V2264

REPORT NO. MGA-95N012

NEW CAR ASSESSMENT PROGRAM (NCAP)

FRONTAL BARRIER IMPACT TEST

FORD MOTOR COMPANY

1995 FORD ESCORT 4 DOOR
NHTSA NO. MS0204

MGA RESEARCH CORPORATION
5000 WARREN ROAD
BURLINGTON, WI 53105

Test Date: February 22, 1995

Report Date: March 23, 1995

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF MARKET INCENTIVES
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15. Supplementary Notes

16. Abstract

A 56 kph (35 mph) frontal barrier impact using a 3Ø load cell barrier was conducted on a 1995 Ford Escort 4 Door at the MGA Proving Grounds and Crash Test Center in Burlington, WI. on February 22, 1995.

The barrier impact velocity was 56.4 kph (35.1 mph), and the ambient temperature at the time of impact was 21°C. The post-test maximum static crush was 512 mm.

The test vehicle appeared to comply with the requirements of the following Federal Motor Vehicle Safety Standards:

1. FMVSS 212, "Windshield Mounting"
2. FMVSS 219 (partial), "Windshield Zone Intrusion"
3. FMVSS 3Ø1, "Fuel System Integrity"

With regard to FMVSS 2Ø8, "Occupant Crash Protection" injury criteria, the driver's HIC was 7Ø7 and the 3 msec. Clip (Chest g's) was 53 g's. The left and right femur loads for the driver were 4574 and 4Ø98 Newtons, respectively. The passenger's HIC was 622 and the 3 msec Clip was 56 g's. The left and right femur maximum loads were 55Ø8 and 69Ø1 Newtons respectively.

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP) FMVSS 212 Indicant Testing FMVSS 219 (partial) Indicant Testing FMVSS 3Ø1 Indicant Testing	Copies of this report are available from: Technical Ref. Division, NHTSA, NASSIF Building, Room 51Ø8 4ØØ Seventh Street, S.W. Washington, D.C. 2Ø59Ø

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APPROVED BY: _____

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_____

Manager, New Car Assess. Program (NCAP)

MAY 3 1 1995

Date of Report Acceptance

_____

Contracting Officer's Tech. Rep. (COTR)

MAY 3 1 1995

Date of Report Acceptance

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SECTION 1

PURPOSE AND TEST PROCEDURE

This 35 mph frontal barrier impact test is part of the Composite FY'95 Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-90-D-12121. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 48 kph (30 mph) FMVSS 208/212/219/301-75 requirements.

The 56 kph (35 mph) frontal barrier impact test was conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Indicant Test Procedure for New Car Assessment Program (NCAP) dated January 1, 1990. Data for FMVSS No. 212, "Windshield Mounting", FMVSS No. 219 (Partial), "Windshield Zone Intrusion", FMVSS No. 301-75, "Fuel System Integrity," as well as occupant performance data are provided herein.

SECTION 2

SUMMARY OF FRONTAL BARRIER IMPACT TEST

A load cell barrier consisting of 30 load cells was impacted by a 1995 Ford Escort 4 Door at a velocity of 56.4 kph (35.1 mph). The test was performed at the MGA Proving Grounds and Crash Test Center on February 22, 1995. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

The frontal barrier impact event was documented by one real-time camera and 16 high speed cameras. Camera locations and other pertinent camera information can be found in this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs) were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head and chest primary and redundant triaxial accelerometers, pelvis triaxial accelerometers, neck load cell, and right/left femur load cells. The driver was also instrumented with right and left lower leg sensors. Seat belt load cells were also on the driver's and passenger's shoulder and lap belts to measure dummy torso and pelvic section loading. The driver ATD (Serial No. 66) and the right-front passenger ATD (Serial No. 65) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C and D.

The 77 channels of data were recorded on 8 computers. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

The driver's head struck the inflated airbag. The driver HIC was 707. The maximum chest deceleration, (Clip), over 3 milliseconds was 53 g's. The left and right femur loads were 4574 and 4098 Newtons respectively.

The right front passenger's head struck the inflated airbag. The passenger HIC was 622 and maximum chest deceleration, (Clip), over 3 milliseconds was 56 g's. The left and right femur loads were 5508 and 6901 Newtons respectively.

GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Ford/Escort/4 Door

NHTSA No.: MSØ2Ø4 VIN.: 3FASP13J6SR1Ø4113

Body color: Red Date of Manufacture: 1Ø/94

Engine: 4 Cylinders; __C.I.D.; 1.9 Liters;

X Gas; __Diesel; __Turbocharged

__Longitudinal; X Transverse

Transmission: 3 Speed; __Manual; X Automatic; X Overdrive

Final Drive: X Front Wheel; __Rear Wheel; __Four Wheel

Odometer Reading: 7Ø miles

X A/C; X P/S; X P/B; __P/wdo;

__P/seats; __Tilt Wheel; __Cruise Control;

Type of Occupant Restraint: Type I (passive shoulder, manual lap) seat belts in both driver and right front passenger seating positions with driver and passenger airbags.

DATA RECORDED FROM VEHICLE'S TIRE PLACARD:

Tire Pressure (at capacity): Front 3.1 kg/cm^2 (44 Psi) Rear 3.1 kg/cm^2 (44 Psi)

Recommended Tire Size: P175/65R14

Recommended Cold Tire Pressure: Front 2.2 kg/cm^2 (32 Psi) Rear 2.2 kg/cm^2 (32 Psi)

Tires on Vehicle: P175/65R14 ; Manufacturer: Goodyear

Number of Occupants: 2 Front; 3 Rear; __3rd Seat; 5 TOTAL

Type of Front Seats: X Bucket; __Bench; __Split Bench

Type of Front Seat Back: __Fixed; X Adj. With; __Power; X Lever

Vehicle Capacity Weight (VCW) = 376.Ø kg. (A)

No. of Occupants x 68.Ø kg. = 34Ø.Ø kg. (B)

Rated Cargo Weight (RCW) A-B = 36.Ø kg.

GVWR 155Ø kg. GAWR: Front 848 kg.; Rear 761 kg.

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (WITH MAXIMUM FLUIDS) = UDW:

Right Front = 366 kg Right Rear = 198 kg

Left Front = 358 kg Left Rear = 216 kg

TOTAL FRONT WEIGHT = 724 kg (63.6% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 414 kg (36.4% of Total Vehicle Weight)

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 1138 kg

CALCULATION FOR TARGET TEST WEIGHT:

UDW = Unloaded Delivered Weight 1138 kg

VCW = Vehicle Capacity Weight 376 kg DSC = Designated Seating Capacity 5

RCW = VCW - 68 (DSC) = 36 *kg

Target Test Weight = UDW + RCW + (2 dummies x 75.8 kg/dummy)

Target Test Weight = 1326 kg

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO:

Right Front = 396 kg Right Rear = 263 kg

Left Front = 400 kg Left Rear = 266 kg

TOTAL FRONT WEIGHT = 796 kg (60.0% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 529 kg (40.0% of Total Vehicle Weight)

TOTAL TEST WEIGHT = 1325 kg

Weight of ballast secured in vehicle trunk area = 0 kg

Vehicle components removed to meet target weight: Rear seats, rear speakers, rear deck, right rear tail lamp, spare tire, jack, tool kit, exhaust rear of muffler, muffler.

VEHICLE ATTITUDE (all dimensions in mm):

Delivered Attitude: RF 642 LF 639 RR 637 LR 631

Test Attitude: RF 629 LF 630 RR 594 LR 590

Wheel Base: 2493 mm; C.G. = 995 mm rearward of front wheel C/L

Remarks: None noted

*light trucks and MPVs RCW is 136 kgs or manufacturer's value, whichever is less

GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

POST-IMPACT DATA:

Type of Test: 35 mph Frontal Impact Impact Angle: 90°

Date of Test: February 22, 1995 Time of Test: 5:32 p.m.

Ambient Temperature: 21 °C (Spec. Range = 18.8 to 25.6°C)

Temperature in Occupant Compartment: 21°C

Windshield Molding Temperature: 21°C

Required Impact Velocity Range: 55.5 to 57.1 kph

Impact Velocity: primary = 56.4 kph; secondary = 56.6 kph

Distance From Front Bumper to Barrier Face When

Entering Speed Trap: 1152 mm

Exiting Speed Trap: 152 mm

VEHICLE REBOUND AND CRUSH (mm):

Vehicle Length: Pre-test = R 4191 C_L 4346 L 4200

Post-test = R 3691 C_L 3834 L 3704

Crush = R 500 C_L 512 L 496

Distance from front of test vehicle to point of impact (rebound):

R 995 mm C_L 873 mm L 1052 mm

VISIBLE DUMMY CONTACT POINTS:

	Driver	Passenger
Head	To airbag	To airbag
Chest	No visible contact	No visible contact
Abdomen	No visible contact	No visible contact
Left Knee	To lower dash panel	To lower dash panel
Right Knee	To lower dash panel	To lower dash panel

GENERAL TEST AND VEHICLE PARAMETER DATA (cont'd)

	Front		Rear	
Door Opening	Left	Right	Left	Right
(without use of tools)	No	No	Yes	Yes

	Front		Rear	
Seat Movement	Left	Right	Left	Right
Seat Back Movement	Ø	Ø	N/A	N/A
Seat Shift (mm)	3	3	N/A	N/A

Glazing Damage

Backlight/Windshield Windshield cracked

Other Notable Impact Effects: None

SECTION 3

SUMMARY OF RESULTS FOR-------

FMVSS 212, "Windshield Mounting"

FMVSS 219 (Partial), "Windshield Zone Intrusion"

FMVSS 301-75, "Fuel System Integrity"

FMVSS NO. 212, "WINDSHIELD MOUNTING", DATA SHEET

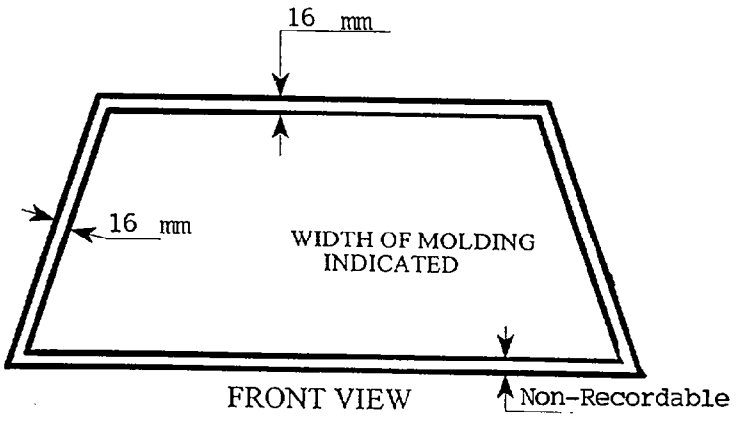
Details of windshield mounting such as retention method, trim type, etc.:
Windshield set in rubber molding within windshield frame

FMVSS 212 Requirements: The Post-Test periphery retention amount must be at least 75% of the Pre-Test periphery measurement for vehicles NOT equipped with automatic restraints, and 50% for each side of windshield for vehicles equipped with automatic restraint systems for front occupants.

FMVSS 212 TEST DATA:

	WINDSHIELD PERIPHERY		
	PRE-TEST (mm)	POST-TEST (mm)	PERCENT RETENTION
RIGHT SIDE	1974	1973	100%
LEFT SIDE	1974	1949	98.7%
TOTAL	3948	3922	99.3%

AREA OF RETENTION FAILURE: None



FAILURE DETAILS: None

FMVSS NO. 219, "WINDSHIELD ZONE INTRUSION", DATA SHEET

PROTECTED ZONE LOWER EDGE REQUIREMENT:

The lower edge of the protected zone is determined by placing a 6.5" dia. rigid sphere weighing 15 pounds in a position such that it simultaneously contacts the inner surface of the windshield and the top surface of the instrument panel including padding. Draw the locus of points on the inner surface of the windshield contacted by the sphere across the width of the instrument panel. From the outermost contact points, extend the locus line horizontally to the edges of the windshield, and then draw a line on the inner surface of the windshield below and 1/2" distant from the locus line. The LOWER EDGE OF THE PROTECTED ZONE is the longitudinal projection onto the outer surface of the windshield of this line.

FMVSS 219 TEST DATA:

A= 1103 mm

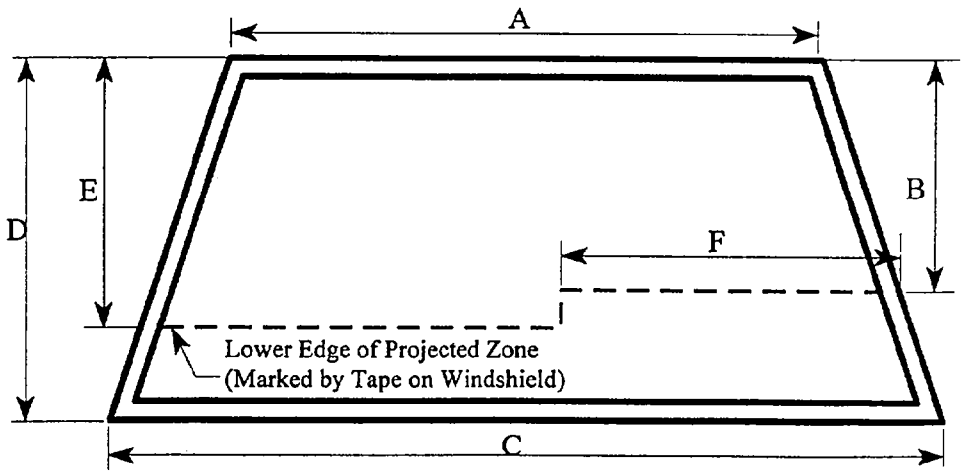
B= 445 mm

C= 1455 mm

D= 650 mm

E= 475 mm

F= 595 mm



FRONT VIEW

DETAILS OF WINDSHIELD GLASS PENETRATION GREATER THAN 1/4":

(Show location of penetration)

NONE

FMVSS NO. 301-75, FUEL SYSTEM INTEGRITY POST IMPACT TEST DATA

FMVSS NO. 301

TEST VEHICLE NHTSA NO.: MS0204 Test Date: February 22, 1995

Vehicle Mfgr./Make/Model: 1995/Ford/Escort/4 Door

Usable Capacity of Vehicle's Fuel Tank: 45.0 Liters
(figure furnished by vehicle manufacturer)

TEST REQUIREMENTS:

Test vehicle's engine operated to "run dry" condition, and then a small amount of stoddard solvent which has been dyed red shall be added to the vehicle's fuel tank. Operate the fuel pump enough to completely fill the fuel system ahead of the fuel tank, and add 92 to 94% of the stated USABLE CAPACITY to the fuel tank.

AMOUNT OF STODDARD SOLVENT ADDED TO VEHICLE'S FUEL TANK:

42.3 Liters which is 94 % of the stated USABLE CAPACITY.

TEST VEHICLE IMPACT TYPE:

- X Frontal (35 mph)
- ____ Oblique (30 mph) with ___° barrier face first contacting (driver/passenger) side
- ____ Rear Moving Barrier (30 mph)
- ____ Side Impact MDB (33.2 mph)

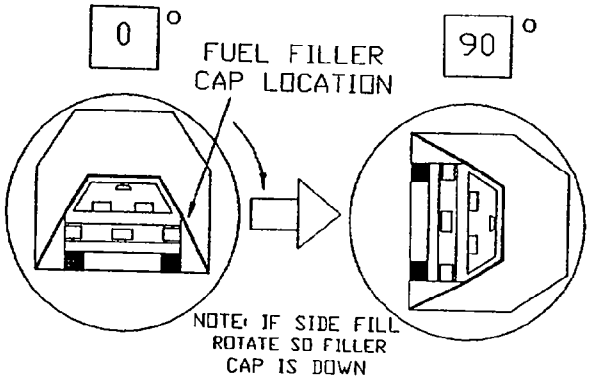
FUEL SPILLAGE MEASUREMENT:

	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

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 0°- 90° Vehicle NHTSA ID No.: MS0204



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 47 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 47 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:

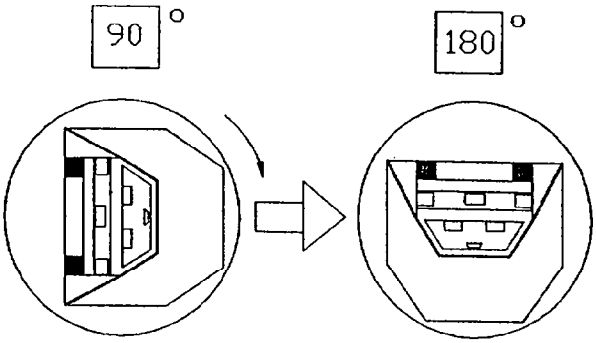
0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 90° - 180° Vehicle NHTSA ID No.: MS0204



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:

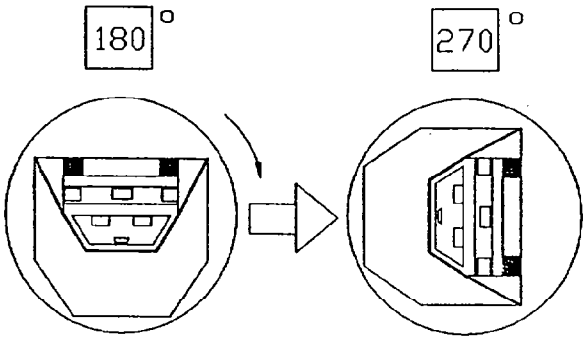
0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 180° - 270° Vehicle NHTSA ID No.: MS0204



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 19 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 19 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:

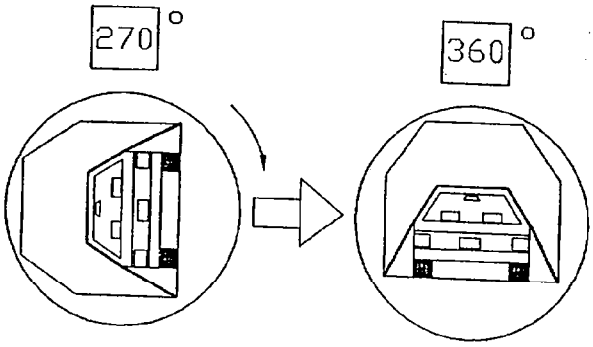
0	0	0	0

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

IV. SOLVENT SPILLAGE LOCATIONS(S): None

FMVSS NO. 301 STATIC ROLLOVER DATA SHEET

TEST PHASE: 270° - 360° Vehicle NHTSA ID No.: MS0204



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time 2 minutes 45 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time + 5 minutes 0 seconds

TOTAL 7 minutes 45 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

SECTION 4

OMI FINAL DATA

Occupant and Vehicle Information

I. OMI DATA

1. Dummy Injury Criteria Data Summary
2. Dummy Positioning Data
3. Seat Belt Positioning Data
4. Seat Belt Performance Assessment Data
5. Camera Locations
6. Vehicle Target Locations

II. OVR DATA

1. Load Cell Barrier Data
2. Vehicle Accelerometer Data
3. Test Vehicle Measurements

III. AID DATA

1. Accident Investigation Damage Data Summary

FMVSS NO. 208, "OCCUPANT CRASH PROTECTION", DATA SHEET

VEH. YR./MAKE/MODEL/BODY STYLE: 1995/Ford/Escort/4 Door

VEH. NHTSA NO.: MS0204 TEST DATE: February 22, 1995

MAX. ACCELERATION VALUES: (g's)	DRIVER # 66	PASSENGER # 65
Head Channel X	-48.1 @ 66 msec.	-60.1 @ 65 msec.
Head Channel Y	10.5 @ 84 msec.	-13.8 @ 89 msec.
Head Channel Z	39.4 @ 64 msec.	37.1 @ 65 msec.
HEAD RESULTANT	60.9 @ 64 msec.	70.2 @ 65 msec.
Chest Channel X	-54.2 @ 63 msec.	-58.3 @ 74 msec.
Chest Channel Y	13.6 @ 80 msec.	-12.2 @ 85 msec.
Chest Channel Z	-15.9 @ 71 msec.	-24.6 @ 81 msec.
CLIP	53.0	56.0
TIME INTERVAL (msec) [0.003 seconds minimum]	t_1 = 60.955 t_2 = 63.893	t_1 = 71.726 t_2 = 74.786

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	706.75	622.26
t_1 = (msec)	53.98	53.24
t_2 = (msec)	89.96	89.23
Avg. Accel. t_1 to t_2 (g's)	52.1	49.6

[The maximum time interval from t_1 to t_2 is 36 milliseconds.]

MAX. COMPRESSIVE FEMUR FORCES:

Left Side (N)	4574	5508
Right Side (N)	4098	6901

MAXIMUM SEAT BELT FORCES:

Lap Belt (N)	5987 @ 67 msec.	3925 @ 65 msec.
Shoulder Belt (N)	8364 @ 64 msec.	9579 @ 65 msec.

NOTE: All values listed must occur during primary impact event.
(Head X,Y,Z and R listed must be during t_1 to t_2 HIC interval)

HYBRID III NECK, CHEST AND PELVIS DATA SHEET

VEHICLE YR./MAKE/MODEL/BODY STYLE: 1995/Ford/Escort/4 Door

VEHICLE NHTSA NO.: MS0204 TEST DATE: February 22, 1995

MAXIMUM VALUES	DRIVER DUMMY #66	PASSENGER DUMMY #65
Neck Load X (N)	956 @ 89 msec.	1253 @ 59 msec.
Neck Load Y (N)	-279 @ 83 msec.	500 @ 89 msec.
Neck Load Z (N)	-2184 @ 65 msec.	-2787 @ 61 msec.
Neck Moment X (N.M)	-16.5 @ 93 msec.	34.5 @ 95 msec.
Neck Moment Y (N.M)	-45.5 @ 98 msec.	56.6 @ 59 msec.
Neck Moment Z (N.M)	9.5 @ 100 msec.	-13.1 @ 198 msec.
Chest Deflection X (mm)	31.9	32.1*
Time of Max. Occurrence	63 msec.	67 msec.*
Pelvis X Acceleration (g's)	-66.6 @ 61 msec.	-62.1 @ 55 msec.
Pelvis Y Acceleration (g's)	11.6 @ 89 msec.	8.7 @ 50 msec.
Pelvis Z Acceleration (g's)	-36.4 @ 73 msec.	-32.5 @ 84 msec.
Pelvis Resultant (g's)	71.7 @ 63 msec.	62.4 @ 55 msec.

* Intermintant data, see page B-101

PART 572 DUMMY IN-VEHICLE POSITION

Vehicle NHTSA No.: MSØ2Ø4 Vehicle: 1995/Ford/Escort/4 Door

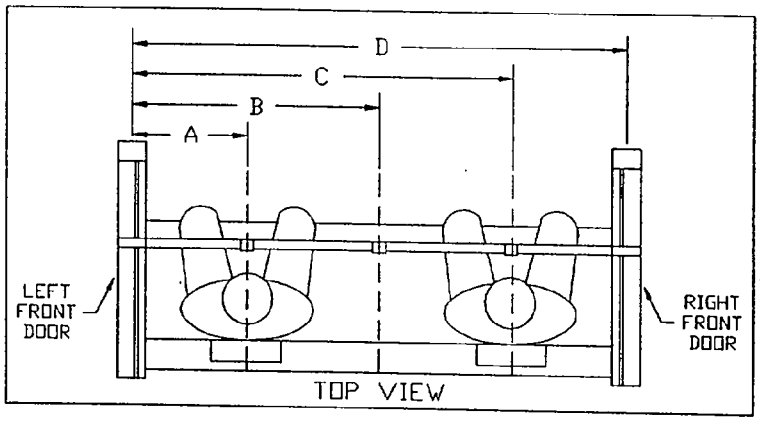
SEAT TYPE:	ADJUSTER TYPE:	BUCKET SEAT BACK TYPE:
____Bench	Driver: _X_Manual	____Fixed
_X_Bucket	___Power	_X___Adjustable Reclining
____Split Bench		
	Passenger: _X_Manual	
	____Power	

Driver Seat Position

Adjusted to the mid position

Passenger Seat Position

Adjusted to the mid position



_66_ DUMMY ID _65_

A	= Left Door to Driver Centerline	_394_ mm
B	= Left Door to Center Passenger Centerline	_73Ø_ mm
C	= Left Door to Right Passenger Centerline	_1Ø72_ mm
D	= Left Door to Right Door	_146Ø_ mm

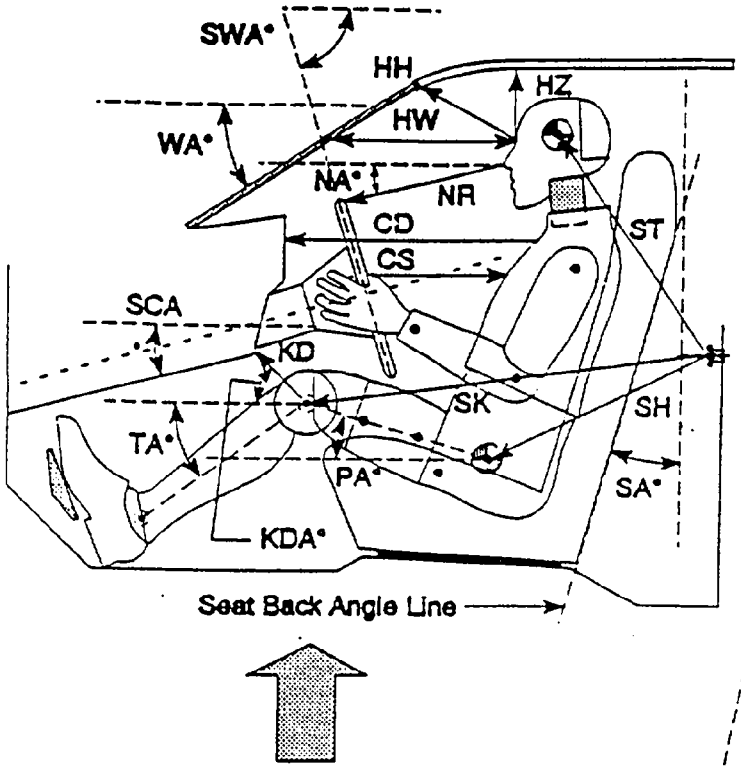
FRONT SEAT MEASUREMENT TABLE

Units (mm)

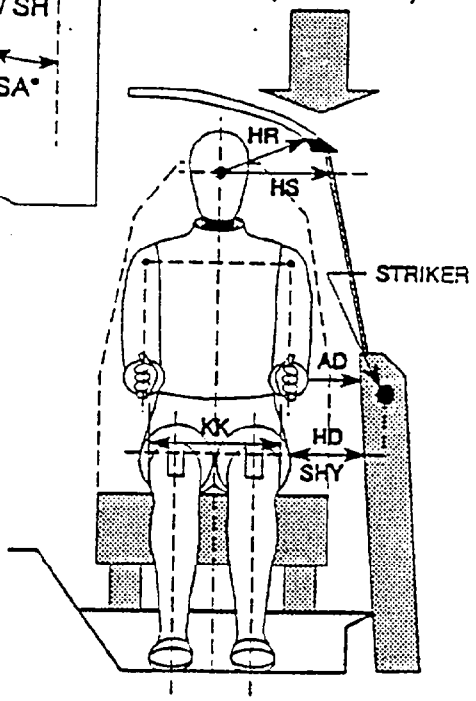
	DRIVER (Serial #66)	PASSENGER (Serial #65)
WA°	32.1°	
SWA°	24.Ø°	N/A
SCA°	24.Ø°	N/A
SA°	15.1°	15.1°
HZ	172	162
HH	32Ø	299
HW	485	453
HR	232	229
NR	381 Angle 1Ø.8°	N/A
CD	5Ø4	555
CS	295	N/A
RA	168	N/A
KDL	165 Angle 25.4°	186
KDR	168	184 Angle 21.1°
PA°	24.8°	2Ø.3°
TA°	4Ø.Ø°	37.6°
KK	35Ø	247
ST	574 Angle 8.9°	574 Angle 11.Ø°
SK	556 Angle 83.5°	594 Angle 89.6°
SH	221 Angle 118.1°	2Ø5 Angle 113.4°
SHY	254	244
HS	3Ø2	3Ø3
HD	172	163
AD	112	1Ø8

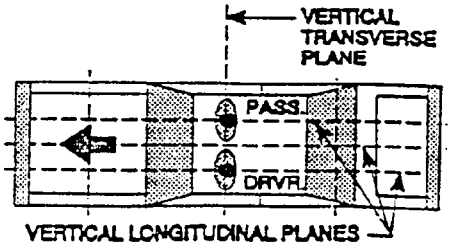
N/A = Not Applicable

FRONT SEAT MEASUREMENTS



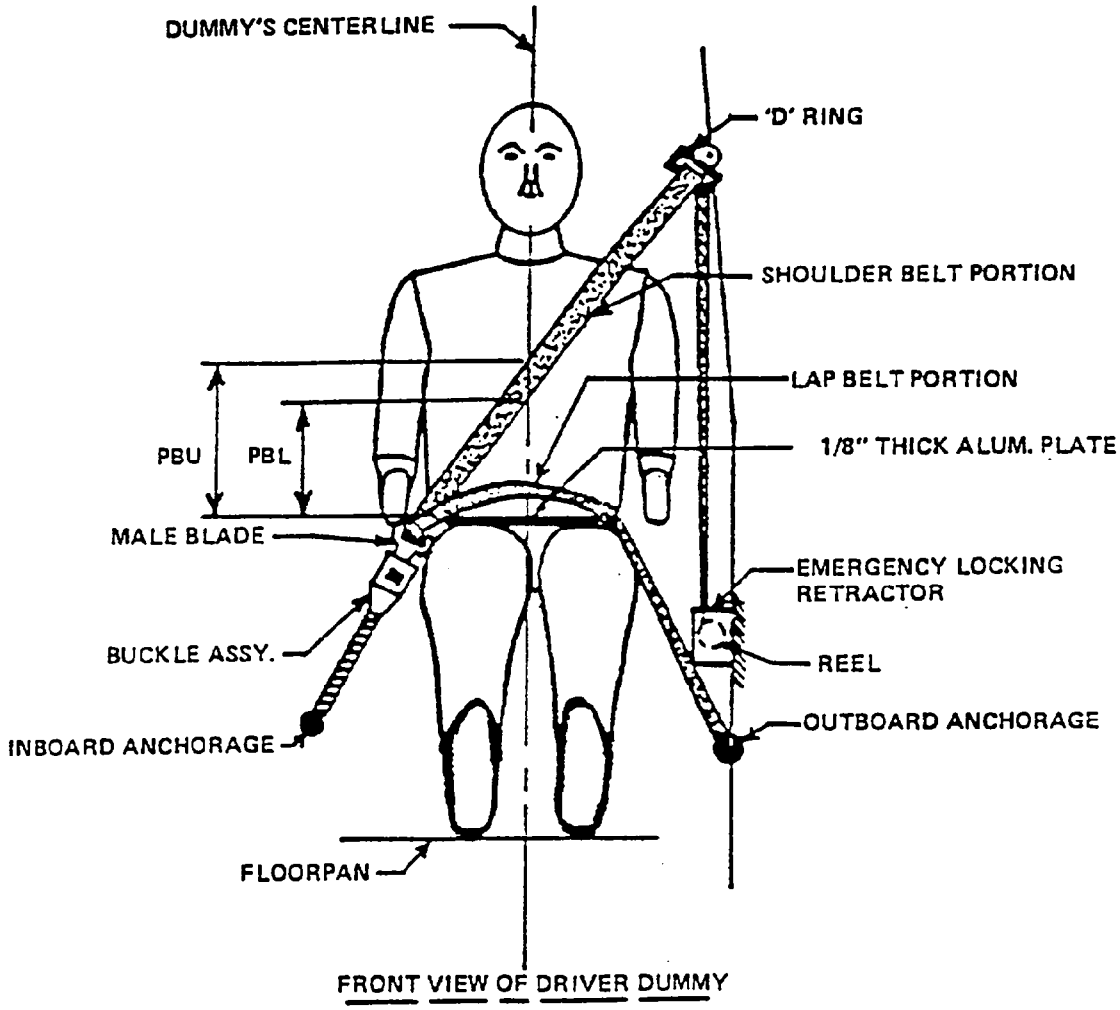
AD - Arm to Door
HD - H-Point to Door
HR - Head to Side Header
HS - Head to Side Window
KK - Knee to Knee
SHY- Striker to H-Point (Y Direction)





CD	-	Chest to Dash
CS	-	Steering Wheel to Chest
HH	-	Head to Header
HW	-	Head to Windshield
HZ	-	Head to Roof
KDA	-	Knee to Dash Angle
KDL	-	Left Knee to Dash
KDR	-	Right Knee to Dash
NA	-	Nose to Rim Angle
NR	-	Nose to Rim
PA	-	Pelvic Angle
RA	-	Rim to Abdomen
SA	-	Seat Back Angle
SCA	-	Steering Column Angle
SH	-	Striker to H-Point
SK	-	Striker to Knee
ST	-	Striker to Head
SWA	-	Steering Wheel Angle
TA	-	Tibial Angle
WA	-	Windshield Angle

SEAT BELT POSITIONING DATA



(illustration)

Dimension = mm

	DRIVER DUMMY	PASSENGER DUMMY
PBU -- Top surface of alum. plate to upper edge	356	345
PBL -- Top surface of alum. plate to belt lower edge	280	270

Note: Adjustable "D" ring set in the fourth position for the highest.

SEAT BELT PERFORMANCE ASSESSMENT TEST DATA

BELT LENGTH DATA:	Driver	Passenger	
Belt length from trim panel exit to bolt hole anchor point for continuous webbing systems.	N/A	N/A	
Shoulder belt length as measured on Part 572 Dummy.	994 mm	998 mm	
Lap belt length as measured on Part 572 Dummy.	830 mm	820 mm	
SHOULDER BELT SPOOL-OFF DATA:			
As determined by film analysis (1)	NR	NR	
As determined mechanically	NR	NR	at retractor
	50 mm	48 mm	at D-ring
As determined electronically (2)	NR	NR	
BELT STRETCH DATA:			
Measured electronically between shoulder belt load cell and the "D" ring.	NR	NR	
Measured mechanically (3)	NR	NR	
RETRACTOR LOCK-UP TIME:			
As determined by shoulder belt (1) spool-off observed in on-board cameras	NR	NR	

NR = Not Recorded

(1) The onboard cameras were not used in this test because of seat belt configuration.

(2) The potentiometer was not used for this test. One spooloff cube was used because of space limitations.

(3) The belt strain thread was not used in this test.

CAMERA LOCATIONS

VEH. NHTSA NO.: MS0204 ; TEST DATE: February 22, 1995; TIME: 5:32 p.m.

VEH. YEAR/MAKE/MODEL/BODY STYLE: 1995/Ford/Escort/4 Door

CAMERA POSITION NO.	VIEW	CAMERA POSITIONS (mm.)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET (mm)	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View	-	-	-	-	-		
2	Left Front View	1090	7610	1085	90°	7220	25	1020
3	Steering Column Top	2060	7150	1525	90°	6760	25	1000
4	Steering Column Bottom	2040	7230	1030	90°	6840	25	1000
5	Left Driver Close-up	1750	7680	1110	90°	7290	50	781
6	Left Angle	4380	4600	2115	50°		35	862
9	Right Overall	2200	6720	1075	90°	6330	13	1053
11	Right Passenger Close-up	1350	5120	1045	50°		35	1010
12	Right Angle	5640	5840	2250			50	930
13	Top View Wide	1840	0	5050			8	1020
14	Top Driver	320	570	2330			13	1143
15	Top Passenger	320	570	2350			13	1000
16	Pit Engine	1080	0	3155			13	971
17	Fuel Tank	2440	50	3115			13	1176

* COORDINATES:

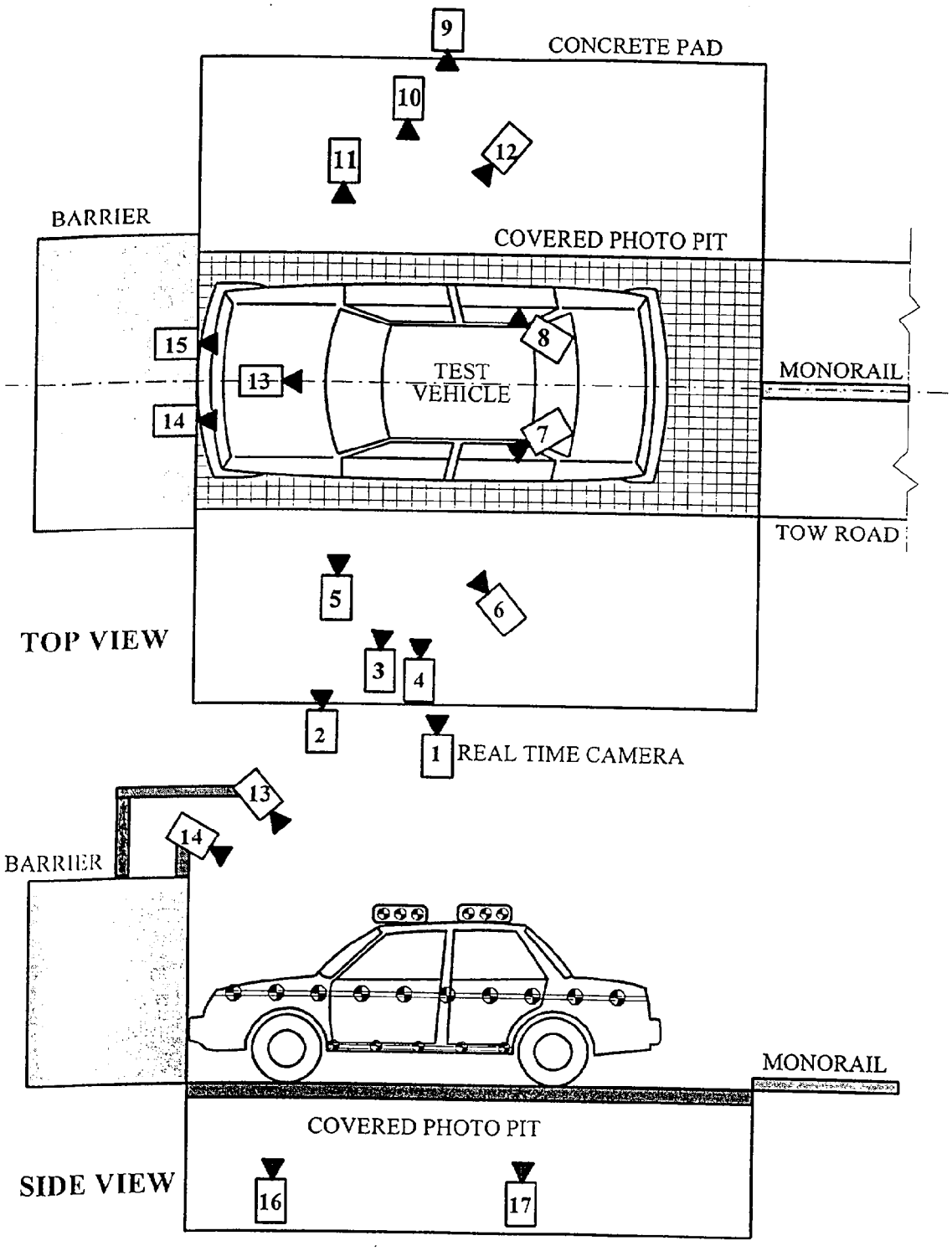
+X = film plane rearward of barrier

+Y = film plane to left of monorail centerline

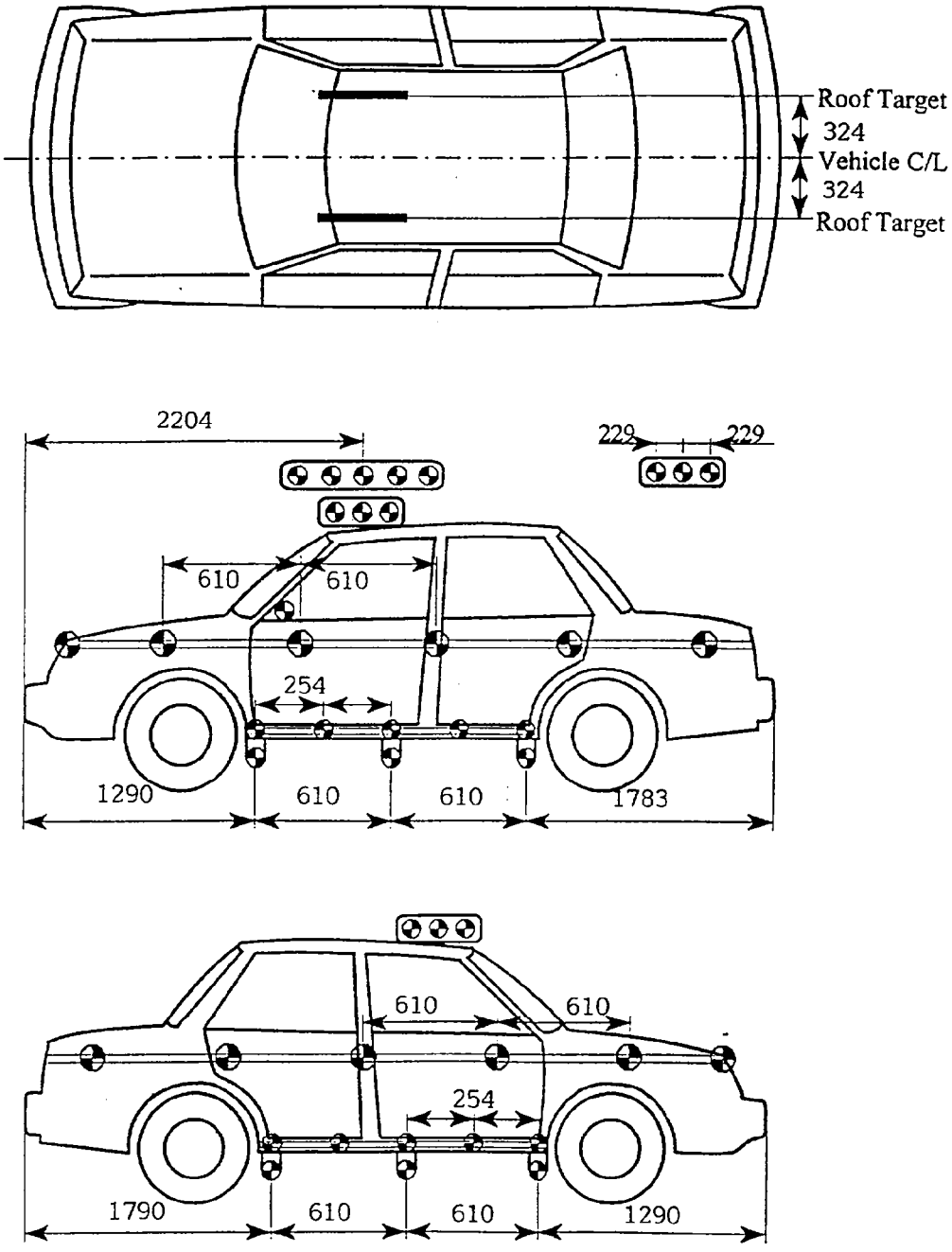
+Z = film plane to above ground level

ORIGIN: For X and Y it is the Impact Point. For Z it is the Floor.

CAMERA LOCATIONS (Cont'd)



VEHICLE TARGET LOCATIONS



(DIMENSIONS IN MM)

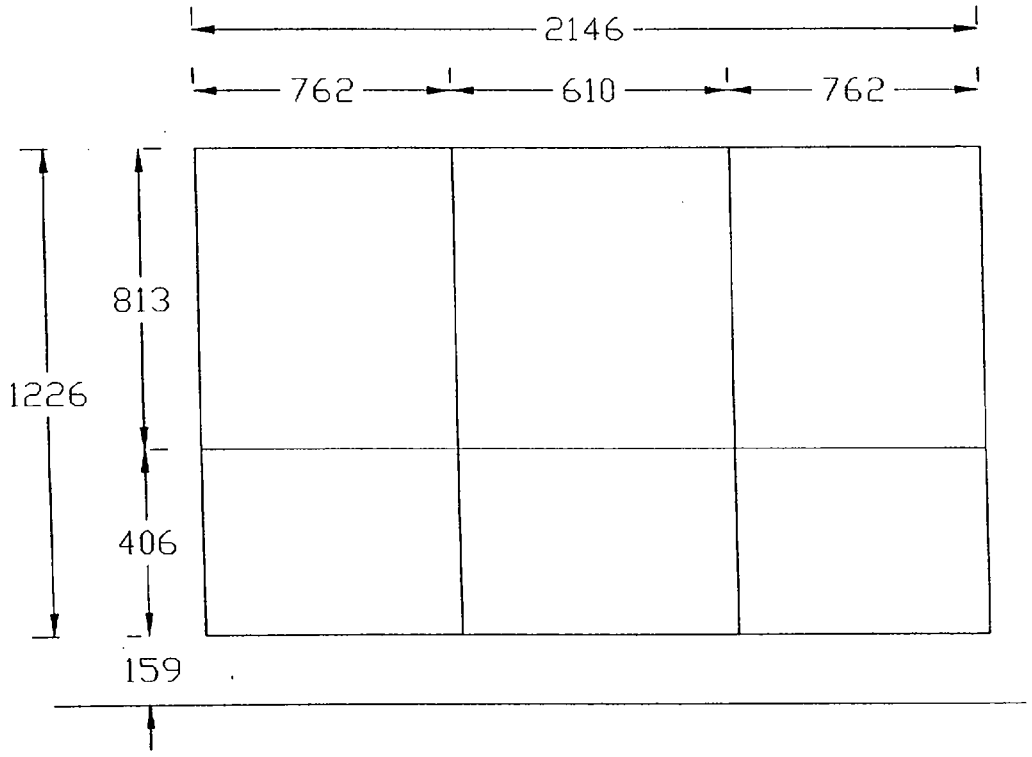
LOAD CELL LOCATIONS ON FIXED BARRIER

3Ø Load Cells

6 Rows

9 Columns

6 Groupings (5 cells/group)

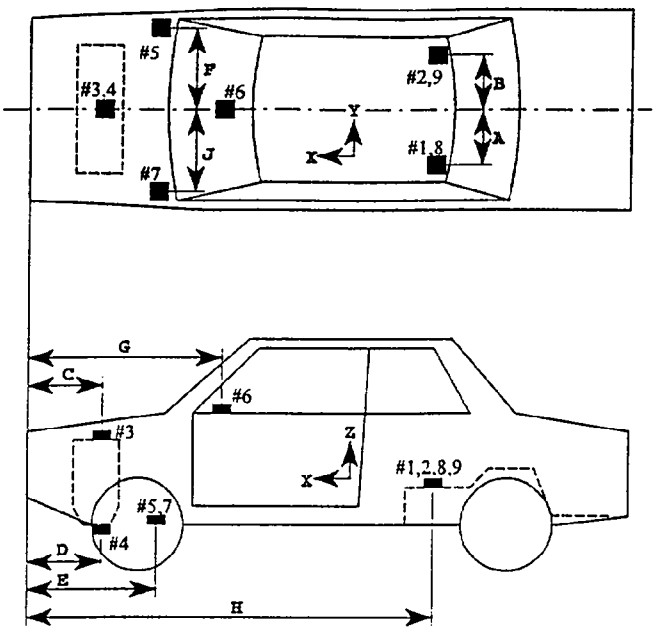


The following data is presented in Appendix B:

(1) Total or Sum of 3Ø individual load cells

(2) Data from 6 Groupings shown above (5 cells/group)

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY



Units: (mm)

Dimension	Length
A	580
B	580
C	677
D	786
E	775
F	615
G	1465
H	2869
J	615

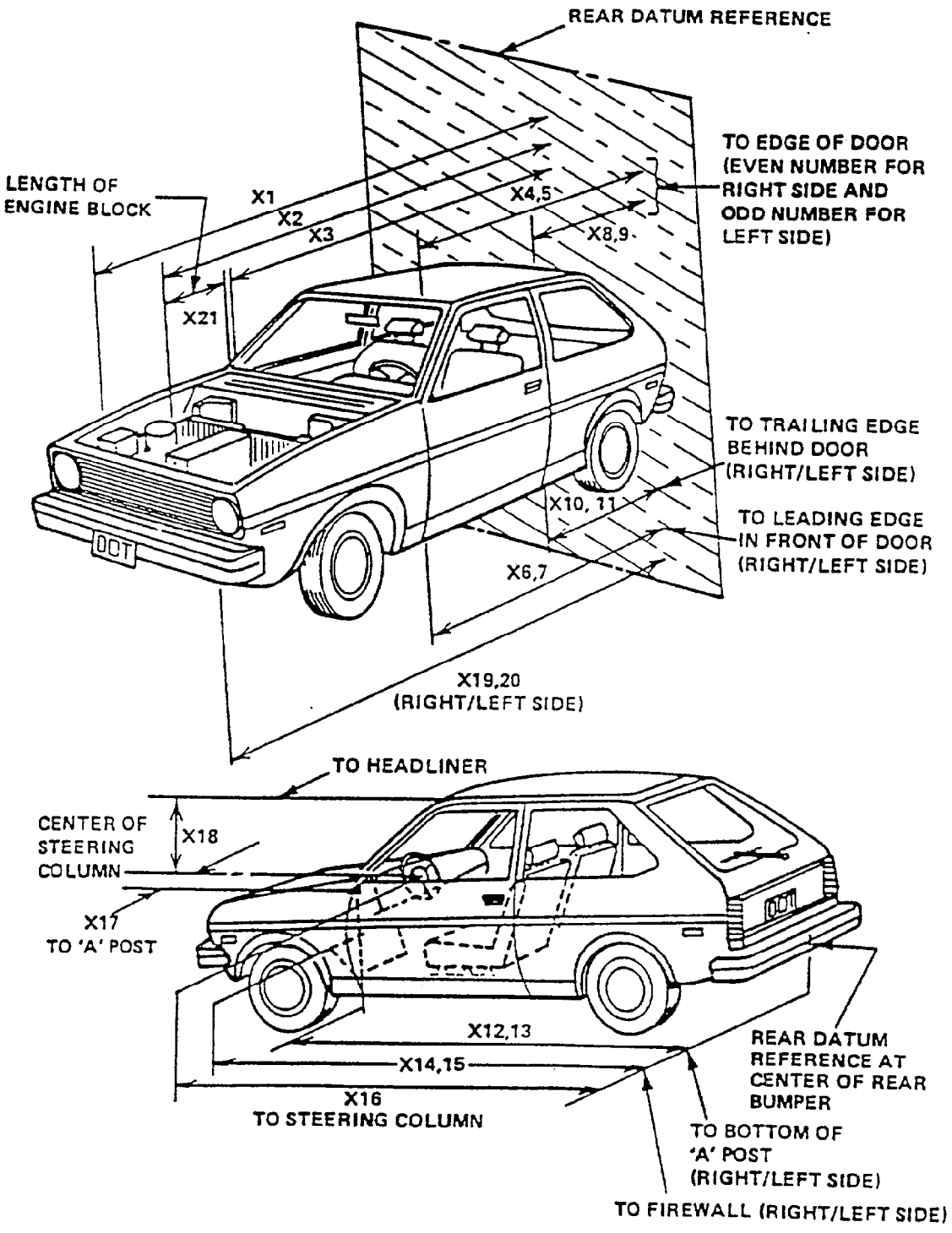
ACCEL. NO.	ACCELEROMETER	DIRECTION
1 and 8	Left Rear Seat Crossmember	X
2 and 9	Right Rear Seat Crossmember	X
3	Top of Engine	X
4	Bottom of Engine	X
5	Right Side Brake Caliper	X
6	Instrument Panel	X
7	Left Disc Brake Caliper	X

* The accelerometer pack number can be correlated with the vehicle response data traces in Appendix B.

TEST VEHICLE MEASUREMENTS

No.	MEASUREMENT DESCRIPTION:	Pre-Test (mm)	Post-Test (mm)	Diff. (mm)
X1	Total Length of Test Vehicle at Centerline	4346	3834	512
X2	Rear Surface of Vehicle to Front of Engine	3832	3576	256
X3	Rear Surface of Vehicle to Firewall	3286	3213	73
X4	Rear Surface to Upr. Leading Edge of Rt. Door	2985	2978	7
X5	Rear Surface to Upr. Leading Edge of Left Door	2985	2971	14
X6	Rear Surface to Lwr. Leading Edge of Rt. Door	2965	2958	7
X7	Rear Surface to Lwr. Leading Edge of Left Door	2969	2958	11
X8	Rear Surface to Upr. Trailing Edge of Rt. Door	1981	1976	5
X9	Rear Surface to Upr. Trailing Edge of Left Door	1986	1975	11
X10	Rear Surface to Lwr. Trailing Edge of Rt. Door	1972	1963	9
X11	Rear Surface to Lwr. Trailing Edge of Left Door	1971	1964	7
X12	Rear Surface to Bottom of `A' Post on Rt. Side	2954	2954	0
X13	Rear Surface to Bottom of `A' Post on Left Side	2962	2960	2
X14	Rear Surface to Firewall on Right Side	3246	3169	77
X15	Rear Surface to Firewall on Left Side	3259	3190	69
X16	Rear Surface to Steering Column	2535	2561	-25
X17	Center of Steering Column to `A' Post	356	341	15
X18	Center of Steering Column to Headlining	402	362	40
X19	Rear Surface to Right Side of Front Bumper	4191	3691	500
X20	Rear Surface to Left Side of Front Bumper	4200	3704	496
X21	Length of Engine Block	425	425	0

TEST VEHICLE MEASUREMENTS



ACCIDENT INVESTIGATION DIVISION DATA

FOR 35 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: 1995/Ford/Escort/4 Door

VEH. NHTSA NO.: MS0204 ; VIN: 3FASP13J6SR104113

MODEL YEAR: 1995 ; BUILD DATE: 10/94 ; TEST DATE: February 22, 1995

VEH. SIZE CATEGORY: Compact ; TEST WEIGHT: 1325 kg

VEH. WHEELBASE: 2493 mm ; FRONT OVERHANG: 880 mm ; OVERALL WIDTH: 1701 mm

ACCELEROMETER DATA:

LOCATION: As per measurements on pages 4-13

CALIBRATION PROCEDURE: As per MGA Calibration Procedure

LINEARITY: >99.9% ; INTEGRATION ALGORITHM: Trapezoidal

VEH: IMPACT SPEED: 56.4 kph ; TIME OF SEPARATION: 116 msec

VELOCITY CHANGE: 68.2 kph

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

F (Frontal)

CRUSH DEPTH DIMENSIONS:

C1 = 496 mm

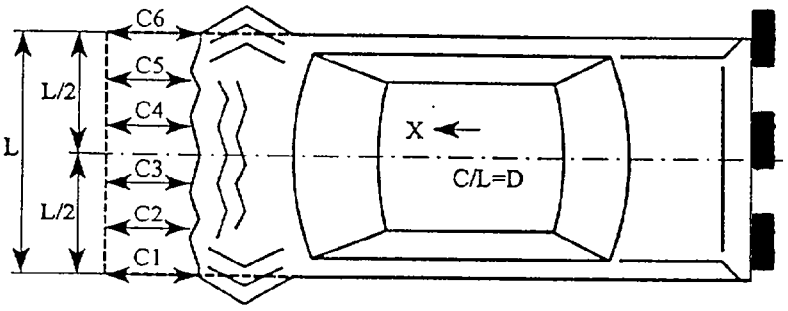
C2 = 513 mm

C3 = 513 mm

C4 = 520 mm

C5 = 514 mm

C6 = 500 mm



MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitude)

LENGTH OF DAMAGED REGION: L = 1435 mm

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (Cont'd)

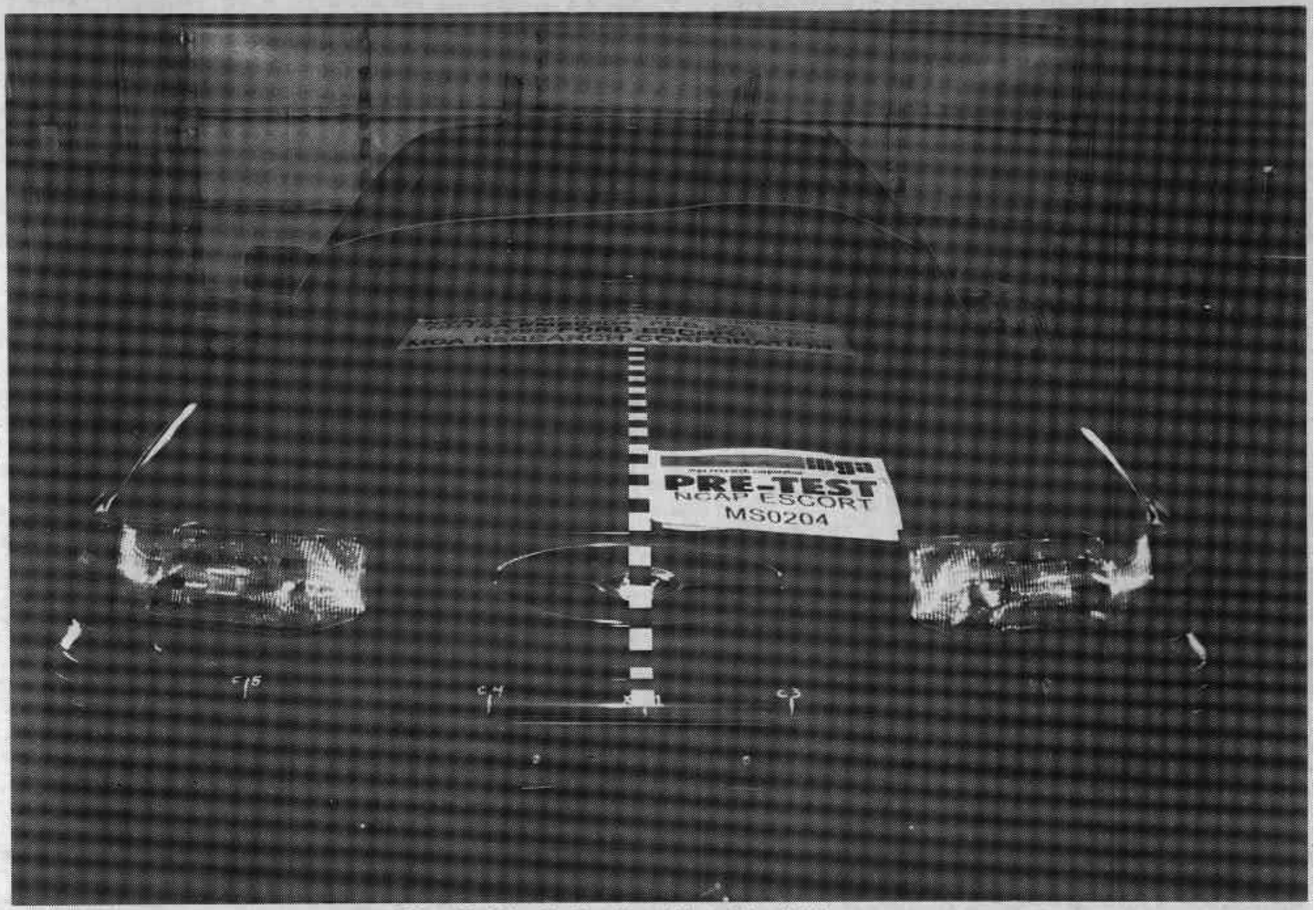


Photo No. A-1 - Pre-Test Front View of Test Vehicle

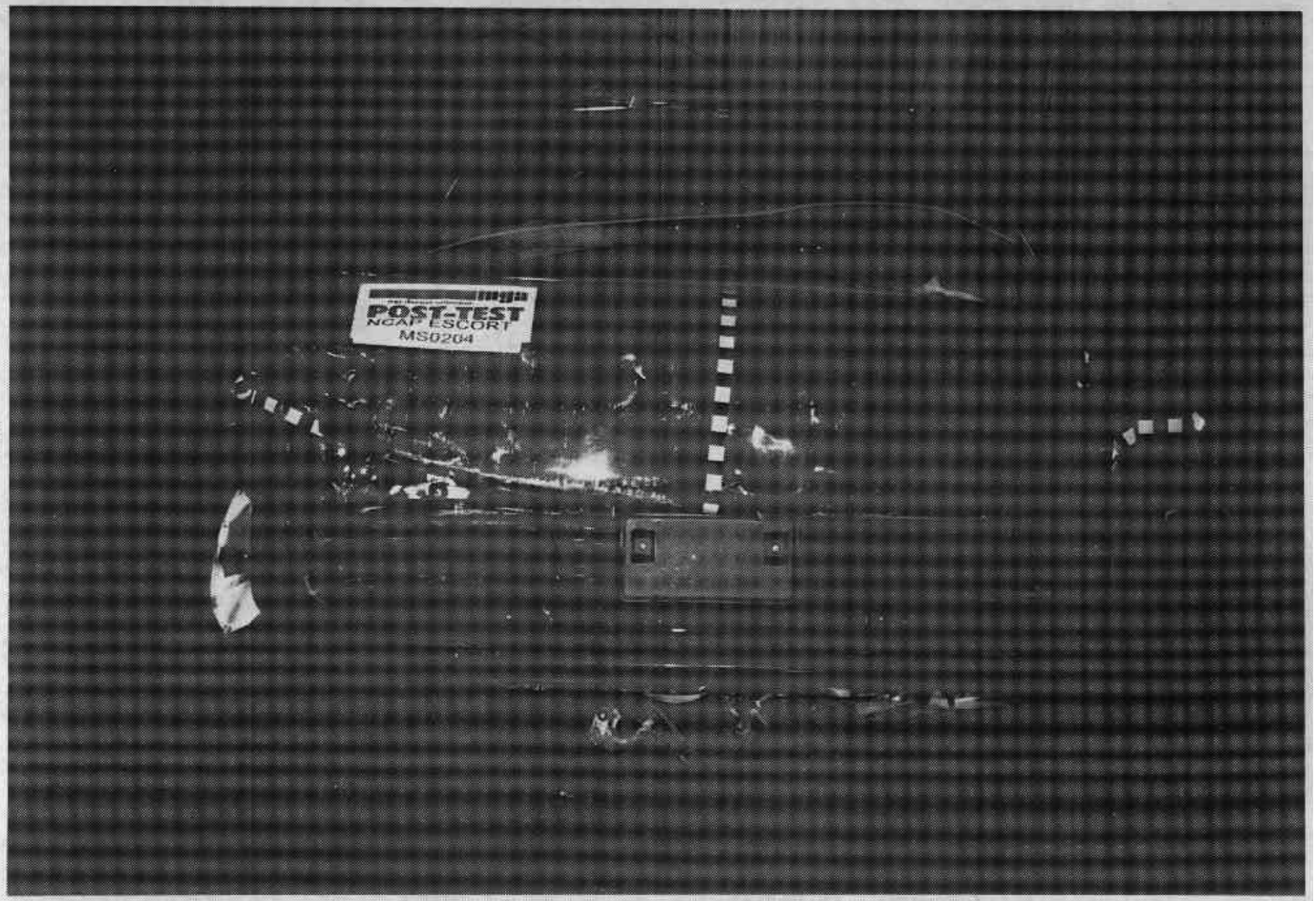


Photo No. A-2 - Post-Test Front View of Test Vehicle

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

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

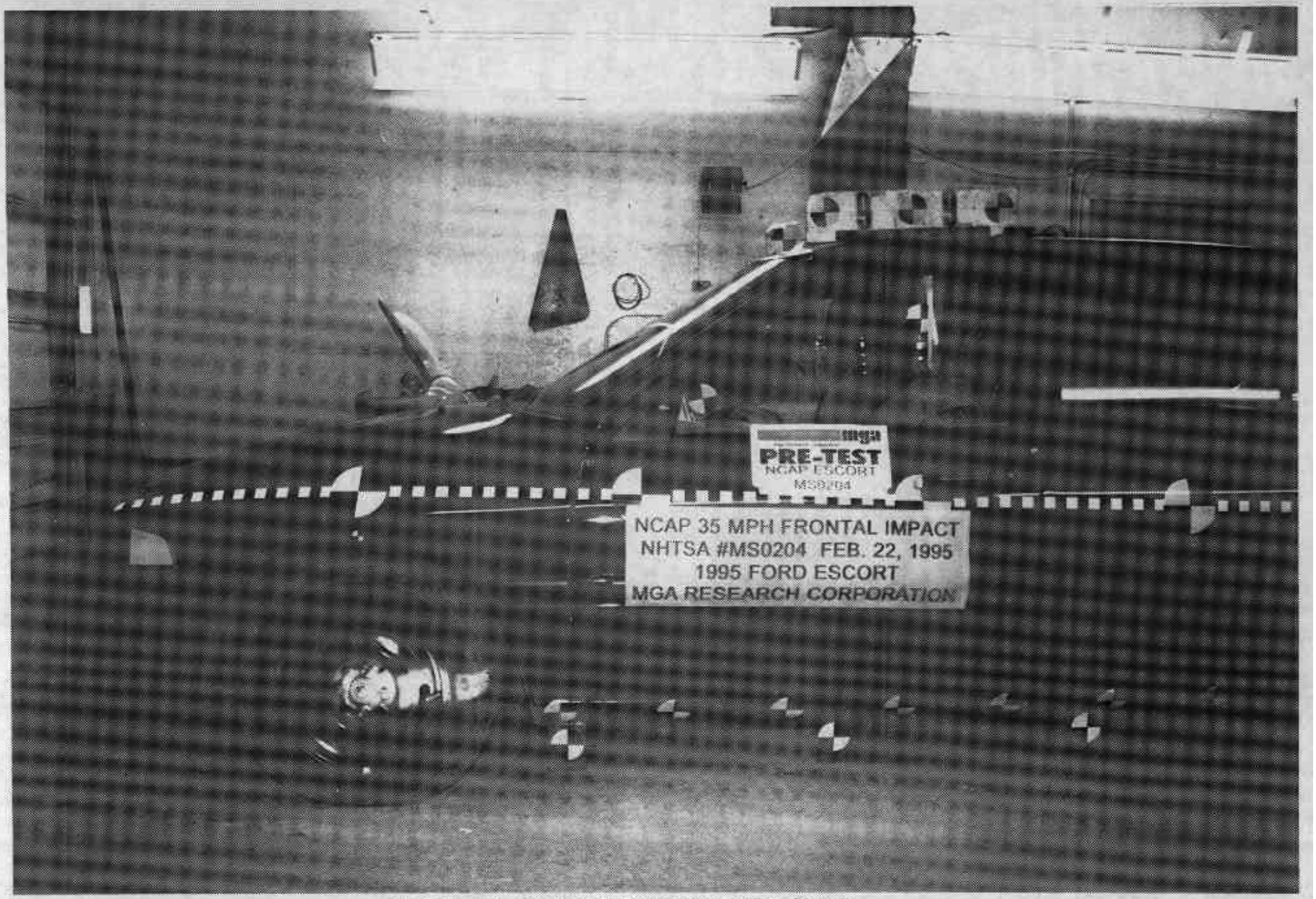


Photo No. A-5 - Pre-Test Left Side View of Test Vehicle

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

Photo No. A-7 - Pre-Test Left Rear Three-Quarter View of Test Vehicle

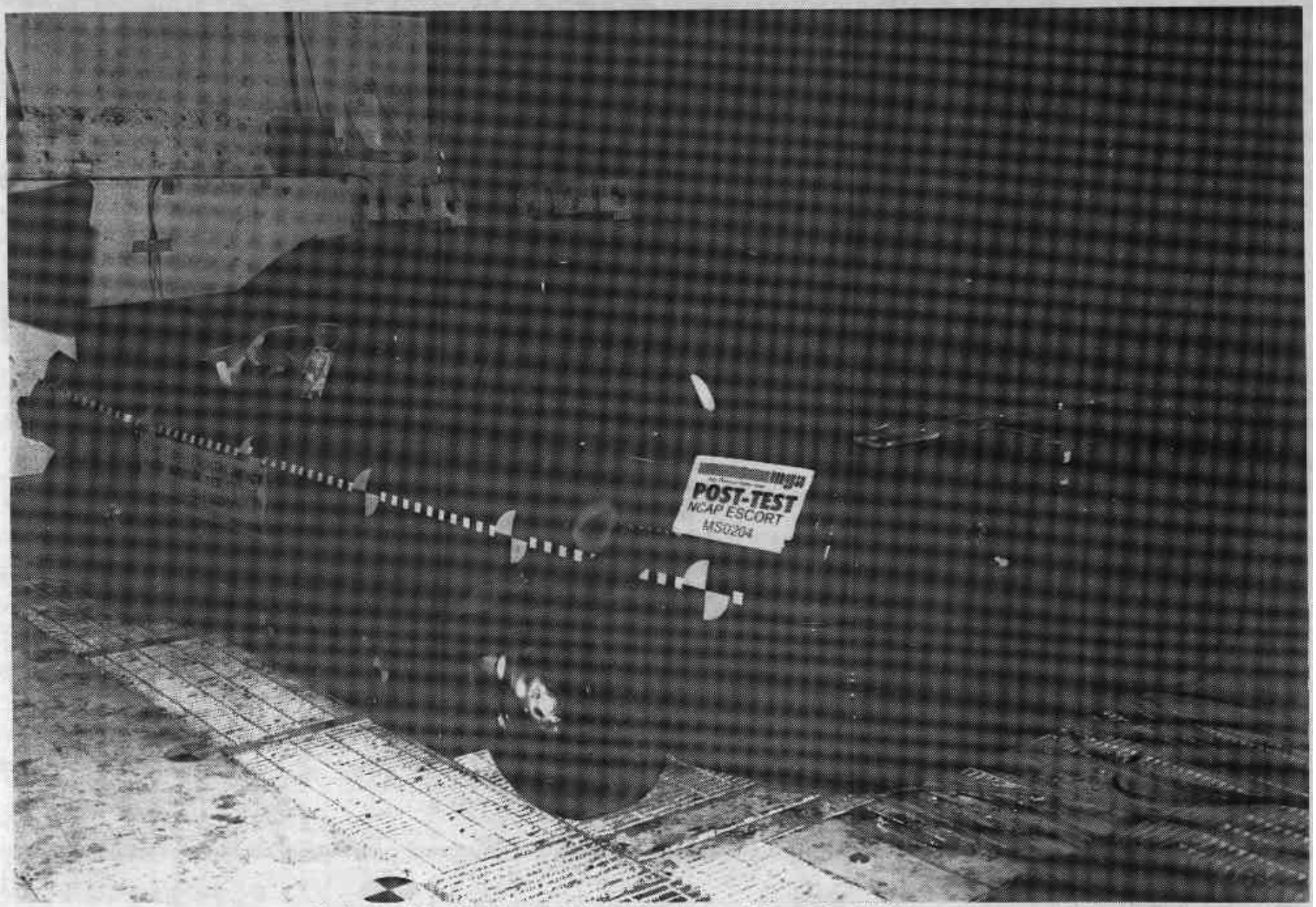


Photo No. A-8 - Post-Test Left Rear Three-Quarter View of Test Vehicle

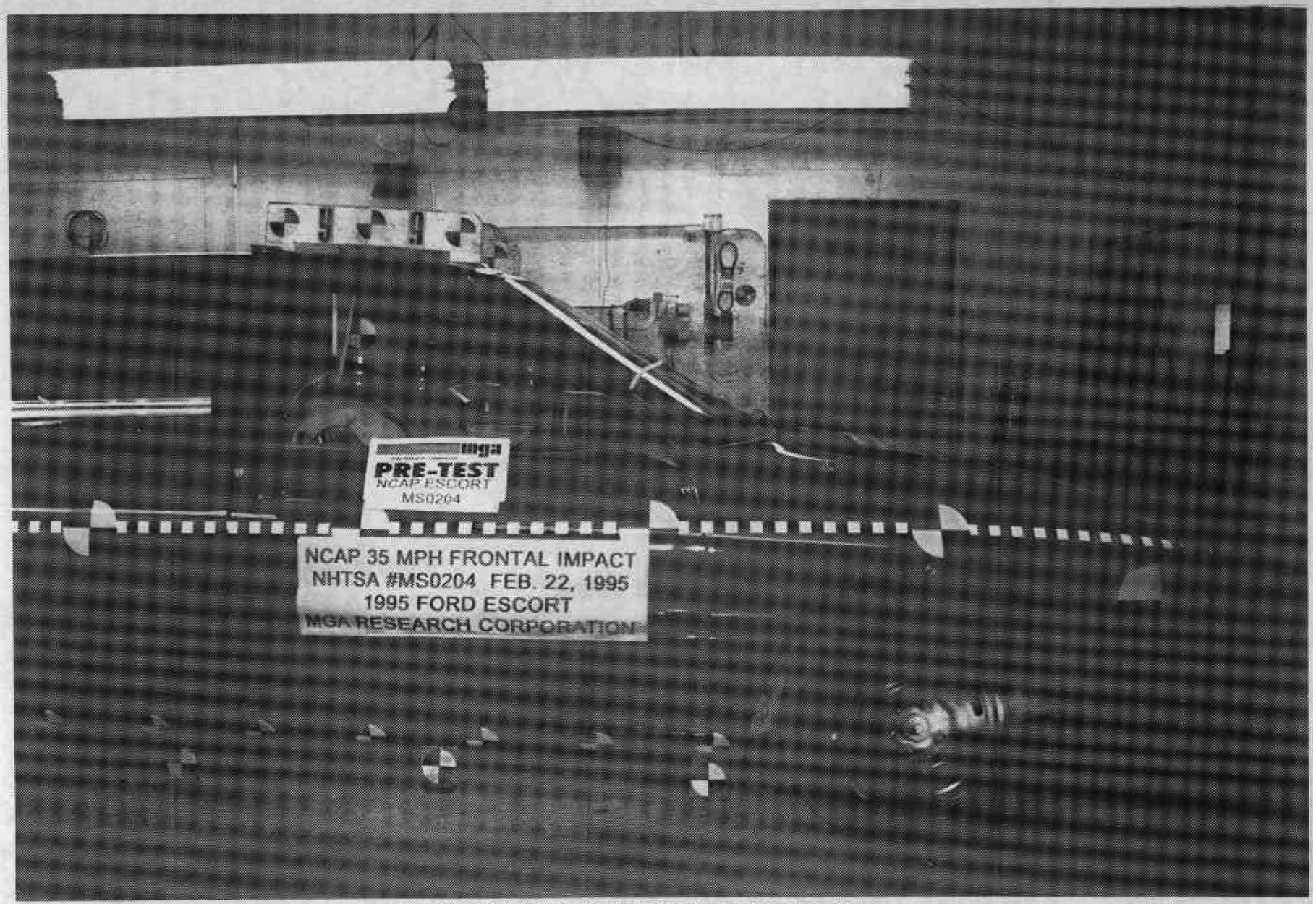


Photo No. A-9 - Pre-Test Right Side View of Test Vehicle

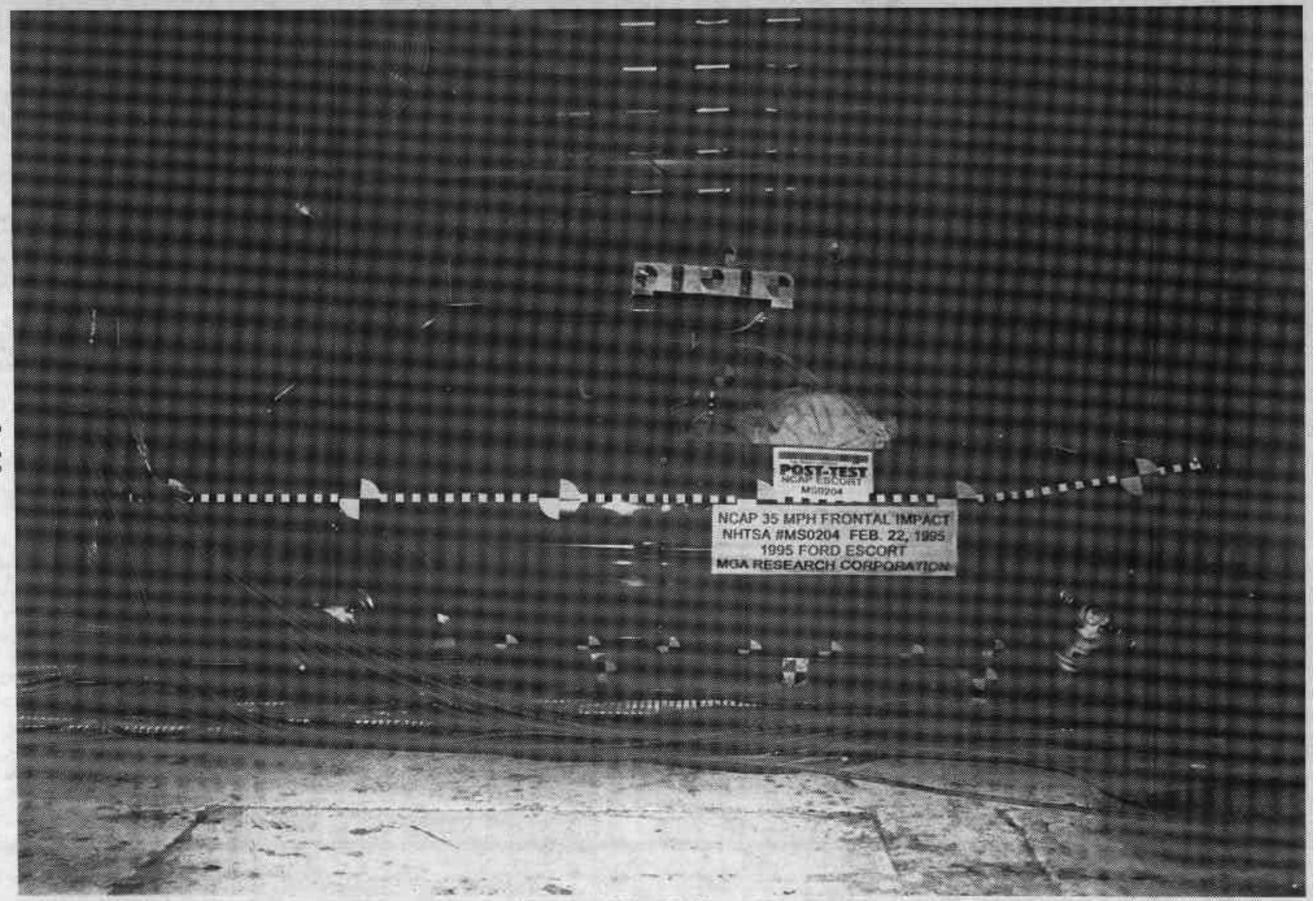


Photo No. A-10 - Post-Test Right Side View of Test Vehicle

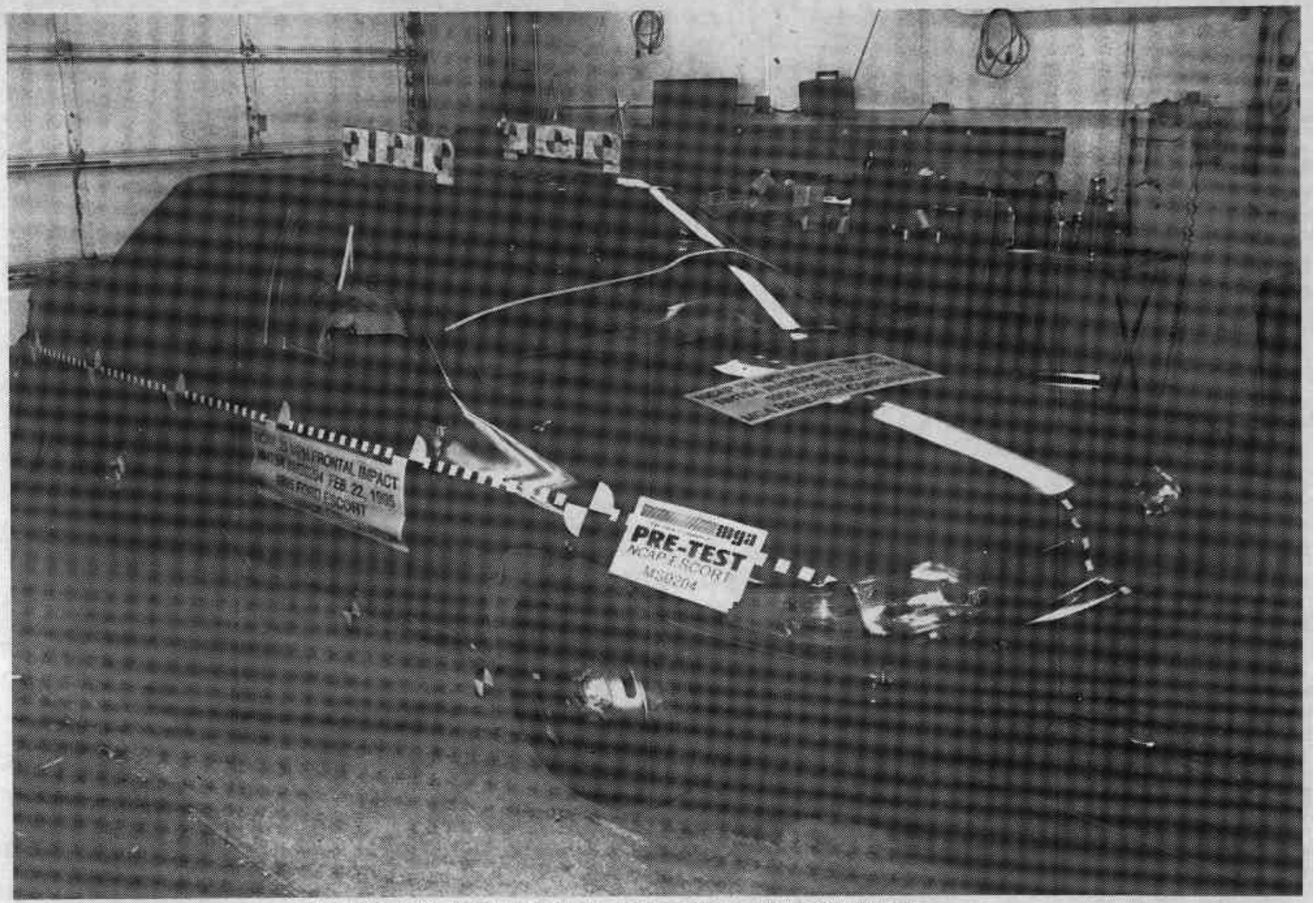


Photo No. A-11 - Pre-Test Right Front Three-Quarter View of Test Vehicle

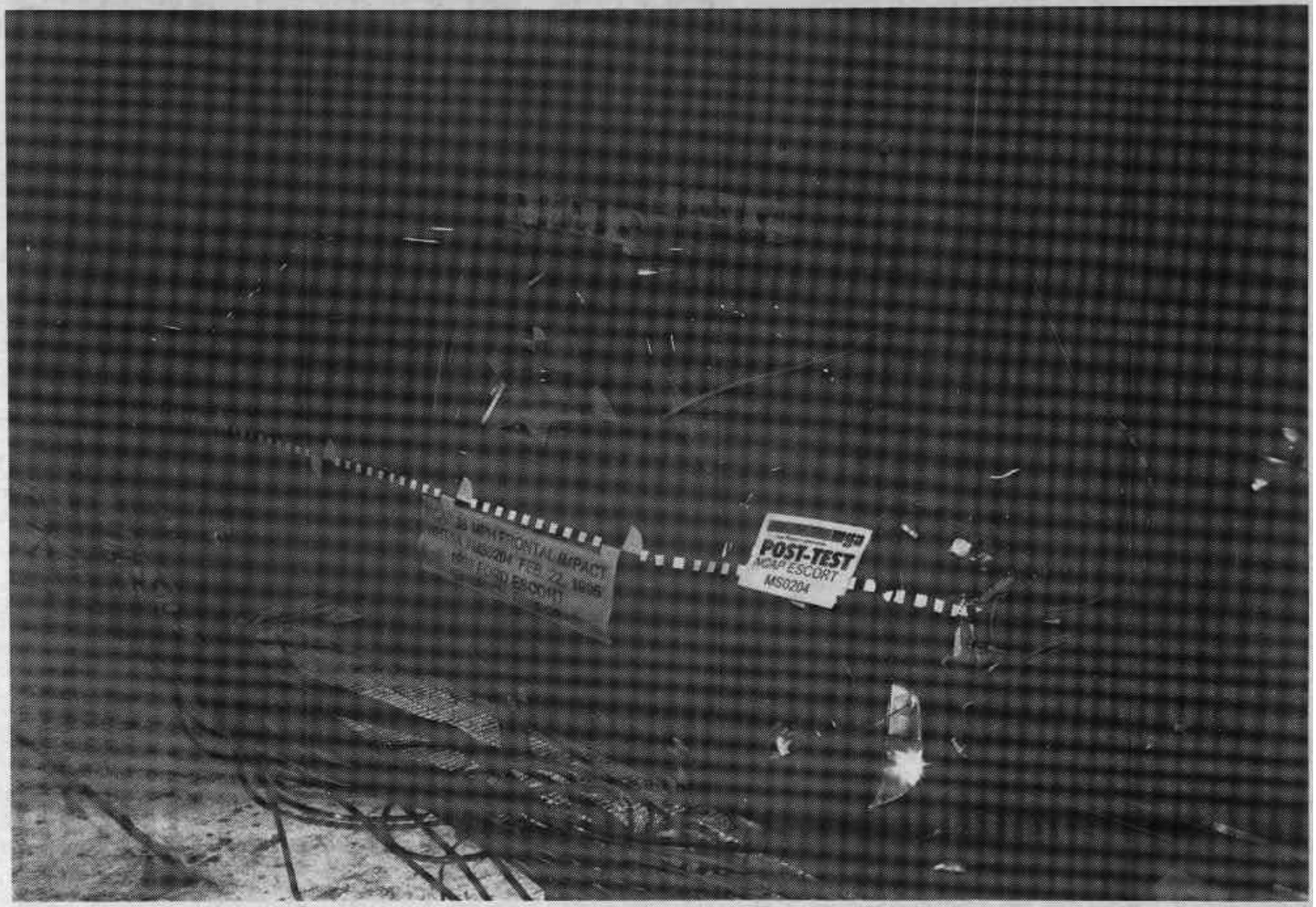


Photo No. A-12 - Post-Test Right Front Three-Quarter View of Test Vehicle

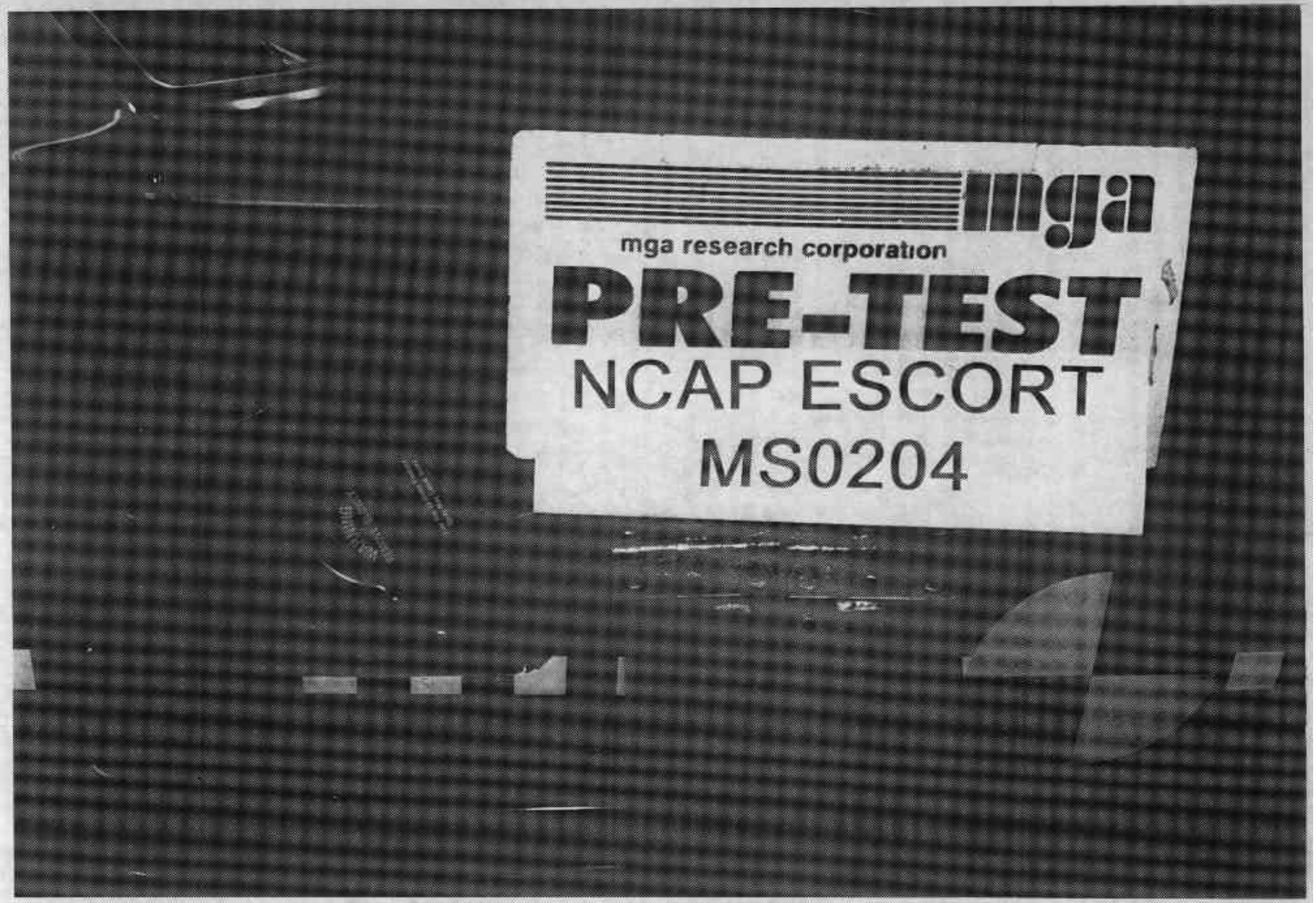


Photo No. A-13 - Pre-Test Fuel Filler Cap View

Photo No. A-14 - Pre-Test Engine Compartment View

Photo No. A-15 - Post-Test Engine Compartment View

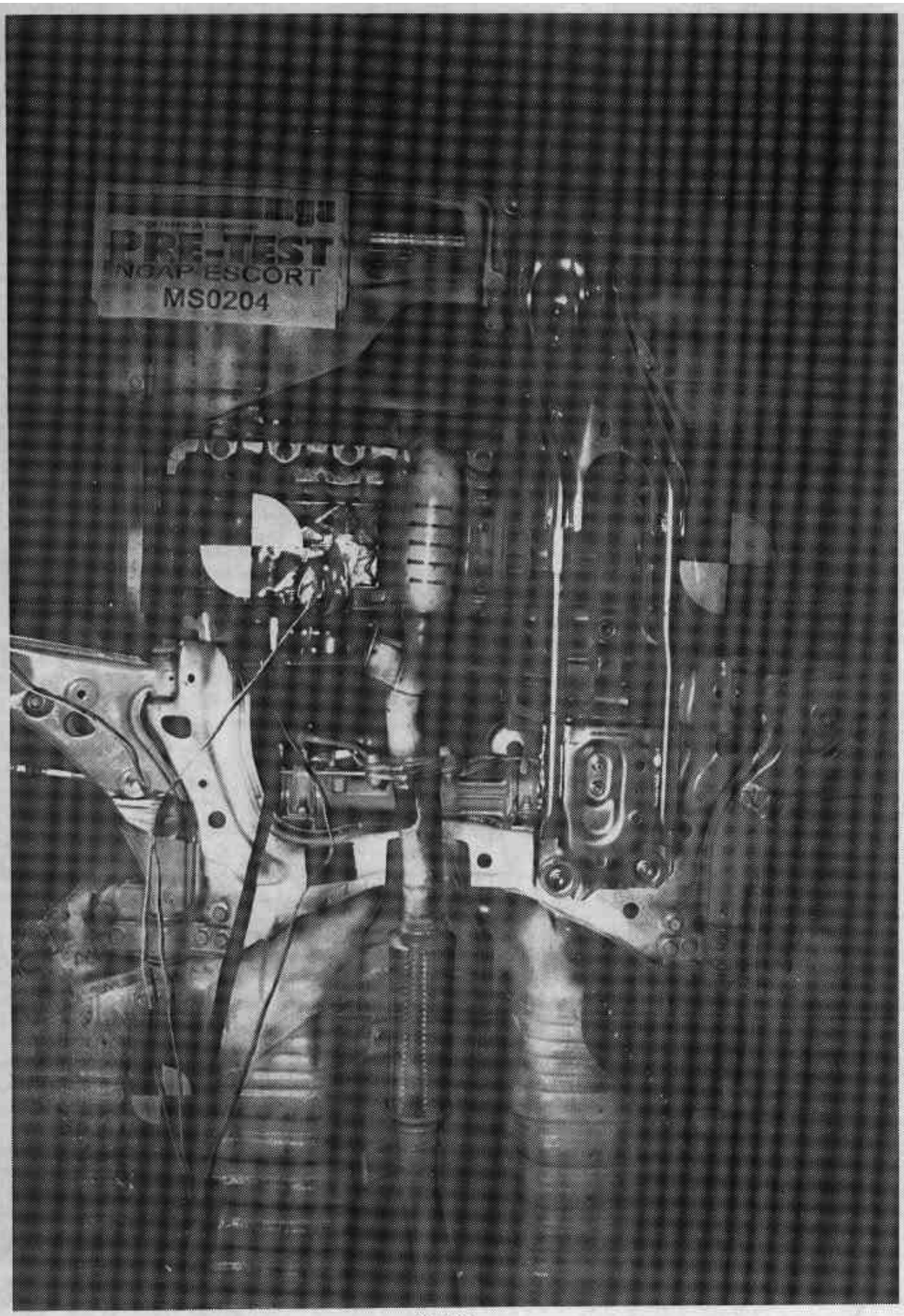


Photo No. A-16 - Pre-Test Front Underbody View

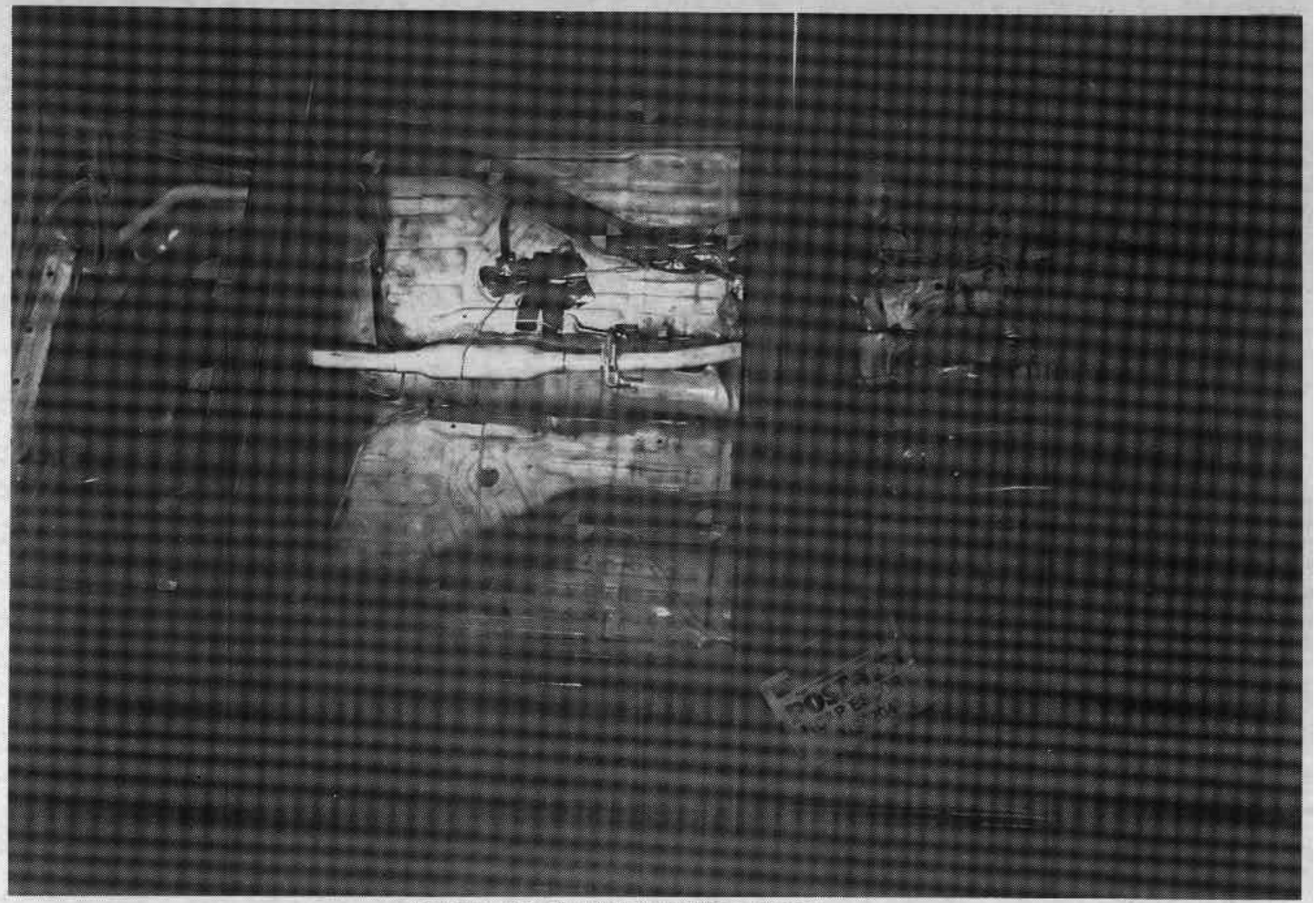


Photo No. A-17 - Post-Test Front Underbody View

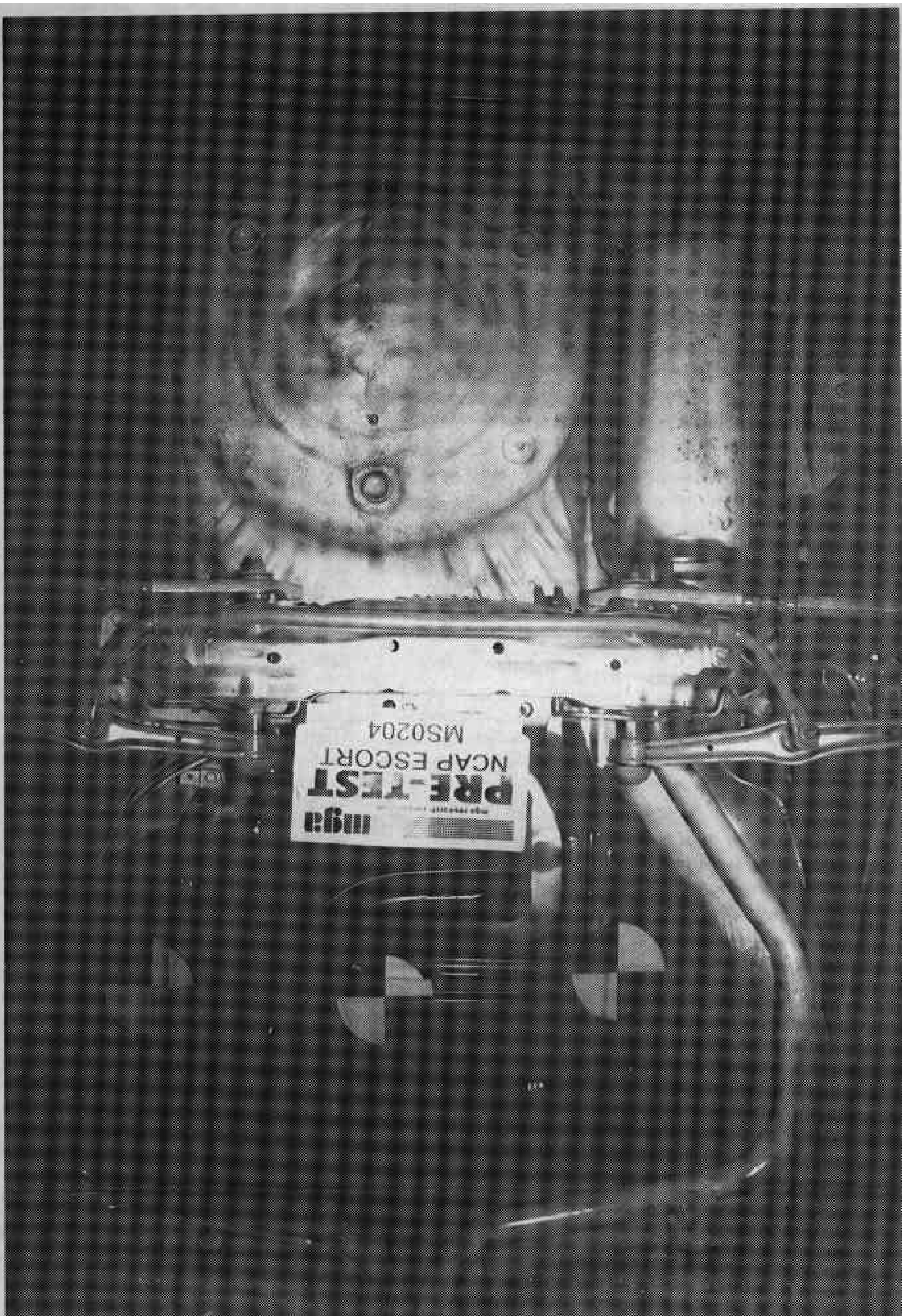


Photo No. A-18 - Pre-Test Rear Underbody View

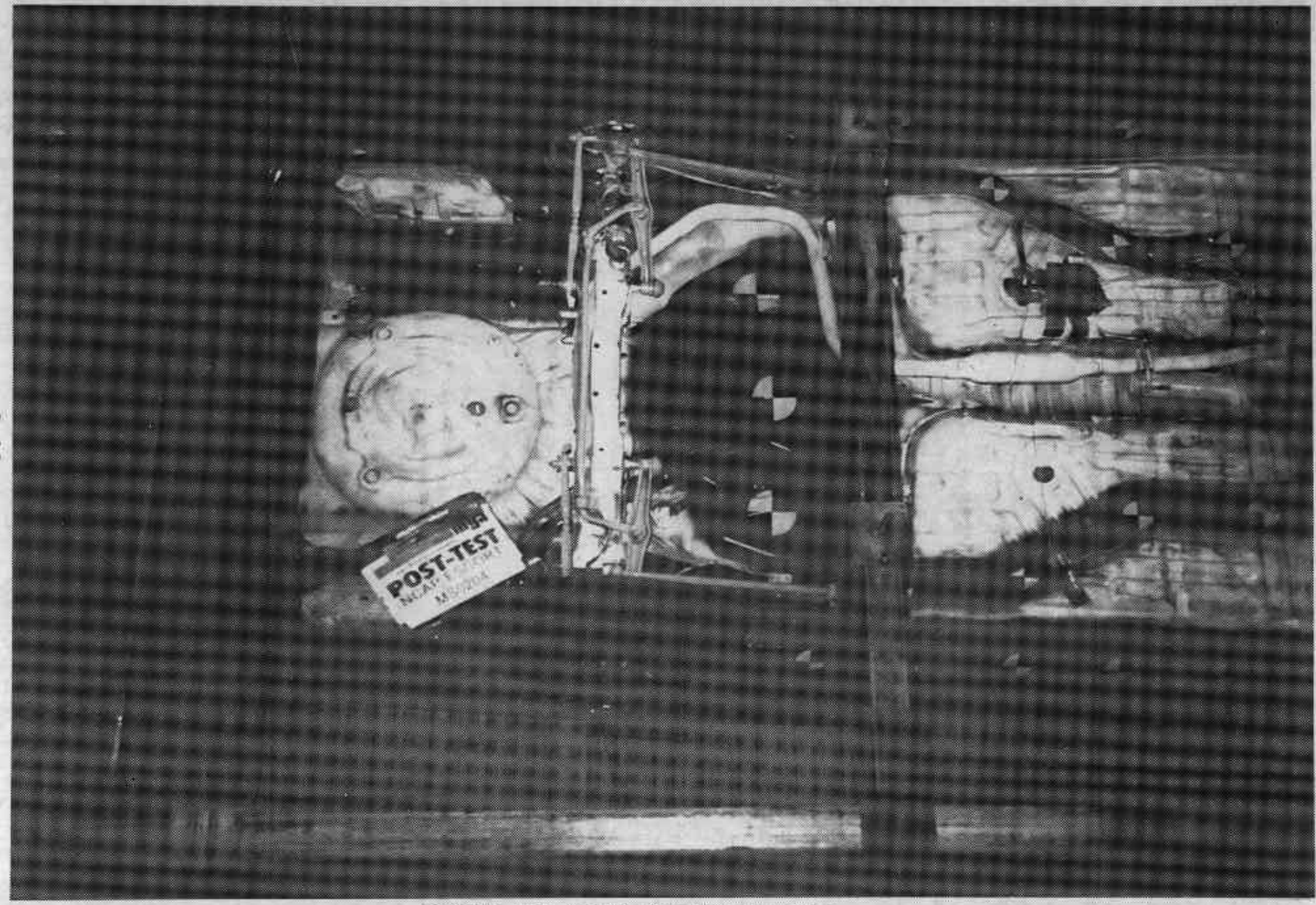


Photo No. A-19 - Post-Test Rear Underbody View

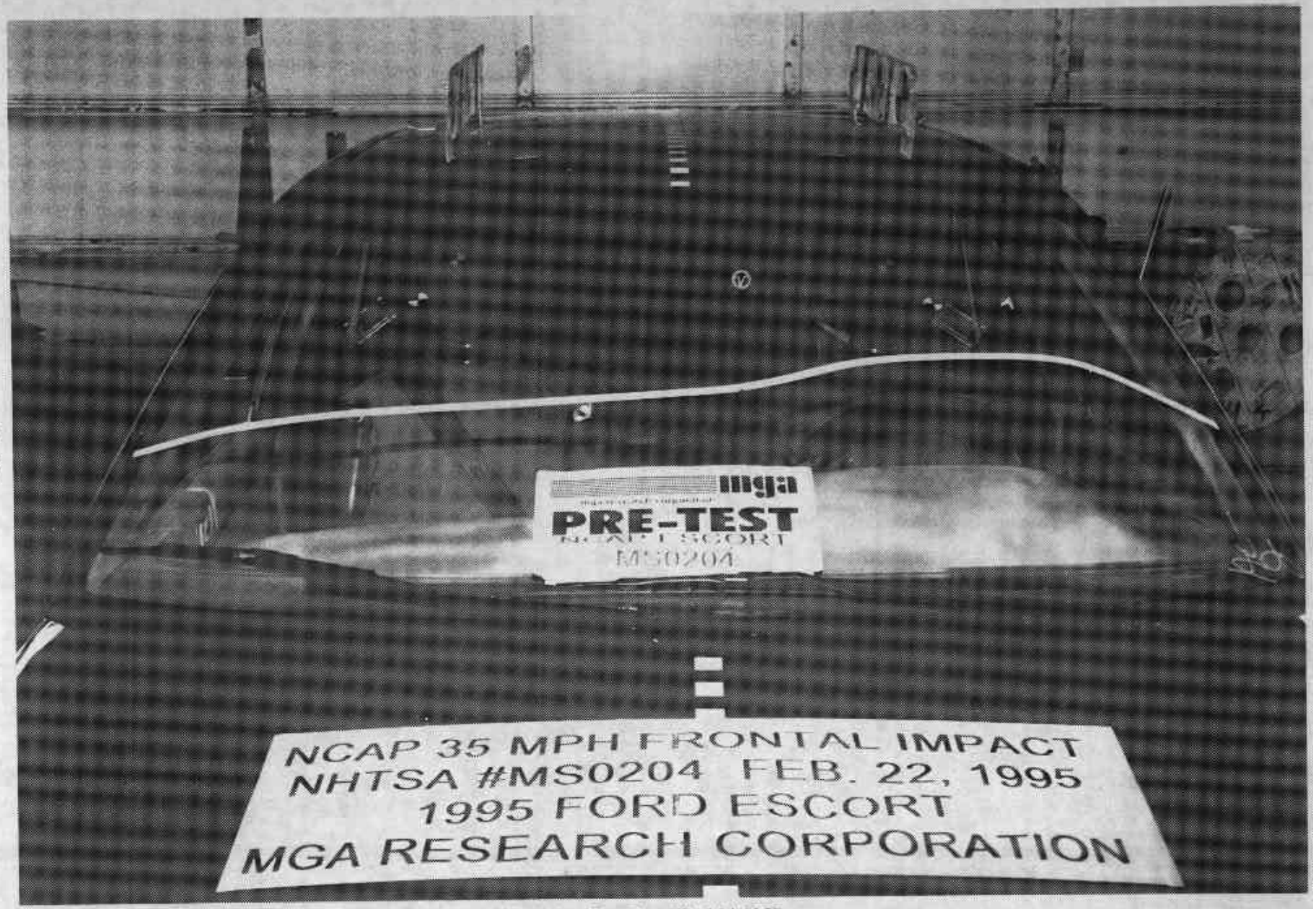


Photo No. A-28 - Pre-Test Windshield View

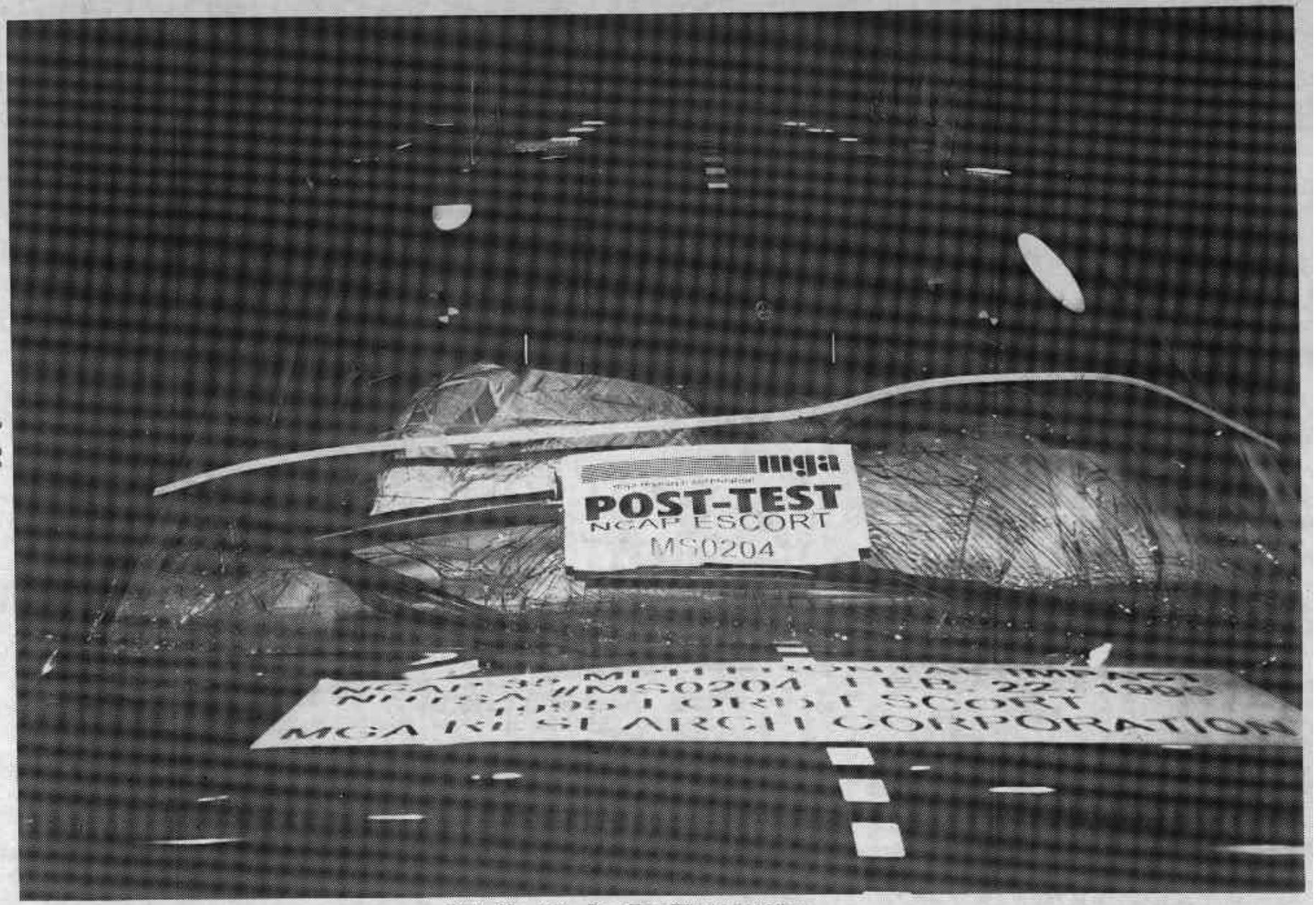


Photo No. A-21 - Post-Test Windshield View

Photo No. A-22 - Pre-Test Driver Dummy Position Left Side View

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

Photo No. A-24 - Pre-Test Driver Dummy Position Left Side View (Door Open)

Photo No. A-25 - Post-Test Driver Dummy Position Left Side View (Door Open)

Photo No. A-26 - Pre-Test Driver Seat Position View

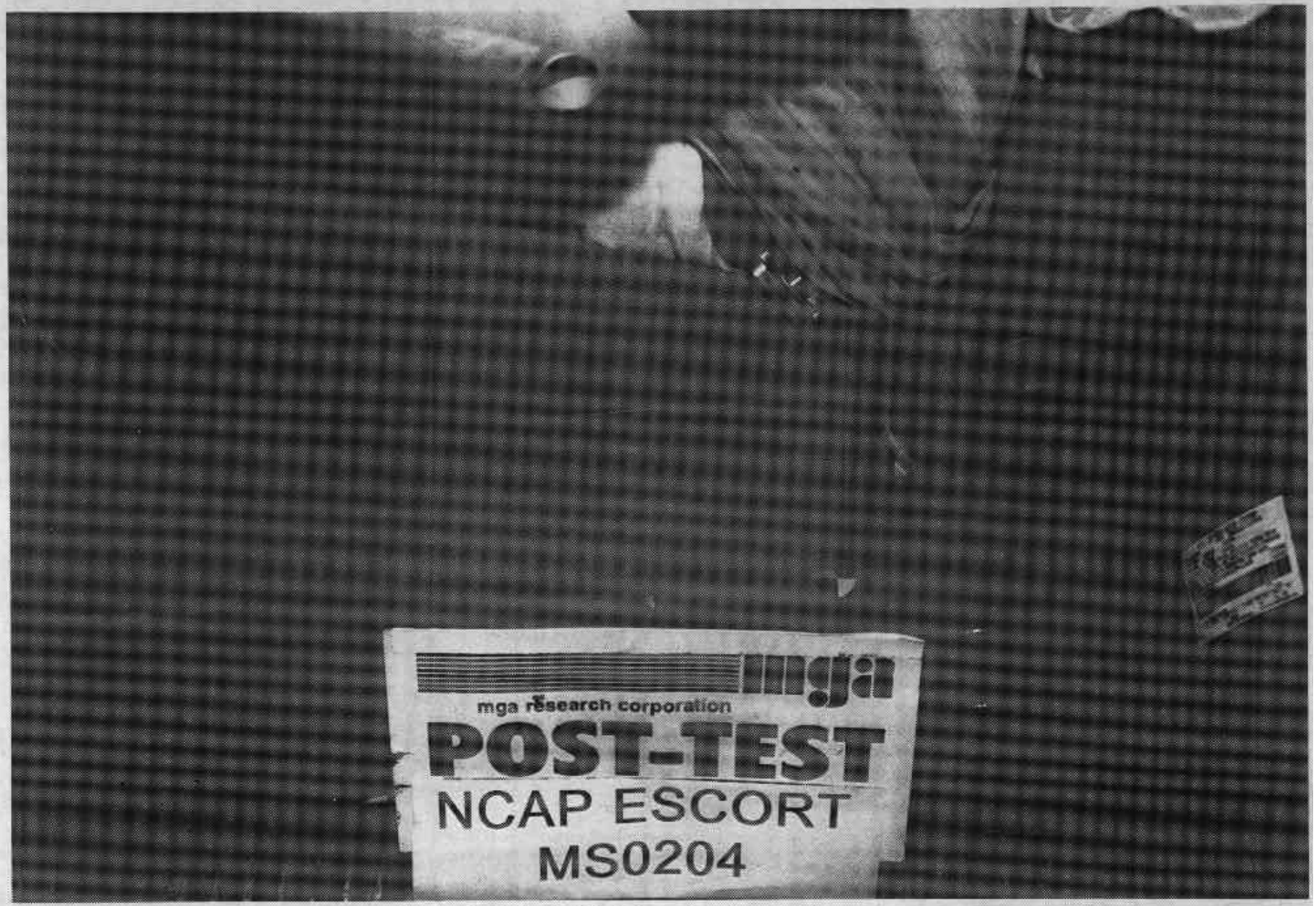


Photo No. A-27 - Post-Test Driver Seat Position View

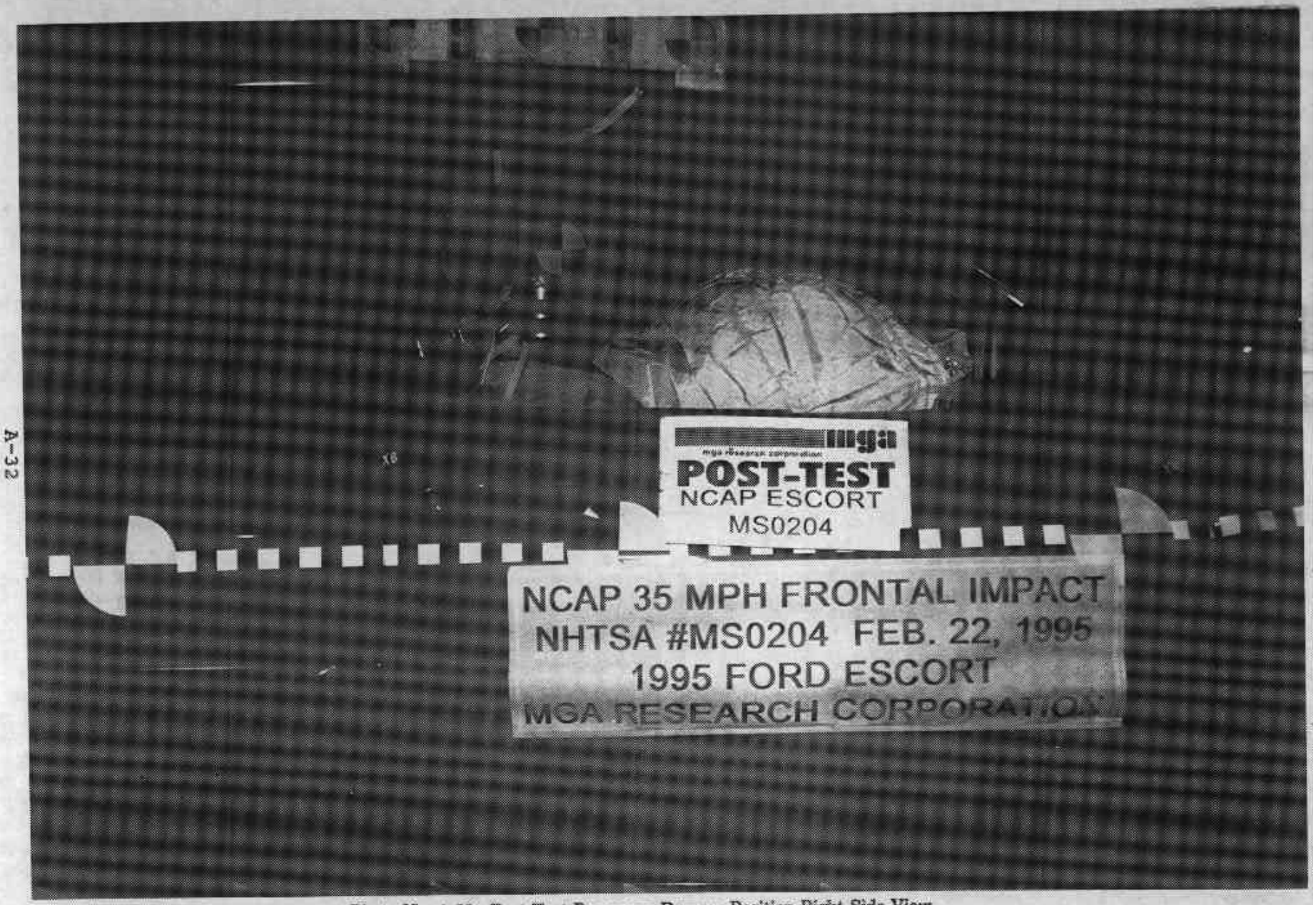
A-28

Photo No. A-28 - Pre-Test Driver Dummy Knee Position

Photo No. A-29 - Post-Test Driver Dummy Knee Position

Photo No. A-30 - Post-Test Driver Airbag Contact

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



A-32

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

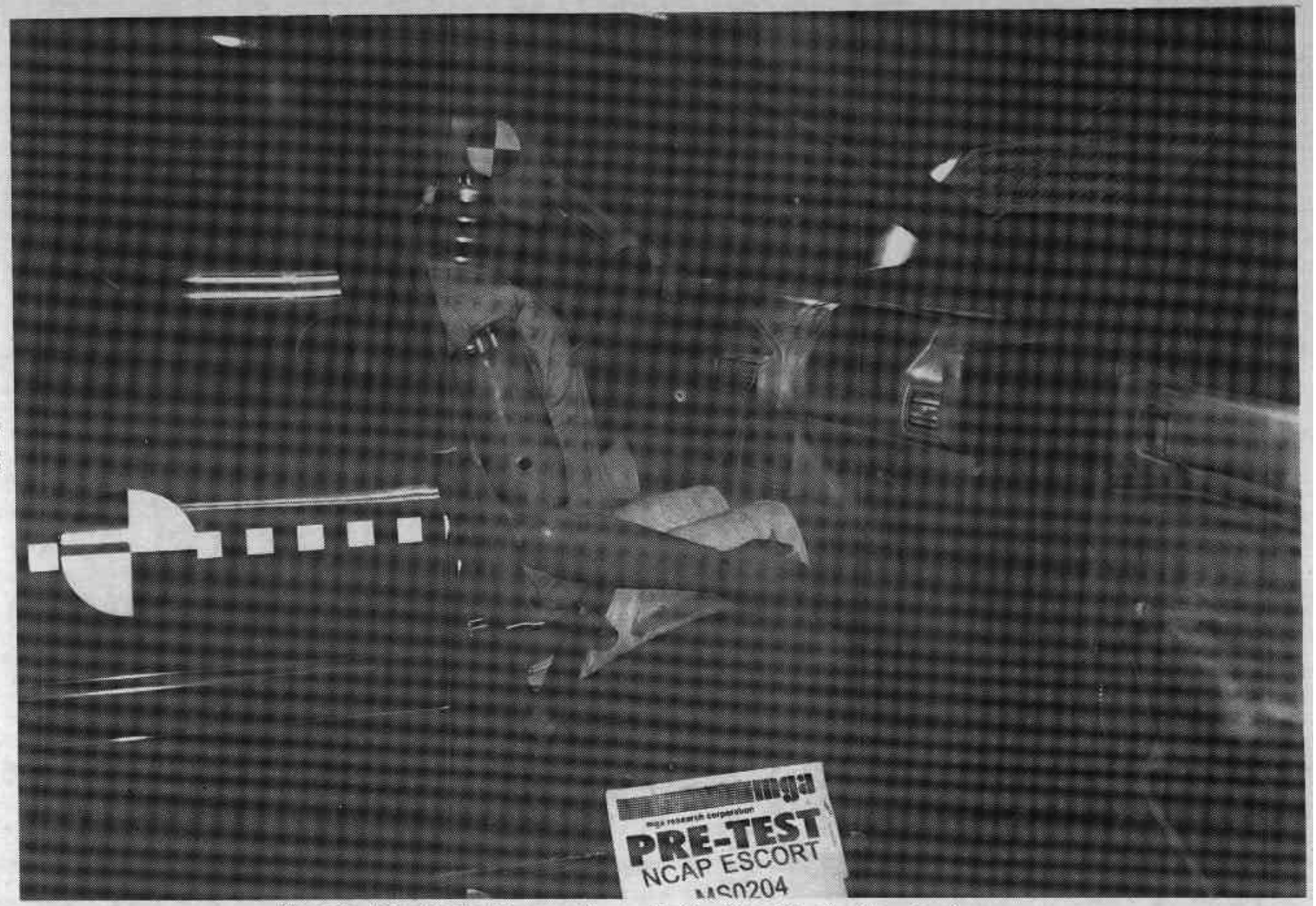


Photo No. A-33 - Pre-Test Passenger Dummy Position Right Side View (Door Open)

Photo No. A-34 - Post-Test Passenger Dummy Position Right Side View (Door Open)

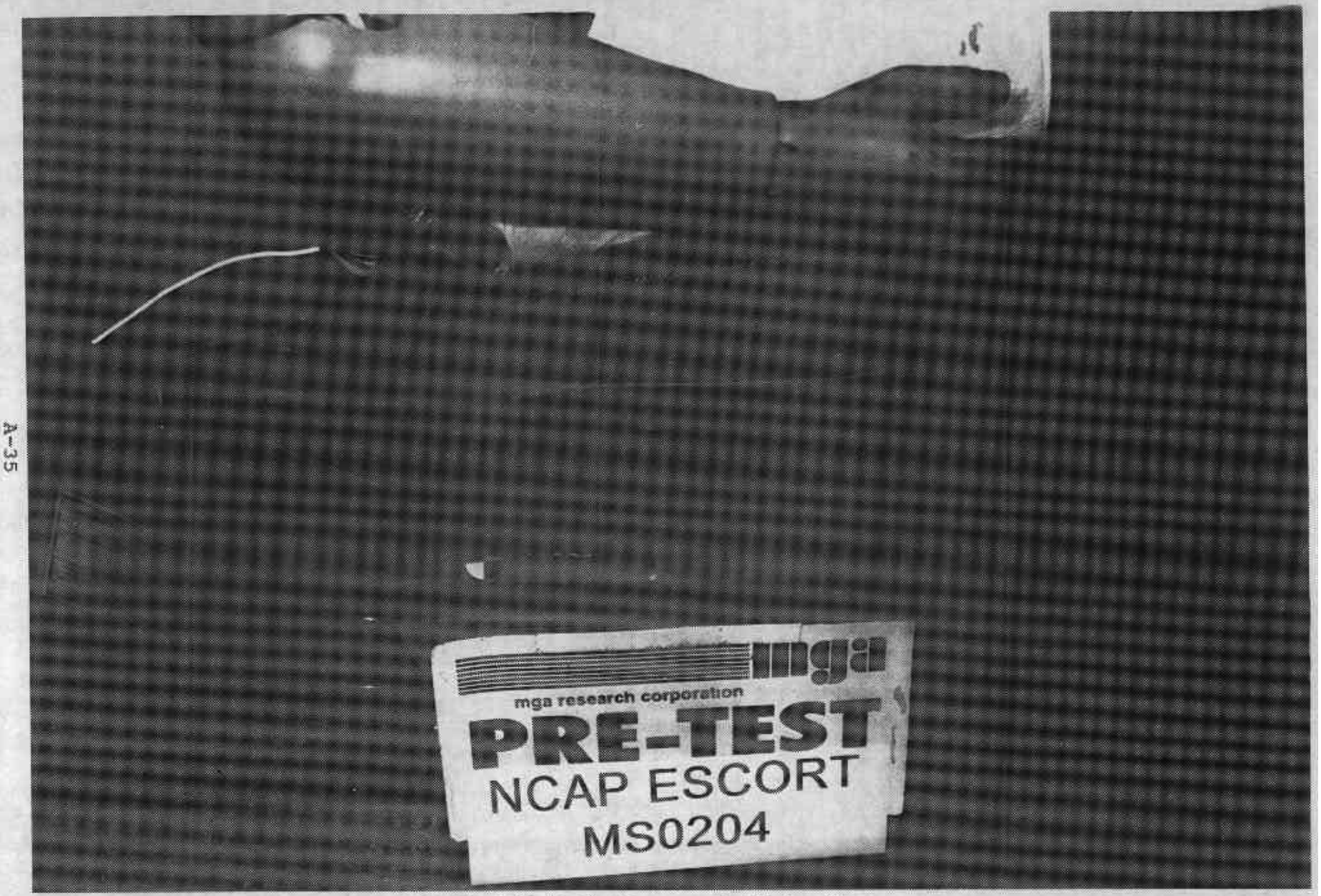


Photo No. A-35 - Pre-Test Passenger Seat Position View

Photo No. A-36 - Post-Test Passenger Seat Position View

Photo No. A-37 - Pre-Test Passenger Dummy Knee Position

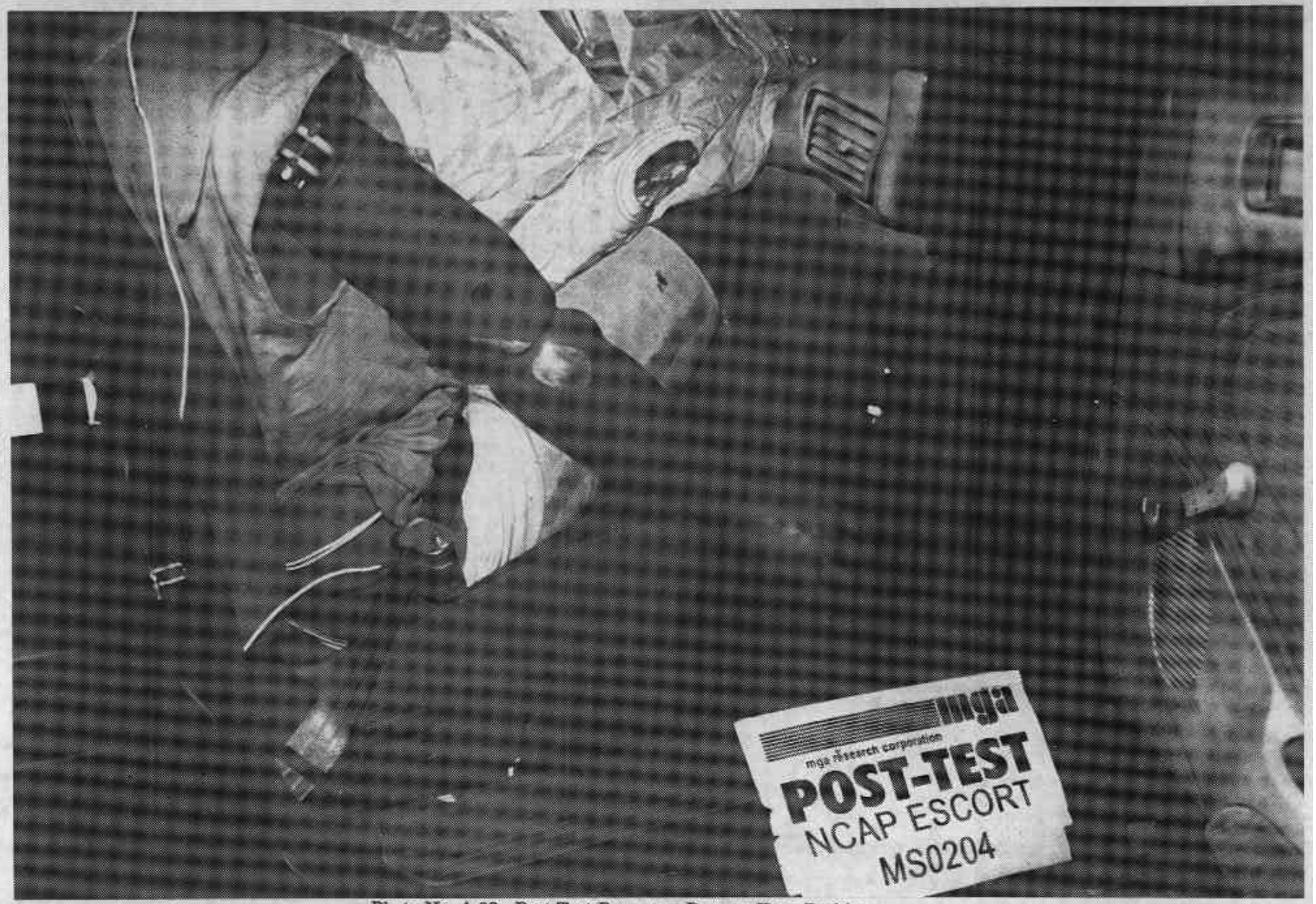


Photo No. A-38 - Post-Test Passenger Dummy Knee Position

Photo No. A-39 - Post-Test Passenger Airbag

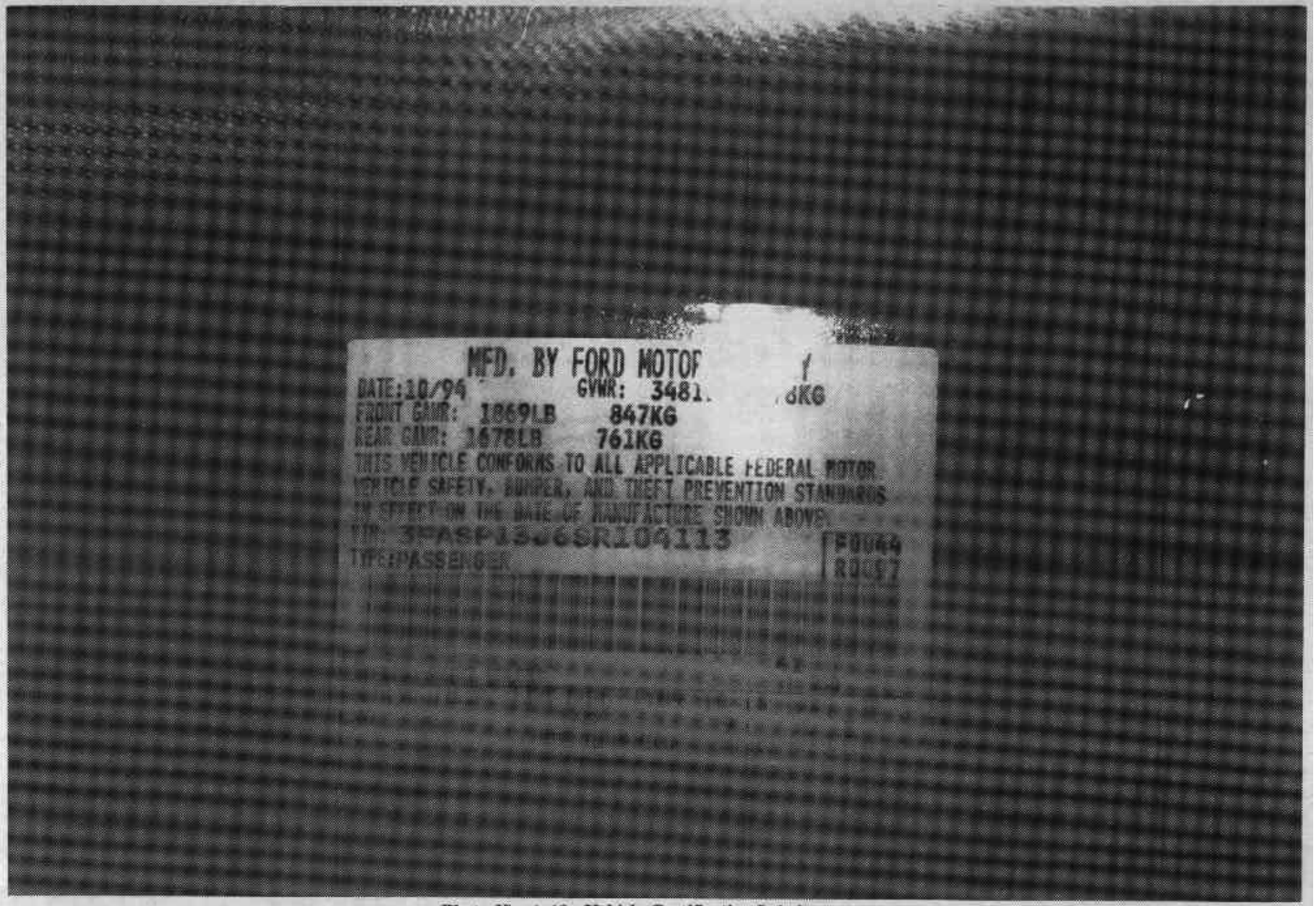


Photo No. A-40 - Vehicle Certification Label

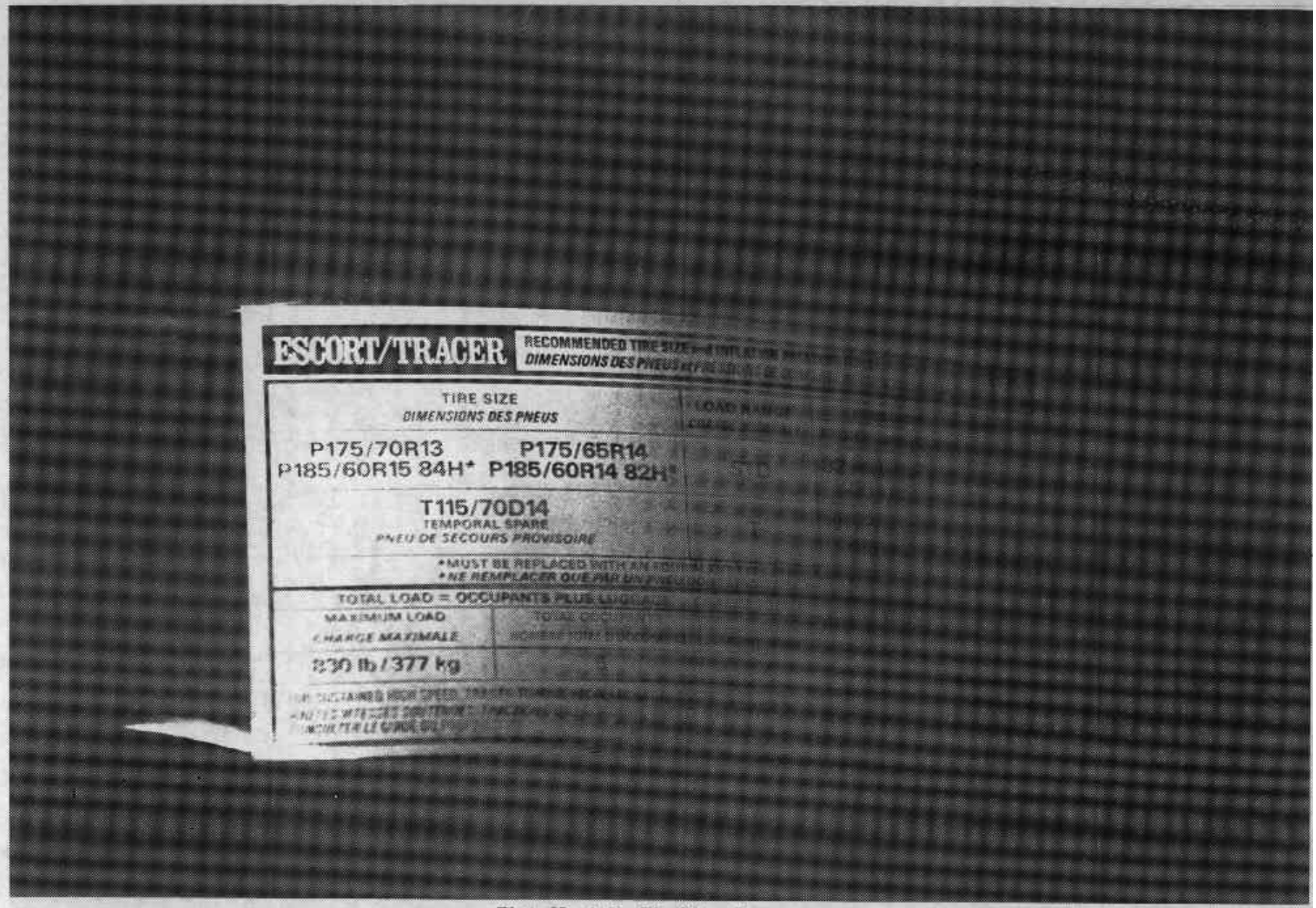


Photo No. A-41 - Tire Placard

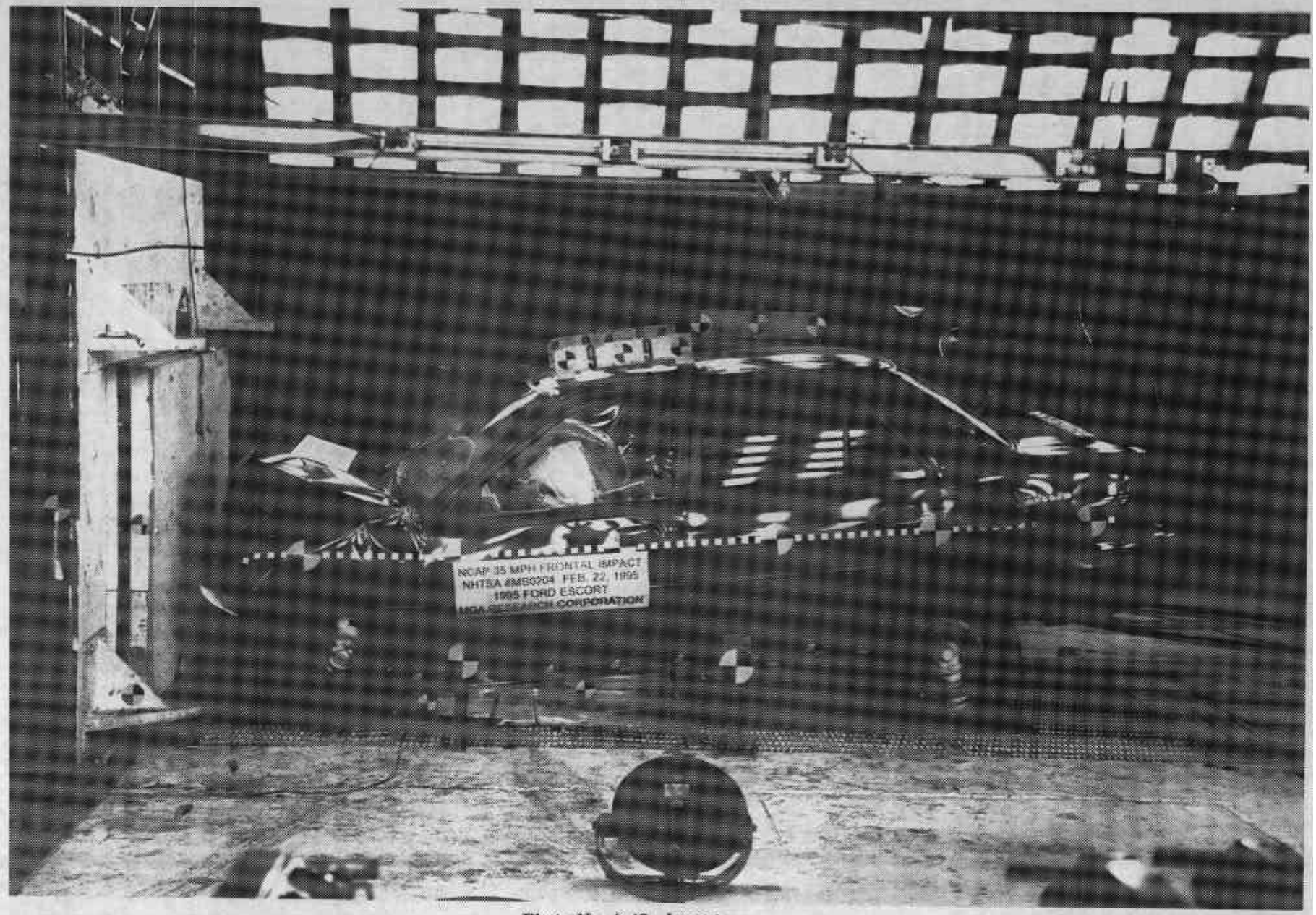


Photo No. A-42 - Impact

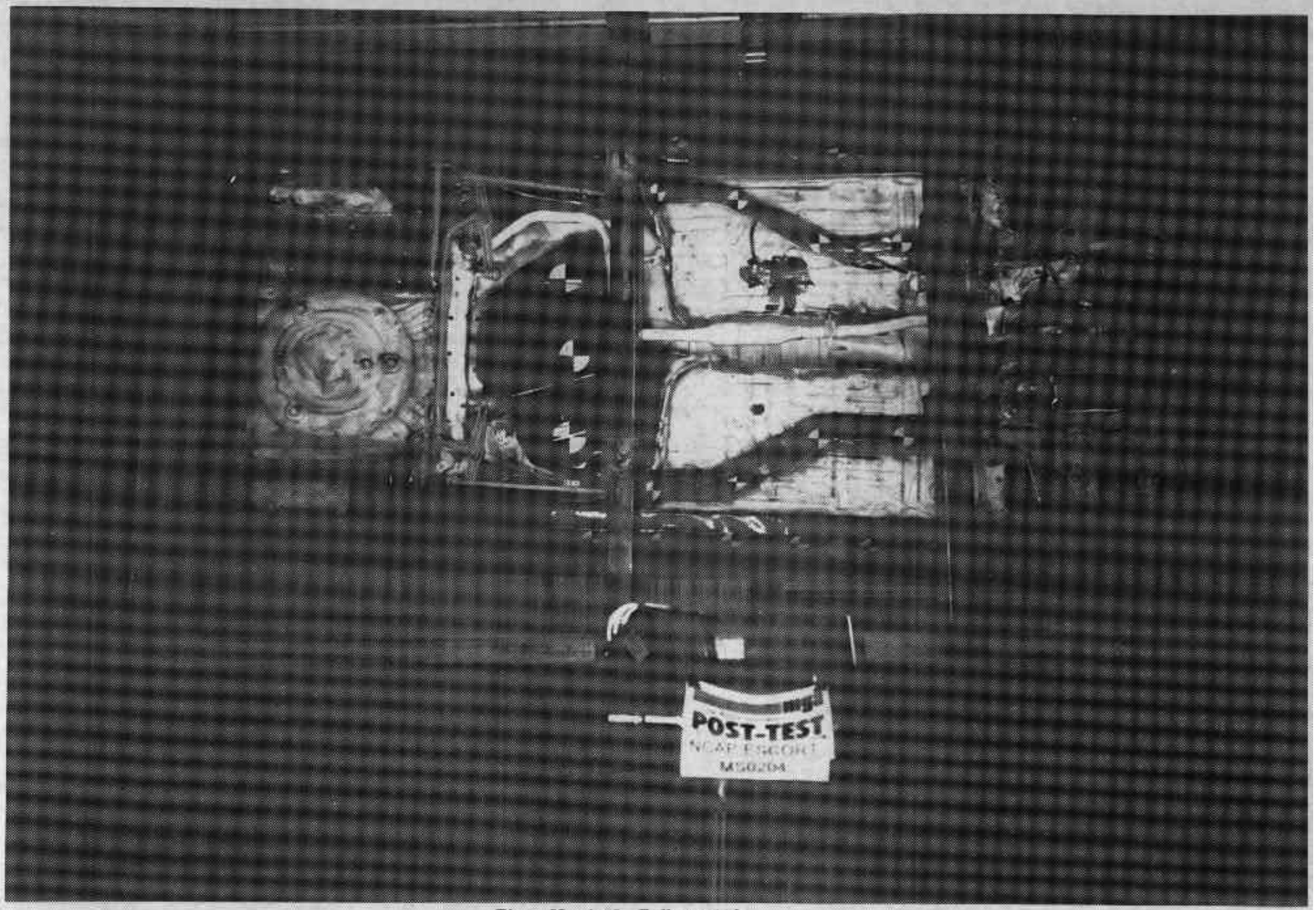


Photo No. A-43 - Rollover 90°

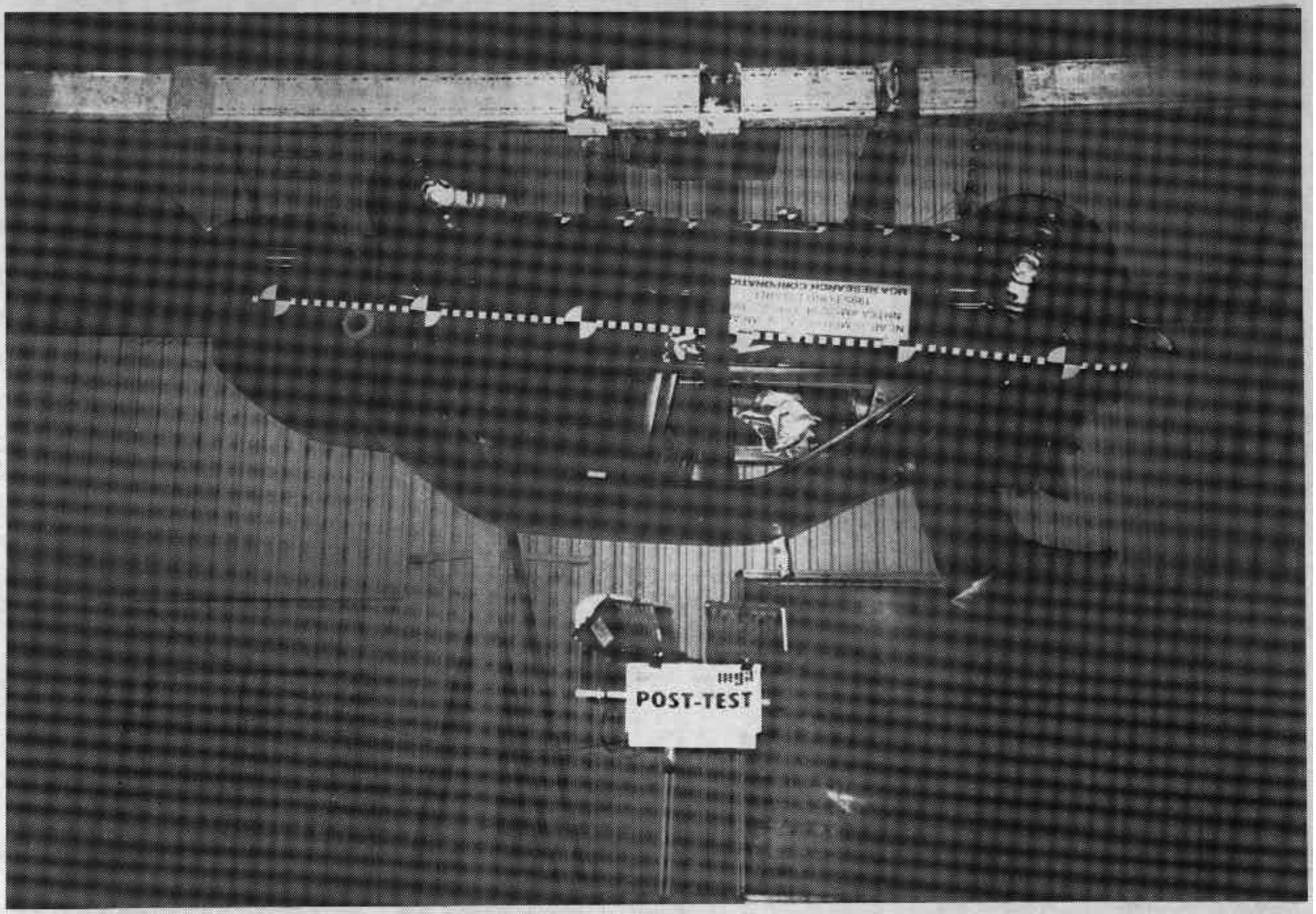


Photo No. A-44 - Rollover 180°

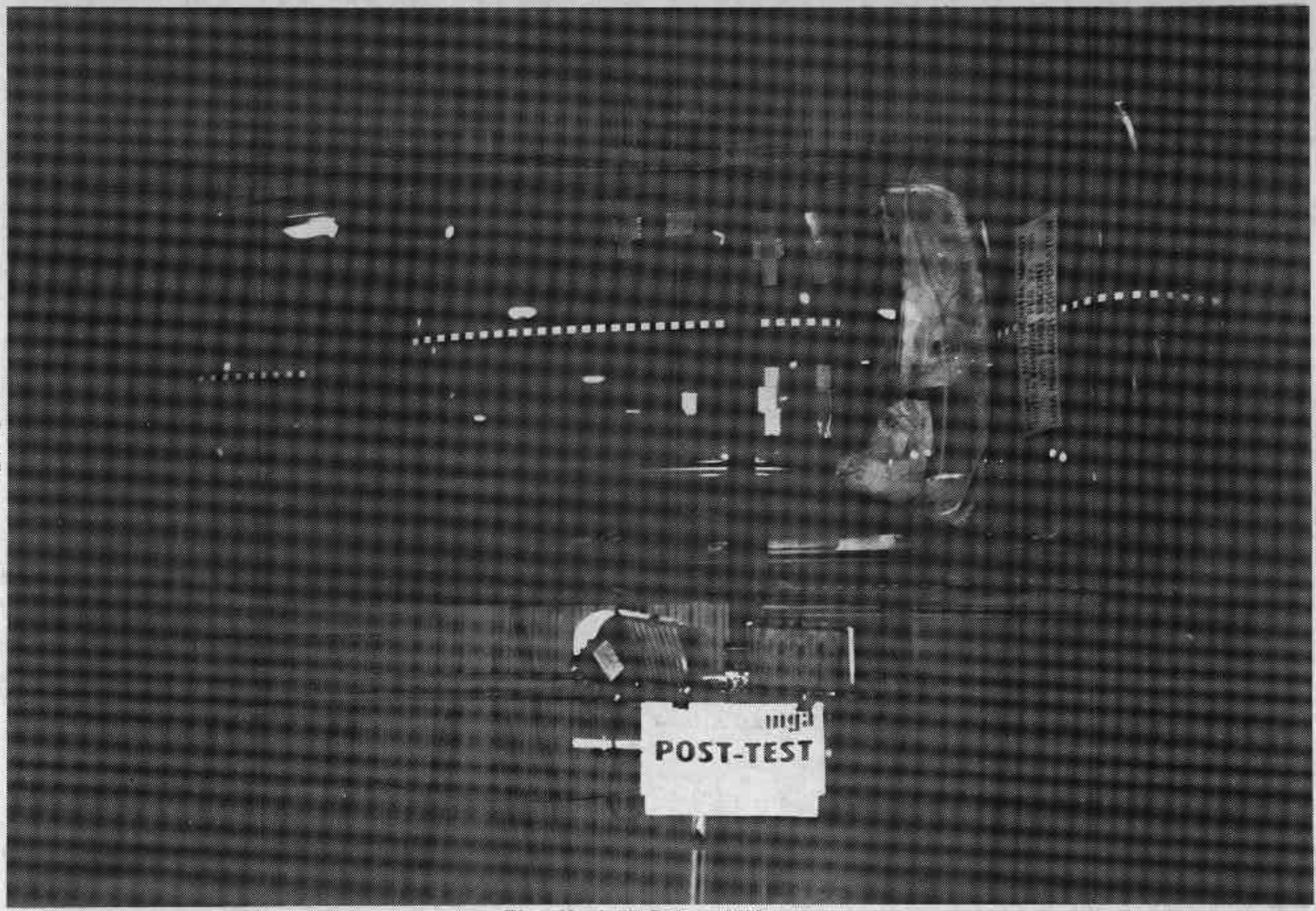


Photo No. A-45 - Rollover 270°

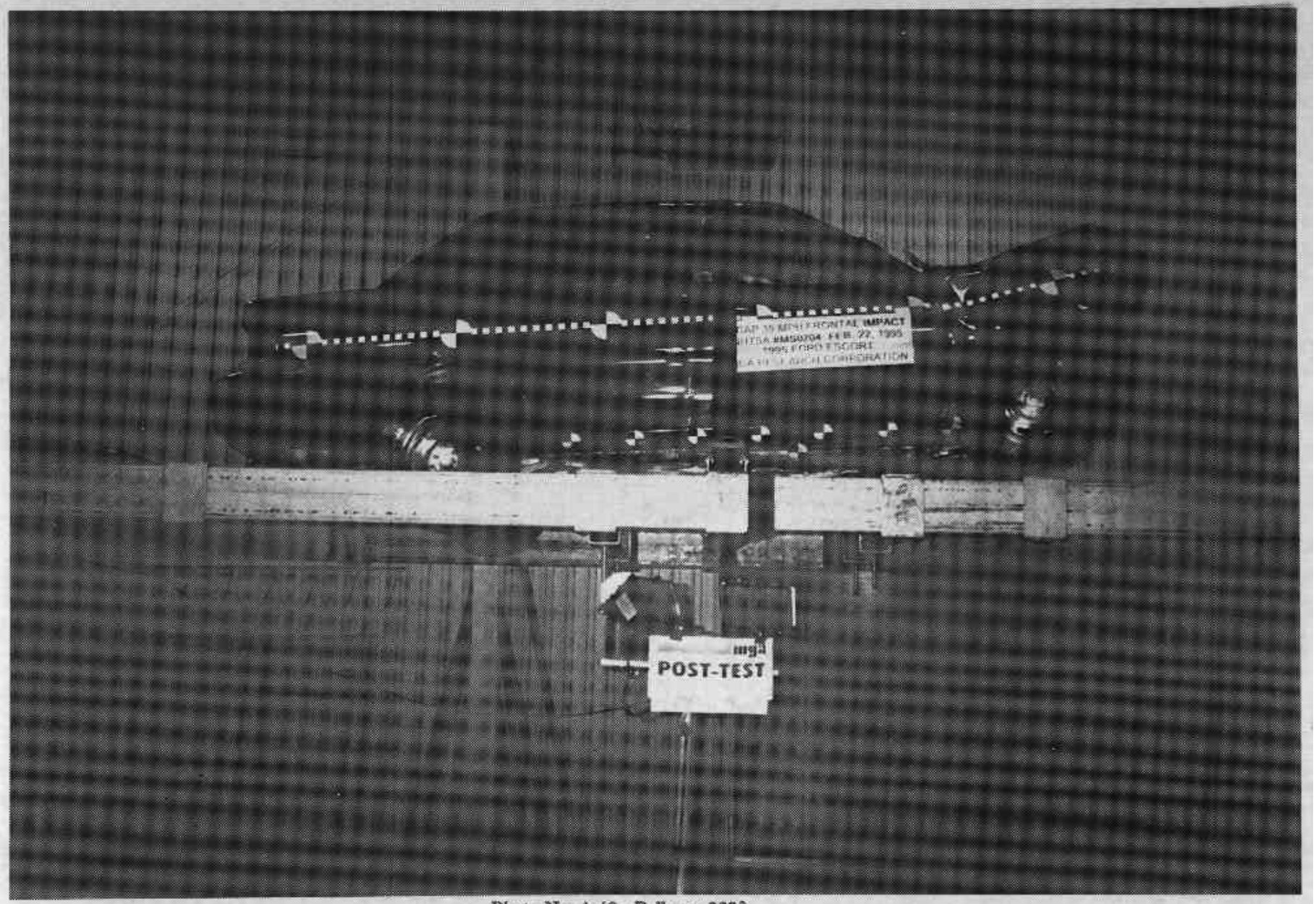


Photo No. A-46 - Rollover 360°

APPENDIX B

Vehicle, Load Cell Barrier and Dummy Response Data

1995 Ford Escort 4 Door

NHTSA NO.: MS0204

VEHICLE DATA		FILTER CHANNEL CLASS
Head Accelerations	1000	(1650 Hz)
Chest Accelerometers	180	(300 Hz)
Vehicle Accelerometers	60	(100 Hz)
Barrier Load Cells	60	(100 Hz)
Femur Load Cells	600	(1000 Hz)
Lap and Torso Belts	60	(100 Hz)

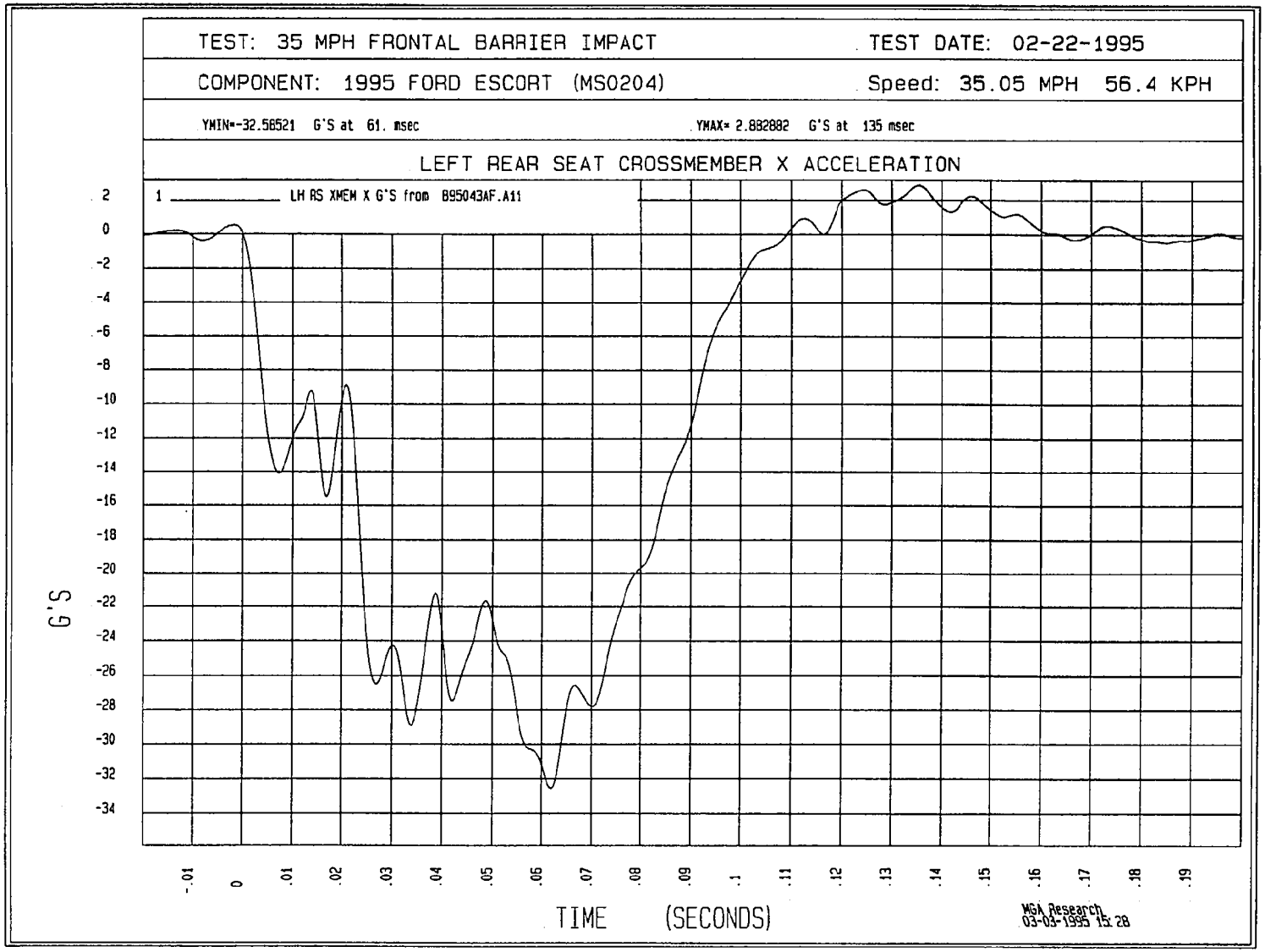


Figure B-1 - Left Rear Seat Crossmember X Acceleration vs. Time

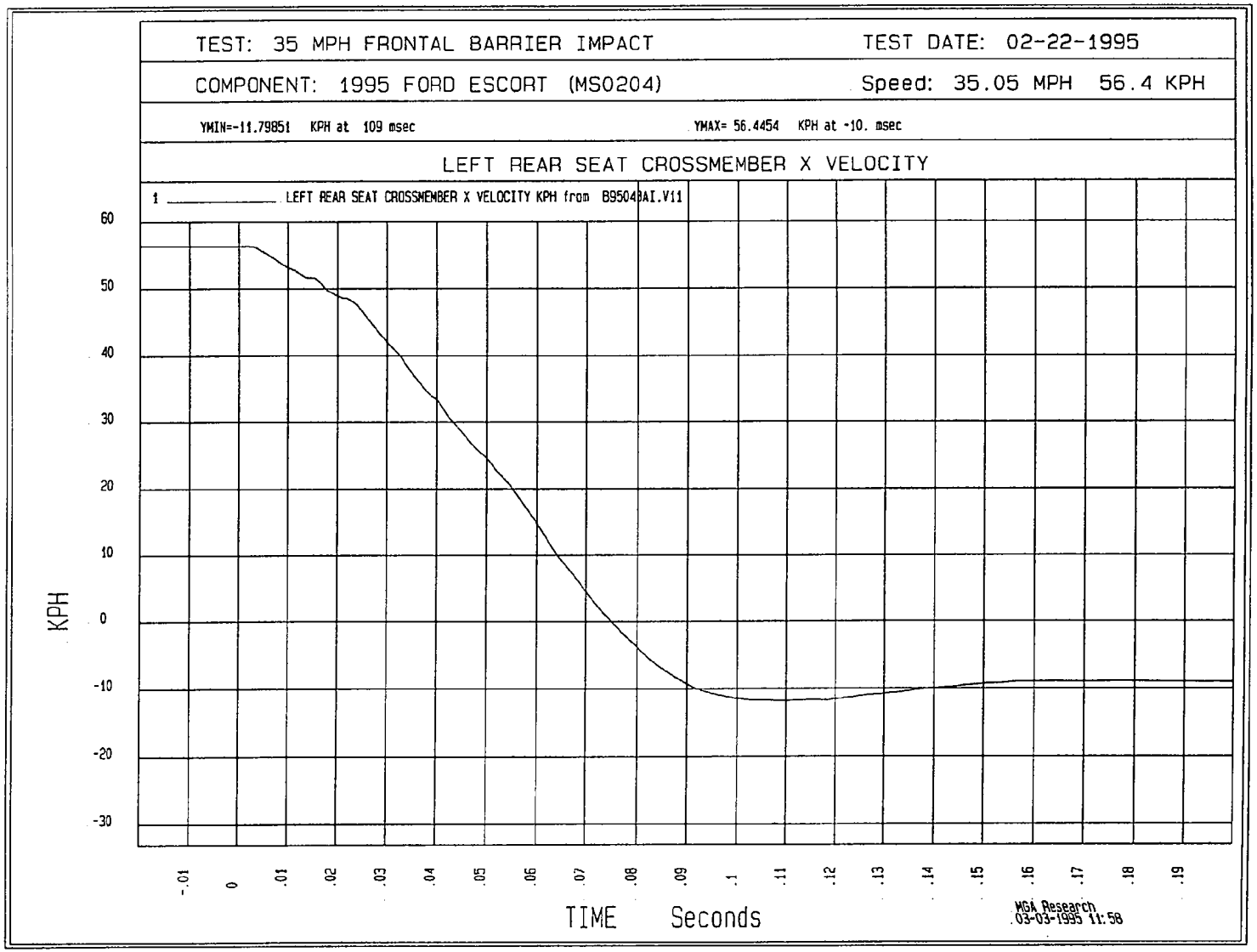


Figure B-2 - Left Rear Seat Crossmember X Velocity vs. Time

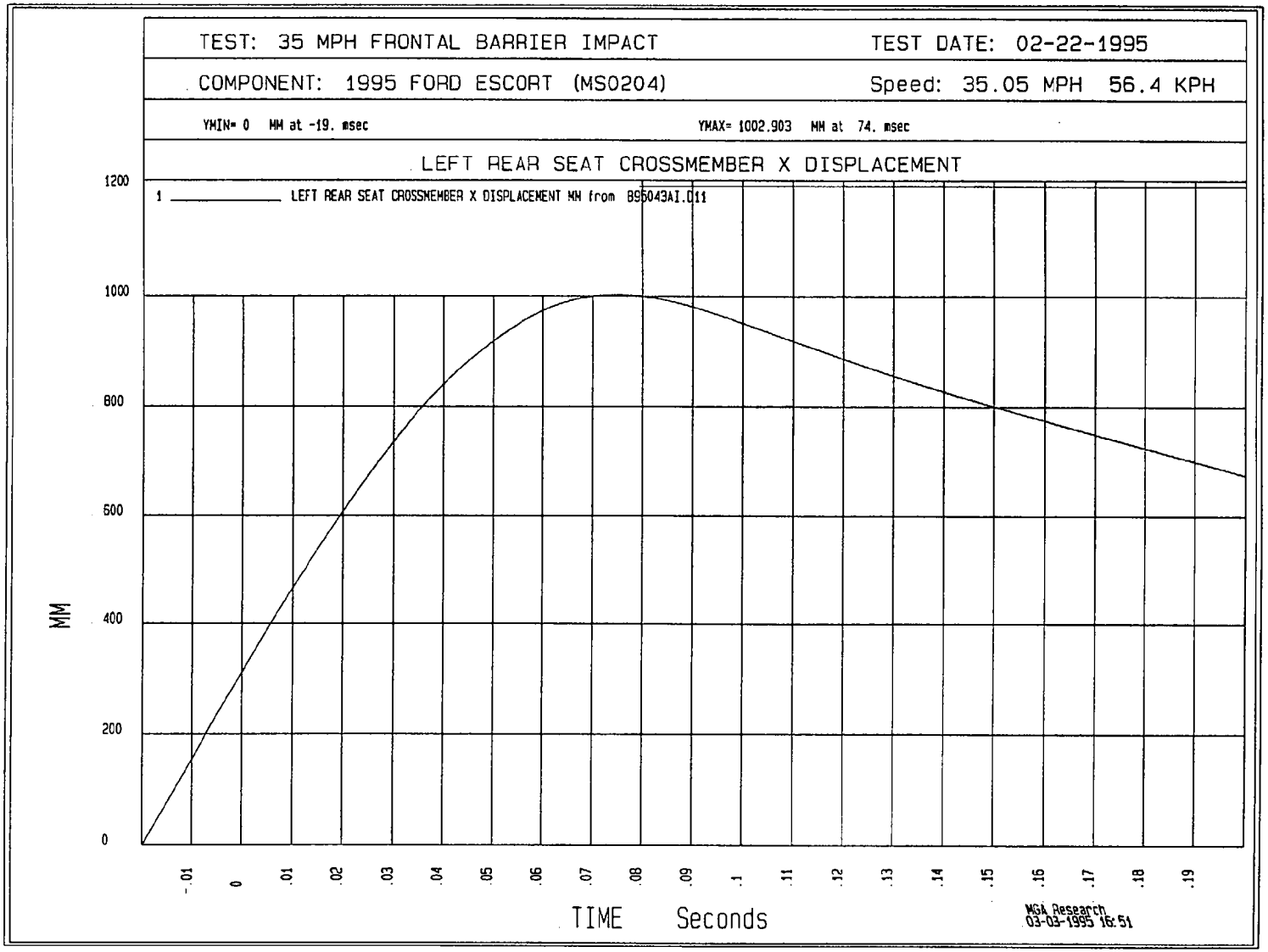


Figure B-3 - Left Rear Seat Crossmember X Displacement vs. Time

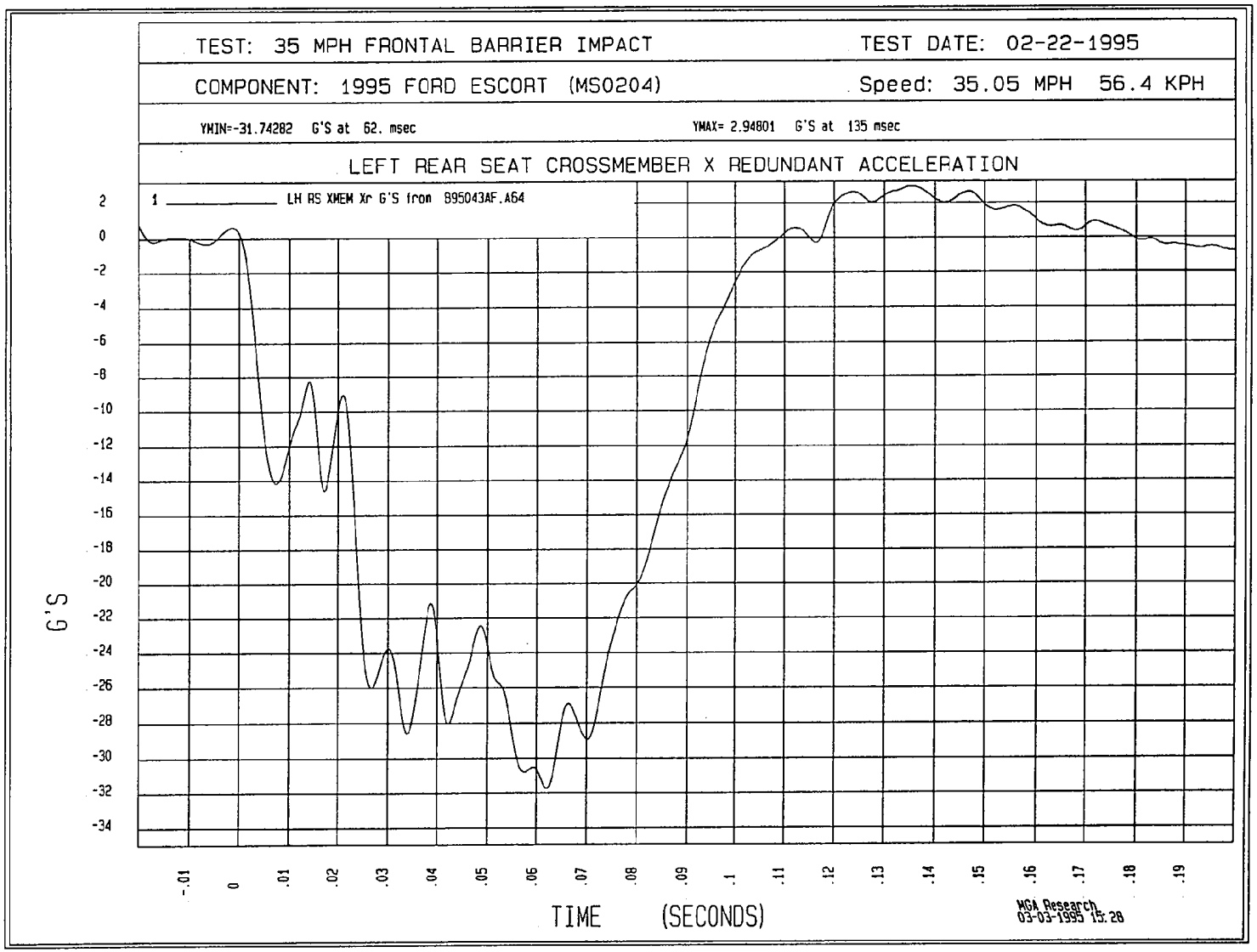


Figure B-4 - Left Rear Seat Crossmember X Redundant Acceleration vs. Time

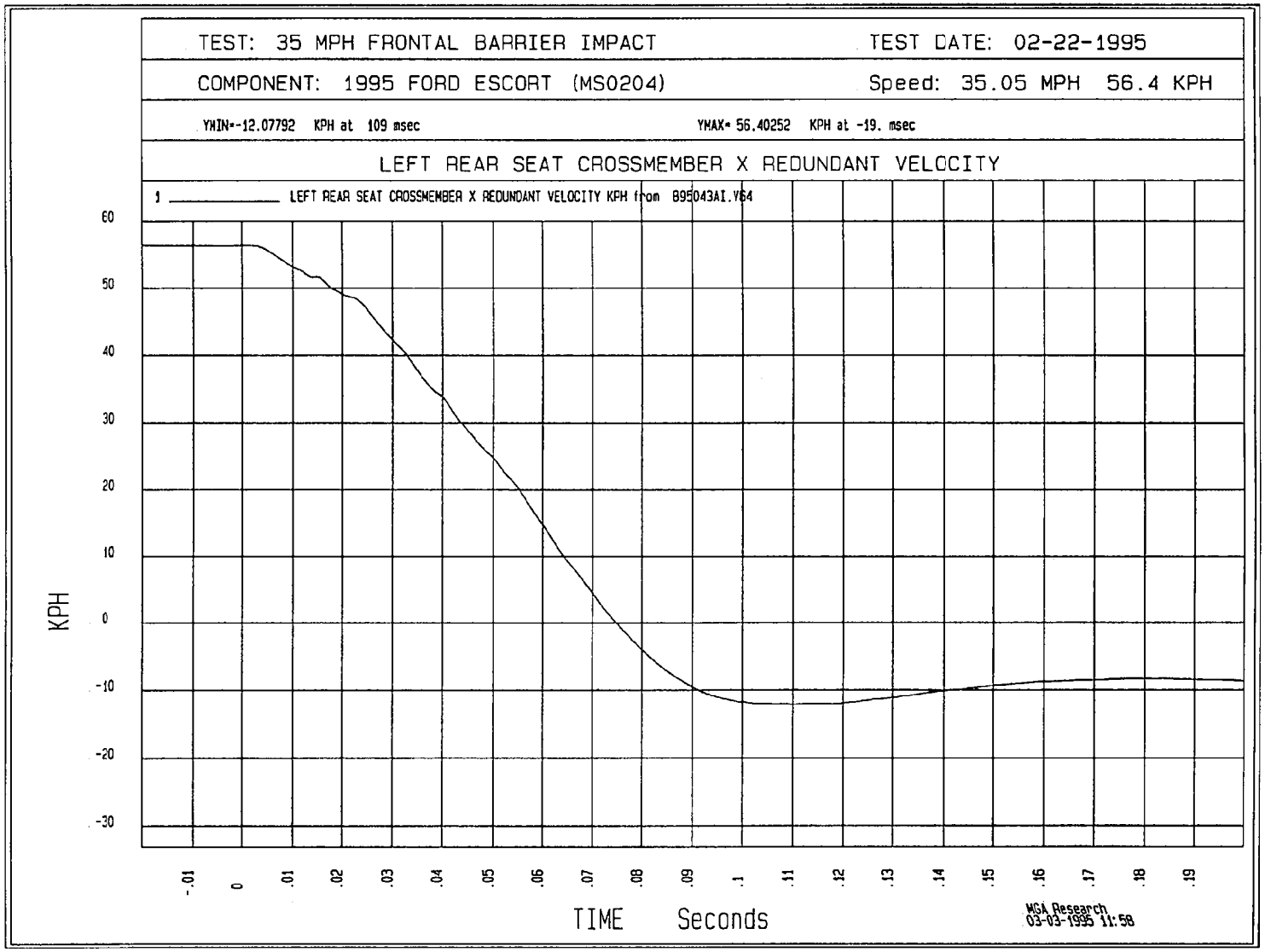


Figure B-5 - Left Rear Seat Crossmember X Redundant Velocity vs. Time

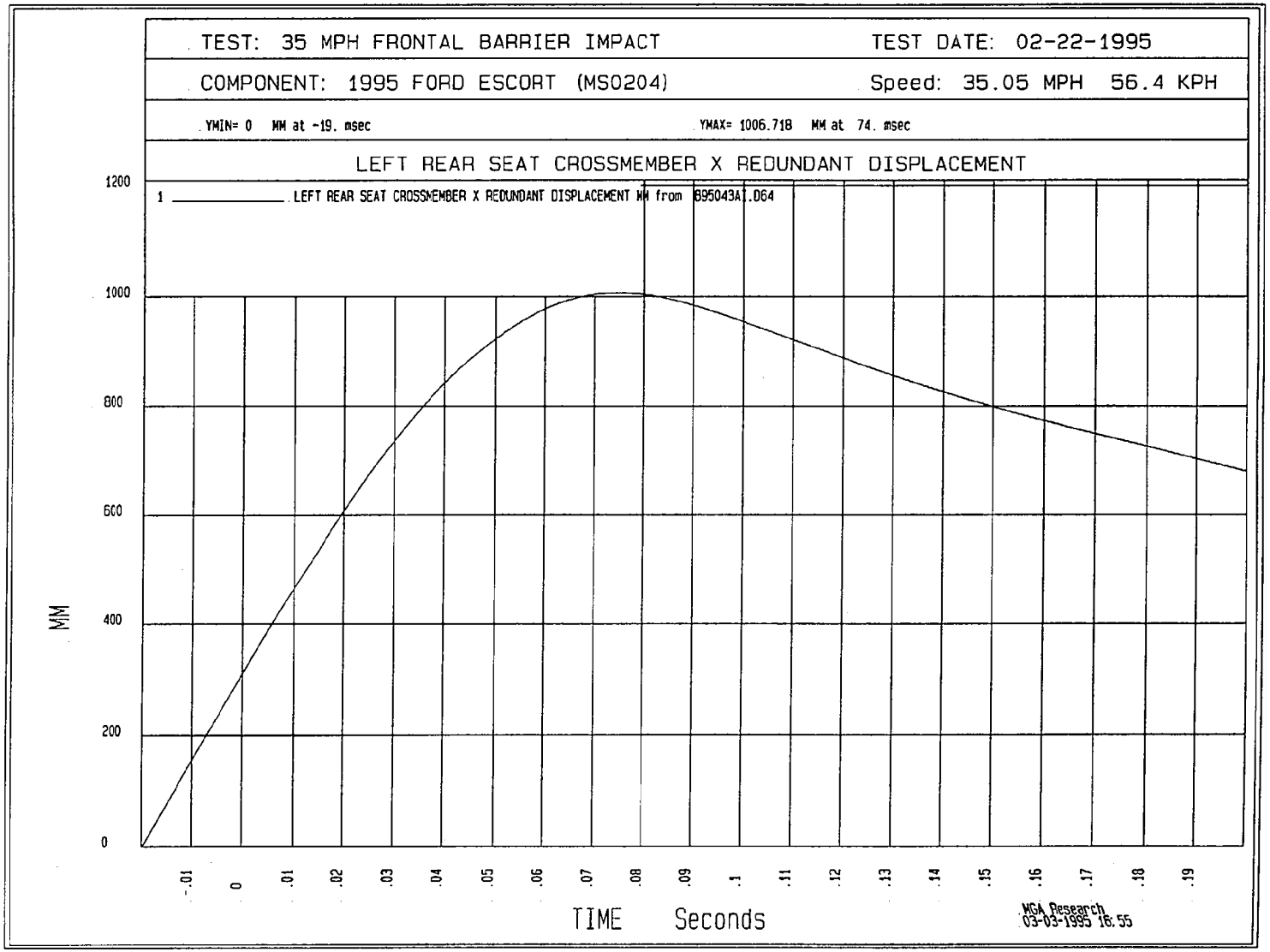


Figure B-6 - Left Rear Seat Crossmember X Redundant Displacement vs. Time

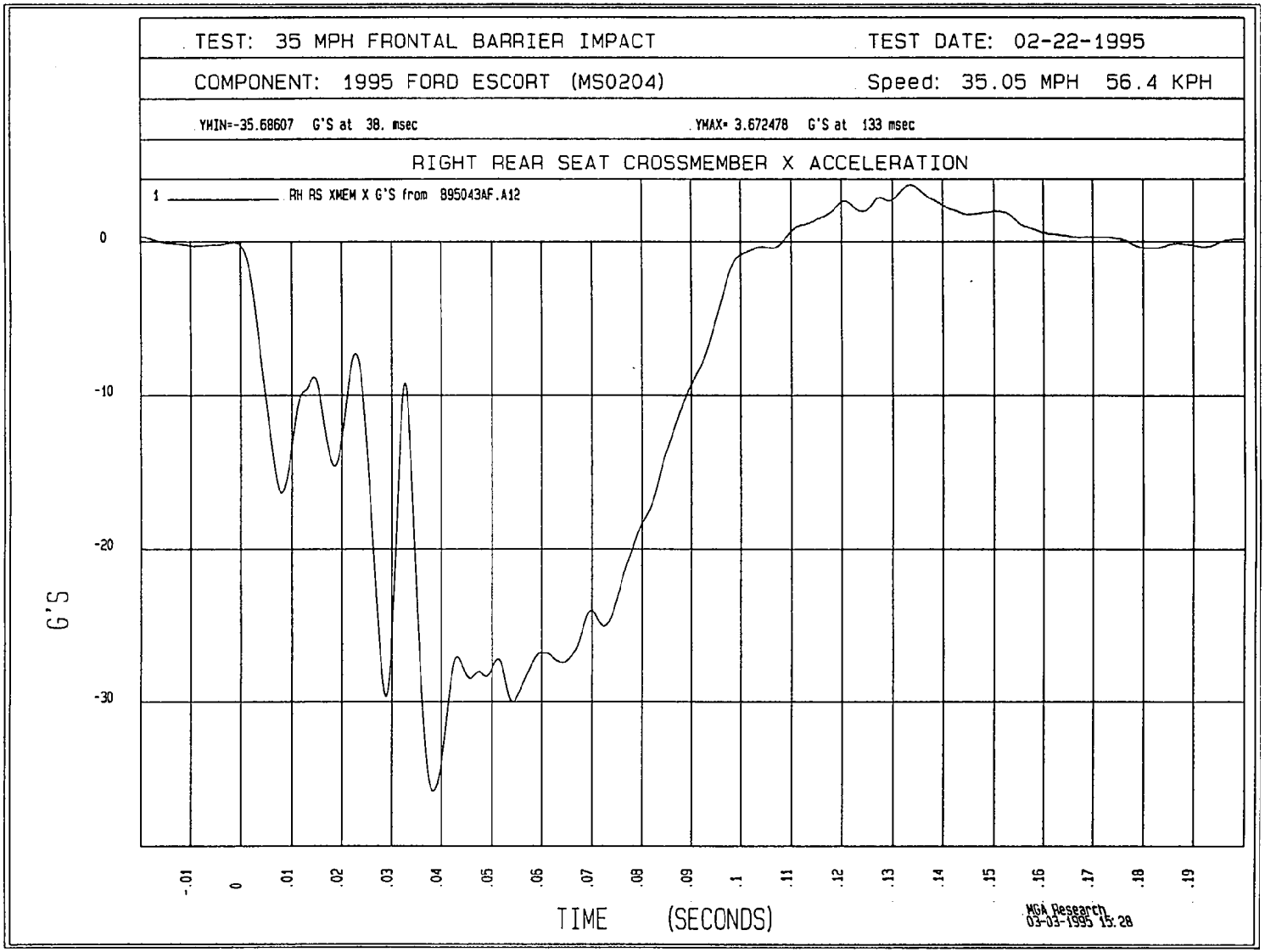


Figure B-7 - Right Rear Seat Crossmember X Acceleration vs. Time

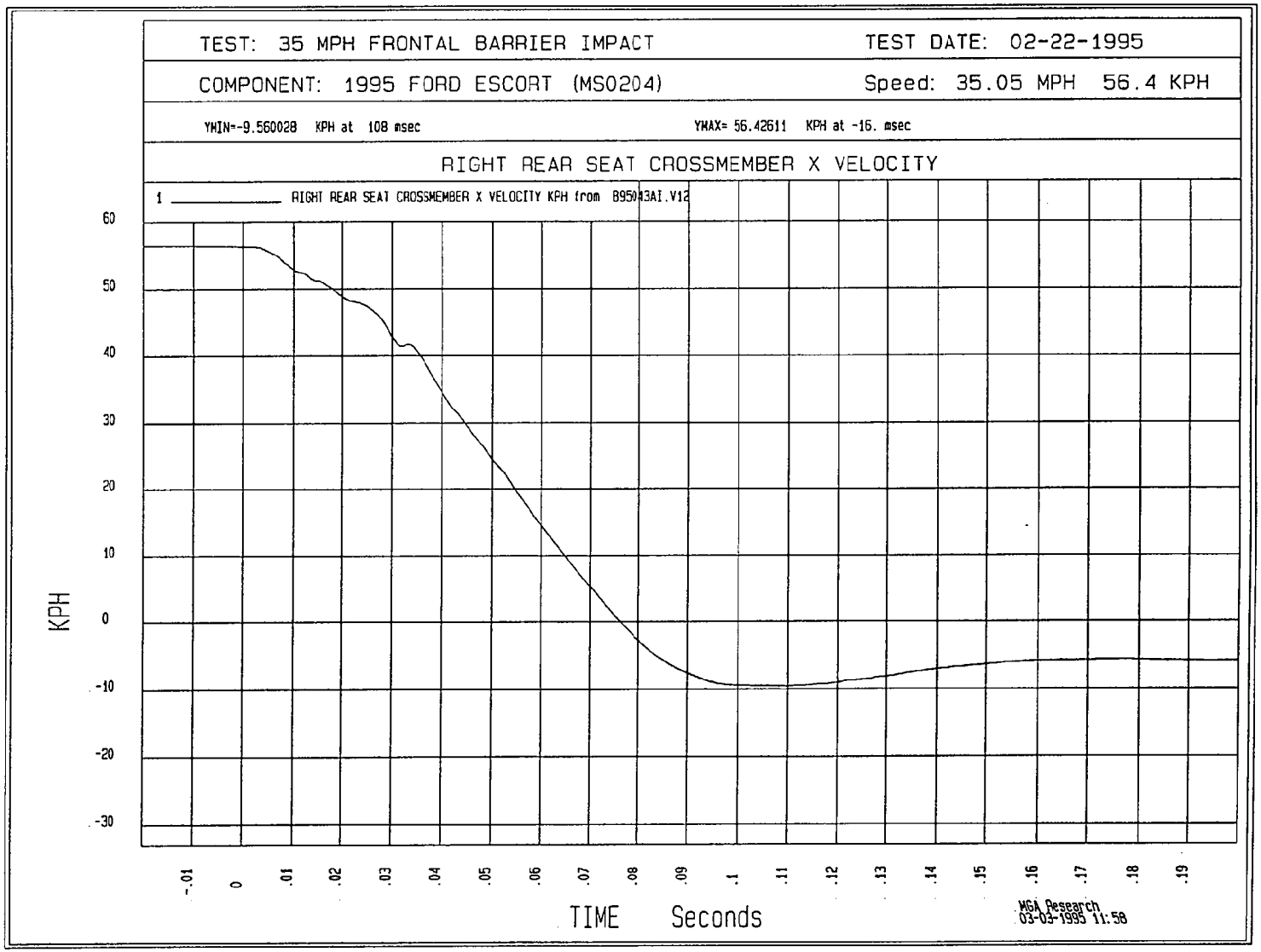


Figure B-8 - Right Rear Seat Crossmember X Velocity vs. Time

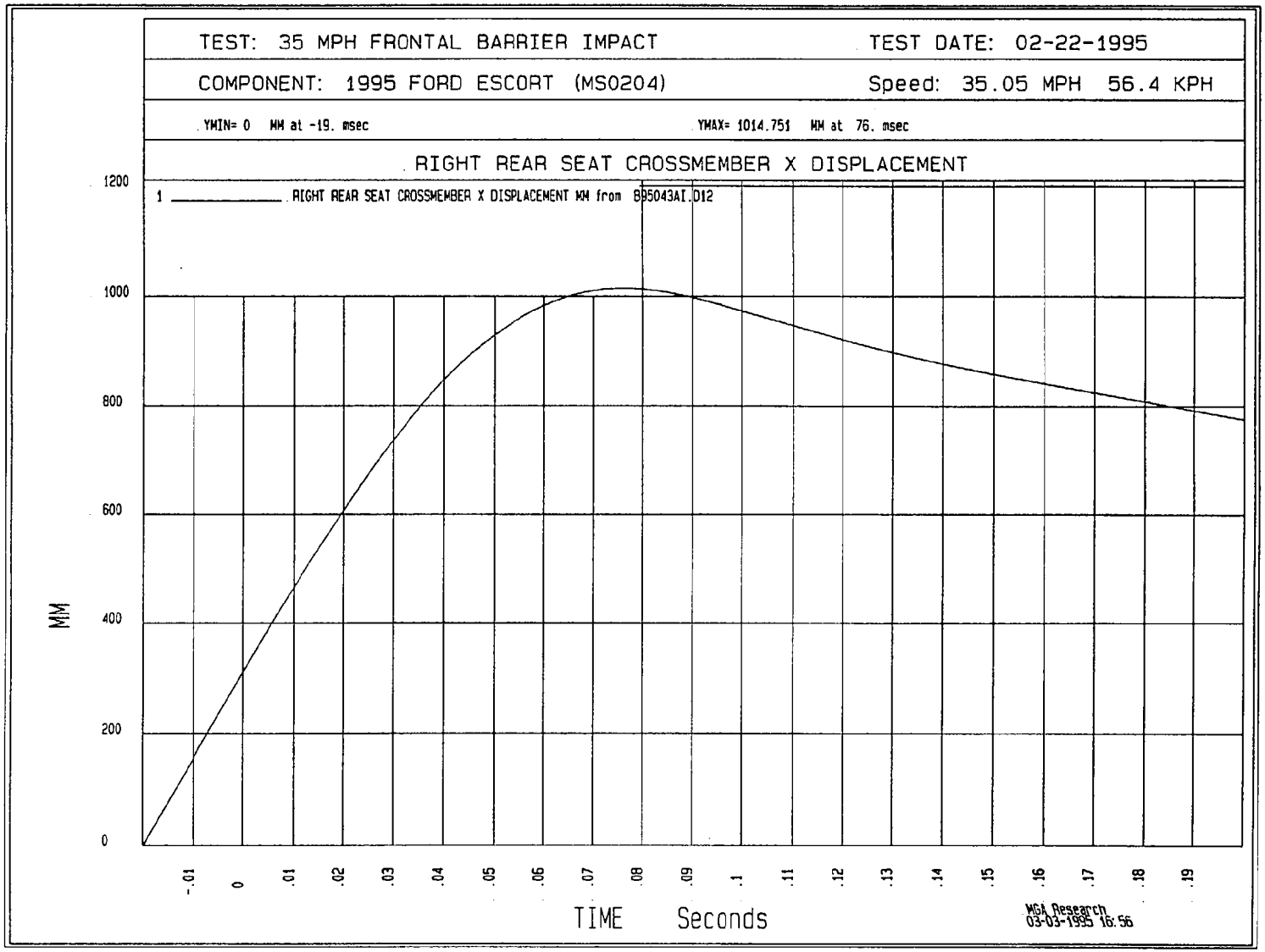


Figure B-9 - Right Rear Seat Crossmember X Displacement vs. Time

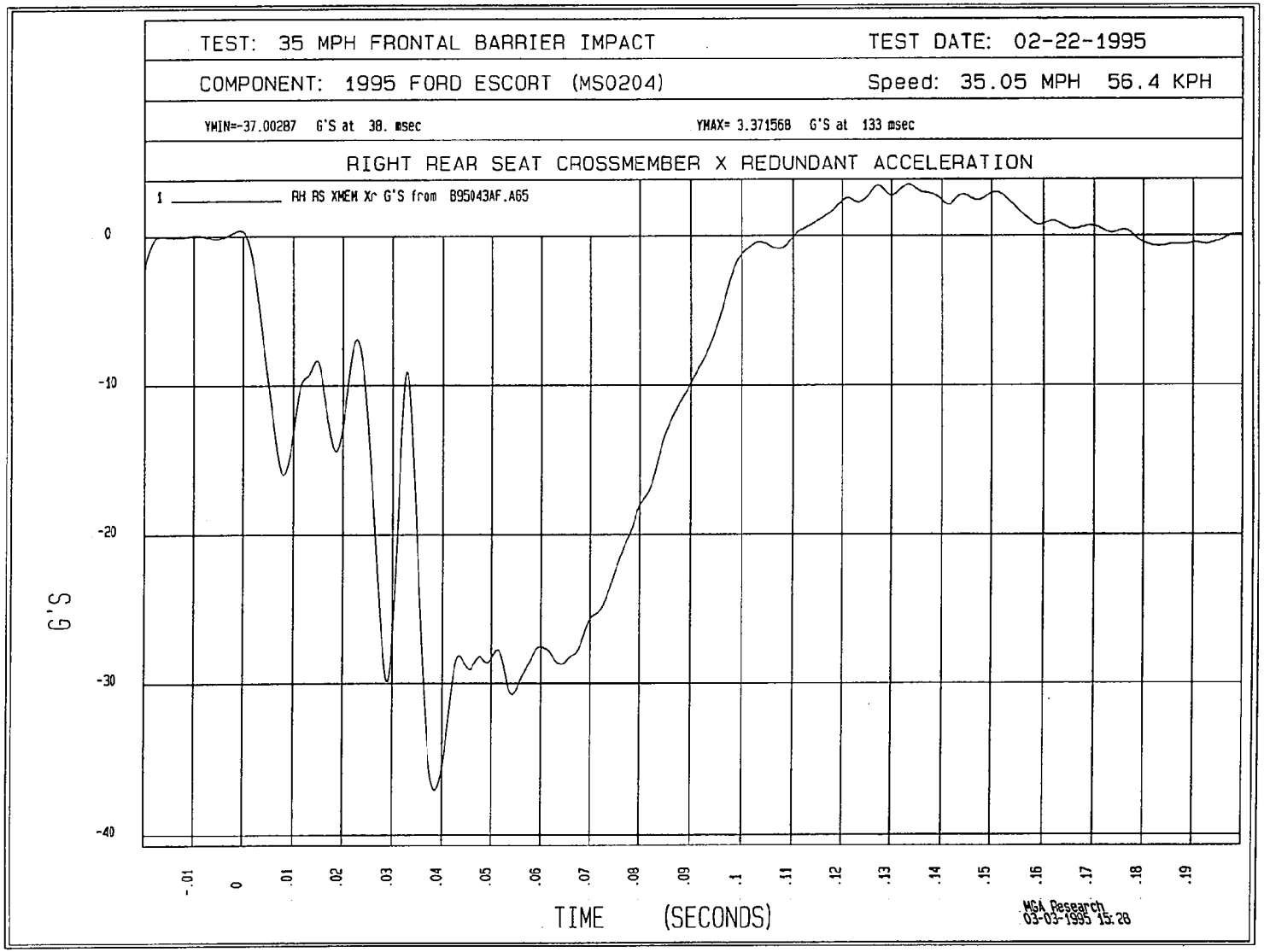


Figure B-10 - Right Rear Seat Crossmember X Redundant Acceleration vs. Time

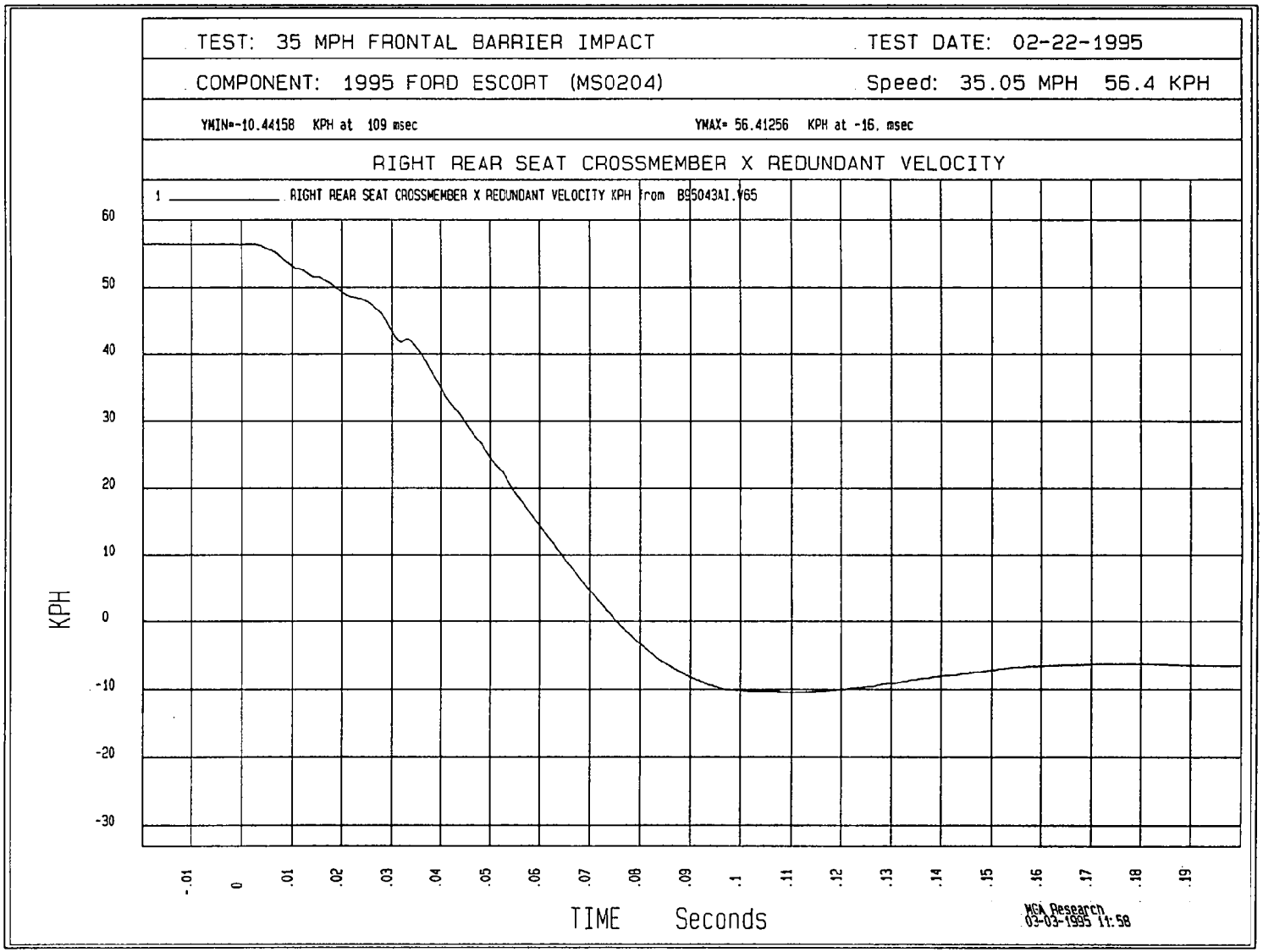


Figure B-11 - Right Rear Seat Crossmember X Redundant Velocity vs. Time

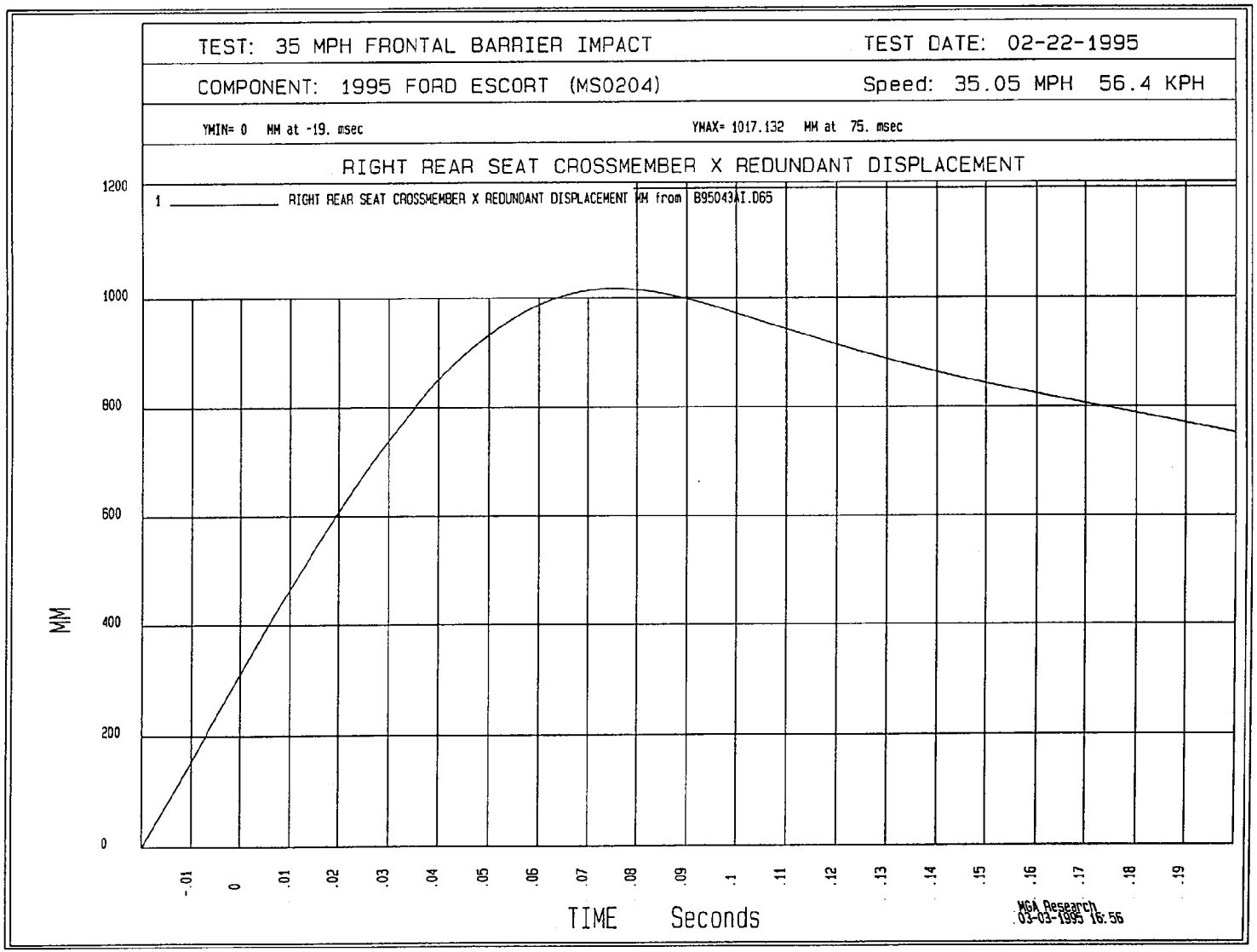


Figure B-12 - Right Rear Seat Crossmember X Redundant Displacement vs. Time

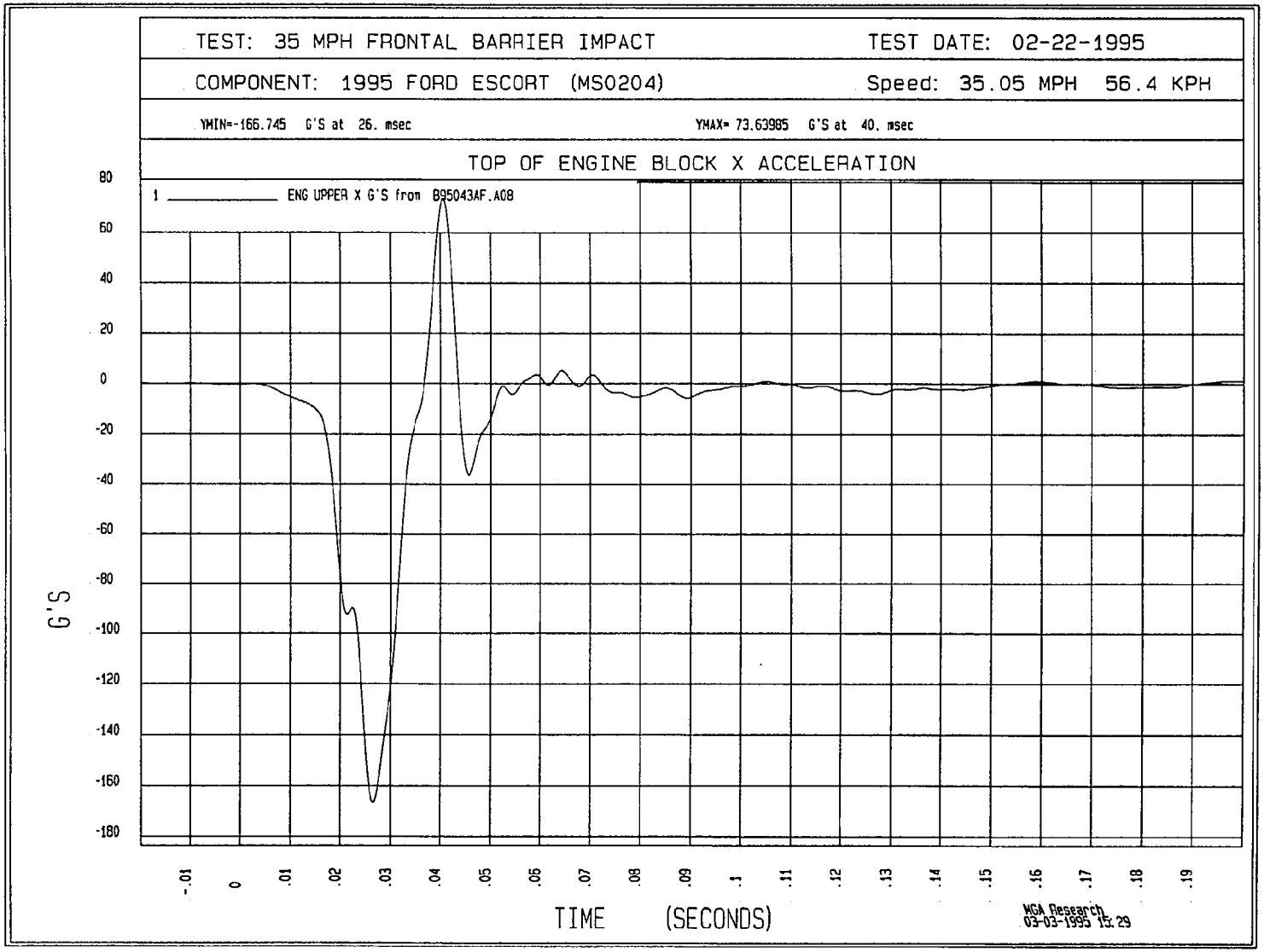


Figure B-13 - Top of Engine Block X Acceleration vs. Time

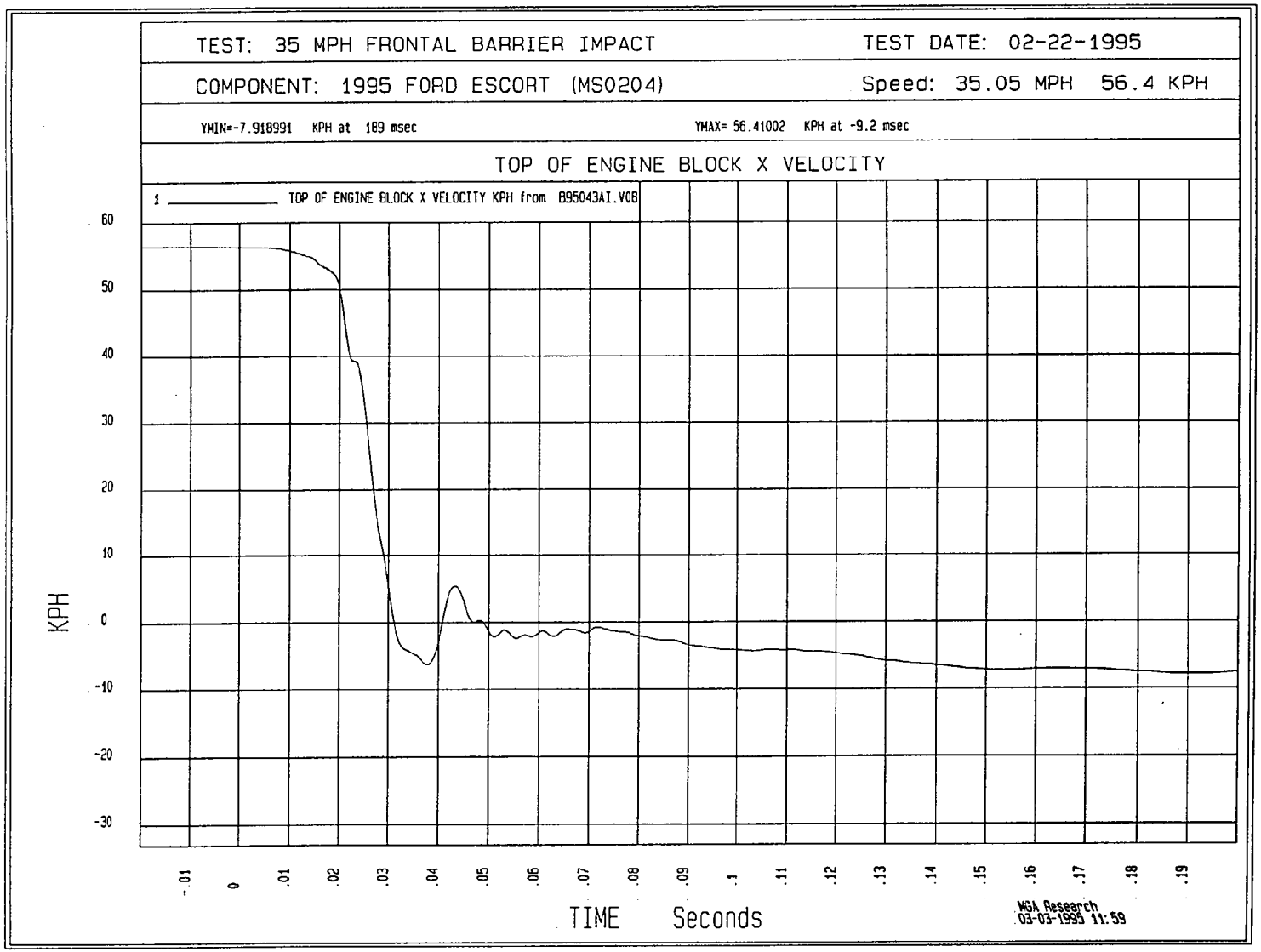


Figure B-14 - Top of Engine Block X Velocity vs. Time

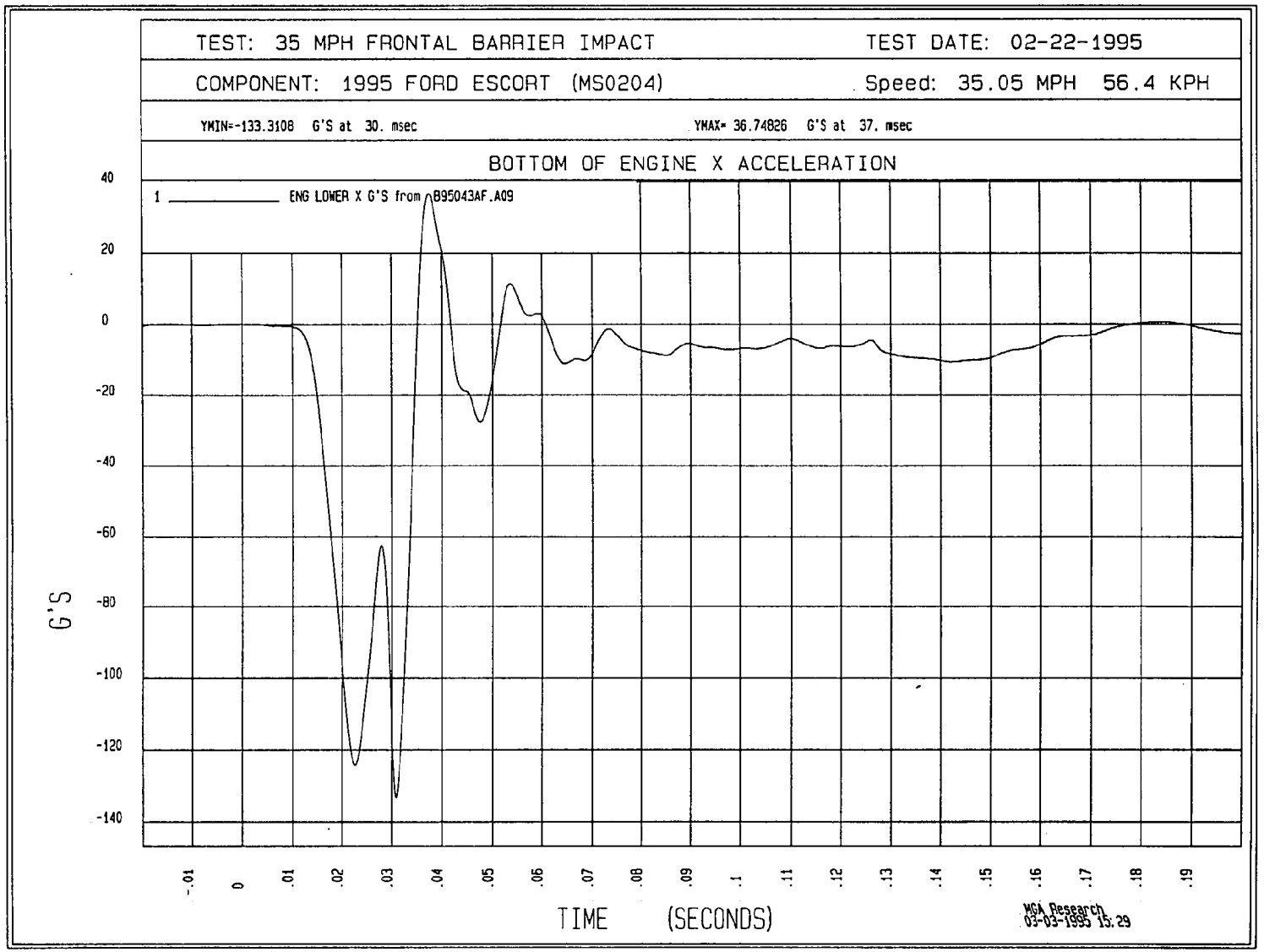


Figure B-15 - Bottom of Engine X Acceleration vs. Time

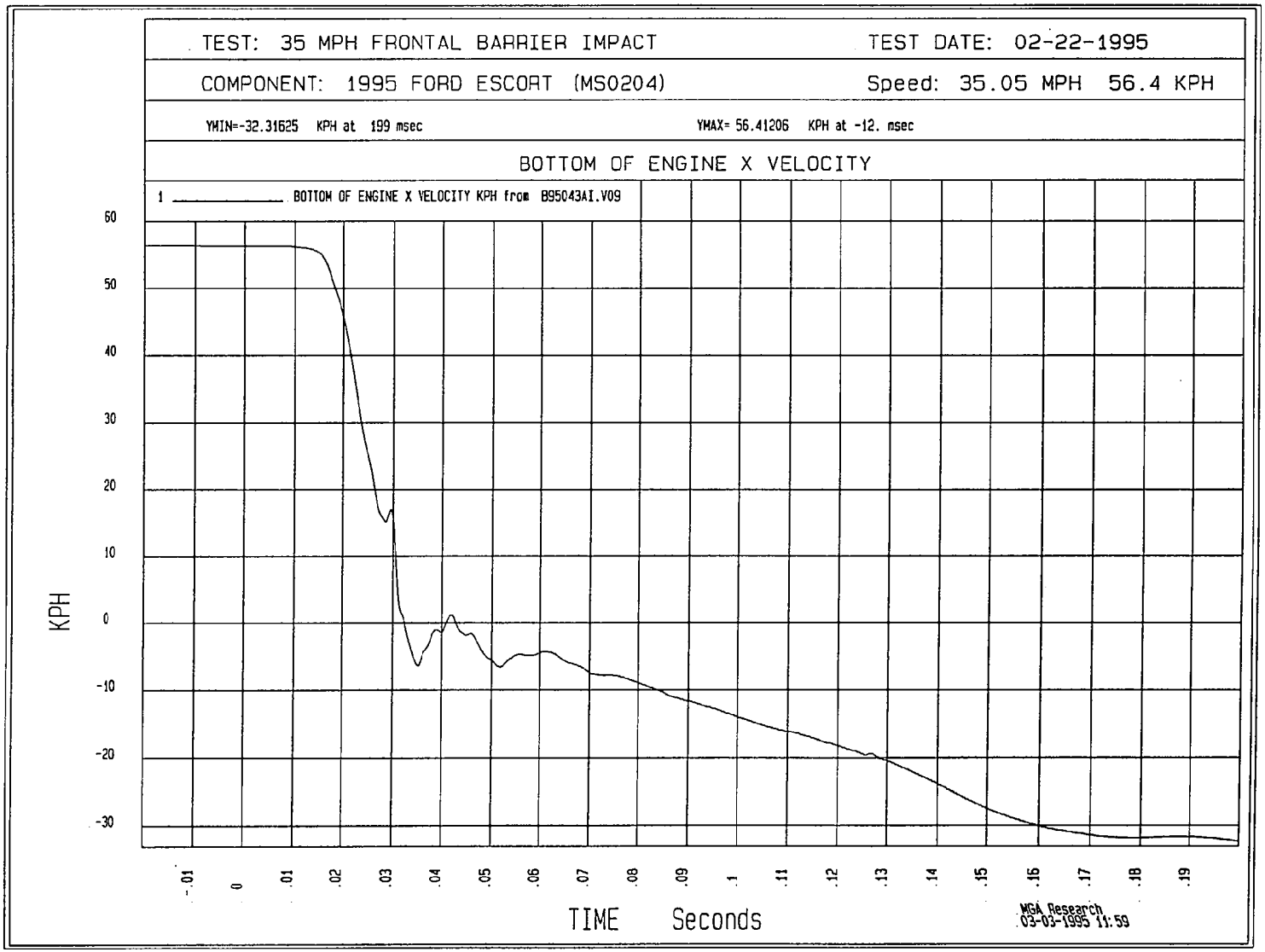


Figure B-16 - Bottom of Engine X Velocity vs. Time

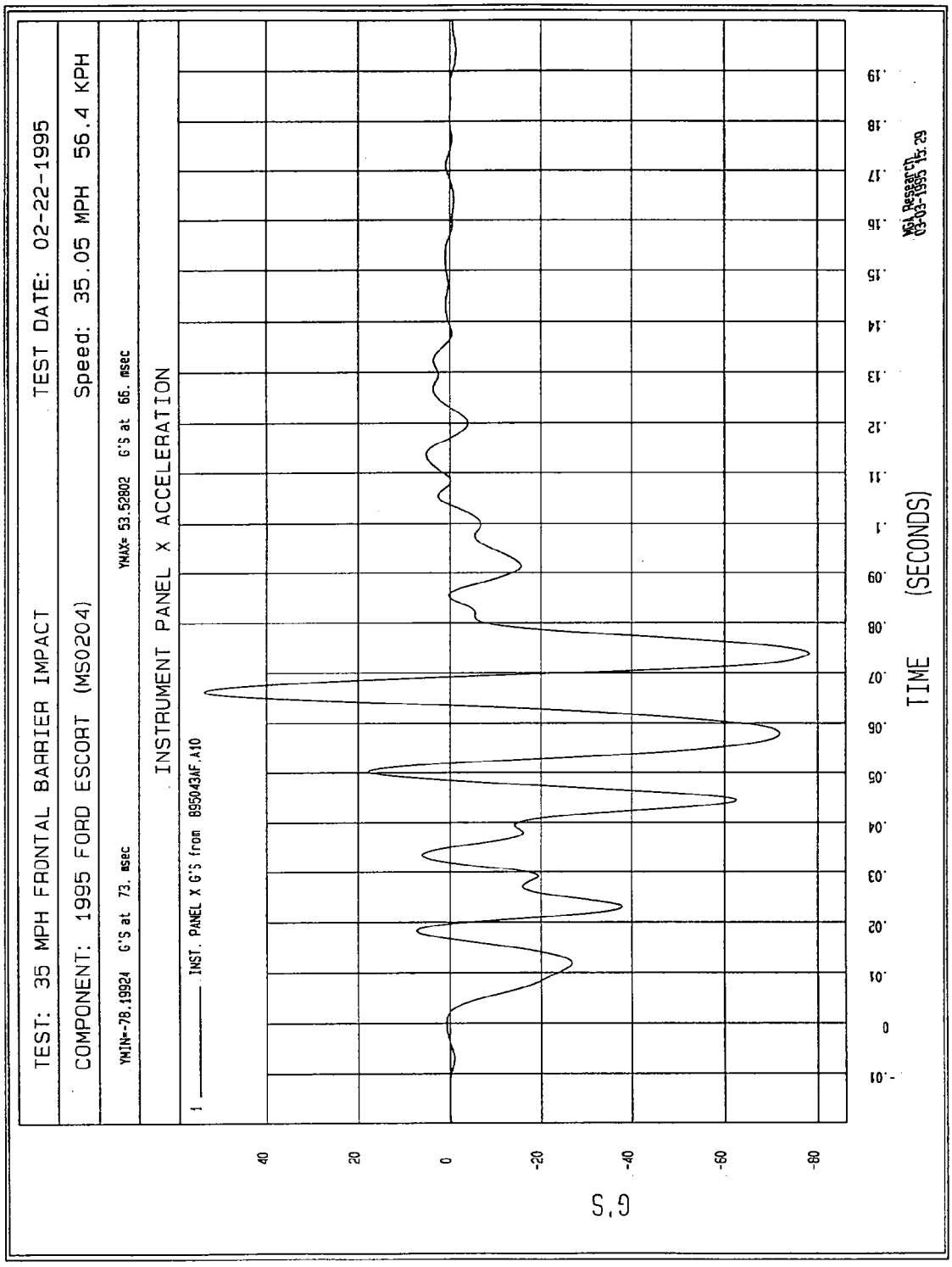


Figure B-17 - Instrument Panel X Acceleration vs. Time

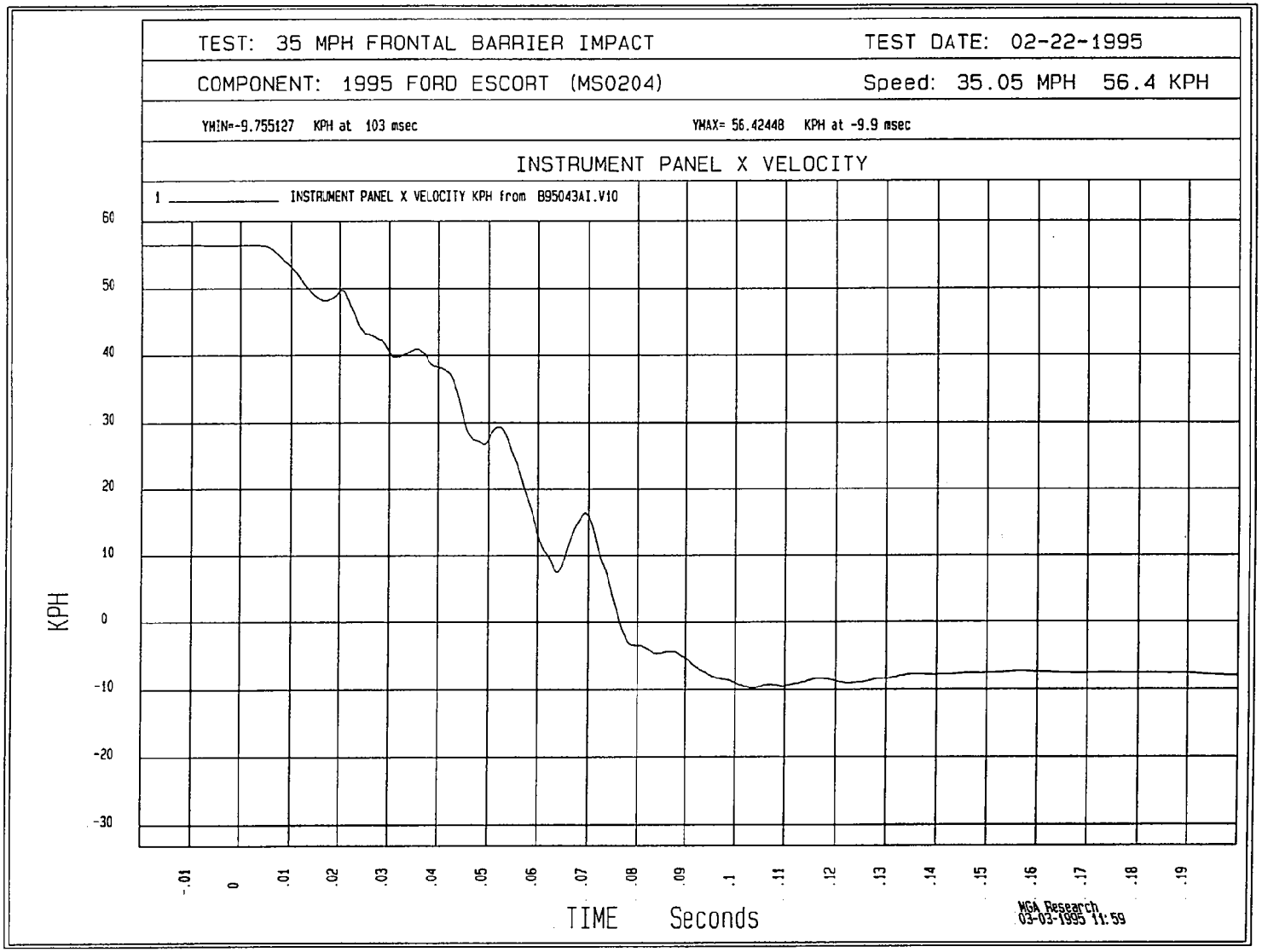


Figure B-18 - Instrument Panel X Velocity vs. Time

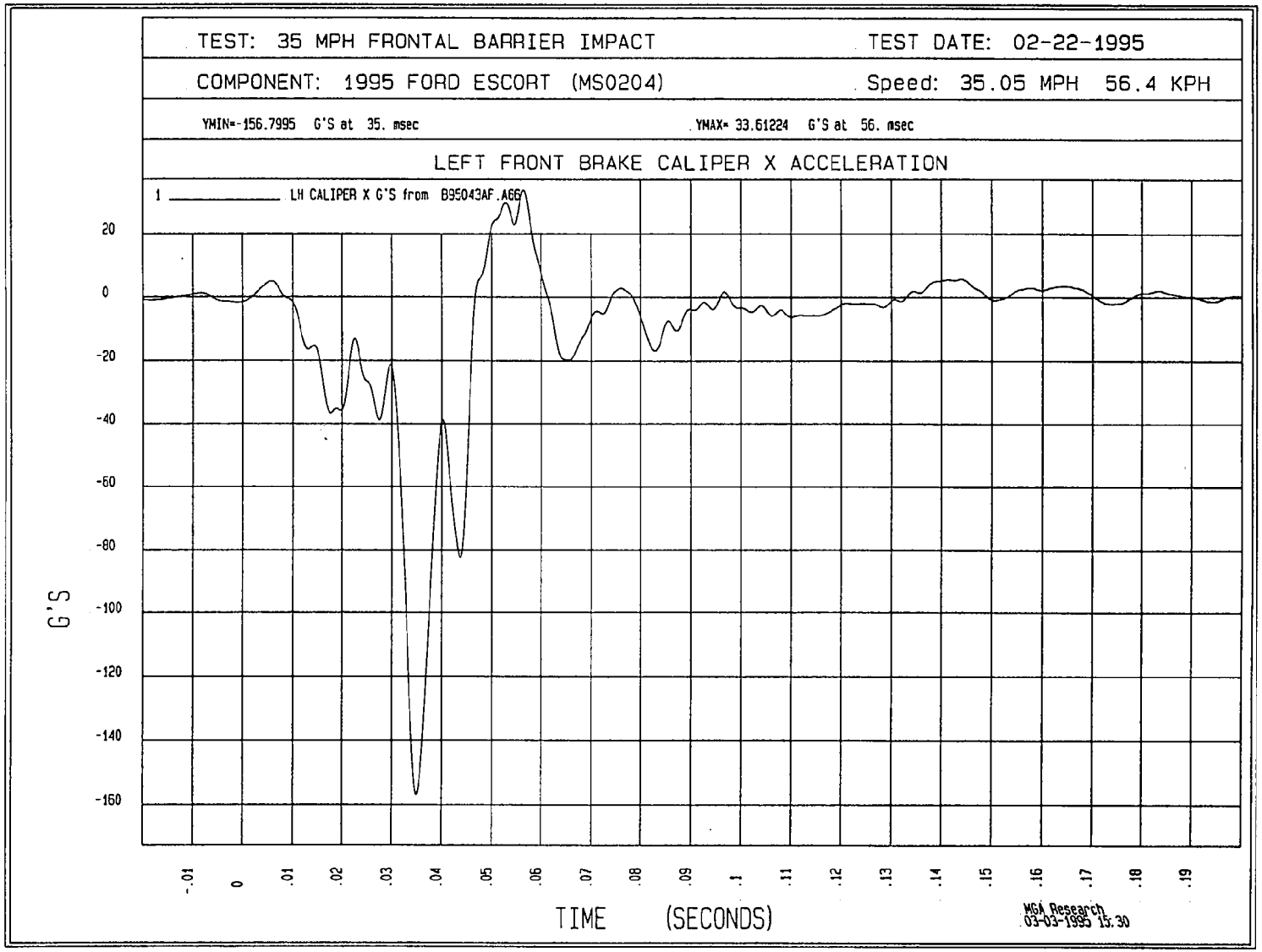


Figure B-19 - Left Brake Caliper X Acceleration vs. Time

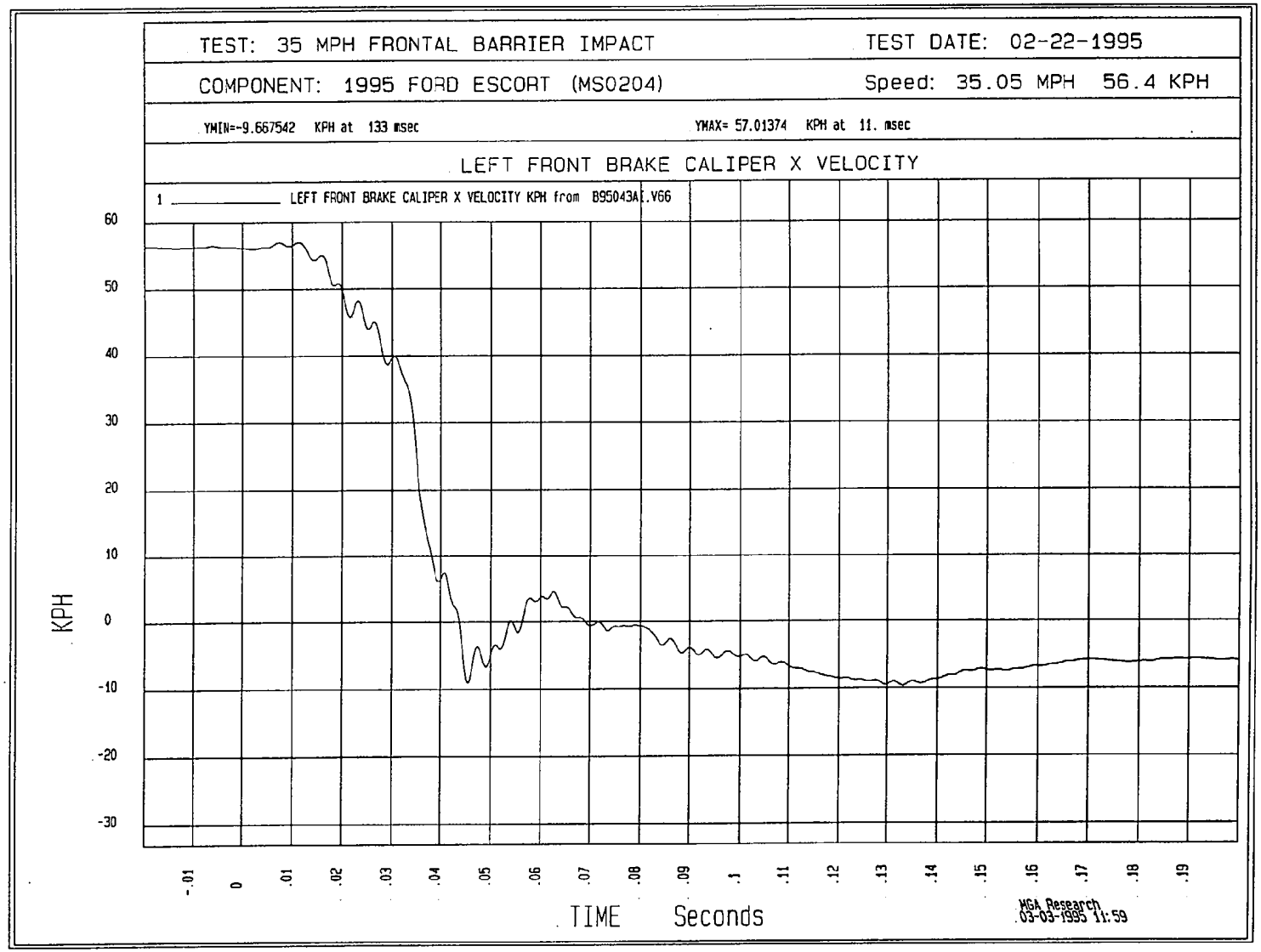


Figure B-2Ø - Left Brake Caliper X Velocity vs. Time

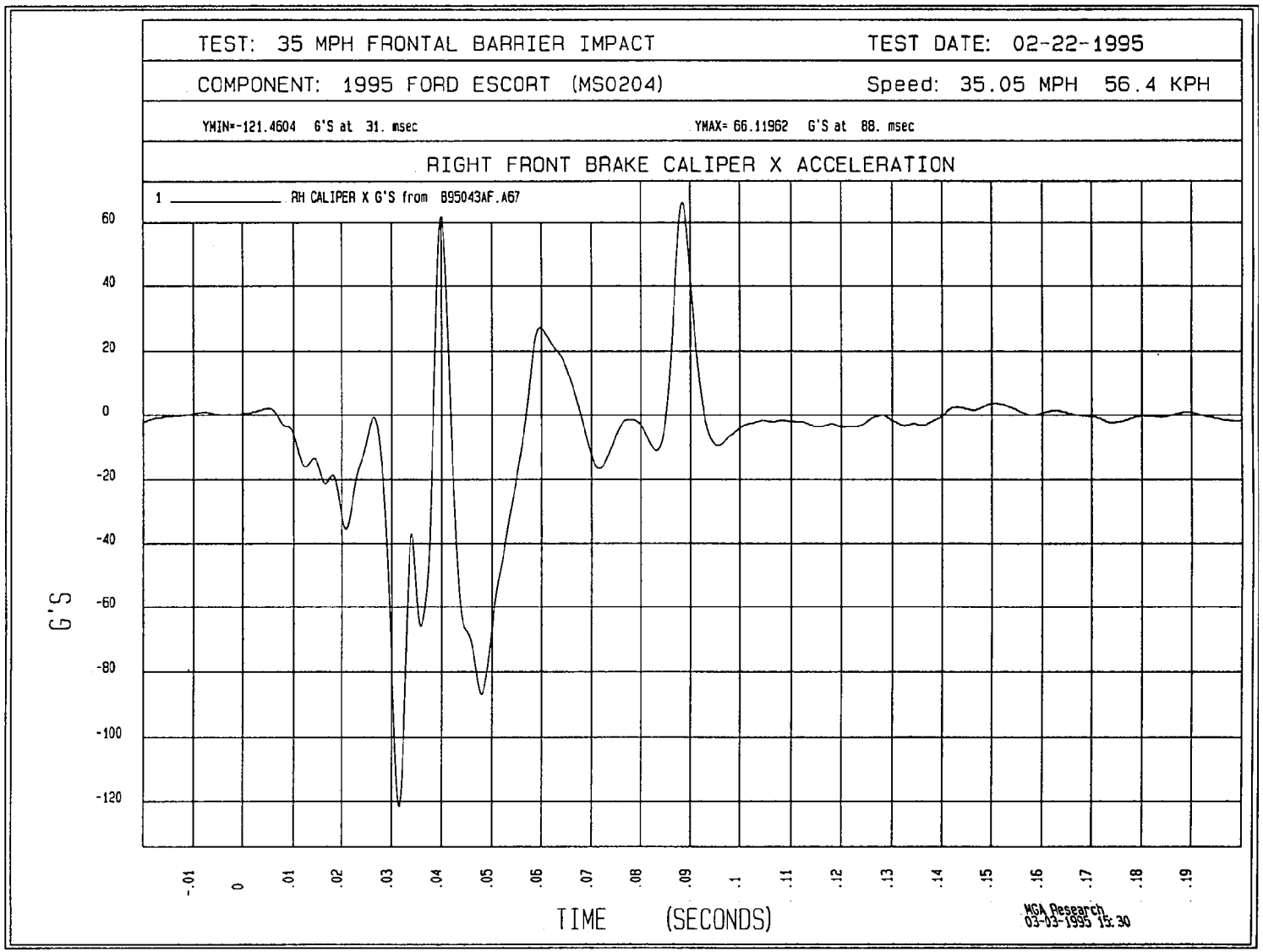


Figure B-21 - Right Brake Caliper X Acceleration vs. Time

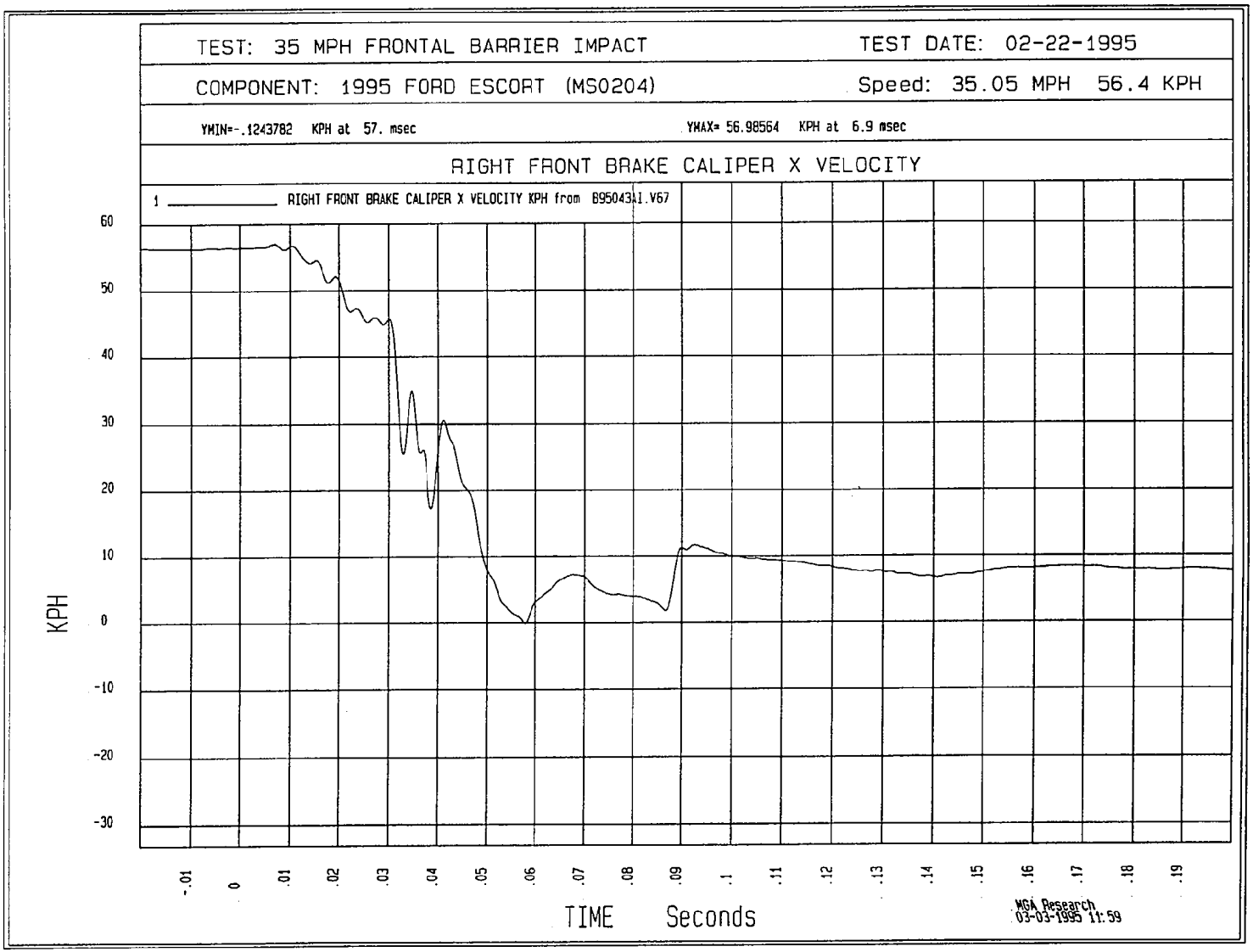


Figure B-22 - Right Brake Caliper X Velocity vs. Time

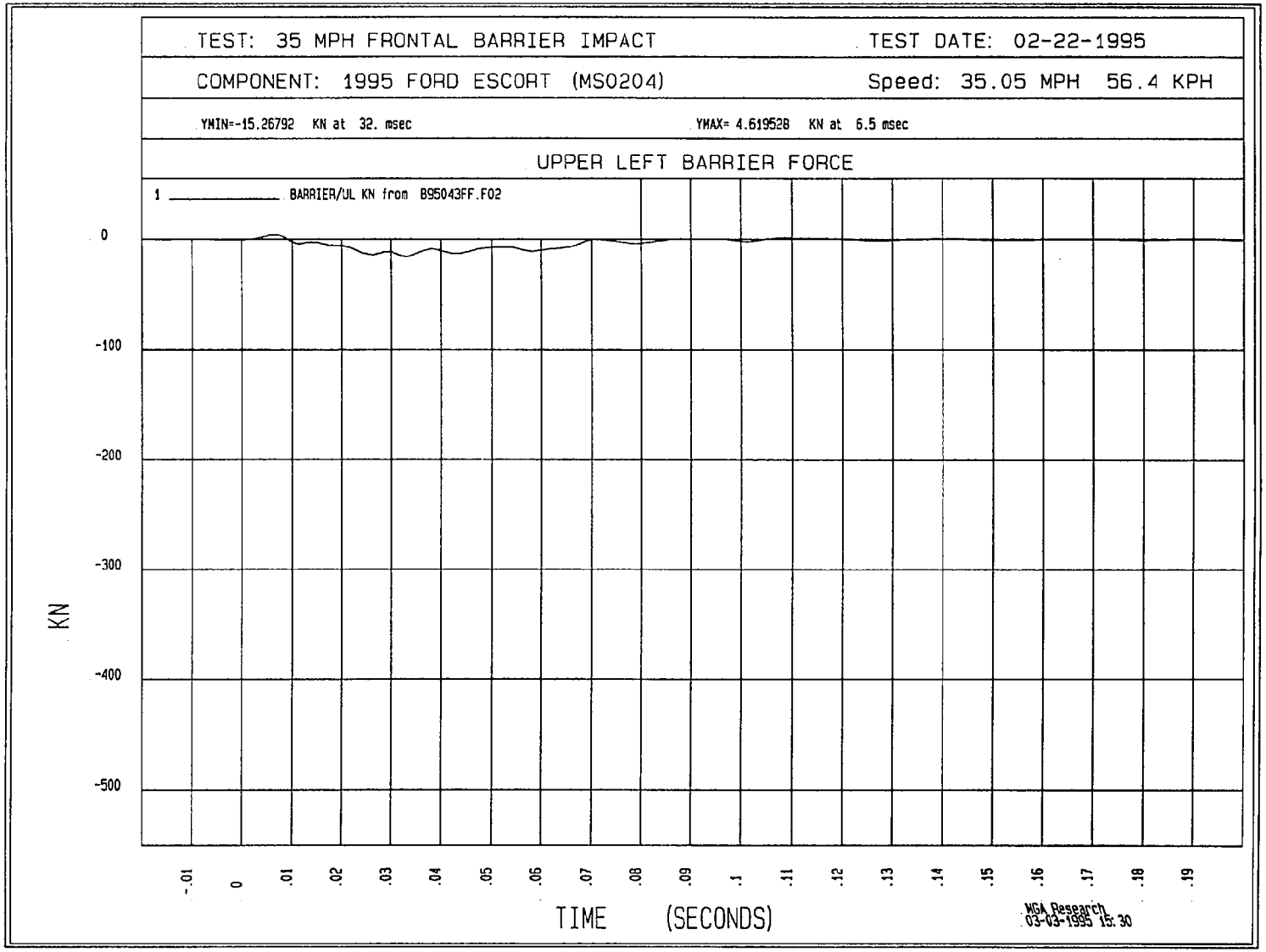


Figure B-23 - Upper Left Barrier Force vs. Time

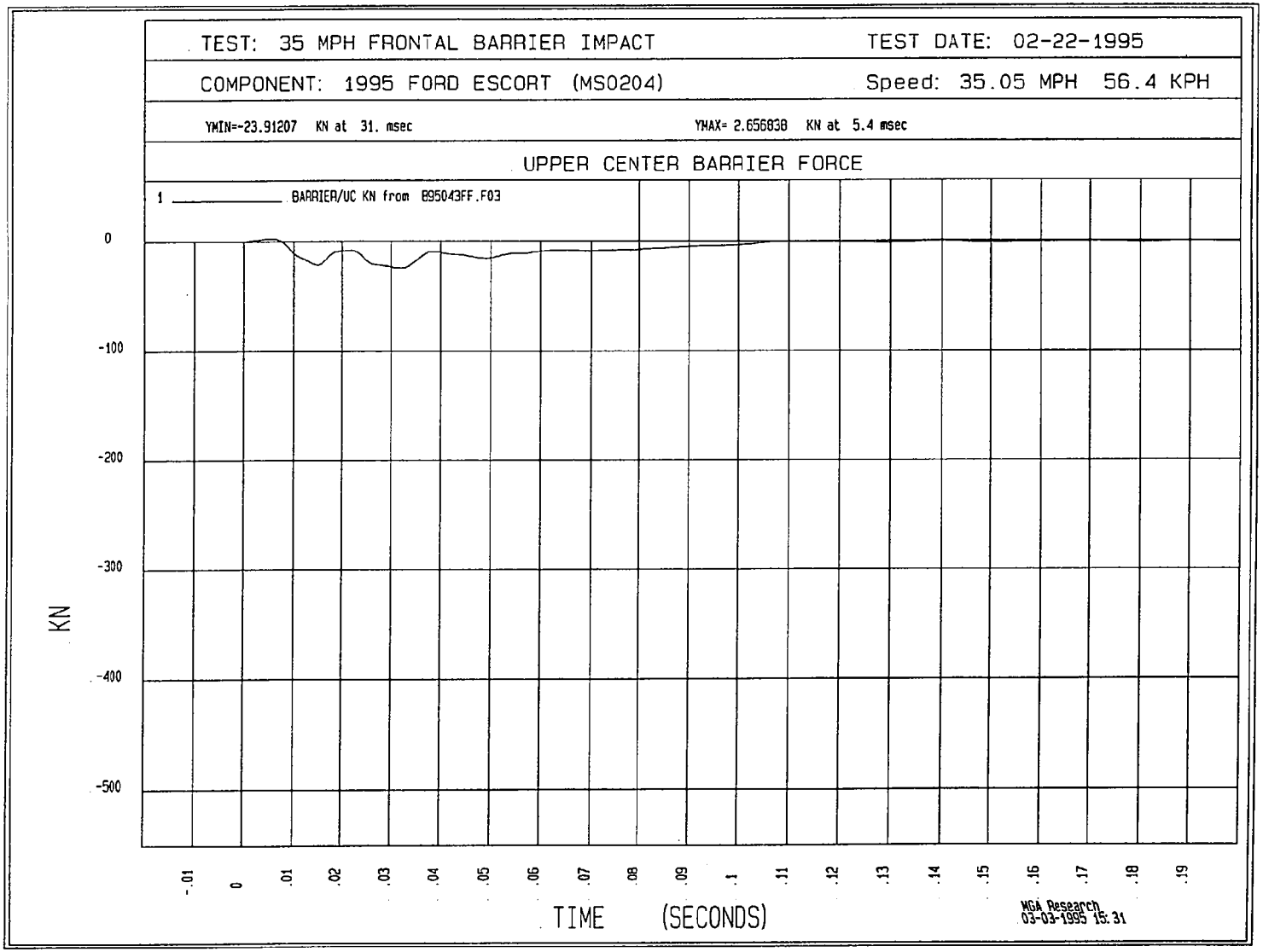


Figure B-24 - Upper Center Barrier Force vs. Time

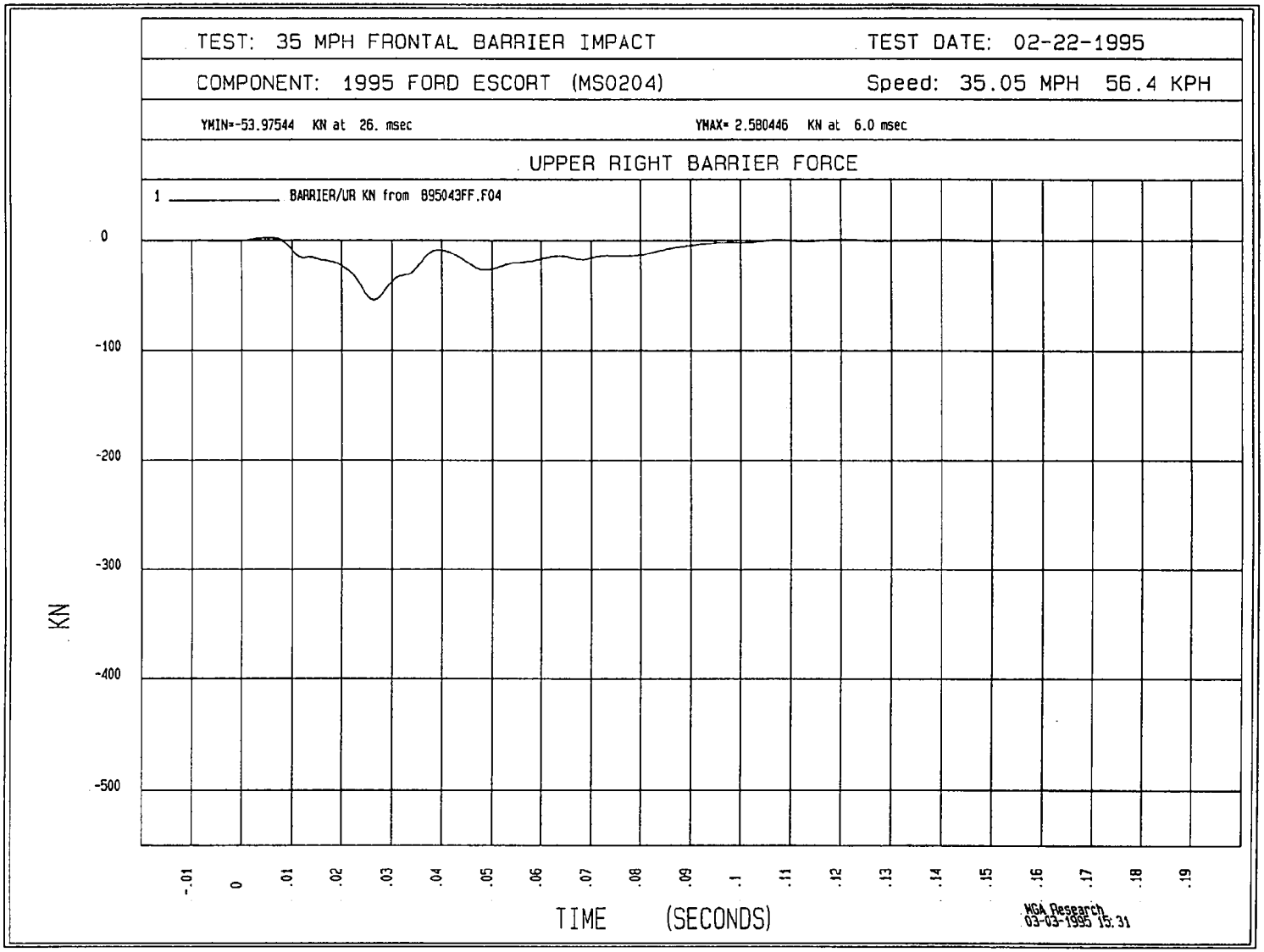


Figure B-25 - Upper Right Barrier Force vs. Time

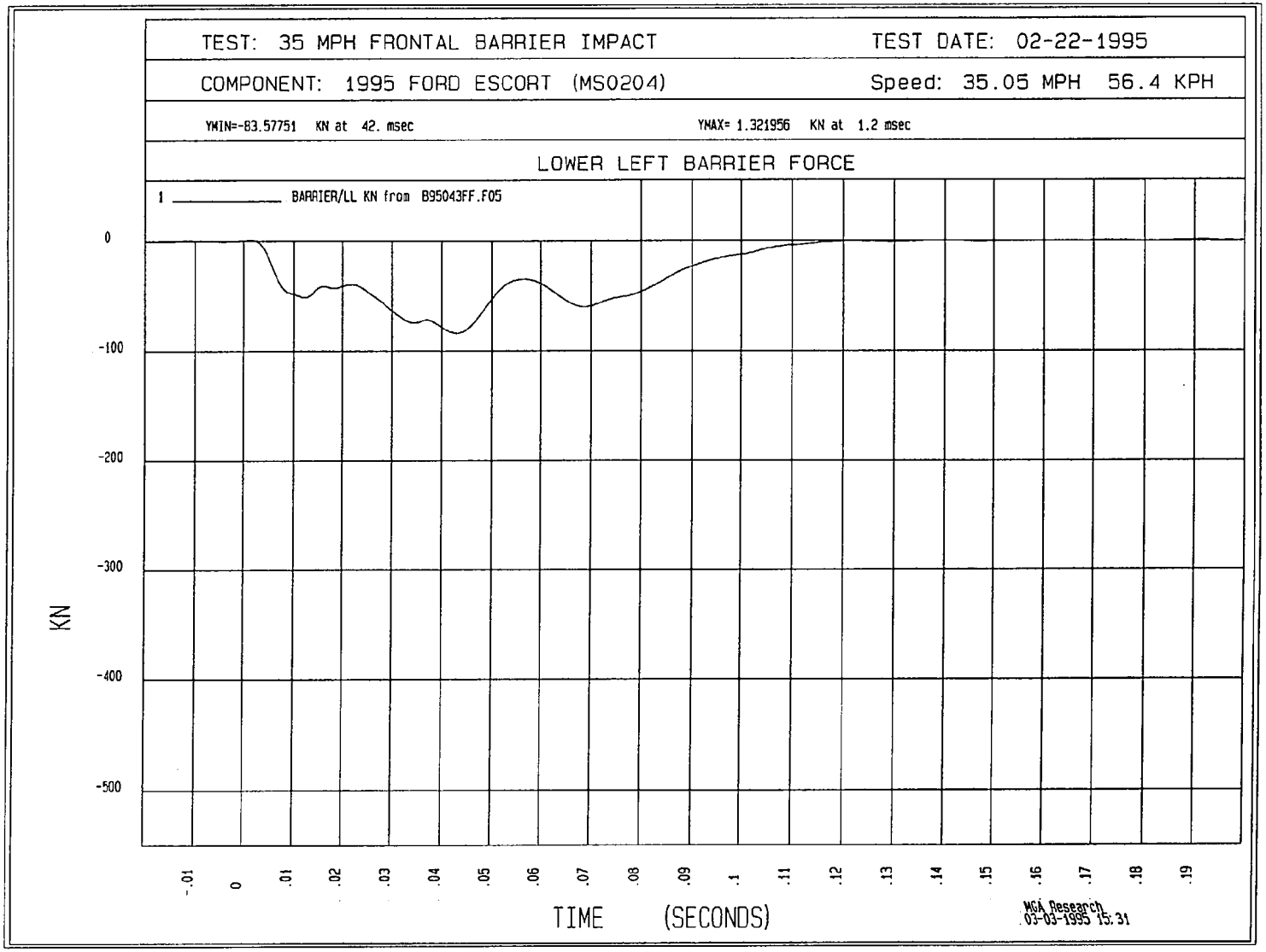


Figure B-26 - Lower Left Barrier Force vs. Time

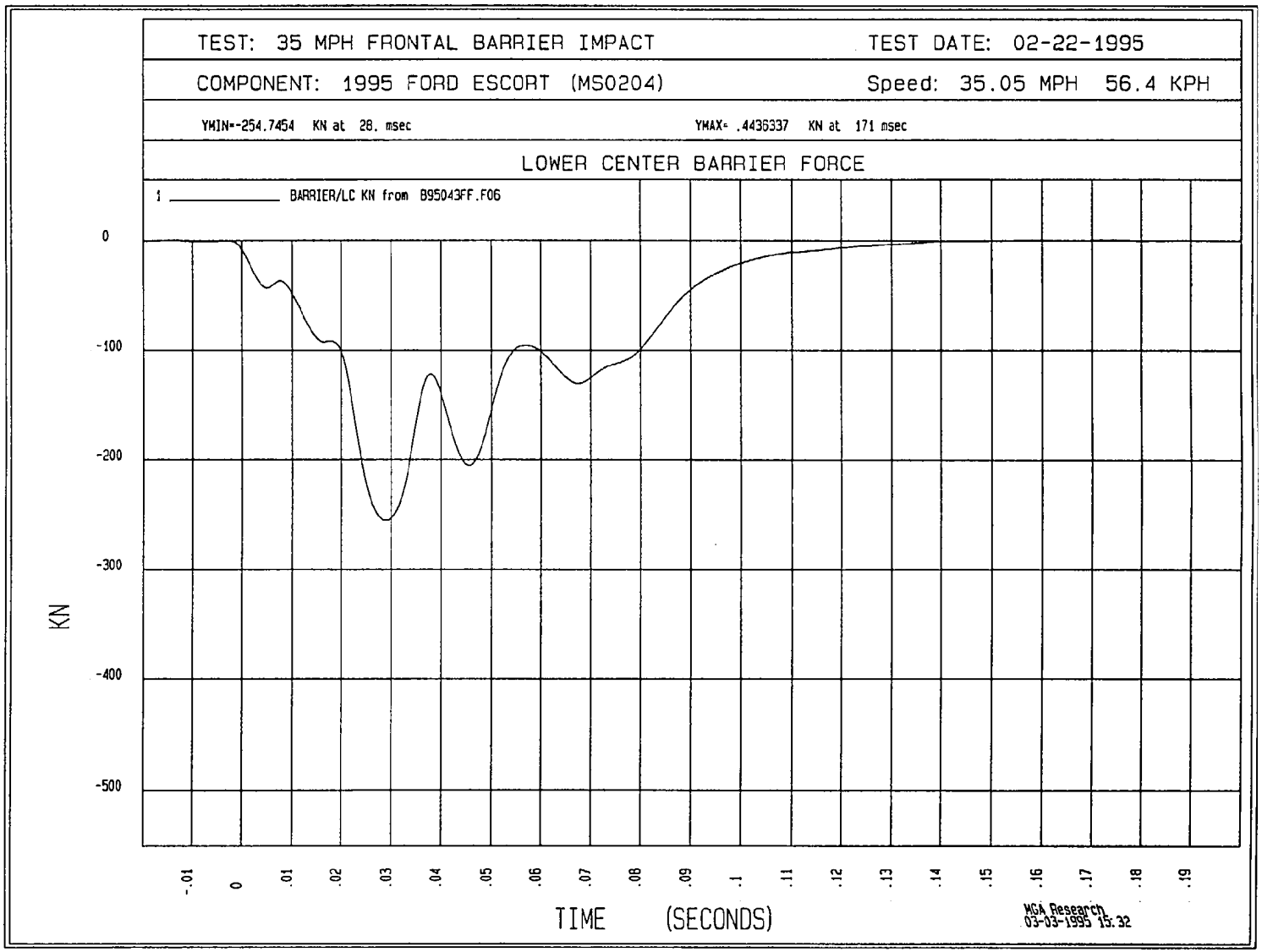


Figure B-27 - Lower Center Barrier Force vs. Time

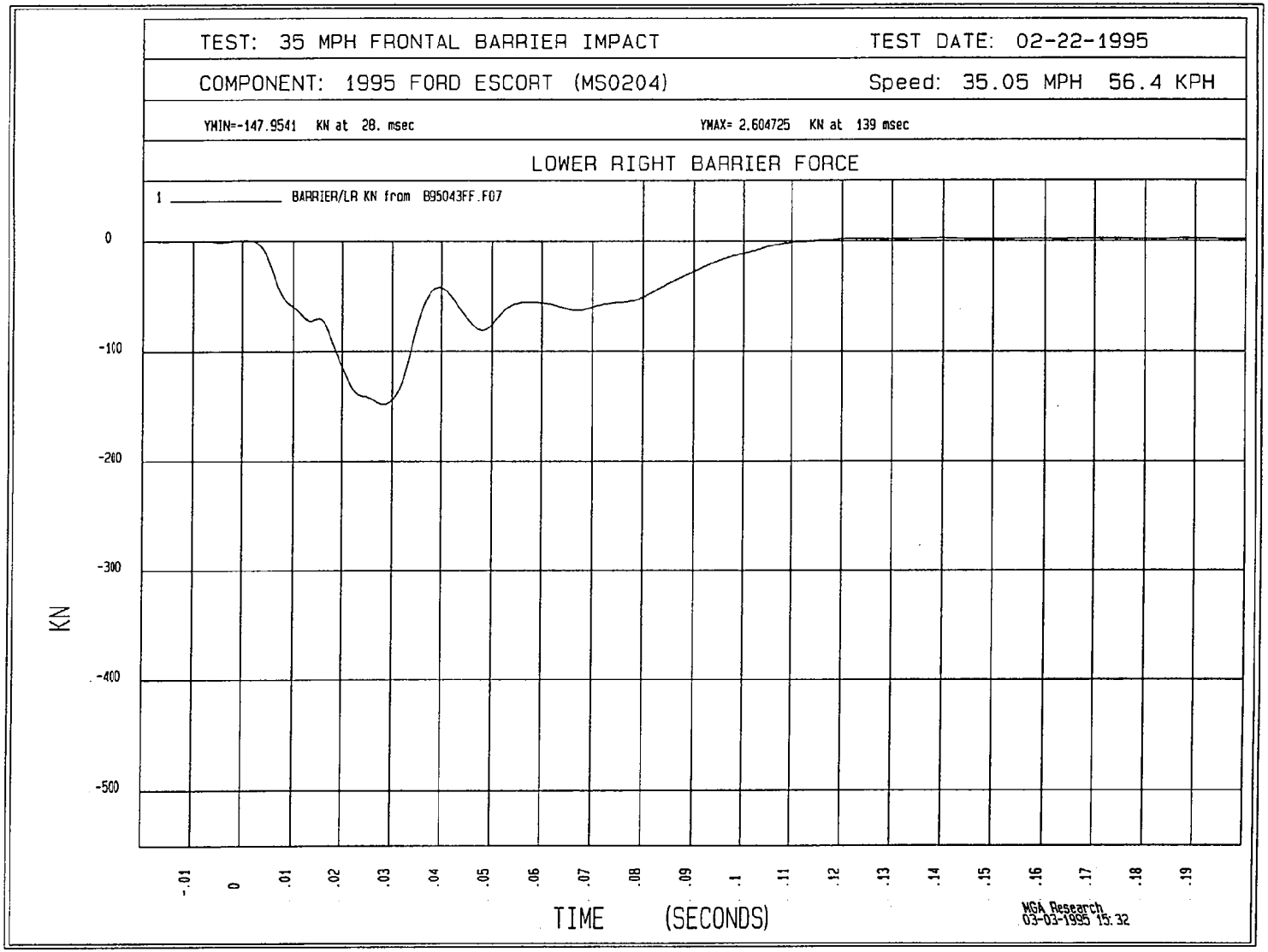


Figure B-28 - Lower Right Barrier Force vs. Time

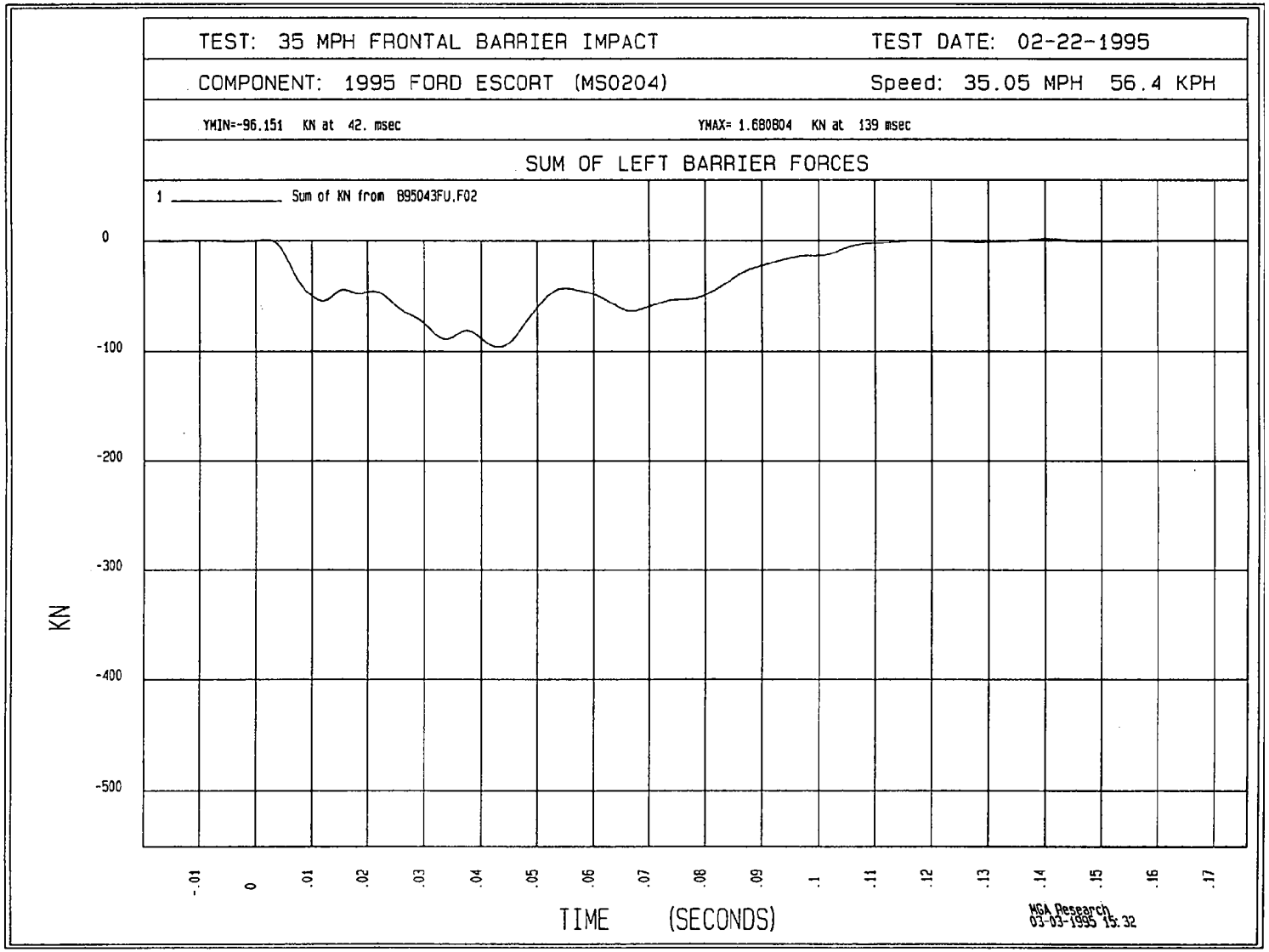


Figure B-29 - Sum of Left Barrier Forces vs. Time

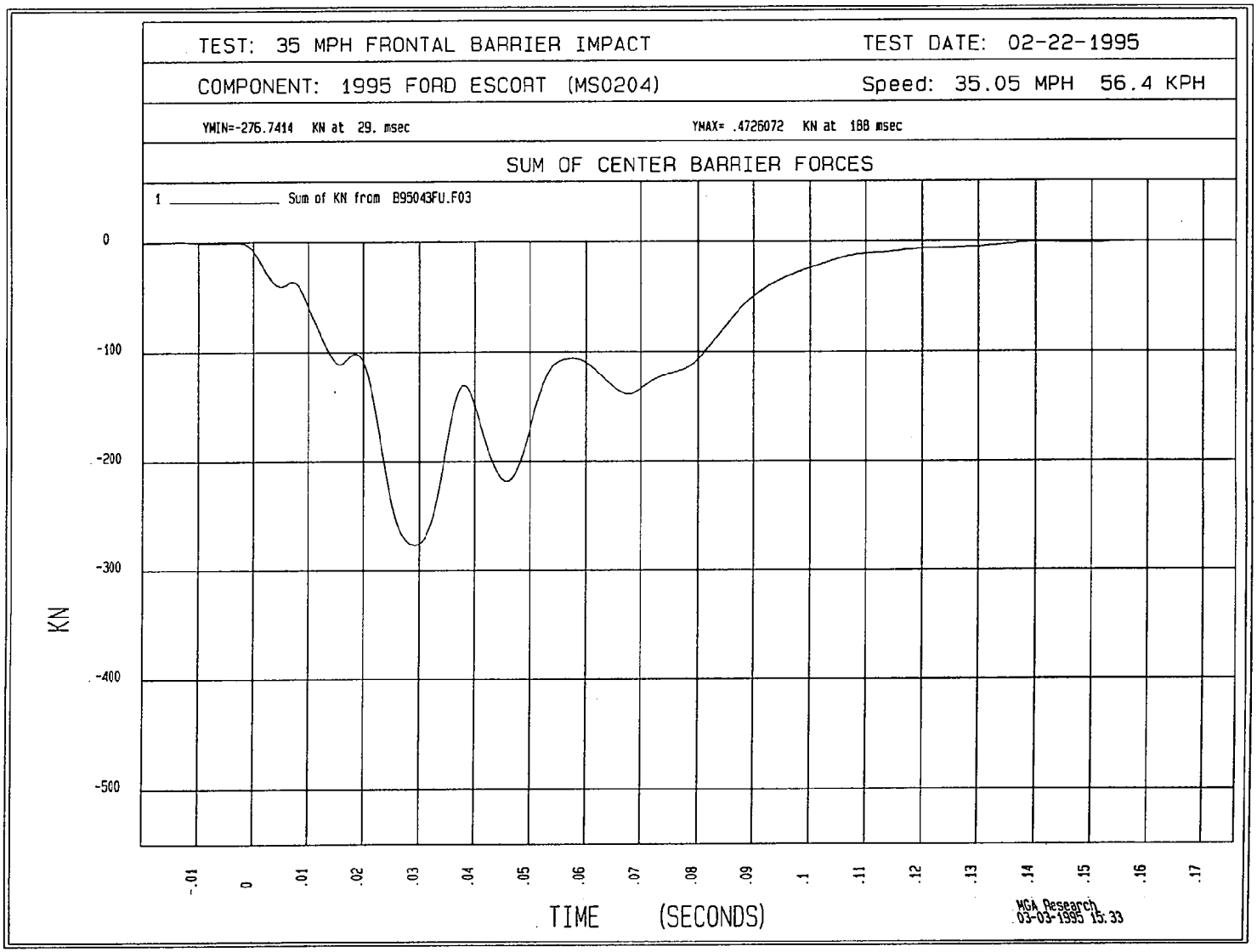


Figure B-30 - Sum of Center Barrier Forces vs. Time

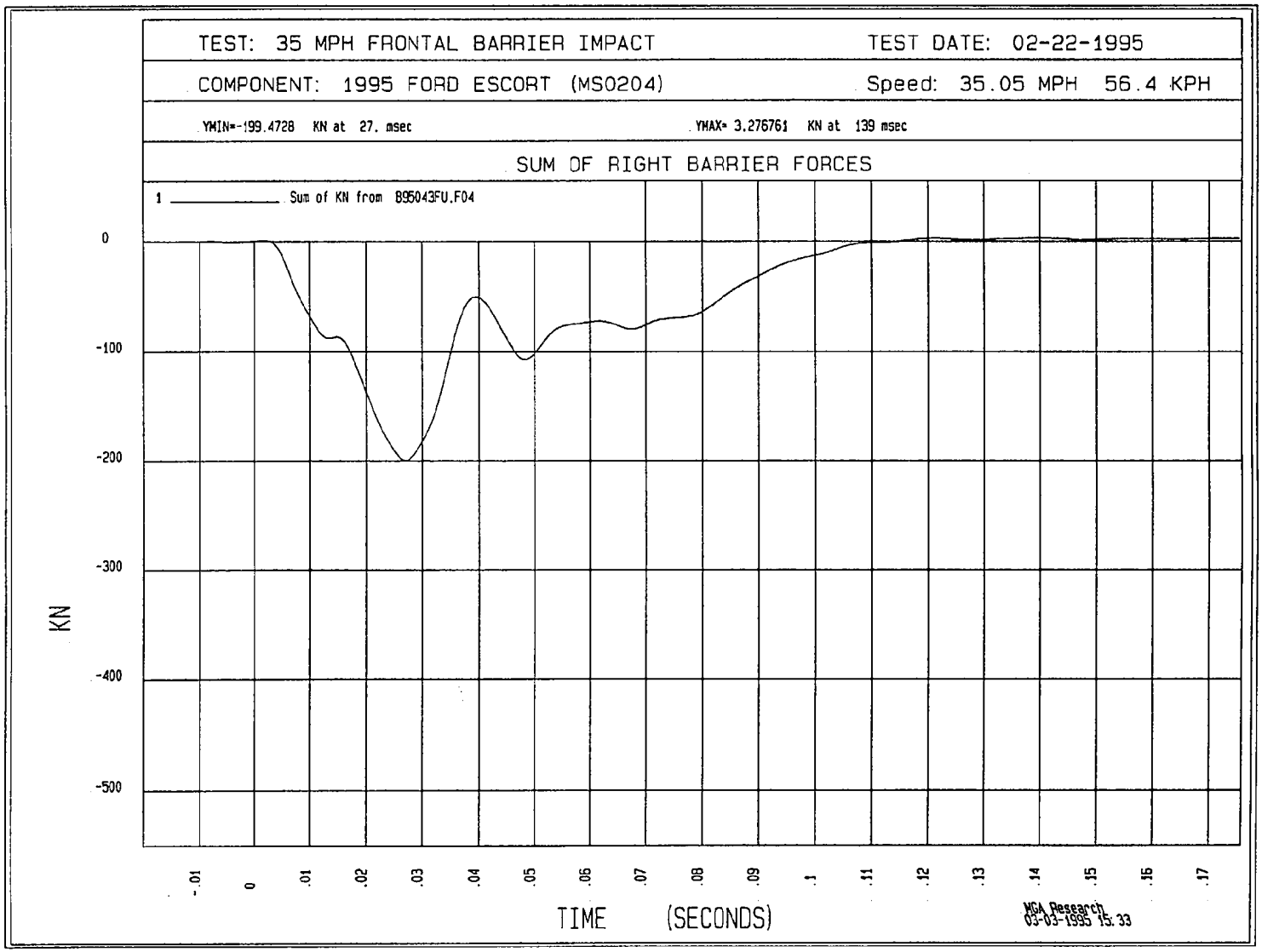


Figure B-31 - Sum of Right Barrier Forces vs. Time

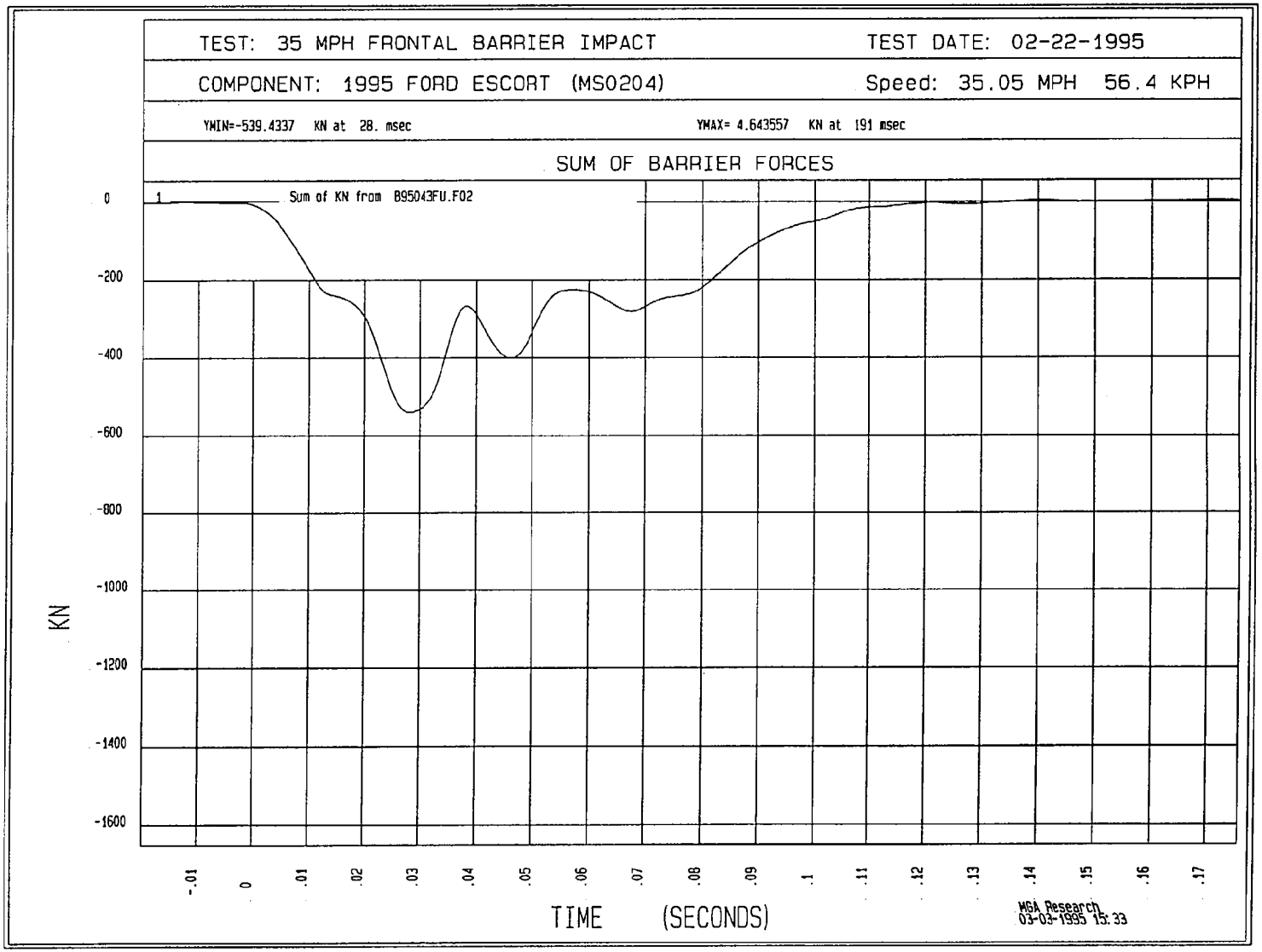


Figure B-32 - Sum of Barrier Forces vs. Time

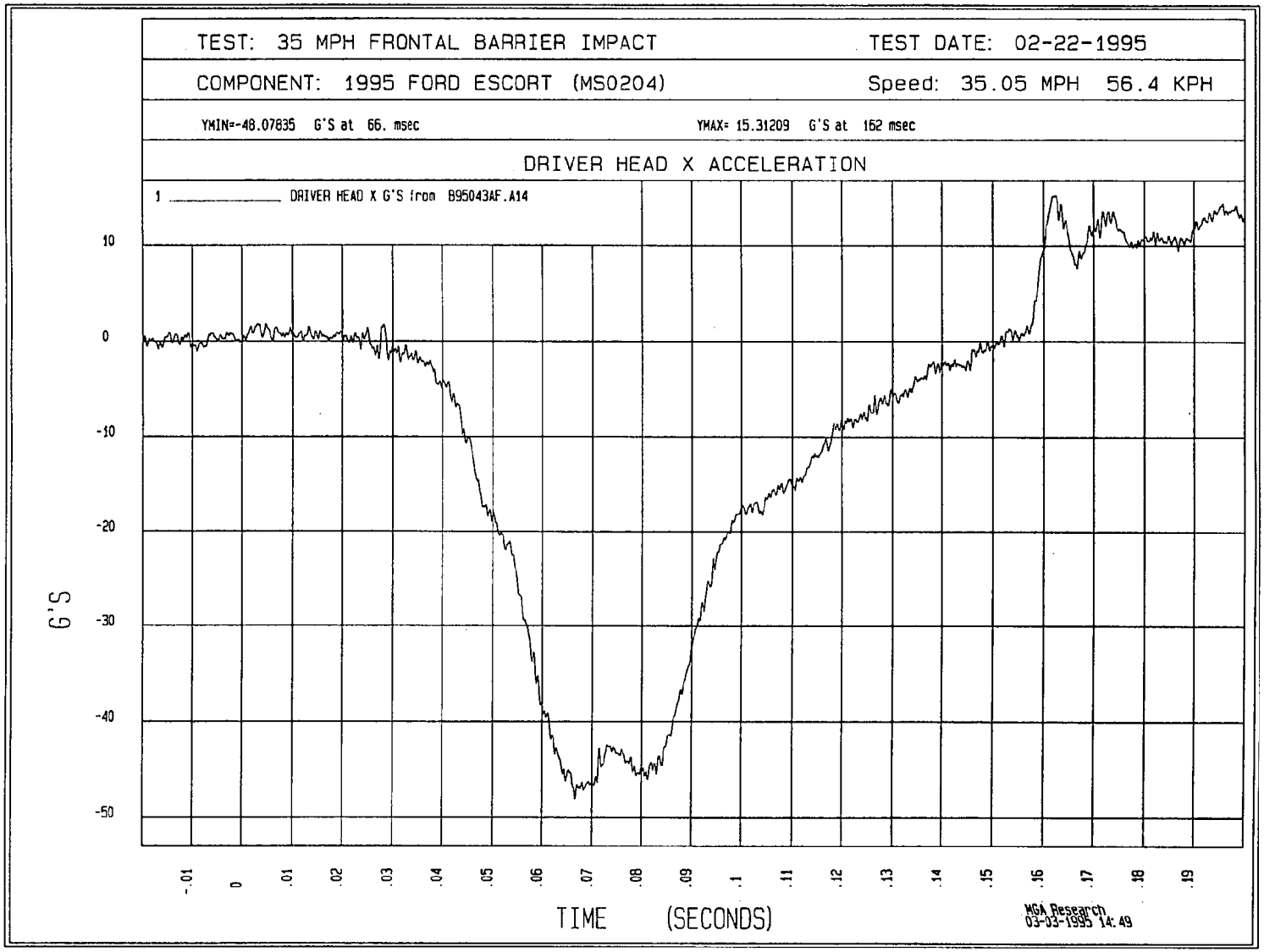


Figure B-33 - Driver Head X Acceleration vs. Time

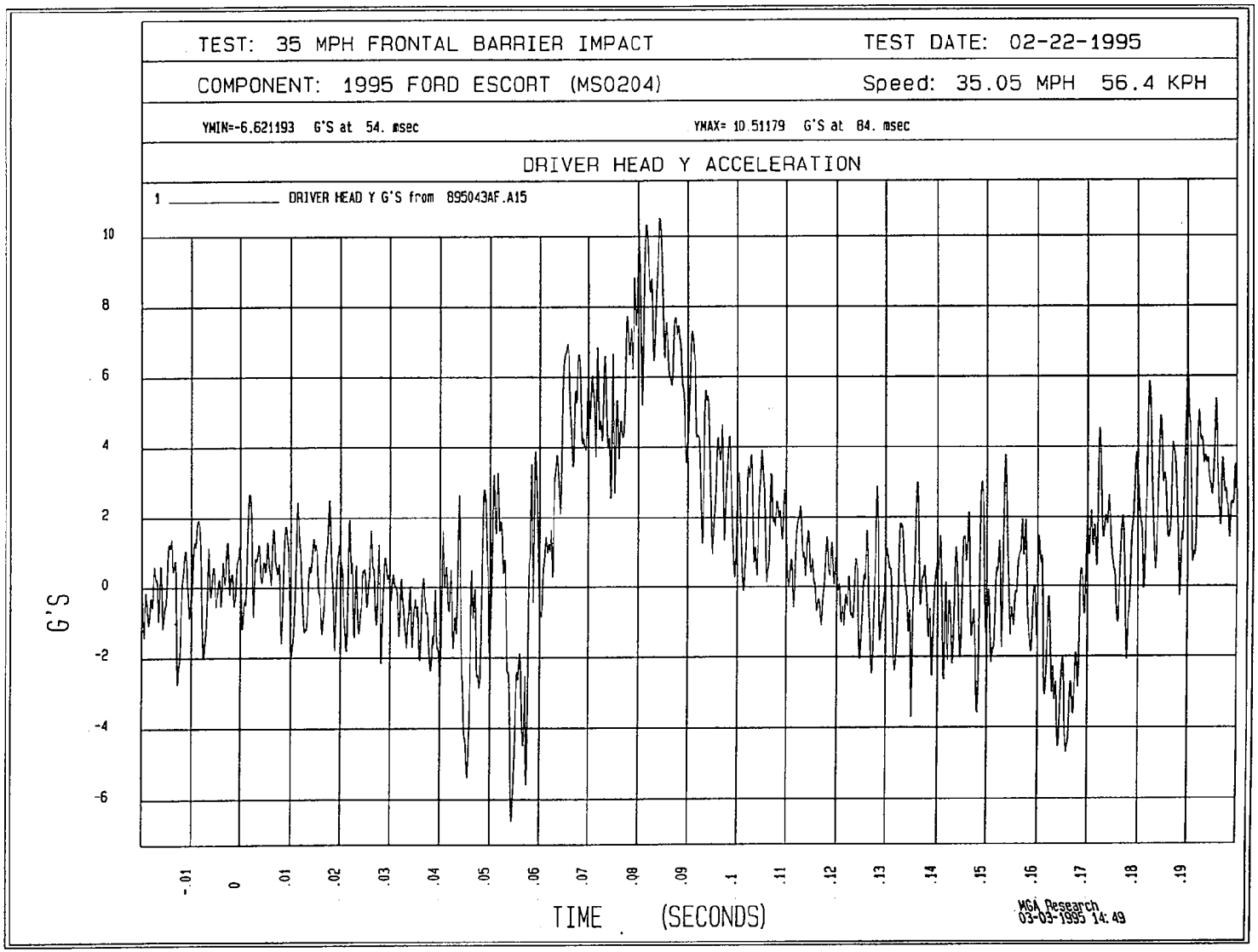


Figure B-34 - Driver Head Y Acceleration vs. Time

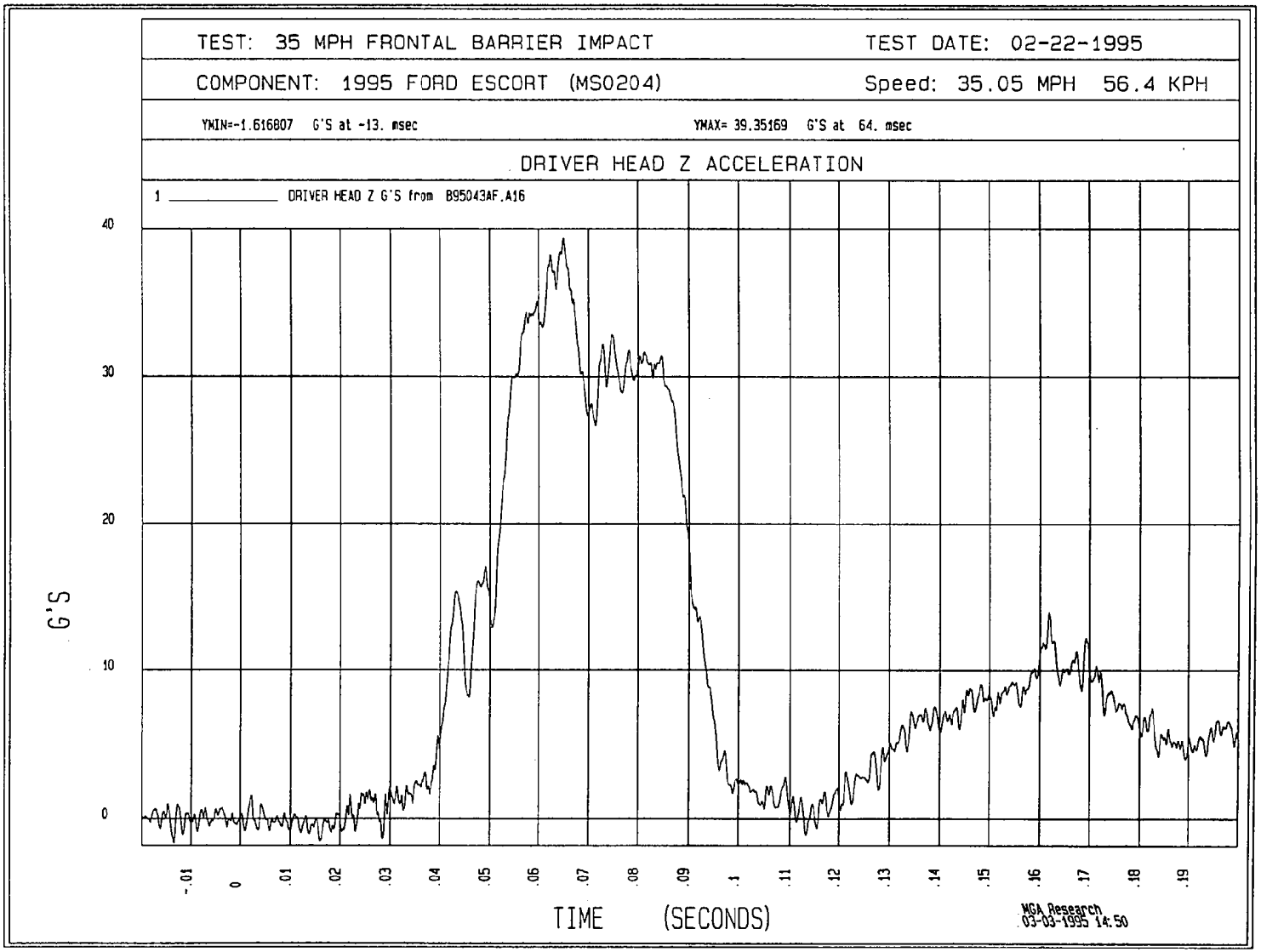


Figure B-35 - Driver Head Z Acceleration vs. Time

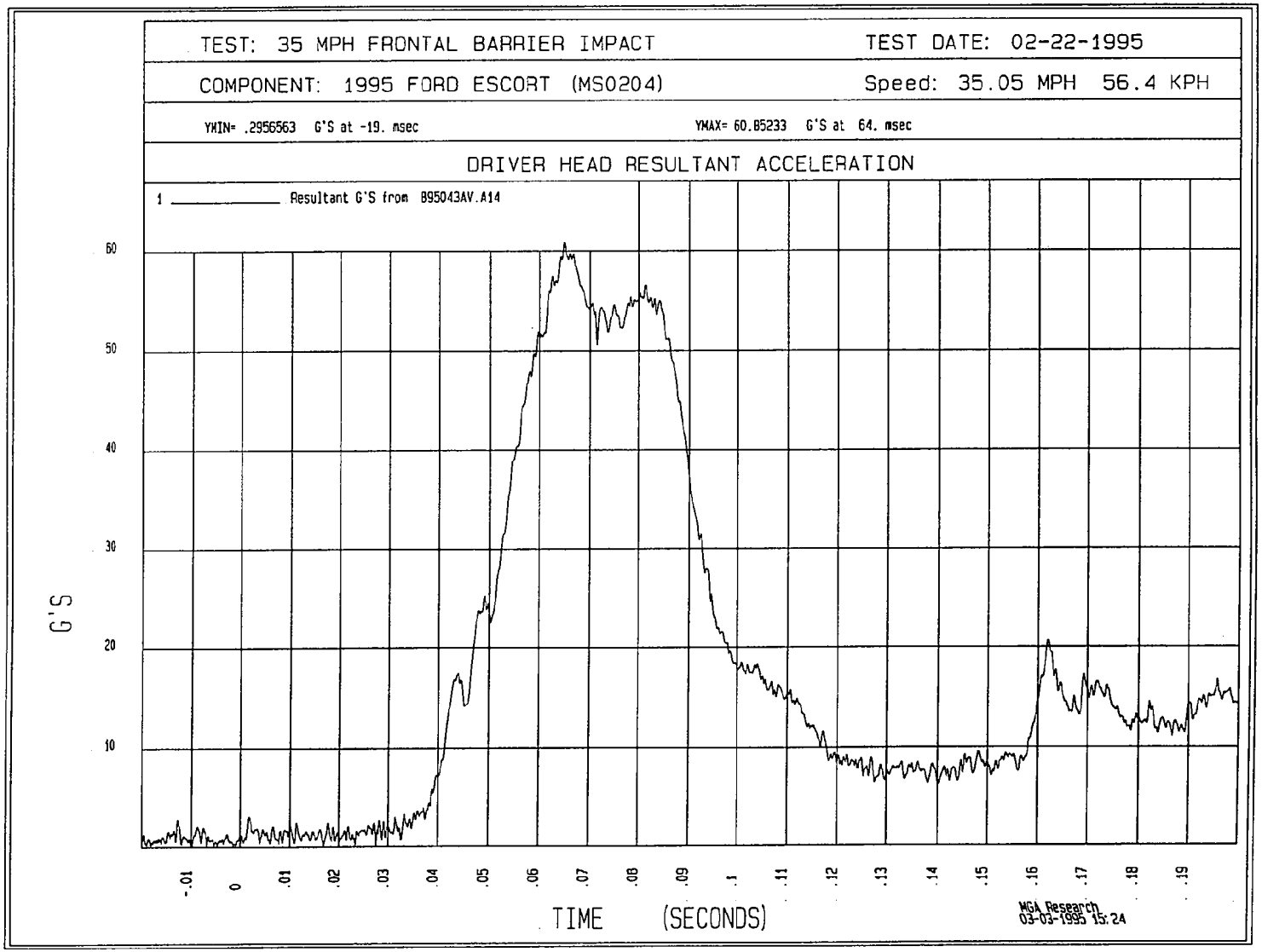


Figure B-36 - Driver Head Resultant Acceleration vs. Time

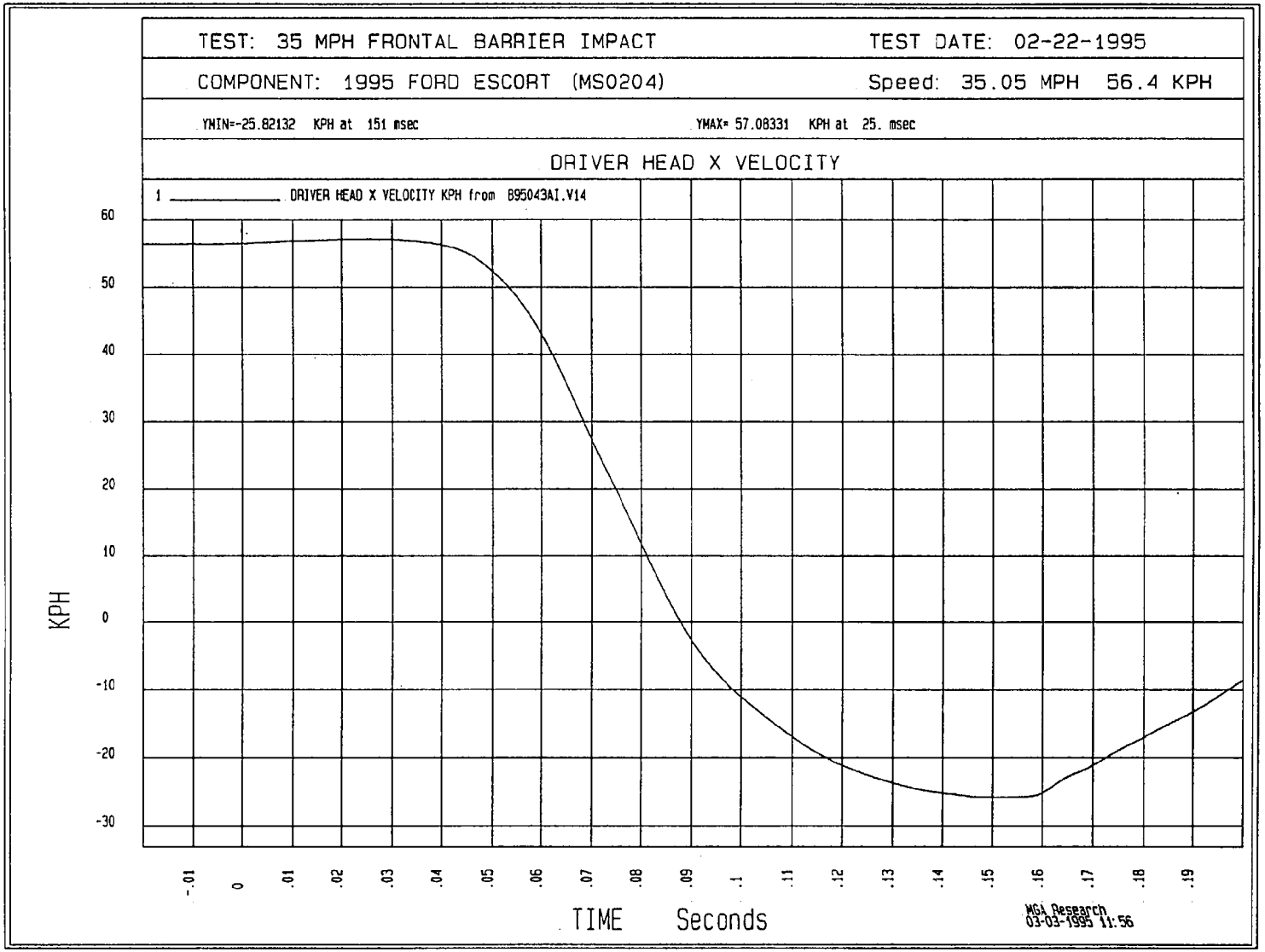


Figure B-37 - Driver Head X Velocity vs. Time

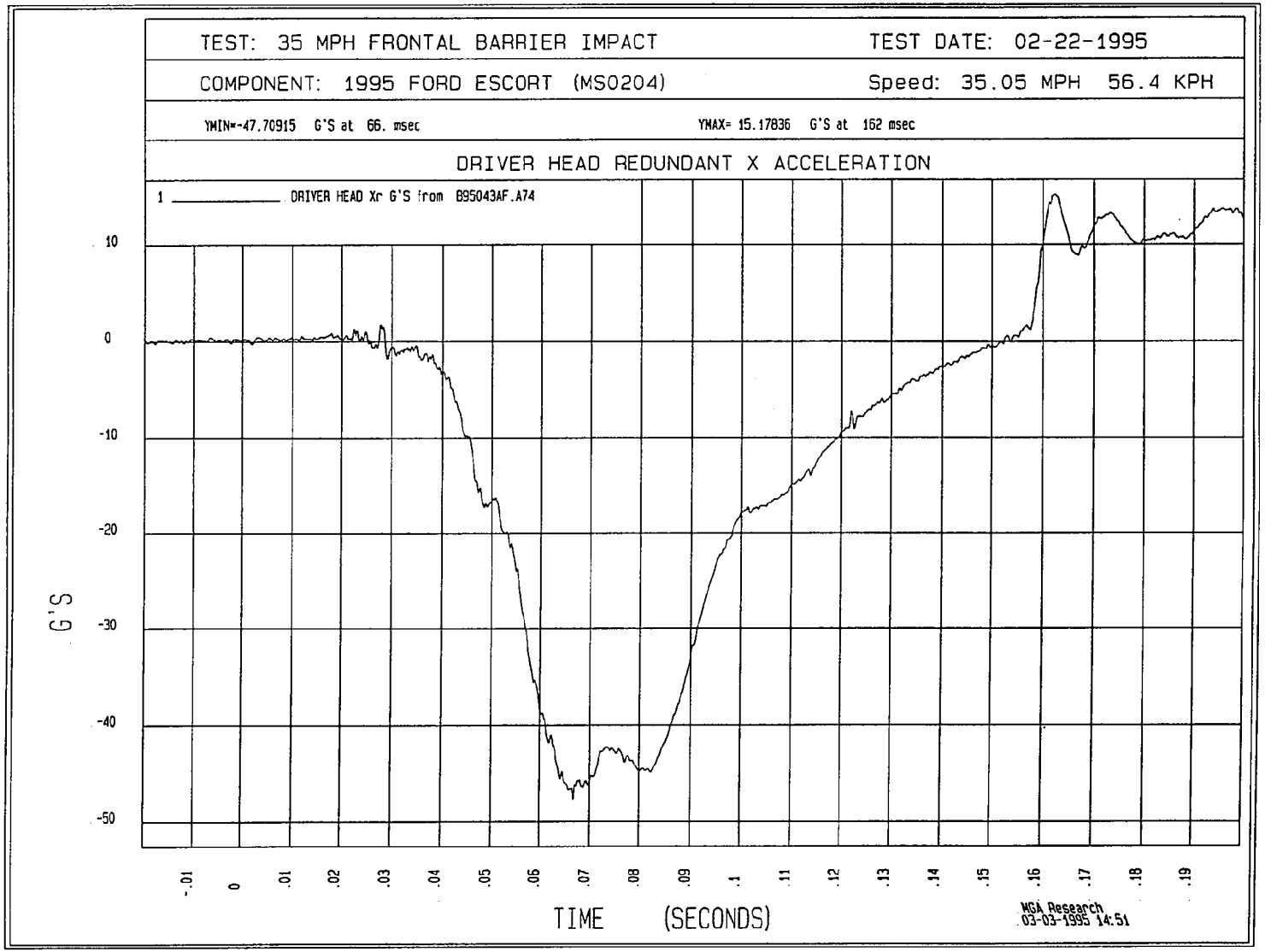


Figure B-38 - Driver Head X Redundant Acceleration vs. Time

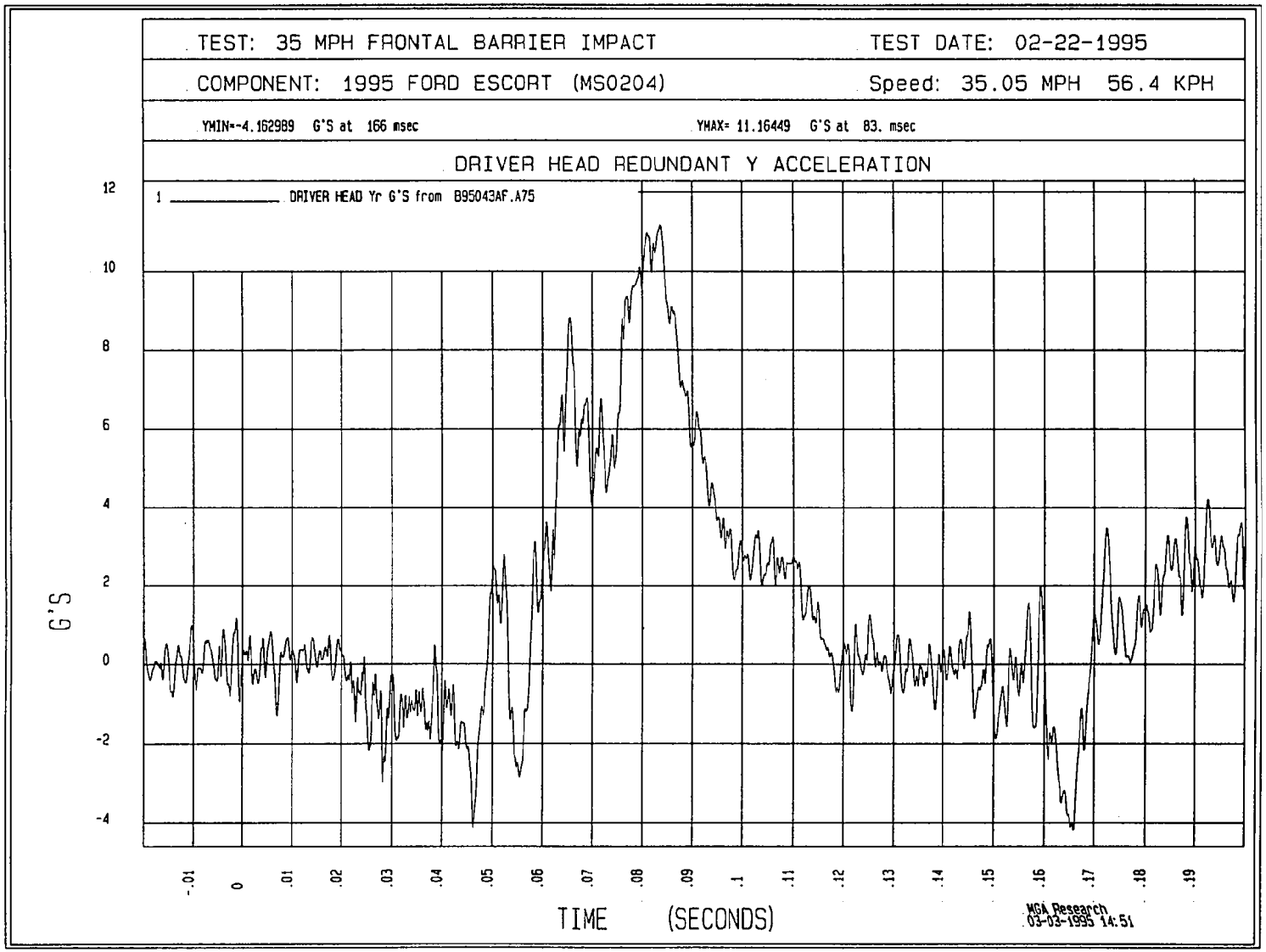


Figure B-39 - Driver Head Y Redundant Acceleration vs. Time

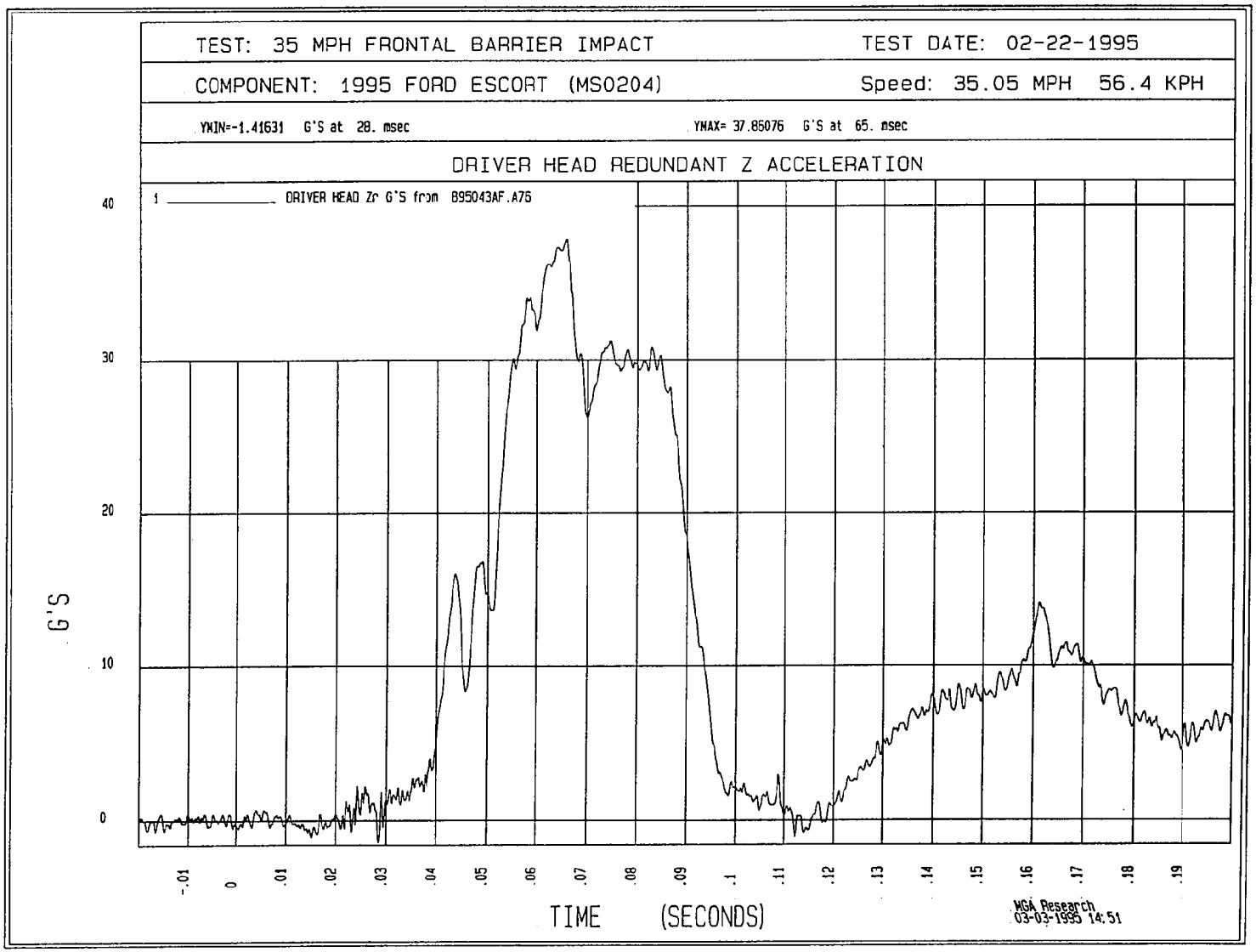


Figure B-40 - Driver Head Z Redundant Acceleration vs. Time

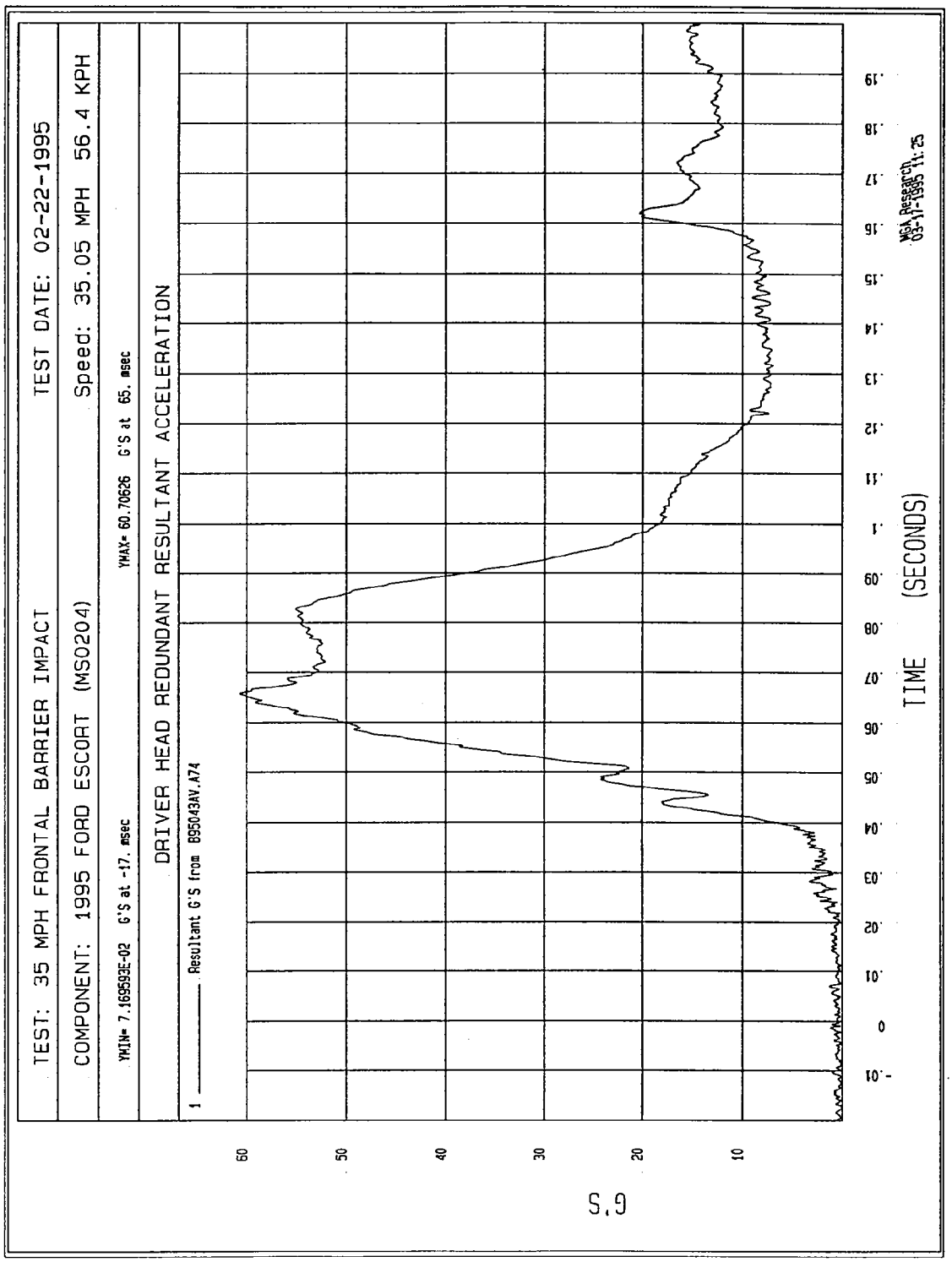


Figure B-41 - Driver Head Redundant Resultant Accel. vs. Time

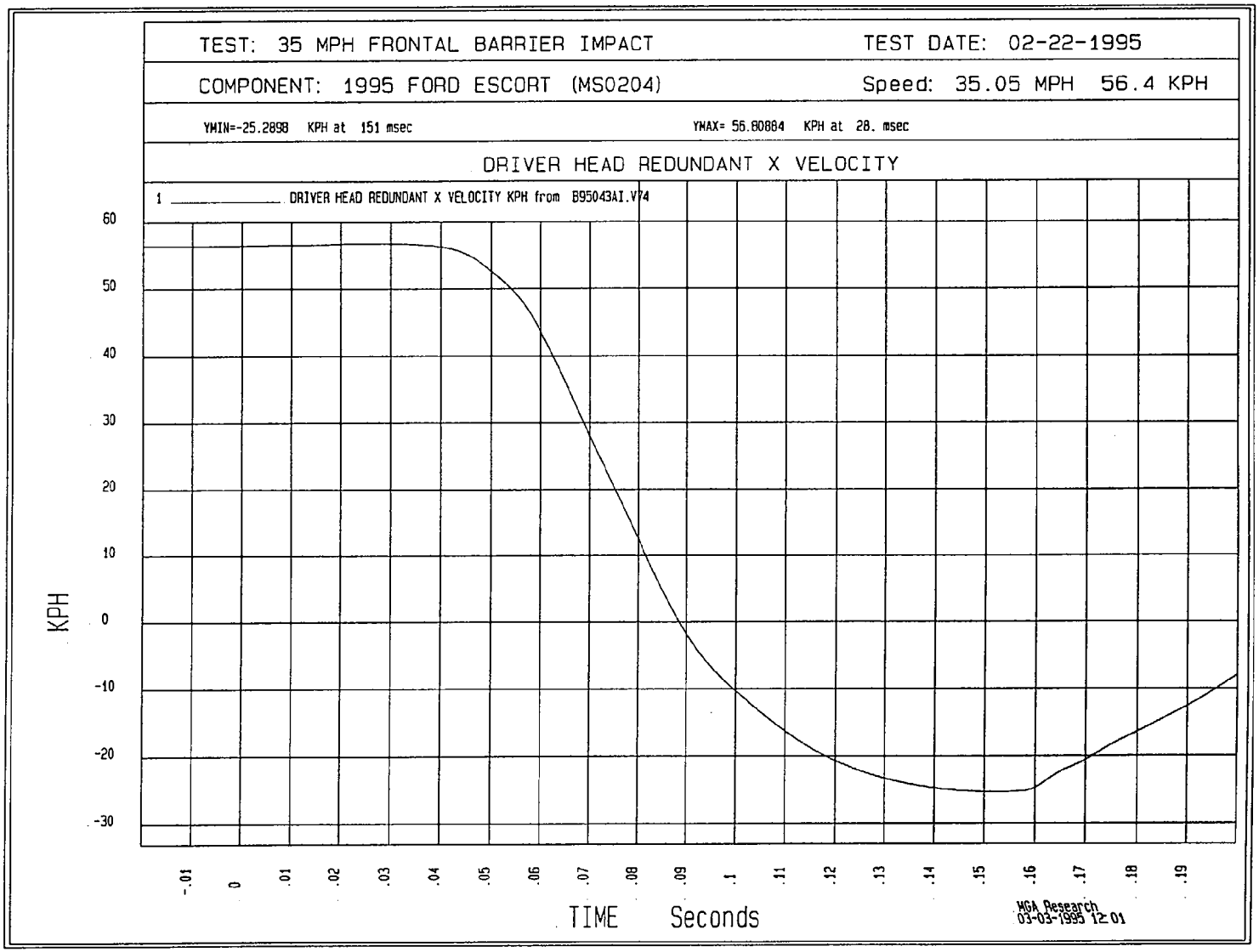


Figure B-42 - Driver Head X Redundant Velocity vs. Time

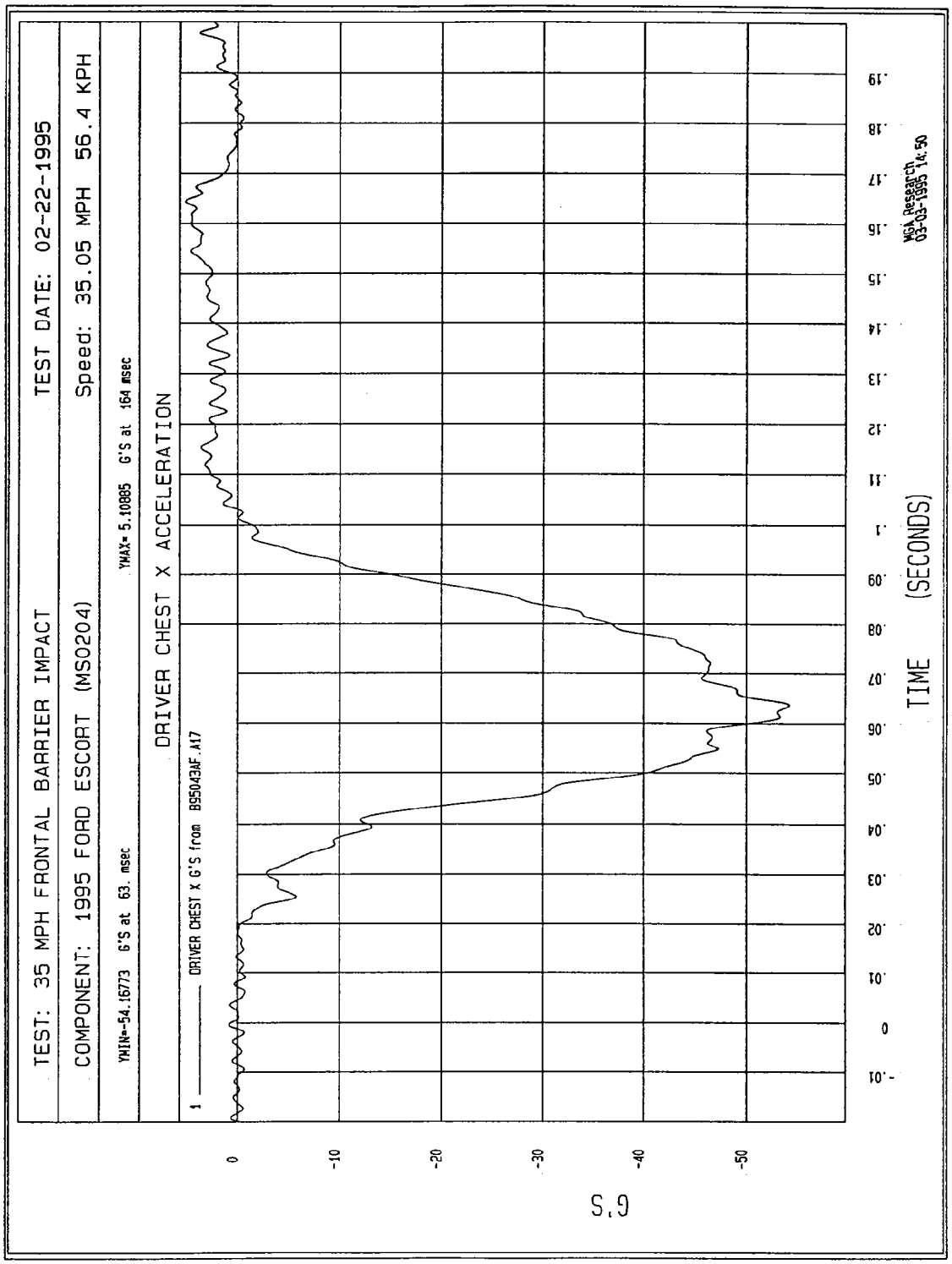


Figure B-43 - Driver Chest X Acceleration vs. Time

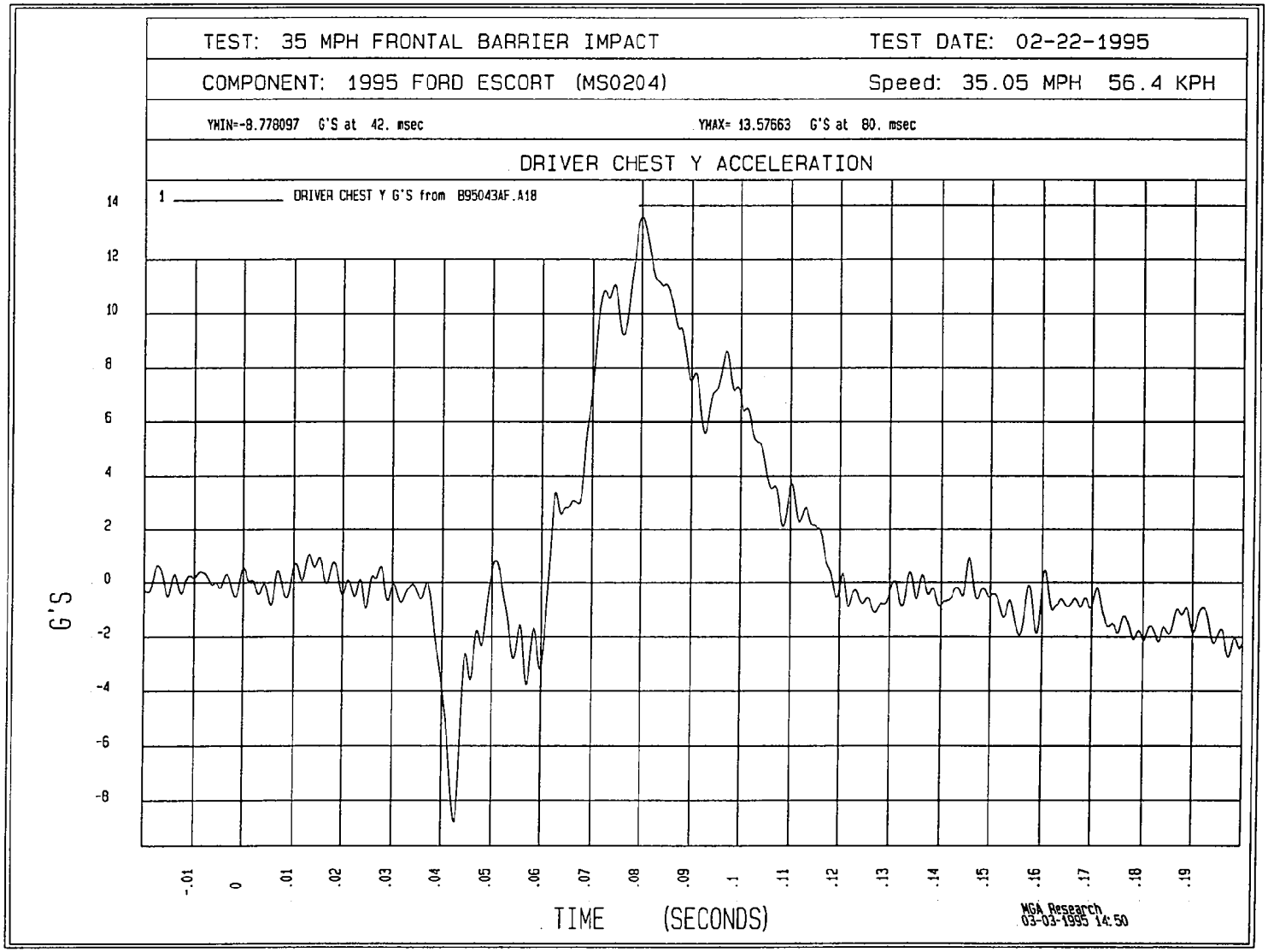


Figure B-44 - Driver Chest Y Acceleration vs. Time

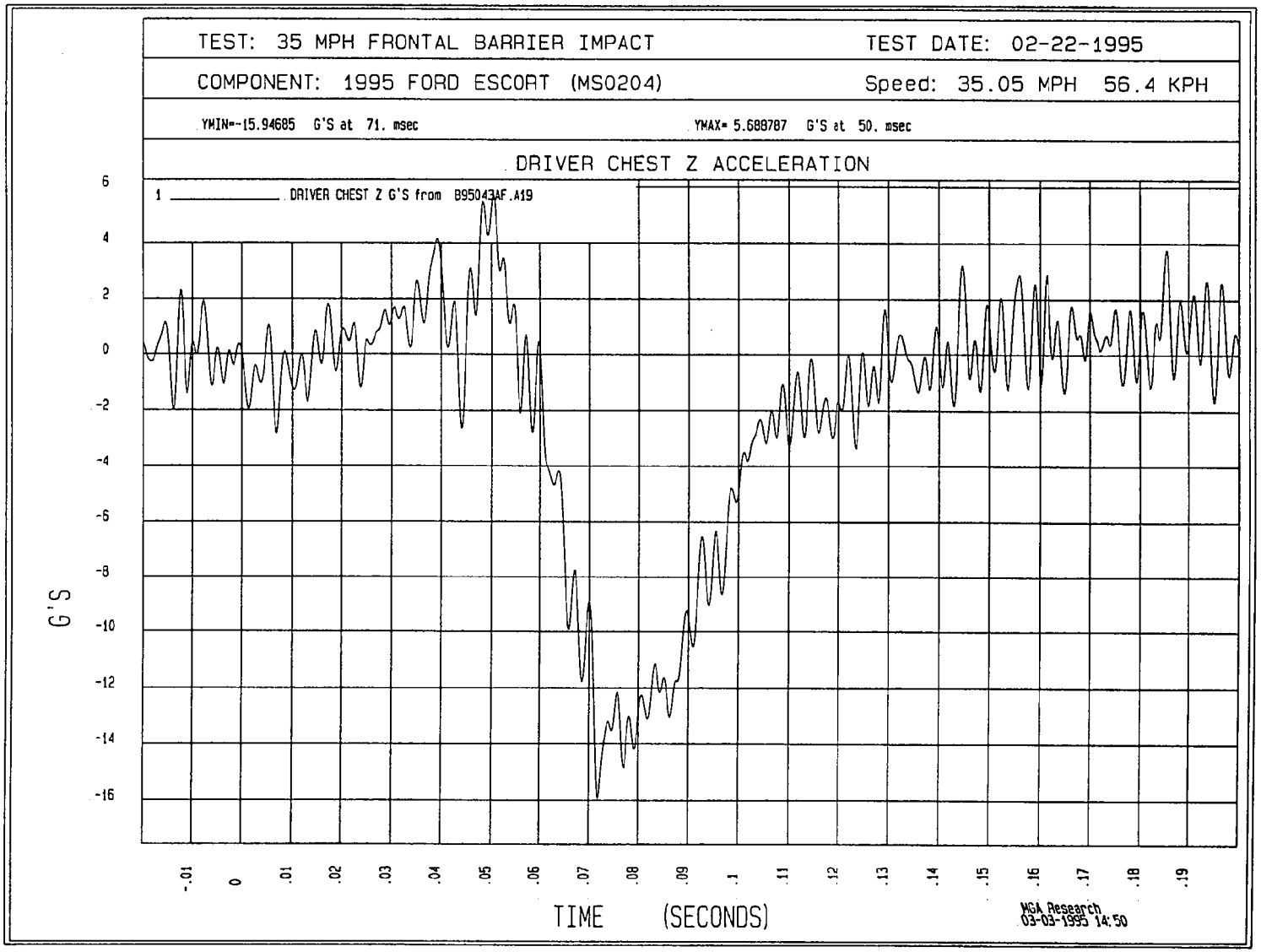


Figure B-45 - Driver Chest Z Acceleration vs. Time

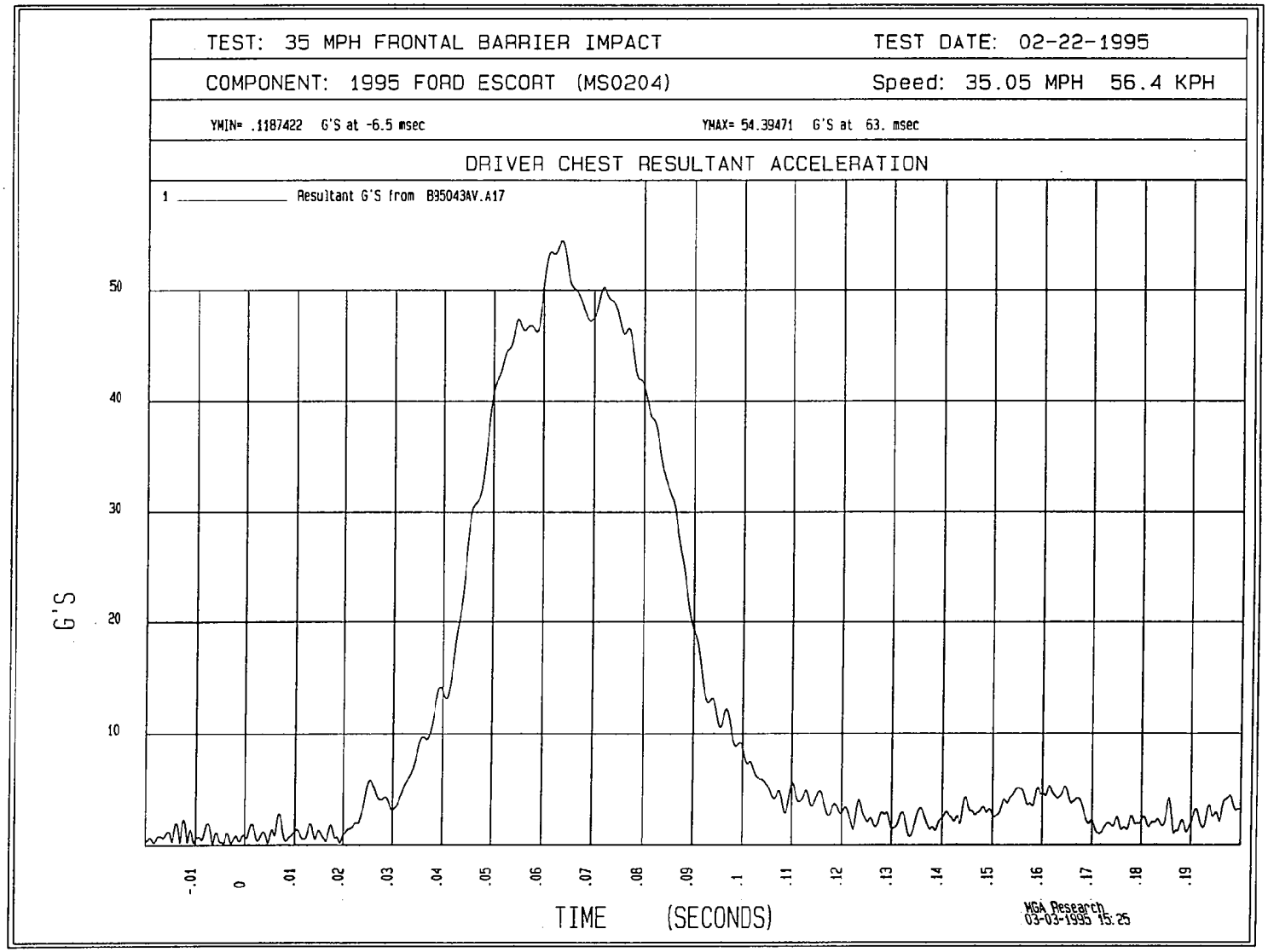


Figure B-46 - Driver Chest Resultant Accel. vs. Time

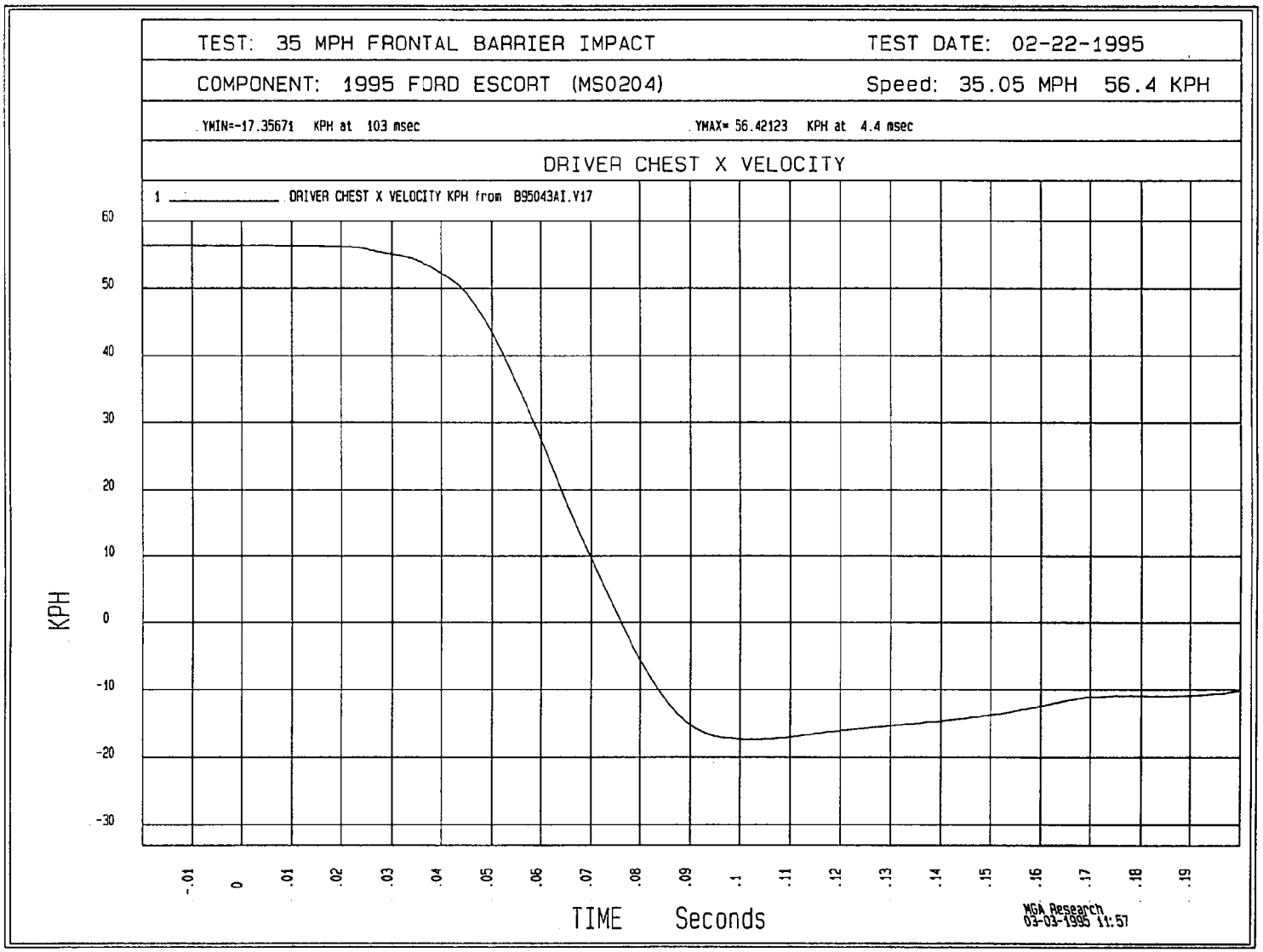


Figure B-47 - Driver Chest X Velocity vs. Time

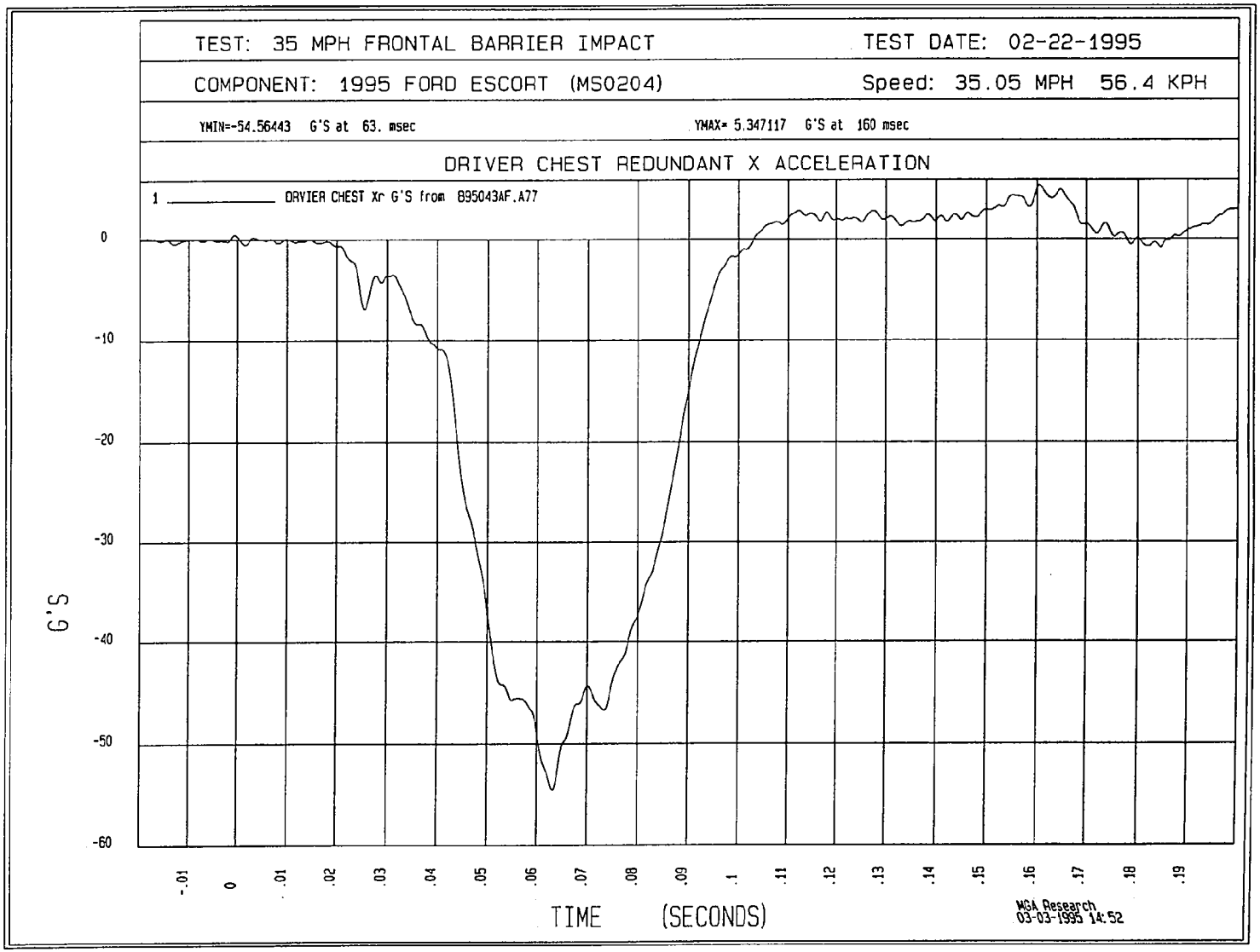


Figure B-48 - Driver Chest X Redundant Acceleration vs. Time

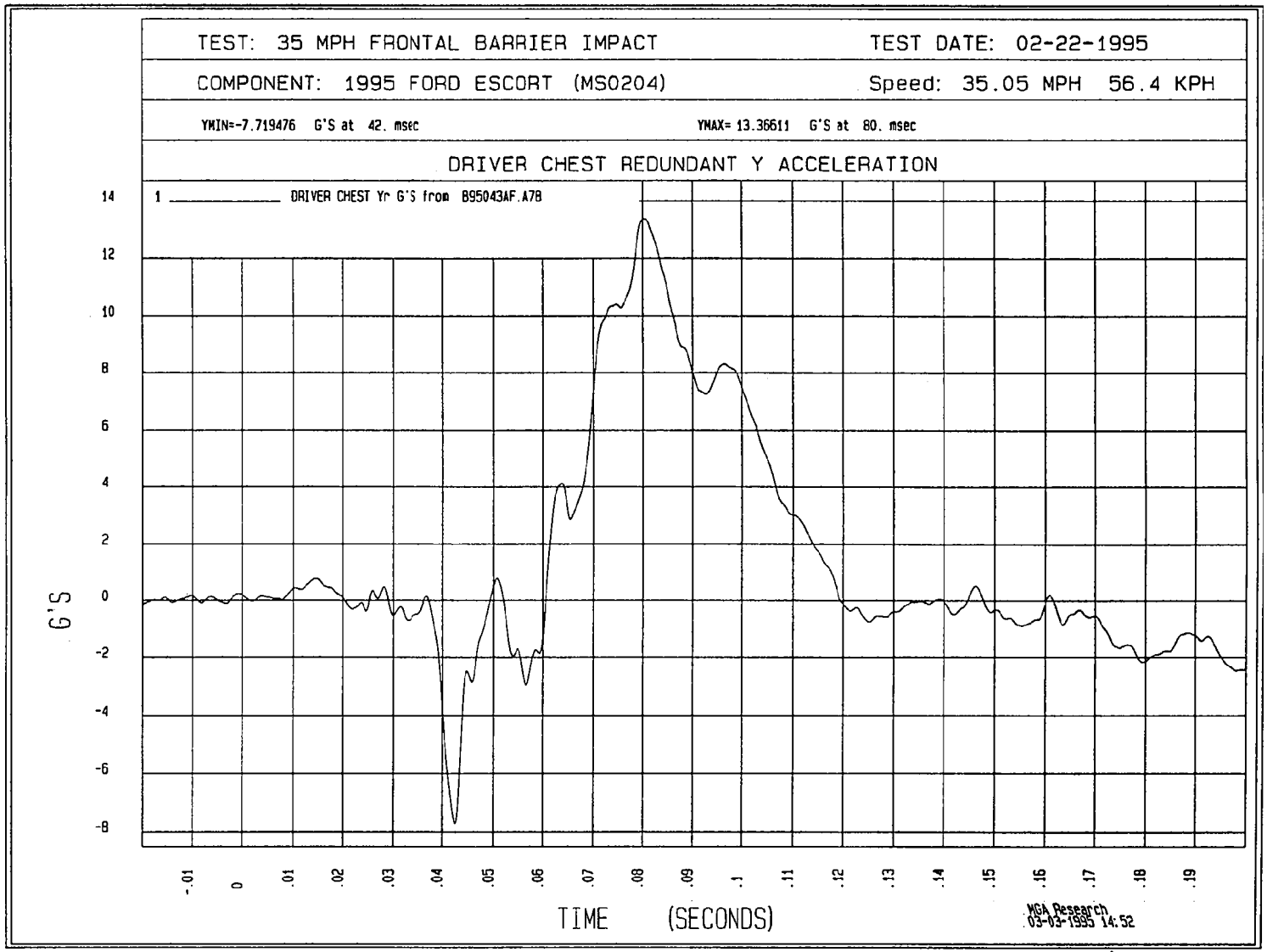


Figure B-49 - Driver Chest Y Redundant Acceleration vs. Time

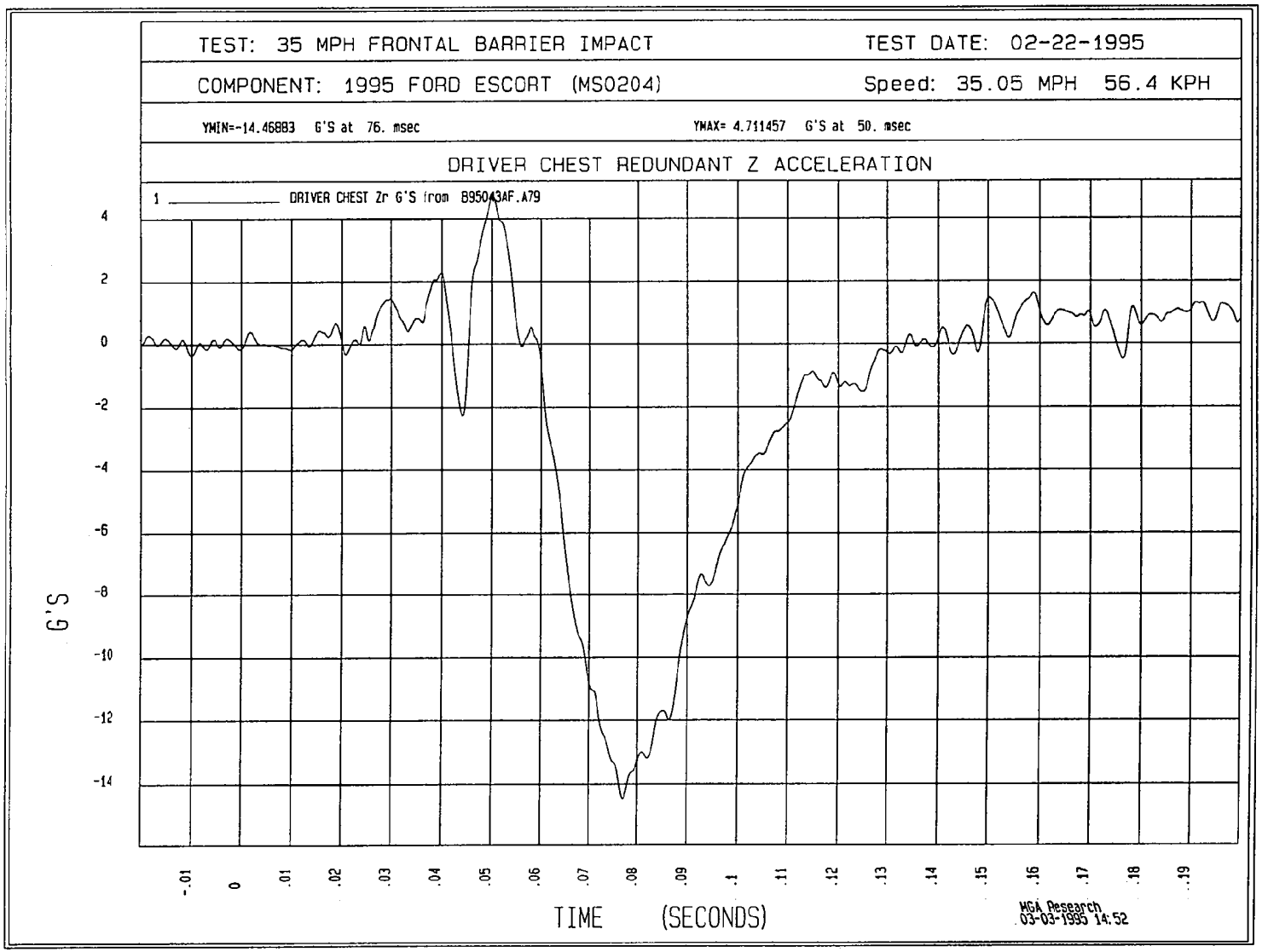


Figure B-5Ø - Driver Chest Z Redundant Acceleration vs. Time

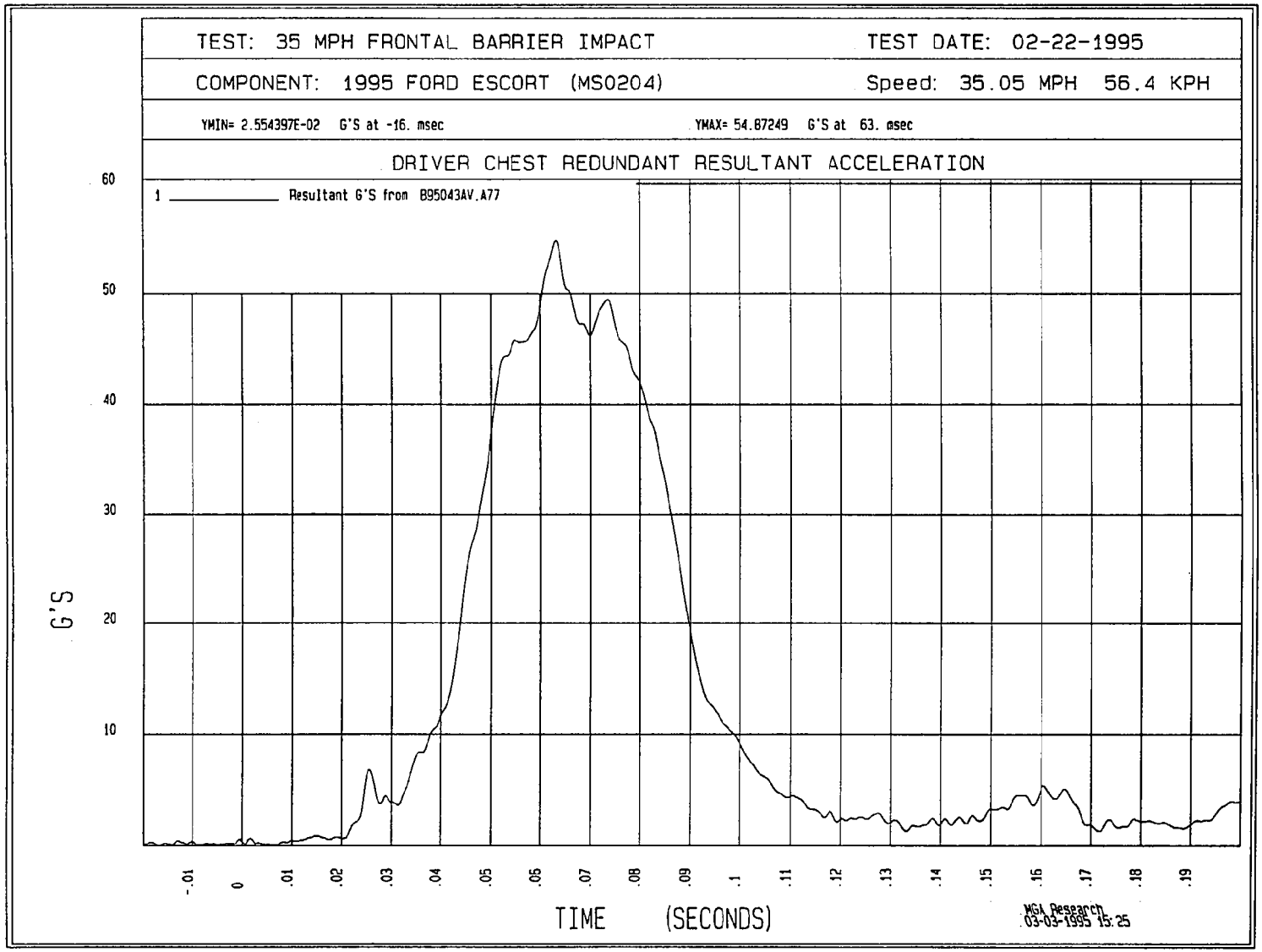


Figure B-51 - Driver Chest Redundant Resultant Accel. vs. Time

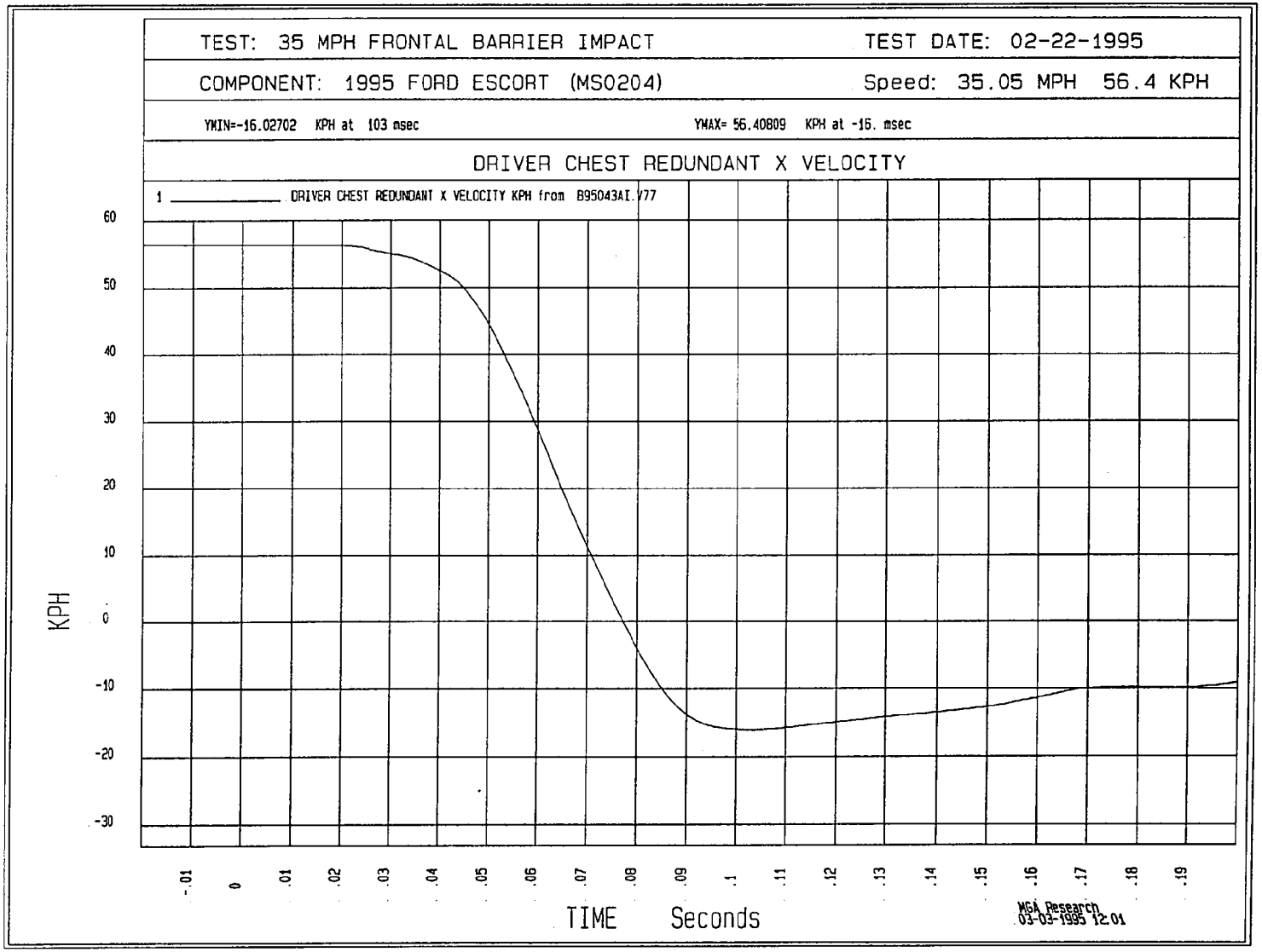


Figure B-52 - Driver Chest X Redundant Velocity vs. Time

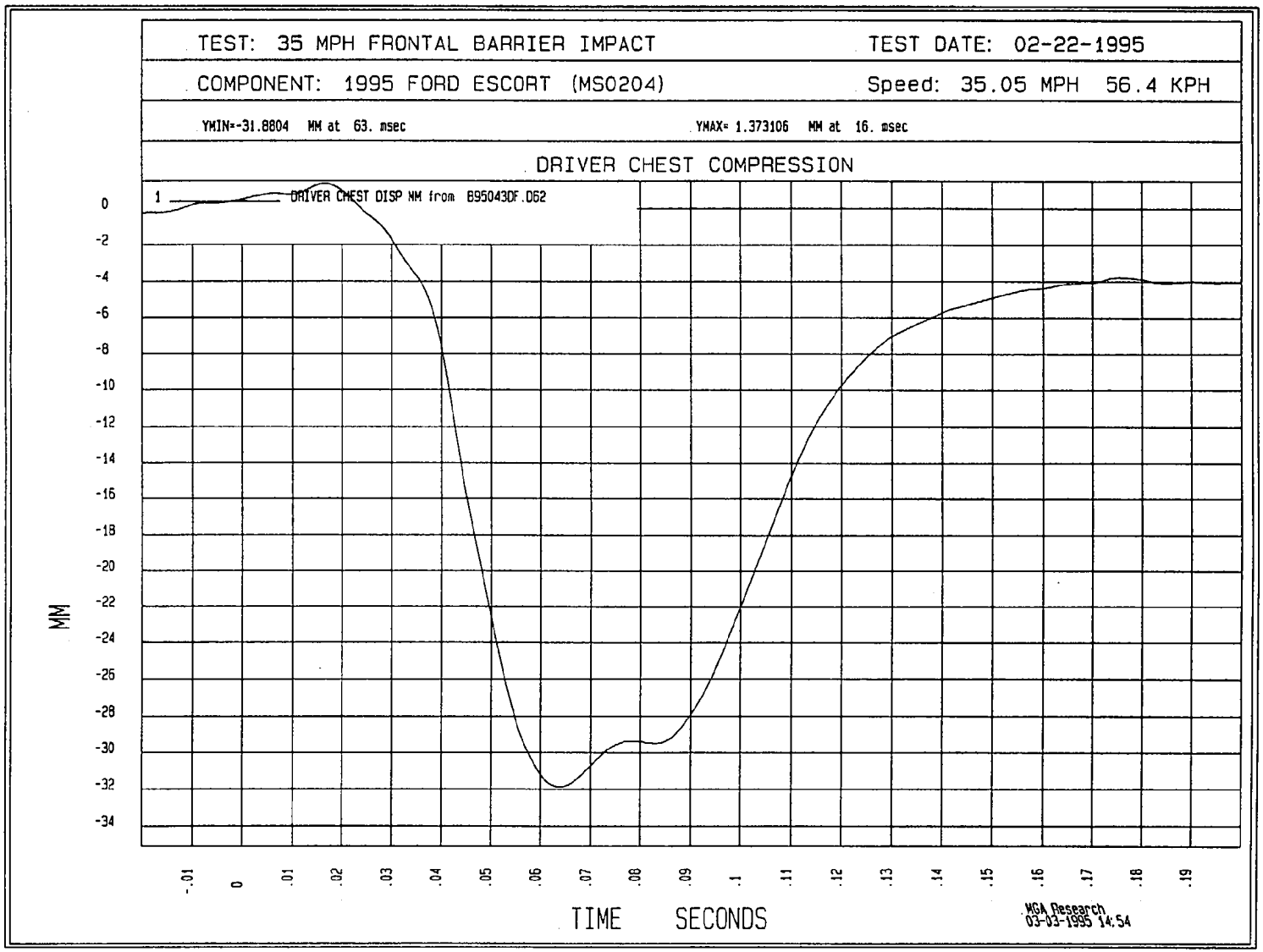


Figure B-53 - Driver Chest Compression vs. Time

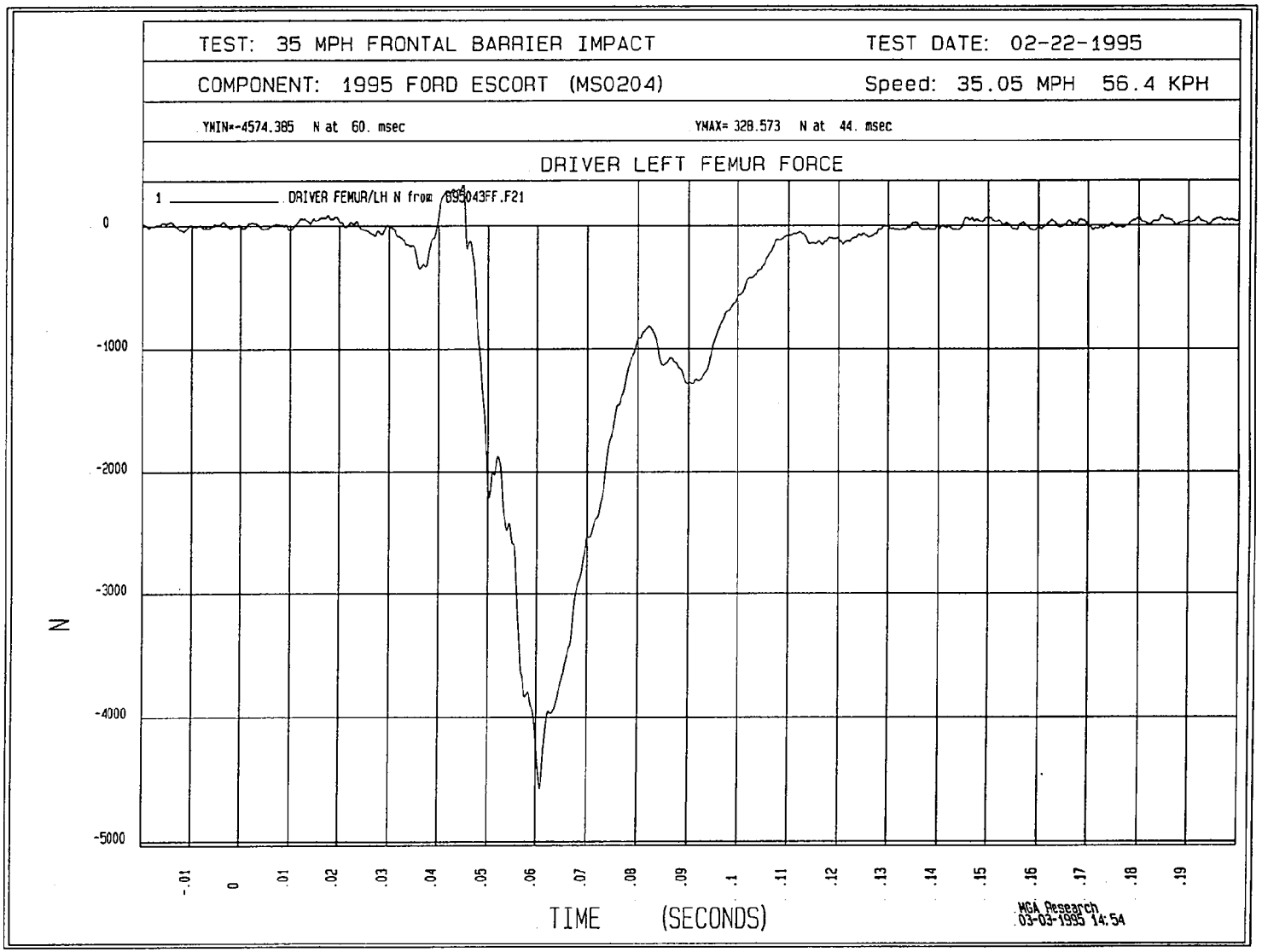


Figure B-54 - Driver Left Femur Force vs. Time

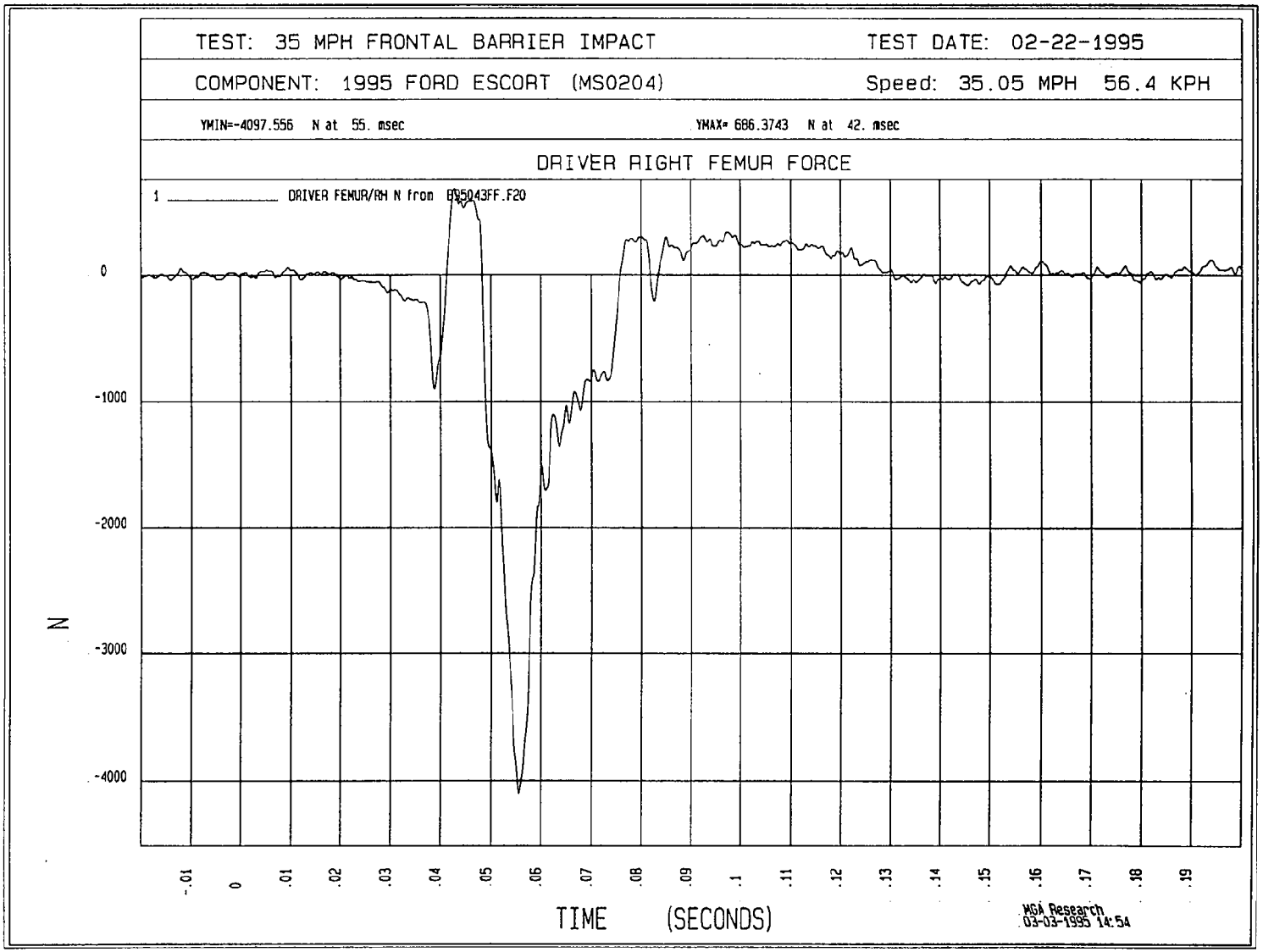


Figure B-55 - Driver Right Femur Force vs. Time

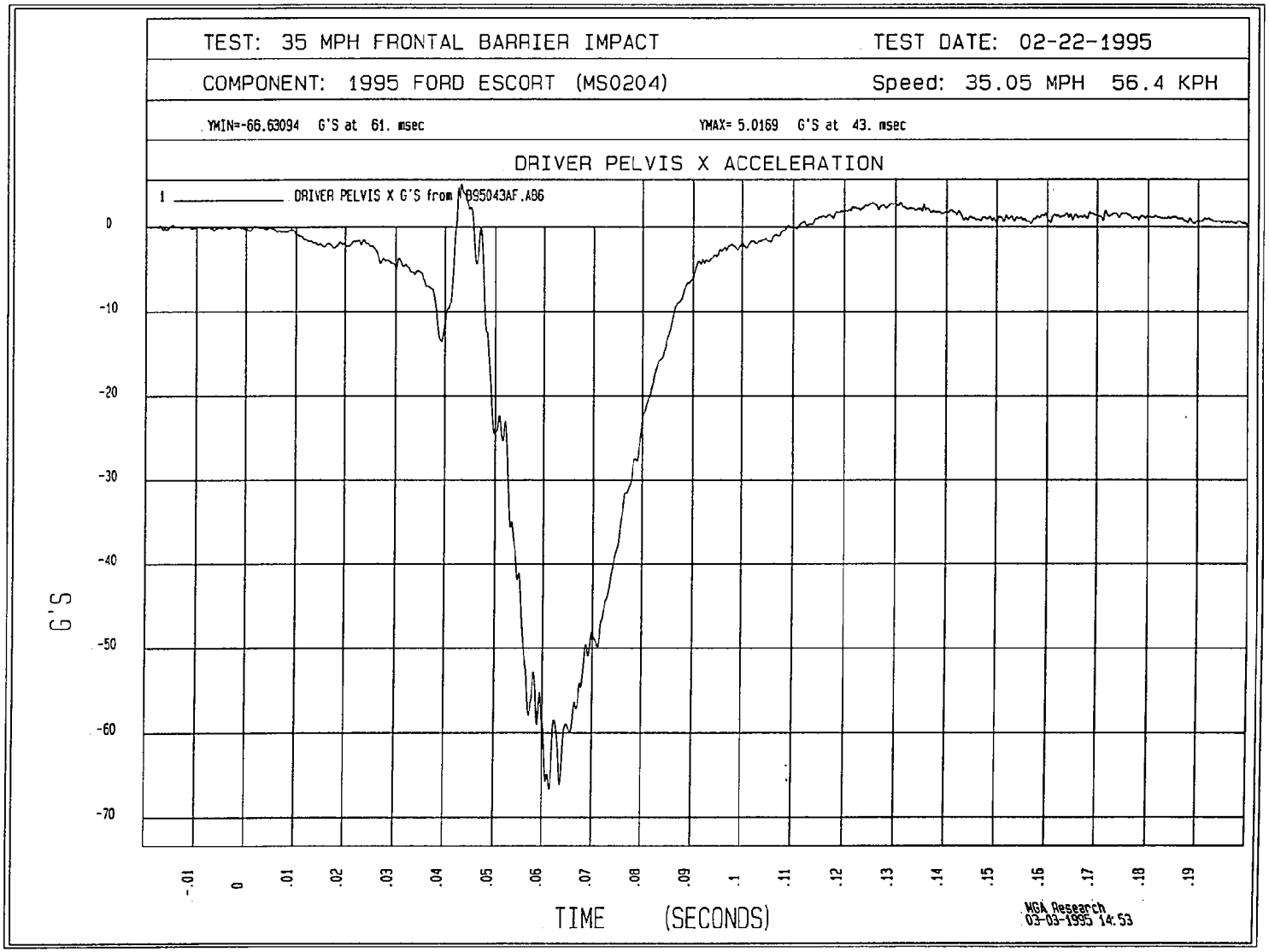


Figure B-56 - Driver Pelvis X Acceleration vs. Time

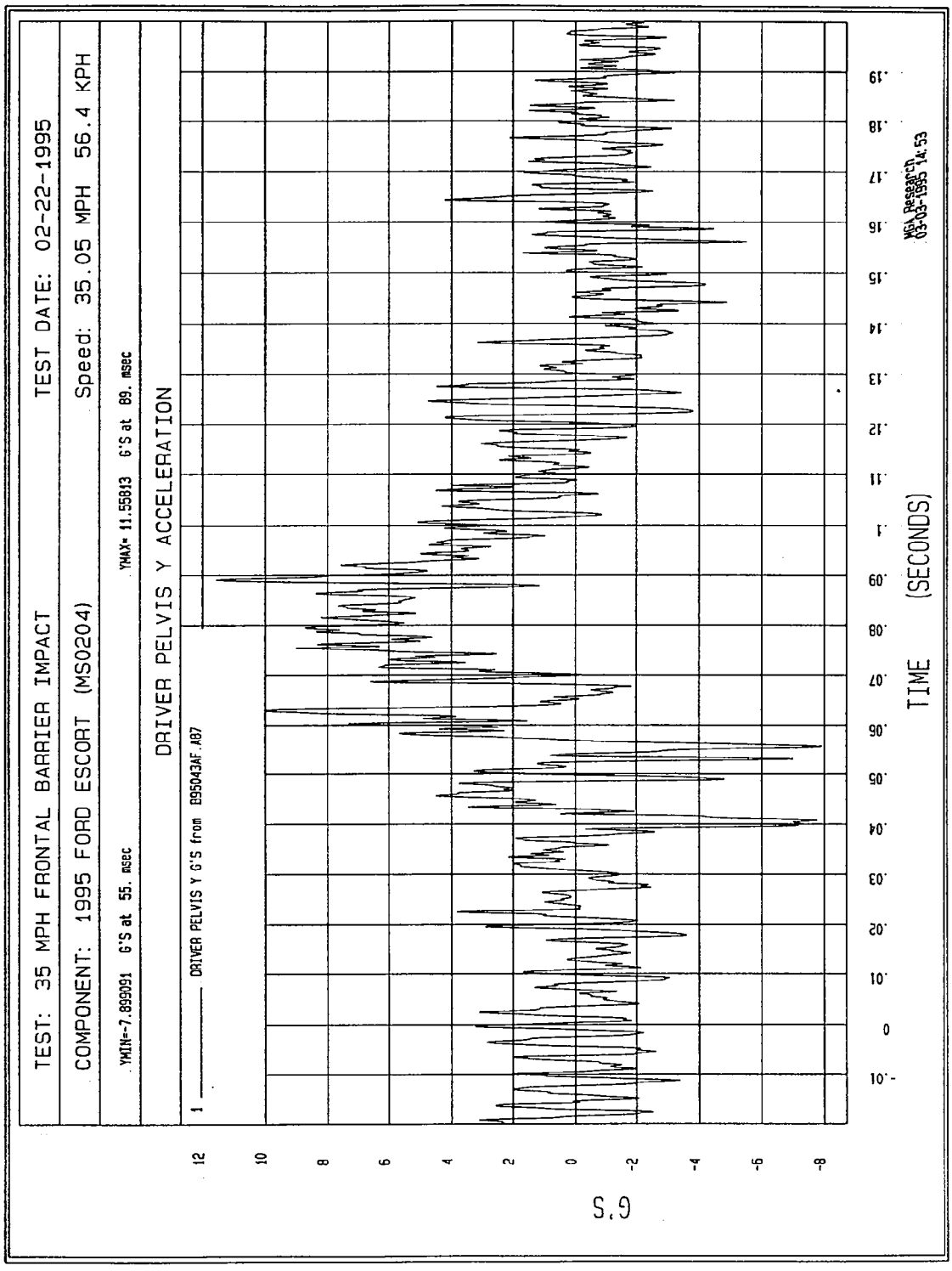


Figure B-57 - Driver Pelvis Y Acceleration vs. Time

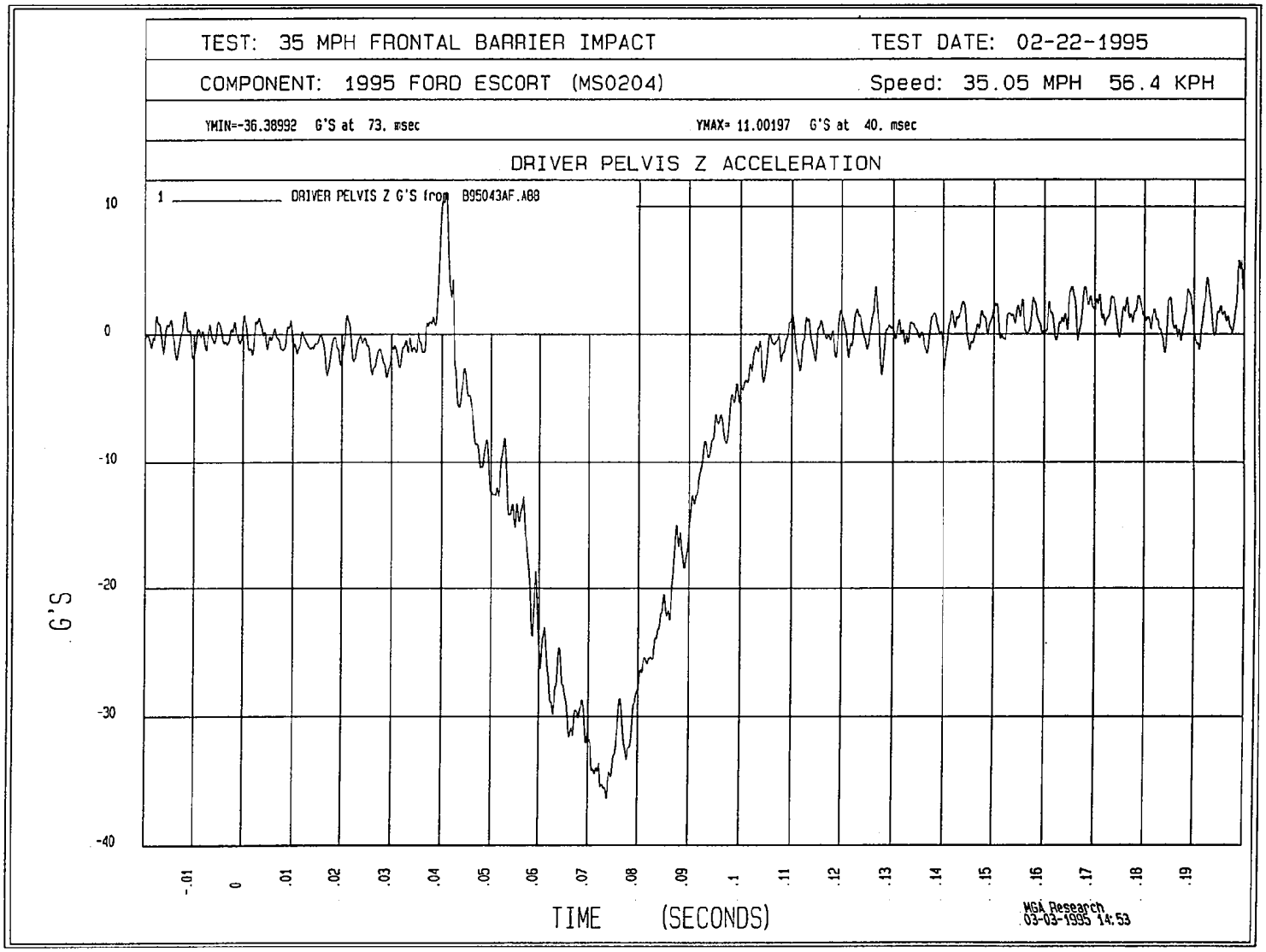


Figure B-58 - Driver Pelvis Z Acceleration vs. Time

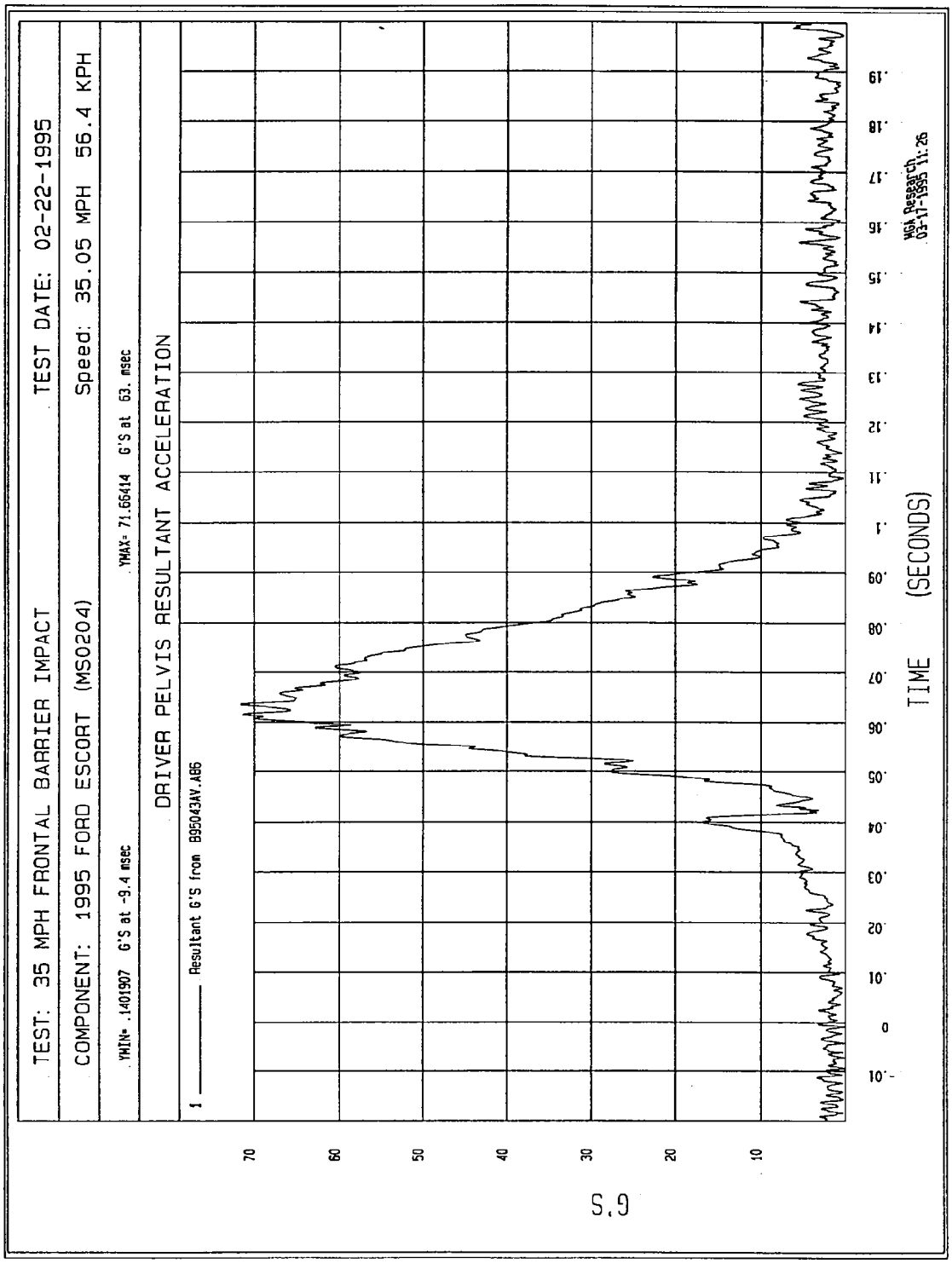


Figure B-59 - Driver Pelvis Resultant Acceleration vs. Time

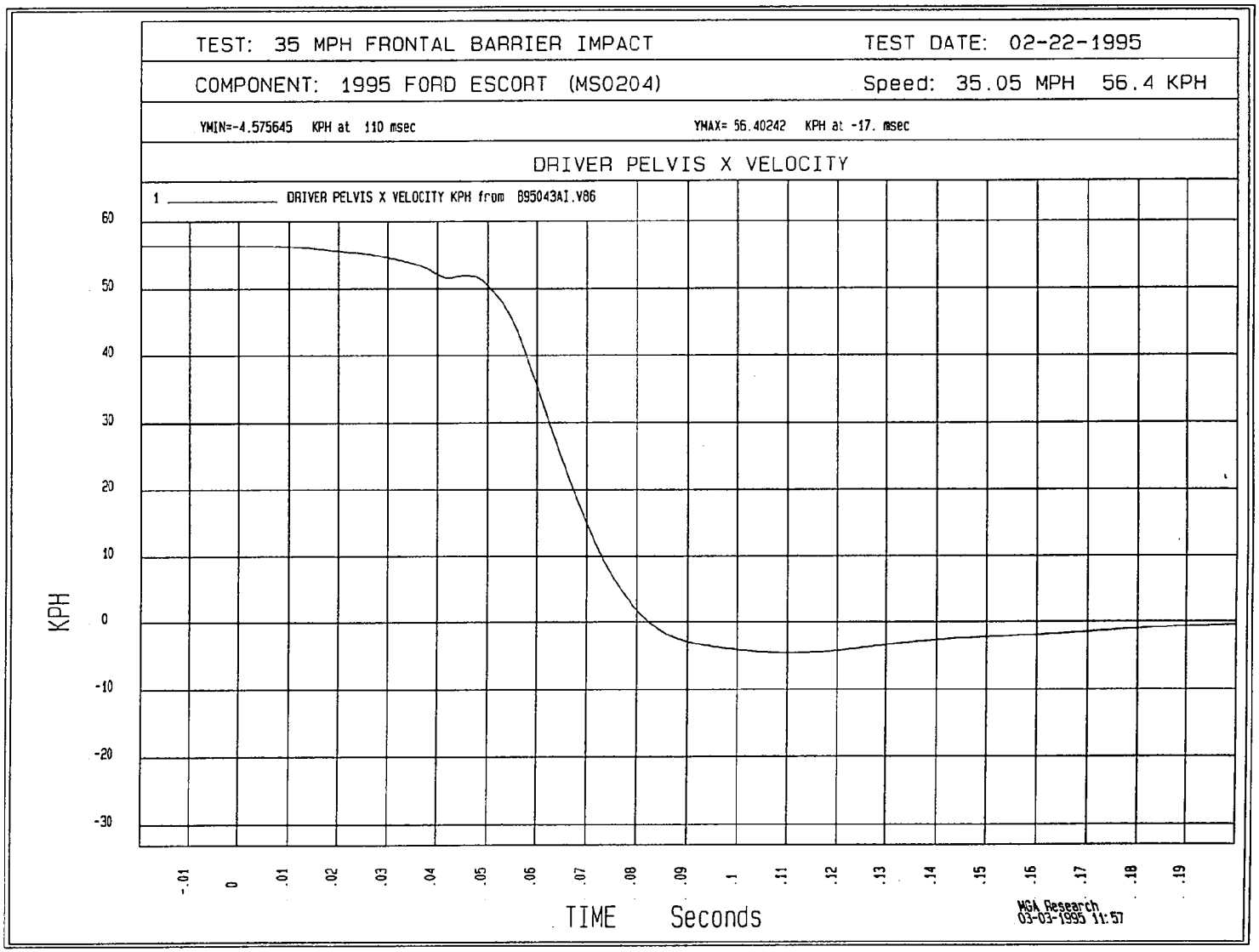


Figure B-60 - Driver Pelvis X Velocity vs. Time

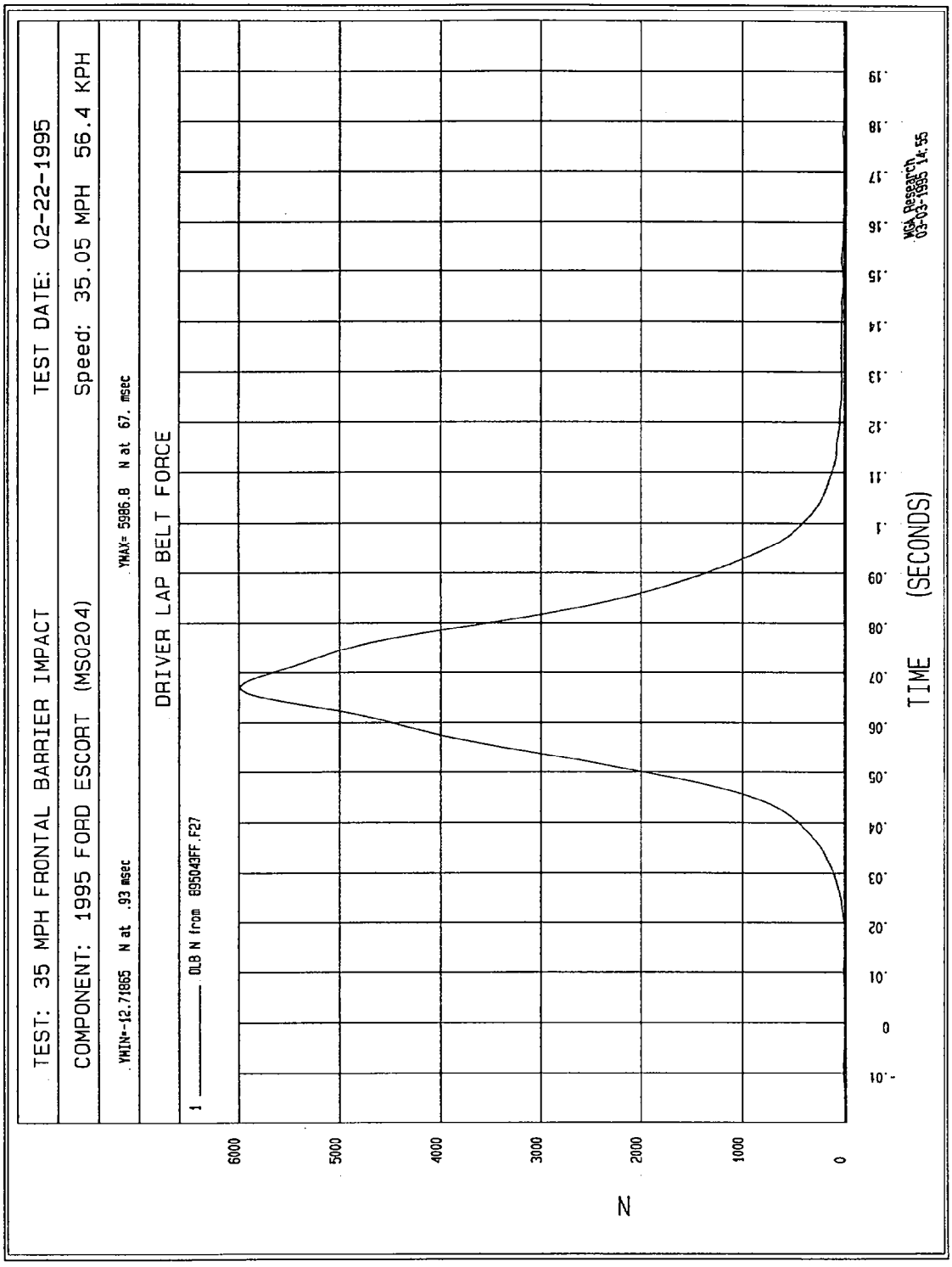


Figure B-61 - Driver Lap Belt Force vs. Time

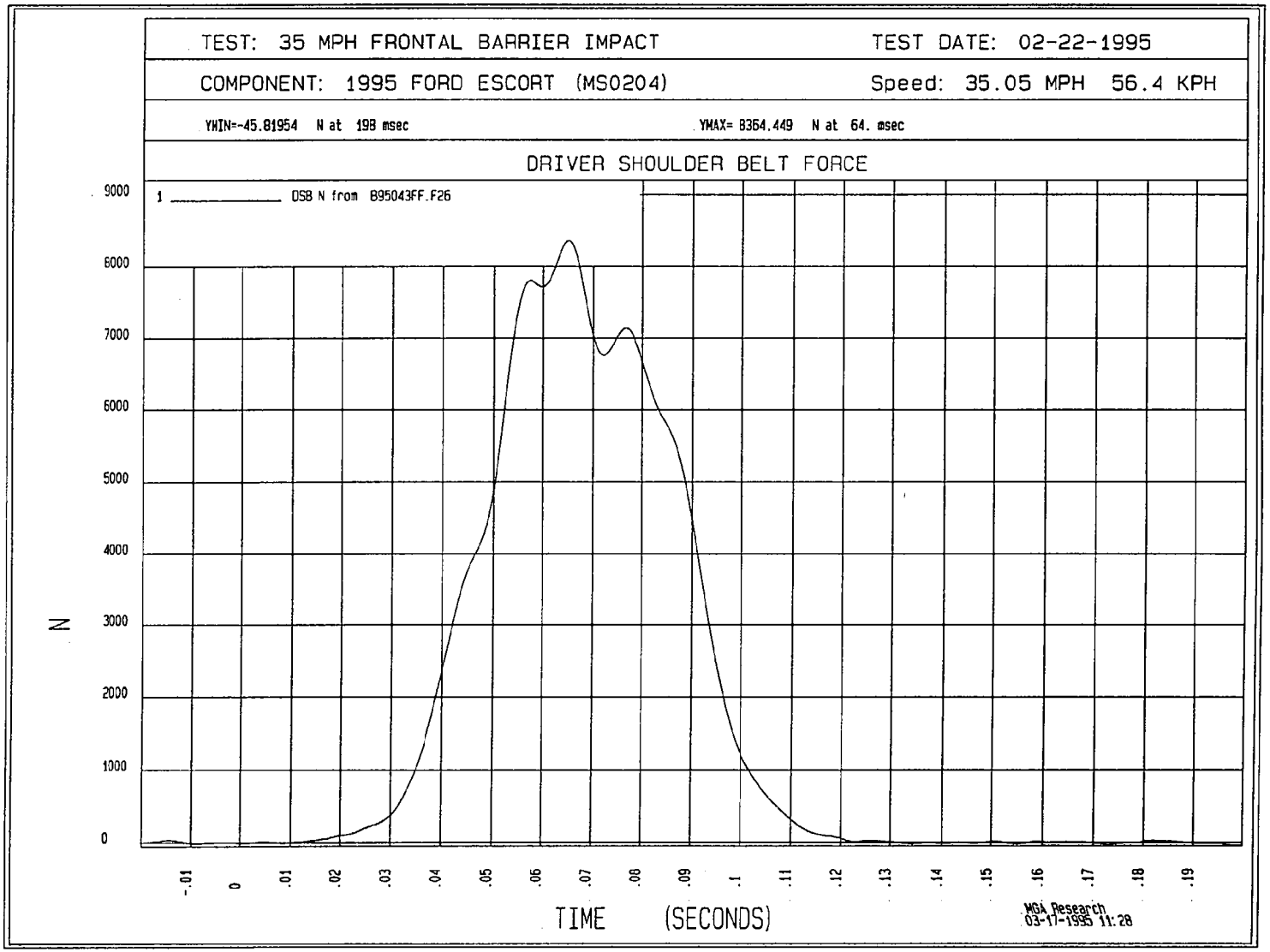


Figure B-62 - Driver Shoulder Belt Force vs. Time

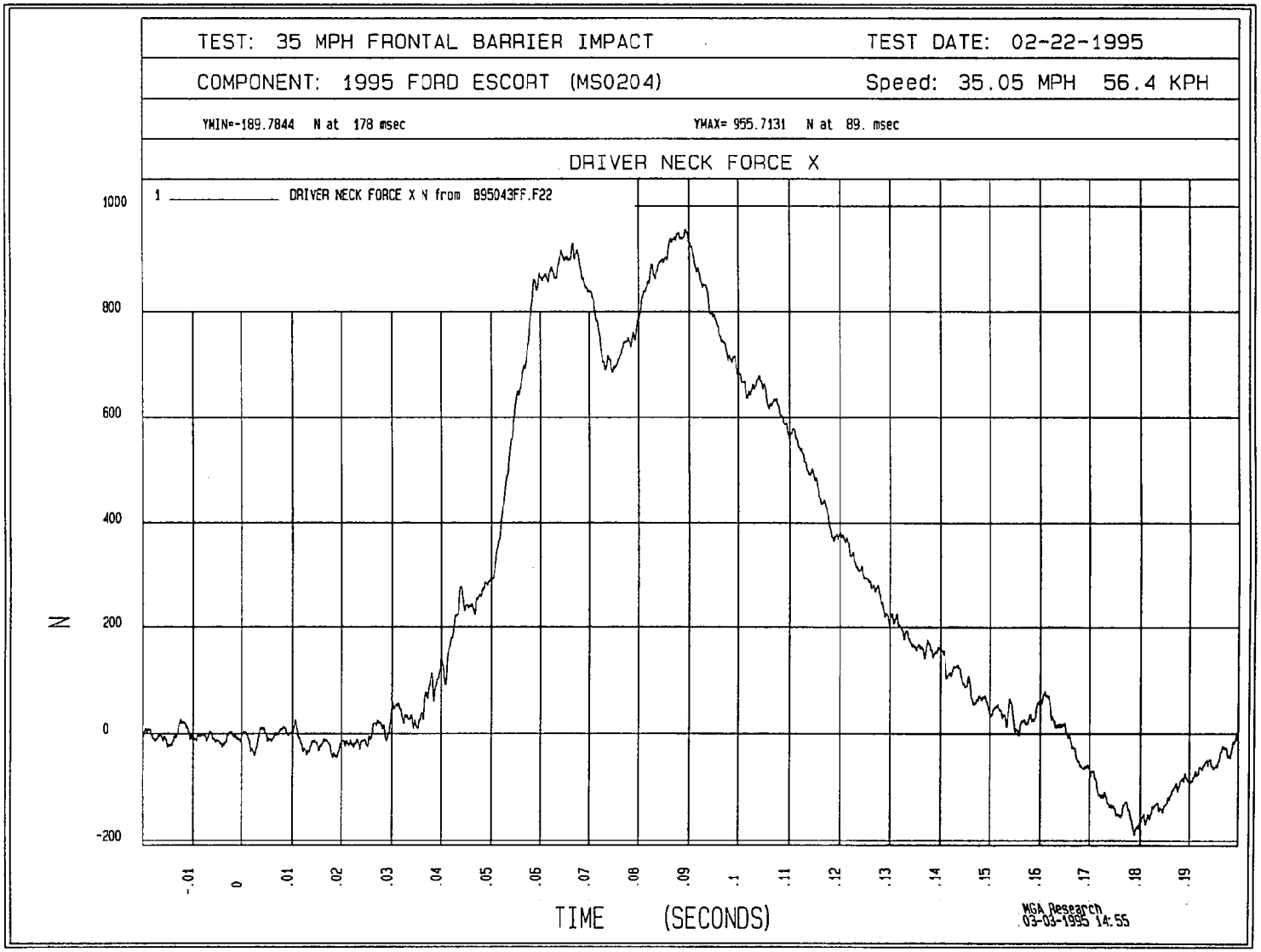


Figure B-63 - Driver Neck Force X vs. Time

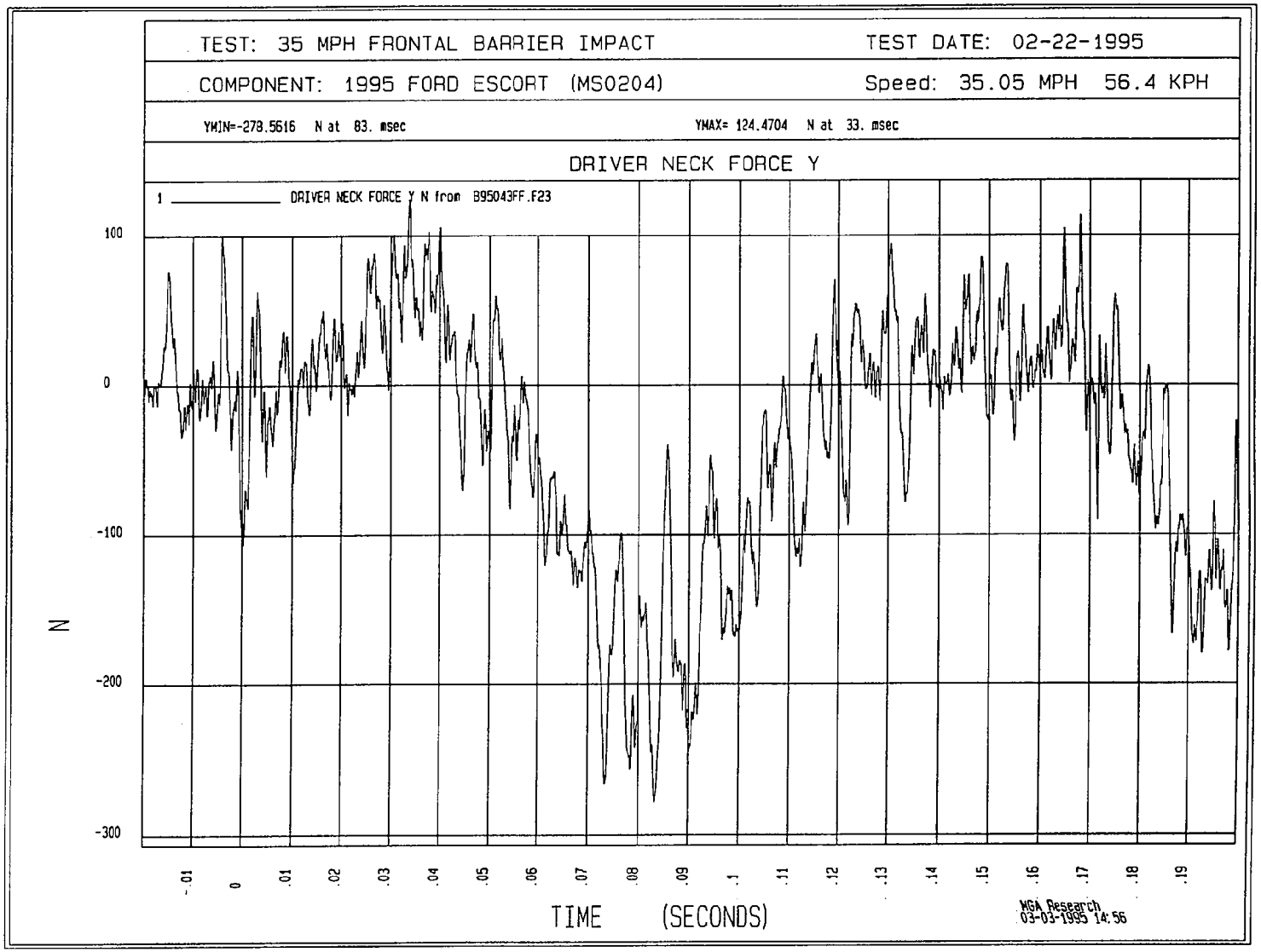


Figure B-64 - Driver Neck Force Y vs. Time

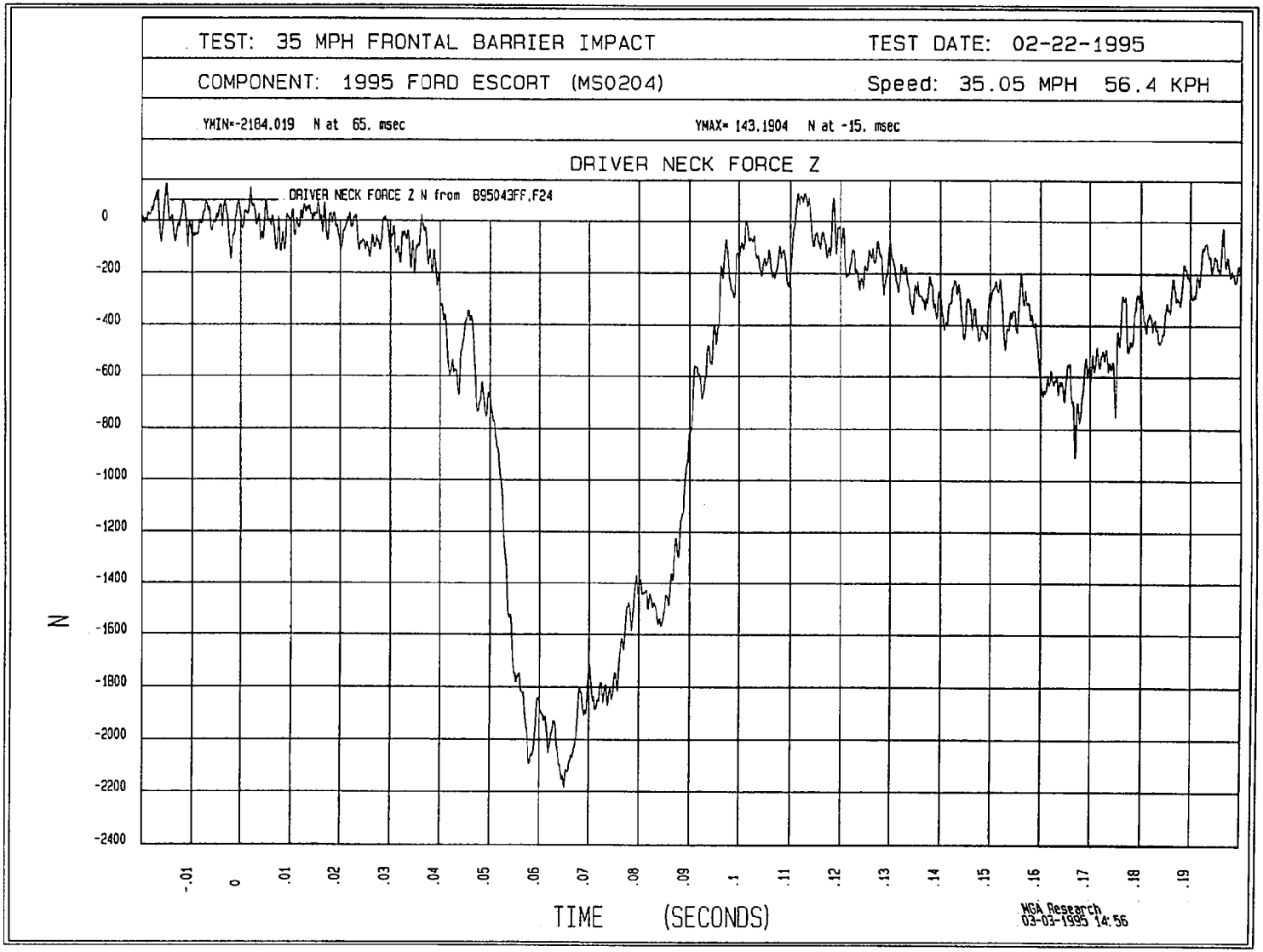


Figure B-65 - Driver Neck Force Z vs. Time

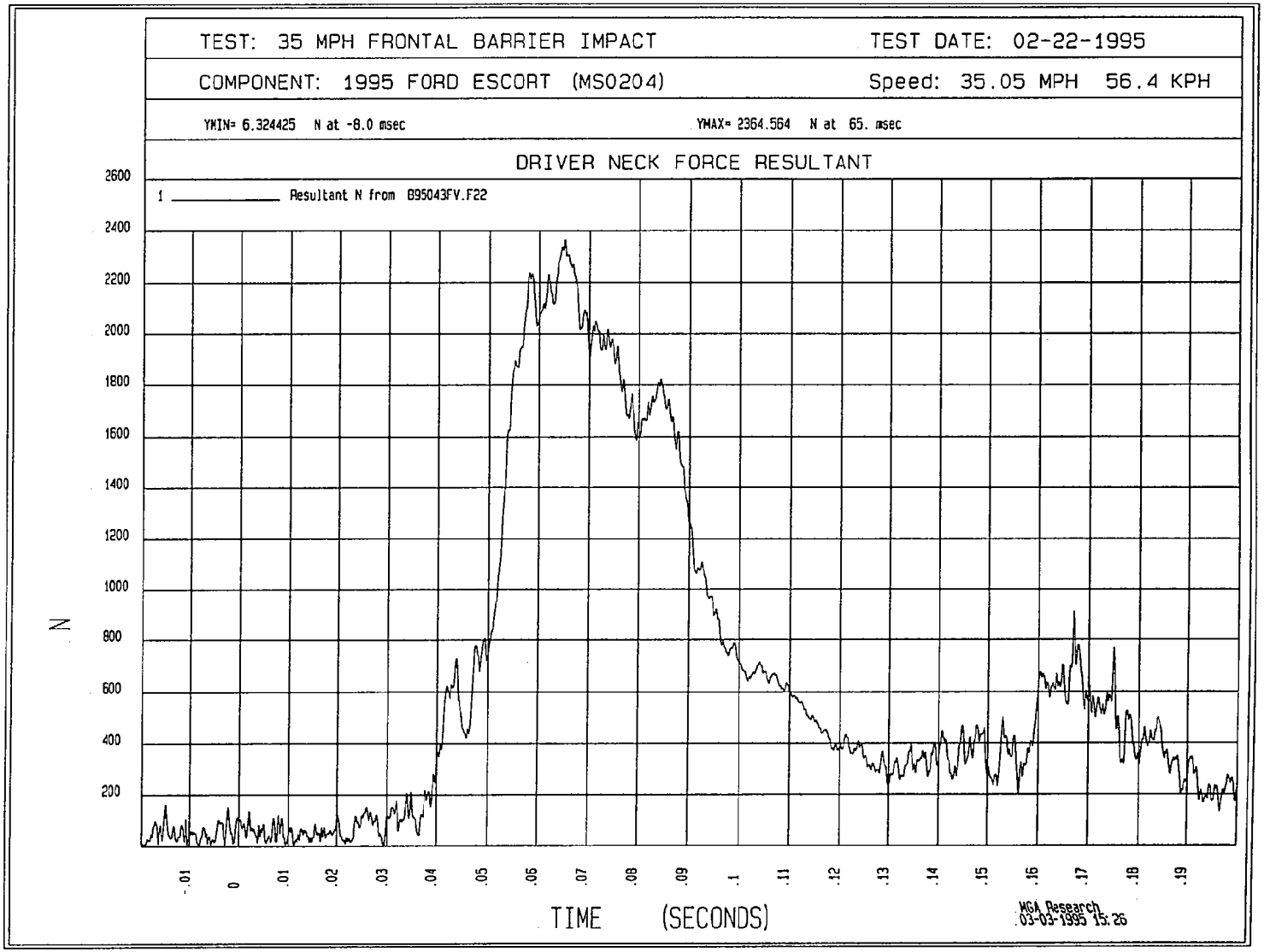


Figure B-66 - Driver Neck Force Resultant vs. Time

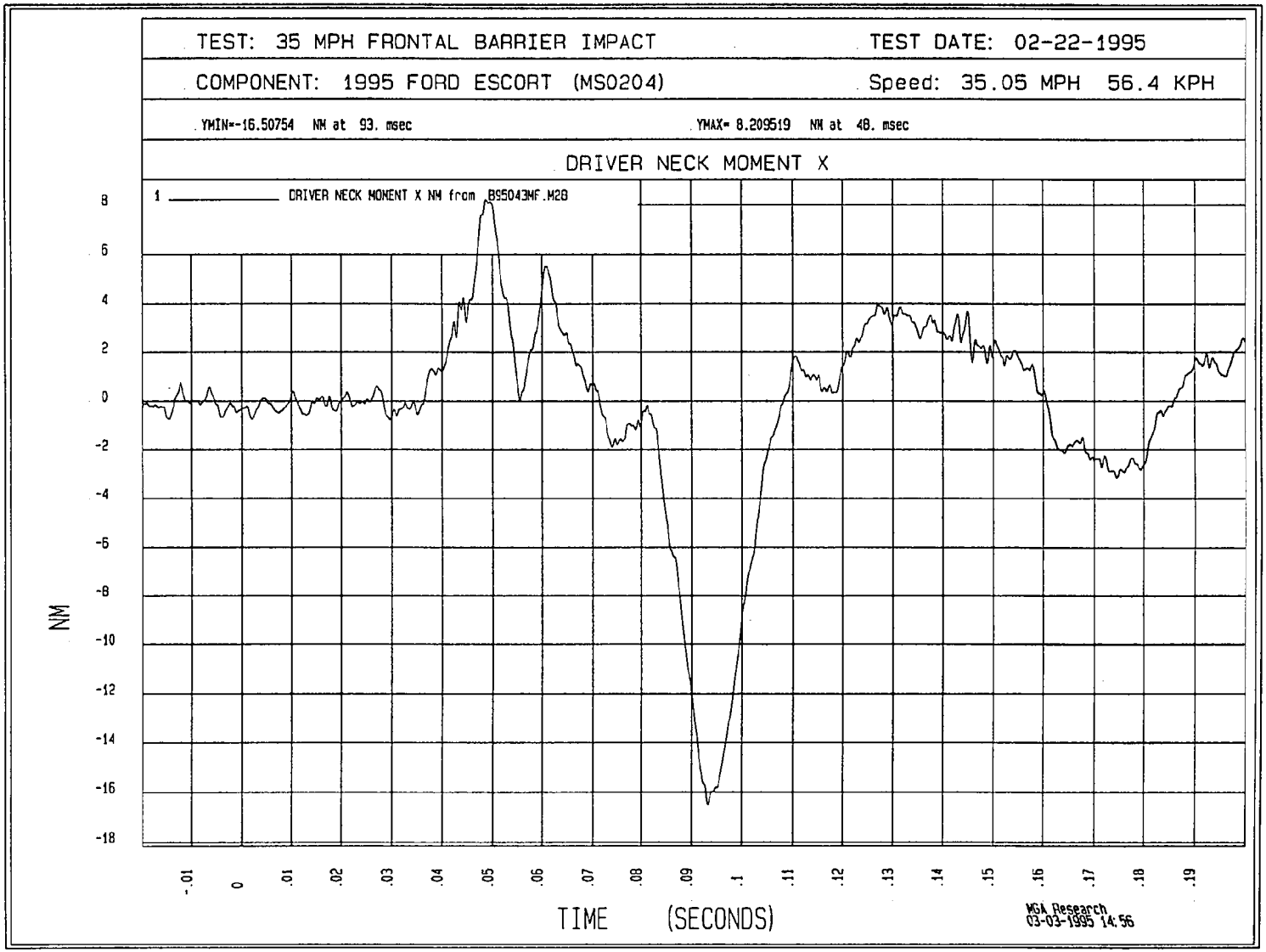


Figure B-67 - Driver Neck Moment X vs. Time

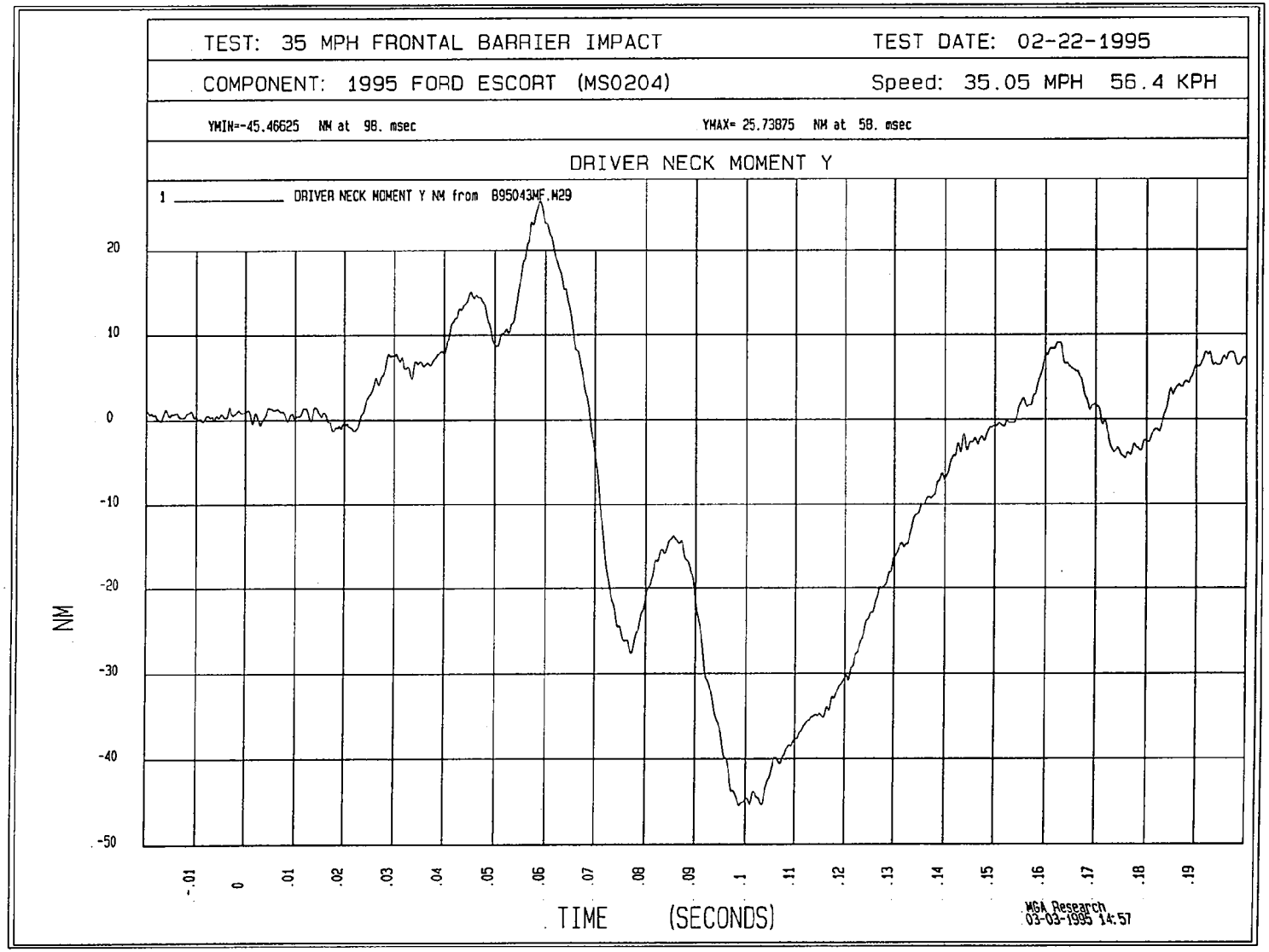


Figure B-68 - Driver Neck Moment Y vs. Time

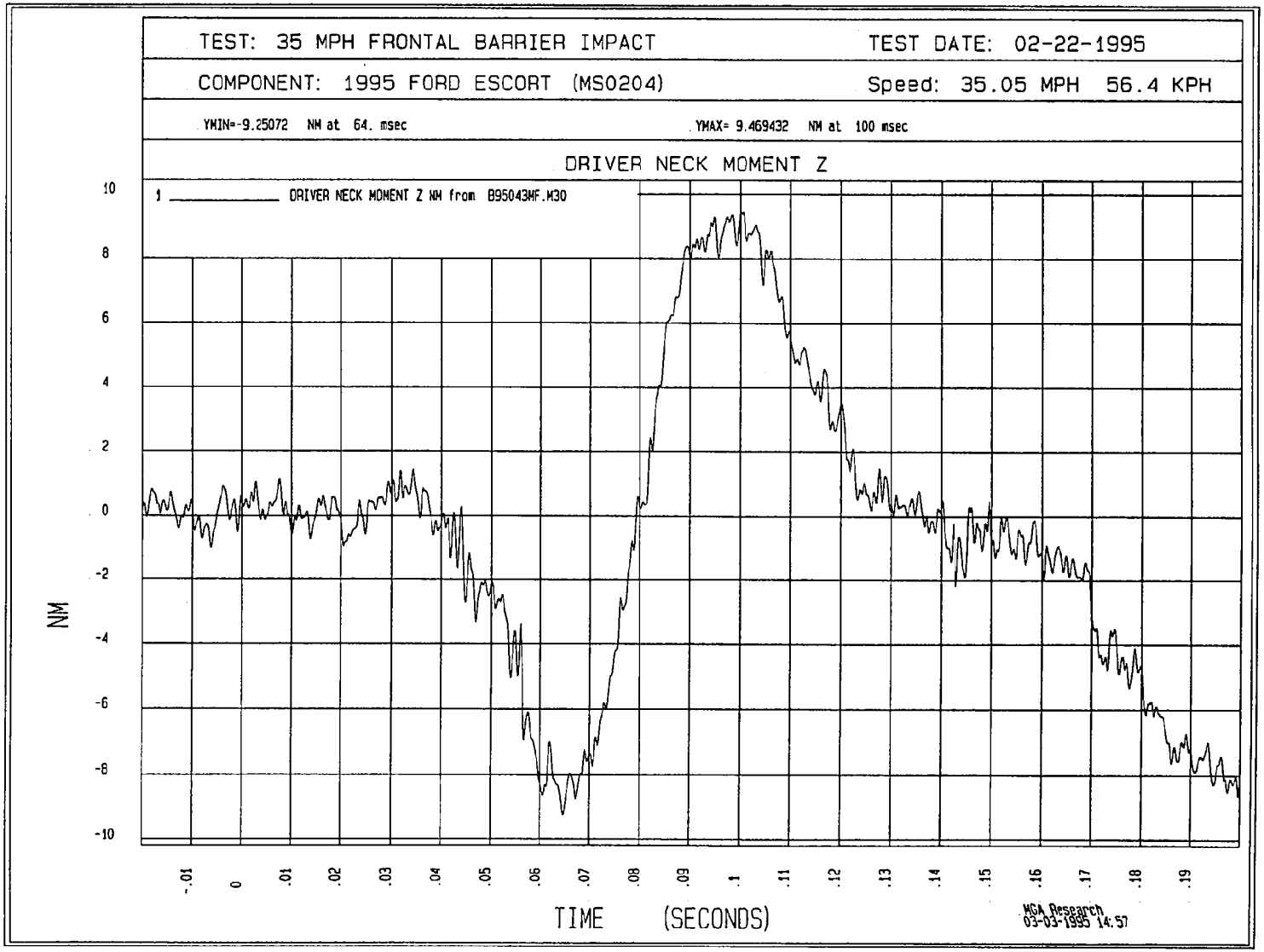


Figure B-69 - Driver Neck Moment Z vs. Time

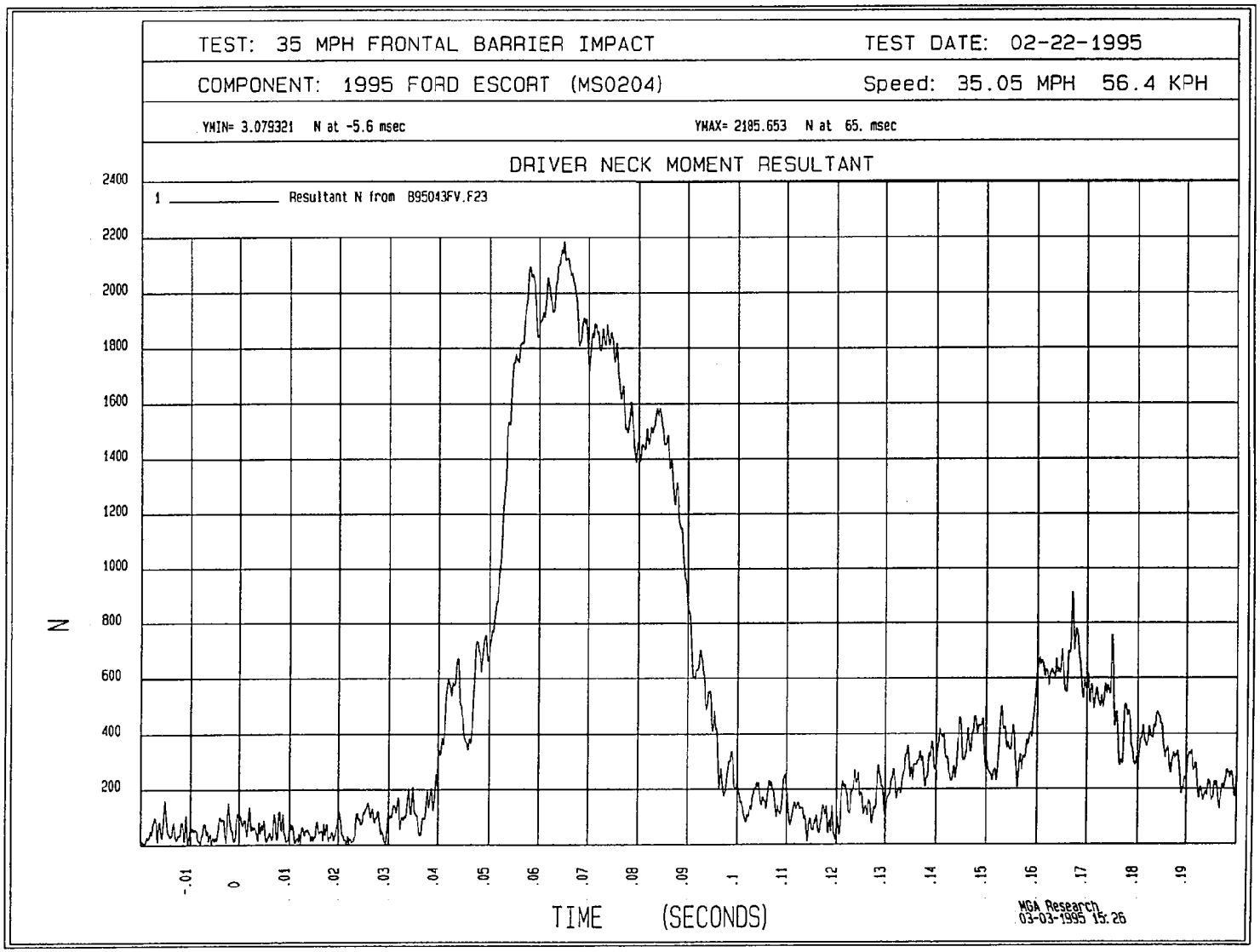


Figure B-7Ø - Driver Neck Moment Resultant vs. Time

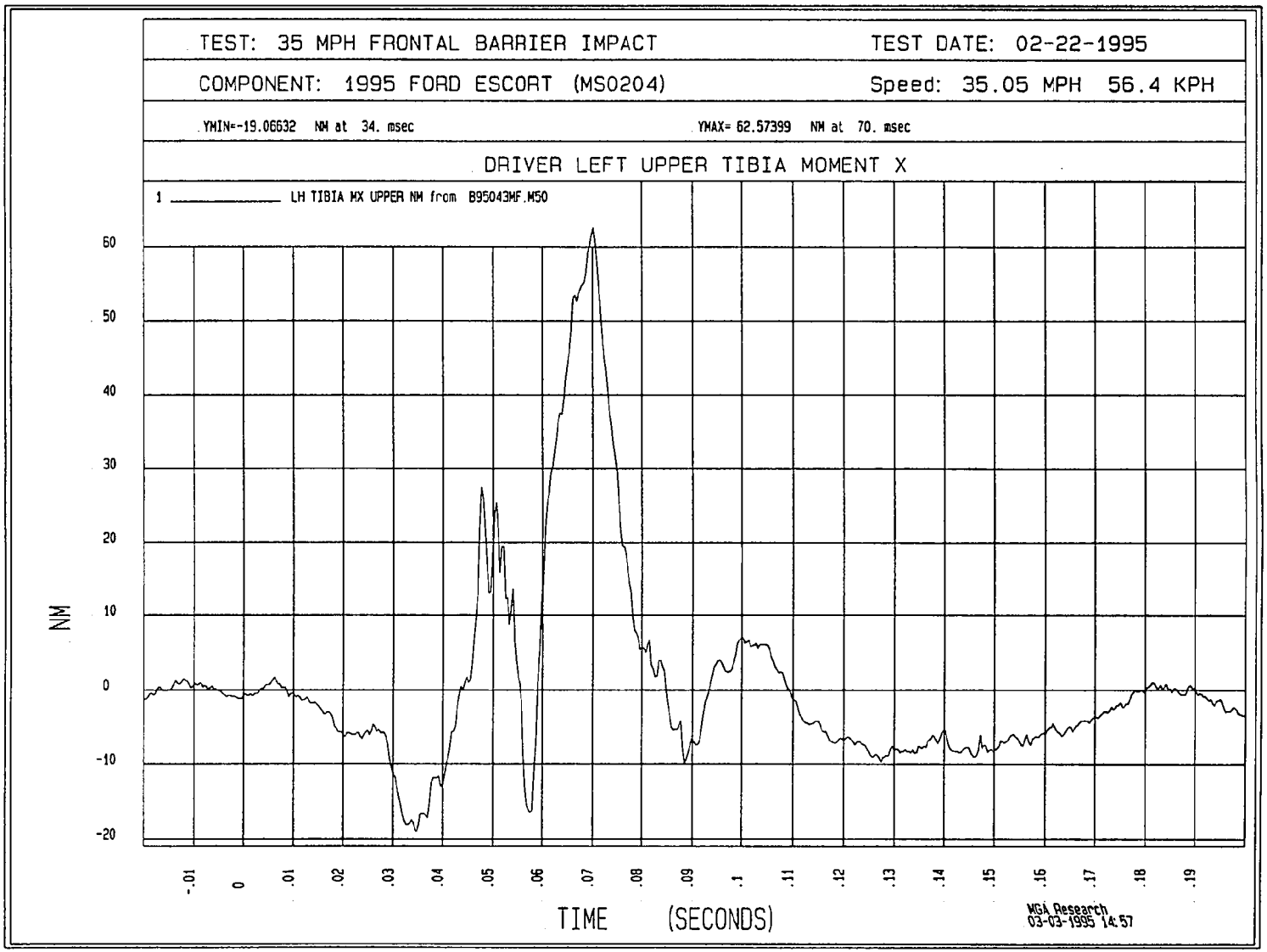


Figure B-71 - Driver Left Upper Tibia Moment X vs. Time

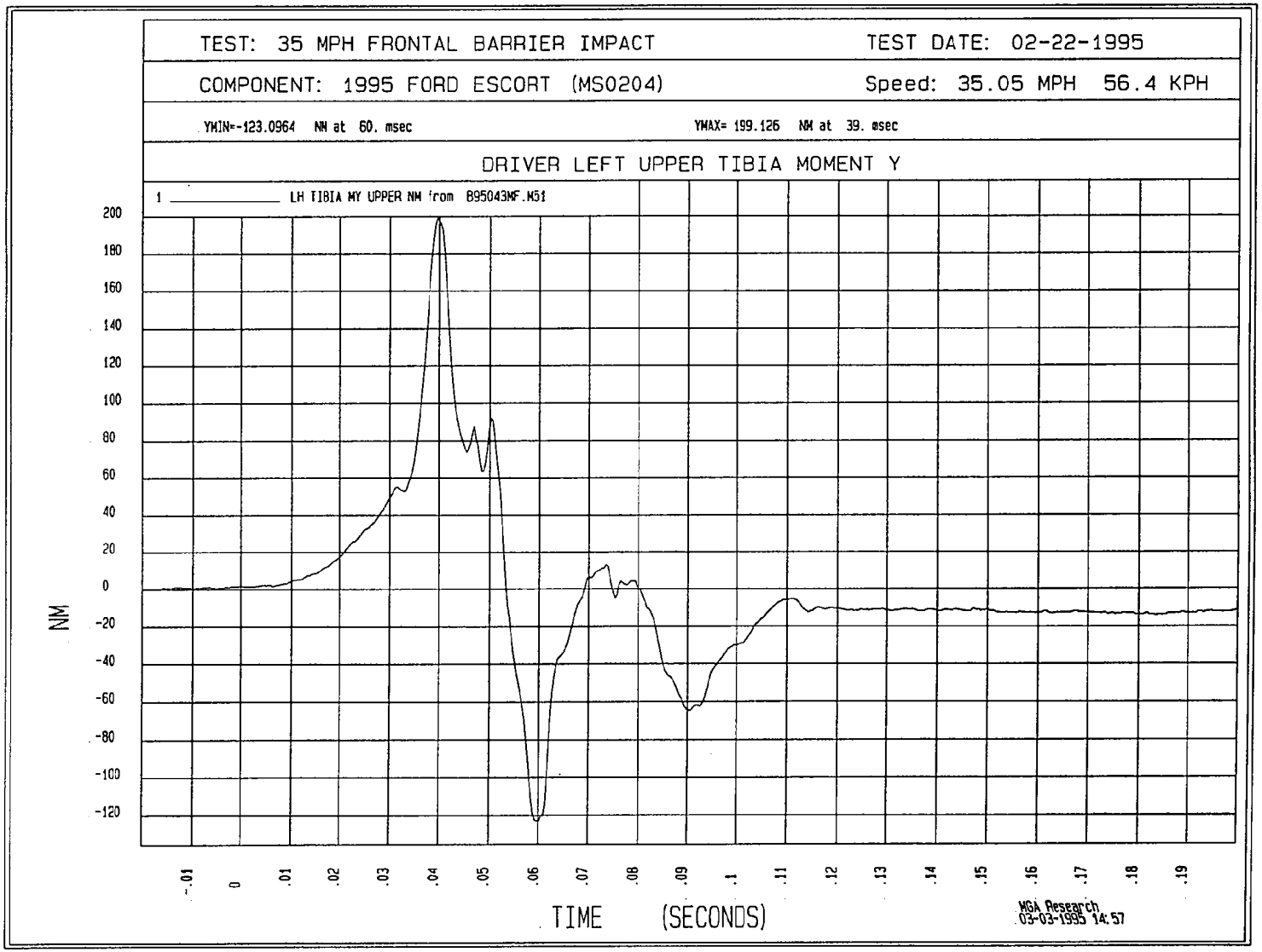


Figure B-72 - Driver Left Upper Tibia Moment Y vs. Time

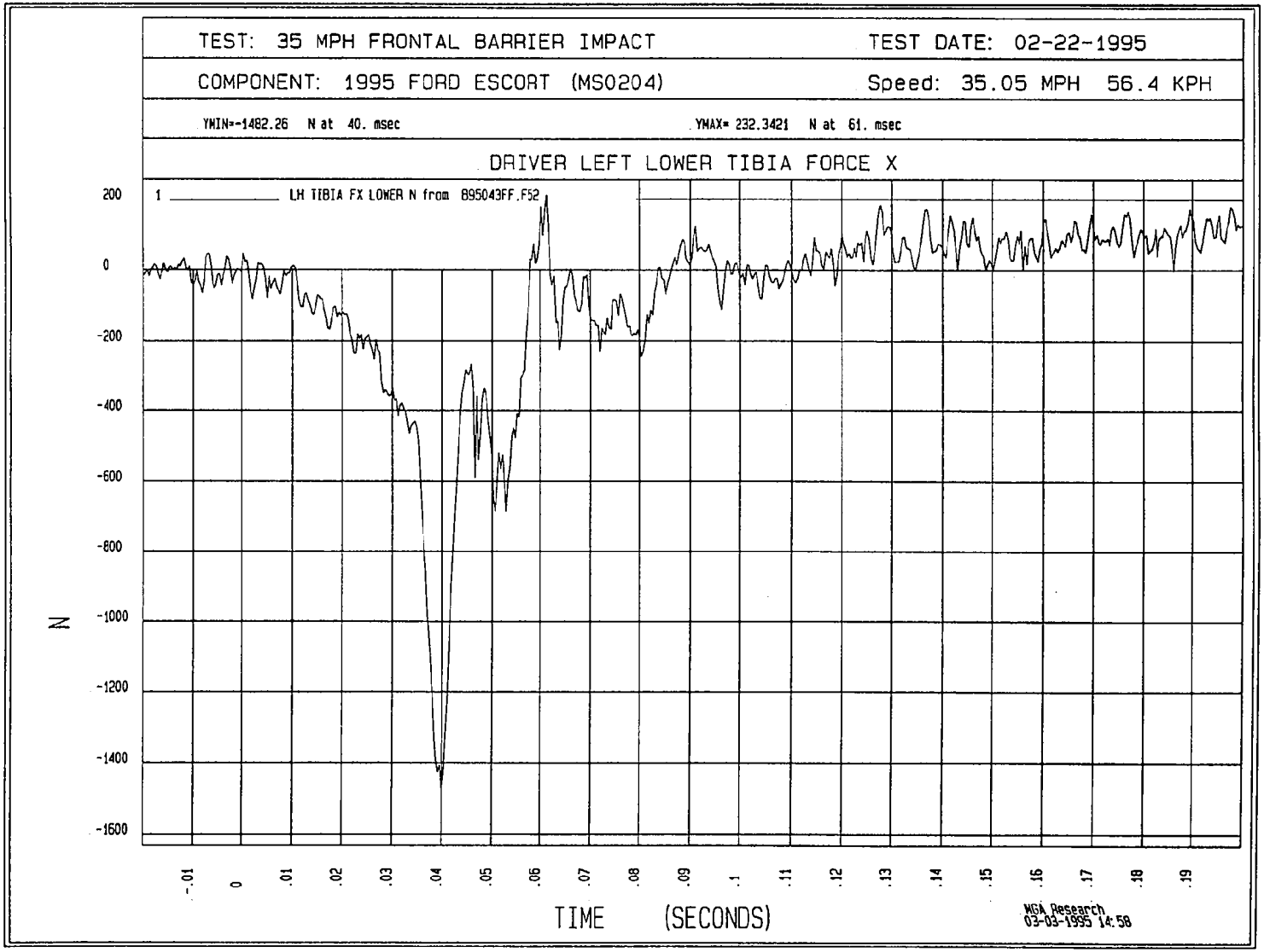


Figure B-73 - Driver Left Lower Tibia Force X vs. Time

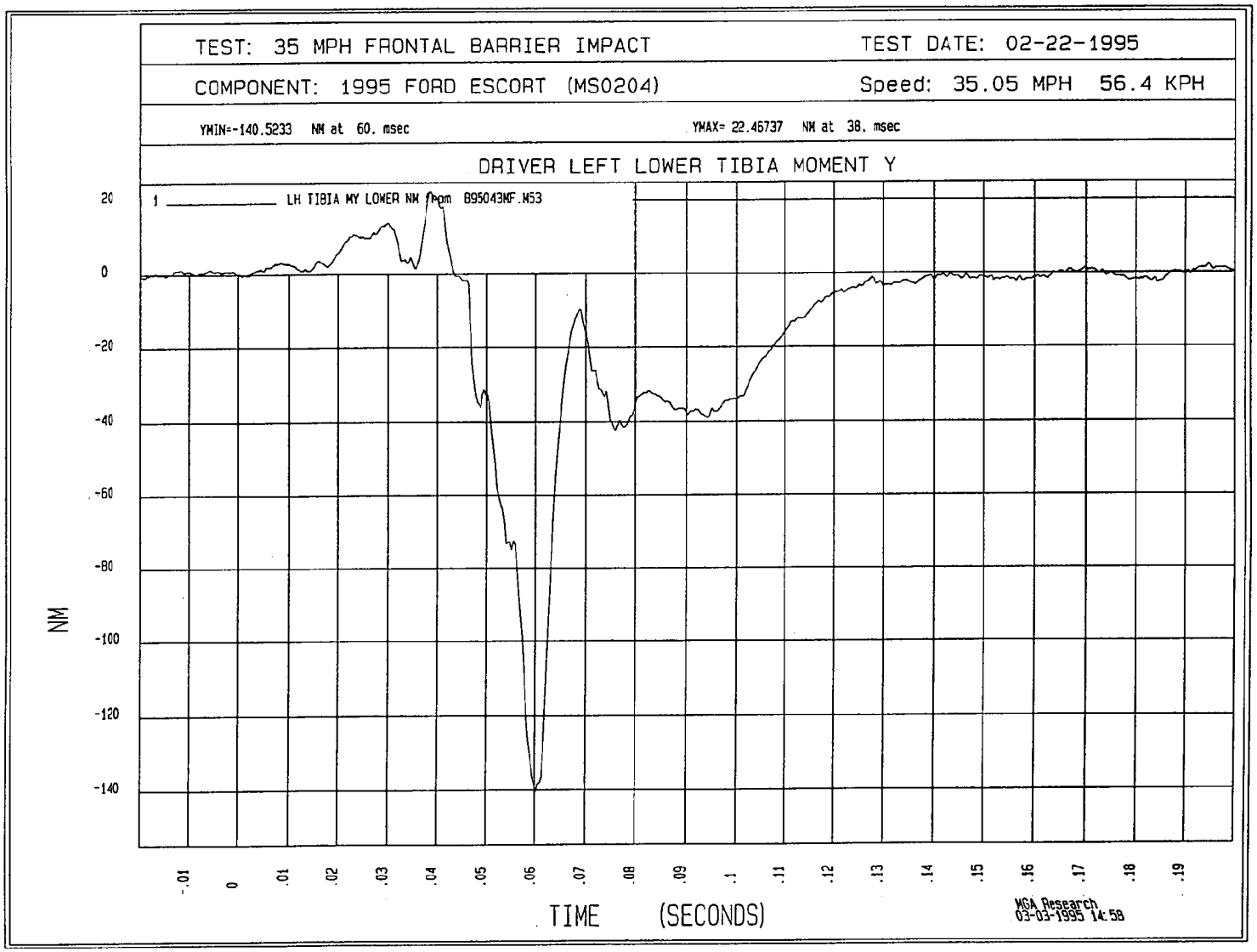


Figure B-74 - Driver Left Lower Tibia Moment Y vs. Time

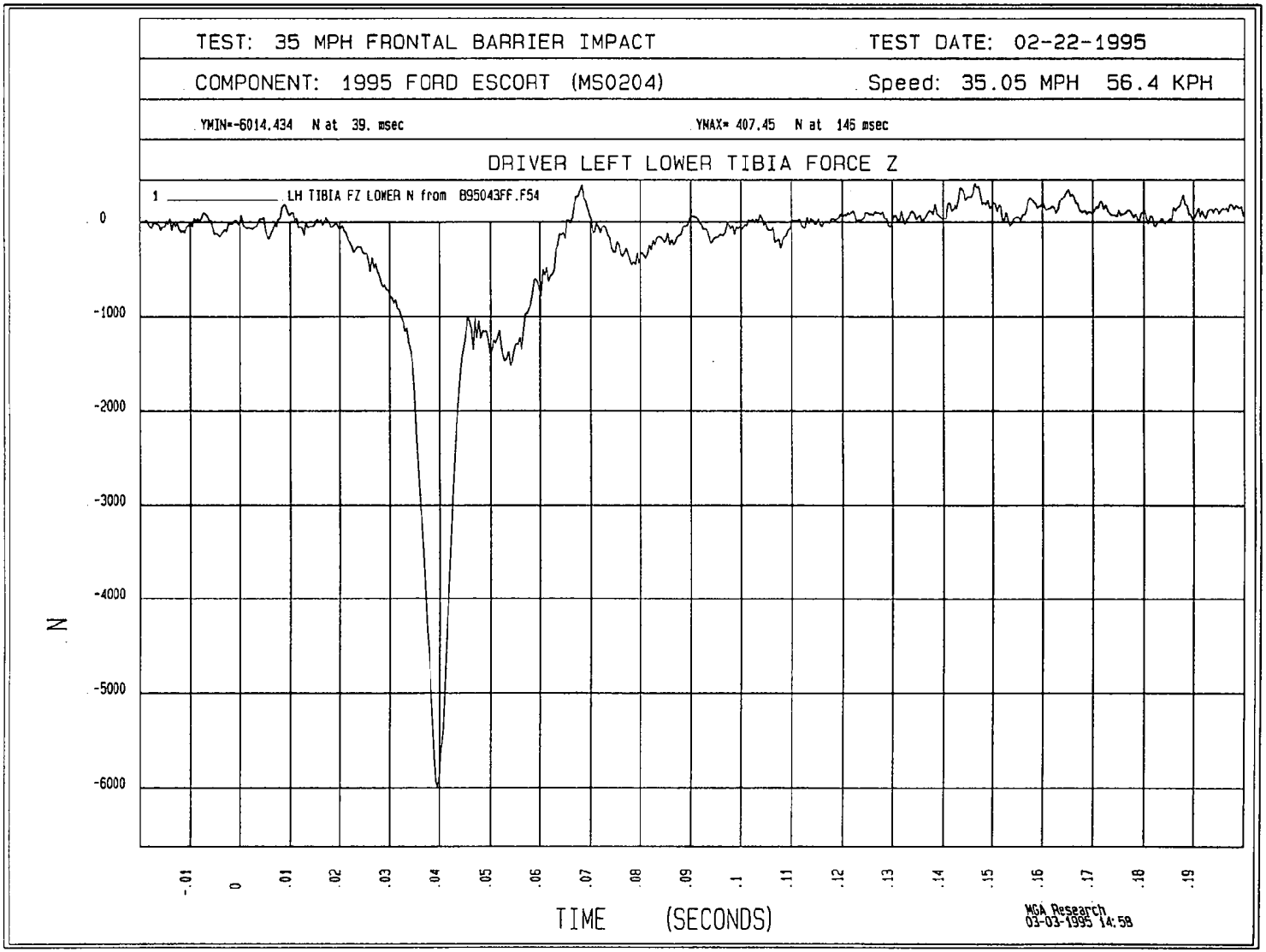


Figure B-75 - Driver Left Lower Tibia Force Z vs. Time

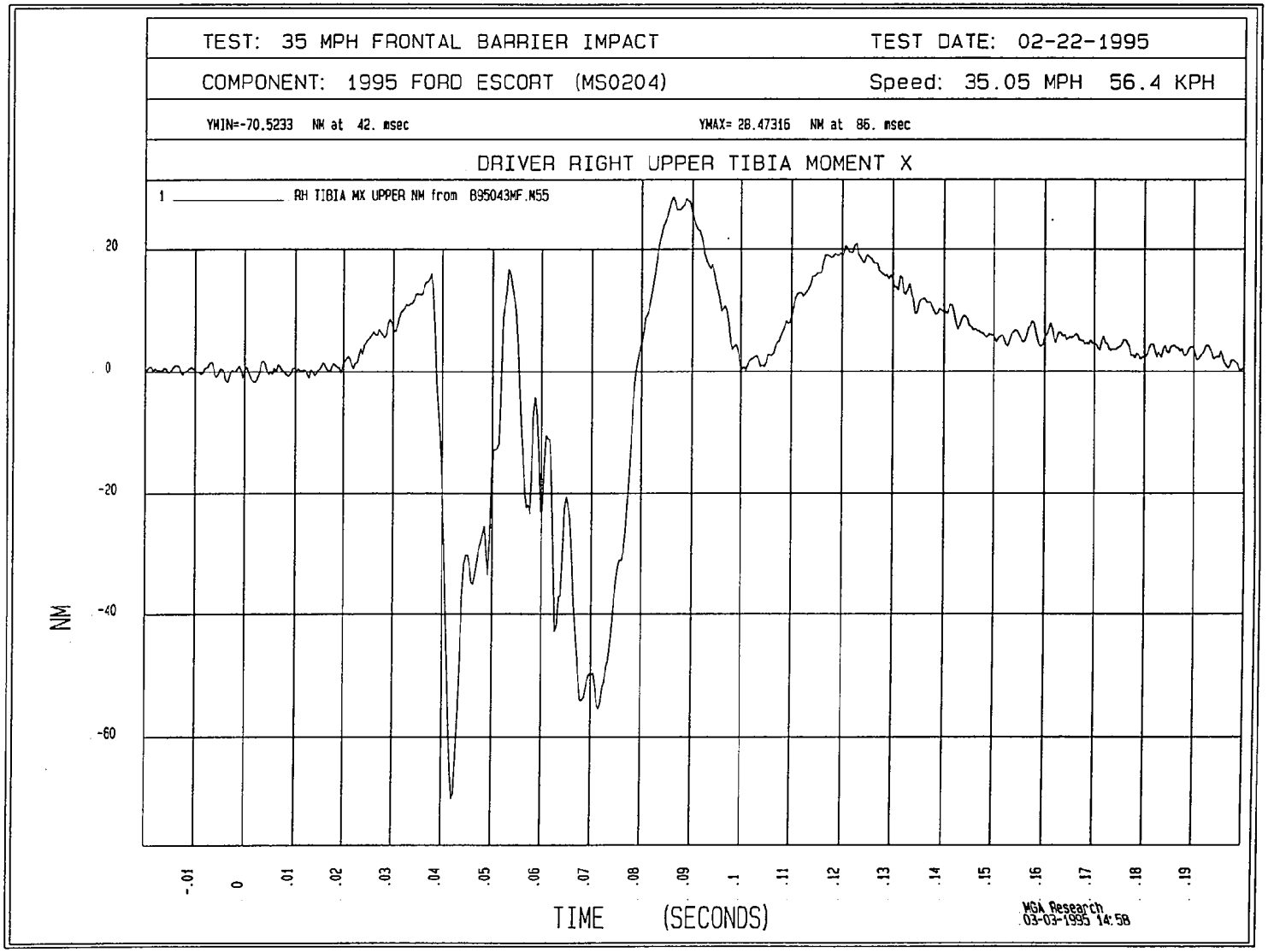


Figure B-76 - Driver Right Upper Tibia Moment X vs. Time

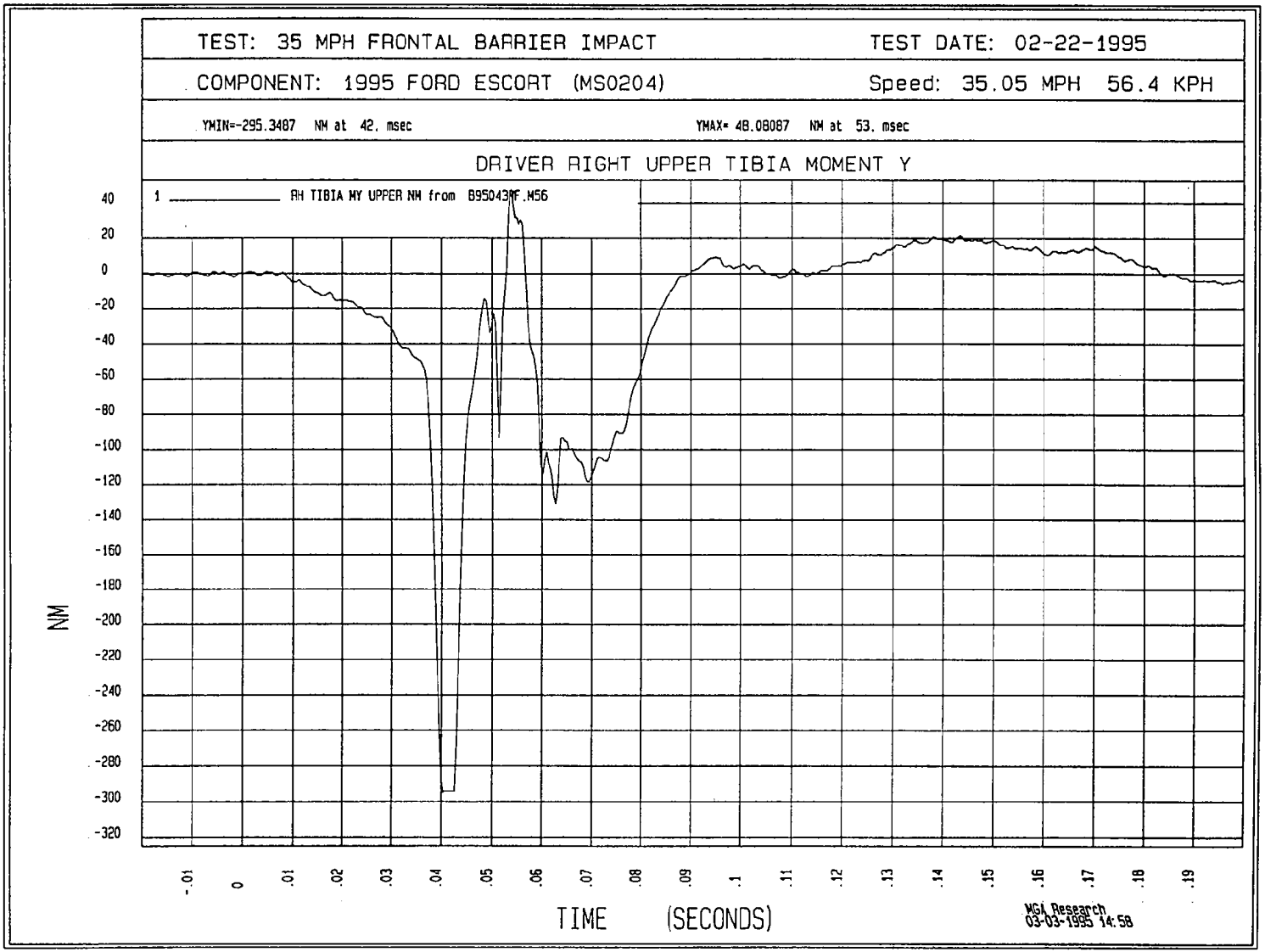


Figure B-77 - Driver Right Upper Tibia Moment Y vs. Time

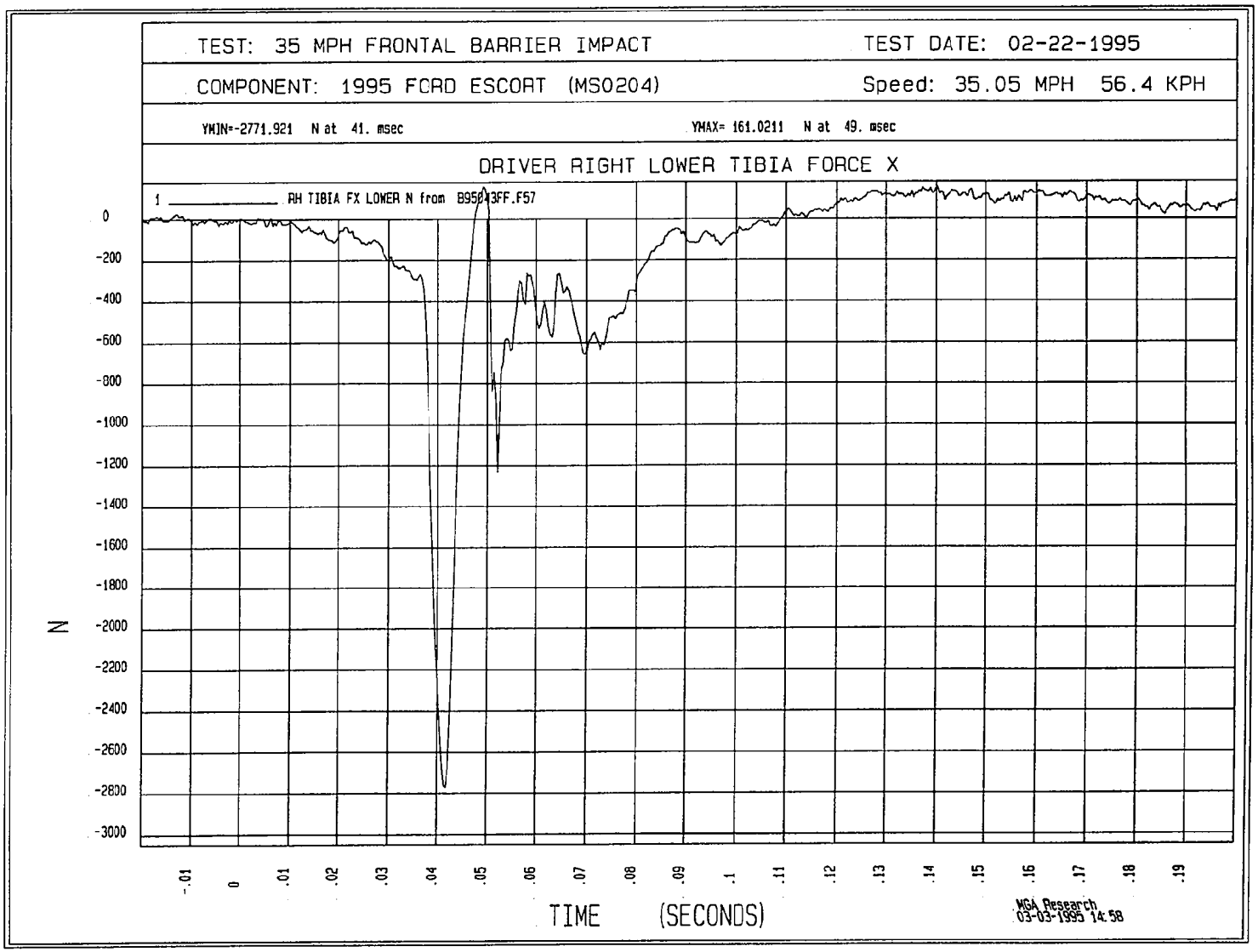


Figure B-78 - Driver Right Lower Tibia Force X vs. Time

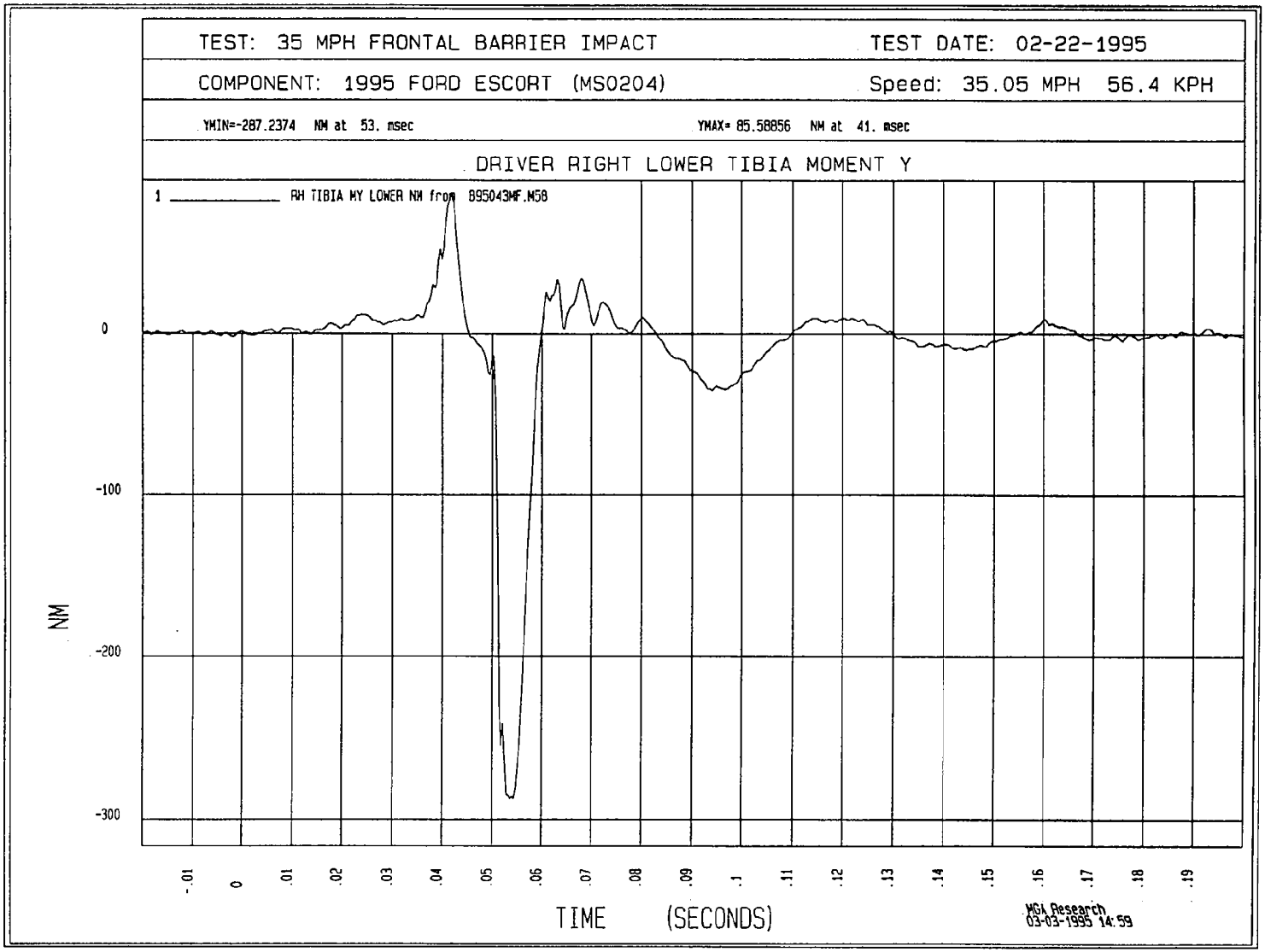


Figure B-79 - Driver Right Lower Tibia Moment Y vs. Time

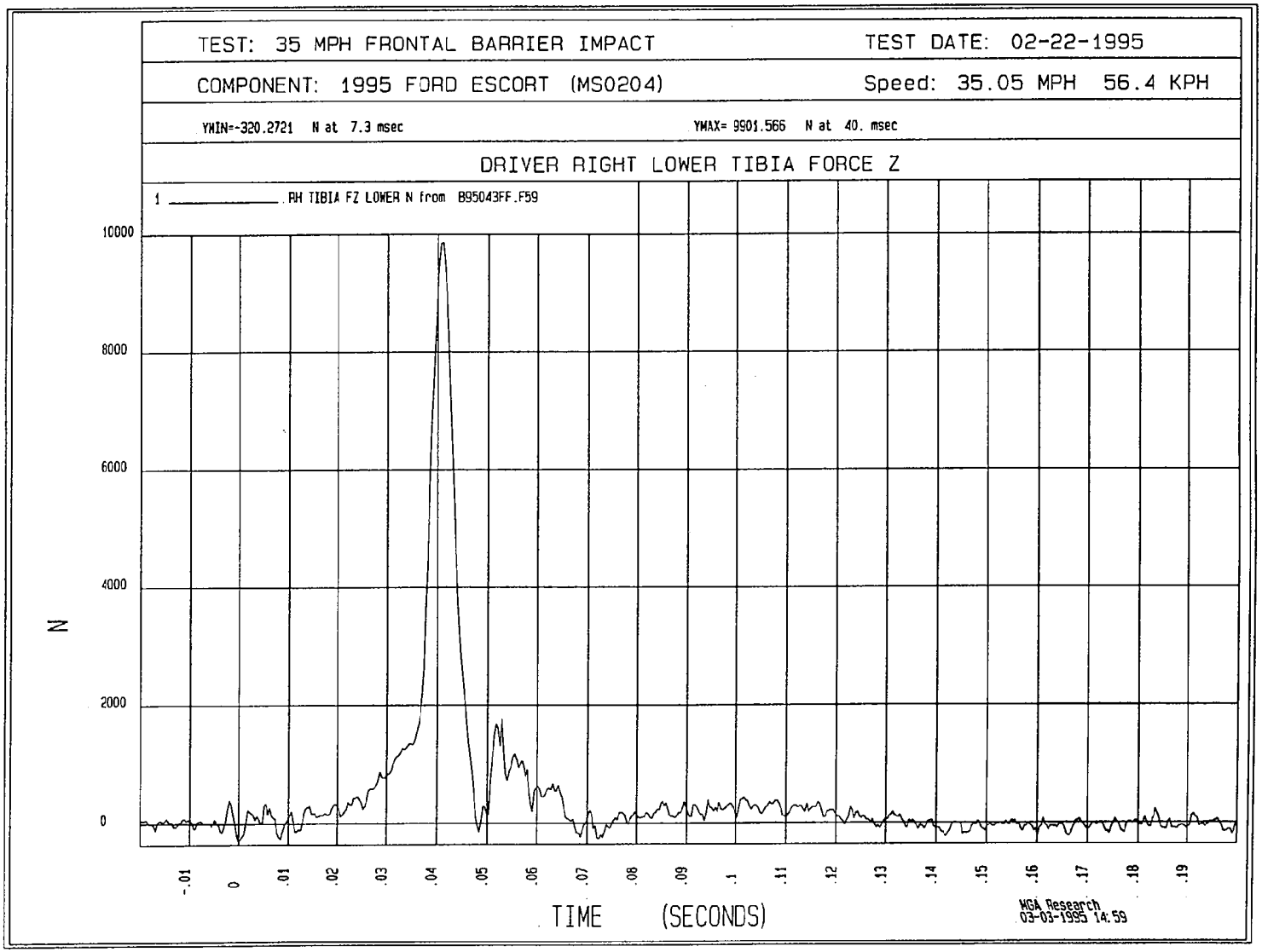


Figure B-8Ø - Driver Right Lower Tibia Force Z vs. Time

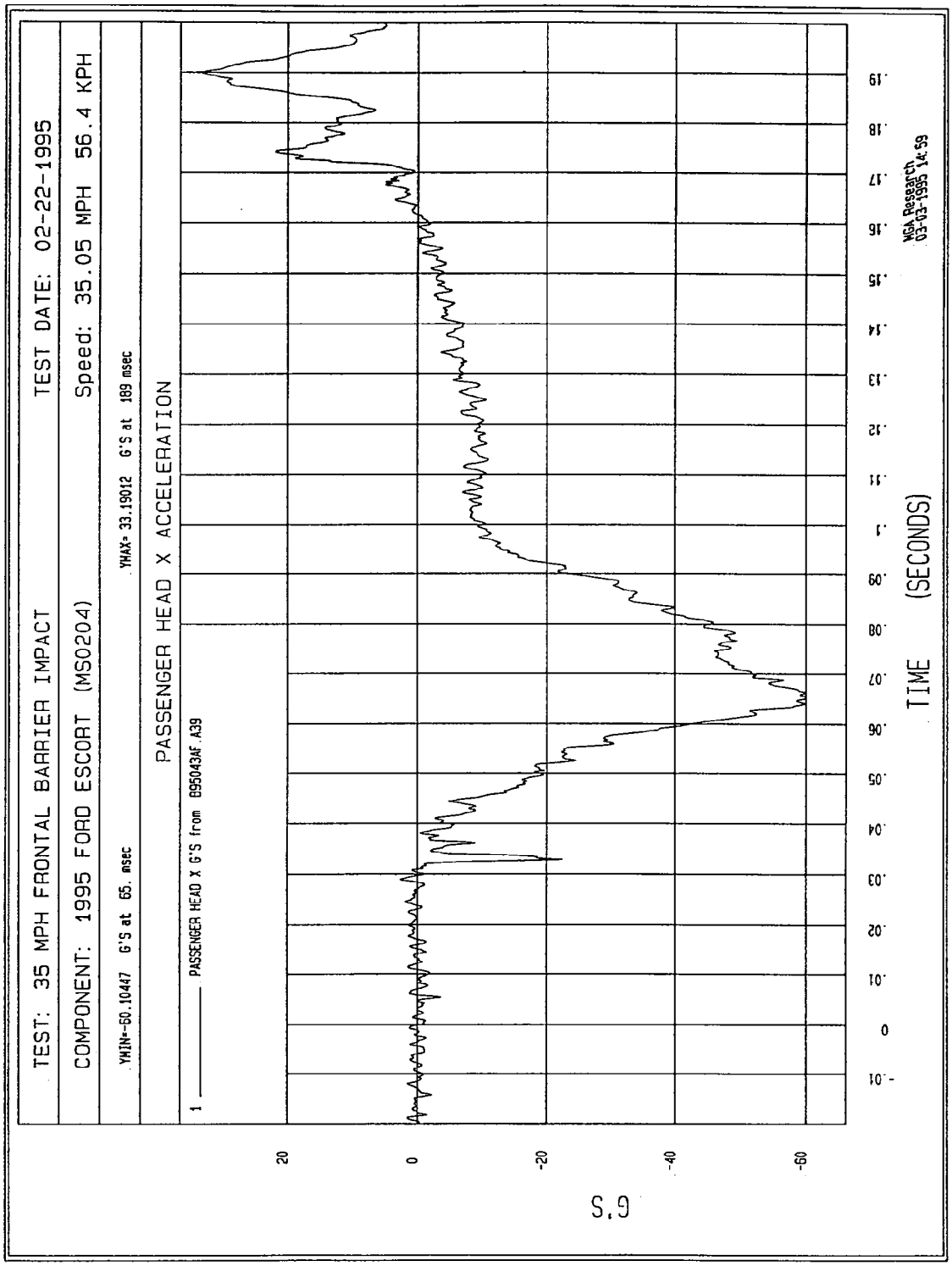


Figure B-81 - Passenger Head X Acceleration vs. Time

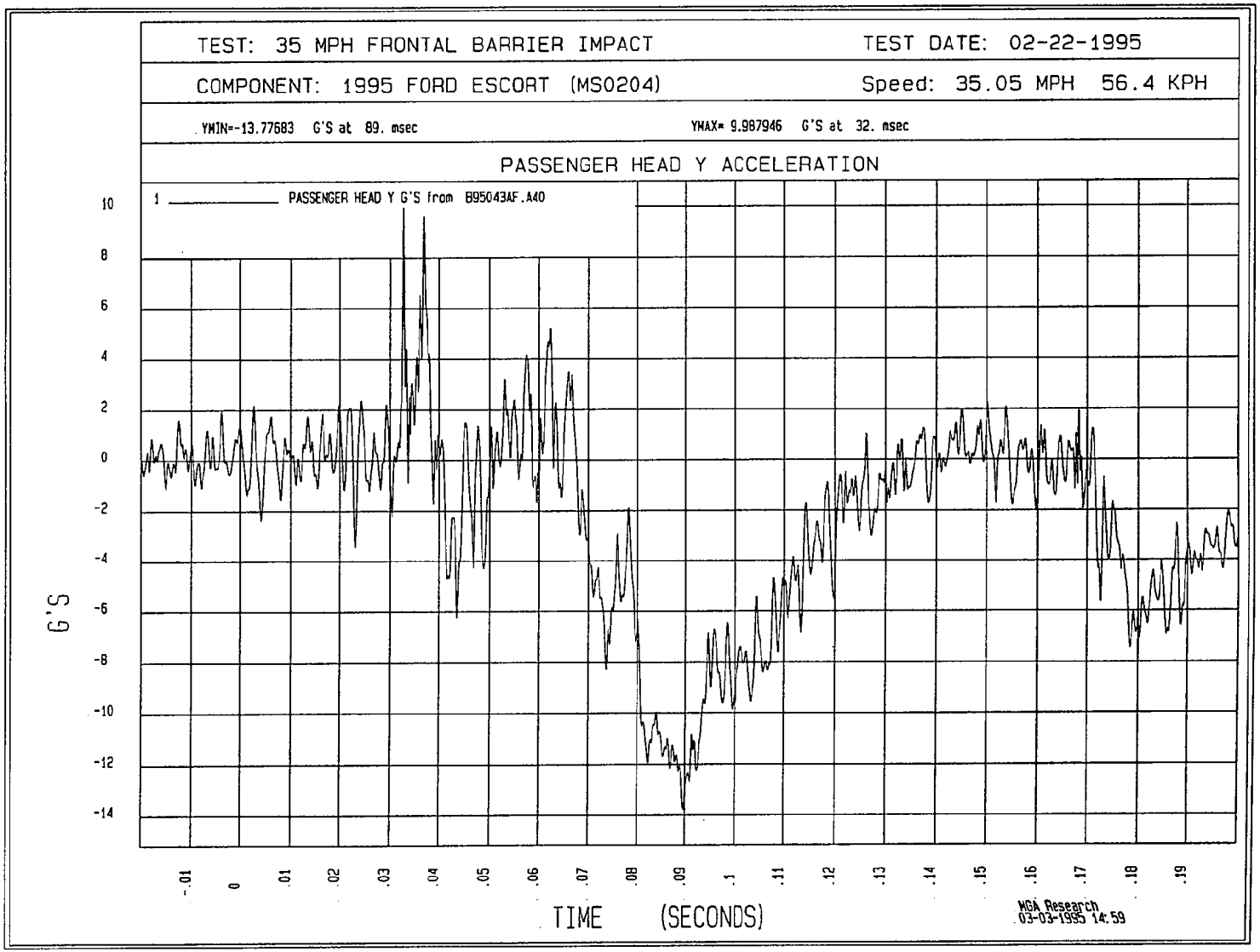


Figure B-82 - Passenger Head Y Acceleration vs. Time

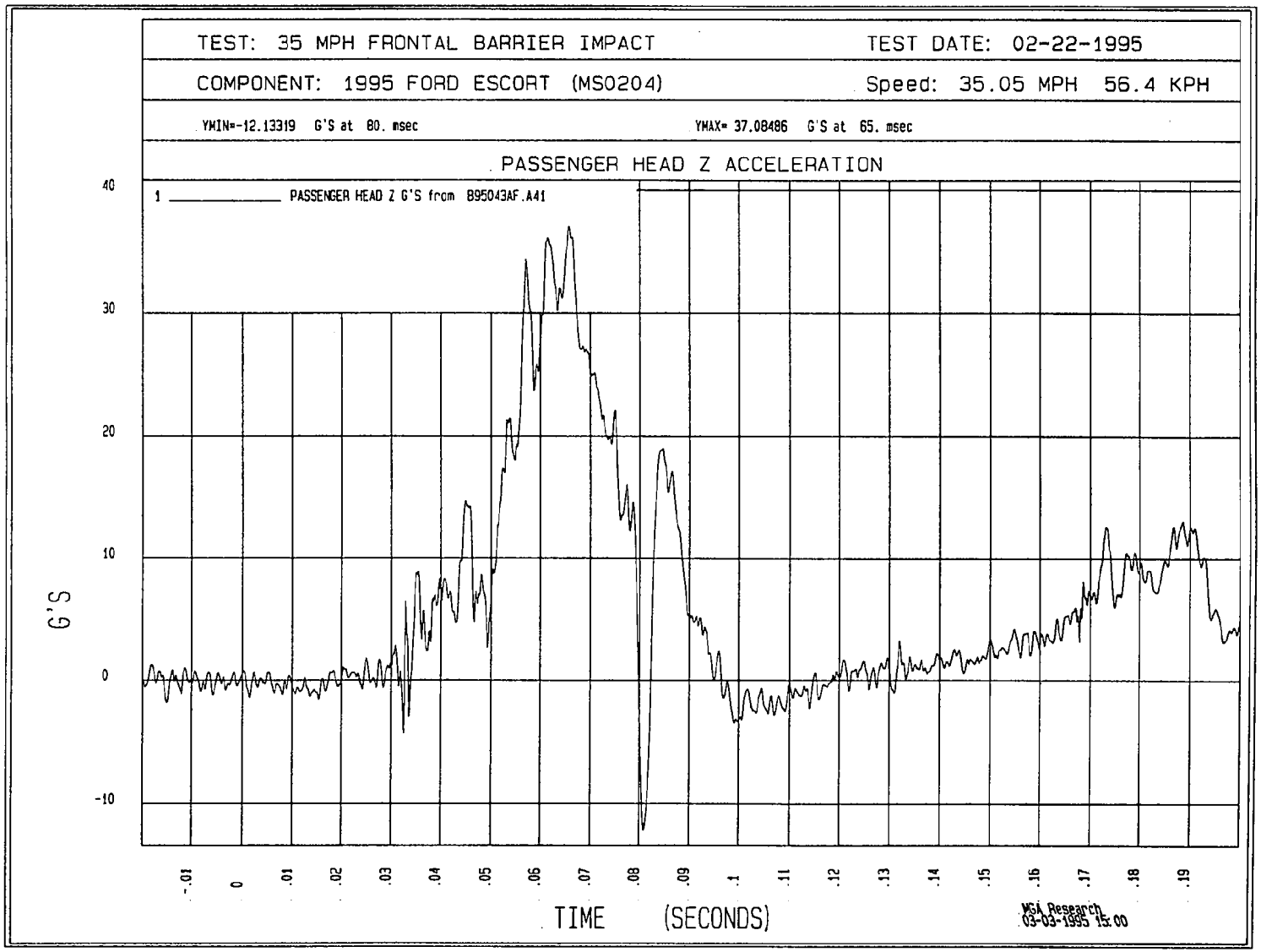


Figure B-83 - Passenger Head Z Acceleration vs. Time

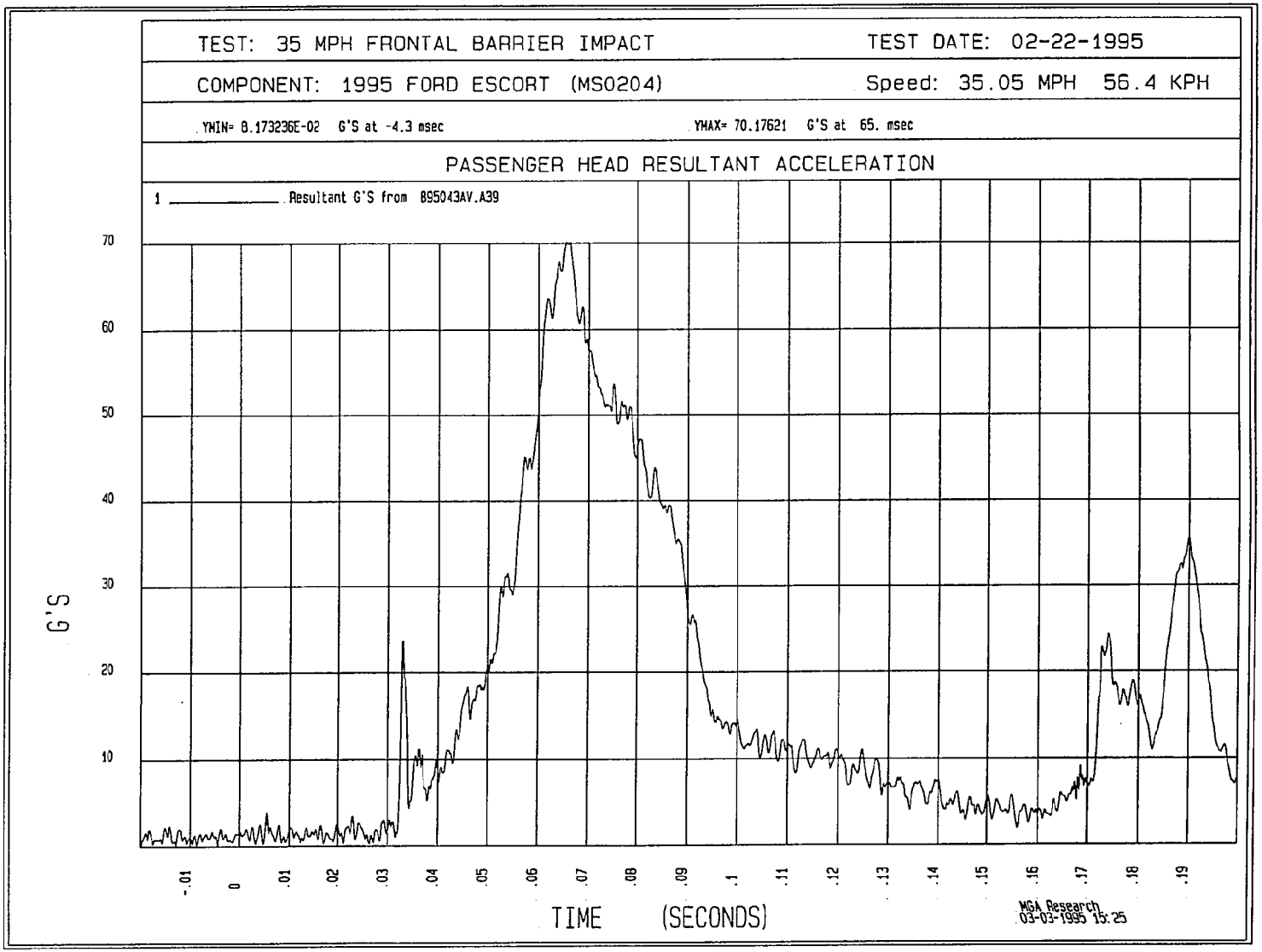


Figure B-84 - Passenger Head Resultant Acceleration vs. Time

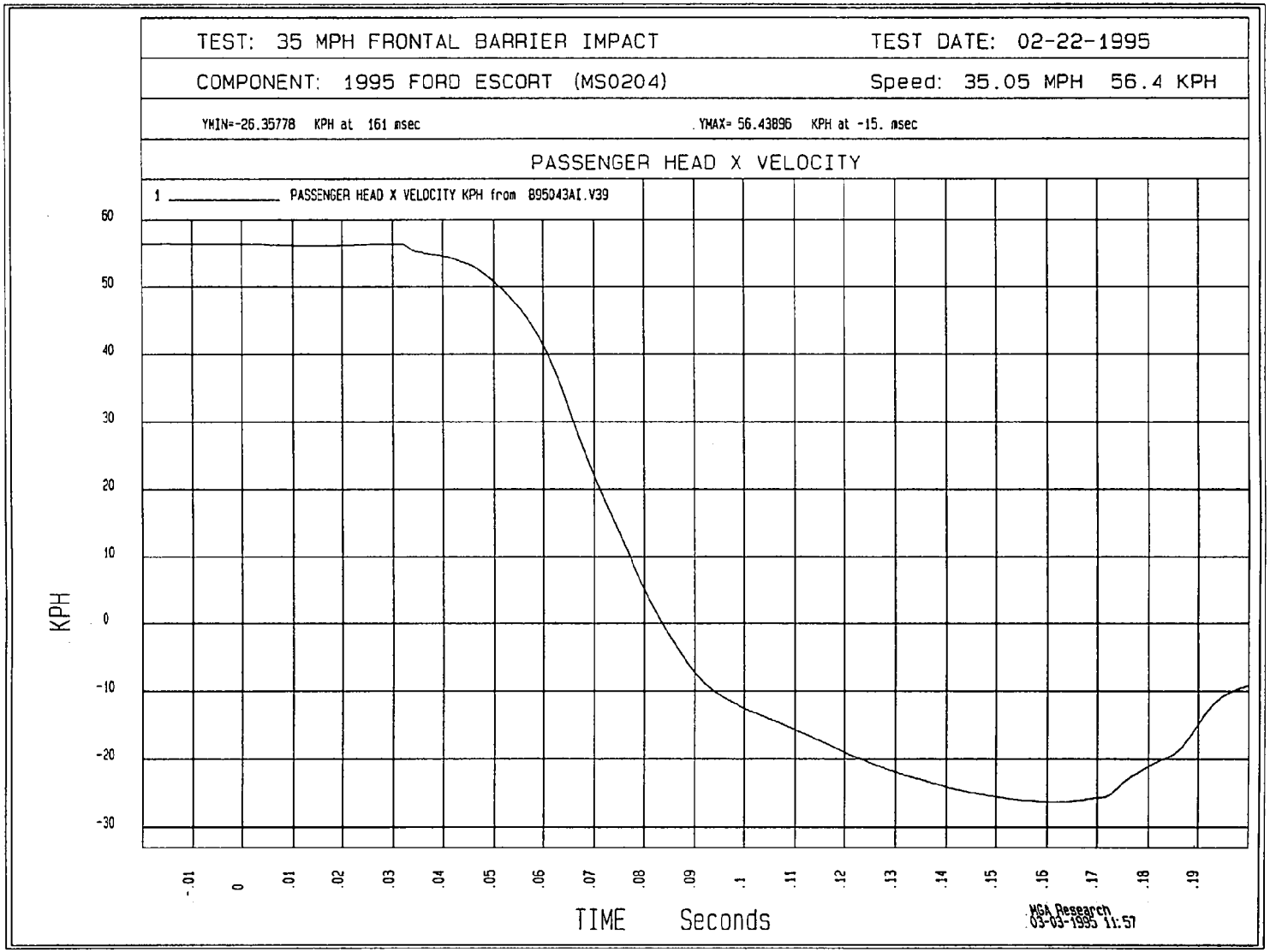


Figure B-85 - Passenger Head X Velocity vs. Time

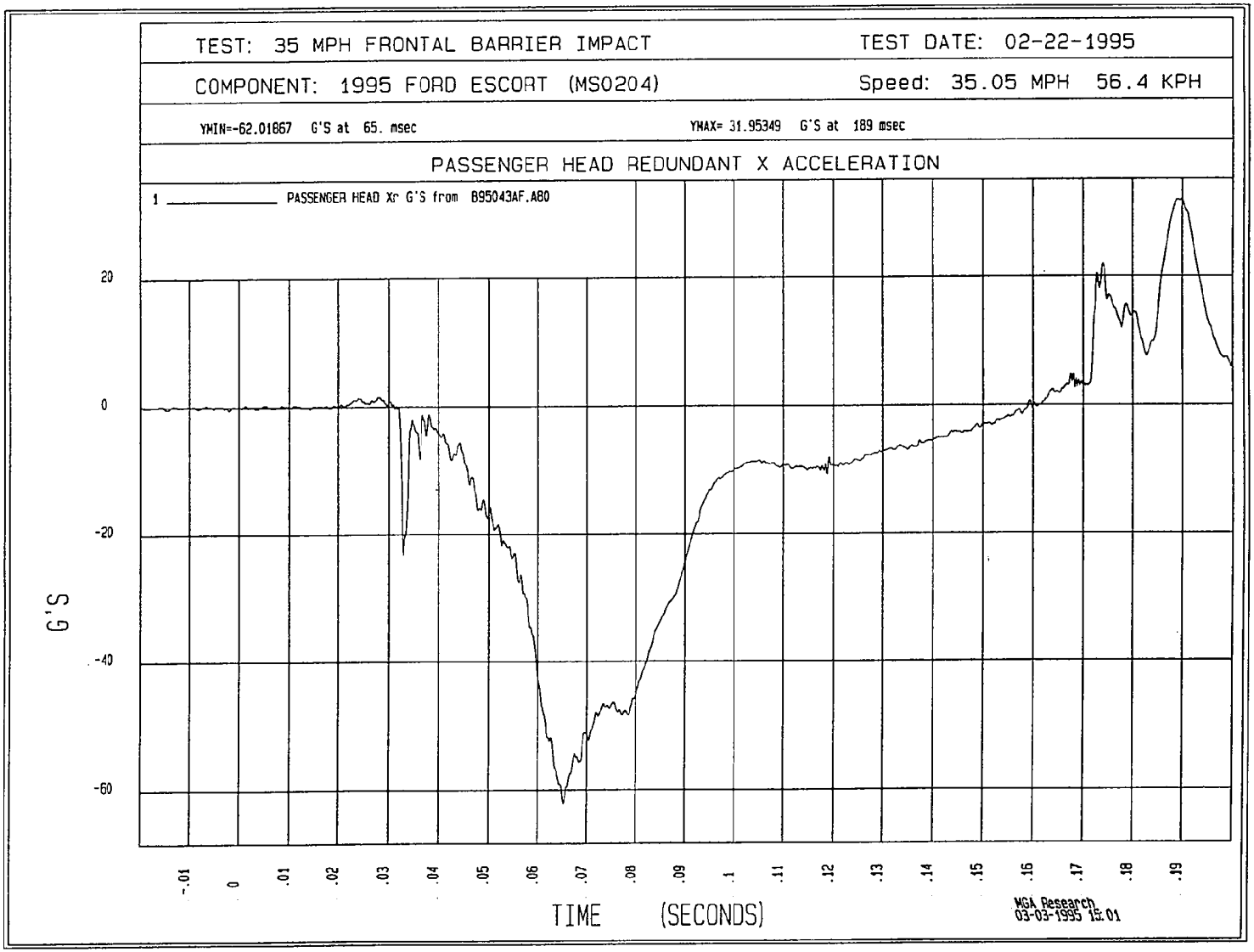


Figure B-86 - Passenger Head X Redundant Acceleration vs. Time

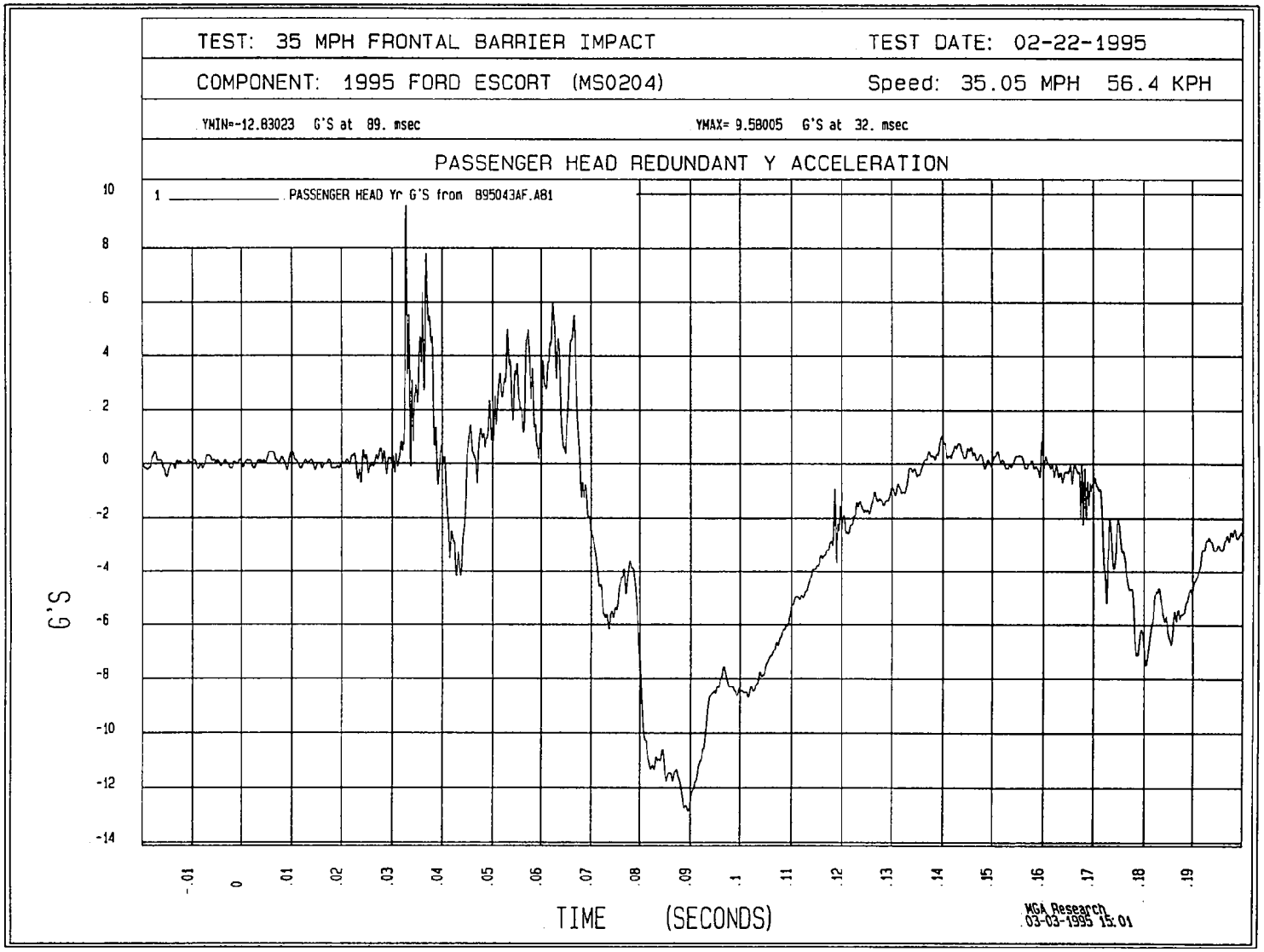


Figure B-87 - Passenger Head Y Redundant Acceleration vs. Time

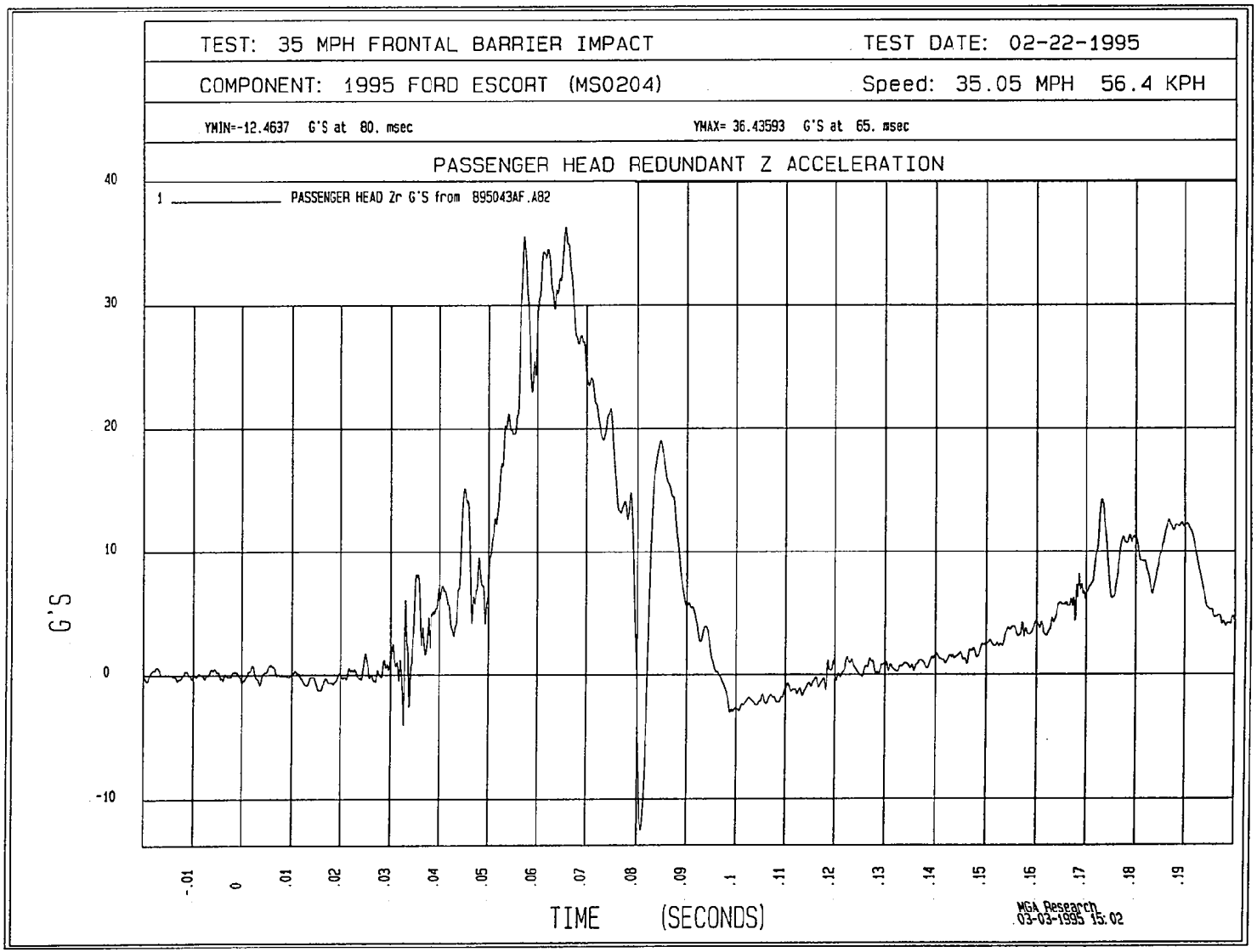


Figure B-88 - Passenger Head Z Redundant Acceleration vs. Time

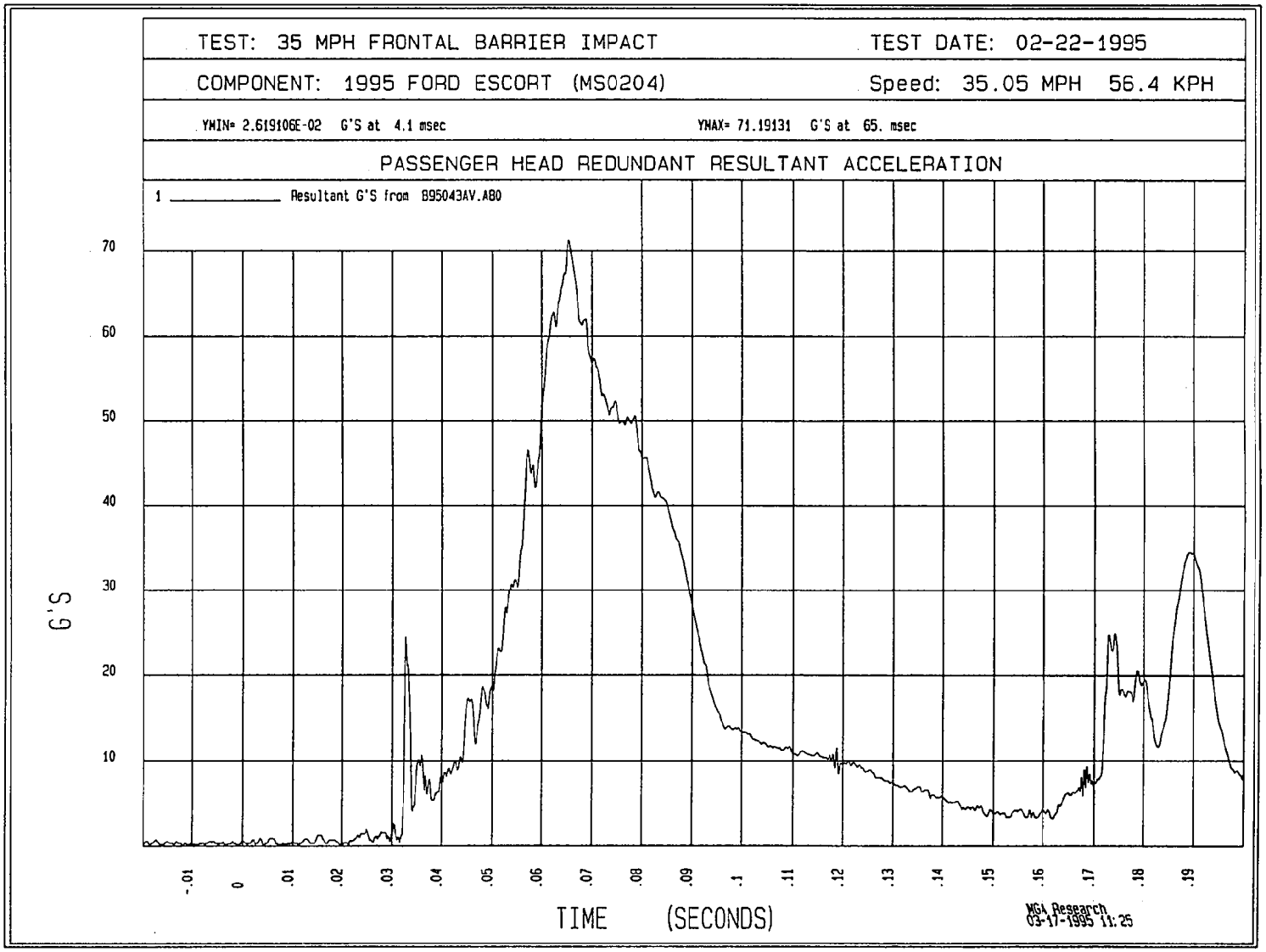


Figure B-89 - Passenger Head Redundant Resultant Accel. vs. Time

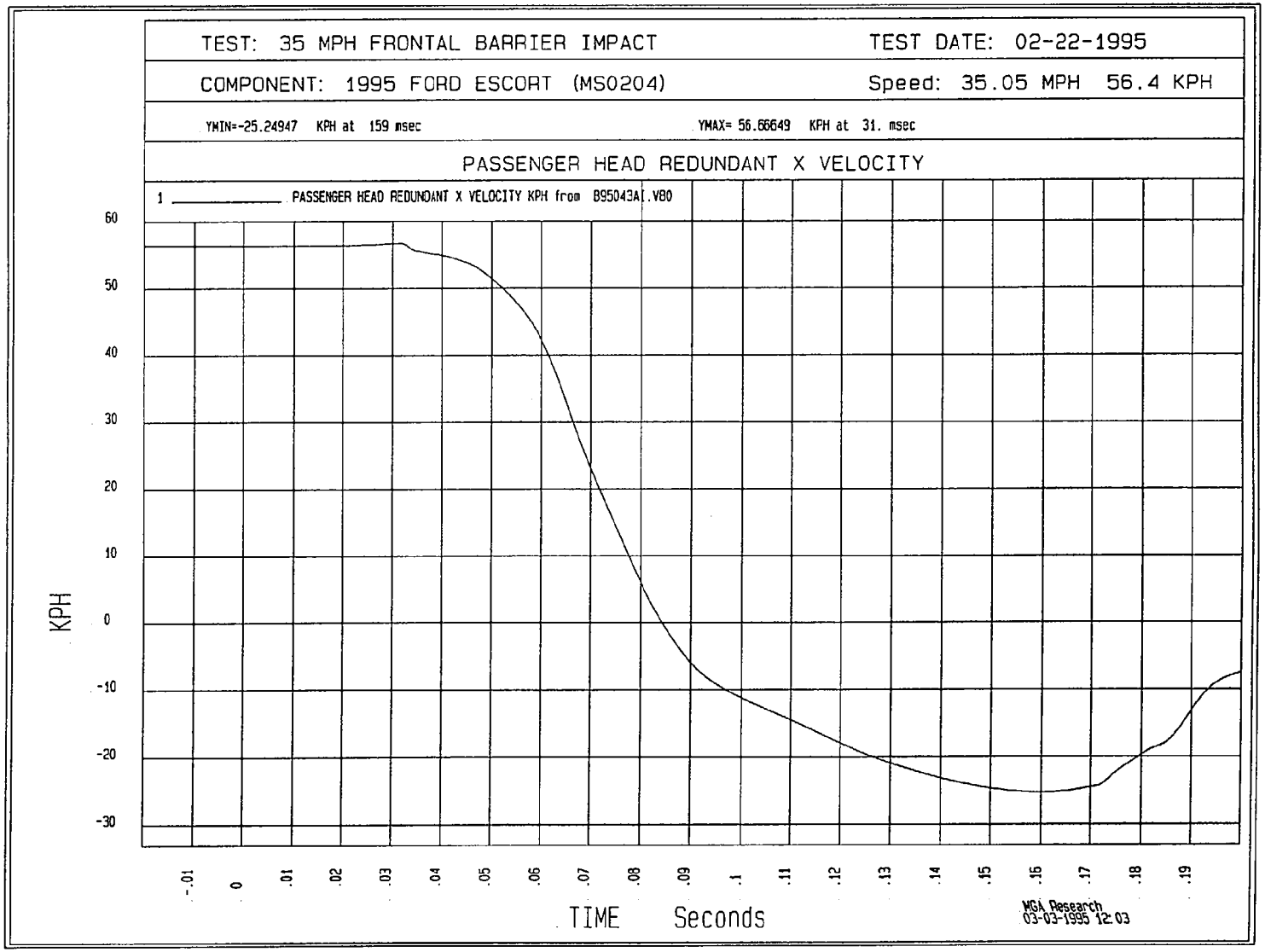


Figure B-9Ø - Passenger Head X Redundant Velocity vs. Time

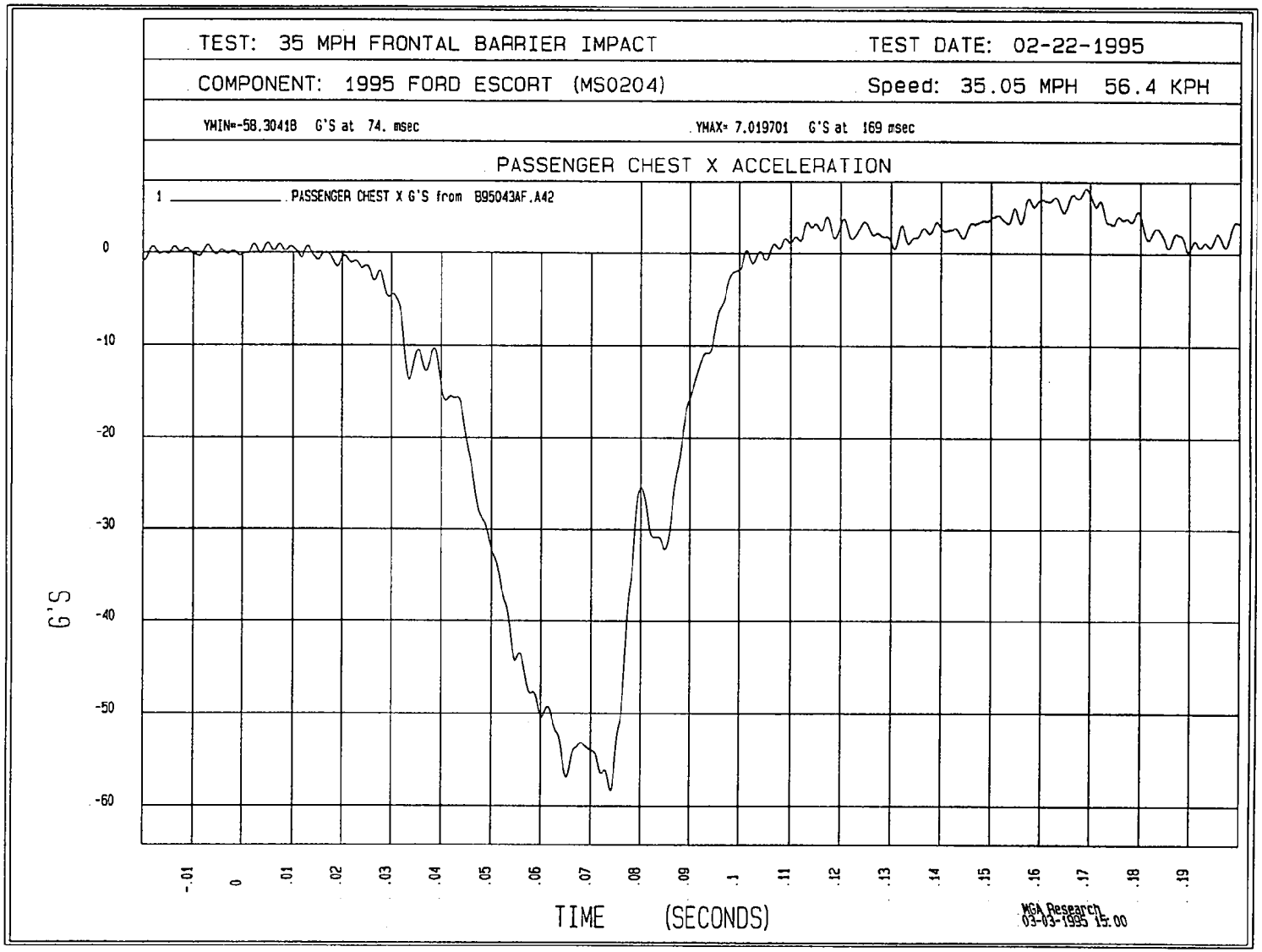


Figure B-91 - Passenger Chest X Acceleration vs. Time

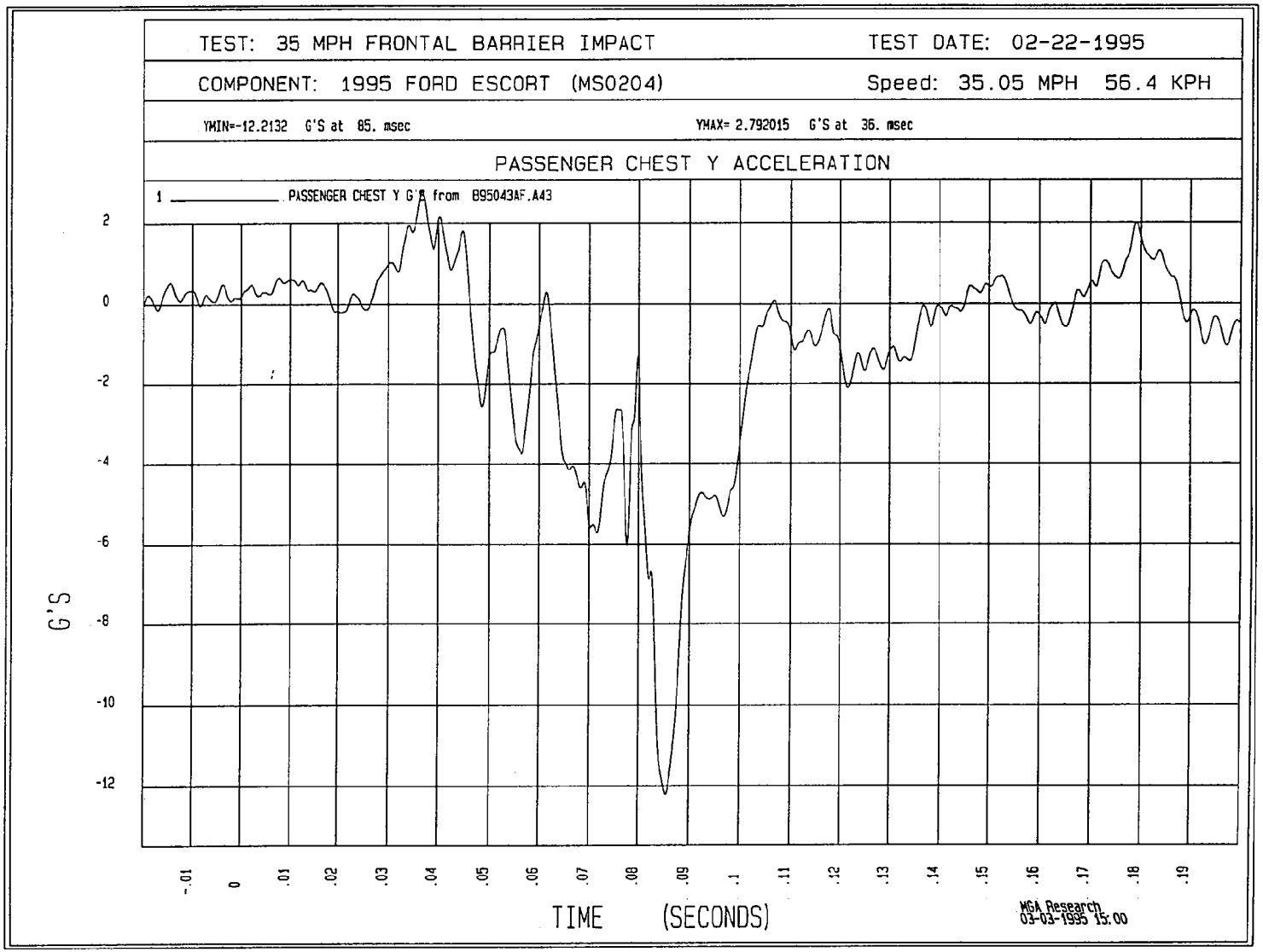


Figure B-92 - Passenger Chest Y Acceleration vs. Time

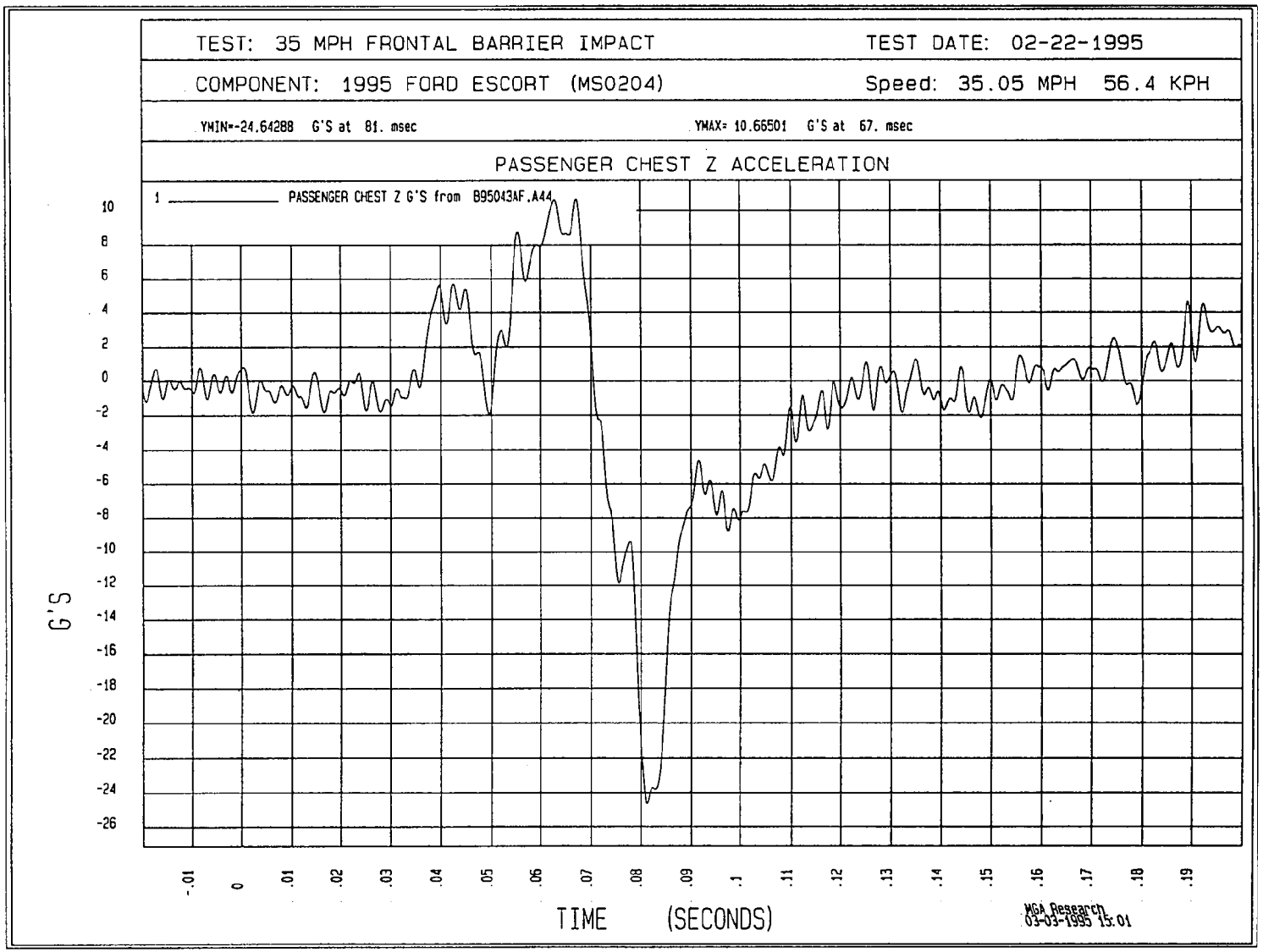


Figure B-93 - Passenger Chest Z Acceleration vs. Time

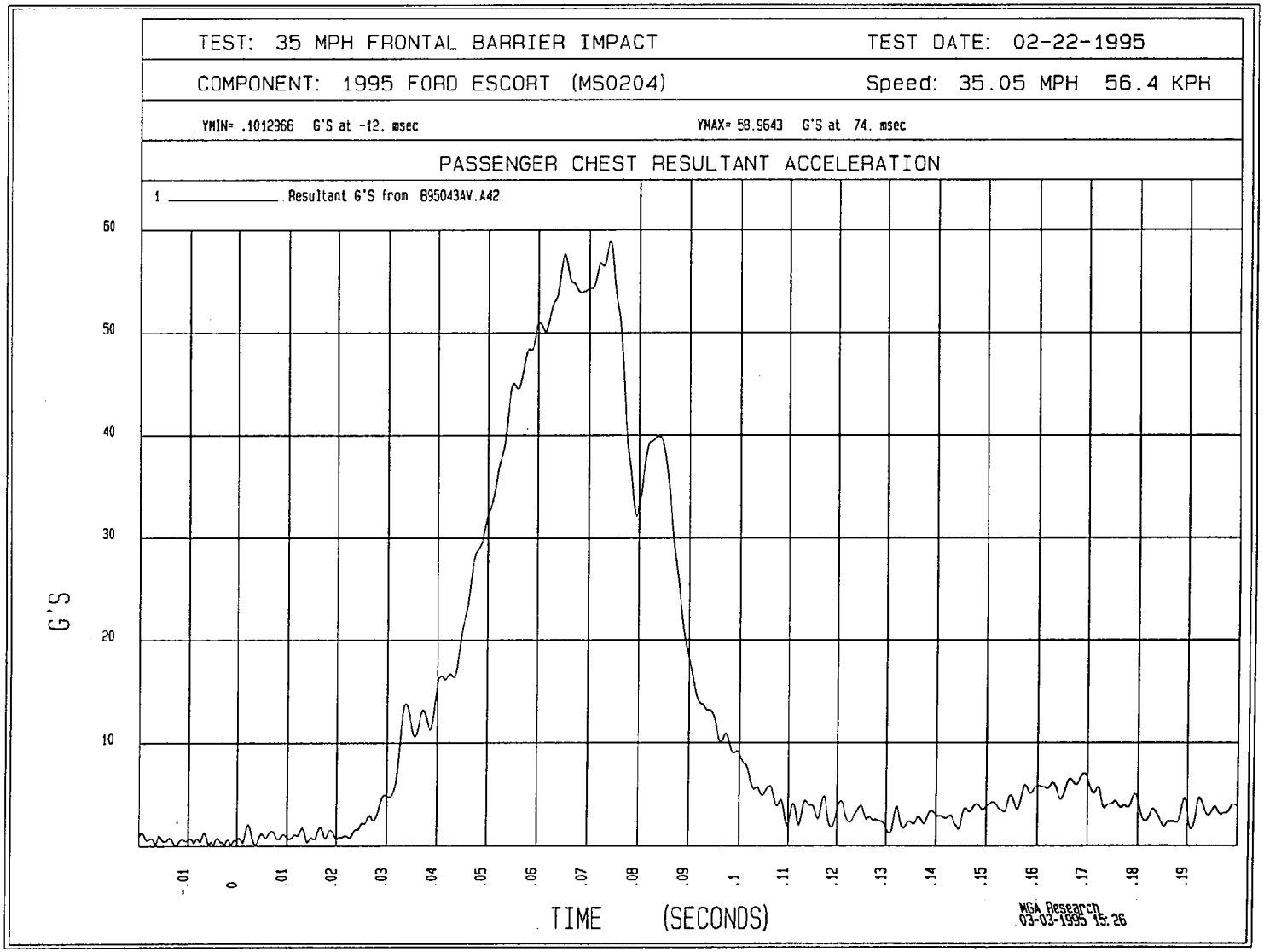


Figure B-94 - Passenger Chest Resultant Accel. vs. Time

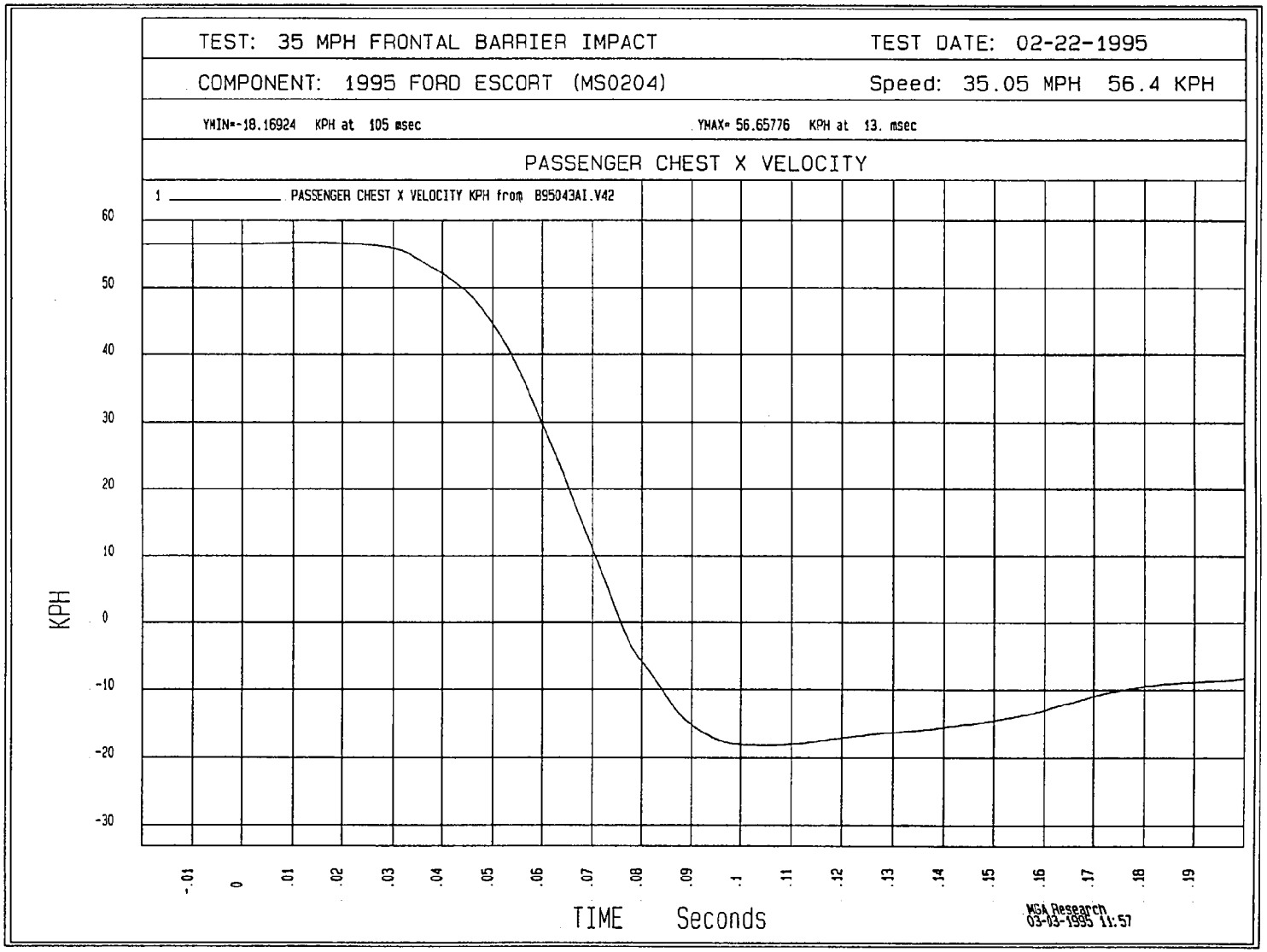


Figure B-95 - Passenger Chest X Velocity vs. Time

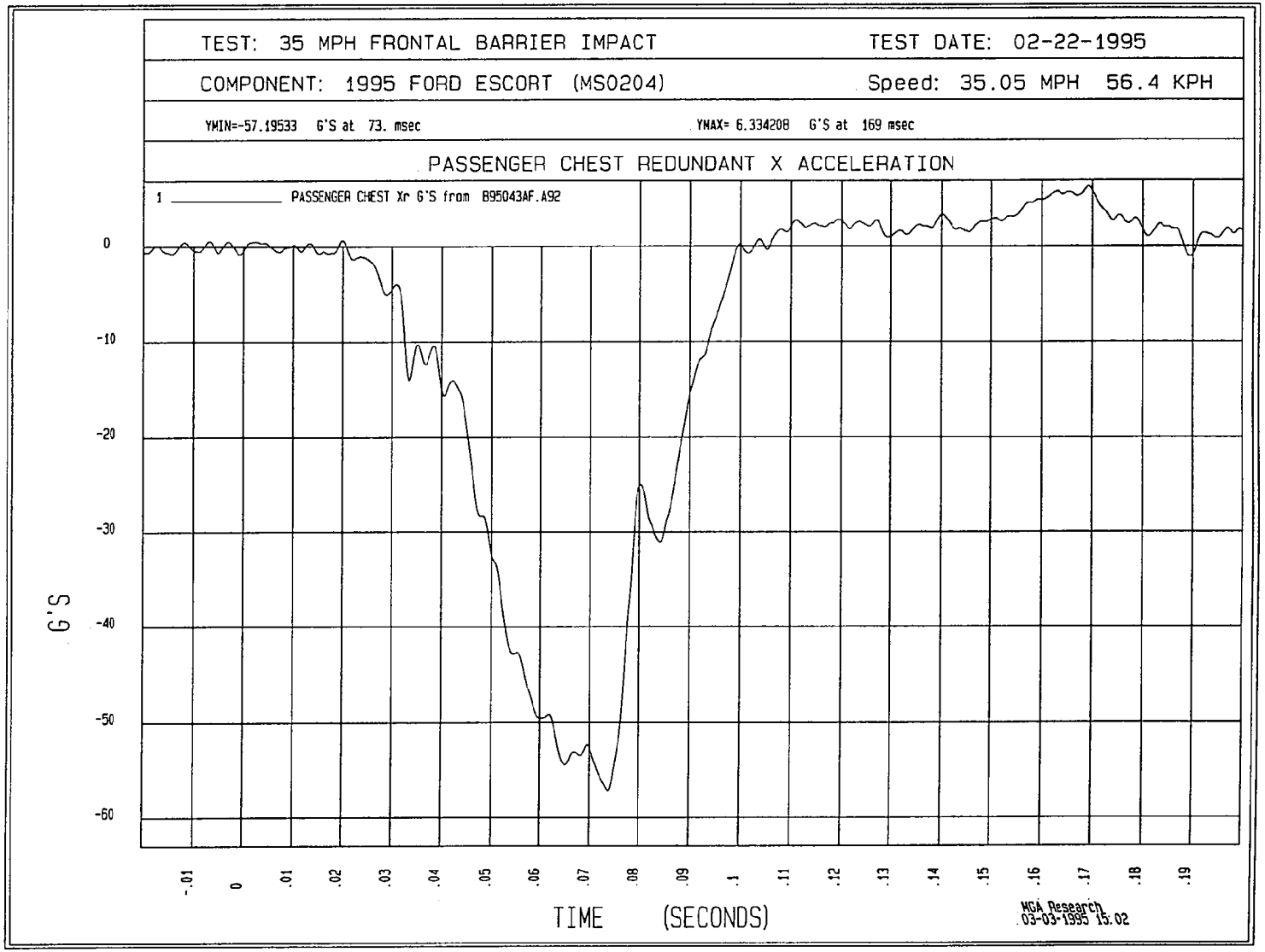


Figure B-96 - Passenger Chest X Redundant Acceleration vs. Time

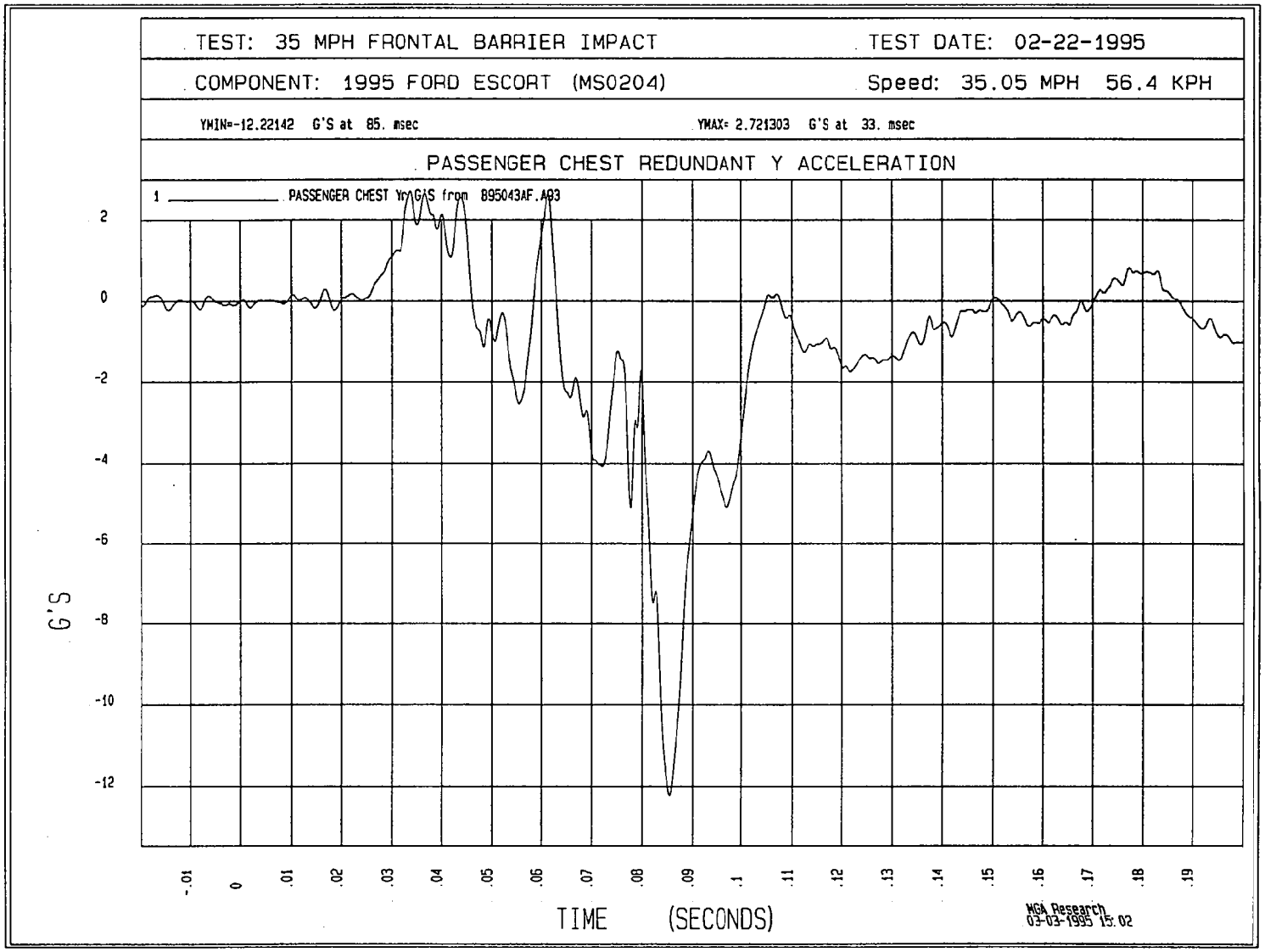


Figure B-97 - Passenger Chest Y Redundant Acceleration vs. Time

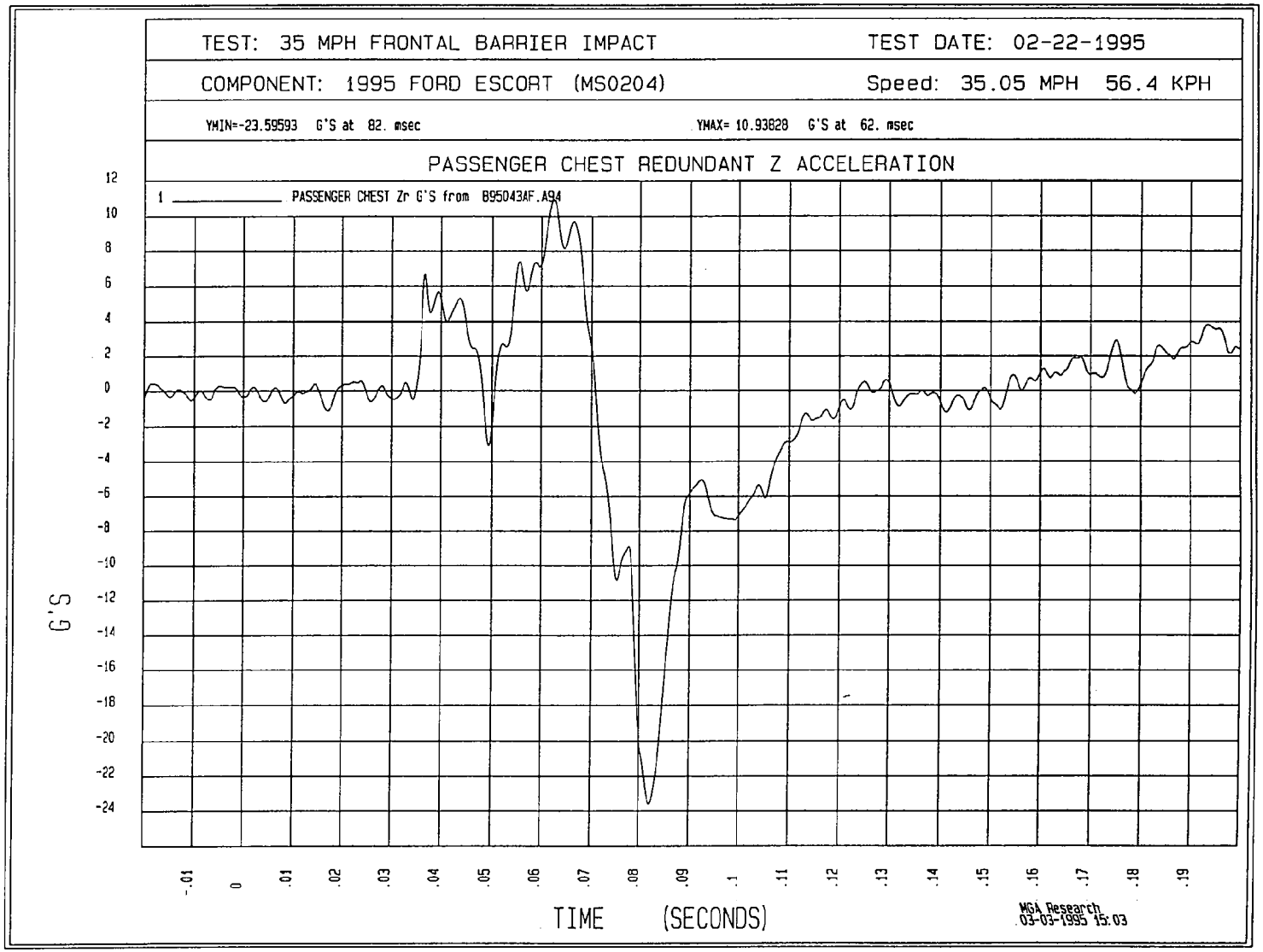


Figure B-98 - Passenger Chest Z Redundant Acceleration vs. Time

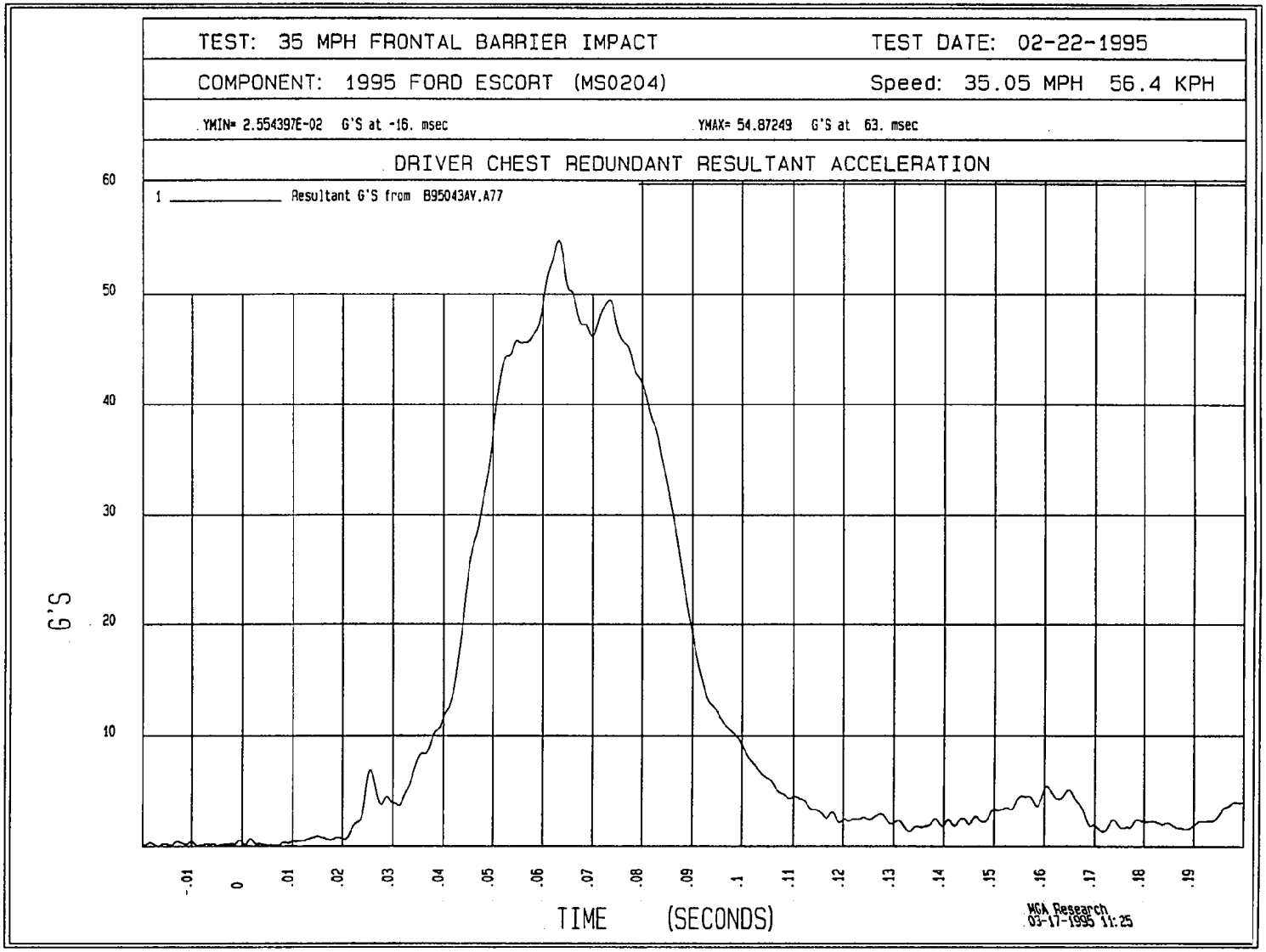


Figure B-99 - Passenger Chest Redundant Resultant Accel. vs. Time

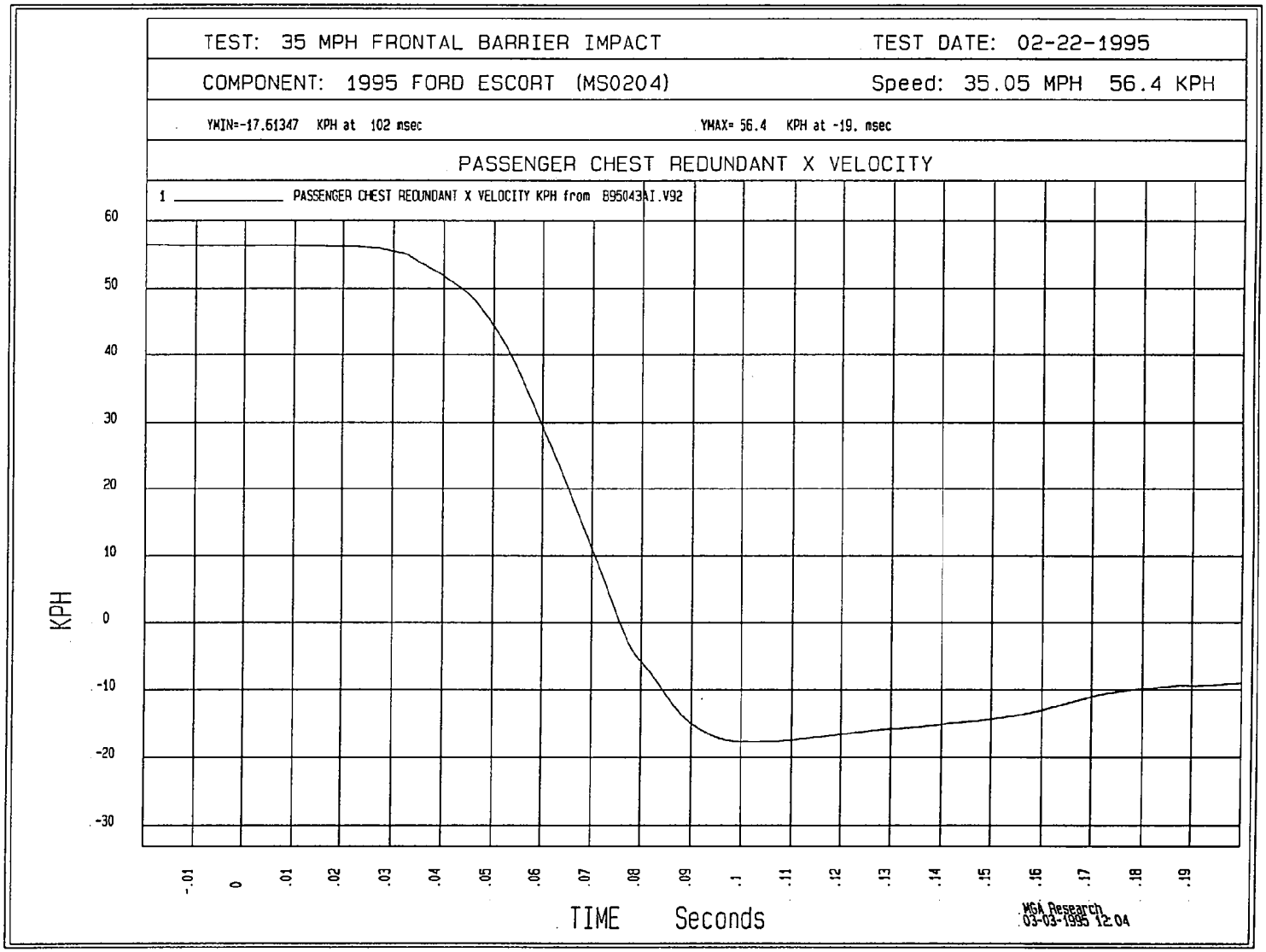


Figure B-1ØØ - Passenger Chest X Redundant Velocity vs. Time

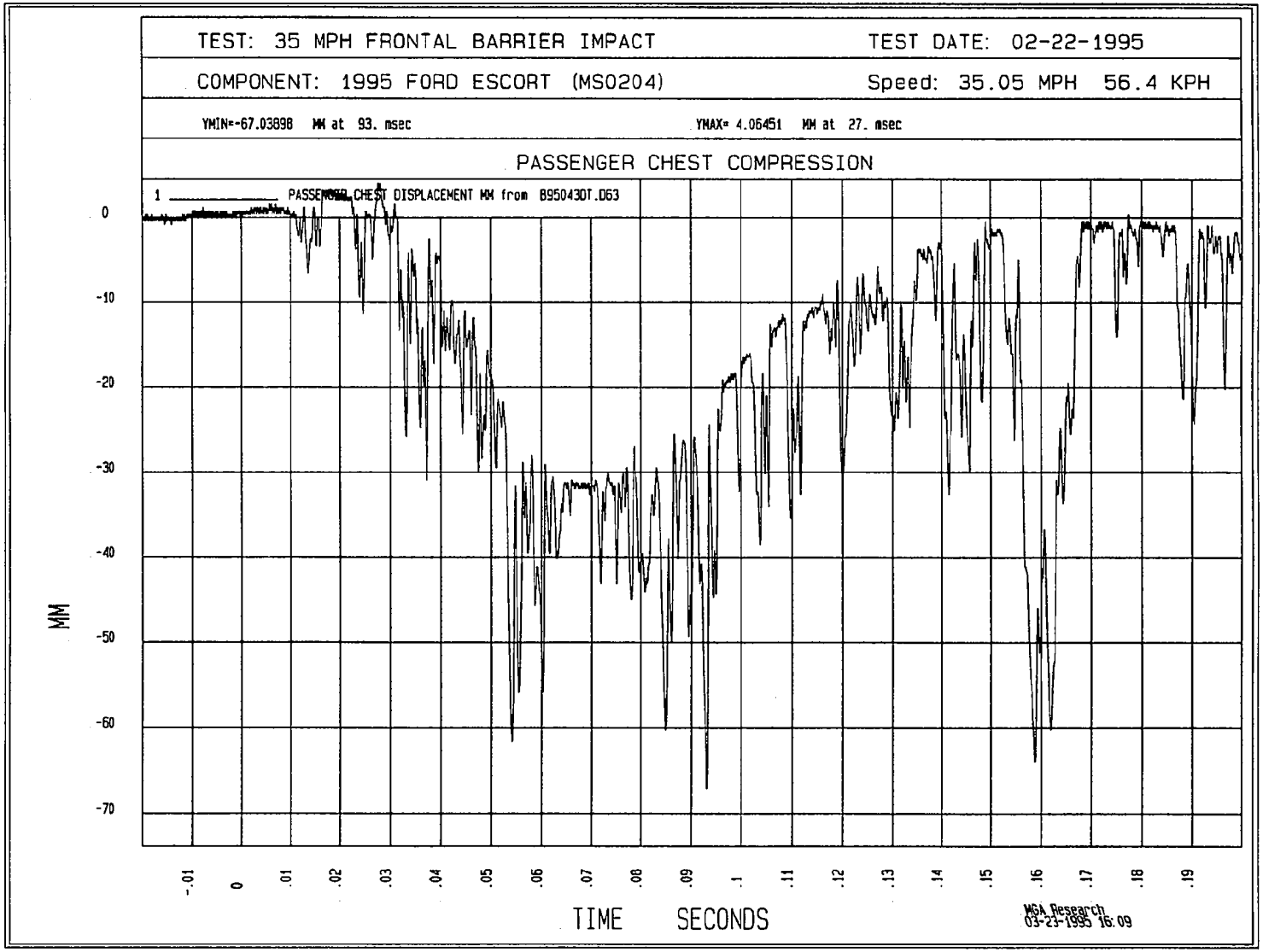


Figure B-101 - Passenger Chest Compression vs. Time

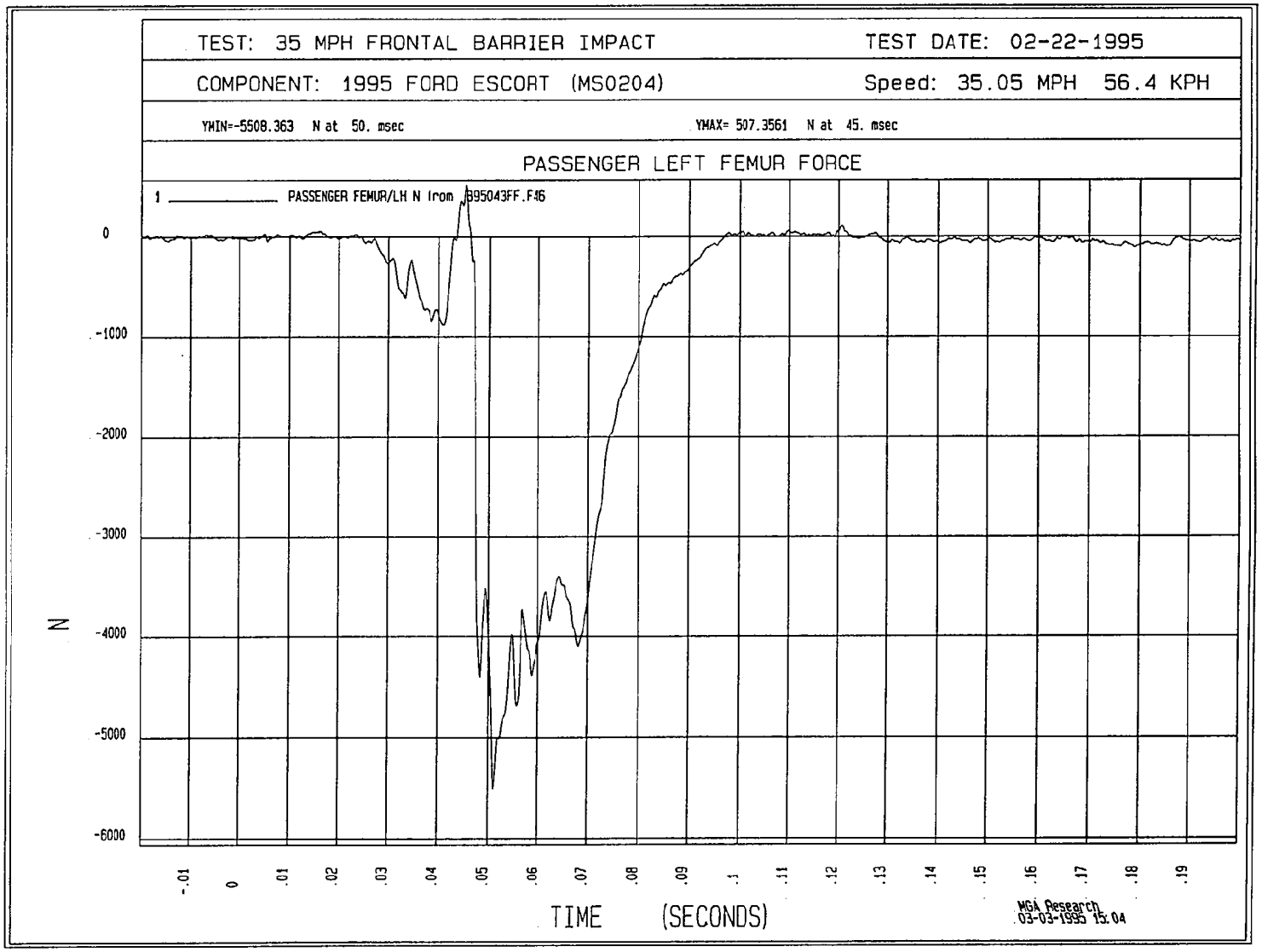


Figure B-1Ø2 - Passenger Left Femur Force vs. Time

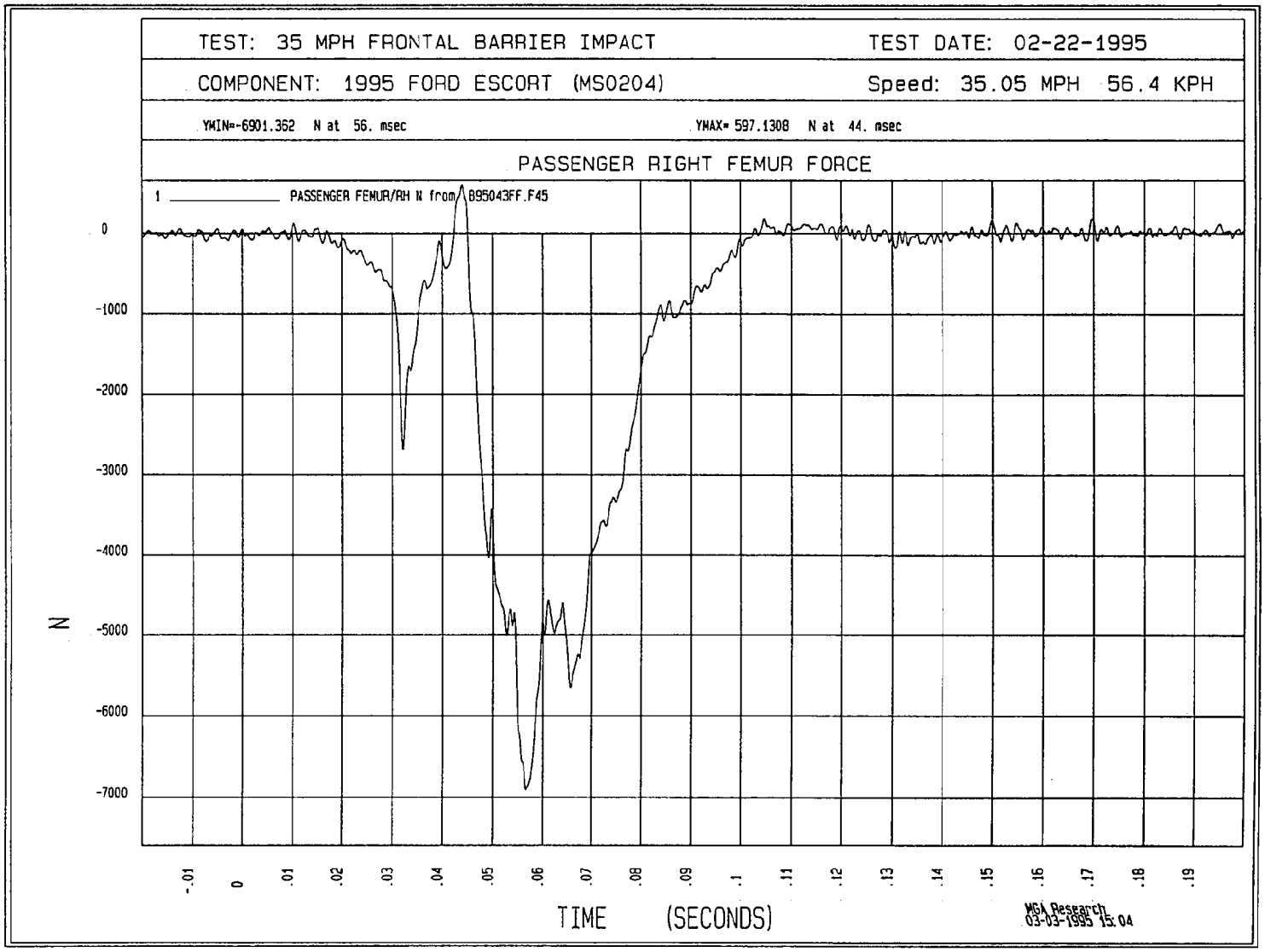


Figure B-103 - Passenger Right Femur Force vs. Time

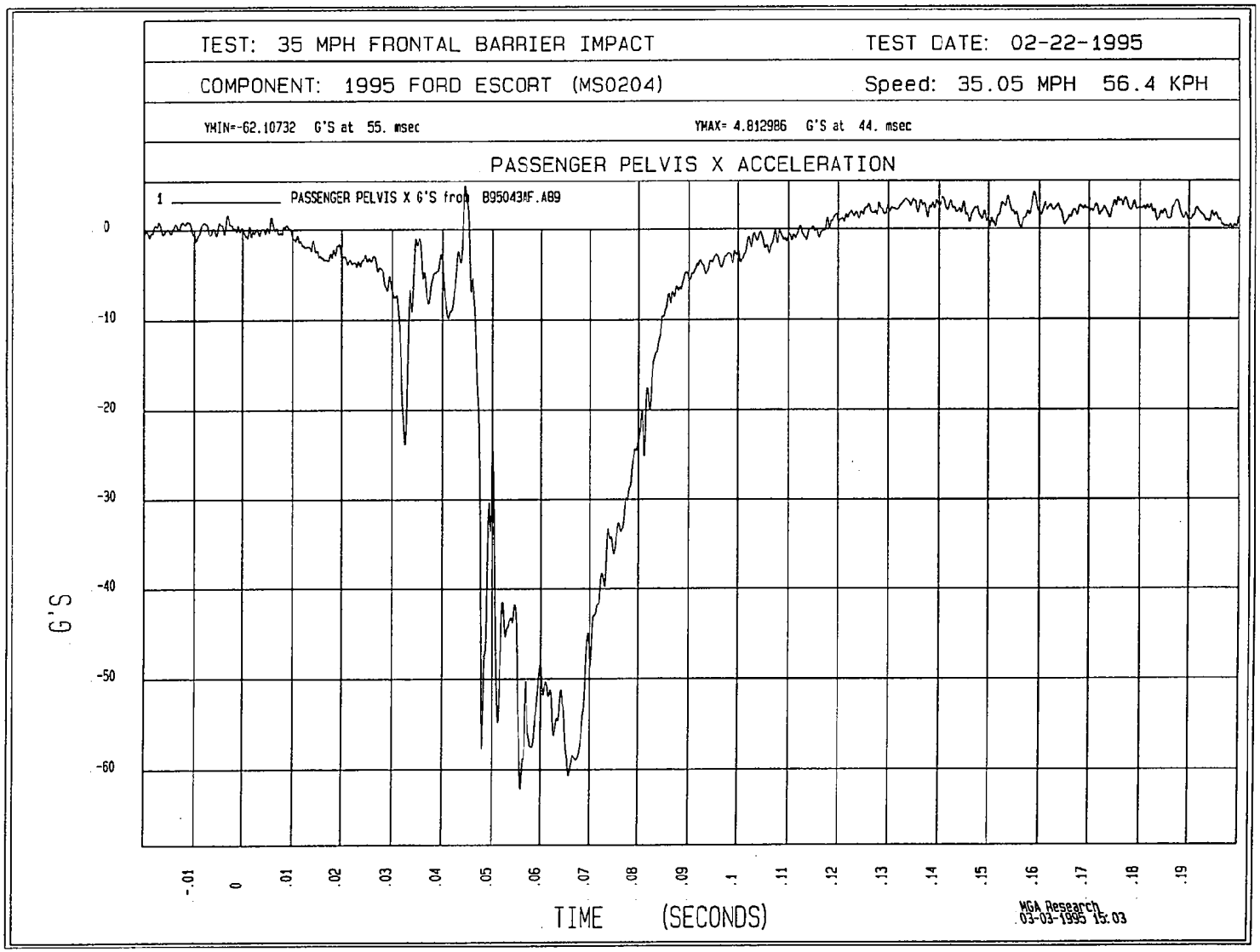


Figure B-104 - Passenger Pelvis X Acceleration vs. Time

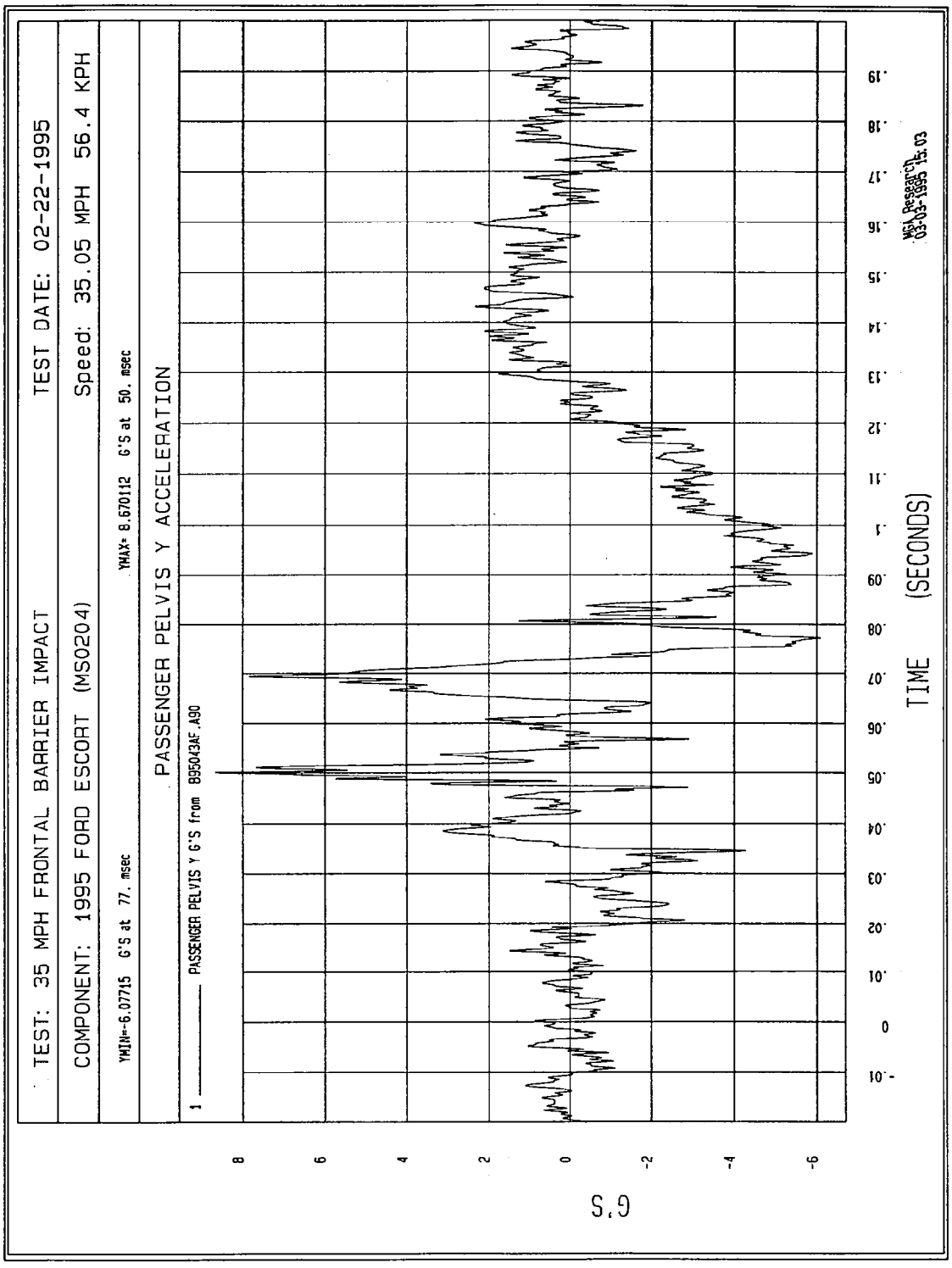


Figure B-105 - Passenger Pelvis Y Acceleration vs. Time

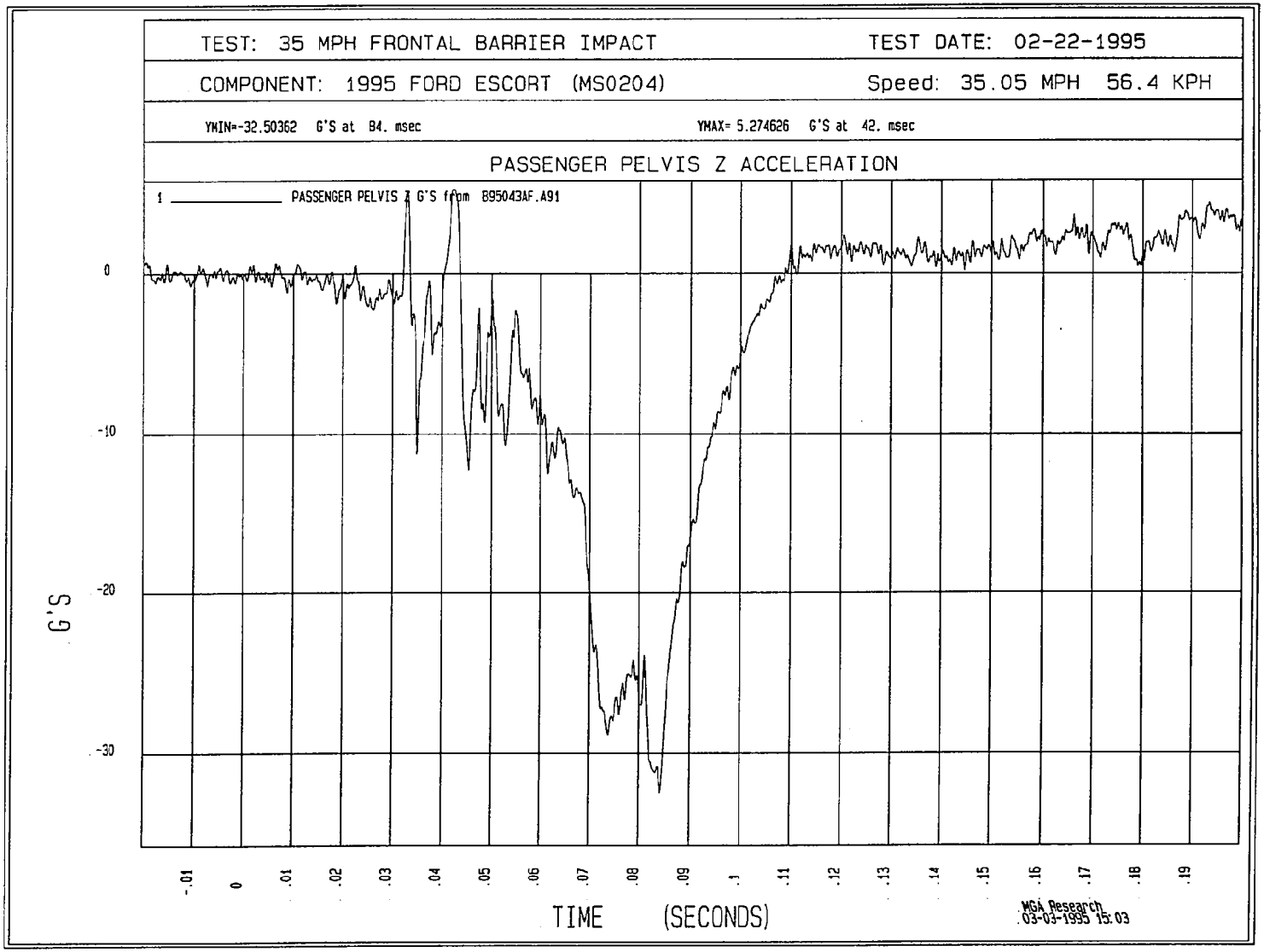


Figure B-1Ø6 - Passenger Pelvis Z Acceleration vs. Time

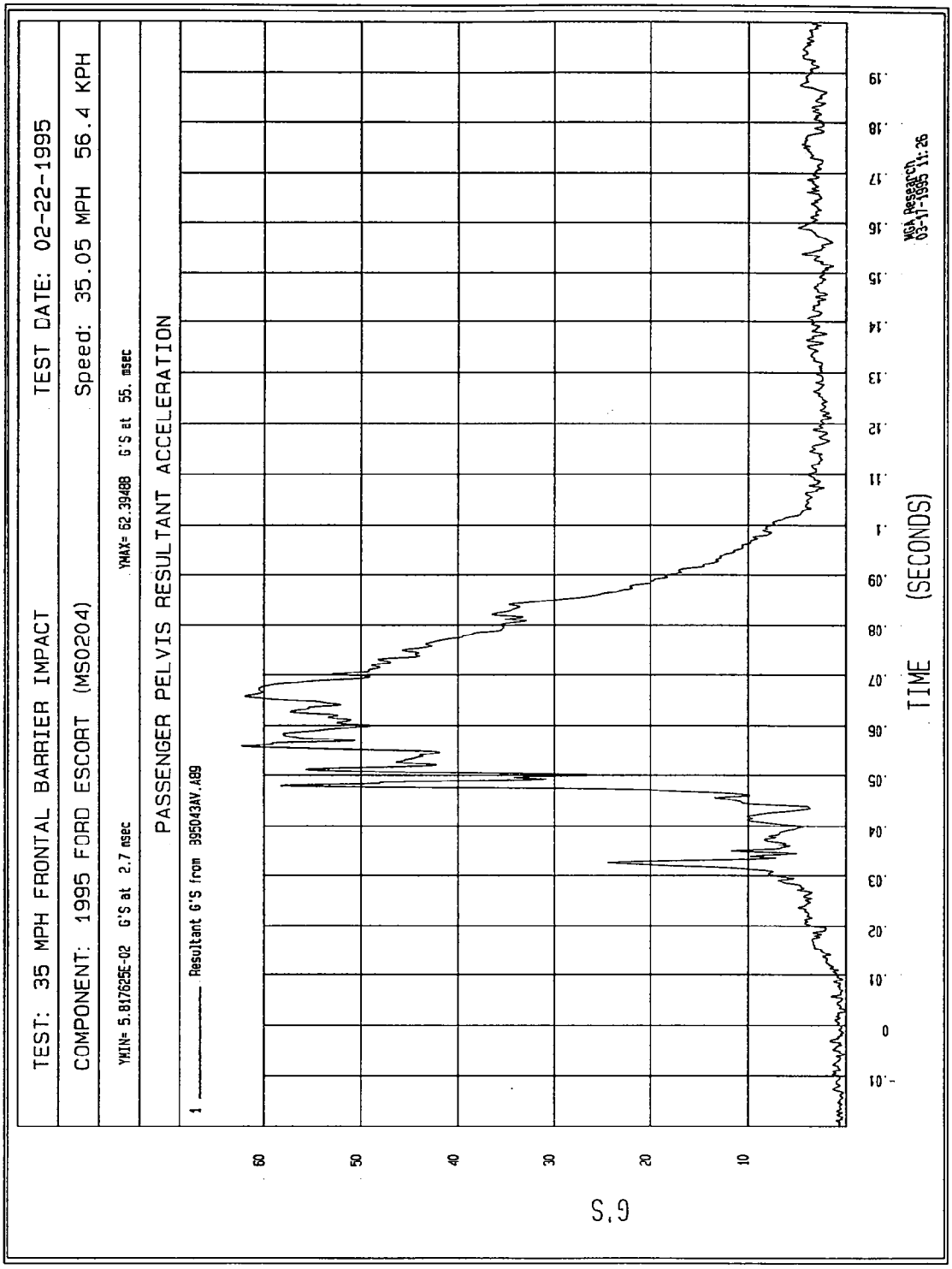


Figure B-107 - Passenger Pelvis Resultant Acceleration vs. Time

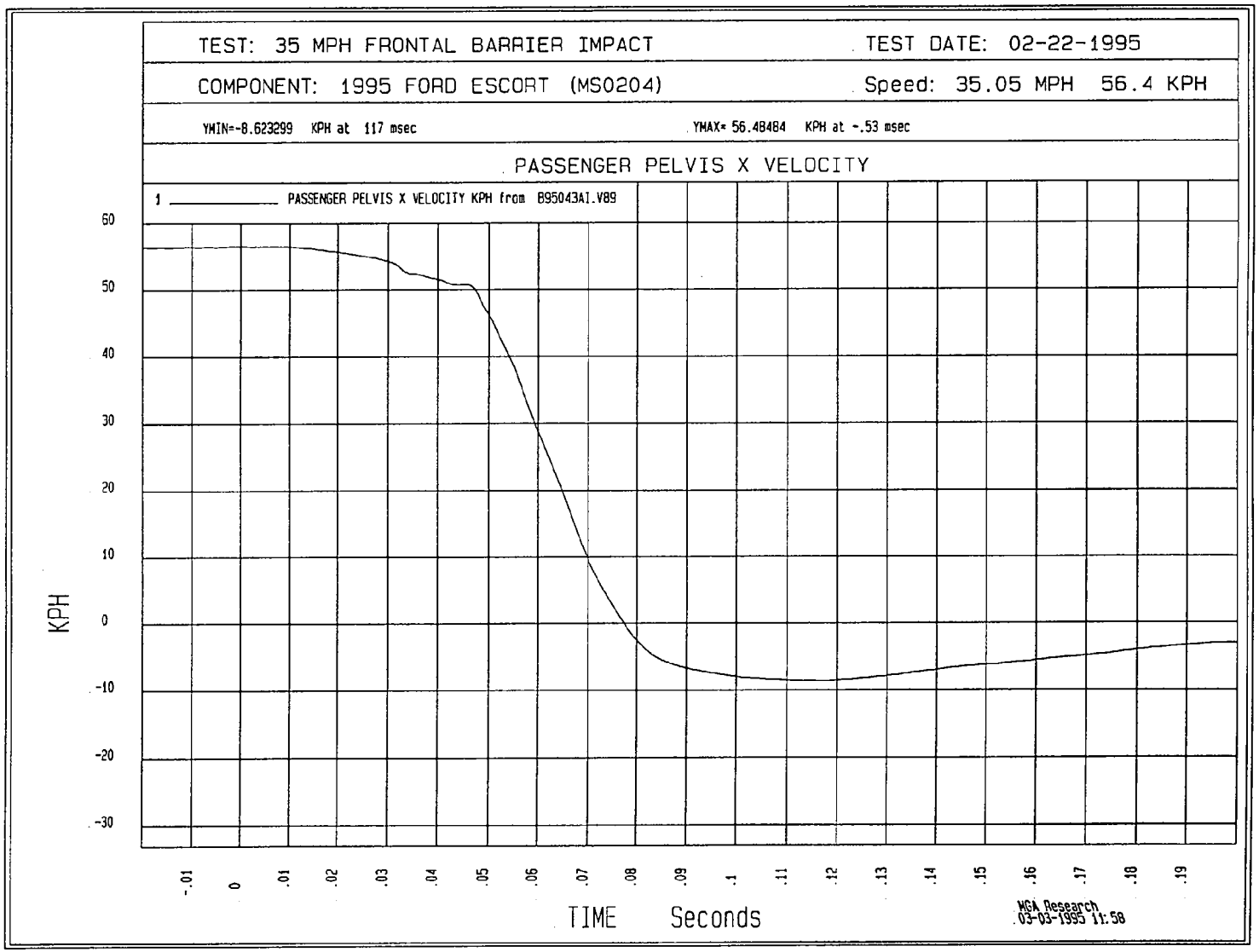


Figure B-108 - Passenger Pelvis X Velocity vs. Time

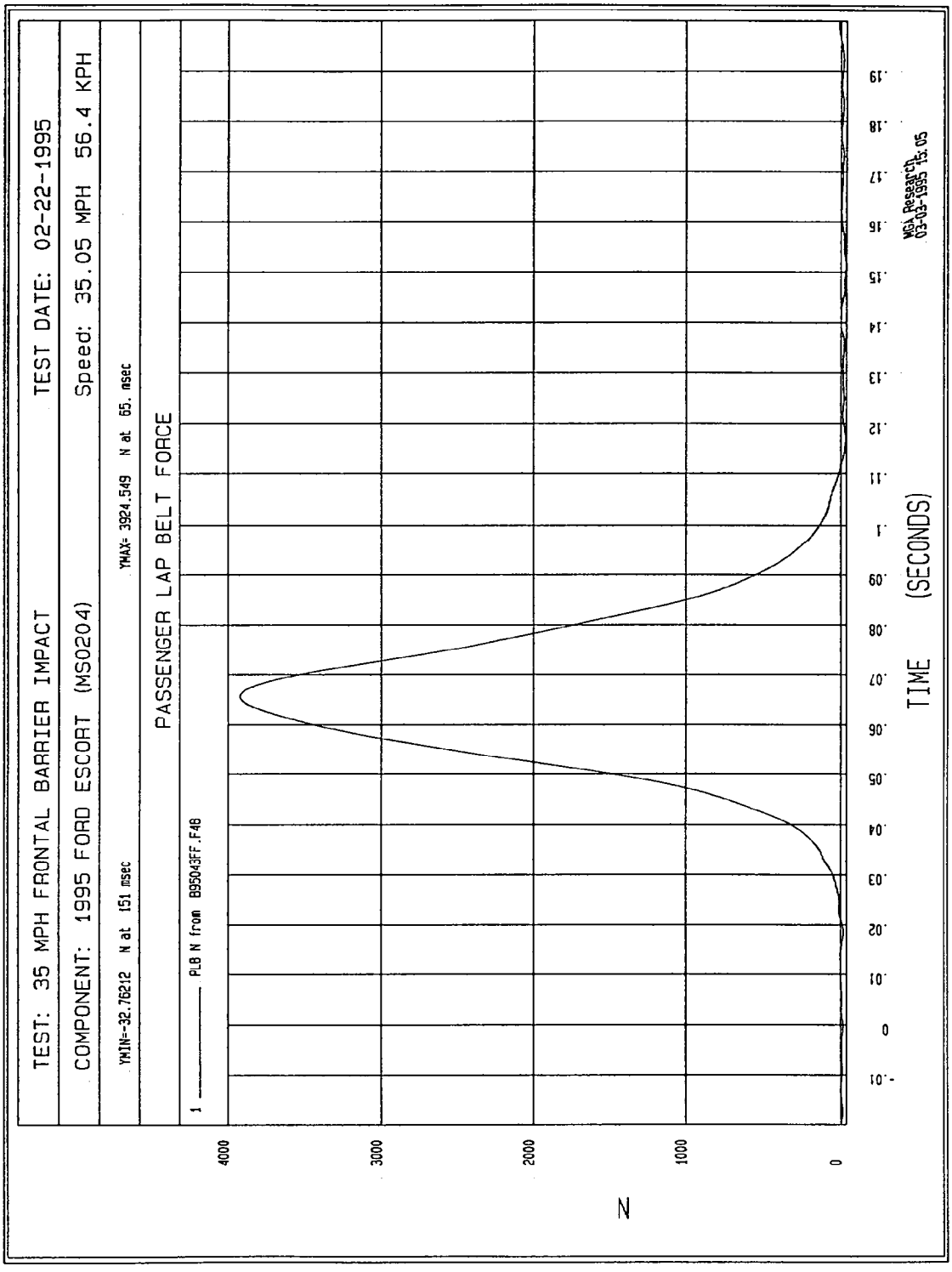


Figure B-109 - Passenger Lap Belt Force vs. Time

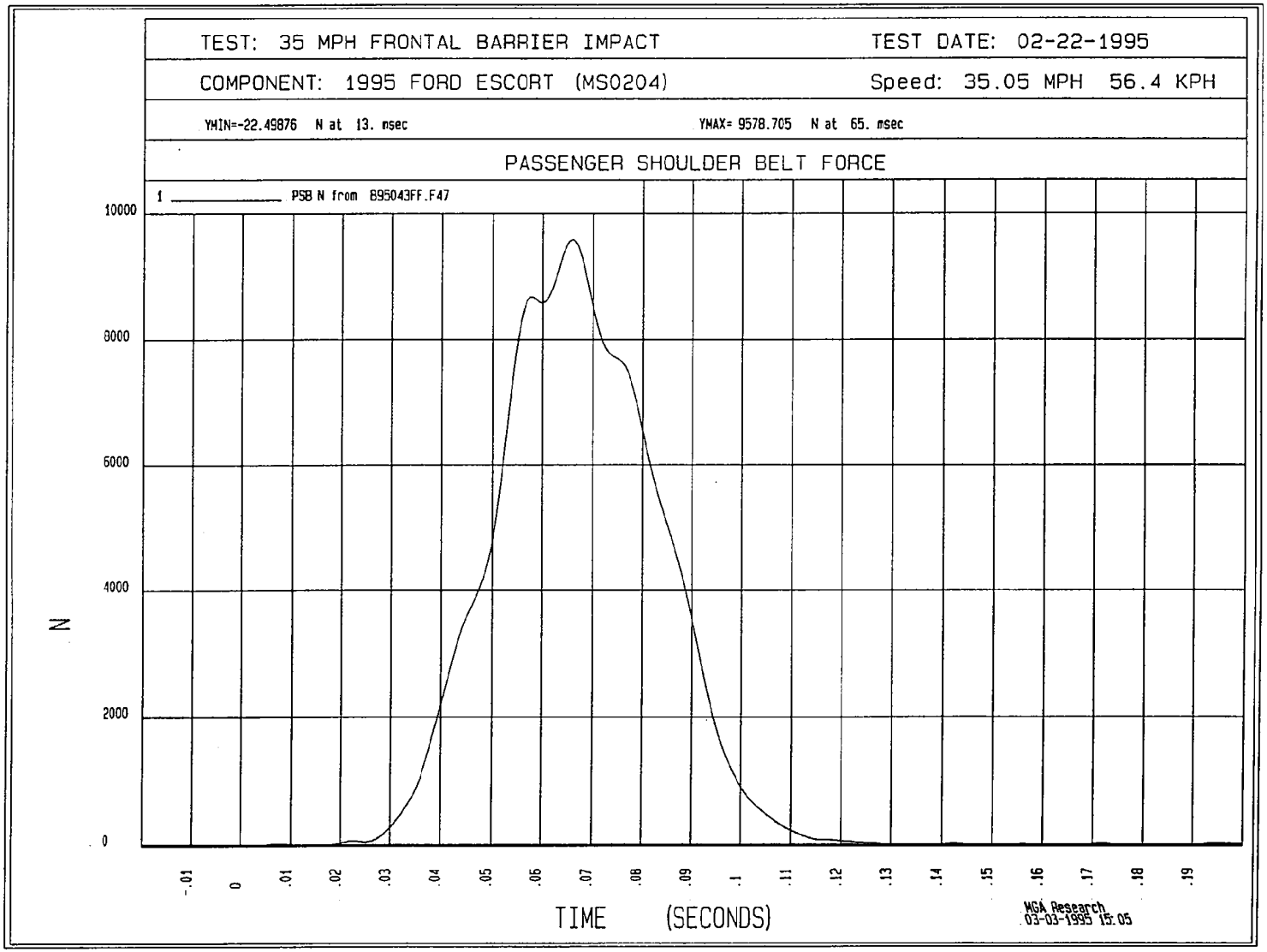


Figure B-11Ø - Passenger Shoulder Belt Force vs. Time

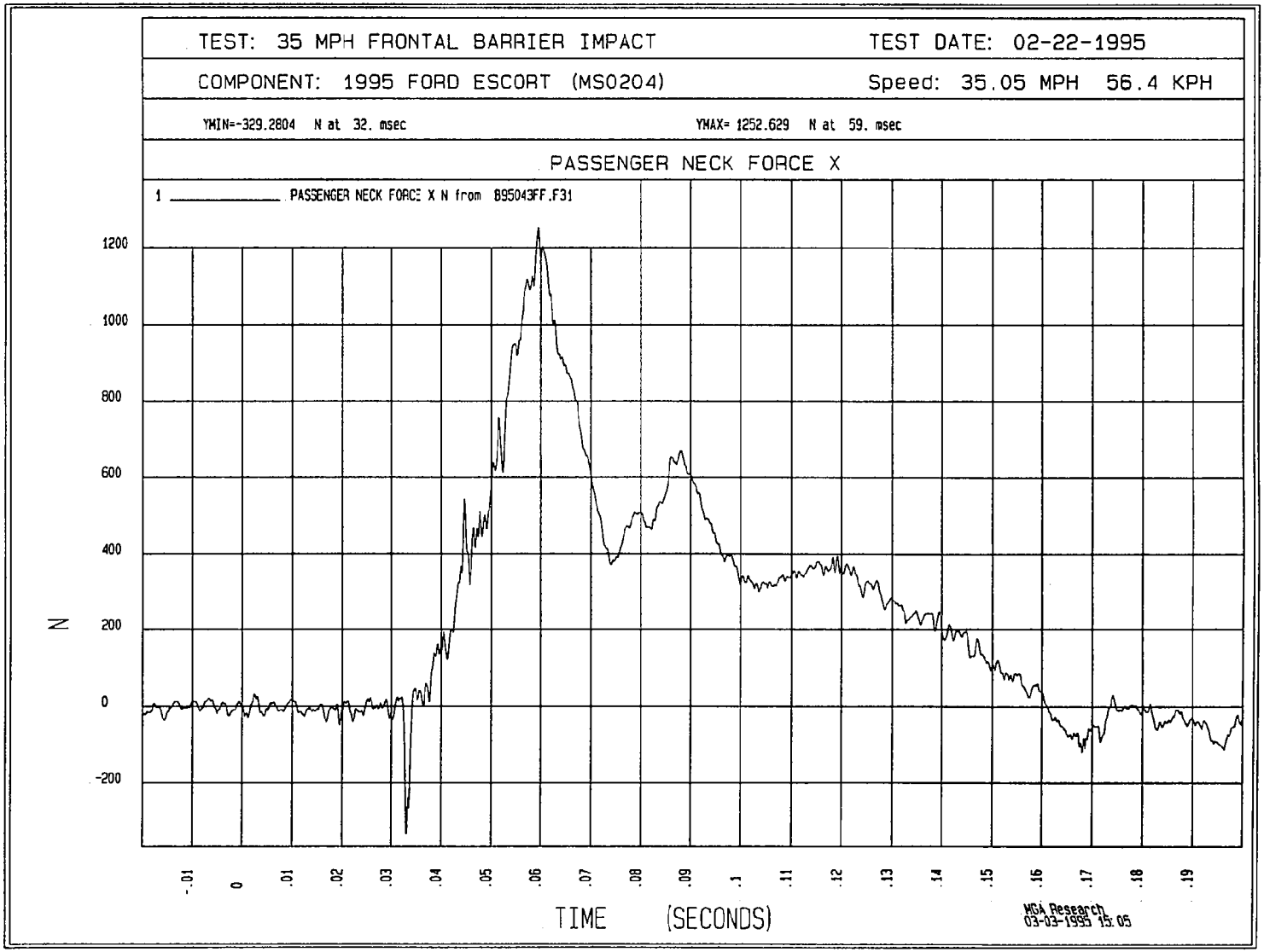


Figure B-111 - Passenger Neck Force X vs. Time

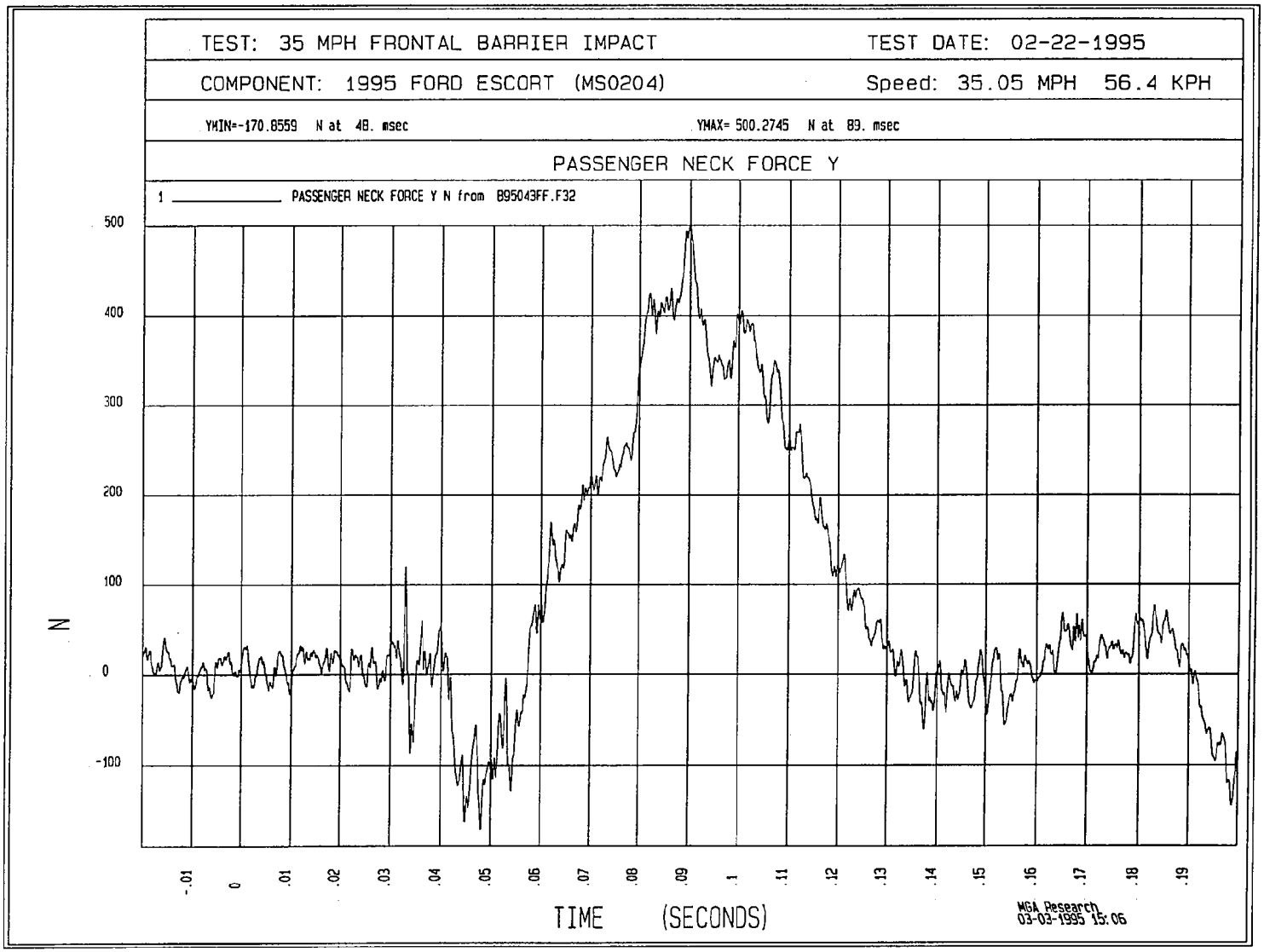


Figure B-112 - Passenger Neck Force Y vs. Time

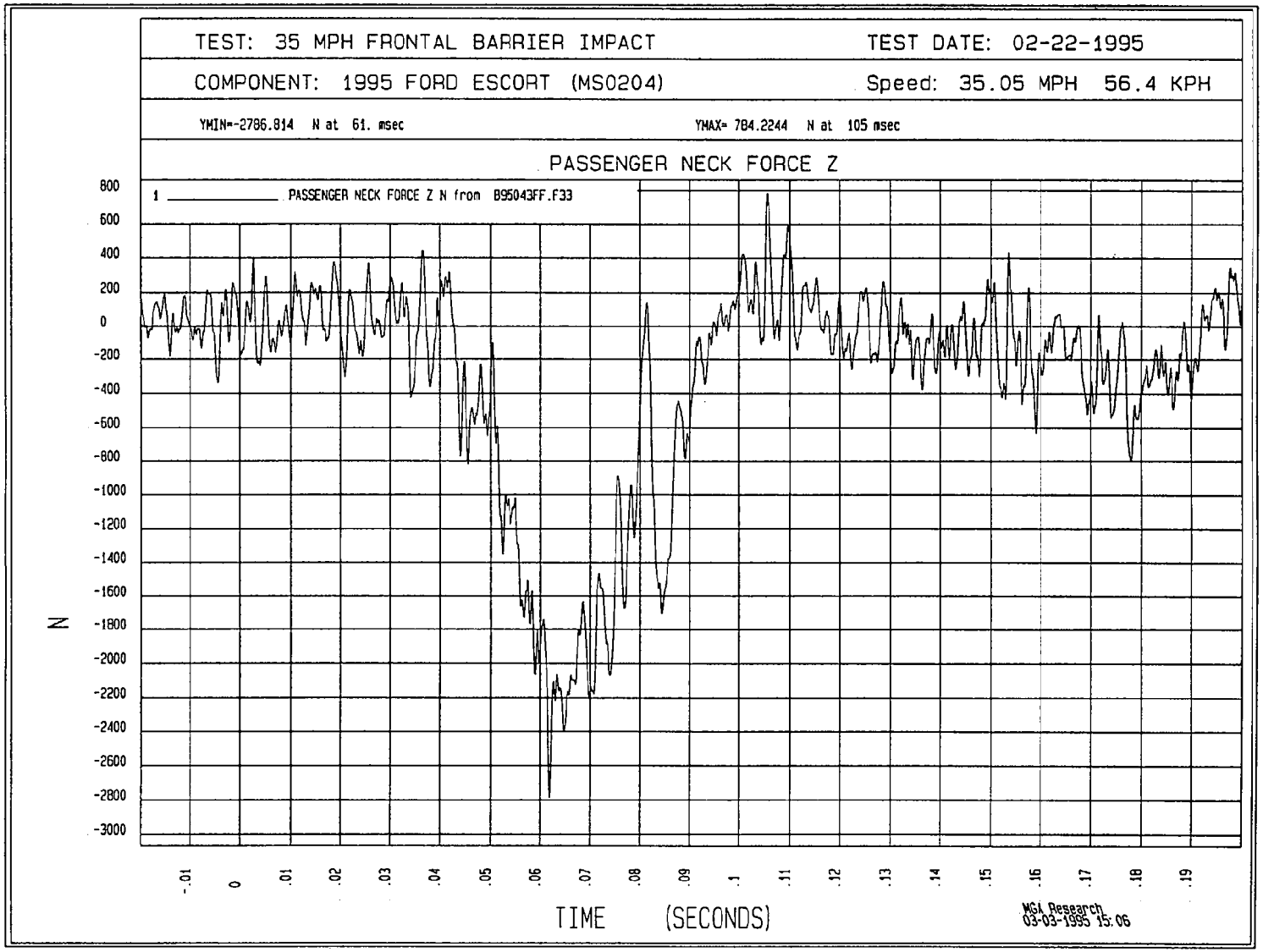


Figure B-113- Passenger Neck Force Z vs. Time

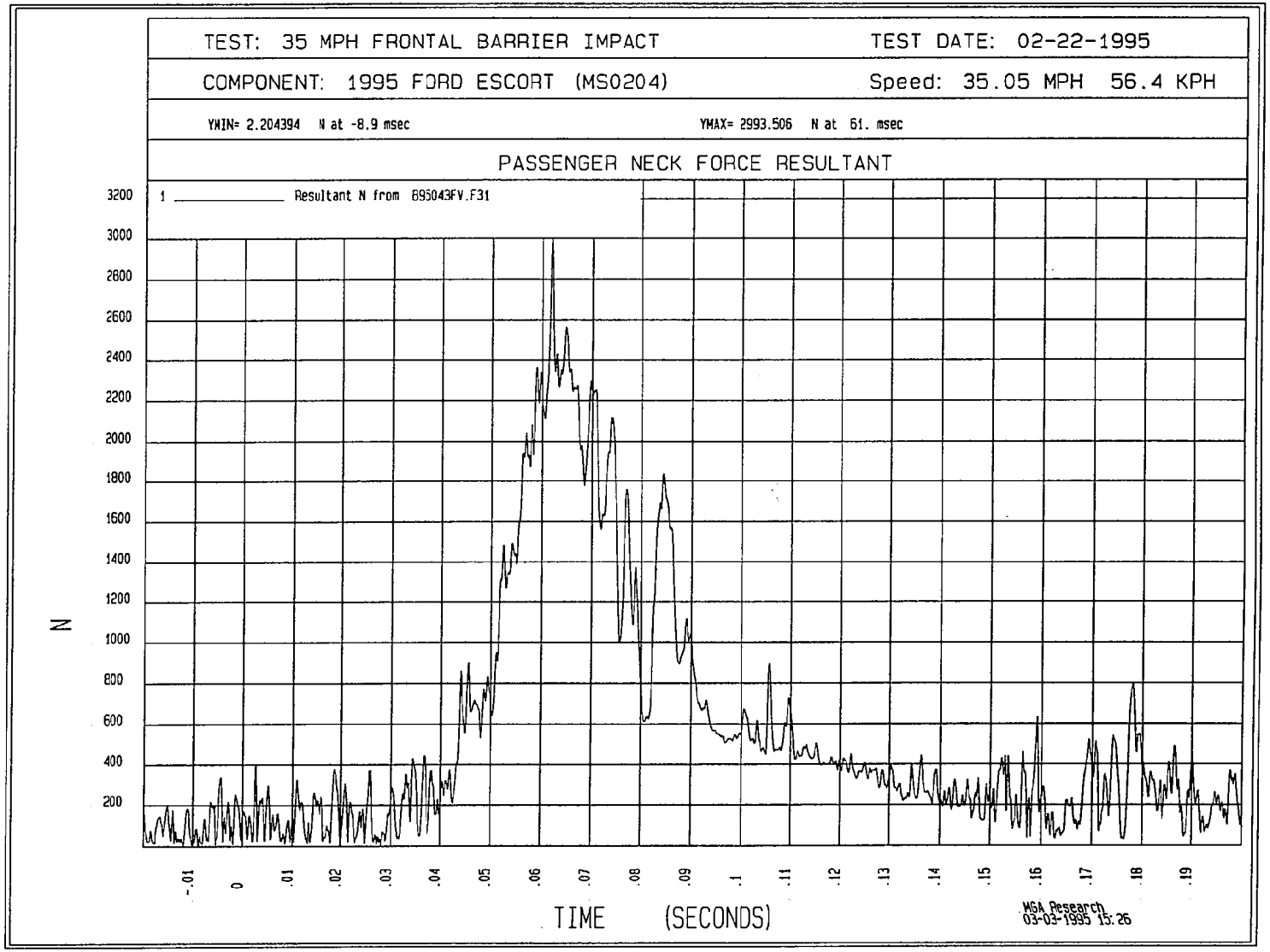


Figure B-114 - Passenger Neck Force Resultant Acceleration vs. Time

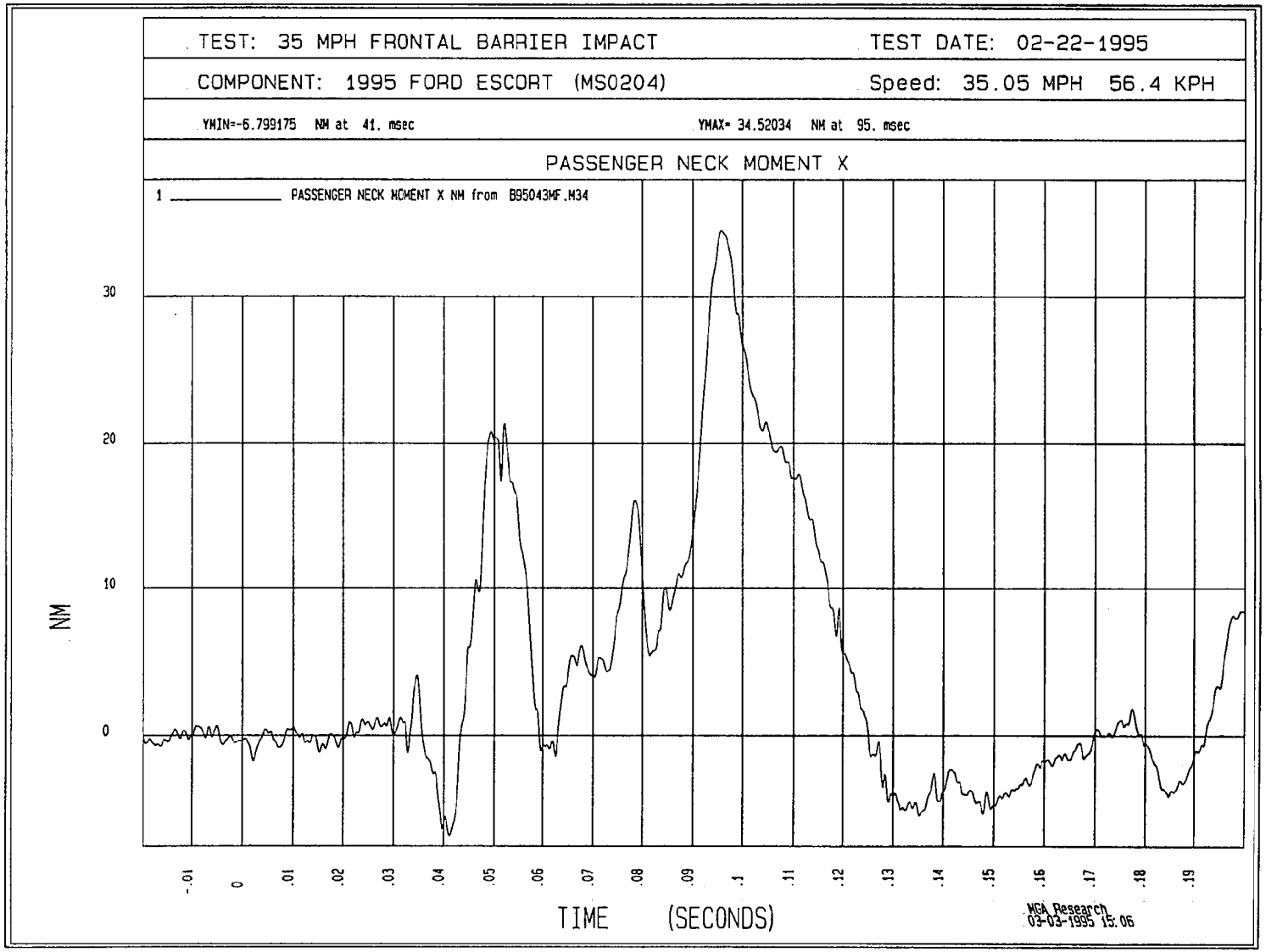


Figure B-115 - Passenger Neck Moment X vs. Time

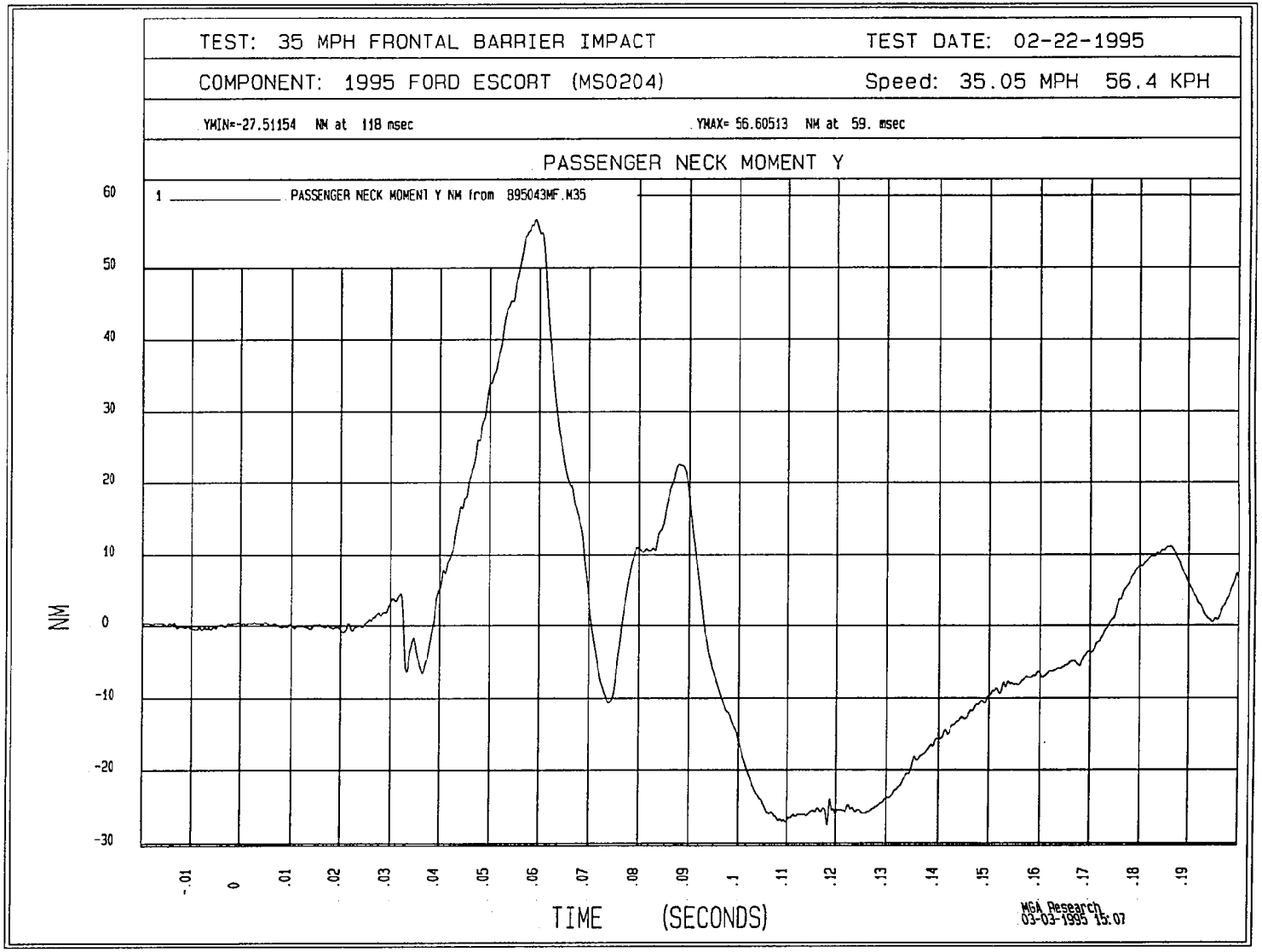


Figure B-116 - Passenger Neck Moment Y vs. Time

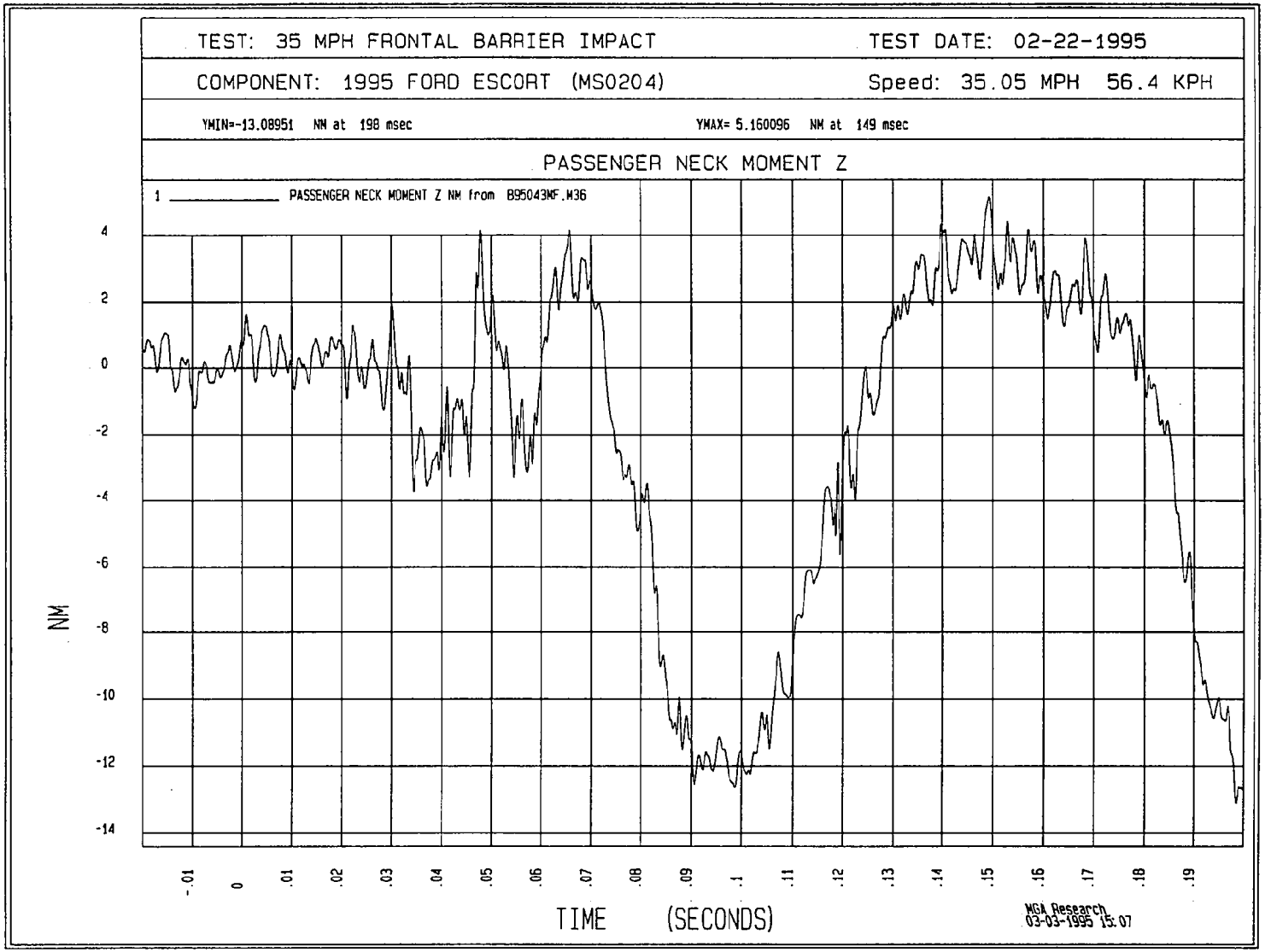


Figure B-117 - Passenger Neck Moment Z vs. Time

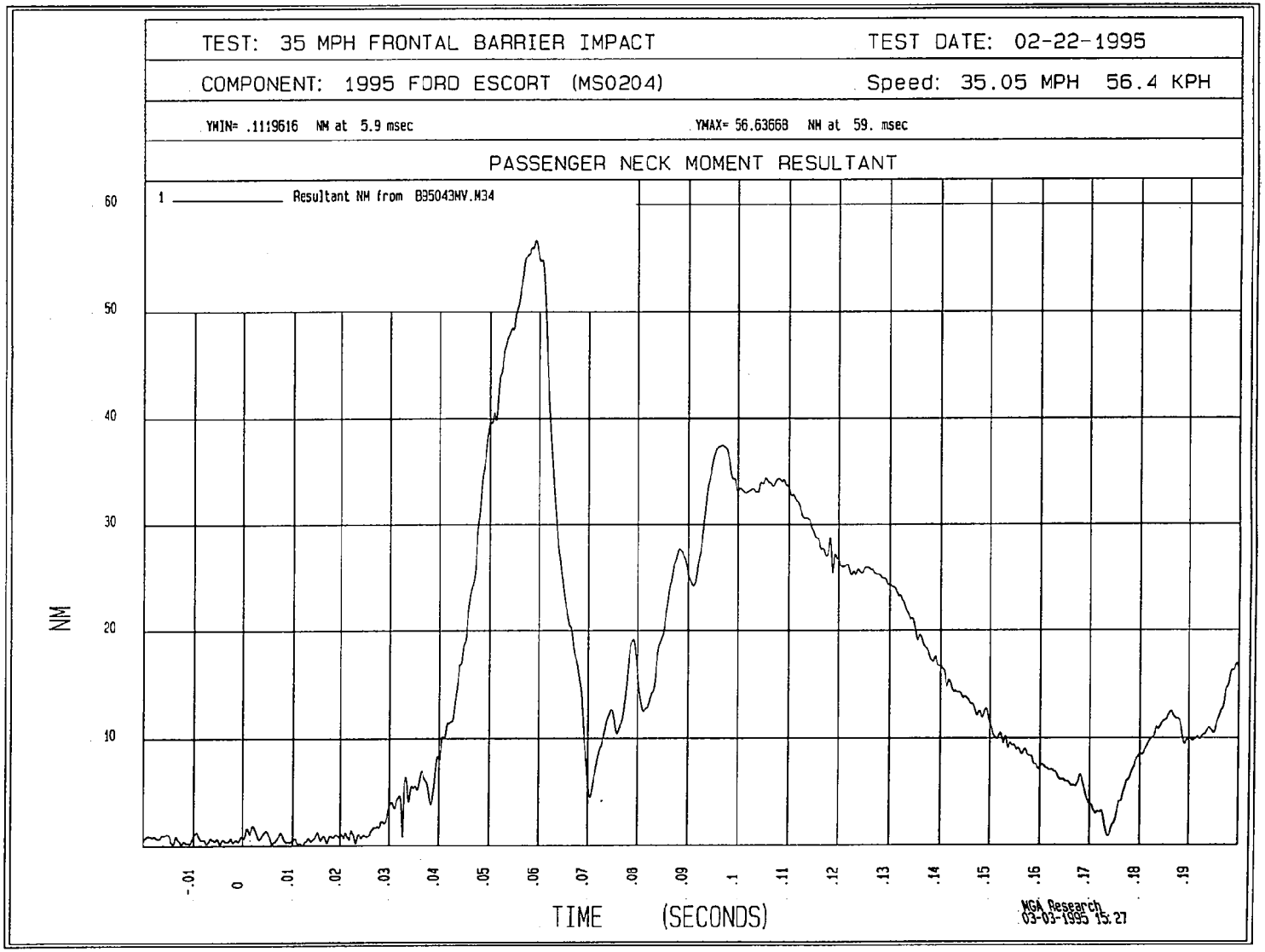


Figure B-118 - Passenger Neck Moment Resultant Acceleration vs. Time

APPENDIX C

Dummy Configuration & Performance Verification Data

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

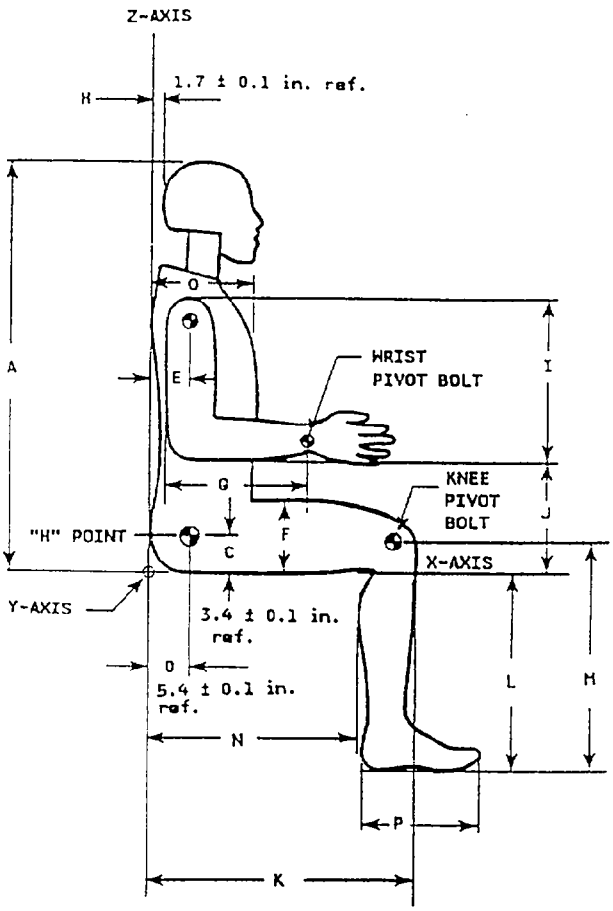
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 12-23-94

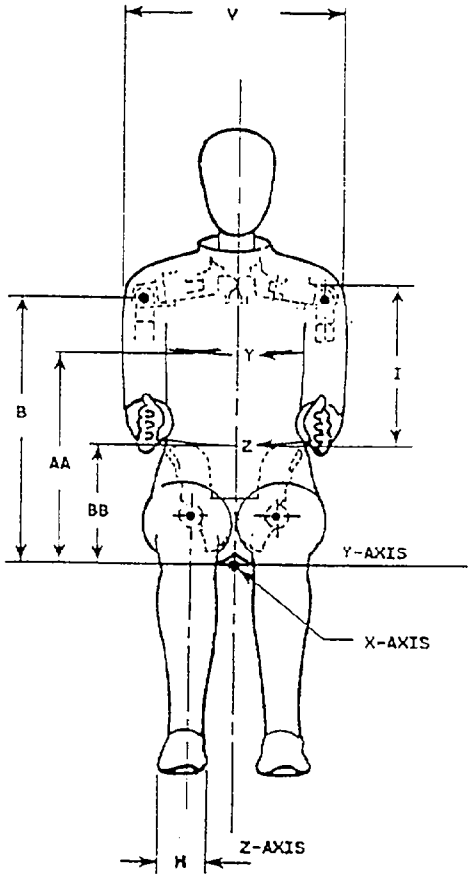
DESCRIPTION	SPECIFICATION (inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.0	34.9
B - Shoulder Pivot Height	19.9 - 20.5	20.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder - Elbow Length	13.0 - 13.6	13.0
J - Elbow Rest Height	7.5 - 8.3	8.0
K - Buttock to Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.0
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.0	8.8
P - Foot Length	9.9 - 10.5	10.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.6 - 4.2	4.0
Y - Chest Circumference	38.2 - 39.4	39.0
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



SIDE VIEW



FRONT VIEW

Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET

DUMMY NO.: 066 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 12-23-94

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	270
Peak Lateral Acceleration	15 G. MAX	2.5
Is Acceleration Curve Unimodel	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	22.9
Pendulum Deceleration	10 MS	22.50 - 27.50 G	23.80
	20 MS	17.60 - 22.60 G	20.61
	30 MS	12.50 - 18.50 G	15.80
Max. Pendulum G Above 30 MS		29.0 G MAX	15.8
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	39
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	60
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	118
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	71
	TIME	47 - 58 MS	52
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	105

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.06
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.51
	20 MS	14.00 - 19.00 G	17.70
	30 MS	11.00 - 16.00 G	12.90
Max. Pendulum G Above 30 MS		22 G Max	18
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	43
D Plane Rotation	MAX	81 - 106 DEG.	105
	TIME	72 - 82 MS	77
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	158
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-53.5
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	147

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.8
Peak Deflection	2.50 to 2.86 IN.	2.77
Peak Resistive Force	1160 to 1325 LBS.	1169
Internal Hysteresis	69 to 85%	76

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1206

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	6.9
Maximum Force	1060 - 1300 LBS.	1138

HYBRID III DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

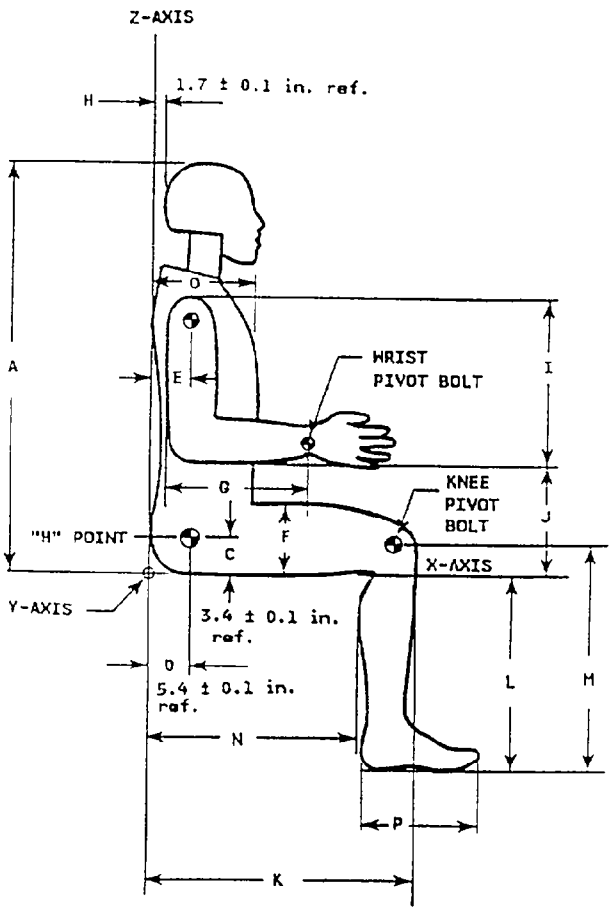
I. CONFIGURATION VERIFICATION DATA

DATE OF VERIFICATION: 12-23-94

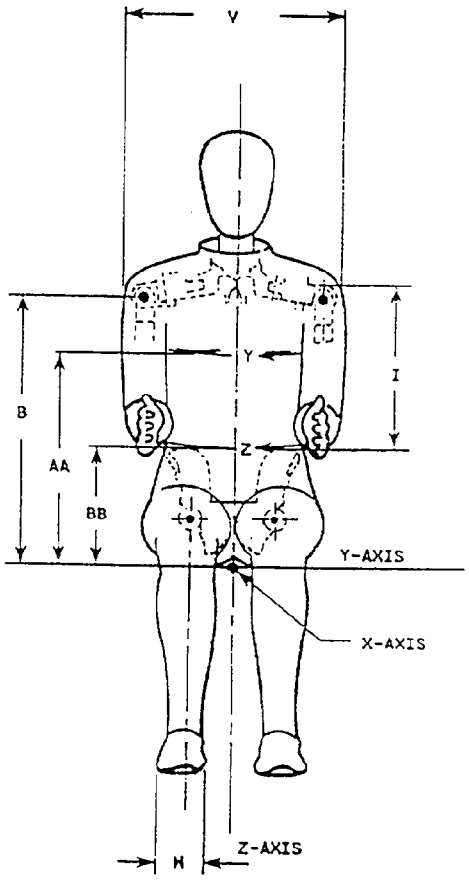
DESCRIPTION	SPECIFICATION (Inches)	ACTUAL MEASUREMENT (inches)
A - Total Sitting Height	34.6 - 35.Ø	34.8
B - Shoulder Pivot Height	19.9 - 2Ø.5	2Ø.5
C - "H" Point Height	3.3 - 3.5	3.5
D - "H" Point from Seat Back	5.3 - 5.5	5.5
E - Shoulder Pivot From Backline	3.3 - 3.7	3.5
F - Thigh Clearance	5.5 - 6.1	6.1
G - Back of Elbow to Wrist Pivot	11.4 - 12.Ø	11.5
H - Skull Cap Skin to Backline	1.6 - 1.8	1.7
I - Shoulder Elbow Length	13.Ø - 13.6	13.Ø
J - Elbow Rest Height	7.5 - 8.3	8.Ø
K - Buttock Knee Length	22.8 - 23.8	23.5
L - Popliteal Height	16.9 - 17.9	17.Ø
M - Knee Pivot Height	19.1 - 19.9	19.5
N - Buttock Popliteal Length	17.8 - 18.8	18.5
O - Chest Depth at 3rd Rib	8.4 - 9.Ø	8.8
P - Foot Length	9.9 - 1Ø.5	1Ø.3
V - Shoulder Breadth	16.6 - 17.2	16.8
W - Foot Breadth	3.5 - 4.2	4.Ø
Y - Chest Circumference	38.2 - 39.4	39.Ø
Z - Waist Circumference	32.9 - 34.1	33.5

Note: (See next page for external dimensions)

HYBRID III EXTERNAL DIMENSIONS



SIDE VIEW



FRONT VIEW

Note: Figure is referenced to the erect seated position. The curved lumbar does not allow the hybrid III to be positioned in a perfect erect attitude.

HYBRID III DUMMY CALIBRATION DATA SUMMARY SHEET (CONT.)

DUMMY NO.: 065 DUMMY CALIBRATION BY: Al Chalmers

VERIFICATION DATE: 12-23-94

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

1.0 HEAD DROP TEST

	SPECIFICATION	MEASUREMENT
Peak Resultant Acceleration	225 - 275 G	271
Peak Lateral Acceleration	15 G. MAX	7
Is Acceleration Curve Unimodal	within 10% of peak	Yes

2.0 NECK FLEXION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		22.6 - 23.4 FT/SEC	22.9
Pendulum Deceleration	10 MS	22.50 - 27.50 G	25.10
	20 MS	17.60 - 22.60 G	21.71
	30 MS	12.50 - 18.50 G	14.90
Max. Pendulum G Above 30 MS		29.0 G MAX	14.8
Deceleration - Time Curve Decay Time to 5 G		34 - 42 MS	38
D Plane Rotation	MAX	64 - 78 DEG.	77
	TIME	57 - 64 MS	59
Rotation Angle - Time Curve Decay Time to Zero		113 - 128 MS	116
Moment About Occipital Condyle	MIN.	65 - 80 FT.LBS	72
	TIME	47 - 58 MS	52
Positive Moment - Time Curve Decay Time to Zero		97 - 107 MS	102

3.0 NECK EXTENSION TEST

		SPECIFICATION	MEASUREMENT
Pendulum Speed		19.50 - 20.30 F/S	20.00
Pendulum Deceleration	10 MS	17.20 - 21.20 G	19.95
	20 MS	14.00 - 19.00 G	17.03
	30 MS	11.00 - 16.00 G	13.60
Max. Pendulum G Above 30 MS		22 G Max	14
Deceleration - Time Curve Decay Time to 5 G		38 - 46 MS	40
D Plane Rotation	MAX	81 - 106 DEG.	104
	TIME	72 - 82 MS	76
Rotation Angle - Time Curve Decay Time to Zero		147 - 174 MS	159
Moment About Occipital Condyle	MIN.	-59.0/-39.0 FT LBS	-52.3
	TIME	65 - 79 MS	72
Positive Moment - Time Curve Decay Time to Zero		120 - 148 MS	147

4.0 CHEST IMPACT TESTS

	SPECIFICATION	MEASUREMENT
Probe Speed	21.6 to 22.4 F/S	21.7
Peak Deflection	2.50 to 2.86 IN.	2.60
Peak Resistive Force	1160 to 1325 LBS.	1214
Internal Hysteresis	69 to 85%	80

5.0 KNEE IMPACT TESTS

LEFT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1214

RIGHT KNEE	SPECIFICATION	MEASUREMENT
Probe Speed	6.8 to 7.0 F/S	7.0
Maximum Force	1060 - 1300 LBS.	1113

APPENDIX D

Dummy, Vehicle and Laboratory Calibration Data

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 066

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	ACCY6	Endevco	02/08/95
Head Y	ACCH1	Endevco	02/08/95
Head Z	AAMW5	Endevco	02/08/95
Head X Redundant	AJ9D2	Endevco	02/08/95
Head Y Redundant	AH1E2	Endevco	02/08/95
Head Z Redundant	AJ7K3	Endevco	02/08/95
Chest X	ACCY1	Endevco	02/02/95
Chest Y	ACCC8	Endevco	02/02/95
Chest Z	ACCT7	Endevco	02/02/95
Chest X Redundant	AJ9D4	Endevco	02/06/95
Chest Y Redundant	AJ9F3	Endevco	02/02/95
Chest Z Redundant	AJ9D9	Endevco	02/06/95
Right Femur Load Cell	261	Denton	02/13/95
Left Femur Load Cell	262	Denton	02/13/95
Pelvis X	ALDY8	Endevco	02/13/95
Pelvis Y	ALEK9	Endevco	02/13/95
Pelvis Z	ALE80	Endevco	02/13/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. __Ø66__

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	443	Denton	Ø1/14/95
Neck Load Cell Y	443	Denton	Ø1/14/95
Neck Load Cell Z	443	Denton	Ø1/14/95
Neck Moment X	443	Denton	Ø1/14/95
Neck Moment Y	443	Denton	Ø1/14/95
Neck Momemt Z	443	Denton	Ø1/14/95
Chest Deflection Gauge	Ø66	Servo	Ø1/31/95
Lap Belt Load Cell	625	GSE	12/Ø5/94
Torso Belt Load Cell	69Ø	Lebow	1Ø/26/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 66

	DRIVER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Upper Right Tibia Moment X	Ø4Ø	Denton	1Ø/17/94
Upper Right Tibia Moment Y	Ø4Ø	Denton	1Ø/17/94
Lower Right Tibia Moment Y	Ø34	Denton	1Ø/17/94
Lower Right Tibia Force X	Ø34	Denton	1Ø/17/94
Lower Right Tibia Force Z	Ø34	Denton	1Ø/17/94
Upper Left Tibia Moment X	Ø23	Denton	1Ø/17/94
Upper Left Tibia Moment Y	Ø23	Denton	1Ø/17/94
Lower Left Tibia Moment Y	Ø19	Denton	1Ø/17/94
Lower Left Tibia Force X	Ø19	Denton	1Ø/17/94
Lower Left Tibia Force Z	Ø19	Denton	1Ø/17/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Head X	AAMN8	Endevco	02/02/95
Head Y	ACC61	Endevco	01/11/95
Head Z	ACCW9	Endevco	02/02/95
Head X Redundant	AJ621	Endevco	02/02/95
Head Y Redundant	AJ619	Endevco	02/02/95
Head Z Redundant	AHY54	Endevco	02/02/95
Chest X	ACC78	Endevco	02/07/95
Chest Y	ACCE6	Endevco	02/07/95
Chest Z	ACCY3	Endevco	02/07/95
Chest X Redundant	AJ9J7	Endevco	02/06/95
Chest Y Redundant	AJ7A2	Endevco	02/02/95
Chest Z Redundant	AJ9D9	Endevco	02/06/95
Right Femur Load Cell	259	Denton	02/13/95
Left Femur Load Cell	260	Denton	02/13/95
Pelvis X	ALDY8	Endevco	02/13/95
Pelvis Y	ALEK9	Endevco	02/13/95
Pelvis Z	AJ834	Endevco	02/10/95

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

INSTRUMENTS FOR DUMMY NO. 065

	PASSENGER		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Load Cell X	442	Denton	01/14/95
Neck Load Cell Y	442	Denton	01/14/95
Neck Load Cell Z	442	Denton	01/14/95
Neck Moment X	442	Denton	01/14/95
Neck Moment Y	442	Denton	01/14/95
Neck Momemt Z	442	Denton	01/14/95
Chest Deflection Gauge	065	Servo	01/31/95
Lap Belt Load Cell	212	GSE	08/04/94
Torso Belt Load Cell	691	Lebow	10/26/94

DUMMY, VEHICLE AND LABORATORY INSTRUMENT CALIBRATION

	VEHICLE ACCELEROMETERS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Left Rear Seat Crossmember X	AJ4R1	Endevco	1/10/95
Right Rear Seat Crossmember X	MGA106	Entran	11/18/94
Top of Engine Block X	MGA021	Entran	12/14/94
Bottom of Engine X	MGA094	Entran	1/18/95
Left Brake Caliper X	MGA122	Entran	1/11/95
Right Brake Caliper X	MGA159	Entran	1/4/95
Instrument Panel X	AJ9E1	Endevco	10/14/94
Redundant Left Rear Seat Crossmember X	X01	Entran	11/10/94
Redundant Right Rear Seat Crossmember X	MGA150	Entran	12/2/94

	LABORATORY INSTRUMENTS		
	SERIAL NO.	MANUFACTURER	CALIBRATION DATE
Neck Bending Pendulum Accelerometer	AGH90	Endevco	09/01/94
Neck Bending Rotary Potentiometer	019	Lebow	08/29/94
Neck Bending Rotary Potentiometer	018	Lebow	08/29/94
Femur/Chest/Thorax Probe Accelerometer	403069	Sensotec	10/24/94
Abdomen Compression Force Gauge	N/A	Transducers Inc.	N/A

APPENDIX E

Vehicle Owner's Occupant Restraint System Instructions

Safety Restraints

Using Safety Restraints Properly

Safety Belts

The use of safety belts helps to restrain you and your passengers in case of a collision. In most states and in Canada, the law requires their use. We strongly recommend that you use them every time you travel in your vehicle.

Safety belts provide best restraint when:

- ❑ the seatback is upright
- ❑ the occupant is sitting upright (not slouched)
- ❑ the lap belt is snug and low on the hips
- ❑ the shoulder belt is snug against the chest
- ❑ the knees are straight forward

For your safety, your vehicle has different types of safety belts:

- ❑ **Motorized Shoulder Belt Passive Restraints** — an automatic shoulder belt for people who sit in the front seat.
- ❑ **Manual Front Lap Belts** — for people who sit in a front seat and have an automatic shoulder belt.
- ❑ **Manual Front Lap and Shoulder Belts (available only on Canadian vehicles)** — for people who sit in the front seat.
- ❑ **Rear Lap and Shoulder Belts** — for people who sit next to the side windows in the rear seat.

Warning: Your vehicle is equipped with a right front passenger air bag. Front passengers, especially children and small adults, should never sit on the edge of the seat, stand near the glove compartment of the instrument panel, or lean over with their faces near the air bag cover when the vehicle is moving. All occupants should sit with their backs against the seatback and use the safety belts. Children weighing less than 40 lbs. (18 kg) should use child or infant seats. Forward-facing child seats must have the passenger seat moved as far back from the instrument panel as possible. REAR-FACING INFANT SEATS SHOULD NEVER BE USED IN THE FRONT SEAT, BECAUSE THE FORCE OF THE RAPIDLY INFLATING PASSENGER AIR BAG COULD PUSH THE TOP OF THE REAR-FACING SEAT AGAINST THE VEHICLE SEATBACK, ARMRESTS OR CONSOLE (IF SO EQUIPPED). REAR-FACING INFANT SEATS MUST ALWAYS BE SECURED IN THE REAR SEAT.

Warning: Lock the doors of your vehicle before driving to lessen the risk of the door coming open in a collision.

Safety Belt Maintenance

Check the safety belt systems periodically to make sure that they work properly and are not damaged.

Warning: All safety belt assemblies, including retractors, buckles, front seat belt buckle support assemblies (slide bar) (if so equipped), child safety seat tether bracket assemblies (if so equipped), and attaching hardware, should be inspected after any collision. Ford recommends that all safety belt assemblies used in vehicles involved in a collision be replaced. However, if the collision was minor and a qualified technician finds that the belts do not show damage and continue to operate properly, they do not need to be replaced. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

Safety Belt Extension Assembly

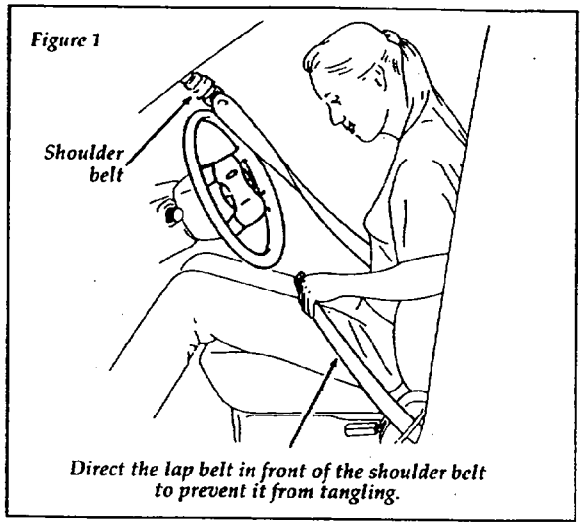
For some people, the safety belt may be too short even when it is fully extended. You can add about eight inches (20 cm) to the belt length with a safety belt extension assembly. Safety belt extensions are available from your dealer.

Warning: Use only extensions manufactured by the same supplier as the safety belt. Manufacturer identification is located at the end of the webbing on a label. Also, use the safety belt extension only if the safety belt is too short for you when fully extended. Do not use the extension to change the fit of the shoulder belt across the torso. Failure to follow these instructions will affect the performance of the safety belts and increase the risk of personal injury.

Motorized Shoulder Belt Passive Restraint System (Not available on Canadian vehicles)

The front seat shoulder belts automatically adjust and together with the manual lap belt, help to provide added restraint in the event of a collision.

While you drive, the shoulder belt adjusts to your movement. However, if you brake hard, turn hard, or if your car receives an impact of 5 mph (8 km/h) or more, the shoulder belt locks and helps reduce your forward movement.



The proper position of the front lap safety belt

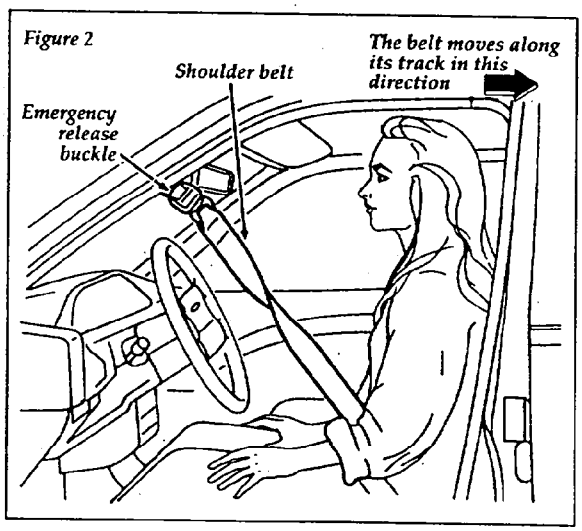
Warning: The lap belt must be manually buckled by the driver and passenger and should fit snugly and as low as possible around the hips, not around the waist. Failure to do so may increase the risk of injury in the event of a collision.

To operate the motorized shoulder belt:

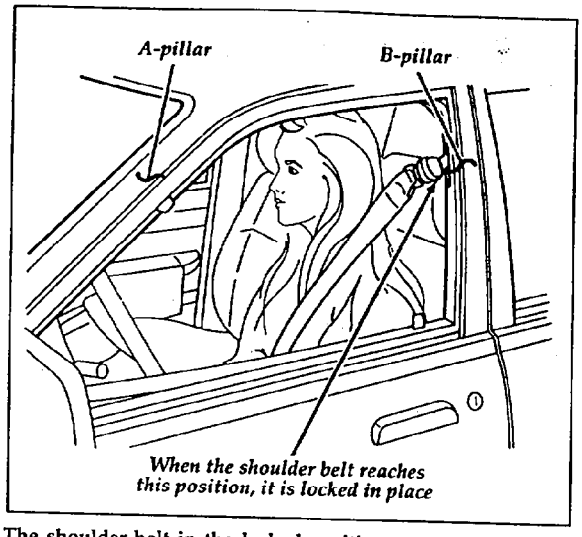
1. Get into your vehicle and close the door. Check to be sure the shoulder belt is latched to the emergency release buckle.
2. If it is not latched, pull the shoulder belt from the retractor and buckle it to the emergency release buckle. Note the twist in the shoulder belt as in Figures 1 and 2.
3. Turn the ignition key to the ON position.

A motor causes the shoulder belt to slide along its track from the A-pillar to the B-pillar until it locks in place.

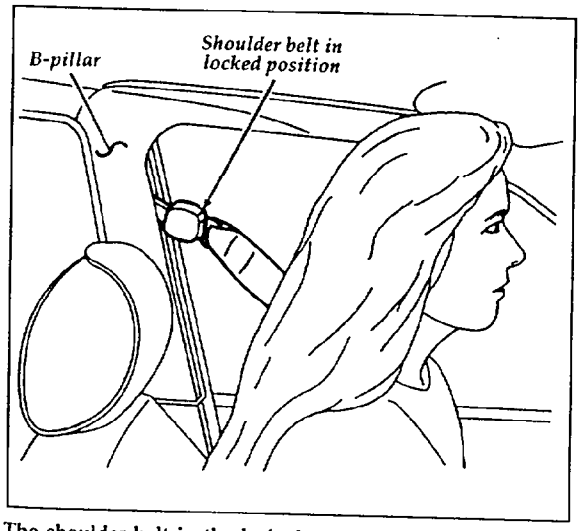
If the belt does not lie flat against you, or the belt has a twist in it at the retractor, unlatch the belt at the buckle, remove twist, and relatch the belt into the buckle.



The shoulder belt sliding along its track



The shoulder belt in the locked position



The shoulder belt in the locked position

If the driver does not fasten the lap belt before the ignition key is turned to ON, the chime will sound for four (4) to eight (8) seconds. The safety belt warning indicator lamp in the instrument cluster will also illuminate for one to two minutes. In the unlikely event the shoulder belt should stall before it reaches the B-pillar, the indicator light will flash continuously until the shoulder belt is in its locked position at the B-pillar. If the indicator lamp remains illuminated for more than one minute, check to be sure that both shoulder belts are latched to the emergency release buckle. If the indicator lamp remains illuminated with both front seat shoulder belts latched to the emergency release buckles, refer to the section titled *What To Do If Your Shoulder Belt Does Not Engage Properly* before driving the vehicle.

Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the risk and/or severity of injury in a collision.

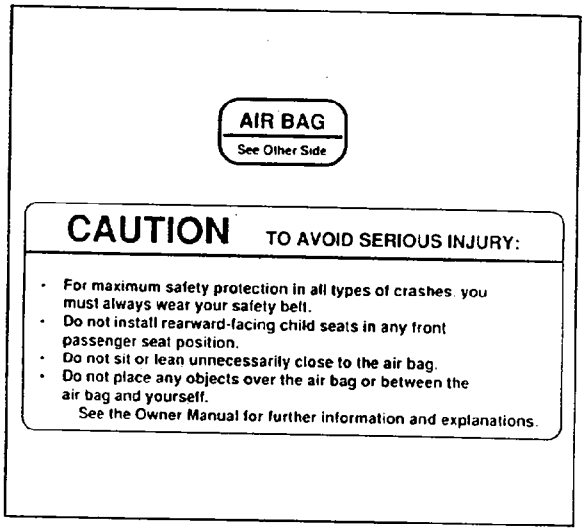
When the ignition is in any position and the door is opened, the shoulder belt will move forward to the A-pillar. This will allow ample room for the driver or passenger to exit from the vehicle. DO NOT use the belt as an assist handle when entering or exiting the vehicle. The door should not be opened while the vehicle is in motion.

Warning: Always drive and ride with your seatback upright and the lap belt portion of your safety belt snug and low across the hips. This will reduce the risk of serious injury to the abdomen or neck that could be caused by sliding under the safety belts in a collision.

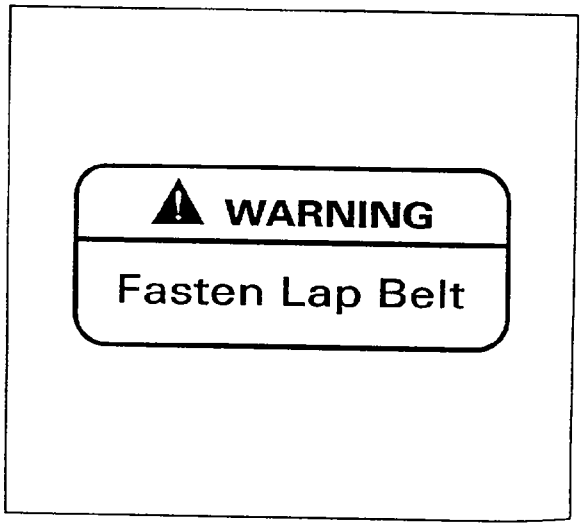
Warning: Children should always ride with the seatback in the fully upright position. When the seatback is not fully upright, there is a greater risk that the child will slide under the safety belt and be seriously injured in a collision.

Important For Your Safety

Before driving your vehicle, read the label on the back of the sun visor or on the headliner above the driver's seat (Canadian vehicles). See the following figures.



Driver and passenger sun visor labels



Label located on headliner (U.S. vehicles only)

An additional warning label is located on the headliner (U.S. vehicles only). On vehicles equipped with a moon roof, the label is located on the manual override access panel.

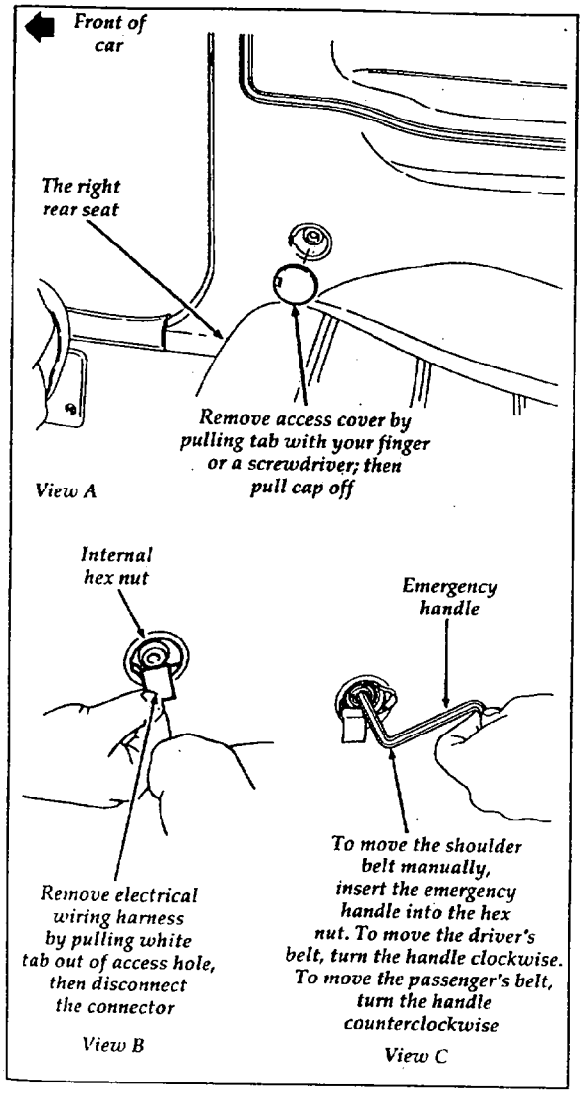
What To Do If Your Shoulder Belt Does Not Engage Properly

If your shoulder belt does not move all the way across to the locked position on the B-pillar, follow these steps:

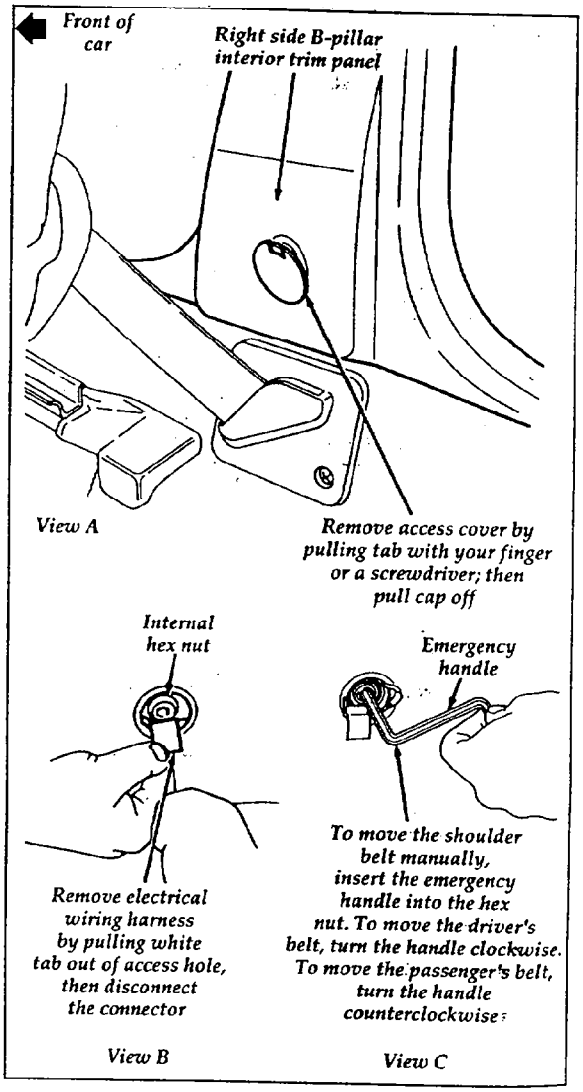
1. Make sure the ignition switch is in the LOCK position.
2. Make sure your door is fully closed. The shoulder belt does not work if your door is open and will remain in the forward position at the A-pillar.

Warning: The vehicle should not be driven unless the doors are fully closed and the shoulder belts are in the locked position on the door lock pillar.

3. Unbuckle the shoulder belt by pressing the red emergency release button on the buckle. Then, reinsert the shoulder belt tongue into the buckle until you hear a snap and feel the latch engage.
4. Turn the key to the ON position.
5. If the shoulder belt doesn't move across you, turn the ignition switch to the LOCK position and then release the shoulder belt from the buckle.
6. Remove the access cap located in the lower portion of the trim panel, rearward of the front door opening.
7. Pull the electrical wiring harness out through the access hole and disconnect the connector. The electrical wiring harness is located near the internal hex nut. To disconnect the connector, pull the left and right sides apart. You may have to loosen the tape to disconnect the electrical connector.
8. Then, insert the emergency handle into the hex nut inside the access hole. The emergency handle is stored in the owner portfolio in the glove compartment.



Moving the shoulder belt manually — 2-door model



Moving the shoulder belt manually — 4-door model

9. Turn the emergency handle to move the buckle rearward until you hear a click. To move the driver's buckle, turn the handle clockwise. To move the passenger's buckle, turn the handle counterclockwise.

10. Reinsert the shoulder belt tongue into the buckle.

Warning: If it is necessary to use the emergency handle to put the shoulder belt in position, have the system serviced by a qualified technician as soon as possible.

Manual Front Lap Belts (U.S. vehicles equipped with motorized passive restraint)

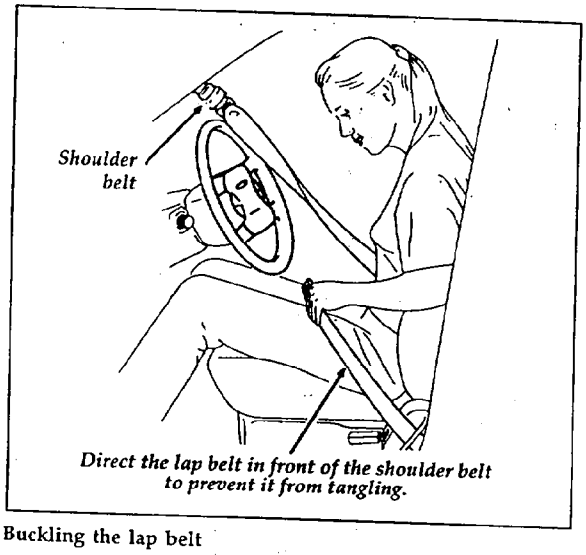
You should always wear the lap belt in addition to the shoulder belt.

Warning: The lap belt must be manually buckled by the driver and passenger and should fit snugly and as low as possible around the hips, not around the waist. Failure to do so may increase the risk of injury in the event of a collision.

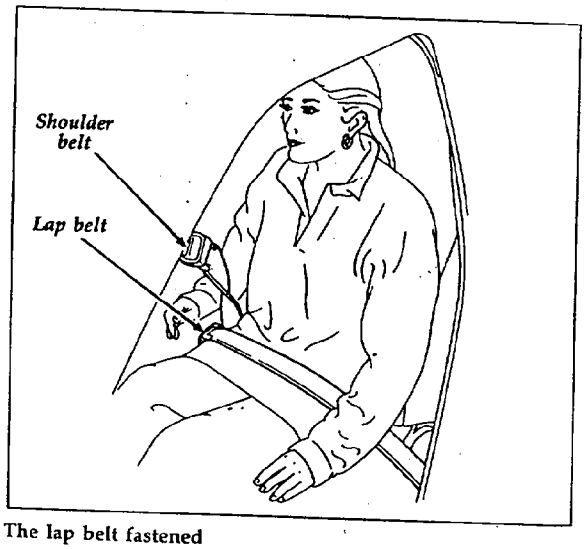
Warning: Front and rear seat occupants, including pregnant women, should wear both lap and shoulder belts for optimum protection in a collision.

To fasten the lap belt: Pull the belt out of the retractor and bring it across your lap. Insert the tongue into the buckle until it snaps and locks in place.

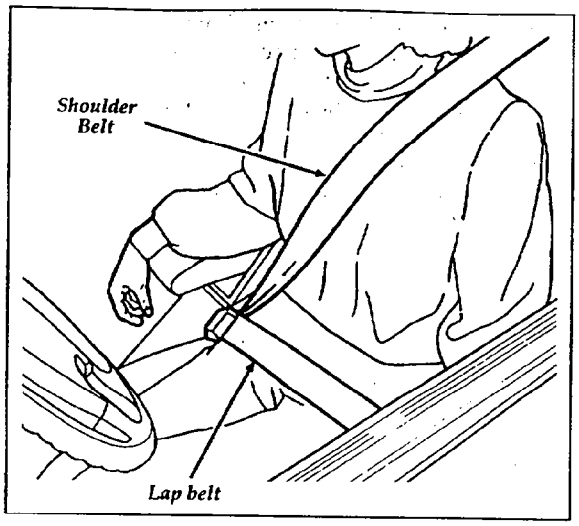
The lap belt retractor will allow the occupant freedom of movement, locking tight only on hard braking, hard cornering or impacts of approximately 5 mph (8 km/h) or more. The retractor can be made to lock by pulling on the belt.



Buckling the lap belt



The lap belt fastened



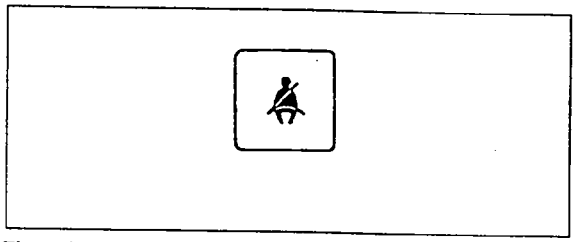
The lap and shoulder belts in place

Safety Belt Light/Chime (U.S. vehicles equipped with motorized passive restraint)

This warning light and chime remind you to fasten your safety belt. One of the following will take place:

- If the lap belt is not buckled when the key is turned to the ON position, the light will come on for one to two minutes and the chime will sound for four to eight seconds.
- If the lap belt is buckled while the light is on and the chime is sounding, both the light and chime will turn off.
- If the lap belt is buckled before the key is turned to the ON position, neither the light nor chime will activate.

If the warning light remains illuminated for more than one minute, check to be sure that both shoulder belts are latched to the emergency release buckle. If the warning light remains illuminated with both front seat shoulder belts latched to the emergency release buckles, refer to the section titled *What to Do If Your Shoulder Belt Does Not Engage Properly* before driving the vehicle.



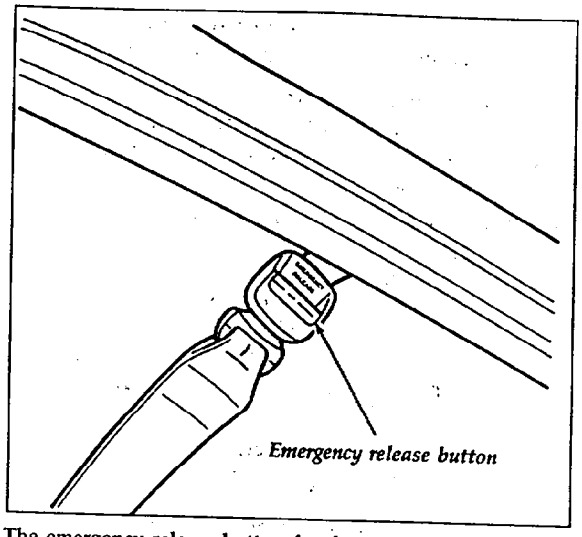
The safety belt light

Shoulder Belt Emergency Release Buttons

If the shoulder belt locks up in a collision, it may stay locked. To unlock the belt, press the emergency release button on the shoulder belt buckle. This allows the tongue to unlatch from the buckle. If the shoulder belt is unlatched and partially retracted, a warning light in the instrument panel lights up and remains on; the warning chime sounds for about five (5) seconds.

To insert the tongue back into the shoulder belt buckle, push it in until you hear a click.

If the belt does not lie flat against you, or the belt has a twist in it at the retractor, unlatch the belt at the buckle, remove twist, and relatch the belt into the buckle.



The emergency release button for the shoulder belt

After a collision, refer to *Safety Belt Maintenance* in this section.

If your shoulder belts stop working after a collision, the fuel pump shut-off switch may have been triggered. Minor parking lot bumping and severe road impacts (such as potholes) may trigger the switch even when there is no apparent body damage. In many instances, you might not even know that the switch has been triggered. The shut-off switch cuts power to the motors that move the shoulder belts in addition to stopping the flow of fuel to the engine. To reset the switch, see *Engine, starting after a collision* in the Index.

If your shoulder belts are not working properly, get your vehicle serviced as soon as possible.

If the fuel pump shut-off switch is not the cause for the shoulder belt not moving, have the system serviced by a qualified technician as soon as possible.

Warning: If the shoulder belt is released from the emergency release buckle, store the tongue end away from the seat tracks. Failure to do this may result in the seat belt being cut or torn when the seat is adjusted forward or back. Any damaged shoulder belt must be replaced.

Manual Front Lap and Shoulder Belt (Available only on Canadian vehicles)

While in motion, the combination lap and shoulder belt adjusts to your movement. However, if you brake hard, turn hard, or if your vehicle receives an impact of 5 mph (8 km/h) or more, the lap and shoulder belt locks and helps reduce your forward movement. The retractor can be made to lock by pulling on the belt.

After you get into your vehicle, close the door and lock it. Then adjust the driver or passenger seat to the position that suits you best.

To fasten the belt, find the long strap of the belt, pull it across your shoulder and chest, and insert the tongue into the proper buckle on your seat until you hear a snap and feel it lock. Be sure to use the correct buckle and check to make sure the buckle is securely fastened.

Safety belt warning light/chime (Canadian vehicles only)

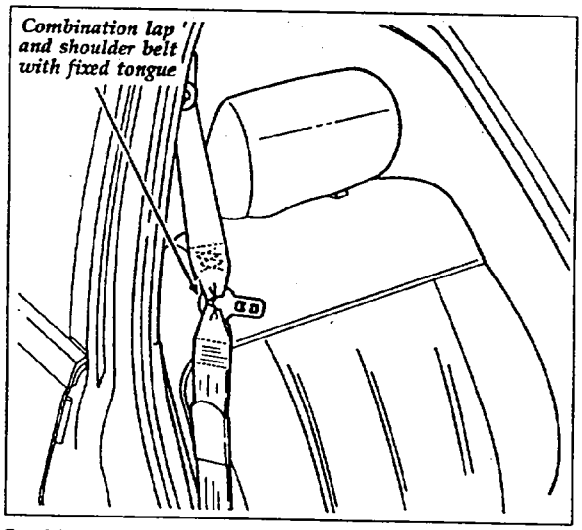
This warning light and chime remind you in two ways to fasten your safety belt. If you do not fasten your safety belt before you turn the ignition key to ON, the chime sounds for four (4) to eight (8) seconds. Also, each time you turn the ignition key to ON, the warning light comes on for one to two minutes to remind you to fasten your combination lap and shoulder belt.

Fastening the front seat lap and shoulder belt

Warning: Make sure that the lap portion of the safety belt is as low around your hips as possible. Do not wear the lap belt around your waist. If you do not use the lap belts properly, the risk of being injured in a collision greatly increases.

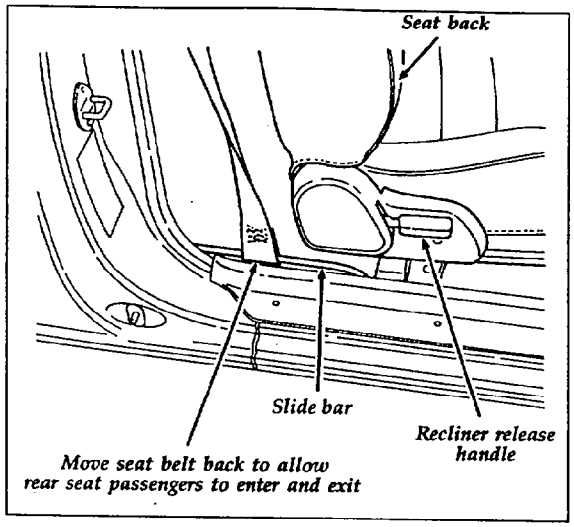
Warning: Front and rear seat occupants, including pregnant women, should wear both lap and shoulder belts for optimum protection in a collision.

Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around your neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the chance and/or severity of injury in a collision.



Combination lap and shoulder belt with a fixed tongue (available only on Canadian vehicles)

Rear Seat Entry (Canadian 2-door hatchback models)



Rear seat entry

The slide bar on the safety belt system is designed to make it easier to enter and exit from the rear seat and to help front seat passengers reach the belt. To enter the rear seat:

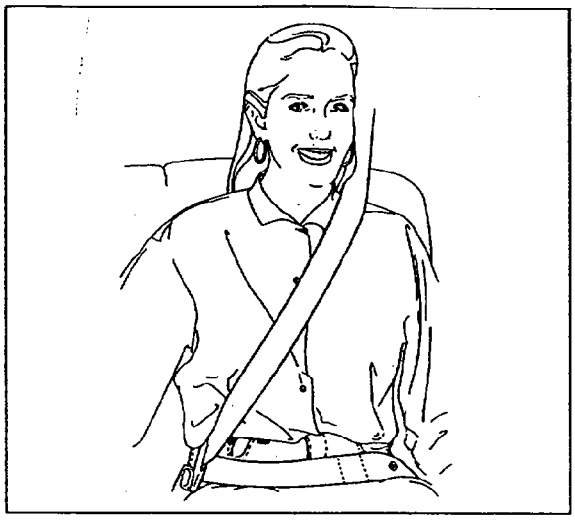
- ❑ Move the safety belt out of the way with the slide bar. (The belt should be at the front end of the slide bar when the belt is in use.)
- ❑ Enter the rear seat in front of the safety belt.

Rear Lap and Shoulder Belts

To fasten the belt, find the long strap of the belt near the door, pull it across your shoulder and chest, and insert the tongue into the proper buckle on your seat until you hear a snap and feel it lock. Be sure to use the correct buckle and check to make sure the buckle is securely fastened.

While in motion, the combination lap and shoulder belt adjusts to your movement. However, if you brake hard, turn hard, or if your vehicle receives an impact of 5 mph (8 km/h) or more, the lap and shoulder belt locks and helps reduce your forward movement. The retractor can be made to lock by pulling on the belt.

To fasten the belt, pull the combination lap and shoulder belt from the retractor so that the shoulder belt portion of the safety belt crosses your shoulder and chest. Be sure the belt is not twisted. If the belt is twisted, remove the twist. (For instructions on how to remove a twist, see the *How to Untwist or Unjam a Safety Belt Retractor* section in this chapter.) Insert the belt tongue into the proper buckle for your seating position until you hear a snap and feel it latch. Make sure the tongue is securely fastened to the buckle. Adjust the lap belt portion of the safety belt by pulling up on the shoulder belt until the lap belt fits snugly and as low as possible around your hips.



The rear lap and shoulder belt fastened

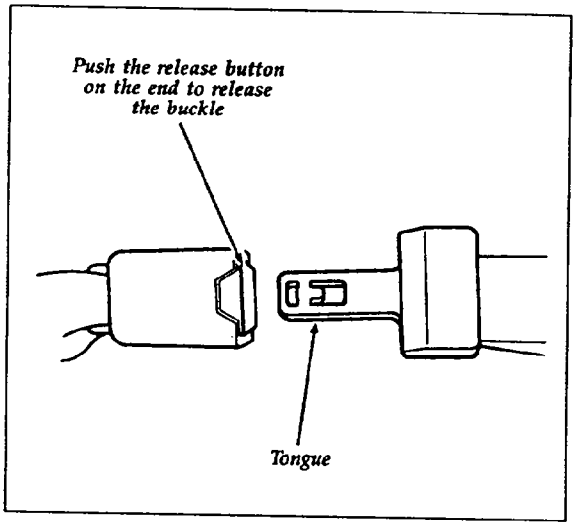
Warning: Front and rear seat occupants, including pregnant women, should wear safety belts for optimum protection in an accident.

Warning: Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. Never swing it around the neck over the inside shoulder. Never use a single belt for more than one person. Failure to follow these precautions could increase the risk and/or severity of injury in a collision.

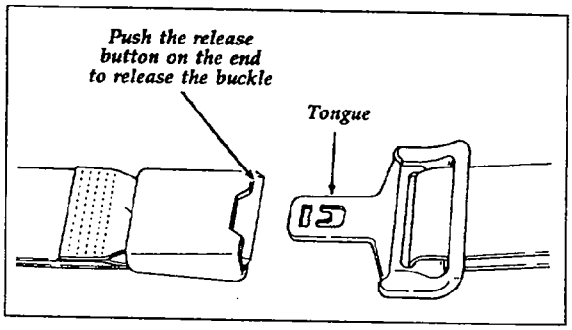
Due to folding rear seats, sometimes the buckles and tongues toward the center of the vehicle may be hidden by the rear edge of the seat cushion. Pull them out so they will be accessible.

To unfasten the belt:

1. Push the release button on the buckle. This allows the tongue to unlatch from the buckle.



Unfastening the safety belts for the center seating position



Unfastening the safety belts

2. While the belt retracts, guide the tongue to its original position. If you do not guide the tongue, it may strike you or part of the vehicle.

Instructions for using a locking clip to secure child safety seats with manual lap and shoulder safety belts are provided later in this chapter.

How to Untwist or Unjam a Safety Belt Retractor

If you should jam the lap belt retractor by allowing the belt to retract when it is twisted, you can free the webbing with this procedure:

1. Pull on the belt with both hands to tighten it on the retractor spool.
2. Feed the belt back into the retractor until it is completely retracted. Repeat previous step if necessary.
3. Pull the belt out of its holder as far as it will go and untwist the belt or remove the object that is jamming the belt. Let the belt retract.
4. Then, pull the belt out and let it retract several times to make sure that the belt works properly.

Procedure to Correct a Twisted Safety Belt at the "D" Ring (if so equipped) Front and/or Rear Outboard Seating Positions

NOTE: **The restraint system shown in the following figures may be different than the restraint system in your vehicle. However, use these figures and this procedure to correct a twisted safety belt at any outboard seating position that has a "D" ring.**

NOTE: **The following illustrations show the front driver's seat safety belt. Your vehicle may not have a "D" ring at the indicated position.**

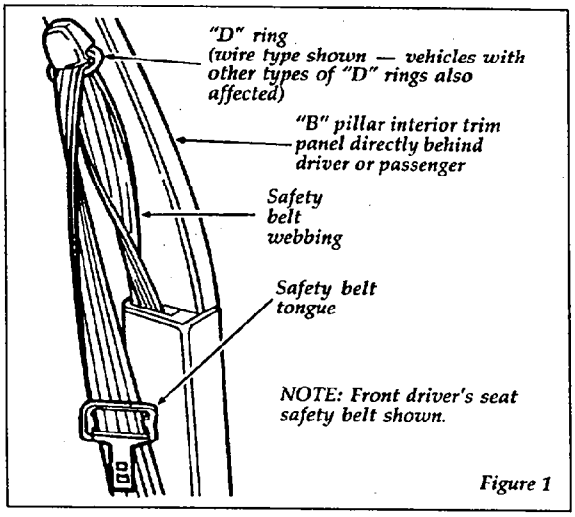


Figure 1

1. Grasp the belt webbing at the "D" ring. See Figure 2.

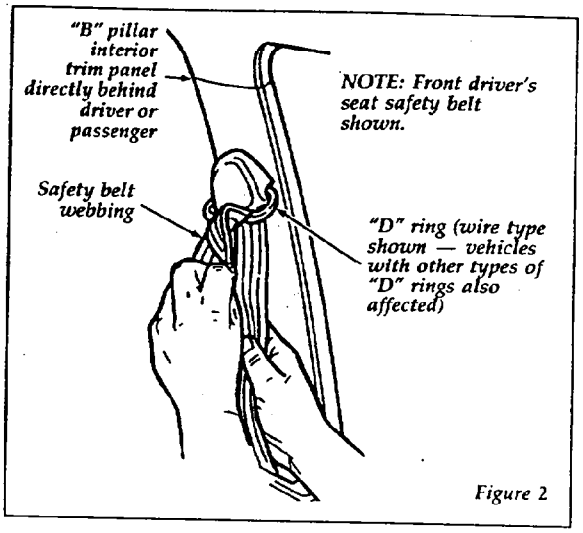


Figure 2

2. Rotate and fold the belt webbing over itself as required to remove the twist.
3. Feed the folded portion of the belt through the "D" ring.
4. When completed, the safety belt should look like Figure 3.

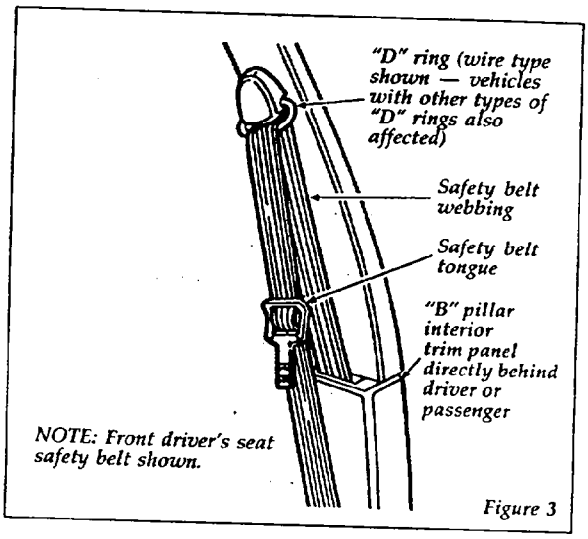


Figure 3

Procedure to Correct a Rotated Tongue on the Safety Belt (Front and/or rear outboard seating positions)

NOTE: The restraint system shown in the following figures may be different than the restraint system in your vehicle. However, use these figures and this procedure to correct a rotated tongue on the safety belt at any seating position that has a "D" ring.

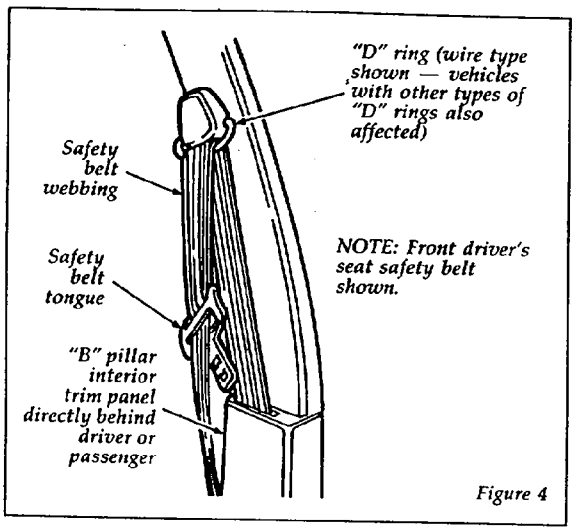


Figure 4

1. Grasp the belt tongue and pull down on the belt webbing closest to you to form a loop through the **upper** (narrow and longer) slot in the tongue. See Figure 5.

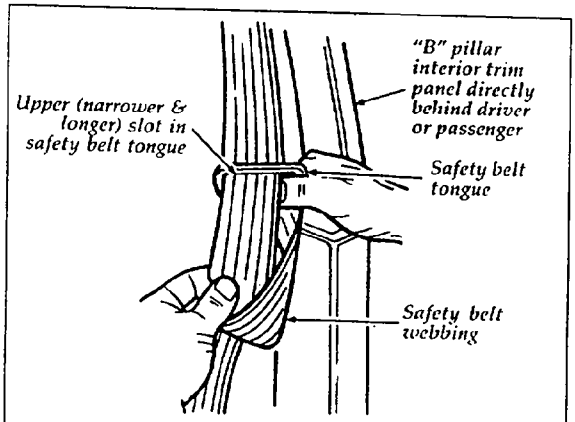


Figure 5

2. Working within the **upper** slot, rotate and fold the belt webbing over itself as required to remove the twist.
3. Pull the excess belt webbing back through the **upper** slot in the tongue.
4. Repeat the above steps to complete the removal of the twist at the **lower** (wider and shorter) slot in the tongue. See Figure 6.

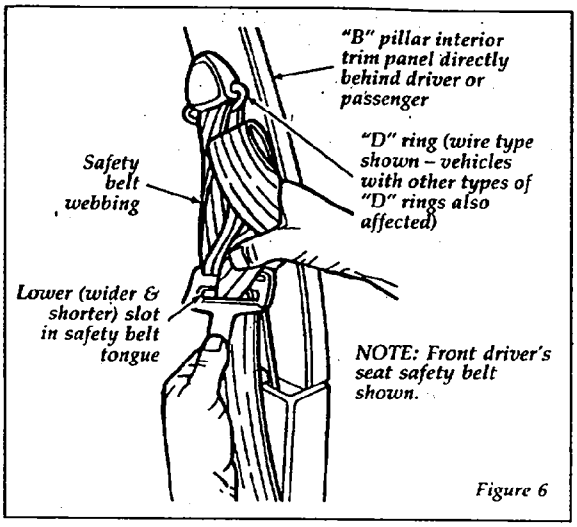


Figure 6

5. When completed, the safety belt should look like Figure 3.

Rear Lap Belt

Warning: Be sure the lap belt is fitted snugly and as low as possible around the hips, not around the waist. Failure to do so may increase the risk of injury in the event of a collision.

Before you fasten your lap belt, you may need to lengthen it.

To lengthen the belt, position the belt tongue at a right angle to the belt. Pull the belt tongue over your lap until it reaches the buckle.

To fasten the belt, pull the belt across your hips and insert the tongue into the correct buckle on your seat until you hear a snap and feel it lock. Make sure the buckle is securely fastened.

Adjust the belt so that it fits snugly around your hips, as low as possible.

If you need to lengthen the belt, unfasten it and repeat the procedure above. If you need to shorten the belt, pull on the loose end of the webbing.

To unfasten the belt, push the release button on the end of the buckle. This allows the tongue to unlatch from the buckle. Because the center lap belt does not have a retractor, it should be shortened and fastened when not in use.

Air Bag Supplemental Restraint System (SRS)

Your vehicle is equipped with a driver side air bag supplemental restraint system, located in the steering wheel and identified by the letters "SRS" in the center of the wheel.

The letters "SRS" above the glove compartment indicate your vehicle is also equipped with a right front passenger air bag.

The driver and right front passenger air bag are Supplemental Restraint Systems (SRS), provided at these seating positions in addition to the lap/shoulder belt and are designed to supplement the protection provided to properly belted occupants in moderate to severe frontal collisions. The supplemental air bag system does not provide restraint to the lower body.

The Importance of Wearing Safety Belts

Warning: ALWAYS WEAR YOUR SAFETY BELT!

Warning: All occupants of the vehicle, including the driver, should always wear their safety belts, whether or not an air bag Supplemental Restraint System is also provided at their seating position. Failure to do so may increase the risk of severe injury or death in the event of a collision.

Warning: Safety belts must be worn by all vehicle occupants to be properly restrained and help reduce the risk of injury in a collision.

There are four very important reasons to use safety belts even with an air bag system. Use your safety belts to:

- help keep you in the proper position (away from the air bag) when it inflates
- reduce the risk of harm in rollover, side or rear impact collisions, because an air bag is not designed to inflate in such situations
- reduce the risk of harm in frontal collisions that are not severe enough to activate the supplemental air bag
- reduce the risk of being thrown from your vehicle

The Importance of Being Properly Seated

In a collision, the air bag must inflate extremely fast to help provide additional protection for you. In order to do this, the air bag must inflate with considerable force. If you are not seated in a normal riding position with your back against the seatback, the air bag may not protect you properly and could possibly hurt you as it inflates.

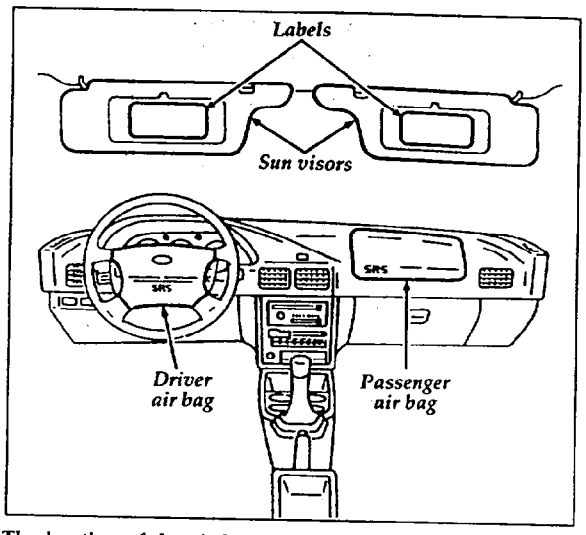
Warning: Your vehicle is equipped with a right front passenger air bag. Front passengers, especially children and small adults, should never sit on the edge of the seat, stand near the glove compartment of the instrument panel, or lean over with their faces near the air bag cover when the vehicle is moving. All occupants should sit with their backs against the seatback and use the safety belts. Children weighing less than 40 lbs. (18 kg) should use child or infant seats. Forward-facing child seats must have the passenger seat moved as far back from the instrument panel as possible. REAR-FACING INFANT SEATS SHOULD NEVER BE USED IN THE FRONT SEAT, BECAUSE THE FORCE OF THE RAPIDLY INFLATING PASSENGER AIR BAG COULD PUSH THE TOP OF THE REAR-FACING SEAT AGAINST THE VEHICLE SEATBACK, ARMRESTS OR CONSOLE (IF SO EQUIPPED). REAR-FACING INFANT SEATS MUST ALWAYS BE SECURED IN THE REAR SEAT.

Warning: Do not place objects or mount equipment on or near the air bag module covers (identified by the letters "SRS") on the steering wheel and instrument panel, or in front seat areas that may come in contact with a deploying air bag, because any such objects could cause harm if the vehicle is in a collision severe enough to cause the air bag to inflate. Failure to follow this instruction may increase the risk of personal injury in the event of a collision.

How the Air Bag Supplemental Restraint System Operates

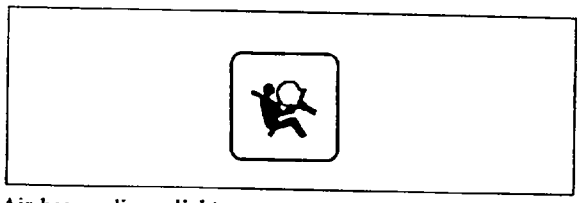
The Air Bag Supplemental Restraint System has two main parts. One part is the air bag system with the driver and passenger air bags and inflators. The second part is the electrical system which has impact sensors and a diagnostic module. The diagnostic module monitors its own internal circuits and the supplemental air bag electrical system readiness, including the crash sensors, the system wiring, the air bag readiness light, air bag back-up power, and the supplemental air bag igniters.

The driver air bag is in the center of the steering wheel and is indicated by the letters "SRS". The front passenger seat air bag is in the upper right-hand section of the instrument panel ledge above the glove compartment. The letters "SRS" appear there.



The location of the air bag and warning labels

The air bag system uses a readiness light and a tone to indicate the condition of the system. The readiness light is in the instrument cluster. When you turn the ignition key to ON, this light will illuminate for approximately six (6) seconds and then turn off. This indicates that the system is operating normally. **NOTE:** Maintenance of the air bag system is not required.



Air bag readiness light

Warning: A problem with the system is indicated by one or more of the following: the readiness light will either flash or stay lit, or it will not light, or a group of five beeps will be heard.

If any of these things happen, even intermittently, have the air bag system serviced at your Ford or Lincoln-Mercury dealer immediately.

Tone generator

The air bag readiness light indicates the air bag system condition. However, a series of five sets of five beeps will be heard only if the readiness light does not work and there is a problem with the air bag system. This also means that the Air Bag Supplemental Restraint System (SRS) is in need of service. The tone pattern will repeat (five sets of five beeps) periodically until the problem and light are repaired. Unless serviced, the Air Bag Supplemental Restraint System may not function properly in the event of a collision.

Warning: Do not attempt to service, repair, or modify the Air Bag Supplemental Restraint System; tampering could cause activation of the system and increase the risk of personal injury. DO NOT REPLACE OR OTHERWISE TAMPER WITH THE AIR BAG FUSES. For servicing of the Air Bag Supplemental Restraint System, see your Ford or Lincoln-Mercury dealer.

The air bag system is designed to stay out of sight until it is activated. The air bag system is designed to deploy in frontal and front-angled collisions more severe than hitting a parked vehicle of similar size and weight head-on at about 28 mph (45 km/h). Because the system senses the crash severity rather than vehicle speed, some frontal collisions at speeds above 28 mph (45 km/h) will not inflate the air bag.

The following four steps show how the air bag system works:

1. Sensors in the vehicle will detect the degree of severity of a frontal impact. When the sensor system is activated, electric current flows to the inflator and the system ignites the gas generant.
2. The propellant then rapidly burns in the metal container. The rapid burning produces nitrogen gas and small amounts of dust. The nitrogen gas and dust are cooled and filtered during inflation of the air bag.
3. The inflating supplemental air bags split open the trim covers. The supplemental air bags then rapidly unfold and inflate in front of the driver and front seat passenger.

NOTE: **STEPS 1-3 TAKE PLACE IN A FRACTION OF A SECOND.**

4. After inflation, the gas empties through holes in the air bag. The air bag deflates at once.

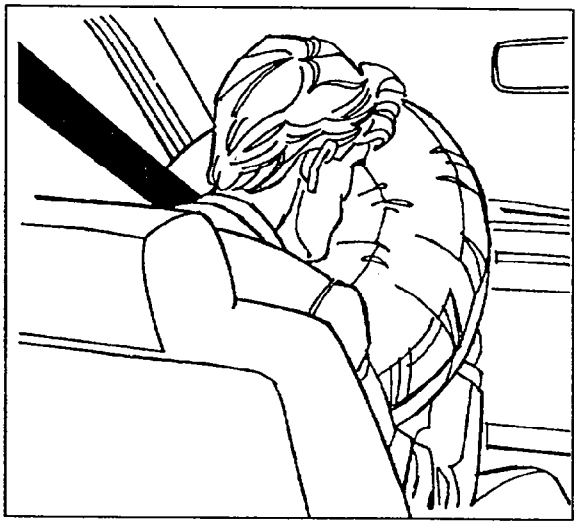
The surface of the air bags and the vehicle interior may be dusted with a powdery residue. The powder is cornstarch or talcum powder, which is used to lubricate the air bag as it inflates, and sodium compounds such as sodium carbonates (e.g., baking soda), and possibly a very small amount of sodium

hydroxide that may be irritating to the skin and eyes, but is not toxic.

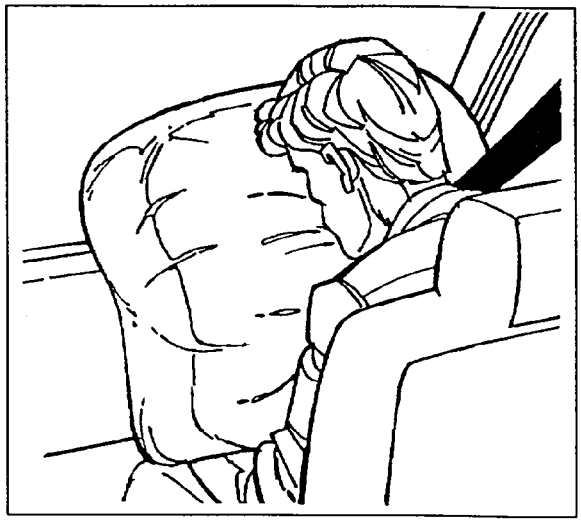
Right after air bag inflation, you may notice smoke (from the powder and dust) and smell the burnt propellant. This is normal.

Warning: Several air bag system components get hot after inflation. Do not try to touch them after inflation.

Air bags may not inflate in certain frontal collisions, even though the vehicle may be badly damaged. The fact that your air bag did not inflate in such a collision does not mean that something is wrong with the air bag system. Rather, it means the crash forces were not severe enough to need an air bag to prevent serious injury.



Inflated driver-side air bag



Inflated passenger-side air bag

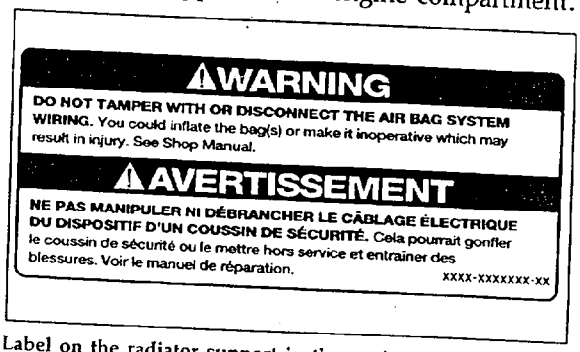
Warning: The air bag will inflate only once. The system is designed to function on a one-time-only basis. If the air bag is inflated, THE AIR BAG WILL NOT FUNCTION AGAIN AND MUST BE REPLACED IMMEDIATELY. If the air bag is not replaced, the unrepaired area will increase the risk of injury in a collision.

Disposal of supplemental air bag equipped vehicles

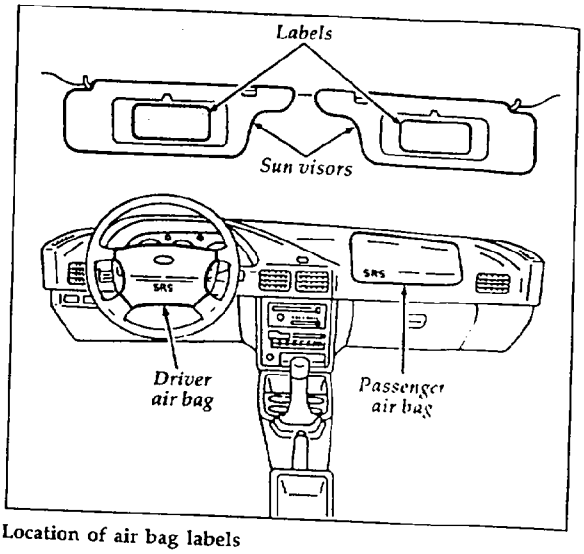
For disposal of air bags or air bag equipped vehicles, see your local Ford or Lincoln-Mercury dealer, or refer to the procedures in the 1995 Ford Service Manual. Information on how to order a service manual is available at an authorized Ford or Lincoln-Mercury dealer. You can also order a service manual using the order form in the *Accessories* chapter of your Owner Guide.

Service and information labels

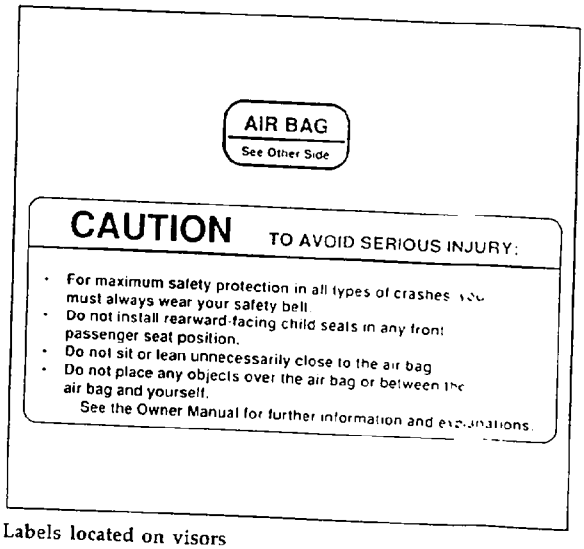
Service and information labels are attached to the sun visor, on the headliner above the driver's sun visor (Canadian vehicles), and near the radiator support in the engine compartment.



Label on the radiator support in the engine compartment



Location of air bag labels



Labels located on visors