U.S. Department of Transportation
National Highway Traffic Safety Administration

FILE Memorandum

V1912

91-02-N01-013

Subject: ACTION: Docket No. 91-02
Submission of NCAP Document

Date: SEP 28 1993

From: James R. Hackney, Deputy Director
Office of Market Incentives

Reply to Attn of:

To: Docket: No. 91-02

Thru: Stanley R. Scheiner, Director
Office of Market Incentives

John Womack, Acting Chief Counsel

93 SEP 28 P3:28

RECEIVED

Please place the attached program summary, the final reports, and 16mm films for the following vehicles in Docket No. 91-02, "Side Impact New Car Assessment Program":

Film #		Docket #
F-003643	1993 Toyota Corolla 4-dr. (MP5101)	91-02-N01-011
F-003644	1993 Toyota Corolla 4-dr. (MP5102)	91-02-N01-012
F-003645	1993 Ford Probe 2-dr. (MP0207)	91-02-N01-013
F-003646	1993 Ford Probe 2-dr. (MP0208)	91-02-N01-014
F-003647	1993 Oldsmobile Achieva 2-dr. (MP0104)	91-02-N01-015
F-003648	1993 Oldsmobile Achieva 2-dr. (MP0105)	91-02-N01-016
F-003649	1993 Dodge Intrepid 4-dr. (MP0306)	91-02-N01-017
F-003650	1993 Dodge Intrepid 4-dr. (MP0307)	91-02-N01-018
F-003651	1993 Acura Legend 4-dr. (MP5305)	91-02-N01-019
F-003652	1993 Acura Legend 4-dr. (MP5306)	91-02-N01-020
F-003653	1993 Honda Civic 2-dr. (MP5303)	91-02-N01-021
F-003654	1993 Honda Civic 2-dr. (MP5304)	91-02-N01-022

3 Attachments
1. Status Report: "Office of Market Incentives Side Impact Protection Study"
2. Four (4) copies of each test report
3. Three (3) 16mm films of each test

#

100

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V1912

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
MGA-93-21401		

4. Title and Subtitle	5. Report Date
Final Report - Side Impact Testing of a 1993 Ford Probe 2-Door NHTSA No. ~~MP0201~~ MP0207	April 23, 1993
	6. Performing Organization Code: MGA

7. Author(s)	8. Performing Organization Report No.
John Fleck	MGA-OMI-01

9. Performing Organization Name and Address	10. Work Unit No.
MGA Research Corporation 5000 Warren Road Burlington, WI 53105 (414) 763-2705	MGA-93-DOT-1
	11. Contract or Grant No.: DTNH22-93-C-02047

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation National Highway Traffic Safety Administration Office of Market Incentives 400 Seventh Street, SW, Washington, D.C. 20590	Final Report
	14. Sponsoring Agency Code: DOT/NHTSA/RM/OMI

15. Supplementary Notes

16. Abstract

A 48/24 kph (30/15 mph) 90° Impact (Moving Deformable Barrier) Test was conducted on the subject 1993 Ford Probe 2-Door in accordance with the specifications of the Office of Market Incentives Test Procedure. The test was conducted at the MGA Proving Grounds and Crash Test Facility in Burlington, WI on April 23, 1993.

The impact velocity of the Moving Deformable Barrier (MDB) was 53.6 kph (33.3 mph), and the ambient temperature at the struck side (driver's) of the target vehicle at the time of impact was 68°F. The target vehicle post-test maximum crush was 384 mm.

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

	Driver's SID	Left Rear SID
Left Upper Rib Acceleration	63.5 g's	61.8 g's
Left Lower Rib Acceleration	75.2 g's	63.3 g's
Lower Spine Acceleration	87.4 g's	60.5 g's
Thoracic Trauma Index (TTI)	81.3 g's	61.9 g's
Pelvis Acceleration	116.4 g's	67.4 g's

17. Key Words	18. Distribution Statement
OMI Side Impact Protection Study Side Impact Dummy (SID)	Copies of this report are available from: National Highway Traffic Safety Adm. Technical Reference Division Docket Section, Room 5108 400 Seventh St., SW., Washington DC 20590

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED		

Form DOT F 1700.7 (8-69)

This Test Report was prepared for the U.S. Department of Transportation. National Highway Traffice Safety Administration, under Contract No. DTNH22-93-C-02047.

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Prepared by:

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Approved by:

P. Michael Miller II, Program Manager

FINAL REPORT ACCEPTED BY:

Contract Technical Manager

09/28/93

Data of Report Acceptance

010

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Section 1

PURPOSE AND TEST PROCEDURE

This side impact test is part of the Composite FY93 Side Impact Protection Study 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 1993 Ford Probe.

The side impact test was conducted in accordance with the Office of Market Incentive (OMI) Laboratory Indicant Test Procedure.

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 1993 Ford Probe 2 door Coupe 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 53.6 kph (33.3 mph) on April 23, 1993. 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 OMI Side Impact Protection Laboratory Test Procedure which is dated March 1992. The side impact event was documented by ten high speed cameras. Camera locations and other pertinent camera information can be found in this report.

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. Upper thoracic spine (T_{34}) uniaxial accelerometer (Y direction)
5. Pelvic (PEV) section uniaxial accelerometer (Y-direction)

A summary of the side impact dummy (SID) configuration and performance verification test data can be found in Appendix C.

A total of 46 channels of data were recorded. Appendix B contains the vehicle and dummy response data traces.

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

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

SECTION 3
SUMMARY OF TEST DATA

Table 1

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST VEHICLE INFORMATION:

Year/Make/Model/Body Style: 1993/Ford/Probe/2 Door

Vehicle NHTSA No.: MP0207 VIN: 1ZVCT20AXP5118933

Vehicle Body Color: Blue Month & Year of Manufacture: 7-92

Engine Data: 4 cylinders; ____ CID; 2.0 Liter; ____cc

Placement X Longitudinal; or ____ Lateral

Transmission: 5 speed; X Manual; ____ Automatic; ____ Overdrive

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

Odometer Reading 89 miles

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

DATA FROM TIRE PLACARD:

Tire Pressure (at capacity): 32 psi FRONT

26 psi REAR

Recommended Tire Size: P195 65R-14

Tires on Test Vehicle: P195 65R-14 Manufacturer: Firestone

Vehicle Capacity Data:

Number of Occupants: 2 Front; 2 Rear; ____ 3rd Seat 4 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 = 313 kg. (A)

No. of Occupants x 150 lbs. = 272 kg. (B)

Cargo Capacity (A-B) = 41 kg.

WEIGHT OF TEST VEHICLE WITH MAXIMUM FLUIDS:

Right Front =	374 kg.	Right Rear =	213 kg.
Left Front =	358 kg.	Left Rear =	223 kg.
TOTAL FRONT =	732 kg.	TOTAL REAR =	436 kg.

% of Total Vehicle Weight = 62.7 ; % of Total Weight = 37.3

TOTAL WEIGHT = 1168 kg.

020

Table 2

TEST VEHICLE DATA

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Test Vehicle Delivered Weight with Maximum Fluids	=	1168 kg.
Maximum Cargo Carrying Capacity of Test Vehicle	=	41 kg.
Weight of 2 Side Impact Dummies (2 x 168 lbs.)	=	152 kg.
TEST VEHICLE TARGET WEIGHT:	=	1361 kg.

ACTUAL WEIGHT OF TEST VEHICLE WITH 2 DUMMIES AND CARGO:

Right Front	= 395 kg.	Right Rear	= 263 kg.
Left Front	= 404 kg.	Left Rear	= 294 kg.
TOTAL FRONT	= 799 kg.	TOTAL REAR	= 557 kg.
% of Total Weight	= 58.9 kg.	% of Total Weight	= 41.1 kg.

TEST VEHICLE ATTITUDE (all dimensions in mm):

AS DELIVERED:

Right Front 597 Left Front 597 Right Rear 584 Left Rear 583

READY FOR TEST:

Right Front 584 Left Front 576 Right Rear 564 Left Rear 551

Test Vehicle Wheelbase: 2604 mm

C.G. = 1070 mm rearward of front wheel centerline

TOTAL VEHICLE LENGTH:

Right Side = 4394 mm

Left Side = 4394 mm

Centerline = 4553 mm

021

Figure 1

PRE-TEST CONDITIONS

VEHICLE IDENTIFICATION:

Vehicle: 1993 Ford Probe

NHTSA No. MP0207

FRONT SEAT CUSHION PLACEMENT:

Total Length of Adjustment Travel: 230 mm

Total Number of Adjustment Positions or Detents: 23

FRONT SEAT BACK ADJUSTMENT POSITION:

Seat Back Torso Angle = 21 degrees

SECOND POSITION SEAT:

Total Length of Fore/Aft Adjustment Travel: Non-Adjustable

Seat Back Adjustment Position: Non-Adjustable

ADJUSTABLE STEERING COLUMN POSITION:

N/A

WINDOW POSITIONS: Left Front Closed Left Rear Closed (fixed window)
Right Front Open Right Rear N/A
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:

14.4 gallons

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

Wheelbase: = 2604 mm

Impact Point is 362 mm rearward of front axle centerline (which is 37 inches forward of the wheelbase midpoint)

022

Table 3

CRASH TEST SUMMARY FOR TEST VEHICLE

VEHICLE IDENTIFICATION:

Vehicle Year/Make/Model: 1993/Ford/Probe

Body Style: 2-Door Coupe VIN: 1ZVCT20AXP5118933

NHTSA No.: MP0207 Test Date: 4-23-93

Overall Length = 4553 mm; Overall Width = 1765 mm

TEST WEIGHT:

Left Front	= 394 kg.	Left Rear	= 263 kg.
Right Front	= 404 kg.	Right Rear	= 294 kg.
TOTAL FRONT	= 798 kg.	TOTAL REAR	= 557 kg.

TOTAL VEHICLE WEIGHT 1355 kg.

Wheelbase = 2604 mm

Longitudinal C.G. front Center of Front Axle = 1070 mm

Impact Angle with Respect to Impactor = 90 degrees

MAXIMUM EXTERIOR STATIC CRUSH:

1. LEVEL 1 (229 mm above ground) = 213 mm
2. LEVEL 2 (419 mm above ground) = 384 mm
3. LEVEL 3 (556 mm above ground) = 384 mm
4. LEVEL 4 (826 mm above ground) = 254 mm
5. LEVEL 5 (1238 mm above ground) = 59 mm

Maximum Post-Test Intrusion = 384 mm

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

INSTRUMENTATION:

Number of Vehicle Data Channels: = 15

Number of Cameras: Onboard = 3

Offboard = 7

TOTAL = 10

023

Table 4

CRASH TEST SUMMARY FOR SIDE IMPACTOR

POSITION OF IMPACT (MDB) ON MONORAIL:

Crabbed 27° to left

MDB DETAILS:

Overall Width of Framework Carriage	= 1251	mm
Overall Length of MDB (incl. honeycomb impact face)	= 4114.8	mm
Wheelbase of Framework Carriage	= 2590.8	mm
Tread of Framework Carriage (Front & Rear)	= 1879.6	mm
C.G. Location Rearward of Front Axle	= 1097.7	mm

MDB WEIGHT:

Left Front	= 477	kg.	Left Rear	= 219	kg.
Right Front	= 308	kg.	Right Rear	= 360	kg.
TOTAL FRONT	= 785	kg.	TOTAL REAR	= 579	kg.
TOTAL MDB WEIGHT	1364	kg.			

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

Impact Speed = 33.3 mph (53.6 kph)

MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE:

1. Row A at Bumper Level (432 mm) = 213 mm
2. Row B at Mid-Stack Level (559 mm) = 254 mm
3. Row C at Top of Stack Level (813 mm) = 241 mm

INSTRUMENTATION:

Number of MDB Data Channels = 5

024

Table 5

POST-TEST OBSERVATIONS

TEST VEHICLE: 1993 Ford Probe 2 Door NHTSA No. MP0207

VISIBLE DUMMY CONTACT POINTS:

	LEFT FRONT SID	LEFT REAR SID
Head	Driver Door Glass	C-Pillar
Chest	N/A	N/A
Abdomen	N/A	N/A
Left Knee	LH Door	LH Interior
Right Knee	-	-

DOOR OPENING:

	LEFT SIDE	RIGHT SIDE
Front	Closed	Closed
Rear	N/A	N/A

MDB DISTANCE FROM TARGET IMPACT POINT: 7.5 mm rearward

ARM REST LOCATIONS:

Front:

Rear:

SEAT MOVEMENT:

Front seat crushed approximately 88 mm

Front seat back crushed approximately 75 mm

GLAZING DAMAGE:

Driver door and passenger window broken

Windshield cracked

PILLAR PERFORMANCE:

None

SILL SEPARATION:

Separated for 51 mm starting at a distance of 1100 mm rear of impact line

OTHER NOTABLE IMPACT EFFECTS:

Rear spindle bent on impact side

Section 4
OCCUPANT AND VEHICLE INFORMATION

Table 6
SIDE IMPACT DUMMY (SID) TEST DATA SUMMARY

Vehicle: 1993 Ford Probe 2-Door Test Date: 4-23-93

	Front Dummy ID # 136				Rear Dummy ID # 137			
	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	63.5	30.6	14.4	155.0	61.8	40.6	5.5	164.0
Upper Rib Lateral....Y(R)	65.0	30.6	14.7	155.0	60.6	40.6	5.0	137.0
Lower Rib Lateral.....Y	75.2	32.5	15.7	155.0	*63.3	41.2	12.3	65.0
Lower Rib Lateral.....Y(R)	76.9	32.5	16.5	155.0	64.8	40.6	12.7	65.0
SPINE ACCELERATIONS:								
Upper Lateral.....Y	116.1	36.8	29.1	66.8	80.0	48.1	24.6	70.0
Upper Lateral.....Y(R)	113.5	36.8	29.1	66.8	80.2	47.5	25.6	70.0
Lower Lateral.....Y	87.4	32.5	23.3	65.6	60.5	43.7	16.9	70.6
Lower Lateral.....Y(R)	88.6	32.5	22.4	65.6	60.9	43.7	17.5	70.6
PELVIC ACCELERATIONS:								
Lateral.....Y	116.4	28.1	22.0	56.8	67.4	33.1	7.7	84.3
Lateral.....Y(R)	116.6	28.1	21.5	56.8	66.6	33.1	7.5	83.7

REFERENCE:

Positive Direction - Longitudinal (X) = forward
Lateral (Y) = to right
Vertical (Z) = up

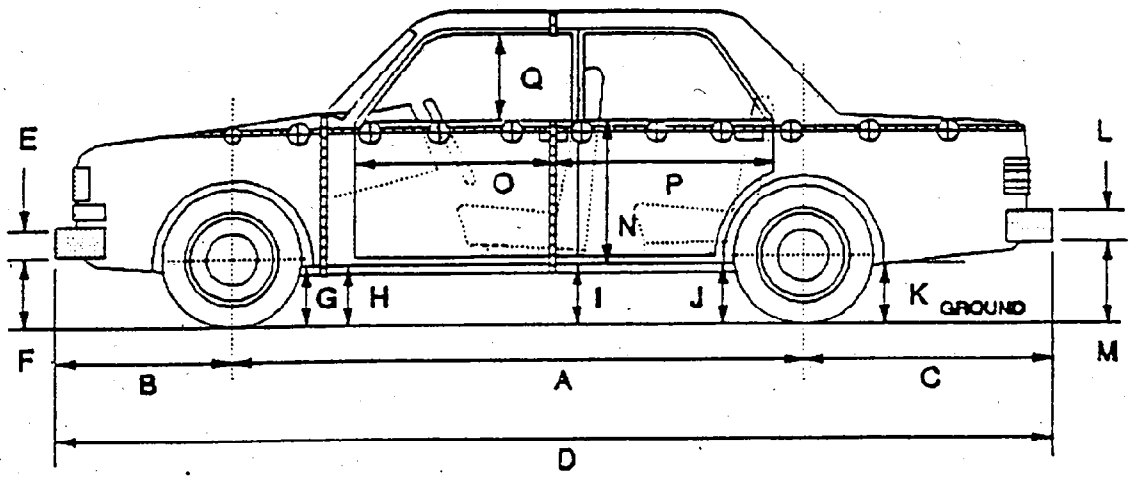
Negative Direction - Longitudinal (X) = rearward
Lateral (Y) = to left
Vertical (Z) = down

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

* Data Loss at Approximately 70 msec.

Figure 2

PRE- AND POST-TEST MEASUREMENTS



LEFT SIDE VIEW

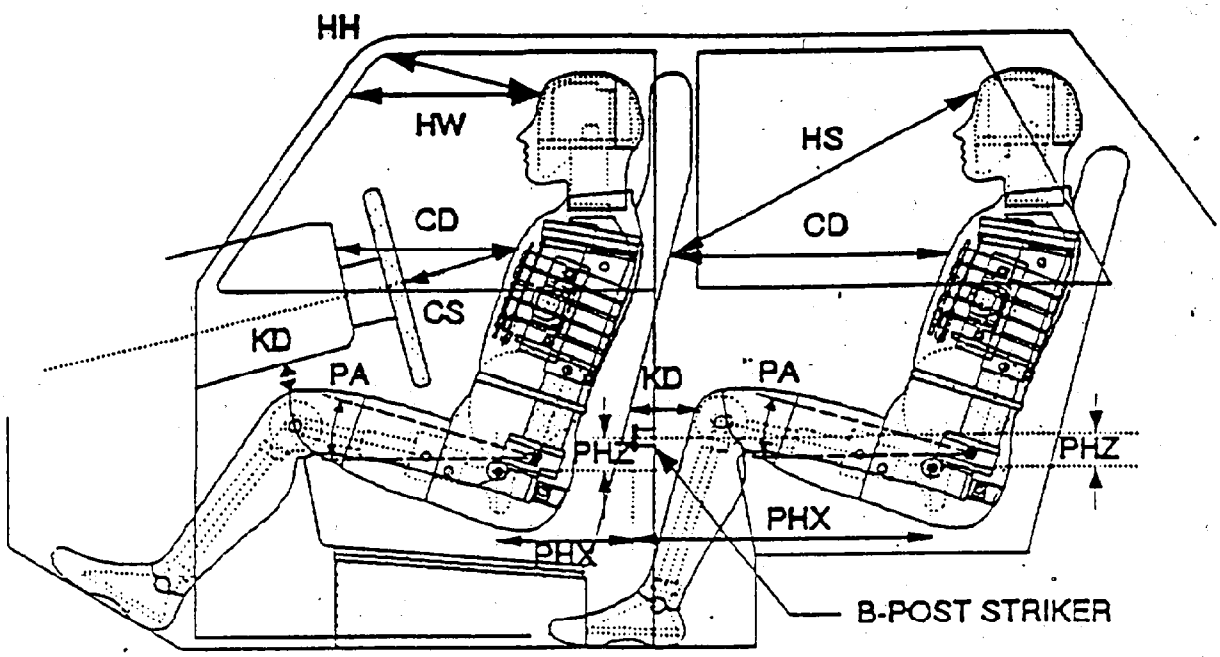
Units: mm

	PRE-TEST	POST-TEST	Δ CHANGE
A	2623	2584	39
B	1027	1016	11
C	921	983	-52
D	4553	4483	70
E	260	260	0
F	365	365	0
G	178	197	-19
H	184	210	-26
I	178	184	-6
J	181	203	-22
K	229	229	0
L	260	260	0
M	286	286	0
N	702	562	140
O	564	519	45
P	573	576	-3
Q	375	330	45
R	4394	4369	25
S	4394	4394	0
T	1765	1391	374

029

Figure 3

SIDE IMPACT DUMMY (SID) LONGITUDINAL CLEARANCE DIMENSIONS



LEFT SIDE VIEW

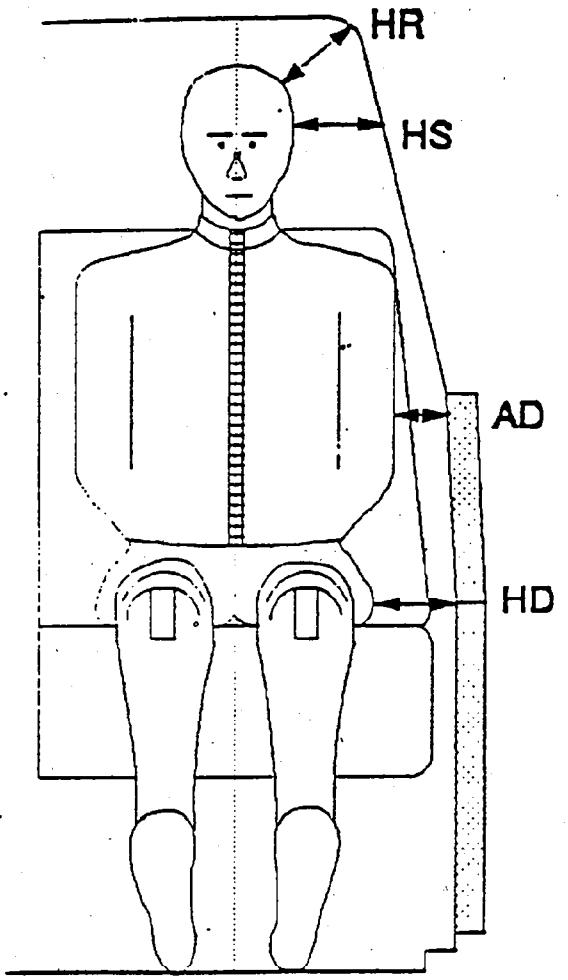
NOTE: All dimensions are in mm

	DRIVER ID # 136	LEFT REAR PASSENGER ID # 137
HH	282	N/A
HW	519	N/A
HS	N/A	524
CD	489	381
CS	311	N/A
KDL	171	92
KDR	187	99
PA	24.7°	16.6°
PHX	476	305
PHZ	184	218

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

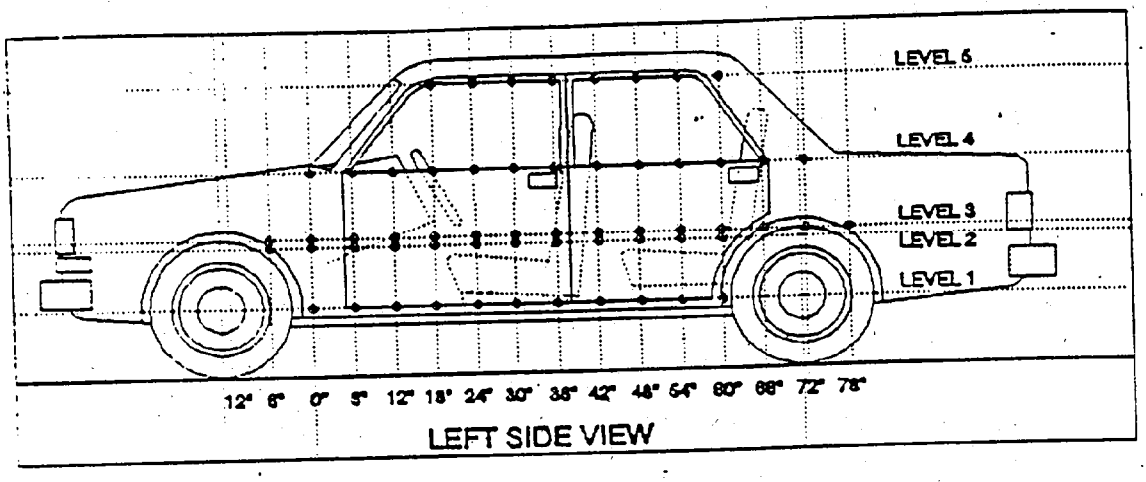


NOTE: All dimensions are in mm

	DRIVER ID # 136	LEFT REAR PASSENGER ID # 137
HR	76	29
HS	222	257
AD	57	117
HD	152	156

Figure 5

VEHICLE SIDE MEASUREMENTS



Measurements Along the Vertical 30" Line Shown Above:

	30" Side Profile	
Level 5 @ Window Top	= 1238	mm
Level 4 @ Window Sill	= 826	mm
Level 3 @ Mid Door	= 556	mm
Level 2 @ Occupant H-Point	= 419	mm
Level 1 @ Axle Centerline Height (or Sill Top Height	= 229	mm

032

Table 7
TEST VEHICLE EXTERIOR PROFILES FROM REFERENCE PLANE AND STATIC CRUSH

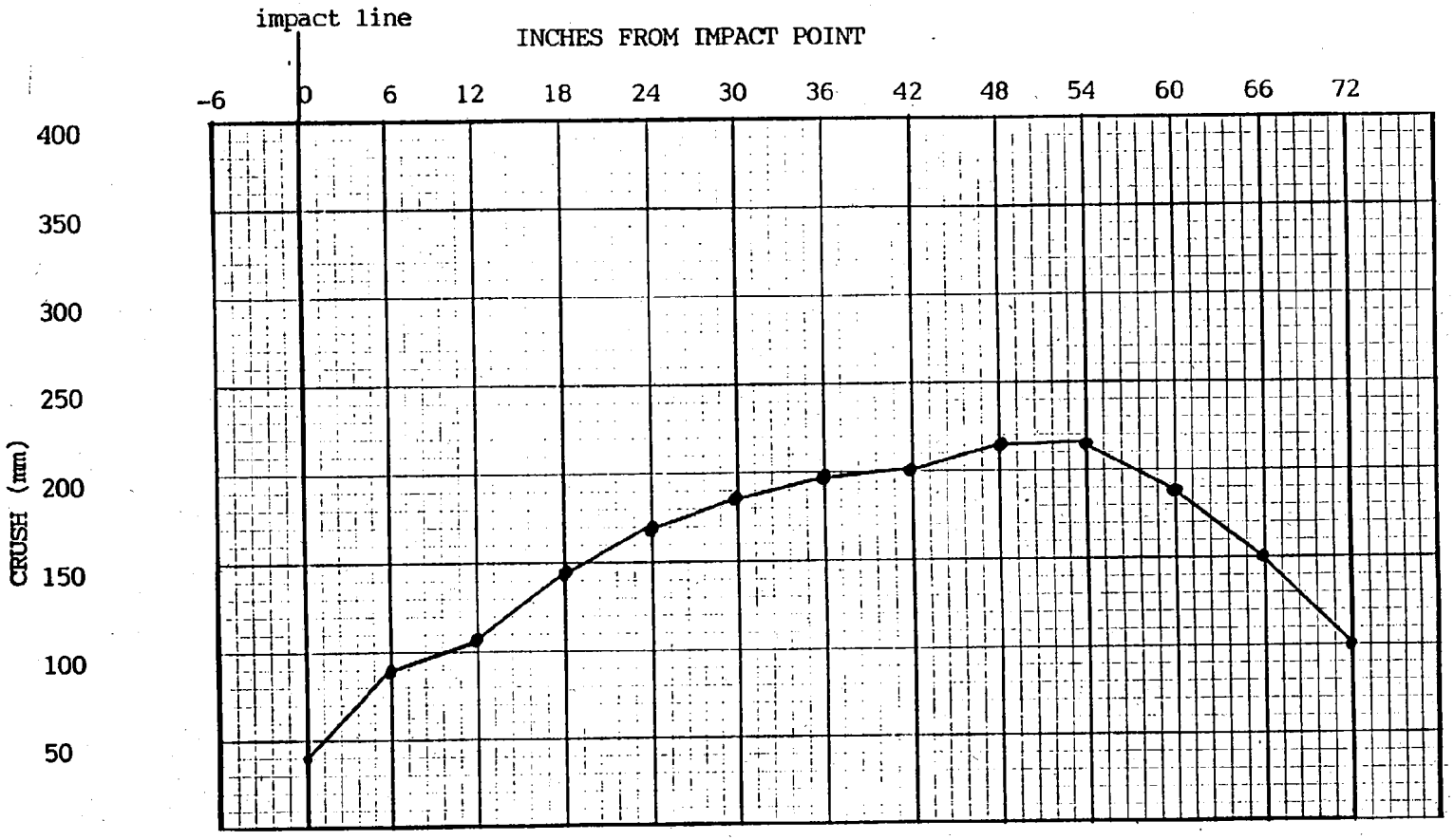
Test Date: 4-23-93 Vehicle: 1993 Ford Probe

	Location	Level 1 Side Sill	Level 2 H-Point	Level 3 Mid-Door	Level 4 Window Sill	Level 5 Window Top
	Height (mm)	229	419	556	826	1238
		PRE/POST/CRUSH (mm)	PRE/POST/CRUSH (mm)	PRE/POST/CRUSH (mm)	PRE/POST/CRUSH (mm)	PRE/POST/CRUSH (mm)
INCHES FROM 4-7 IMPACT POINT	6	N/A	N/A	N/A	862/876/14	N/A
	Ø	805/848/43	765/848/83	762/826/64	864/876/12	N/A
	6	787/879/92	764/905/141	762/868/106	860/886/26	N/A
	12	816/924/108	762/1048/268	759/1006/247	860/927/67	N/A
	18	819/964/145	761/1100/339	758/1038/280	854/981/127	N/A
	24	819/989/170	759/1118/359	759/1048/289	851/1004/153	N/A
	30	822/1006/184	759/1127/368	759/1054/295	851/1004/153	N/A
	36	825/1022/197	759/1126/367	759/1063/304	848/1016/168	1091/1124/33
	42	825/1026/201	761/1116/355	756/1080/324	845/1029/184	1091/1130/39
	48	822/1035/213	761/1140/379	756/1100/344	845/1039/194	1095/1140/45
	54	819/1032/213	759/1143/384	752/1108/356	838/1048/210	1094/1153/59
	60	812/1000/188	756/1121/365	746/1130/384	835/1089/254	1099/1143/44
	66	803/953/150	756/1092/336	740/1108/368	835/1051/216	1105/1141/36
	72	797/897/100	756/1013/257	737/1060/323	832/984/152	1124/1165/41

Reference plane is parallel to and 48 inches from test vehicle longitudinal centerline
Given dimensions = reference plane to car body

Figure 6

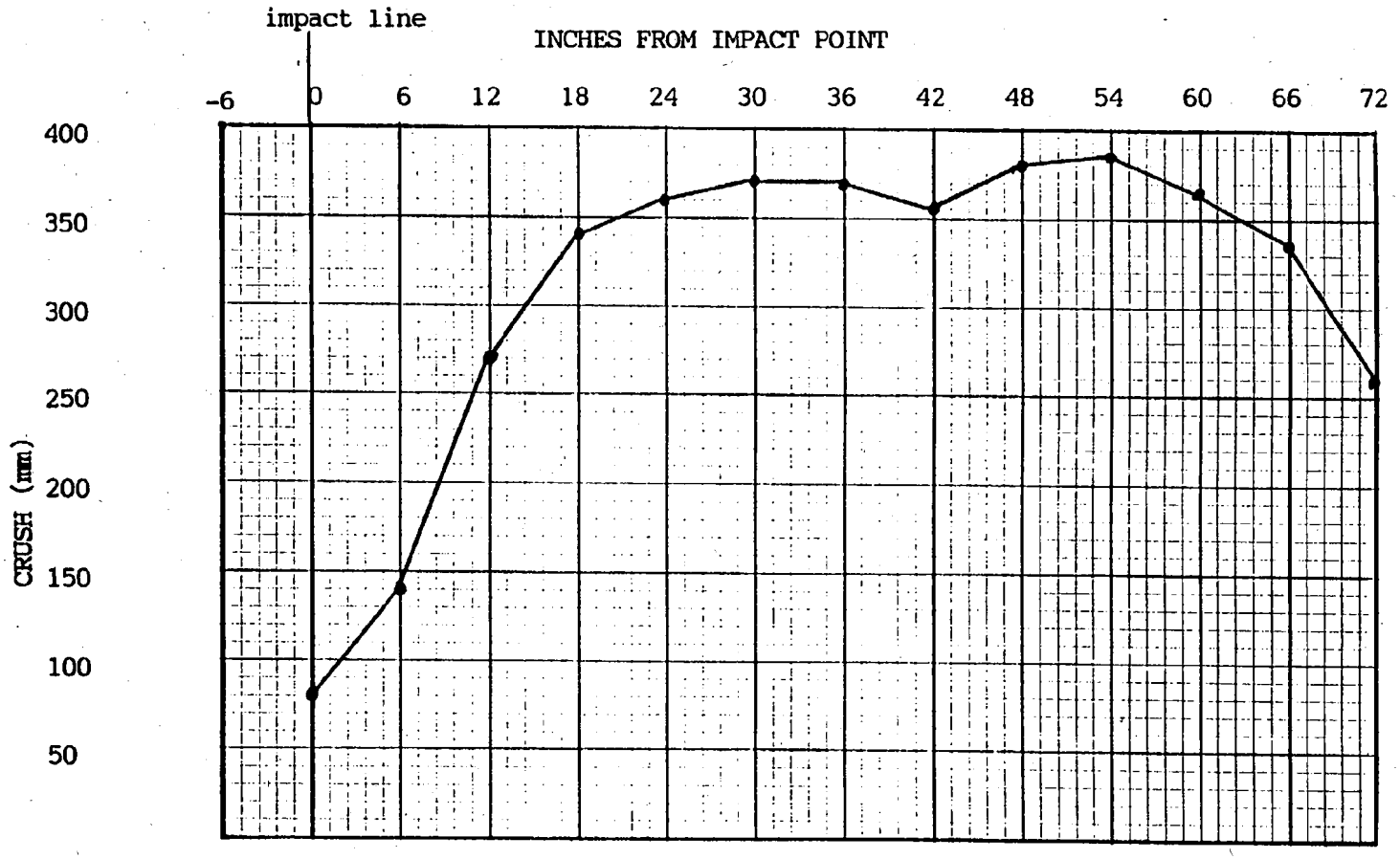
VEHICLE EXTERIOR STATIC CRUSH



Level 1 Side Sill

Figure 6 - Continued

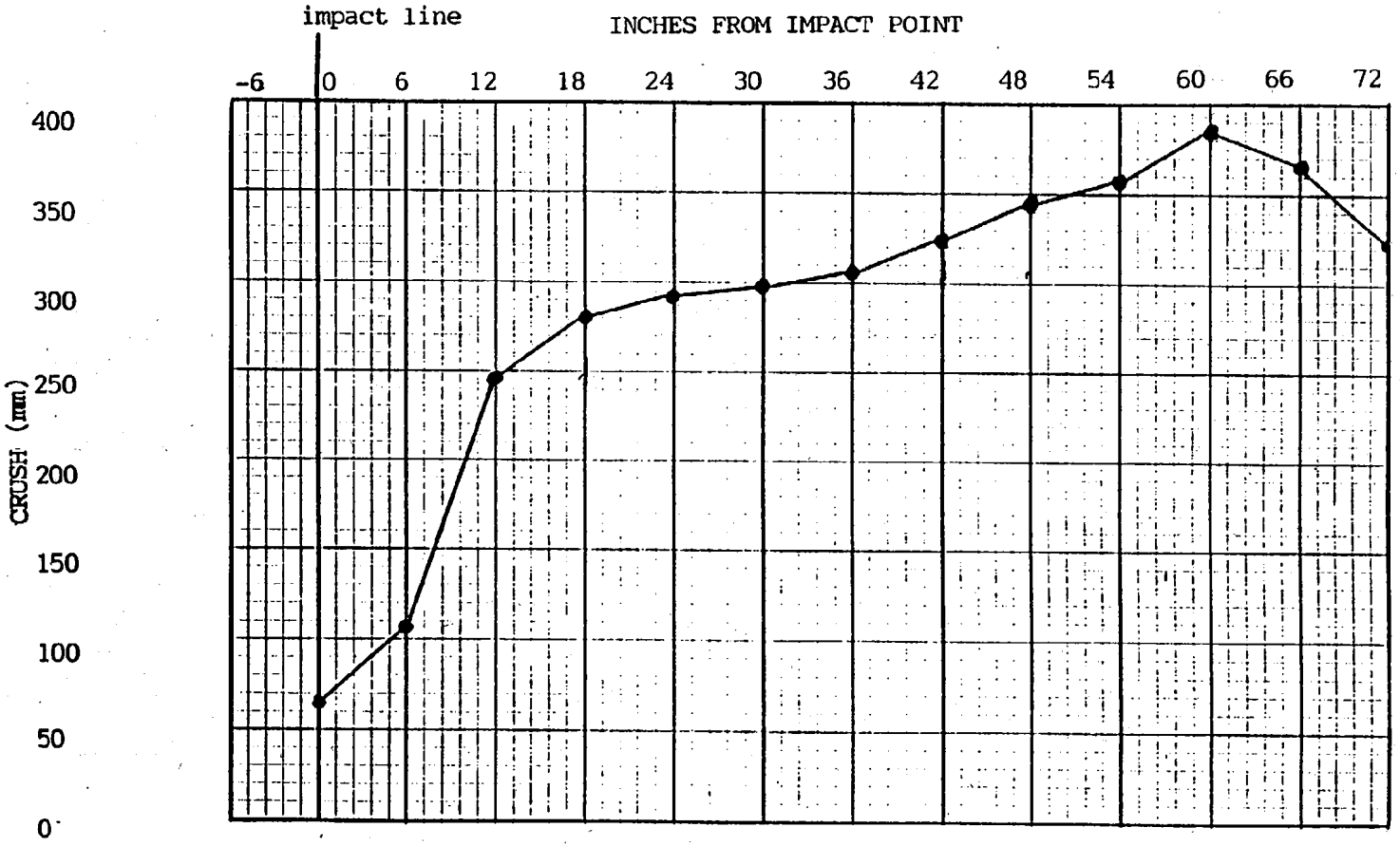
VEHICLE EXTERIOR STATIC CRUSH



Level 2 H-Point

Figure 6 (Continued)

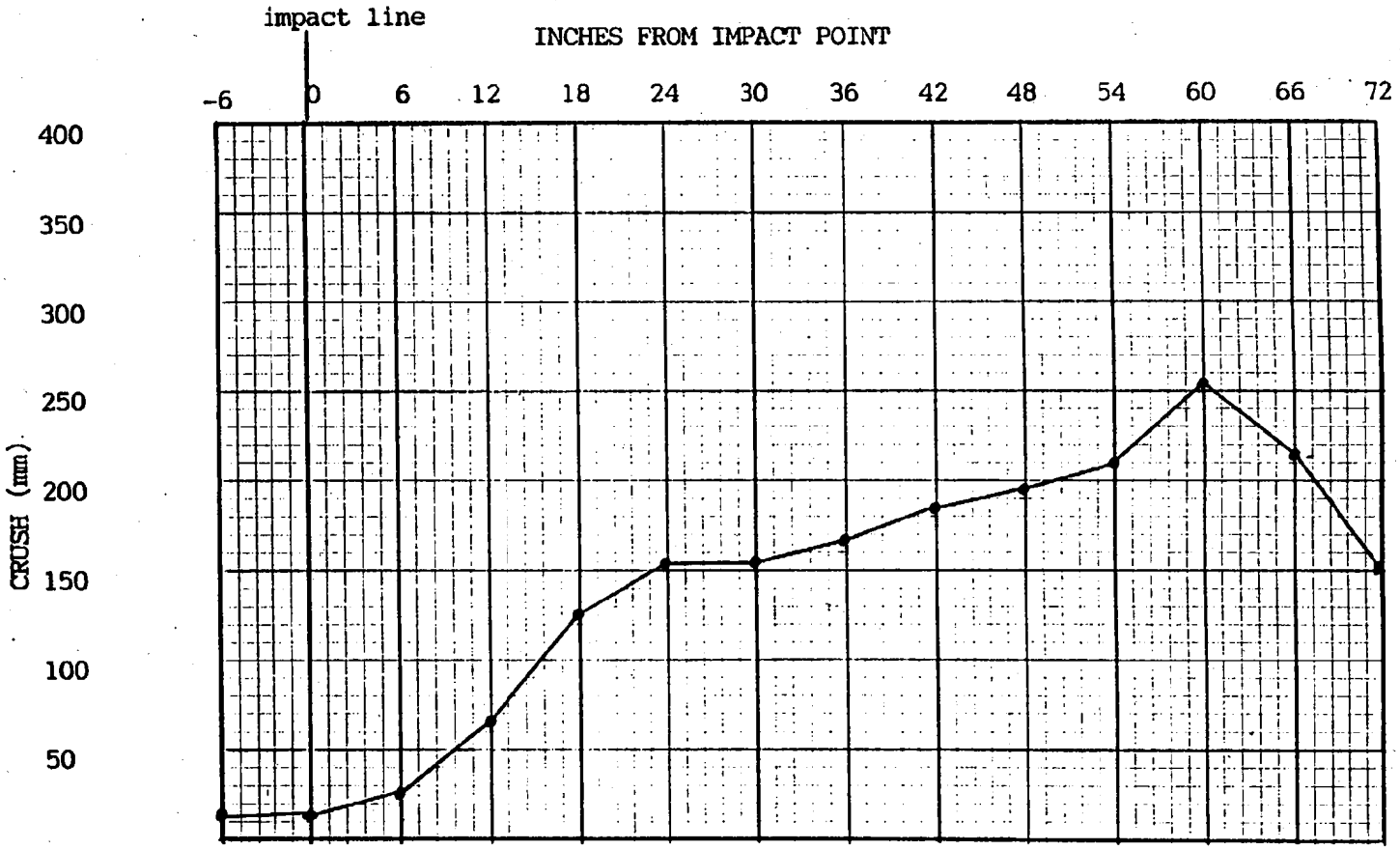
VEHICLE EXTERIOR STATIC CRUSH



Level 3 - Mid Door

Figure 6 - Continued

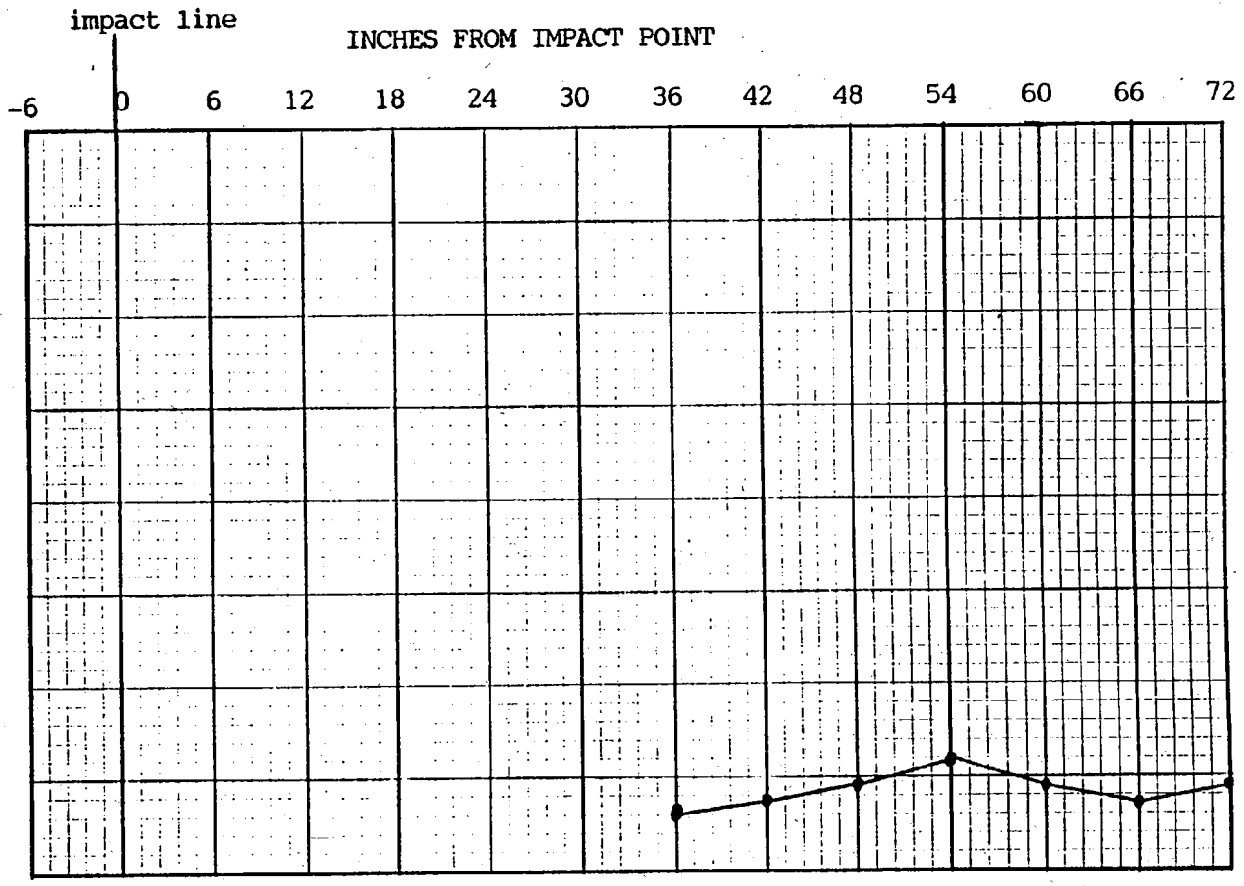
VEHICLE EXTERIOR STATIC CRUSH



Level 4 Window Sill

Figure 6 - Continued

VEHICLE EXTERIOR STATIC CRUSH



Level 5 Window Top

Figure 7

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

Test Vehicle: 1993 Ford Probe 2 Door NHTSA No.: MP0207

Test Date: 4-23-93

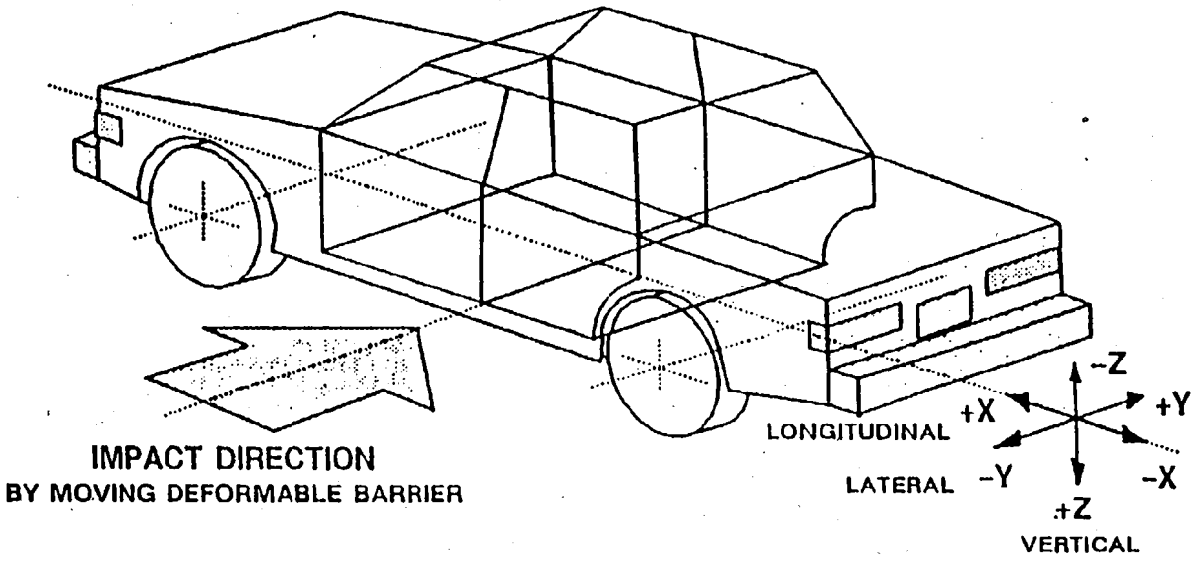


Table 8
EXTERIOR STATIC CRUSH FOR SIDE IMPACTOR

Test Date: 4-23-93 Vehicle: 1993 Ford Probe

Location	Top of Stack Level	Mid-Stack Level	Bumper Level	
Height at C_L*	32"	22"	17"	
32"	149	92	32	
28"	89	98	98	
24"	70	57	86	Left Side as viewed from front
20"	60	64	73	
16"	57	57	64	
12"	60	60	67	
8"	64	64	70	
4"	67	64	73	
0"	70	64	76	
4"	73	67	79	
8"	73	67	83	
12"	86	67	89	
16"	108	73	95	Right Side as viewed from front
20"	121	92	105	
24"	152	124	146	
28"	165	191	194	
32"	241	254	213	

Crush measured in mm.

* Heights measured above ground level.

Table 9

TEST VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

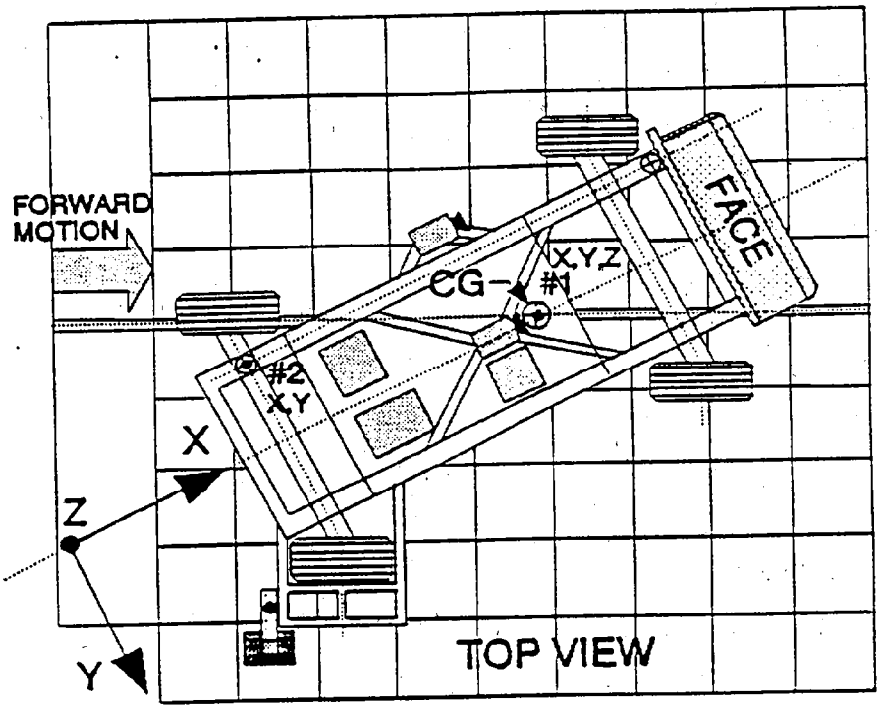
Accel. Time No.	Location	Coordinates (mm)			Long. (X) Pos./Neg.		Lat. (Y) Pos./Neg.		Vert. (Z) Pos./Neg.		Resultant Pos./Neg.	
		X	Y	Z								
1	Rt. Side Sill @ Front Seat	2463	673	292	4.3	-3.5	12.9	-3.6	3.5	-5.1	18.6	-
2	Rt. Side Sill @ Rear Seat	1752	660	286	4.7	-4.0	16.1	-2.8	5.1	-6.0	20.9	-
3	Rr. Floorpan Above Axle	1092	0	419	2.0	-9.9	21.3	-2.3	6.7	-4.5	23.3	-
4	Left Side Sill @ Rr. Seat	1714	-635	292	-	-	117.1	-31.6	-	-	-	-
5	Left Side Sill @ Frt. Seat	2388	673	292	-	-	63.4	-36.9	-	-	-	-
6	Left Frt. Door On Centerline	2362	-711	279	-	-	-	-	-	-	-	-
7	Right Rear Occupant Compartment	1715	343	286	-	-	18.7	-1.8	-	-	-	-
8	Midrear of Left Frt. Door	1803	-749	305	-	-	121.0	-95.4	-	-	-	-
9	Left Frt. Door Upper Centerline	2387	-737	483	-	-	192.0	-86.3	-	-	-	-
10	Midrear of Left Rear Door	-	-	-	-	-	-	-	-	-	-	-
11	Left Rear Door Upper Centerline	-	-	-	-	-	-	-	-	-	-	-

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

Figure 8

MOVING DEFORMABLE BARRIER (MDB) ACCELEROMETER LOCATIONS

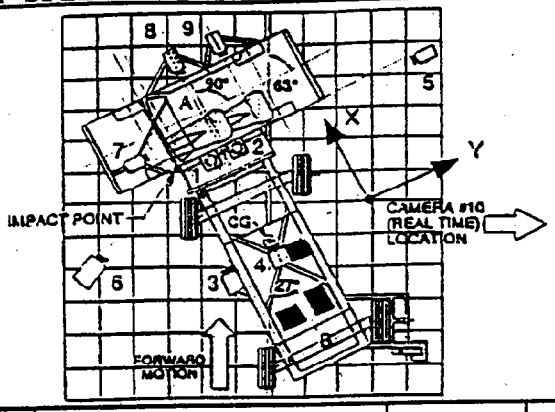
Test Vehicle: 1993 Ford Probe 2 Door Test Date: 4-23-93



Accel. No.	Location	Coordinates (mm)			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	1854	Ø	352	2 9 11 27	17Ø 5Ø 53 53	-16 -2 -1Ø -	47 77 44 -
2	Rear Frame Member Longitudinal ... X Lateral ..... Y	4ØØ	-629	622	2 4	145 36	-19 -1	53 16

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

Figure 9
HIGH SPEED CAMERA LOCATIONS AND DATA



Camera No.	View	Coordinates (mm)			Angle	Film Plane To Head Target	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*				
10	Real Time						10	24
1	Overhead Overall View	380	0	5086	-	-	13	939
2	Overhead Closeup View of Impact	180	670	4100	-	-	25	1130
3	MDB Onboard Closeup of Impact	-	-	-	-	-	35	1015
4	MDB Onboard View of Dummy	-	-	-	-	-	13	1000
5	Right Side Ground Overall View	4150	8715	1075	-	-	25	897
6	Left Side Ground Overall View	4150	2790	2050	-	-	13	111
7	Test Vehicle Onboard Driver Front View	-	-	-	-	-	13	962
8	Test Vehicle Onboard Driver Side View	-	-	-	-	-	7.5	1070
9	Test Vehicle Onboard Passenger Side View	-	-	-	-	-	7.5	690
	Right Overall	4200	8900	1220	90°	8545	13	no run

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

043

Table 10

FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: MP0207 Test Date: 4-23-93

Vehicle Mfgr./Make/Model: 1993 Ford Probe 2 Door

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:

_____ Frontal (35 mph)

_____ Oblique (30 mph) with ____° barrier face first contacting _____ (driver/passenger) side

_____ Rear Moving Barrier (30 mph)

__X__ Side Impact MDB (33.3 mph)

FUEL SPILLAGE MEASUREMENT:

1. From impact until vehicle motion ceases

ACTUAL	MAX ALLOWED
0	102
0	502
0	102/1 MIN

2. For 5 minute period after vehicle motion ceases

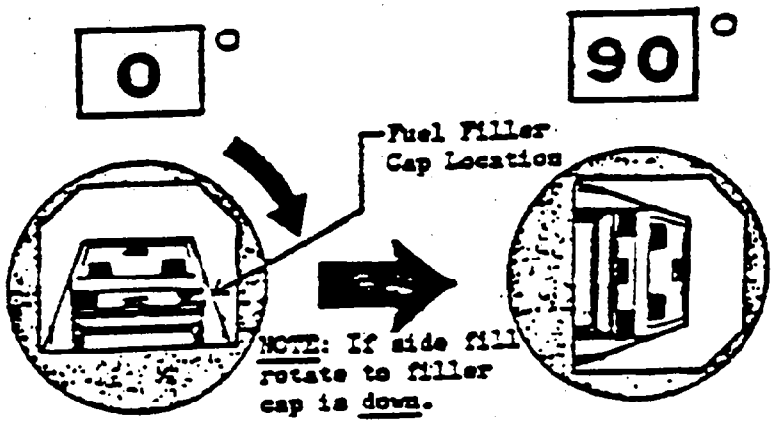
3. For next 25 minutes

SOLVENT SPILLAGE DETAILS:

Table 11

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: Vehicle NHTSA ID No.: MP0207



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 52 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 52 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.

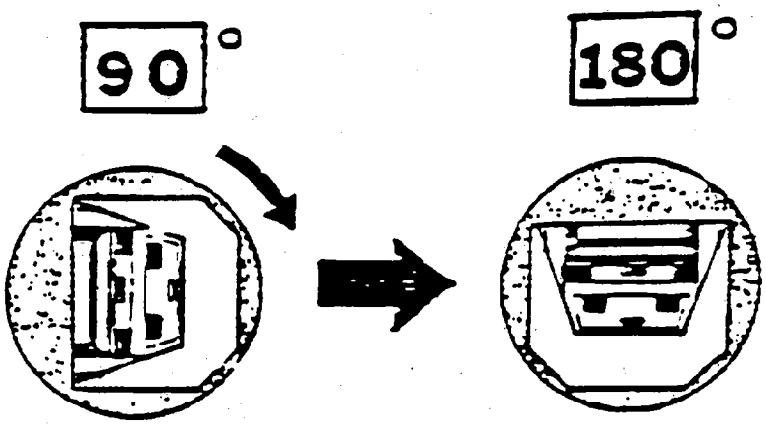
IV. SOLVENT SPILLAGE LOCATIONS(S):

045

Table 11

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

TEST PHASE: Vehicle NHTSA ID No.: MP0207



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 43 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 43 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

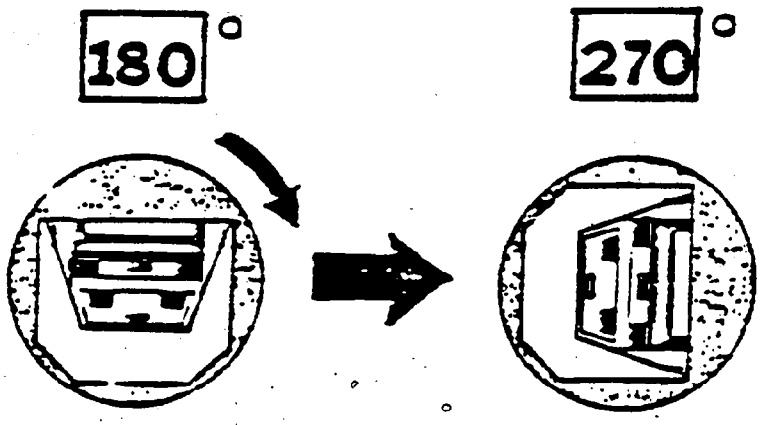
Note: Record Spillage for whole minute intervals only as determined above.

IV. SOLVENT SPILLAGE LOCATIONS(S):

Table 11

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

TEST PHASE: Vehicle NHTSA ID No.: MP0207



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 25 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 25 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.

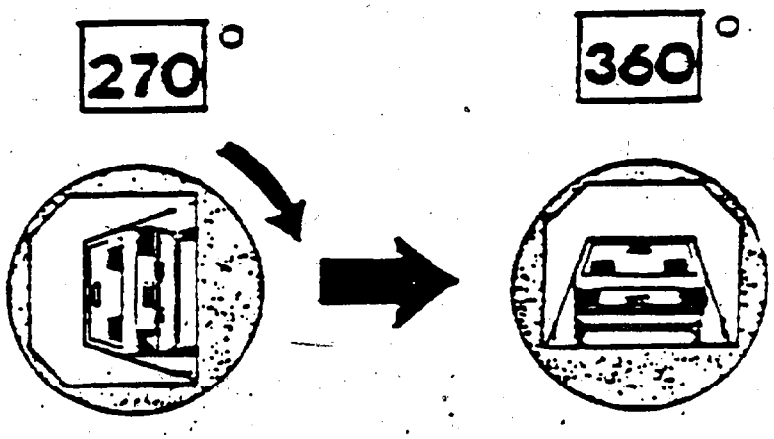
IV. SOLVENT SPILLAGE LOCATIONS(S):

047

Table 11

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

TEST PHASE: Vehicle NHTSA ID No.: MP0207



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 49 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 49 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):

APPENDIX A - PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

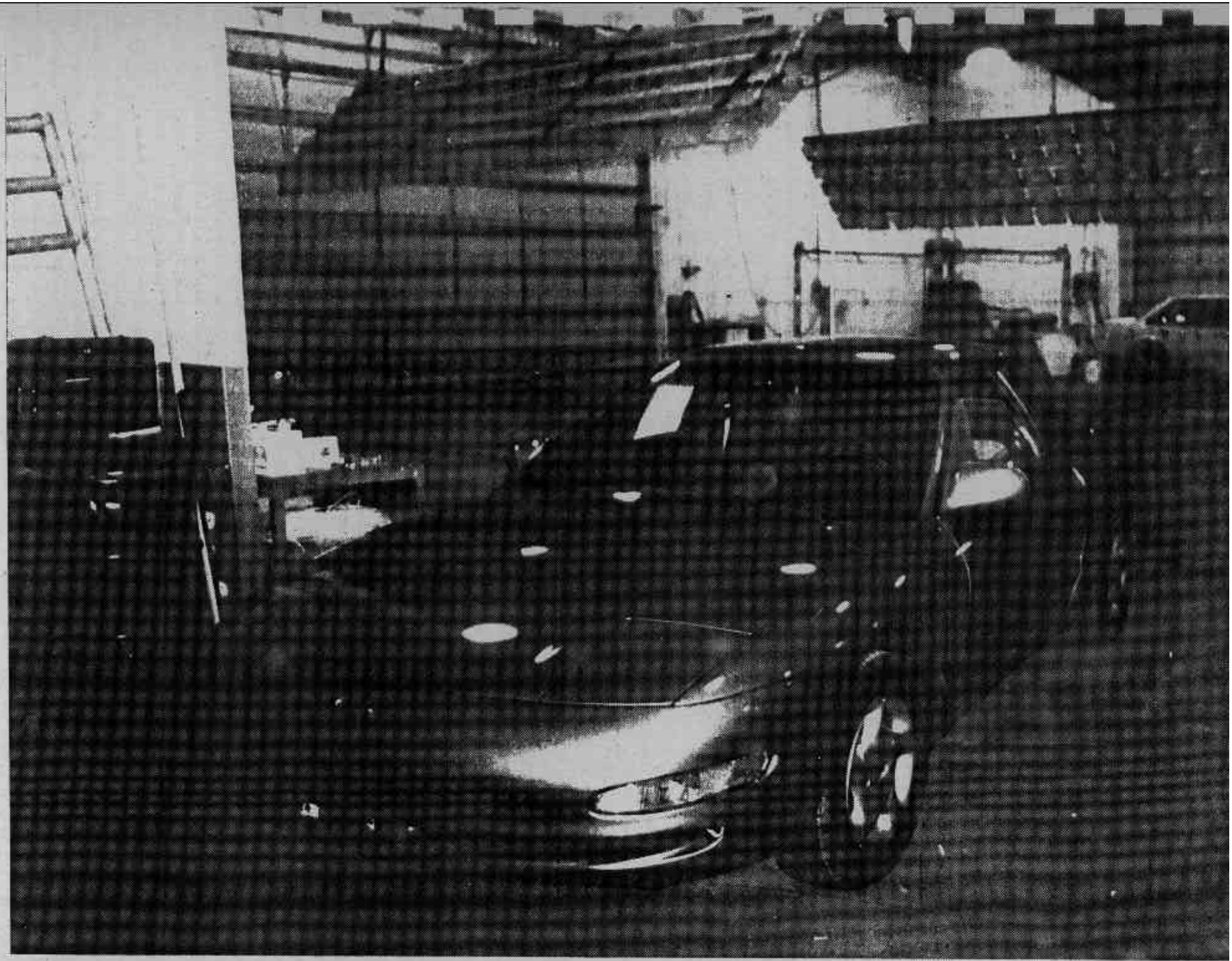


Photo No. A-1 - Test Vehicle as Received

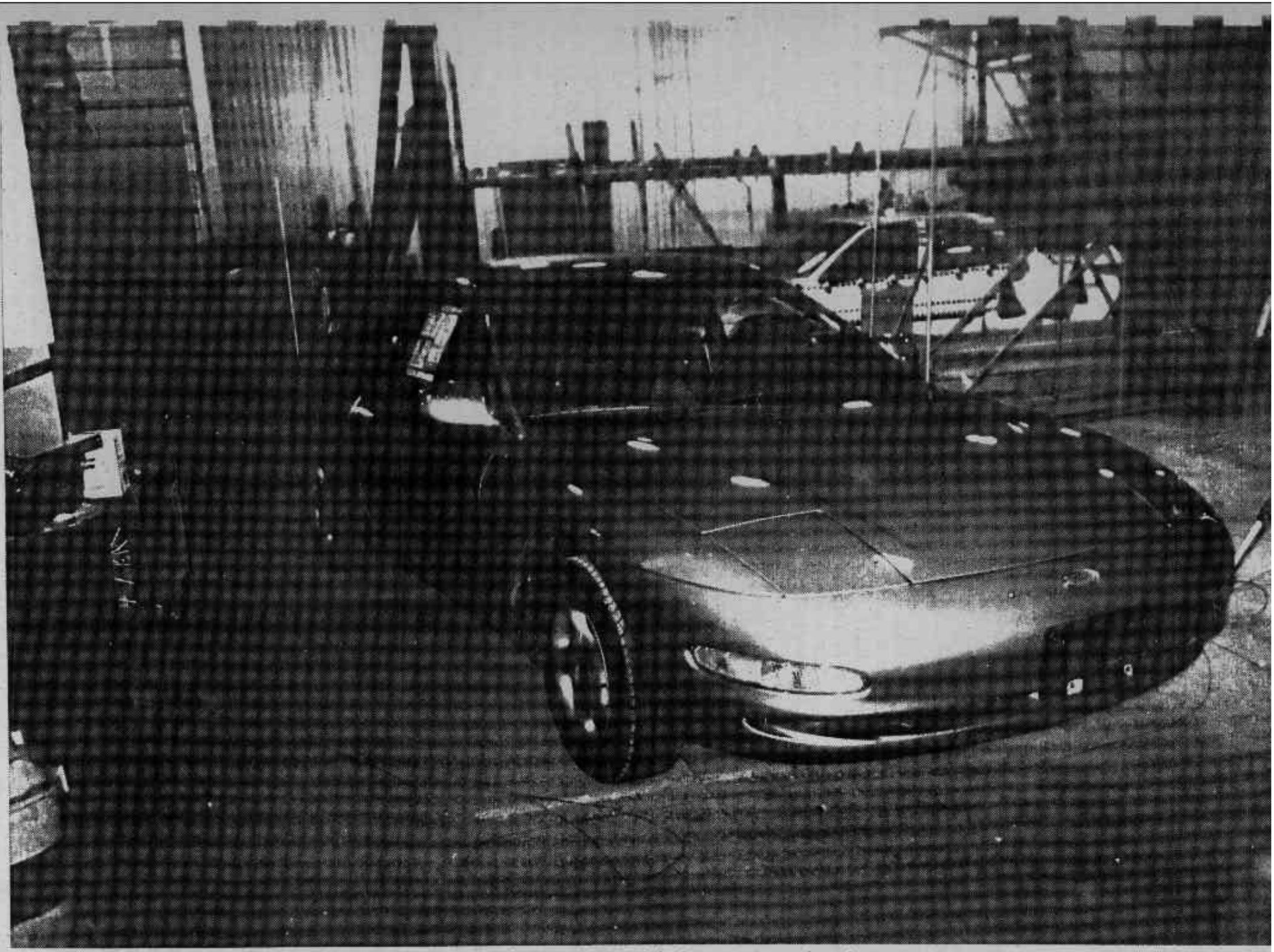


Photo No. A-2 - Test Vehicle as Received

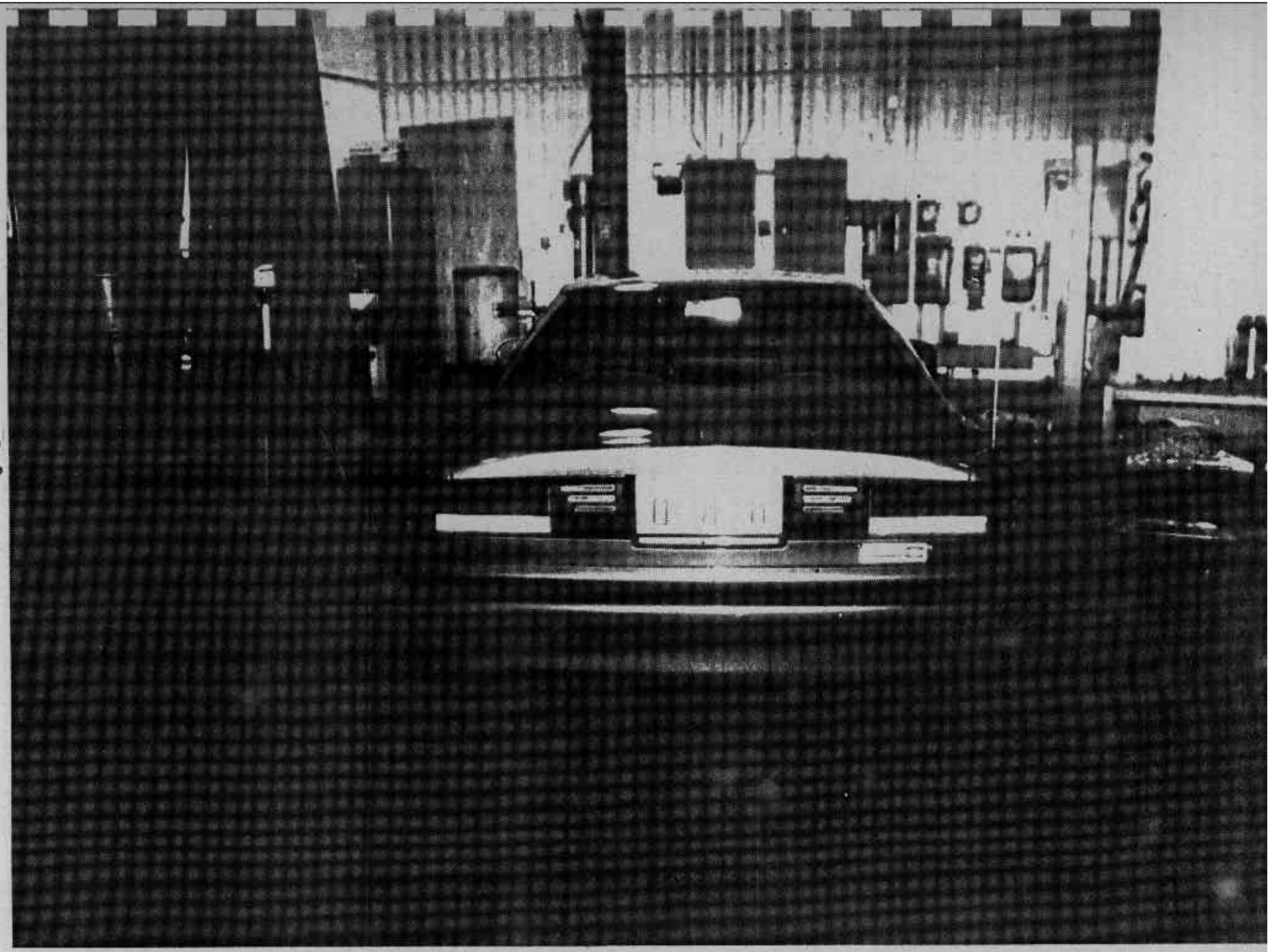
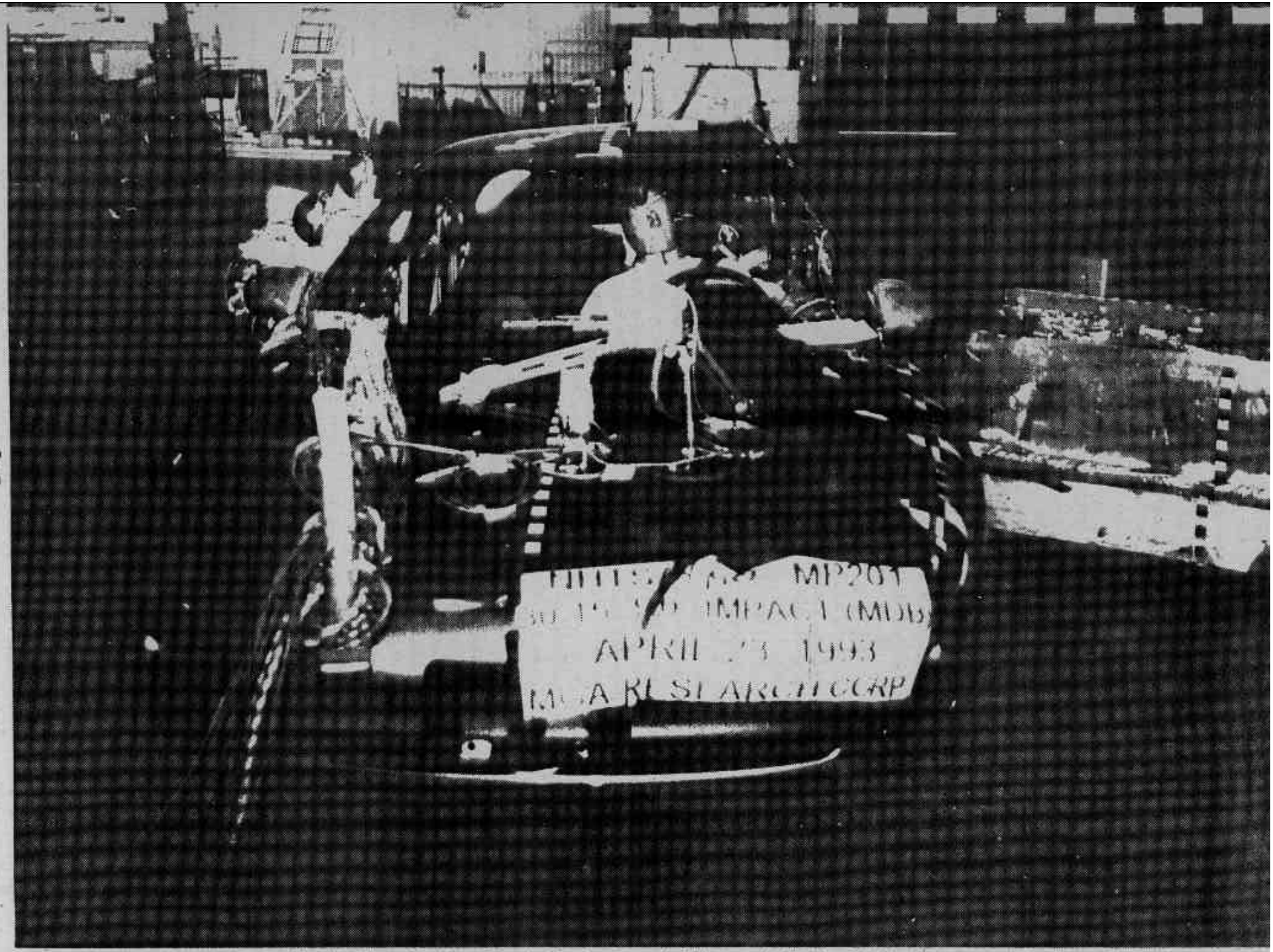


Photo No. A-3 - Test Vehicle as Received

Photo No. A-4 - Pre-Test Front View of Test Vehicle



A-5

Photo No. A-5 - Post-Test Front View of Test Vehicle

A-6

Photo No. A-6 - Pre-Test Rear View of Test Vehicle

A-7

Photo No. A-7 - Post-Test Rear View of Test Vehicle

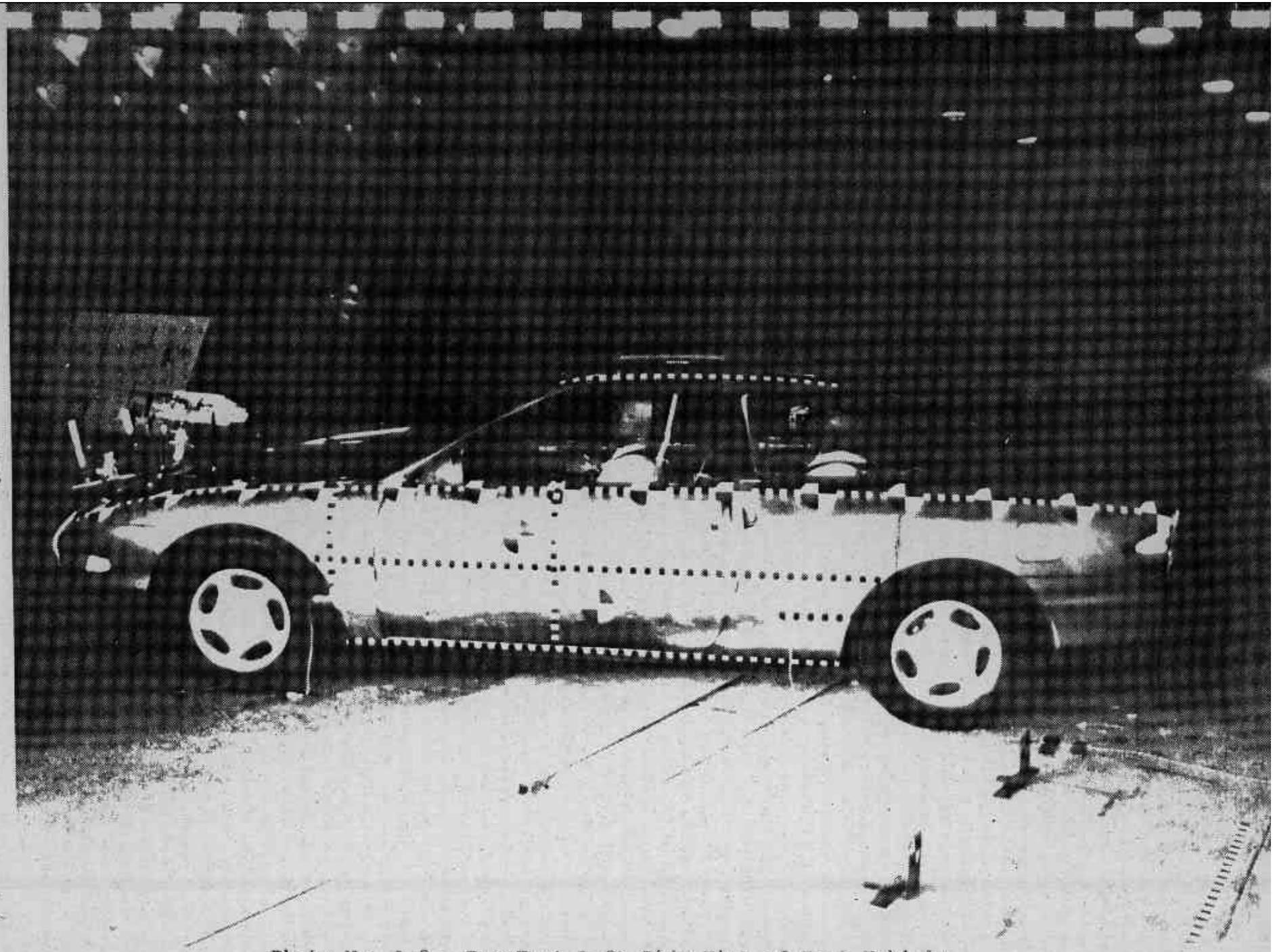


Photo No. A-8 - Pre-Test Left Side View of Test Vehicle

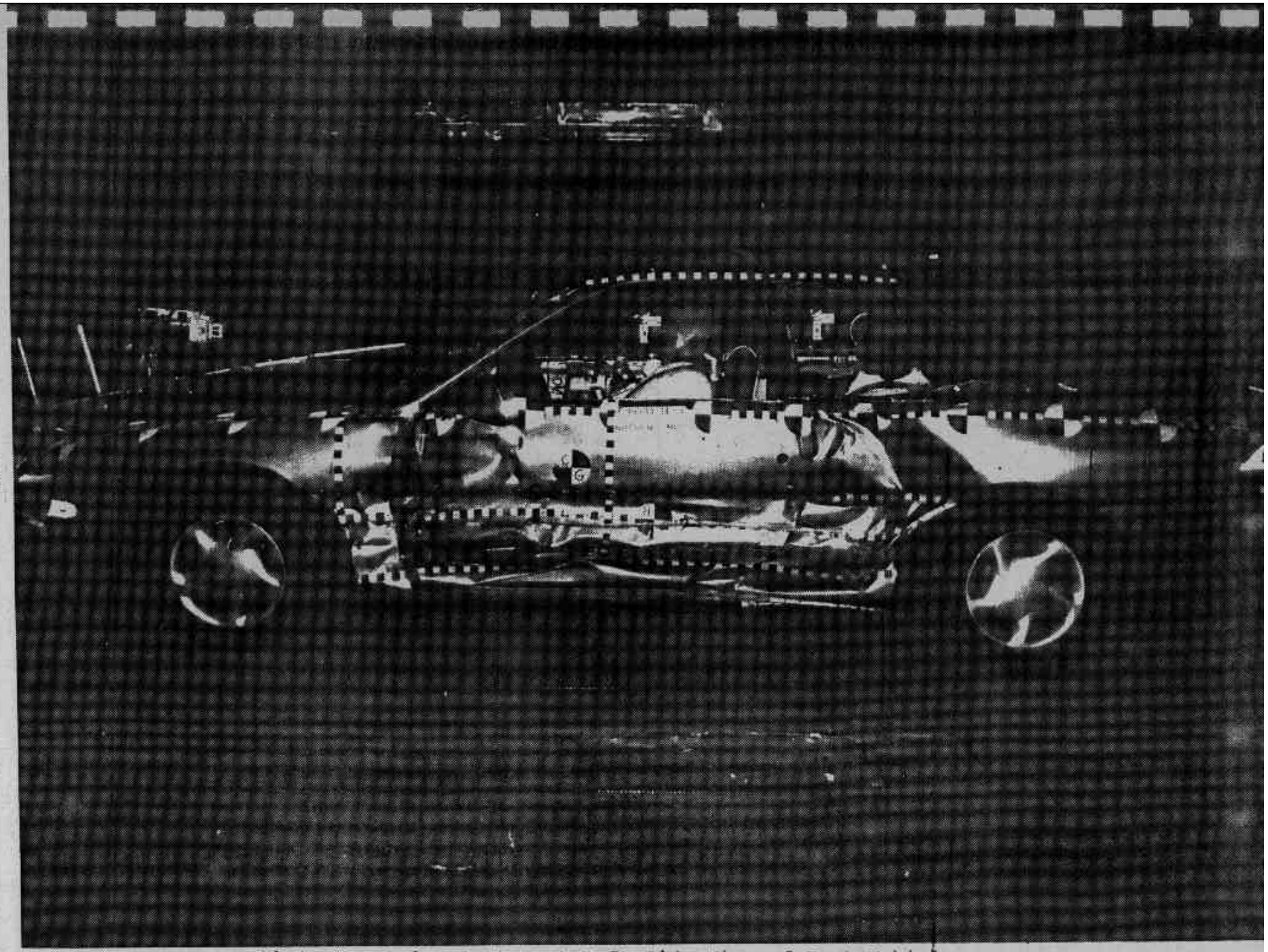


Photo No. A-9 - Post-Test Left Side View of Test Vehicle

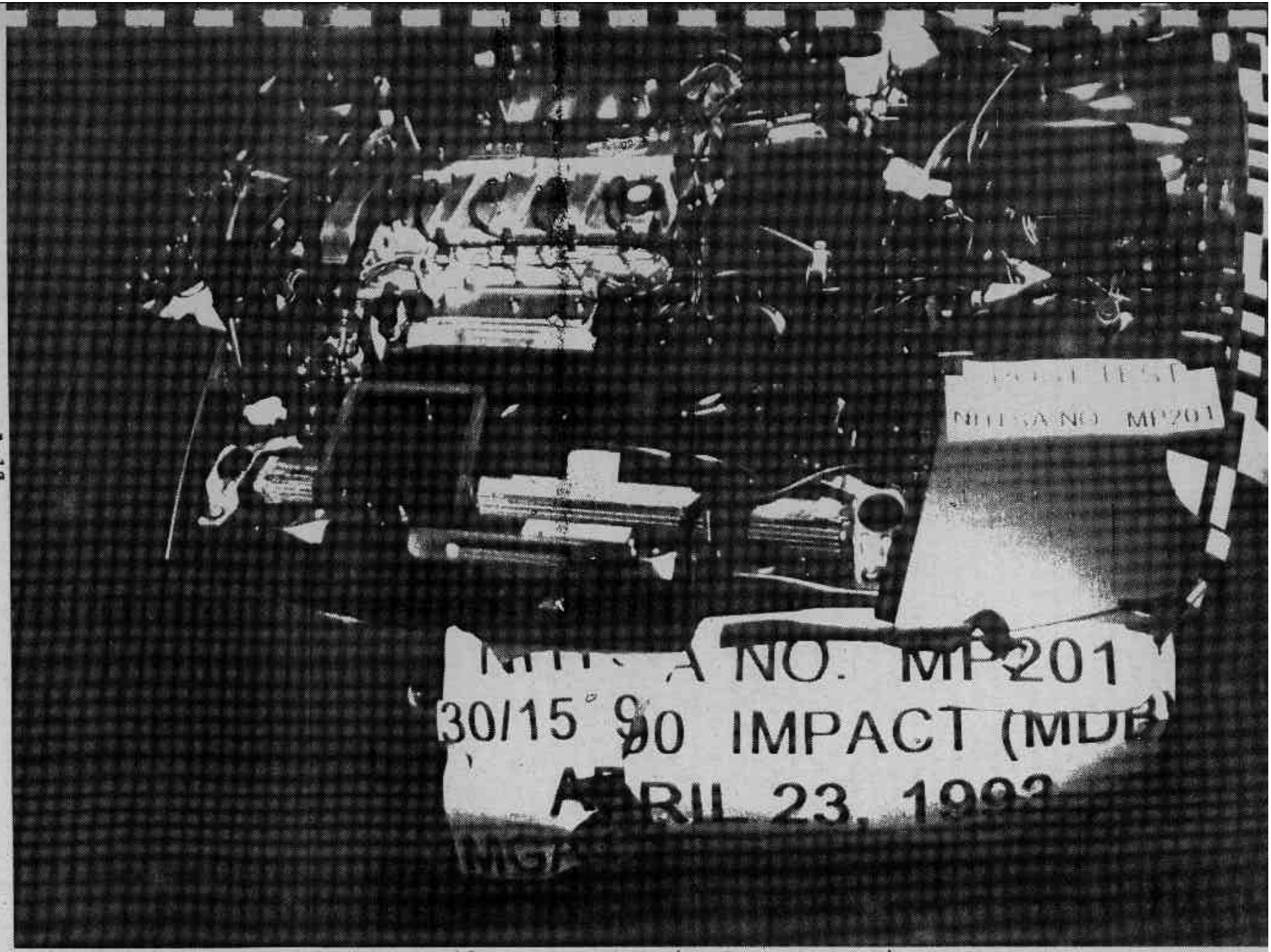
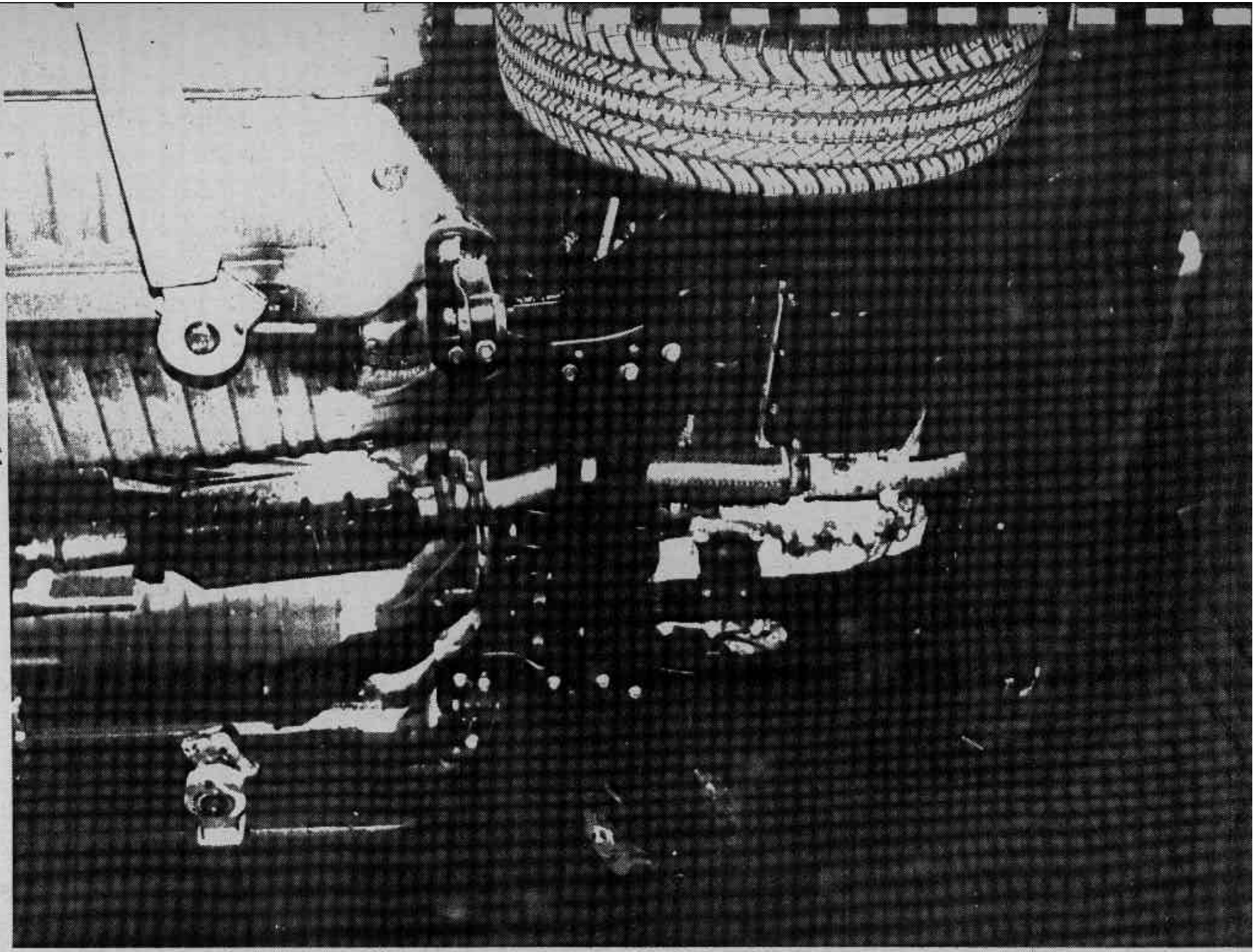


Photo No. A-10 - Post-Test Engine Compartment View



A-11

Photo No. A-11 - Pre-Test Front Underbody View of Test Vehicle

Photo No. A-12 - Pre-Test Rear Underbody View of Test Vehicle

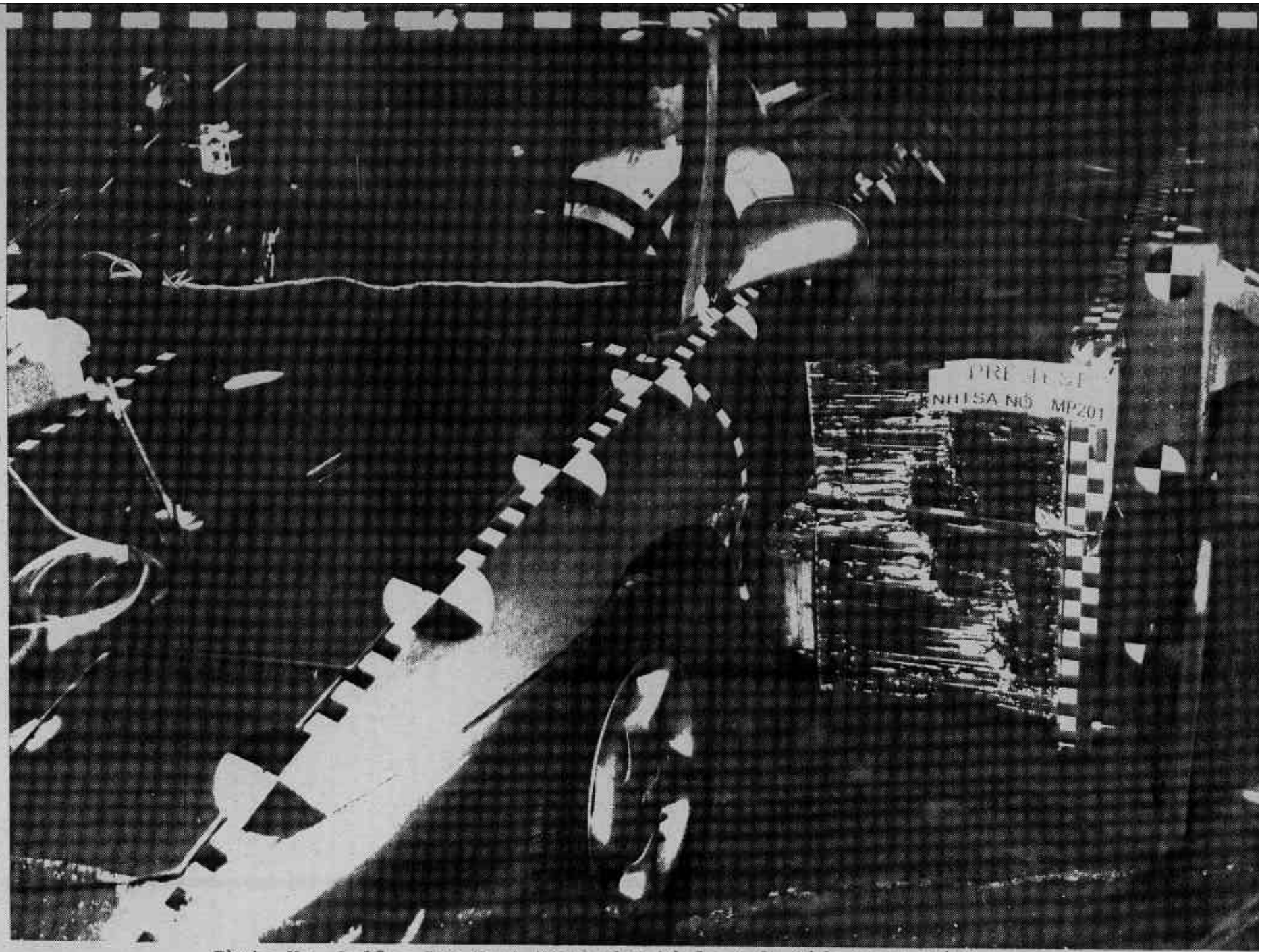


Photo No. A-13 - Pre-Test MDB and Vehicle Left Side Front View

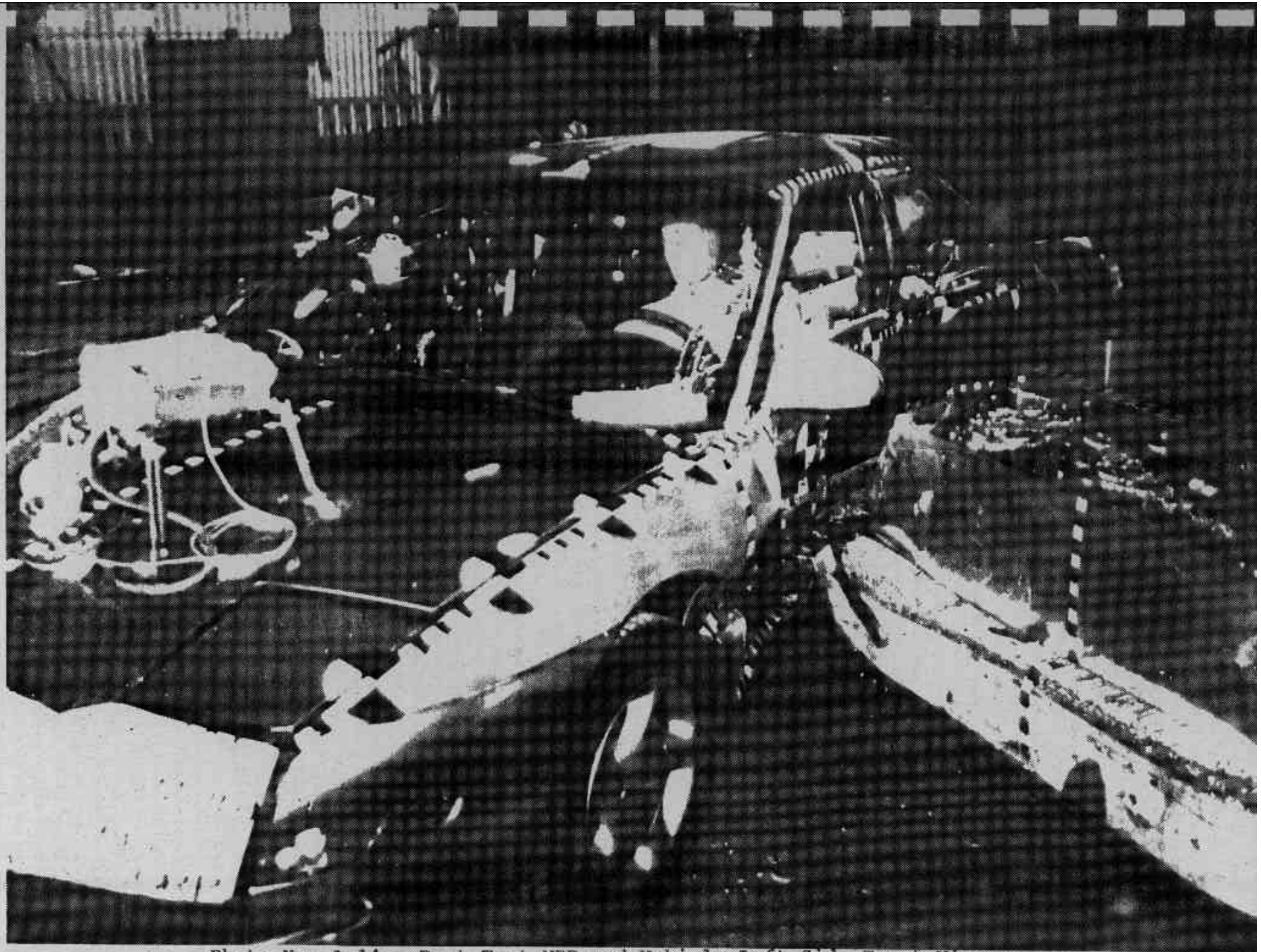
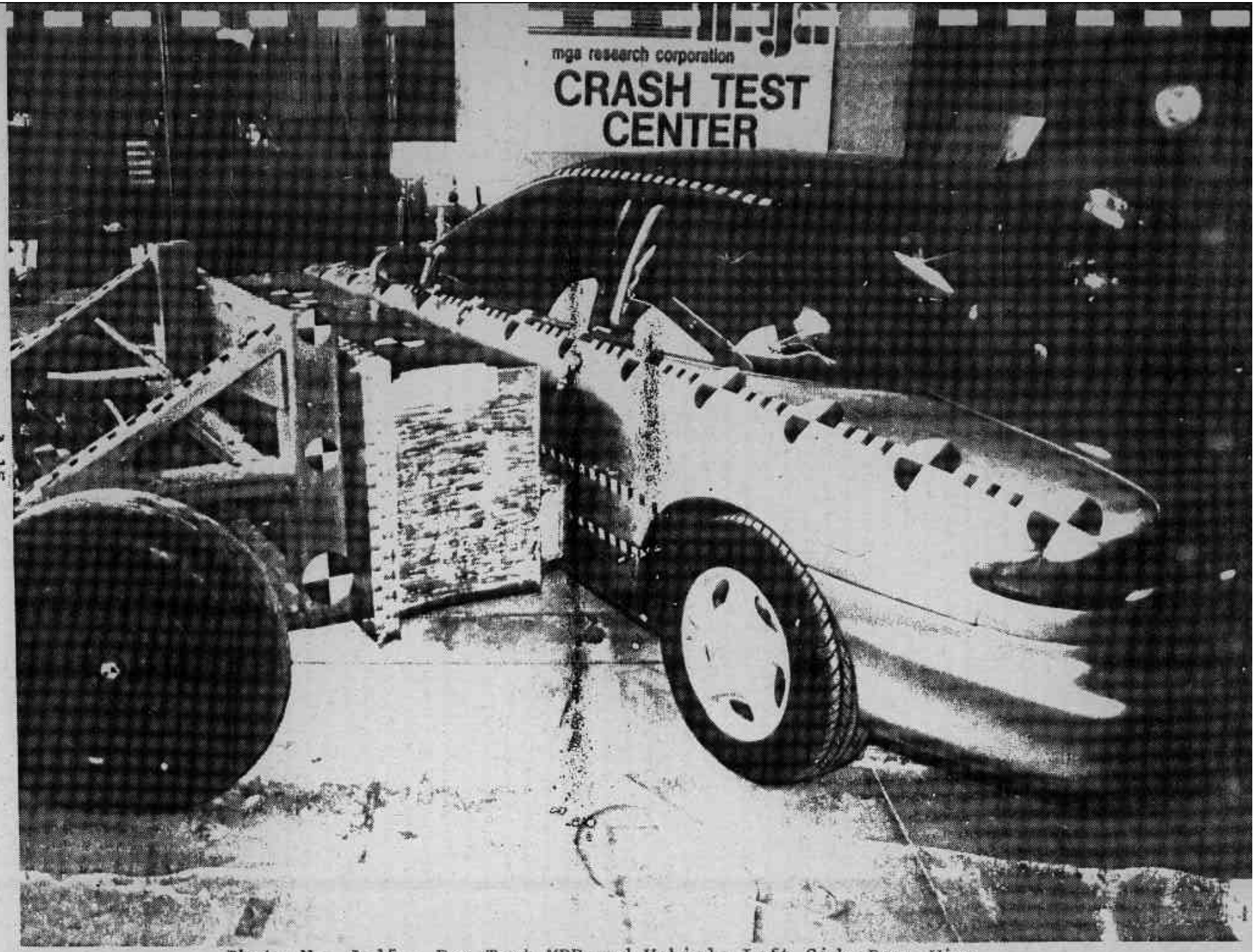
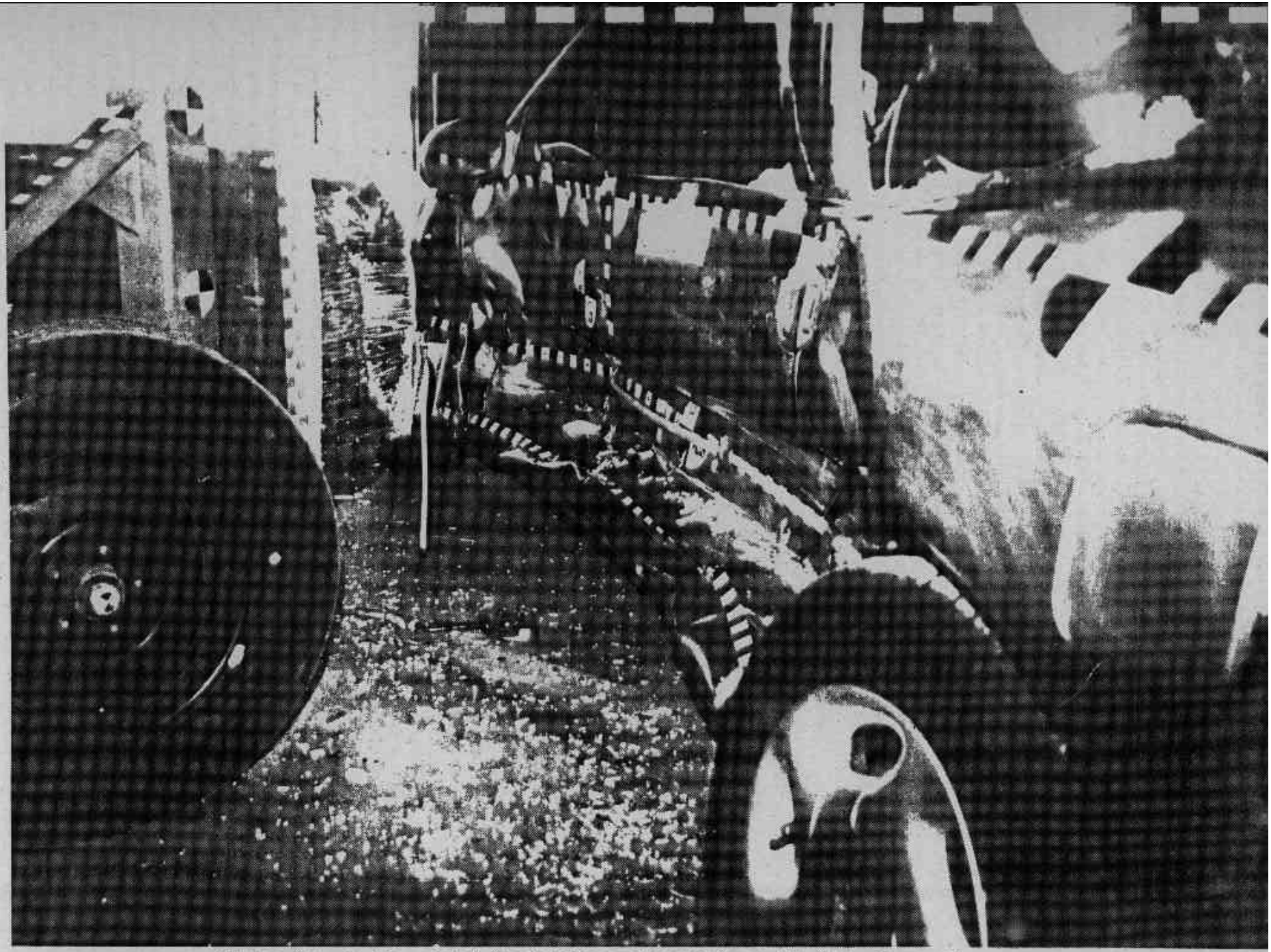


Photo No. A-14 - Post-Test MDB and Vehicle Left Side Front View



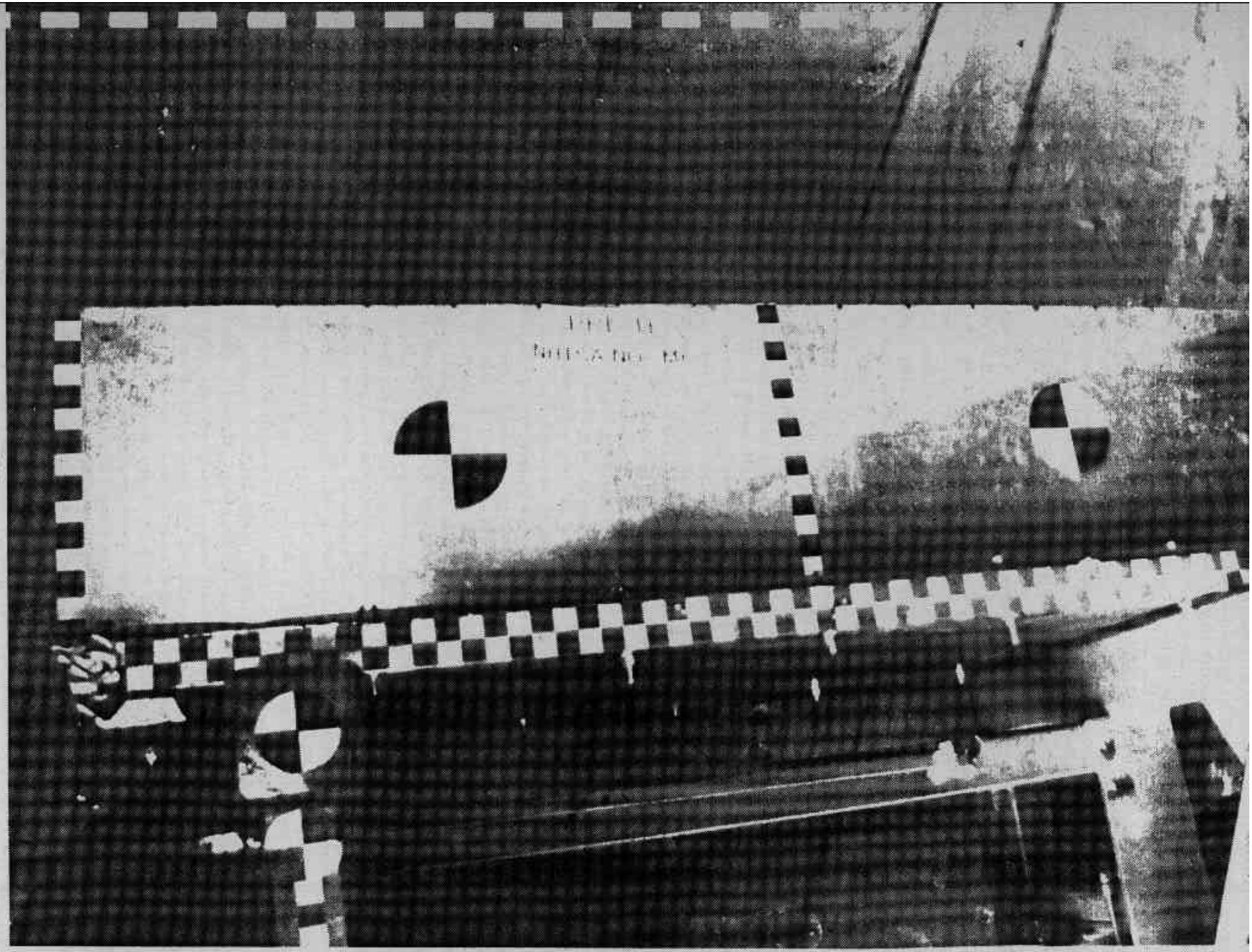
A-15

Photo No. A-15 - Pre-Test MDB and Vehicle Left Side Rear View



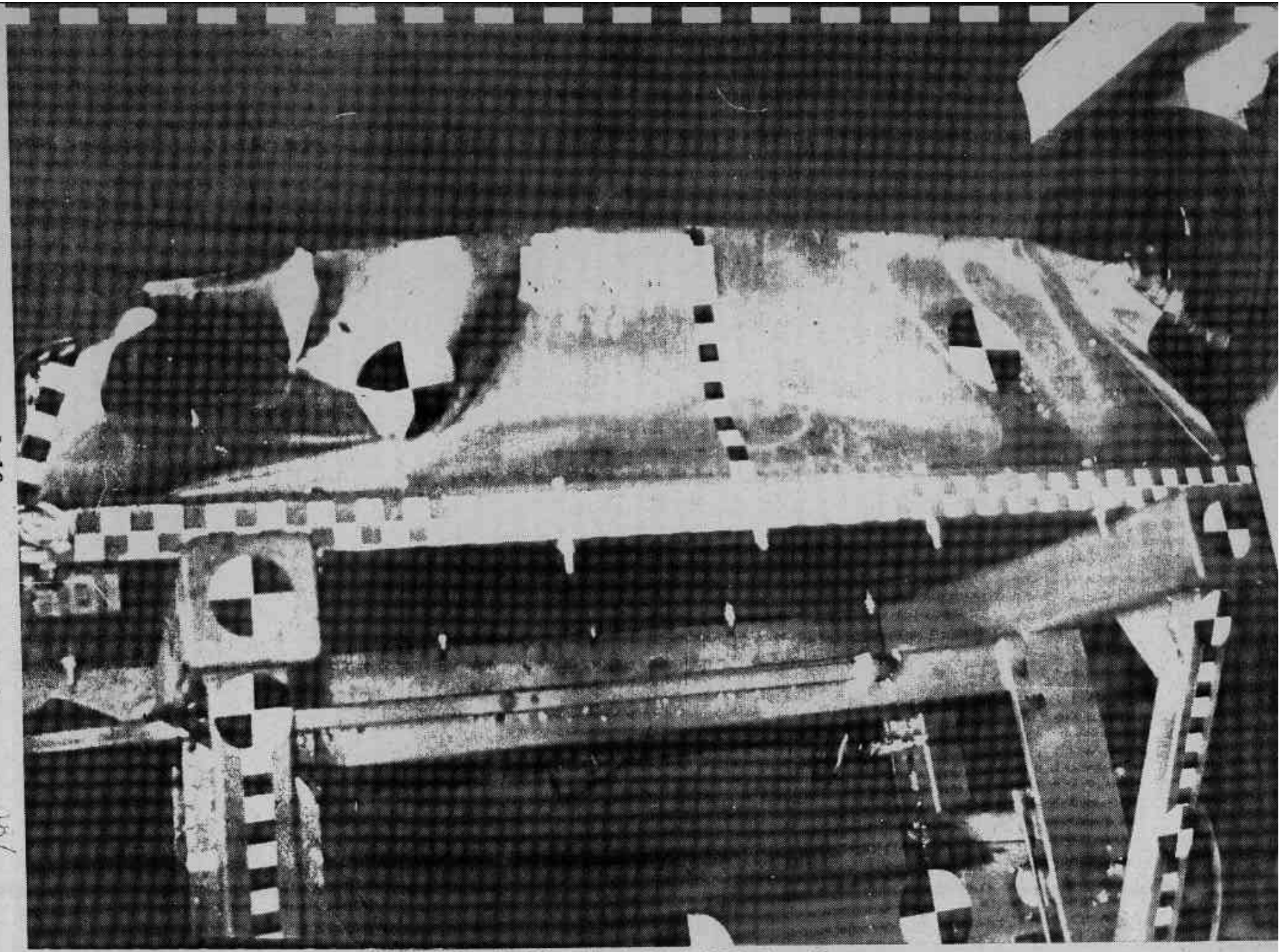
A-16

Photo No. A-16 - Post-Test MDB and Vehicle Left Side Rear View



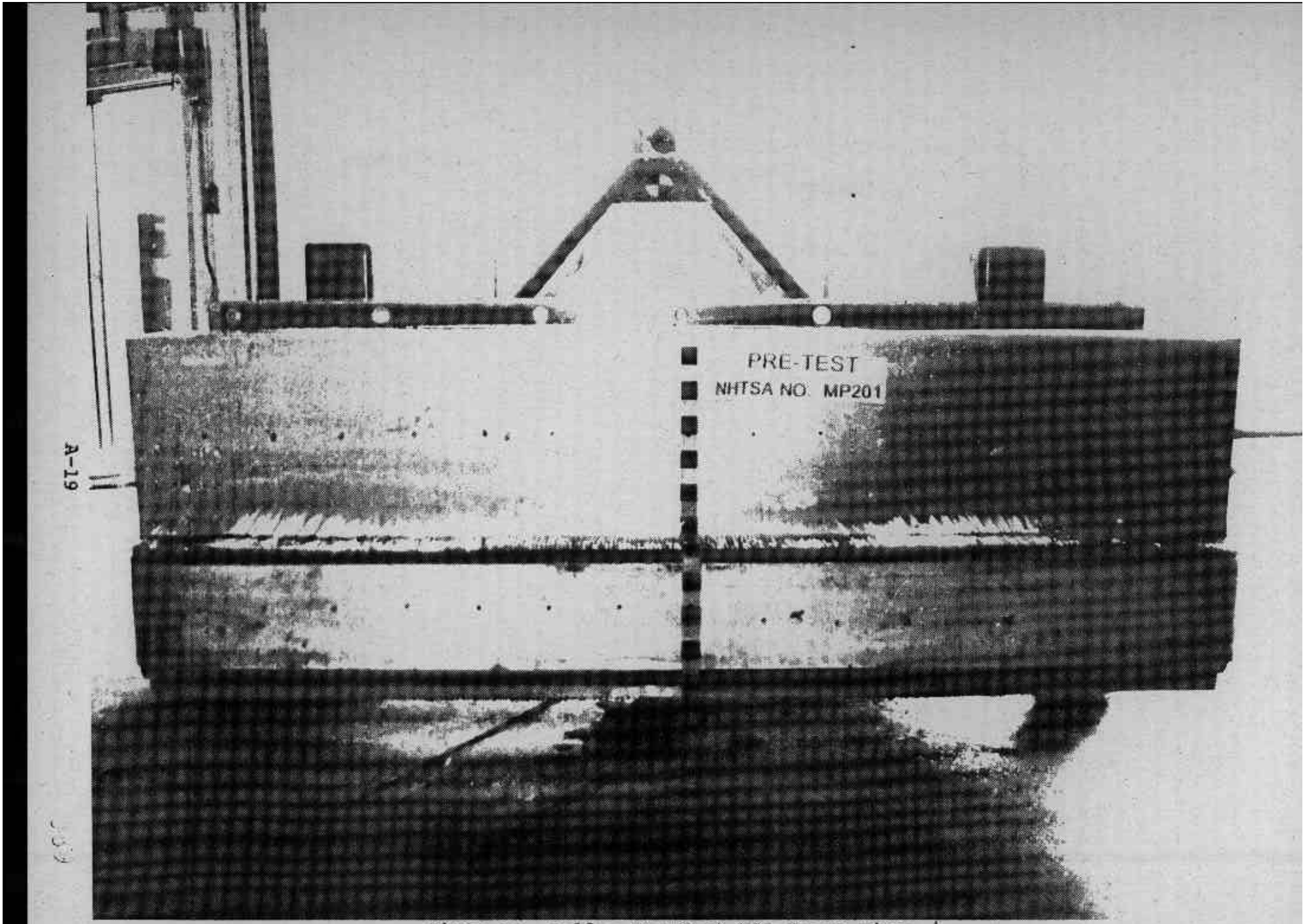
A-17

Photo No. A-17 - Pre-Test MDB Top View



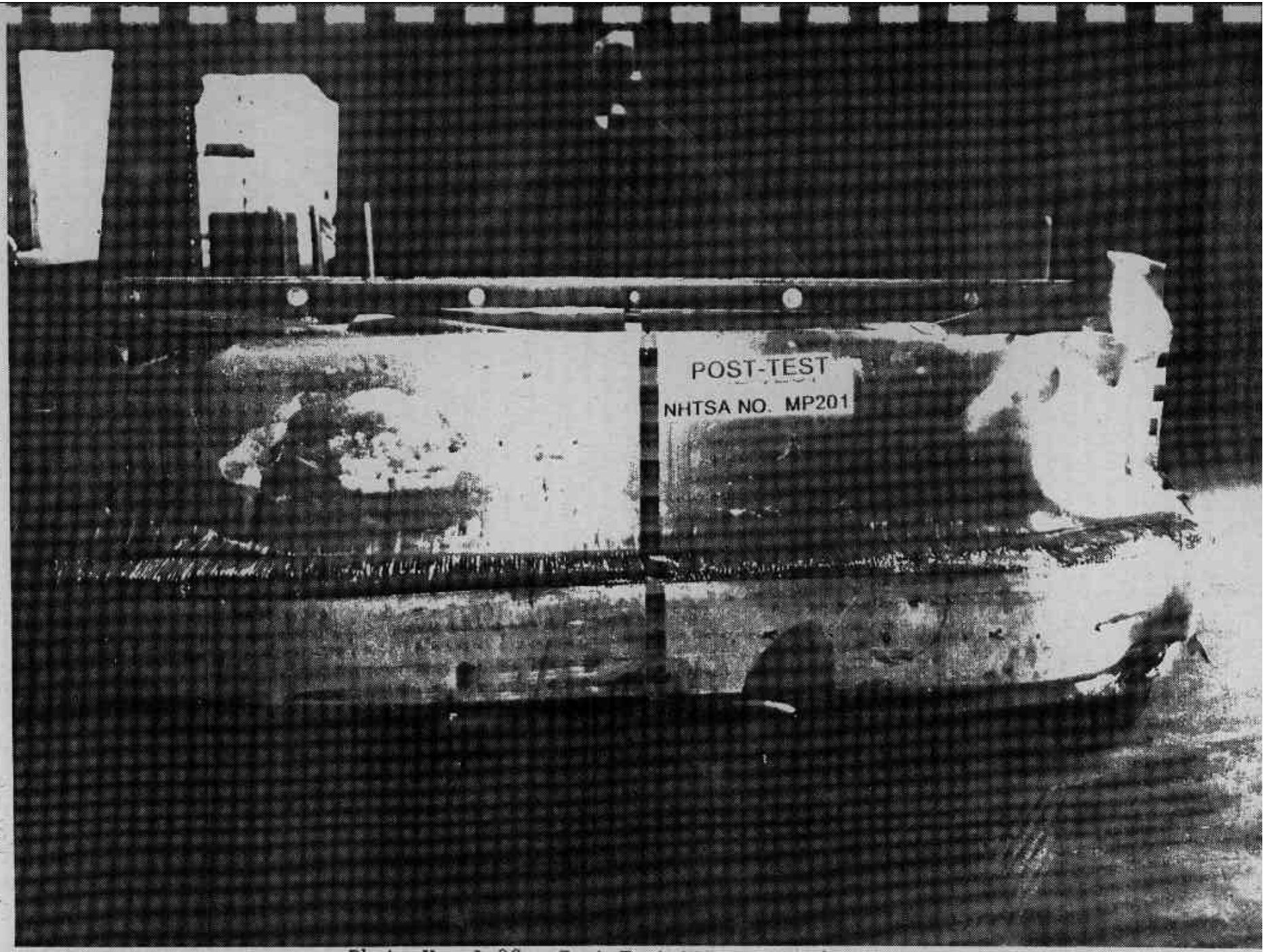
A-18

Photo No. A-18 - Post-Test MDB Top View



A-19

Photo No. A-19 - Pre-Test MDB Front View



A-20

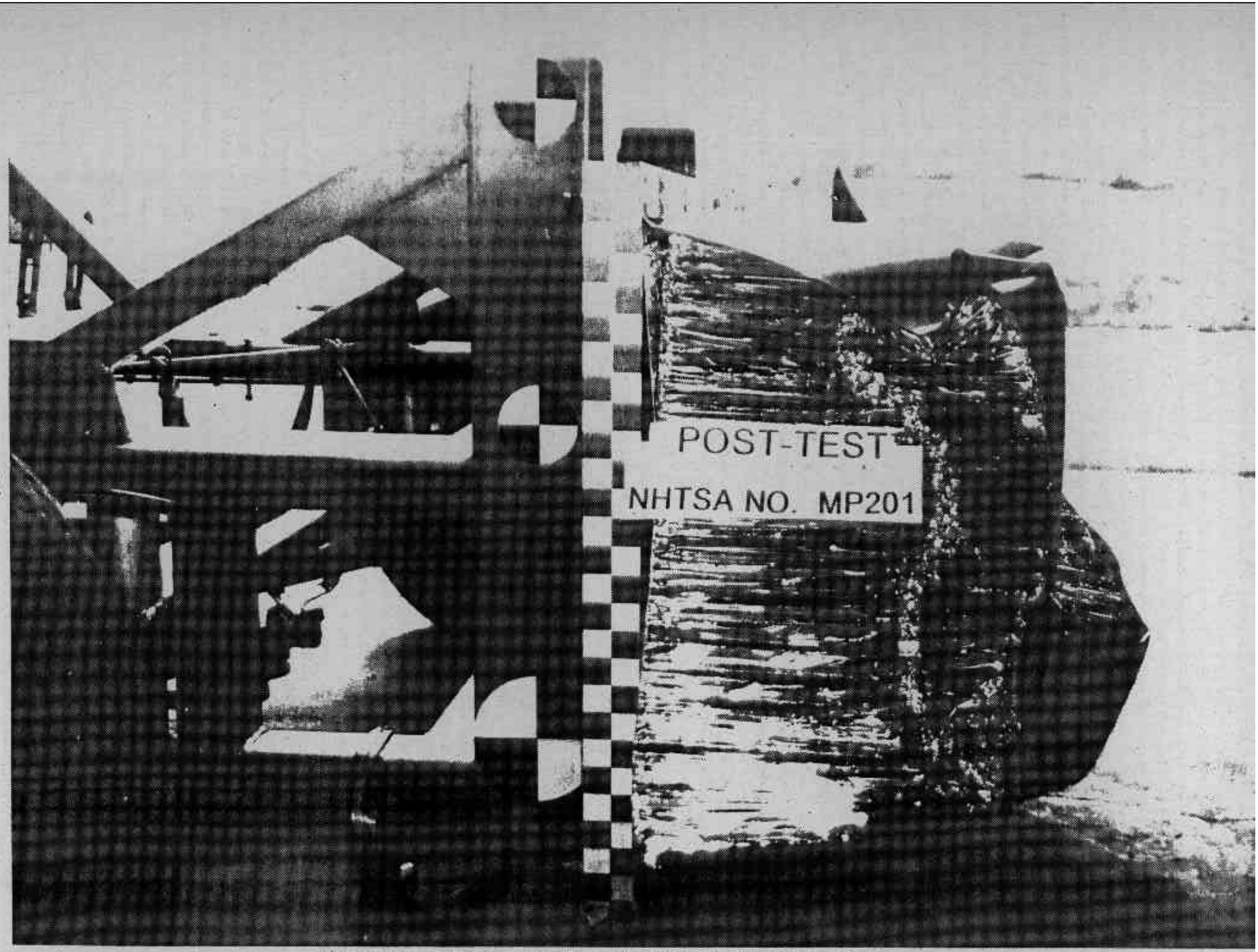
Photo No. A-20 - Post-Test MDB Front View

Photo No. A-21 - Pre-Test MDB Left Side View

J95

Photo No. A-22 - Post-Test MDB Left Side View

Photo No. A-23 - Pre-Test MDB Right Side View



A-24

Photo No. A-24 - Post-Test MDB Right Side View

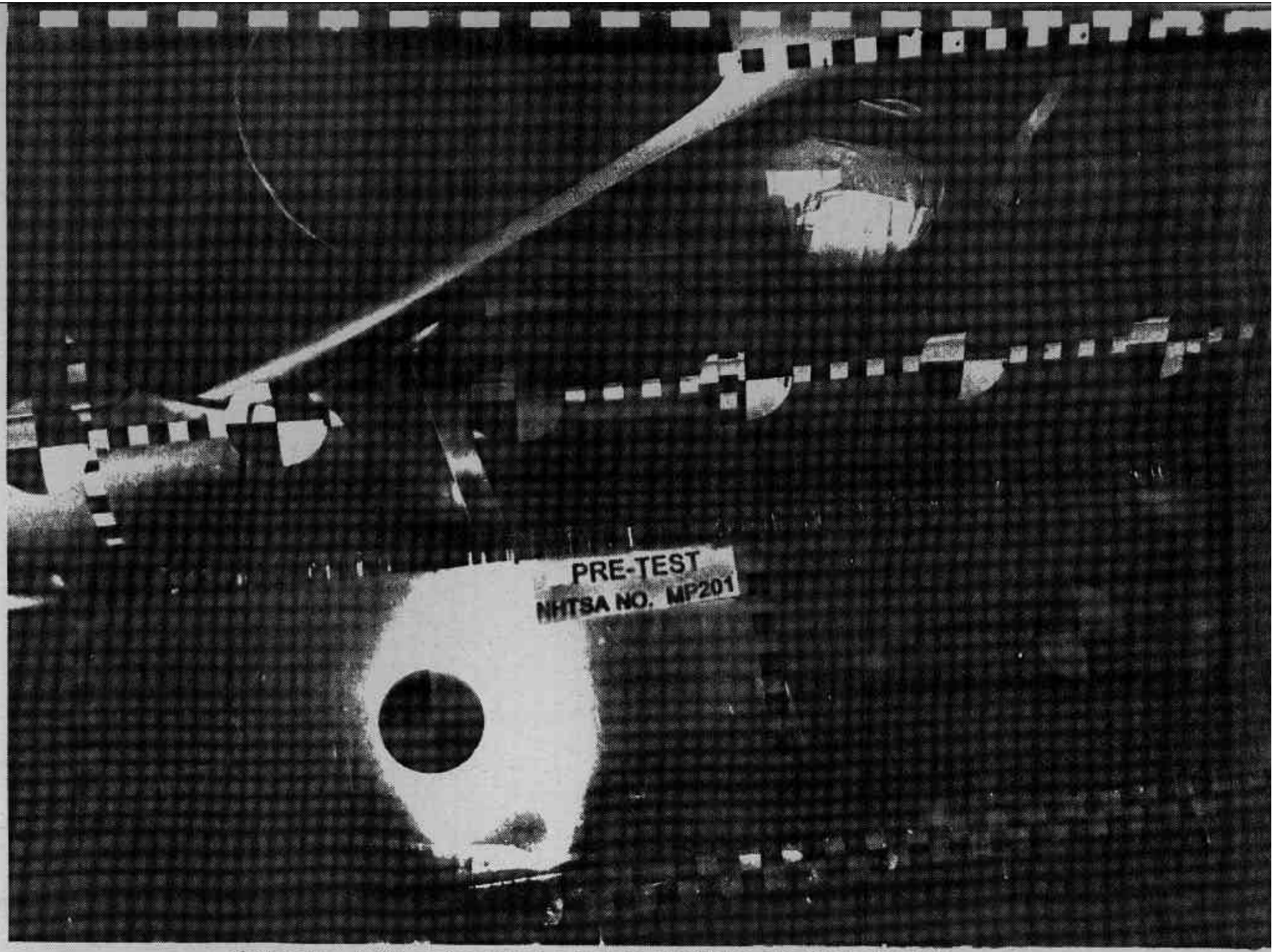


Photo No. A-25 - Pre-Test Barrier Position Against Vehicle
Overhead View

Photo No. A-26 - Pre-Test Driver Dummy Right Side View

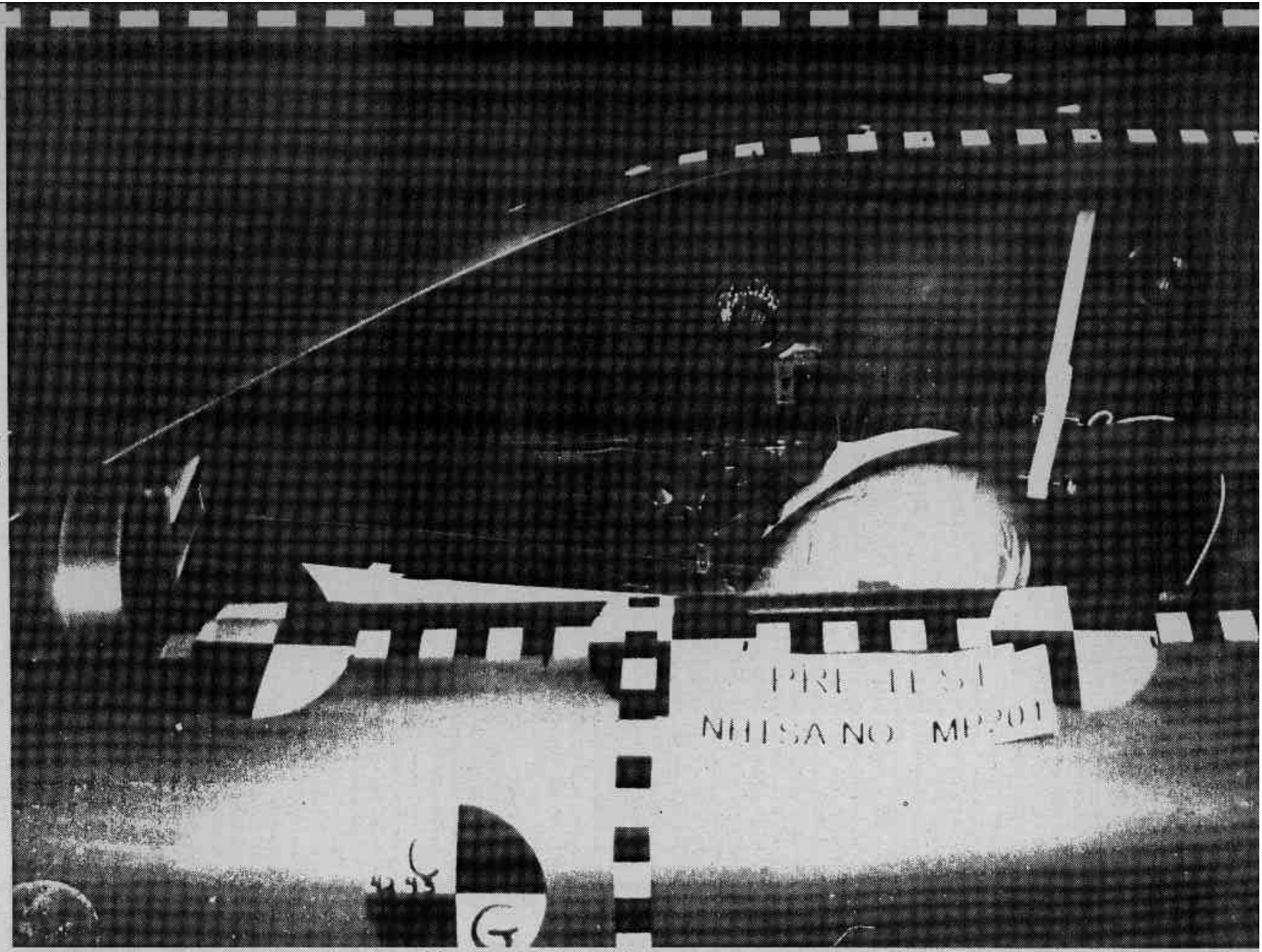


Photo No. A-28 - Pre-Test Driver Dummy Left Side View

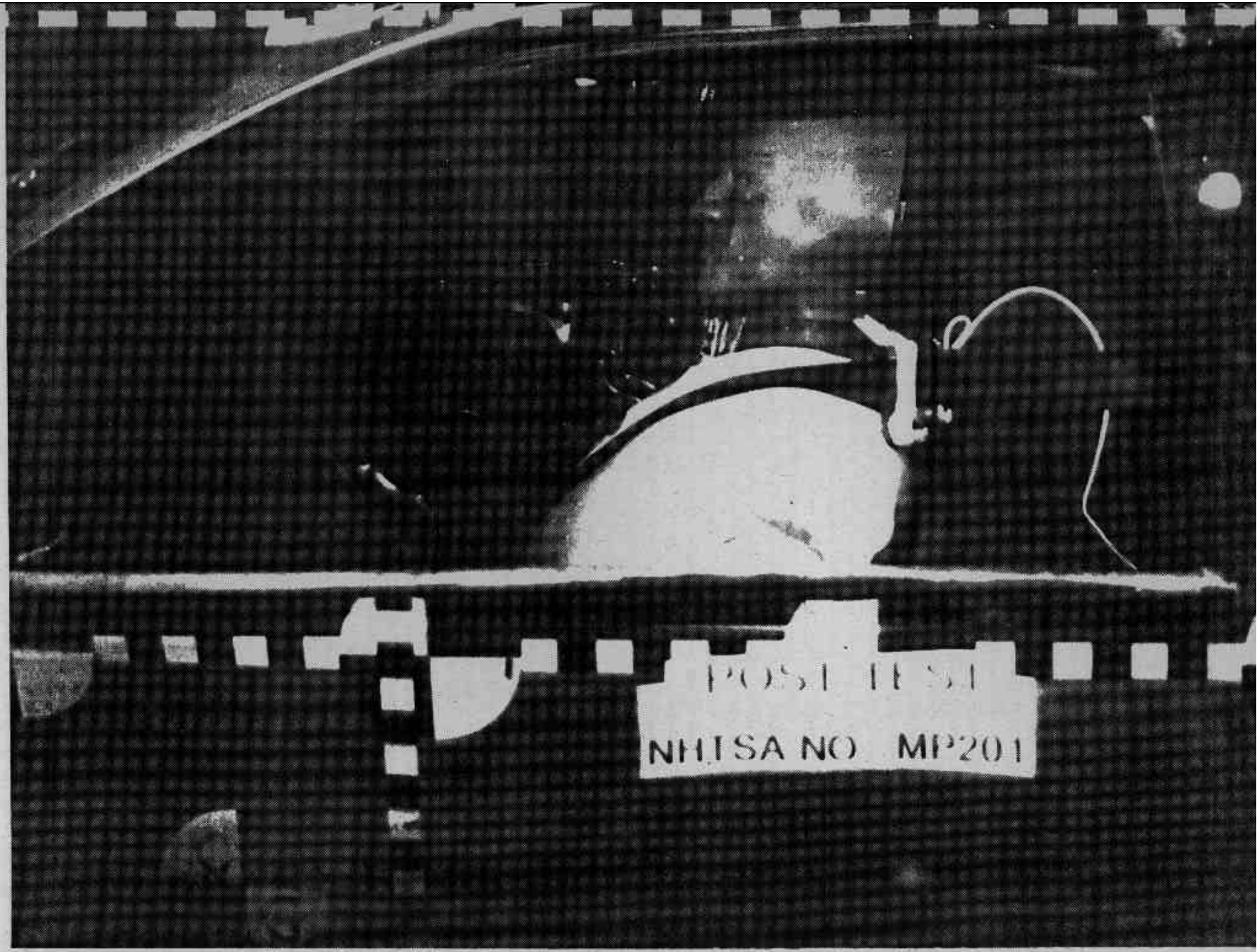


Photo No. A-29 - Post-Test Driver Dummy Left Side View

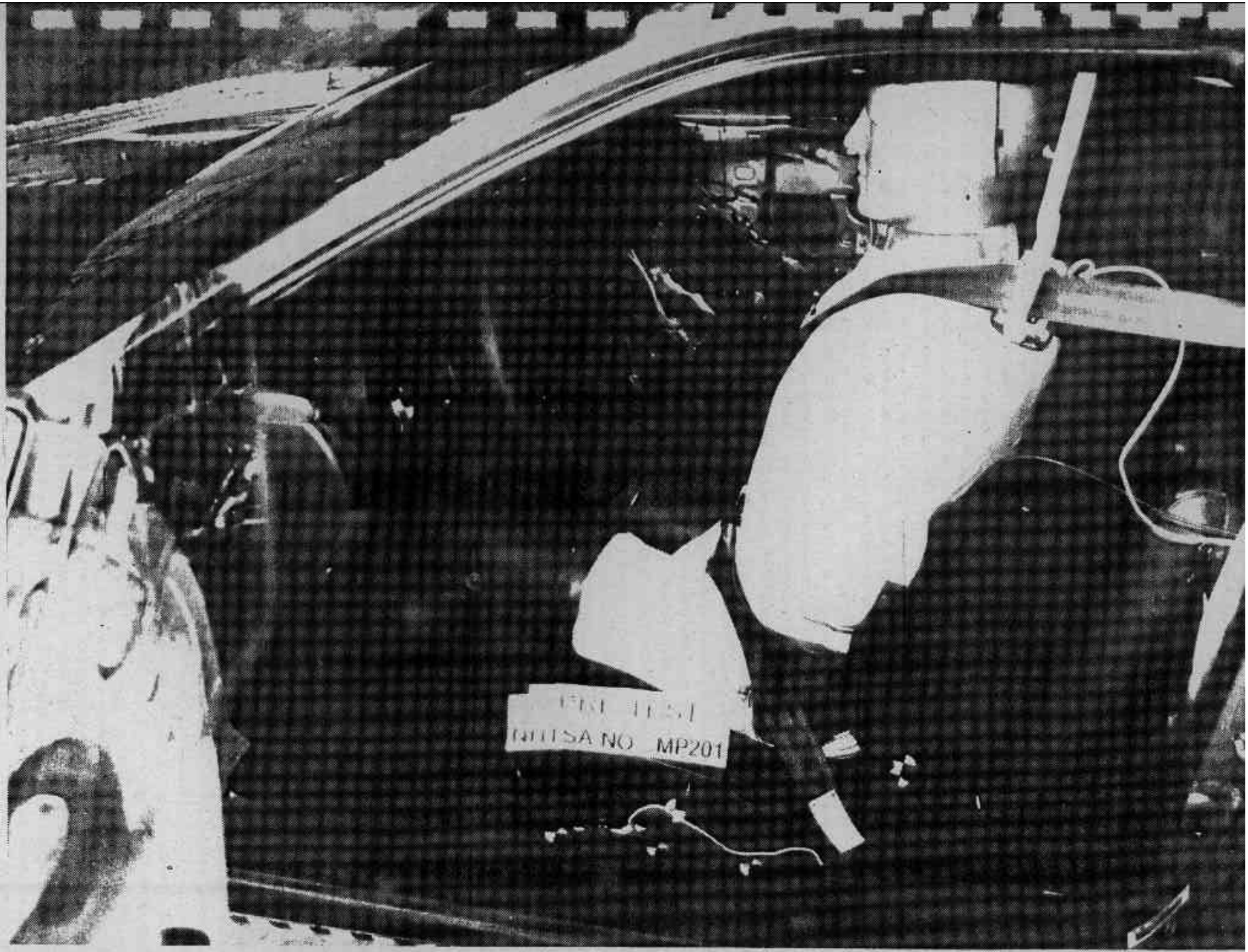
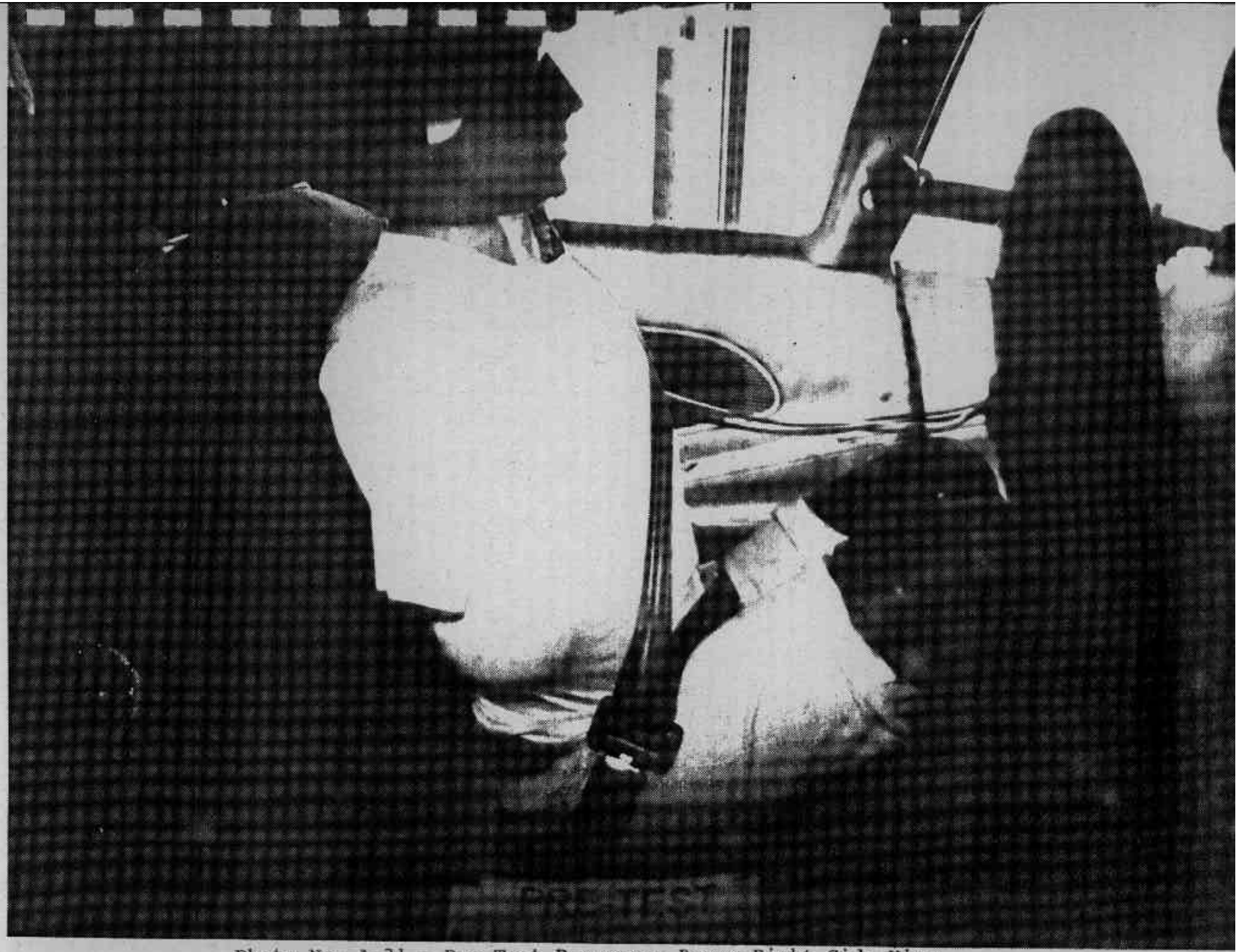


Photo No. A-30 - Pre-Test Driver Dummy Left Side View (Door Open)



A-31

Photo No. A-31 - Pre-Test Passenger Dummy Right Side View

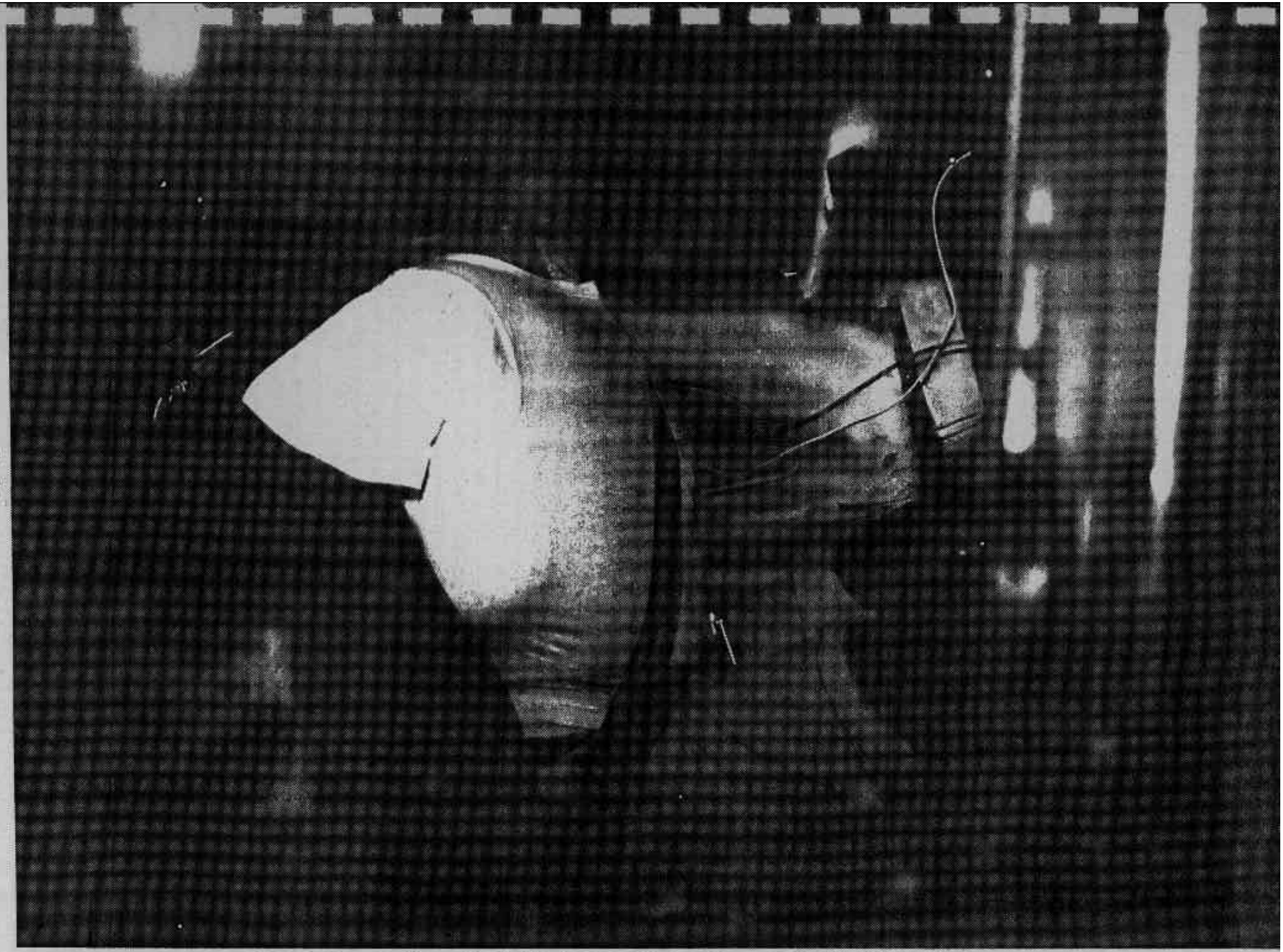


Photo No. A-32 - Post-Test Passenger Dummy Right Side View

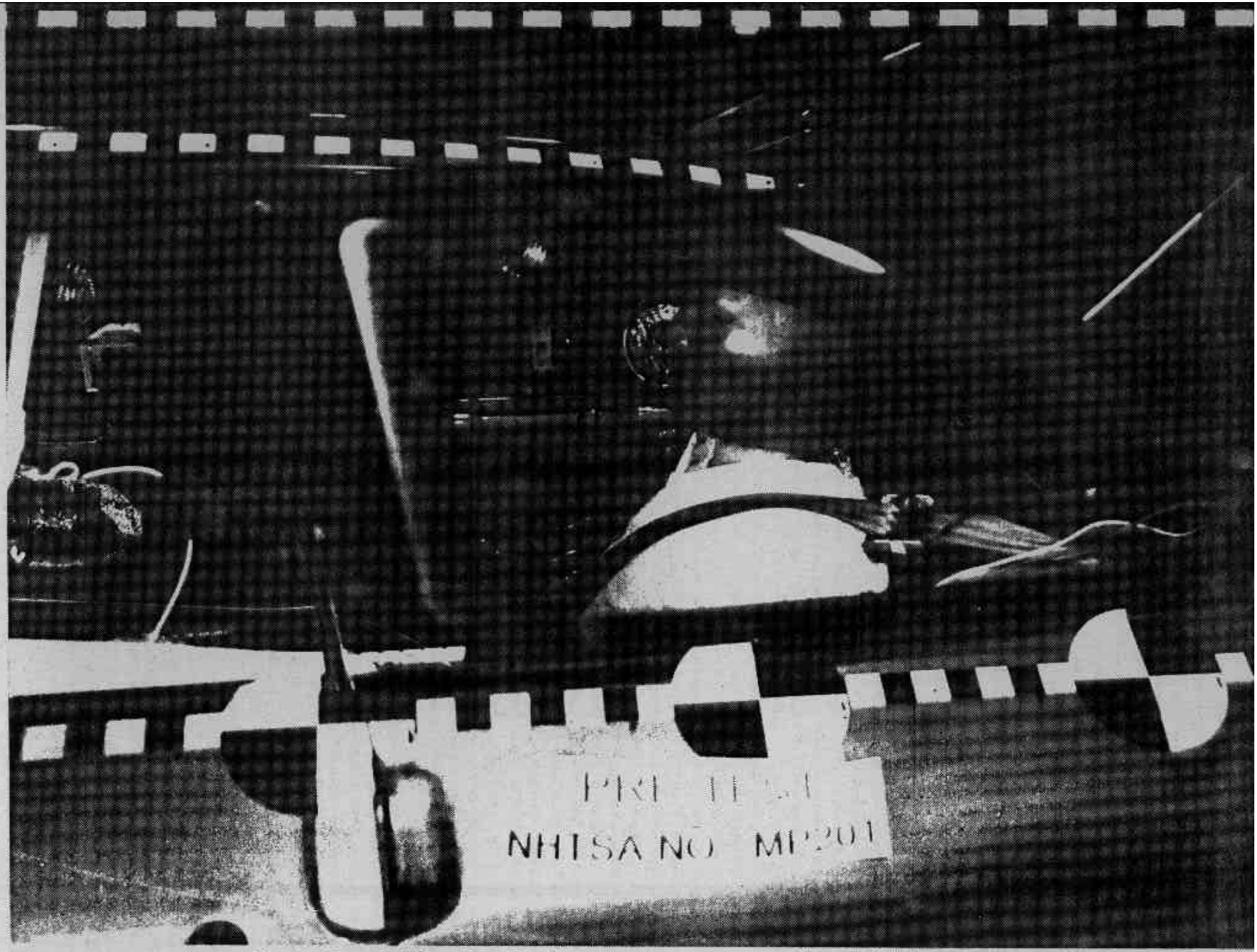
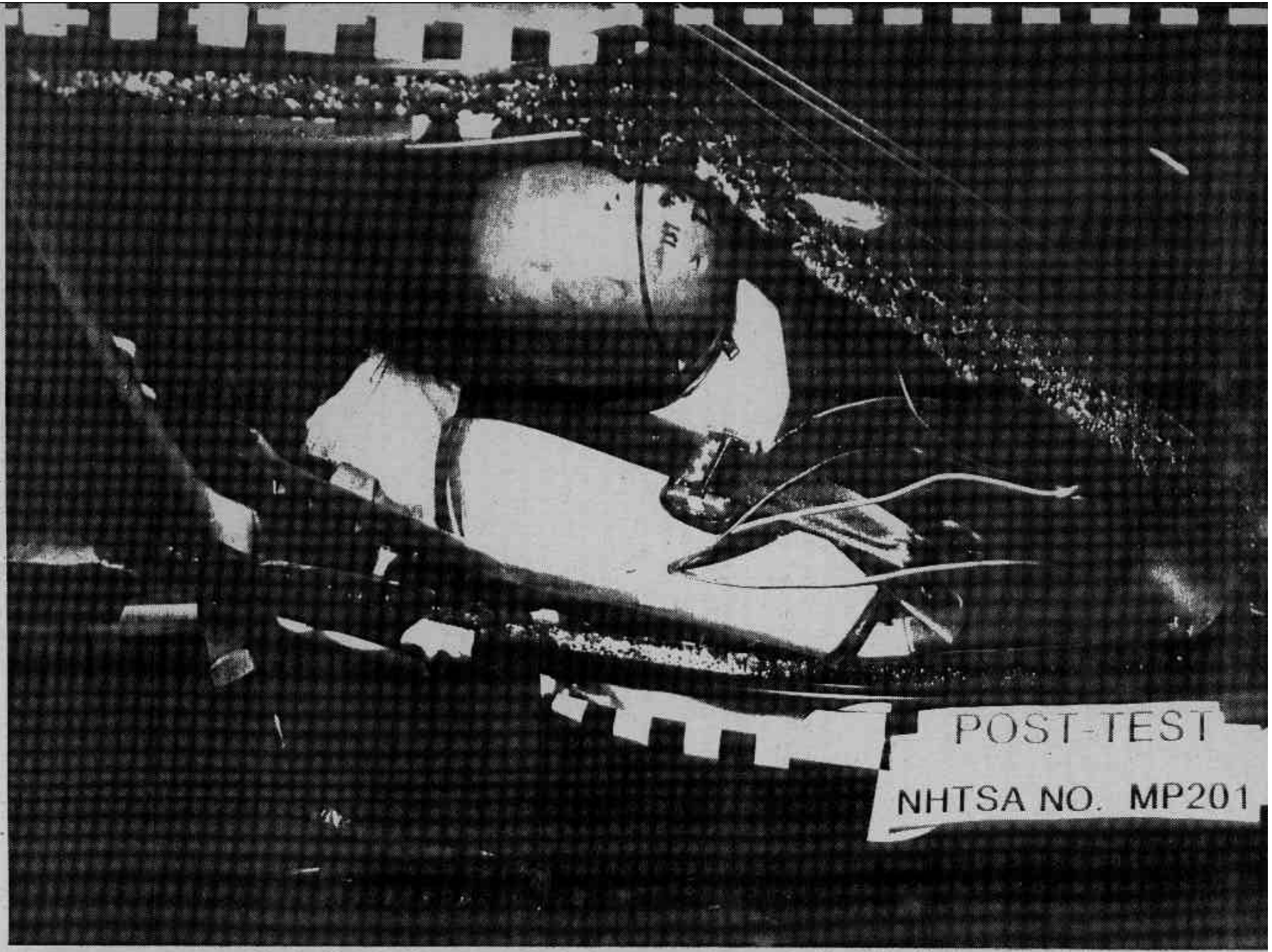


Photo No. A-33 - Pre-Test Passenger Dummy Left Side View



A-34

Photo No. A-34 - Post-Test Passenger Dummy Left Side View

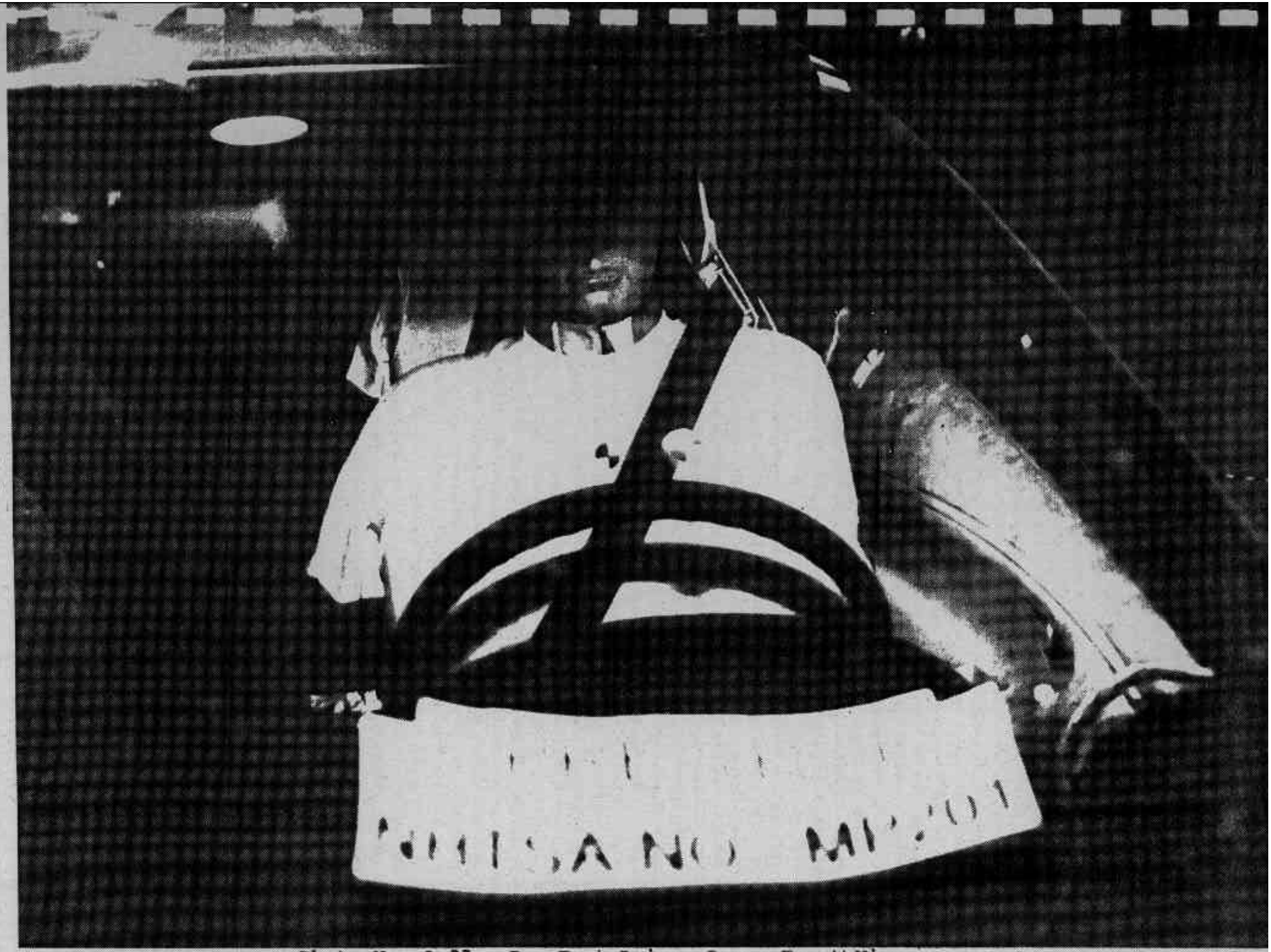


Photo No. A-35 - Pre-Test Driver Dummy Front View

Photo No. A-36 - Post-Test Driver Dummy Front View

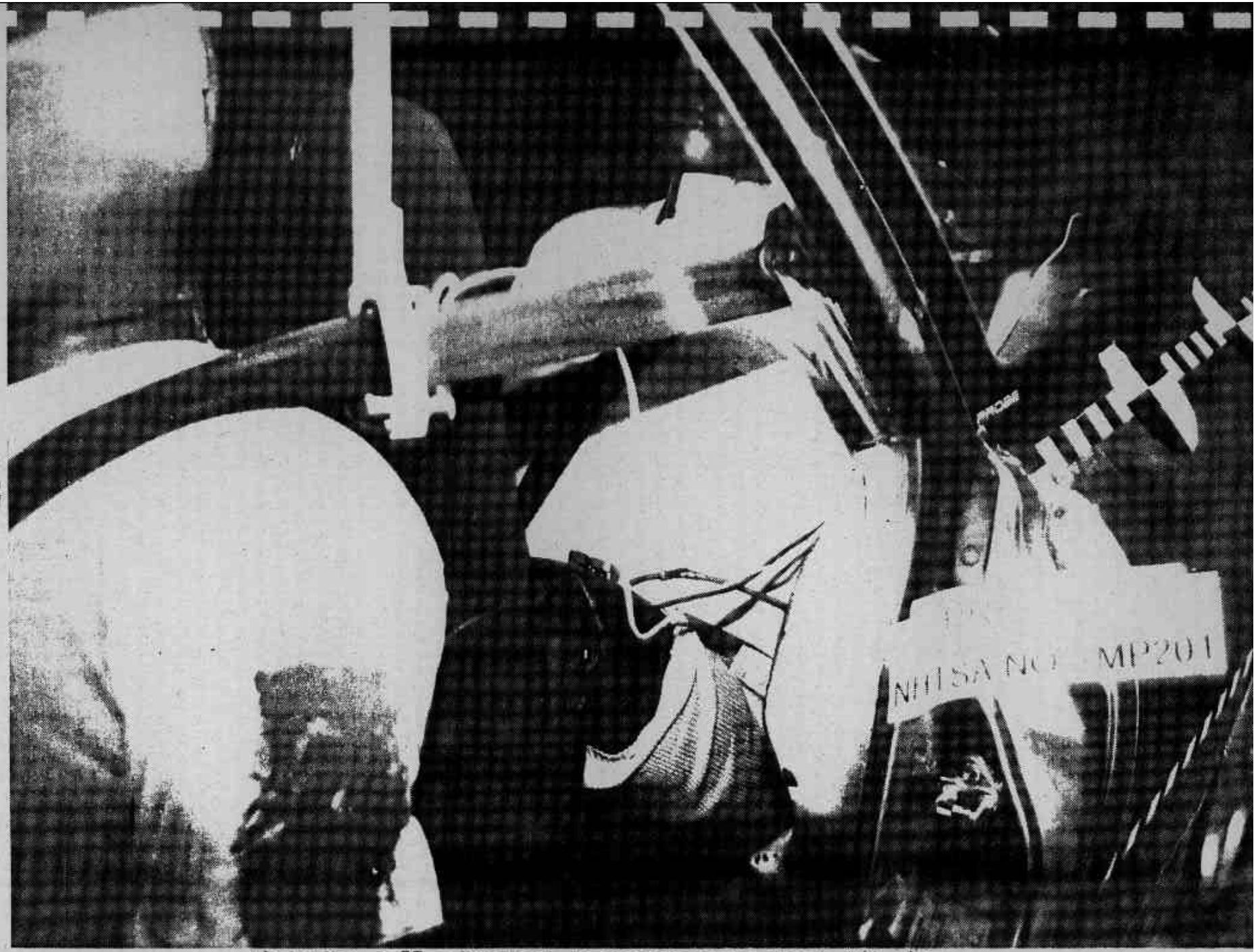


Photo No. A-37 - Pre-Test Passenger Dummy Front 1/4 View

Photo No. A-38 - Driver Impact

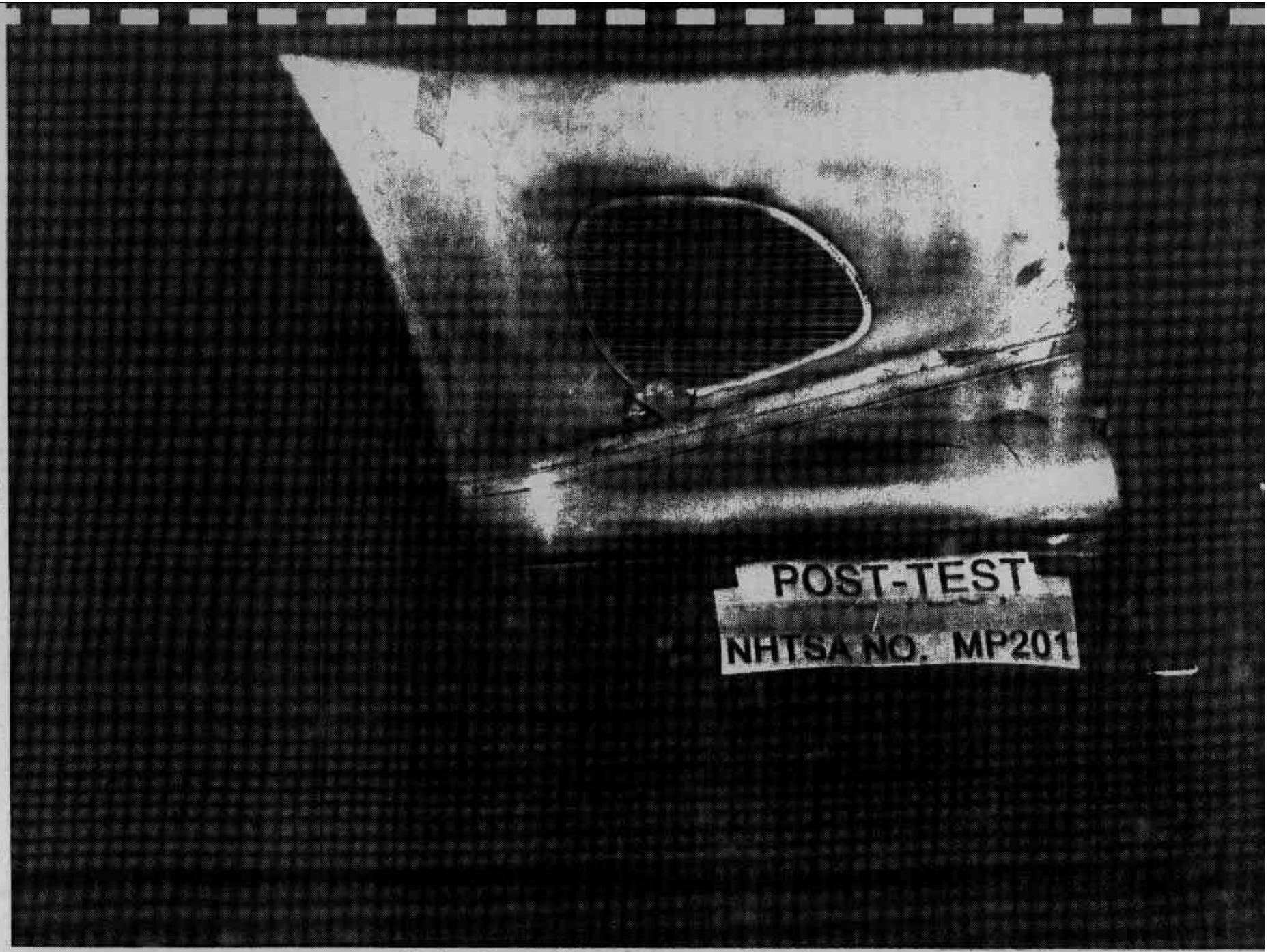
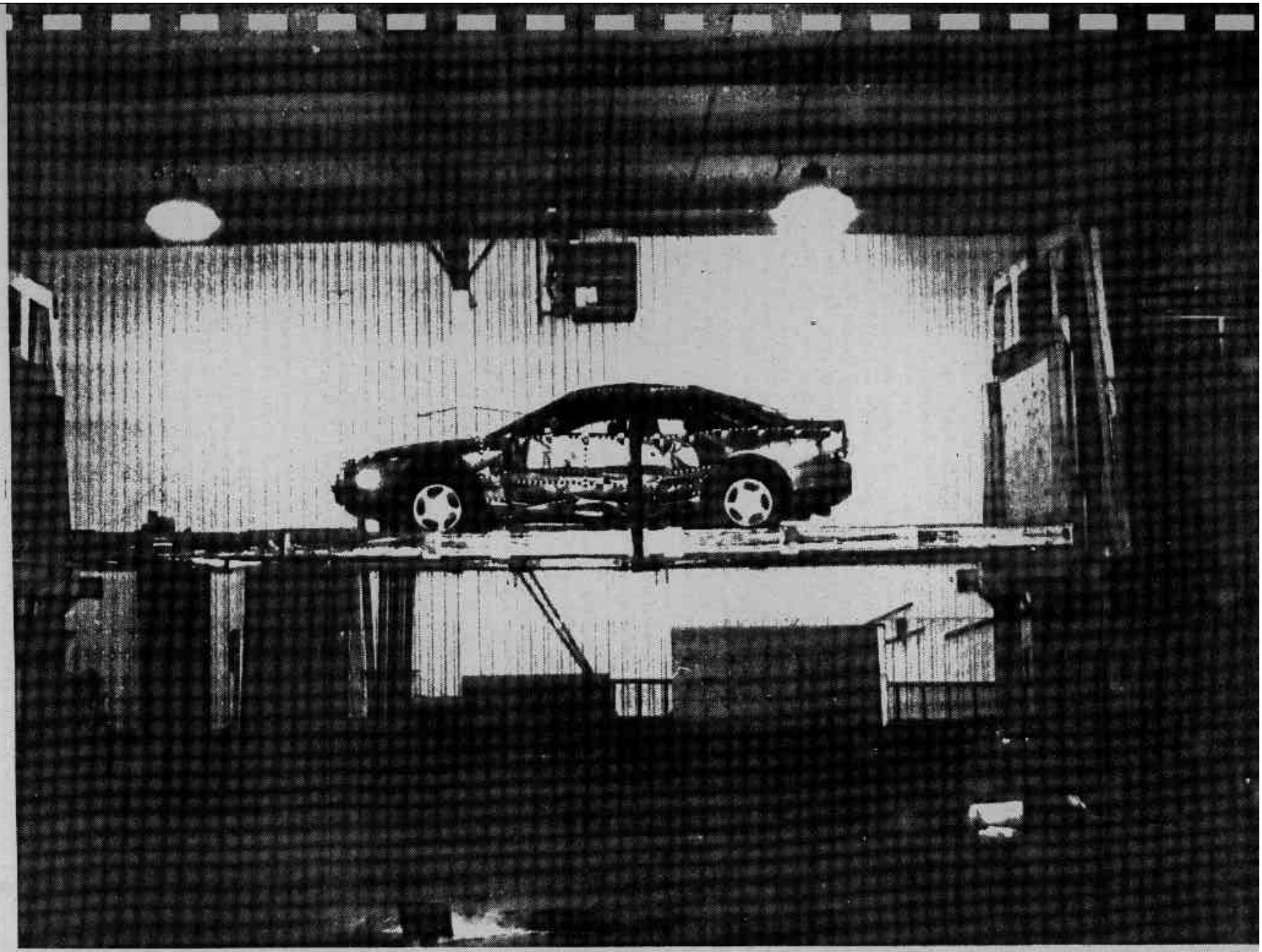
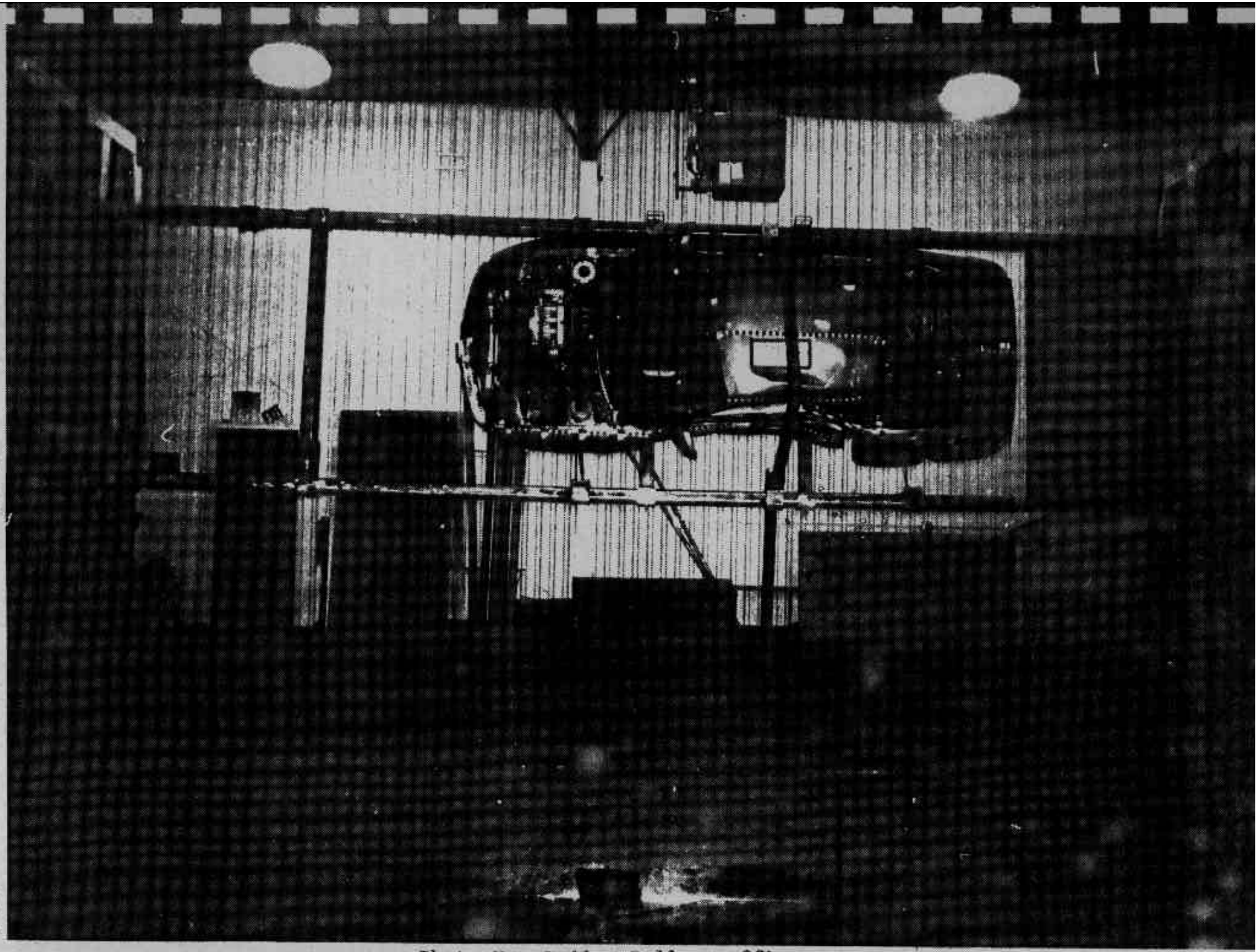


Photo No. A-39 - Passenger Impact



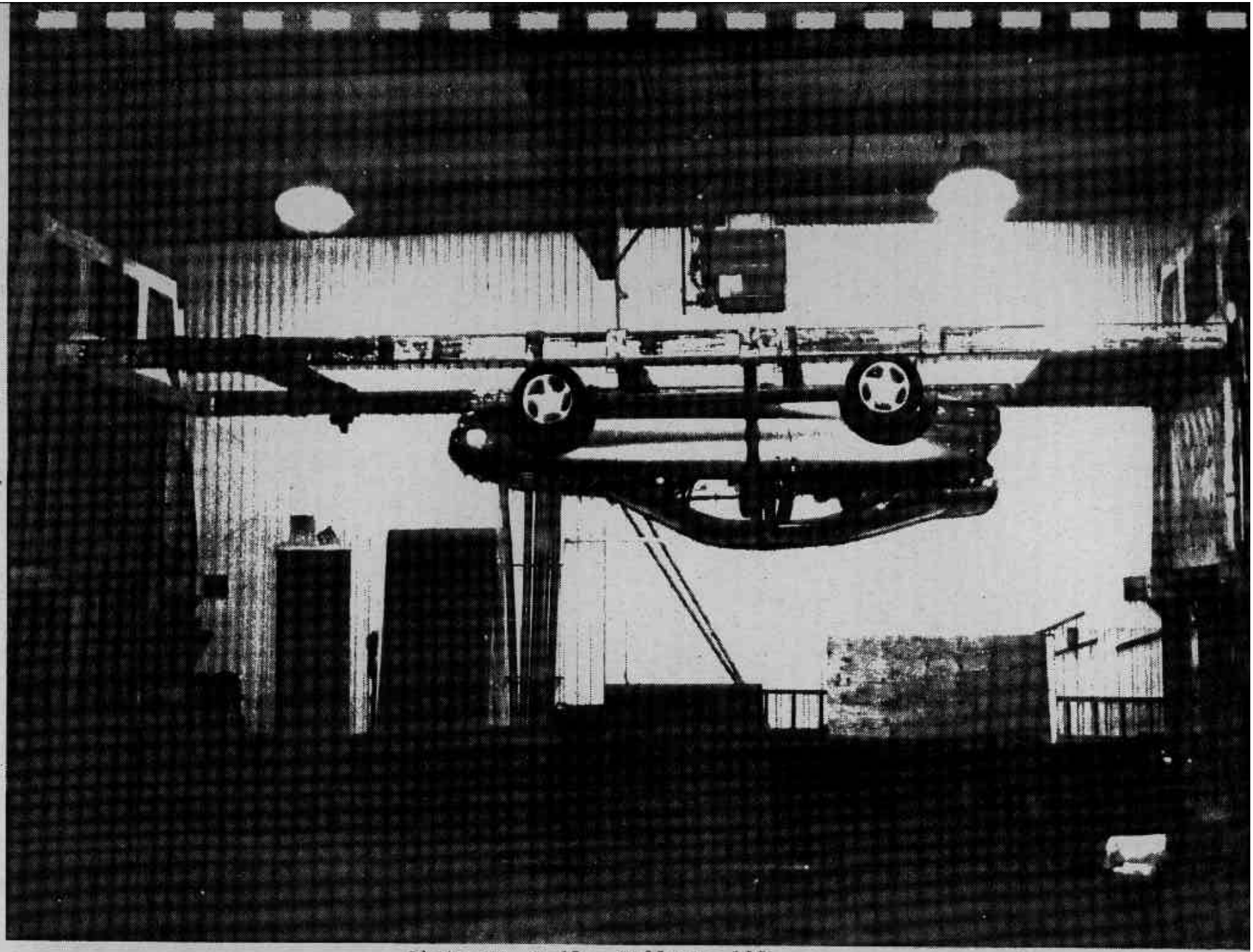
A-40

Photo No. A-40 - Rollover 0°



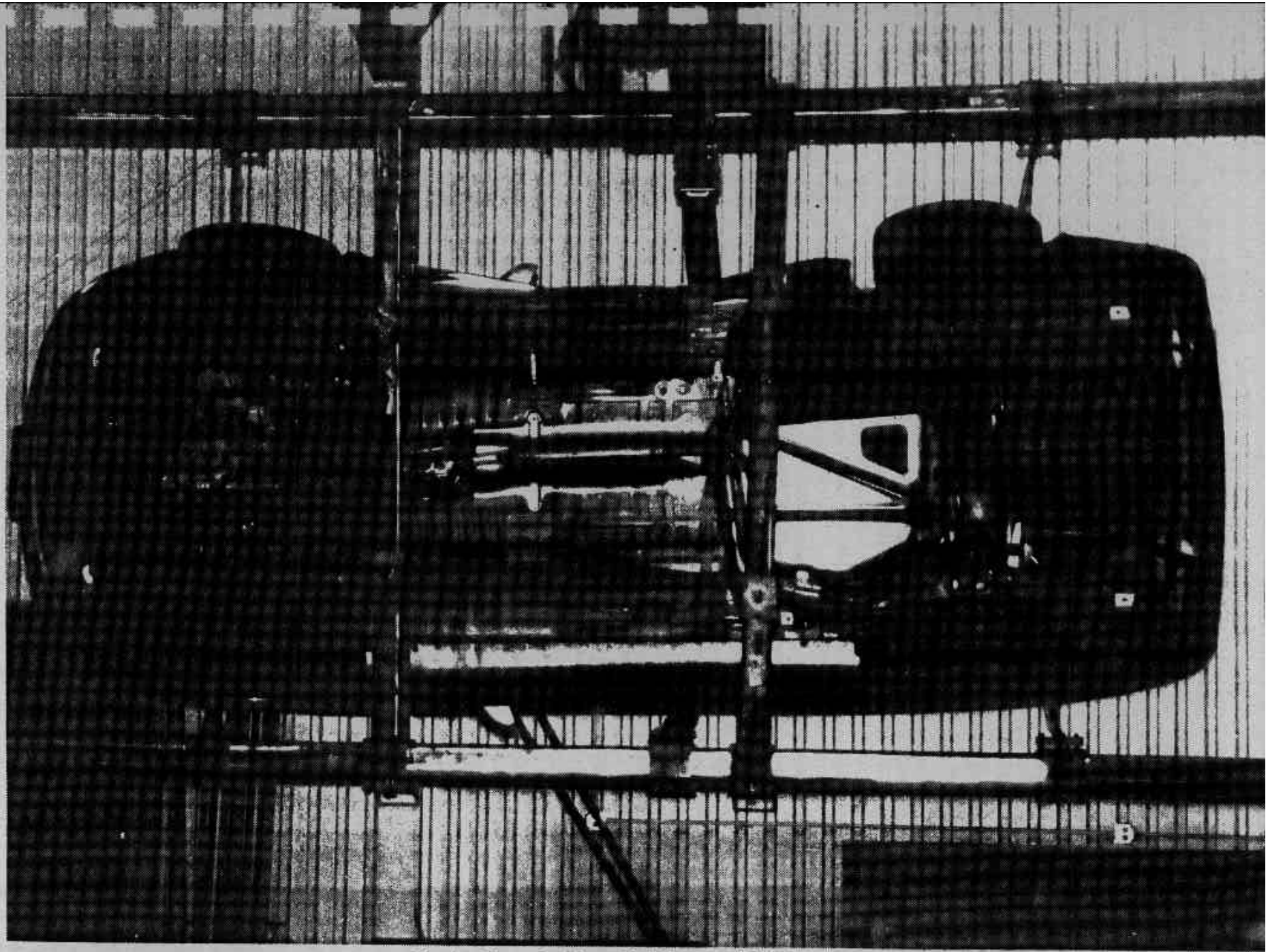
A-41

Photo No. A-41 - Rollover 90°



A-42

Photo No. A-42 - Rollover 180°



A-43

Photo No. A-43 - Rollover 270°

APPENDIX B - DATA PLOTS

Table of Data Plots

Table of Data Plots (continued)

Table of Data Plots (continued)

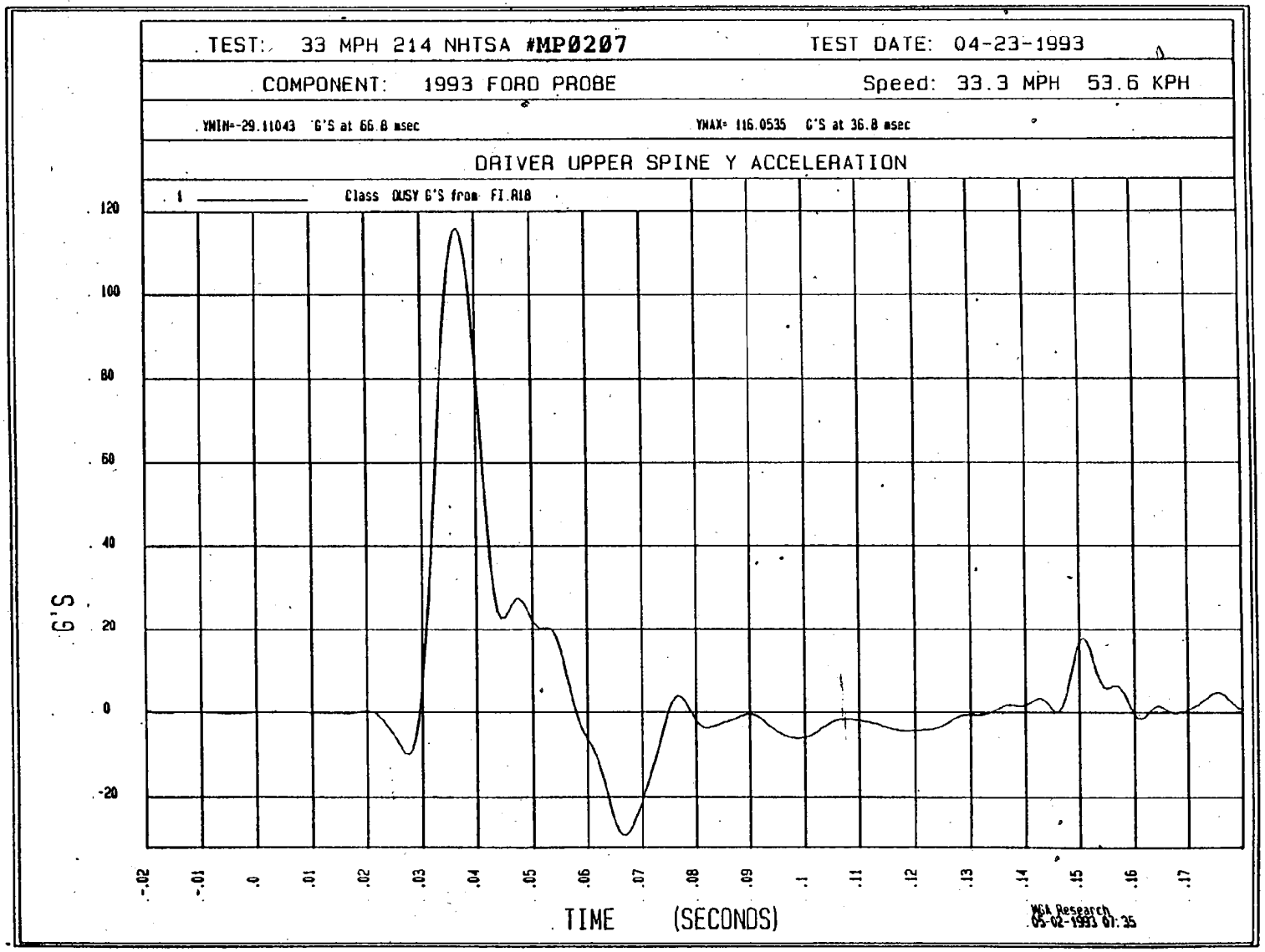


Figure B-1 - Driver Upper Spine Y Acceleration vs. Time

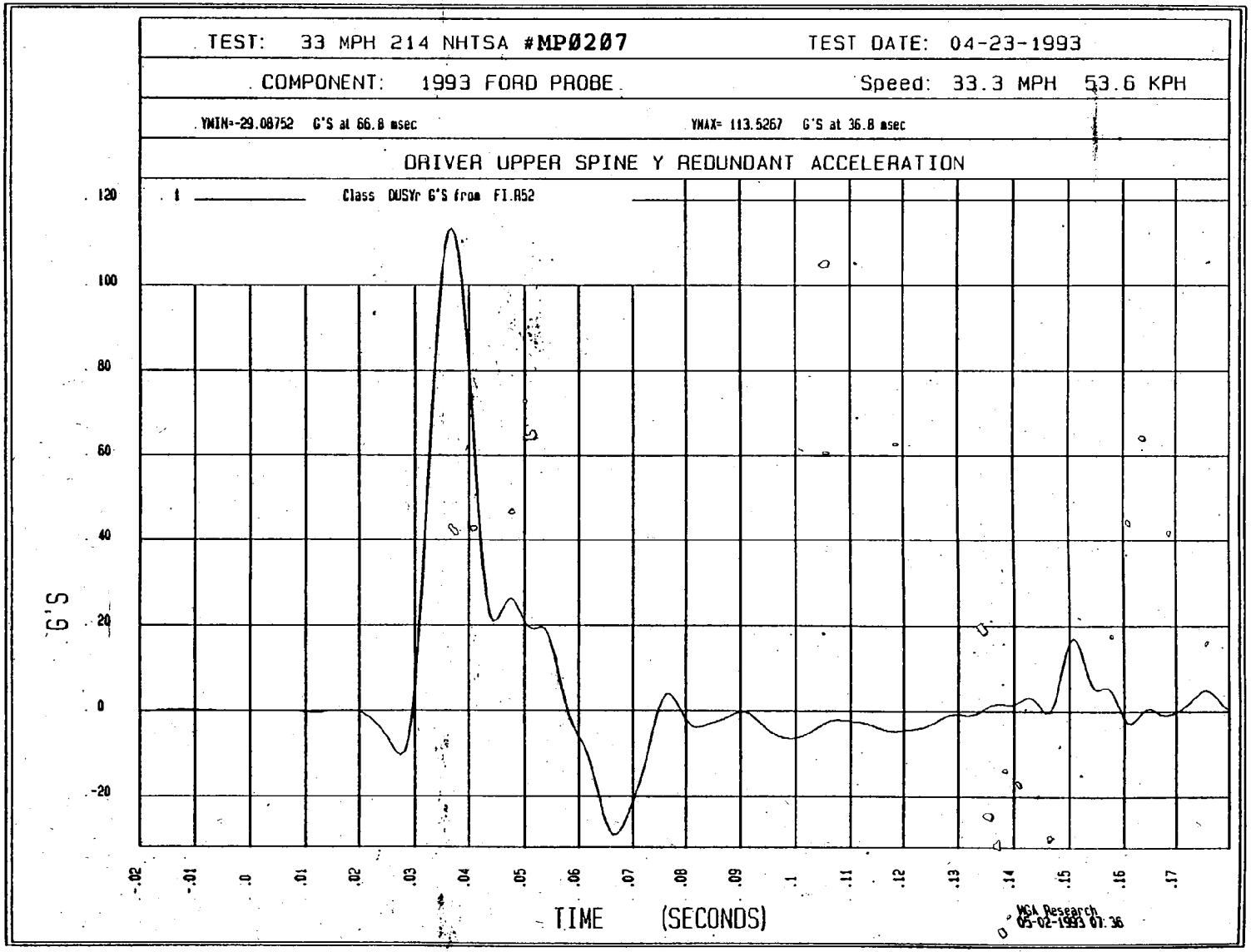
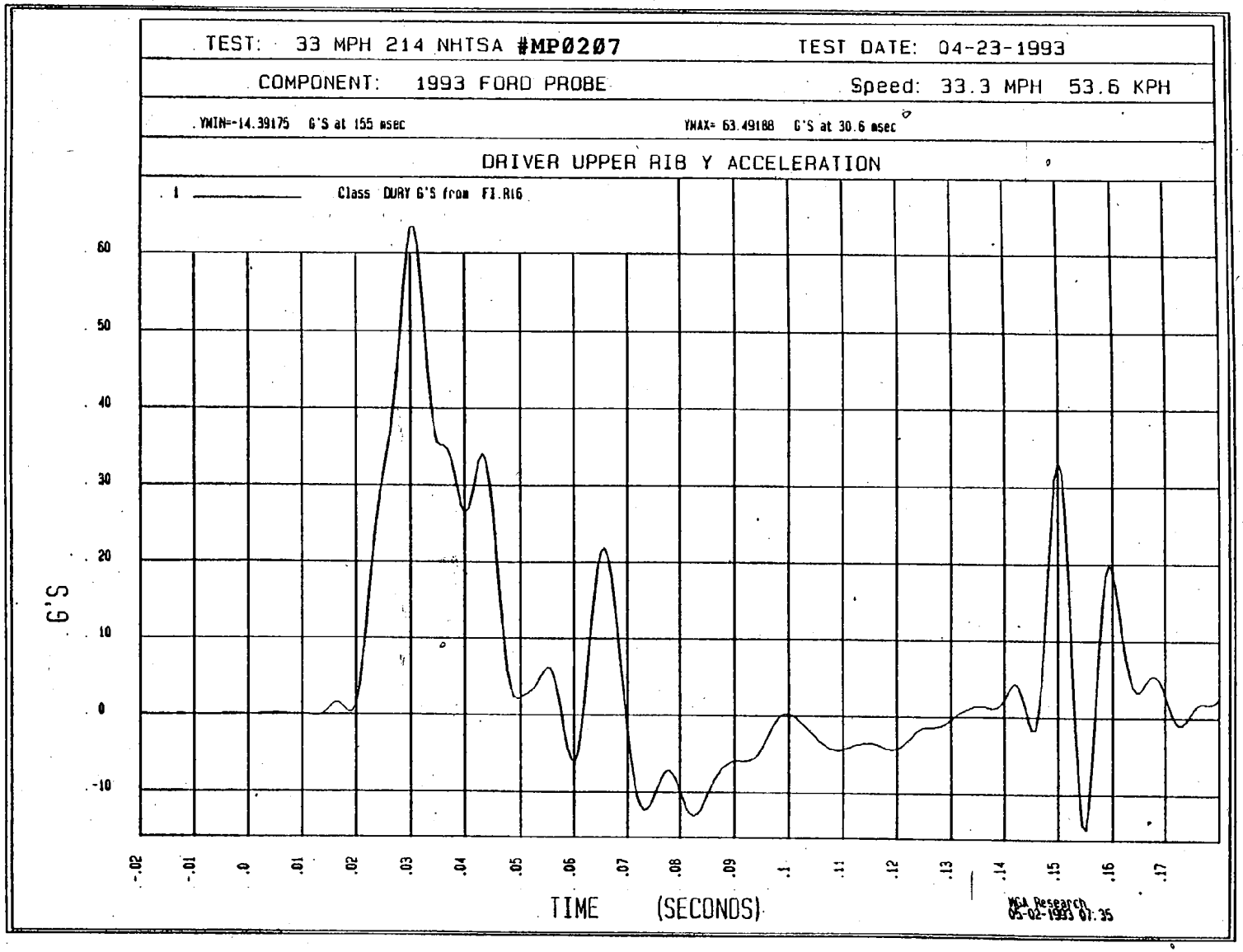


Figure B-2 - Driver Upper Spine Y Redundant Acceleration vs. Time



B-3

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

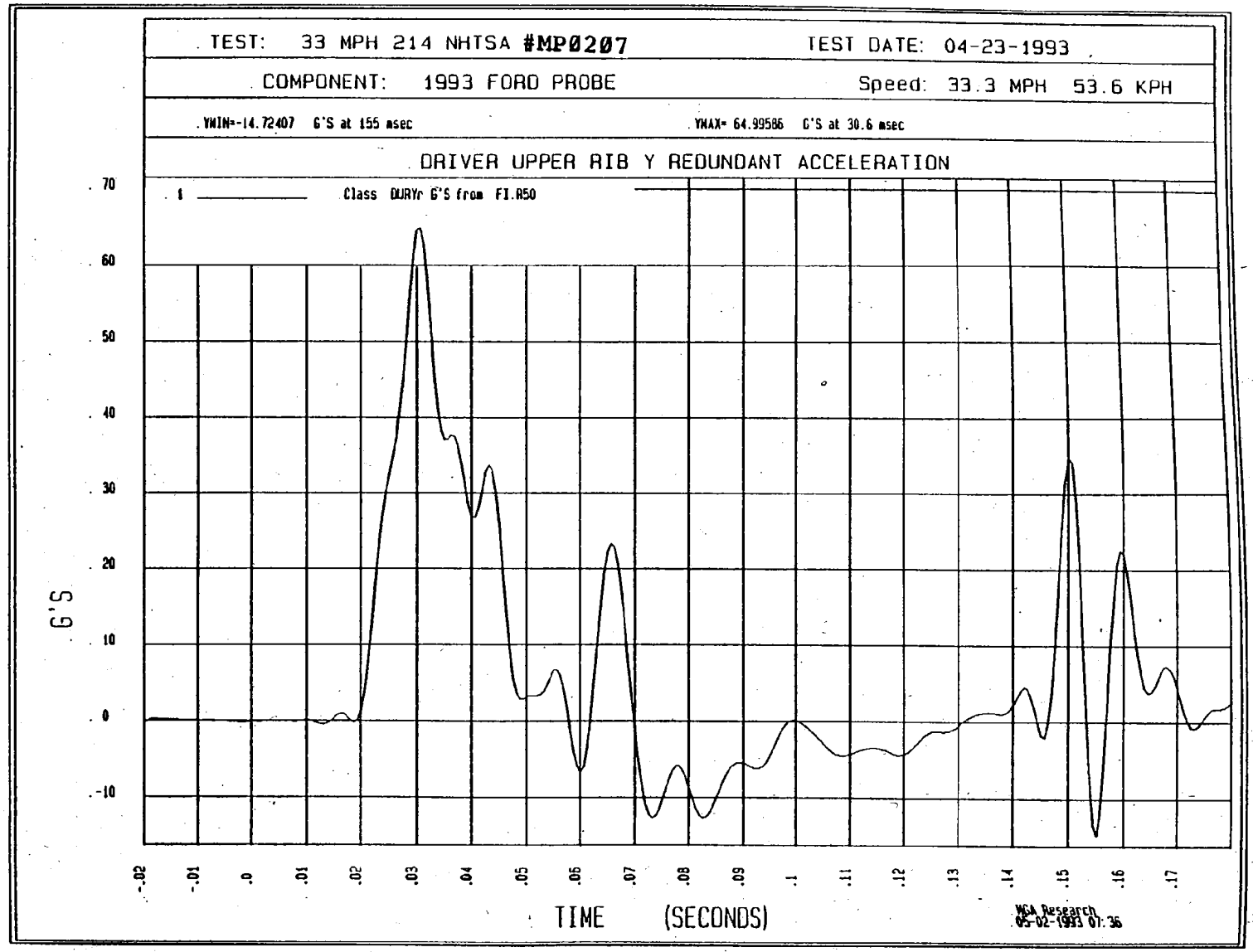


Figure B-4 - Driver Upper Rib Y Redundant Acceleration vs. Time

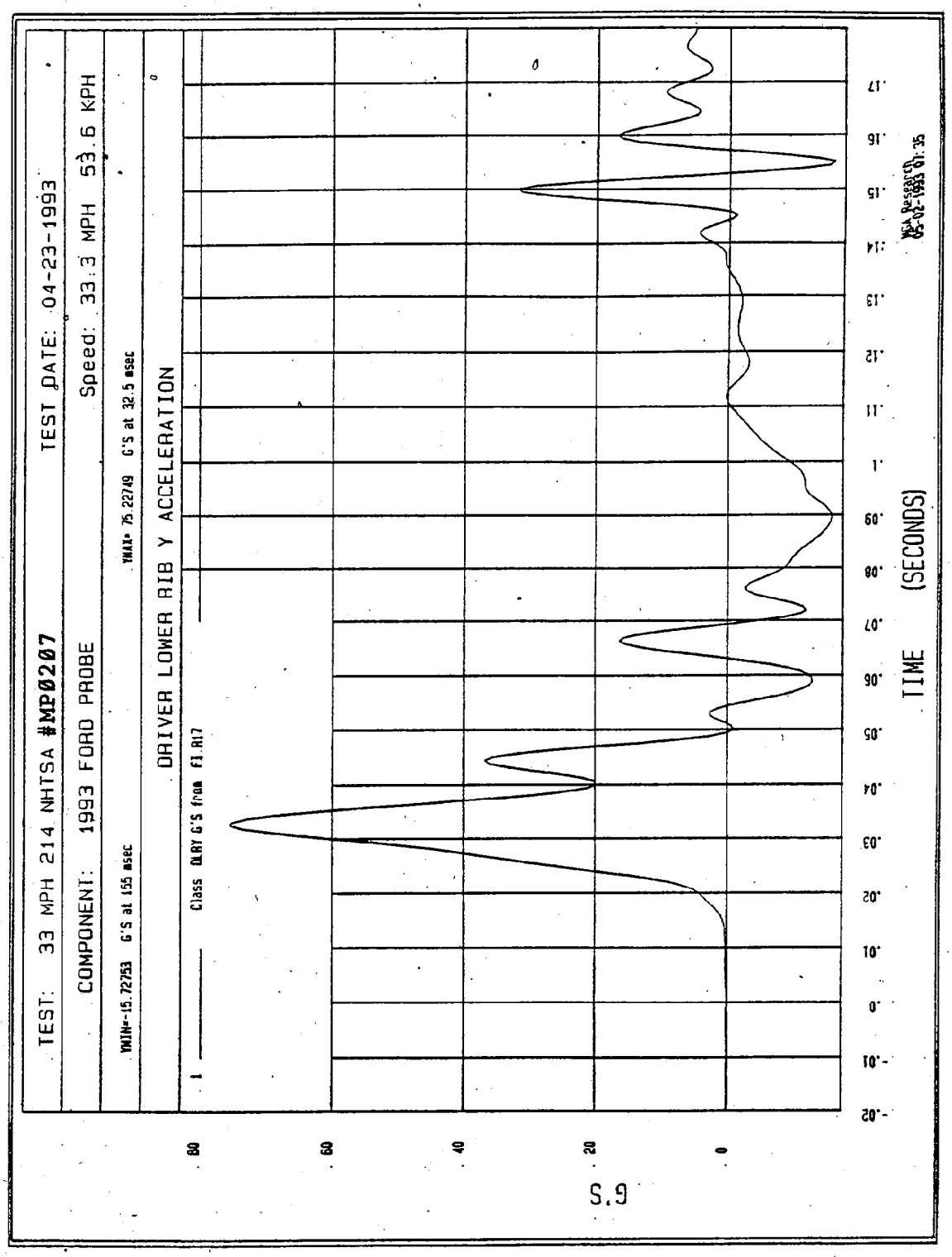
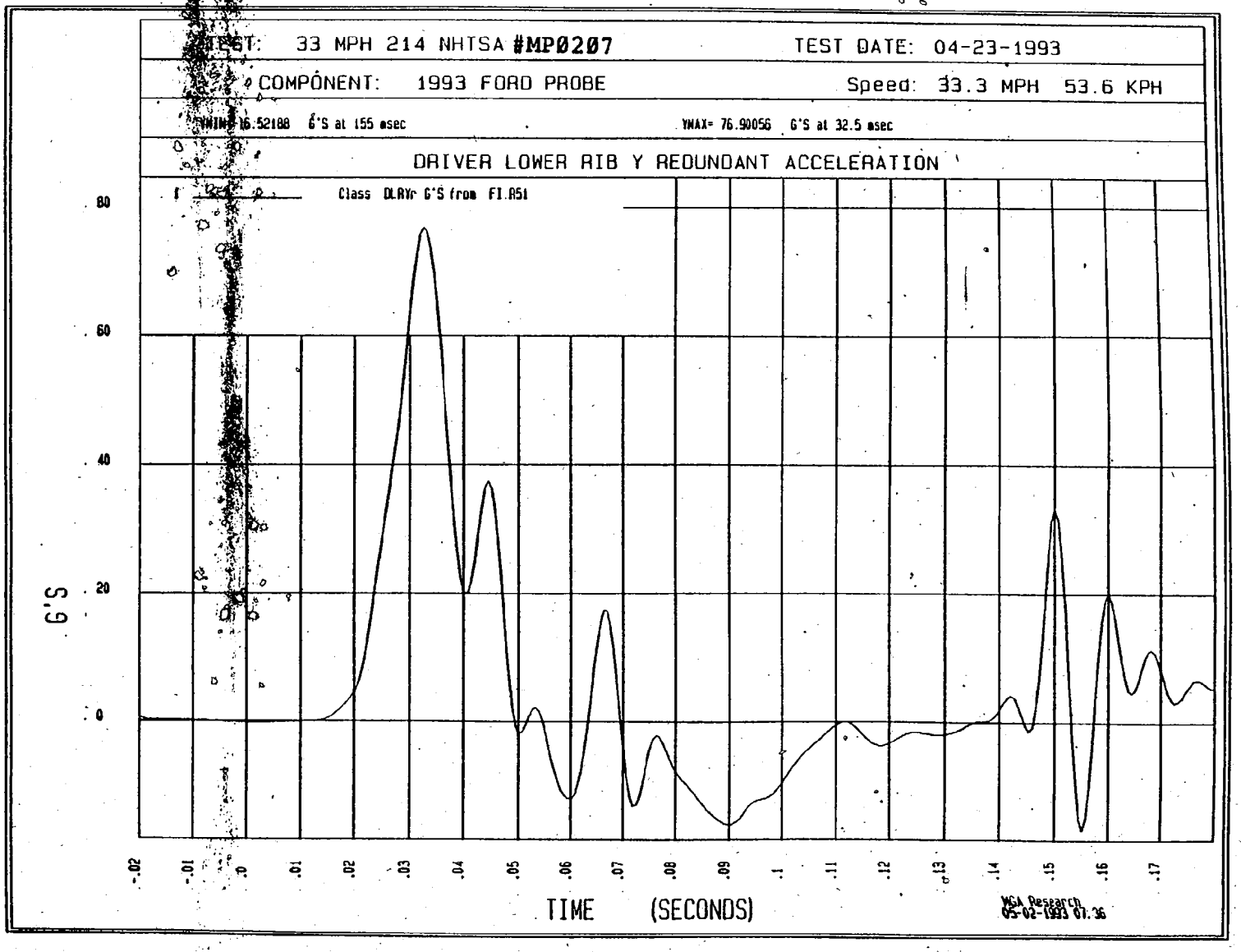


Figure B-5 - Driver Lower Rib Y Acceleration vs. Time



B-6

Figure B-6 - Driver Lower Rib Y Redundant Acceleration vs. Time

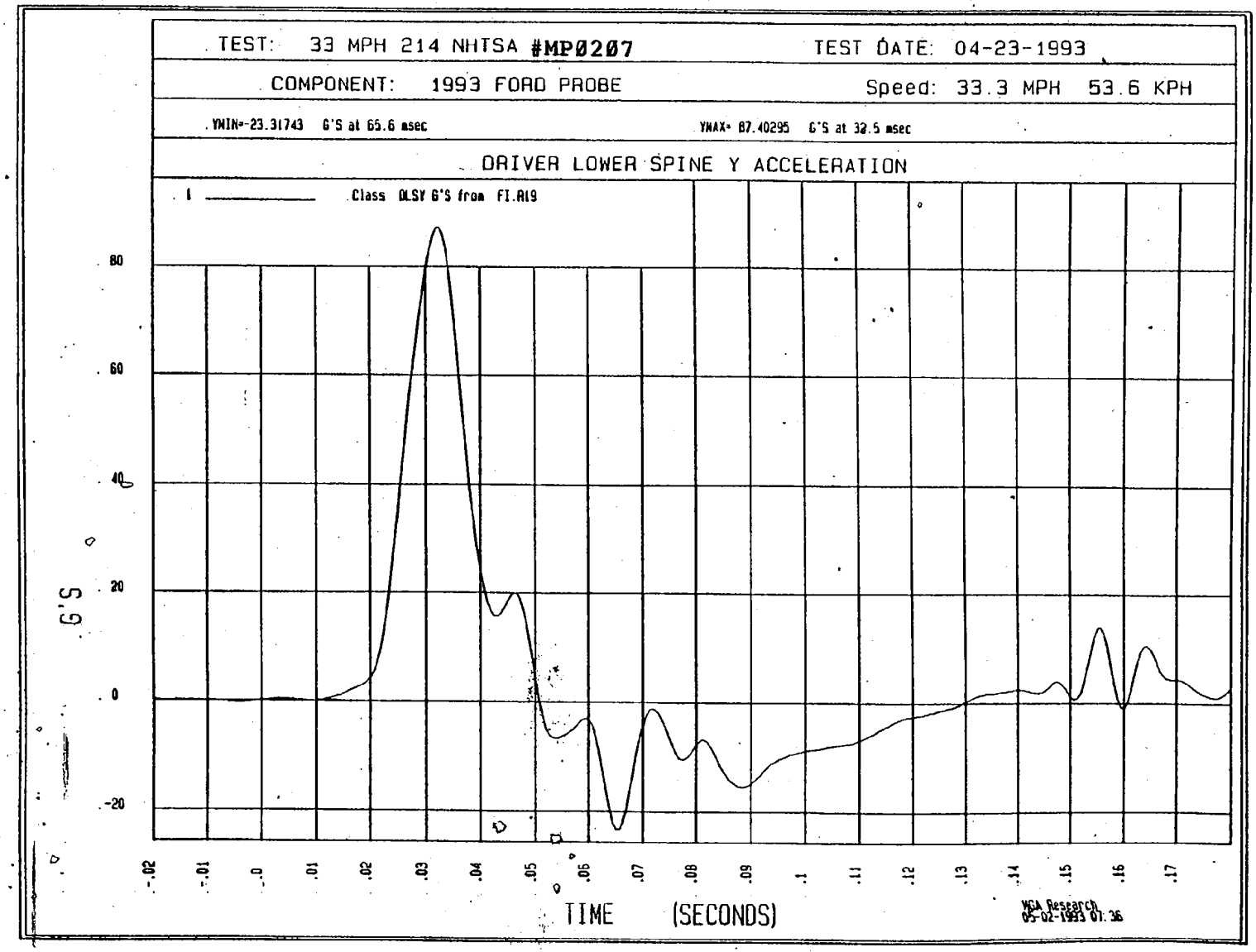


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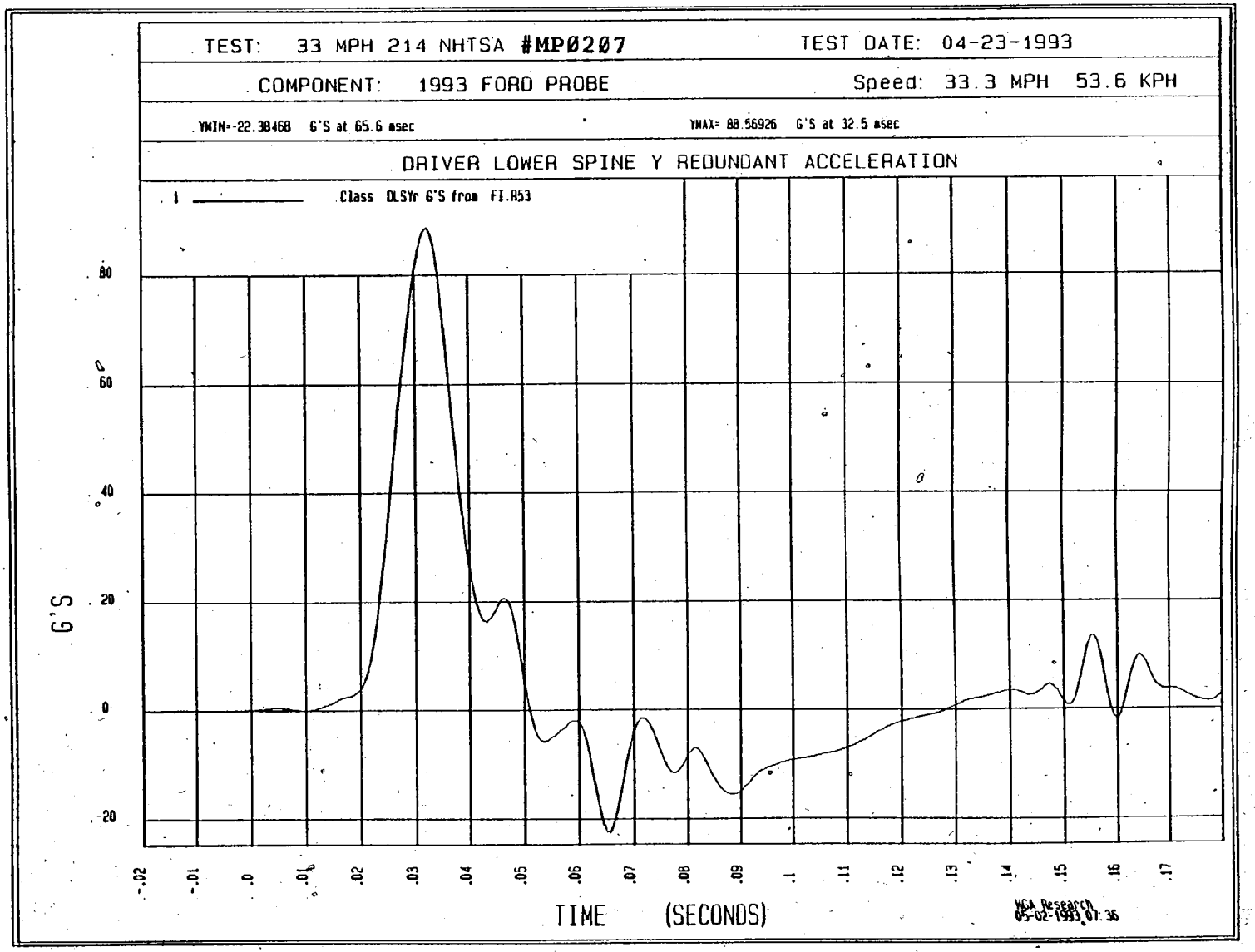
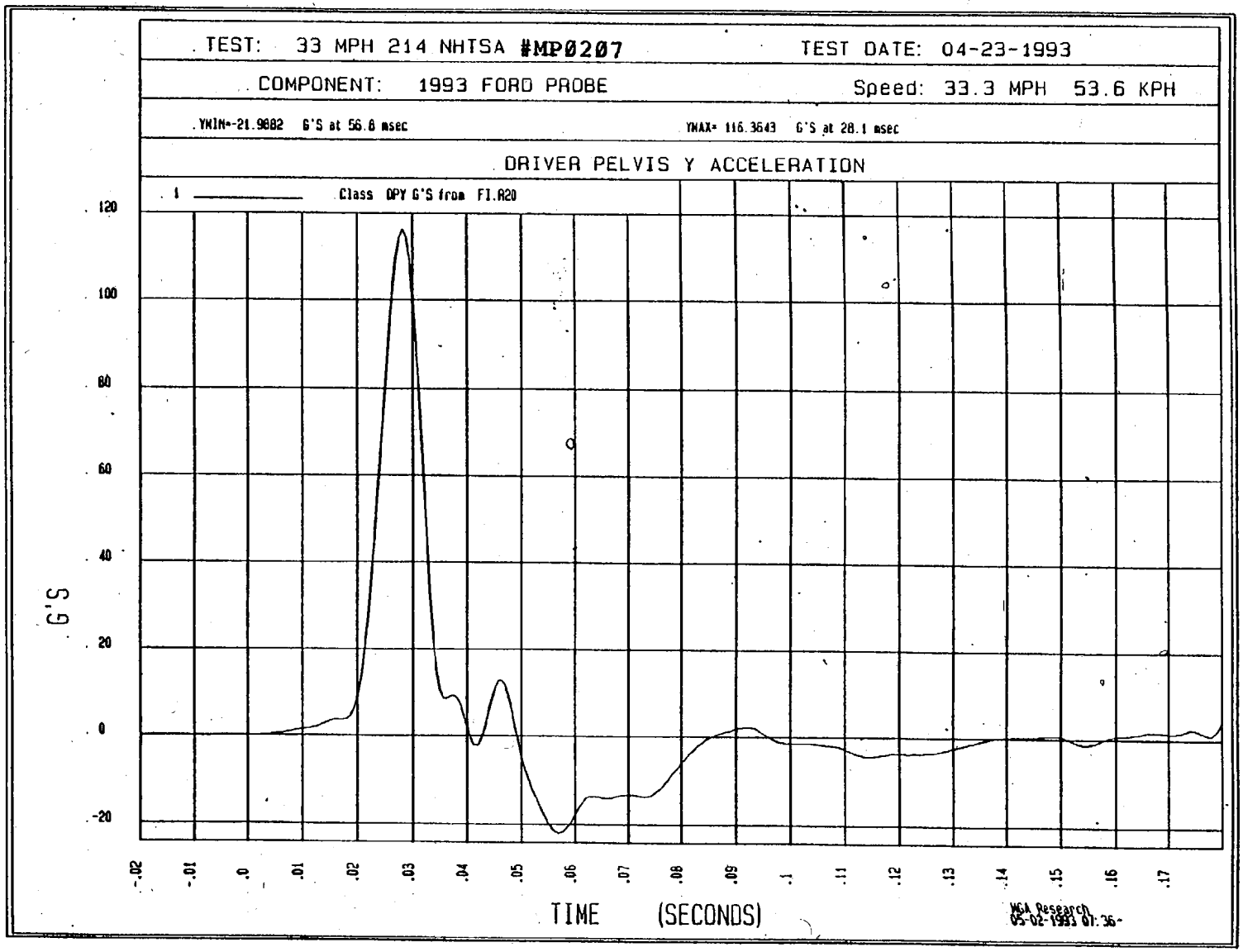
Figure B-7 - Driver Lower Spine Y Acceleration vs. Time



B-8

Figure B-8 - Driver Lower Spine Y Redundant Acceleration vs. Time



B-9

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

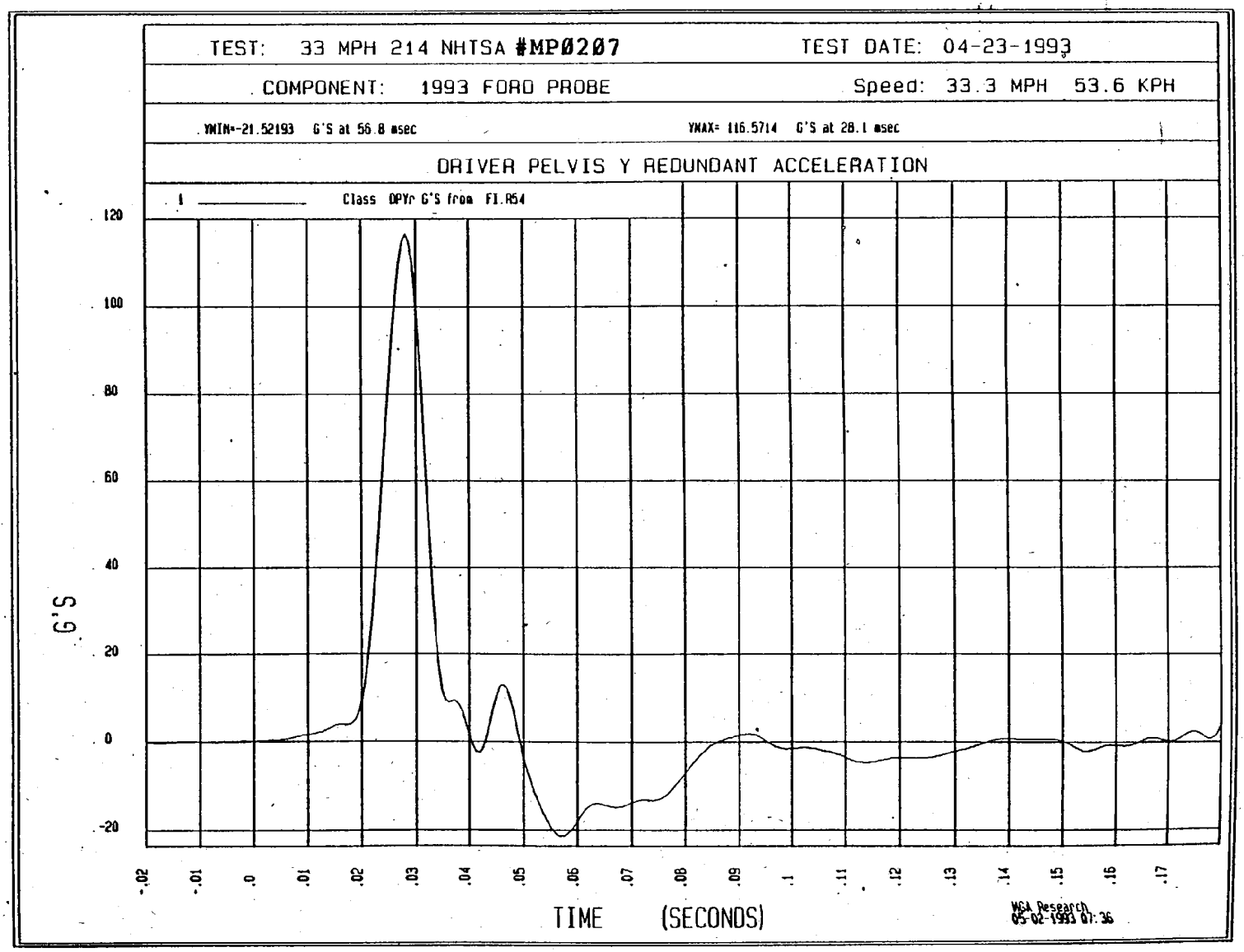


Figure B-10 - Driver Pelvis Y Redundant Acceleration vs. Time

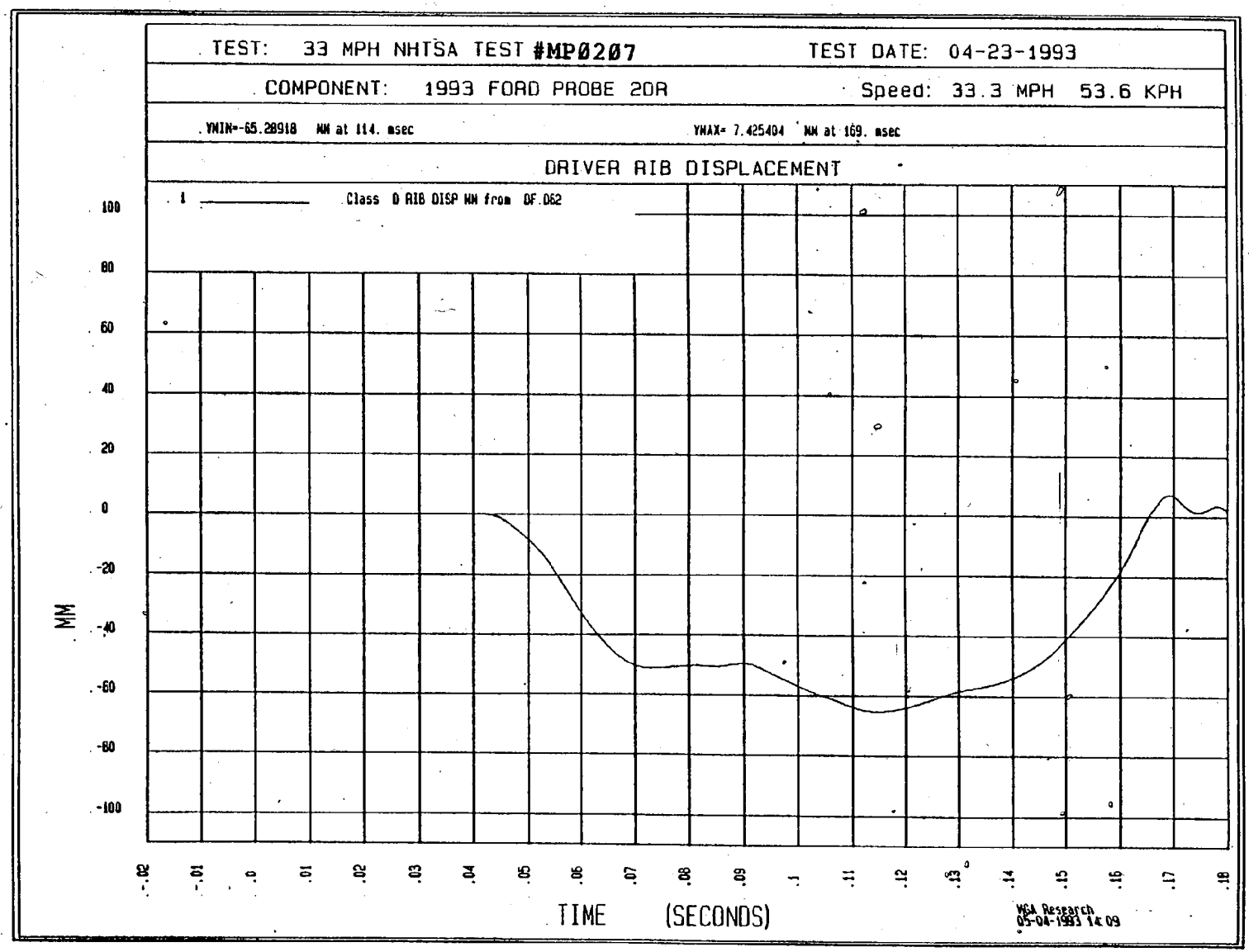


Figure B-11 - Driver Rib Displacement vs. Time

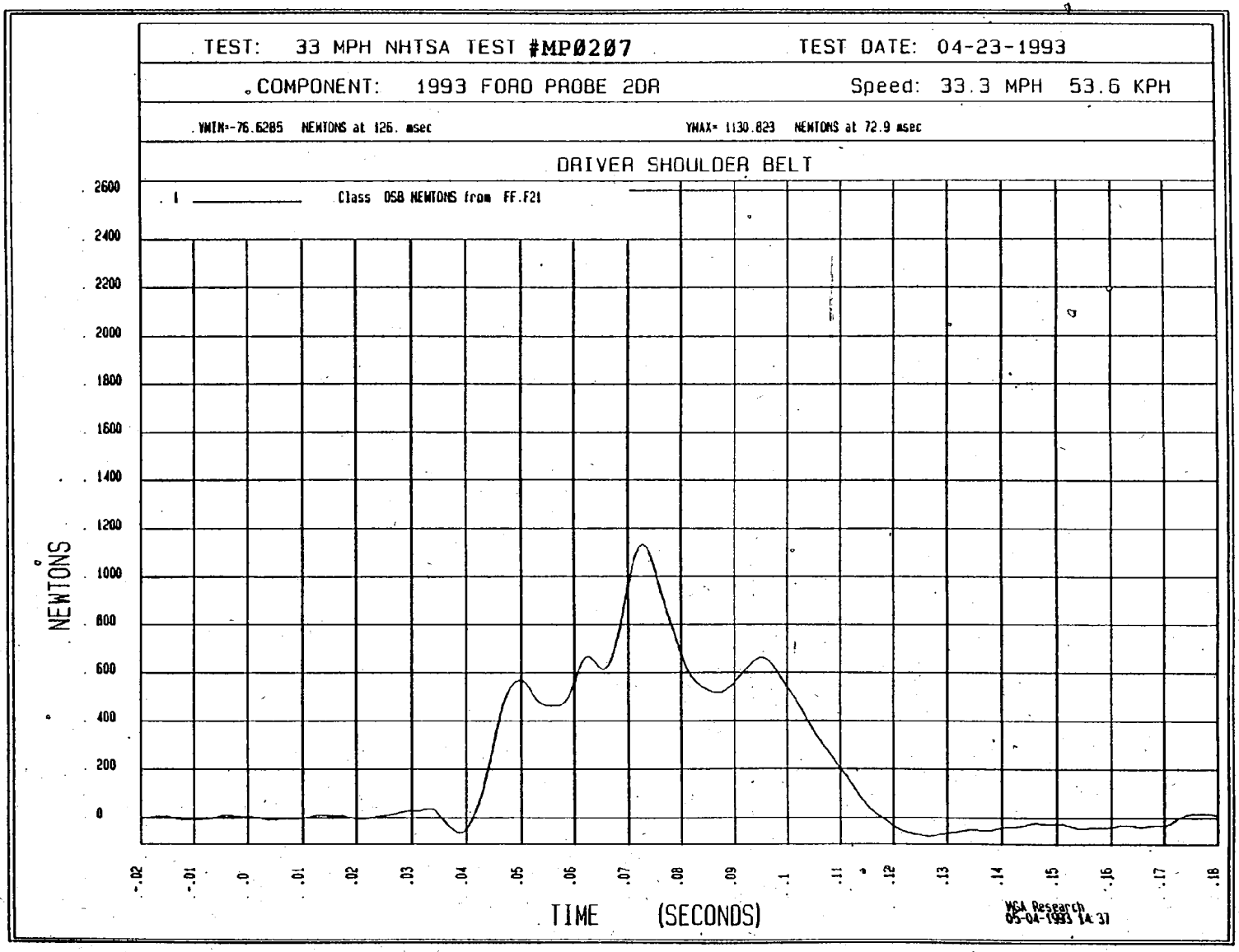


Figure B-12 - Driver Shoulder Belt

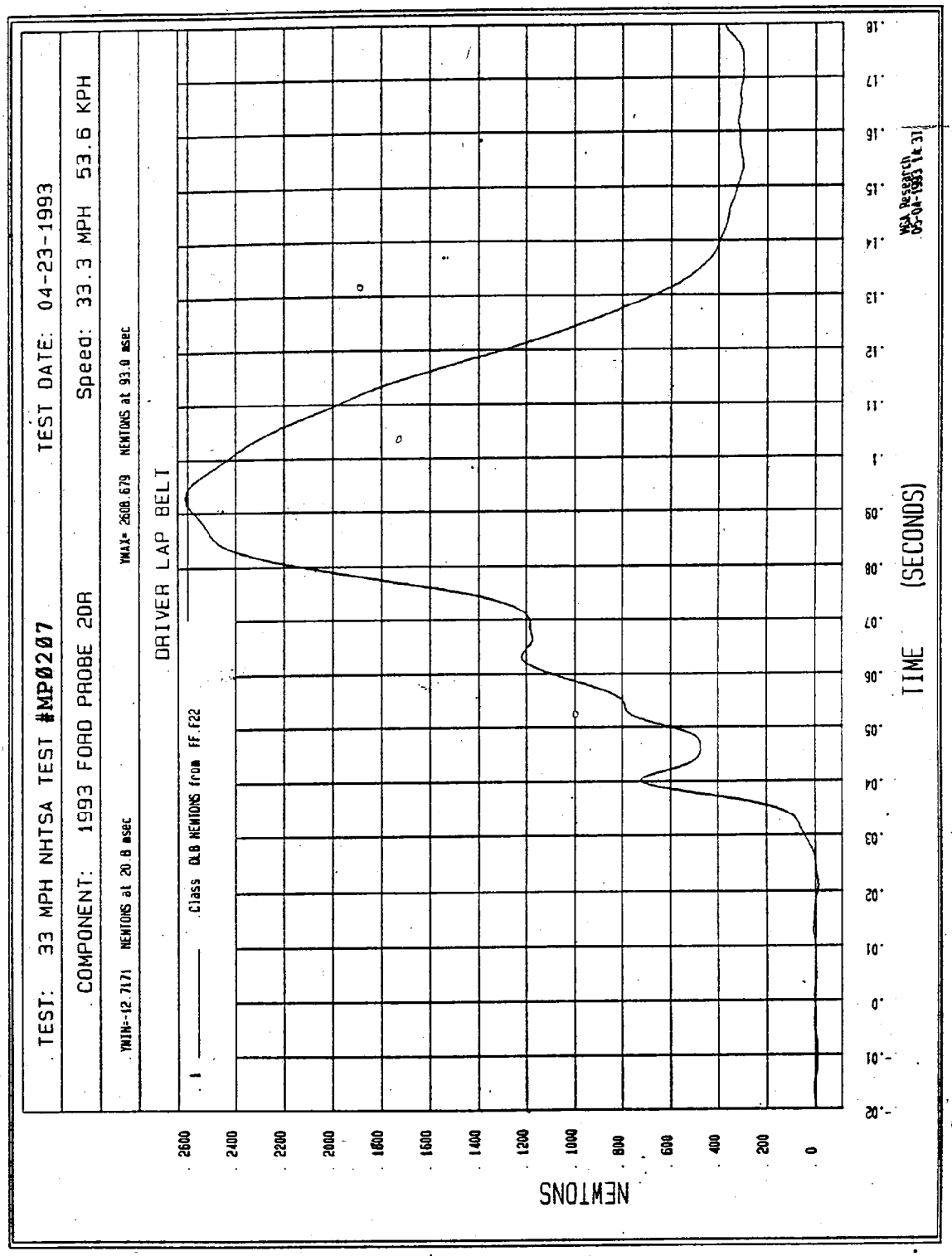


Figure B-13 - Driver Lap Belt

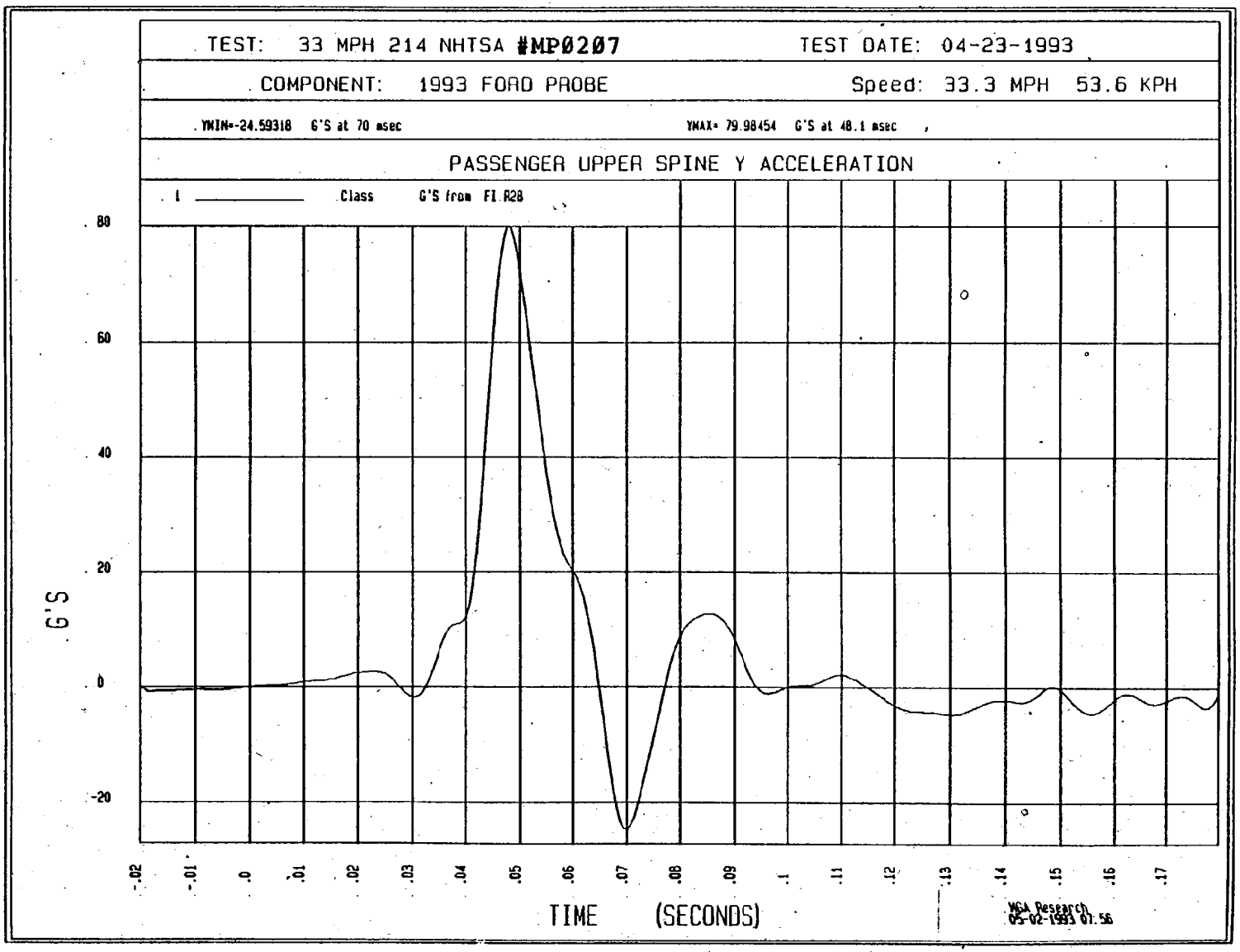


Figure B-14 - Passenger Upper Spine Y Acceleration vs. Time

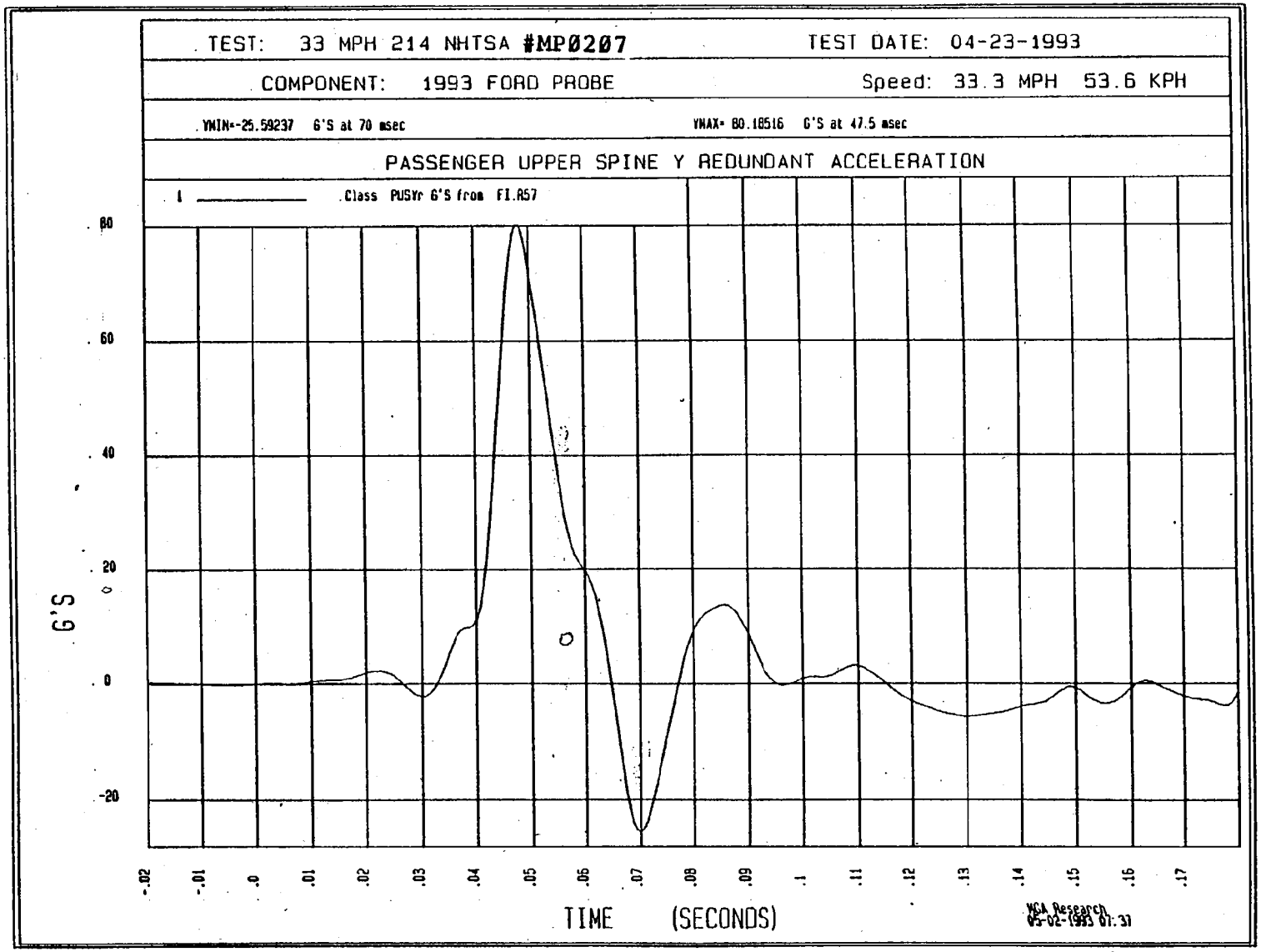


Figure B-15 - Passenger Upper Spine Y Redundant Acceleration vs. Time

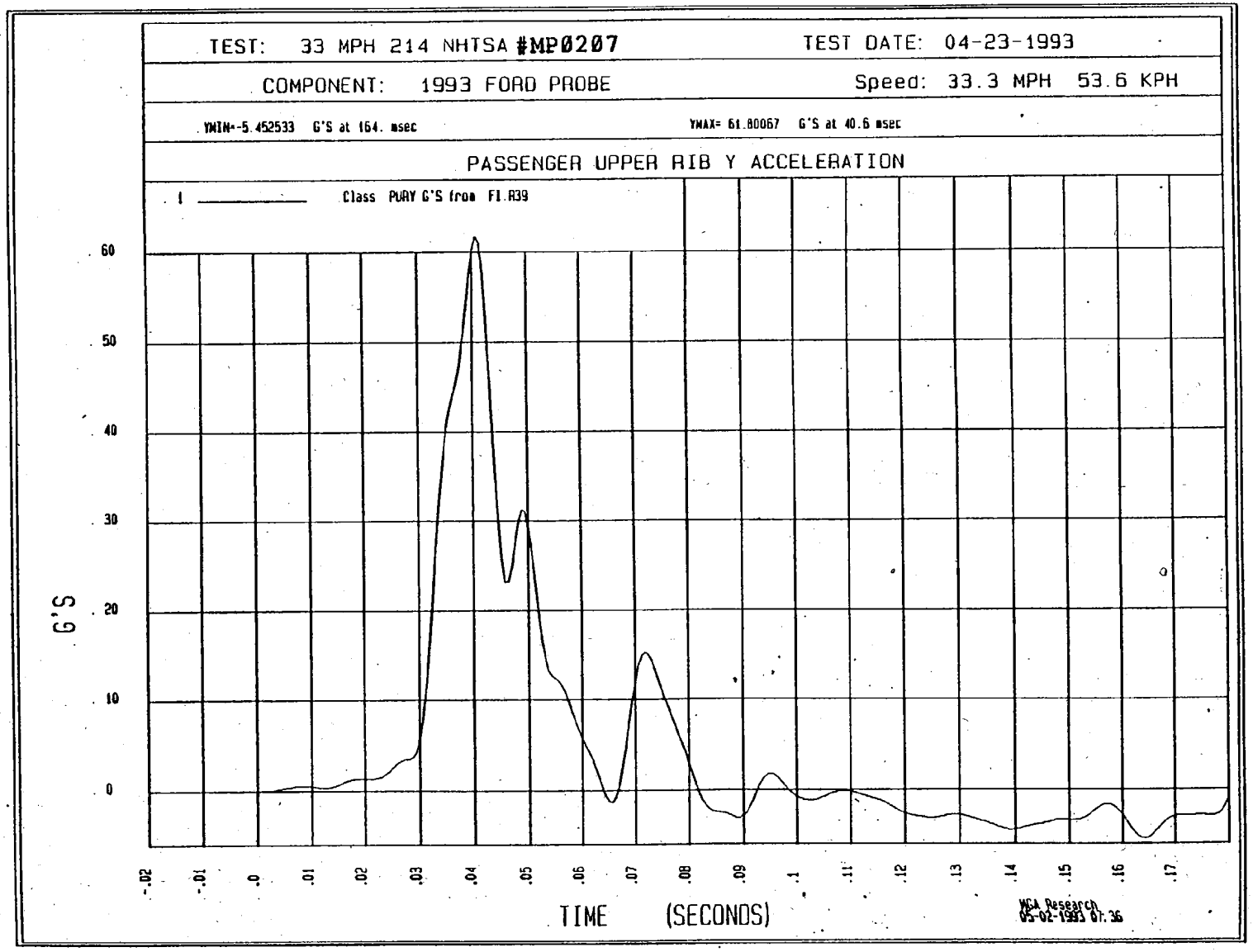


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Figure B-16 - Passenger Upper Rib Y Acceleration vs. Time

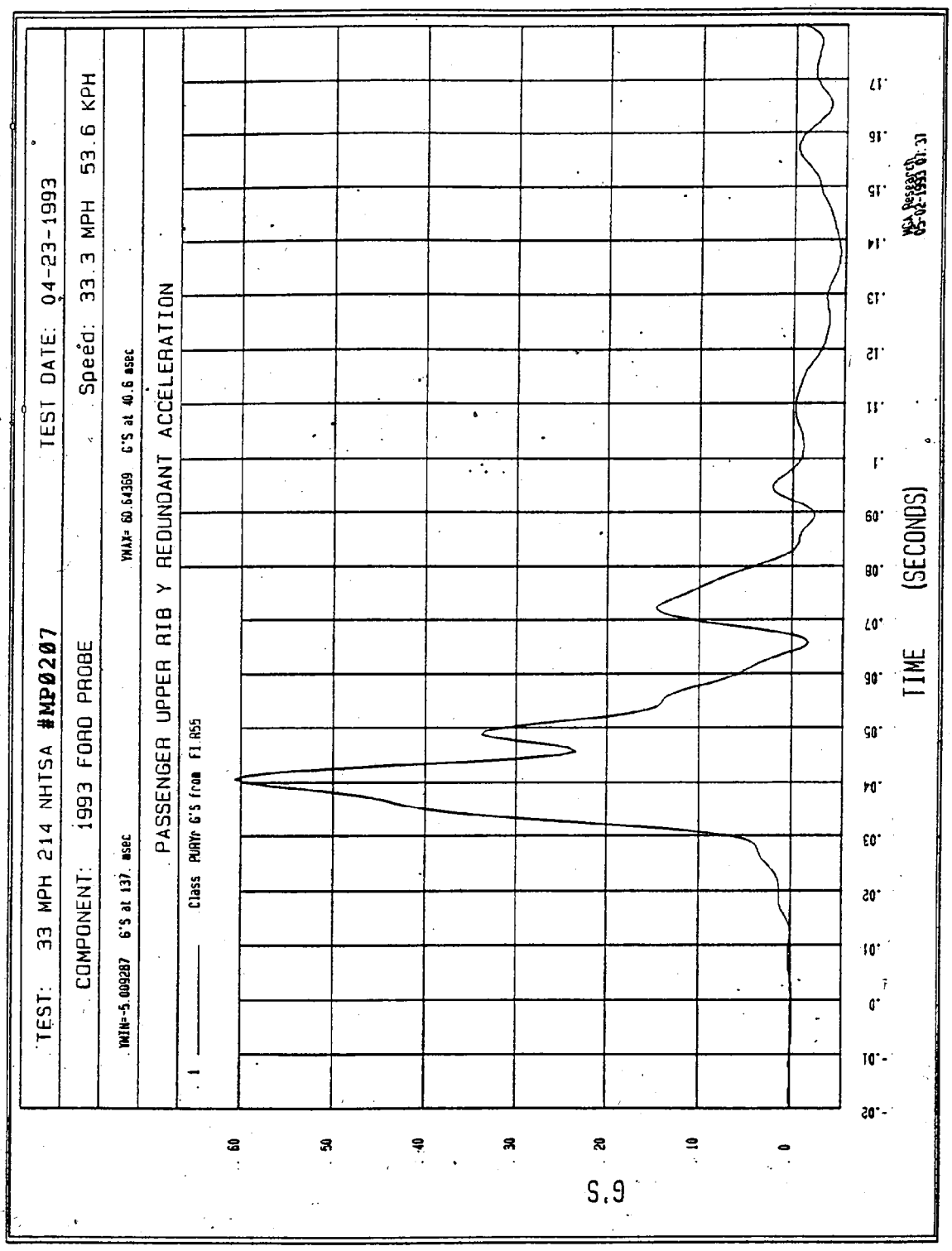

Figure B-17 - Passenger Upper Rib Y Redundant Acceleration vs. Time

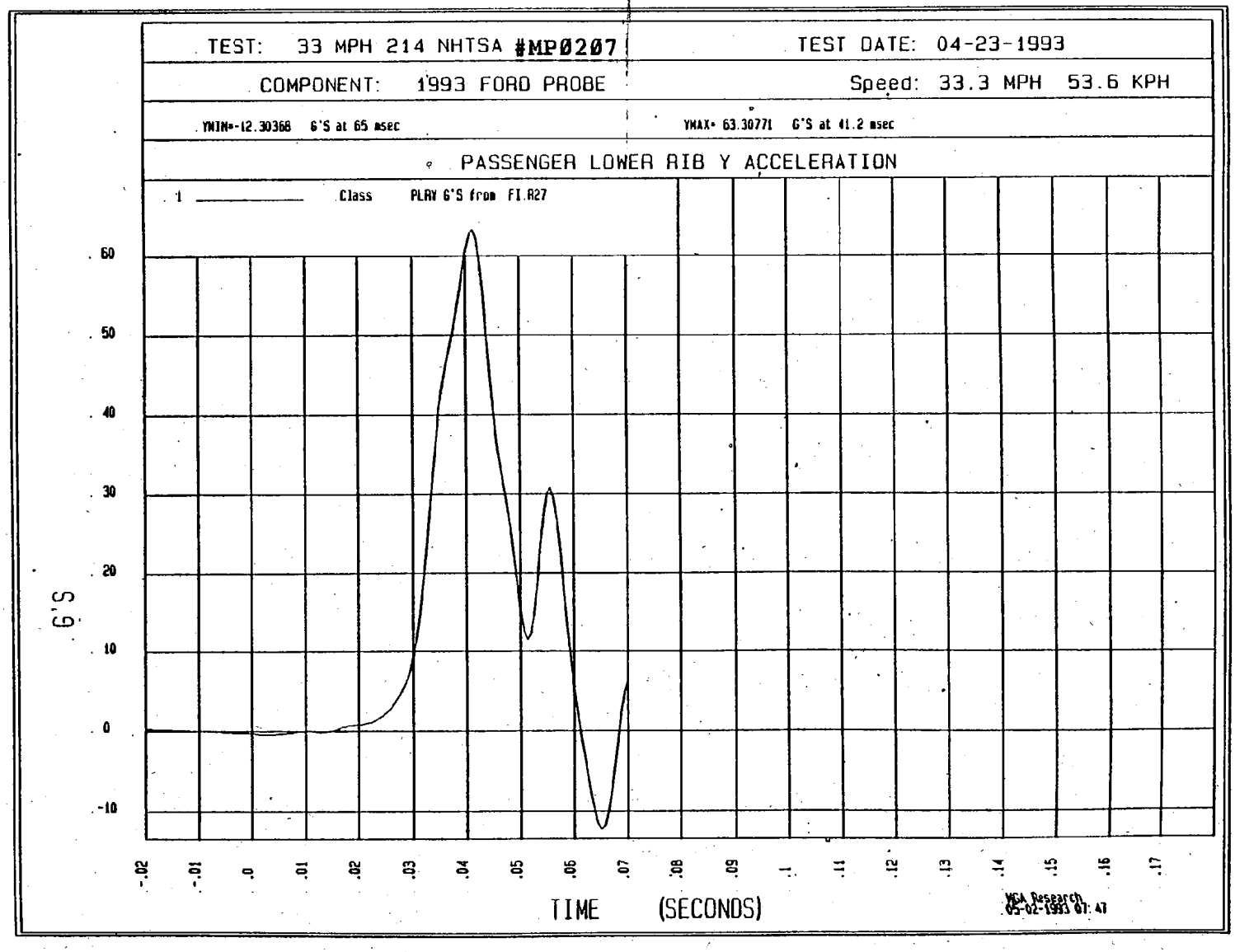

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Figure B-18 - Passenger Lower Rib Y Acceleration vs. Time

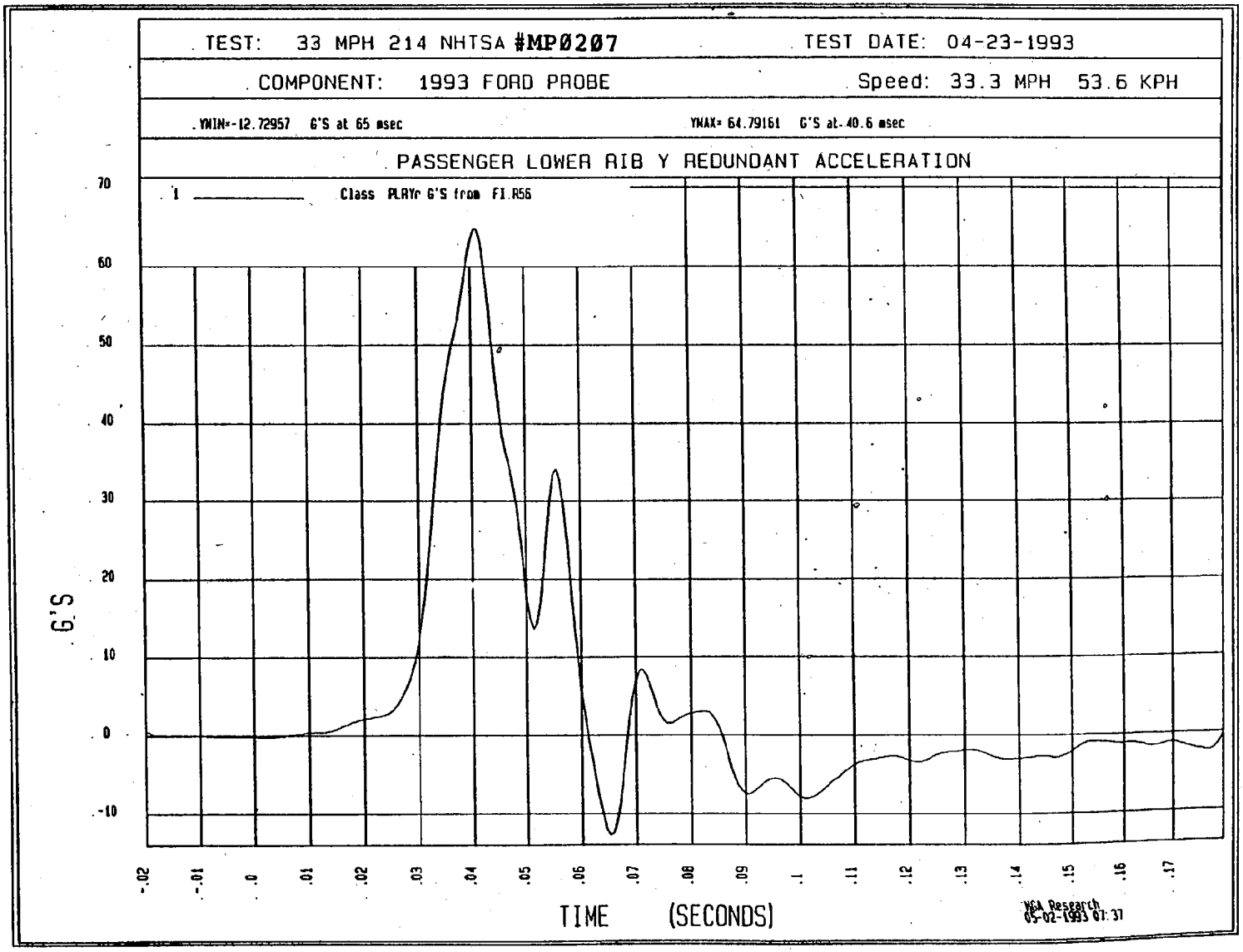

Figure B-19 - Passenger Lower Rib Y Redundant Acceleration

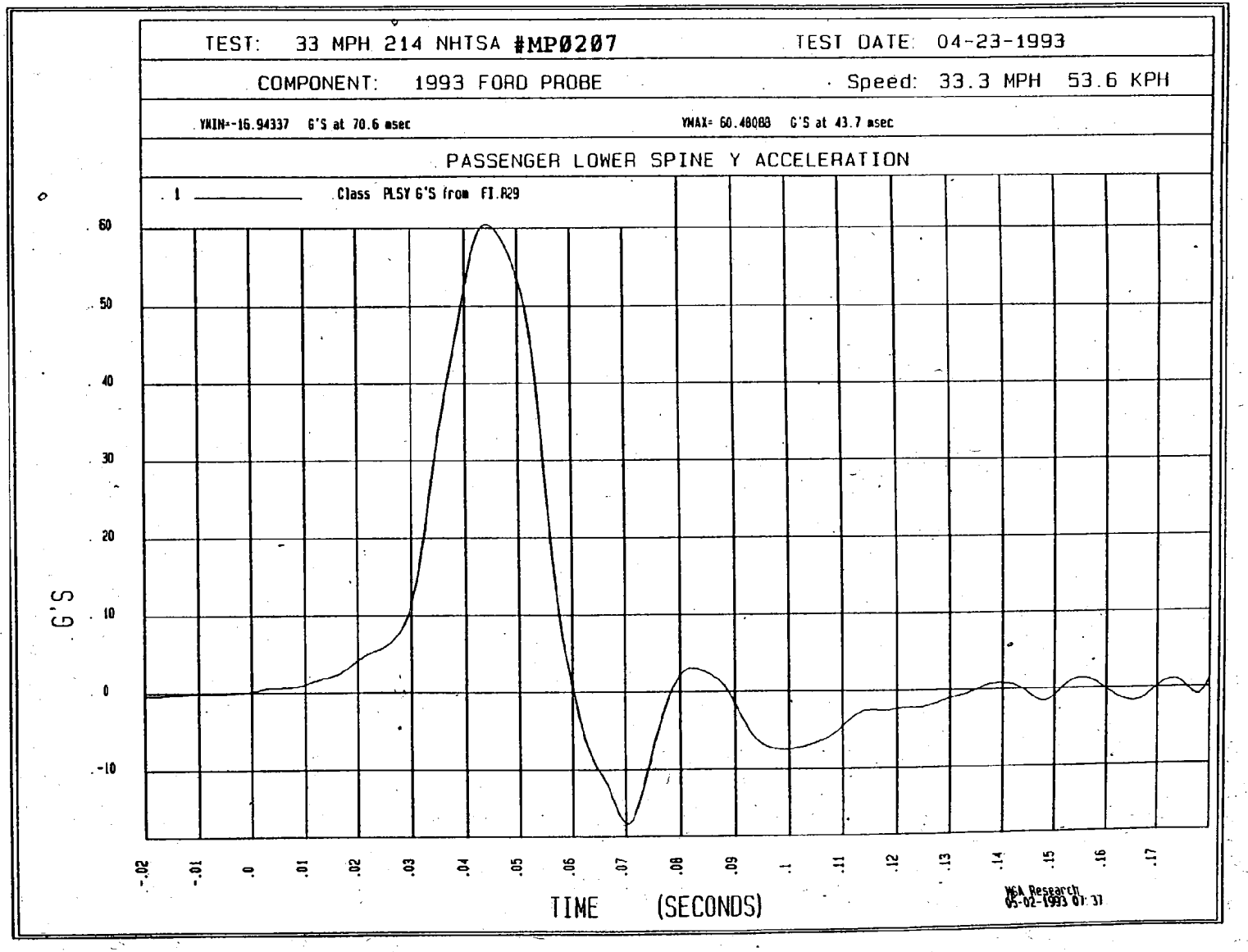

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Figure B-20 - Passenger Lower Spine Y Acceleration vs. Time

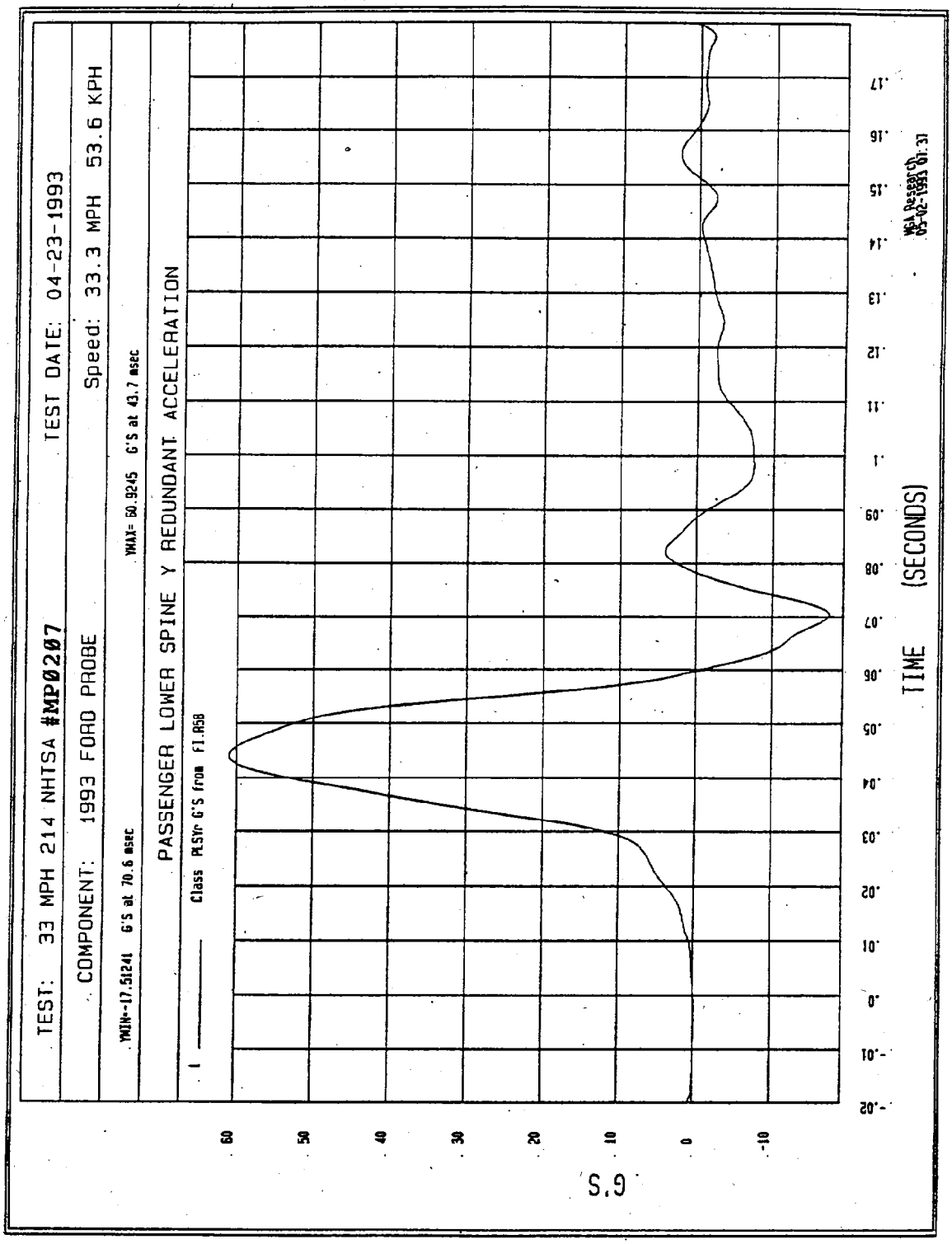

Figure B-21 - Passenger Lower Spine Y Redundant Acceleration vs. Time

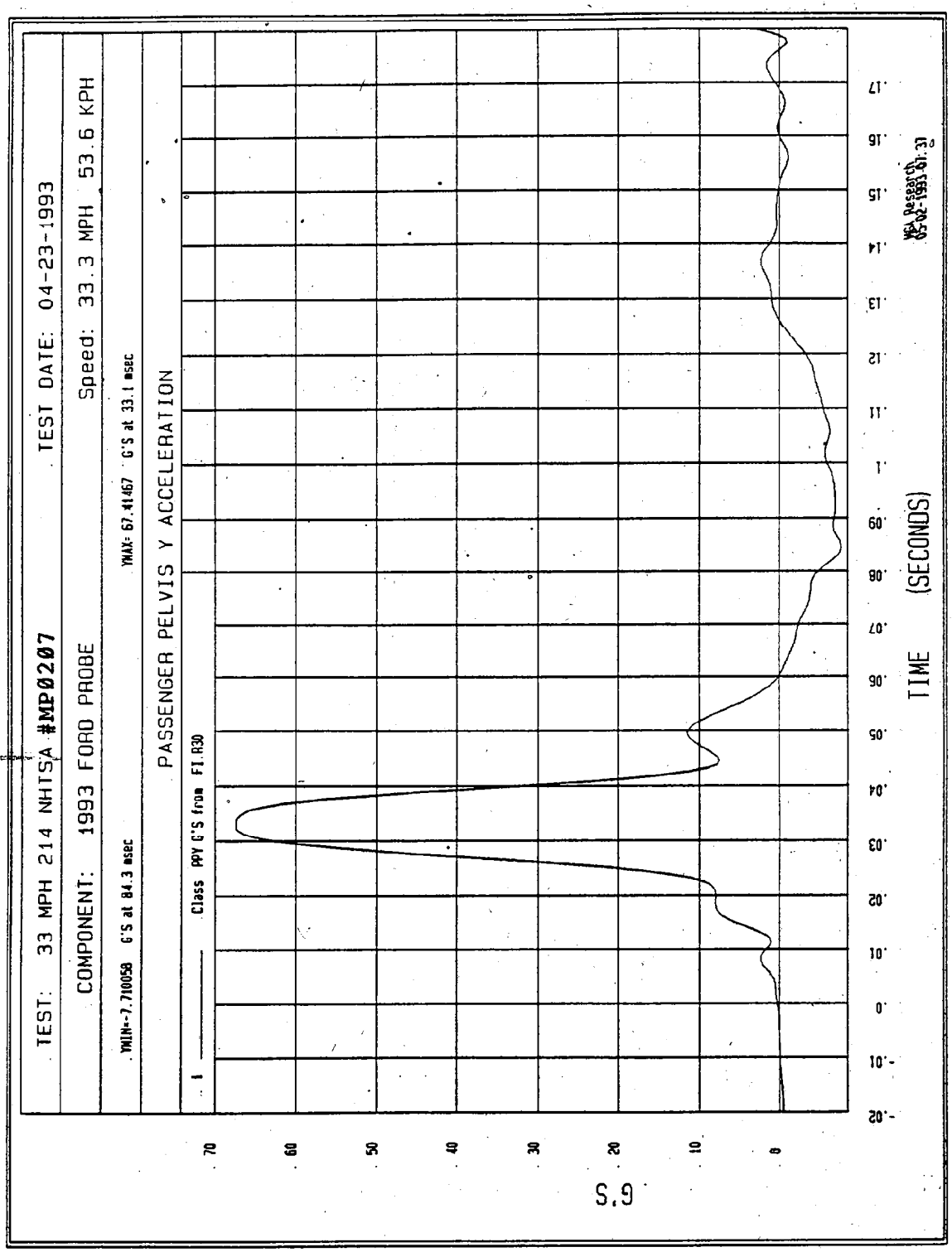

Figure B-22 - Passenger Pelvis Y Acceleration vs. Time

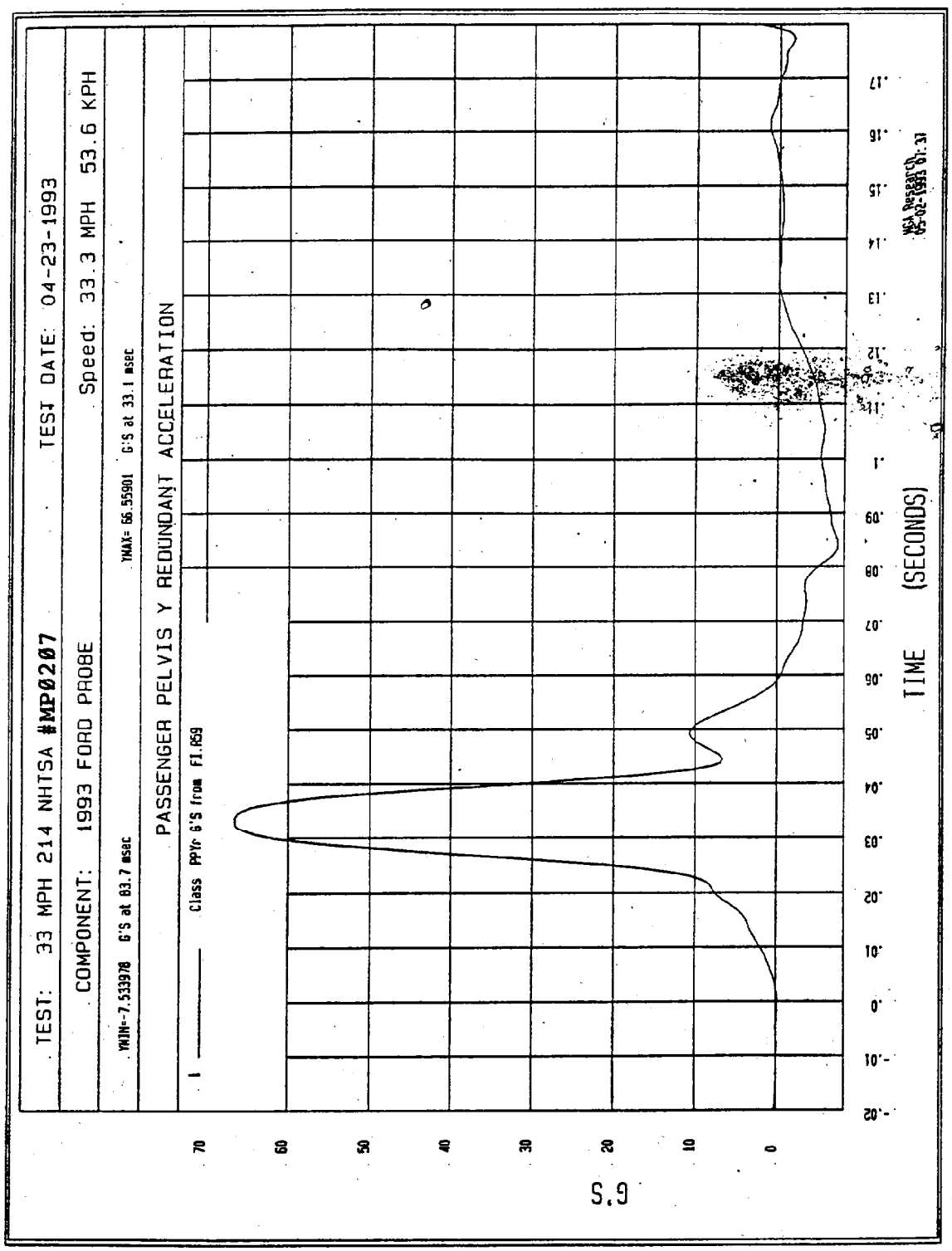

Figure B-23 - Passenger Pelvis Y Redundant Acceleration vs. Time

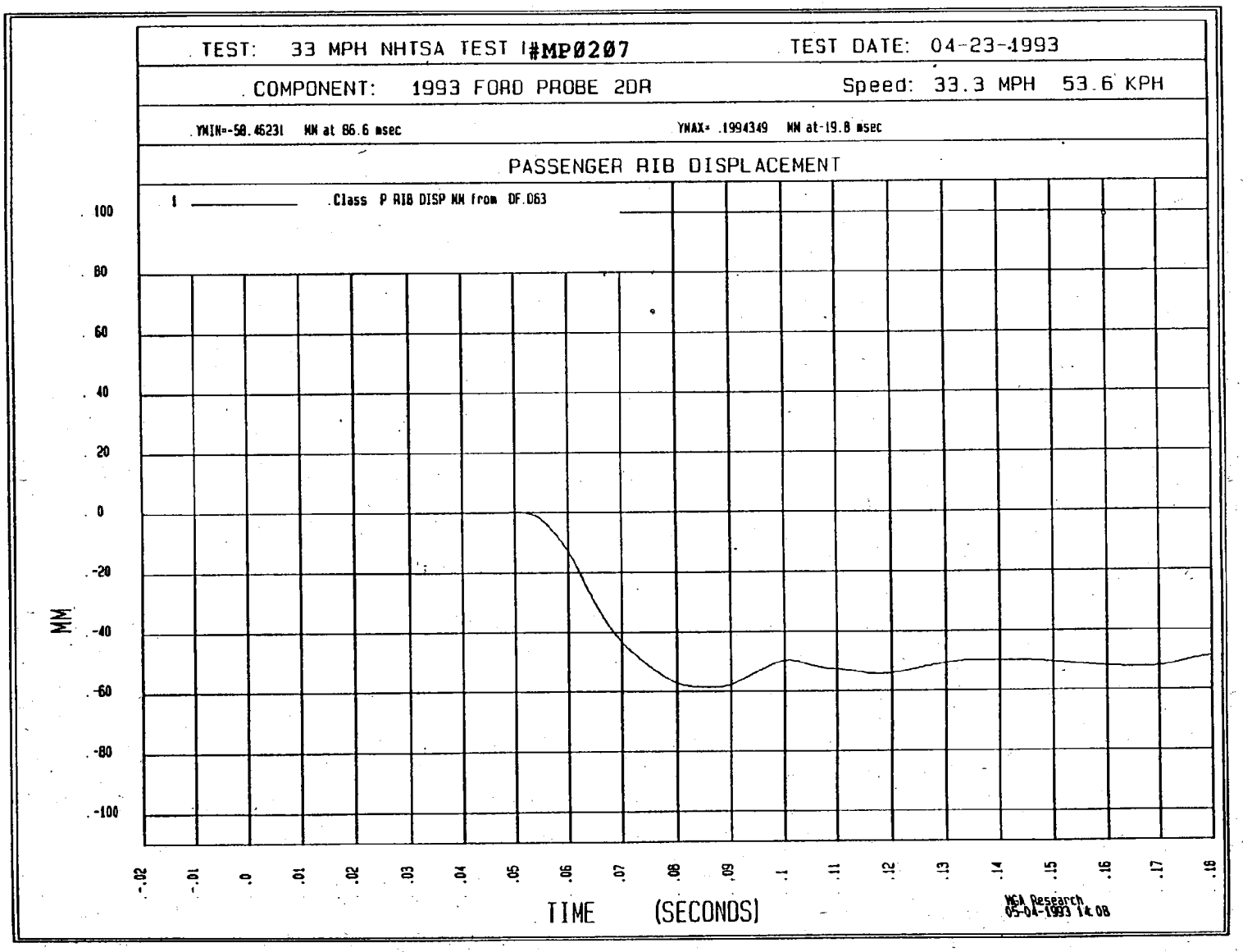

Figure B-24 - Passenger Rib Displacement vs. Time

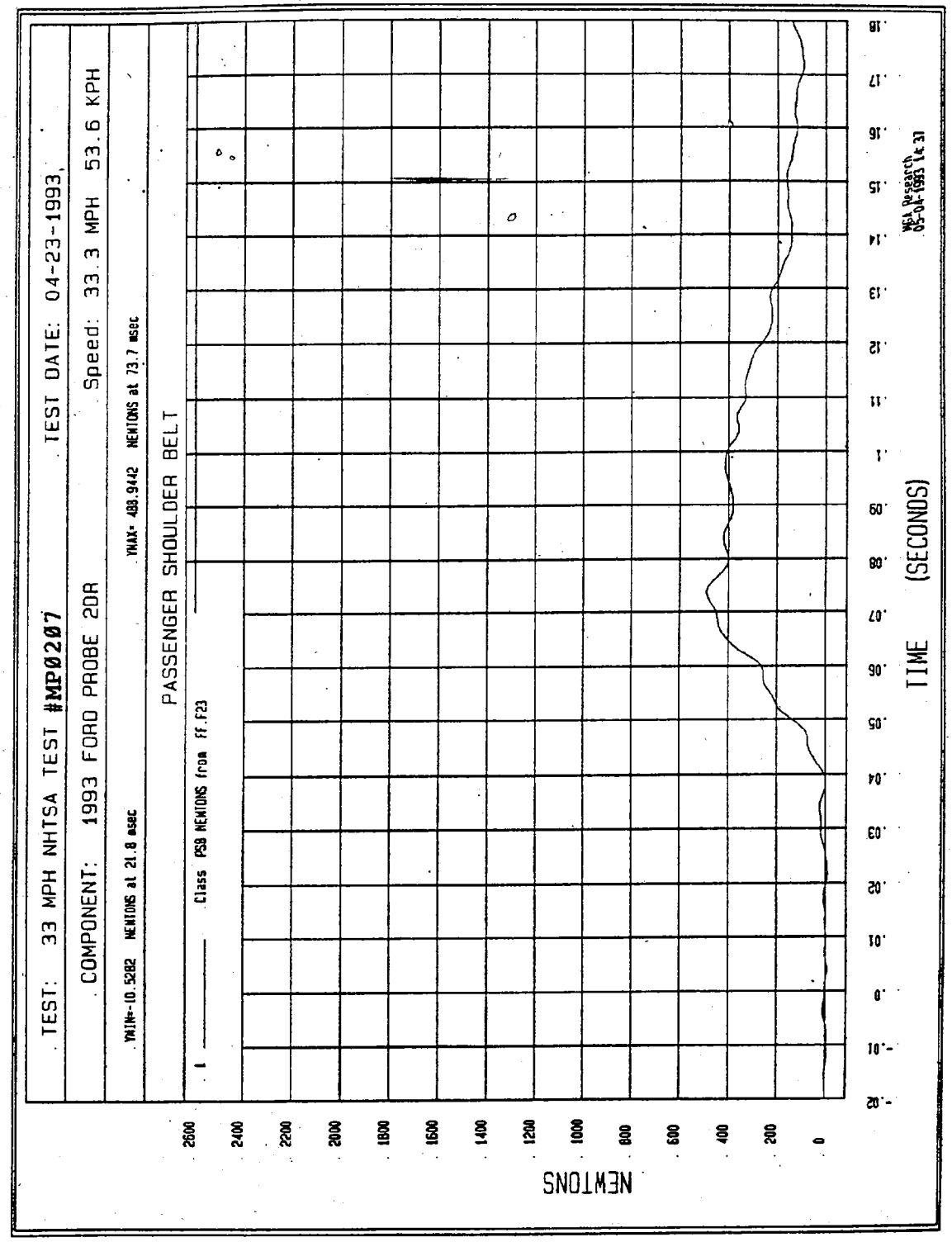

Figure B-25 - Passenger Shoulder Belt

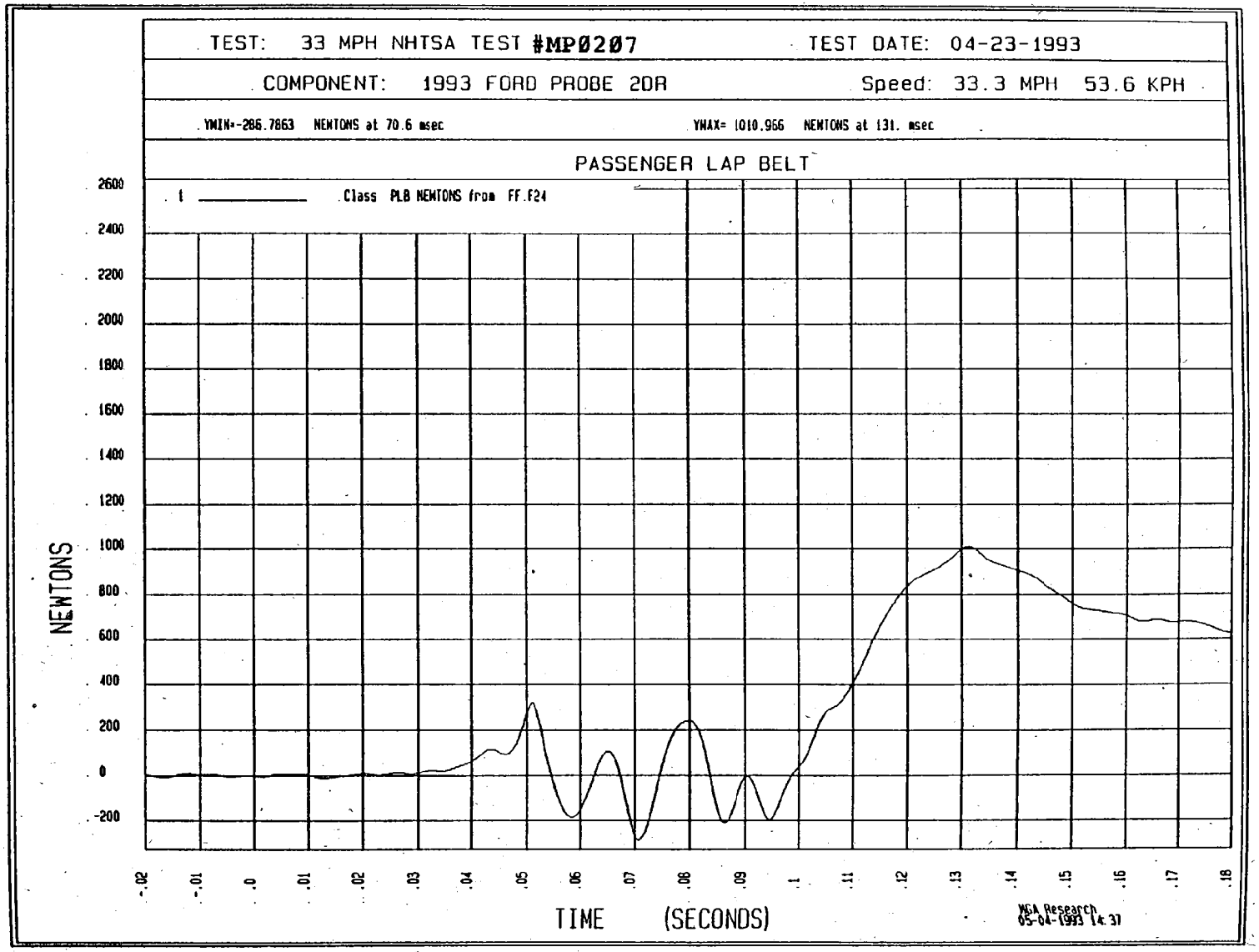

Figure B-26 - Passenger Lap Belt

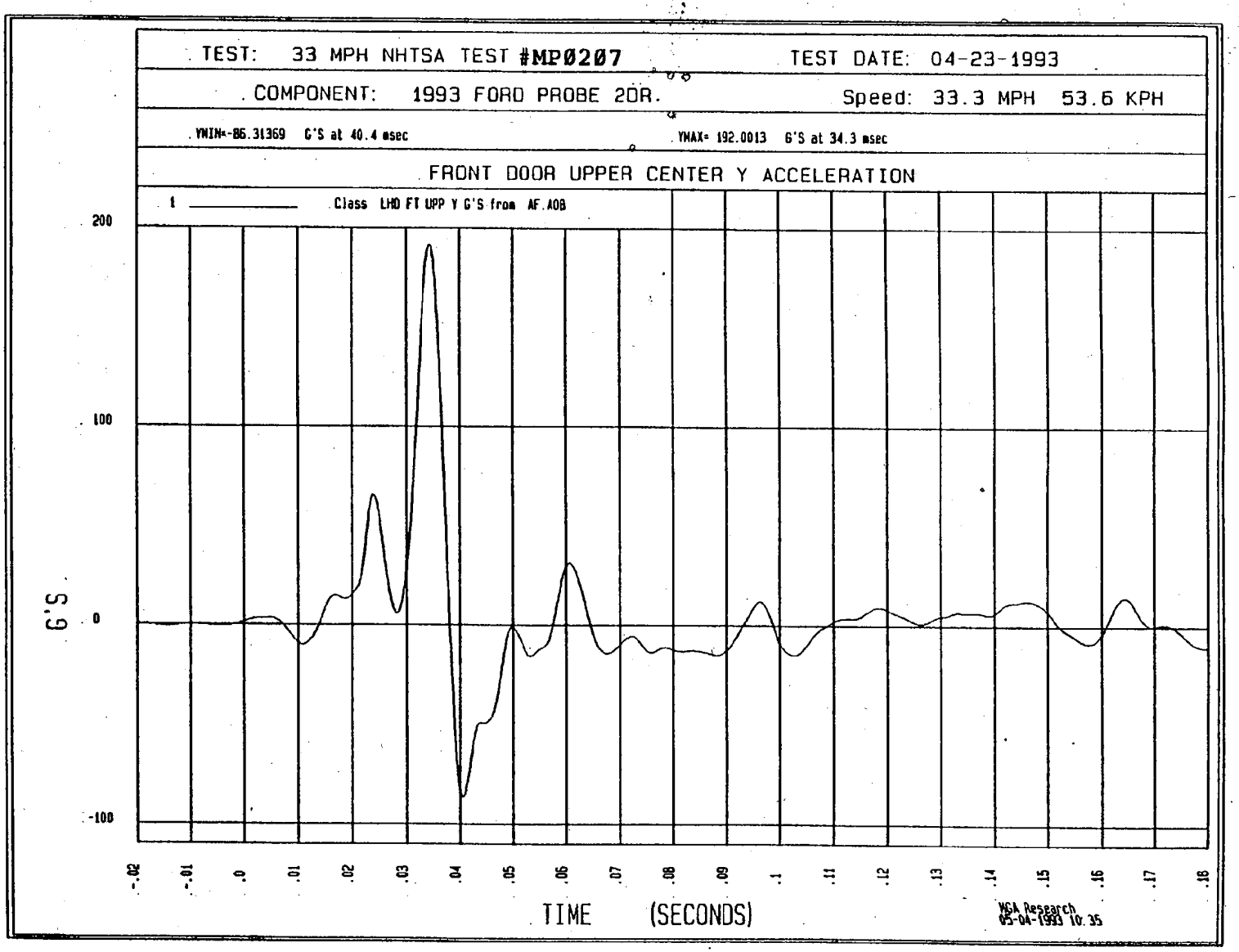

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Figure B-27 - Front Door Upper Center Y Acceleration vs. Time

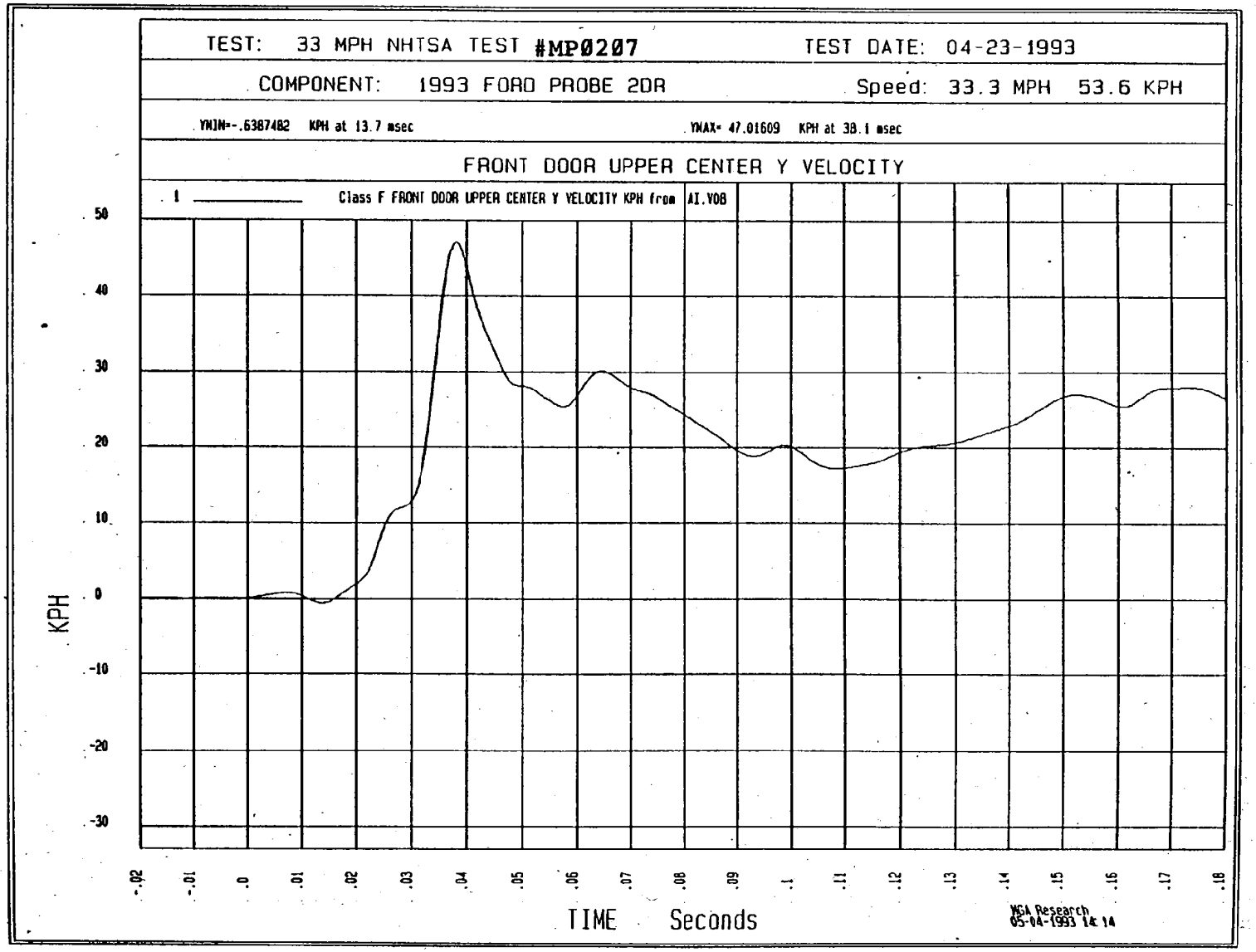

Figure B-28 - Front Door Upper Center Y Velocity vs. Time

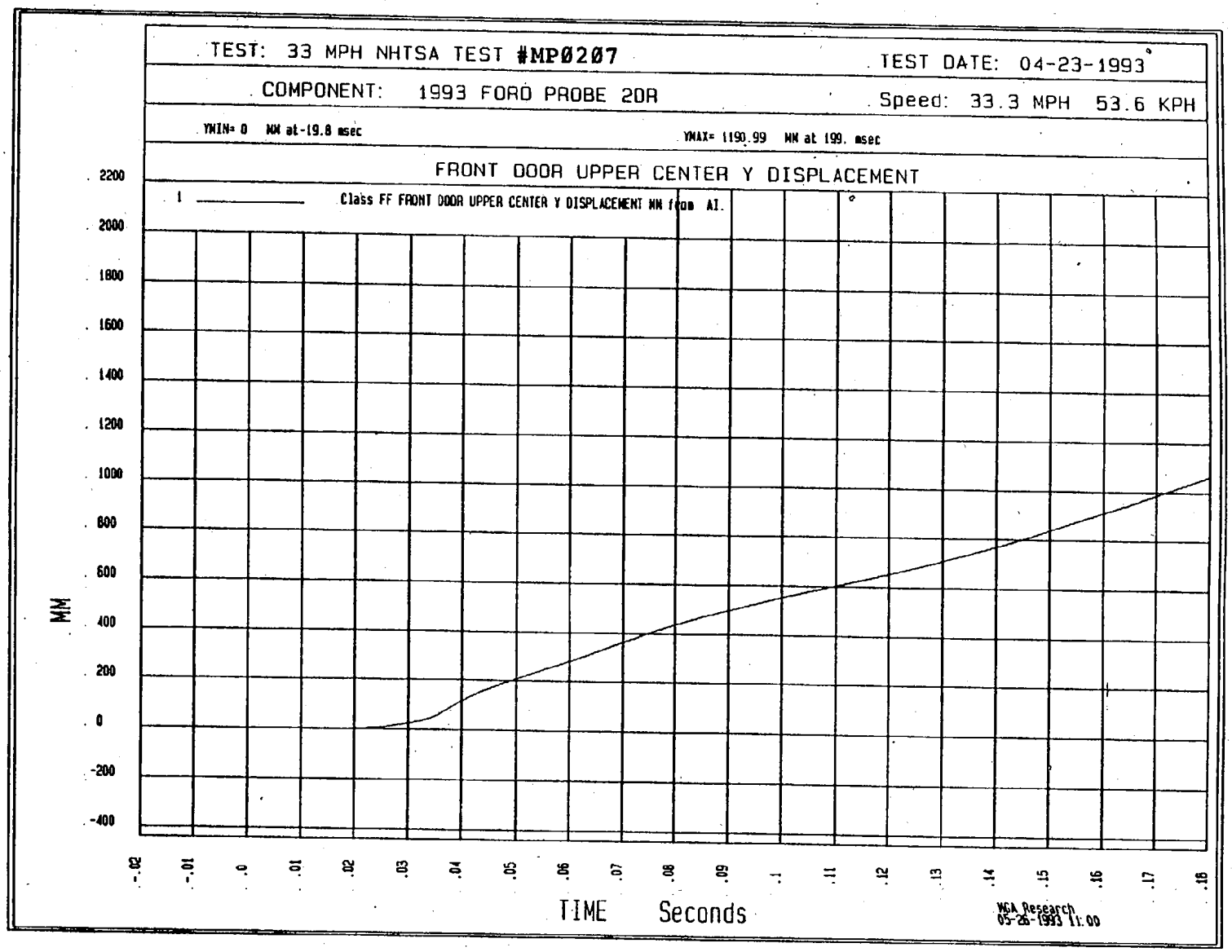

Figure B-29 - Front Door Upper Center Y Displacement vs. Time

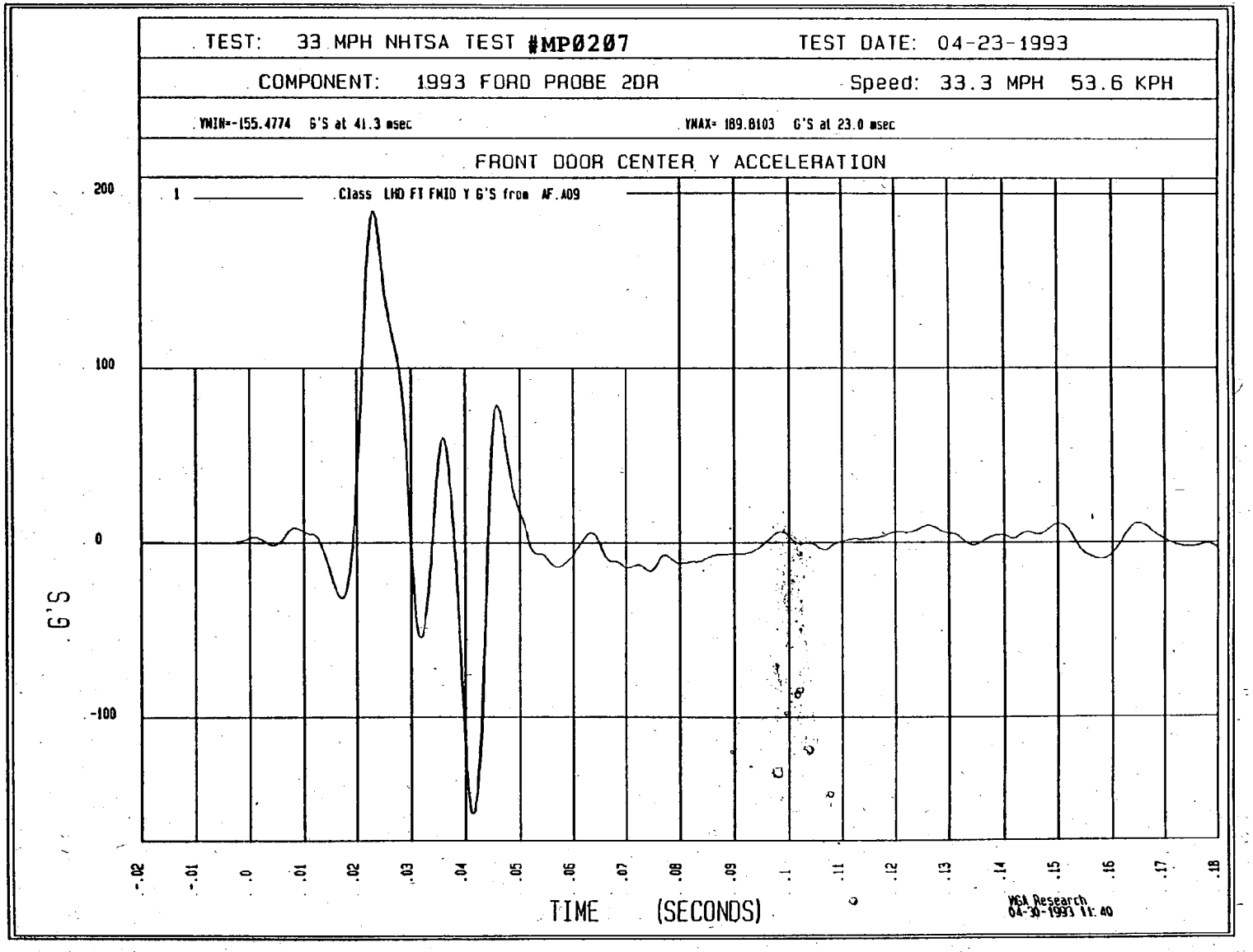

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Figure B-30 - Front Door Mid Center Y Acceleration vs. Time

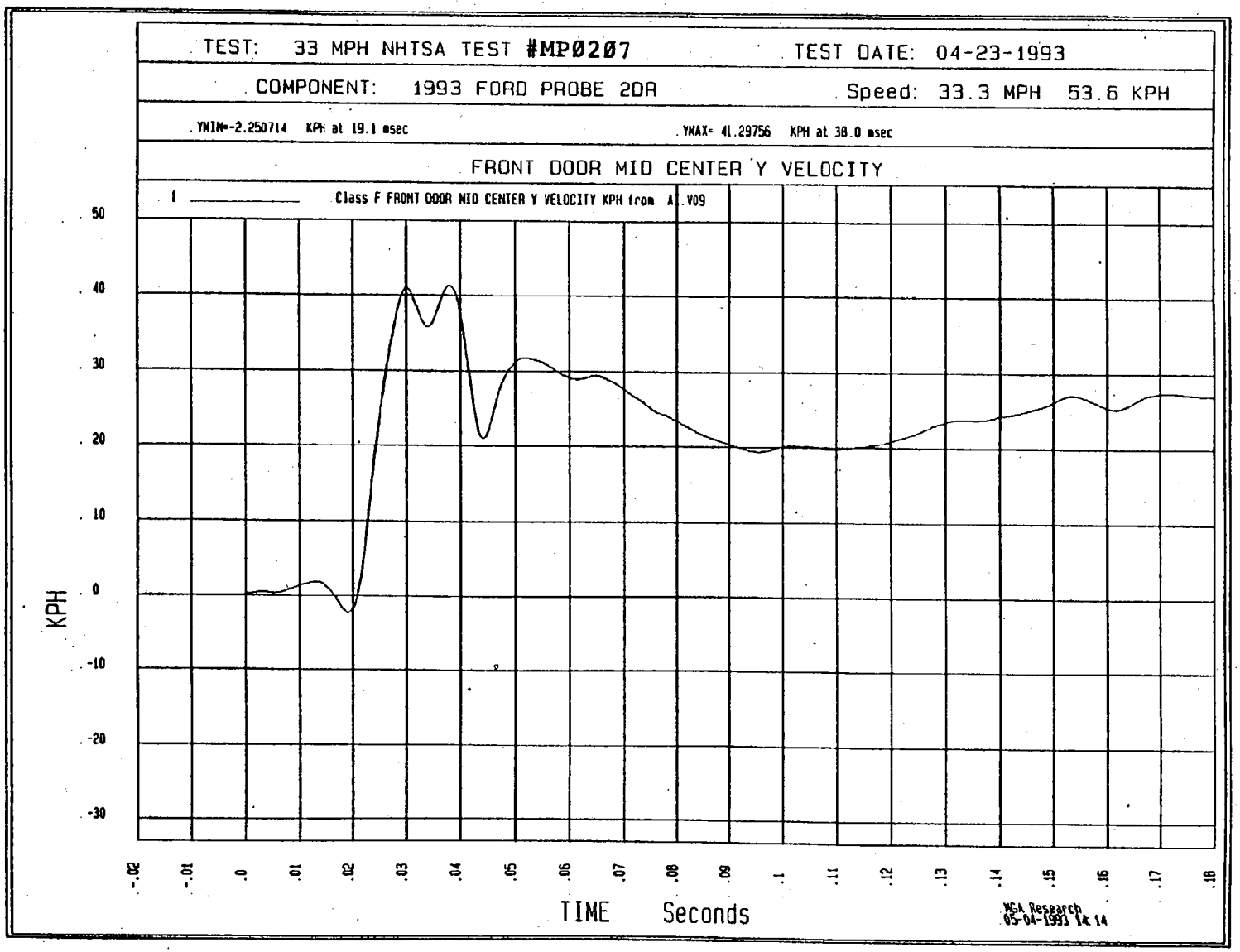

Figure B-31 - Front Door Mid Center Y Velocity vs. Time

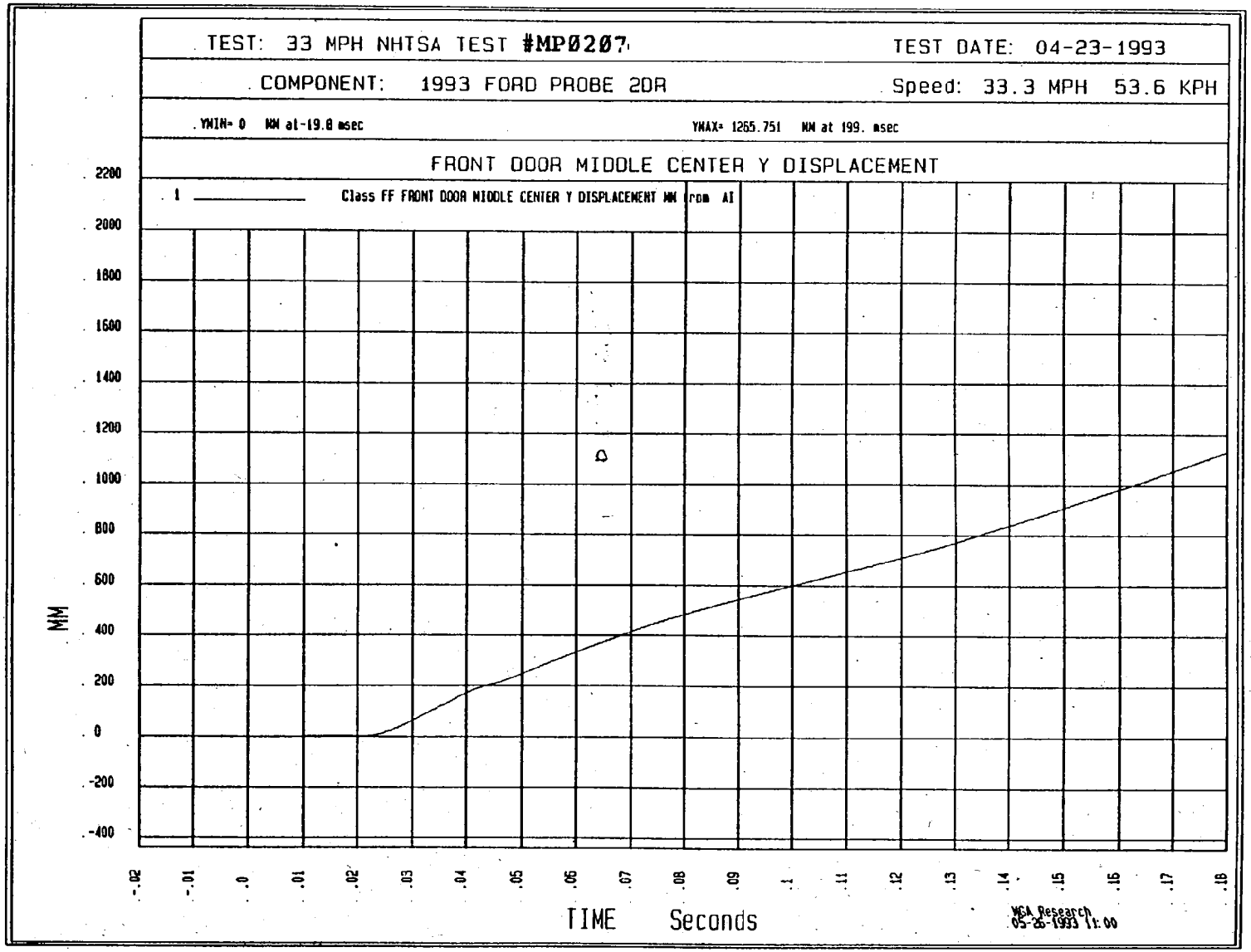

Figure B-32 - Front Door Mid Center Y Displacement vs. Time

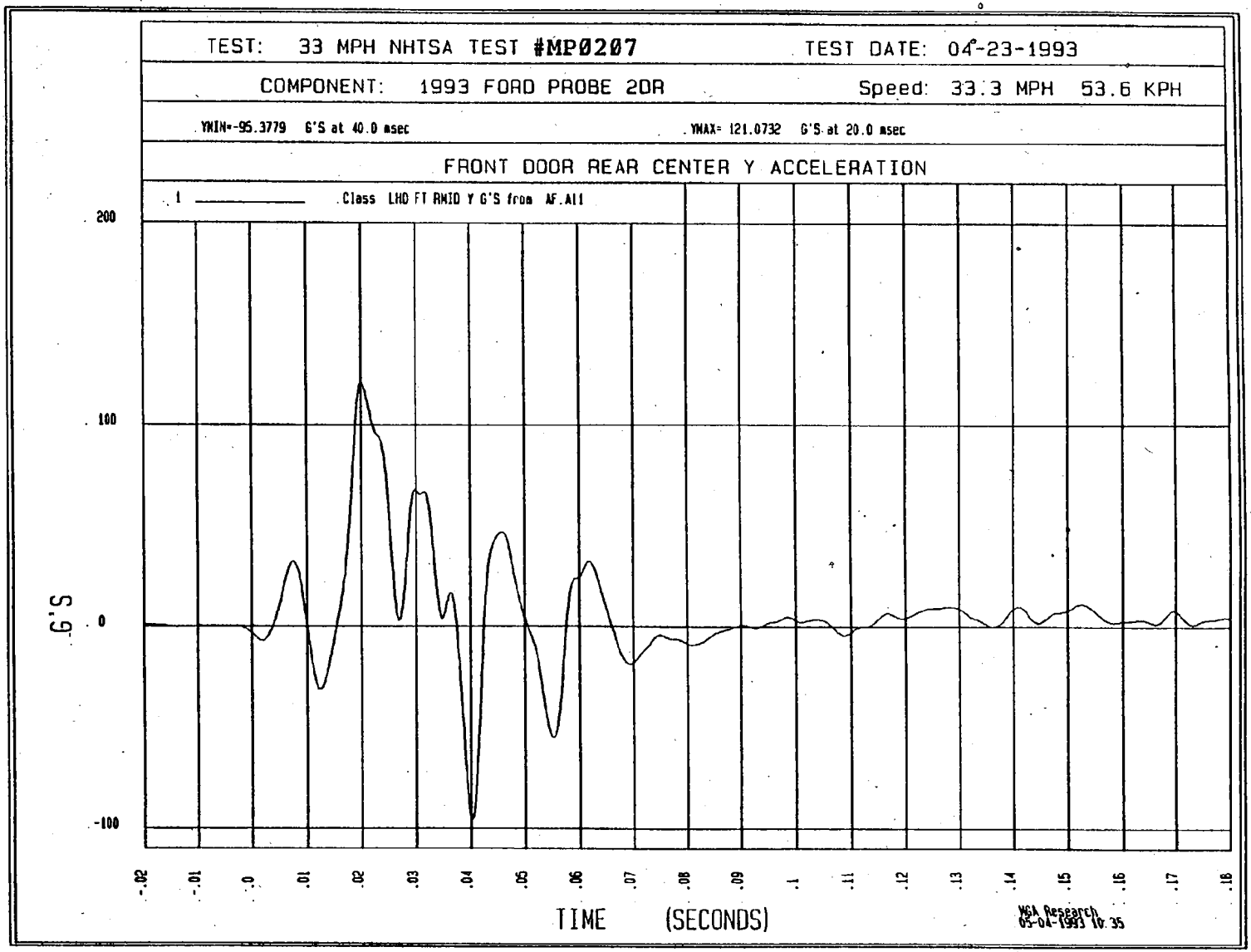

Figure B-33 - Front Door Rear Center Y Acceleration vs. Time

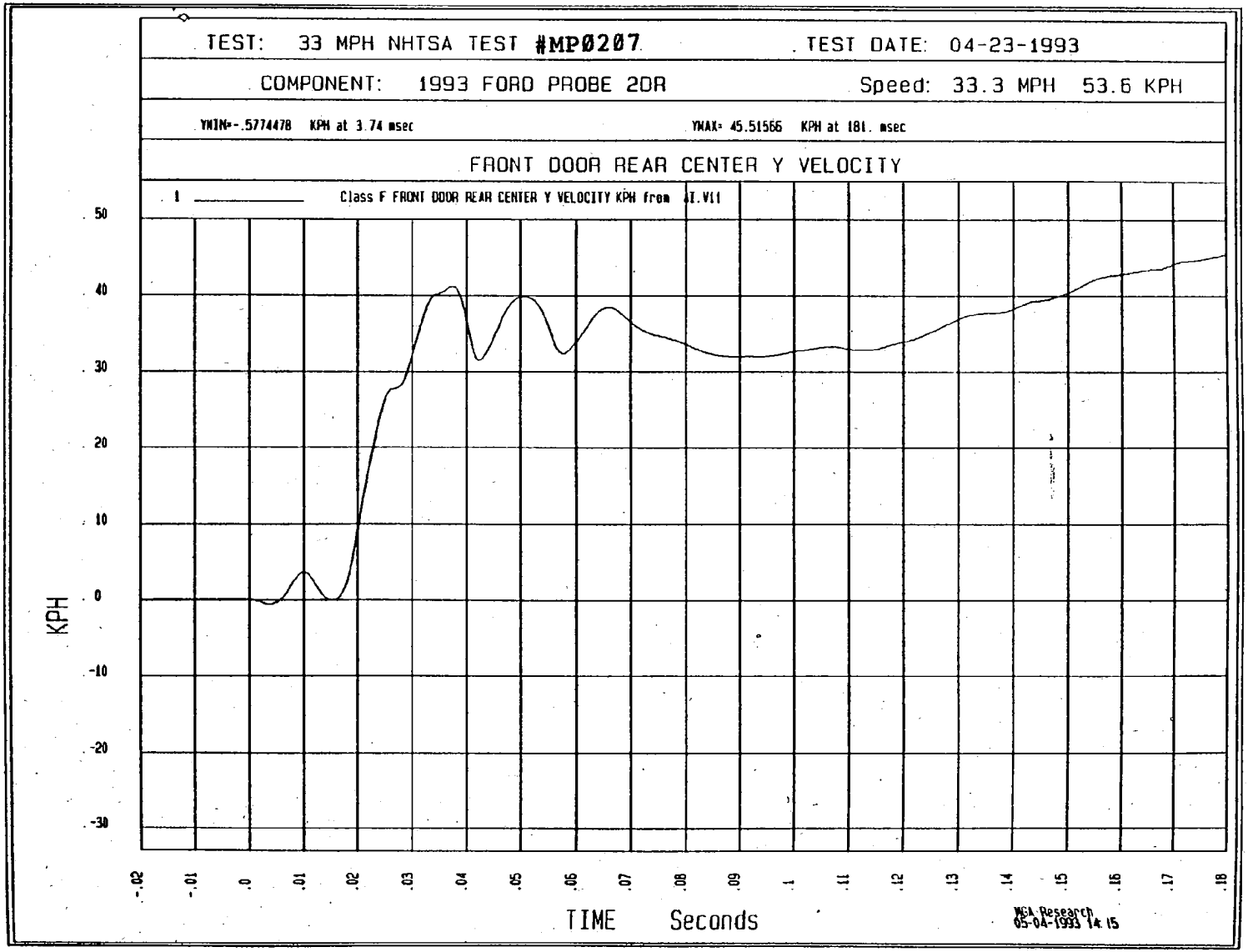

Figure B-34 - Front Door Rear Center Y Velocity vs. Time

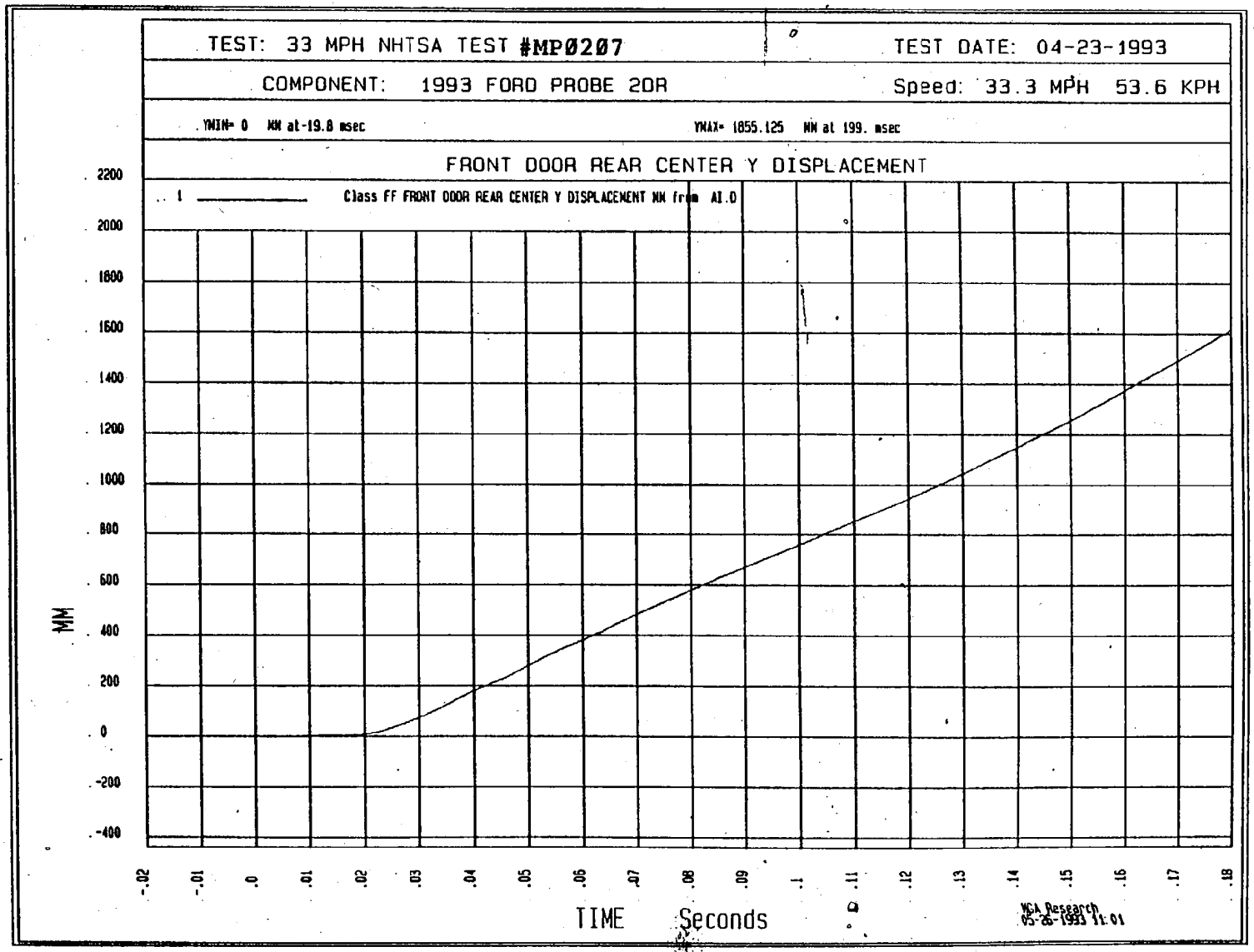

Figure B-35 - Front Door Rear Center Y Displacement vs. Time

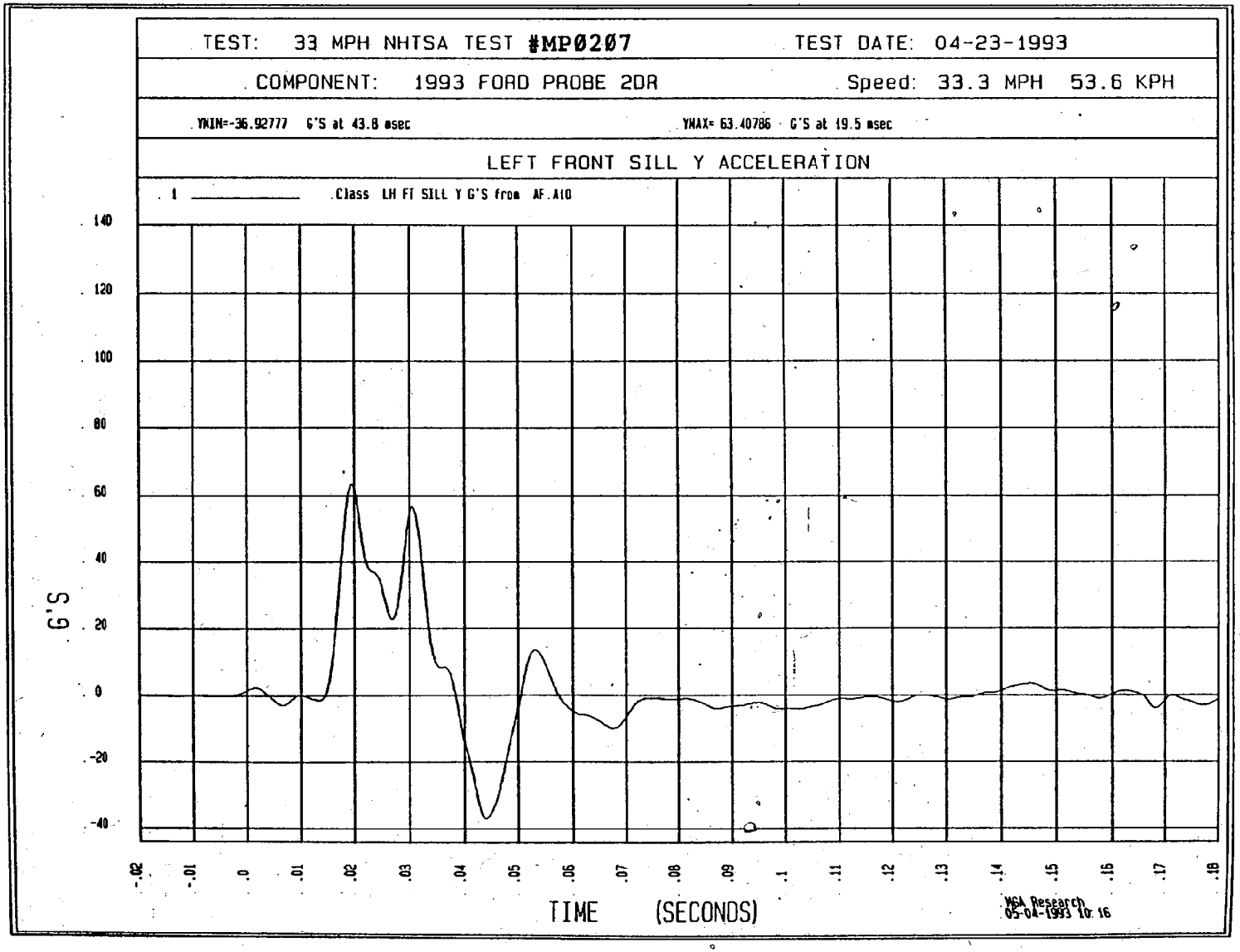

Figure B-36 - Left Front Sill Y Acceleration vs. Time

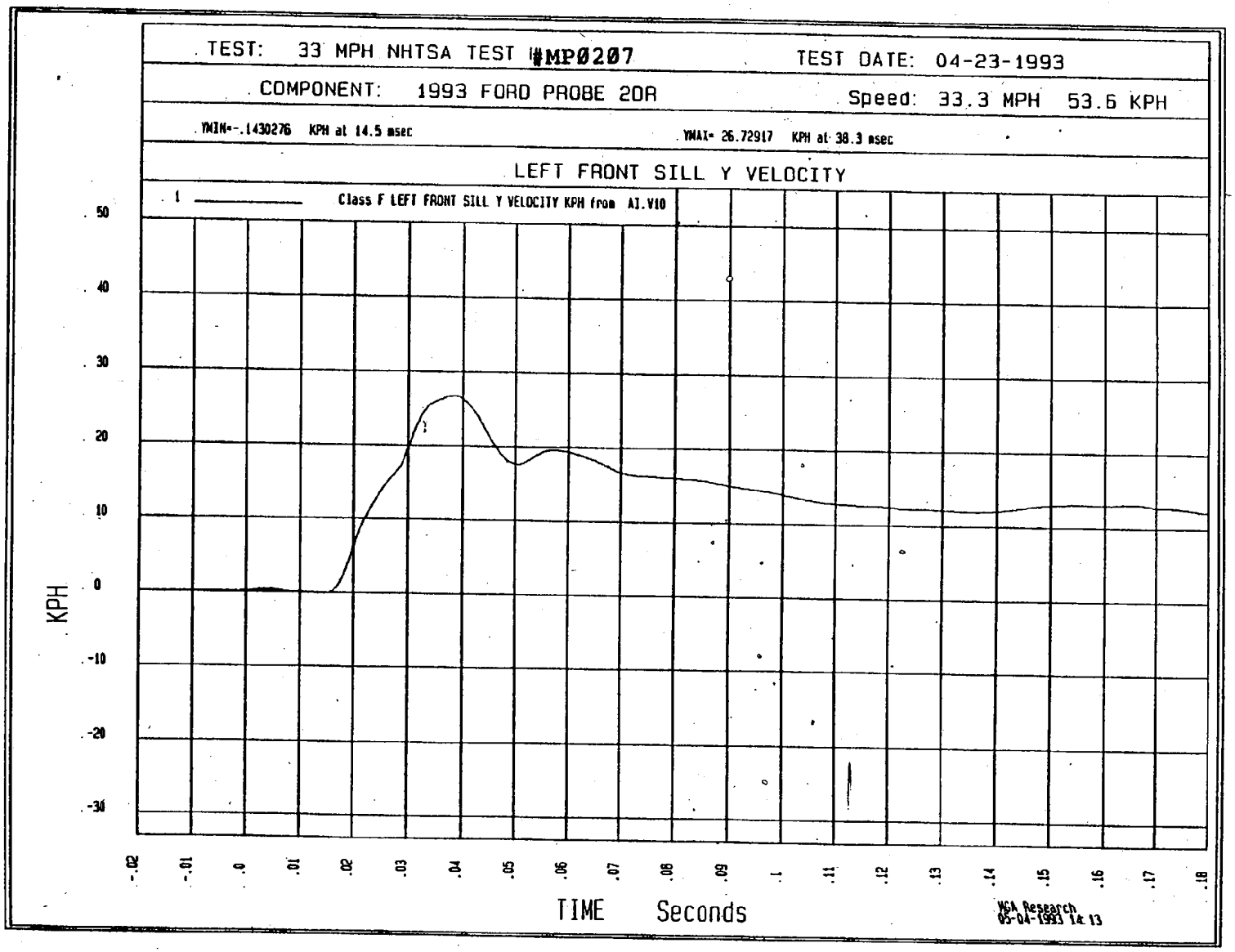

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Figure B-37 - Left Front Sill Y Velocity vs. Time

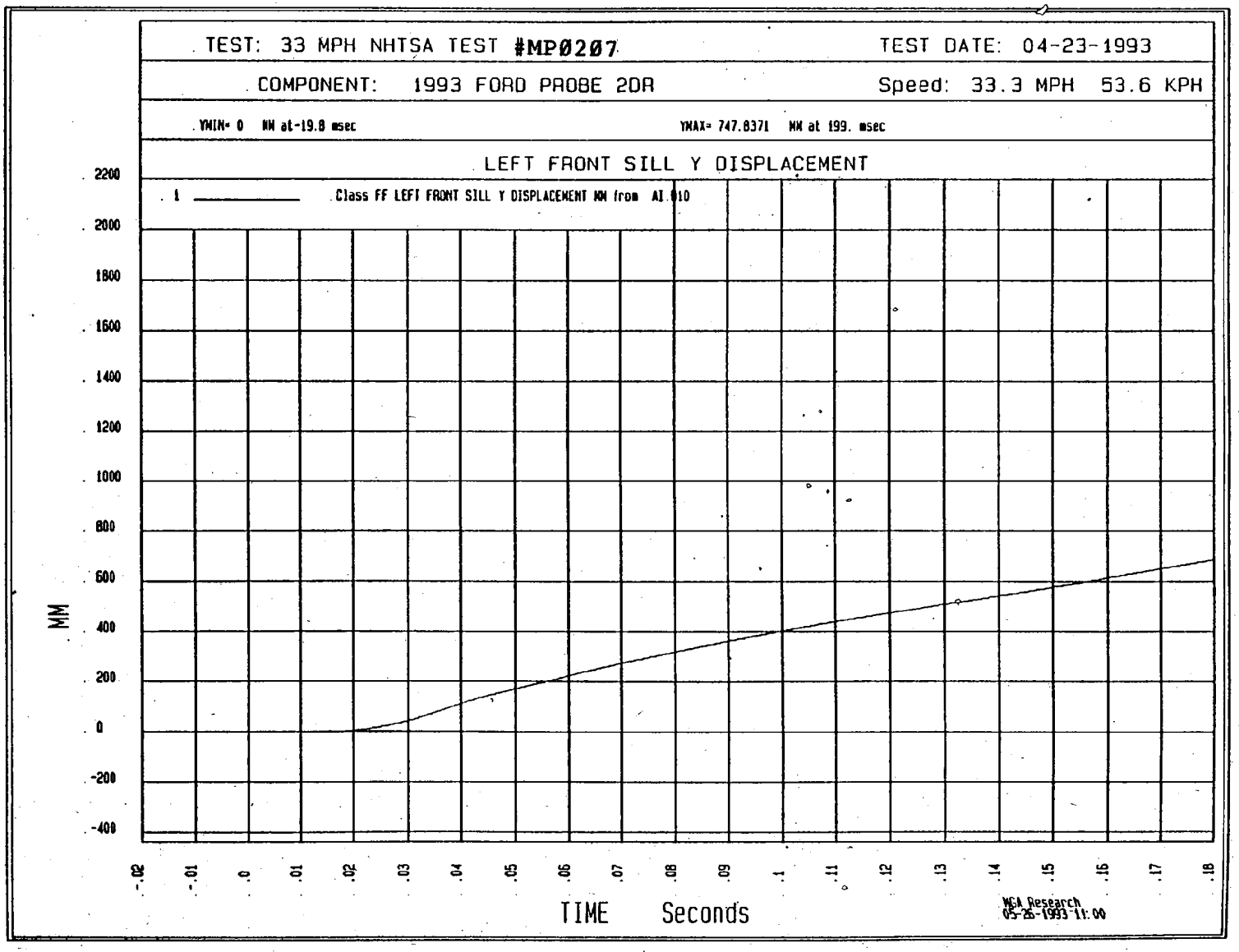

Figure B-38 - Left Front Sill Y Displacement vs. Time

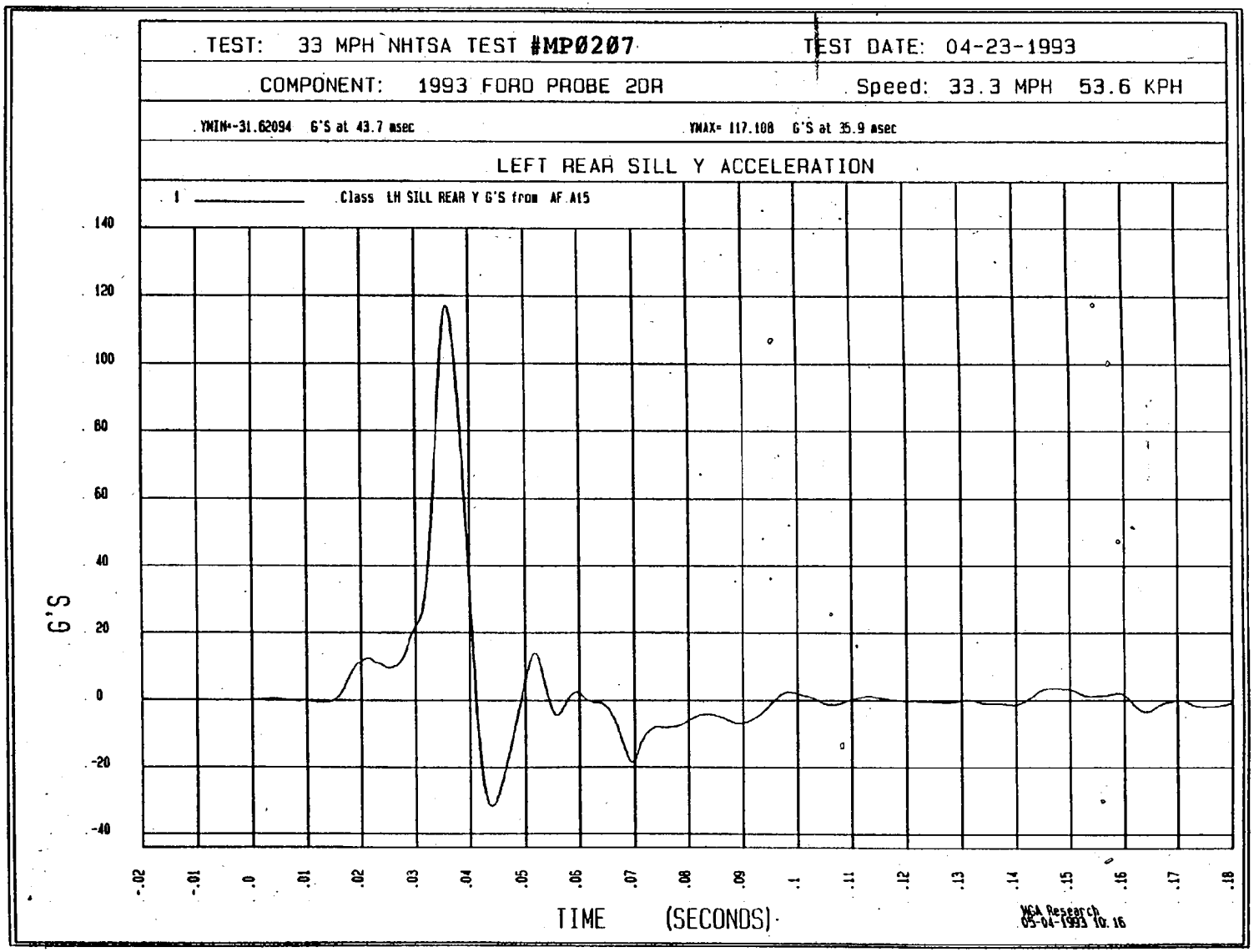

Figure B-39 - Left Rear Sill Y Acceleration vs. Time

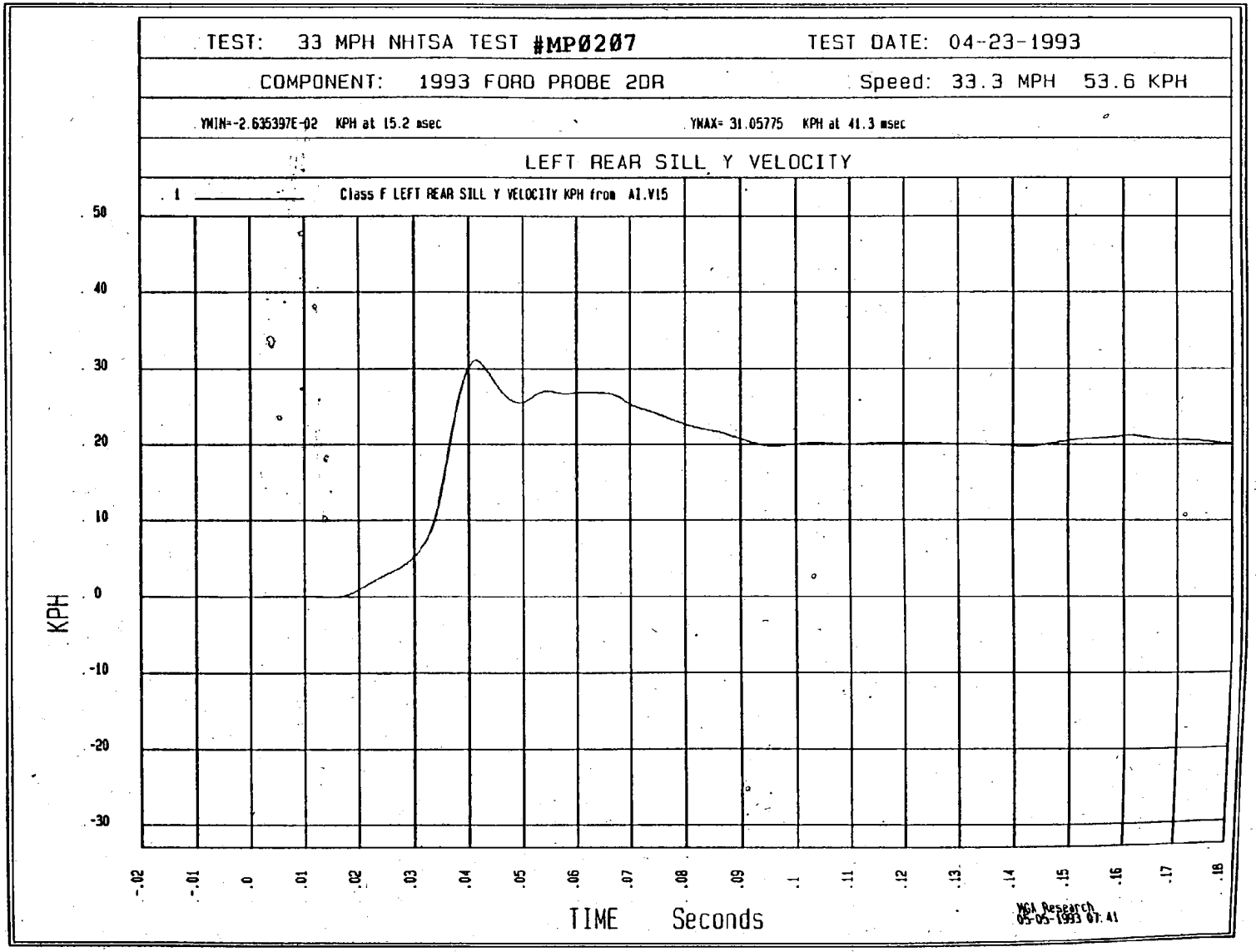

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Figure B-40 - Left Rear Sill Y Velocity vs. Time

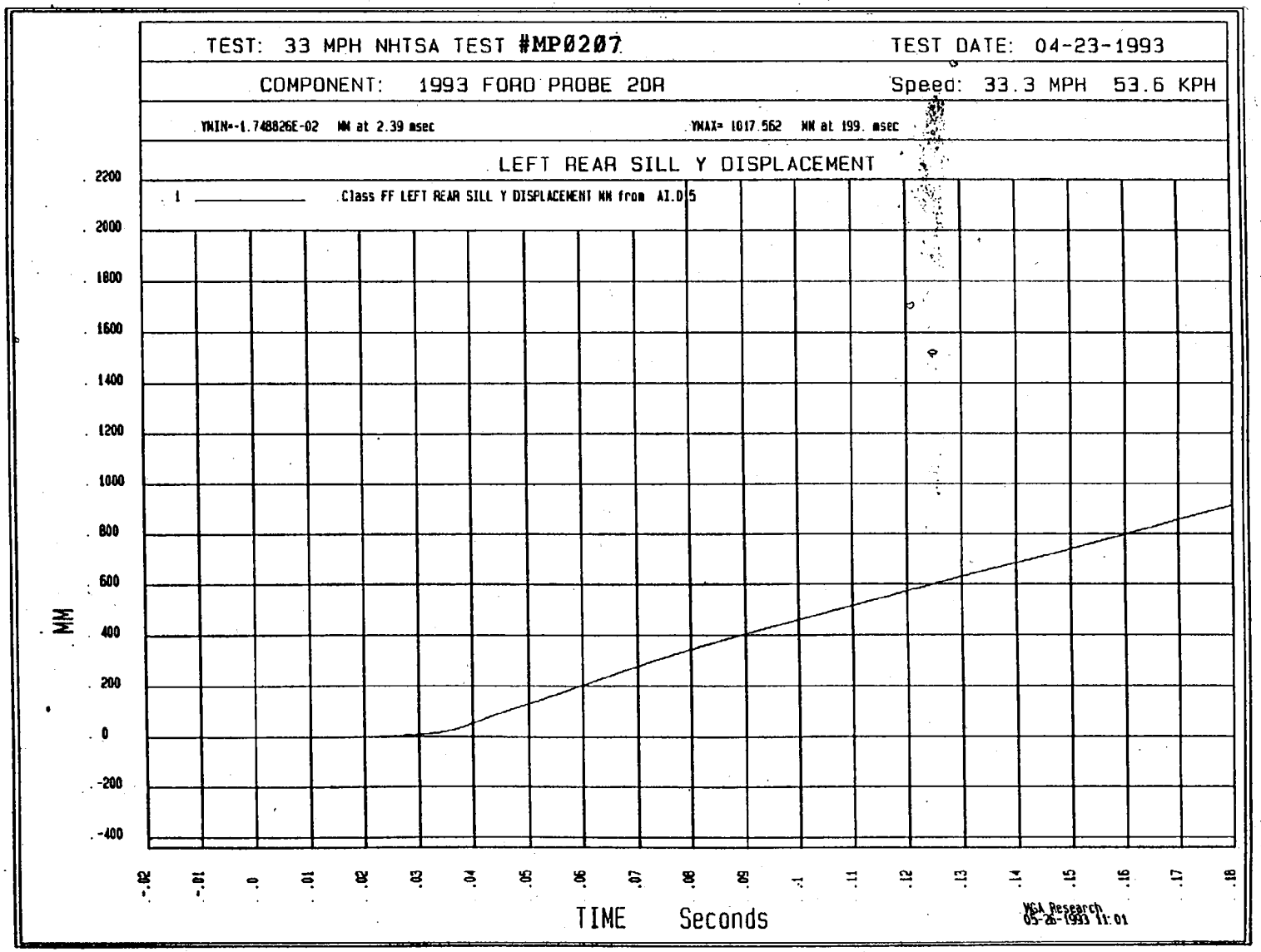

Figure B-41 - Left Rear Sill Y Displacement vs. Time

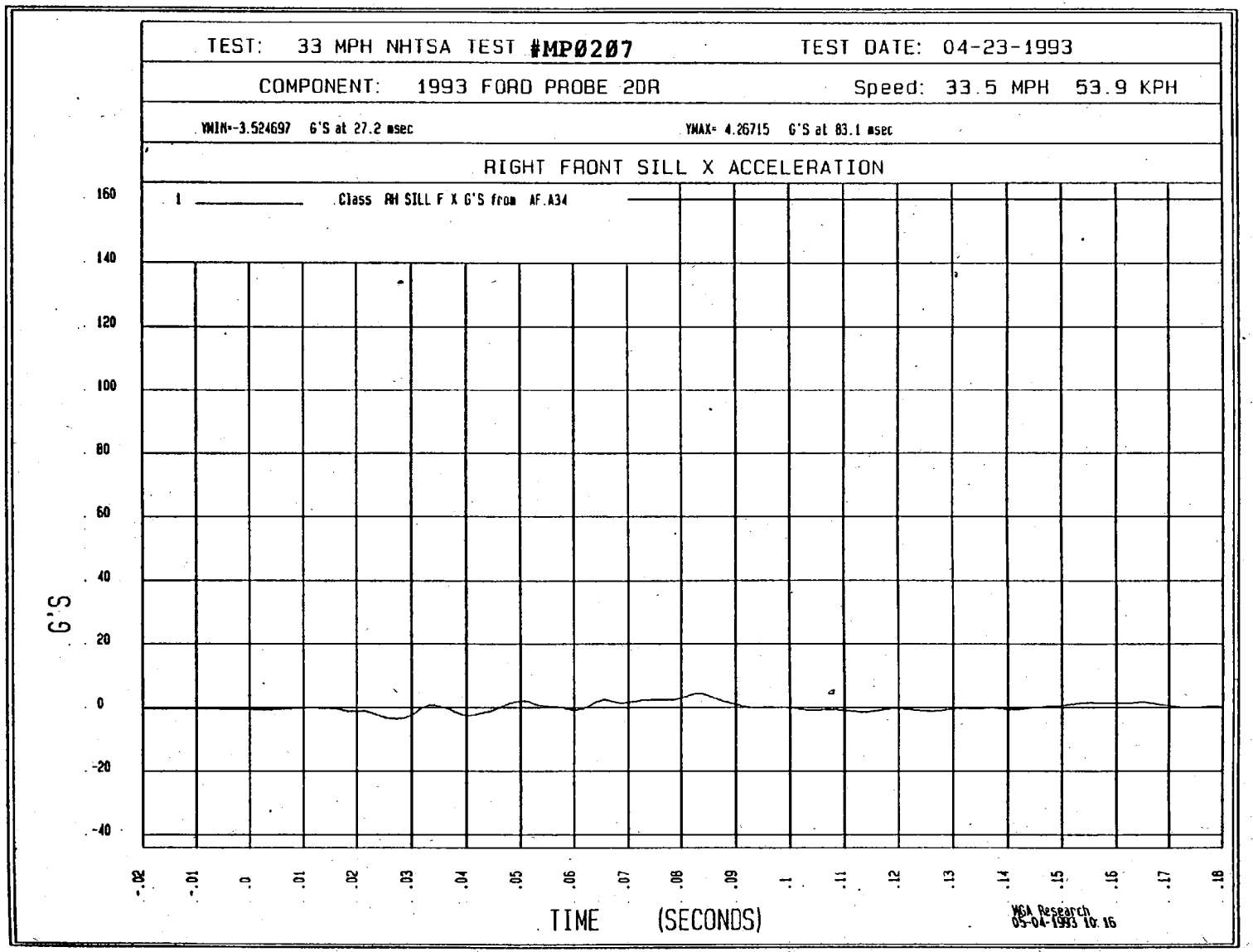

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Figure B-42 - Right Front Sill X Acceleration vs. Time

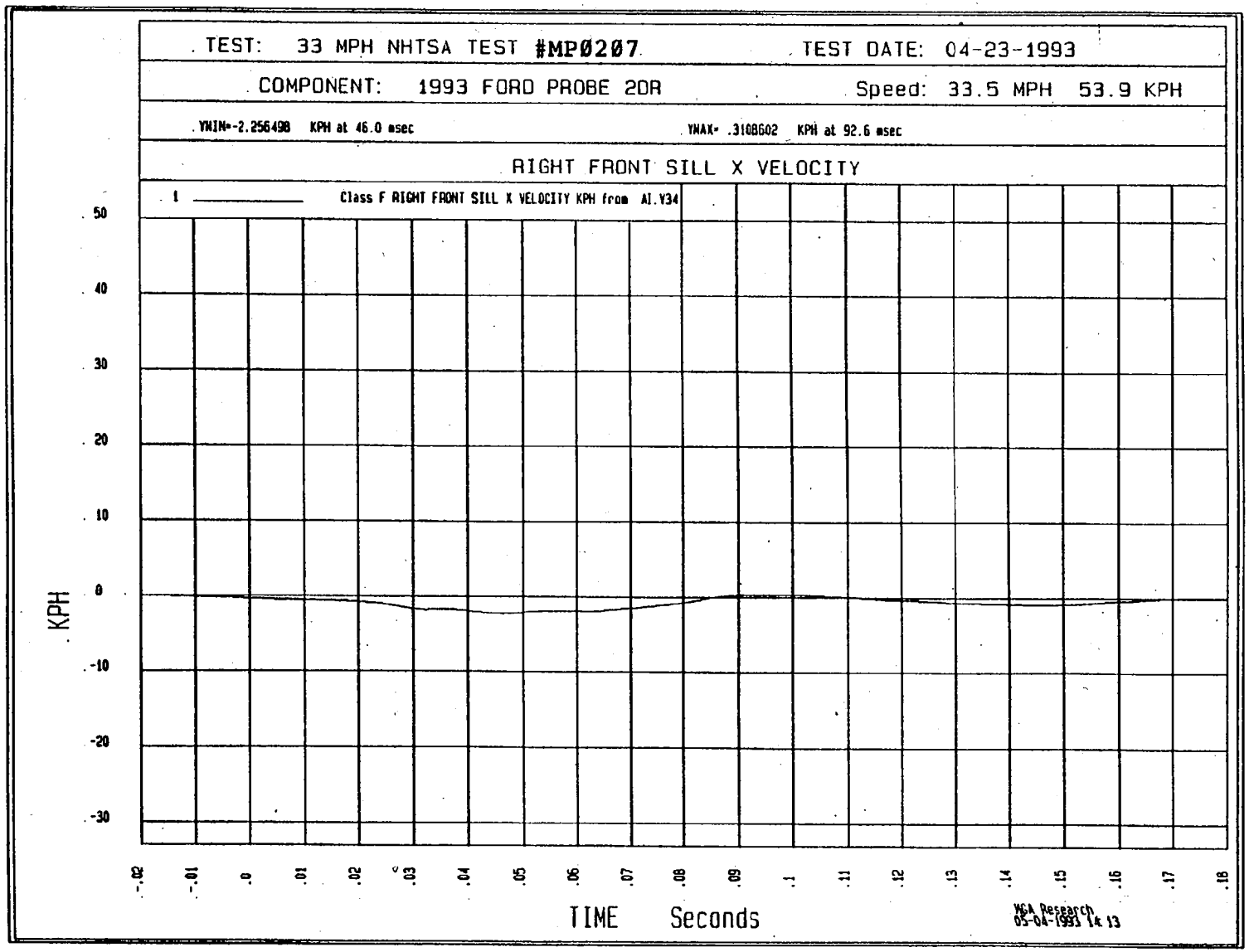


Figure B-43 - Right Front Sill X Velocity vs. Time

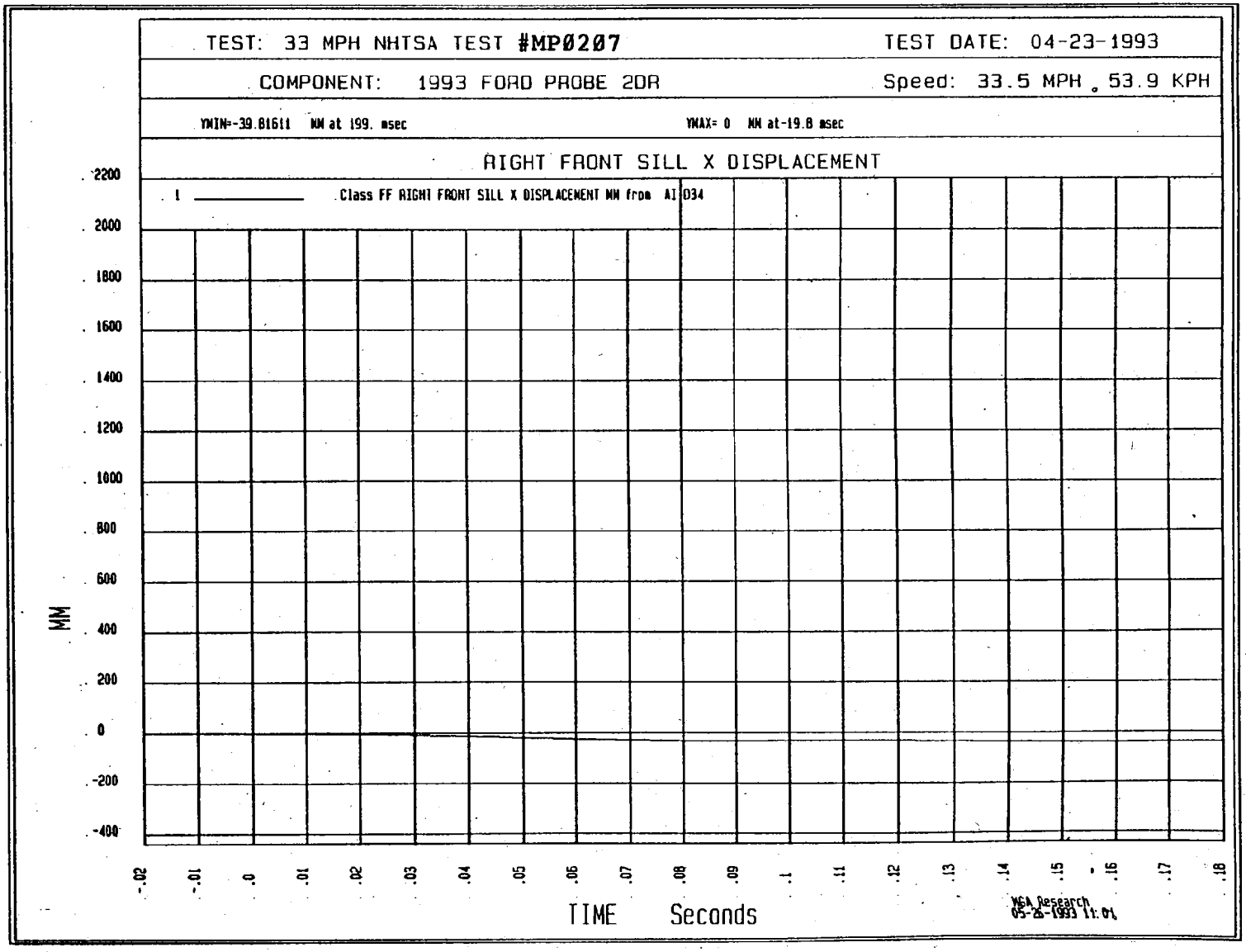


Figure B-44 - Right Front Sill X Displacement vs. Time

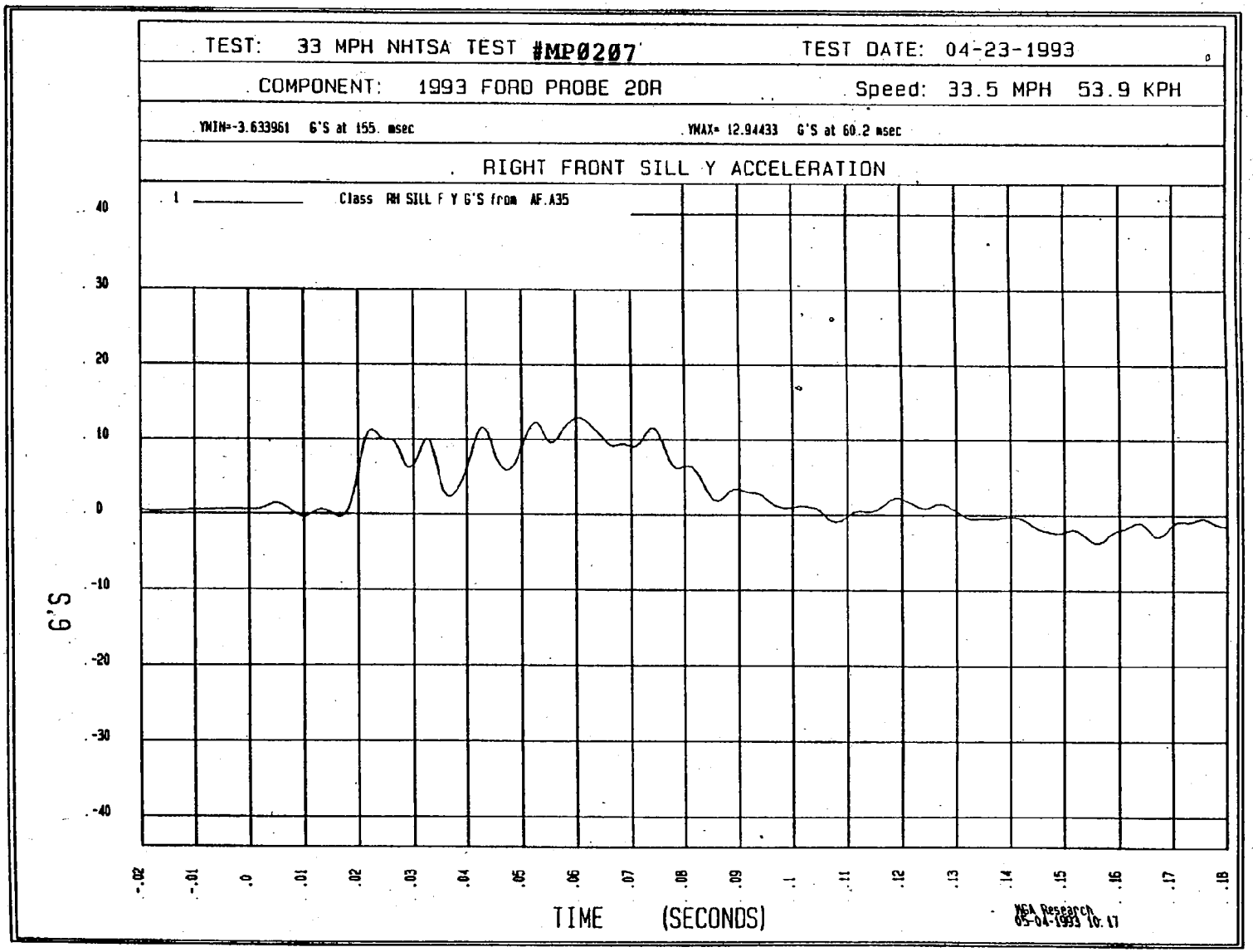


Figure B-45 - Right Front Sill Y Acceleration vs. Time

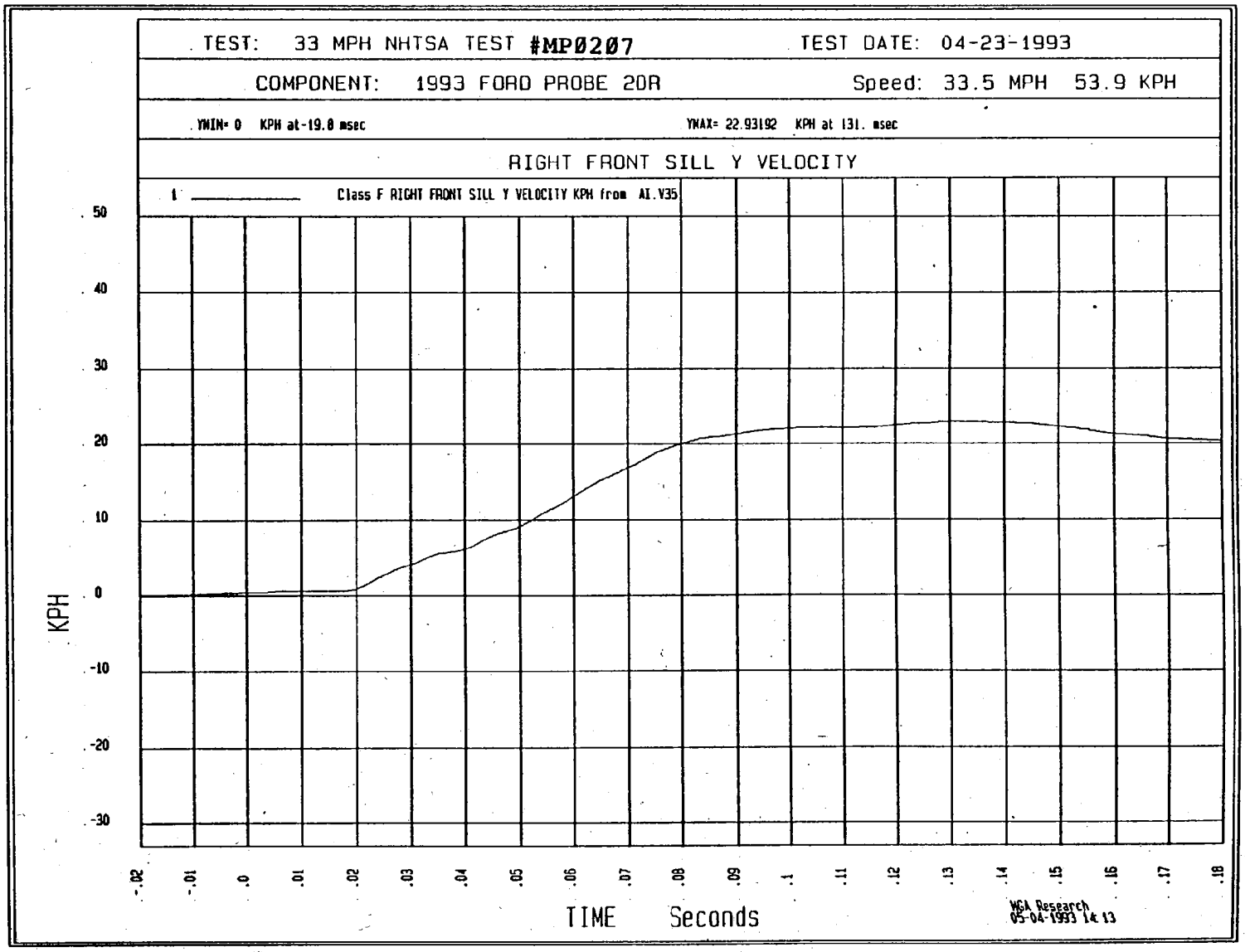
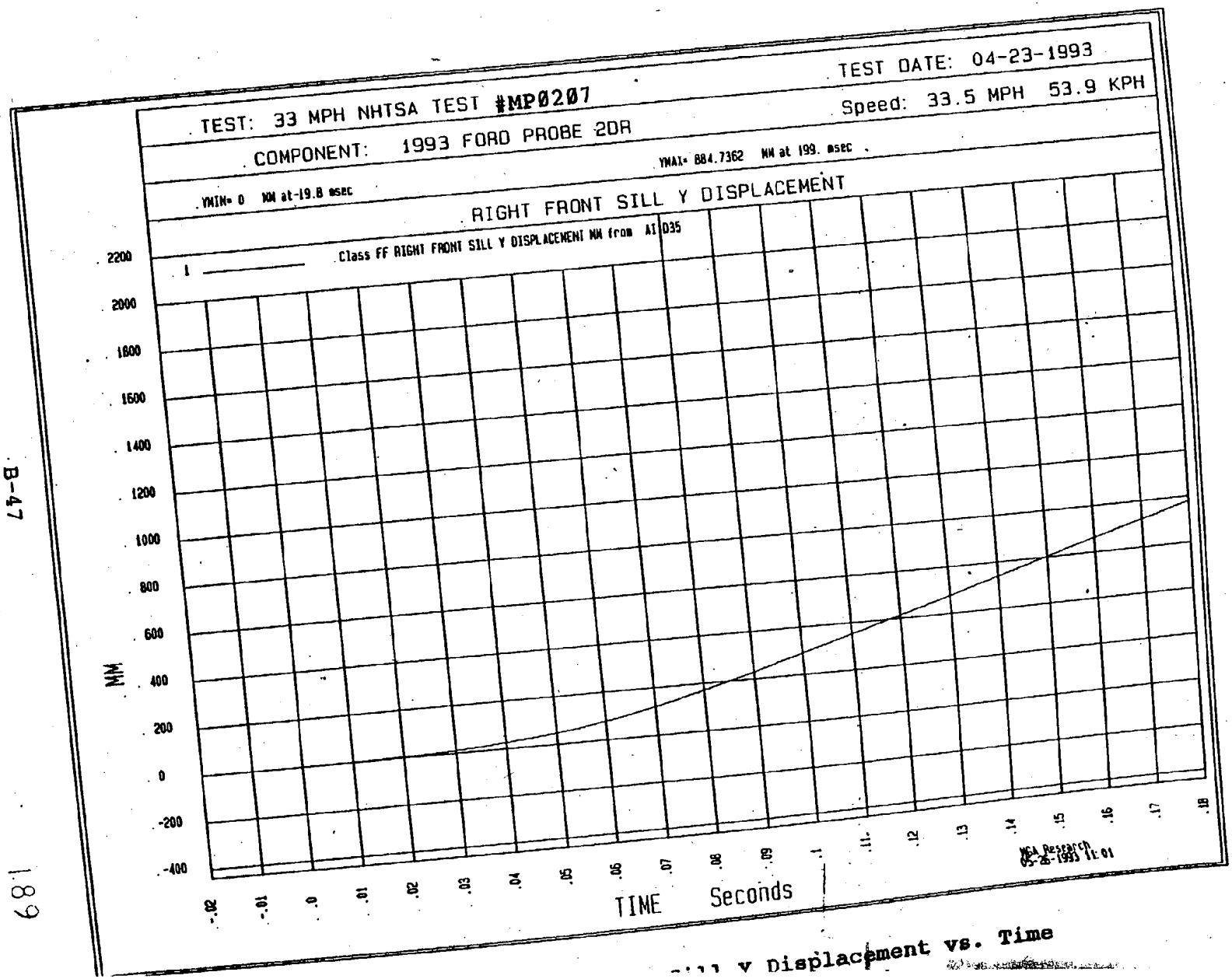


Figure B-46 - Right Front Sill Y Velocity vs. Time



...ill Y Displacement vs. Time

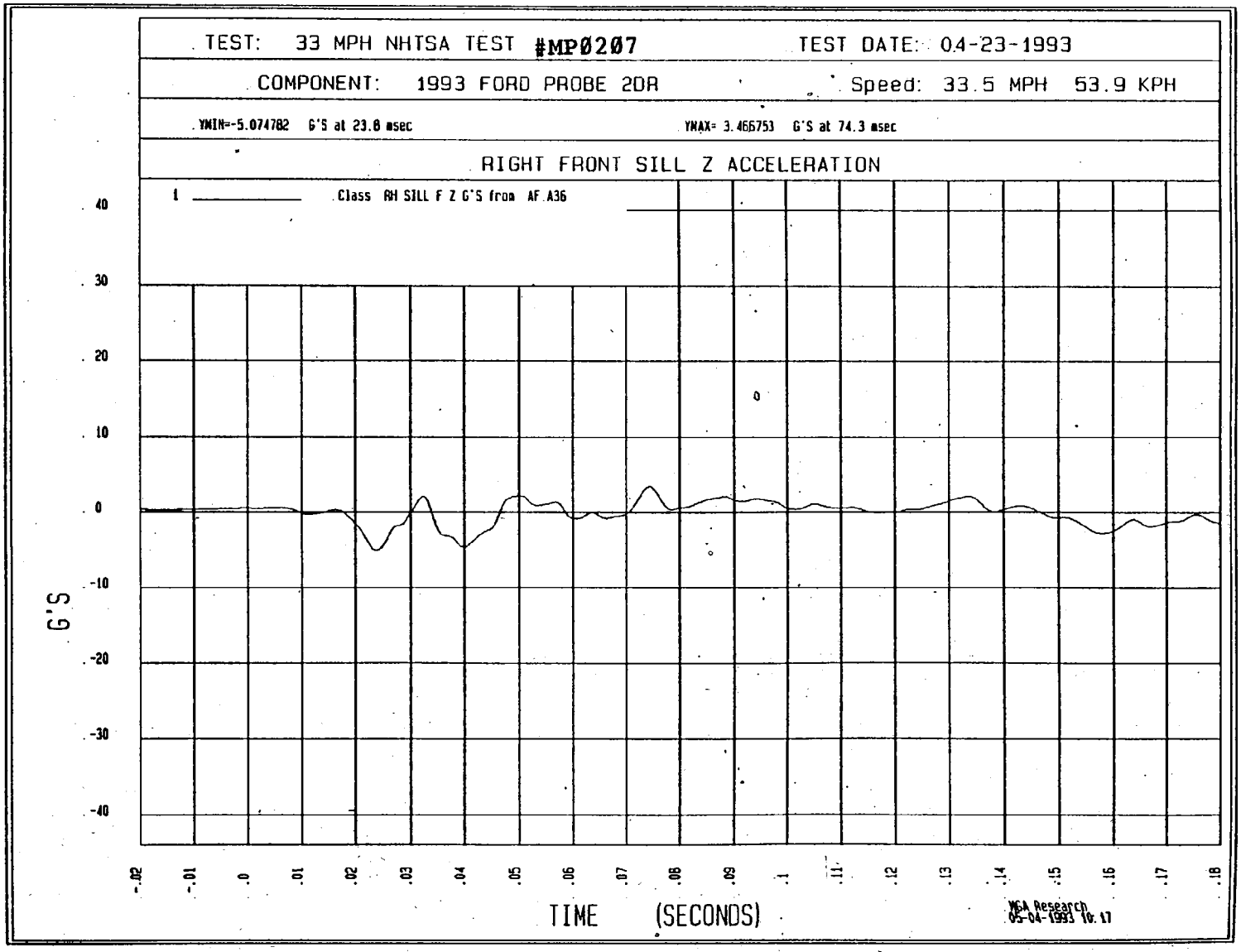


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Figure B-48 - Right Front Sill Z Acceleration vs. Time

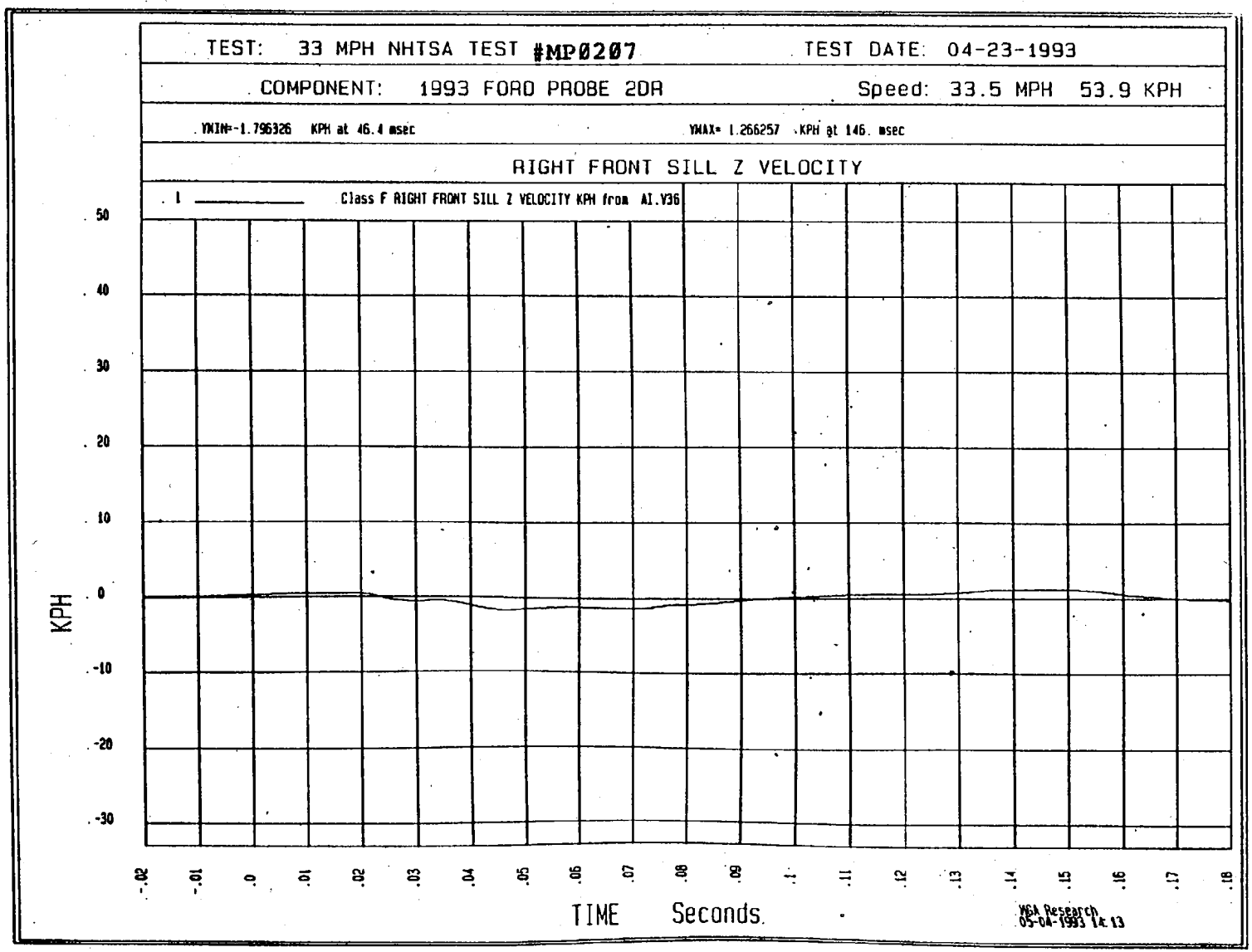

Figure B-49 - Right Front Sill Z Velocity vs. Time

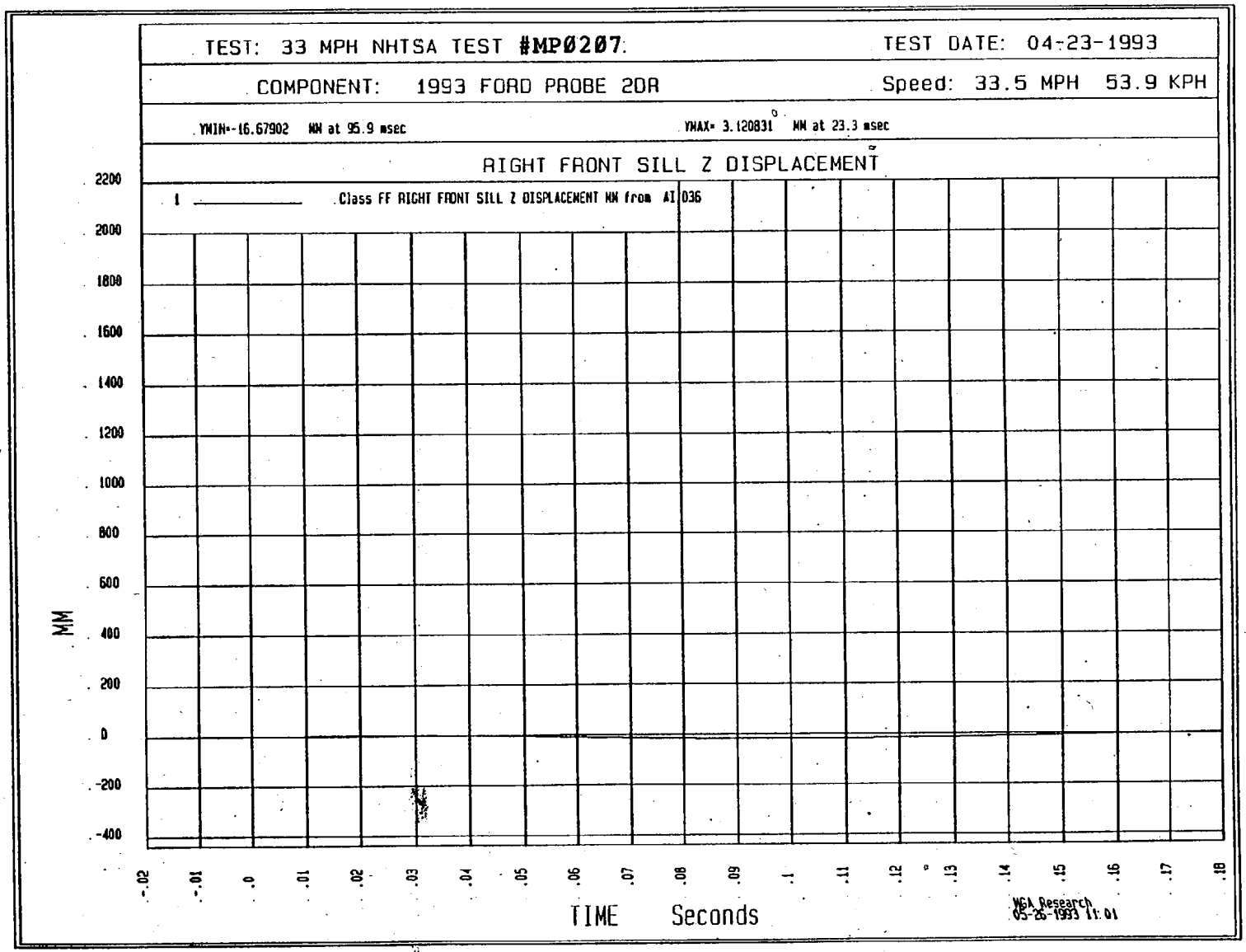

Figure B-50 - Right Front Sill Z Displacement vs. Time

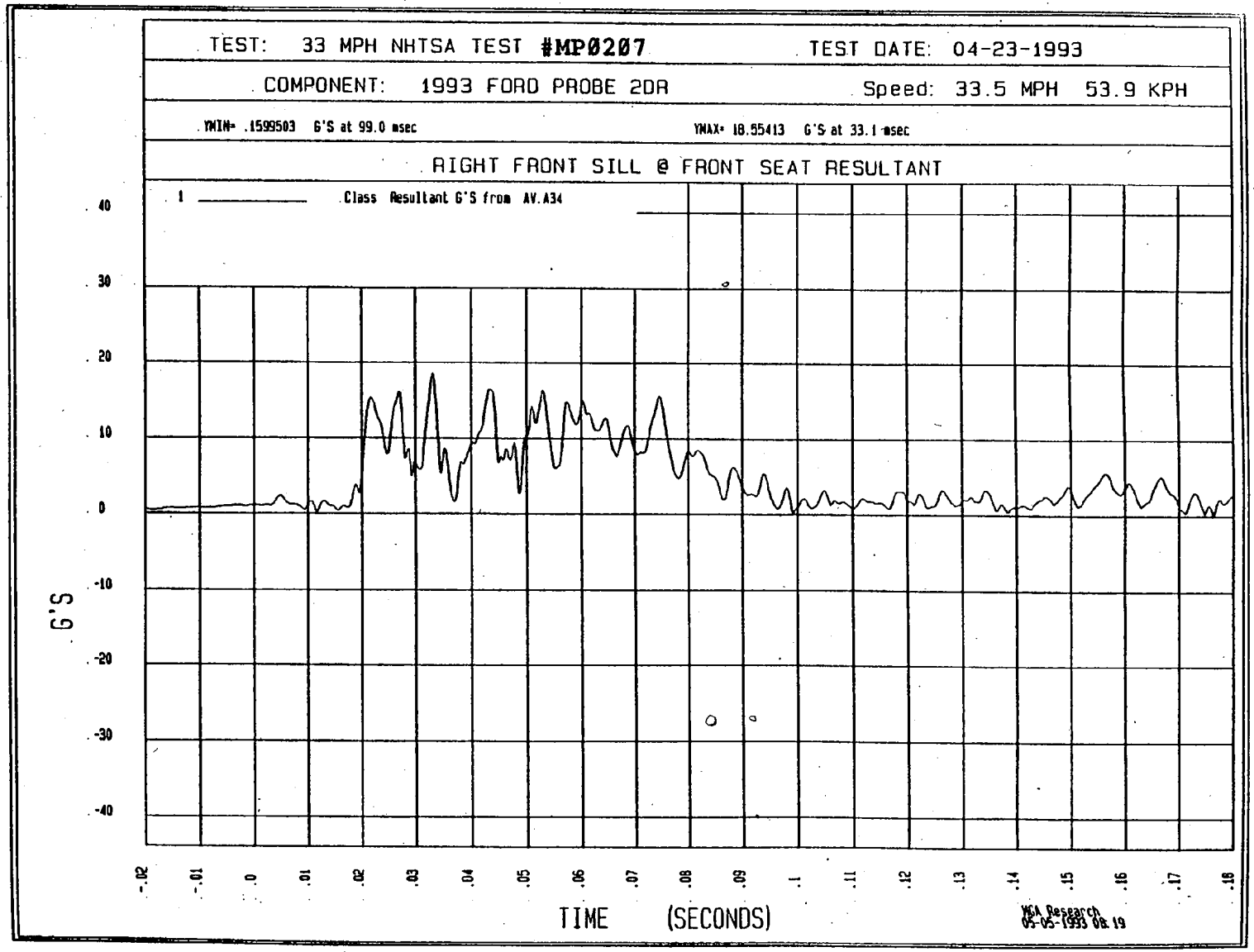

Figure B-51 - Right Front Sill at Front Seat Resultant vs. Time

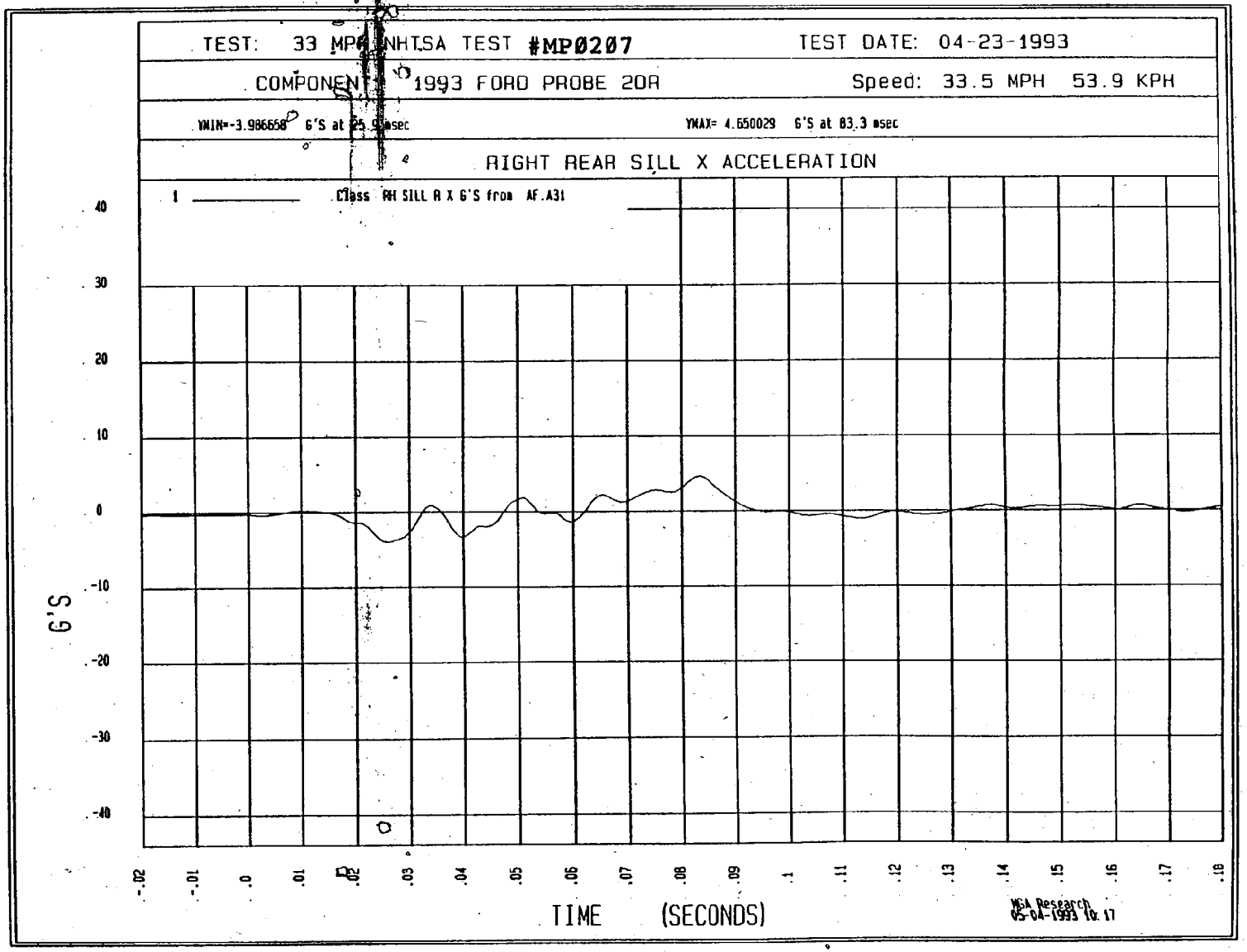

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Figure B-52 - Right Rear Sill X Acceleration vs. Time

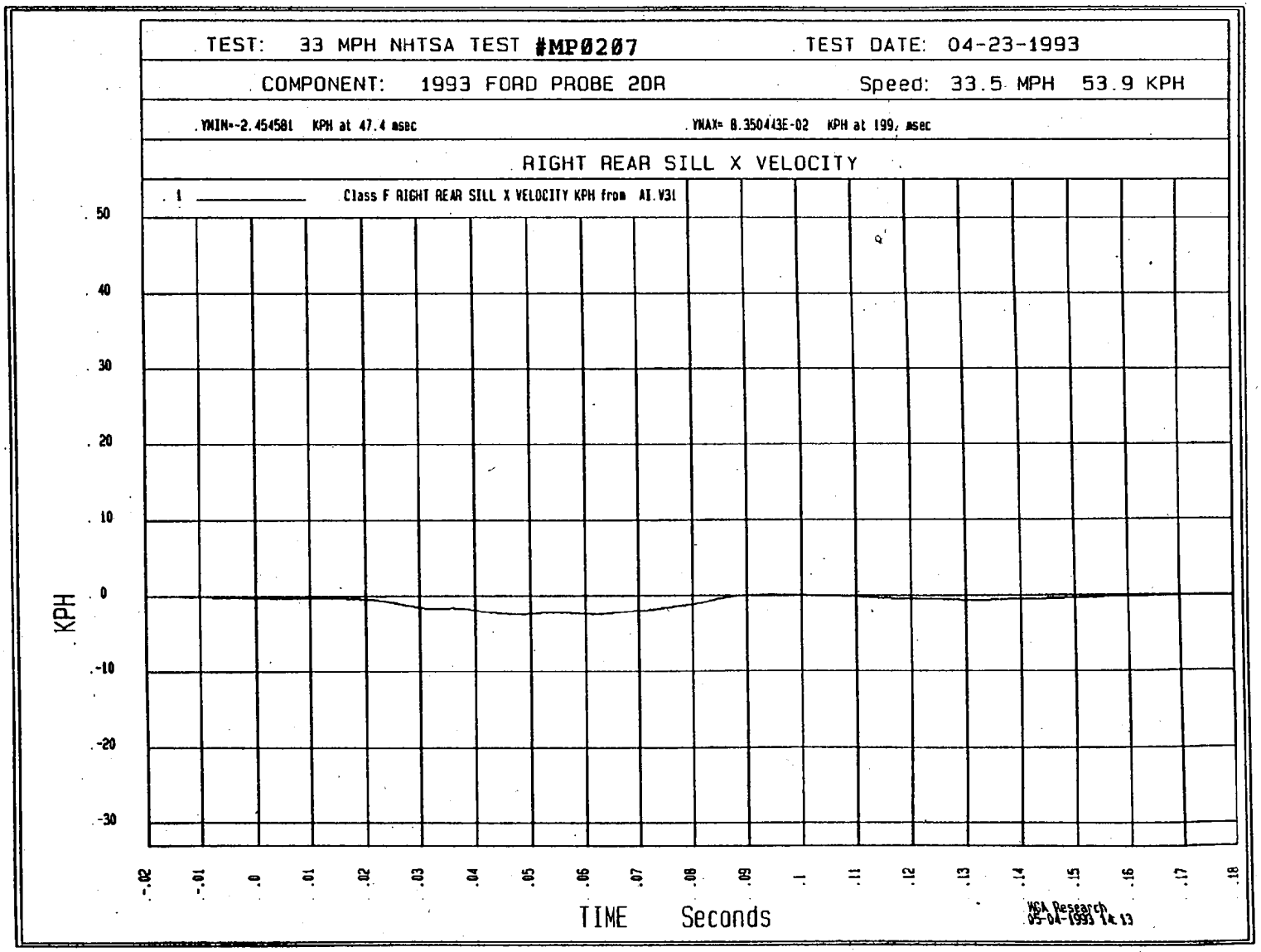


Figure B-53 - Right Rear Sill X Velocity vs. Time

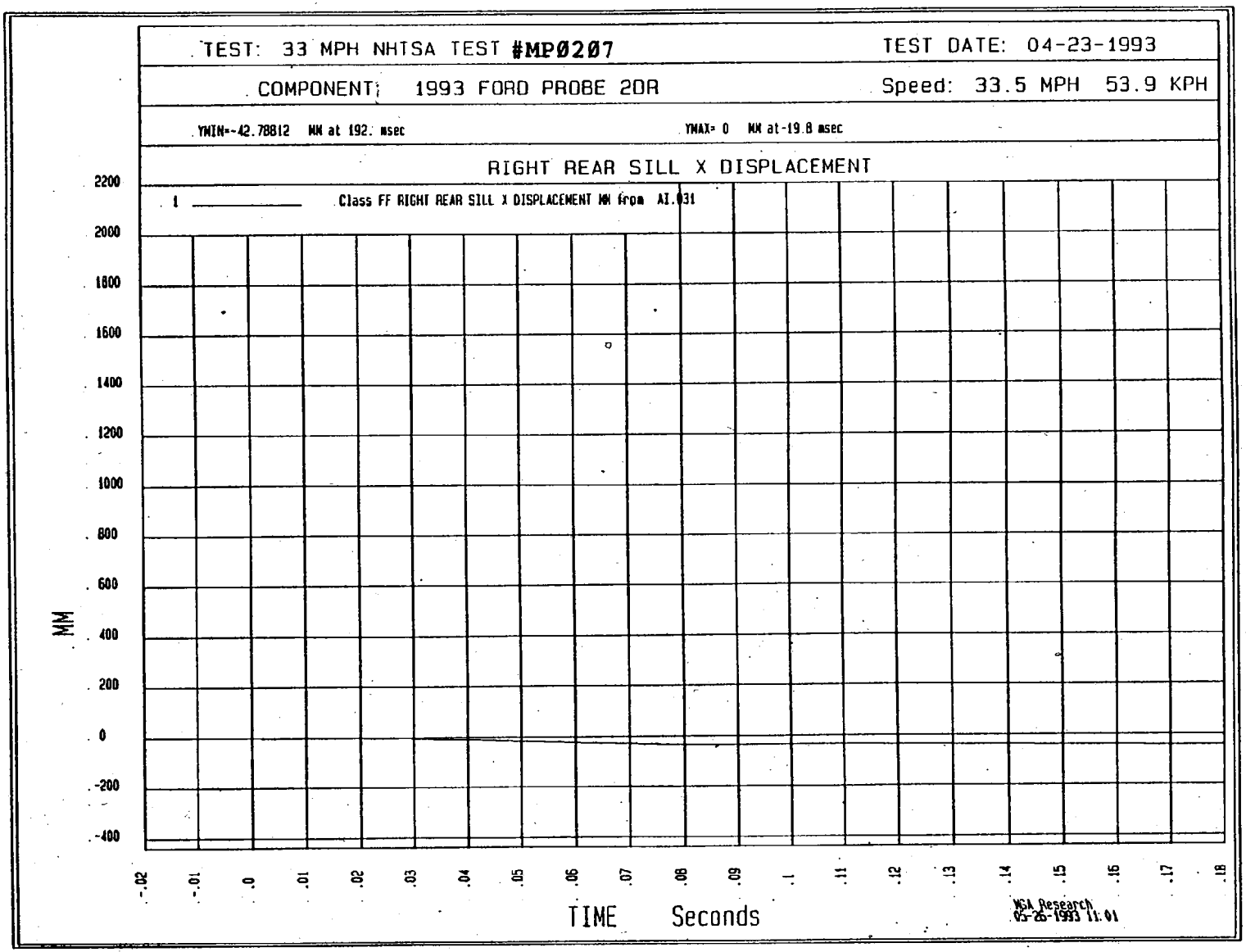


Figure B-54 - Right Rear Sill X Displacement vs. Time

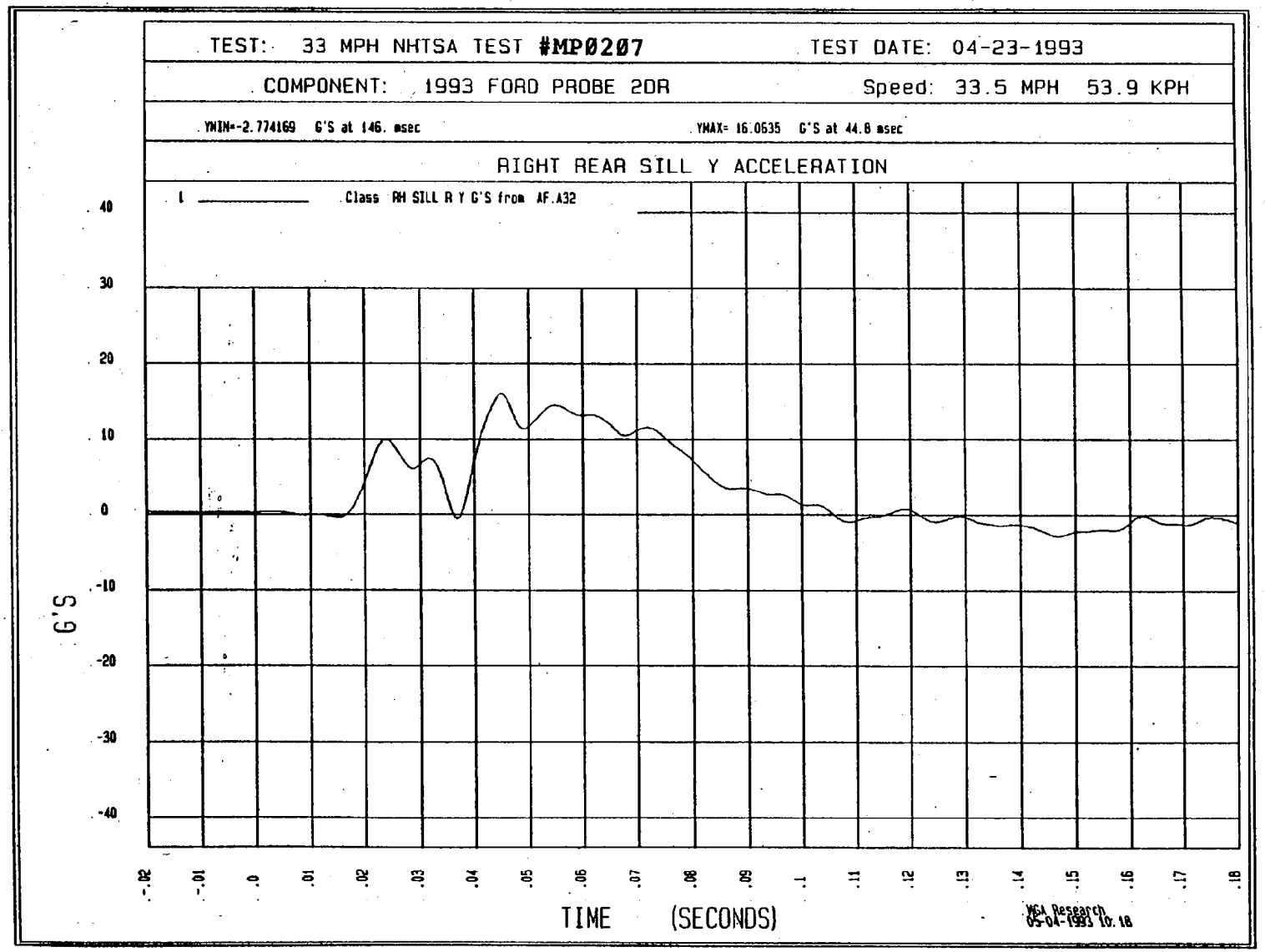


Figure B-55 - Right Rear Sill Y Acceleration vs. Time

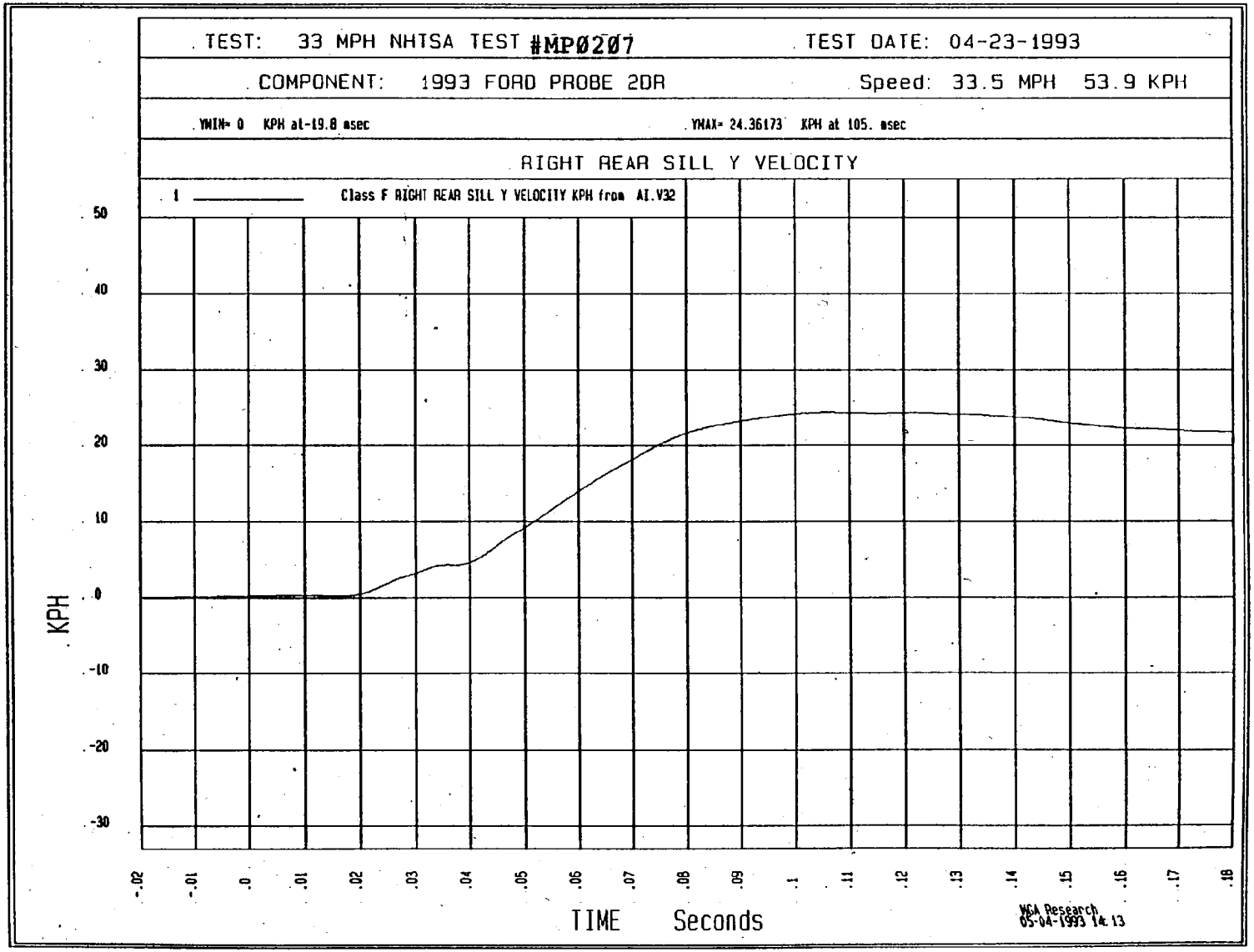


Figure B-56 - Right Rear Sill Y Velocity vs. Time

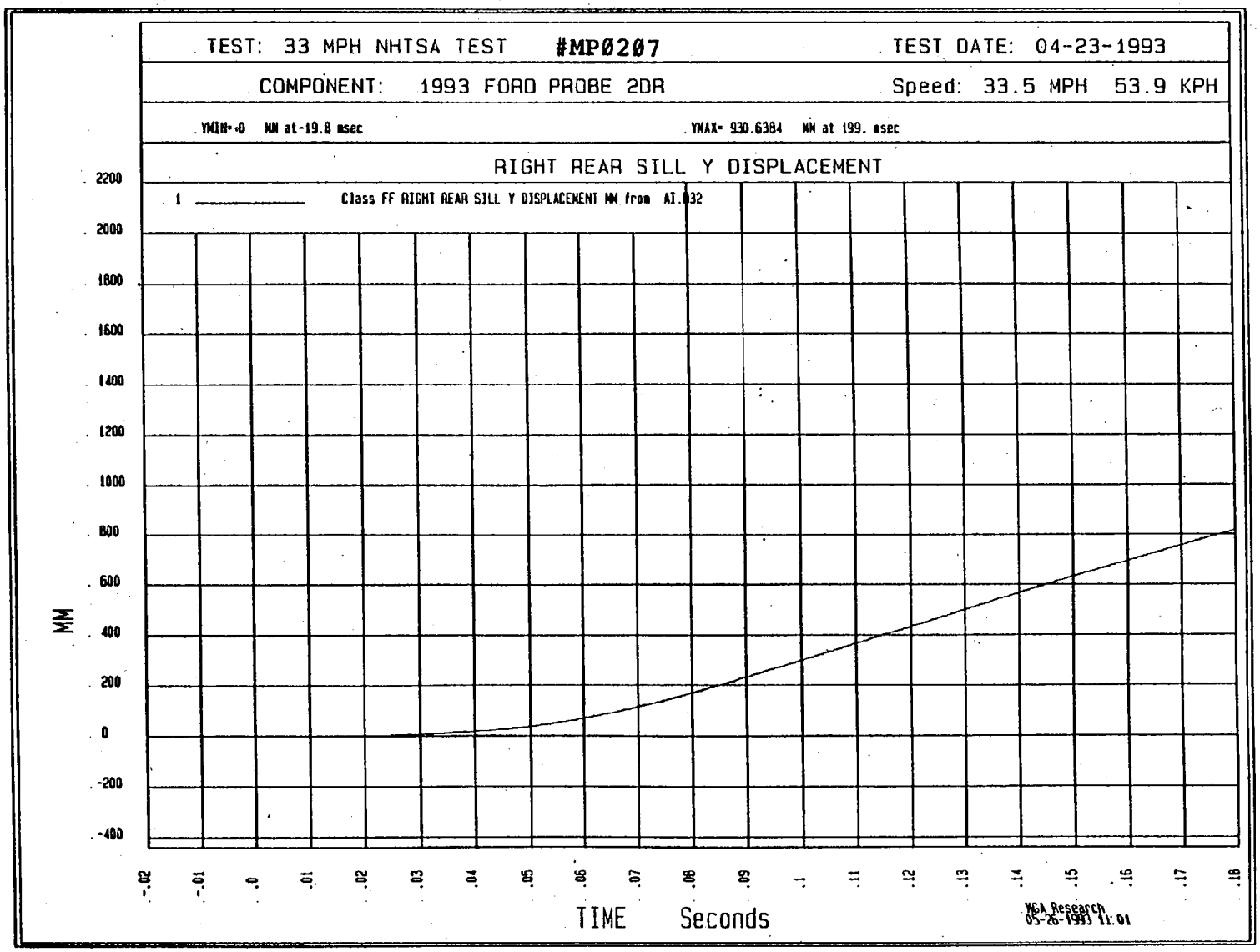
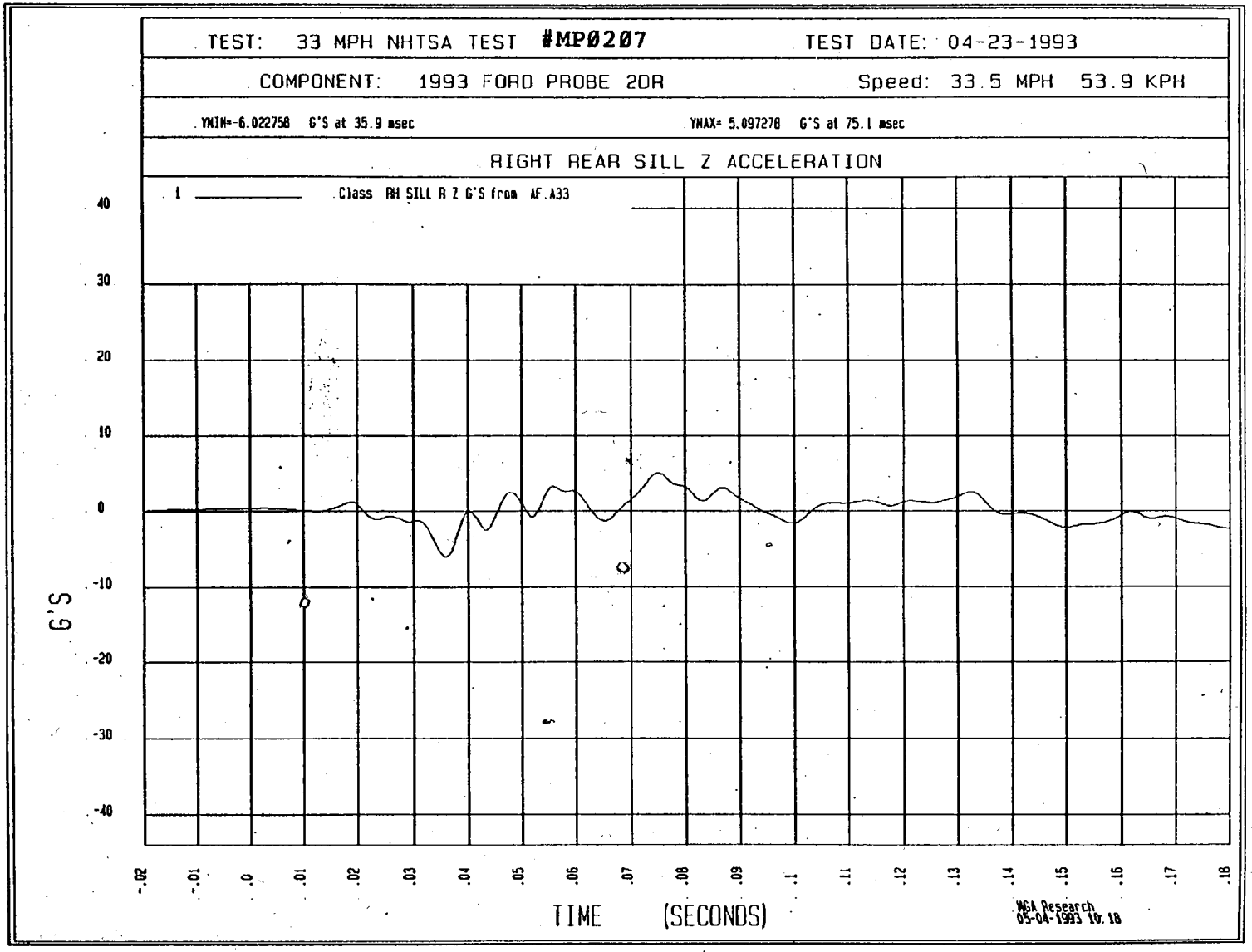
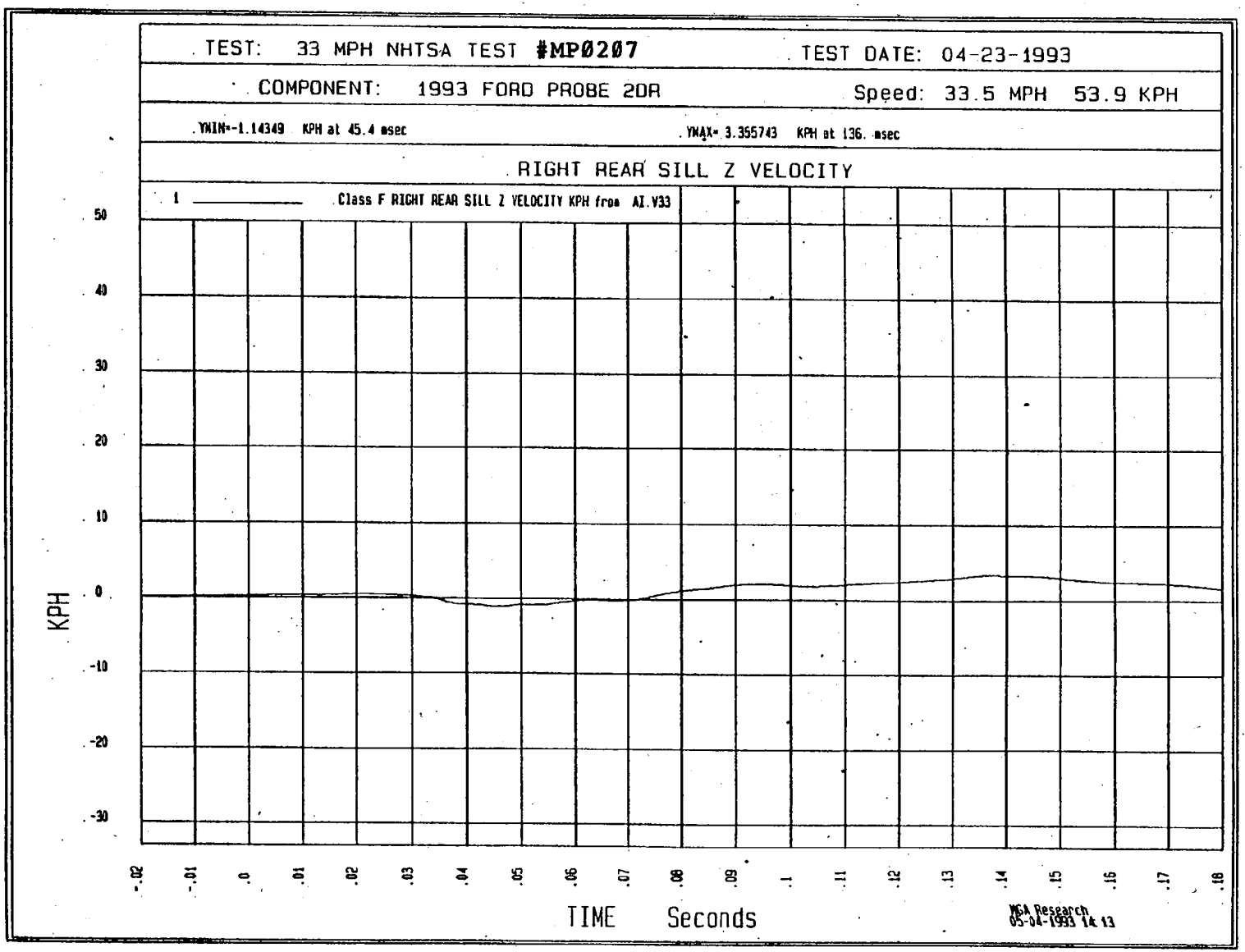


Figure B-57 - Right Rear Sill Y Displacement vs. Time



B-58

Figure B-58 - Right Rear Sill Z Acceleration vs. Time



B-59

201

Figure B-59 - Right Rear Sill Z Velocity vs. Time

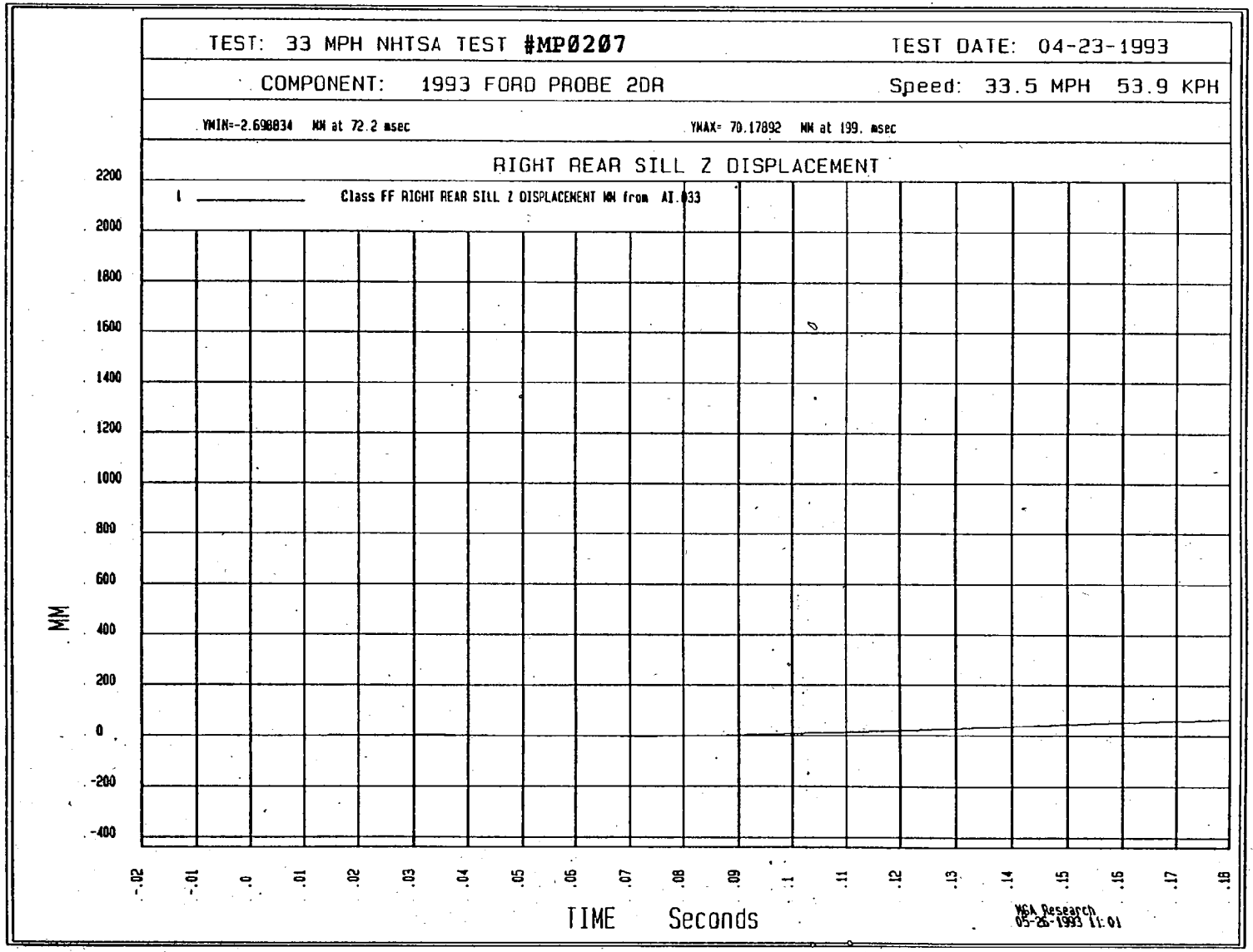


Figure B-60 - Right Rear Sill Z Displacement vs. Time

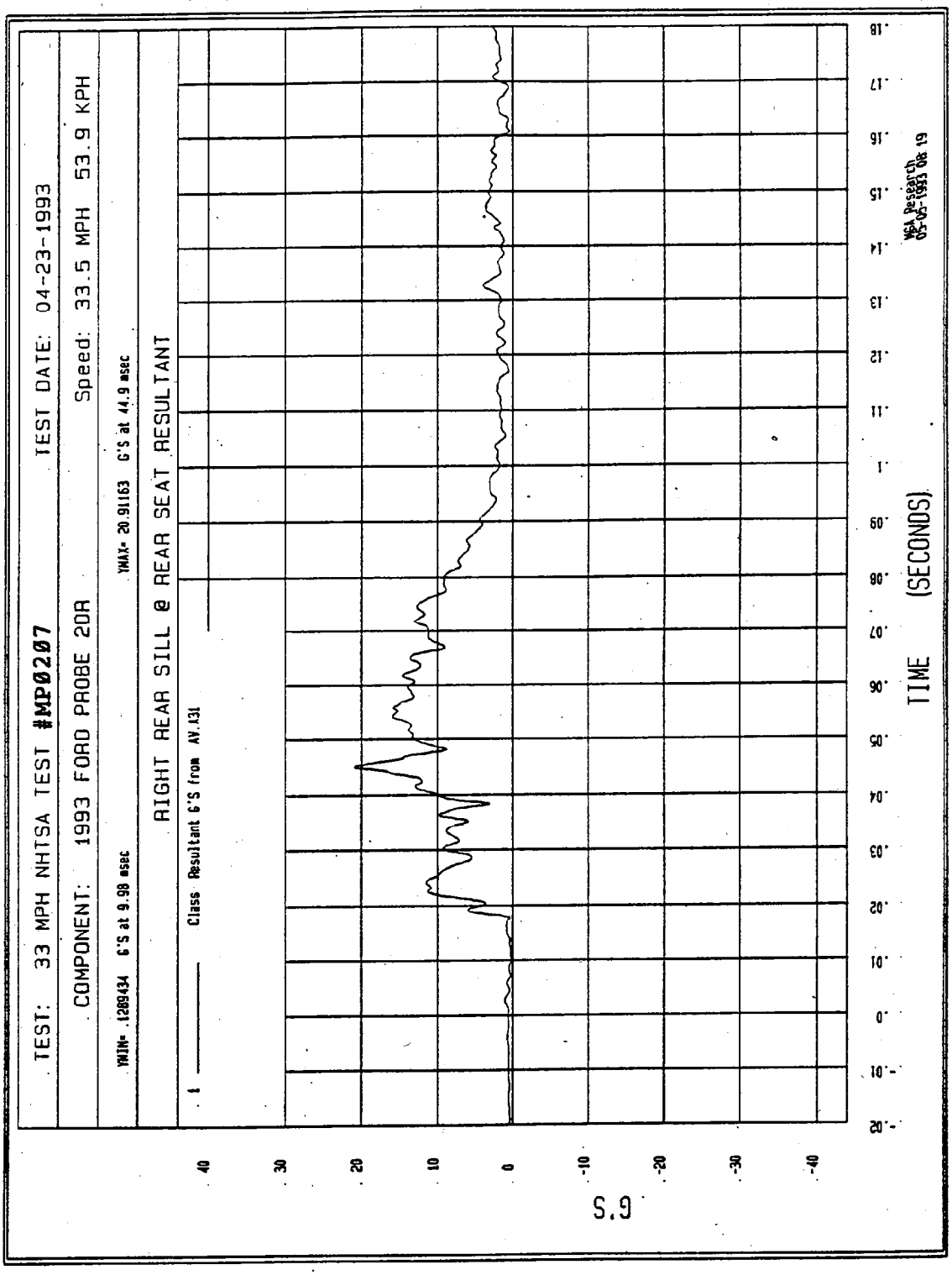
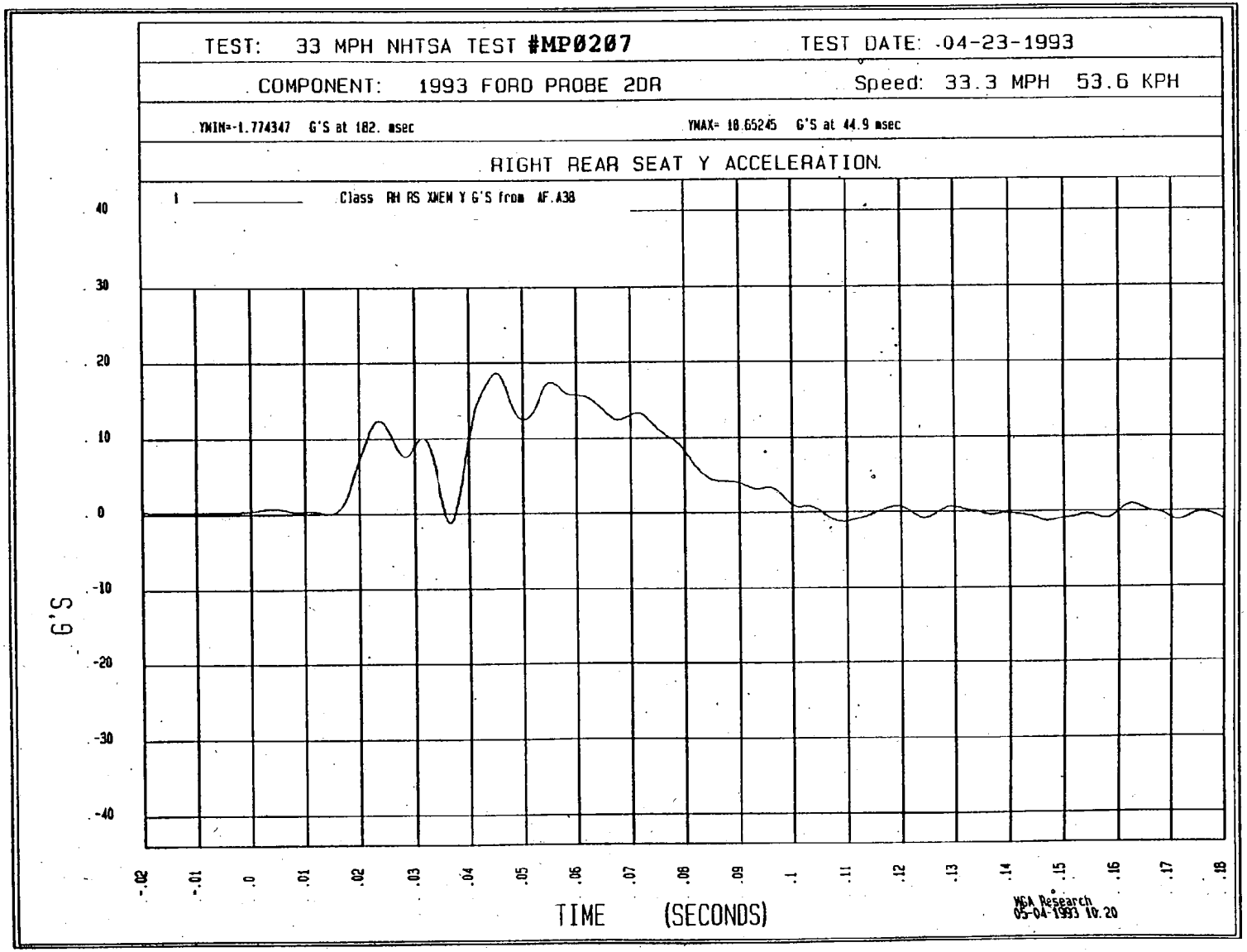


Figure B-61 - Right Rear Sill at Rear Seat Resultant vs. Time



B-62

Figure B-62 - Right Rear Seat Y Acceleration vs. Time

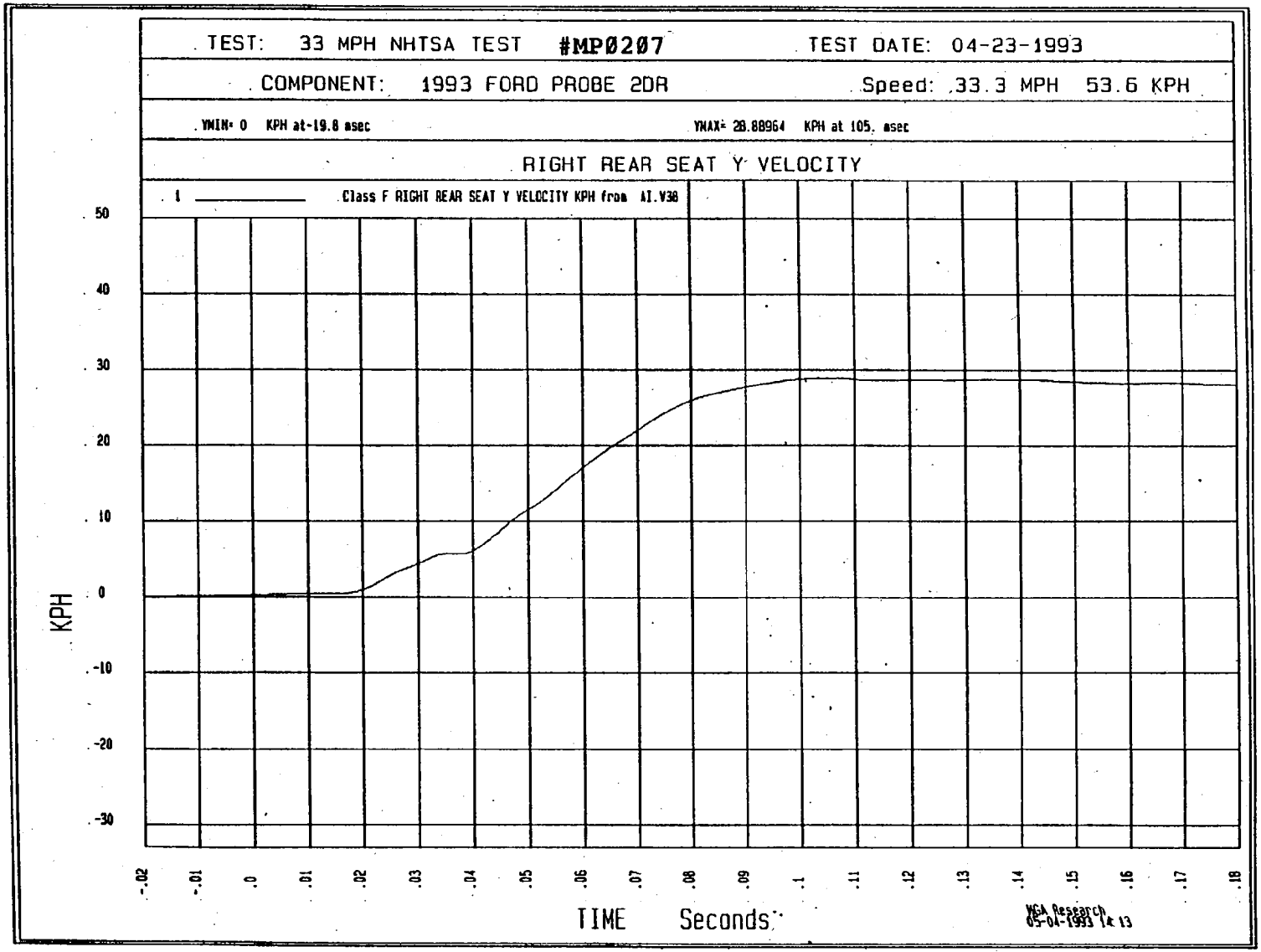


Figure B-63 - Right Rear Seat Y Velocity vs. Time

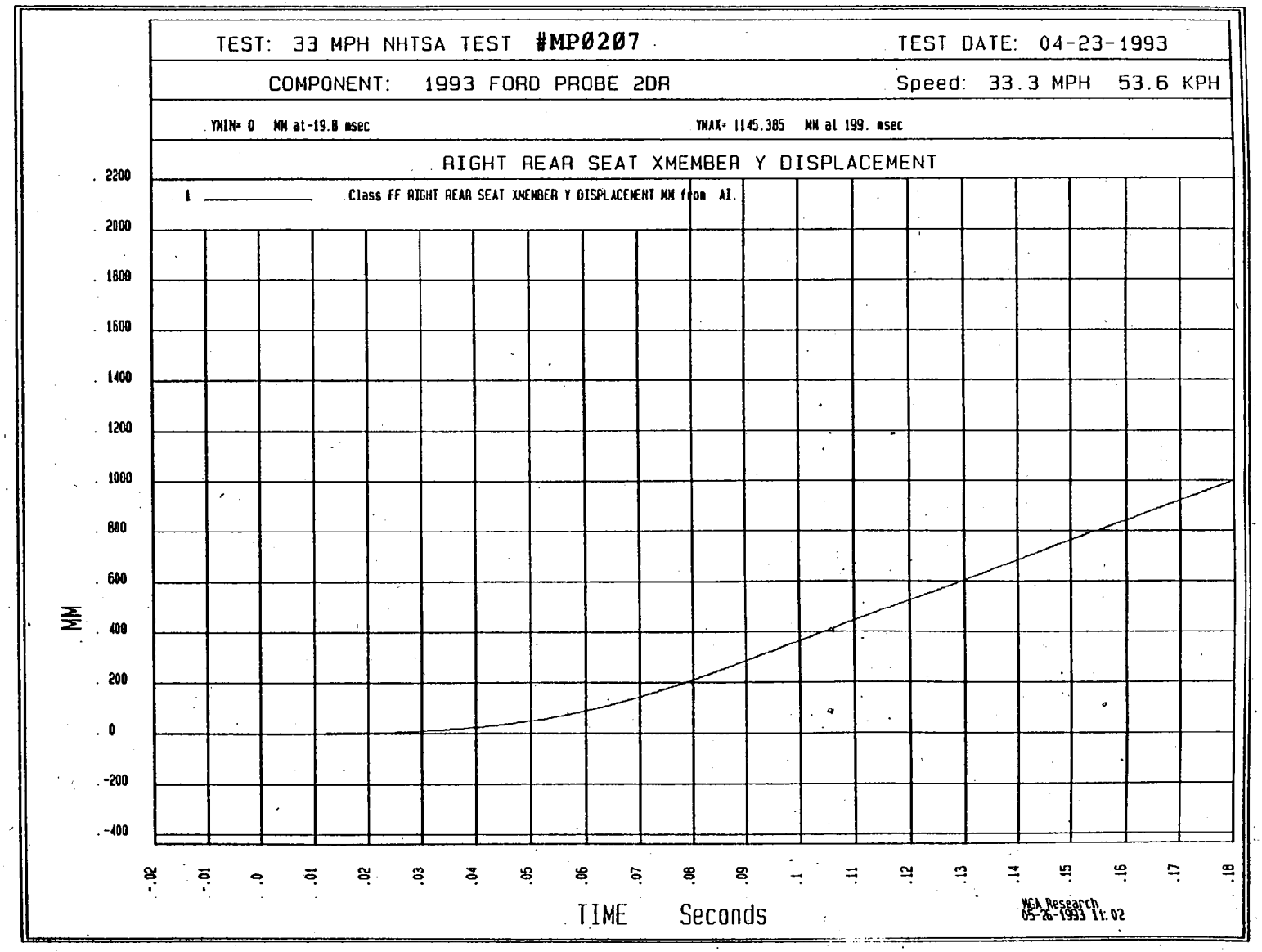


Figure B-64 - Right Rear Seat Y Displacement vs. Time

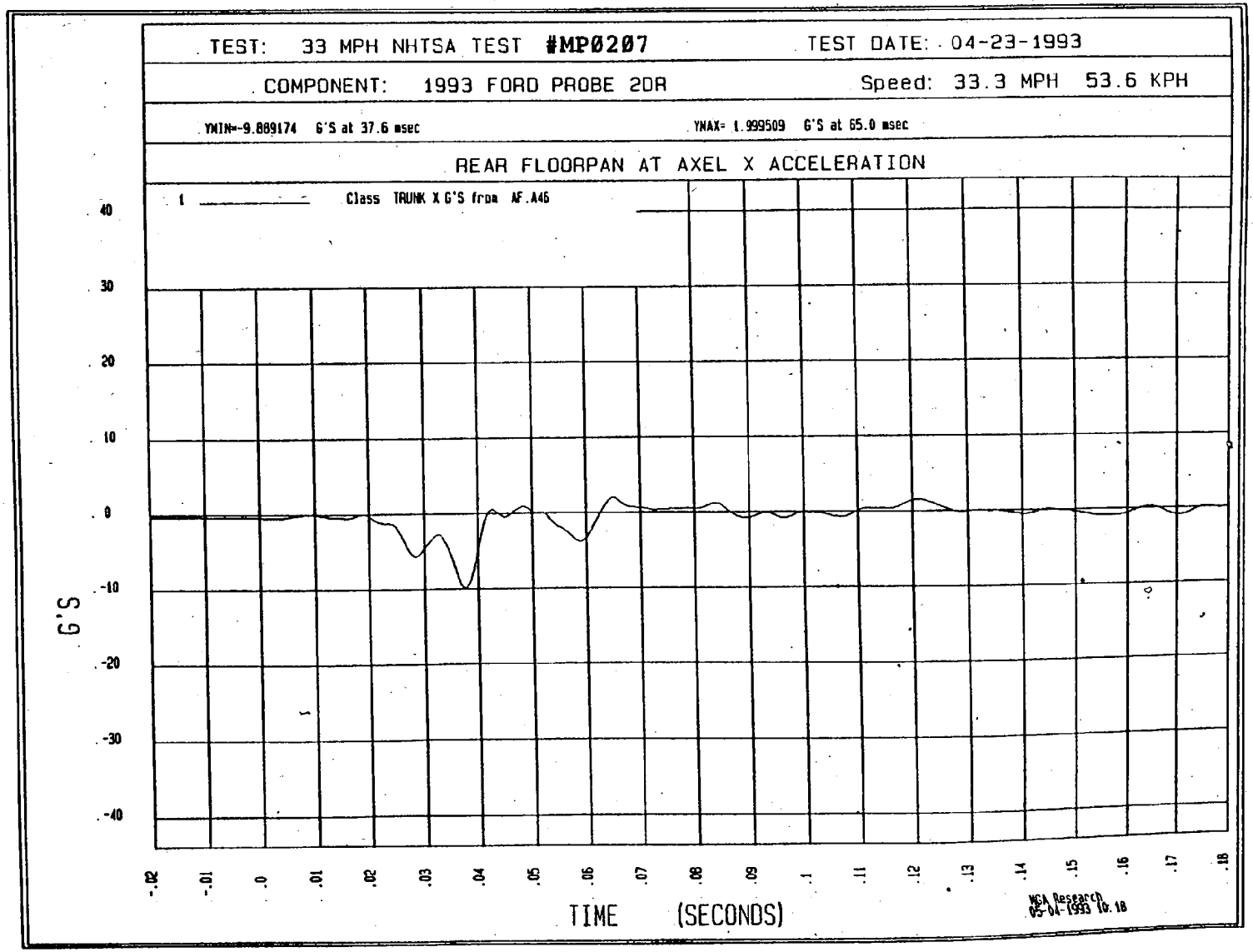


Figure B-65 - Rear Floorpan at Axle X Acceleration vs. Time

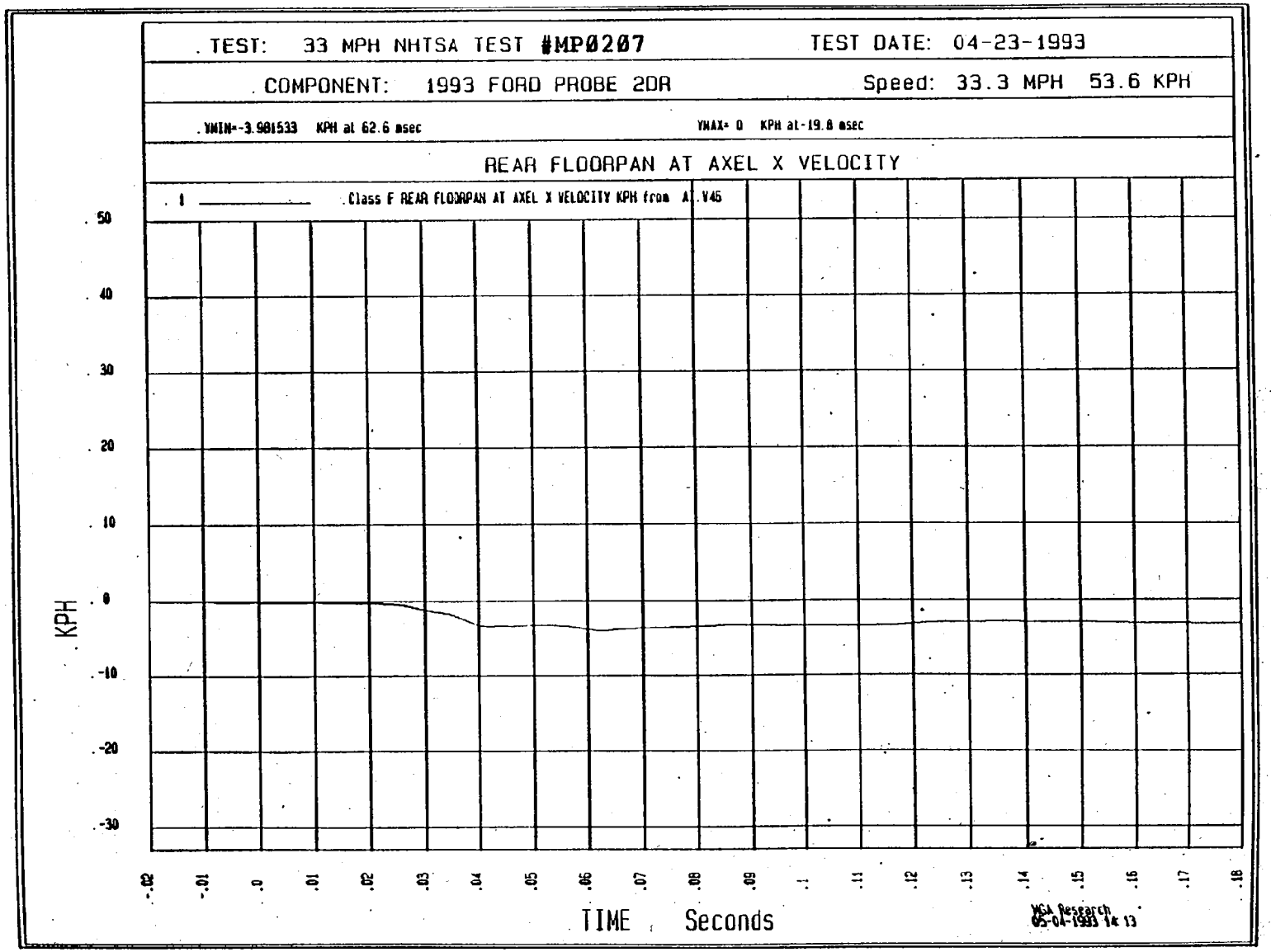


Figure B-66 - Rear Floorpan at Axle X Velocity vs. Time

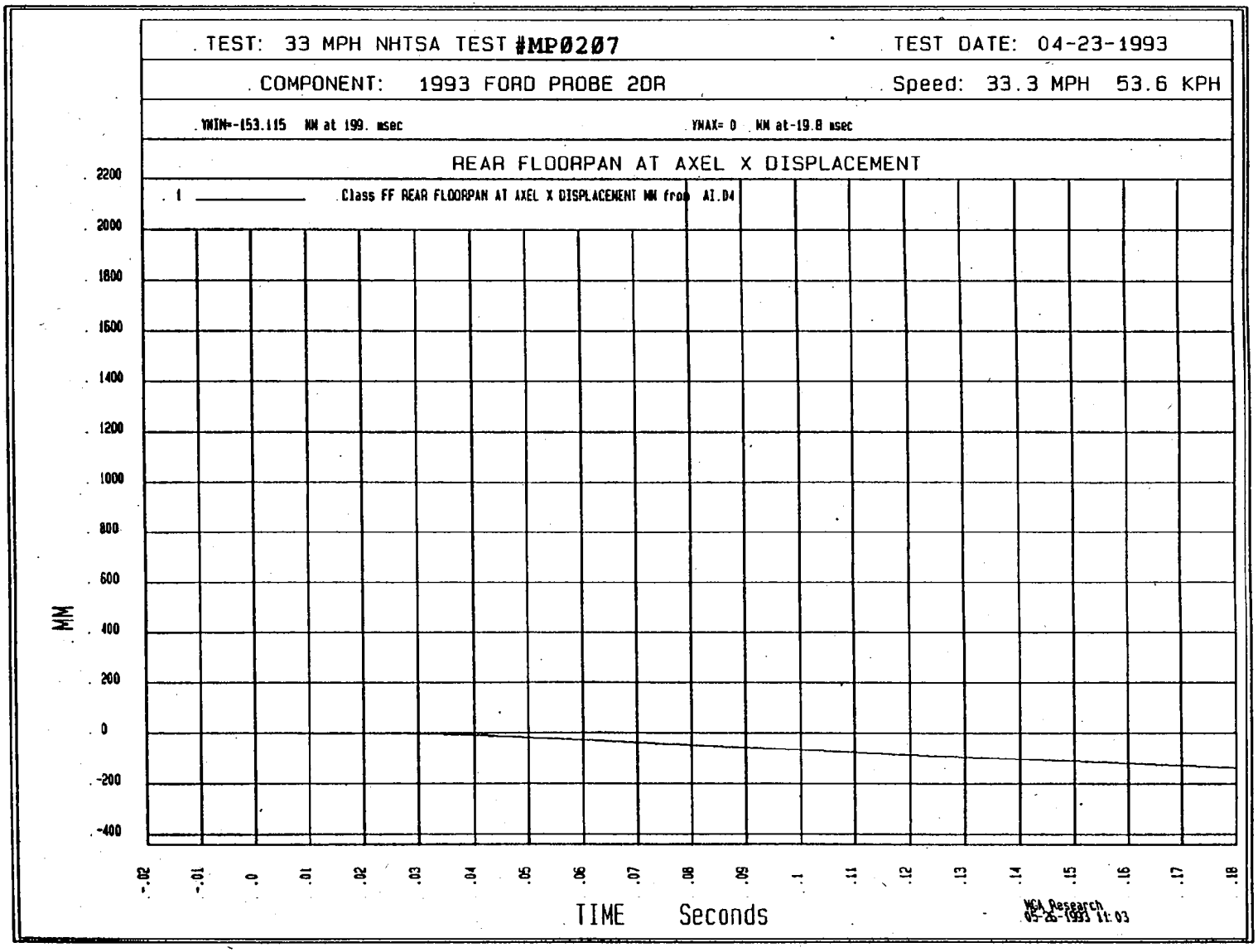
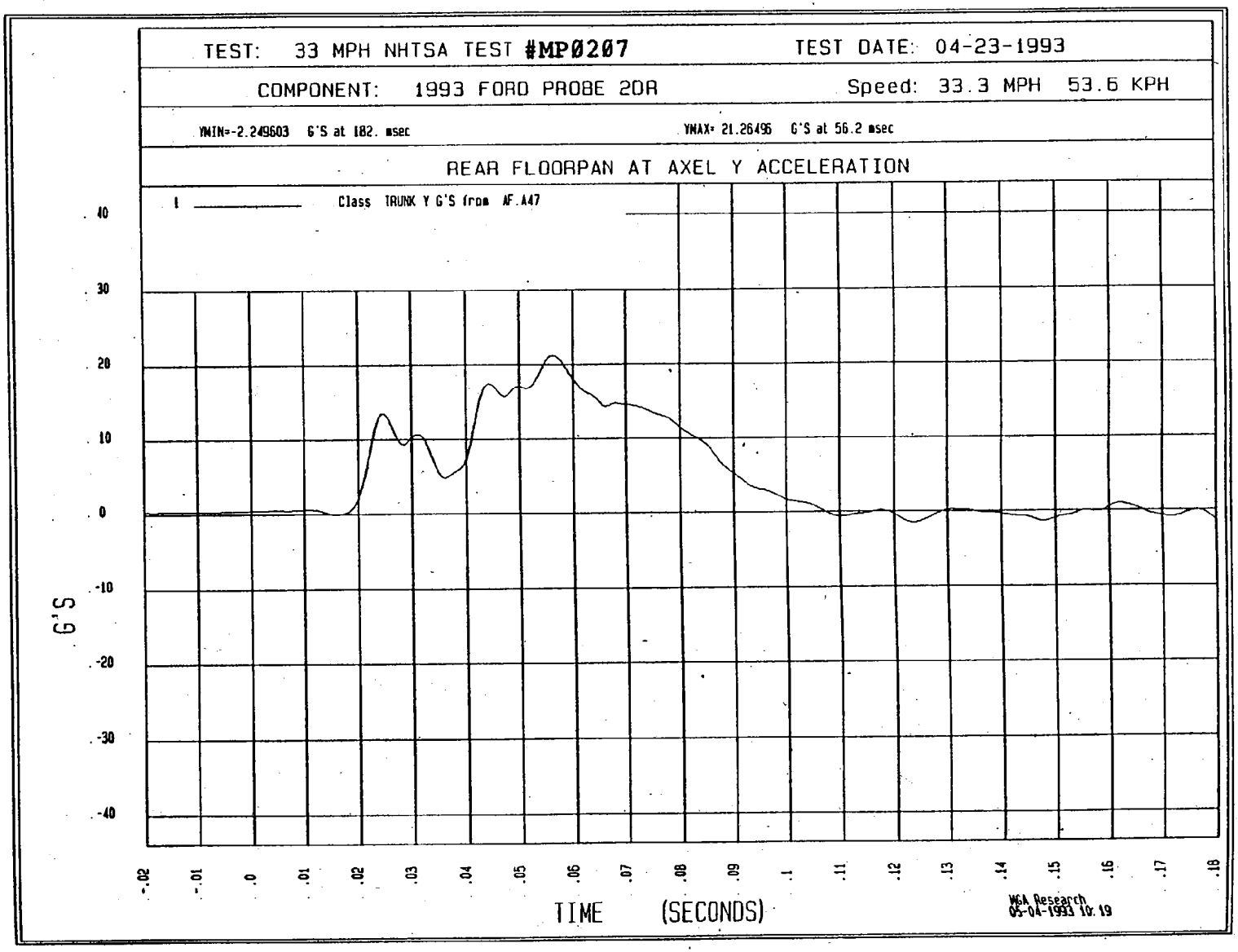
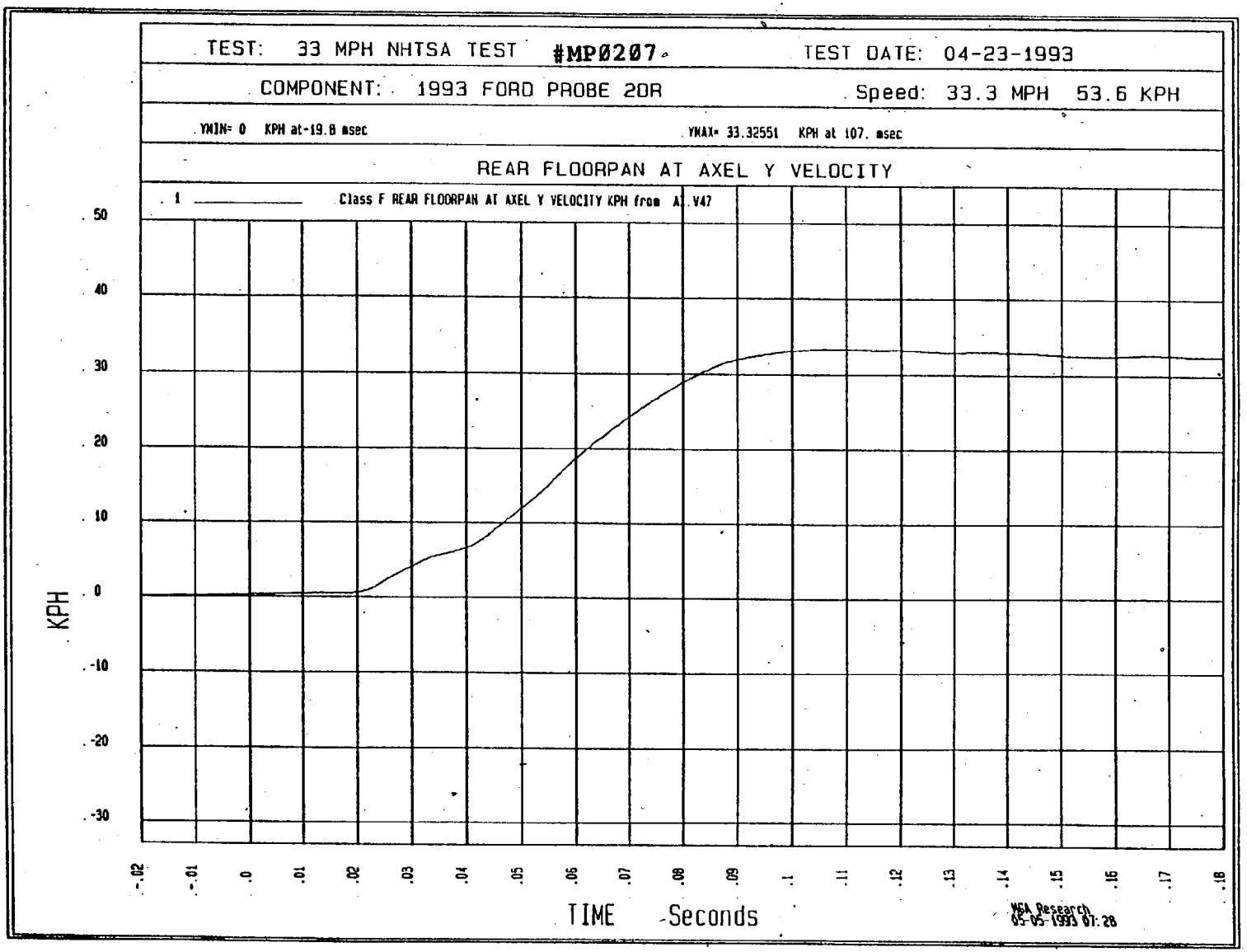


Figure B-67 - Rear Floorpan at Axle X Displacement vs. Time



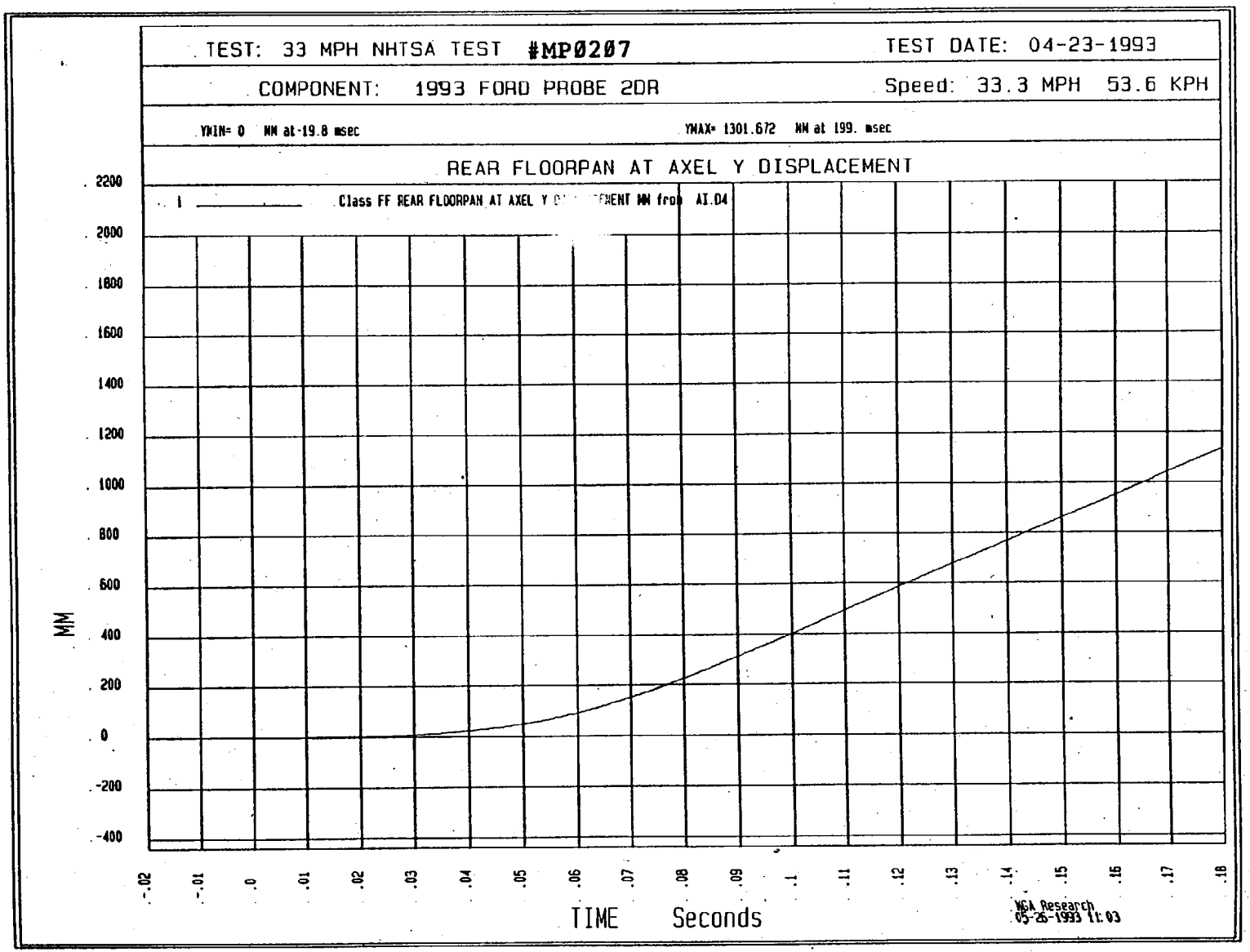
B-68

Figure B-68 - Rear Floorpan at Axle Y Acceleration vs. Time



B-69

Figure B-69 - Rear Floorpan at Axle Y Velocity vs. Time



B-70

Figure B-70 - Rear Floorpan at Axle Y Displacement vs. Time

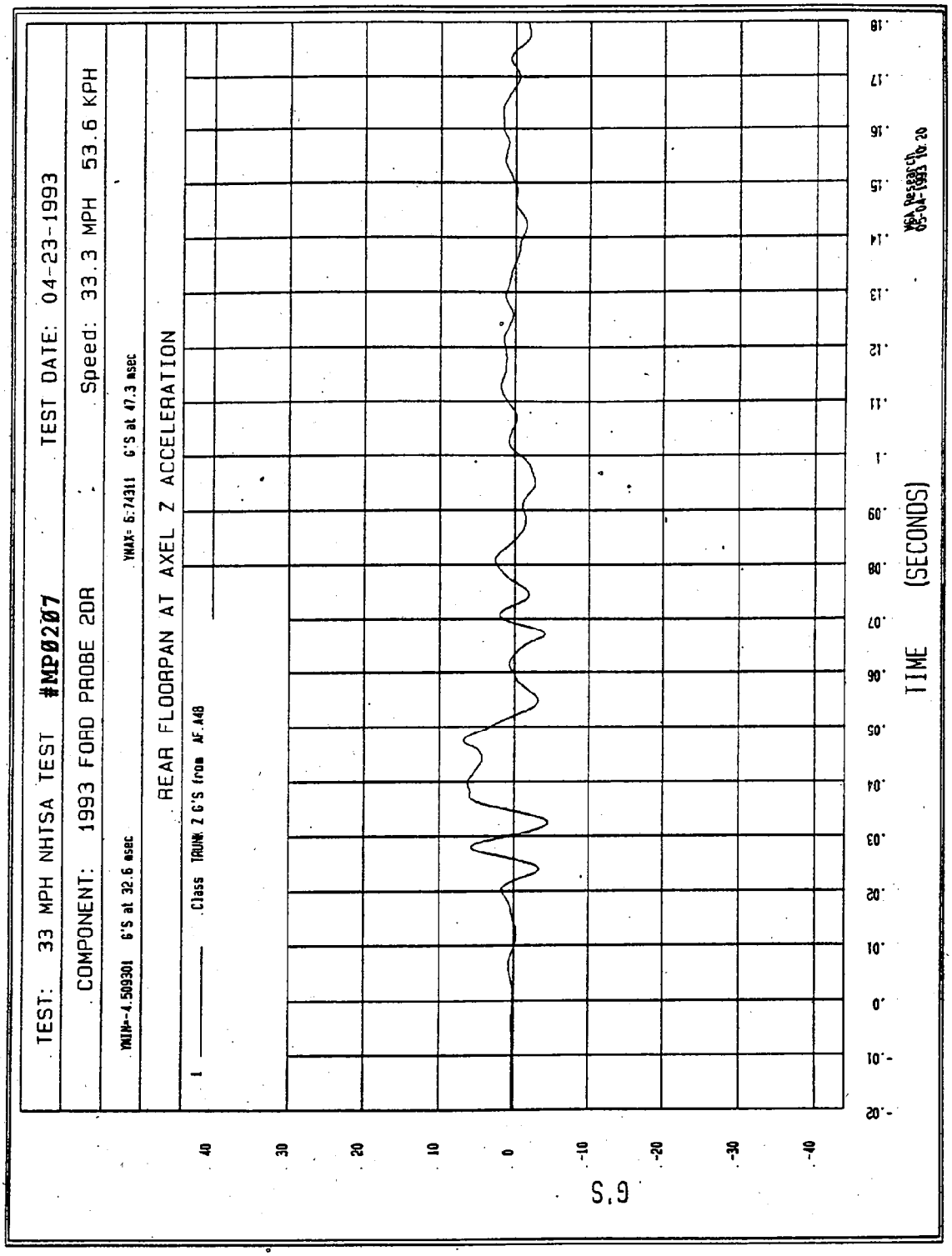


Figure B-71 - Rear Floorpan at Axle Z Acceleration vs. Time

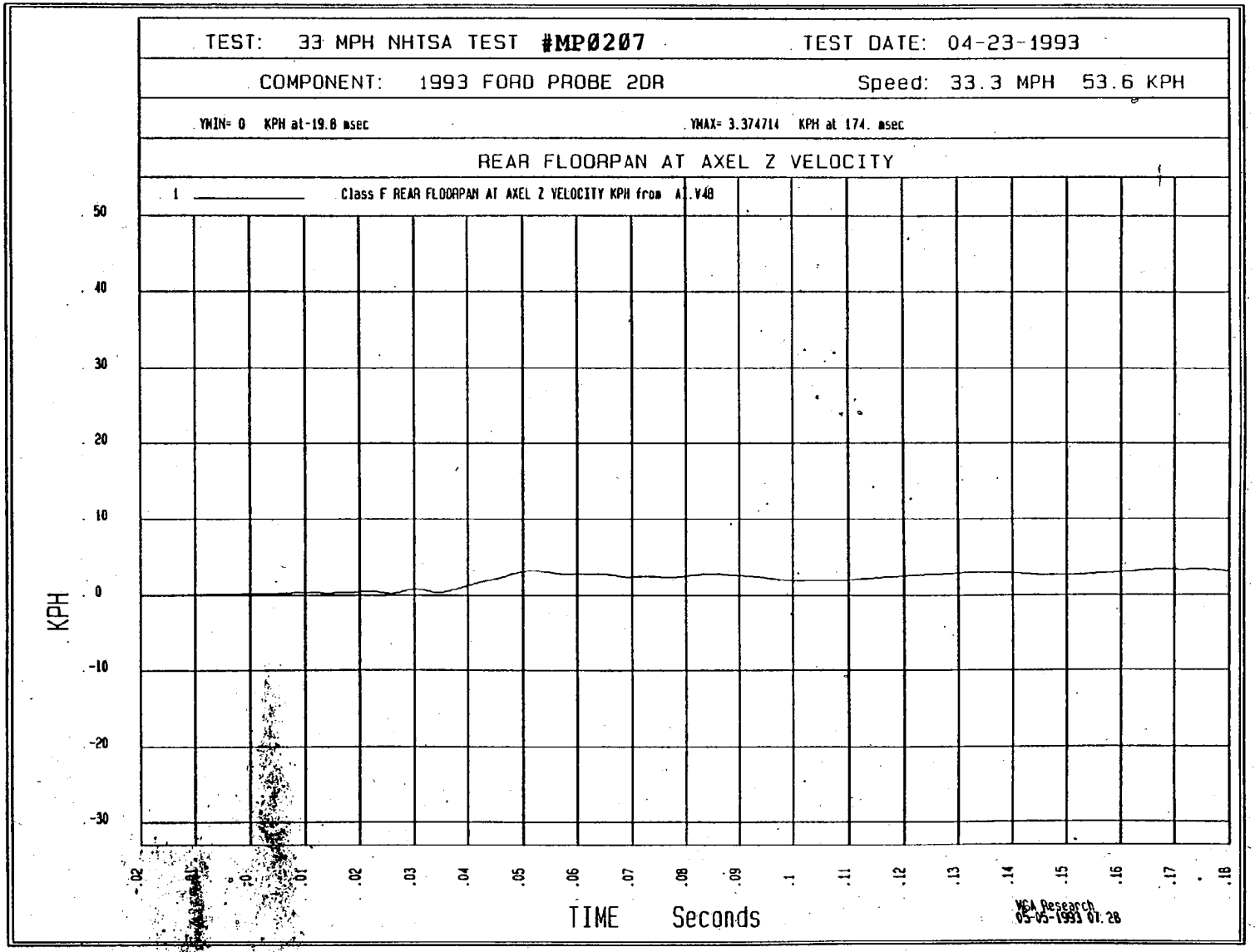


Figure B-72 - Rear Floorpan at Axle Z Velocity vs. Time

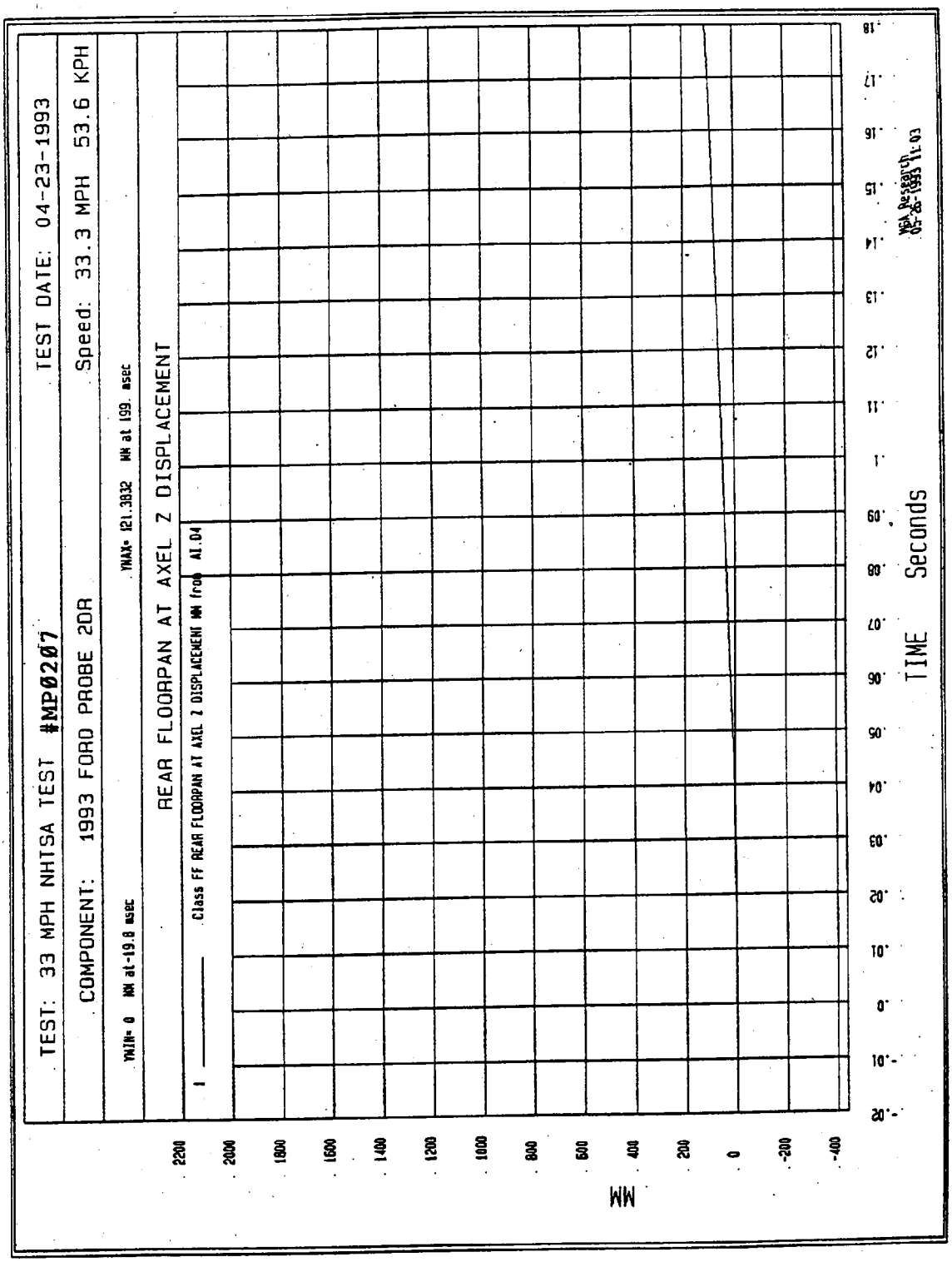
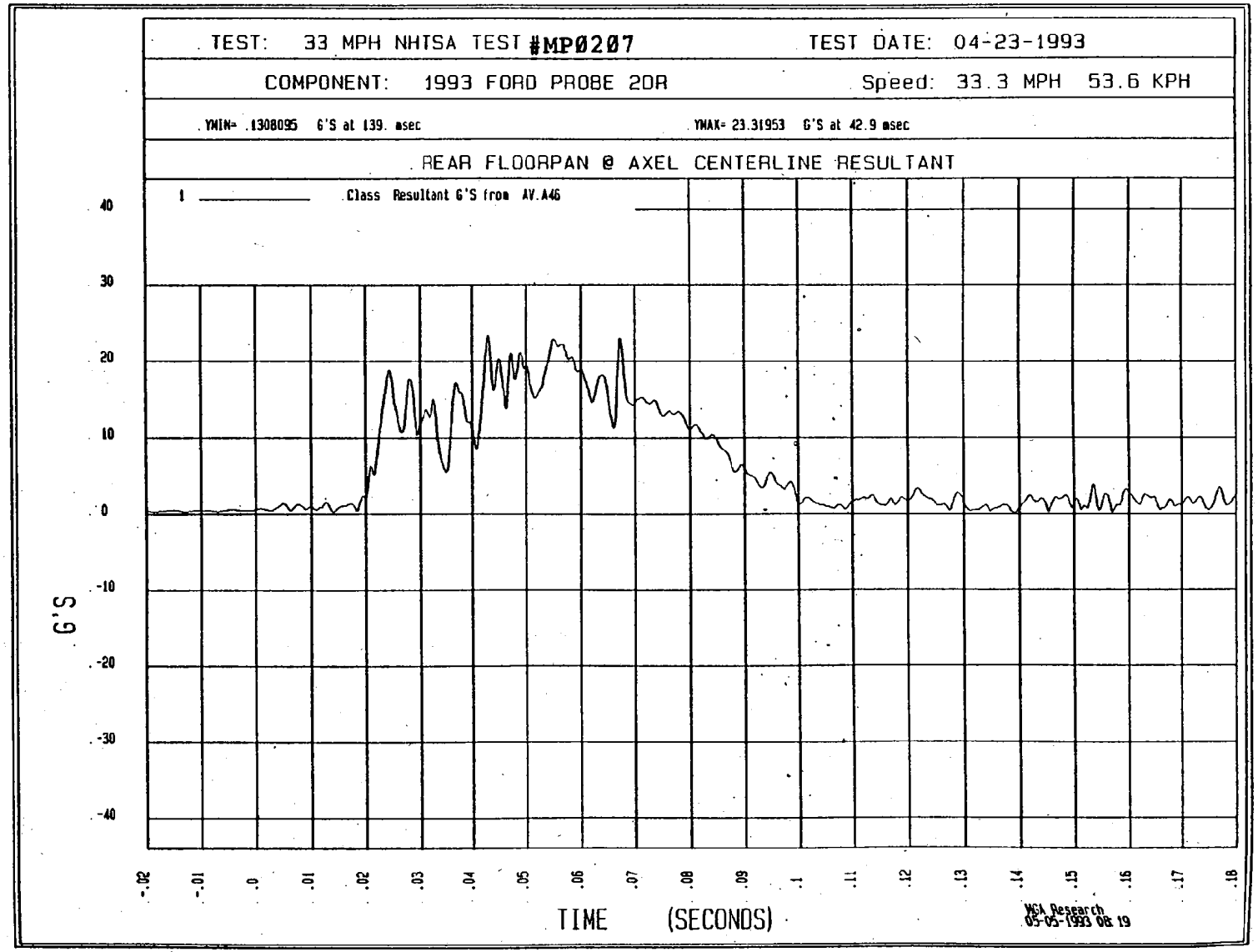


Figure B-73 - Rear Floorpan at Axle Z Displacement vs. Time



B-74

Figure B-74 - Rear Floorpan at Axel Centerline Resultant

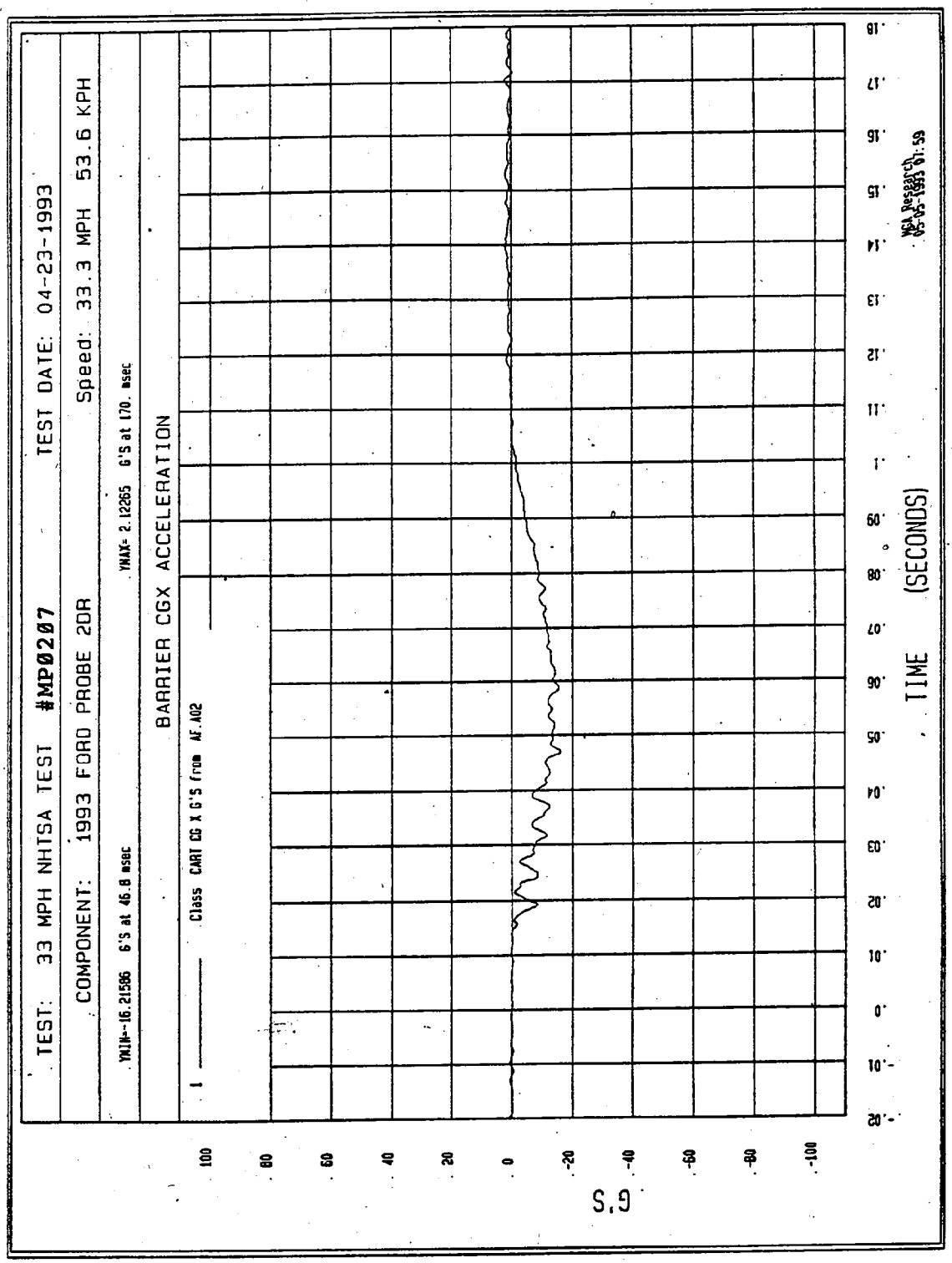
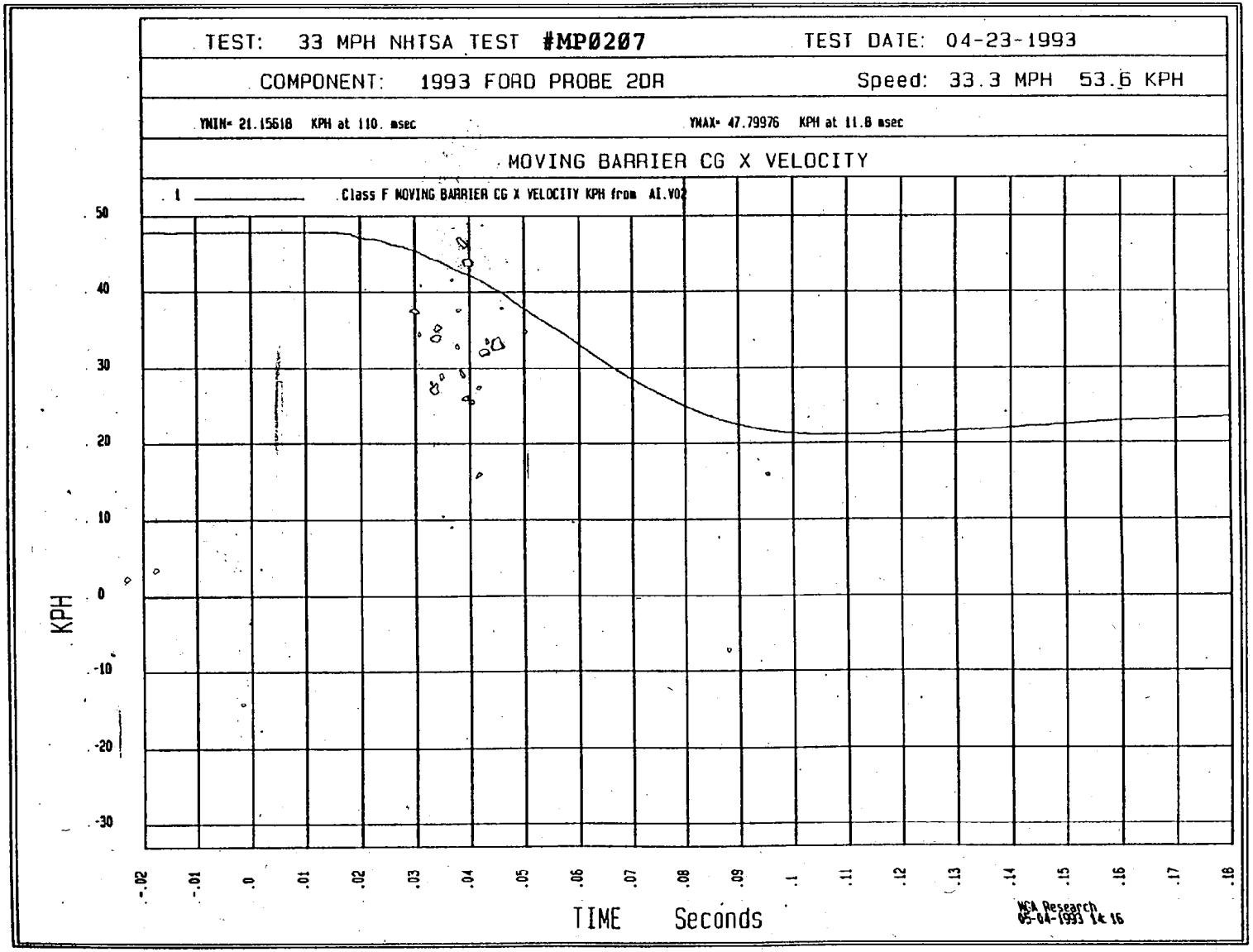


Figure B-75 - MDB Center of Gravity X Accel. vs. Time



B-76

Figure B-76 - MDB Center of Gravity X Velocity vs. Time

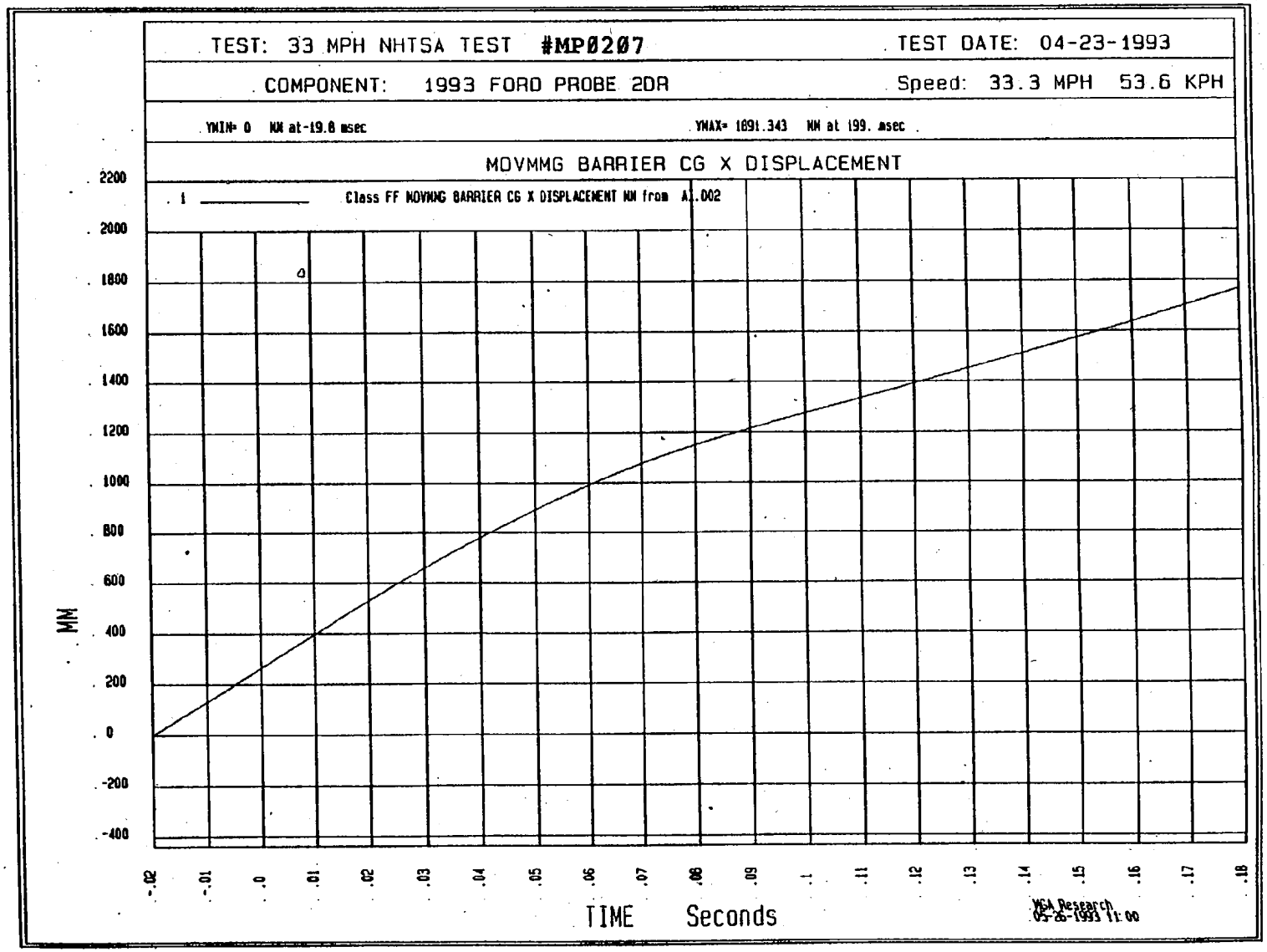


Figure B-77 - MDB Center of Gravity X Displacement vs. Time

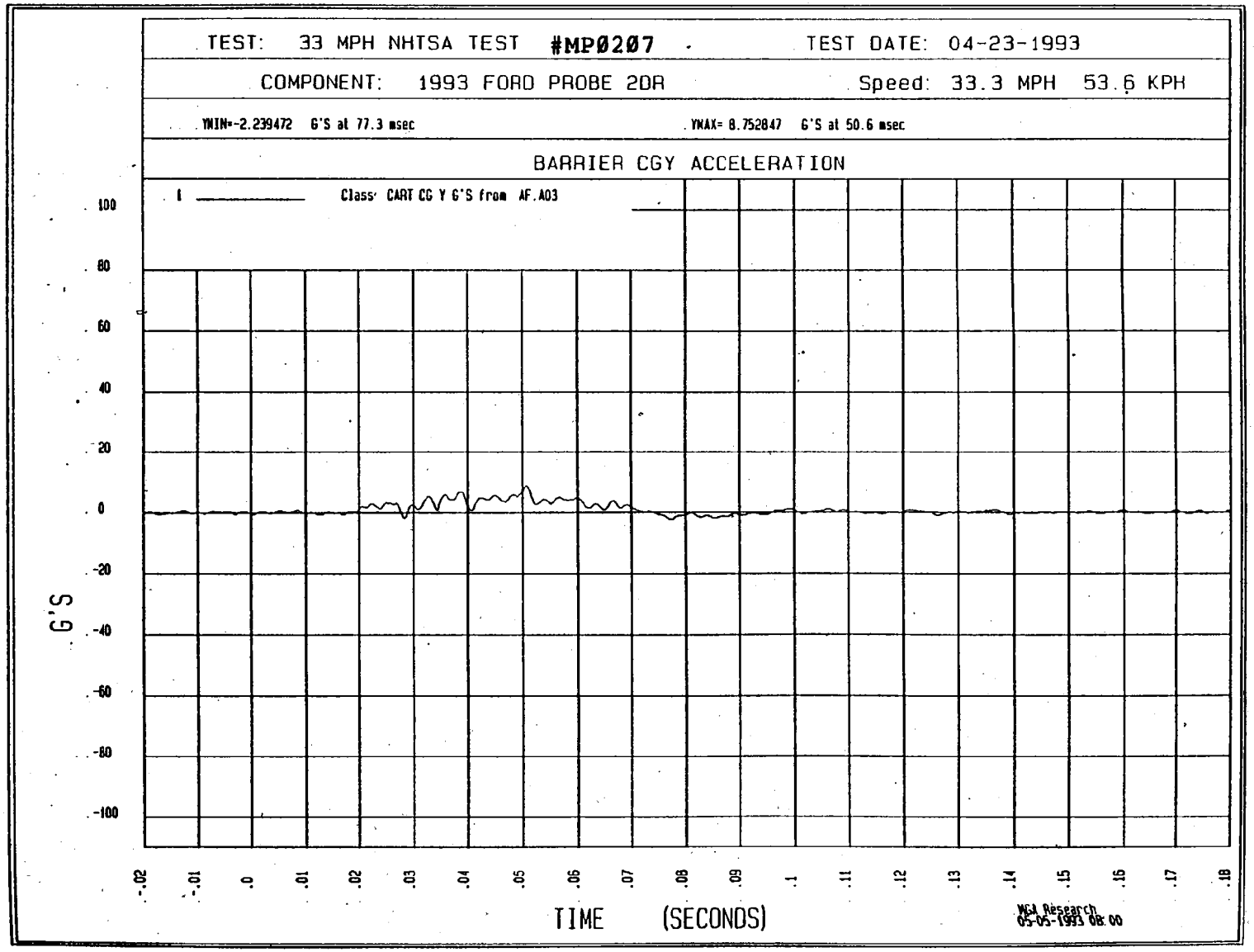


Figure B-78 - MDB Center of Gravity Y Accel. vs. Time

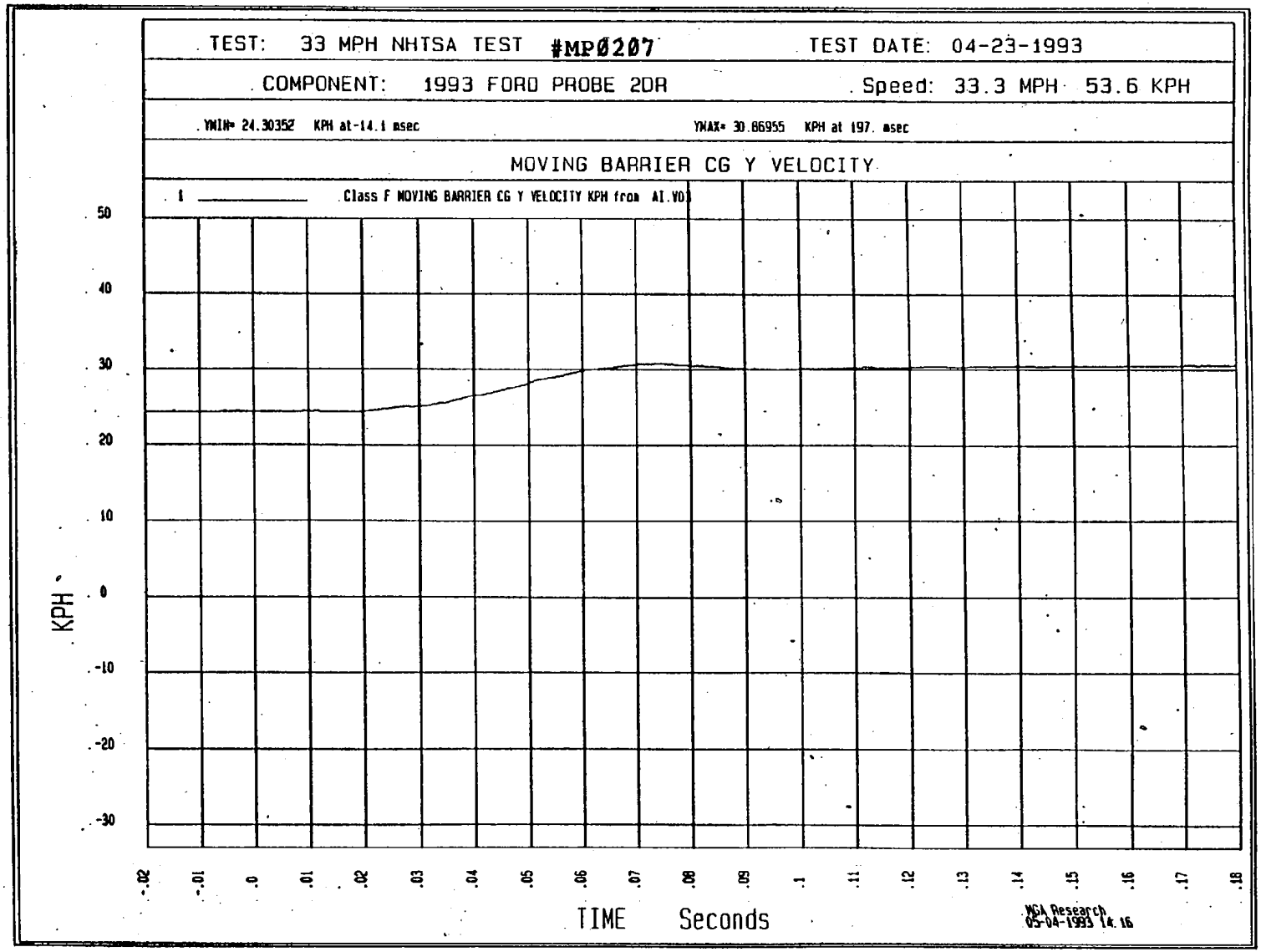
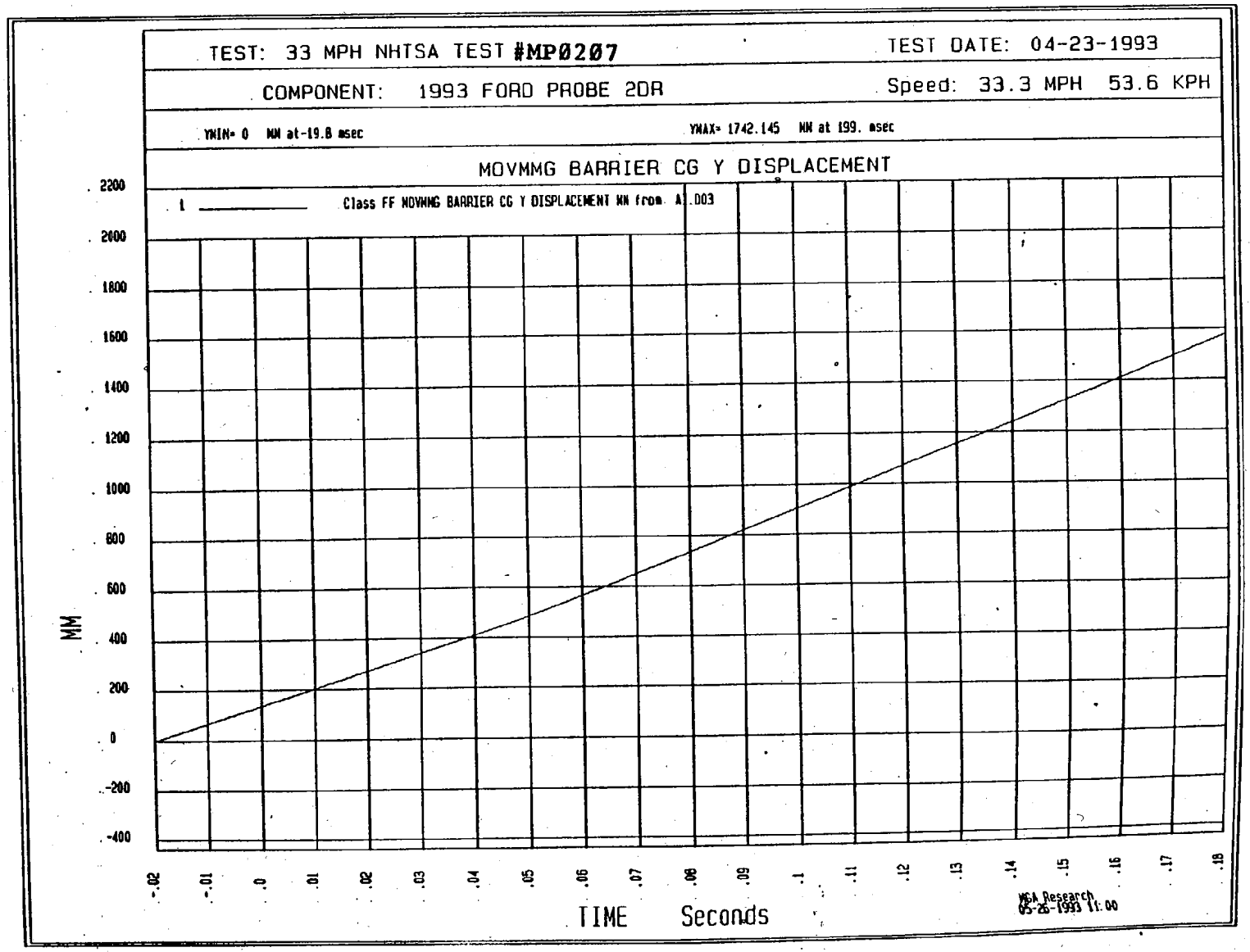


Figure B-79 - MDB Center of Gravity Y Velocity vs. Time



B-80

Figure B-80 - MDB Center of Gravity Y Displacement vs. Time

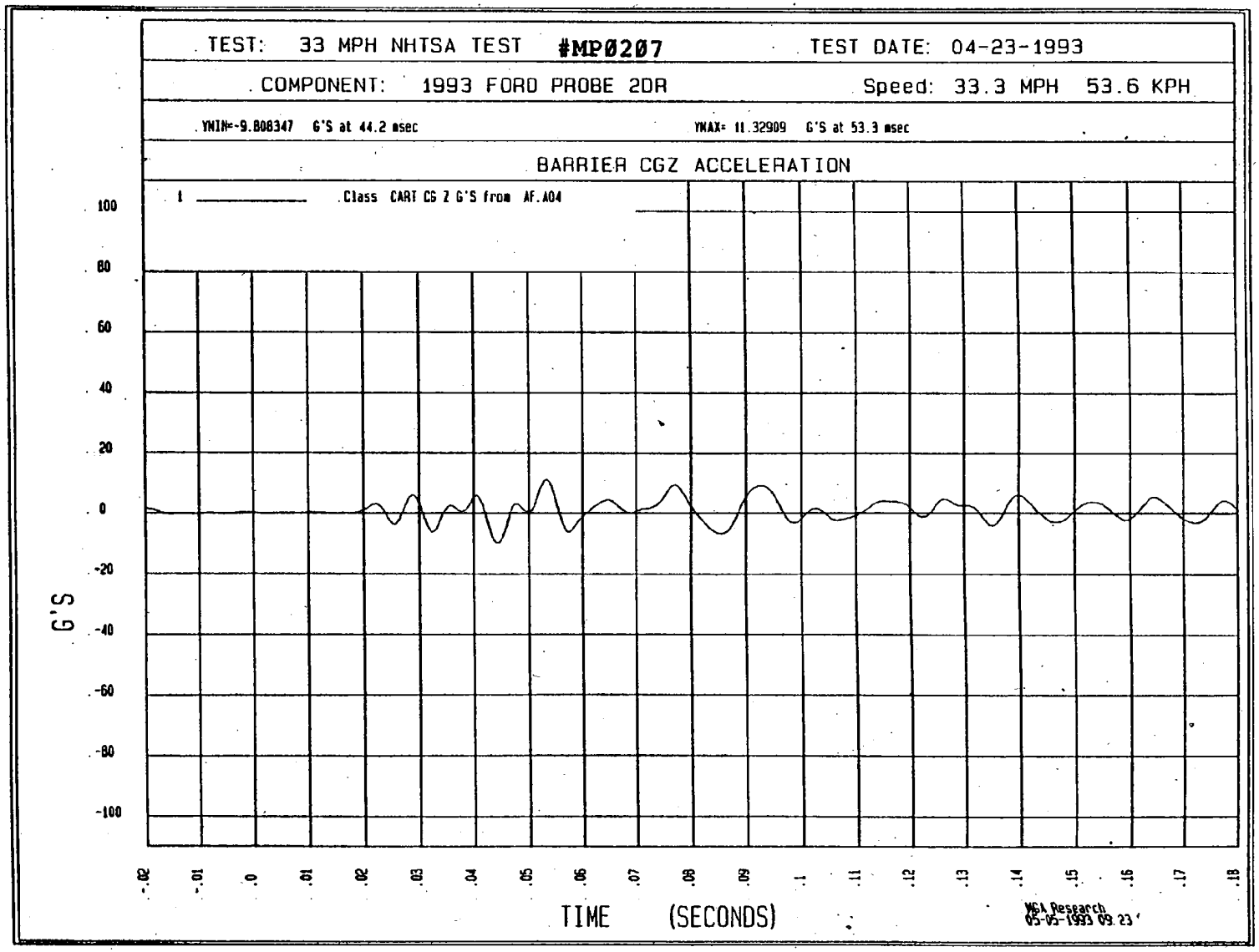
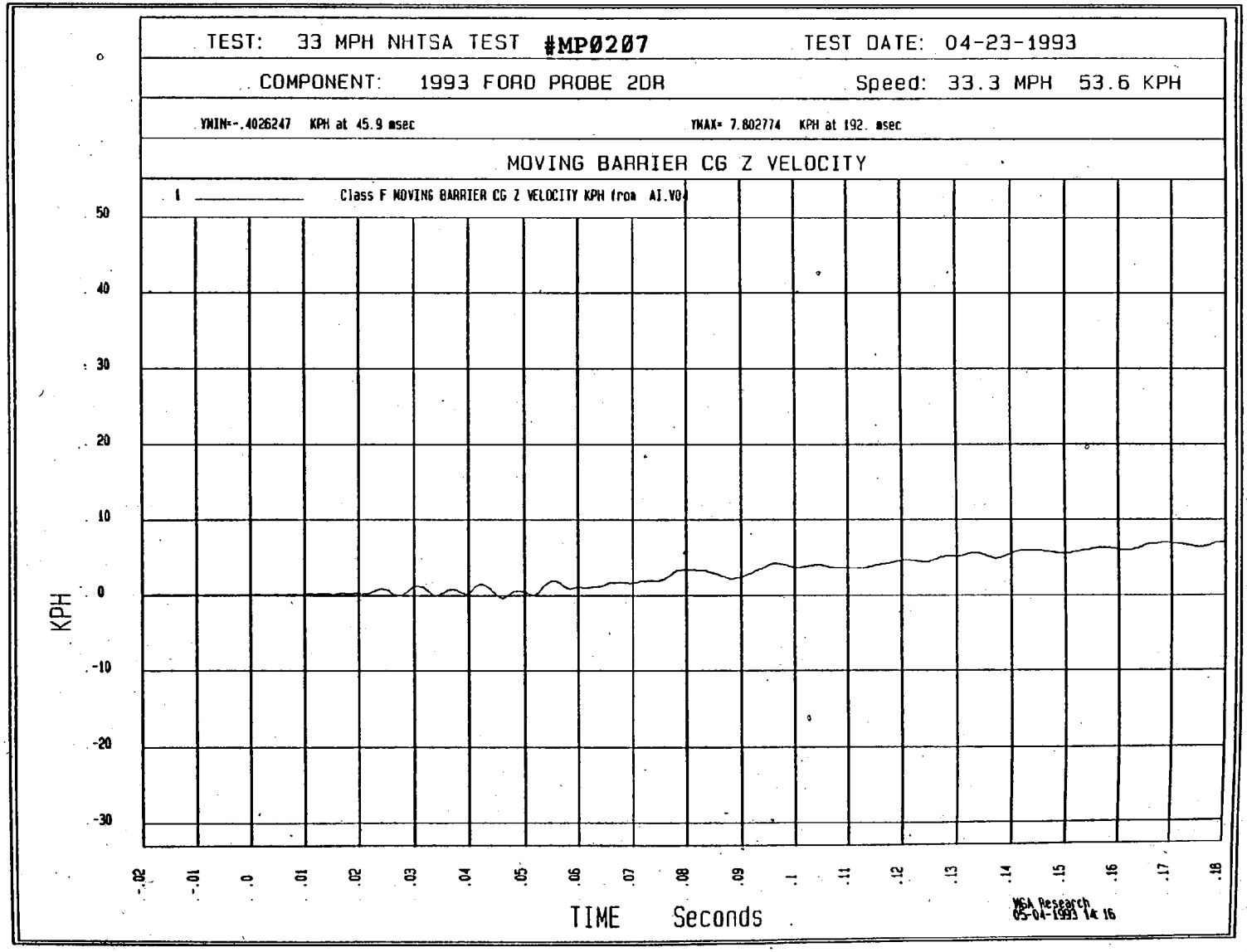


Figure B-81 - MDB Center of Gravity Z Accel. vs. Time



B-82

Figure B-82 - MDB Center of Gravity Z Velocity vs. Time

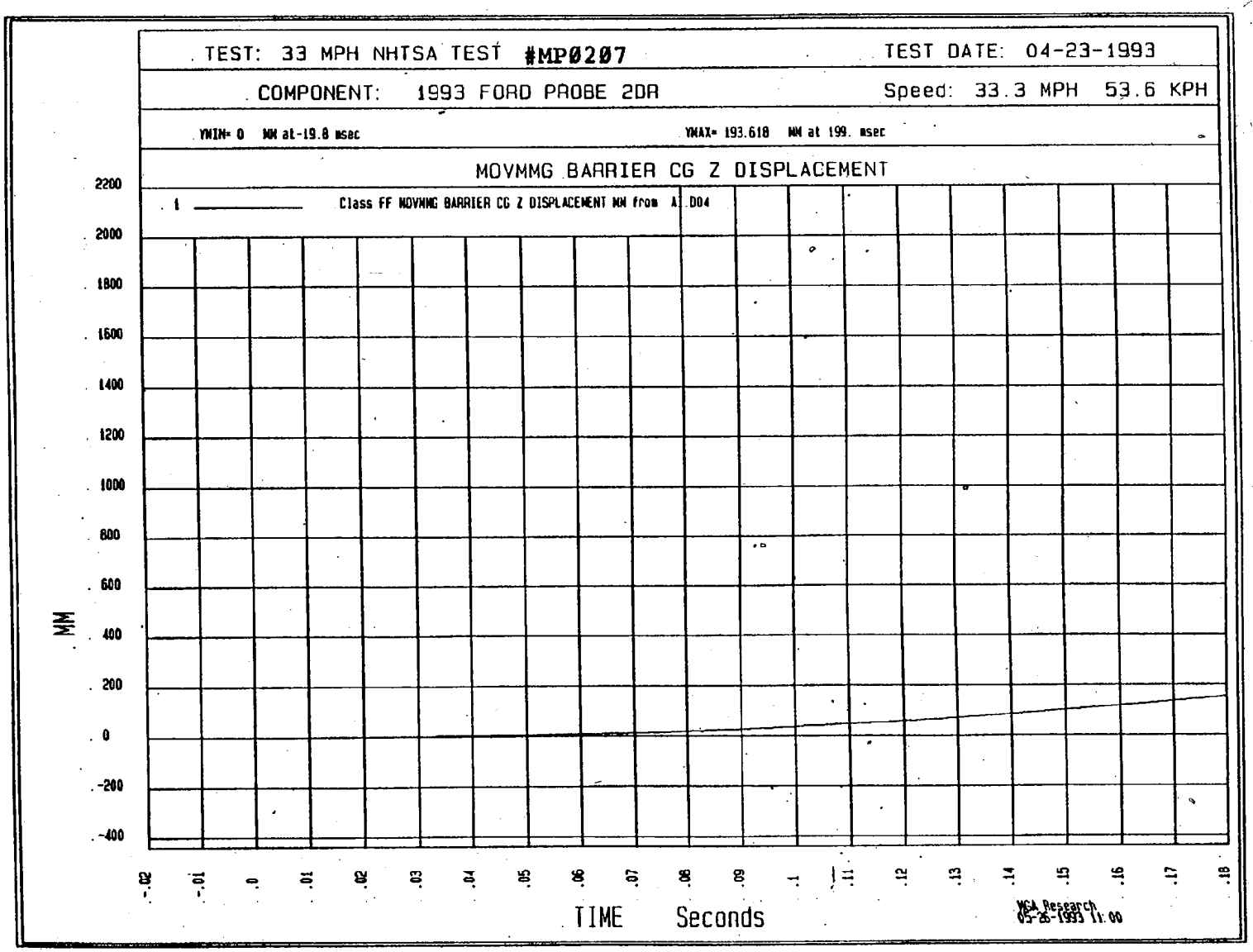
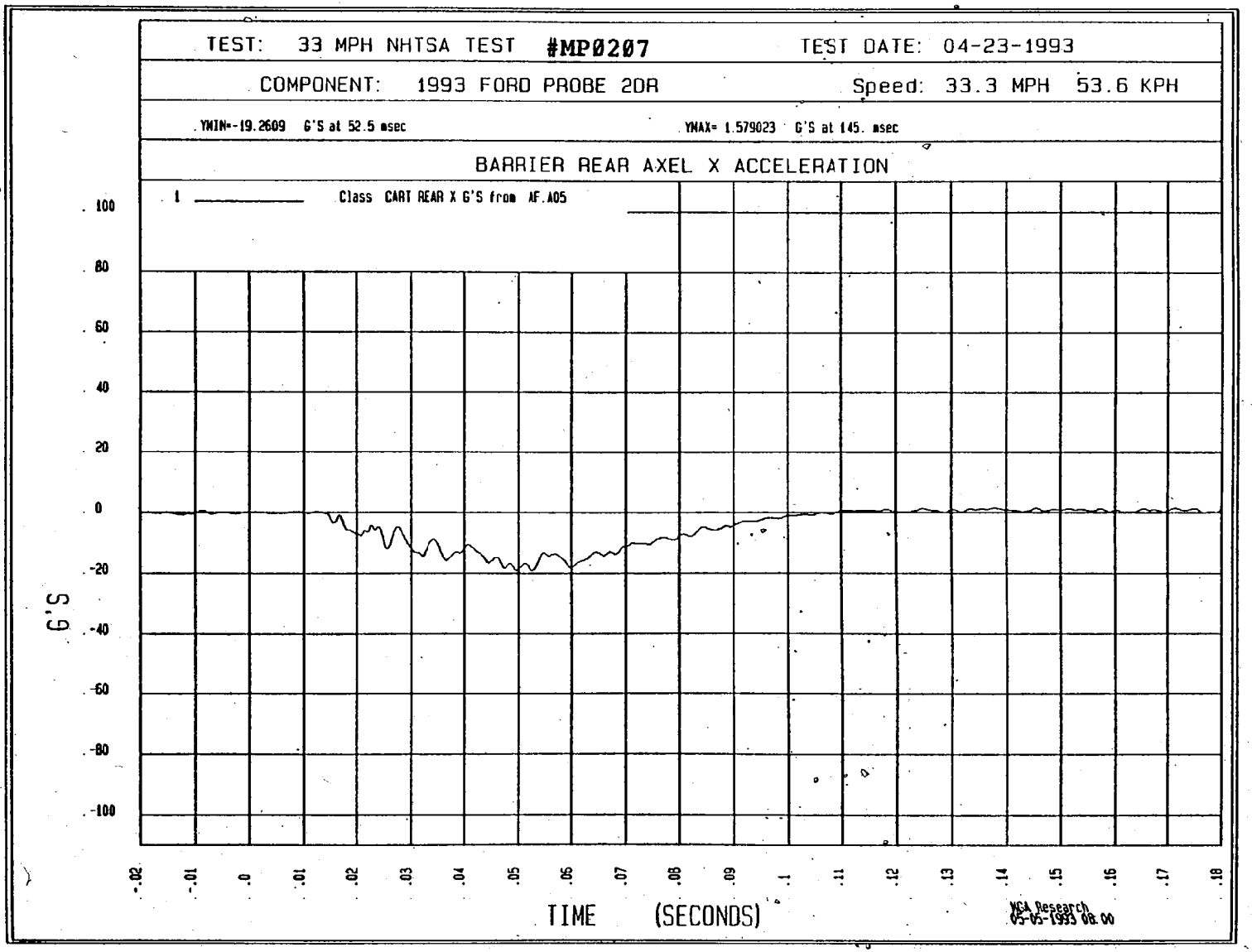


Figure B-83 - MDB Center of Gravity Z Displacement vs. Time



B-84

Figure B-84 - MDB Rear X Acceleration vs. Time

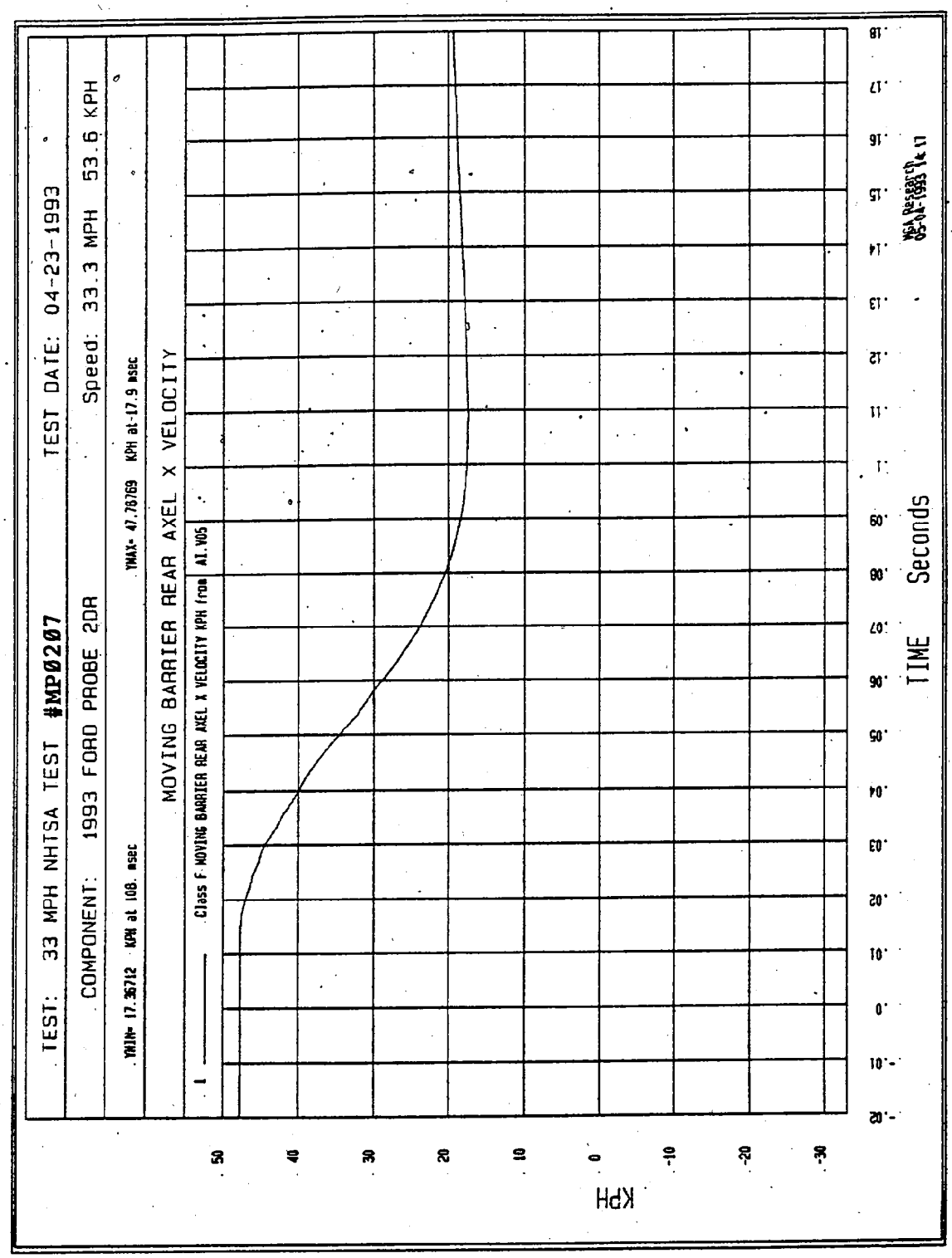


Figure B-85 - MDB Rear X Velocity vs. Time

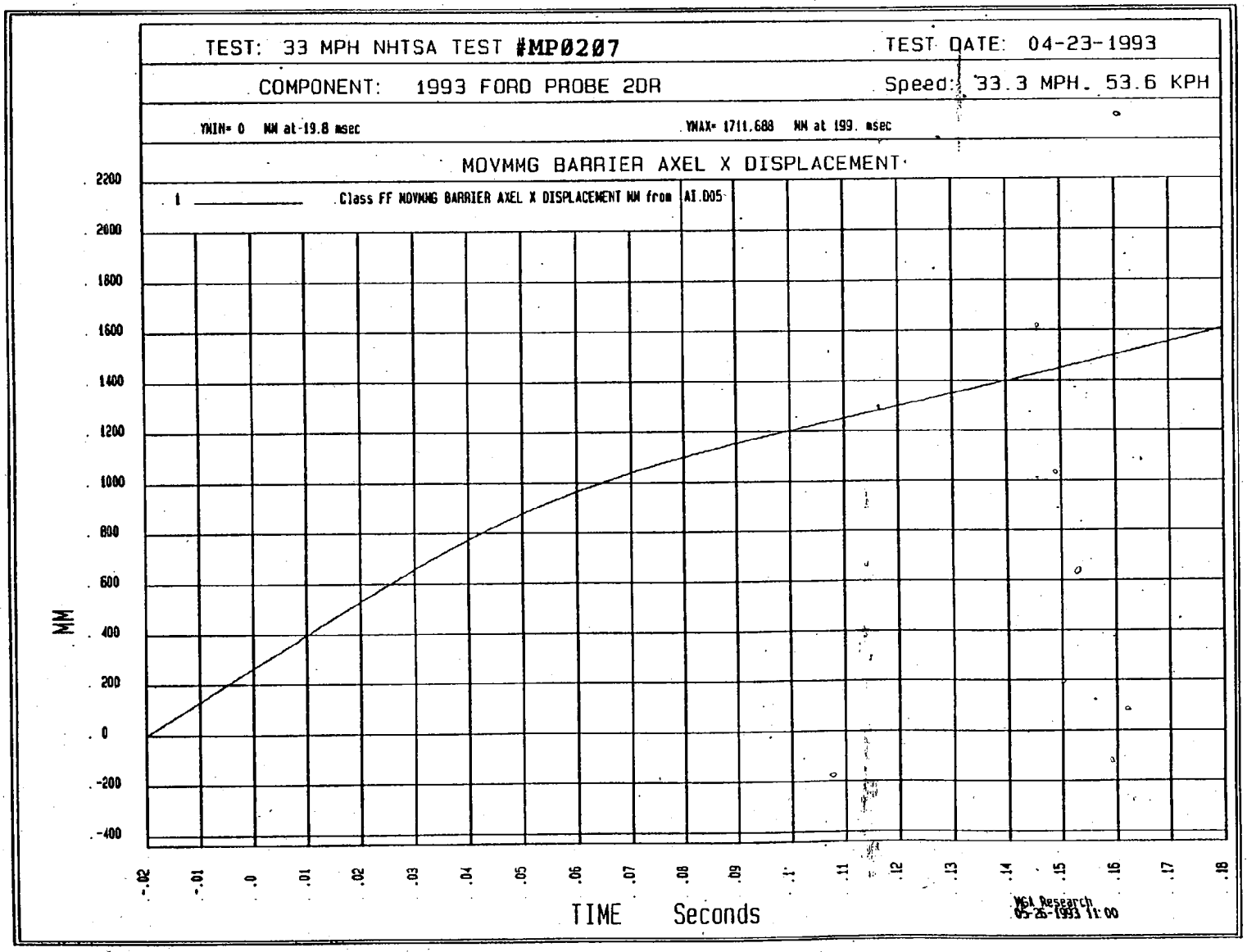


Figure B-86 - MDB Rear X Displacement vs. Time

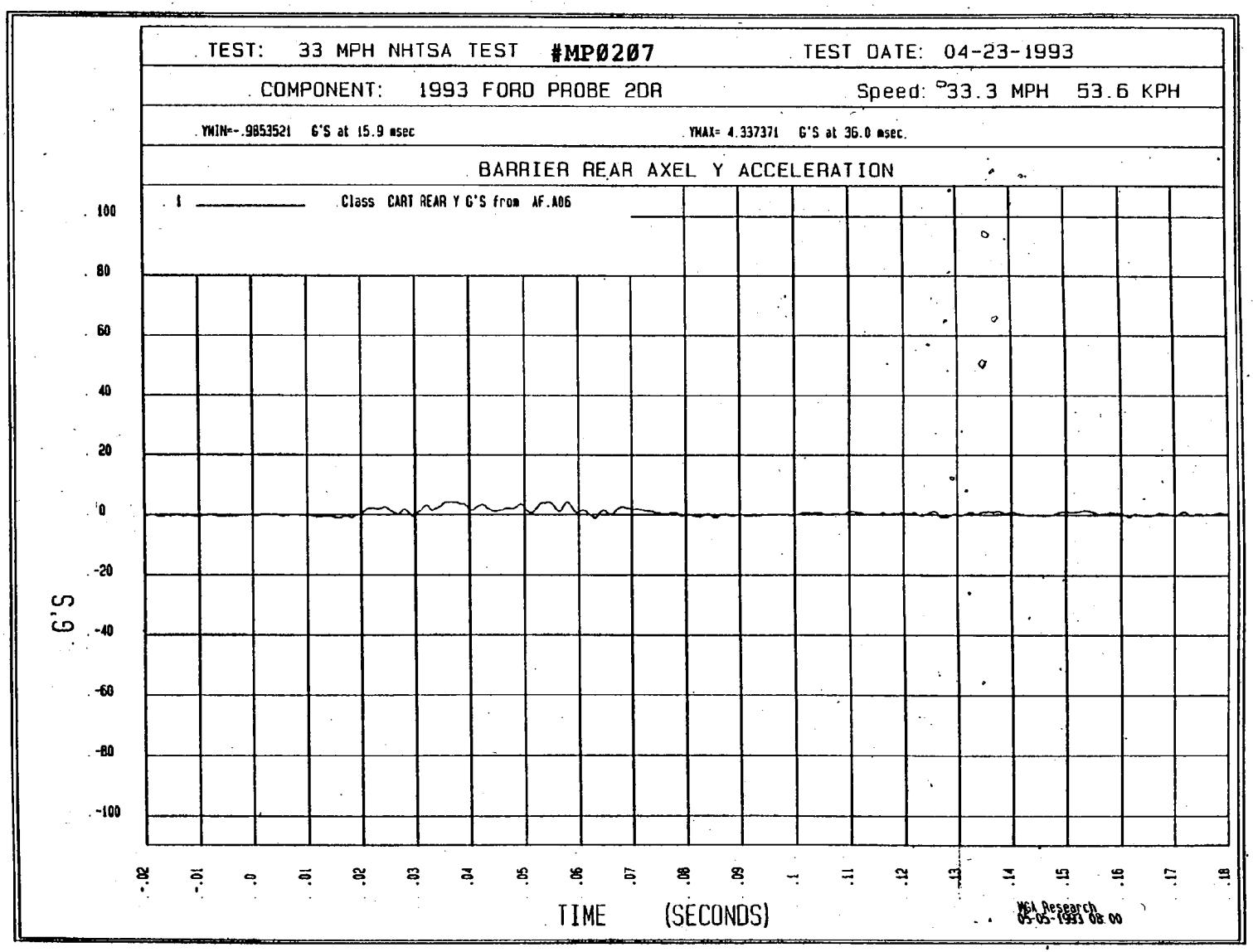


Figure B-87 - MDB Rear Y Acceleration vs. Time

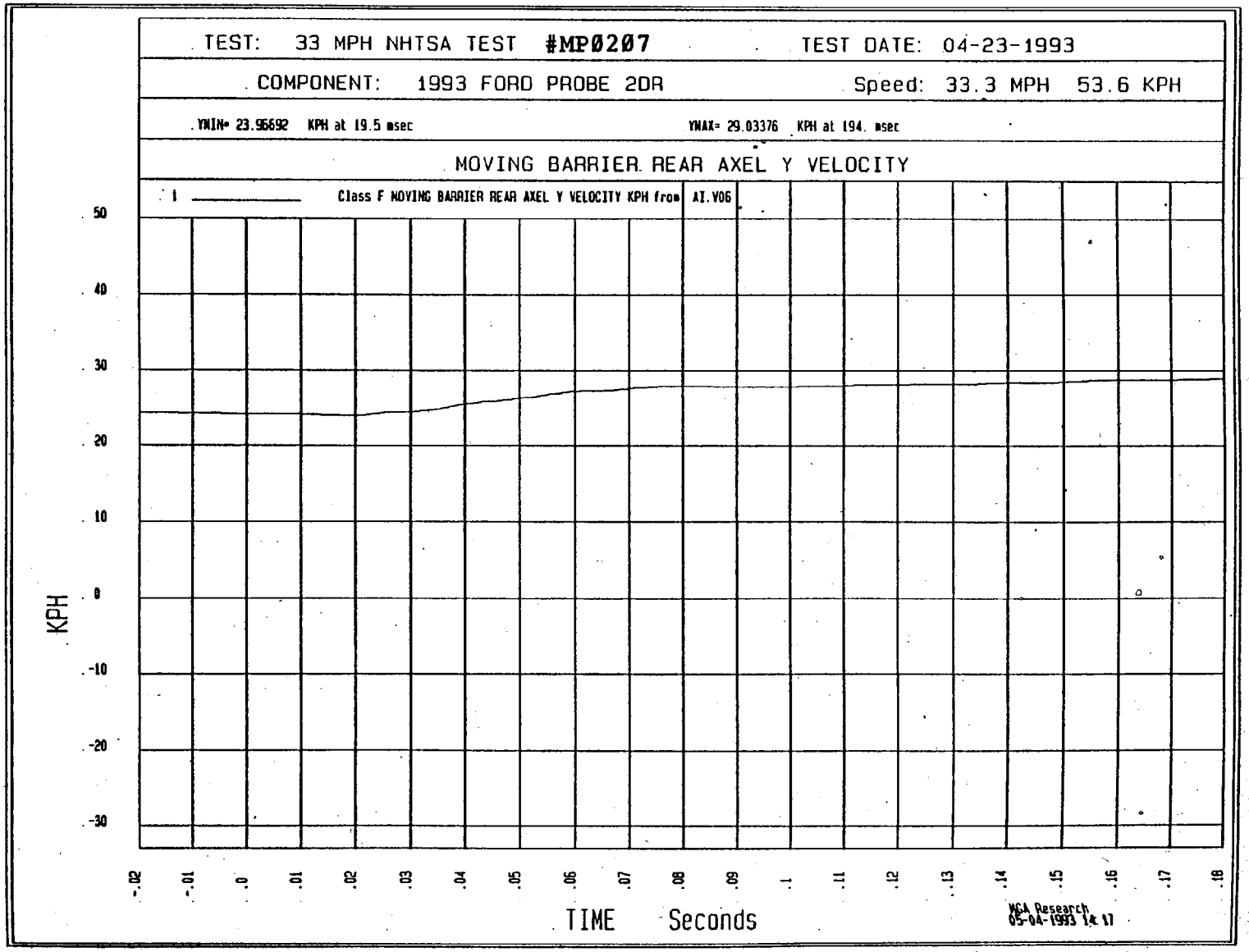


Figure B-88 - MDB Rear Y Velocity vs. Time

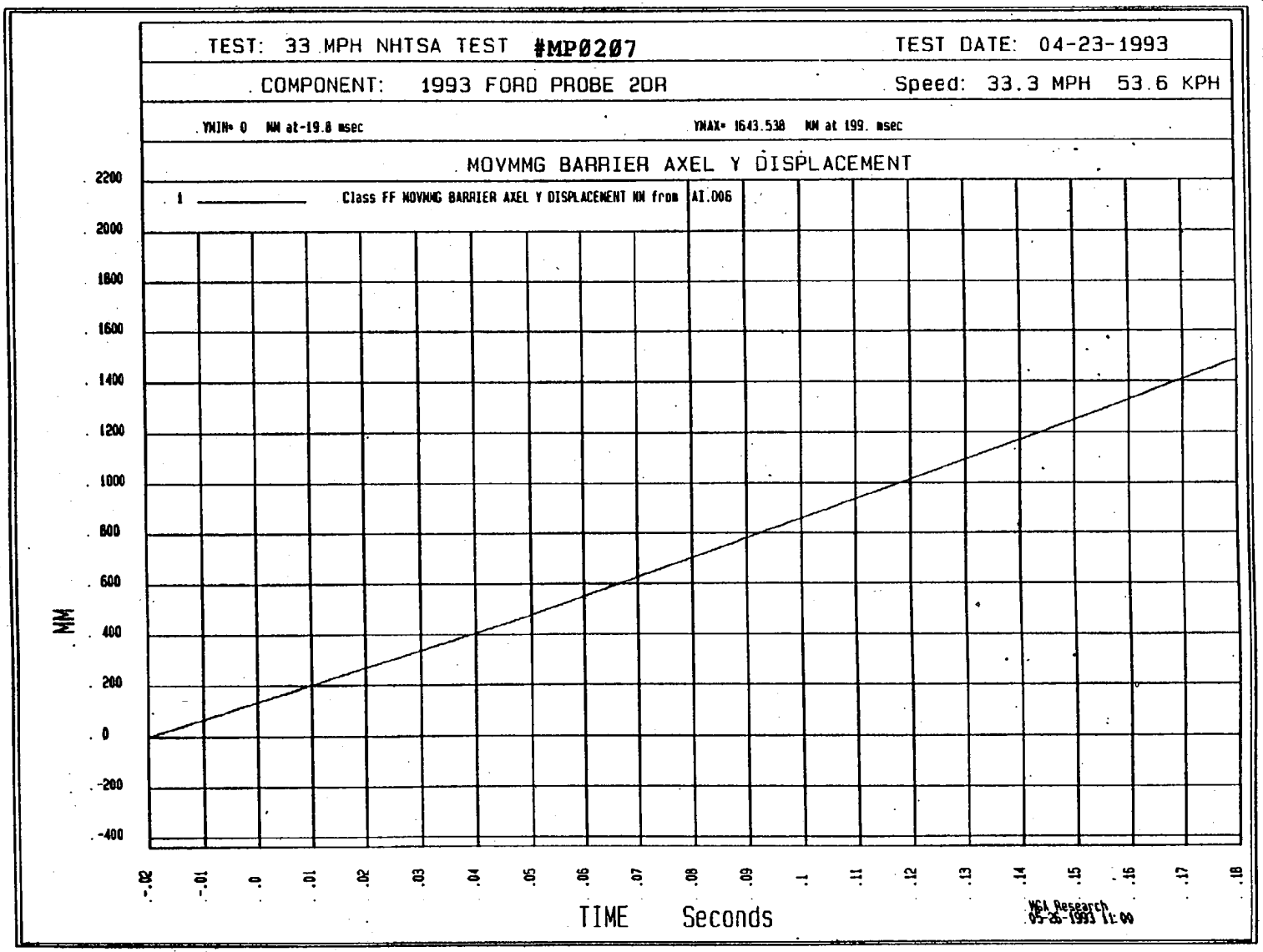


Figure B-89 - MDB Rear Y Displacement vs. Time

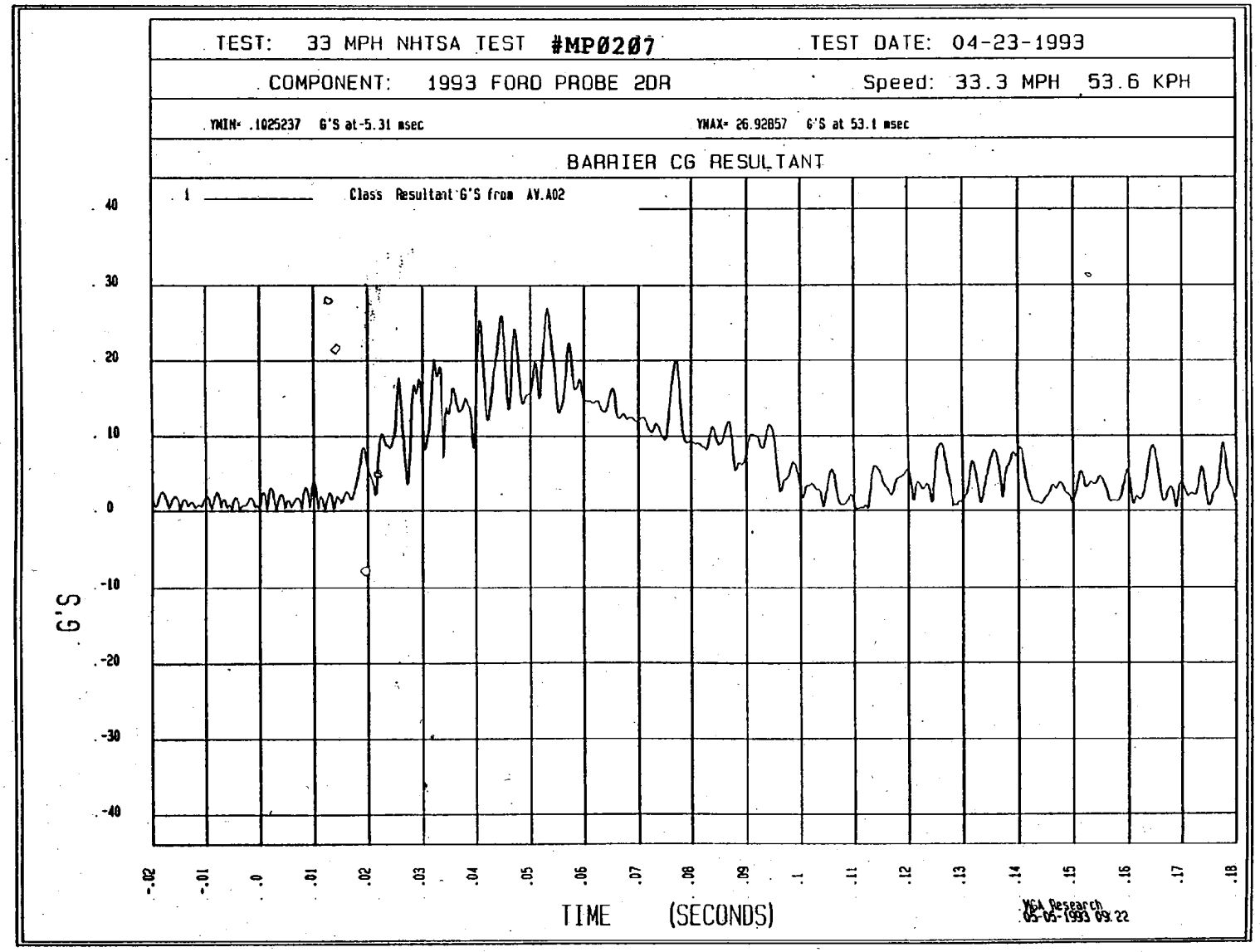


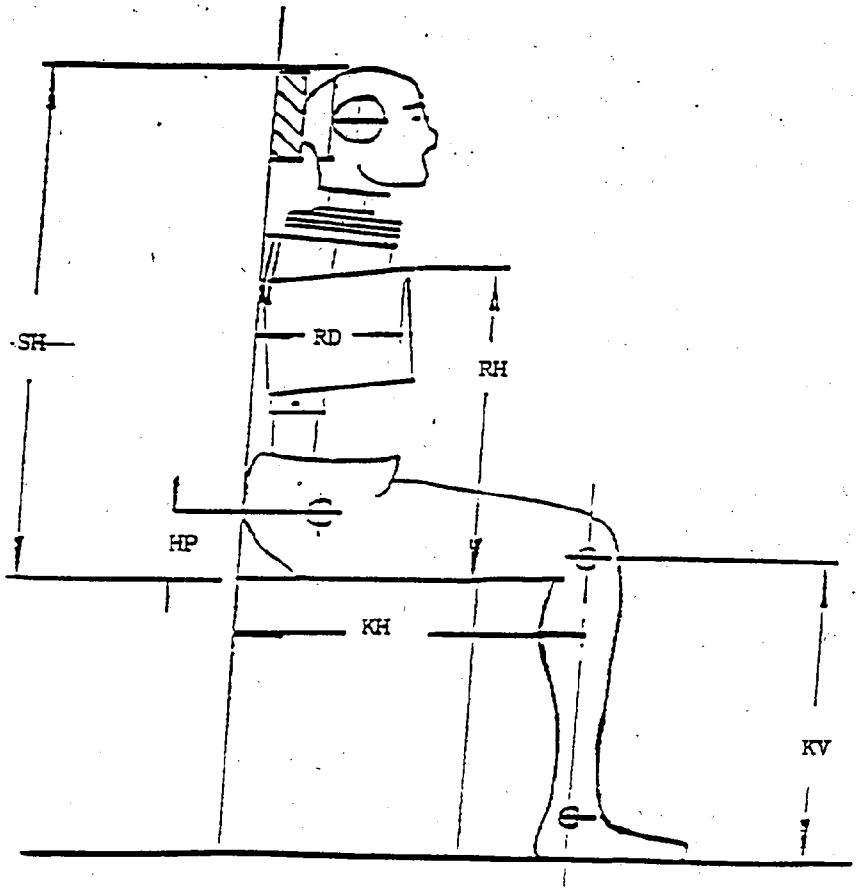
Figure B-90 - MDB Center of Gravity Resultant vs. Time

APPENDIX C
SID CONFIGURATION AND PERFORMANCE VERIFICATION DATA

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 136 DUMMY CALIBRATION BY: Rod McClelland

I. CONFIGURATION VERIFICATION DATA



DATE OF CONFIGURATION VERIFICATION: 4-30-93.

DESCRIPTION	SPECIFICATION	ACTUAL MEASUREMENT
SH - Seated Height	35.6" to 35.8"	35.7
RH - Rib Height	19.75" to 20.5"	20.5
HP - Hip Pivot Height	3.9" ref.	3.8
RD - Rib From Backline	9.0" to 9.5"	9.0
KH - Knee Pivot From Backline	20.1" to 20.7"	20.5
KV - Knee Pivot to Floor	19.3" to 19.9"	19.5
HW - Hip Width	14.0" to 15.4"	15.4

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

II. PERFORMANCE VERIFICATION DATA

DUMMY NO.: 136 DUMMY CALIBRATION BY: Rod McClelland

VERIFICATION LABORATORY TEMPERATURE (66° - 78°F): 70°

1.0 LUMBAR FLEXION TEST

	SPECIFICATION	MEASUREMENT
Force @ 20°	22 to 34 lbs	33
Force @ 30°	34 to 46 lbs	45
Force @ 40°	46 to 58 lbs	53
Return Angle	12° Maximum	9°

2.0 ABDOMINAL COMPRESSION TEST
(Preload = 10 lbs)

	SPECIFICATION	MEASUREMENT
Force @ 0.5 in	23.3 to 36.5 lbs	29
Force @ 0.75 in	36.7 to 49.8 lbs	42
Force @ 1.0 in	50 to 63 lbs	54
Force @ 1.3 in	73 to 88 lbs	74

3.0 THORAX IMPACT TEST

	SPECIFICATION	MEASUREMENT
Probe Speed	13.8 TO 14.2 f/s	13.8
Upper Rib	37 to 46 g	42
Lower Rib	37 to 46 g	41
Lower Spine	15 to 22 g	20

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

4.0 PELVIC IMPACT TEST

	SPECIFICATION	MEASUREMENT
Probe Speed	13.8 to 14.2 f/s	13.95
Pelvis Acceleration	40 to 60 g	51

SIDE IMPACT DUMMY DATA SHEET

DUMMY #: 136

TEST DATE: 4-23-93

DRIVER	PASSENGER
X	

EXPOSURE	DATE	TYPE OF TEST
1st	4-22-93	NHTSA

1) RIB ACCELEROMETERS:

	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
UR	Endevco	A06M	11-9-92	99.14	X
URR	Endevco	AC764	2-23-93	108.82	X
LR	Endevco	AC8R2	12-29-92	112.43	X
LRR	Endevco	A43M	11-6-92	124.44	X

2) SPINE ACCELEROMETERS.

	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
USY	Endevco	ACC00	11-6-92	119.6	X
USRY	Endevco	A82D	11-6-92	89.23	X
LSY	Endevco	ACC68	12-29-92	112.14	X
LSRY	Endevco	ACCL3	12-29-92	102.65	X

3) PELVIS ACCELEROMETERS

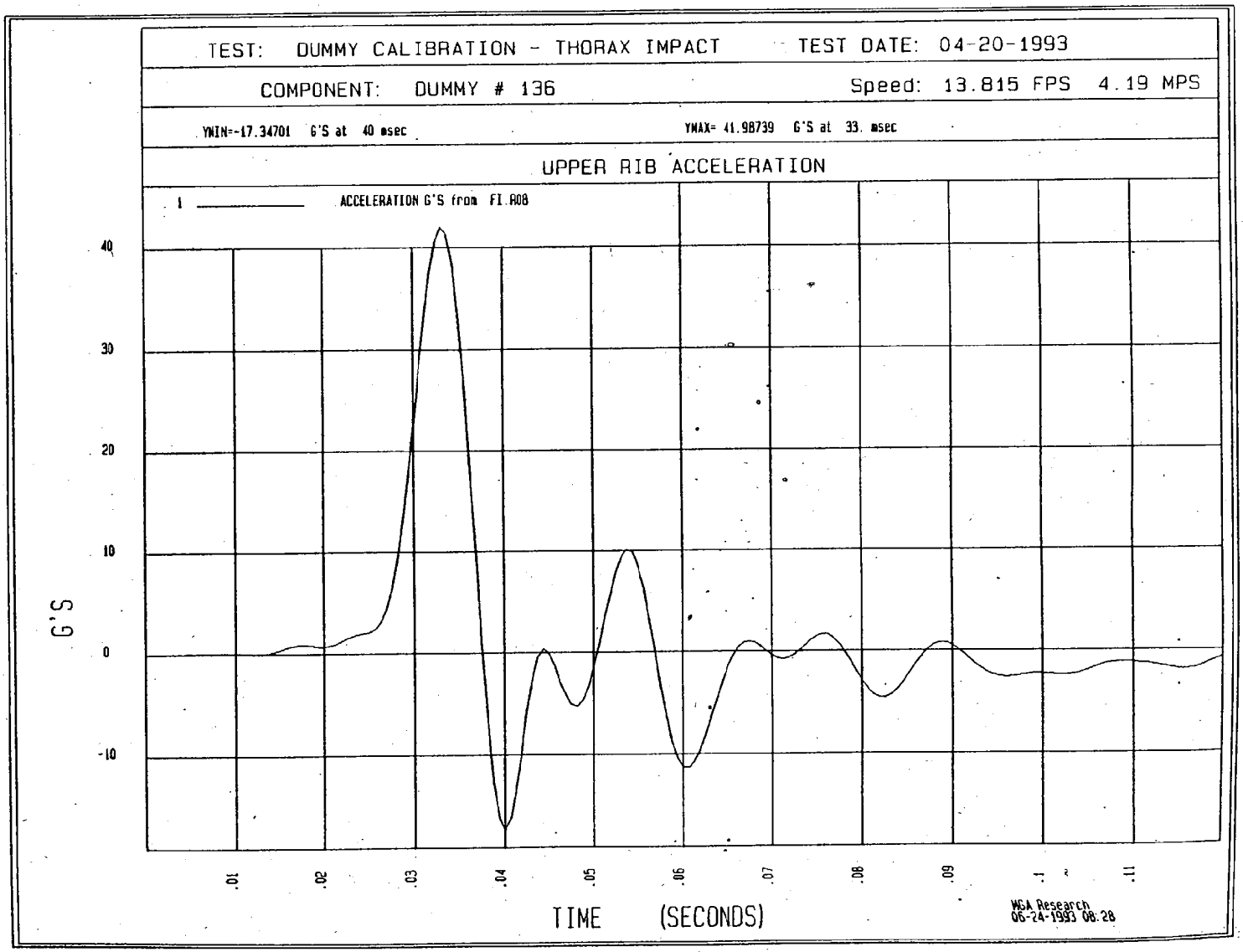
	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
Y	Endevco	AC758	2-23-93	97.45	X
RY	Endevco	AC8R7	2-23-93	124.15	X

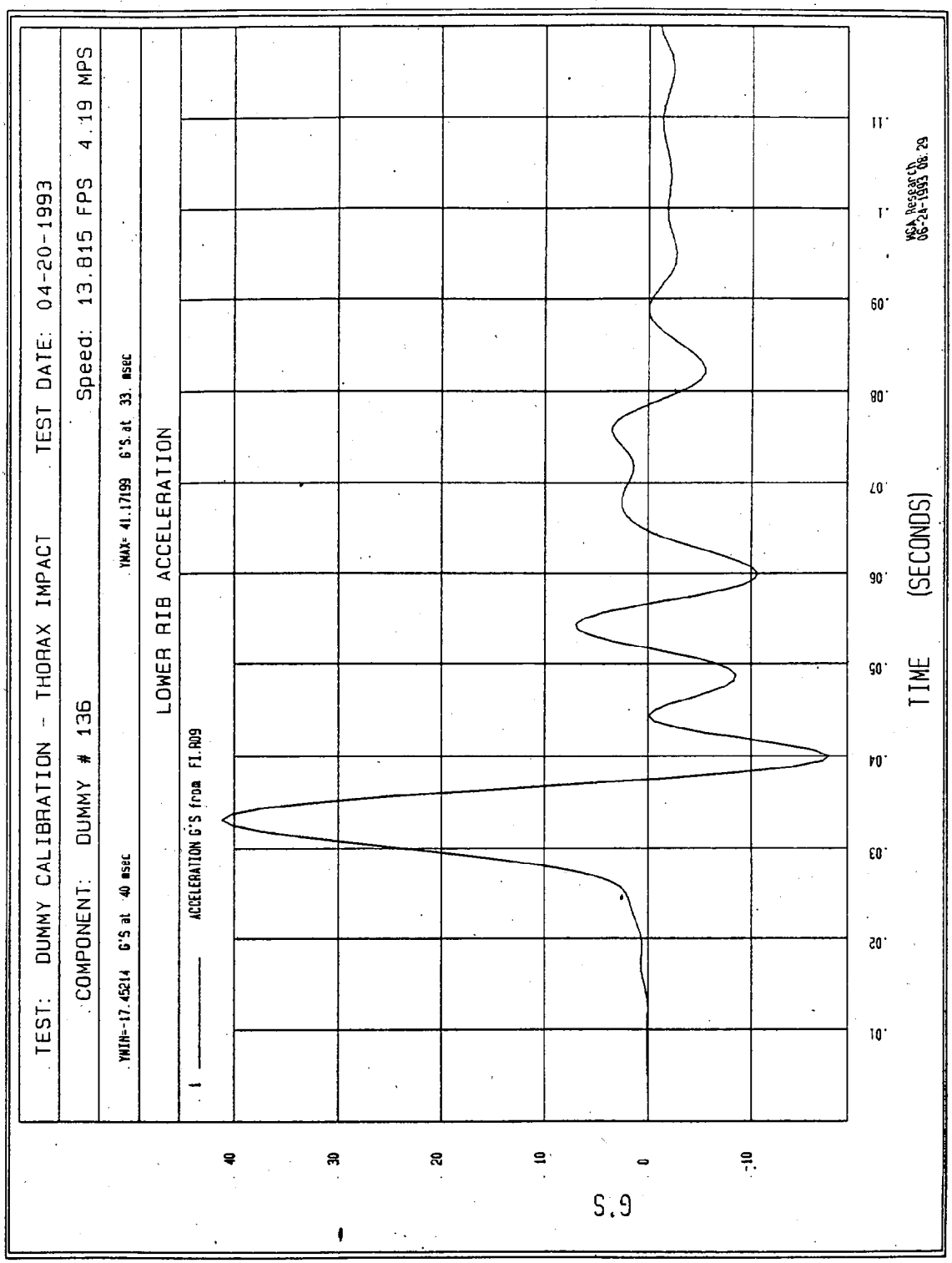
4) OTHER ACCELEROMETERS

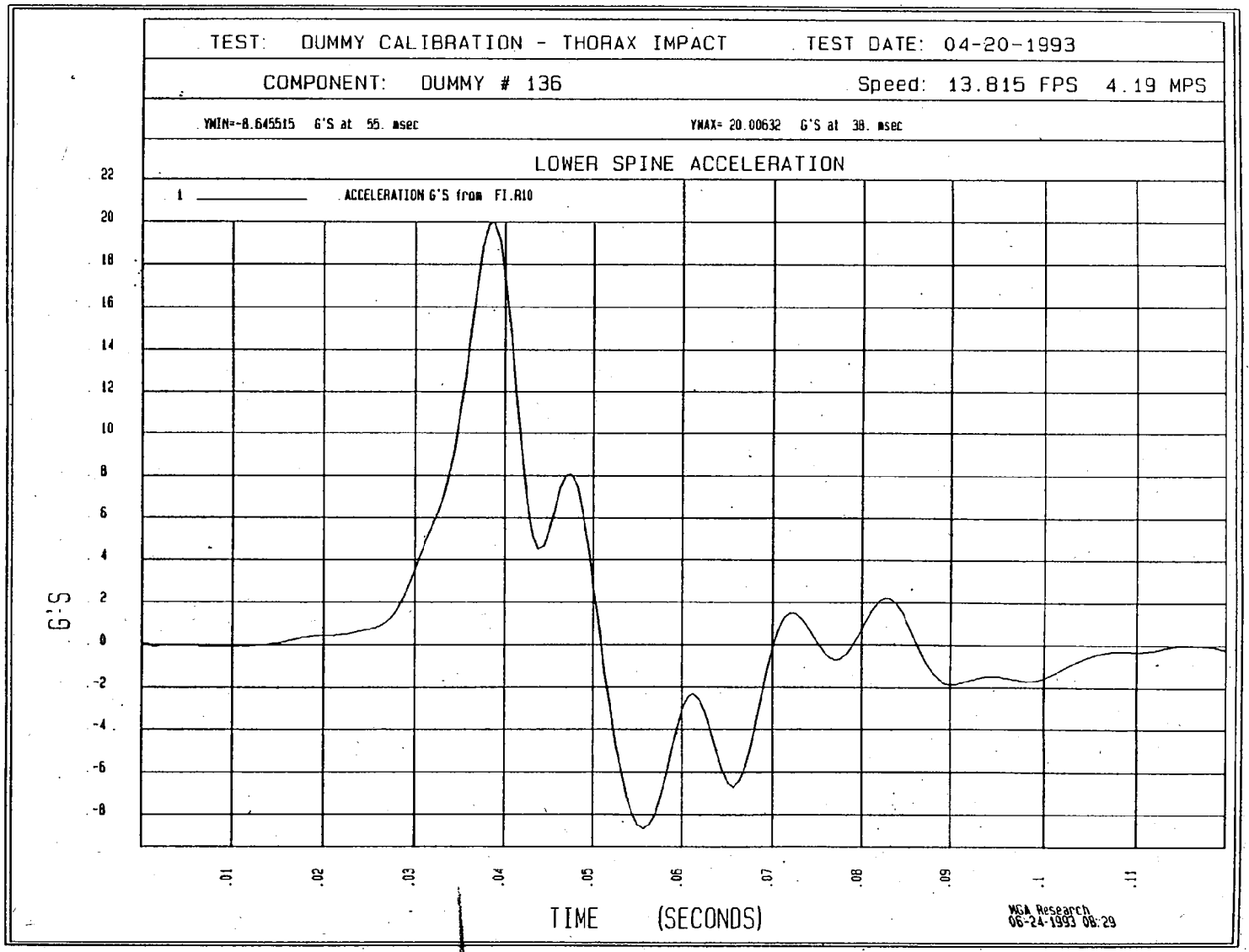
	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
CHEST DISPLACEMENT	Servco	136	4-20-93	.61 in/v	X

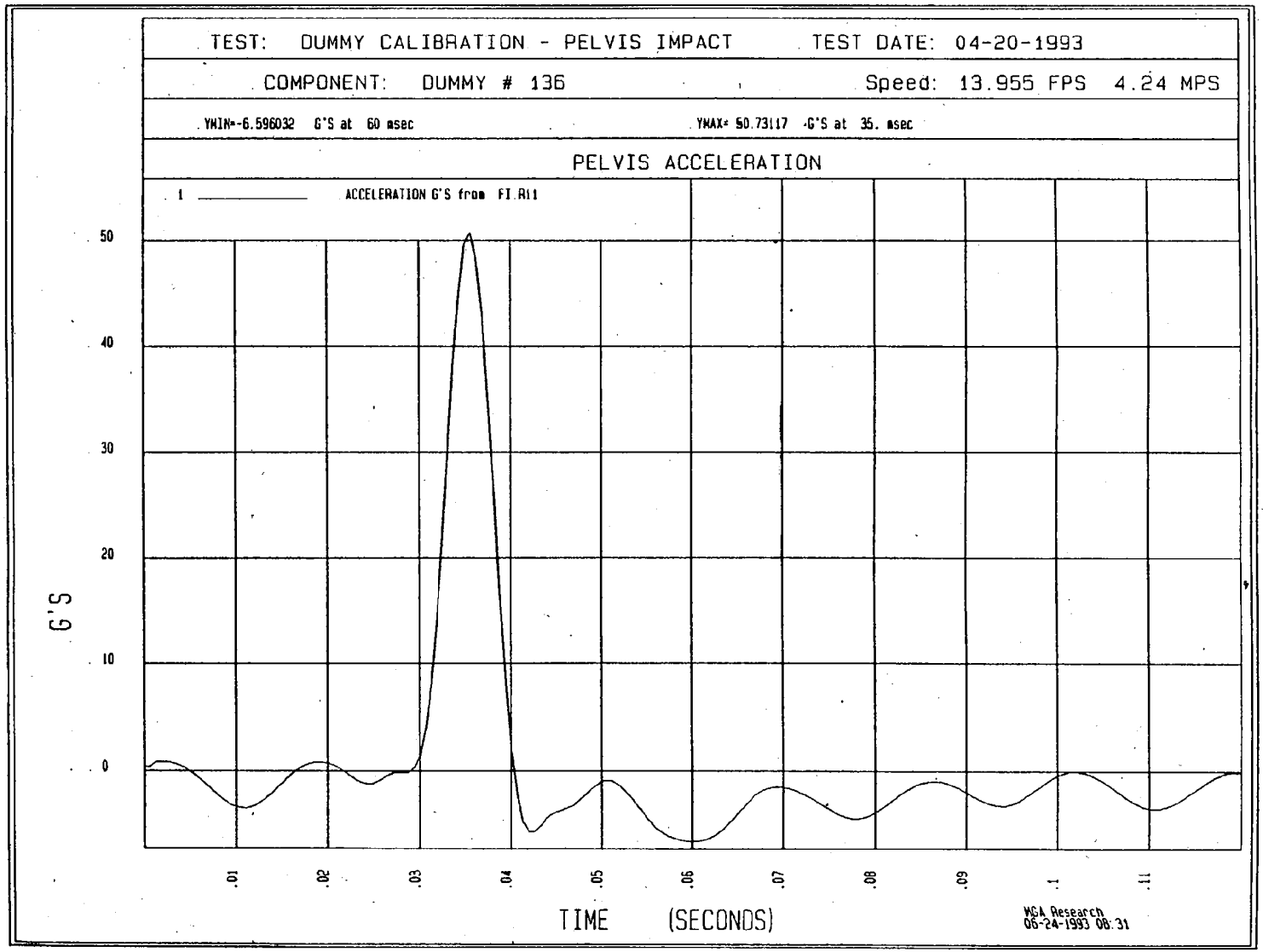
DUMMY INSTRUMENTED BY: Rod McClelland

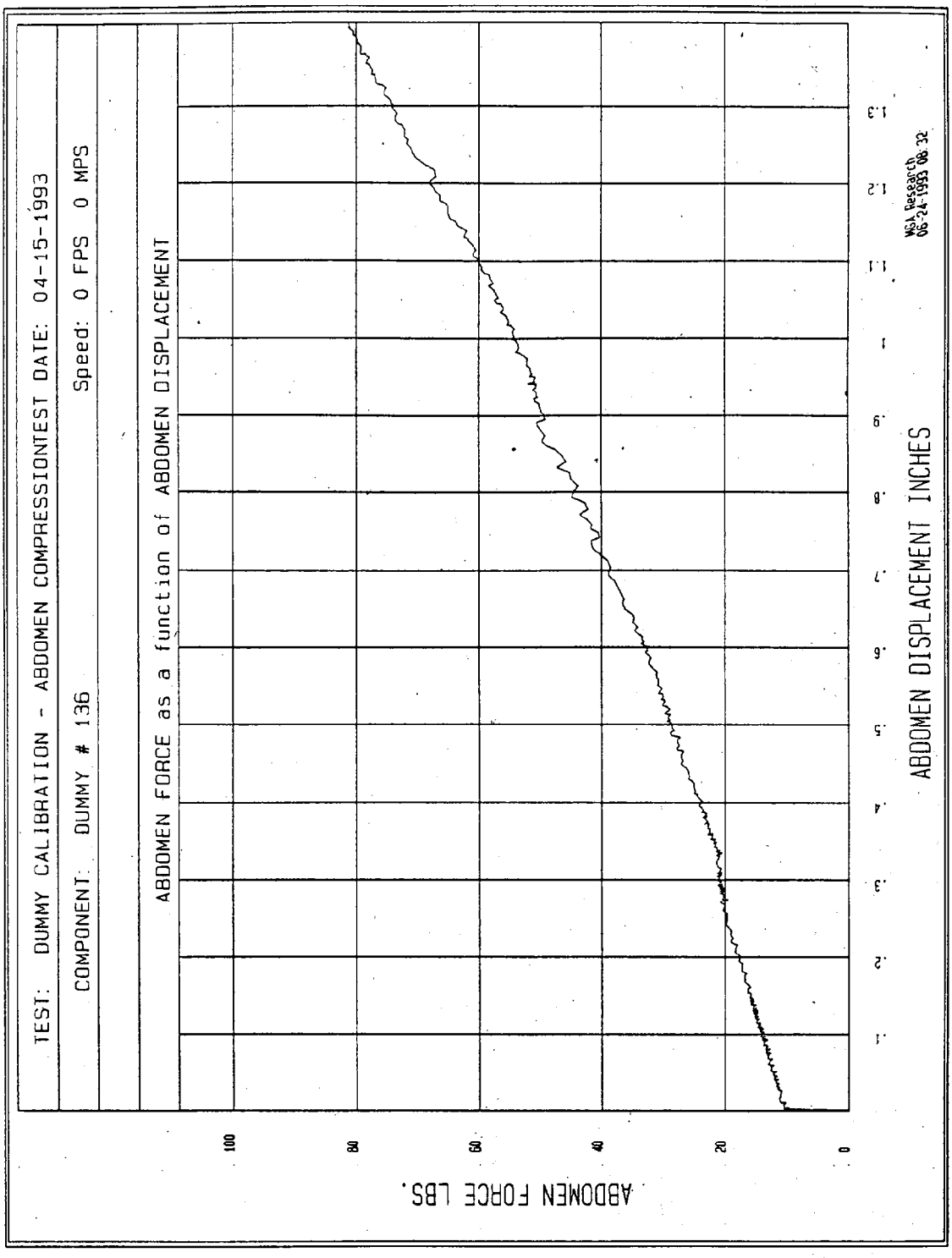
APPROVED BY: Rod McClelland


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 04-20-1993
COMPONENT: DUMMY # 136
Speed: 13.815 FPS 4.19 MPS
YMIN=-17.34701 G'S at 40 msec
YMAX= 41.98739 G'S at 33. msec
UPPER RIB ACCELERATION
1 ACCELERATION G'S from FI.R08
40
30
20
10
0
-10
G'S
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
TIME (SECONDS)
MGA Research
06-24-1993 08:28

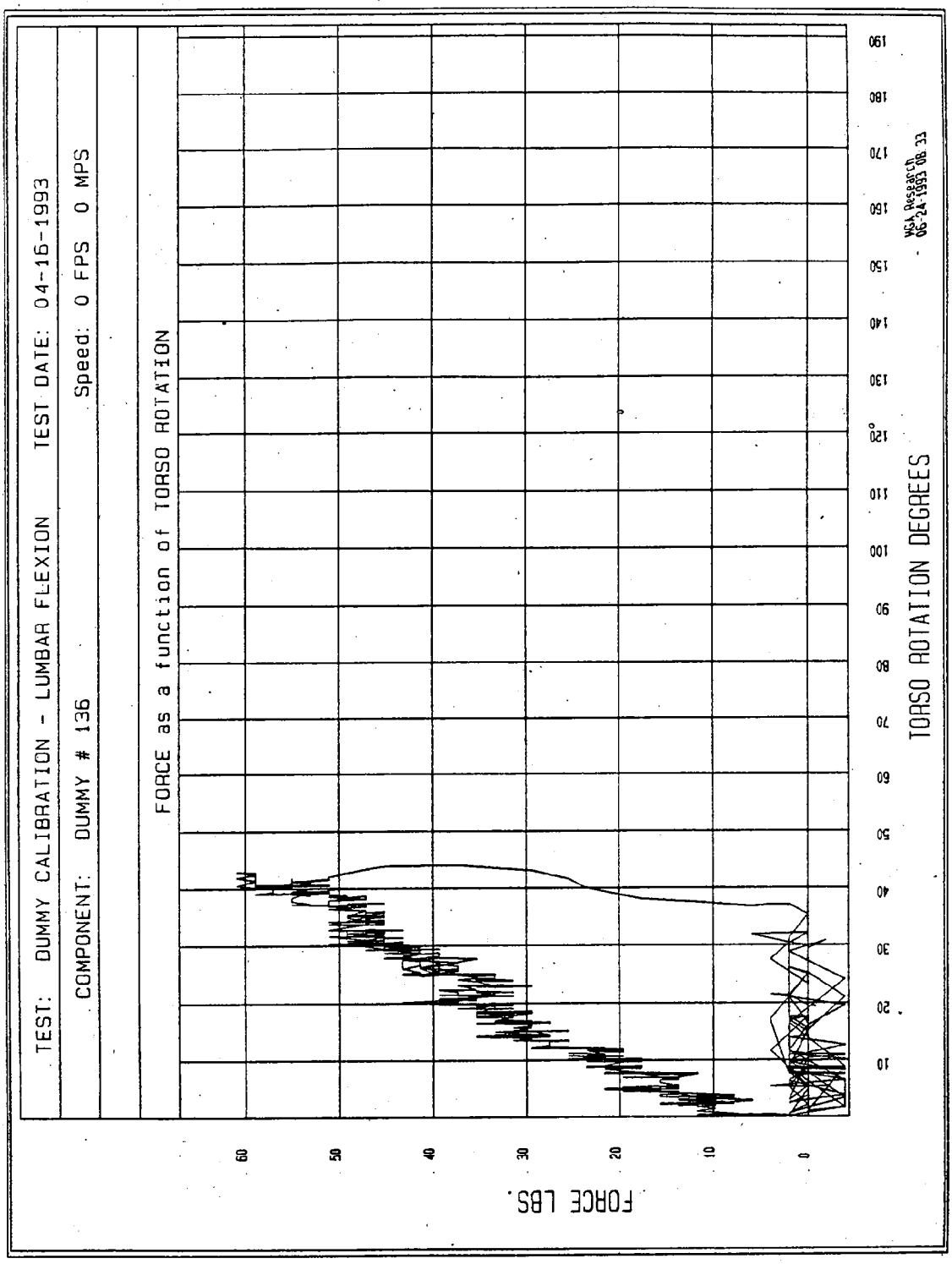

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-20-1993
COMPONENT: DUMMY # 136 Speed: 13.815 FPS 4.19 MPS
YMIN=-17.45214 G'S at 40 msec YMAX= 41.17199 G'S at 33. msec
LOWER RIB ACCELERATION
1 ACCELERATION G'S from F1.R09
40
30
20
10
0
-10
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
TIME (SECONDS)
MGA Research 06-24-1993 08:29
G's


TEST: DUMMY CALIBRATION - THORAX IMPACT
TEST DATE: 04-20-1993
COMPONENT: DUMMY # 136
Speed: 13.815 FPS 4.19 MPS
YMIN=-8.645515 G'S at 55. msec
YMAX= 20.00632 G'S at 38. msec
LOWER SPINE ACCELERATION
1 ACCELERATION G'S from FI.R10
G'S
22
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
TIME (SECONDS)
MGA Research
06-24-1993 08:29


TEST: DUMMY CALIBRATION - PELVIS IMPACT
TEST DATE: 04-20-1993
COMPONENT: DUMMY # 136
Speed: 13.955 FPS 4.24 MPS
YMIN=-6.596032 G'S at 60 msec
YMAX= 50.73117 G'S at 35. msec
PELVIS ACCELERATION
1 ACCELERATION G'S from FI.R11
G'S
50
40
30
20
10
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
TIME (SECONDS)
MGA Research
06-24-1993 08:31


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 04-15-1993
COMPONENT: DUMMY # 136 Speed: 0 FPS 0 MPS
ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT
ABDOMEN FORCE LBS.
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
ABDOMEN DISPLACEMENT INCHES
WSA Research
06-24-1993 08:32

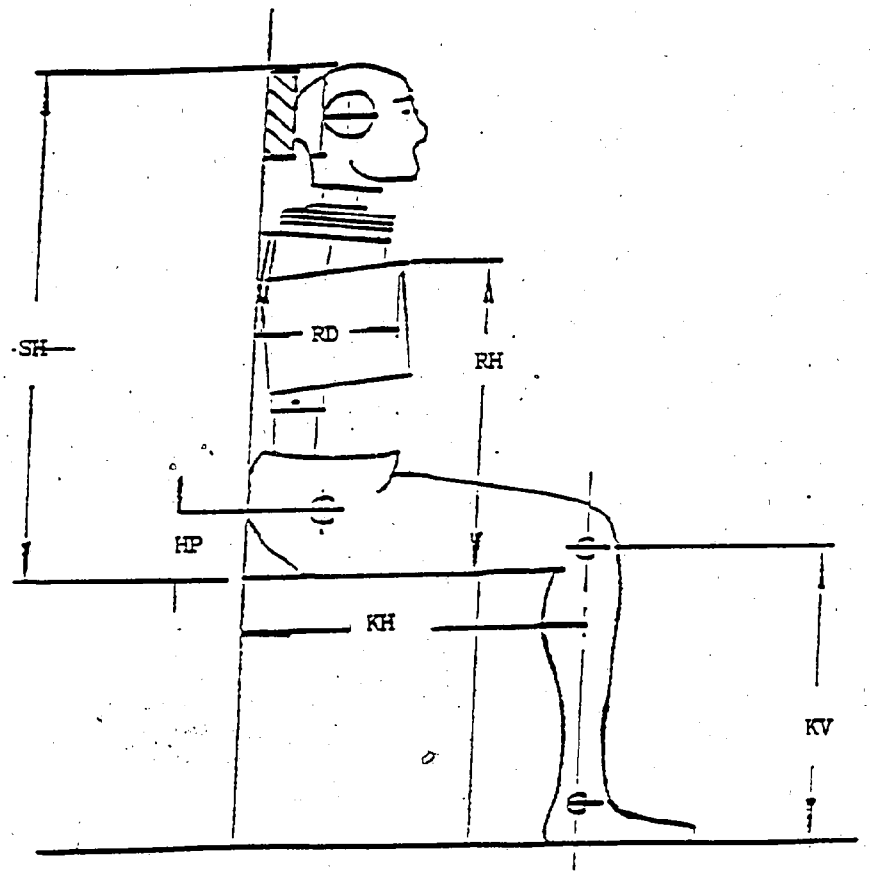
C-10


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 04-16-1993
COMPONENT: DUMMY # 136 Speed: 0 FPS 0 MPS
FORCE as a function of TORSO ROTATION
FORCE LBS.
TORSO ROTATION DEGREES
WSA Research
06-24-1993 08:33

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 137 DUMMY CALIBRATION BY: Rod McClelland

I. CONFIGURATION VERIFICATION DATA



DATE OF CONFIGURATION VERIFICATION: 4-30-93

DESCRIPTION	SPECIFICATION	ACTUAL MEASUREMENT
SH - Seated Height	35.6" to 35.8"	35.7
RH - Rib Height	19.75" to 20.5"	20.3
HP - Hip Pivot Height	3.9" ref.	3.9
RD - Rib From Backline	9.0" to 9.5"	9.2
KH - Knee Pivot From Backline	20.1" to 20.7"	20.2
KV - Knee Pivot to Floor	19.3" to 19.9"	19.5
HW - Hip Width	14.0" to 15.4"	14.5

SIDE IMPACT DUMMY CONFIGURATION AND PERFORMANCE (CONT.)

II. PERFORMANCE VERIFICATION DATA

DUMMY NO.: 137 DUMMY CALIBRATION BY: Rod McClelland

VERIFICATION LABORATORY TEMPERATURE (66° - 78°F): 70°

1.0 LUMBAR FLEXION TEST

	SPECIFICATION	MEASUREMENT
Force @ 20°	22 to 34 lbs	26
Force @ 30°	34 to 46 lbs	41
Force @ 40°	46 to 58 lbs	57
Return Angle	12° Maximum	7°

2.0 ABDOMINAL COMPRESSION TEST
(Preload = 10 lbs)

	SPECIFICATION	MEASUREMENT
Force @ 0.5 in	23.3 to 36.5 lbs	27
Force @ 0.75 in	36.7 to 49.8 lbs	39
Force @ 1.0 in	50 to 63 lbs	57
Force @ 1.3 in	73 to 88 lbs	84

3.0 THORAX IMPACT TEST

	SPECIFICATION	MEASUREMENT
Probe Speed	13.8 TO 14.2 f/s	13.8
Upper Rib	37 to 46 g	40
Lower Rib	37 to 46 g	38
Lower Spine	15 to 22 g	19

4.0 PELVIC IMPACT TEST

	SPECIFICATION	MEASUREMENT
Probe Speed	13.8 to 14.2 f/s	13.88
Pelvis Acceleration	40 to 60 g	50

SIDE IMPACT DUMMY DATA SHEET

DUMMY #: 137

TEST DATE: 4-23-93

DRIVER	PASSENGER
	X

EXPOSURE	DATE	TYPE OF TEST
1st	4-22-93	NHTSA

1) RIB ACCELEROMETERS:

	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
UR	Endevco	A11M	11-9-92	124.19	X
URR	Endevco	A07M	11-6-92	88.92	X
LR	Endevco	DR22	11-6-92	76.57	X
LRR	Endevco	A87M	11-6-92	94.46	X

2) SPINE ACCELEROMETERS

	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
USY	Endevco	A33D	3-4-93	96.83	X
USRY	Endevco	A67M	1-20-93	89.49	X
LSY	Endevco	A55D	11-6-92	90.00	X
LSRY	Endevco	EA71	11-6-92	90.04	X

3) PELVIS ACCELEROMETERS

	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
Y	Endevco	EH45	11-9-92	129.95	X
RY	Endevco	A99L	11-6-92	102.6	X

4) OTHER ACCELEROMETERS

	MANUFACTURER	SERIAL NO.	CAL. DATE	DLR	CHECKED
CHEST DISPLACEMENT	Servco	137	4-20-93	.61 in/v	X

DUMMY INSTRUMENTED BY: Rod McClelland

APPROVED BY: Rod McClelland

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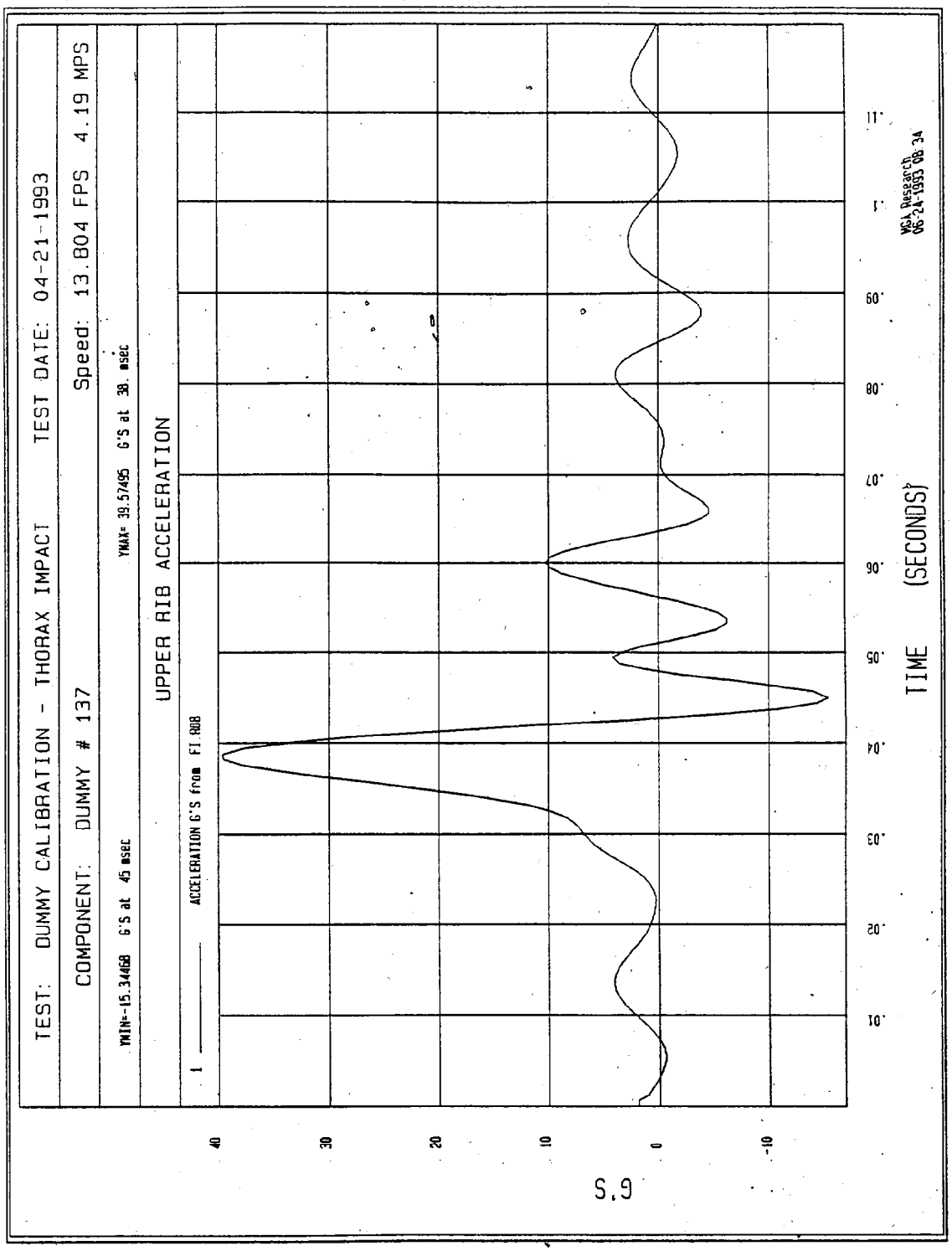
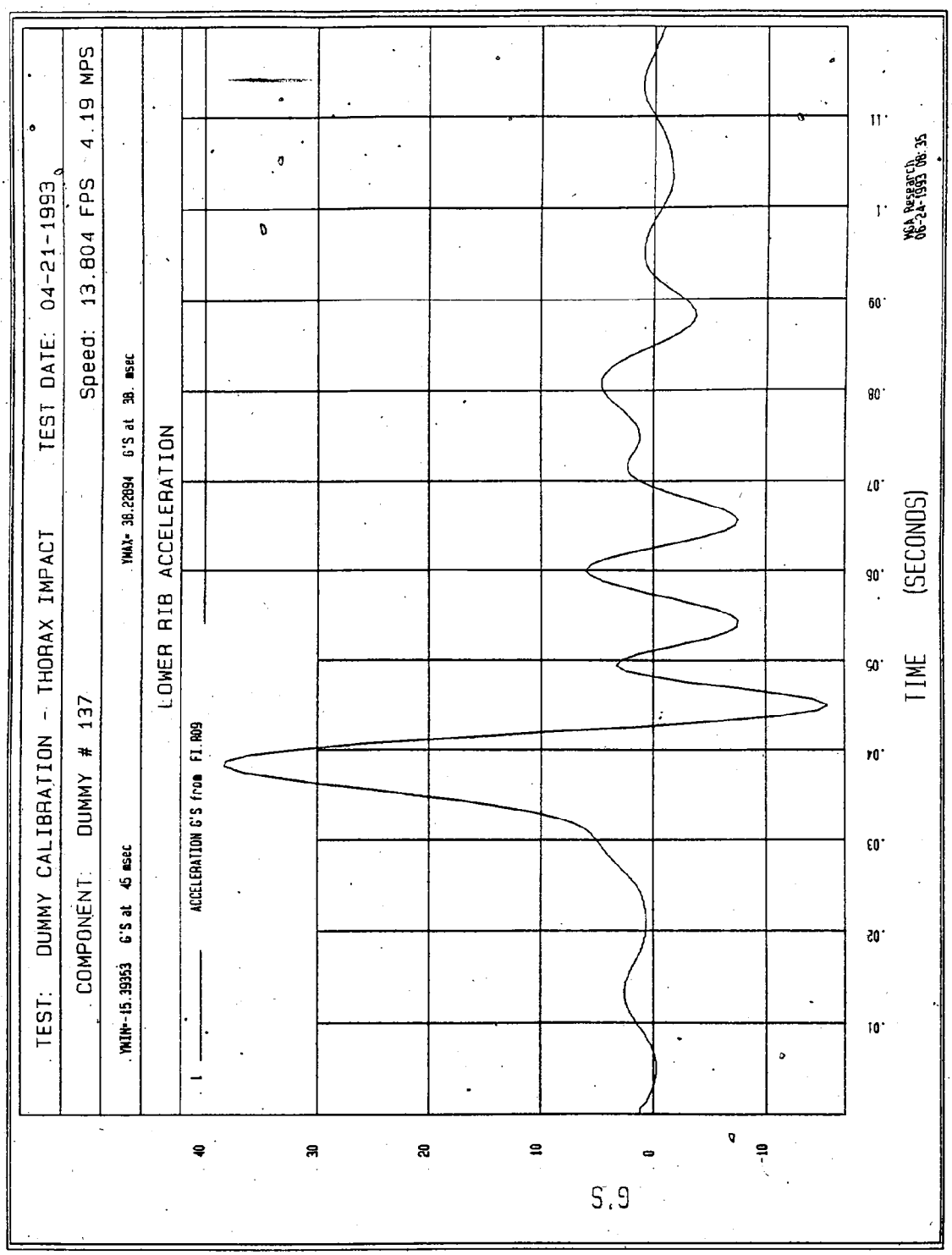
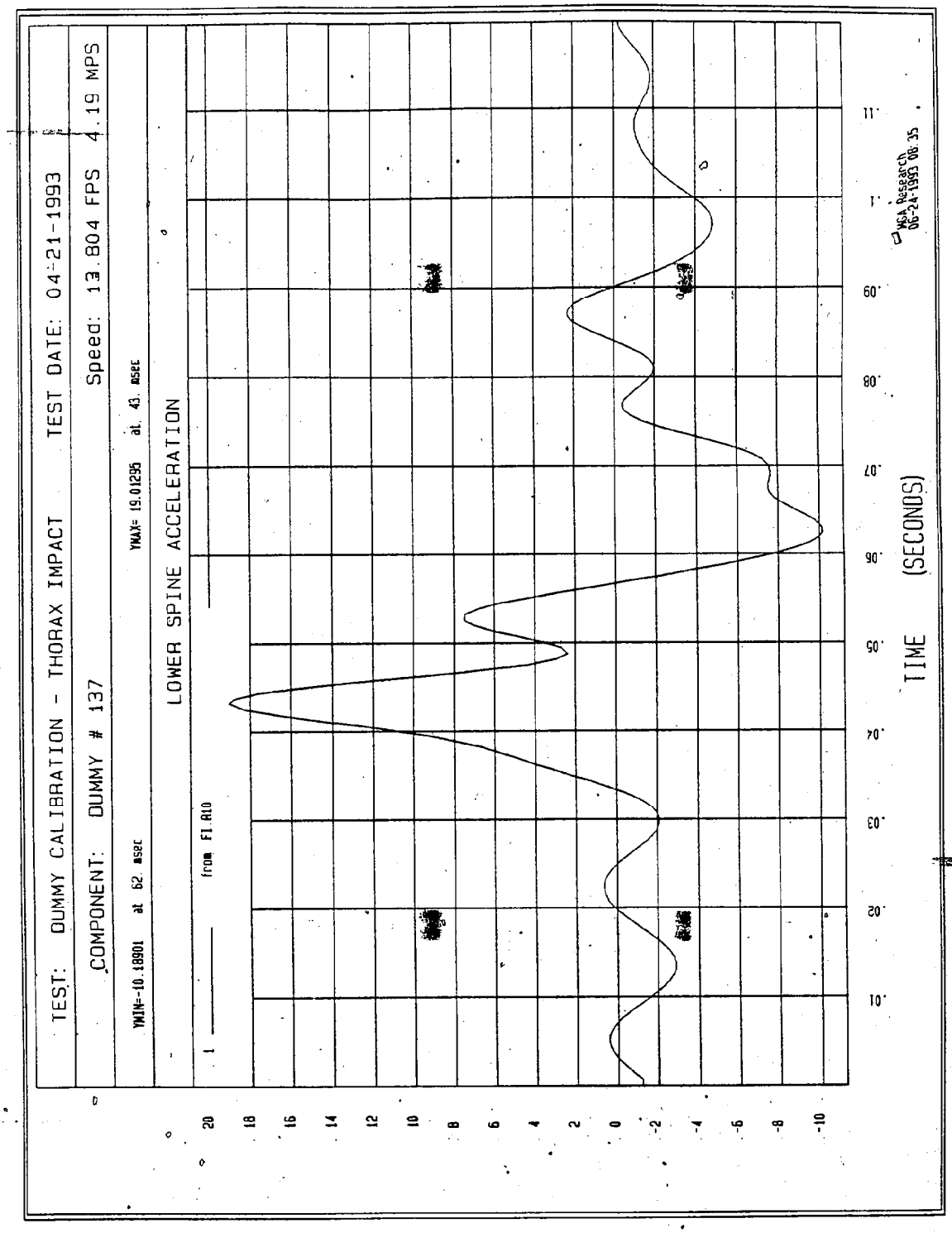

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-21-1993
COMPONENT: DUMMY # 137 Speed: 13.804 FPS 4.19 MPS
YMIN=-15.34468 G'S at 45 msec YMAX= 39.57495 G'S at 38. msec
UPPER RIB ACCELERATION
1 ACCELERATION G'S from FI.RUB
40
30
20
10
0
-10
G'S
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
TIME (SECONDS)
MGA Research
06-24-1993 08:34

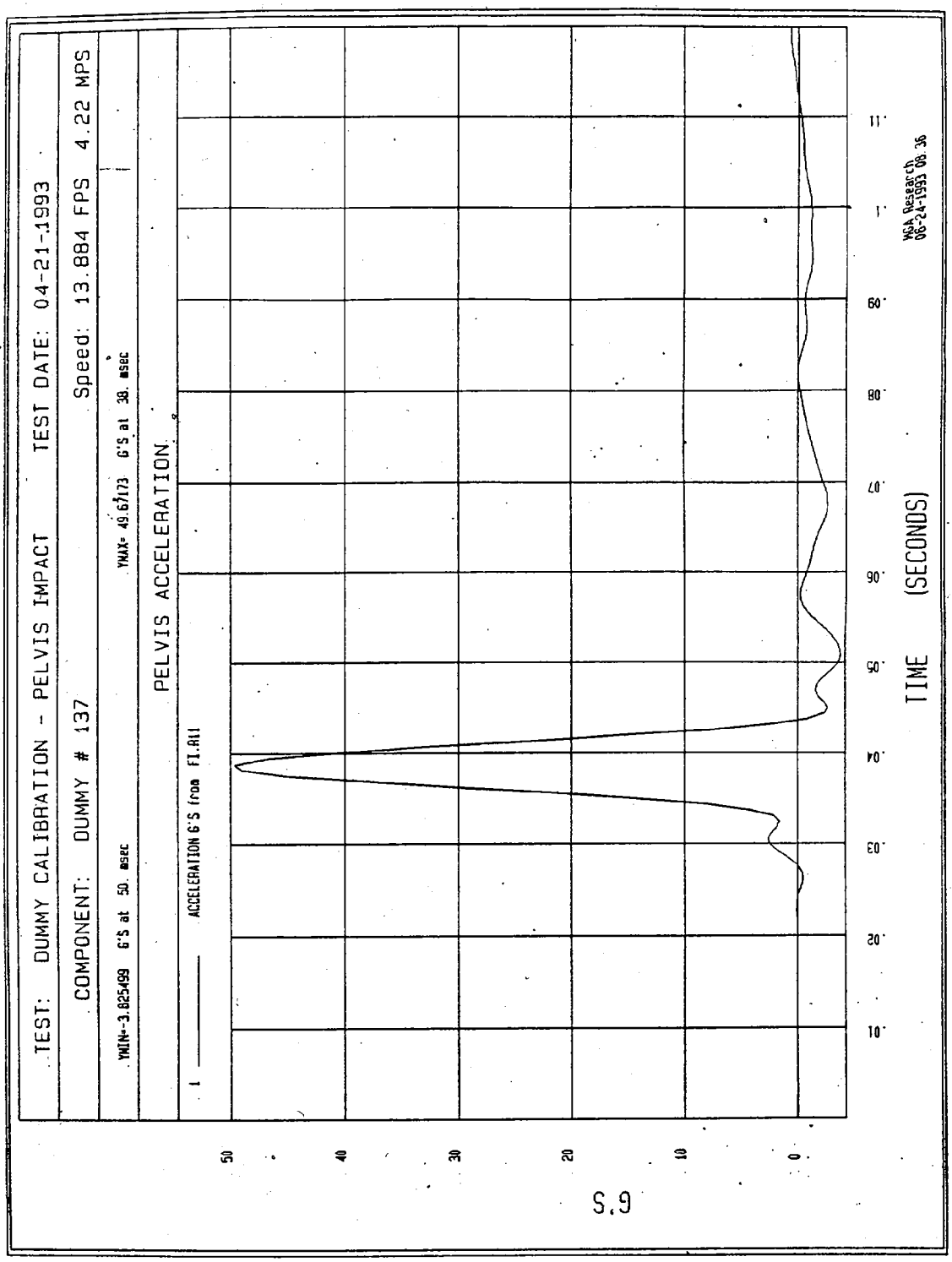
C-16

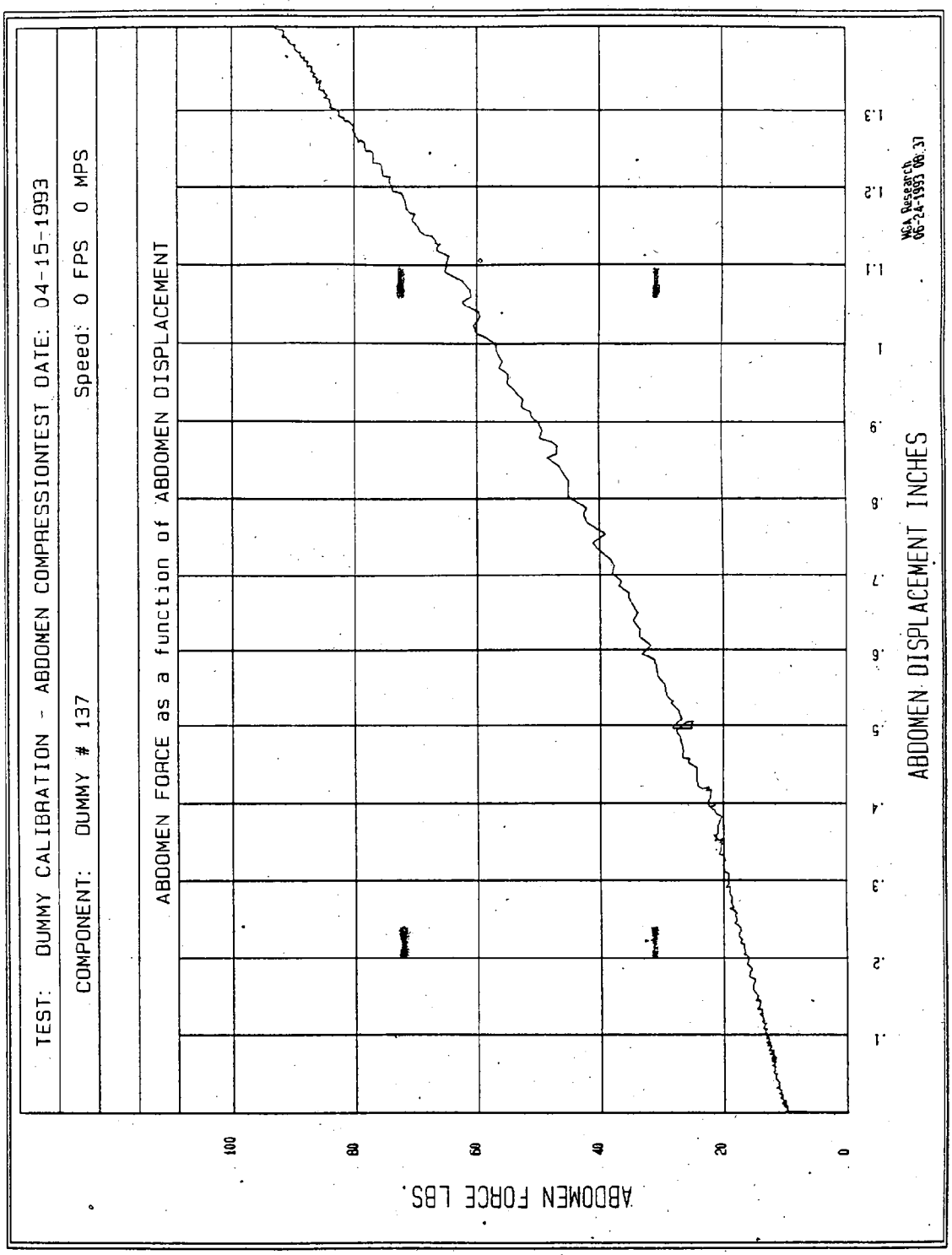

TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-21-1993
COMPONENT: DUMMY # 137 Speed: 13.804 FPS 4.19 MPS
YMIN= -15.39353 G'S at 45 msec YMAX= 38.22894 G'S at 38. msec
LOWER RIB ACCELERATION
1 ACCELERATION G'S from FI R09
40
30
20
10
0
-10
.01
.02
.03
.04
.05
.06
.07
.08
.09
.1
.11
TIME (SECONDS)
MGA Research 06-24-1993 08:35
5.9

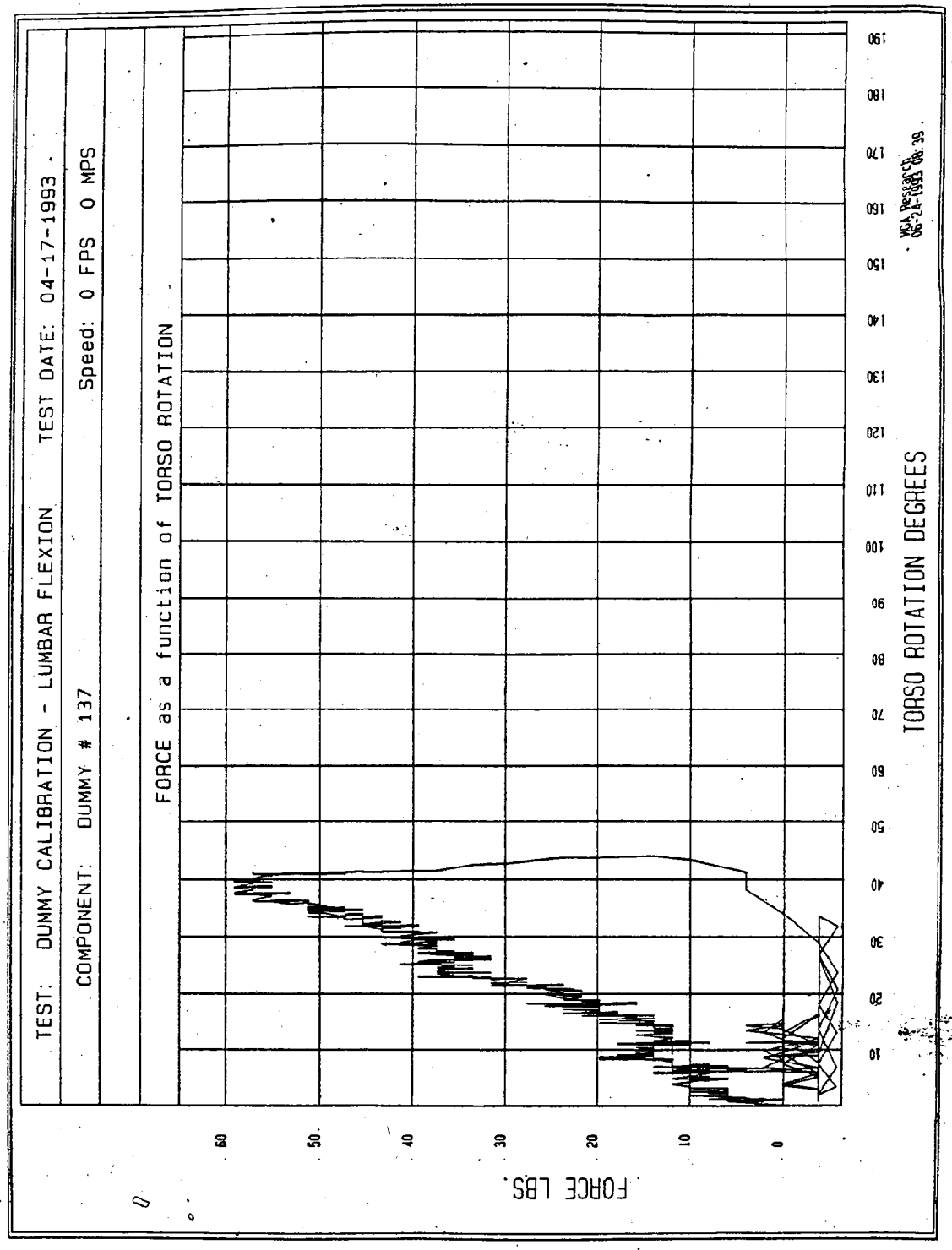
C-17


TEST: DUMMY CALIBRATION - THORAX IMPACT TEST DATE: 04-21-1993
COMPONENT: DUMMY # 137 Speed: 13.804 FPS 4.19 MPS
YMIN=-10.18901 at 62 msec YMAX= 19.01295 at 43. msec
LOWER SPINE ACCELERATION
1 from F1.A10
TIME (SECONDS)
MGA Research 06-24-1993 08:35

250


TEST: DUMMY CALIBRATION - PELVIS IMPACT TEST DATE: 04-21-1993
COMPONENT: DUMMY # 137 Speed: 13.884 FPS 4.22 MPS
YMIN=-3.825499 G'S at 50. msec YMAX= 49.67173 G'S at 38. msec
PELVIS ACCELERATION
1 ACCELERATION G'S from F1.A11
50
40
30
20
10
0
10
20
30
40
50
60
80
70
90
11
1
TIME (SECONDS)
MGA Research 06-24-1993 08:36
S.9


TEST: DUMMY CALIBRATION - ABDOMEN COMPRESSIONTEST DATE: 04-15-1993
COMPONENT: DUMMY # 137 Speed: 0 FPS 0 MPS
ABDOMEN FORCE as a function of ABDOMEN DISPLACEMENT
ABDOMEN FORCE LBS.
100
80
60
40
20
0
1.3
1.2
1.1
1
.9
.8
.7
.6
.5
.4
.3
.2
.1
ABDOMEN DISPLACEMENT INCHES
WSA Research
06-24-1993 08:33


TEST: DUMMY CALIBRATION - LUMBAR FLEXION TEST DATE: 04-17-1993
COMPONENT: DUMMY # 137 Speed: 0 FPS 0 MPS
FORCE as a function of TORSO ROTATION
FORCE LBS
TORSO ROTATION DEGREES
MGA Research Corp
06-24-1993 08:39