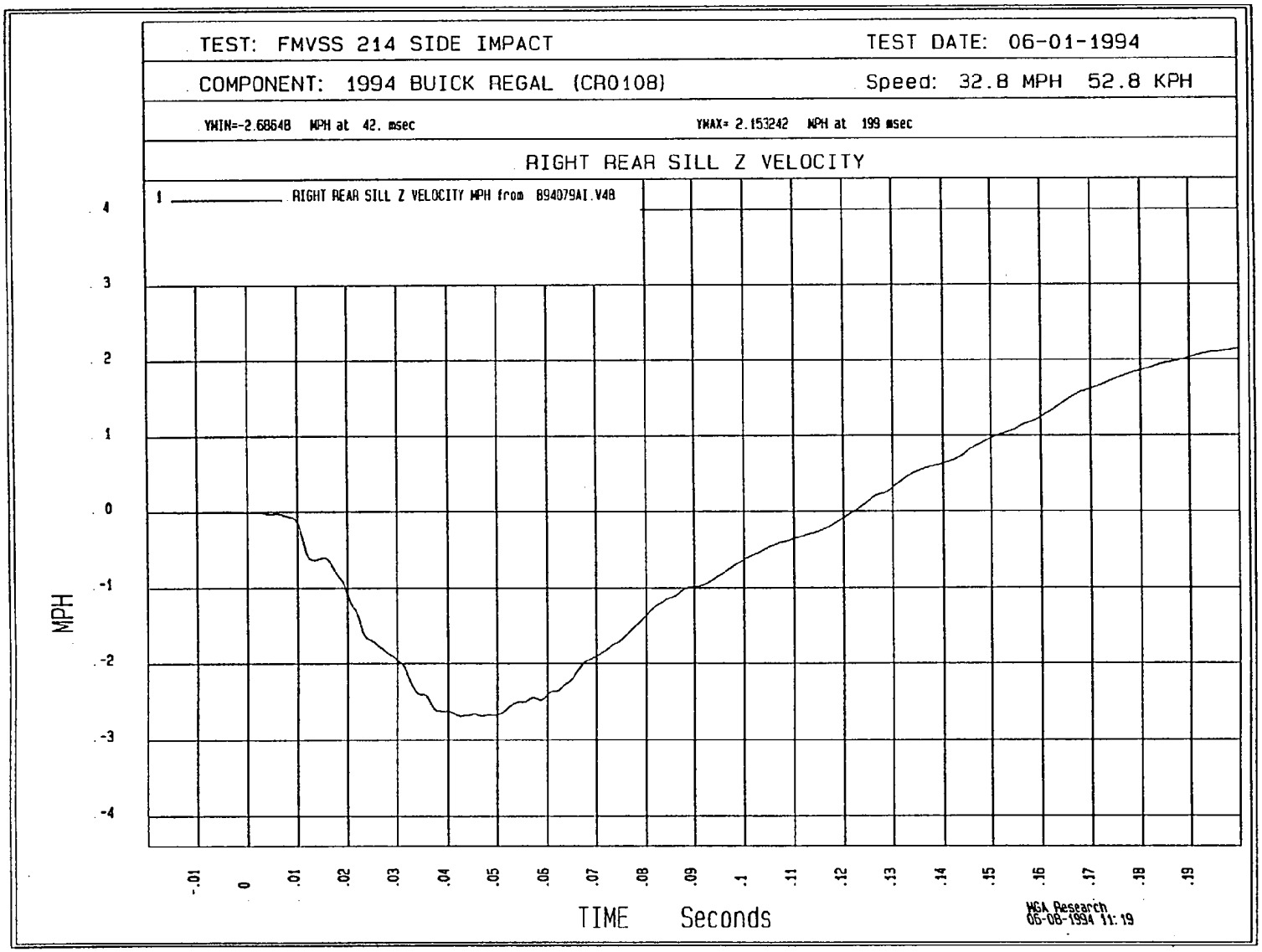


Figure B-33 - Right Rear Sill Z Velocity vs. Time

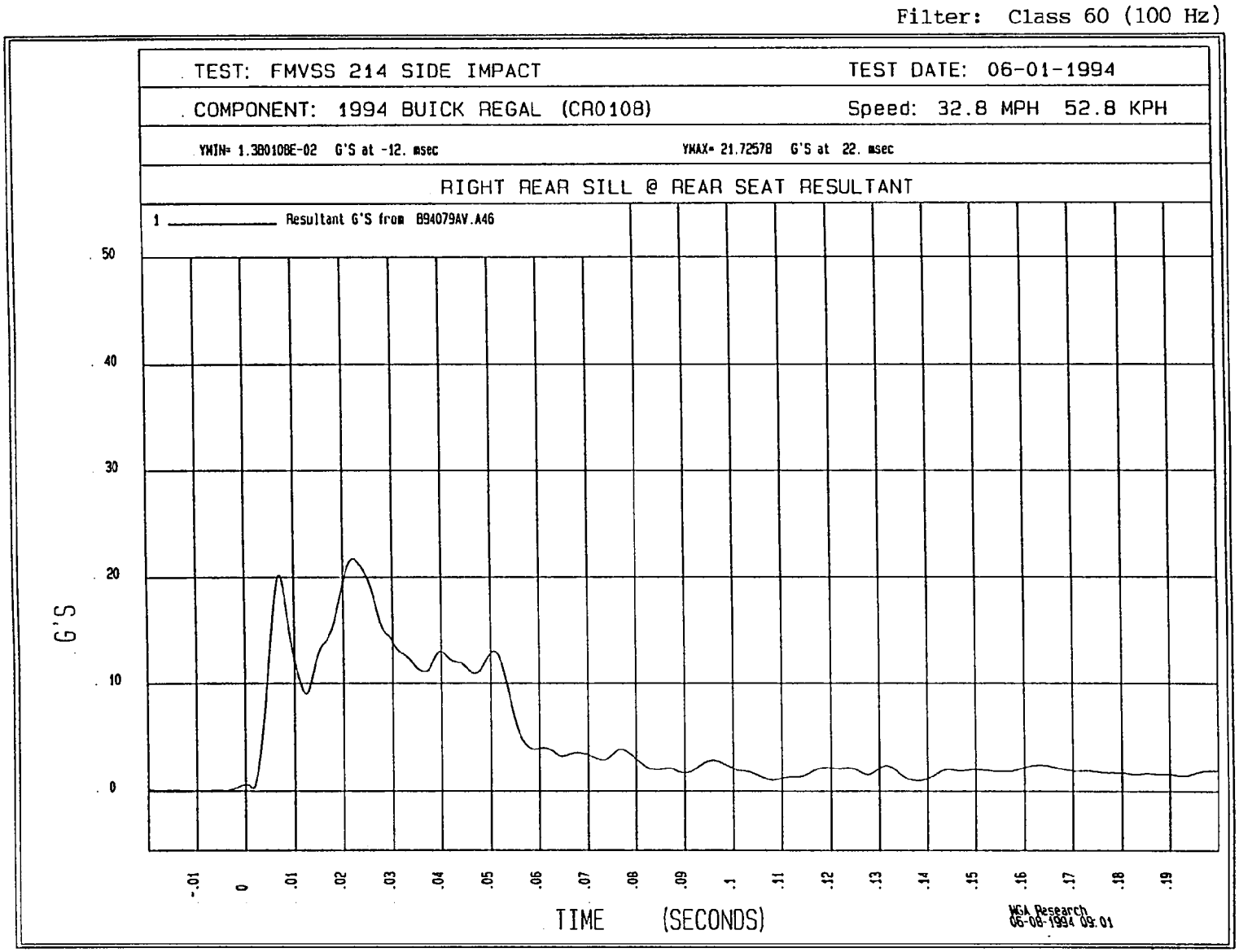


Figure B-34 - Right Rear Sill at Rear Seat Resultant vs. Time

Filter: Class 60 (100 Hz)

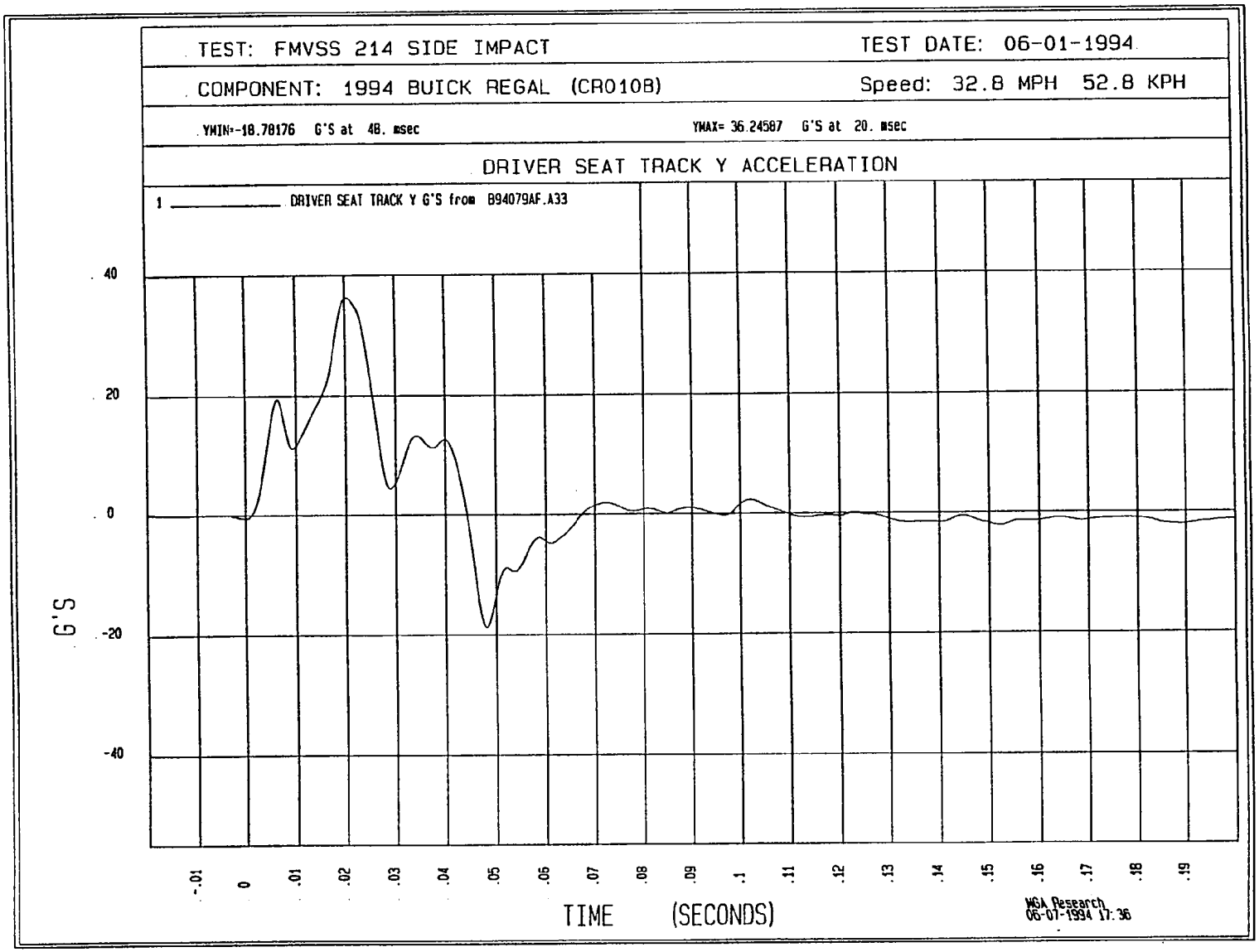


Figure B-35 - Driver Seat Track Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

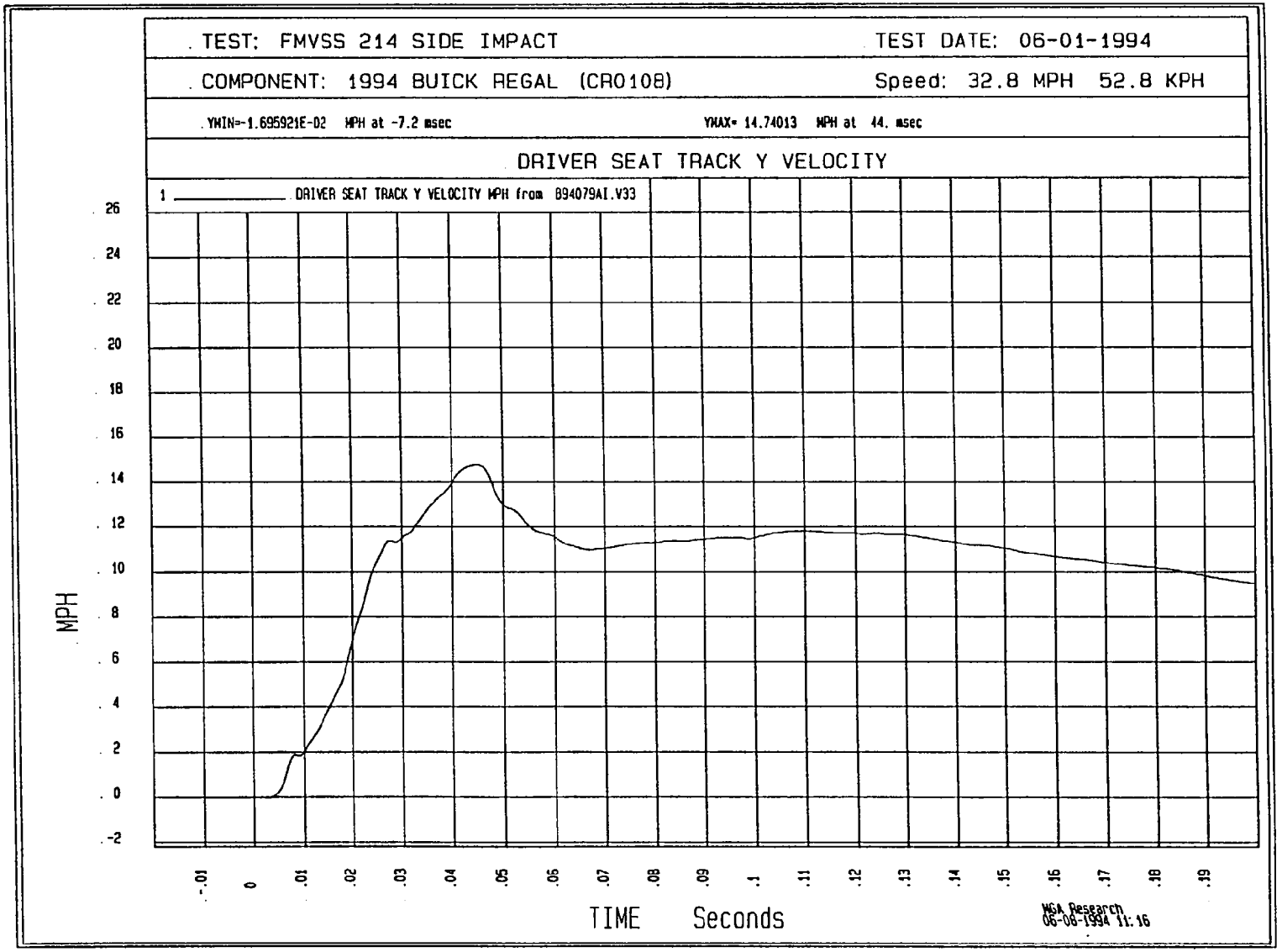


Figure B-36 - Driver Seat Track Y Velocity vs. Time

Filter: Class 60 (100 Hz)

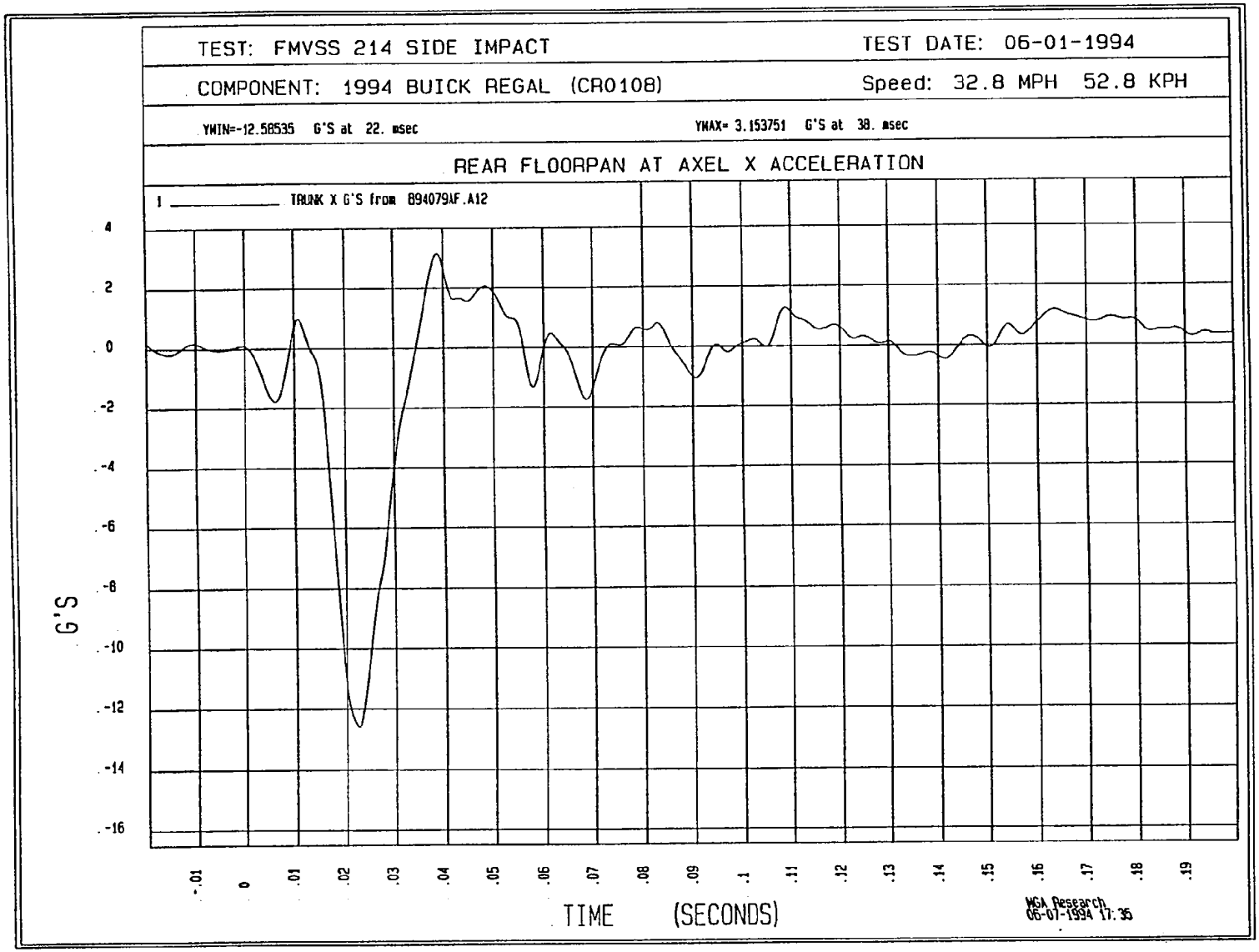


Figure B-37 - Rear Floorpan at Axle X Acceleration vs. Time

Filter: Class 180 (300 Hz)

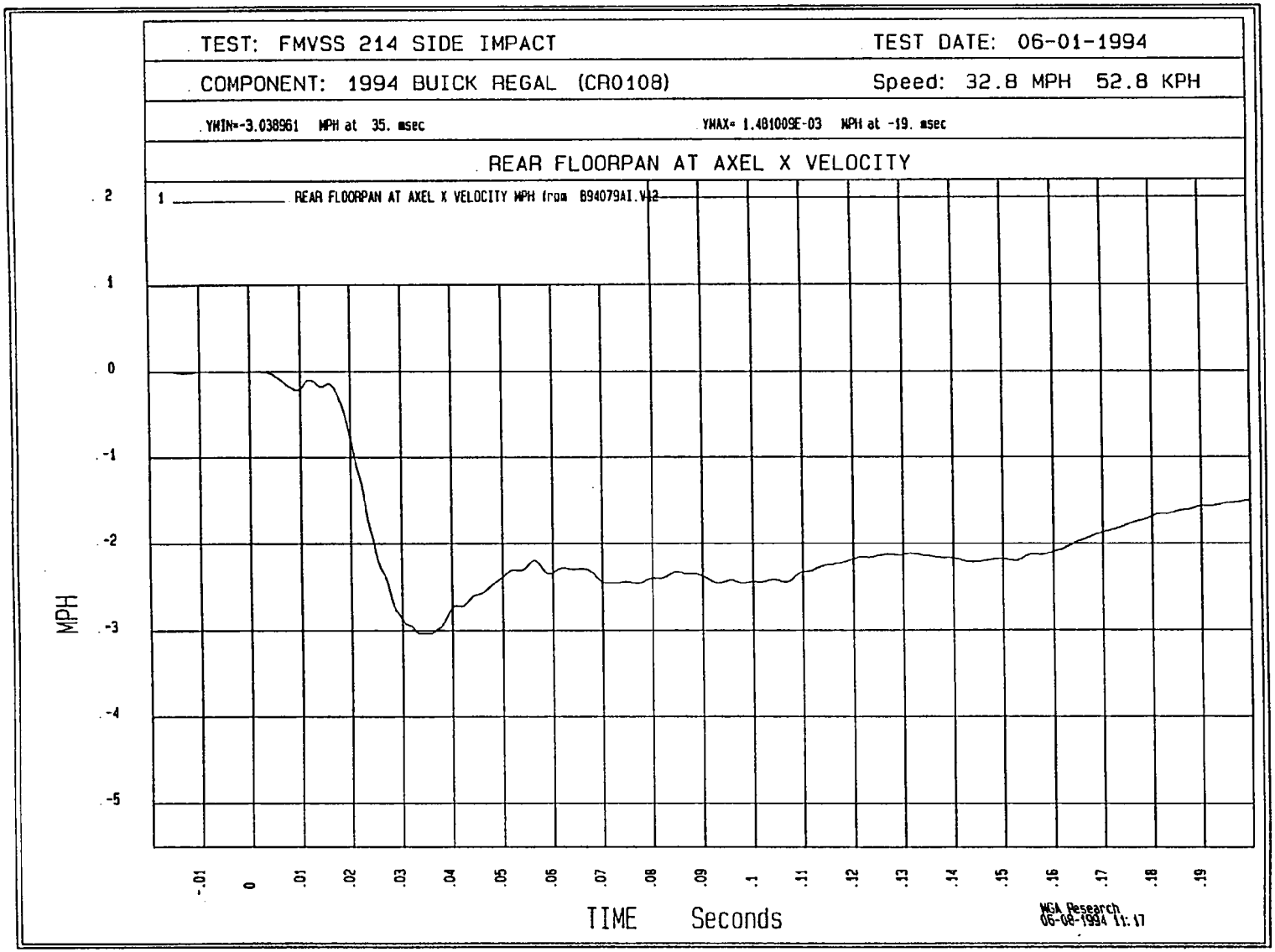


Figure B-38 - Rear Floorpan at Axle X Velocity vs. Time

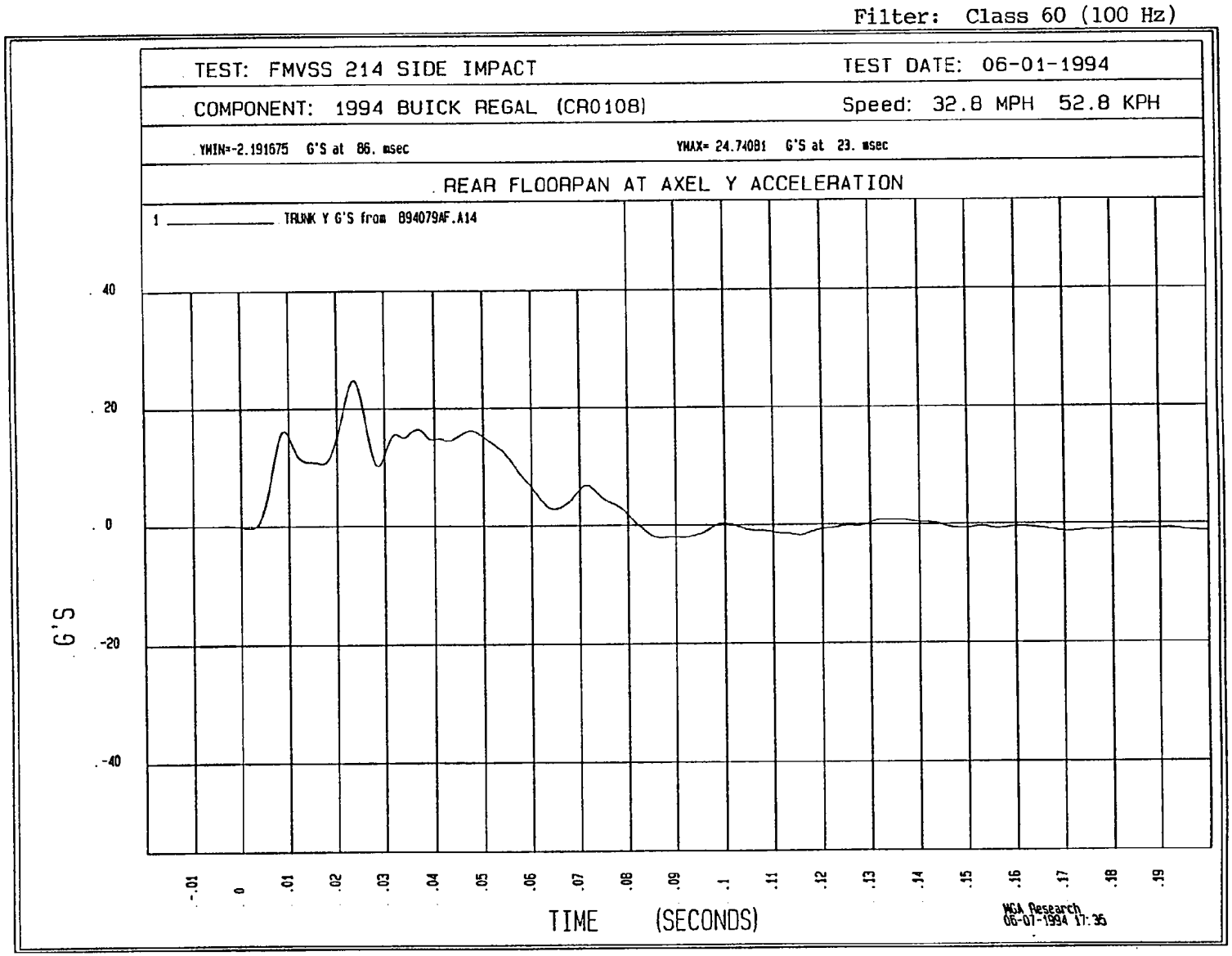


Figure B-39 - Rear Floorpan at Axle Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

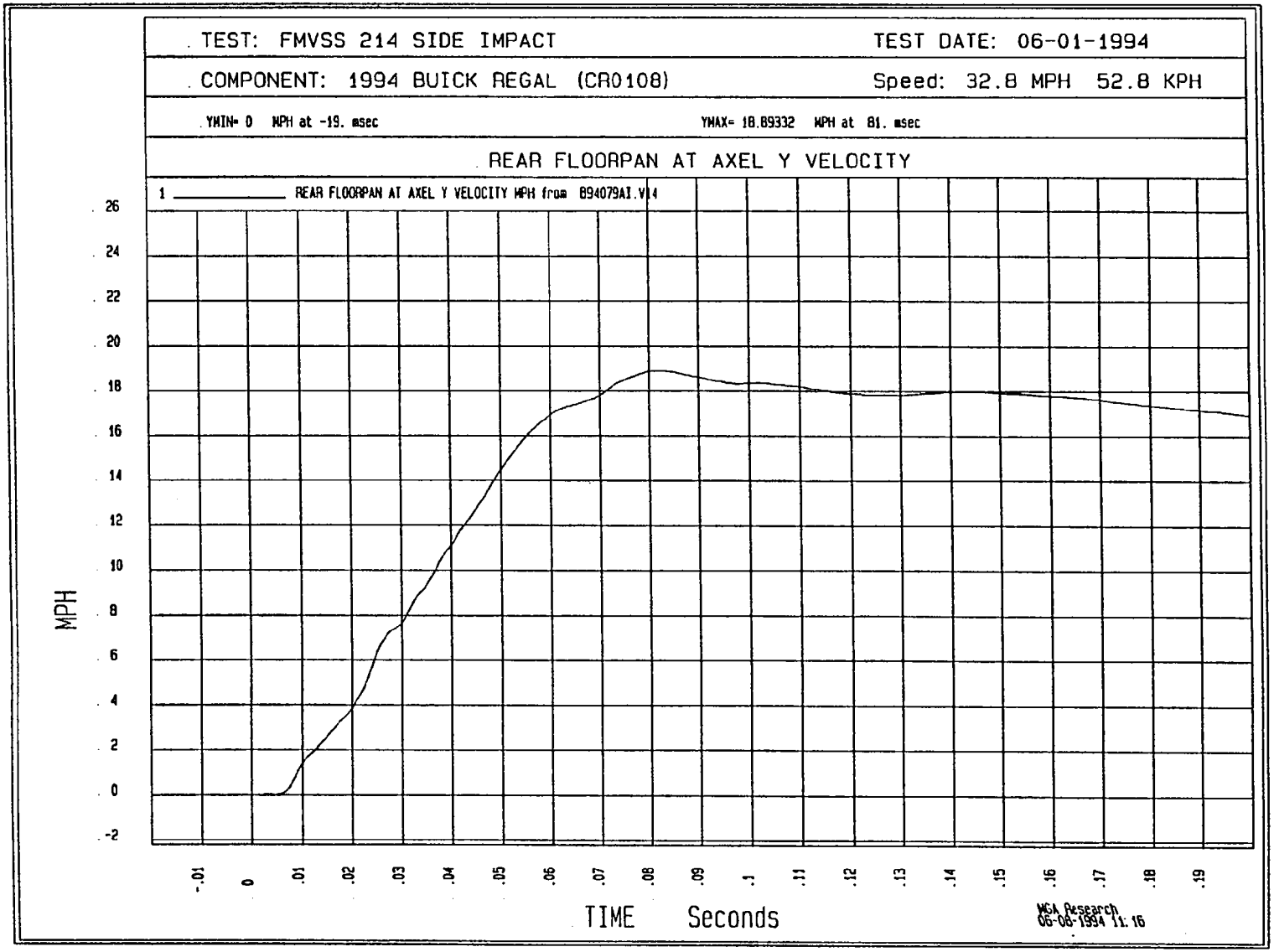


Figure B-40 - Rear Floorpan at Axle Y Velocity vs. Time

Filter: Class 60 (100 Hz)

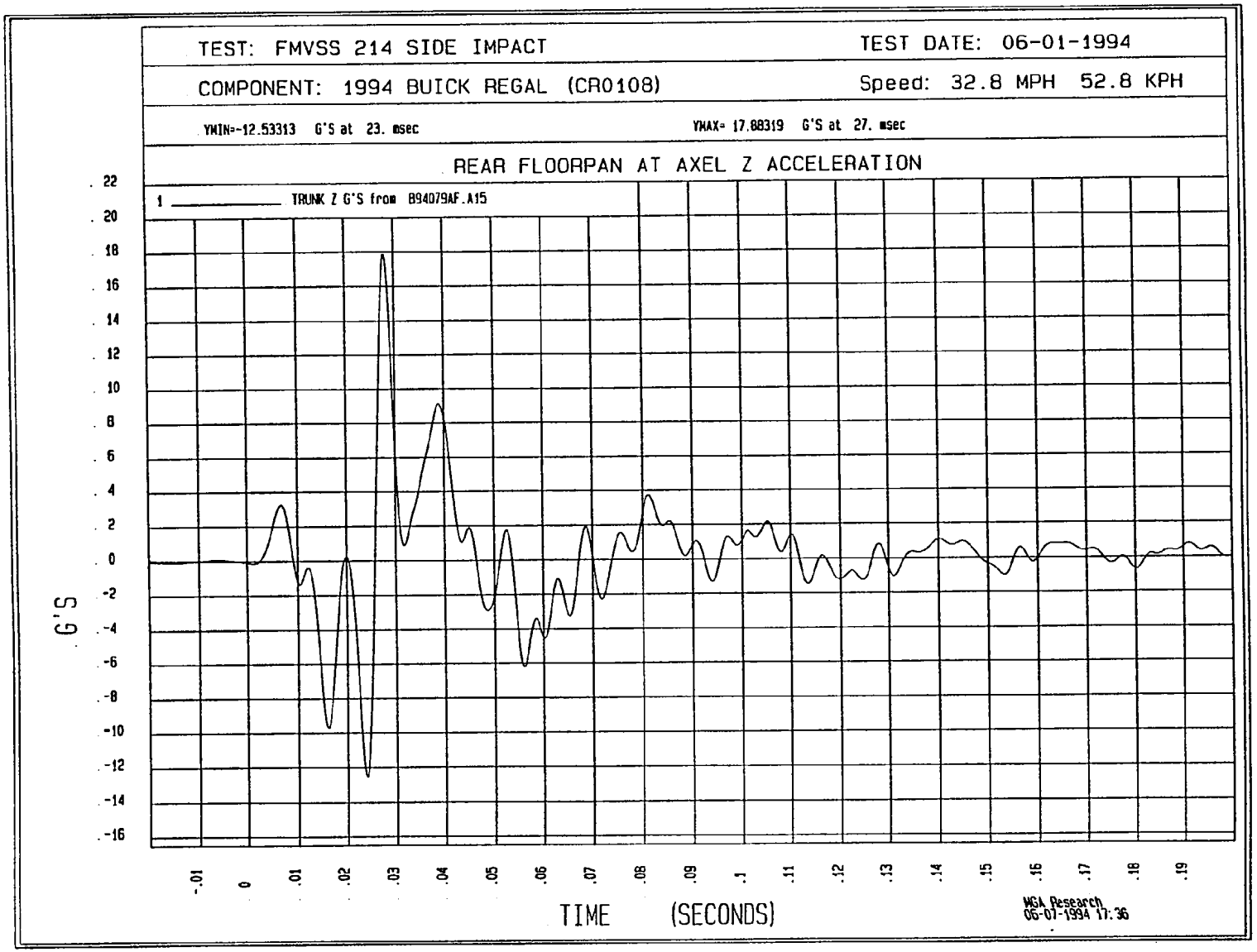


Figure B-41 - Rear Floorpan at Axle Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

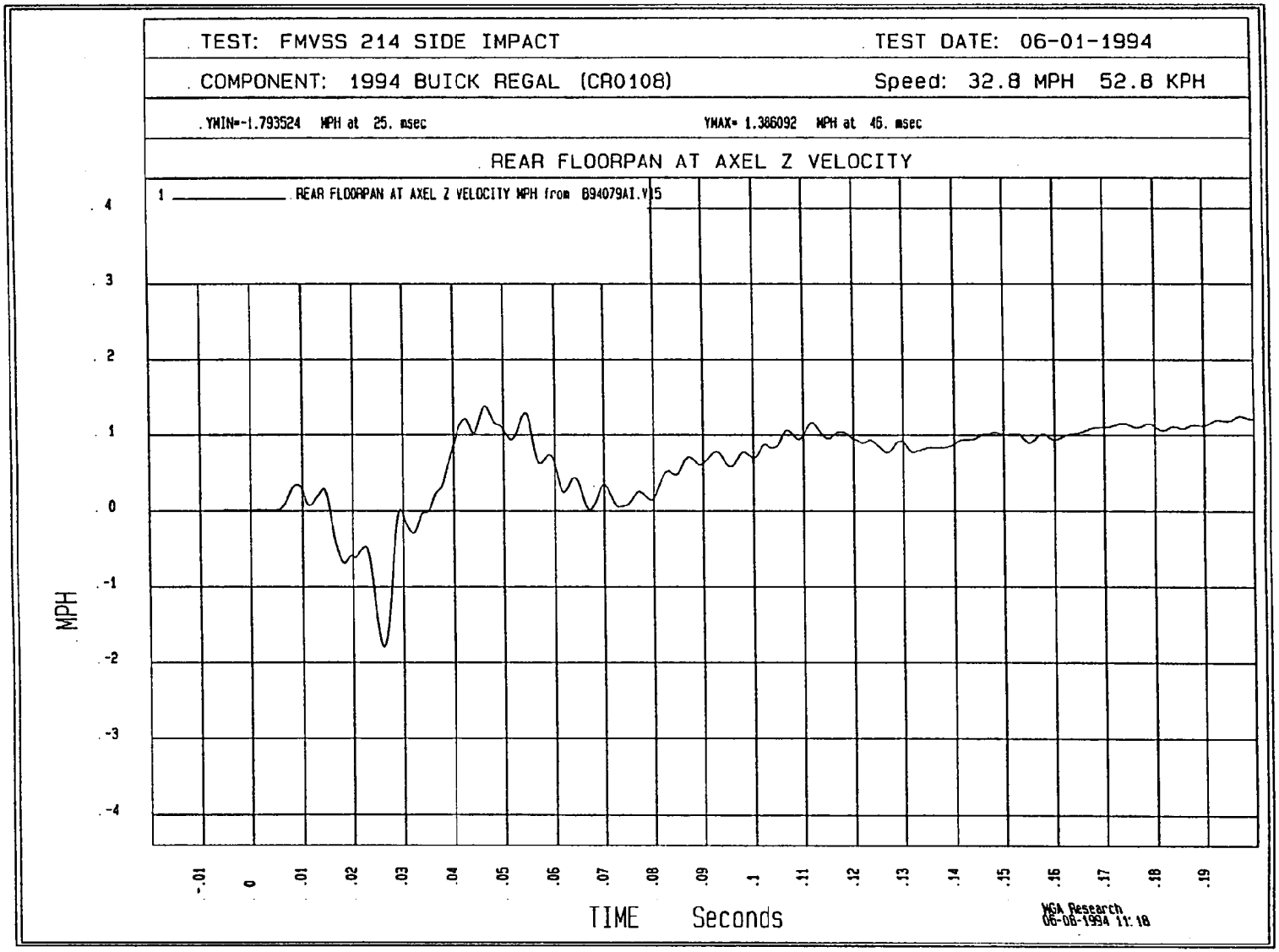


Figure B-42 - Rear Floorpan at Axle Z Velocity vs. Time

Filter: Class 60 (100 Hz)

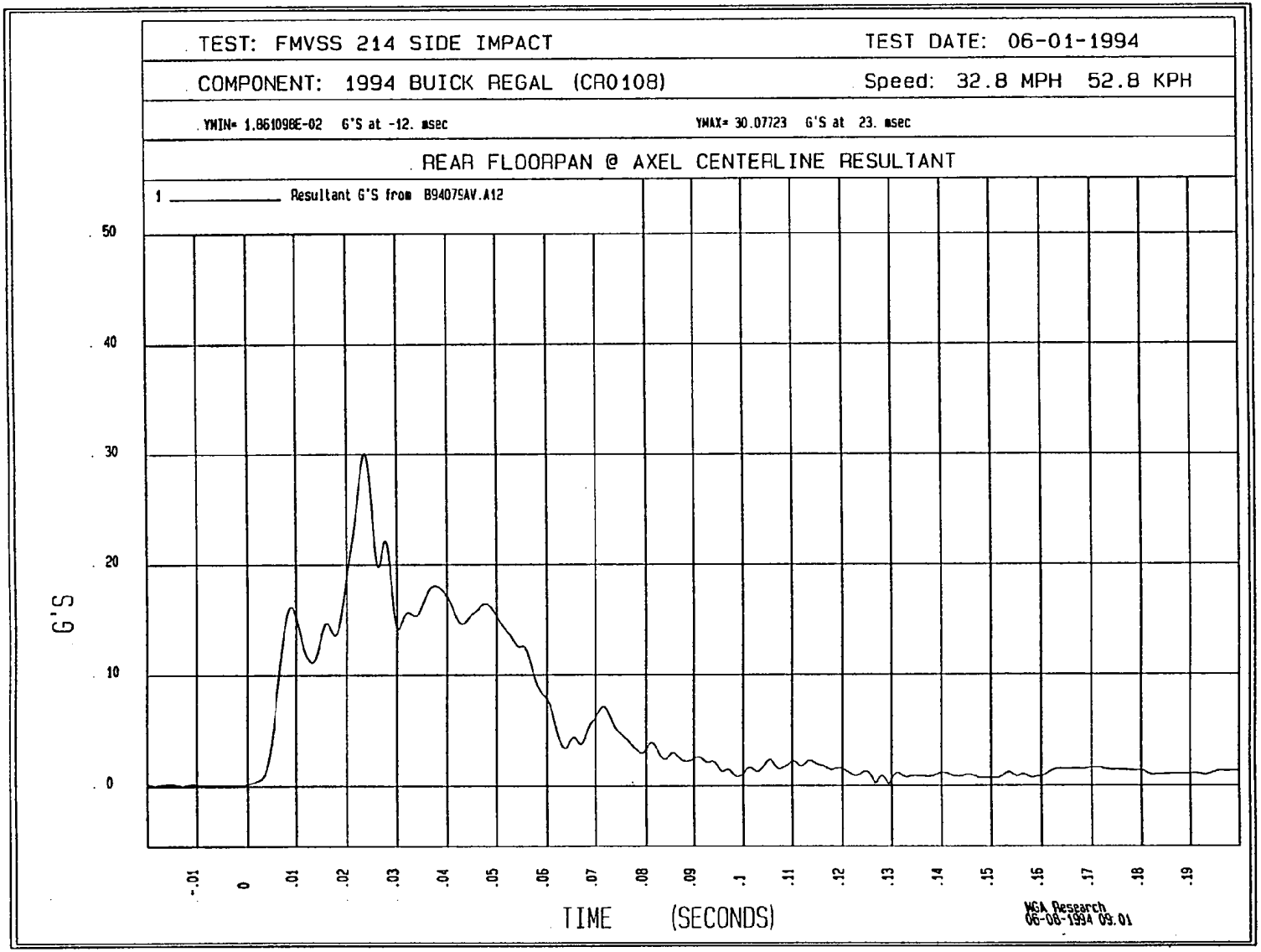


Figure B-43 - Rear Floorpan at Axle Centerline Resultant vs. Time

Filter: Class 60 (100 Hz)

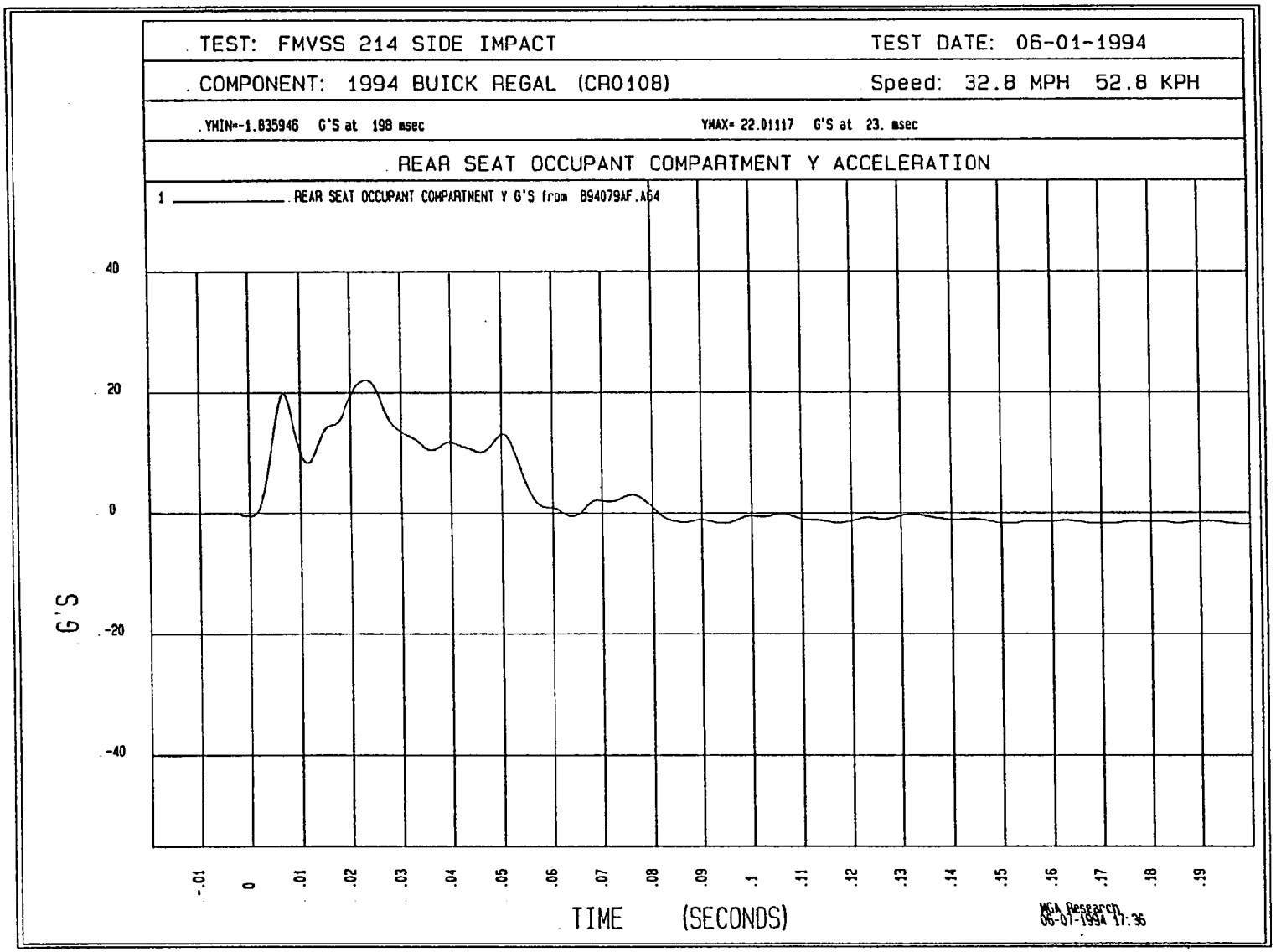


Figure B-44 - Rear Seat Occupant Compartment Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

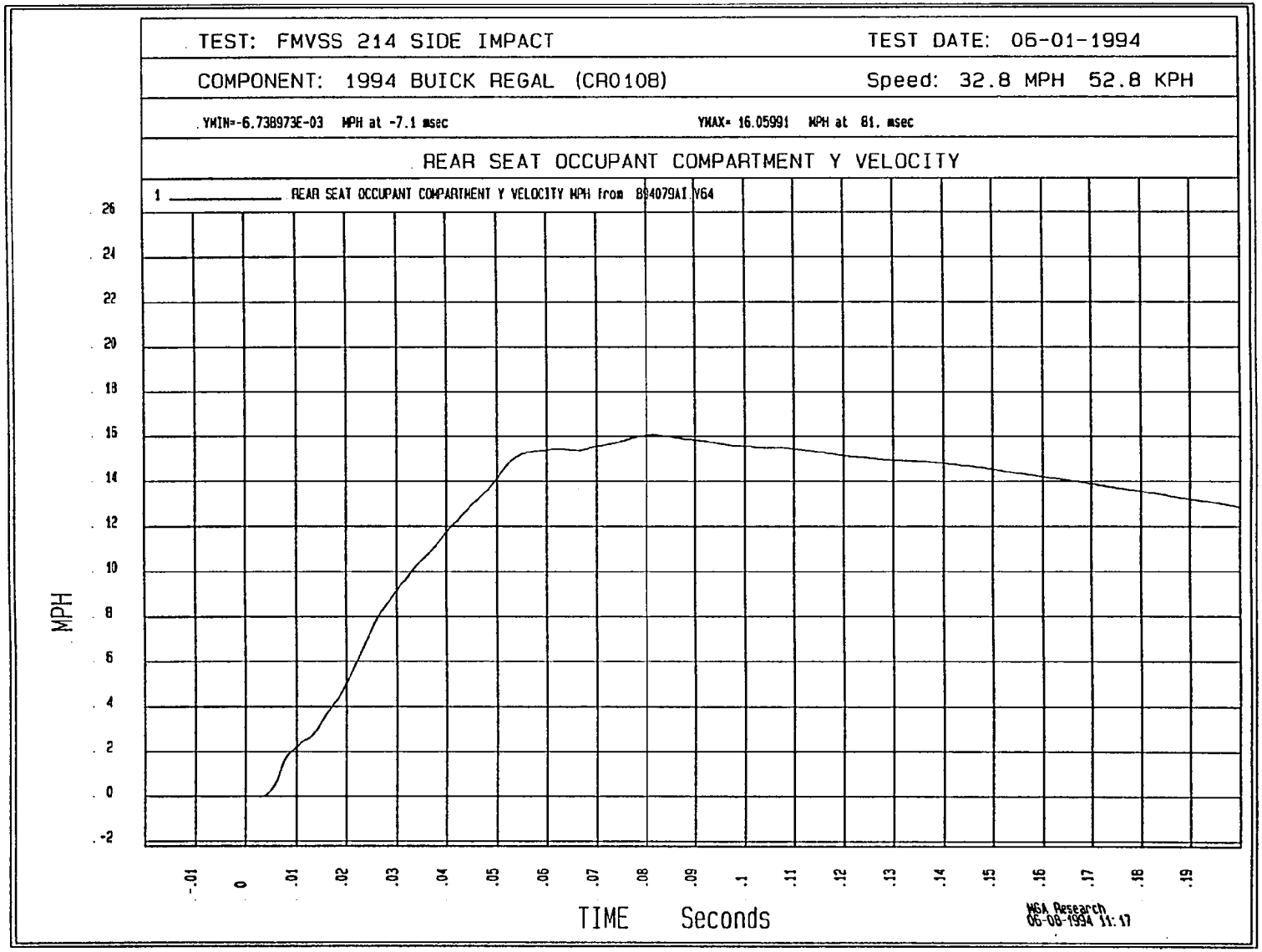


Figure B-45 - Rear Seat Occupant Compartment Y Velocity vs. Time

Filter: Class 60 (100 Hz)

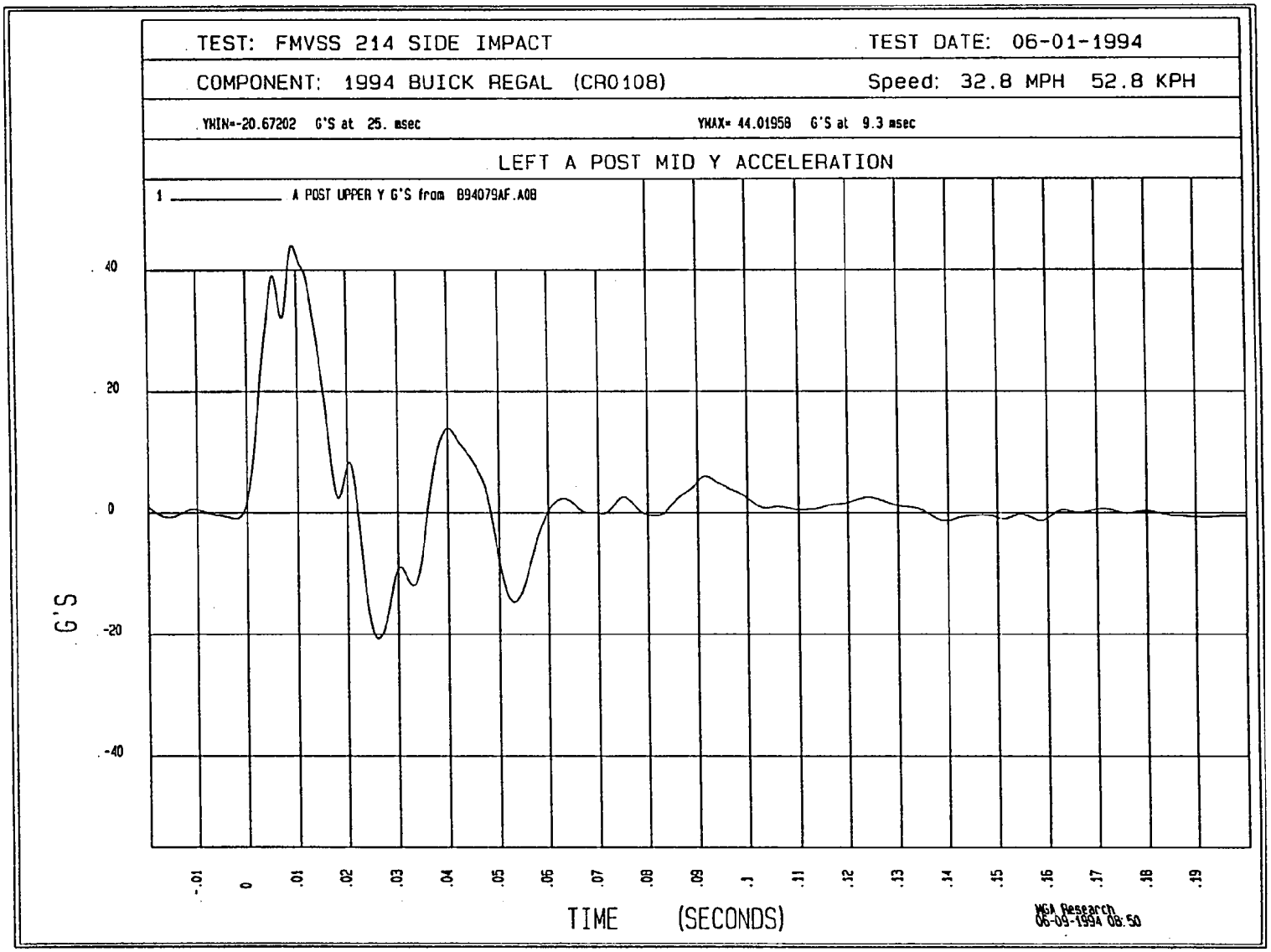


Figure B-46 - Left A Post Mid Y Acceleration vs. Time

Filter; Class 180 (300 Hz)

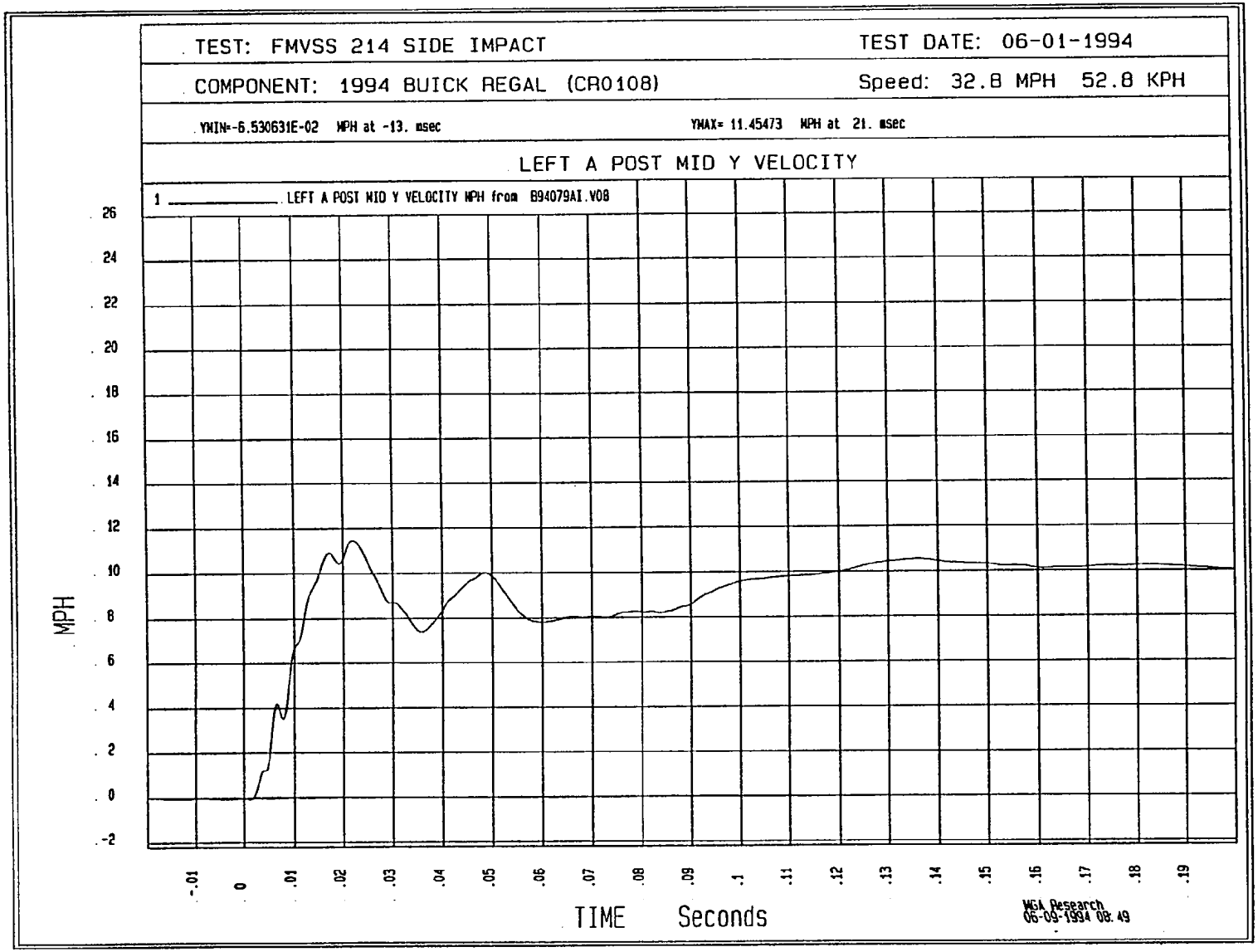


Figure B-47 - Left A Post Mid Y Velocity vs. Time

Filter: Class 60 (100 Hz)

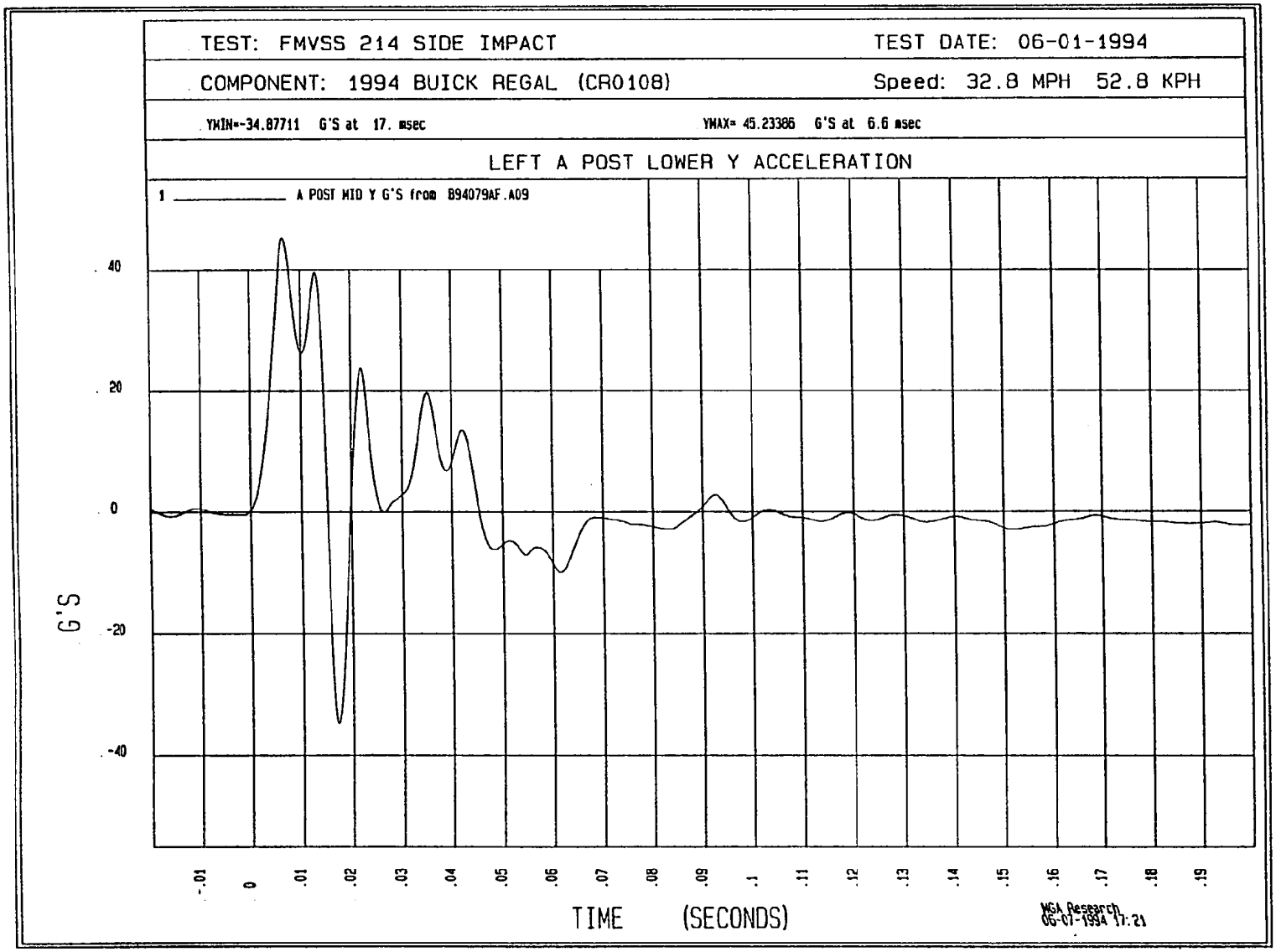


Figure B-48 - Left A Post Lower Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

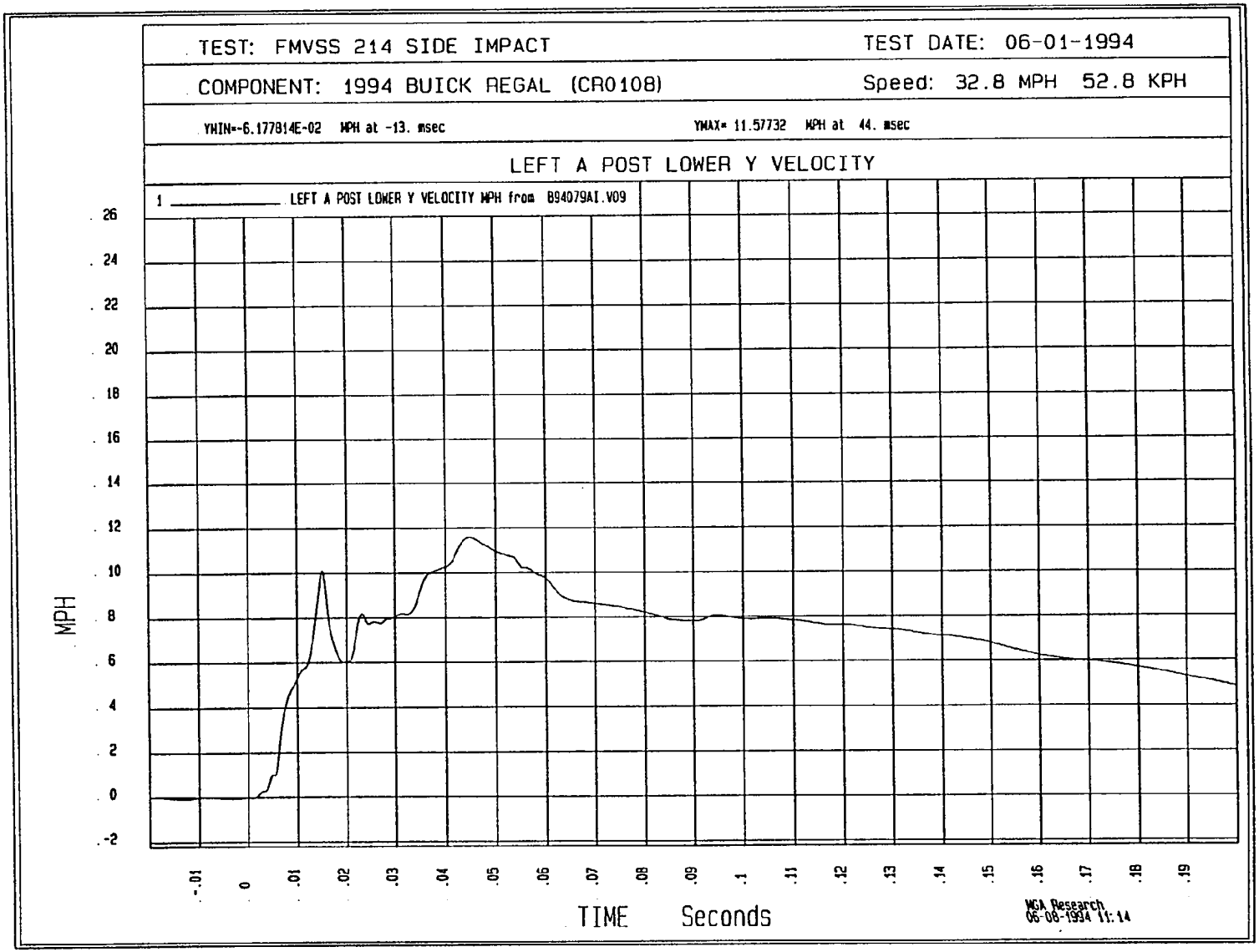


Figure B-49 - Left A Post Lower Y Velocity vs. Time

Filter: Class 60 (100 Hz)

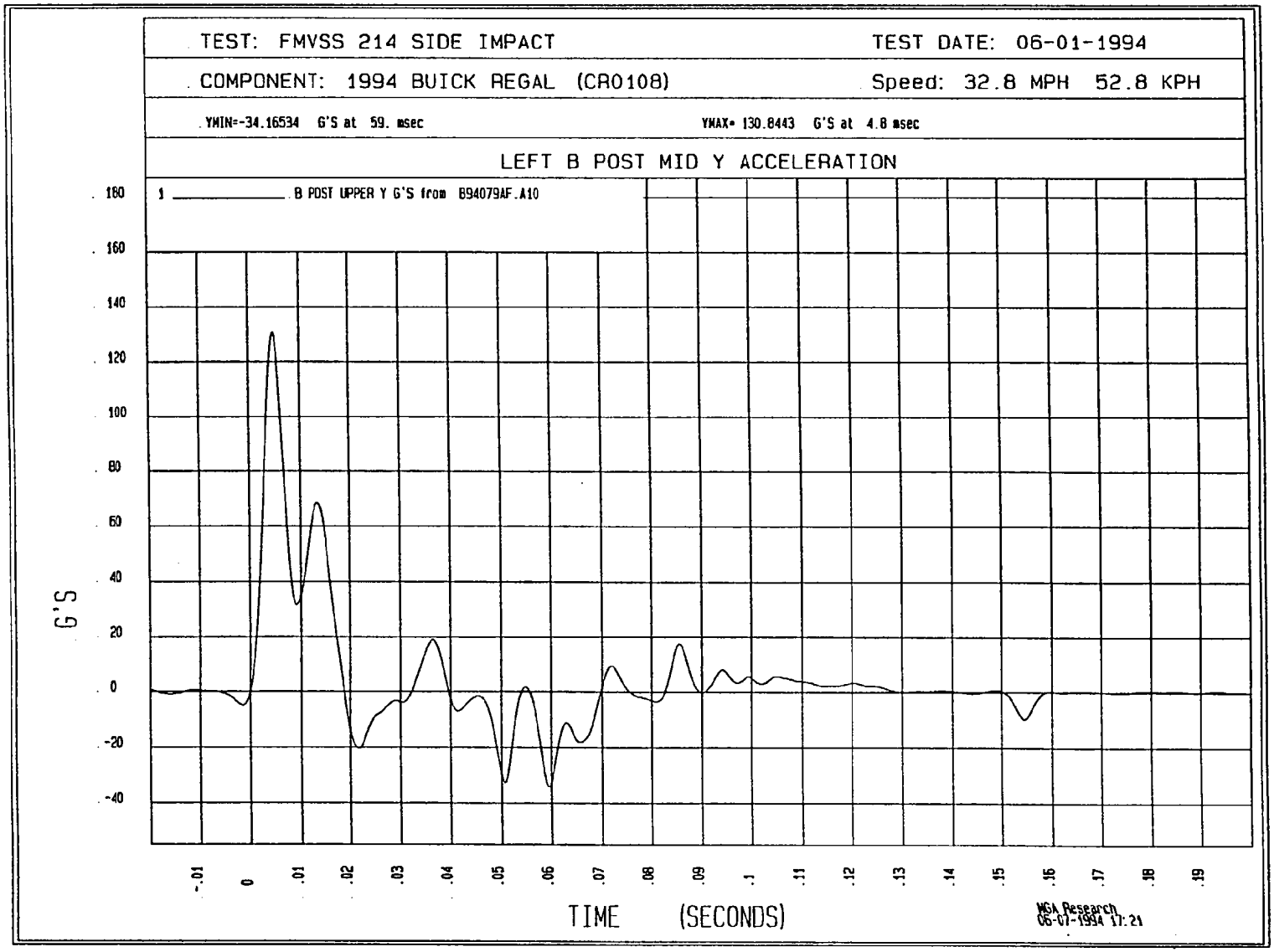


Figure B-5Ø - Left B Post Mid Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

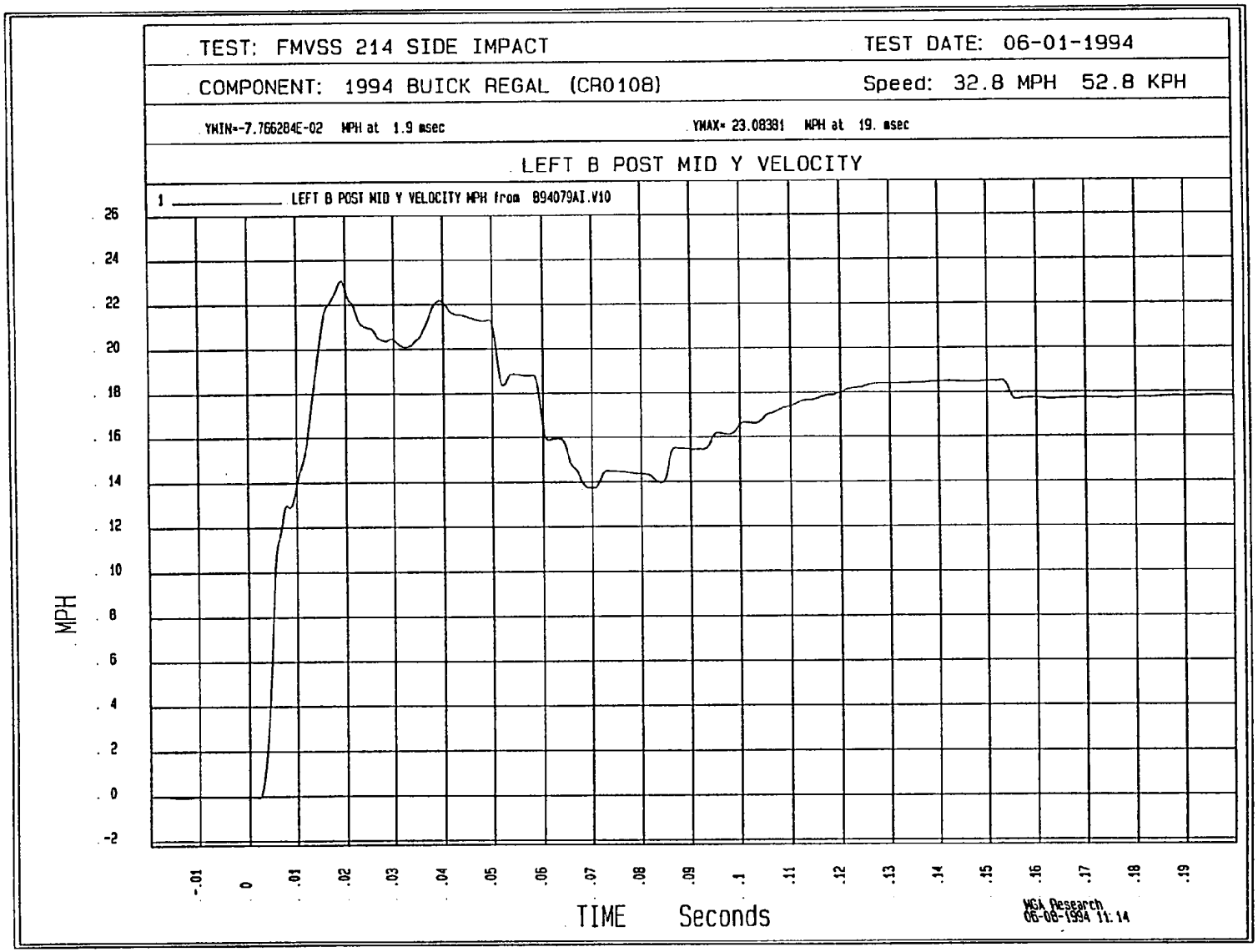


Figure B-51 - Left B Post Mid Y Velocity vs. Time

Filter: Class 60 (100 Hz)

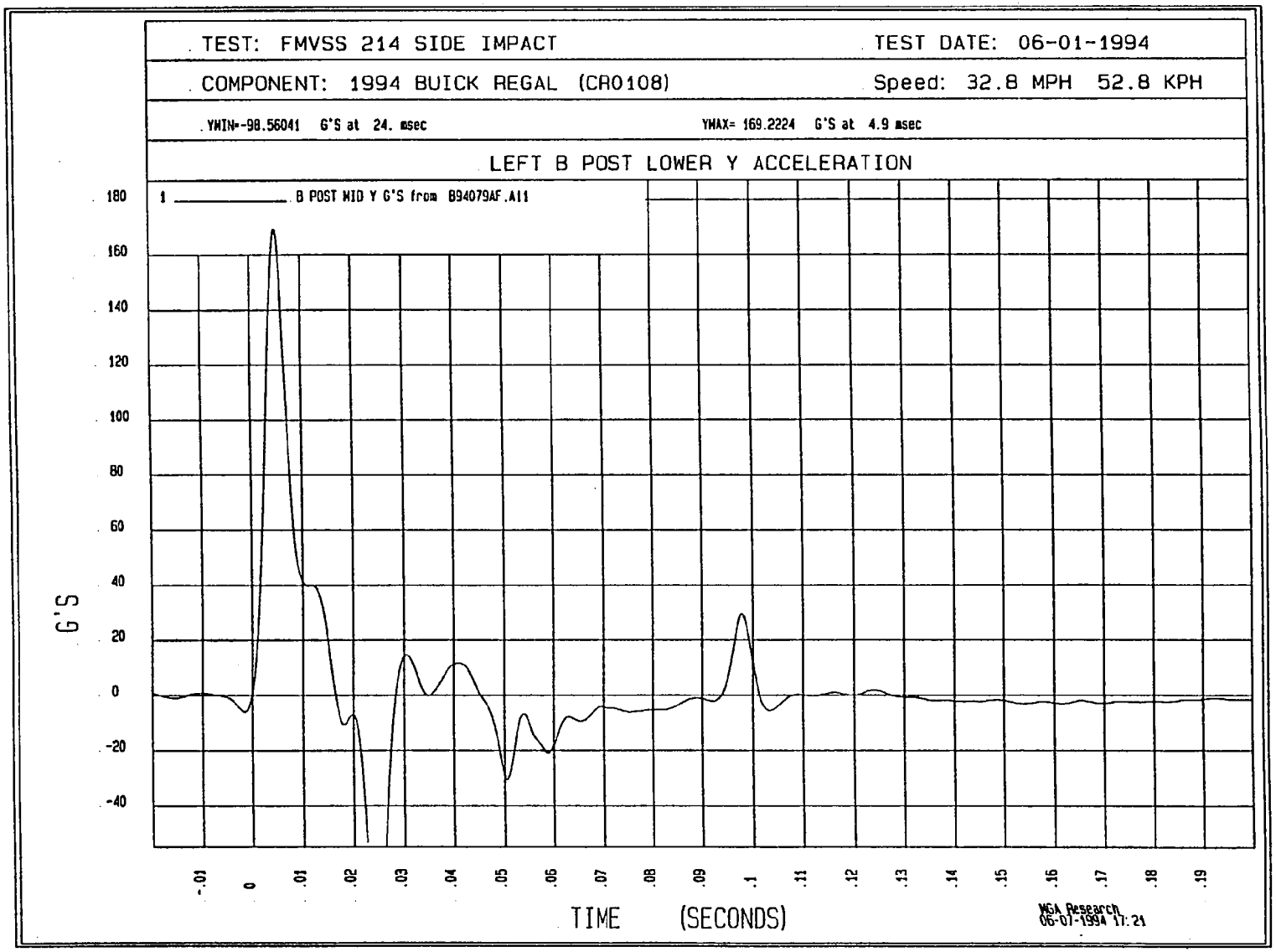


Figure B-52 - Left B Post Lower Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

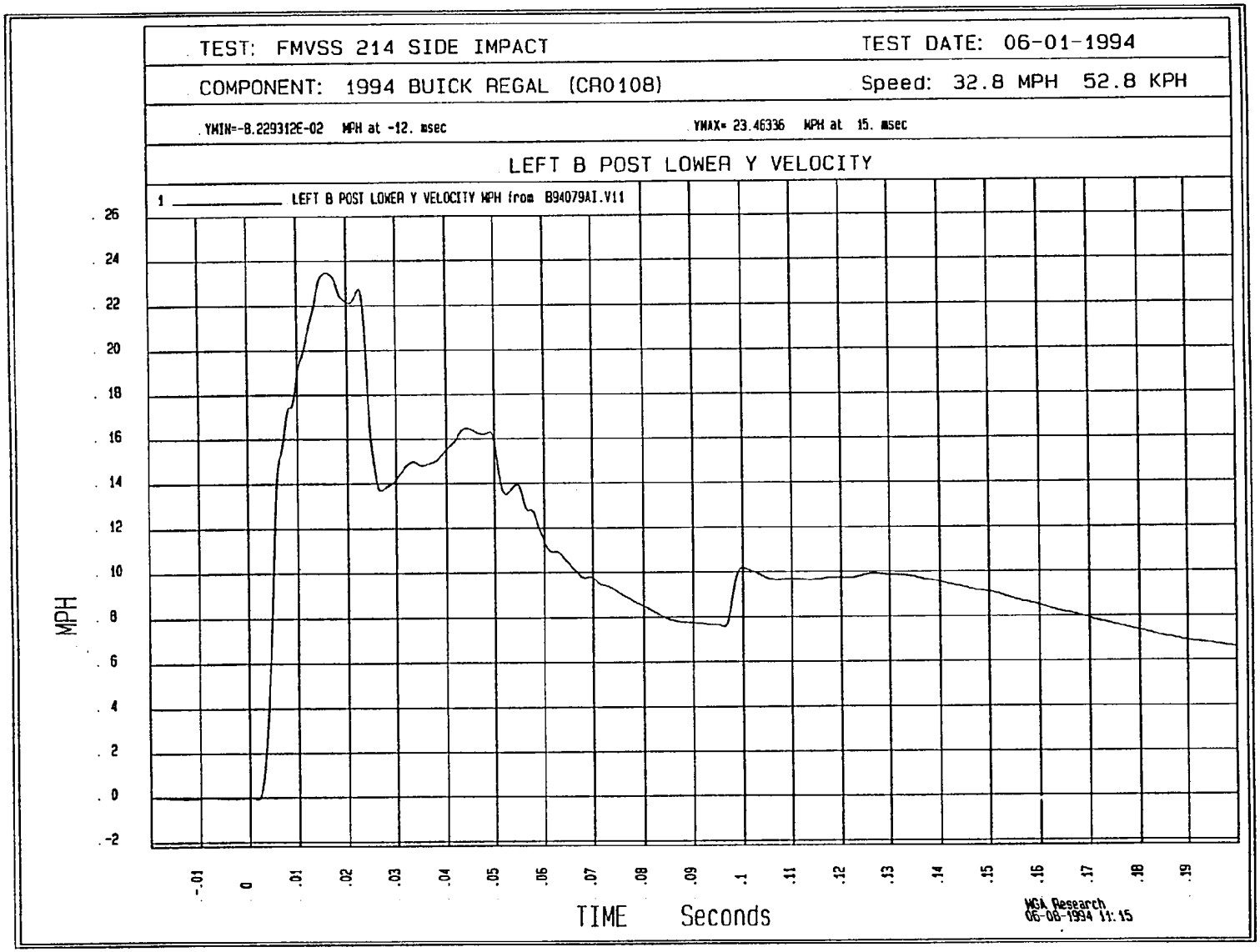


Figure B-53 - Left B Post Lower Y Velocity vs. Time

Filter: Class 60 (100 Hz)

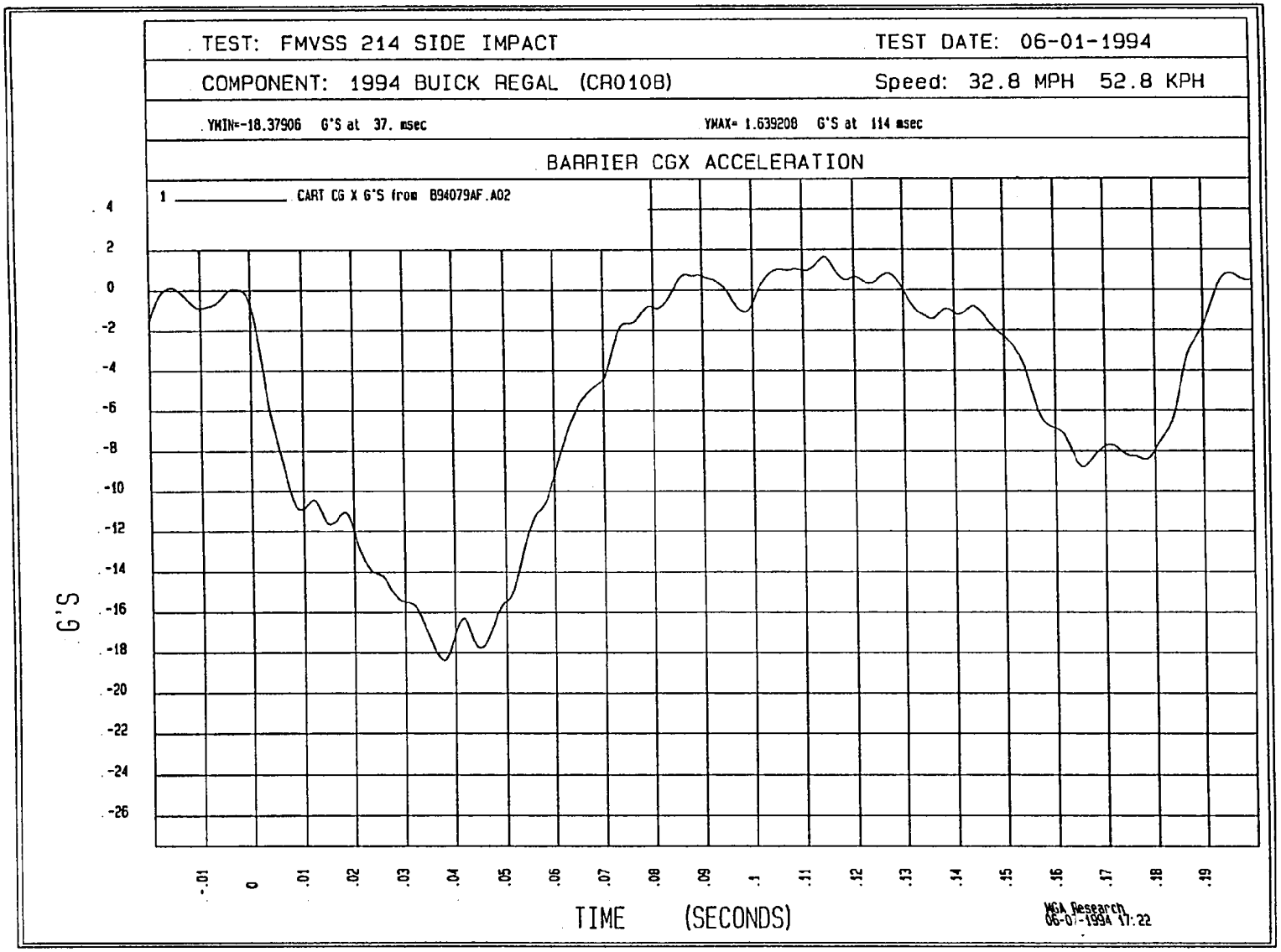


Figure B-54 - Moving Barrier Center of Gravity X Acceleration vs. Time

Filter: Class 180 (300 Hz)

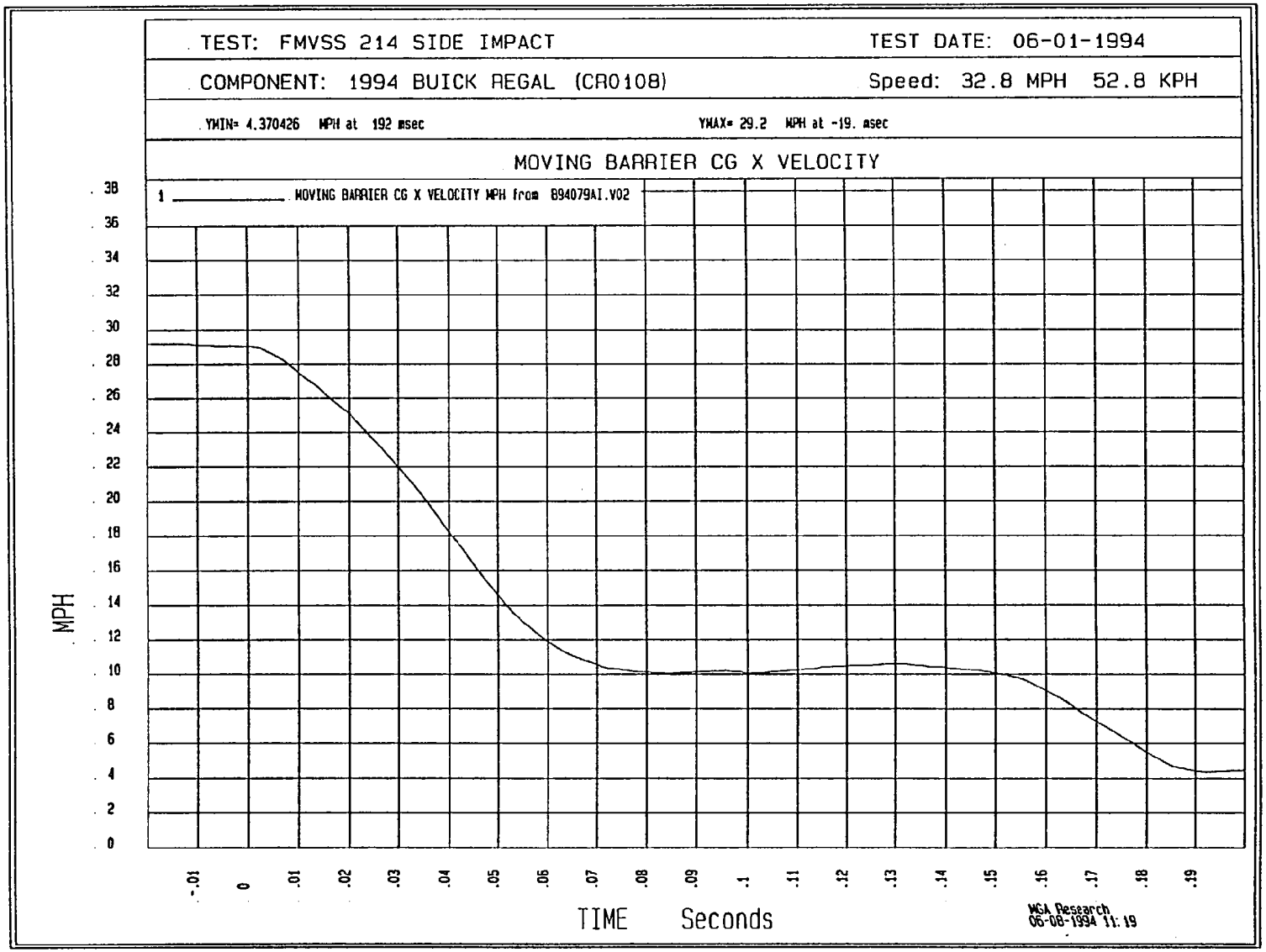


Figure B-55 - Moving Barrier Center of Gravity X Velocity vs. Time

Filter: Class 60 (100 Hz)

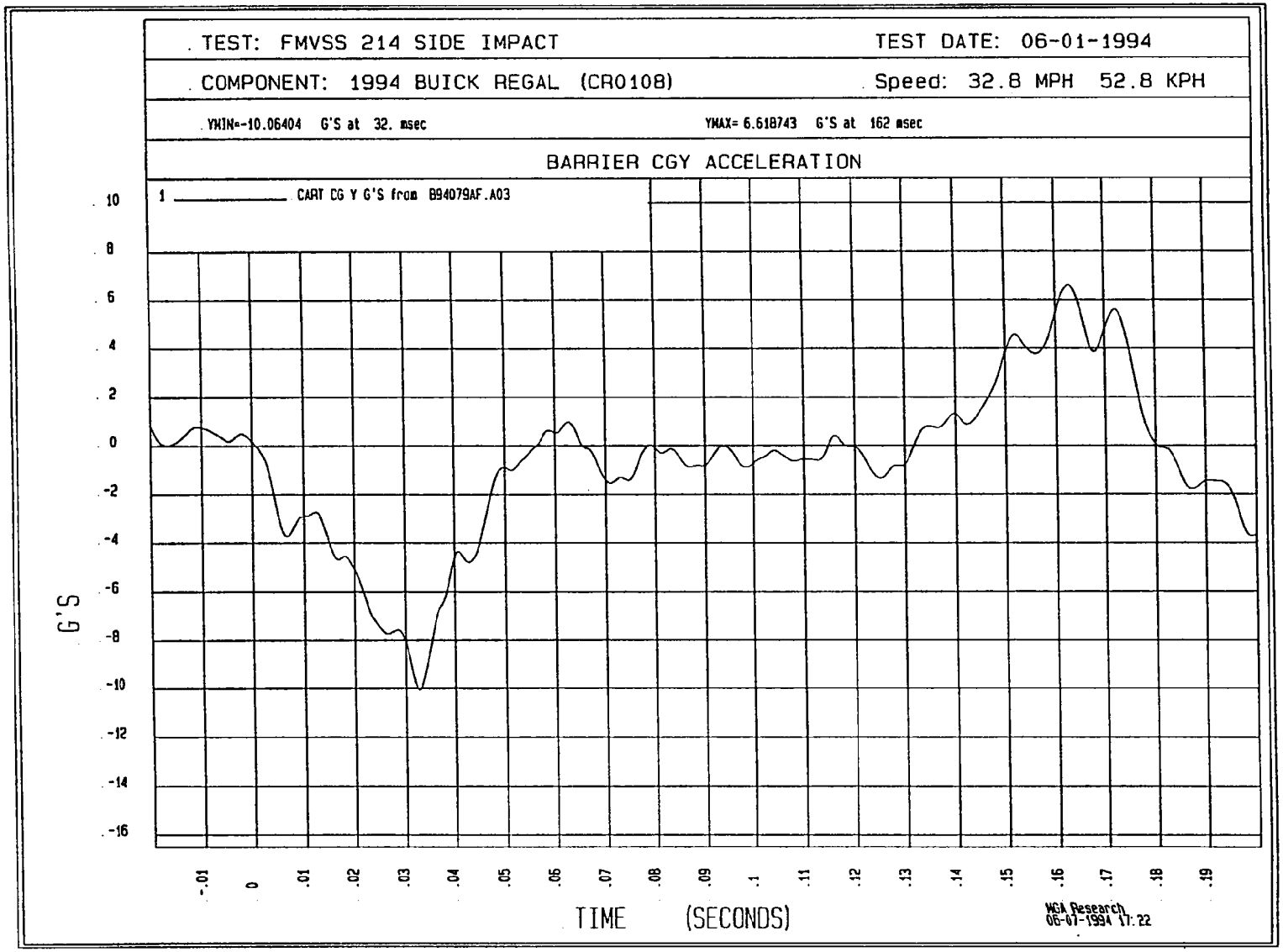


Figure B-56 - Moving Barrier Center of Gravity Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

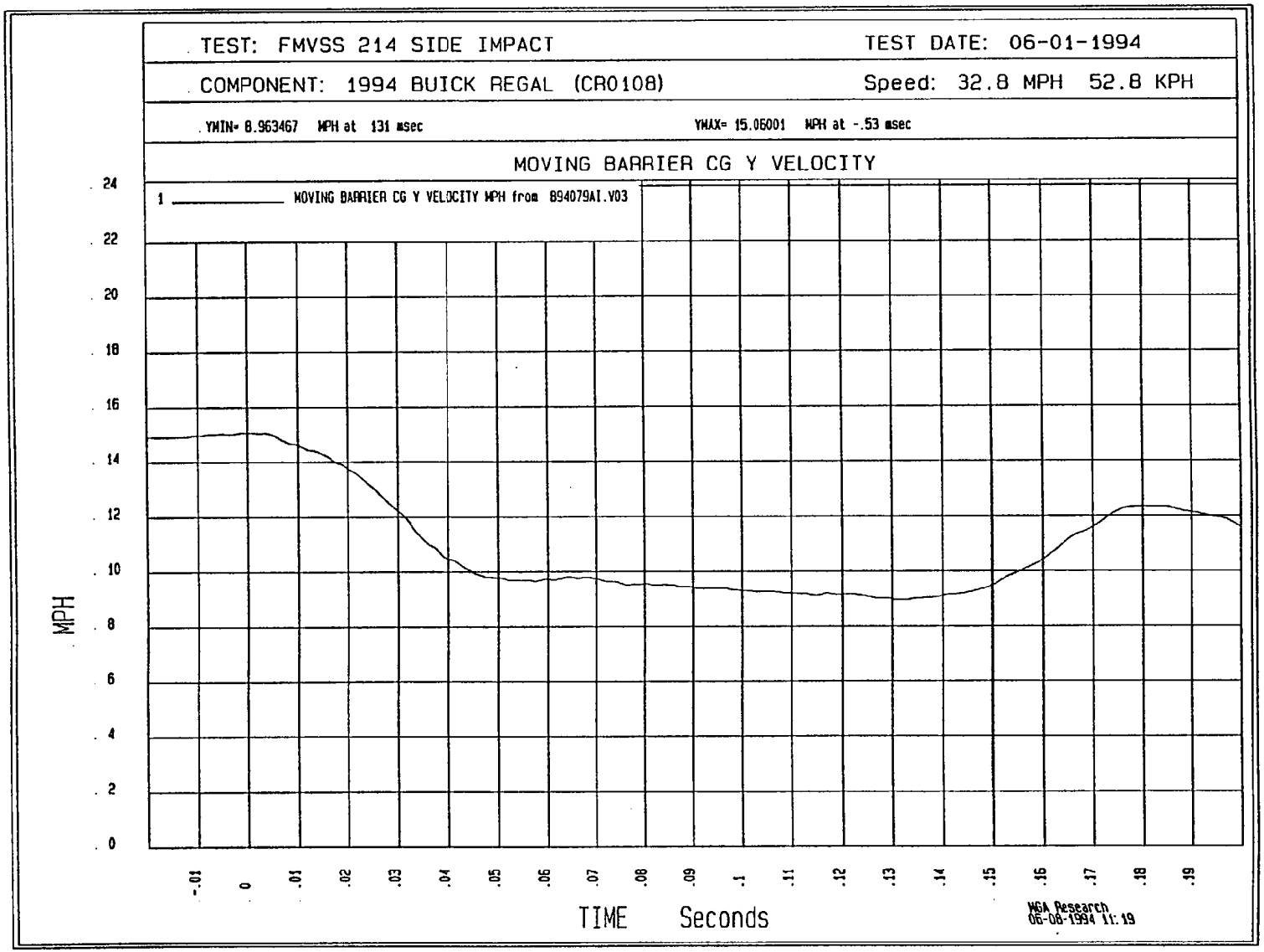


Figure B-57 - Moving Barrier Center of Gravity Y Velocity vs. Time

Filter: Class 60 (100 Hz)

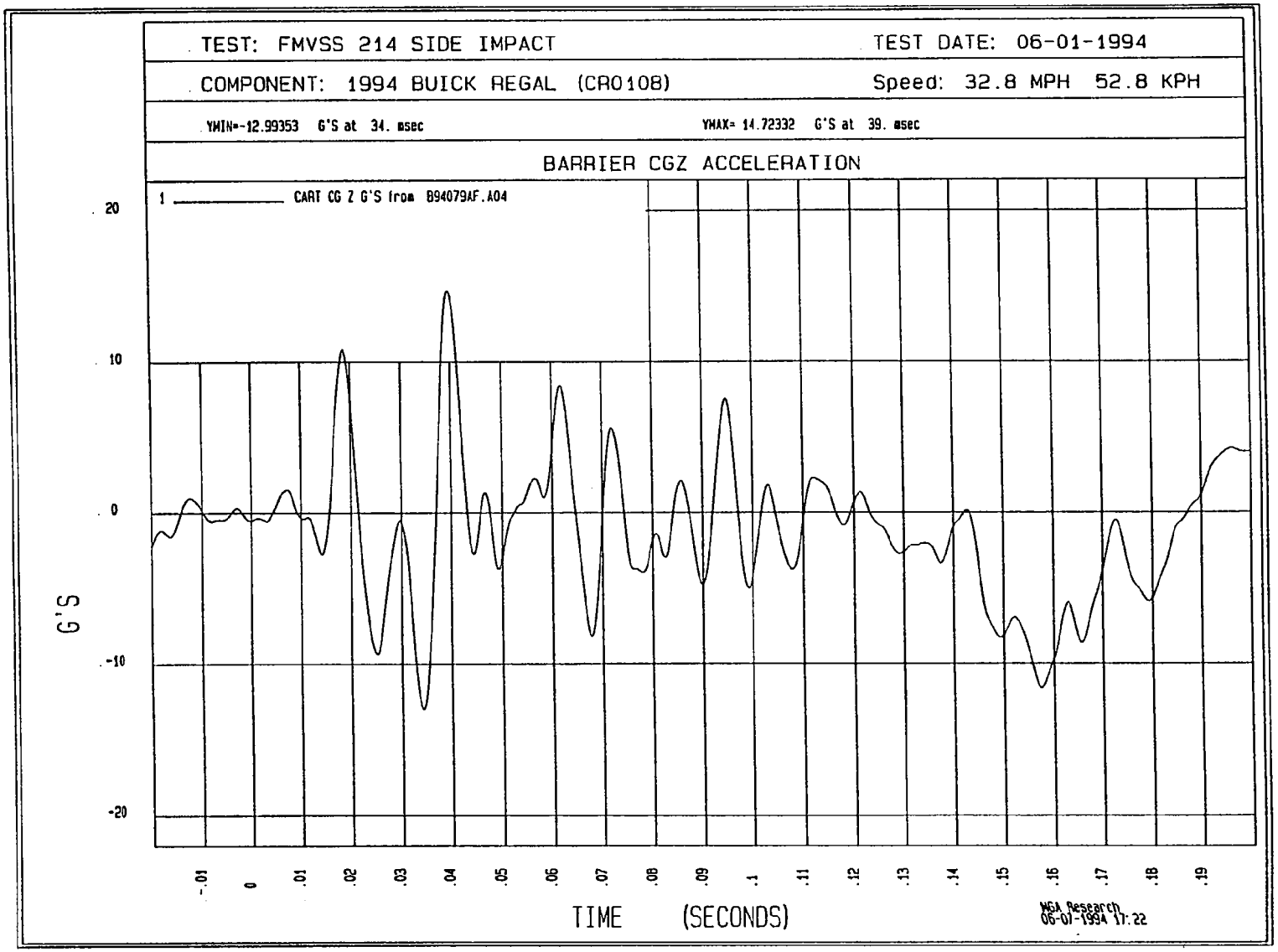


Figure B-58 - Moving Barrier Center of Gravity Z Acceleration vs. Time

Filter: Class 180 (300 Hz)

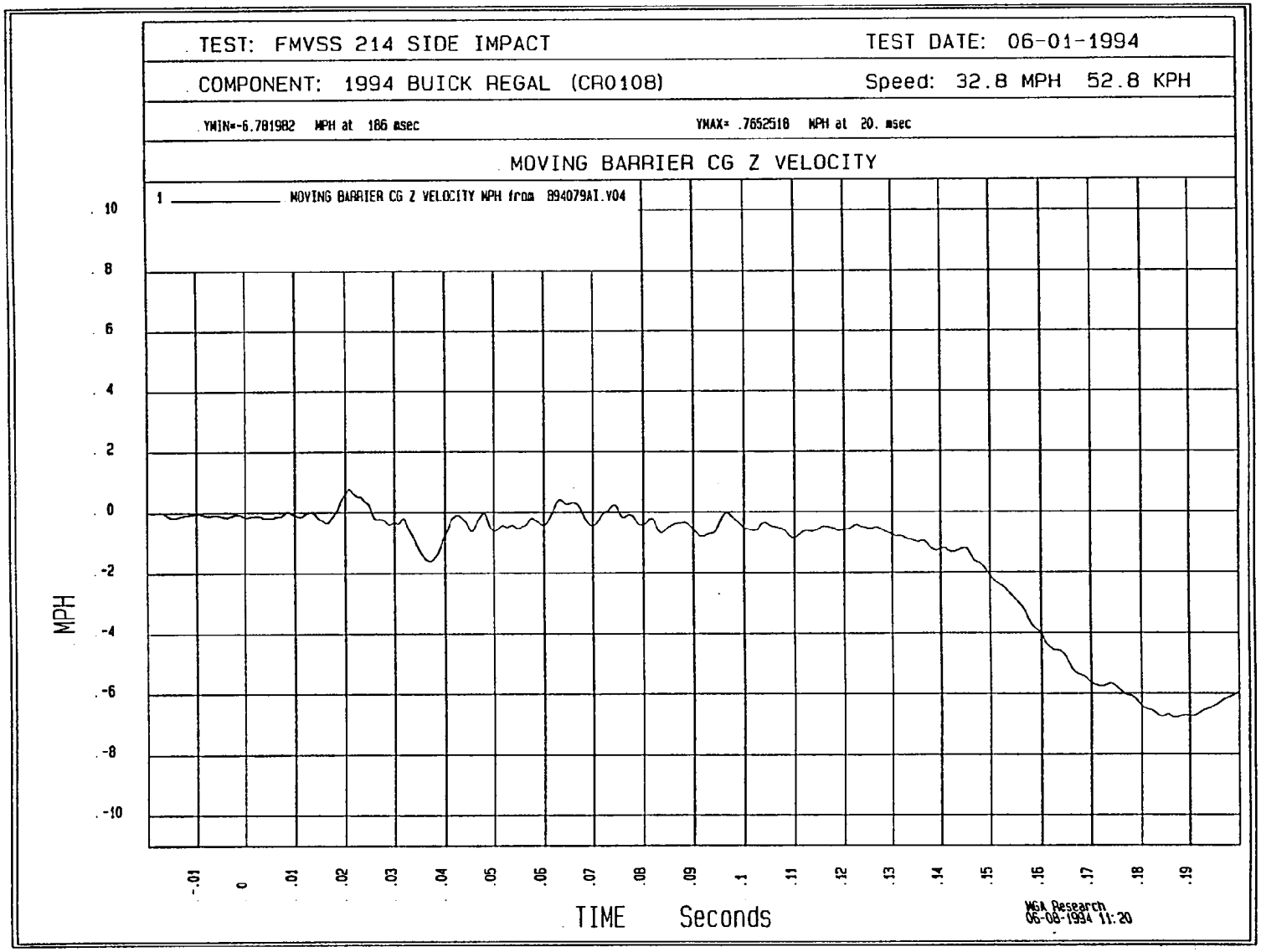


Figure B-59 - Moving Barrier Center of Gravity Z Velocity vs. Time

Filter: Class 60 (100 Hz)

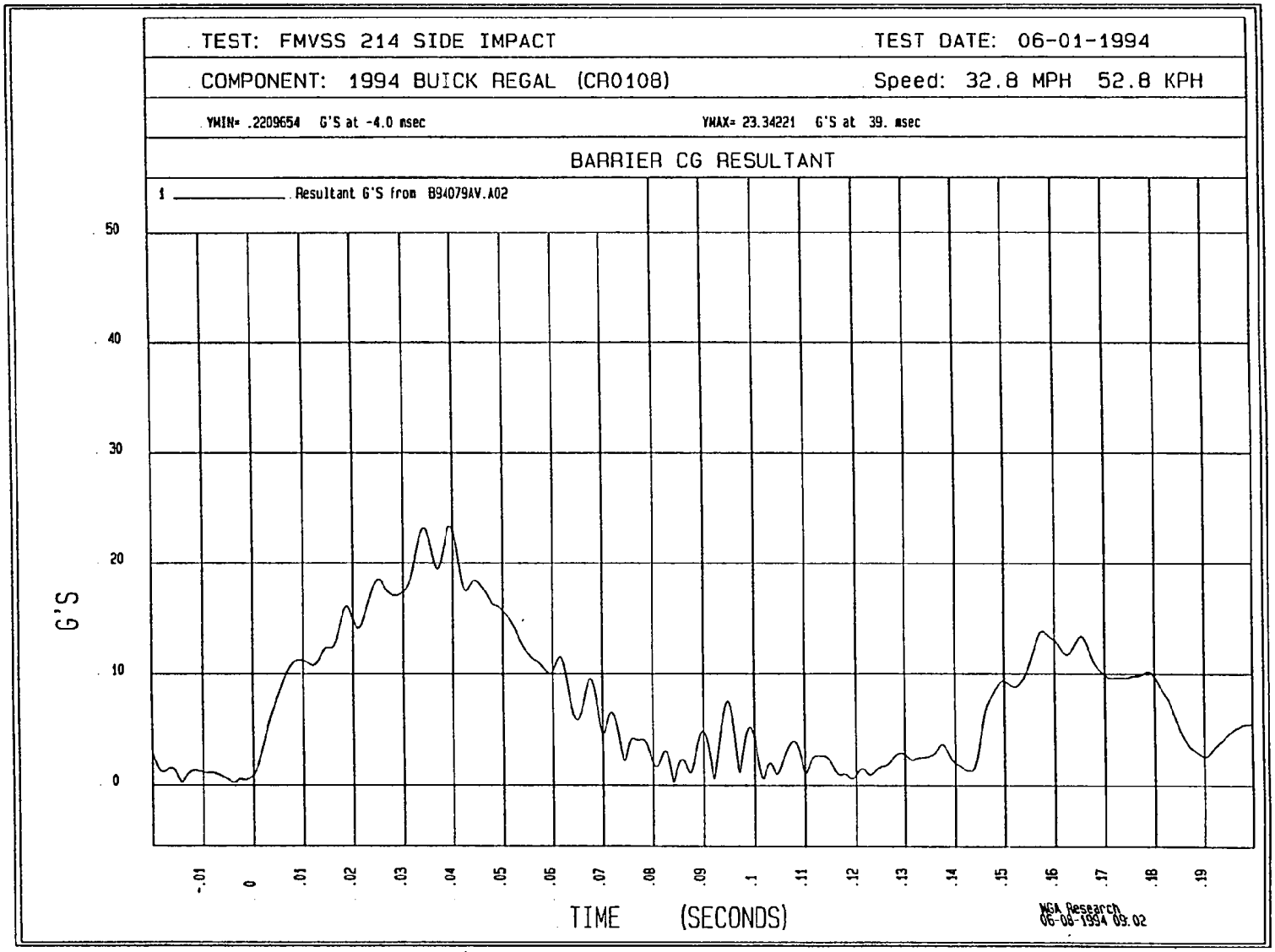


Figure B-60 - Moving Barrier Center of Gravity Resultant vs. Time

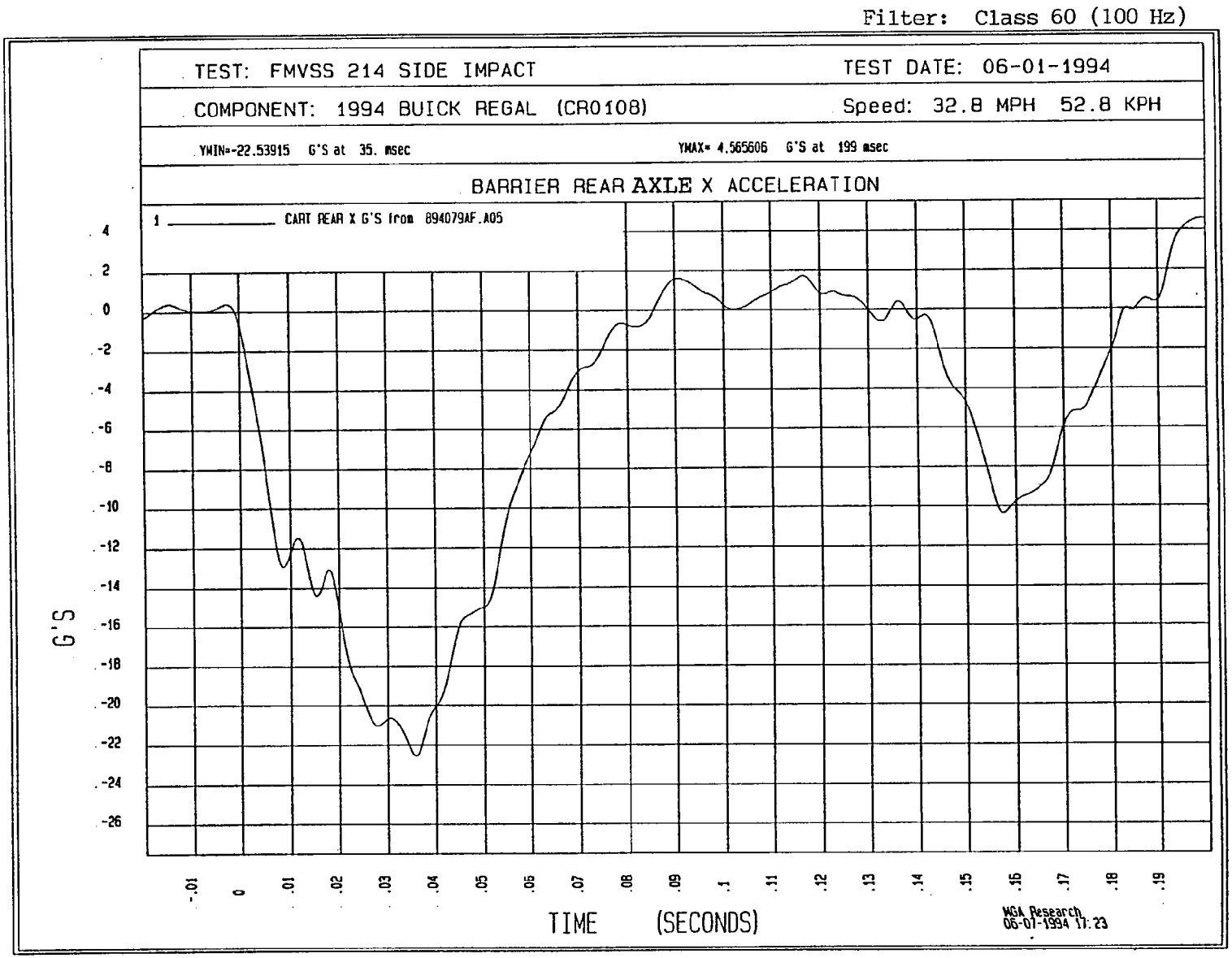


Figure B-61 - Moving Barrier Rear Axle X Acceleration vs. Time

Filter: Class 180 (300 Hz)

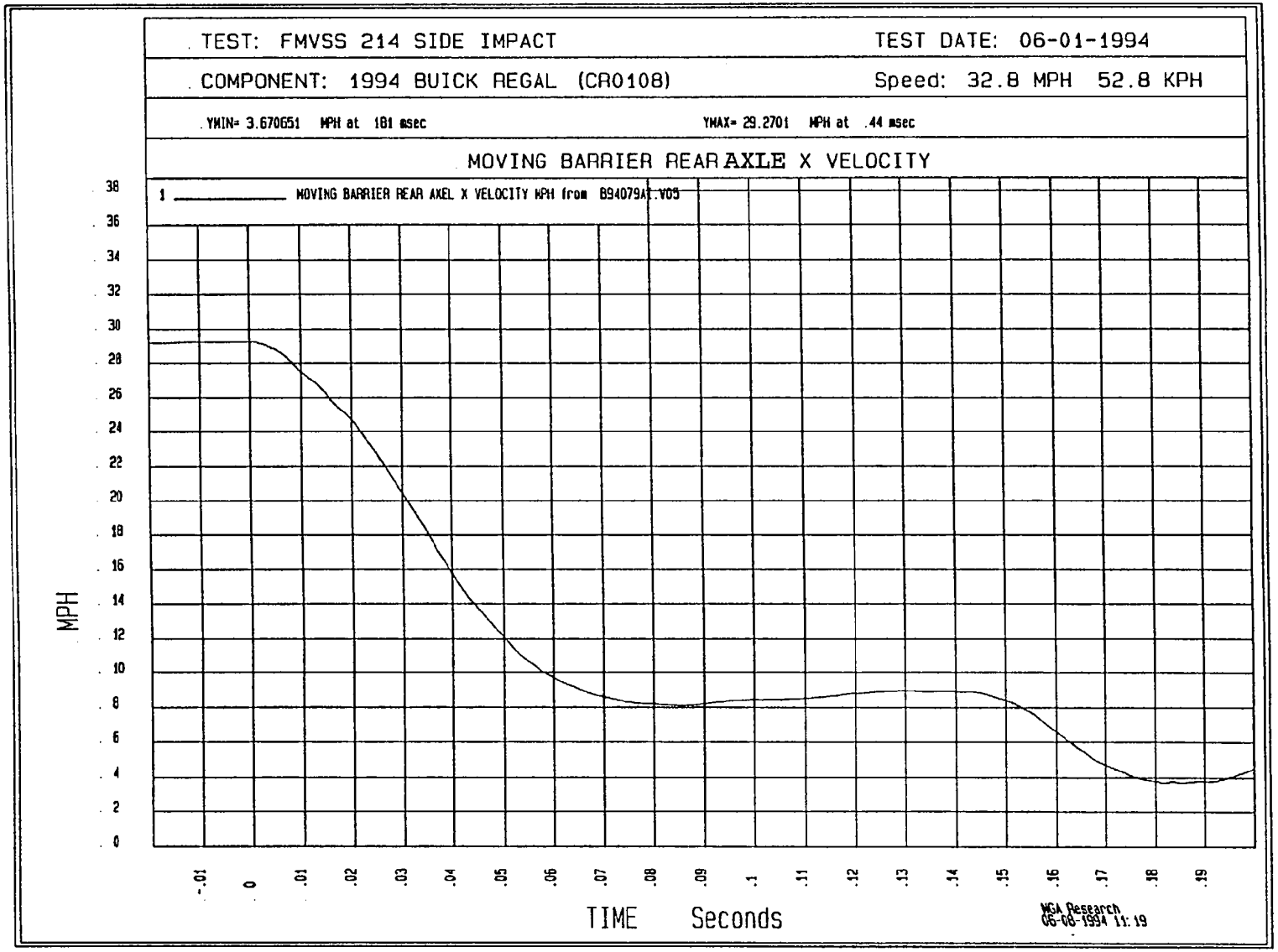


Figure B-62 - Moving Barrier Rear Axle X Velocity vs. Time

Filter: Class 60 (100 Hz)

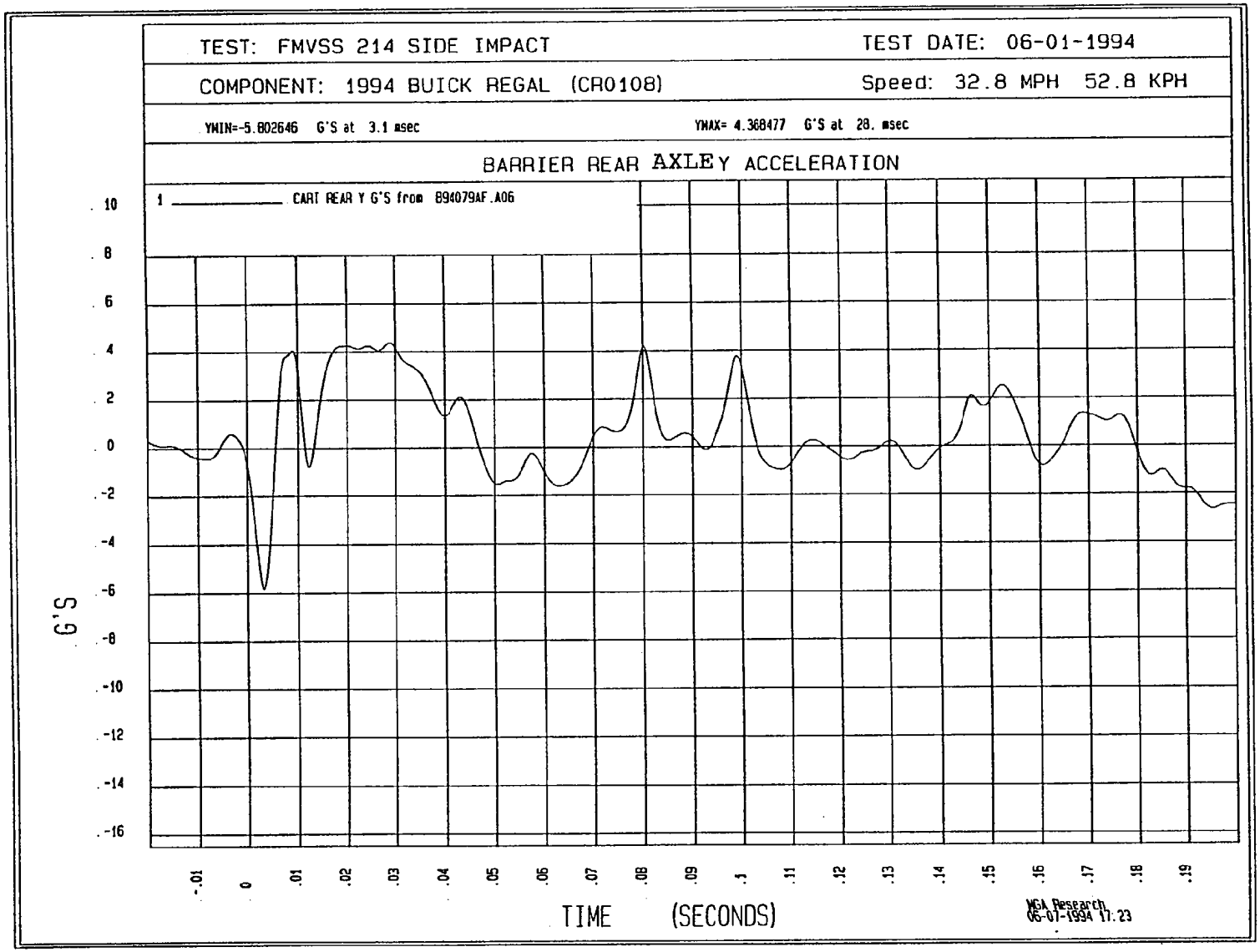


Figure B-63 - Moving Barrier Rear Axle Y Acceleration vs. Time

Filter: Class 180 (300 Hz)

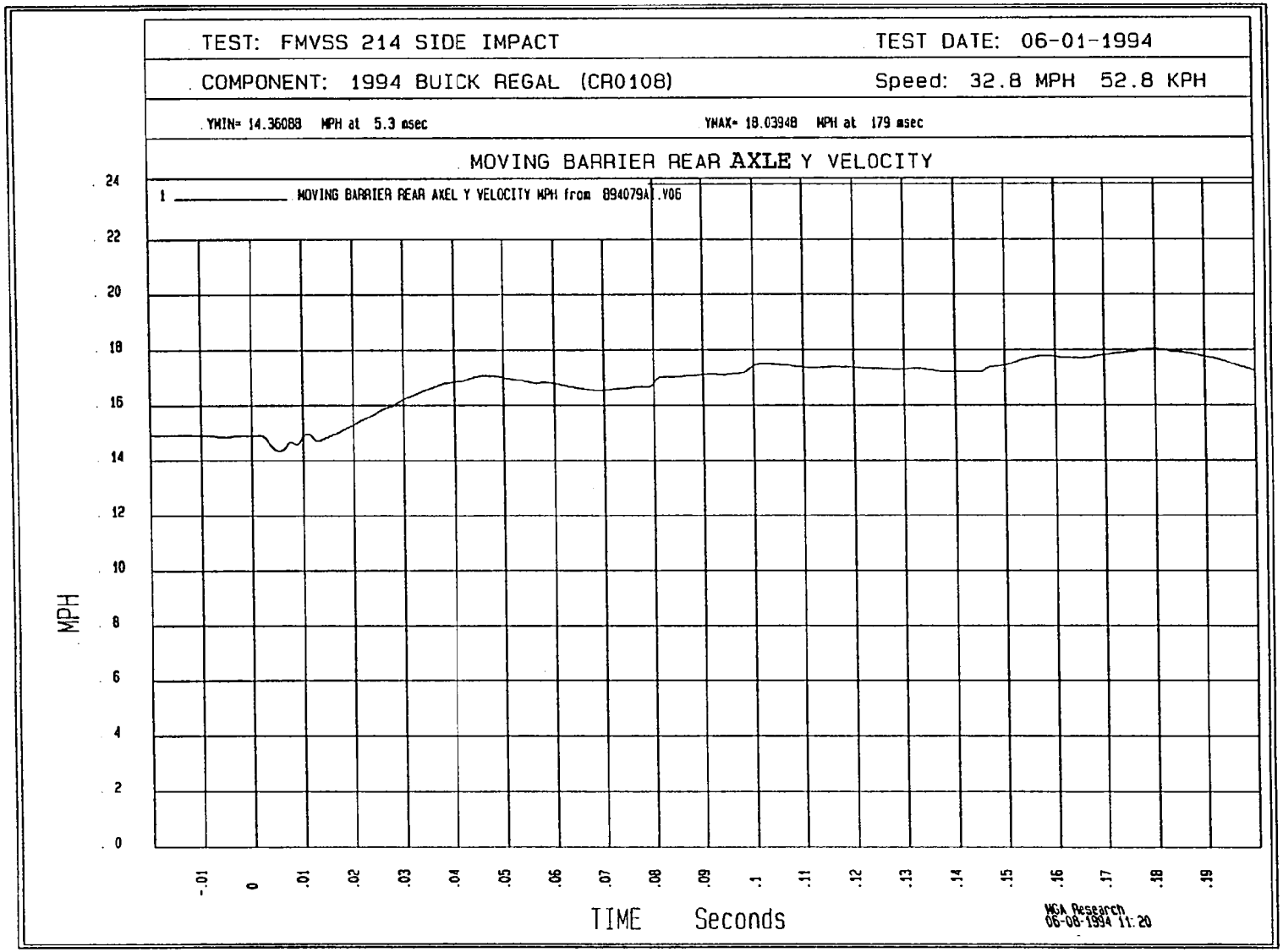


Figure B-64 - Moving Barrier Rear Axle Y Velocity vs. Time

Filter: Class 1000 (1650 Hz)

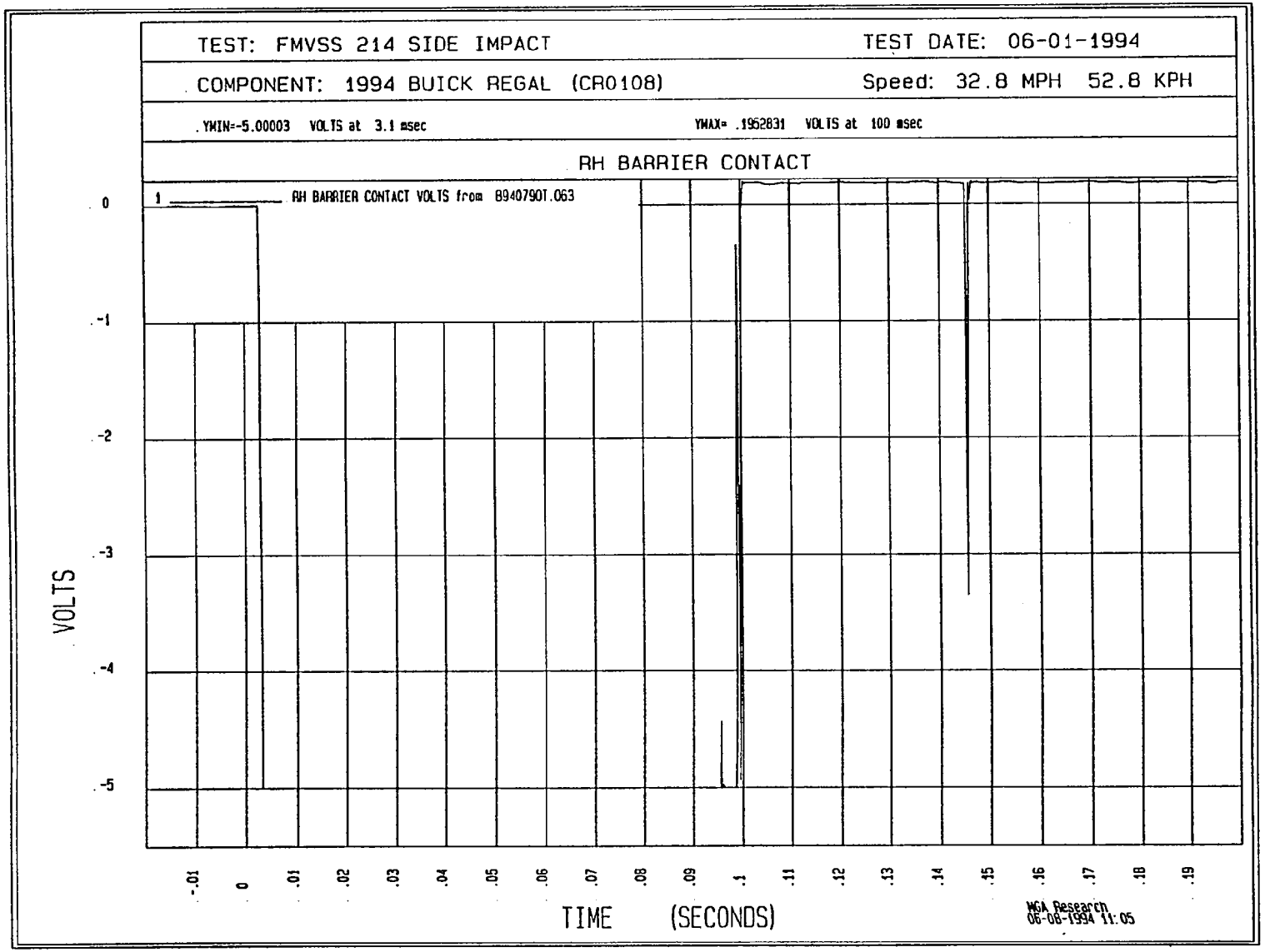


Figure B-65 - Right Hand Barrier Contact

Filter: Class 1000 (1650 Hz)

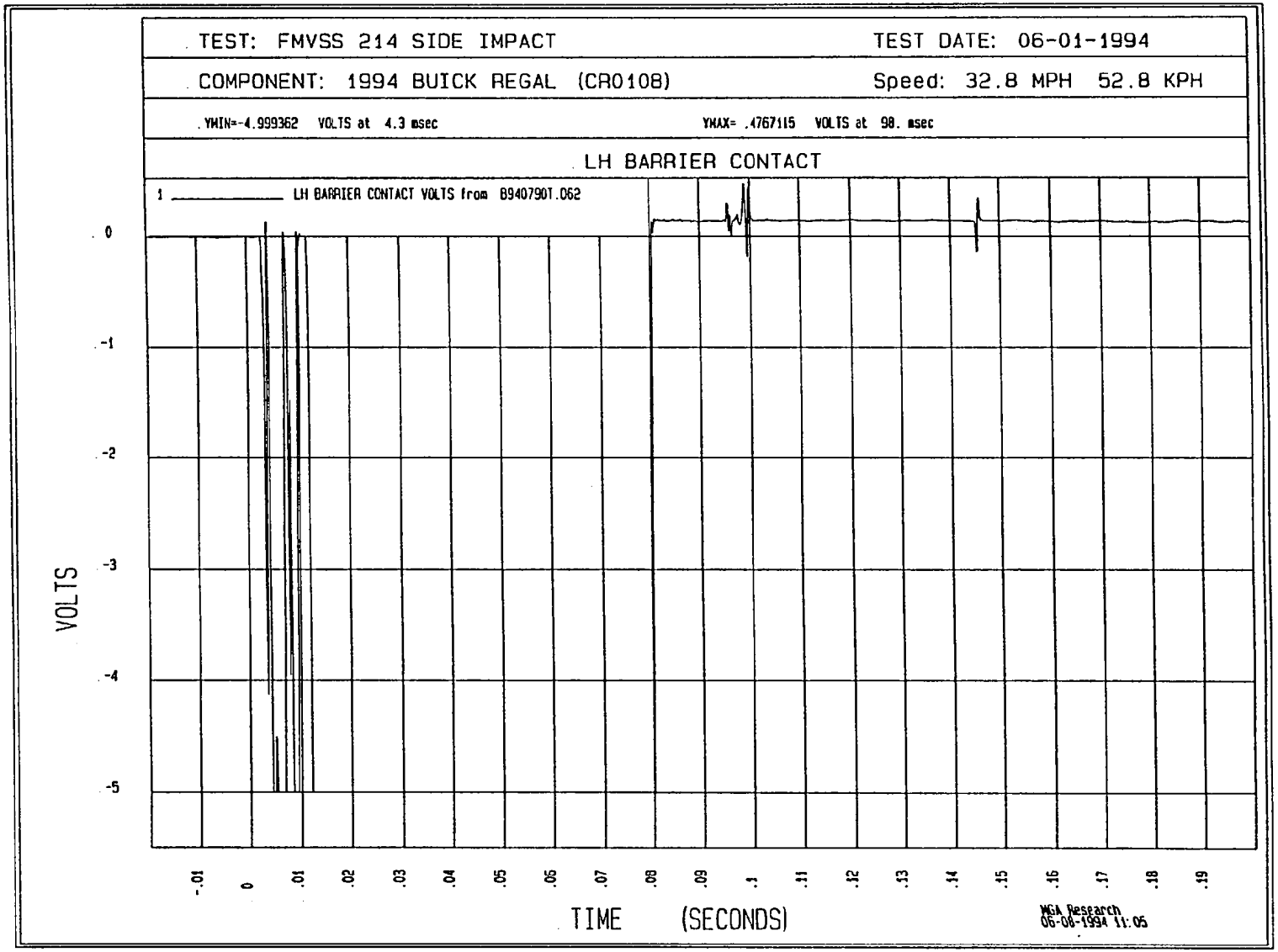


Figure B-66 - Left Hand Barrier Contact

Filter: Class 180 (300 Hz)

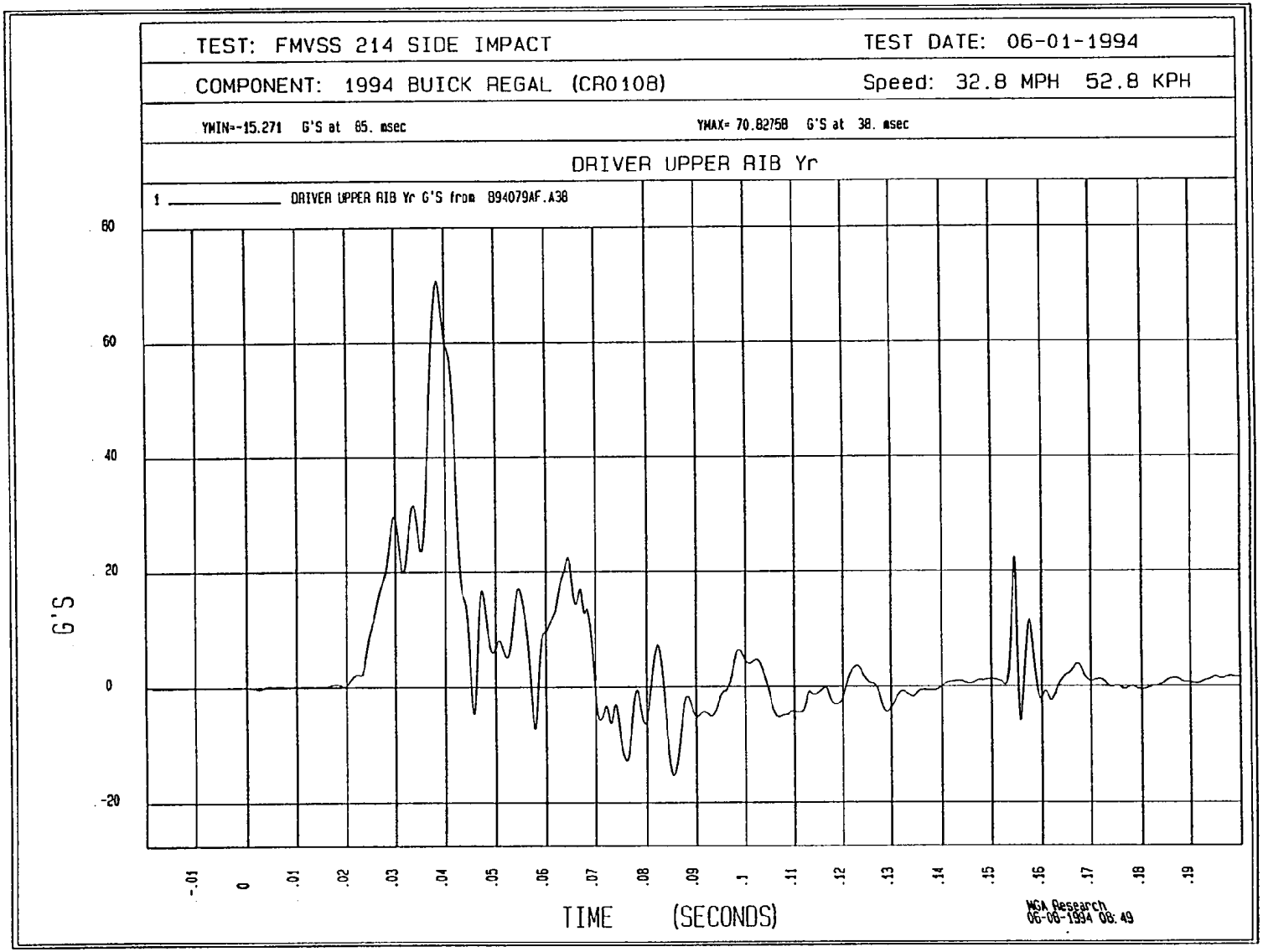


Figure B-67 - Driver Upper Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

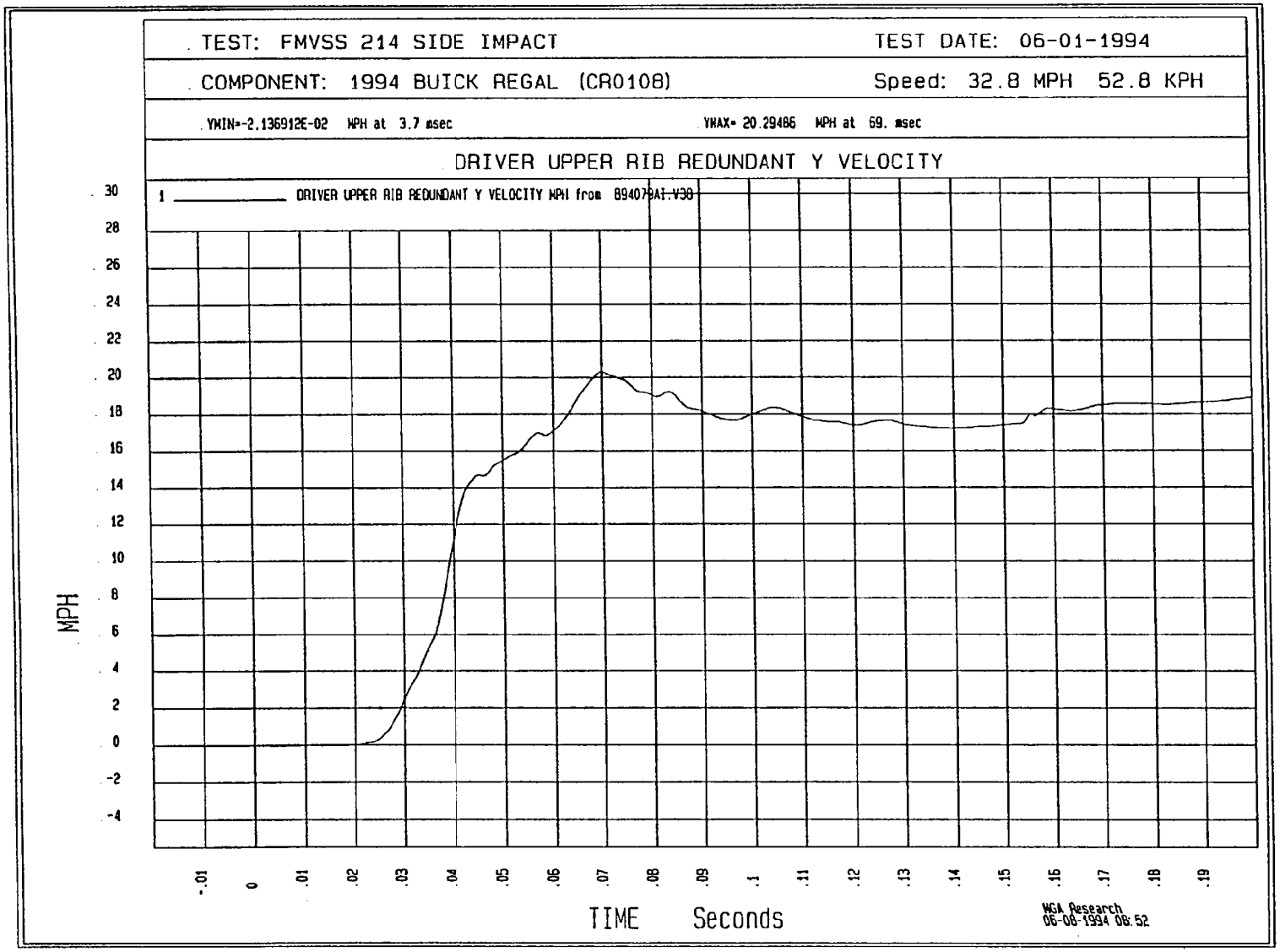


Figure B-68 - Driver Upper Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

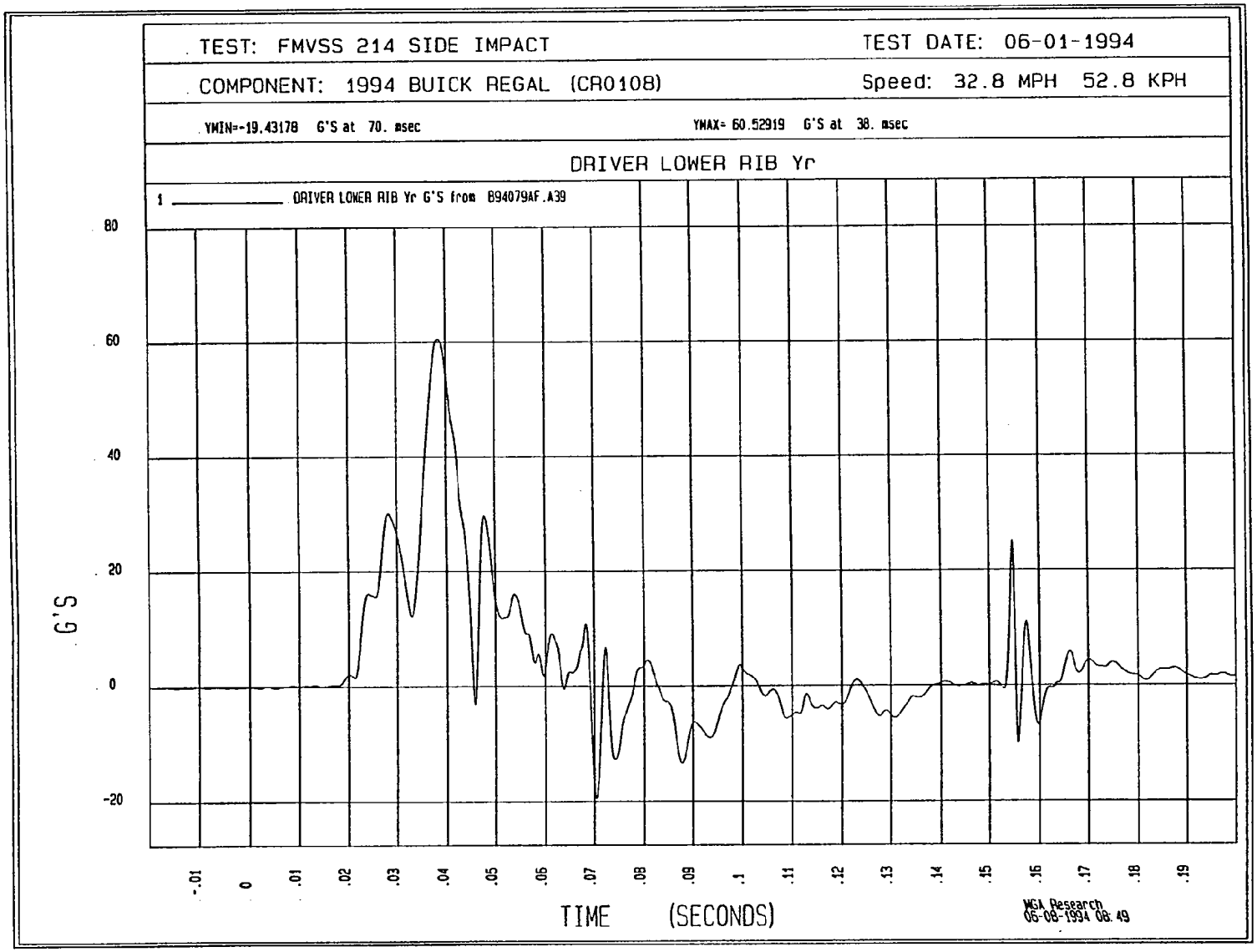


Figure B-69 - Driver Lower Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

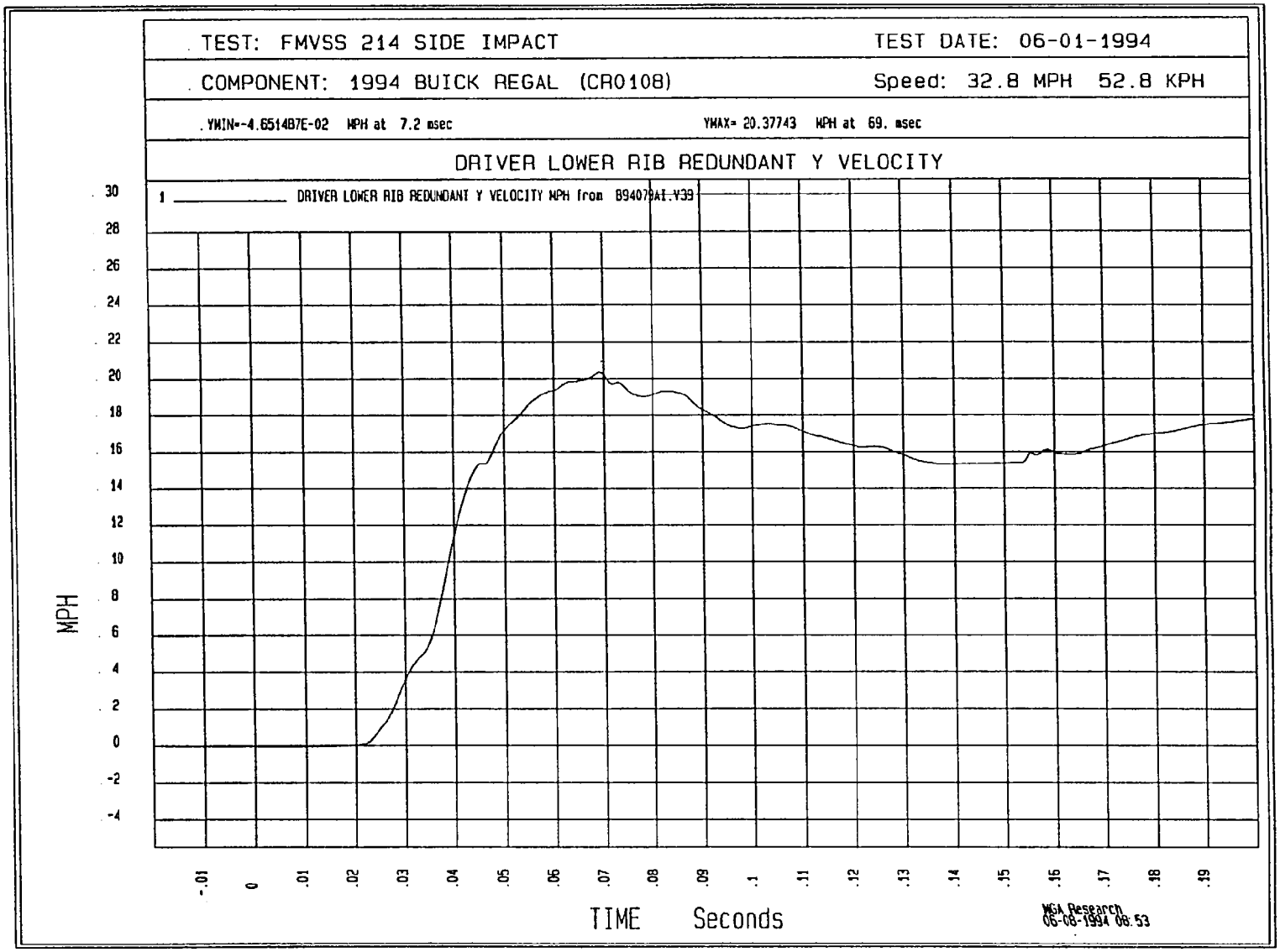


Figure B-70 - Driver Lower Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

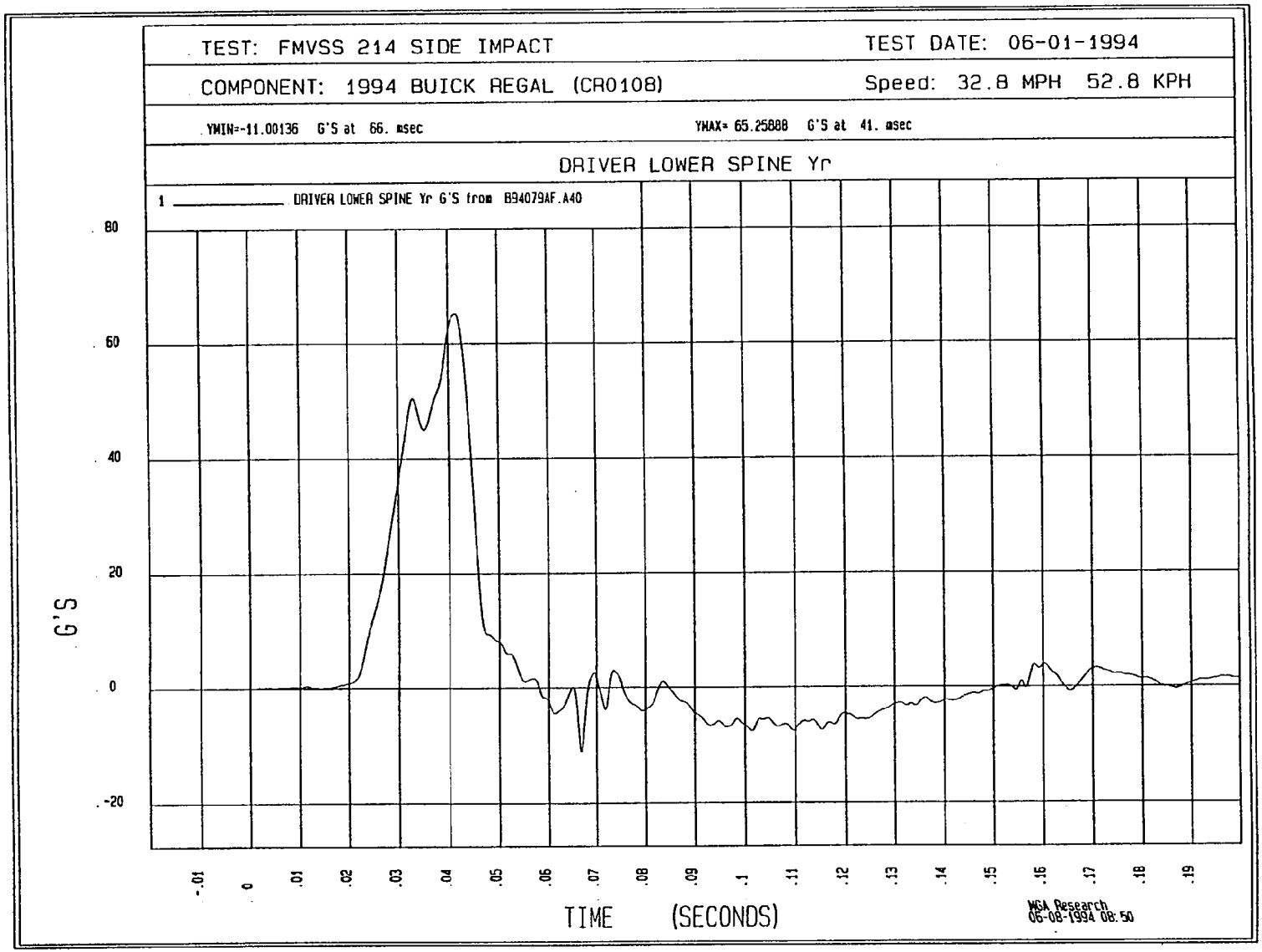


Figure B-71 - Driver Lower Spine Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

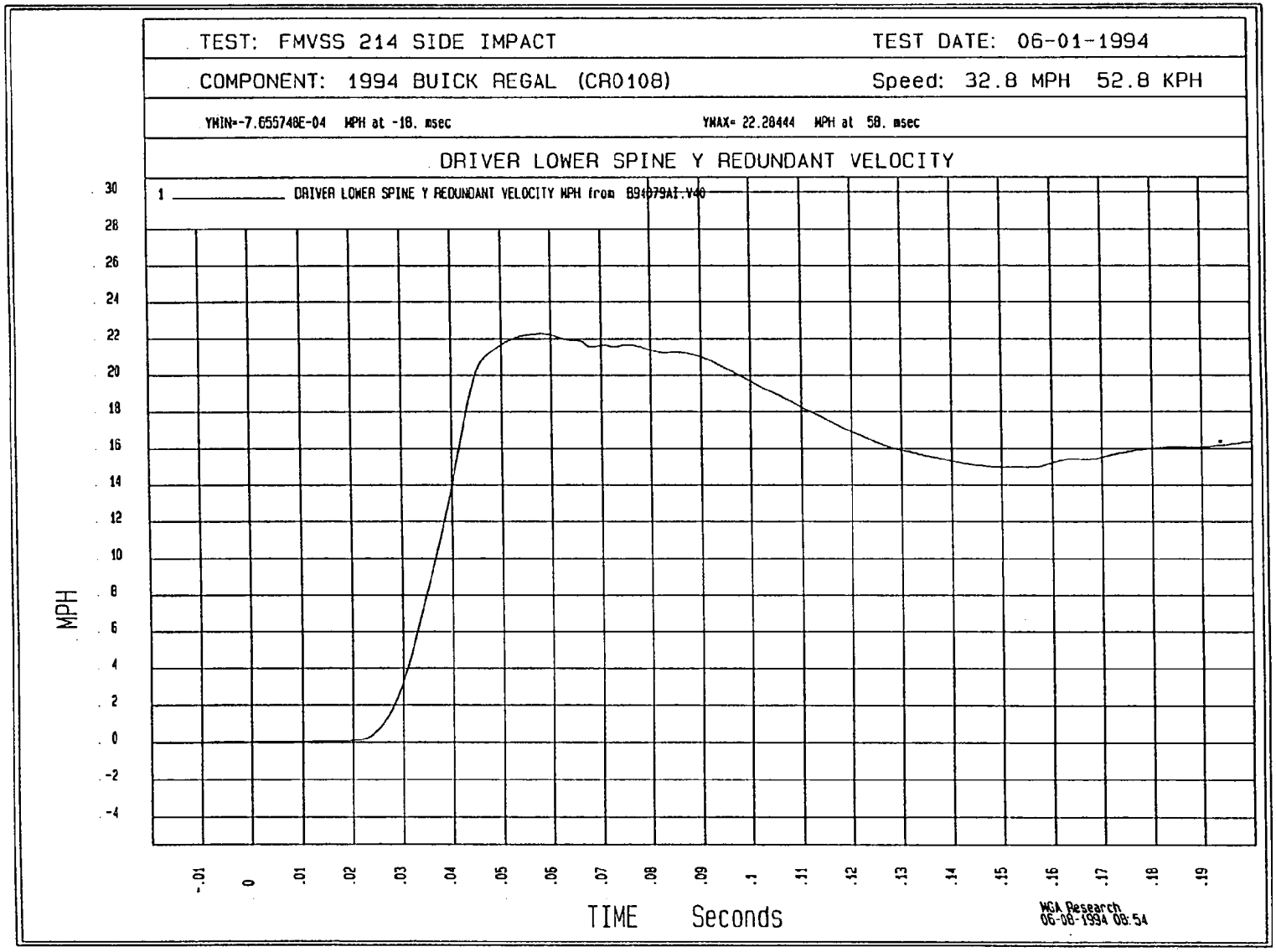


Figure B-72 - Driver Lower Spine Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

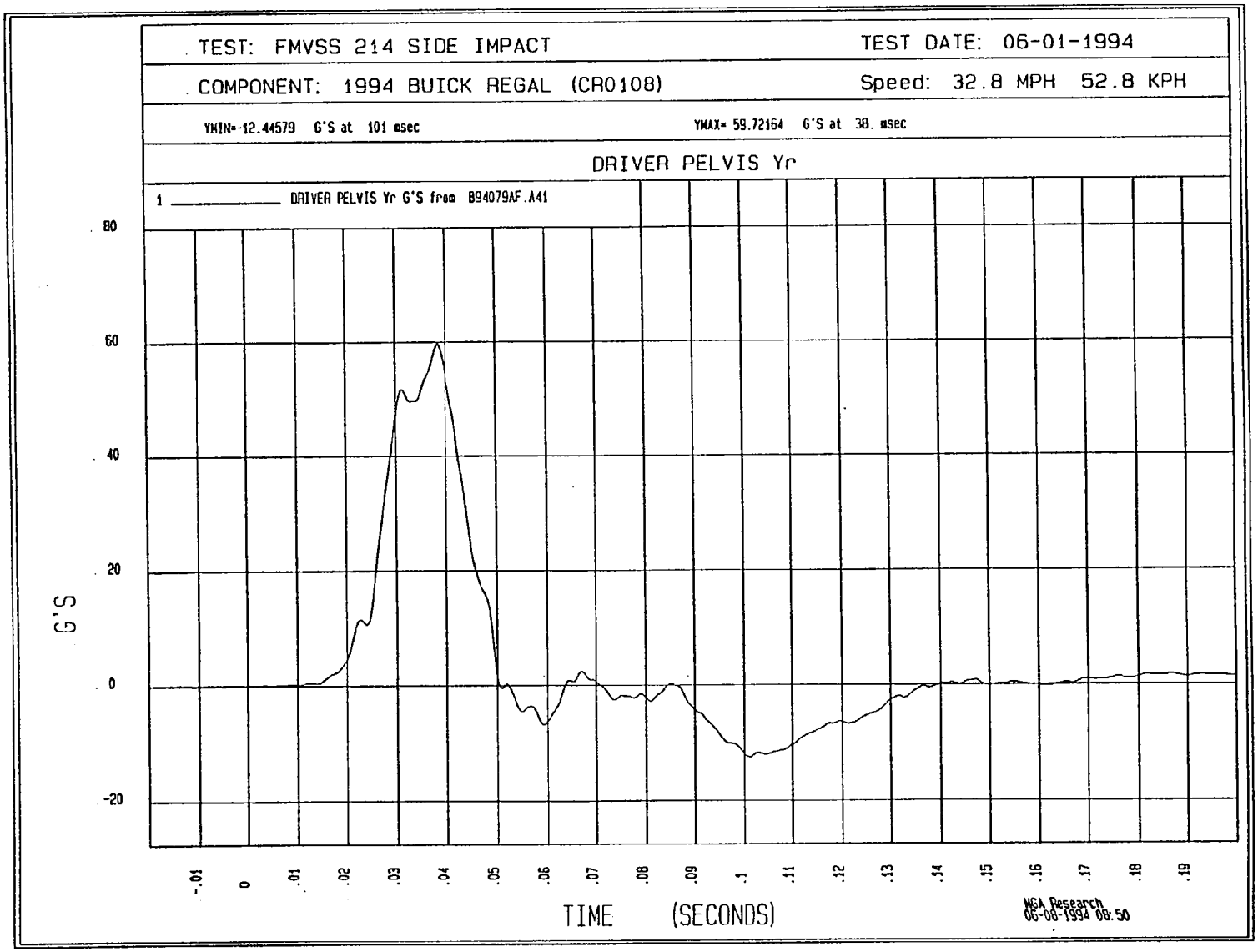


Figure B-73 - Driver Pelvis Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

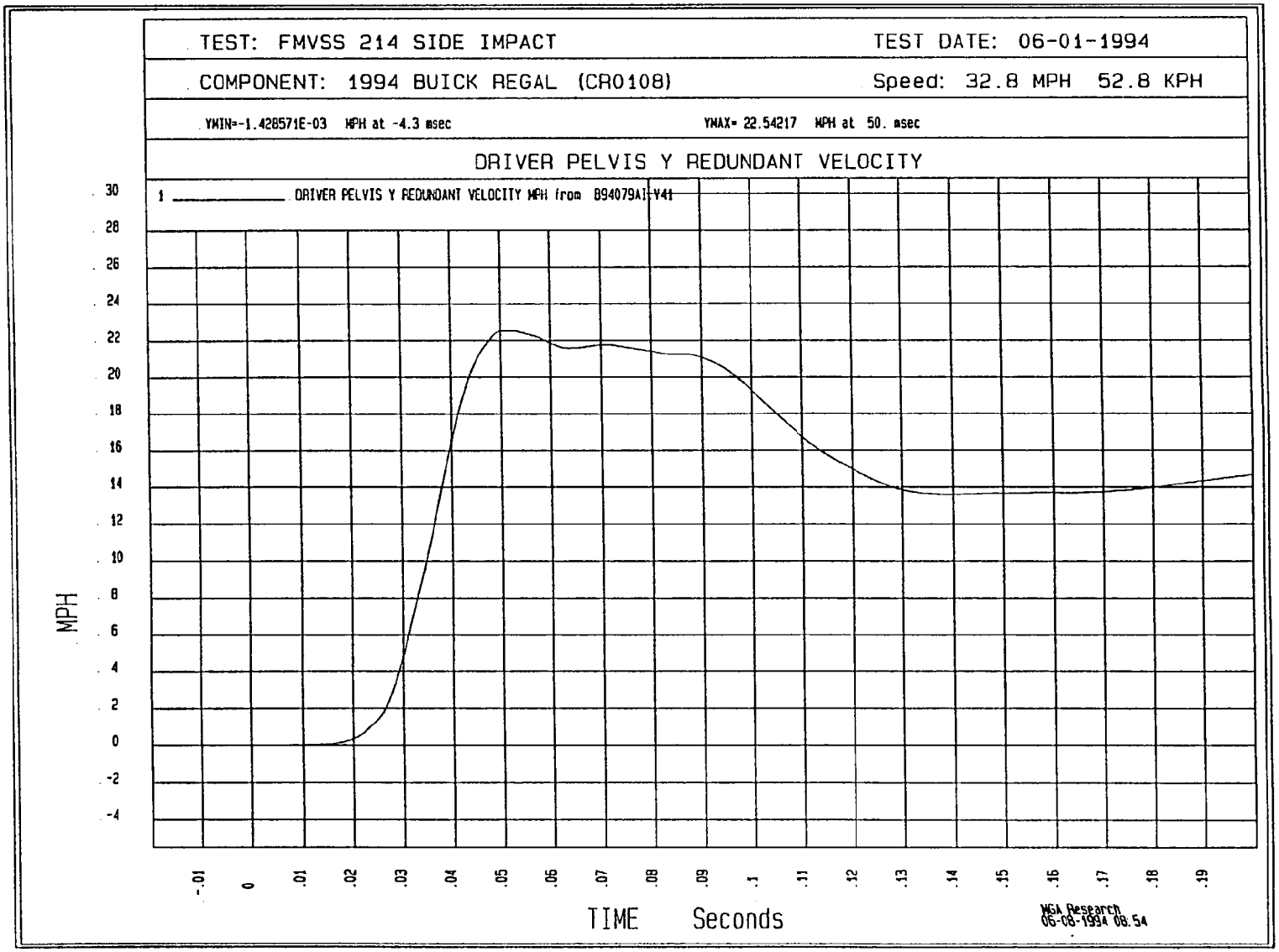


Figure B-74 - Driver Pelvis Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

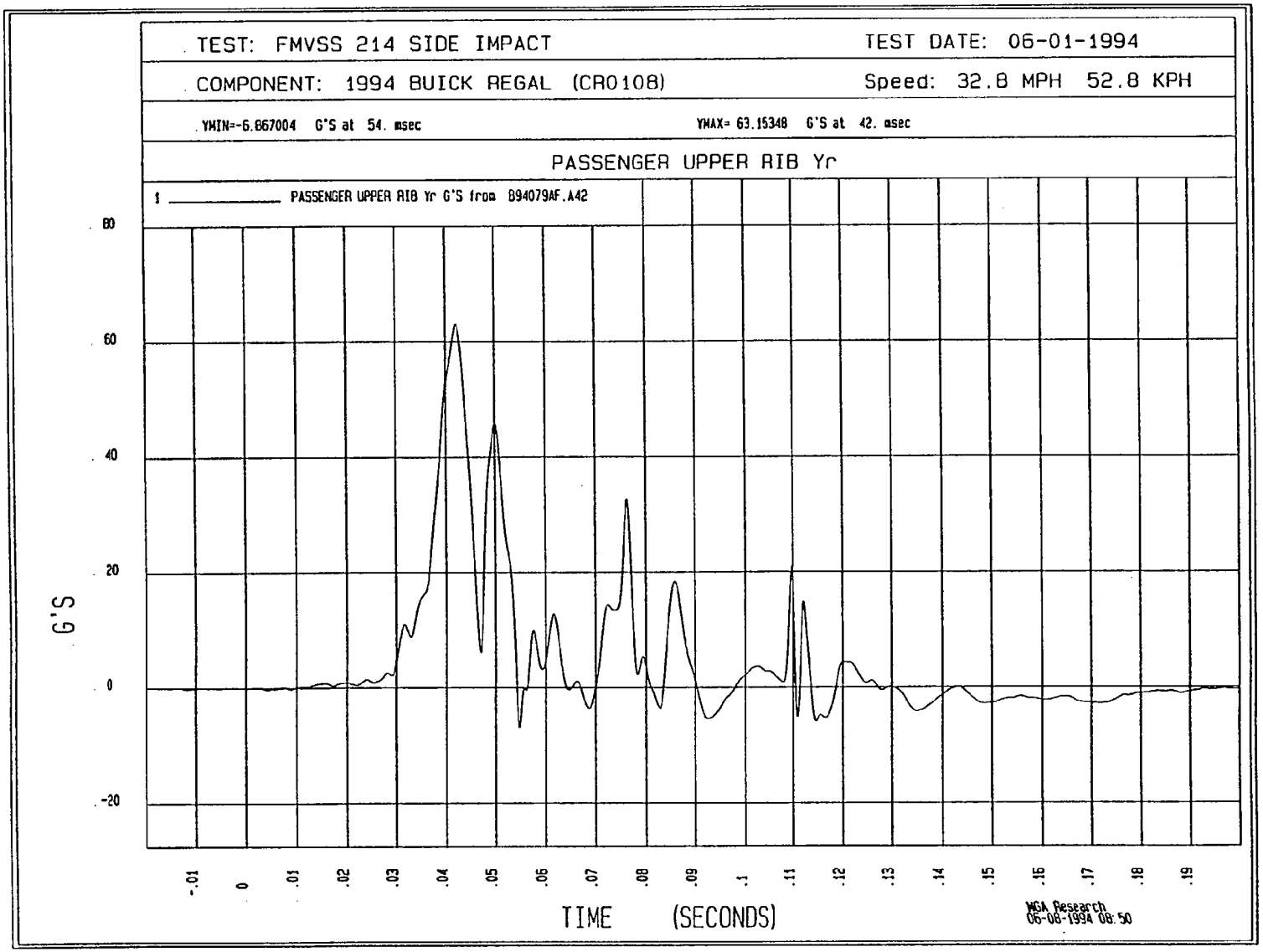


Figure B-75 - Passenger Upper Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

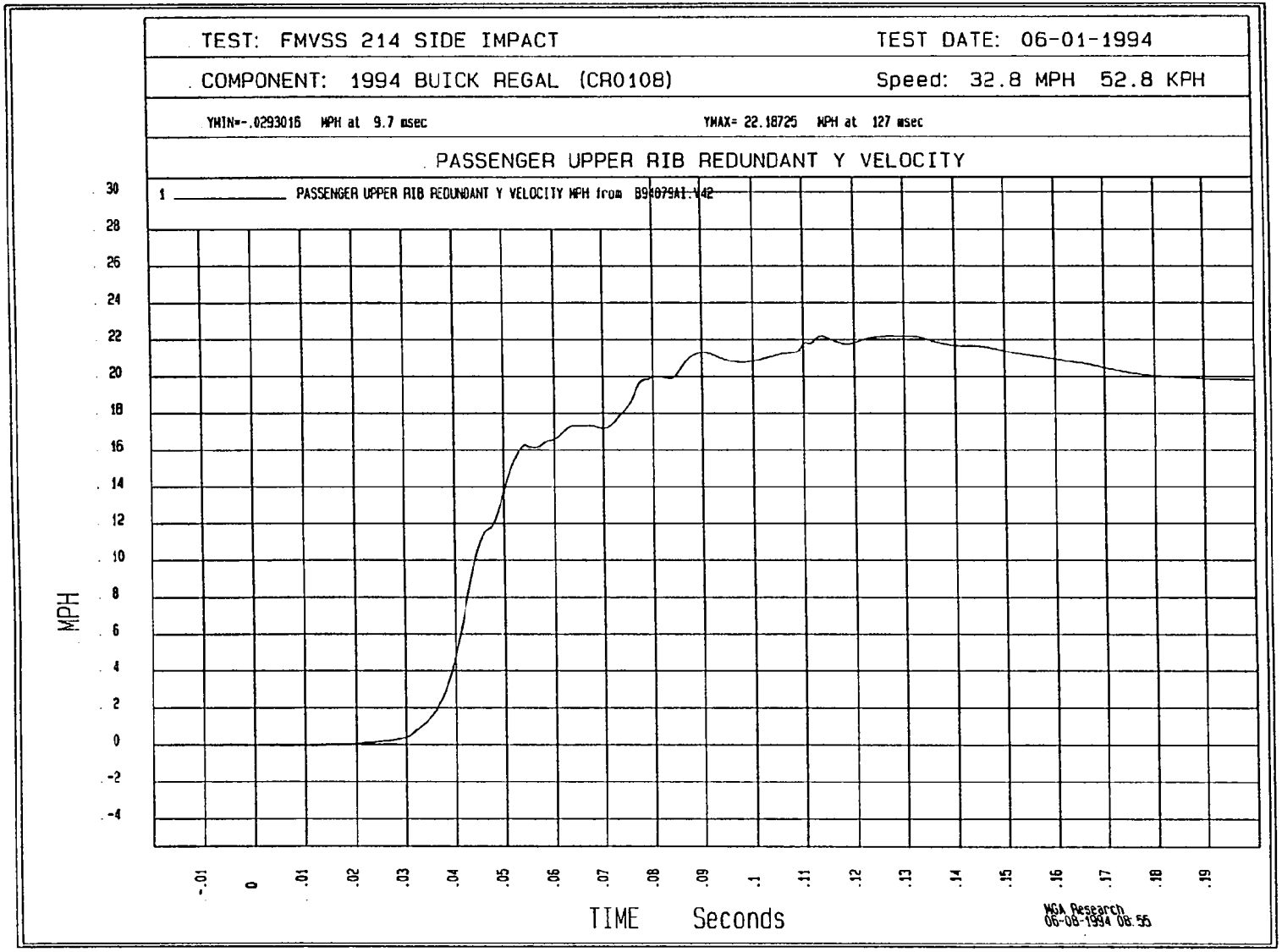


Figure B-76 - Passenger Upper Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

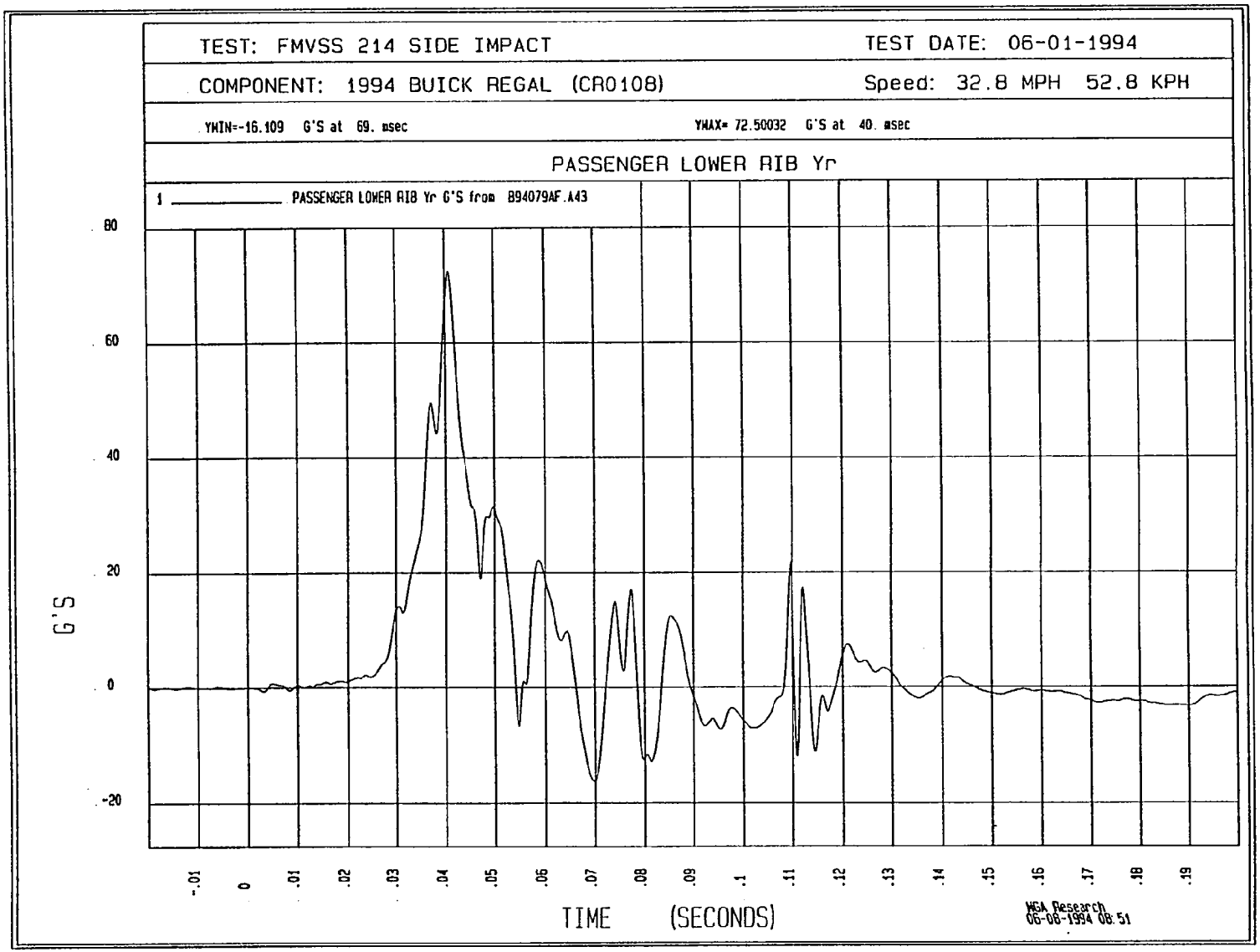


Figure B-77 - Passenger Lower Rib Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

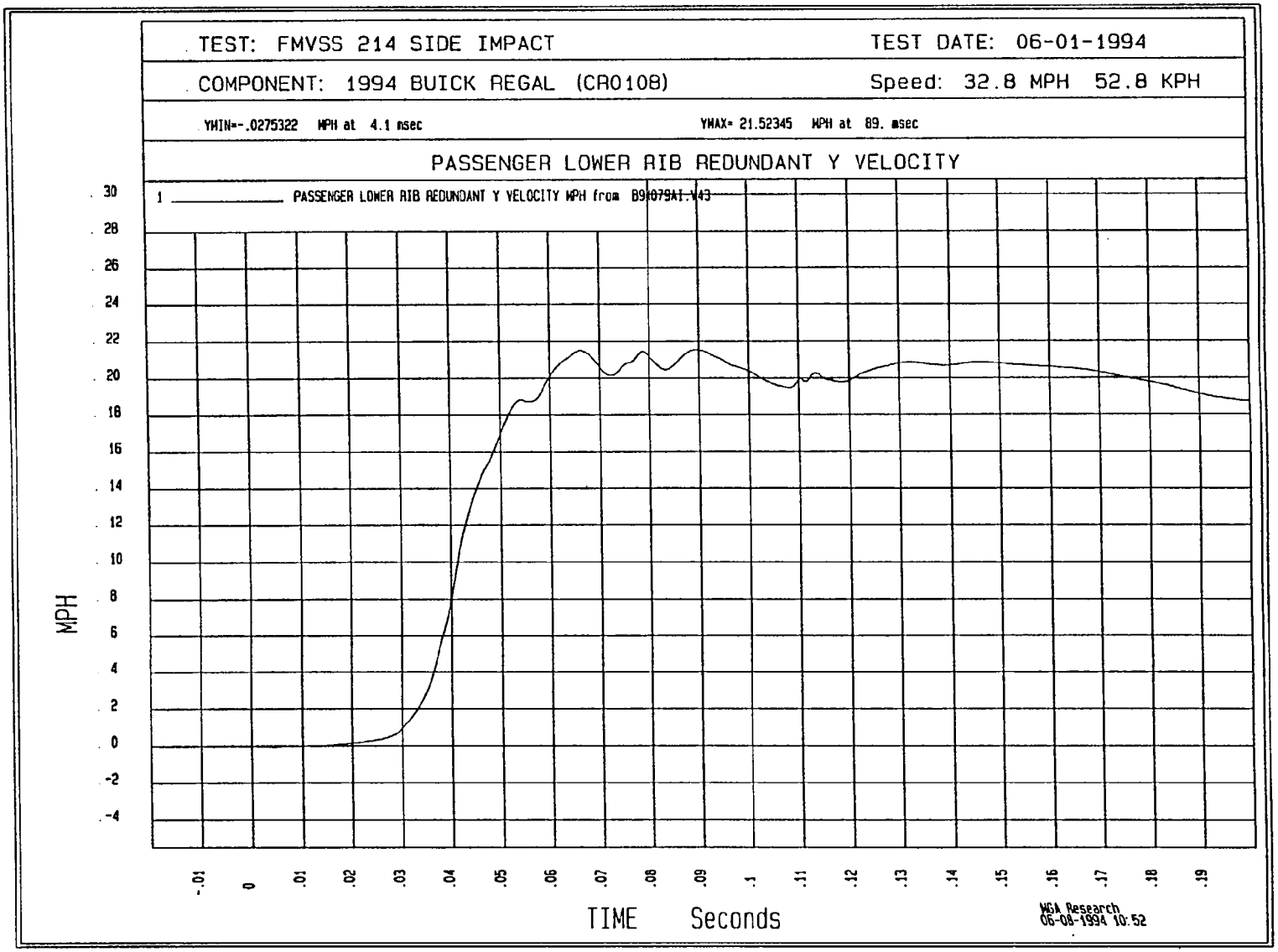


Figure B-78 - Passenger Lower Rib Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

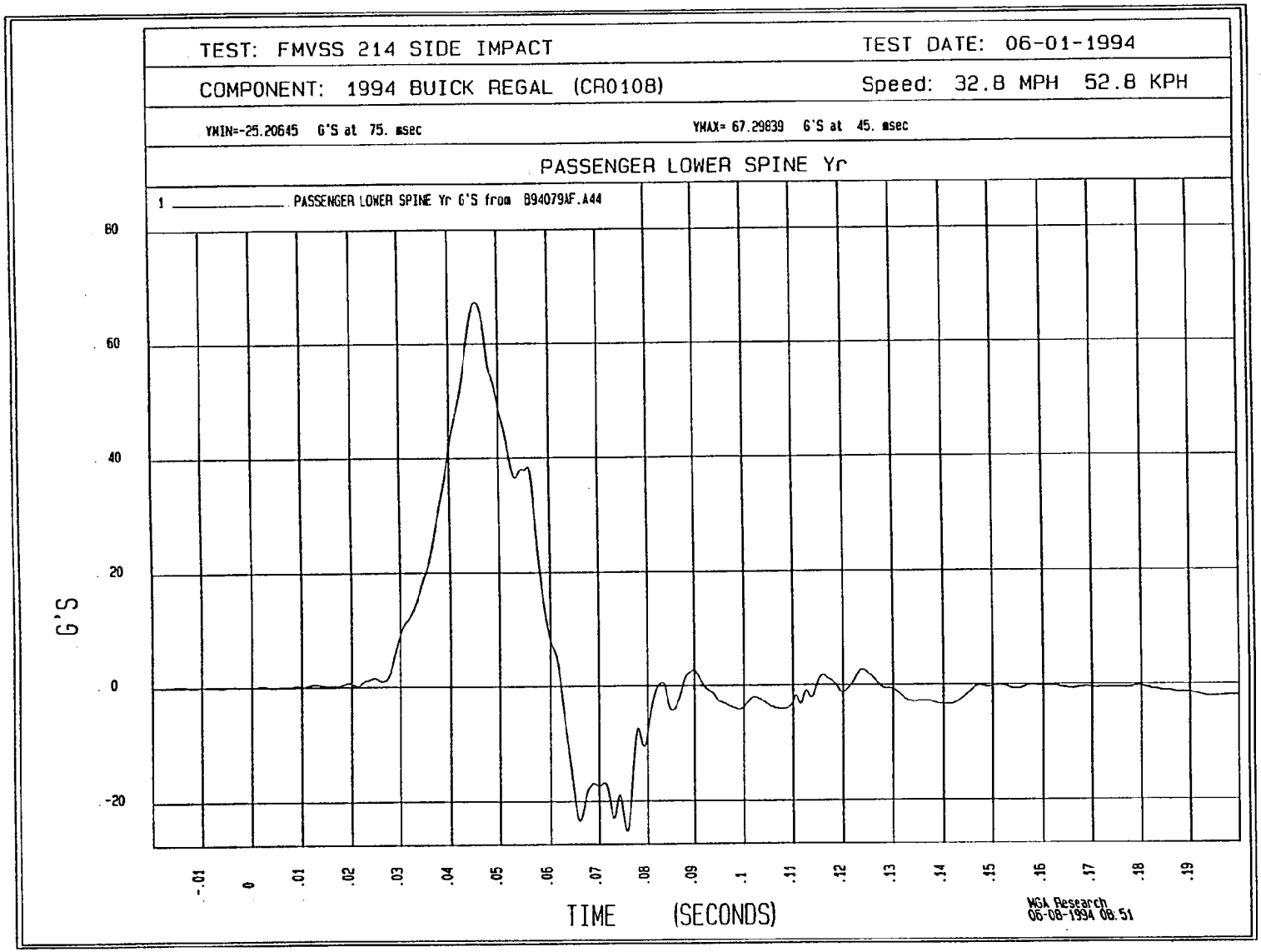


Figure B-79 - Passenger Lower Spine Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

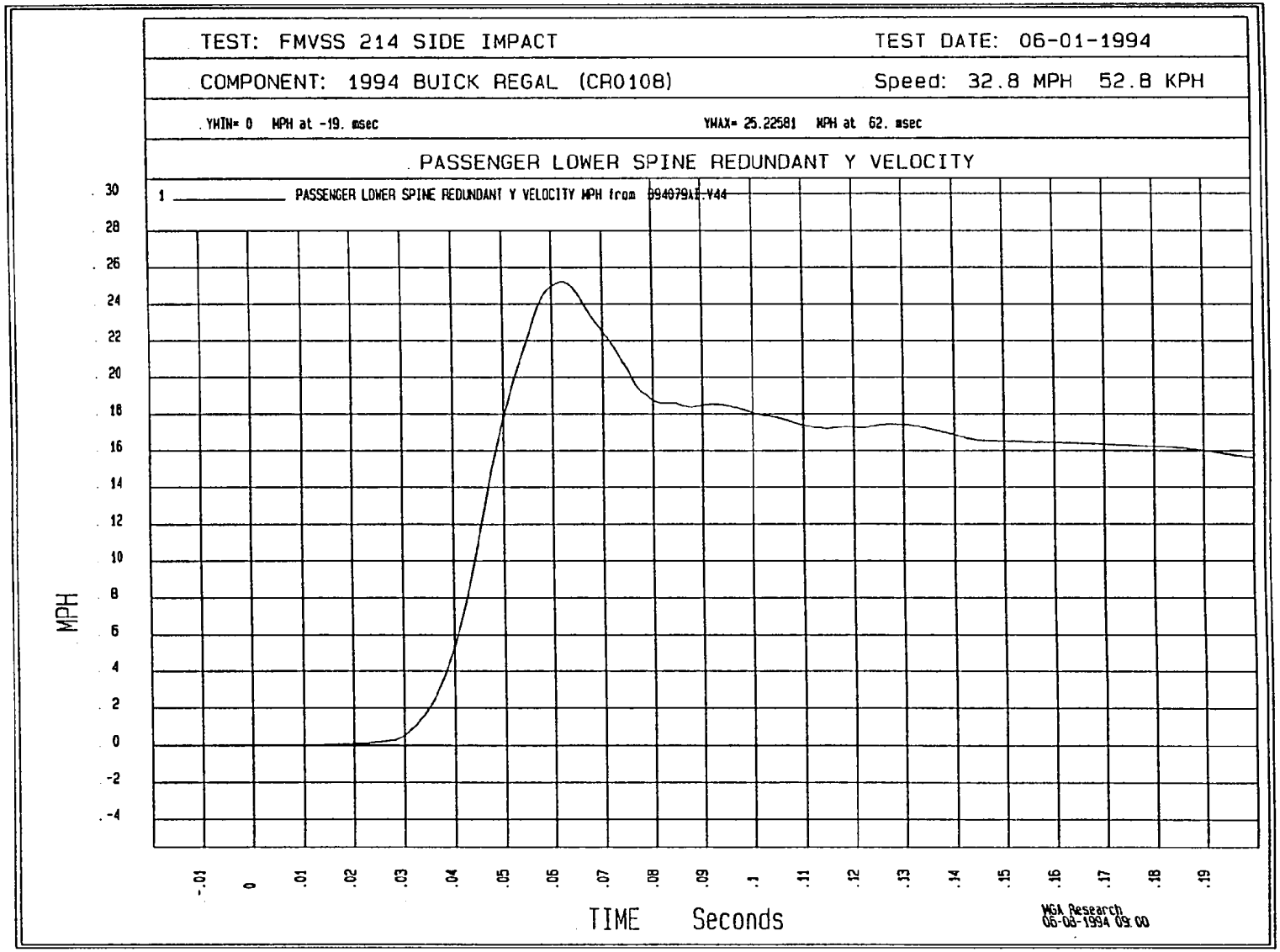


Figure B-80 - Passenger Lower Spine Y Redundant Velocity vs. Time

Filter: Class 180 (300 Hz)

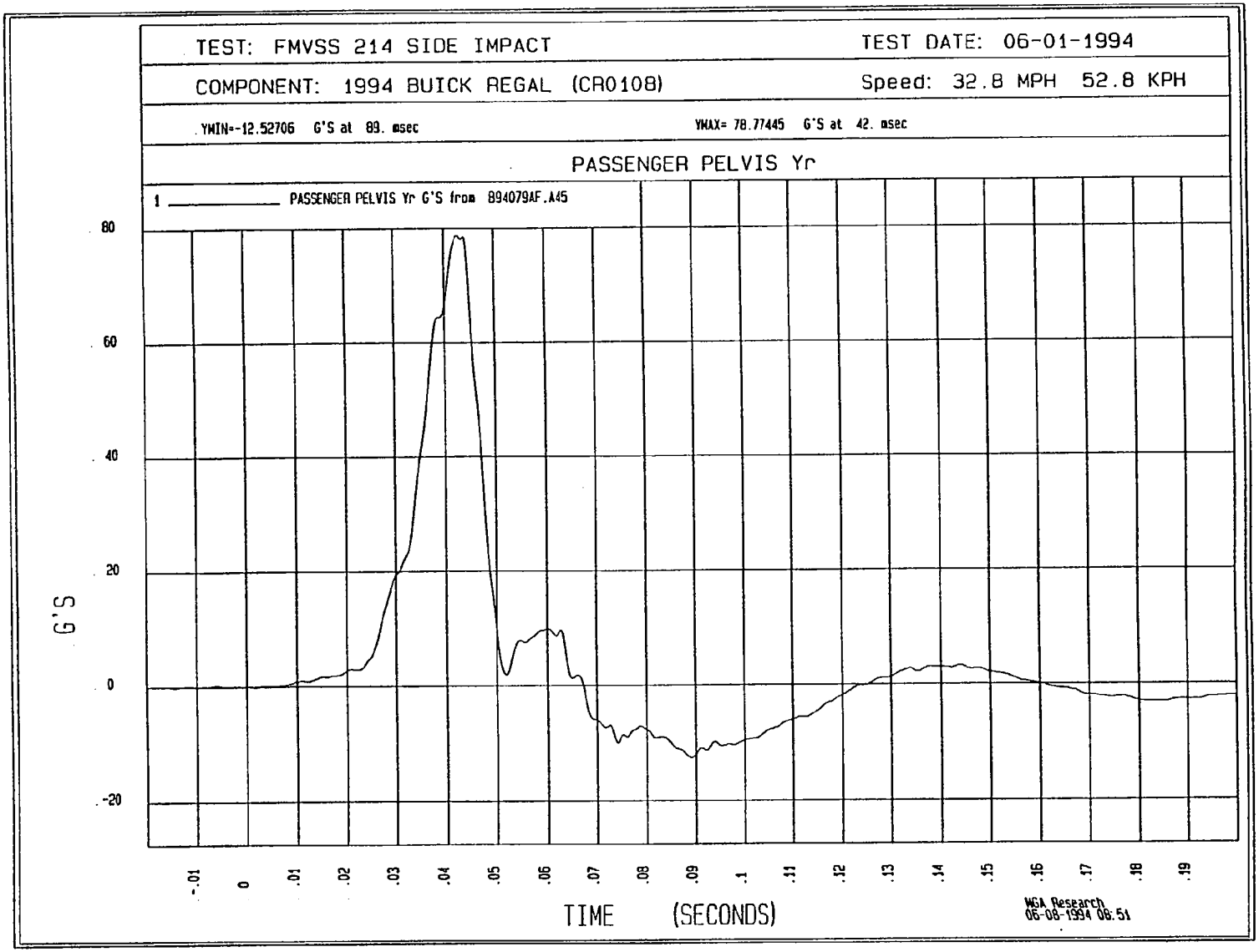


Figure B-81 - Passenger Pelvis Y Redundant Acceleration vs. Time

Filter: Class 180 (300 Hz)

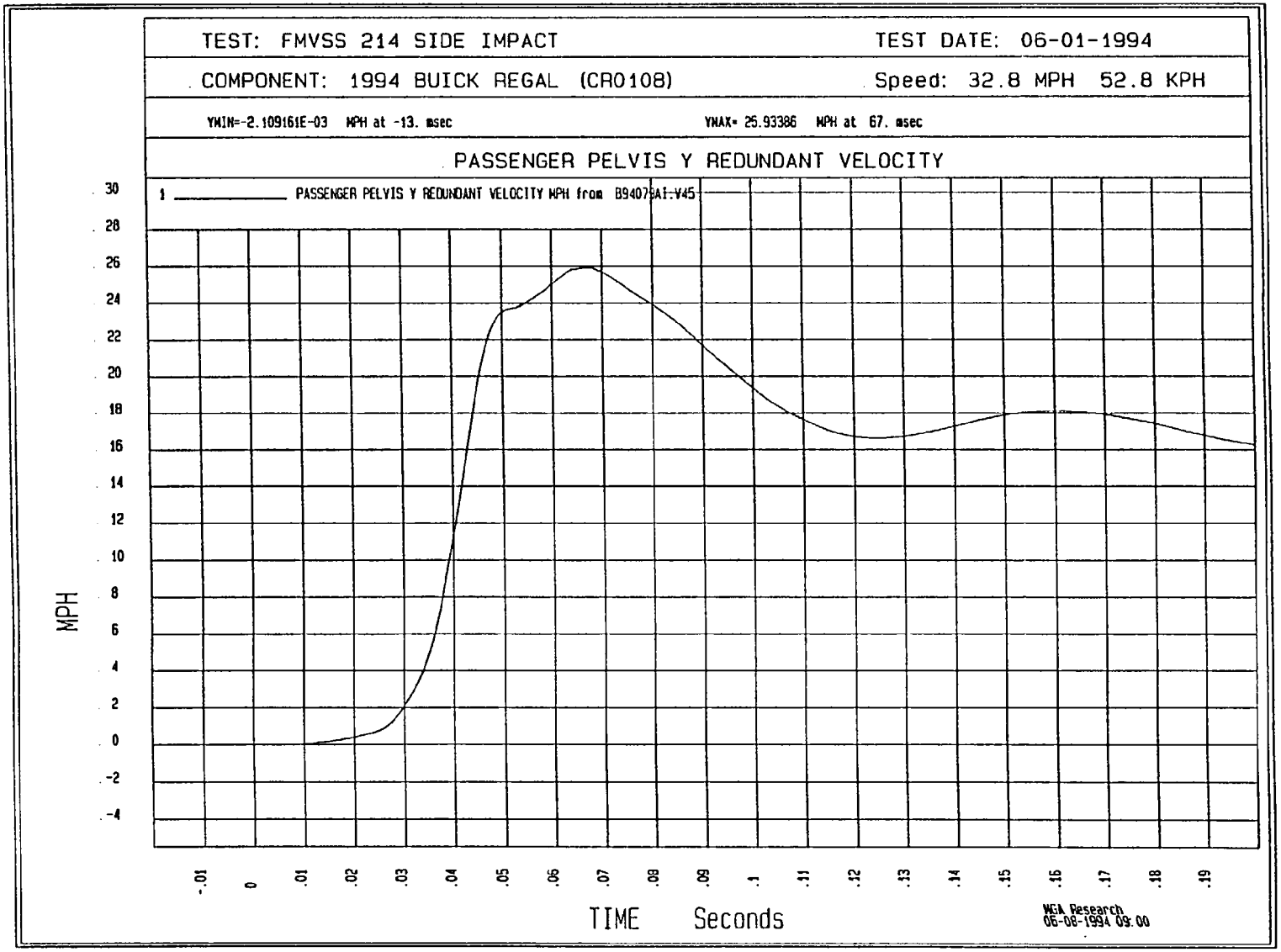


Figure B-82 - Passenger Pelvis Y Redundant Velocity vs. Time

FINITE IMPULSE RESPONSE (FIR) FILTERED DATA

Table of Data Plots

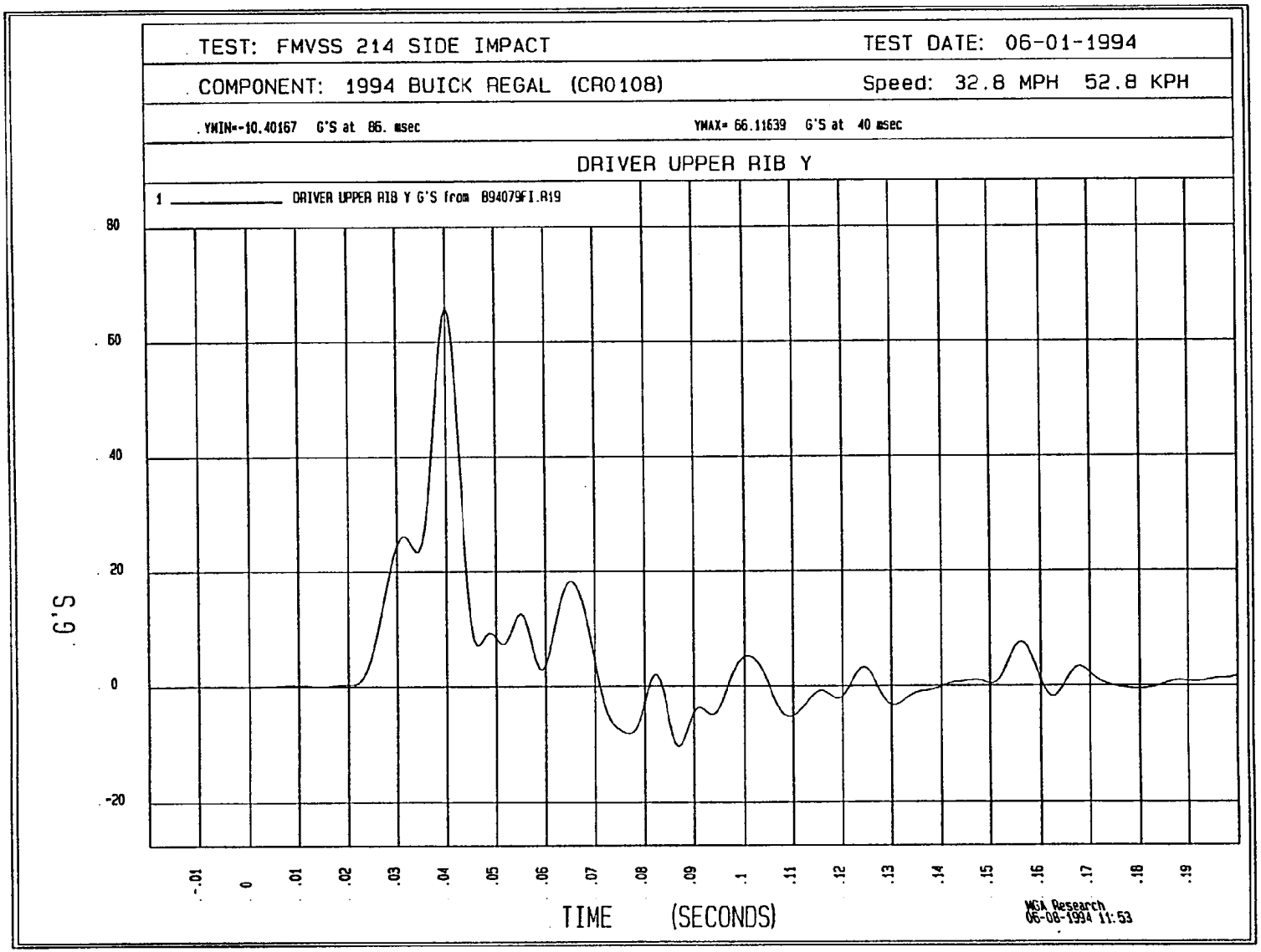


Figure B-83 - Driver Upper Rib Y Acceleration vs. Time

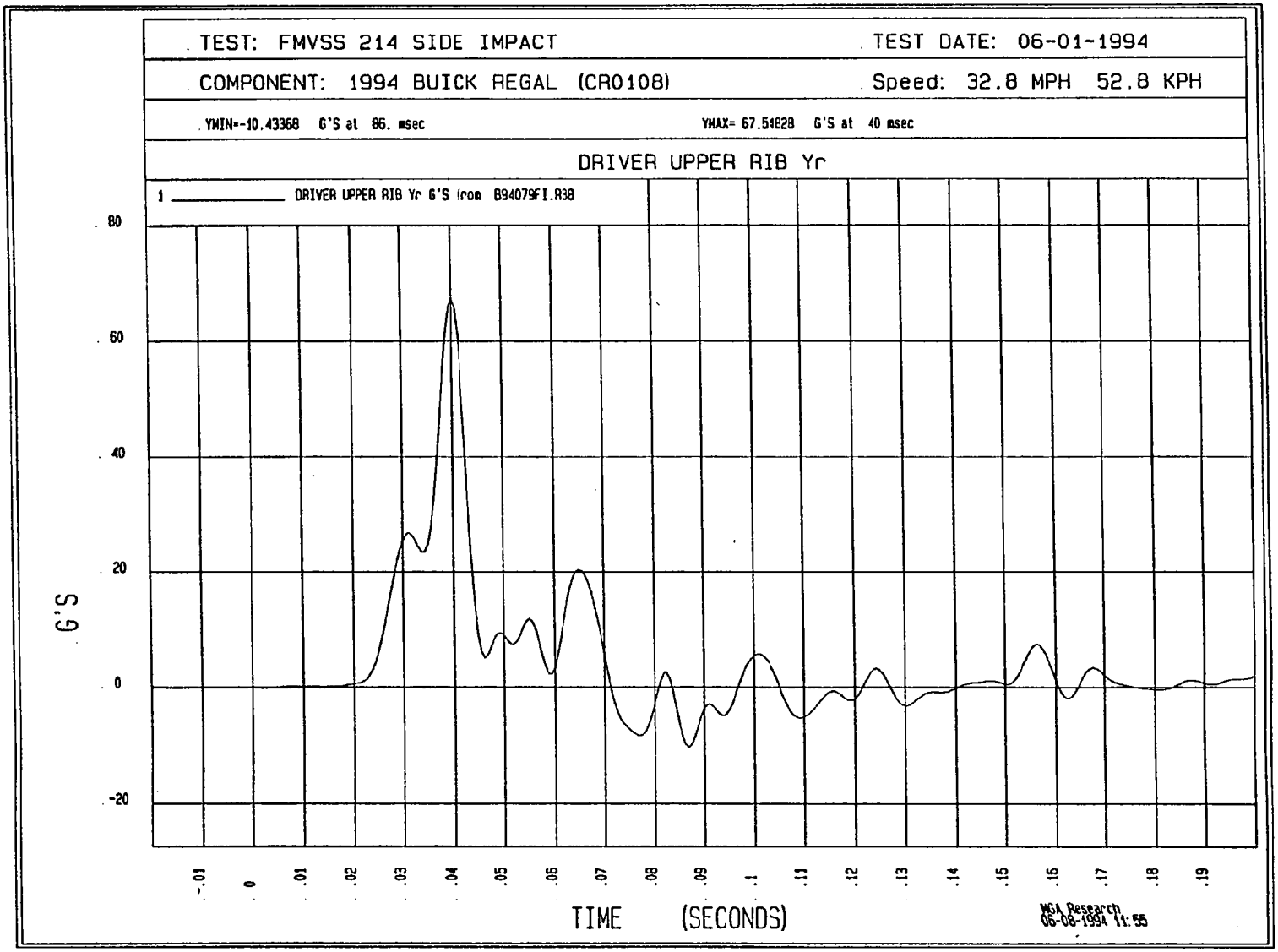


Figure B-84 - Driver Upper Rib Y Redundant Acceleration vs. Time

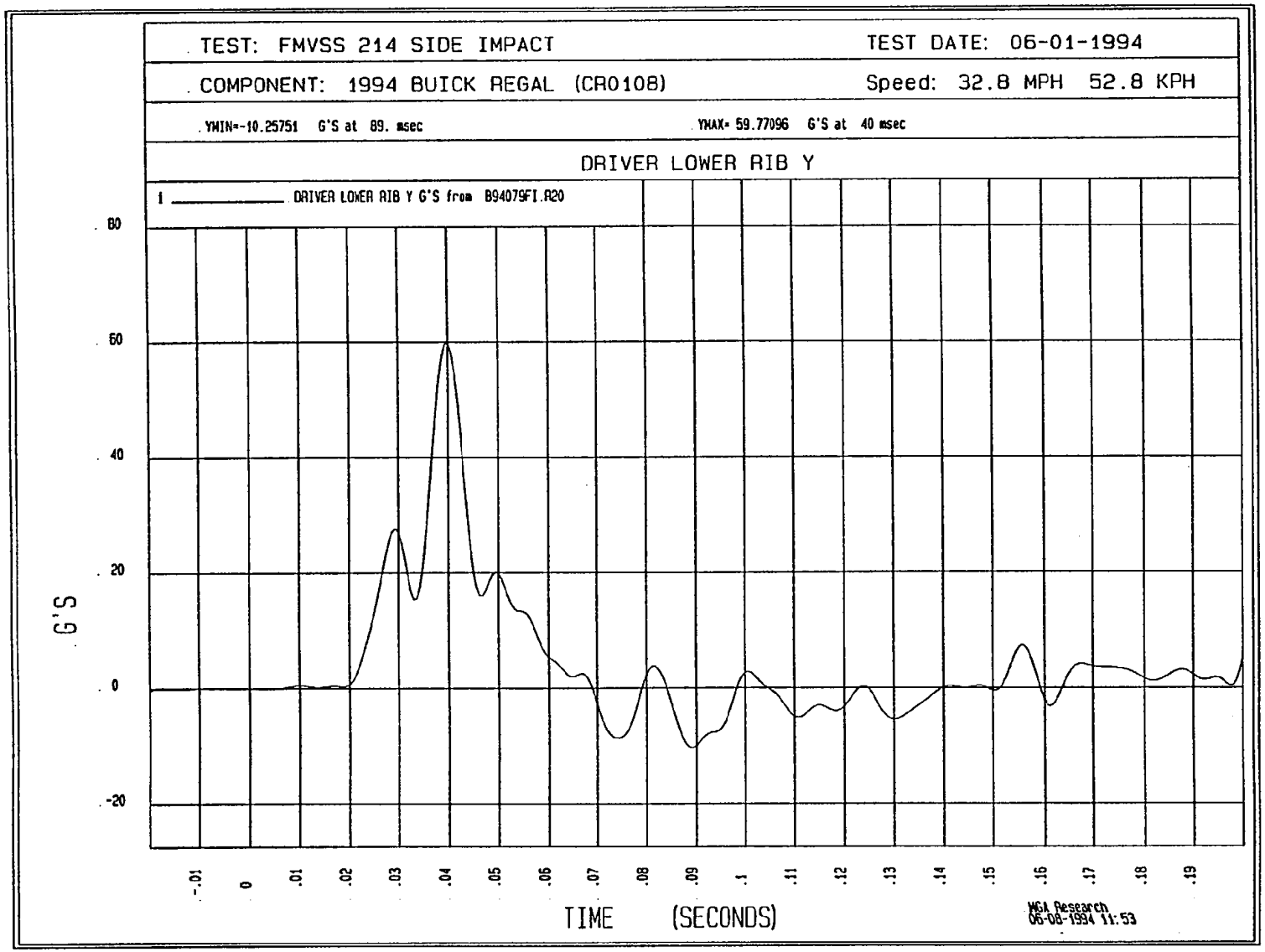


Figure B-85 - Driver Lower Rib Y Acceleration vs. Time

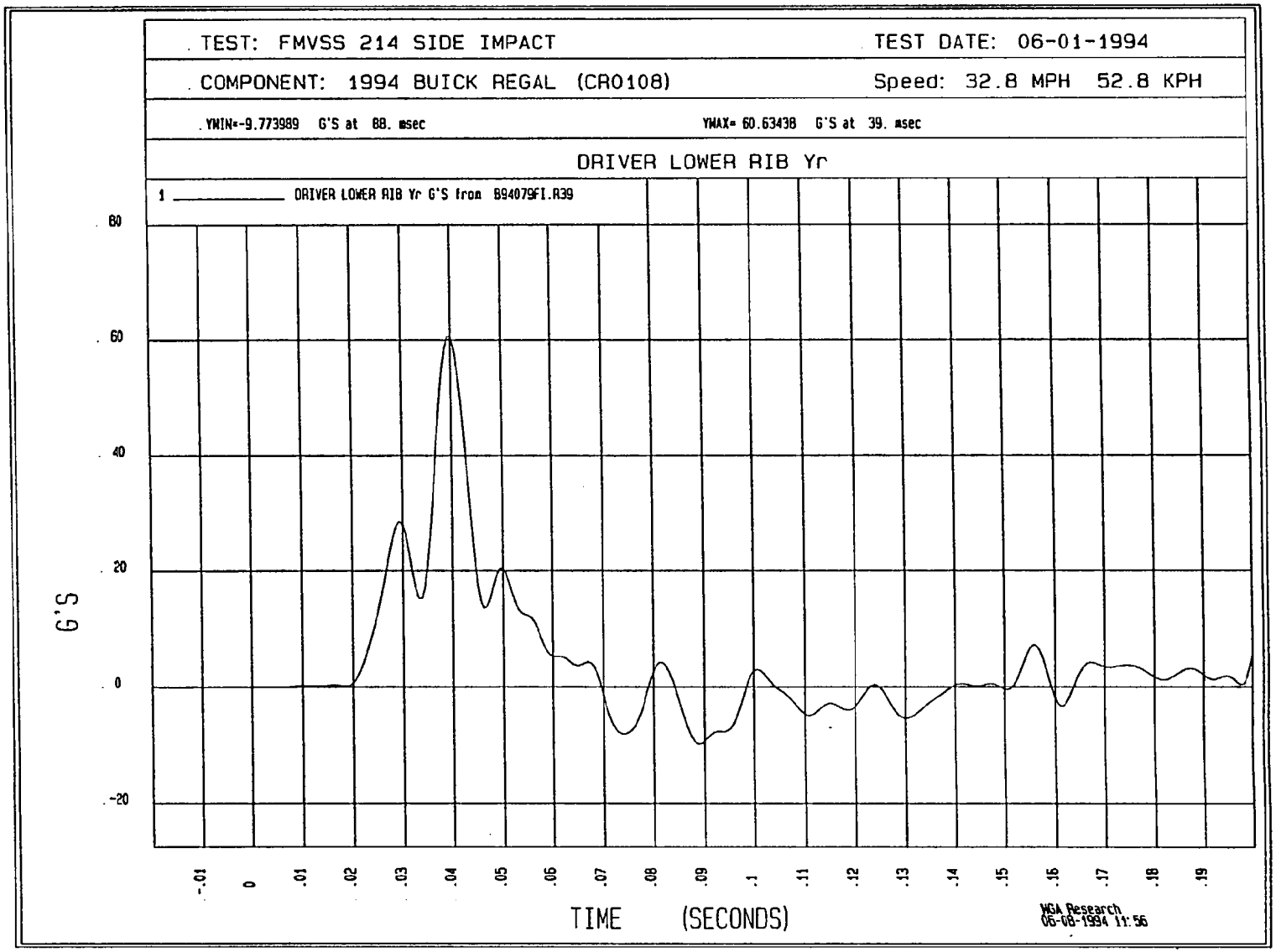


Figure B-86 - Driver Lower Rib Y Redundant Acceleration vs. Time

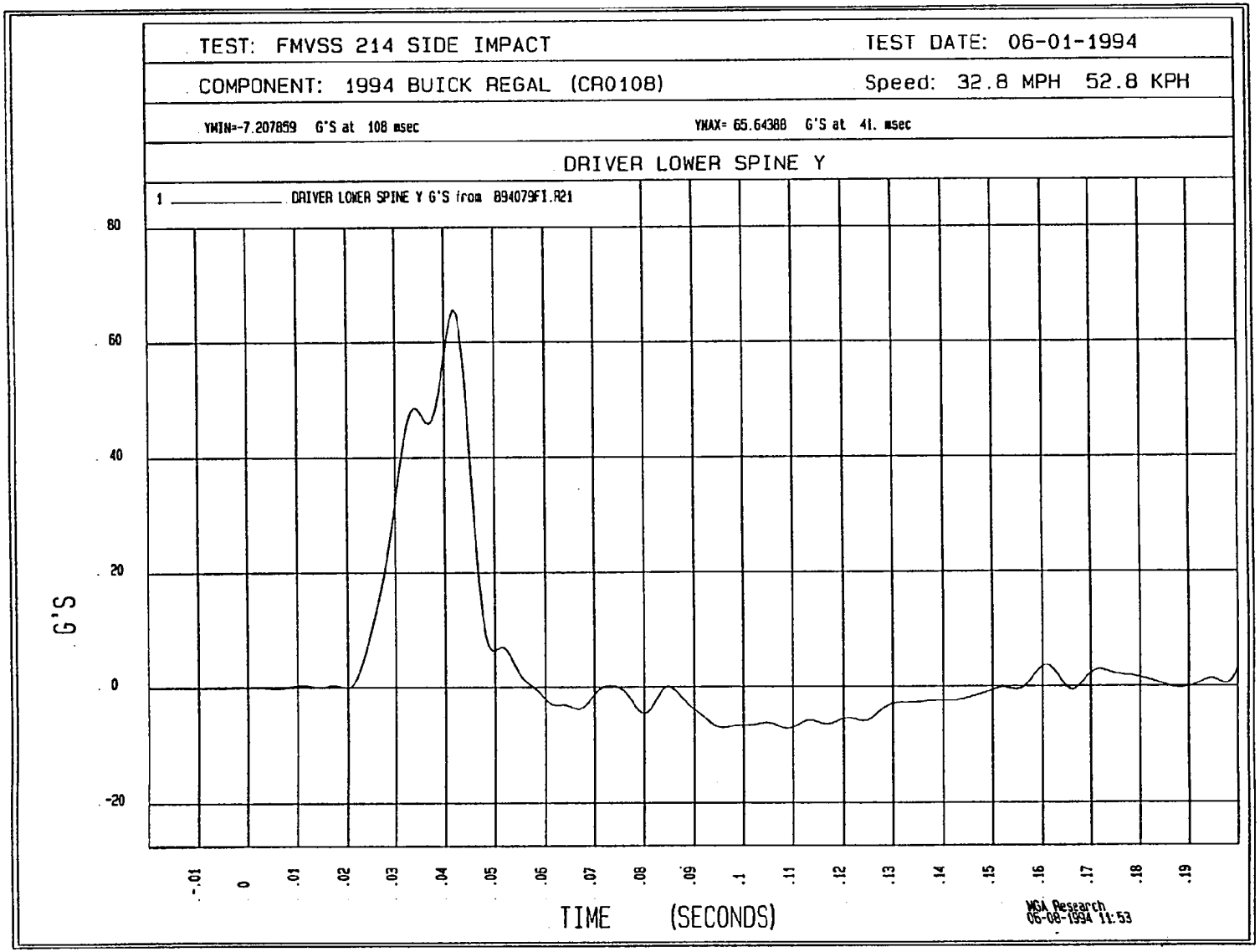


Figure B-87 - Driver Lower Spine Y Acceleration vs. Time

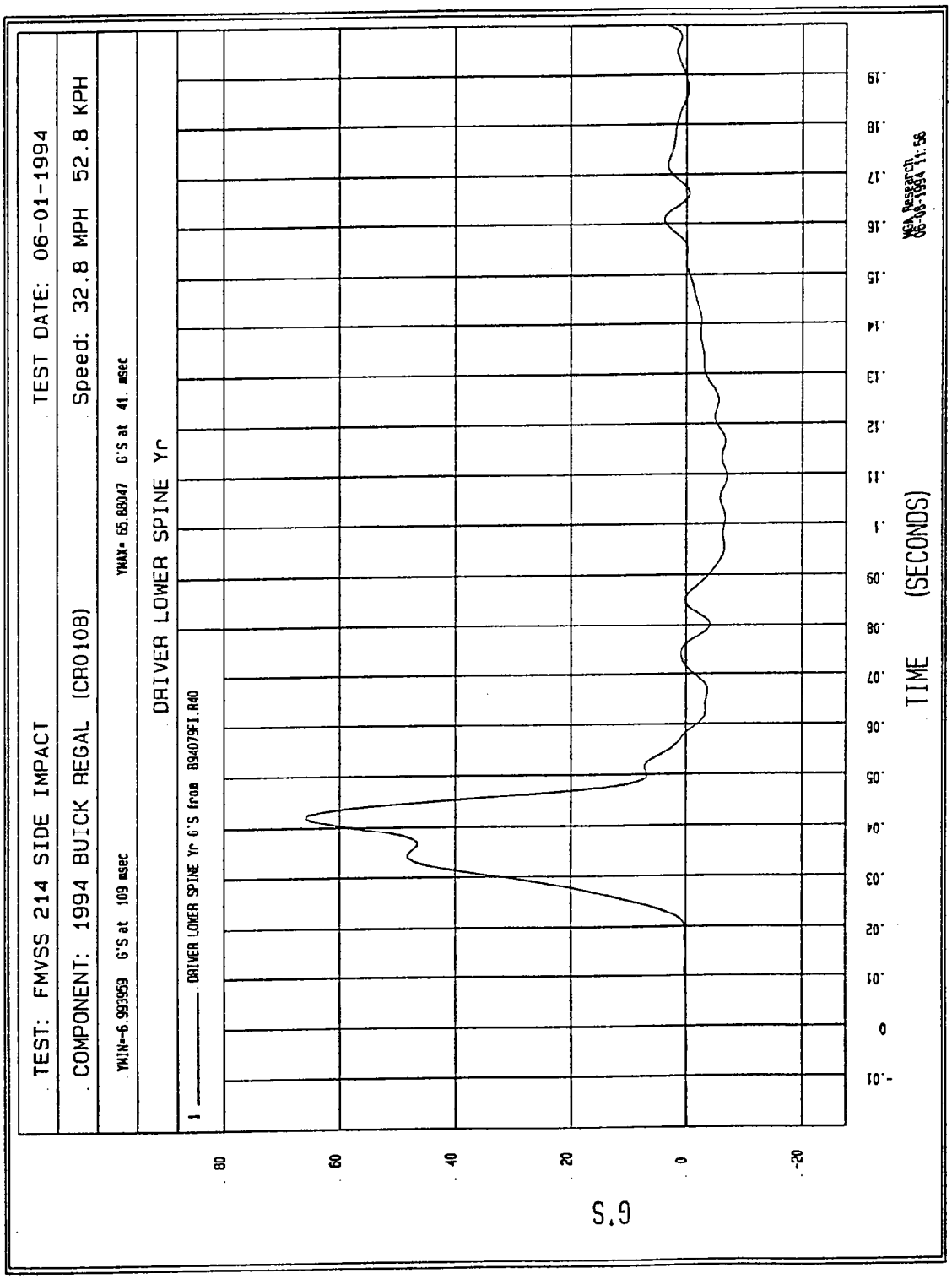


Figure B-88 - Driver Lower Spine Y Redundant Acceleration vs. Time

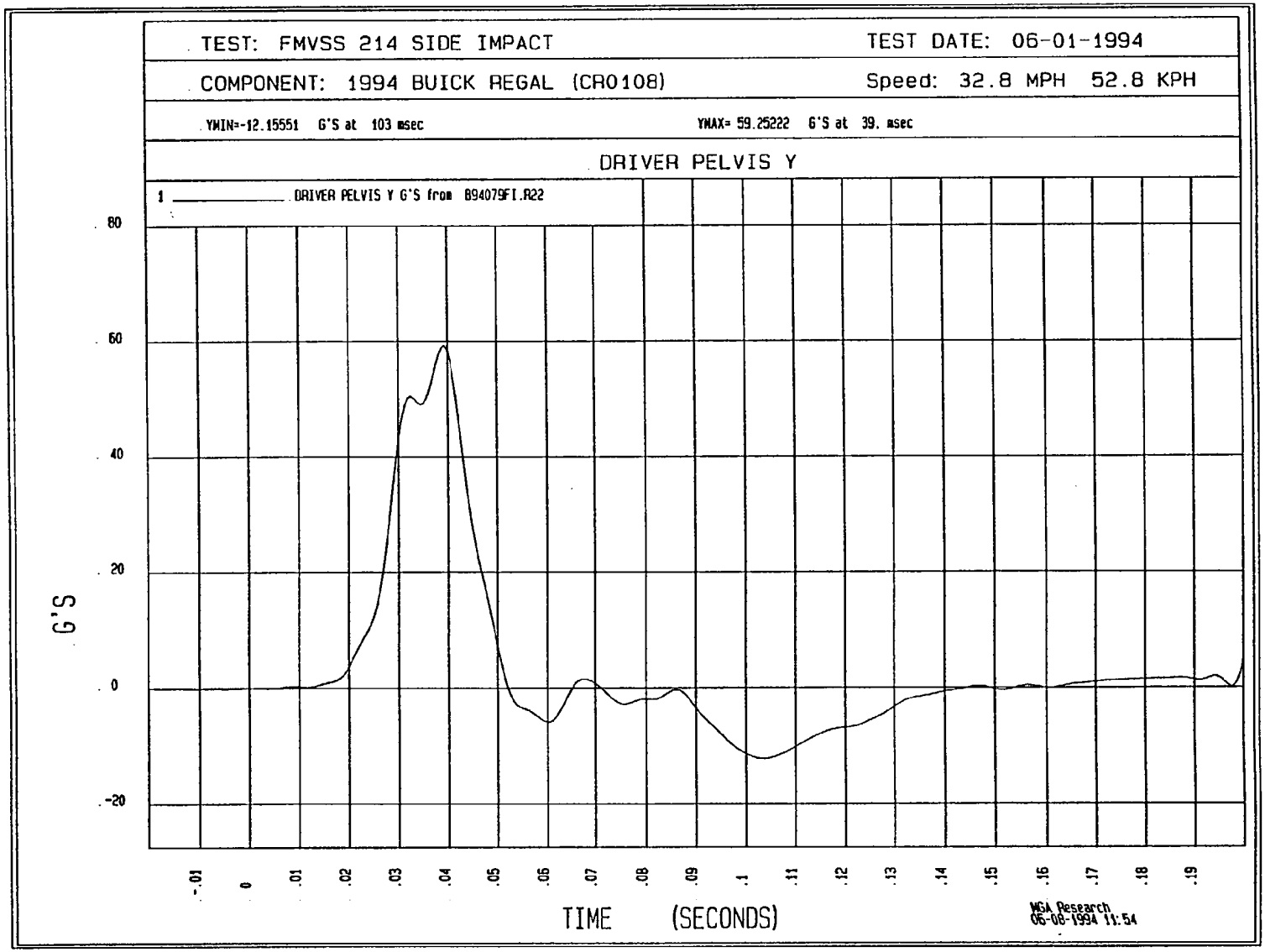


Figure B-89 - Driver Pelvis Y Acceleration vs. Time

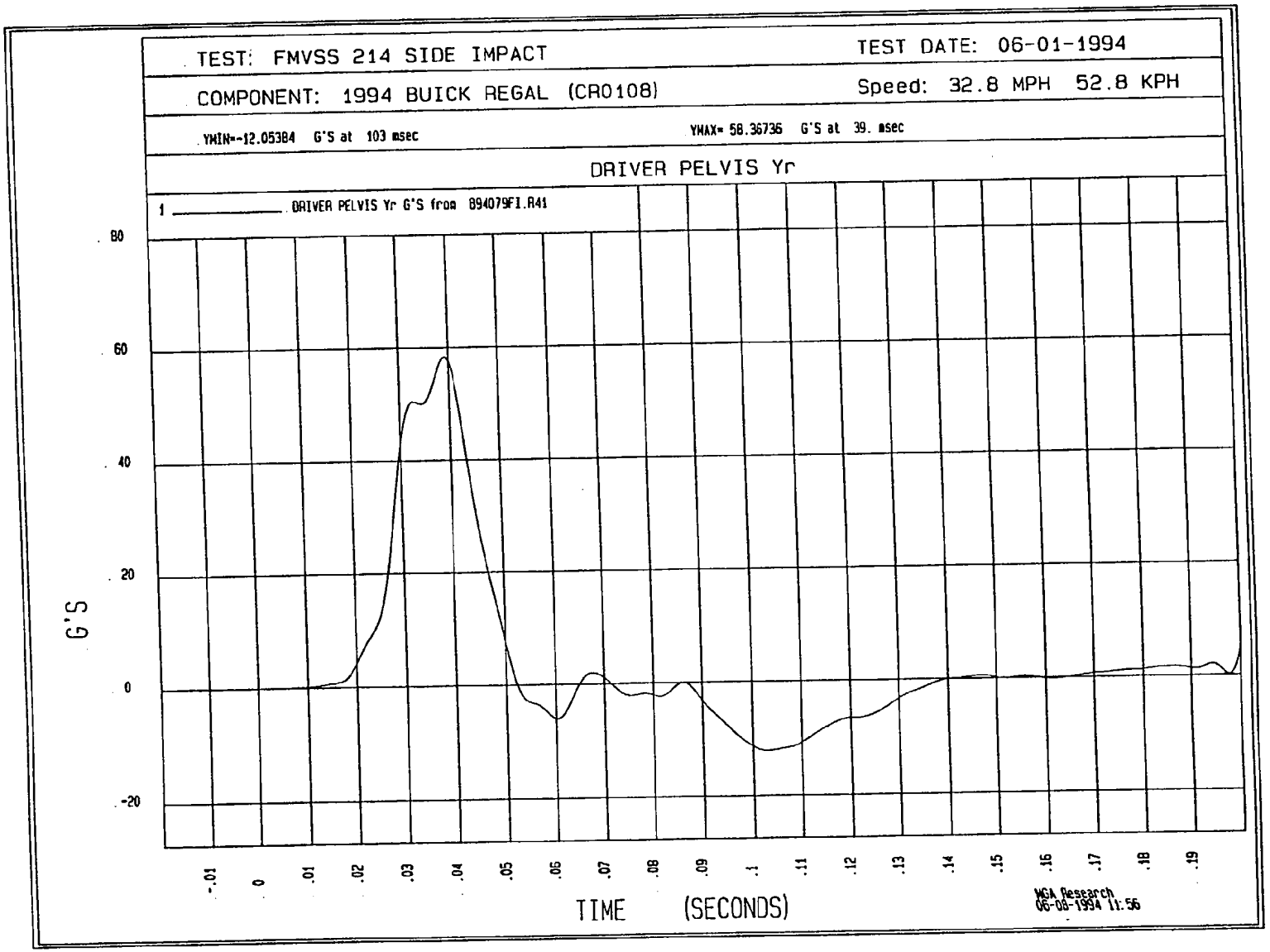


Figure B-9Ø - Driver Pelvis Y Redundant Acceleration vs. Time

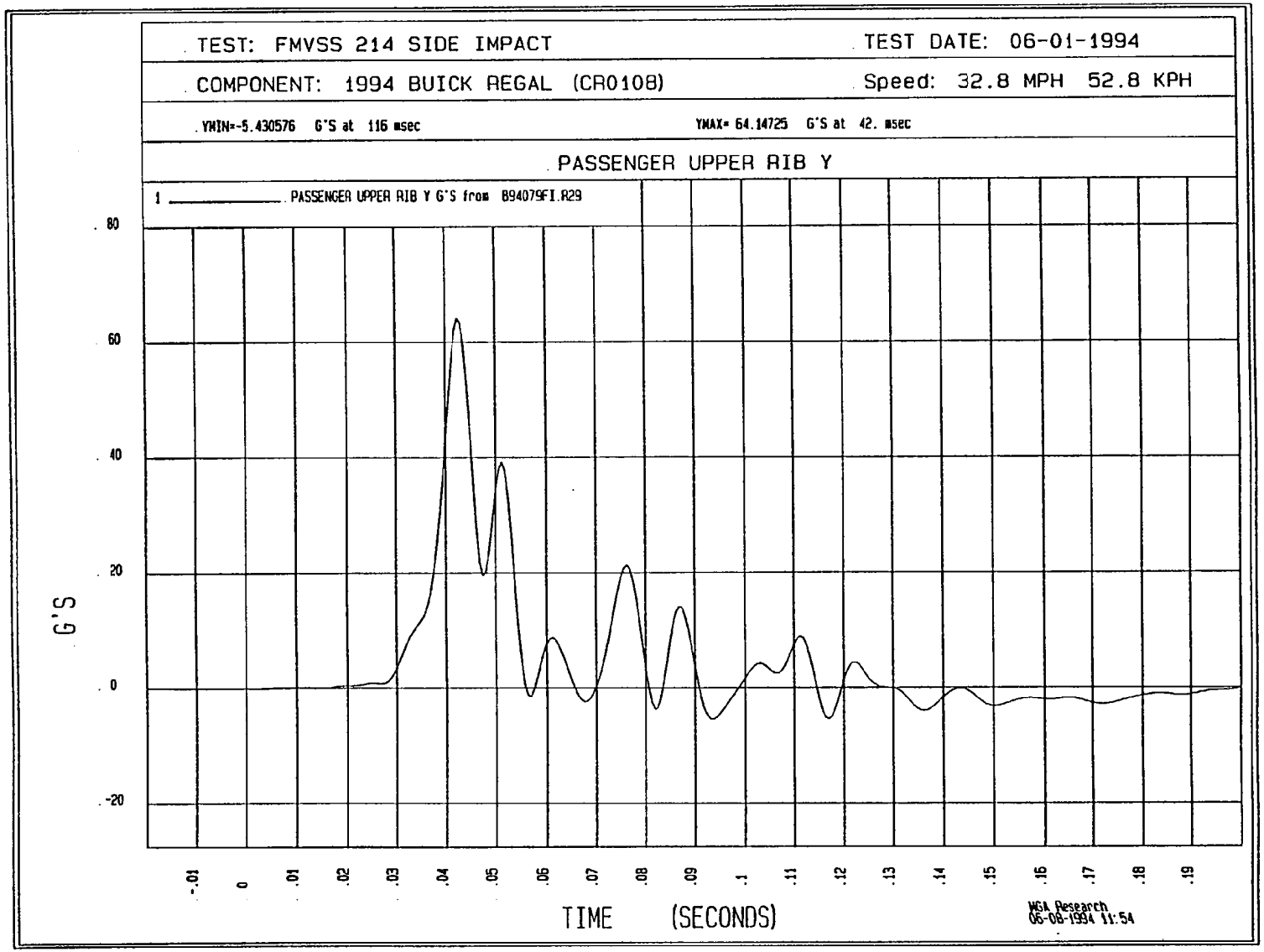


Figure B-91 - Passenger Upper Rib Y Acceleration vs. Time

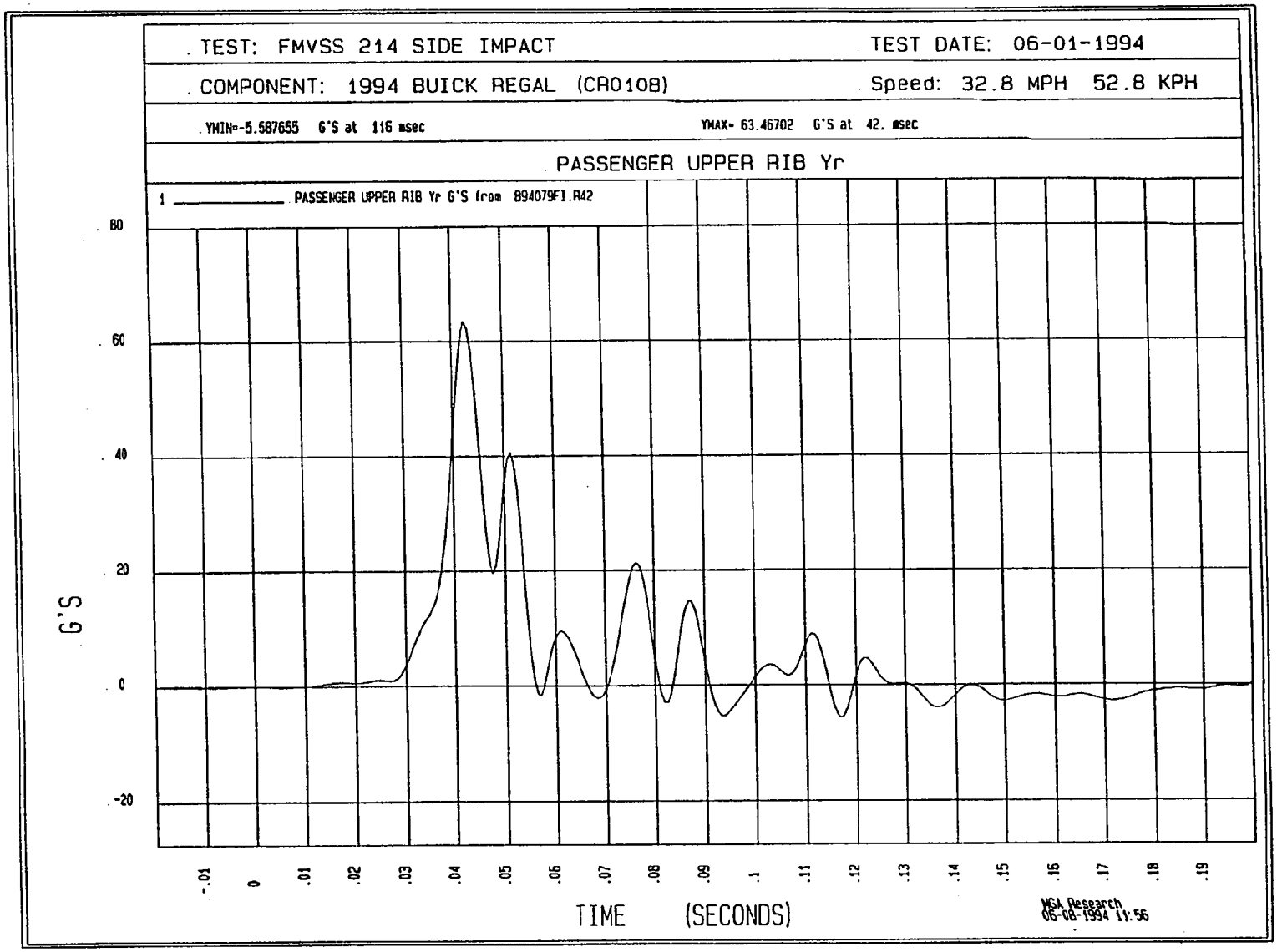


Figure B-92 - Passenger Upper Rib Y Redundant Acceleration vs. Time

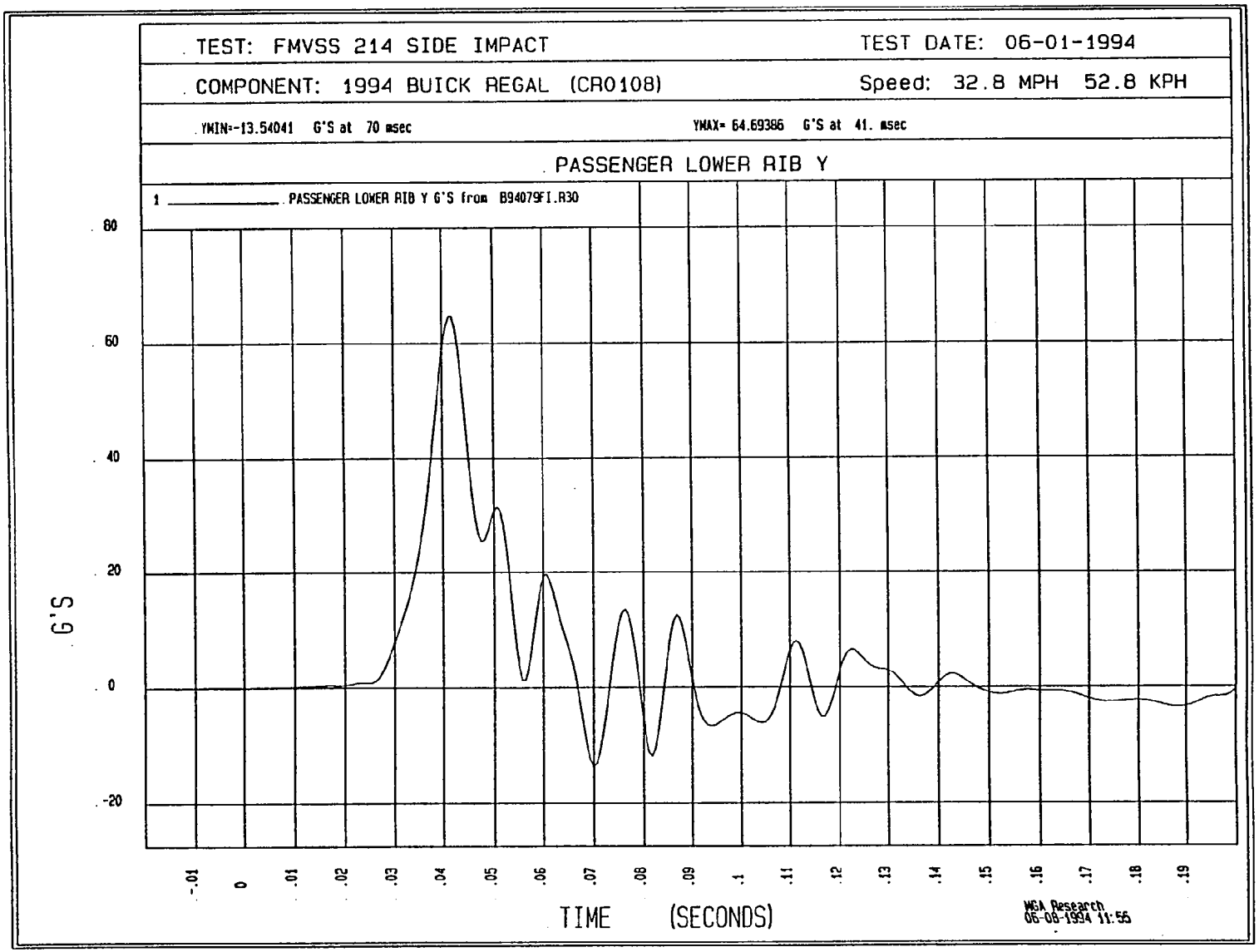


Figure B-93 - Passenger Lower Rib Y Acceleration vs. Time

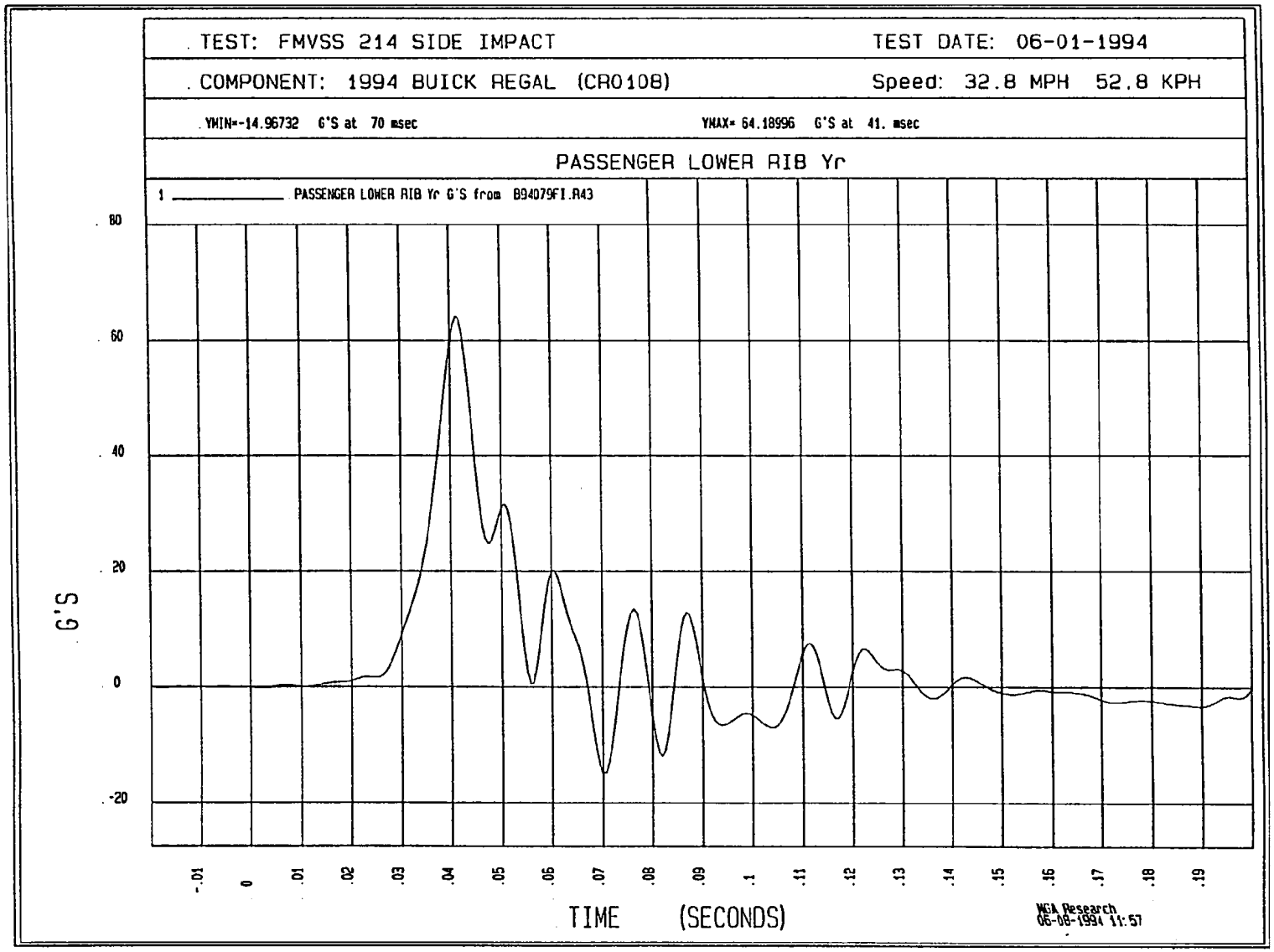


Figure B-94 - Passenger Lower Rib Y Redundant Acceleration vs. Time

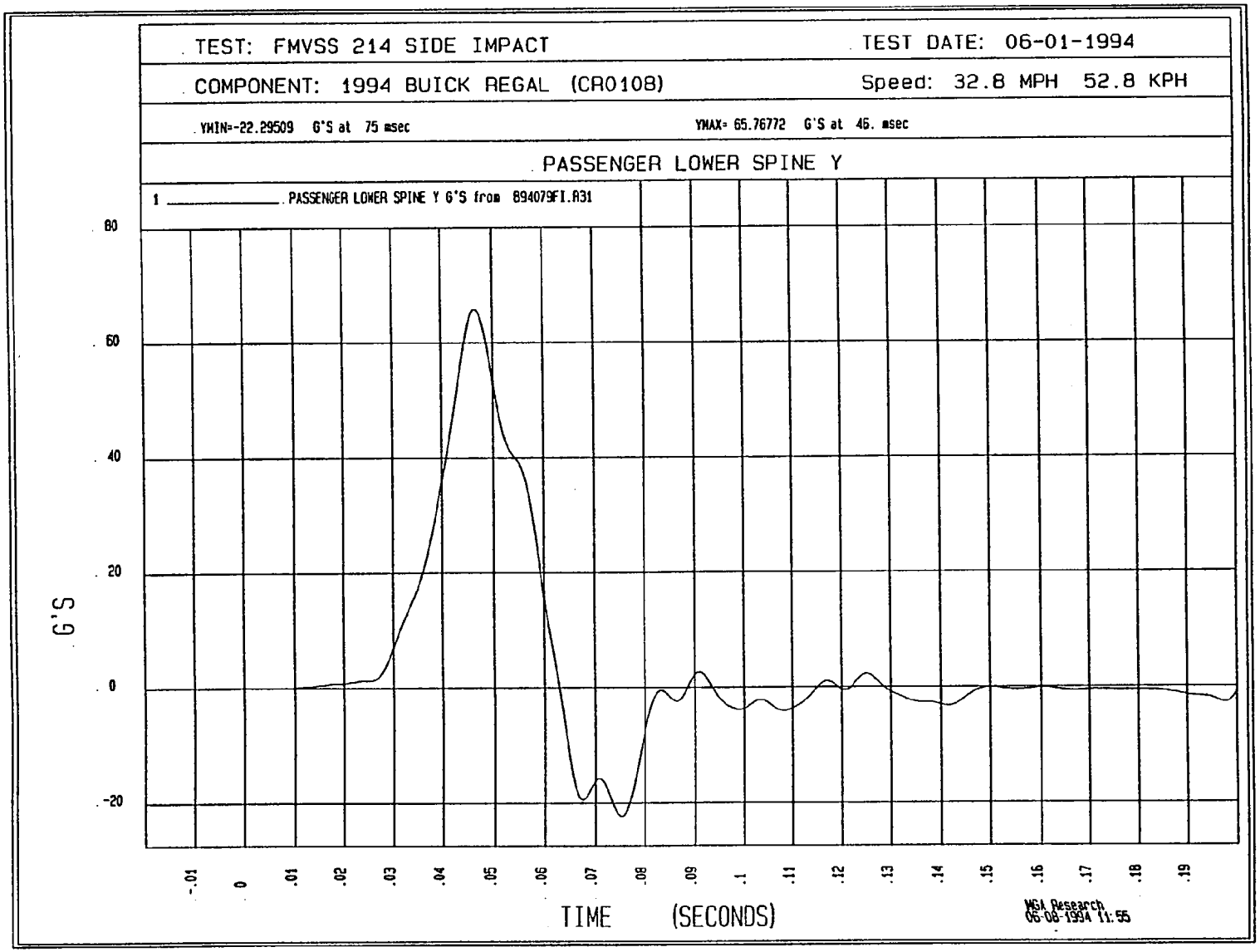


Figure B-95 - Passenger Lower Spine Y Acceleration vs. Time

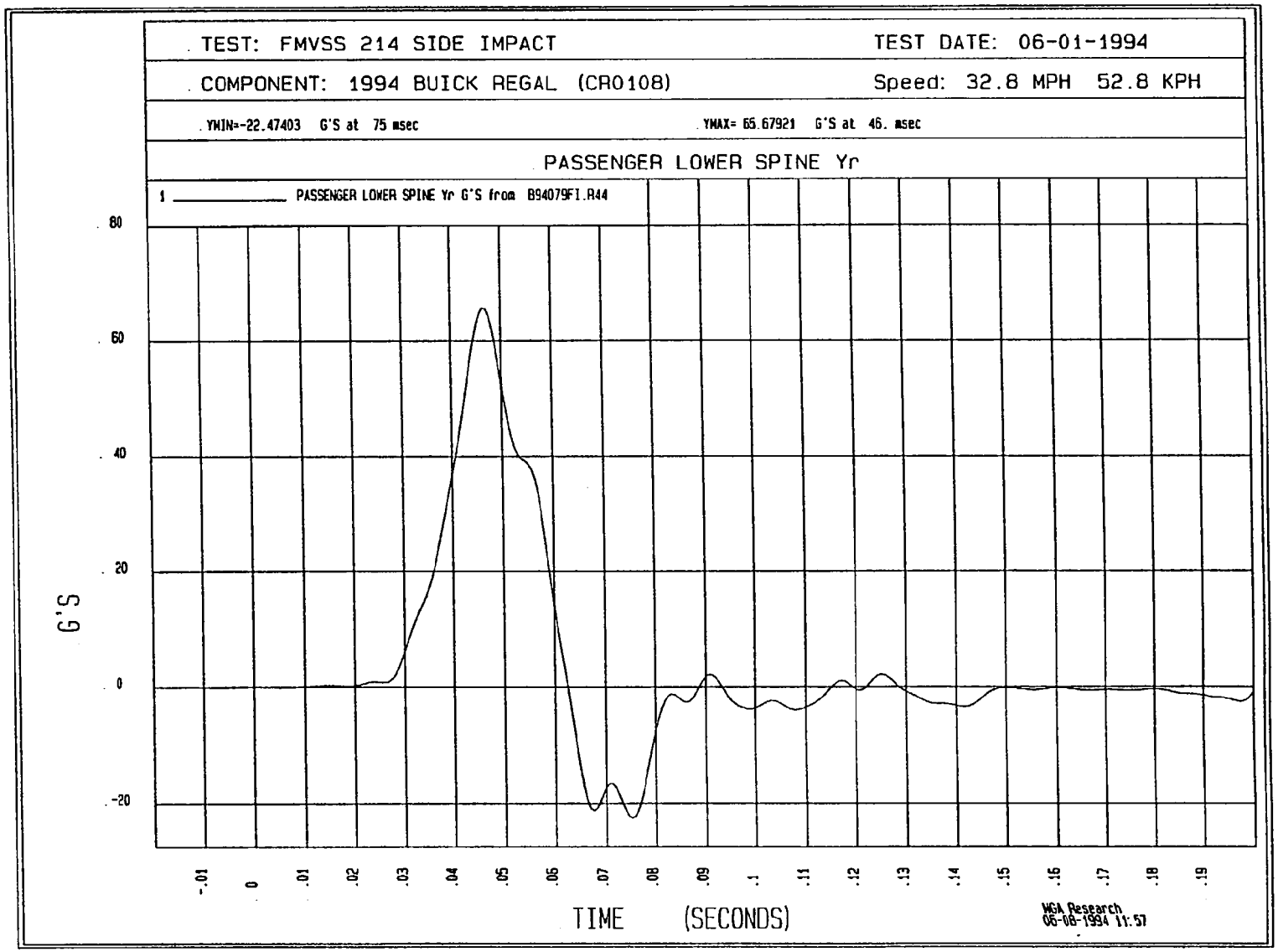


Figure B-96 - Passenger Lower Spine Y Redundant Acceleration vs. Time

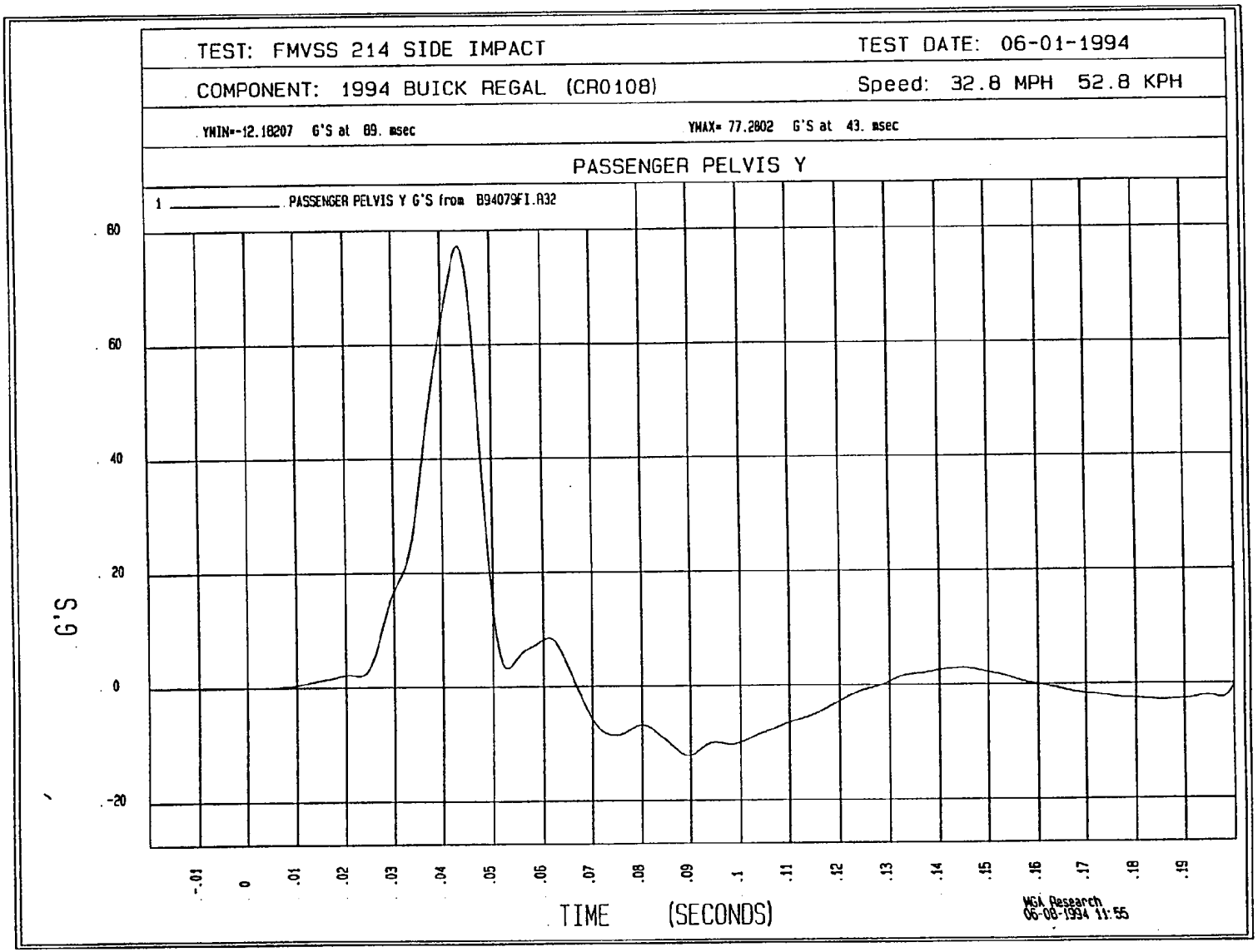


Figure B-97 - Passenger Pelvis Y Acceleration vs. Time

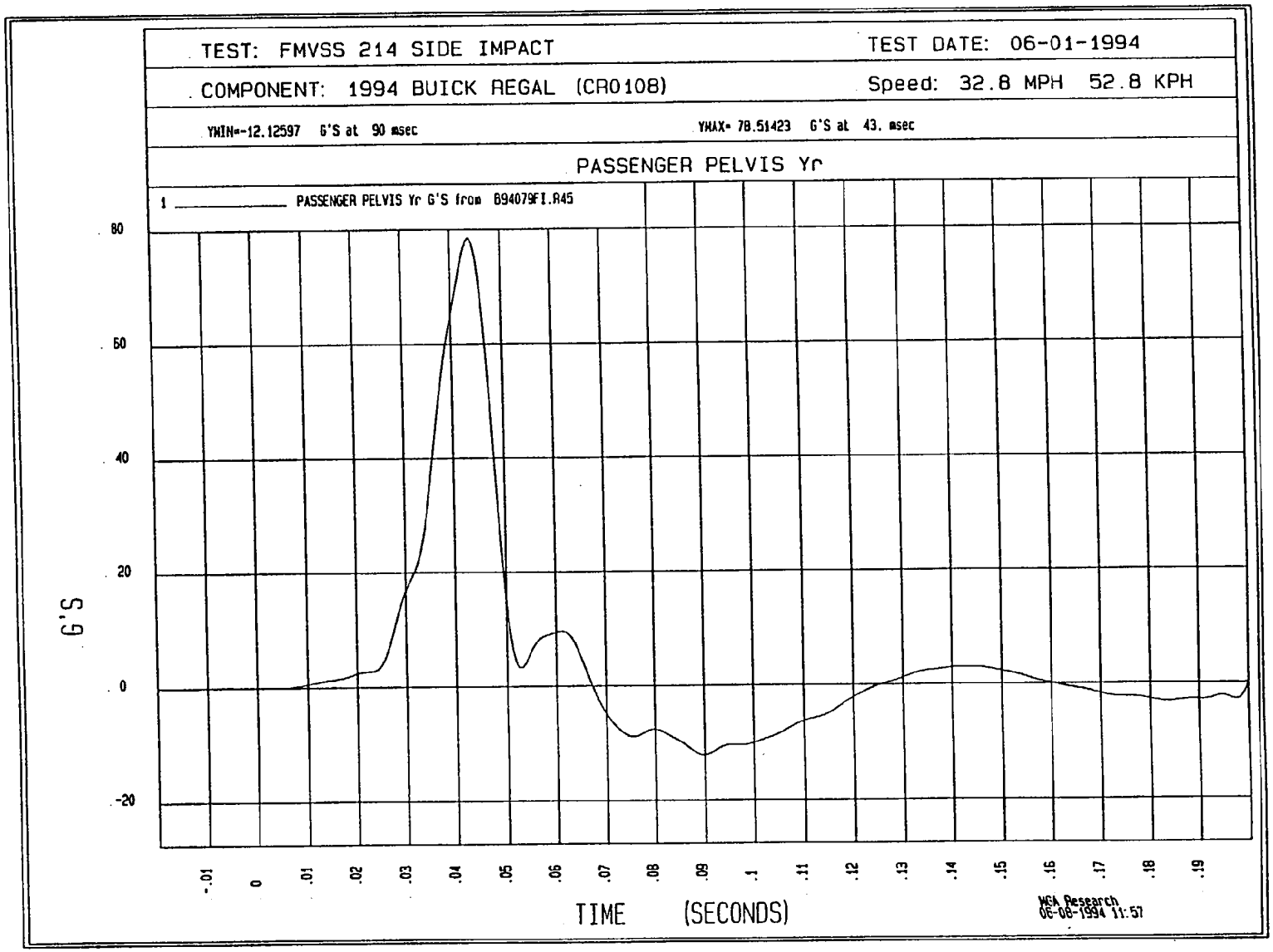


Figure B-98 - Passenger Pelvis Y Redundant Acceleration vs. Time

APPENDIX C

SID CONFIGURATION AND PERFORMANCE VERIFICATION

REPORT NO. MGA-94-DCØØ4

DUMMY PERFORMANCE CALIBRATIONS

FMVSS 214 - SIDE IMPACT TEST

GENERAL MOTORS CORPORATION
1994 BUICK REGAL 4 DOOR SEDAN
NHTSA NO. CRØ1Ø8

MGA PROVING GROUNDS
5ØØØ WARREN ROAD
BURLINGTON, WI 5315Ø5

Test Date: June 1, 1994

Report Date: June 28, 1994

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NEF-3Ø
4ØØ SEVENTH STREET, S.W., ROOM 6115
Washington, D.C. 2Ø59Ø

TABLE OF CONTENTS

PRE-TEST CERTIFICATION DATA

Driver Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements
Lumbar Flexion Test:	The lumbar passed all flexion test requirements

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 270

DATE OF VERIFICATION: May 16, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.7
RH - Rib Height	19.75 - 20.5"	20.5
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.1
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.8

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 24, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94772

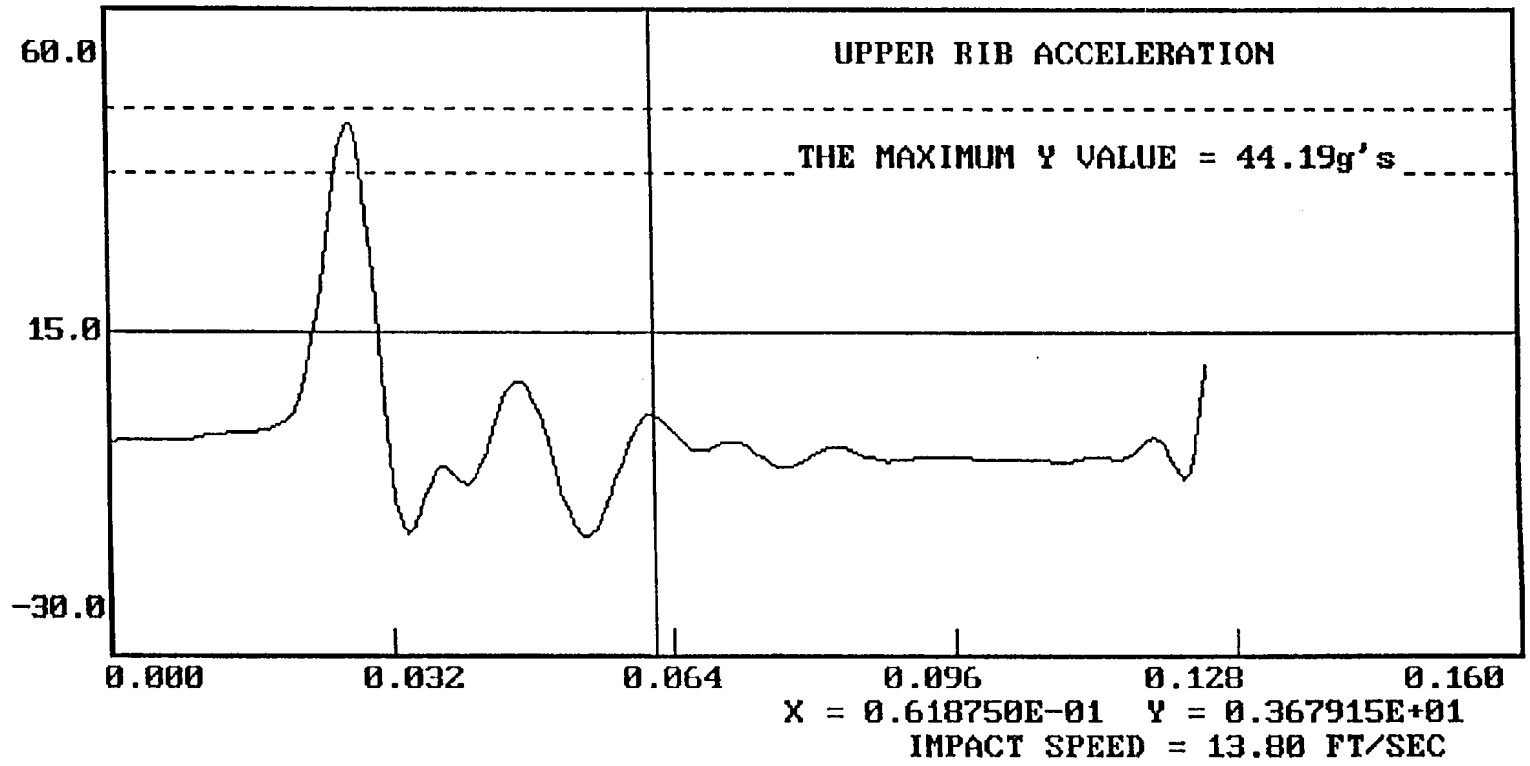
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	68°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	13.8 - 14.2 fps	13.8
UPPER RIB	37 - 46 g's	44
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	19

TEST MEETS SPECIFICATIONS

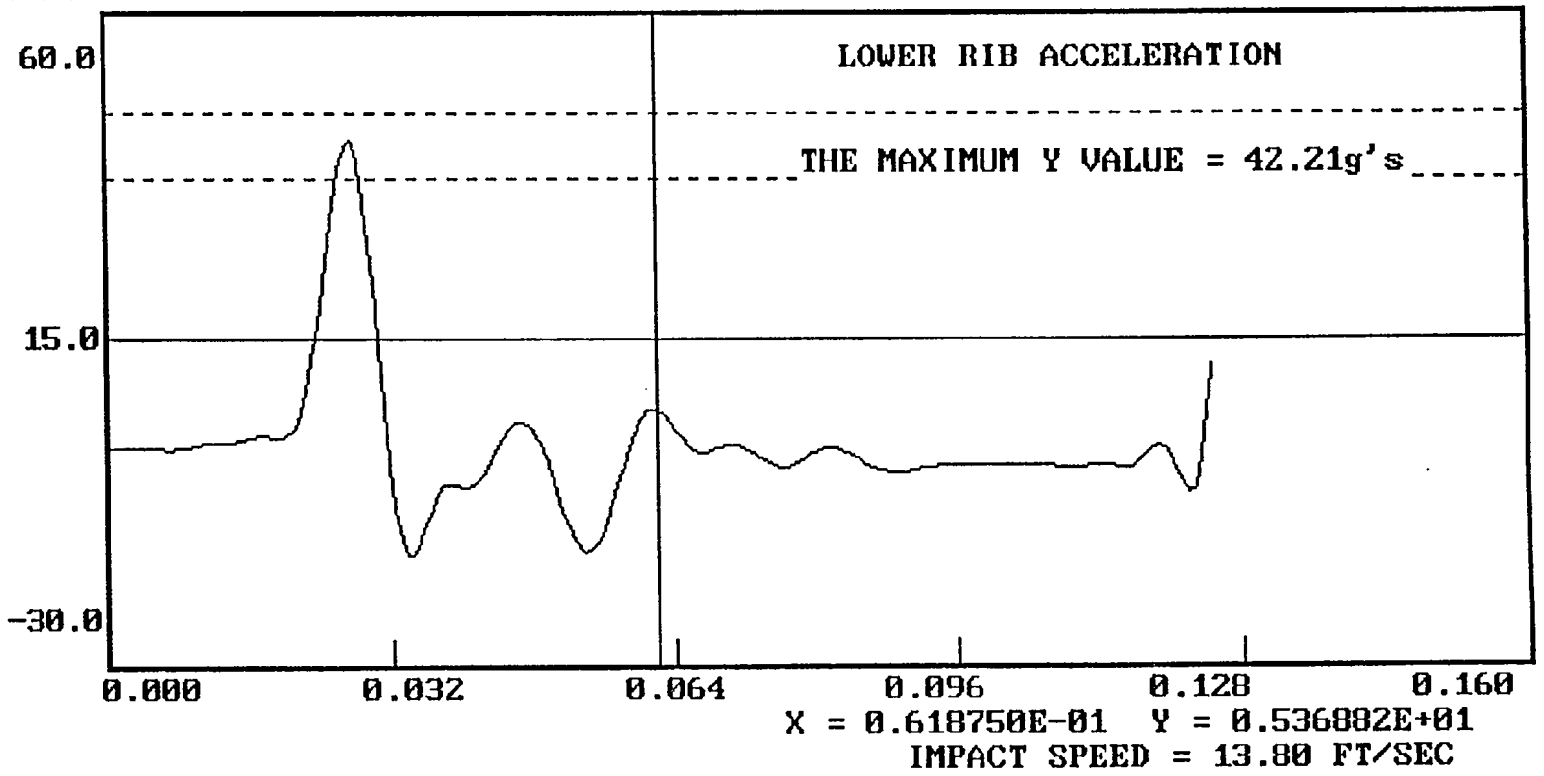
TECHNICIAN

APPROVED BY

DUMMY CALIBRATION - THORAX IMPACT 05-24-1994 14:23
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))

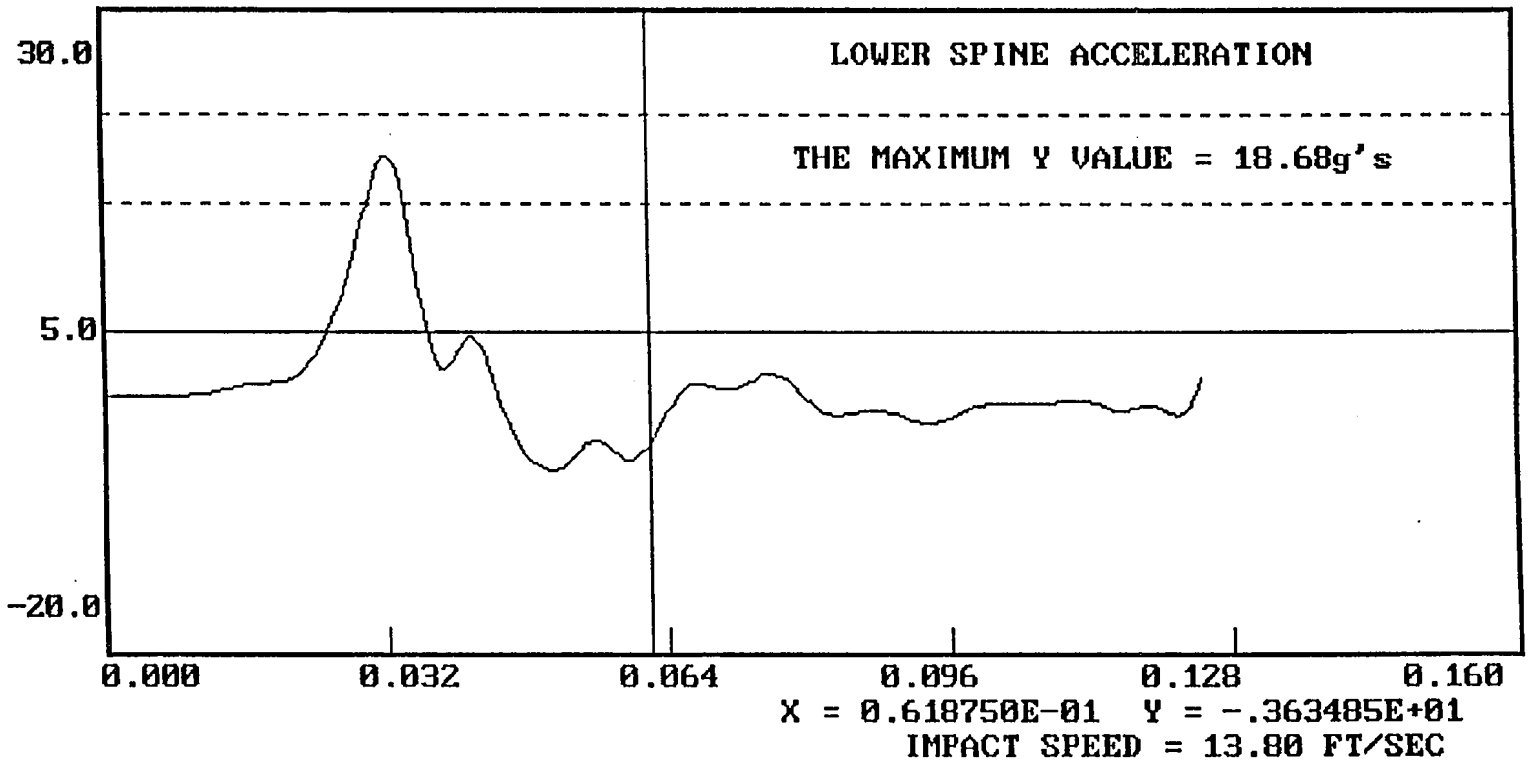


DUMMY CALIBRATION - THORAX IMPACT 05-24-1994 14:23
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = 0.536882E+01
IMPACT SPEED = 13.80 FT/SEC

DUMMY CALIBRATION - THORAX IMPACT 05-24-1994 14:23
DUMMY # 270
() VS. TIME ((SECONDS))



X = 0.618750E-01 Y = -.363485E+01
IMPACT SPEED = 13.80 FT/SEC

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 24, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94773

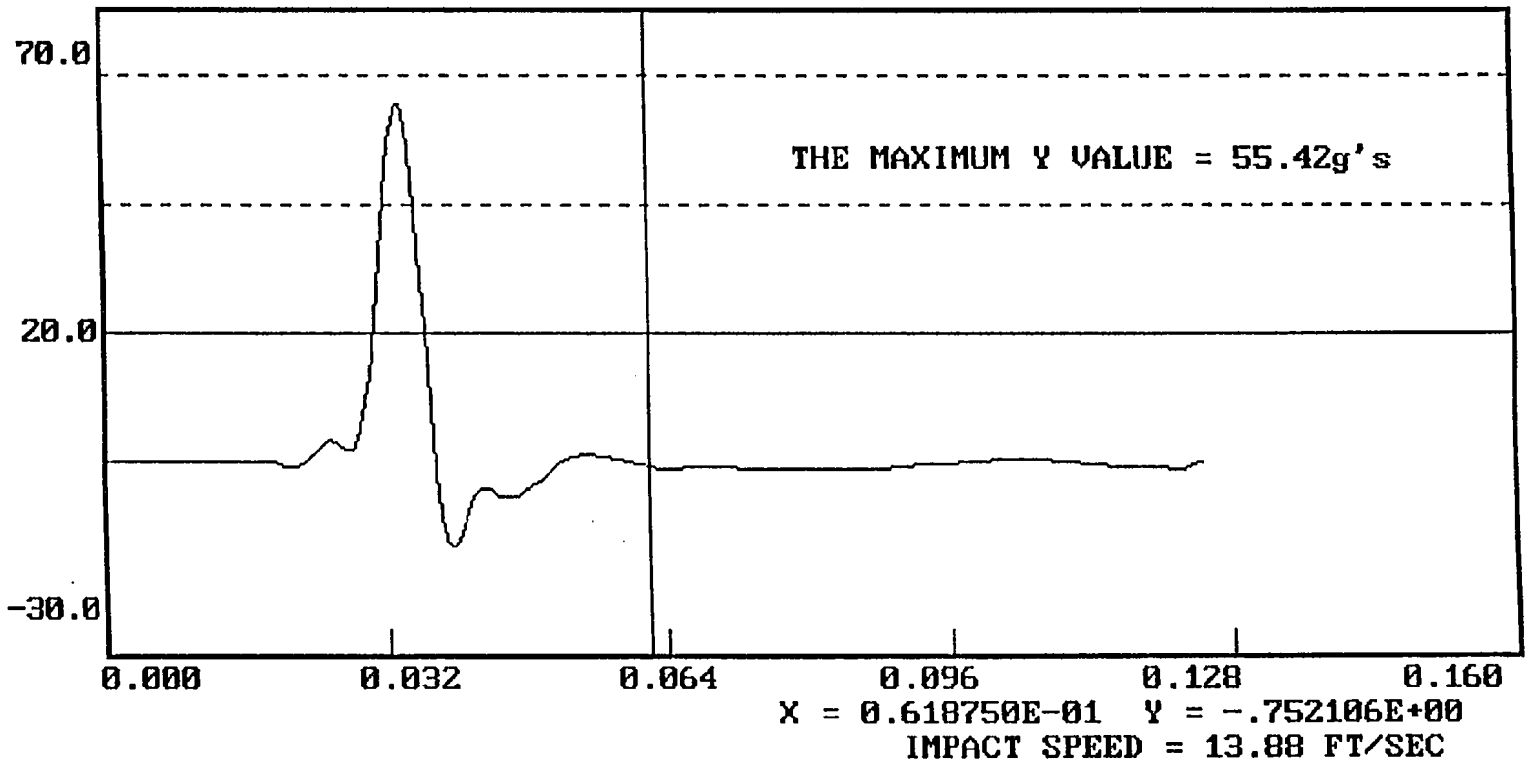
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	68°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	13.8 - 14.2 fps	13.9
PELVIS ACCELERATION	40 - 60 g's	55

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - PELVIS IMPACT 05-24-1994 18:51
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = -.752106E+00
IMPACT SPEED = 13.88 FT/SEC

MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: May 26, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94774

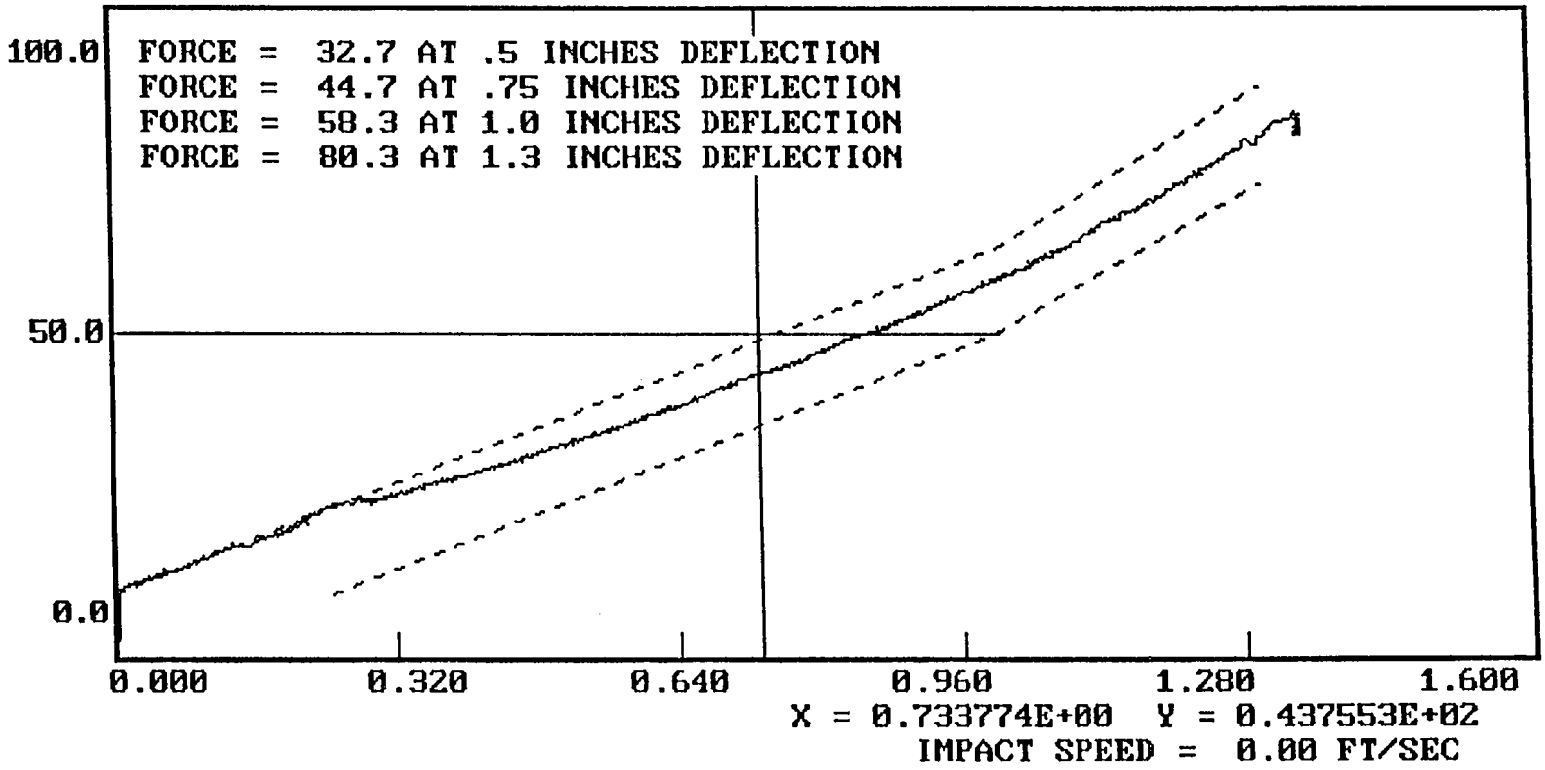
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	69°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.7
FORCE @ 0.75 in	36.7 - 49.8 lbs	44.7
FORCE @ 1.0 in	50 - 63 lbs	58
FORCE @ 1.3 in	73 - 88 lbs	80

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - ABDOMEN COMPRESSION 05-26-1994 10:22
DUMMY # 270
ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

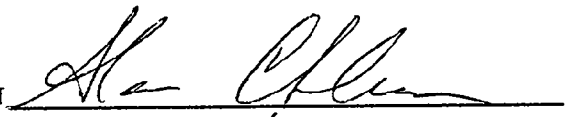
SIDE IMPACT DUMMY (SID)

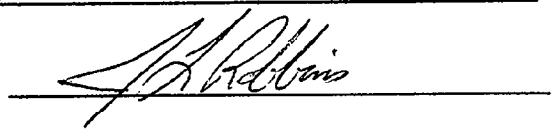
DATE: May 26, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94775

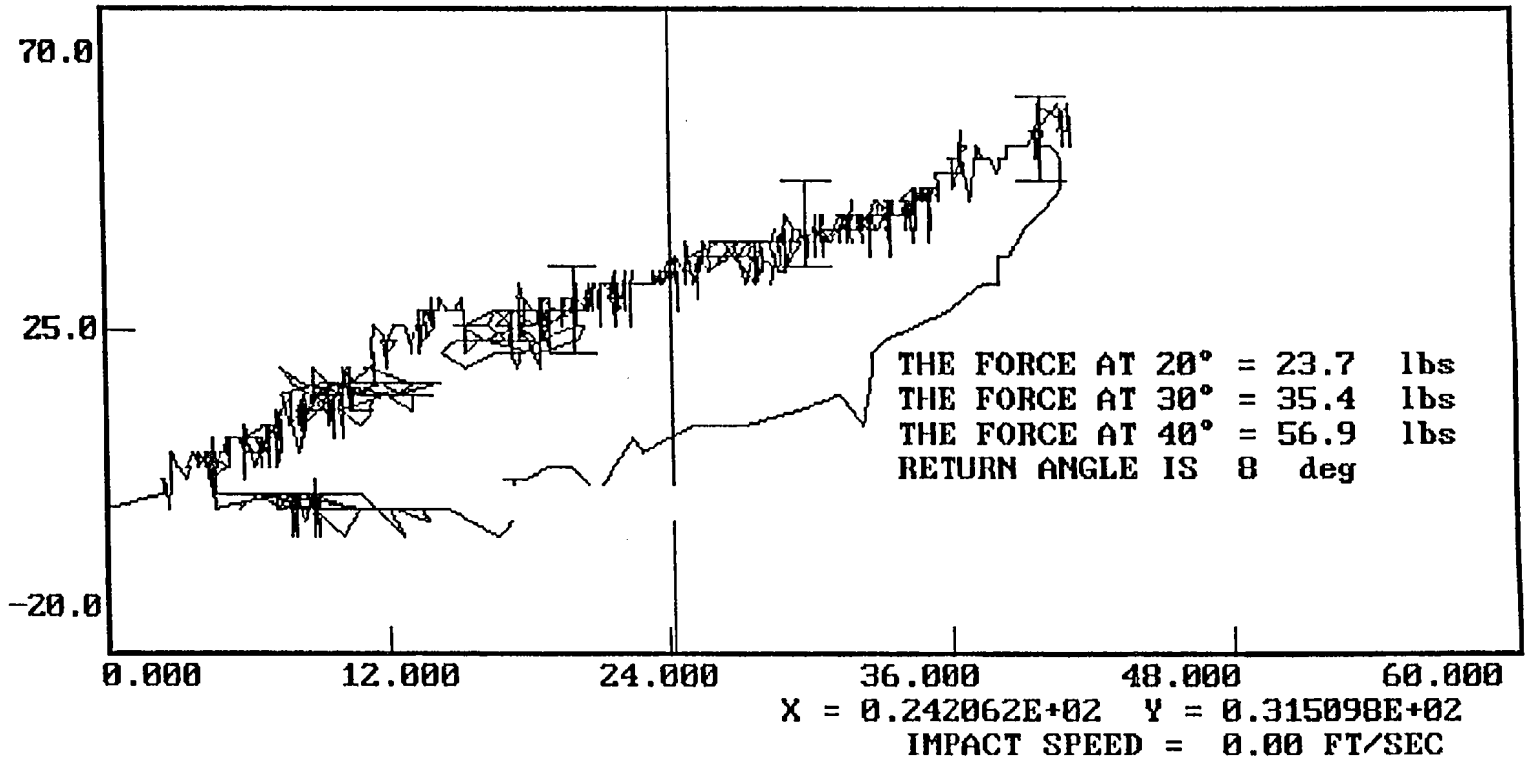
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	69°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	24
FORCE @ 30°	34 - 46 lbs	35
FORCE @ 40°	46 - 58 lbs	57
RETURN ANGLE	12° maximum	8°

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

DUMMY CALIBRATION - LUMBAR FLEXION 05-26-1994 12:02
DUMMY # 270
FORCE () VS. TORSO ROTATION (DEGREES)



PRE-TEST CERTIFICATION DATA

Passenger Dummy Serial Number: 272

Calibration Test Results Summary

Passenger Serial Number: 272

Pre-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvic Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements
Lumbar Flexion Test:	The lumbar passed all flexion test requirements

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

DATE OF VERIFICATION: May 16, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.7
RH - Rib Height	19.75 - 20.5"	20.5
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.1
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.3
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	15.0

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 21, 1994

DUMMY NUMBER: 272 TEST NUMBER: D94792

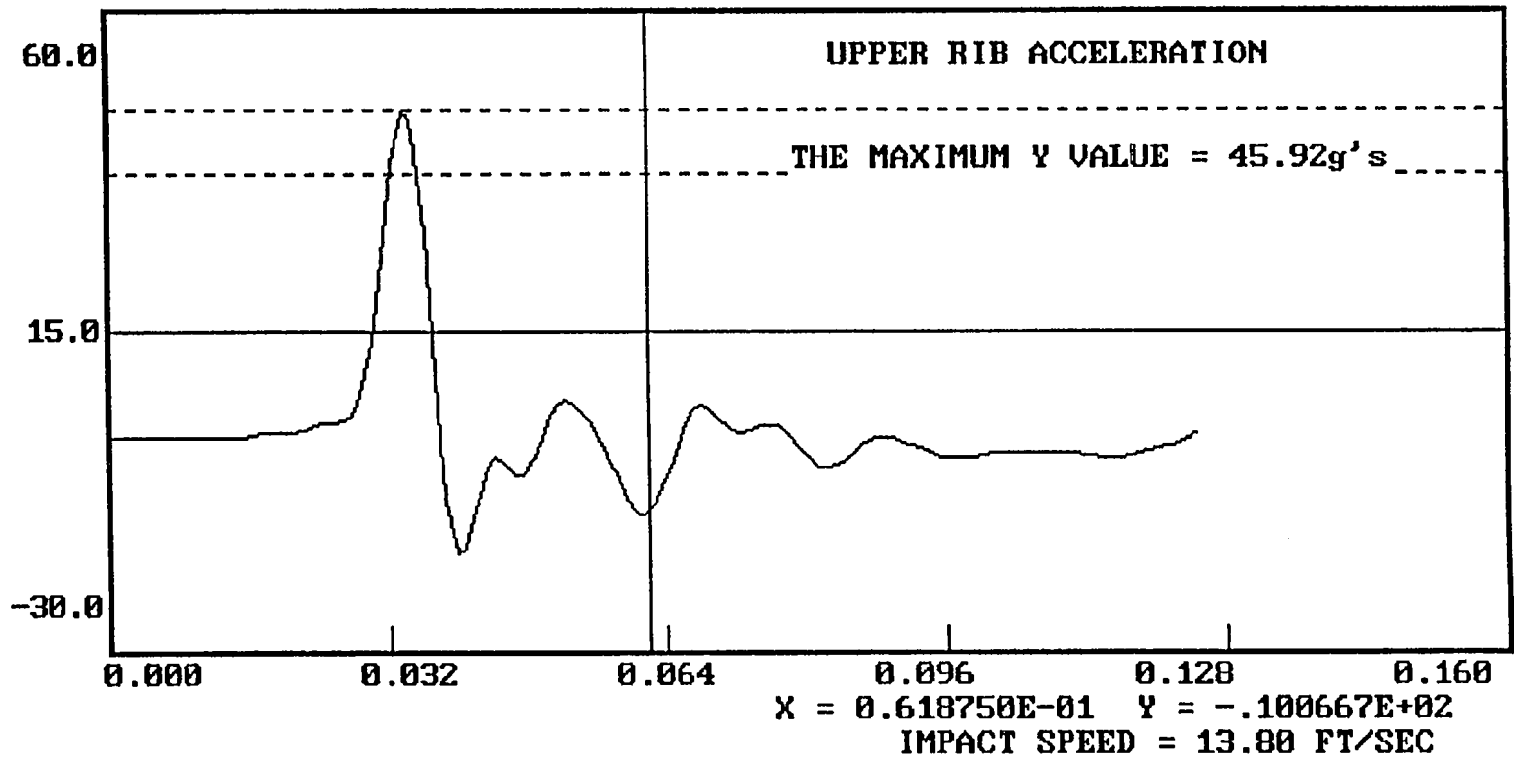
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	40%
PROBE SPEED	13.8 - 14.2 fps	13.8
UPPER RIB	37 - 46 g's	46
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	21

TEST MEETS SPECIFICATIONS

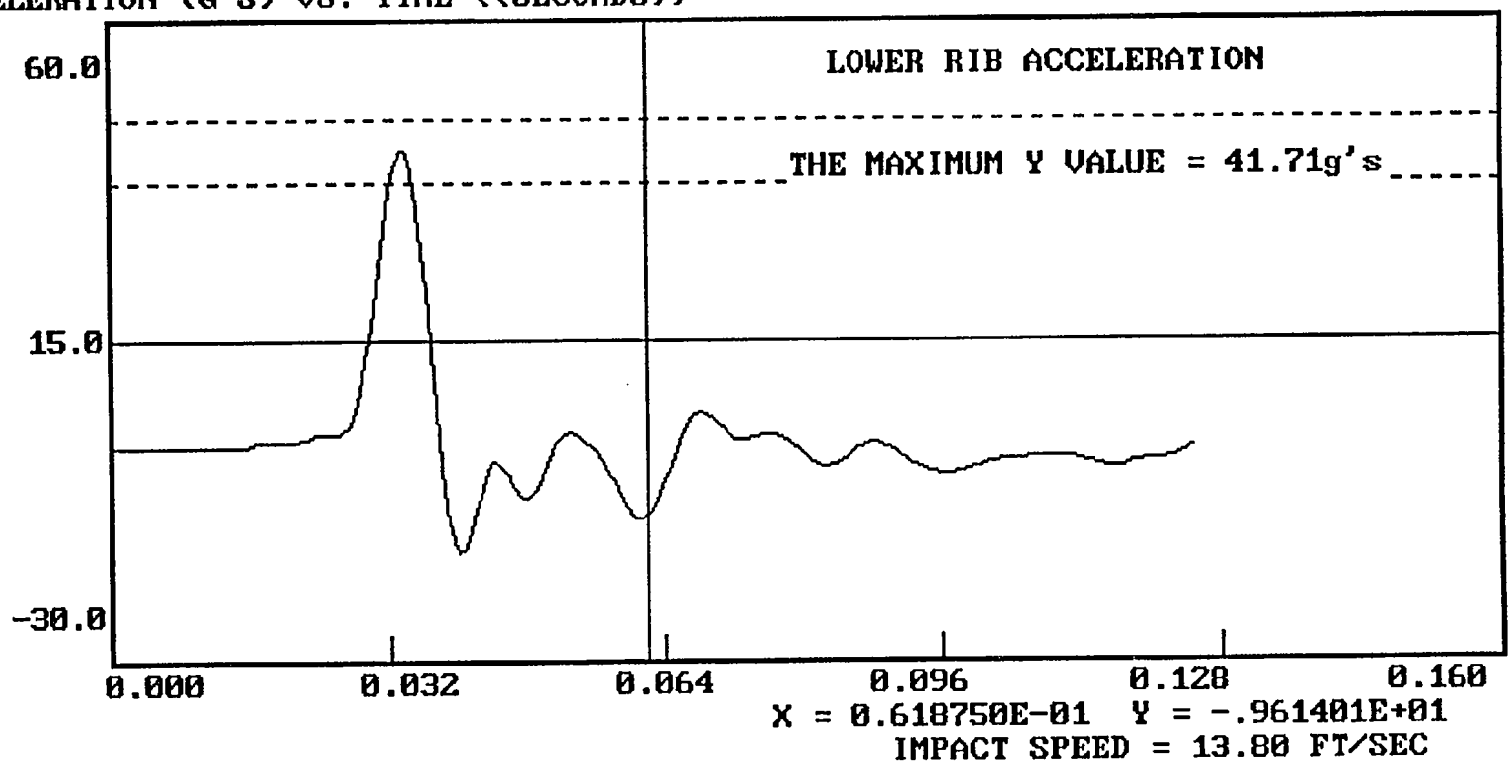
TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - THORAX IMPACT 05-21-1994 14:35
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



DUMMY CALIBRATION - THORAX IMPACT 05-21-1994 14:35
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = -.961401E+01
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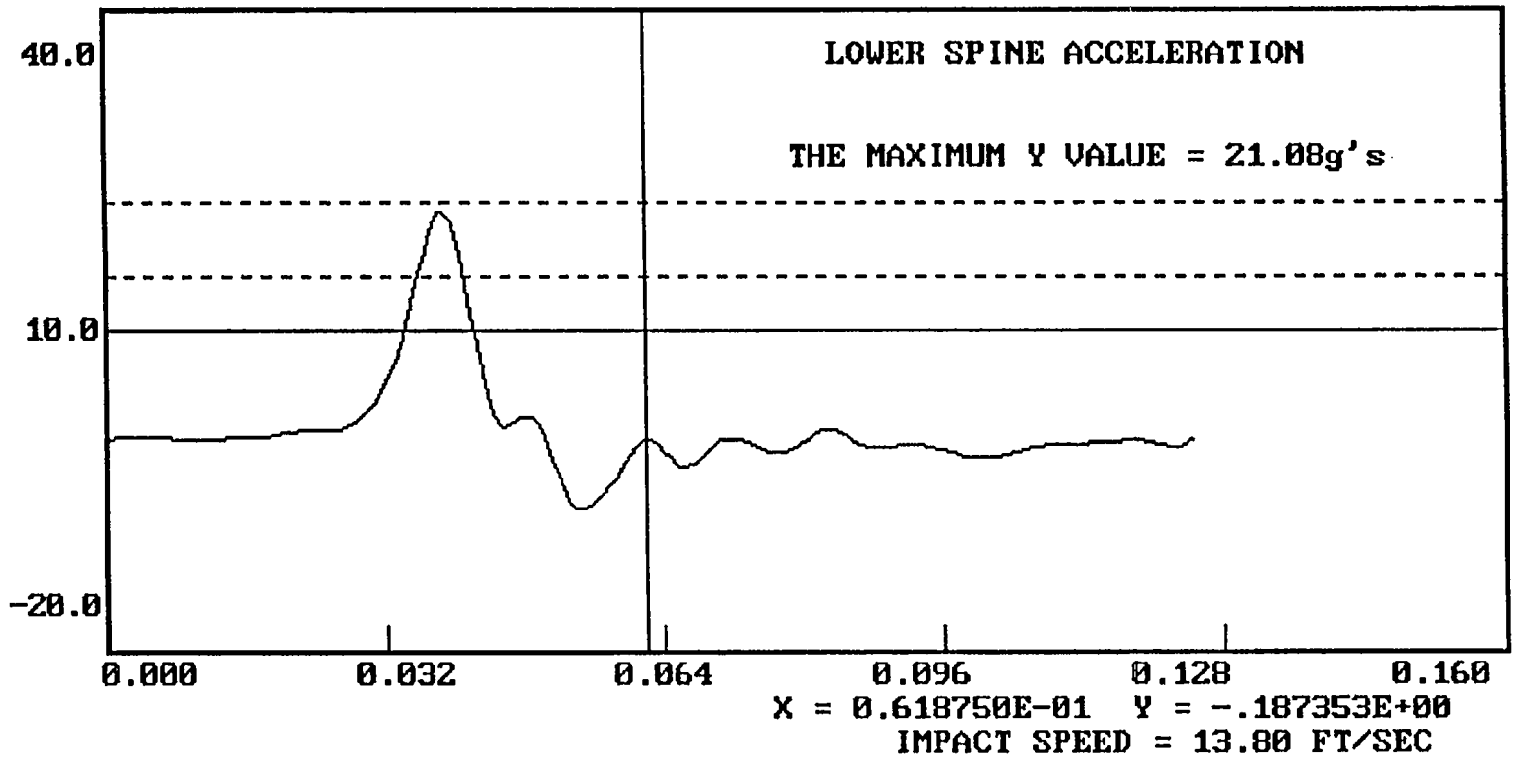
DUMMY CALIBRATION - THORAX IMPACT 05-21-1994 14:35
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = -.187353E+00
IMPACT SPEED = 13.80 FT/SEC

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: May 24, 1994

DUMMY NUMBER: 272 TEST NUMBER: D94793

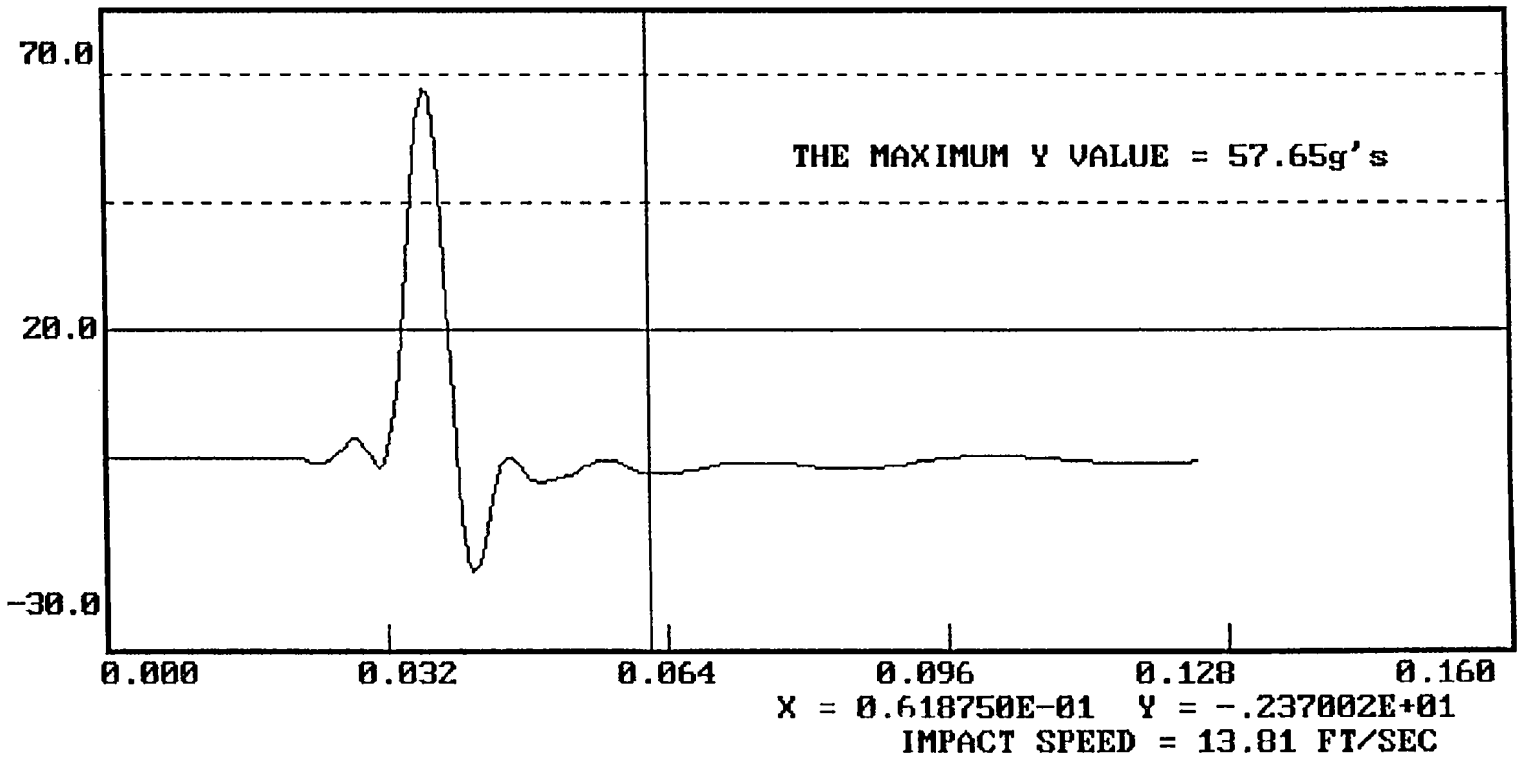
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	68°
RELATIVE HUMIDITY	10 - 70%	25%
PROBE SPEED	13.8 - 14.2 fps	13.8
PELVIS ACCELERATION	40 - 60 g's	58

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - PELVIS IMPACT 05-24-1994 18:43
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: May 26, 1994

DUMMY NUMBER: 272 TEST NUMBER: D94794

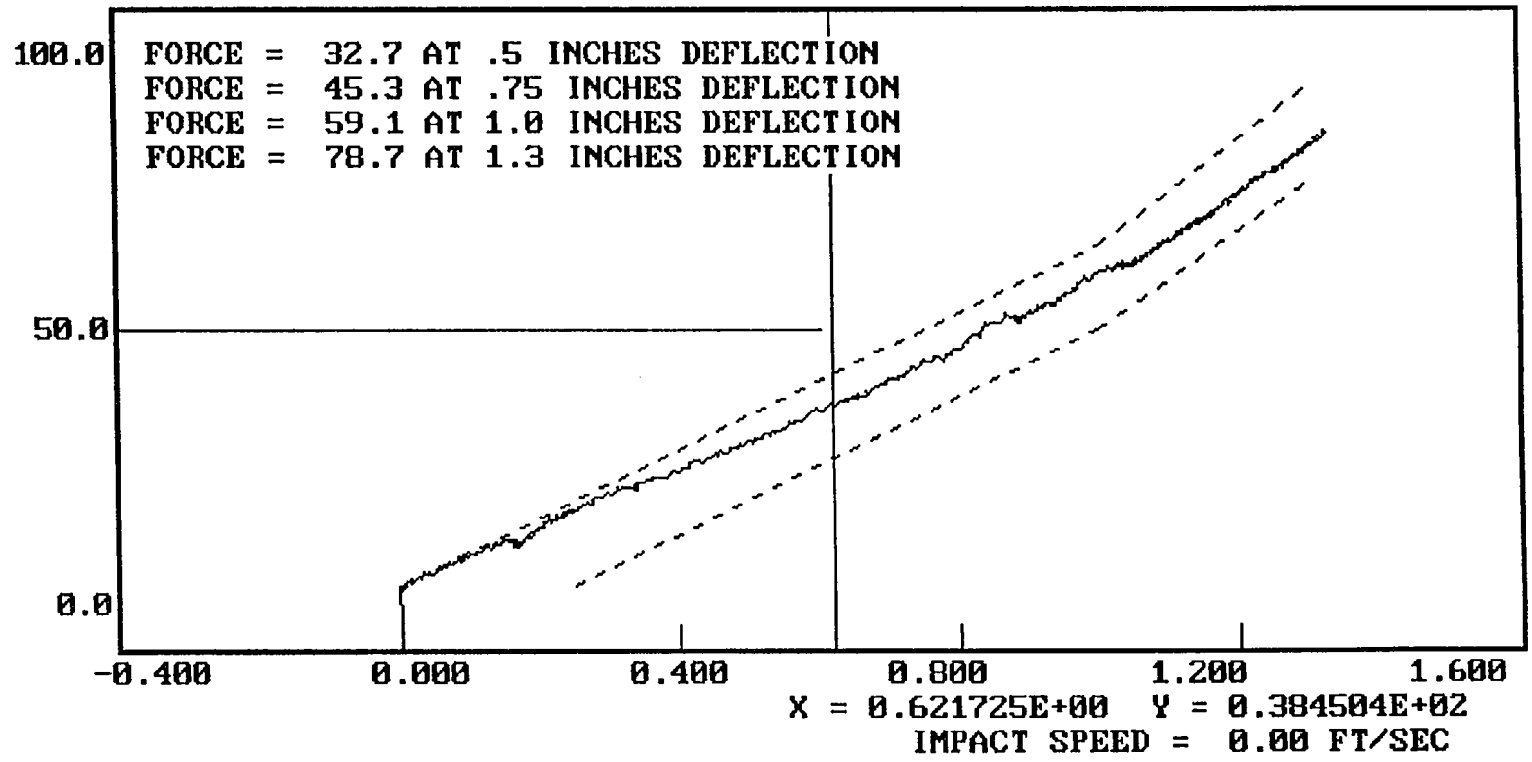
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.7
FORCE @ 0.75 in	36.7 - 49.8 lbs	45.3
FORCE @ 1.0 in	50 - 63 lbs	59
FORCE @ 1.3 in	73 - 88 lbs	79

TEST MEETS SPECIFICATIONS

TECHNICIAN

APPROVED BY

DUMMY CALIBRATION - ABDOMEN COMPRESSION 05-26-1994 10:16
DUMMY # 272
ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



X = 0.621725E+00 Y = 0.384504E+02
IMPACT SPEED = 0.00 FT/SEC

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

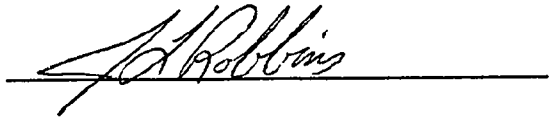
DATE: May 26, 1994

DUMMY NUMBER: 272 TEST NUMBER: D94795

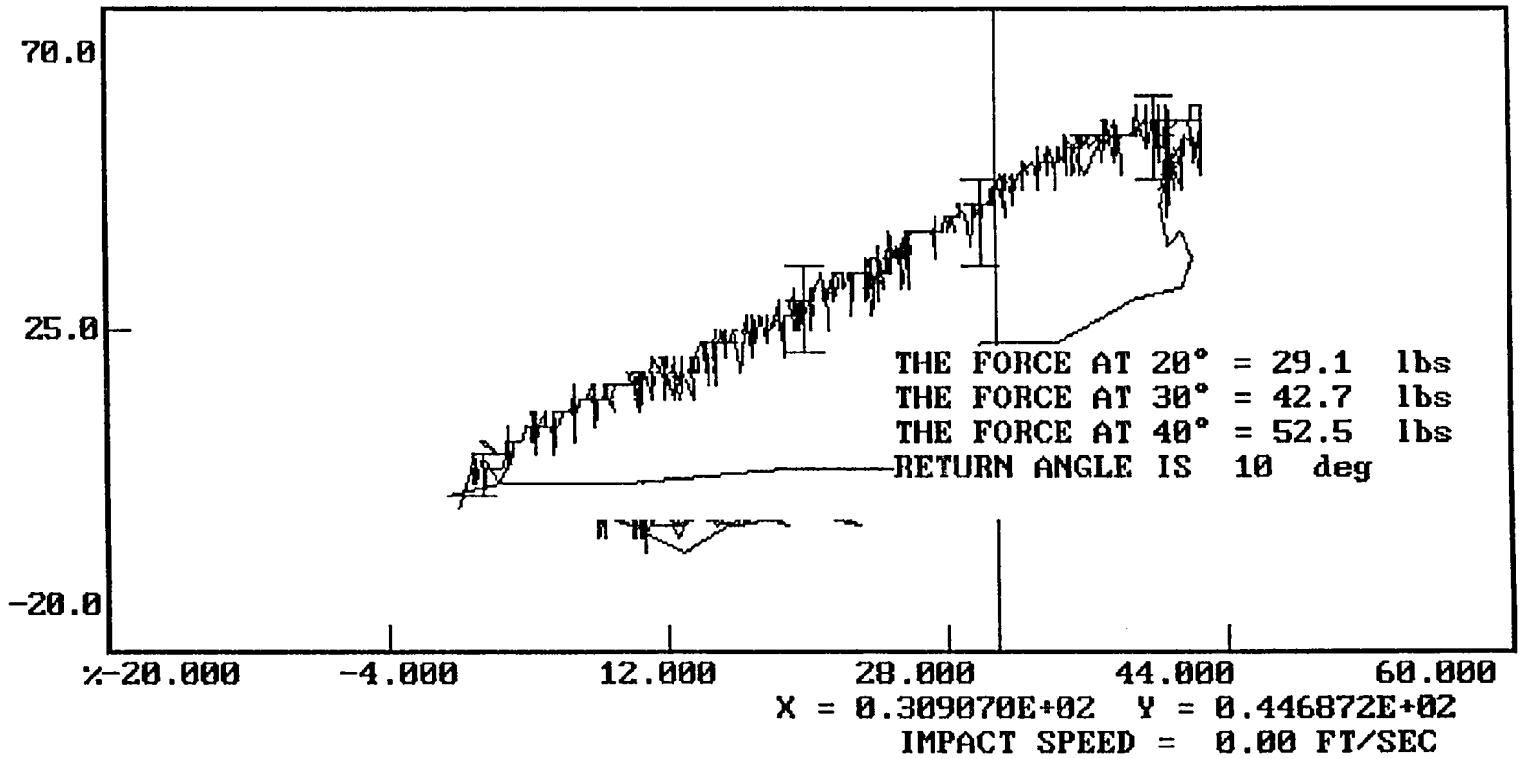
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	29
FORCE @ 30°	34 - 46 lbs	43
FORCE @ 40°	46 - 58 lbs	53
RETURN ANGLE	12° maximum	10°

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

DUMMY CALIBRATION - LUMBAR FLEXION 05-26-1994 10:56
DUMMY # 272
FORCE () VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Driver Dummy Serial Number: 270

Calibration Test Results Summary

Dummy Serial Number: 270

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvis Impact Test:	The pelvis passed all impact test requirements.
Abdominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 270

DATE OF VERIFICATION: June 2, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.0" - 35.8"	35.6
RH - Rib Height	19.75 - 20.5"	20.4
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.0" to 9.5"	9.2
KV - Knee Pivot From Back Line	20.1" - 20.7"	20.7
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.0" - 15.4"	14.8

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 2, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94862

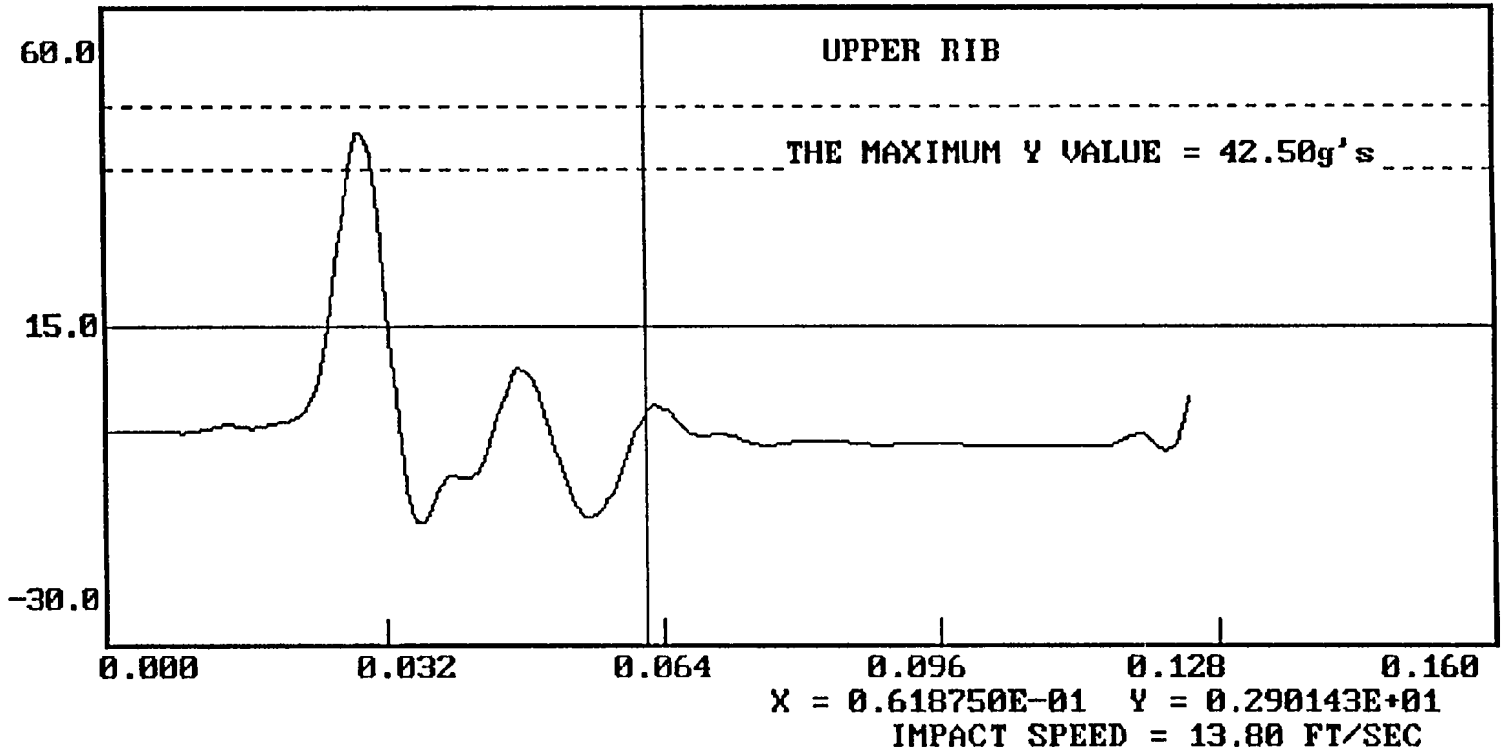
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	13.8 - 14.2 fps	13.8
UPPER RIB	37 - 46 g's	43
LOWER RIB	37 - 46 g's	40
LOWER SPINE	15 - 22 g's	18

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - THORAX IMPACT 06-02-1994 13:49
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))



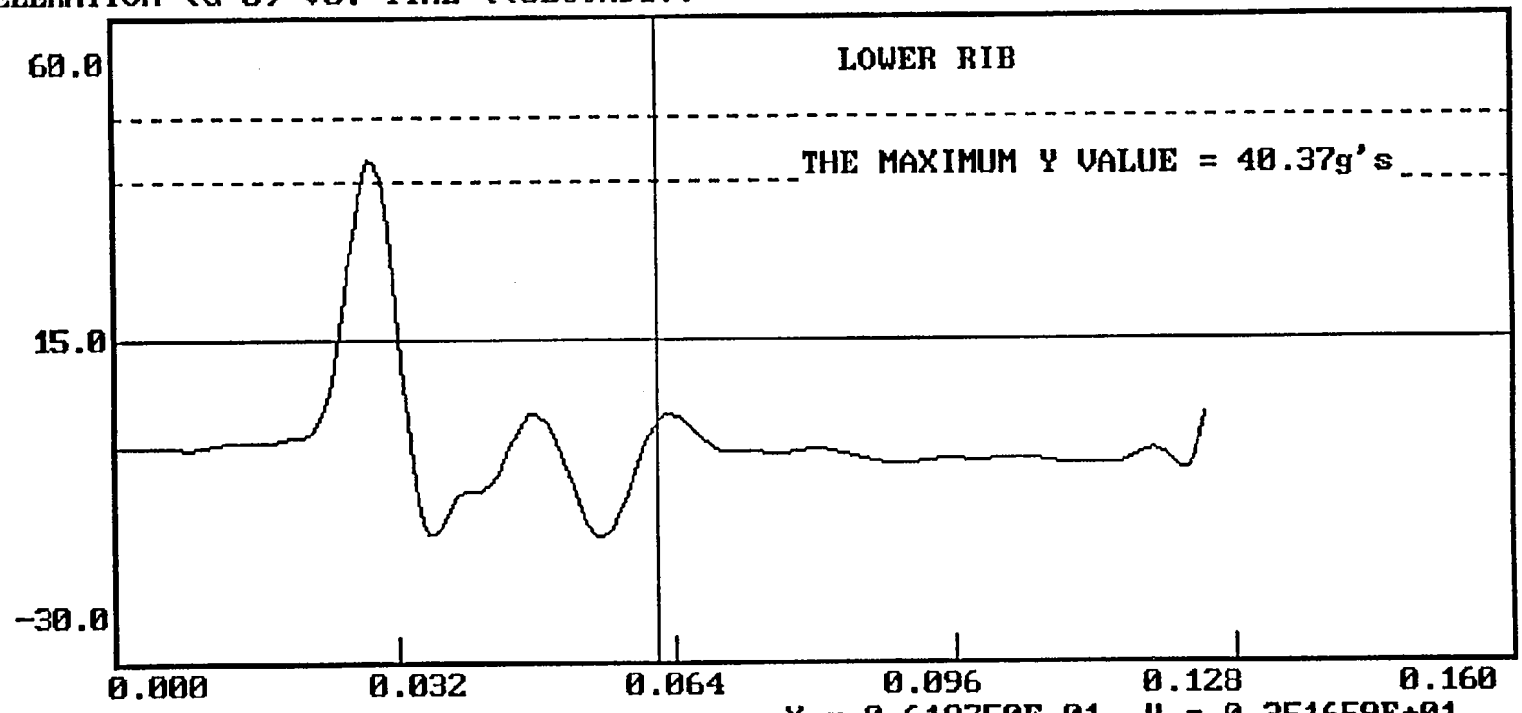
X = 0.618750E-01 Y = 0.290143E+01
IMPACT SPEED = 13.80 FT/SEC

DUMMY CALIBRATION - THORAX IMPACT

06-02-1994 13:49

DUMMY # 270

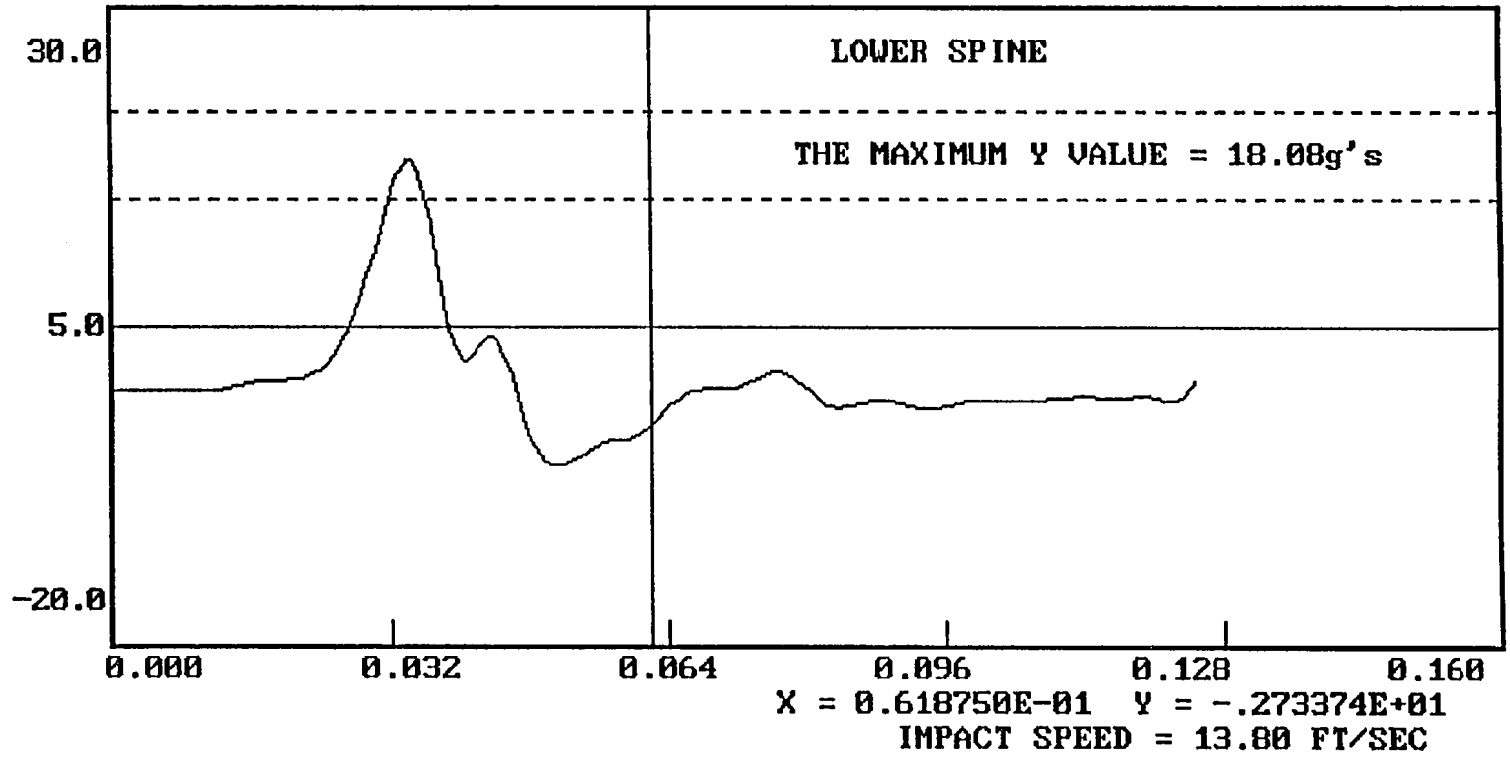
ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = 0.351659E+01

IMPACT SPEED = 13.80 FT/SEC

DUMMY CALIBRATION - THORAX IMPACT 06-02-1994 13:49
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 2, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94863

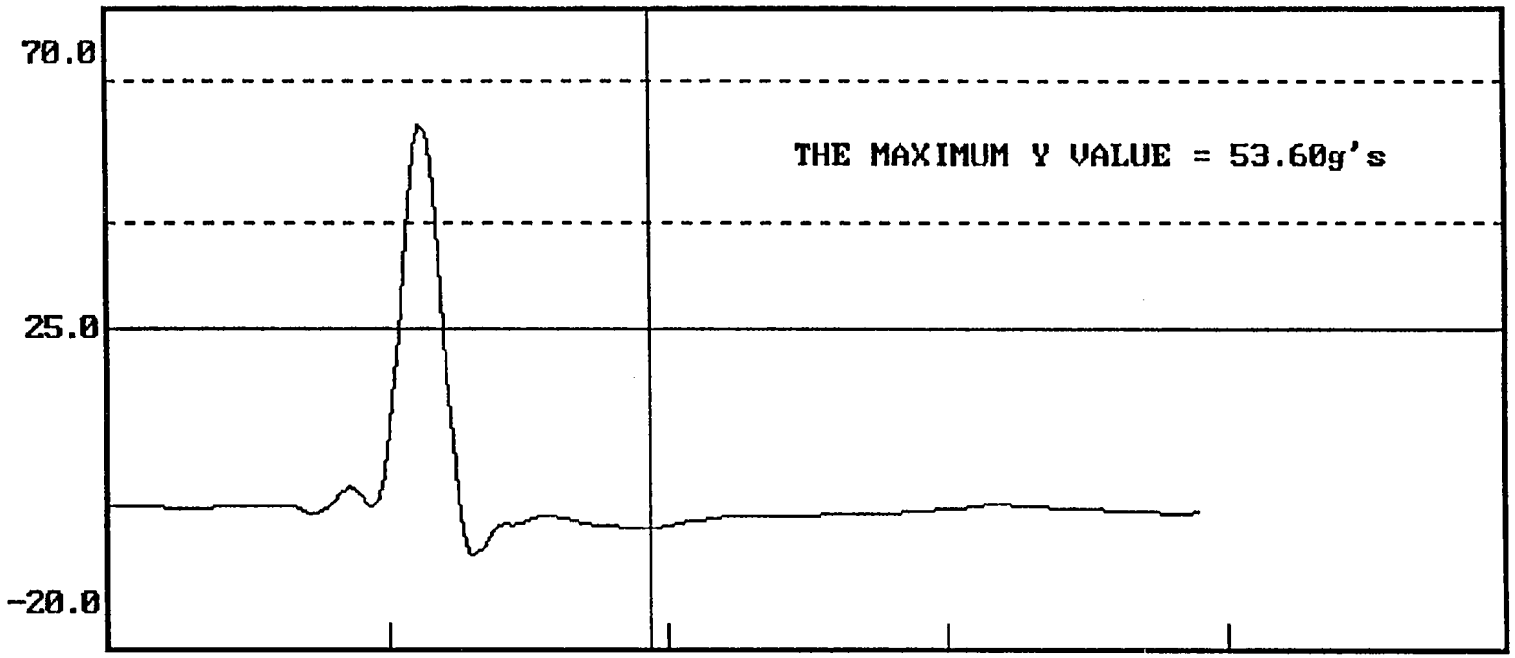
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	13.8 - 14.2 fps	13.9
PELVIS ACCELERATION	40 - 60 g's	54

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - PELVIS IMPACT 06-02-1994 09:40
DUMMY # 270
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: June 3, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94864

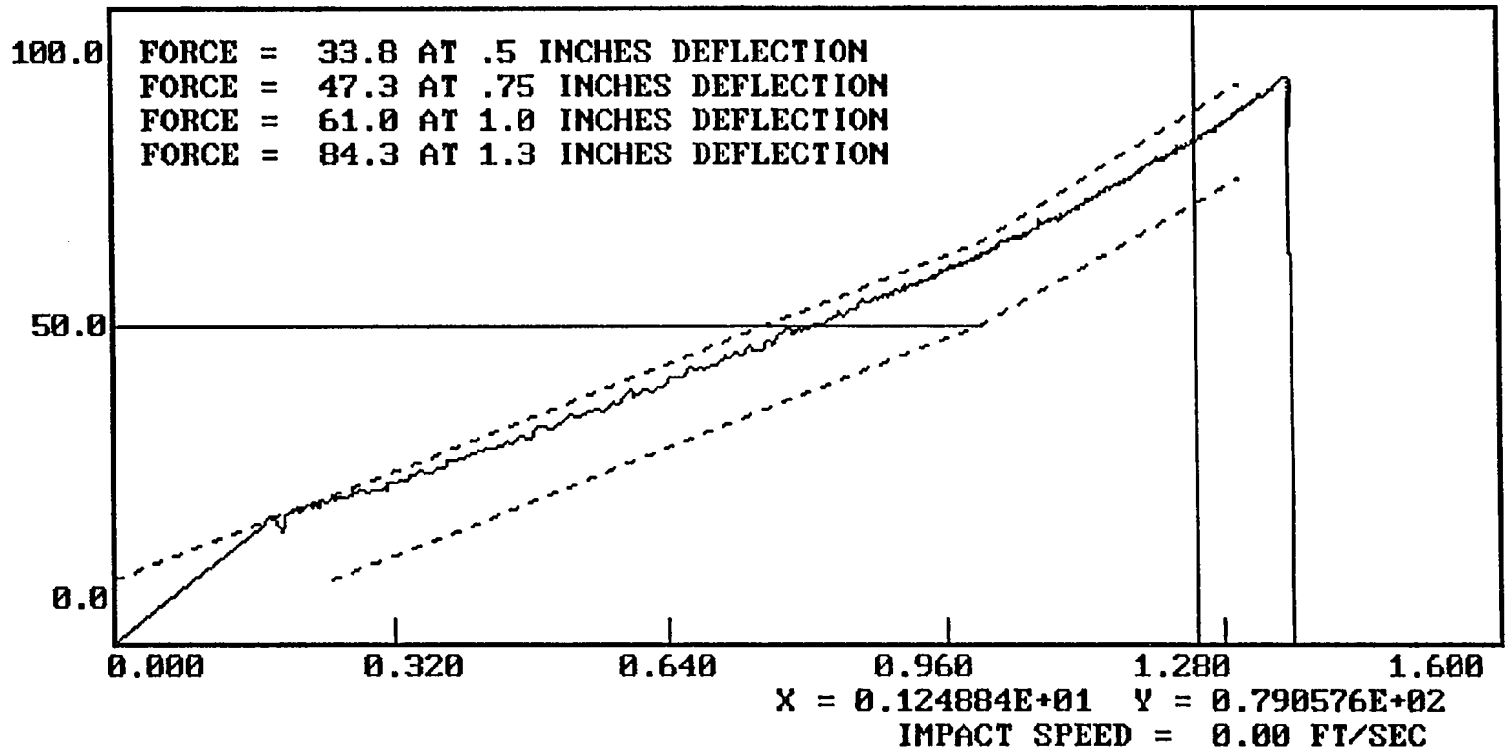
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0.5 in	23.3 - 36.5 lbs	33.8
FORCE @ 0.75 in	36.7 - 49.8 lbs	47.3
FORCE @ 1.0 in	50 - 63 lbs	61
FORCE @ 1.3 in	73 - 88 lbs	84

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - ABDOMEN COMPRESSION 06-03-1994 09:07
DUMMY # 270
ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

SIDE IMPACT DUMMY (SID)

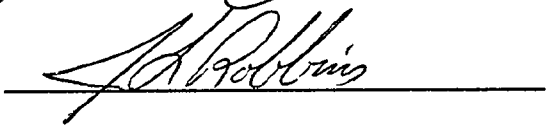
DATE: June 3, 1994

DUMMY NUMBER: 270 TEST NUMBER: D94865

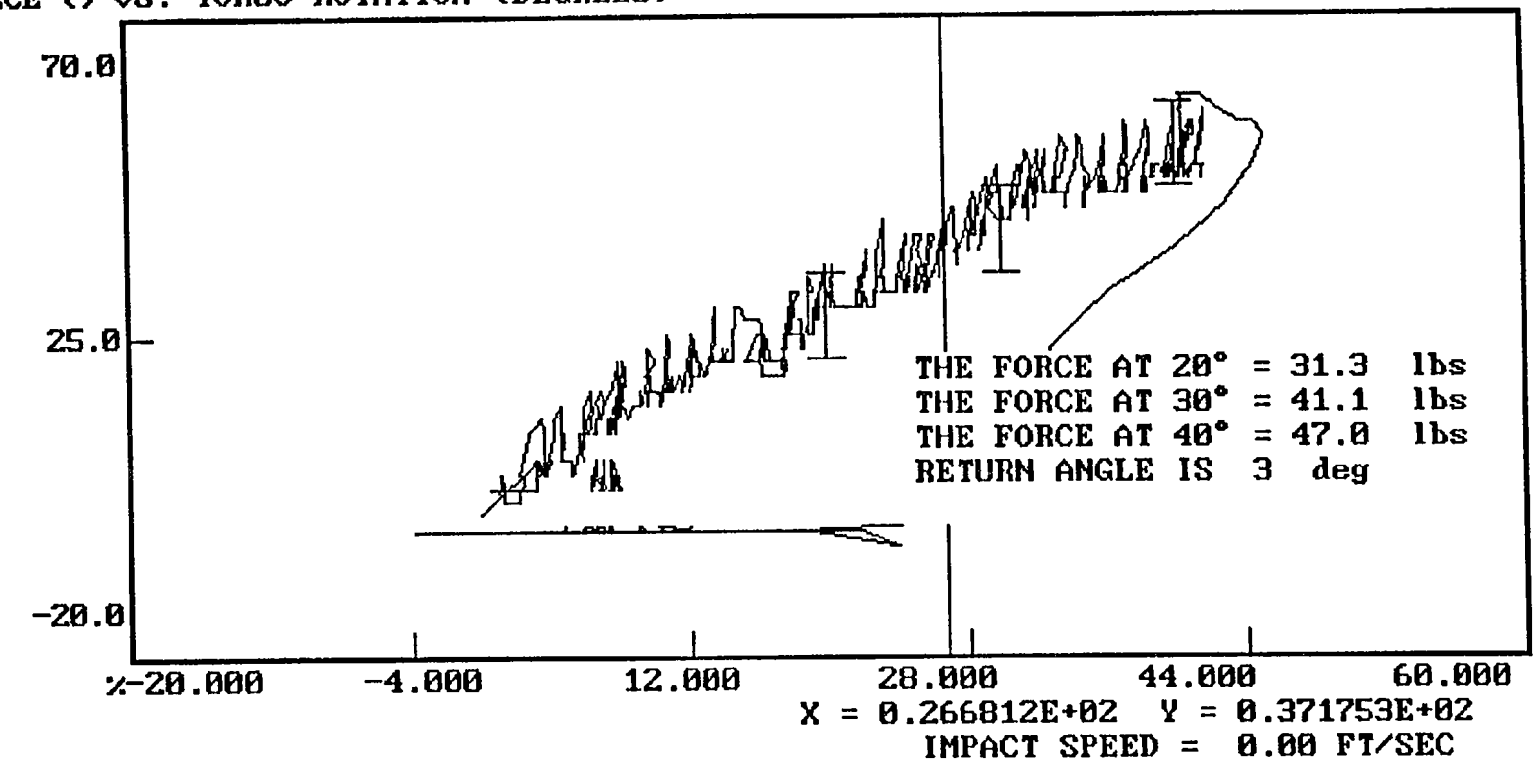
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	30%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	31
FORCE @ 30°	34 - 46 lbs	41
FORCE @ 40°	46 - 58 lbs	47
RETURN ANGLE	12° maximum	3°

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

DUMMY CALIBRATION - LUMBAR FLEXION 06-03-1994 11:47
DUMMY # 270
FORCE () VS. TORSO ROTATION (DEGREES)



POST-TEST CERTIFICATION DATA

Passenger Dummy Serial Number: 272

Calibration Test Results Summary

Dummy Serial Number: 272

Post-Test Calibration

External Dimensions:	The dummy passed all external dimension requirements.
Thorax Impact Test:	The thorax passed all impact test requirements.
Pelvis Impact Tests:	The pelvis passed all impact test requirements.
Adbominal Compression Test:	The abdomen passed all compression test requirements.
Lumbar Flexion Test:	The lumbar passed all flexion test requirements.

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 272

DATE OF VERIFICATION: June 2, 1994

DESCRIPTION	SPECIFICATION	TEST RESULTS
SH - Seated Height	35.Ø" - 35.8"	35.6
RH - Rib Height	19.75 - 2Ø.5"	2Ø.4
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Back Line	9.Ø" to 9.5"	9.1
KV - Knee Pivot From Back Line	2Ø.1" - 2Ø.7"	2Ø.3
SW - Knee Pivot to Floor	19.3" - 19.9"	19.5
HW - Hip Width	14.Ø" - 15.4"	15.Ø

MEASUREMENTS BY: _____

APPROVED BY: _____

MGA RESEARCH CORPORATION

THORAX IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 2, 1994

DUMMY NUMBER: 272

TEST NUMBER: D94872

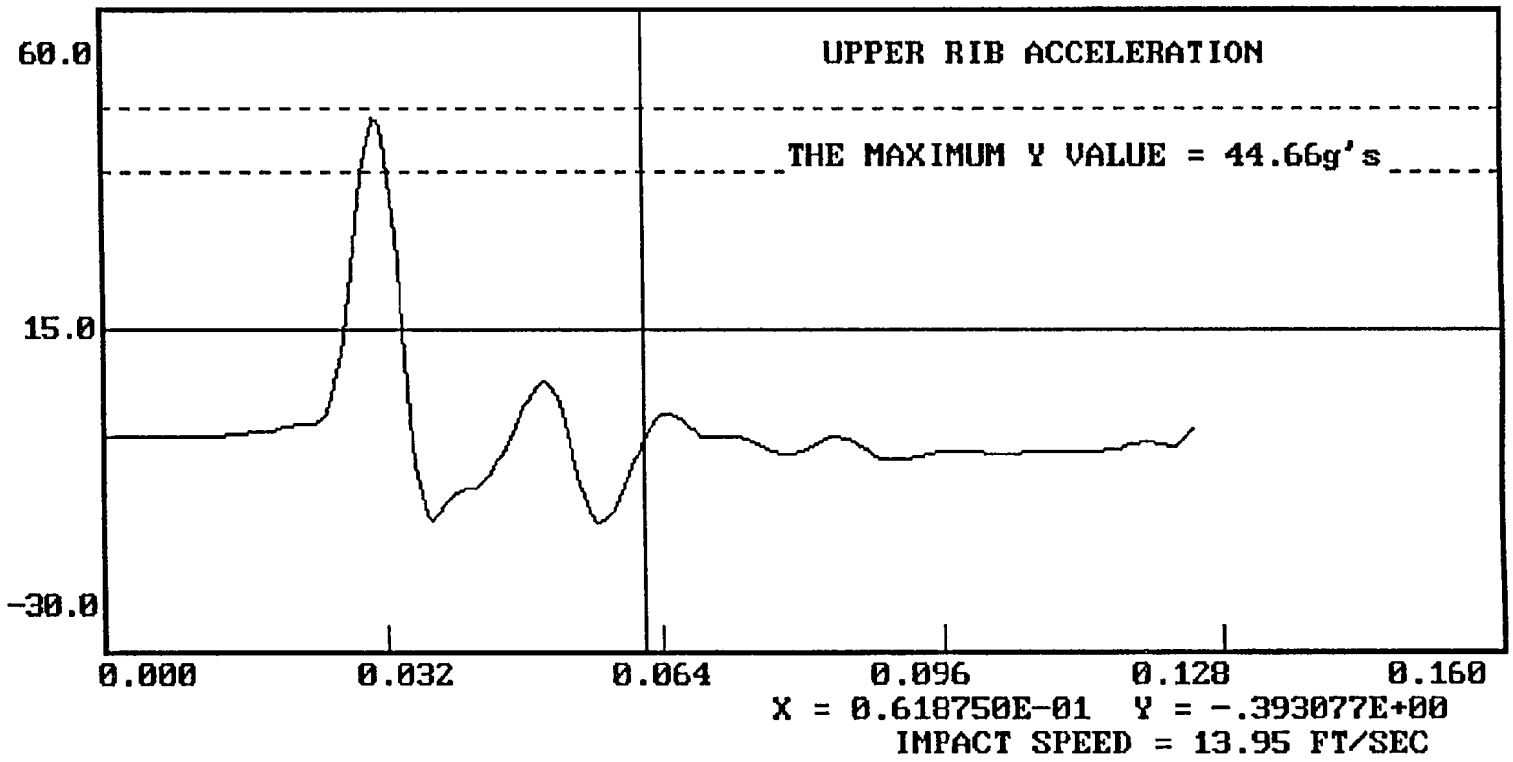
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	13.8 - 14.2 fps	14.0
UPPER RIB	37 - 46 g's	45
LOWER RIB	37 - 46 g's	42
LOWER SPINE	15 - 22 g's	20

TEST MEETS SPECIFICATIONS

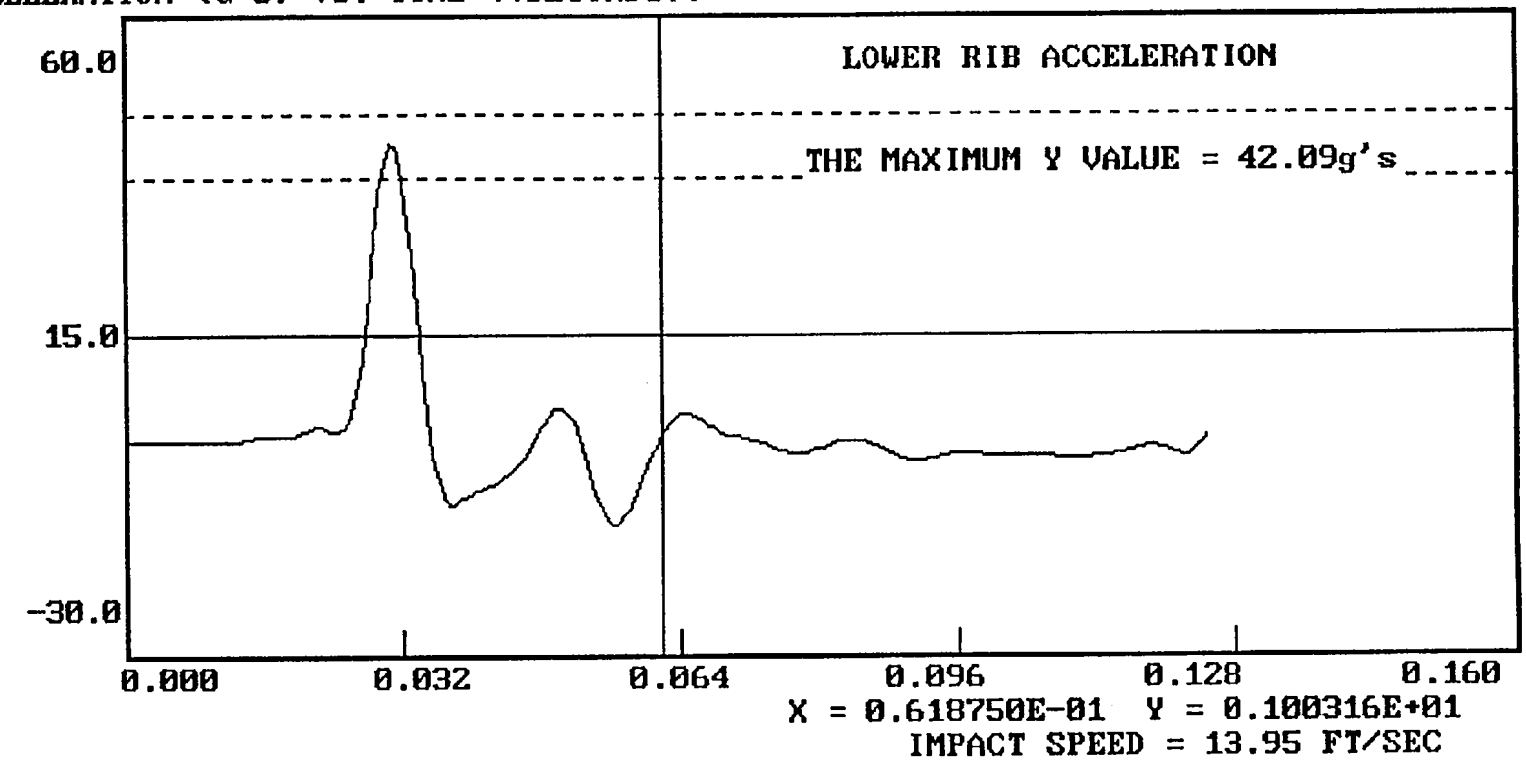
TECHNICIAN

APPROVED BY

DUMMY CALIBRATION - THORAX IMPACT 06-02-1994 14:47
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))

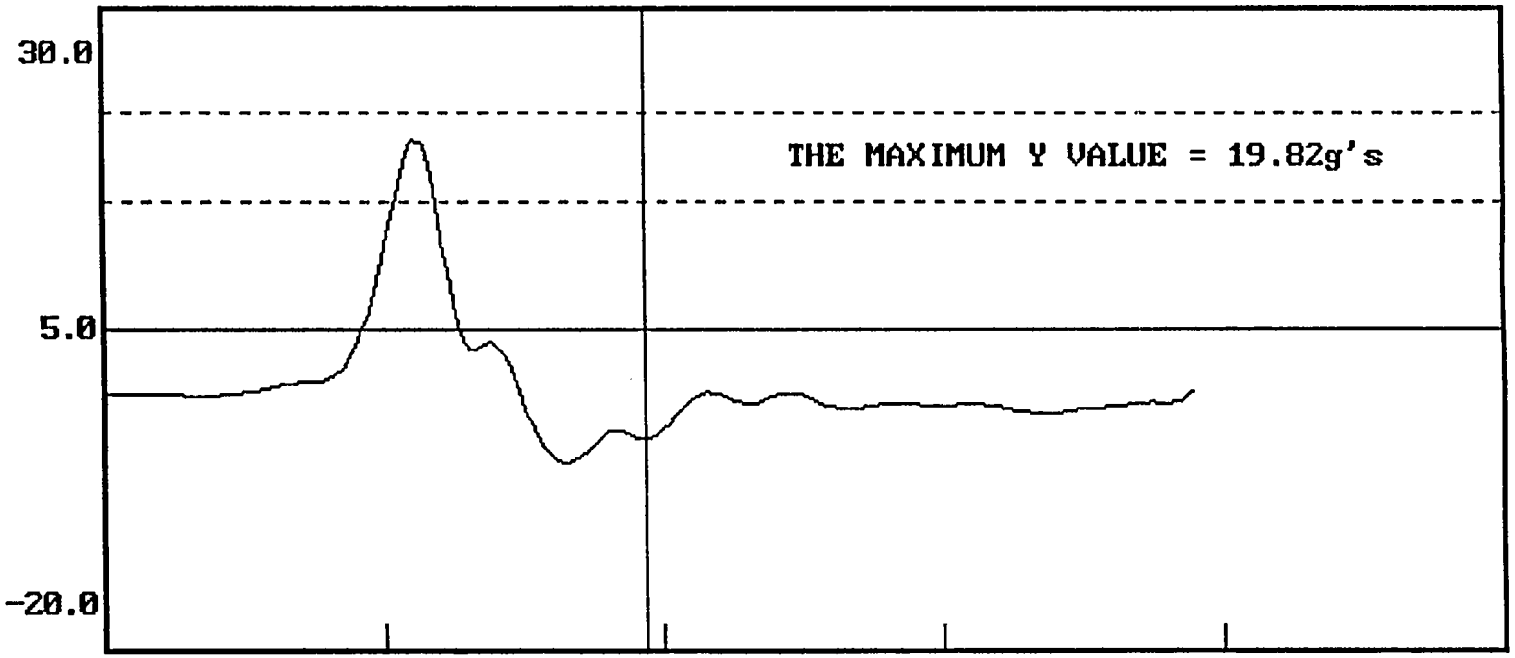


DUMMY CALIBRATION - THORAX IMPACT 06-02-1994 14:47
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = 0.100316E+01
IMPACT SPEED = 13.95 FT/SEC

DUMMY CALIBRATION - THORAX IMPACT 06-02-1994 14:47
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



X = 0.618750E-01 Y = -.350230E+01
IMPACT SPEED = 13.95 FT/SEC

MGA RESEARCH CORPORATION

PELVIS IMPACT TEST

SIDE IMPACT DUMMY (SID)

DATE: June 2, 1994

DUMMY NUMBER: 272 TEST NUMBER: D94873

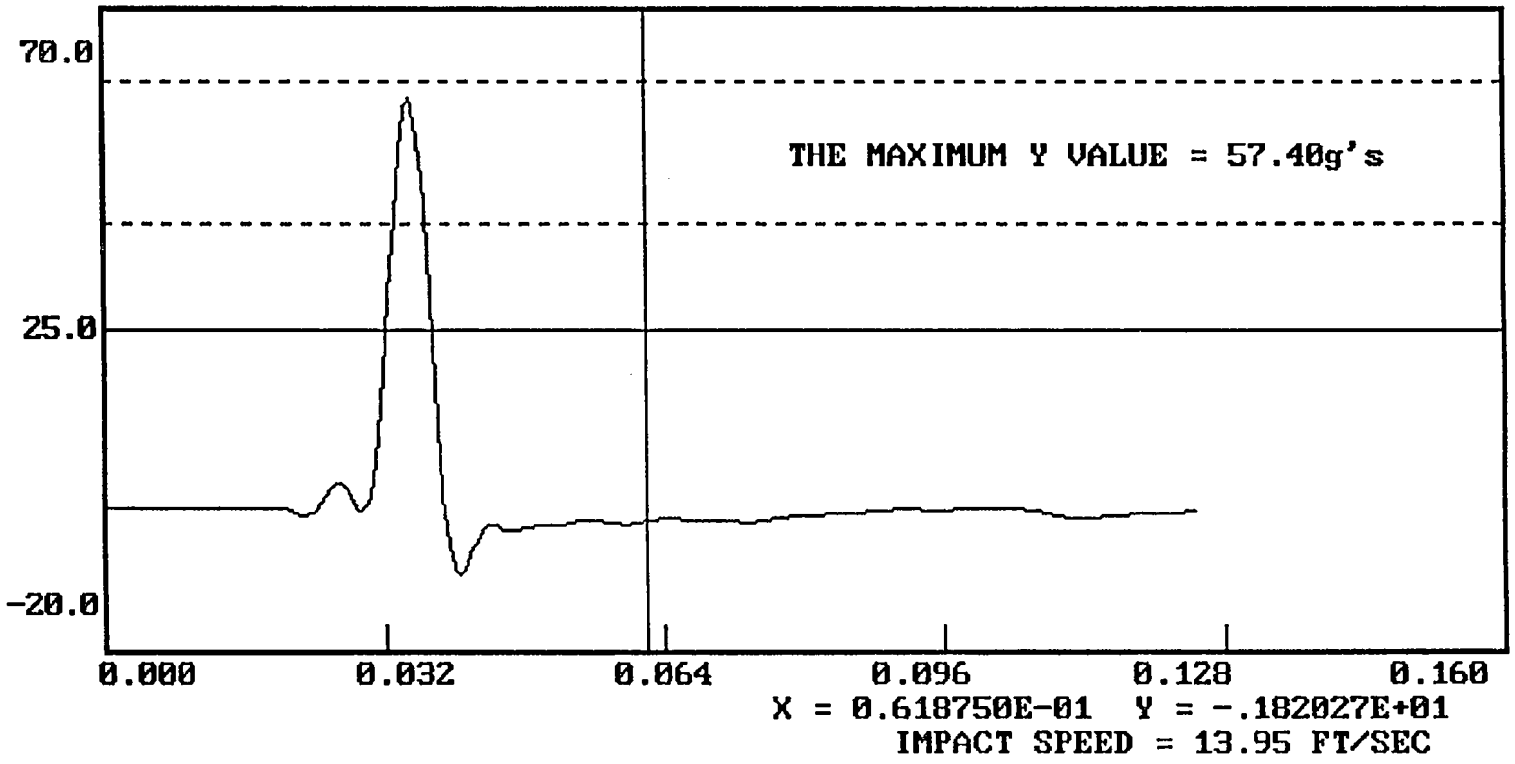
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	70°
RELATIVE HUMIDITY	10 - 70%	30%
PROBE SPEED	13.8 - 14.2 fps	14.0
PELVIS ACCELERATION	40 - 60 g's	57

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - PELVIS IMPACT 06-02-1994 09:52
DUMMY # 272
ACCELERATION (G'S) VS. TIME ((SECONDS))



MGA RESEARCH CORPORATION

ABDOMINAL COMPRESSION TEST
(PRELOAD = 10 LBS)

SIDE IMPACT DUMMY (SID)

DATE: June 3, 1994

DUMMY NUMBER: 272 TEST NUMBER: D94874

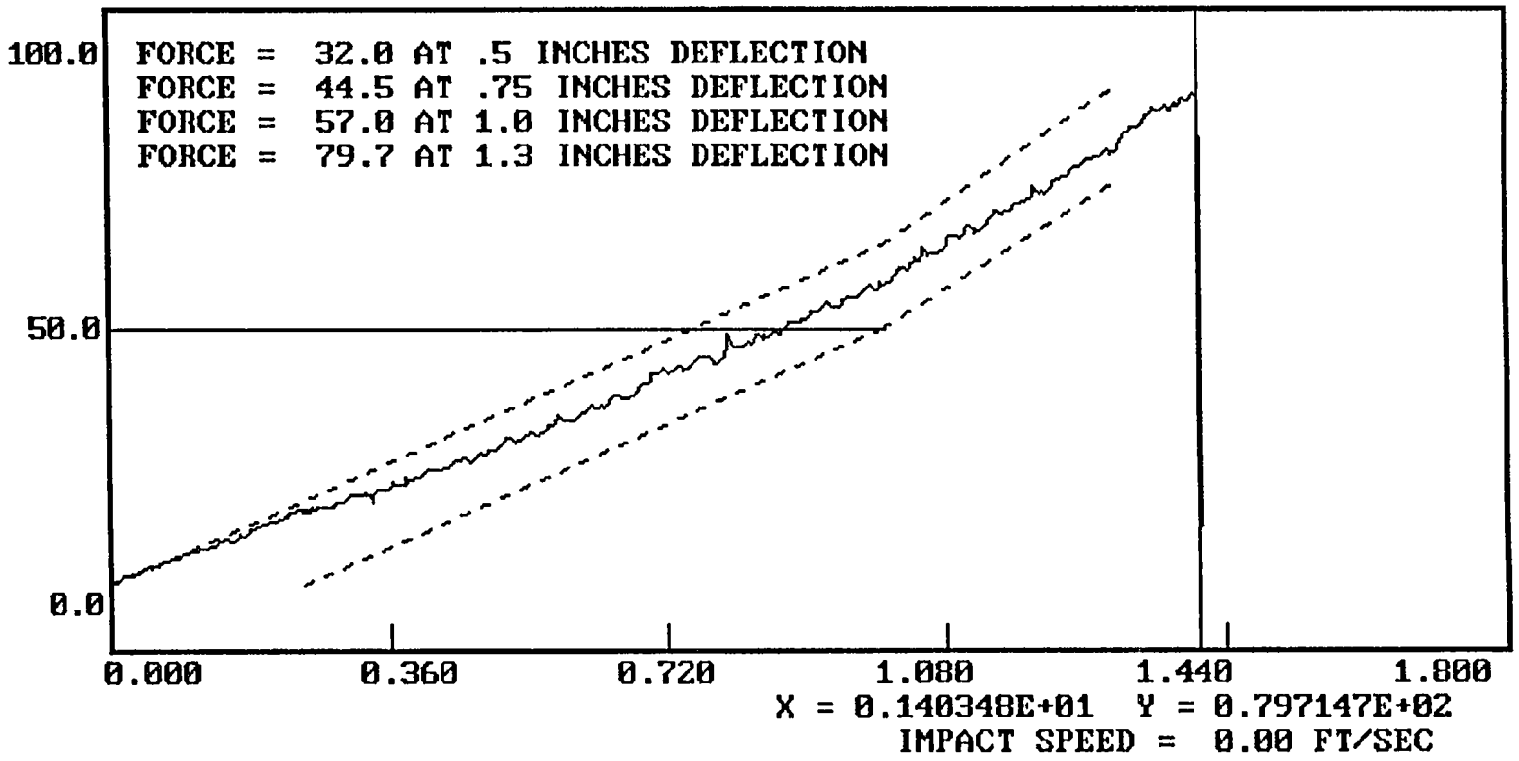
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	33%
FORCE @ 0.5 in	23.3 - 36.5 lbs	32.0
FORCE @ 0.75 in	36.7 - 49.8 lbs	44.5
FORCE @ 1.0 in	50 - 63 lbs	57
FORCE @ 1.3 in	73 - 88 lbs	80

TEST MEETS SPECIFICATIONS

TECHNICIAN _____

APPROVED BY _____

DUMMY CALIBRATION - ABDOMEN COMPRESSION 06-03-1994 09:23
DUMMY # 272
ABDOMEN FORCE () VS. ABDOMEN DISPLACEMENT (INCHES)



X = 0.140348E+01 Y = 0.797147E+02
IMPACT SPEED = 0.00 FT/SEC

MGA RESEARCH CORPORATION

LUMBAR FLEXION TEST

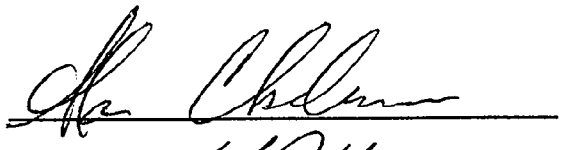
SIDE IMPACT DUMMY (SID)

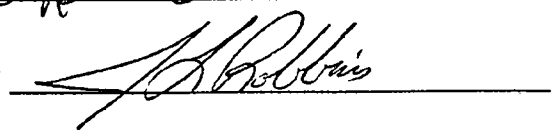
DATE: June 3, 1994

DUMMY NUMBER: 272 TEST NUMBER: D94875

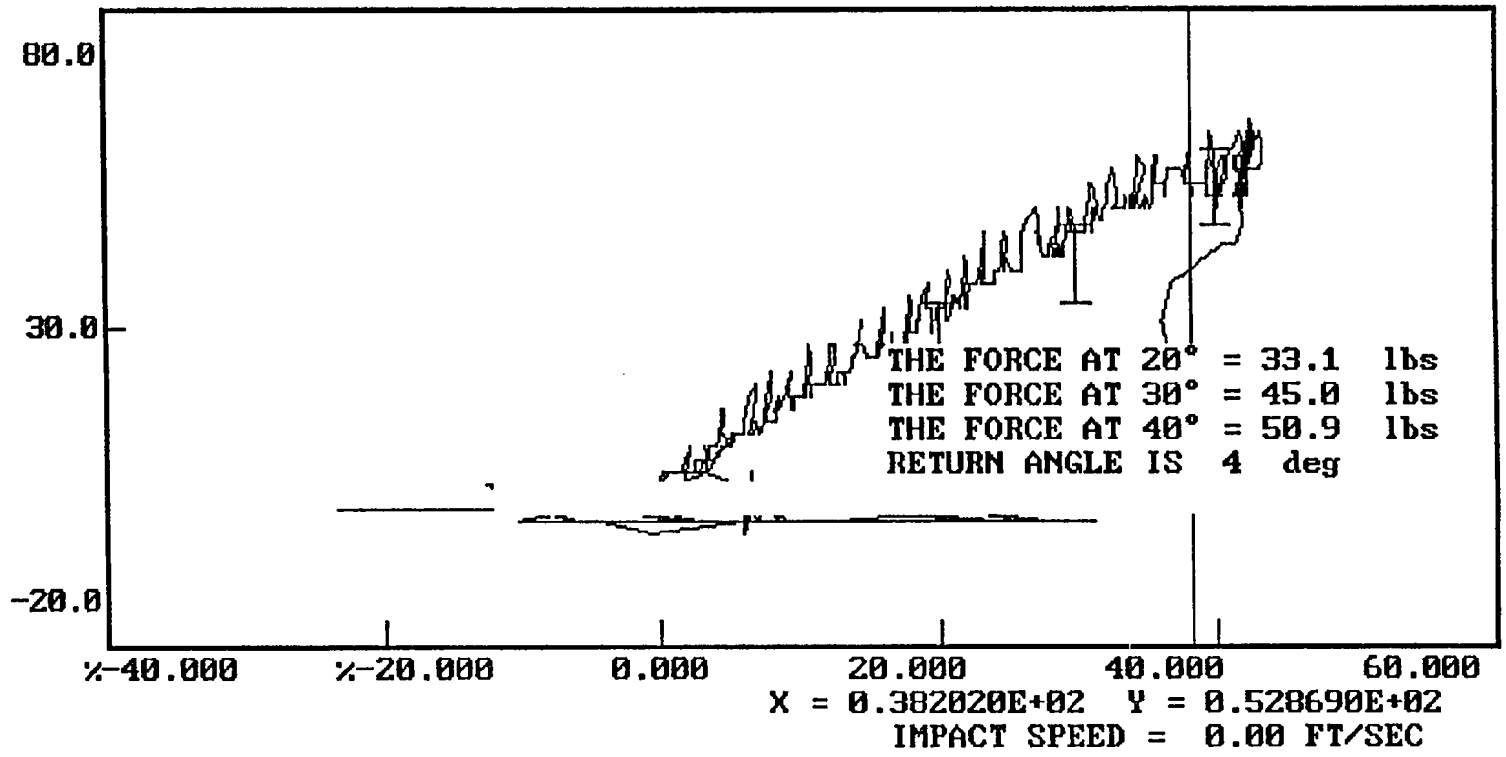
TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78° F	72°
RELATIVE HUMIDITY	10 - 70%	33%
FORCE @ 0°	0 - 6 lbs	0
FORCE @ 20°	22 - 34 lbs	33
FORCE @ 30°	34 - 46 lbs	45
FORCE @ 40°	46 - 58 lbs	51
RETURN ANGLE	12° maximum	4°

TEST MEETS SPECIFICATIONS

TECHNICIAN 

APPROVED BY 

DUMMY CALIBRATION - LUMBAR FLEXION 06-03-1994 14:22
DUMMY # 272
FORCE () VS. TORSO ROTATION (DEGREES)



POST-TEST DRIVER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 270

Inspected By: Jeff Robbins

Date: June 2, 1994

Part	Items Checked	Comments
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual, cable torque	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure, stiffeners	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual, stops, inserts	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

NOTES: (include component/problem/action/reason):

POST-TEST PASSENGER DUMMY INSPECTION CHECKLIST

Type: Side Impact Dummy

Serial Number: 272

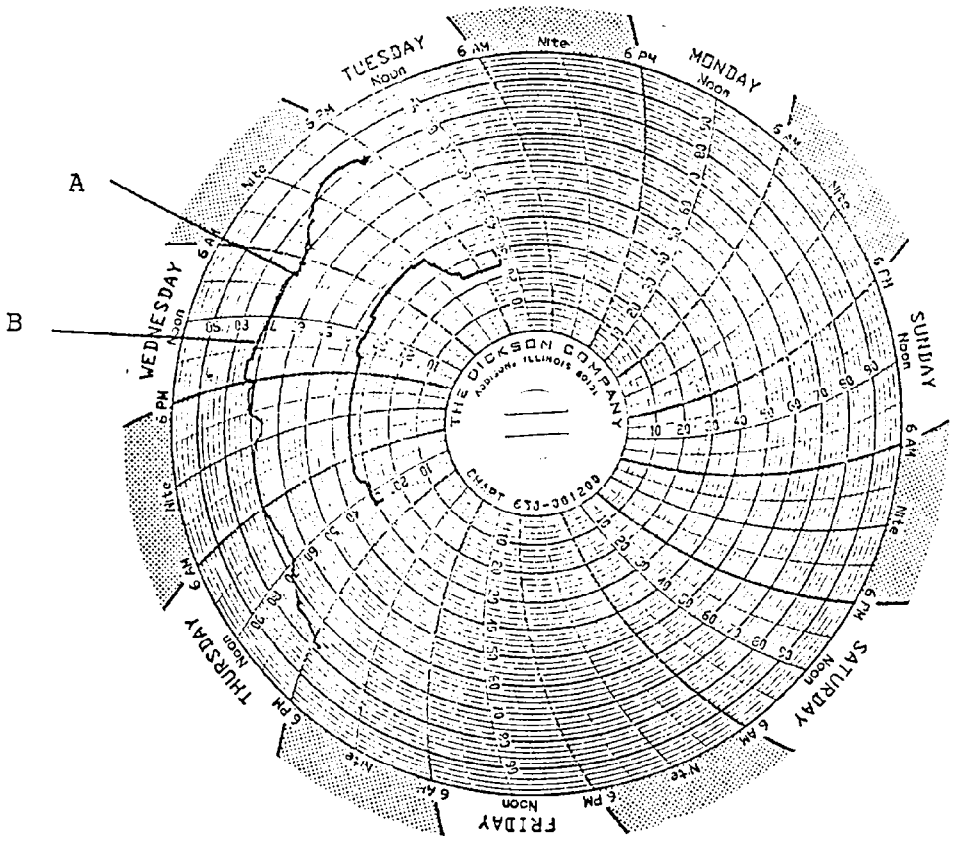
Inspected By: Jeff Robbins

Date: June 2, 1994

Part	Items Checked	Comments
Skin	visual inspection	OK
Head	visual, ballast, accelerometer mount	OK
Neck	visual, cable torque	OK
Spine box	visual, ballast, weldment, accelerometer mount	OK
Rib cage	visual, measure, stiffeners	OK
Sternum	visual	OK
Lumbar spine	visual	OK
Abdomen	visual	OK
Pelvis	visual, palpate, accelerometer mount	OK
Upper legs	visual	OK
Knees	visual, stops, inserts	OK
Lower legs	visual, range of motion	OK
Ankles	visual, range of motion	OK
Feet	visual, range of motion	OK
Joints	1 to 2 g range	OK
Other		

NOTES: (include component/problem/action/reason):

VEHICLE AND DUMMY TEMPERATURE



A = Dummies installed in vehicle
B = Impact

No electronic data available

APPENDIX D

DUMMY AND VEHICLE CALIBRATION DATA

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DRIVER DUMMY NO. 270

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib	AGRW3	Endevco	May 25, 1994
Lower Rib	AHTW4	Endevco	May 24, 1994
Lower Spine	AGRD5	Endevco	May 24, 1994
Pelvis	AHTN3	Endevco	May 25, 1994
Upper Rib Redundant	AGTP6	Endevco	May 24, 1994
Lower Rib Redundant	AHWL7	Endevco	May 24, 1994
Lower Spine Redundant	AC6J4	Endevco	May 06, 1994
Pelvis Redundant	AC9B7	Endevco	May 25, 1994

INSTRUMENTS FOR PASSENGER DUMMY NO. 272

	LEFT REAR PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Rib	AGTM2	Endevco	May 24, 1994
Lower Rib	ACCA3	Endevco	May 24, 1994
Lower Spine	AGR57	Endevco	May 25, 1994
Pelvis	AHTL9	Endevco	May 25, 1994
Upper Rib Redundant	AGTB5	Endevco	May 24, 1994
Lower Rib Redundant	AHTP3	Endevco	May 24, 1994
Lower Spine Redundant	AGTG8	Endevco	May 25, 1994
Pelvis Redundant	AC9B7	Endevco	May 25, 1994

VEHICLE INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
MDB CG X	MGA132	Entran	May Ø6, 1994
MDB CG Y	MGAØØ7	Entran	May Ø6, 1994
MDB CG Z	MGAØ16	Entran	May Ø6, 1994
MDB Rear Axle X	MGA134	Entran	May Ø6, 1994
MDB Rear Axle Y	MGA147	Entran	May Ø6, 1994
Mid Left A-Post Y	MGA165	Entran	May Ø6, 1994
Lower Left A-Post Y	MGAØ54	Entran	May Ø6, 1994
Mid Left B-Post Y	ACCØØ	Endevco	May Ø6, 1994
Lower Left B-Post Y	MGA114	Entran	April 25, 1994
Trunk Centerline X	MGA124	Entran	May Ø6, 1994
Trunk Centerline Y	AC815	Endevco	May Ø6, 1994
Trunk Centerline Z	MGA146	Entran	May Ø6, 1994
Driver Seat Track Y	MGA122	Entran	May 24, 1994
Right Front Sill X	MGA158	Entran	May 17, 1994
Right Front Sill Y	MGA143	Entran	May 17, 1994
Right Front Sill Z	MGA128	Entran	May 17, 1994
Right Rear Sill X	MGA13Ø	Entran	May 24, 1994
Right Rear Sill Y	MGA125	Entran	May Ø6, 1994
Right Rear Sill Z	MGAØ73	Entran	May 17, 1994
Right Rear Seat Occupant Compartment Y	MGA131	Entran	April 25, 1994
Left Front Sill Y	MGA154	Entran	April 25, 1994
Left Rear Sill Y	MGAØ14	Entran	April 25, 1994

Note: All Endevco accelerometers are Model No. 7264-2ØØØ
All Entran accelerometers are Model No. EGE-72