

REPORT NO. : 208-MGA-95-010
212-MGA-95-010
301-MGA-95-010

VEHICLE SAFETY COMPLIANCE TESTING

FOR

FMVSS 208, OCCUPANT CRASH PROTECTION
FMVSS 212, WINDSHIELD MOUNTING
FMVSS 219, WINDSHIELD ZONE INTRUSION
FMVSS 301, FUEL SYSTEM INTEGRITY

NISSAN MOTOR CO., LTD.
1995 NISSAN SENTRA 4 DOOR
NHTSA NO. CS5208

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: March 21, 1995

Report Date: March 30, 1995

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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17. Key Words Frontal Impact 30 mph Vehicle Safety Compliance Testing: FMVSS 208, "Occupant Crash Protection" FMVSS 212, "Windshield Mounting" FMVSS 219 (partial), "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"				18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division, Room 5108 (NAD-52). 400 Seventh Street, S.W. Washington, D.C. 20590 Telephone No. (202) 366-4946 Attn: Robert Hornickle	
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SECTION 1
PURPOSE AND TEST PROCEDURE

PURPOSE

This 30 mph flat frontal barrier impact test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 208, 212, 219 (partial), and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by the MGA Research Corporation (MGA) under Contract No. DTNH22-93-D-21089. The purpose of this test was to determine whether the subject vehicle, a 1995 Nissan Sentra 4 Door Sedan, NHTSA No. CS5208, meets the performance requirements of FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," in the flat frontal barrier impact mode.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-208-09 dated March 15, 1993. Data was obtained relative to FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; and FMVSS 301, "Fuel System Integrity," performance.

The test vehicle was instrumented with seven (7) accelerometers to measure longitudinal axis accelerations and one (1) accelerometer to measure vertical axis acceleration. The vehicle's specified impact velocity range was 28.9 to 29.9 mph. The vehicle impacted a fixed flat barrier of which face was covered with a sheet of 3/4 inch thick plywood.

The test vehicle contained two (2) Part 572 E 50th percentile adult male anthropomorphic test devices (dummies). The dummies were positioned in the front outboard designated seating positions according to the dummy placement procedures specified in Appendix C of the Laboratory Test Procedure.

Both dummies were instrumented with head and chest accelerometers to measure longitudinal, lateral, and vertical accelerations, and with left and right femur load cells to measure axial forces. Each Part 572 E dummy's instrumentation also included a chest potentiometer to measure longitudinal deflection, and the driver dummy had lower leg instrumentation.

The thirty-six (36) data channels were multiplexed and recorded on four IBM PC compatible computers with Metrabyte DAS-16F A/D converter boards. The data was digitally sampled at 8170 samples per second and processed per Section 11.13 through 11.15 of the Laboratory Test Procedure.

The crash event was recorded by one (1) real-time panning motion picture camera and fourteen (14) high-speed motion picture cameras. The pre-test and post-test conditions were recorded by the real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2. The FMVSS 208, 212, 219 (partial) and 301 data are presented in Section 3. The vehicle, occupant, and camera measurements are presented in Section 4. Appendix A contains the still photographic prints. Appendix B contains the dummy and vehicle data plots. Appendix C contains the manufacturer's vehicle information.

SECTION 2
SUMMARY OF FRONTAL BARRIER IMPACT TEST

TEST RESULTS SUMMARY

This flat frontal barrier test was conducted at MGA Research Corporation on March 21, 1995.

The test vehicle, a 1995 Nissan Sentra, NHTSA No. CS5208, appeared to comply with the performance requirements of FMVSS 208, 212, 219 (partial), and 301 in the flat frontal barrier impact mode. The Head Injury Criteria (HIC) calculations were less than 1000, the chest resultant accelerations did not exceed 60 g's, and the compressive forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Part 572 E dummies seated in the front outboard designated seating positions. For each Part 572 E dummy, the chest deflection did not exceed 3.0 inches. The vehicle's restraint system met the applicable comfort and convenience requirements. The windshield periphery retention on each side of the vehicle centerline was greater than 50 percent. There was no penetration into any portion of the windshield. No fluid spilled from the vehicle's fuel system following the impact or during the static rollover test.

The test vehicle was equipped with an airbag and a Type 2 seat belt in the front outboard designated seating positions. Both dummies were restrained only by the airbag during the test. The vehicle's test weight was 2796 pounds. The vehicle's impact speed was 29.6 mph. The vehicle's maximum static crush was 16.5 inches.

The driver's HIC was 294. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 52 g's. The driver's chest maximum deflection was 1.9 inches. The driver's left and right femur maximum compressive forces were 1158 pounds and 1024 pounds, respectively.

The right front passenger's HIC was 270. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 50 g's. The right front passenger's chest maximum deflection was 0.4 inches. The right front passenger's left and right femur maximum compressive forces were 1293 pounds and 1385 pounds, respectively.

There was no loss of windshield periphery retention and no penetration through the windshield.

Following the impact, no fluid spilled from the vehicle's fuel system prior to the static rollover test or during any portion of the static rollover test.

TEST NOTES

TABLE 1 CRASH TEST SUMMARY

Vehicle Yr/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan
 Vehicle NHTSA No.: CS5208 Test Type: Frontal Barrier Impact
 Test Date: 03/21/95 Time: 3:44 Temp: 70°F
 Vehicle Test Weight: 2796 lbs. Vehicle/Barrier Impact Angle: 0°
 Impact Velocity: 29.6 mph Maximum Static Crush: 16.5 inches
 Vehicle Rebound: 20.0 inches

Dummies:	Driver	Passenger
Dummy Type	<u>Part 572E</u>	<u>Part 572E</u>
Serial Number	<u>401</u>	<u>403</u>
Restraint System	<u>Airbag</u>	<u>Airbag</u>
No. of Data Channels	<u>19</u>	<u>9</u>

Number of Cameras: 1 Real Time
14 High Speed

Door Opening Data: Left Front: Yes Left Rear: Yes
 Right Front: Yes Right Rear: Yes

Front Seat(s) Data:	Driver	Passenger
Seat Track Failure	<u>None</u>	<u>None</u>
Seat Back Failure	<u>None</u>	<u>None</u>

Visible Dummy Contact Points:	Driver	Passenger
Head	<u>Airbag, Visor, and Windshield</u>	<u>Airbag</u>
Chest	<u>Airbag</u>	<u>Airbag</u>
Left Knee	<u>Dashboard</u>	<u>Glove Box</u>
Right Knee	<u>Dashboard</u>	<u>Glove Box</u>

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATA

Vehicle Yr/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

NHTSA No: CS5208 VIN: 1N4AB41D1SC-705713 Body Color: Blue

Engine: 4 Cylinders; C.I.D.; 1.6 liters; CC

 Gas; Diesel; Turbocharged

 Longitudinal; X Transverse

Transmission: 5 Speed; X Manual; Automatic; Overdrive

Final Drive: X Front Wheel; Rear Wheel; Four Wheel

Major Option: X A/C; X P/S; X P/B; P/wdo; P/door locks;
 P/seats; X Tilt Wheel; Anti-skid Brakes; Cruise Control; Other

Date Received: 02/28/95; Odometer Reading: 242 miles

Dealer's Name/Address: Ray Hutson Nissan
P.O. Box 1565
Lacrosse, WI 54601

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Nissan Motor Co., LTD

Date of Manufacture: 12/94; VIN: 1N4AB41D1SC-705713

GVWR: 3329 lbs; GAWR Front: 1872 lbs. GAWR Rear: 1567 lbs.

DATA FROM TIRE PLACARD:

Tire Pressure with maximum capacity vehicle load: Front 33 psi Rear 29 psi

Recommended Tire Size: P175/70R13

Recommended Cold Tire Pressure: Front 33 psi; Rear 29 psi

Tires on Vehicle: P175/70R13; Manufacturer: General

Type of Spare Tire: Space Saver

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; X Lever; Rot. Knob Power

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATA (Cont'd)

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

Right Front = 743 lbs

Right Rear = 447 lbs

Left Front = 750 lbs

Left Rear = 458 lbs

TOTAL FRONT WEIGHT = 1493 lbs (62.3% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 905 lbs (37.7% of Total Vehicle Weight)

TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 2398 lbs

CALCULATION FOR TARGET TEST WEIGHT:

UDW (Unloaded Delivered Weight) = 2398 lbs

VCW (Vehicle Capacity Weight) = 814 lbs

DSC (Designated Seating Capacity) = 5

RCLW*(Rated Cargo/Luggage Weight) = VCW - 150 (DSC) = 814 - 150 (5) = 64 lbs

Target Test Weight = UDW + RCLW + (2 Dummies x Dummy Weight)

Target Test Weight = 2398 + 64 + 344 = 2806 lbs

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO WEIGHT:

Right Front = 855 lbs

Right Rear = 584 lbs

Left Front = 800 lbs

Left Rear = 557 lbs

TOTAL FRONT WEIGHT = 1655 lbs (59.2% of Total Vehicle Weight)

TOTAL REAR WEIGHT = 1141 lbs (40.8% of Total Vehicle Weight)

TOTAL TEST WEIGHT = 2796 lbs

Weight of ballast secured in vehicle = 0 lbs

Vehicle components removed to meet target weight: Rear tail lights, back seat, bumper face shield,
muffler, spare tire, jack, trunk lid, trunk compartment trim, rear brake light.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 25.8 LF 26.0 RR 25.4 LR 25.7

Fully Loaded Attitude: RF 25.1 LF 25.2 RR 24.4 LR 24.6

Test Attitude: RF 24.9 LF 25.4 RR 24.1 LR 24.6

Wheel Base: 99.9 in; C.G. = 40.8 in rearward of front wheel centerline

*Cargo weight for multi-purpose passenger vehicles, truck, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 300 pounds, whichever is less.

TABLE 3 POST-IMPACT DATA

Type of Test: Frontal Barrier Impact Impact Angle: 0°
Test Date: 03/21/95 Time: 3:44 Temperature: 70°F
Vehicle NHTSA No.: CS5208 VIN: 1N4AB41D1SC-705713

BARRIER IMPACT VELOCITY

Required Impact Velocity Range: 28.9 to 29.9 mph
Impact Velocity: Primary = 29.60 mph; Secondary = 29.65 mph
Distance From Front Bumper to Barrier Face When
Entering Speed Trap: 51.4 inches
Exiting Speed Trap: 12.0 inches

VEHICLE STATIC CRUSH AND REBOUND (inches):

Vehicle Length:	Pre-test	= R	<u>164.5</u>	C _L	<u>168.3</u>	L	<u>163.1</u>
	Post-test	= R	<u>148.8</u>	C _L	<u>152.0</u>	L	<u>151.6</u>
	Crush	= R	<u>15.7</u>	C _L	<u>16.3</u>	L	<u>11.5</u>
	Average	=	<u>14.5</u>				

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

R 22.2 in C_L 20.6 in L 20.0 in

TABLE 4 ACCIDENT INVESTIGATION DIVISION DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Veh. NHTSA No.: CS5208;

VIN: 1N4AB41D1SC-705713

Build Date: 12/94 ;

Test Date: 03/21/95

Veh. Size Category: Subcompact;

Test Weight: 2796 lbs

Veh. Wheelbase: 99.9 in ;

Front Overhang: 32.5 in ;

Overall Width: 66.2 in

ACCELEROMETER DATA:

Location: As per measurements on page 2-10.

Calibration Procedure: As per MGA Calibration Procedure

Linearity: >99.9% ; Integration Algorithm: Trapezoidal

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:

Impact Mode: Frontal Barrier

Crush Depth C1 = 11.5 inches

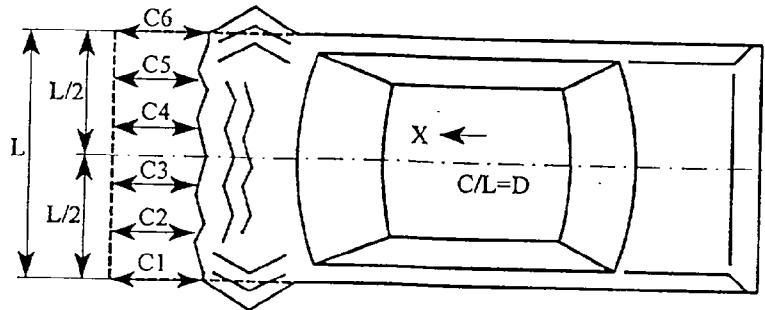
Dimensions: C2 = 14.1 inches

C3 = 15.0 inches

C4 = 16.5 inches

C5 = 16.5 inches

C6 = 15.7 inches



Midpoint of Damage: D = Vehicle Longitudinal Centerline

Length of Damaged Region: L = 54.7 inches

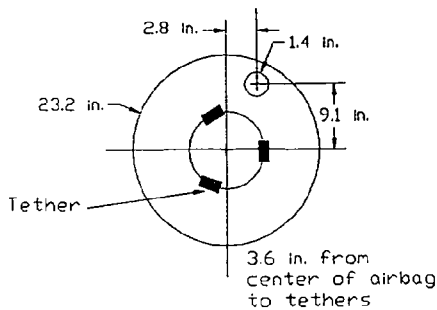
TABLE 5 POST TEST AIRBAG DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

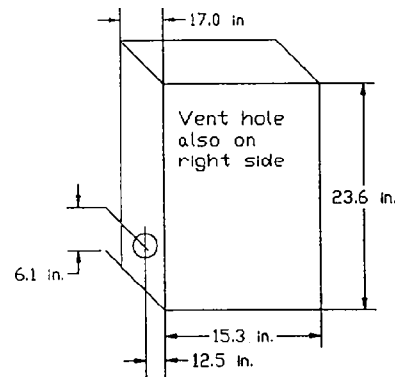
NHTSA No: CS5208; Test Date: 03/21/95; Technician: Nicole Walter

- A. No of Vent Holes: Driver 1; Passenger 2
- B. Size of Vent Holes: Driver 1.4 in. dia.; Passenger 2.8 in. dia.
- C. Total Vent Area: Driver 1.5 in²; Passenger 6.0 in²
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
 Driver; Length N/A; Width N/A; Diameter 23.2 in
 Passenger; Length 32.3; Width 30.8; Diameter N/A
- E. Is the Airbag Tethered?
 Driver; X Yes; No; If yes, record length of tether 7.7 in
 Passenger; Yes; X No; If yes, record length of tether N/A in

Driver Airbag



Passenger Airbag



There were three (3) tethers in driver airbag.

- F. Part Numbers and Manufacture Name of Airbag and Gas Generator

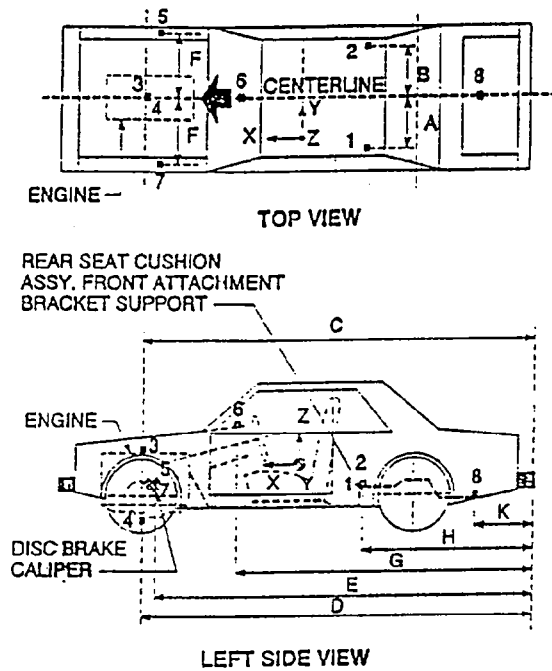
Driver; Mfr *; Airbag 336310C; Gen MEF038A0031
 Passenger; Mfr *; Airbag *; Gen KP1M294Z055361

* Not Available

TABLE 6 VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208; Test Date: 03/21/95



ACCELEROMETER LOCATION (inches)		
	PRE-TEST	POST-TEST
A	25.0	24.9
B	25.0	25.0
C	135.0	130.5
D	137.8	137.6
E	140.6	135.3
F	25.8	22.9
G	109.6	109.6
H	59.4	59.4
K	7.2	7.2

ACCELEROMETER DATA SUMMARY					
No.	DESCRIPTION	MAXIMUM (g's)	TIME (msec)	MINIMUM (g's)	TIME (msec)
1	Left Rear Seat Crossmember	2.9	89	-35.6	41
2	Right Rear Seat Crossmember	2.0	87	-32.8	57
3	Top of Engine Block	55.6	46	-110.2	34
4	Bottom of Engine	48.7	42	-94.8	33
5	Right Disc Brake Caliper	18.0	70	-60.2	48
6	Instrument Panel	6.9	77	-42.9	19
7	Left Disc Brake Caliper	42.0	71	-94.6	43
8	Trunk	10.7	29	-12.1	46

TABLE 7 REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

Contract Number: DTNH22-93-D-21089

From: MGA Research Corporation
5000 Warren Road
Burlington, WI 53105

To: Mr. Charles Case, COTR
Office of Vehicle Safety Compliance

The following vehicle has been subjected to testing for FMVSS 208. The vehicle was inspected upon arrival at the laboratory for the test and found to contain all of the equipment listed below. The vehicle was again inspected after the above test had been conducted, and all changes were noted below. The final condition of the vehicle was also noted in detail.

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Body Color: Blue

VIN: 1N4AB41D1SC-705713 Cost: \$12,708.00

Odometer: Arrival Date: 02/28/95 Reading: 242 miles

Completion Date: 03/21/95 Reading: 249 miles

Engine: 4 Cylinders; 1.6 Liters; X Gas; Diesel

Transmission: 5 Speed; X Manual; Automatic

Final Drive: X Front Wheel; Rear Wheel; Four Wheel

Tire Size: P175/70R13; Manufacturer: General

Air Conditioner	<u>Yes</u>	Console	<u>No</u>	Brakes	<u>Power</u>
Tinted Glass	<u>Yes</u>	Tachometer	<u>No</u>	Front	<u>Disc</u>
Power Steering	<u>Yes</u>	Cruise Control	<u>No</u>	Rear	<u>Drum</u>
Power Windows	<u>No</u>	Rear Window Def.	<u>Yes</u>	Front Seats	<u>Manual</u>
Power Door Locks	<u>No</u>	Sun/Moon Roof	<u>No</u>	Seat Type	Front <u>Bucket</u>
Radio	<u>Yes</u>	T-Top	<u>No</u>		Rear <u>Bench</u>
Clock	<u>Yes</u>	Tilt Steering Wheel	<u>Yes</u>		
Roof Rack	<u>No</u>	Other Options:	<u> </u>	No. of Seats	<u>Five</u>

TABLE 7 REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING, (Cont'd)

Equipment that is no longer on the vehicle as noted above: Rear tail lights, back seat, bumper face shield, muffler, spare tire and jack, trunk lid, trunk compartment trim, rear brake light.

Explanation:

Items removed to allow installation of data acquisition system and meet target test weight.

Vehicle Condition:

The vehicle was subjected to a 30 mph frontal crash test. There is severe structural damage on the front body. Various interior and exterior portions of the vehicle have been painted and have had holes drilled to facilitate attachment of instrumentation. Various body parts have been removed. Stoddard solvent replaced the fuel in the fuel system and engine. THE VEHICLE IS FOR SALVAGE ONLY AND IS NOT TO BE REPAIRED FOR HIGHWAY USE.

SECTION 3
SUMMARY OF RESULTS FOR FMVSS 208
212, 219 (PARTIAL), AND 301

TABLE 8 FMVSS 208 OCCUPANT INJURY CRITERIA

Veh. Yr./Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Veh. NHTSA No.: CS5208 Test Date: 03/21/95

MAXIMUM ACCELERATION VALUES: (g's)	DRIVER DUMMY #401	PASSENGER DUMMY #403
Head Channel X	-42.4	-45.6
Head Channel Y	19.0	-18.6
Head Channel Z	34.0	34.0
HEAD RESULTANT	50.0	49.8
Chest Channel X	-49.8	-47.1
Chest Channel Y	8.9	-4.2
Chest Channel Z	20.9	21.7
CHEST RESULTANT	53.7	50.6

HEAD INJURY CRITERIA (HIC) VALUES:

HIC	294.4	269.8
$t_1 =$ (msec)	67.4	65.1
$t_2 =$ (msec)	96.6	91.3

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

CHEST INJURY CRITERIA (CLIP) VALUES: (g's)

CLIP	51.7	49.6
$t^1 =$ (msec)	78.8	73.2
$t^2 =$ (msec)	81.9	76.1
CHEST DEFLECTION (in)	1.9	0.4

MAX. COMPRESSIVE FEMUR FORCES: (lbs)

Left Side	1158	1293
Right Side	1024	1385

TABLE 8 FMVSS 208 OCCUPANT INJURY CRITERIA (CONTINUED)

Veh. Yr./Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Veh. NHTSA No.: CS5208 Test Date: 03/21/95

TIBIA FORCES: (LBS)	DRIVER DUMMY # <u>401</u>
Left Lower Tibia Force X	-179.0
Left Lower Tibia Force Z	-640.3
Right Lower Tibia Force X	-198.0
Right Lower Tibia Force Z	-738.5

TIBIA MOMENTS: (IN/LBS)	
Left Lower Tibia Moment Y	-1760
Left Upper Tibia Moment X	254
Left Upper Tibia Moment Y	-1022
Right Lower Tibia Moment Y	-1263
Right Upper Tibia Moment X	309
Right Upper Tibia Moment Y	897

TABLE 9 DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy translated forward on the seat impacting both knees into the instrument panel. The dummy's head and chest impacted the airbag and windshield with the dummy's head rotating rearward. The driver dummy was restrained by the airbag. The dummy rebounded rearward into the seat back with the dummy's head contacting the head restraint. The driver dummy came to rest in the seat.

RIGHT FRONT PASSENGER DUMMY

Upon impact, the right front passenger dummy translated forward on the seat impacting both knees into the dashboard. The dummy's head and chest impacted the airbag with the dummy's head rotating rearward. The right front passenger dummy was restrained by the airbag. The dummy rebounded rearward into the seat back. The right front passenger dummy came to rest in the seat.

TABLE 10 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY
FRONT OUTBOARD DESIGNATED SEATING POSITIONS

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

NHTSA No.: CS5208; Date of Comfort/Convenience Check: 03/15/95

Technician Performing Check: Nicole Walter

GVWR: 3329 lbs

Automatic seat belts installed in any vehicle, other than a walk-in van-type vehicle which has a gross vehicle weight rating of 10,000 pounds or less, and is manufactured on or after September 1, 1986, shall meet the requirements for convenience hooks, webbing tension relieving devices, and belt contact force.

Manual seat belts installed for compliance with this standard in front outboard designated seating positions of any vehicle, other than a walk-in van-type vehicle which has a gross vehicle rating of 10,000 pounds or less, and is manufactured on or after September 1, 1989, shall meet the requirements for belt contact force, plate access, retraction and seat belt guides, and hardware.

VEHICLE EQUIPMENT:

The vehicle's front outboard seating positions were equipped with manual Type 2 seat belts which must comply with the dynamic test requirements of S5.1; requirements for webbing tension-relieving devices (S7.4.2), belt contact force (S7.4.3), latchplate access (S7.4.4), retraction (S7.4.5), and seat belt guides and hardware (S7.4.6) apply.

CONVENIENCE HOOKS (S7.4.1):

Not applicable, the vehicle was not equipped with automatic seat belts.

WEBBING TENSION-RELIEVING DEVICE (S7.4.2)

The seat belt assembly on the front outboard seating positions did not have webbing tension-relieving devices.

TABLE 10 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY
FRONT OUTBOARD DESIGNATED SEATING POSITIONS, (Cont'd)

BELT CONTACT FORCE (S7.4.3)

The belt contact force on the chest of the test dummy was 0.4 pounds.

LATCHPLATE ACCESS (S7.4.4)

The seat belt latchplates, in their normal stowed position, were within the reach envelope.

The clearance test block moved unhindered to the latchplate or buckle.

RETRACTION (S7.4.5):

The seat belt automatically retracted when the seat belt latchplate was released.

The stowed seat belt webbing and hardware were not pinched when the door was closed.

SEAT BELT GUIDES AND HARDWARE (S7.4.6)

The seat cushion was movable, but the seat back did not serve as a function other than seating.

The seat was not removable.

The seat was not movable so that the space formerly occupied by the seat could be used for a secondary function.

Note: If the seat or seat cushion is removable or if the seat is movable so that the space formerly occupied by the seat can be used for a secondary function, the seat belt guides and hardware requirements do not apply.

TABLE 10 FMVSS 208 SEAT BELT COMFORT AND CONVENIENCE TEST SUMMARY
FRONT OUTBOARD DESIGNATED SEATING POSITIONS. (Cont'd)

SEAT BELT GUIDES AND HARDWARE (S7.4.6)(Cont'd)

The webbing was not designed to pass through the seat cushion or between the cushion and seat back.

The remaining two parts (the seat belt latchplate and the buckle) were accessible under normal conditions.

The latchplate and buckle did not pass through the guides provided and fall behind the seat when the belt was completely retracted (or detached if not retractable) and the seat was moved to any position.

TABLE 11 FMVSS 208 EQUIPMENT DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Date of Check: 03/15/95

Technician Performing Check: Nicole Walter

GVWR: 3329 lbs

FMVSS 208 SEAT BELT WARNING SYSTEM DATA

With an occupant in the driver's position and the lap belt/unibelt in stowed position and the ignition switch placed in the "start/on" position, the duration of audible warning signal was 5.0 seconds and the reminder light stayed on.

With an occupant in the driver's position and the lap belt/unibelt in use and the ignition switch placed in the "start/on" position, the duration of audible warning signal and the reminder light operation were 0 second.

Note: The audible warning should not operate.

The wording of the visual seat belt warning was the symbol from Table 2 of FMVSS 101.

FMVSS 208 LABELING AND DRIVER'S MANUAL DATA

The labels which describe manufacturer's maintenance or replacement schedule for the crash-deployed occupant protection system were located on the driver and passenger sunvisors.

The airbag system is required to be inspected ten (10) years after the date of manufacture shown on the certification label.

Appropriate instructions concerning maintenance and/or replacement of this system were provided in the owner's manual on page 2-19.

A description of the functional operation of the system was provided in the owner's manual on page 2-16

A reference to the instructions and description of the system was included on the label.

TABLE 11 FMVSS 208 EQUIPMENT DATA, (Cont'd)

FMVSS 208 LABELING AND DRIVER'S MANUAL DATA (Cont'd)

An owner's manual was provided.

The owner's manual contained appropriate information concerning maintenance and/or replacement and a description of the functional operation of the systems on pages 2-14 through 2-19.

FMVSS 208 READINESS INDICATOR DATA

The vehicle contained a crash-deployed occupant protection system which was not totally mechanical. The readiness indicator was located on the left area of the instrument cluster.

The readiness indicator was clearly visible to the driver.

A list of the elements in the occupant restraint system, being monitored by the readiness indicator, was provided in the owner's manual on page 2-18.

FMVSS 208 REAR OUTBOARD SEATING POSITION SEAT BELTS

All rear outboard seating positions had Type 2 seat belts.

TABLE 12 FMVSS 212, "WINDSHIELD MOUNTING", DATA SUMMARY

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Test Date: 03/21/95

DETAILS OF WINDSHIELD MOUNTING SUCH AS RETENTION METHOD, TRIM TYPE, ETC.:

Rubber trim with glue retention

CLIPS OR BRACKETS USED TO RETAIN WINDSHIELD: None

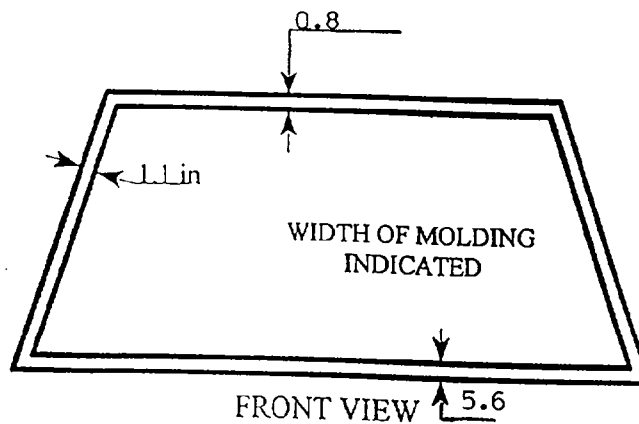
FMVSS 212 REQUIREMENTS:

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 (inches)		PERCENT RETENTION
	PRE-TEST	POST-TEST	
RIGHT SIDE	78.2	78.2	100%
LEFT SIDE	77.6	77.6	100%
TOTAL	155.8	155.8	100%

Pre-Test Windshield Mounting Material Temperature: 70 ° F



FAILURE DETAILS: None

TABLE 13 FMVSS 219, "WINDSHIELD ZONE INTRUSION", DATA SUMMARY

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Test Date: 03/21/95

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.

WINDSHIELD MEASUREMENTS:

A= 42.2 in

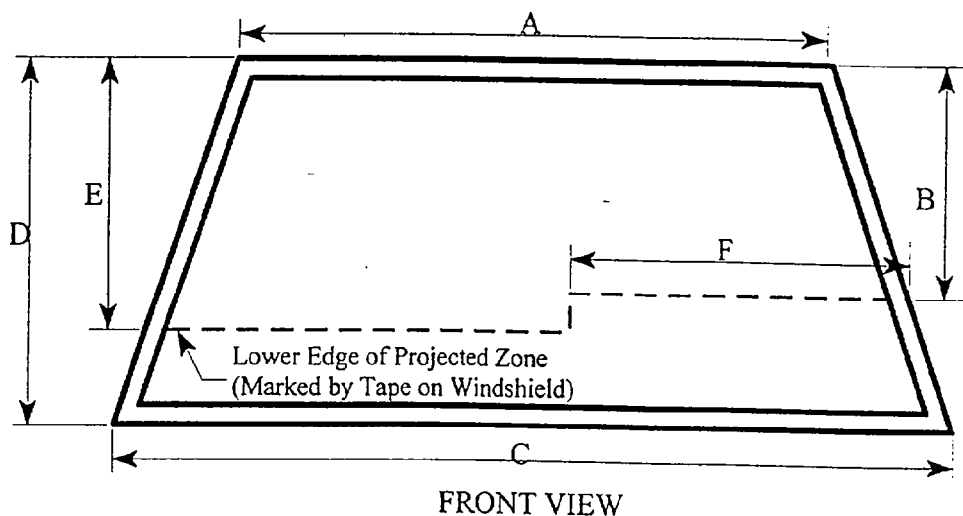
B= 19.0 in

C= 54.1 in

D= 30.9 in

E= 19.8 in

F= 23.9 in



AREAS OF WINDSHIELD TEMPLATE PENETRATION GREATER THAN 1/4 IN:

None

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE, THROUGH THE INNER SURFACE OF THE WINDSHIELD:

None

TABLE 14 FUEL SYSTEM DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Test Date: 03/21/95

Fuel System Capacity from Owner's Manual = 13.2 gallons

Usable Capacity Figure Furnished by COTR = 13.2 gallons

Test Volume Range (92 to 94% of Usable Capacity)

= 12.1 to 12.4 gallons

Actual Test Volume = 12.3 gallons

Test Fluid Type: Stoddard Solvent; Spec. Grav. = 0.77

Kinematic Viscosity = 1.788 centistokes; Color = Purple

Type of Fuel Pump: X Electric; Mechanical

Does electric pump operate with ignition switch "On" and engine "Off"?

X Yes; No

Details of Fuel System:

Vehicle contained an EFI fuel system.

TABLE 15 FMVSS 301 POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Test Date: 03/21/95

TEST REQUIREMENTS:

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

TEST VEHICLE IMPACT TYPE:

- ☒ Frontal (30 mph)
☐ Oblique (30 mph) with ___° barrier face first
contacting (driver/passenger) side
☐ Rear Moving Barrier (30 mph)
☐ Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT:

POST IMPACT TEST	TEST RESULTS	MAXIMUM ALLOWABLE
1. From impact until vehicle motion ceases	0 oz	1 oz
2. For 5 minute period after vehicle motion ceases	0 oz	5 oz
3. For next 25 minutes	0 oz	1 oz./1 min

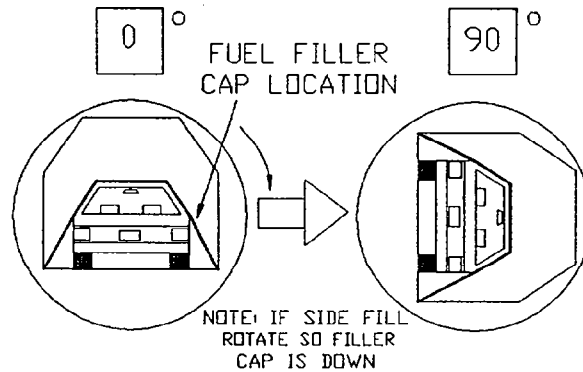
FUEL SPILLAGE LOCATION(S): None

TABLE 16 FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Test Date: 03/21/95

TEST PHASE: 0° - 90°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 42 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 42 seconds

Next Whole Minute Interval = 8 minutes

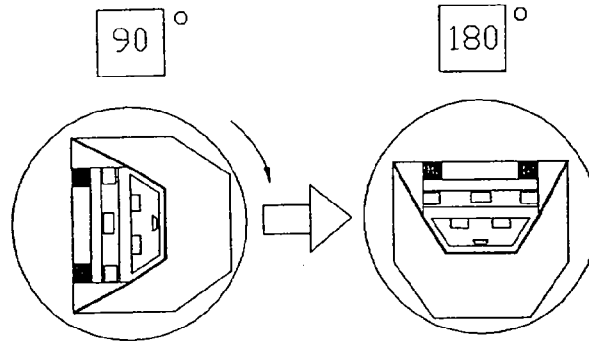
FUEL SPILLAGE MEASUREMENT:

0° TO 90° ROTATION (FILLER CAP DOWN)	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	N/A	1 oz

FUEL SPILLAGE LOCATIONS(S): None

TABLE 16 FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

TEST PHASE: 90° - 180°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 27 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 27 seconds

Next Whole Minute Interval = 8 minutes

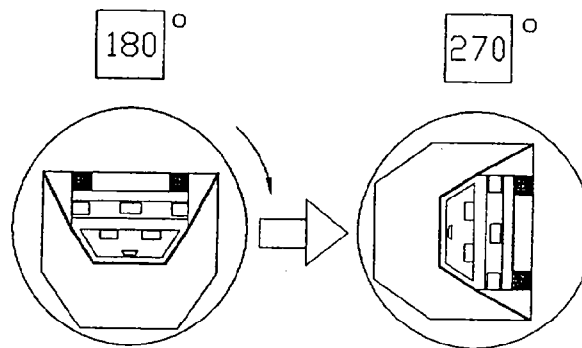
FUEL SPILLAGE MEASUREMENT:

90° TO 180° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	N/A	1 oz

FUEL SPILLAGE LOCATIONS(S): None

TABLE 16 FMVSS 301 STATIC ROLLOVER TEST DATA (Cont'd)

TEST PHASE: 180° - 270°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 22 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 22 seconds

Next Whole Minute Interval = 8 minutes

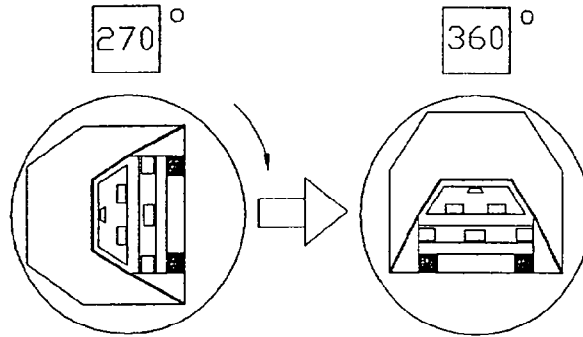
FUEL SPILLAGE MEASUREMENT:

180° TO 270° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	N/A	1 oz

FUEL SPILLAGE LOCATIONS(S): None

TABLE 16 FMVSS 301 STATIC ROLLOVER TEST DATA

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

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

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 43 seconds

Next Whole Minute Interval = 8 minutes

FUEL SPILLAGE MEASUREMENT:

270° TO 360° ROTATION	TEST RESULTS	MAXIMUM ALLOWABLE
1. First 5 Minutes From Onset of Rotation	0 oz	5 oz
2. Sixth Minute From Onset of Rotation	0 oz	1 oz
3. Seventh Minute From Onset of Rotation	0 oz	1 oz
4. Eighth Minute if Required	N/A	1 oz

FUEL SPILLAGE LOCATIONS(S): None

SECTION 4
OCCUPANT, VEHICLE, AND CAMERA INFORMATION

TABLE 17 SEAT AND STEERING COLUMN POSITIONING DATA

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

Vehicle NHTSA No.: CS5208 Test Date: 03/21/95

NOMINAL DESIGN RIDING POSITION:

Driver Seat: Seat Back Angle = *

* The seat back angle was adjustable and was positioned at the 7th notch in accordance with the seat back set procedure in the manufacturer's information.

Passenger Seat: Same as driver's seat.

SEAT FORE AND AFT POSITIONS:

Driver Seat: The seat track had 20 detents and was positioned at the 11 notch rearward from the foremost position which was counted as the first notch.

Passenger Seat: Same as driver's seat.

STEERING COLUMN ADJUSTMENTS:

The steering column was positioned at the mid-point of its swing. The angle of the steering column was 25.4°.

FIGURE 1 DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS

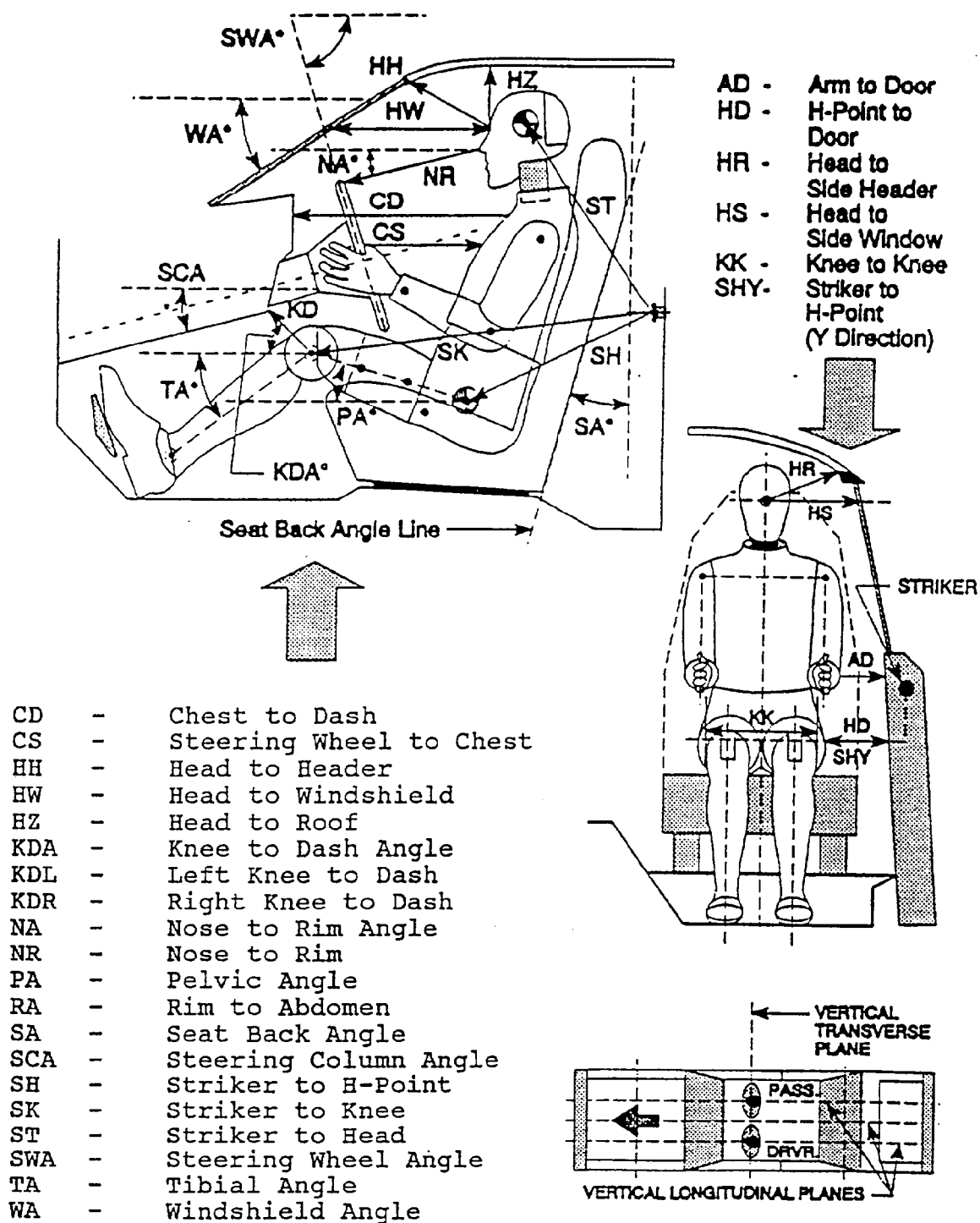


TABLE 18 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

Vehicle Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

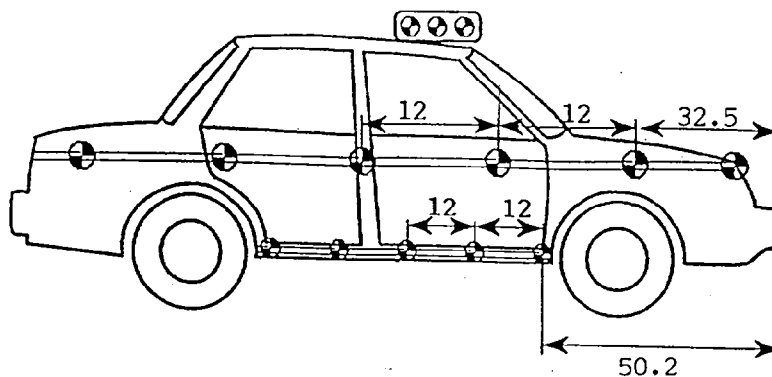
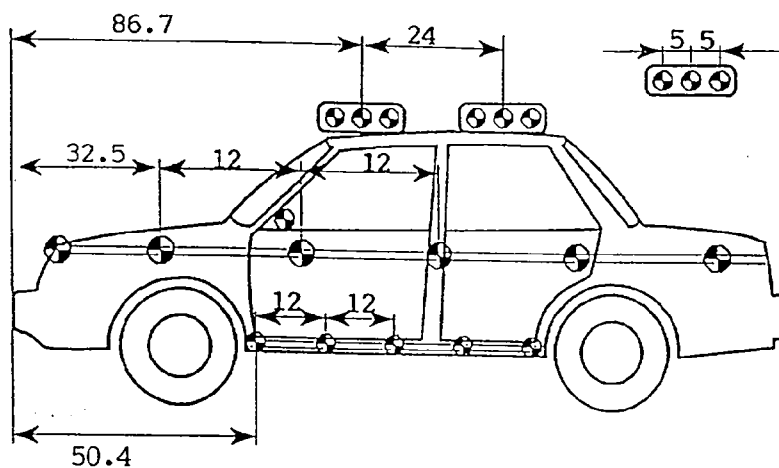
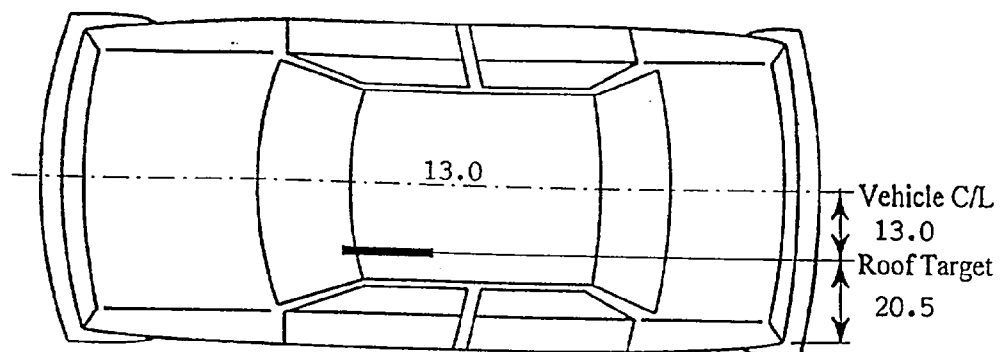
Vehicle NHTSA No.: CS5208 Test Date: 03/21/95

	DRIVER (Serial #401)	PASSENGER (Serial #403)
WA°	29.1°	N/A
SWA°	24.0°	N/A
SCA°	25.4°	N/A
SA°	7th notch	7th notch
HZ	6.4 in	6.3 in
HH	12.9 in	12.1 in
HW	21.7 in	21.5 in
HR	8.5 in	8.7 in
NR	16.5 in Angle (NA) 16.7°	N/A
CD	21.2 in	20.2 in
CS	13.5 in	N/A
RA	7.2 in	N/A
KDL	6.1 in Angle (KDA) 22.6°	5.2 in
KDR	6.4 in	5.7 in Angle (KDA) 18.4°
PA°	22.4°	24.0°
TA°	40.6°	44.1°
KK	12.5 in	10.1 in
ST*	20.7 in Angle 82.4°	21.0 in Angle 76.9°
SK*	22.5 in Angle 0.4°	23.3 in Angle 0.7°
SH*	9.3 in Angle -30.8°	9.8 in Angle -29.5°
SHY	9.4 in	9.6 in
HS	9.9 in	12.5 in
HD	4.6 in	4.9 in
AD	3.7 in	4.0 in

N/A = Not Applicable

* Angles measured from horizontal

FIGURE 2 VEHICLE TARGET LOCATIONS



(Dimensions in Inches)

FIGURE 3 CAMERA POSITIONS

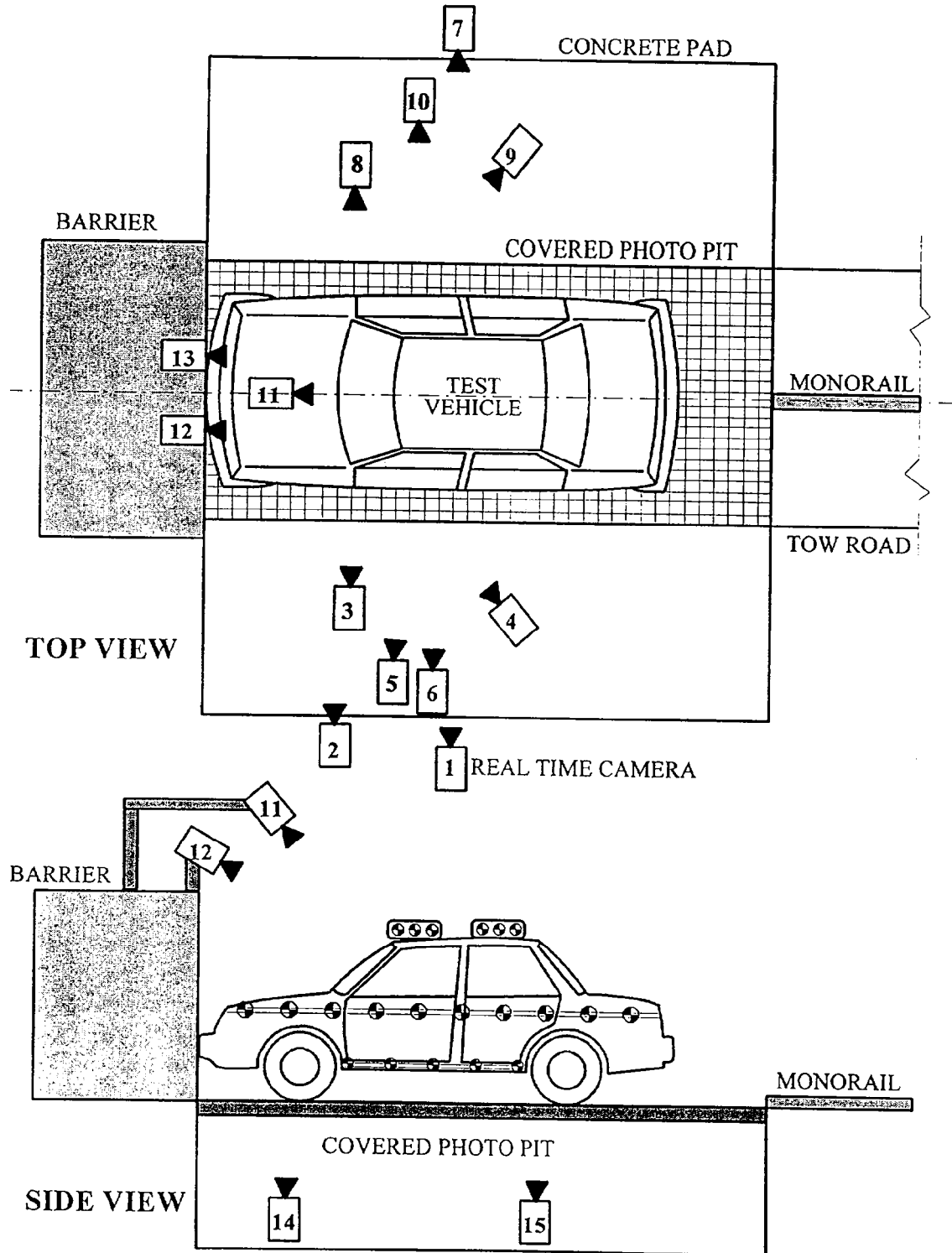


TABLE 19 CAMERA LOCATIONS

Veh. Year/Make/Model/Body Style: 1995/Nissan/Sentra/4 Door Sedan

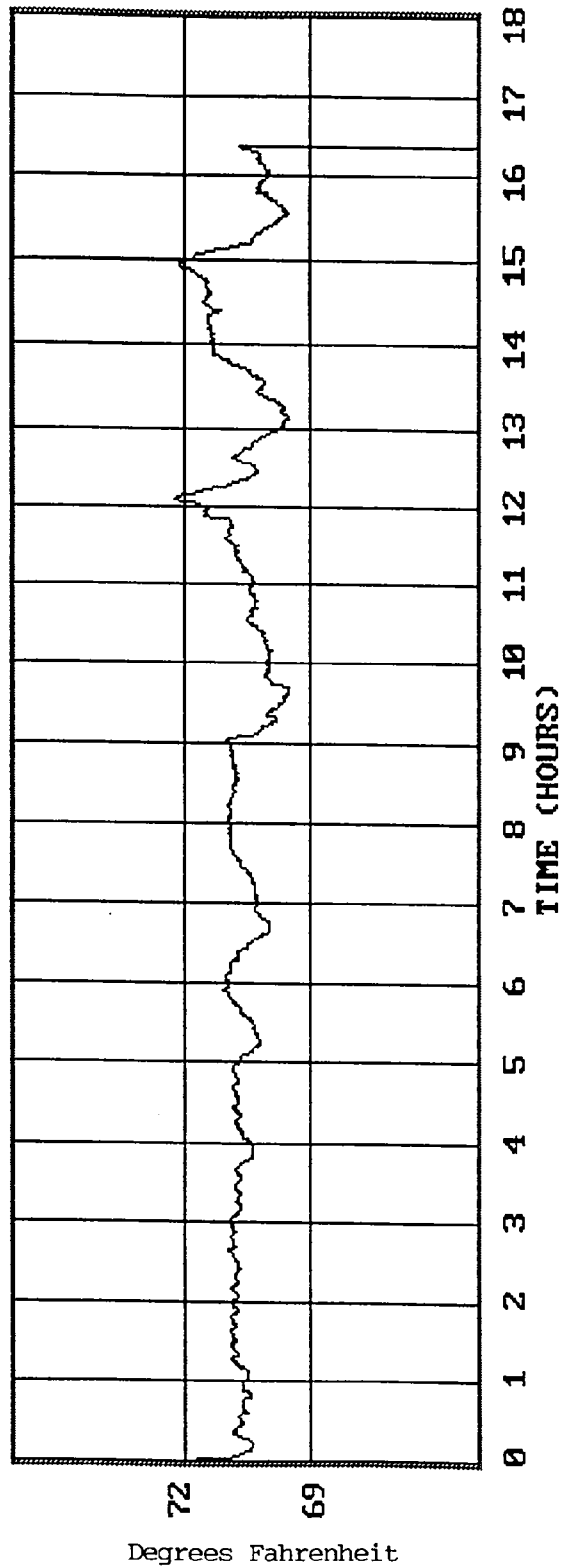
Vehicle NHTSA No.: CS5208 ; Test Date: 03/21/95

	VIEW	CAMERA POSITIONS (inches)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View						10	24
2	Left Front	40.2	287.0	42.9	90°	271.5	25	1010
3	Driver Close-up	57.9	311.0	41.9	90°	295.5	50	1053
4	Driver Angle Motion	164.2	179.9	77.4	50°		35	870
5	Steering Column Top	74.0	290.6	61.4	90°	275.0	25	1010
6	Steering Column Bottom	73.2	290.6	40.4	90°	275.0	25	1010
7	Right Overall	87.0	-293.3	39.8	90°	-308.9	13	1081
8	Right Close-up	52.4	-287.4	35.4	90°	-303.0	50	1010
9	Right Angle	170.5	-200.0	80.1	50°		35	939
10	Right Passenger	43.3	-281.1	40.6	90°	-296.7	25	1200
11	Top Overall	92.5	0	197.8			8	1117
12	Top Driver	-5.7	12.6	95.9			13	800
13	Top Passenger	-7.0	-15.2	91.7			13	1020
14	Pit Front	52.4	0	122.6			13	1000
15	Pit Rear View	94.5	0	122.6			13	1220

- *
 + X = Film plane rearward of barrier
 + Y = Film plane to left of monorail centerline
 + Z = Film plane to above ground level

AIR PROBE TEMPERATURE
TEST DATE: MARCH 21, 1995
FMVSS 208
1995 NISSAN SENTRA
NHTSA NO.: CS5208

FIGURE 4 TEST DUMMY TEMPERATURE



APPENDIX A
PHOTOGRAPHS

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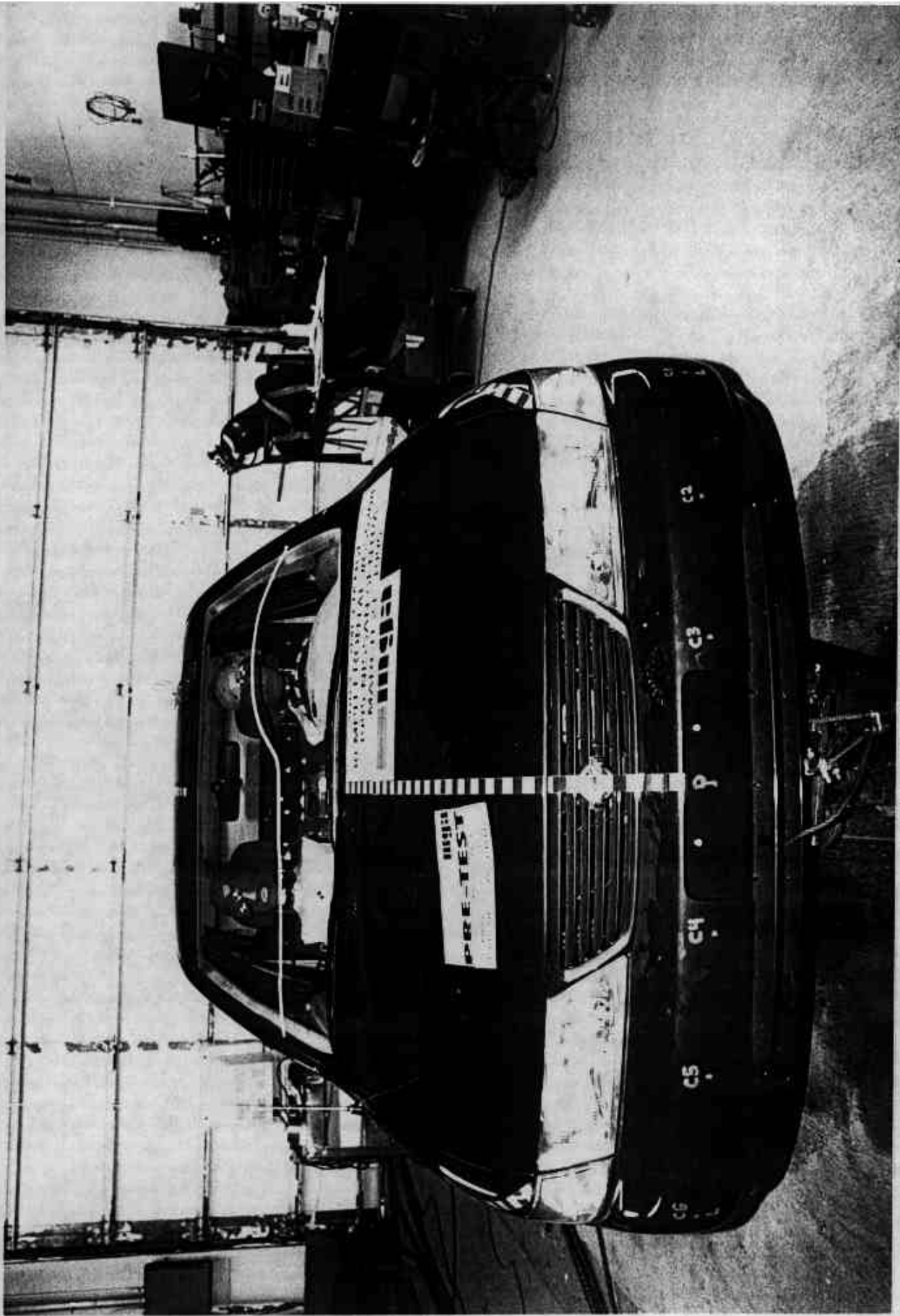


Photo No. A-1 - Pre-Test Front View

A-1

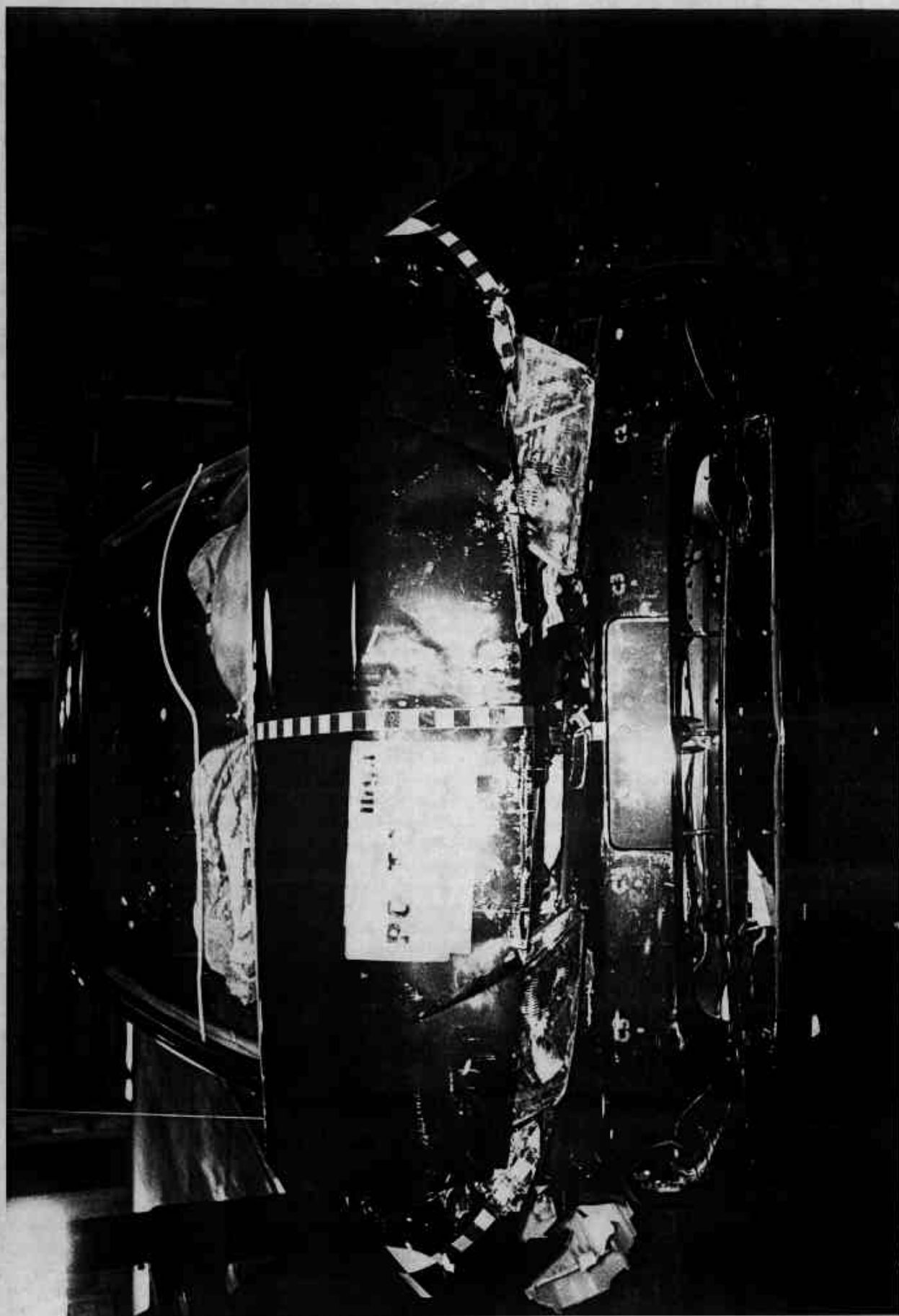


Photo No. A-2 - Post-Test Front View

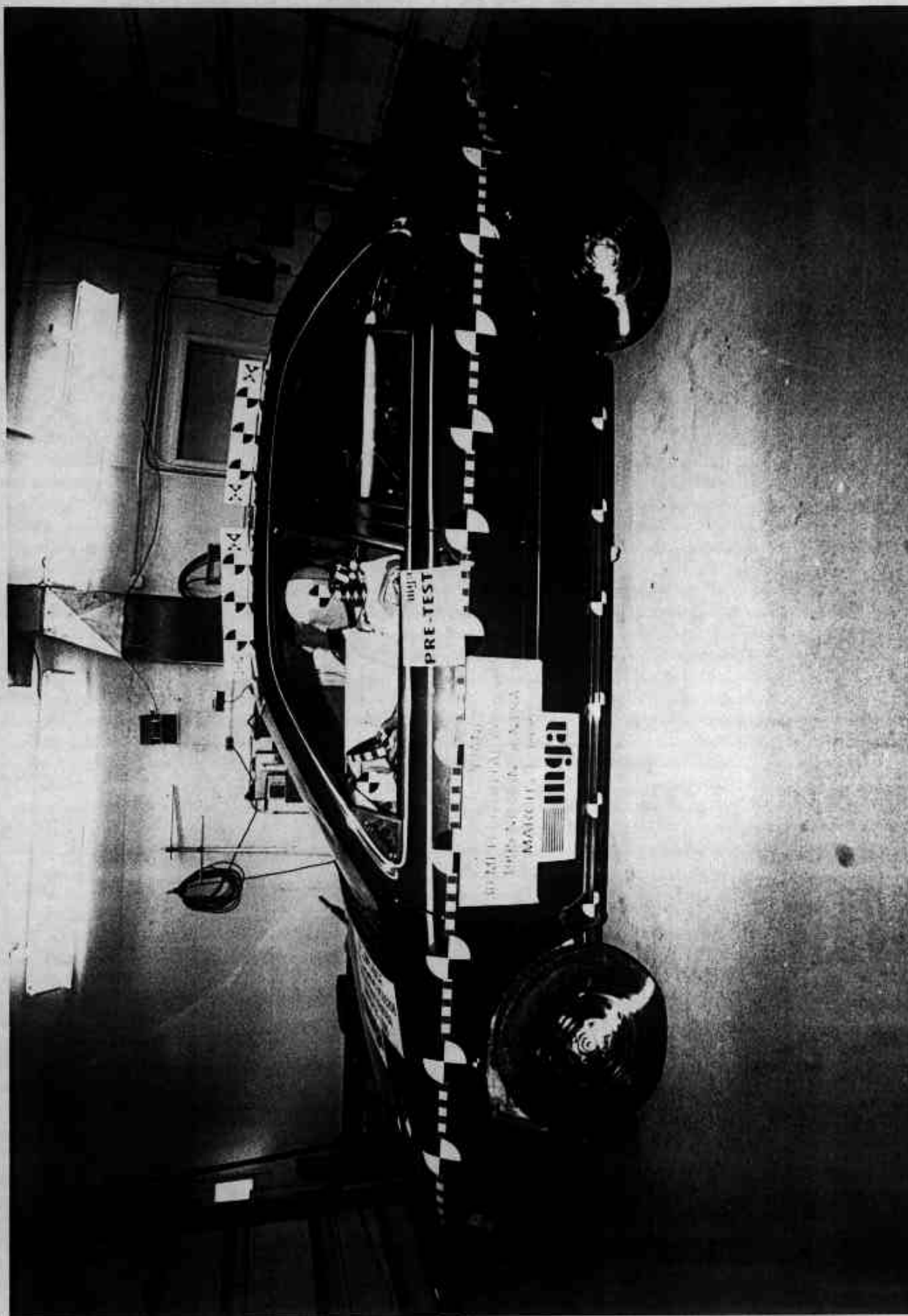


Photo No. A-3 - Pre-Test Left Side View

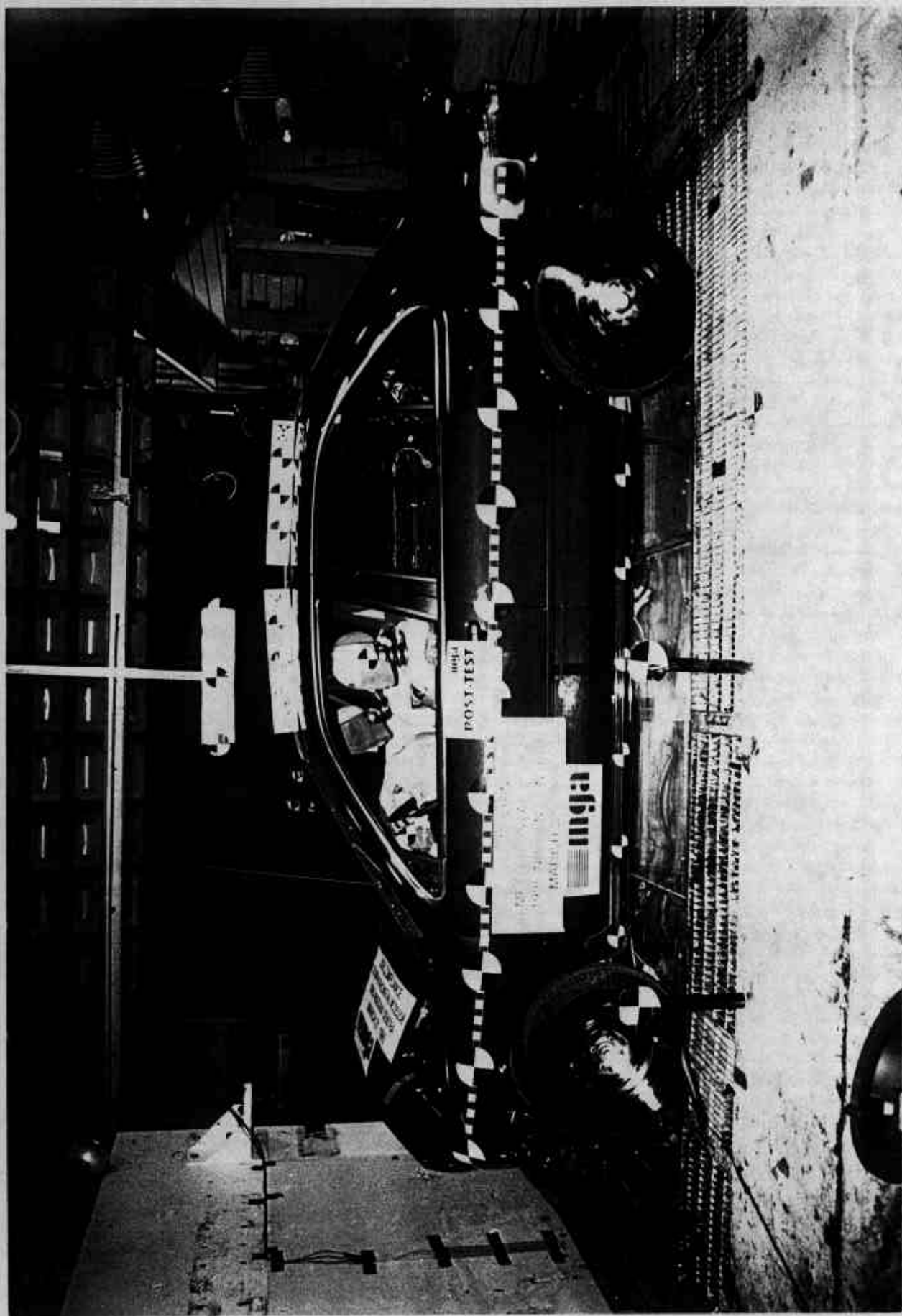


Photo No. A-4 - Post-Test Left Side View

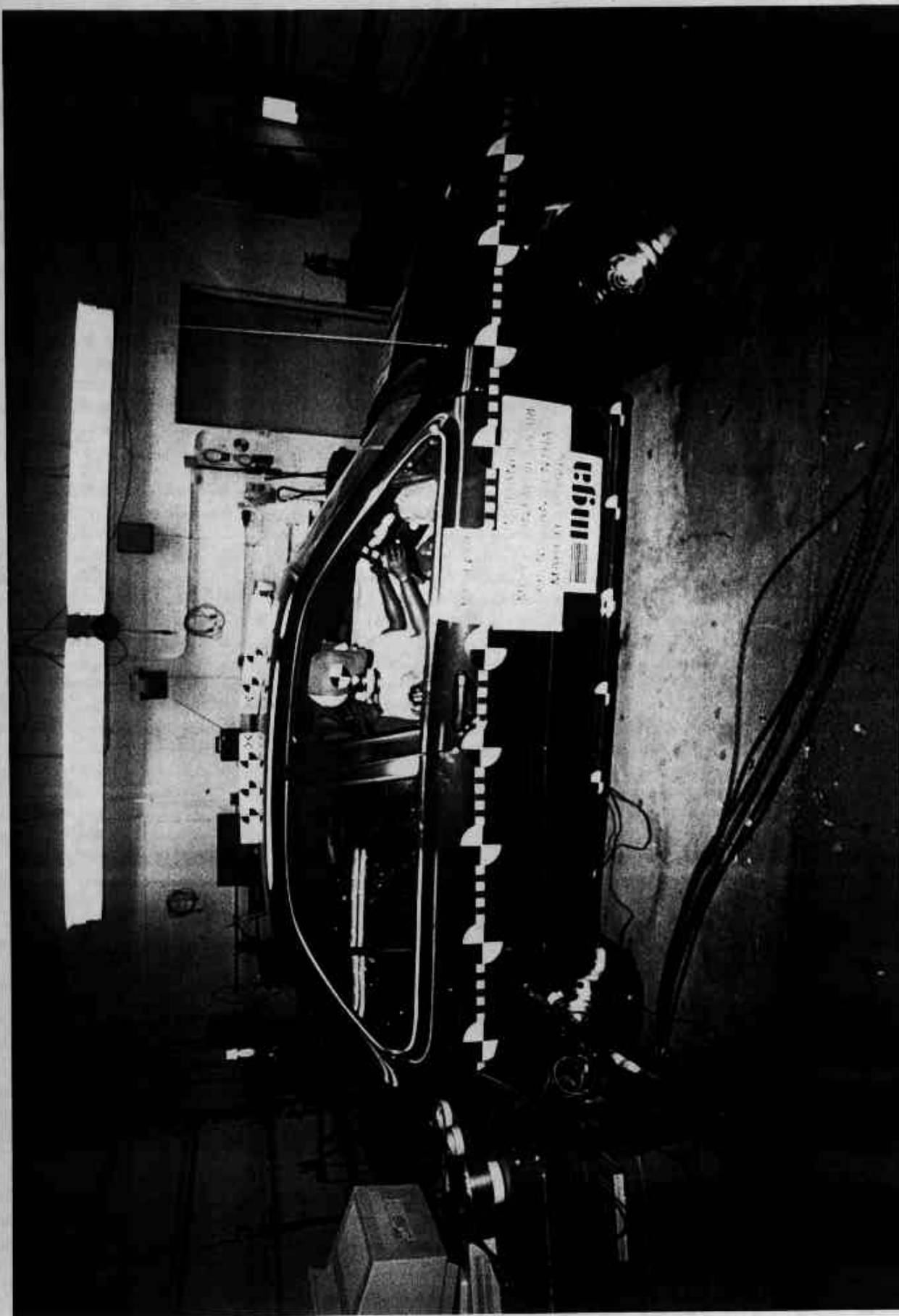


Photo No. A-5 - Pre-Test Right Side View

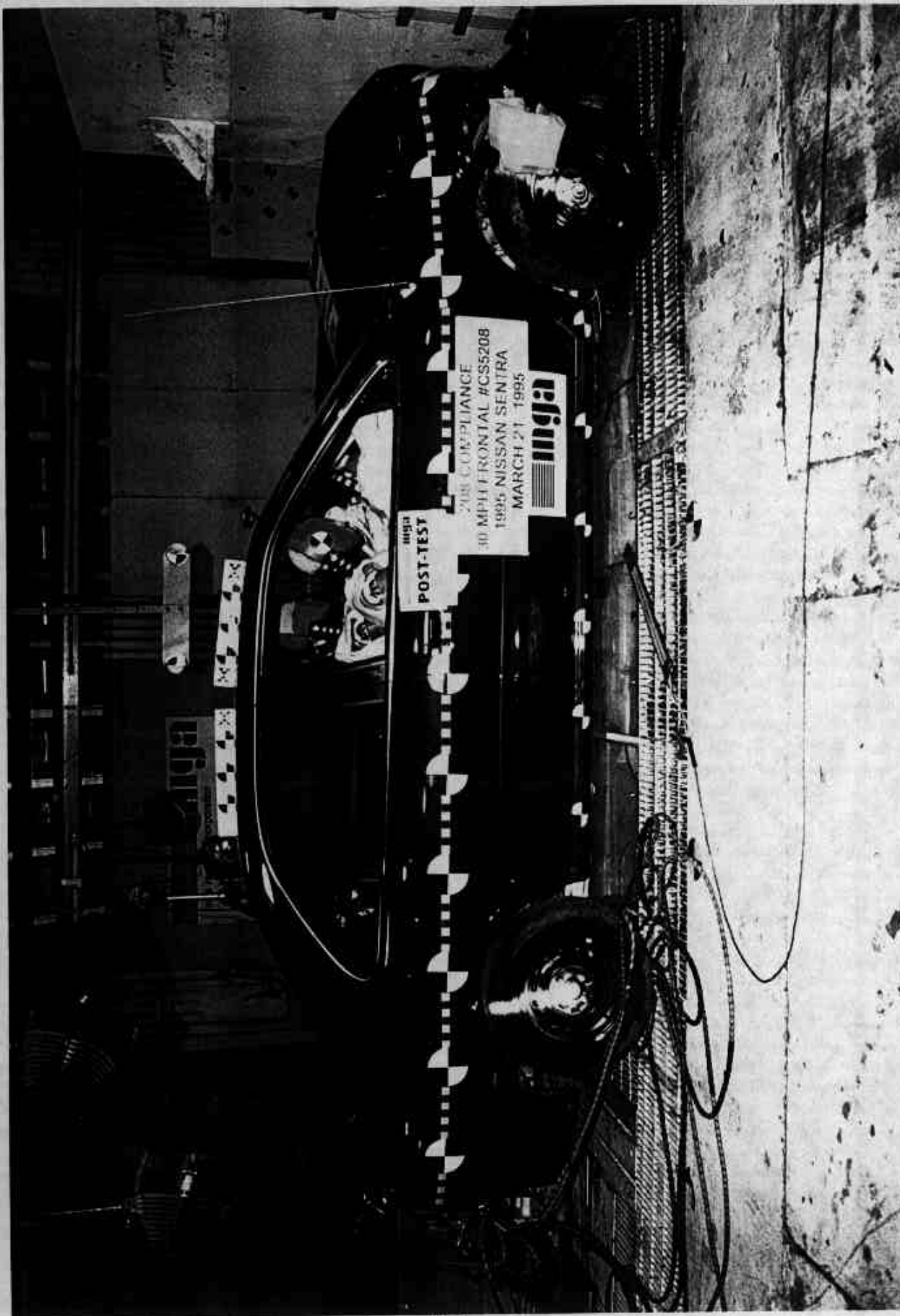


Photo No. A-6 - Post-Test Right Side View

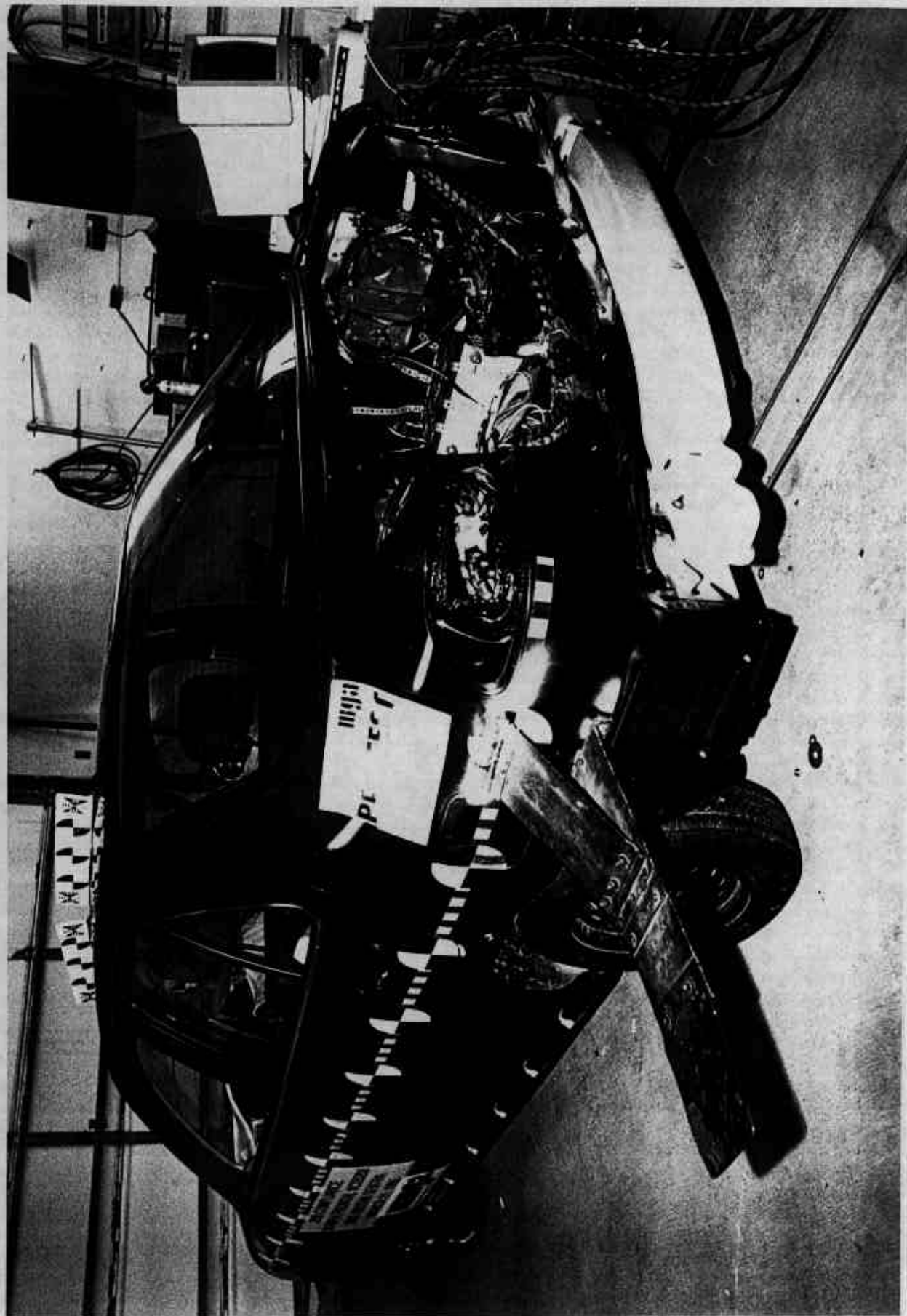


Photo No. A-7 - Pre-Test 3/4 Left Rear View

A-7

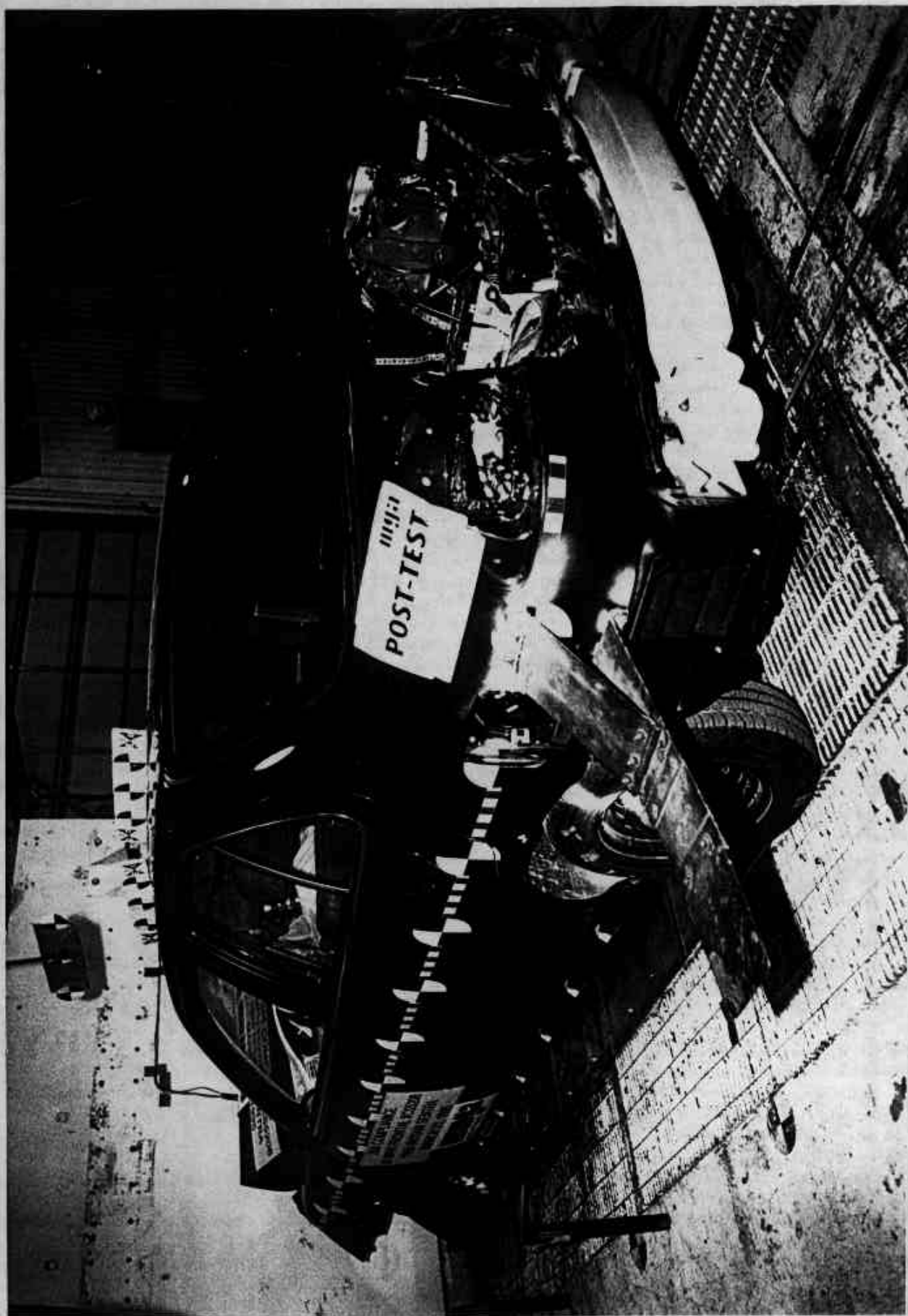


Photo No. A-8 - Post-Test 3/4 Left Rear View



Photo No. A-9 - Pre-Test 3/4 Right Front View



Photo No. A-10 - Post-Test 3/4 Right Front View

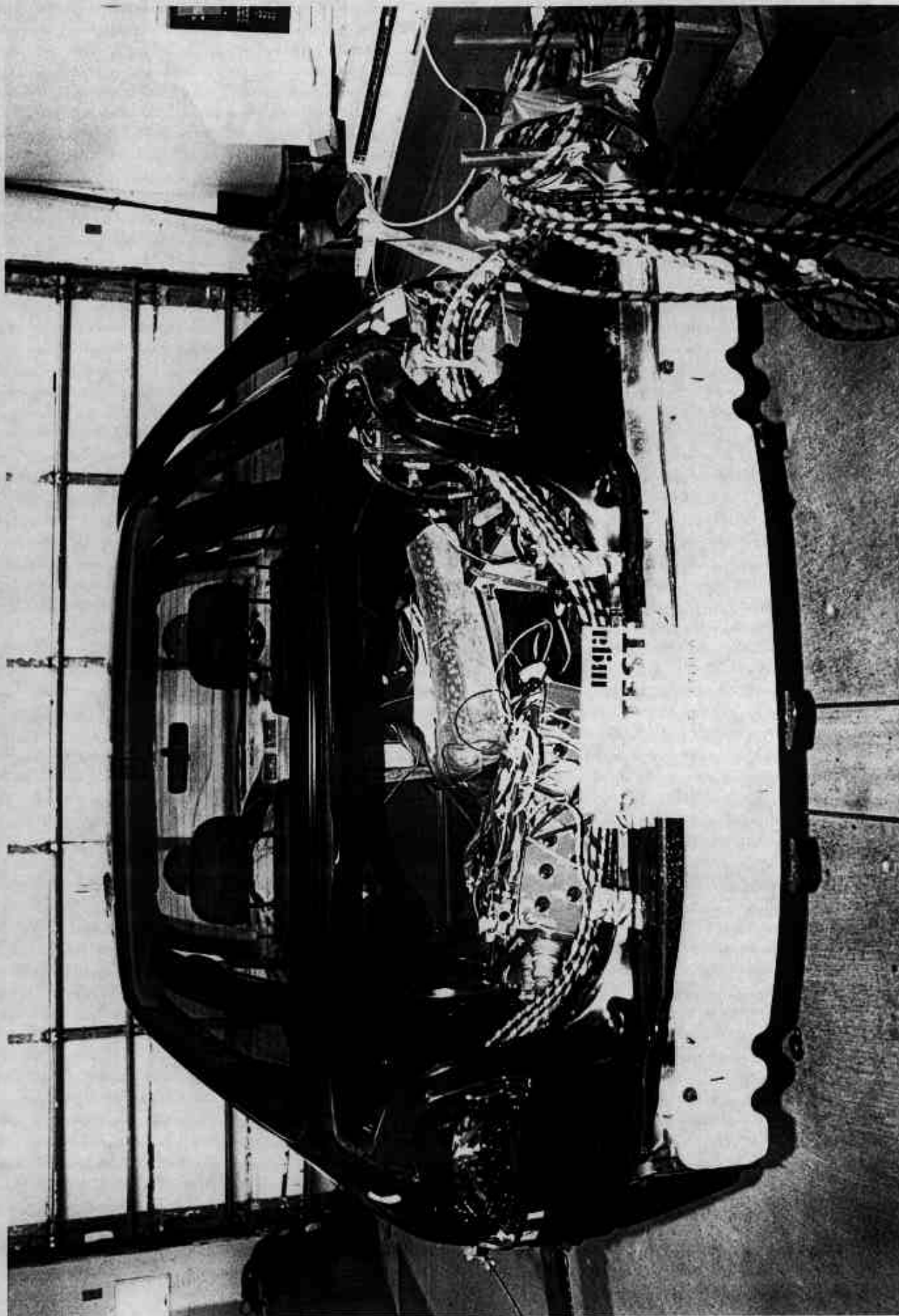


Photo No. A-11 - Pre-Test Rear View

A-11

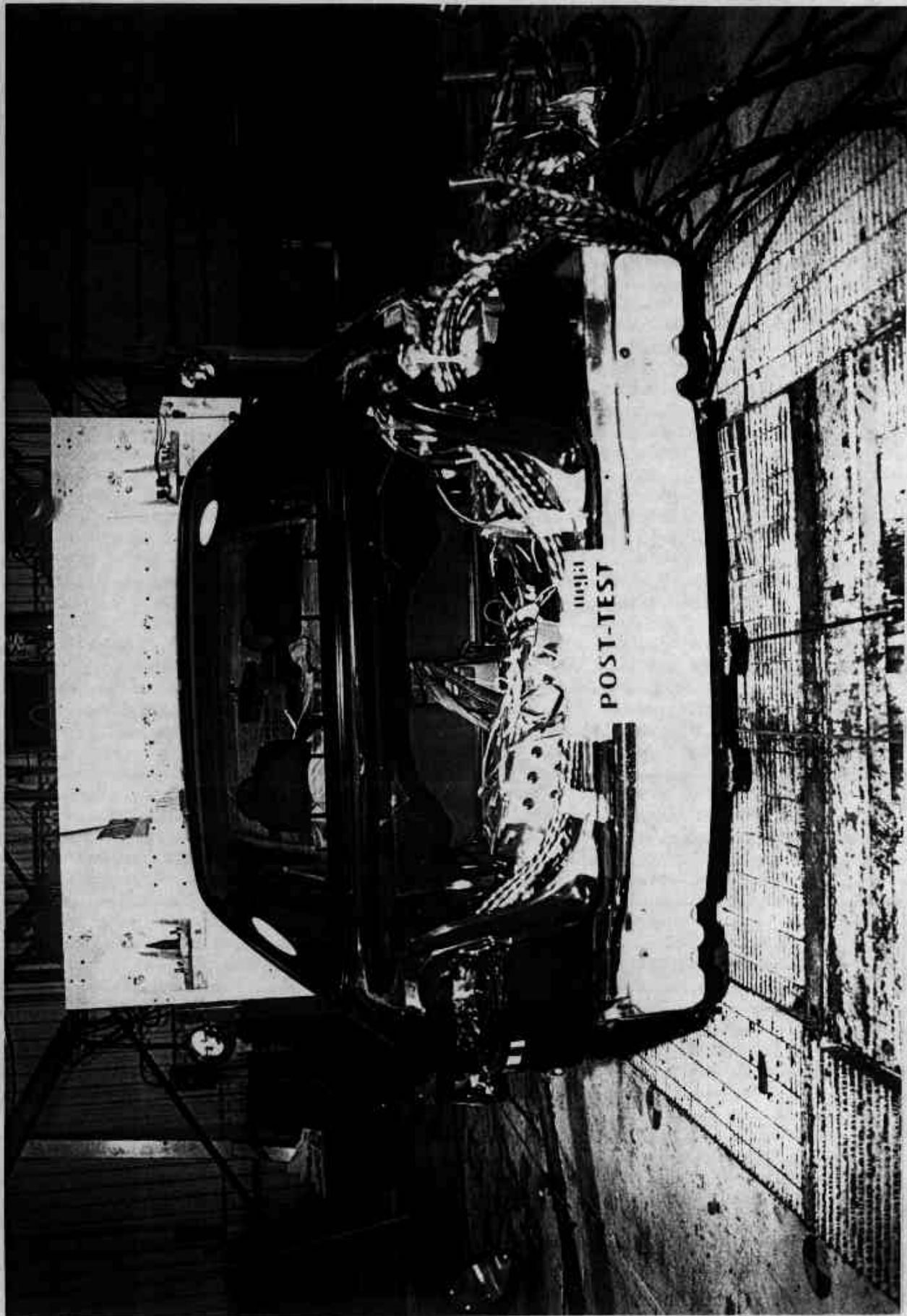


Photo No. A-12 - Post-Test Rear View

A-12

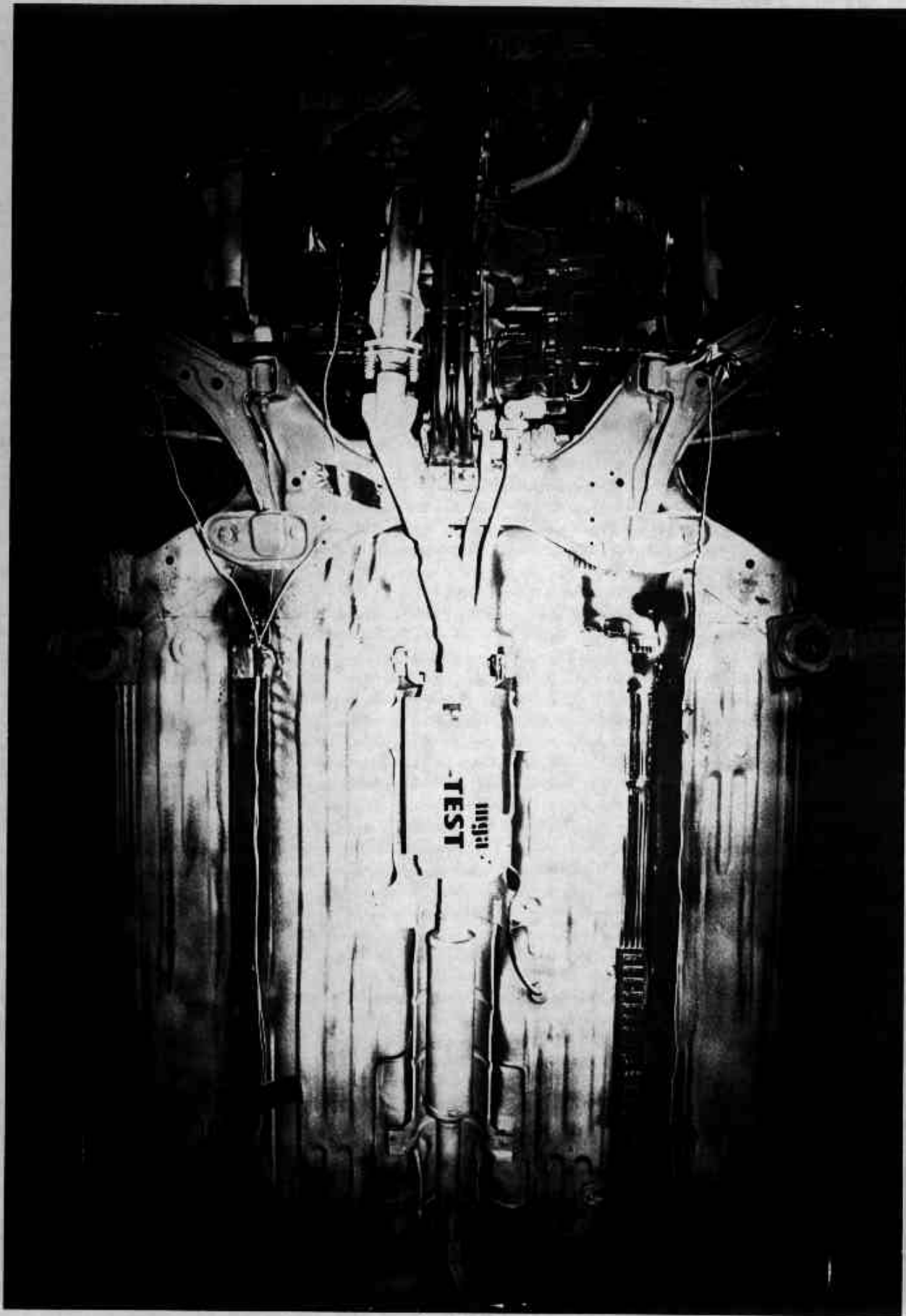


Photo No. A-13- Pre-Test Front Underbody View

A-13

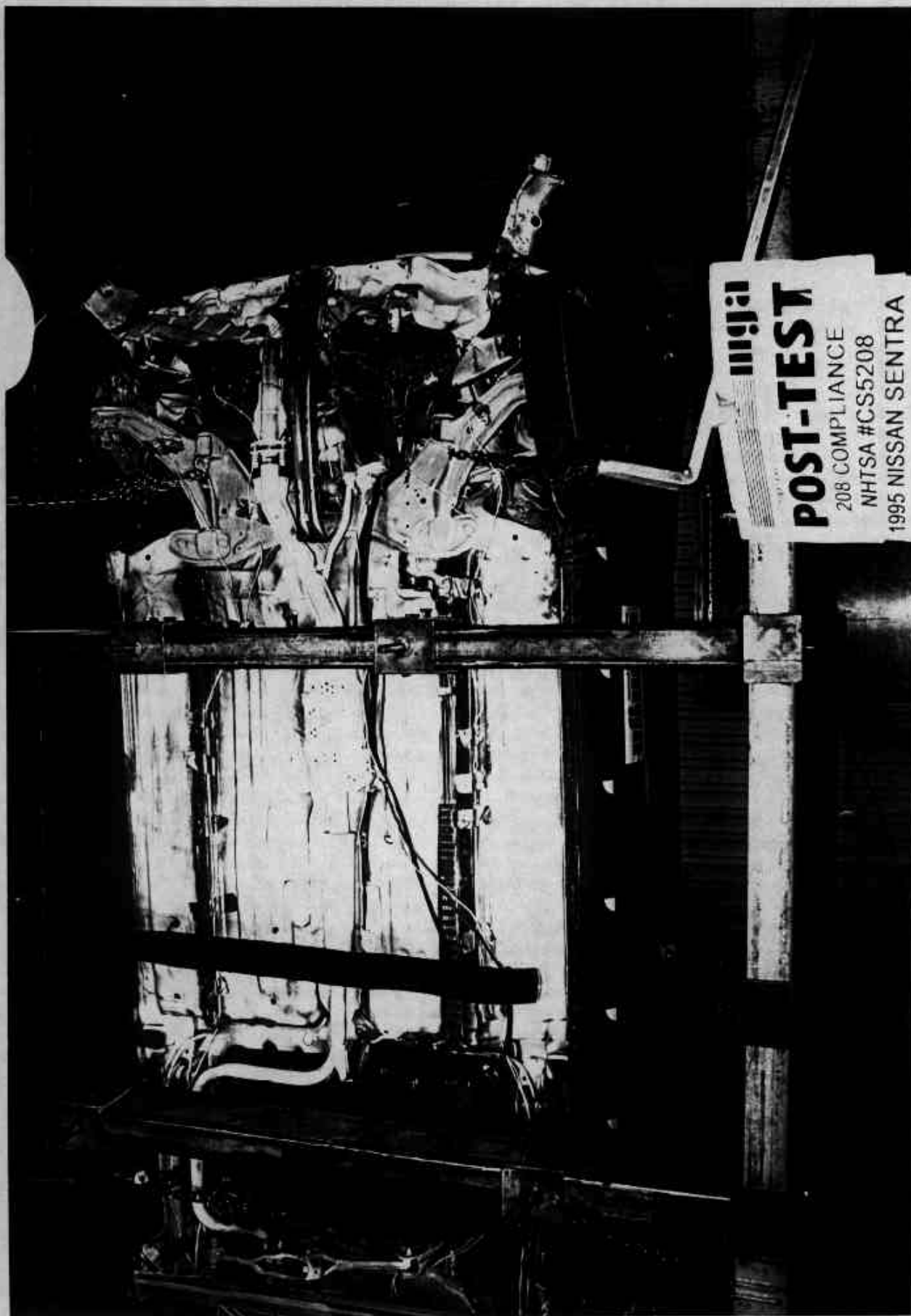


Photo No. A-14 - Post-Test Front Underbody View

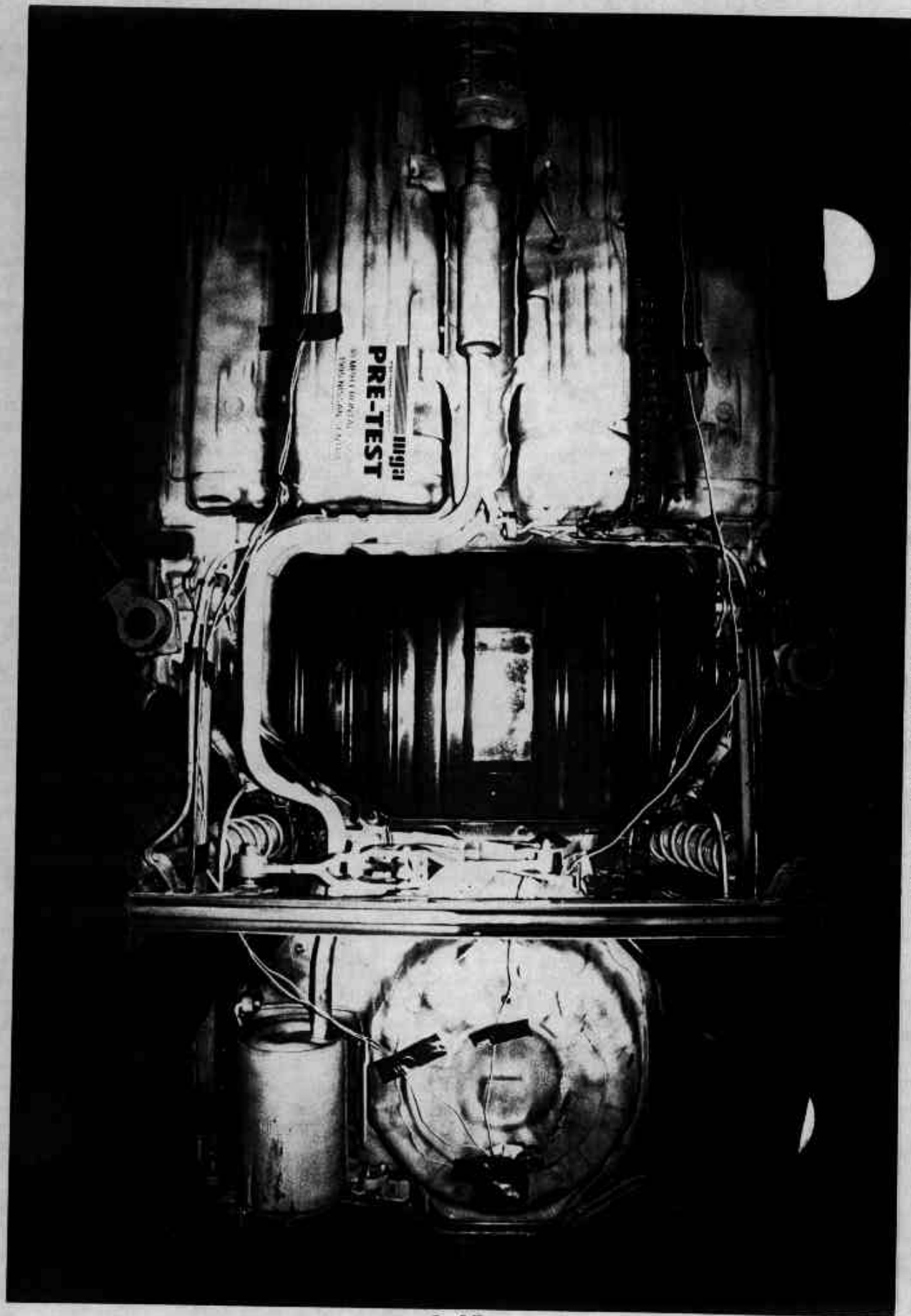


Photo No. A-15 - Pre-Test Rear Underbody View

A-15

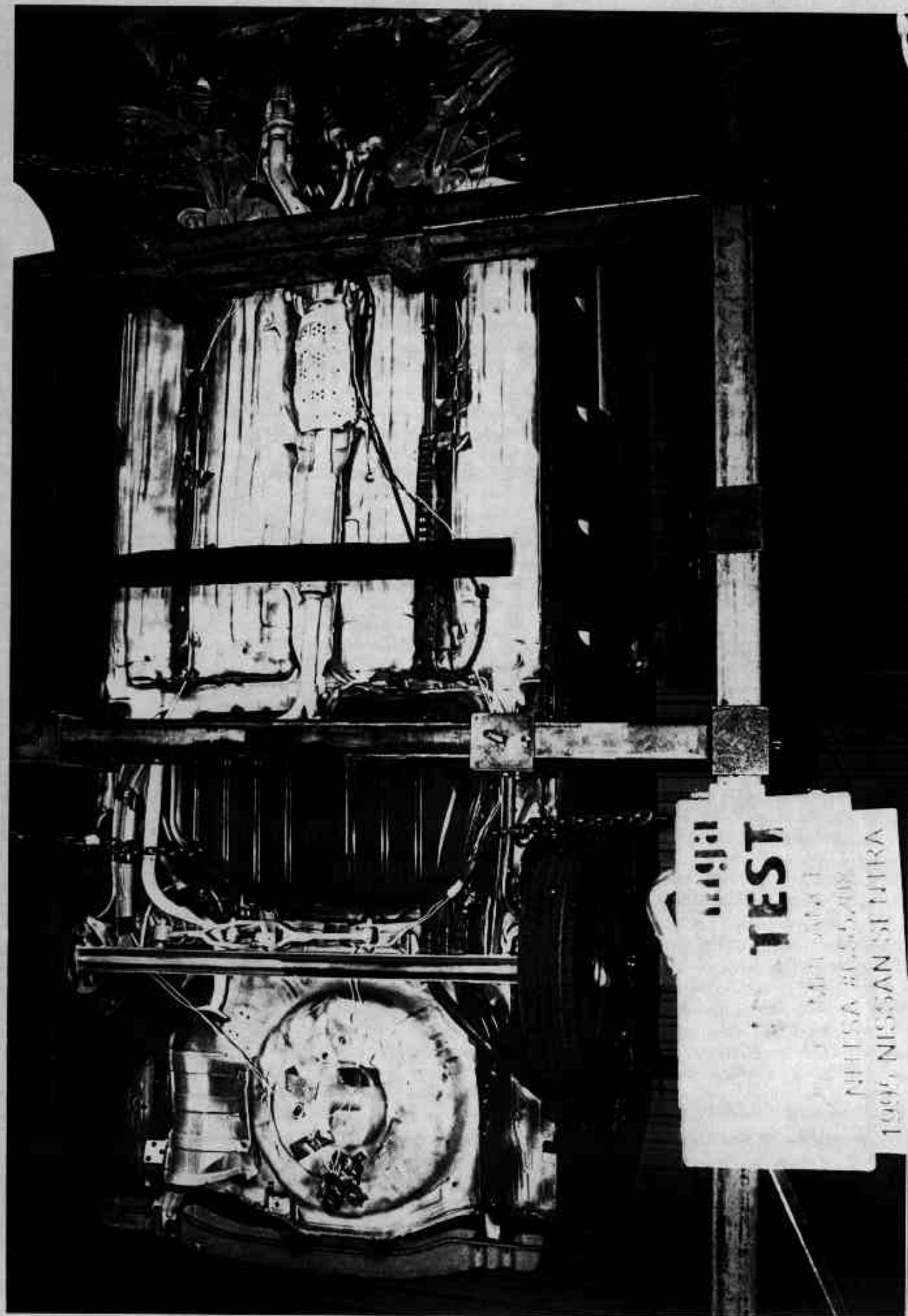
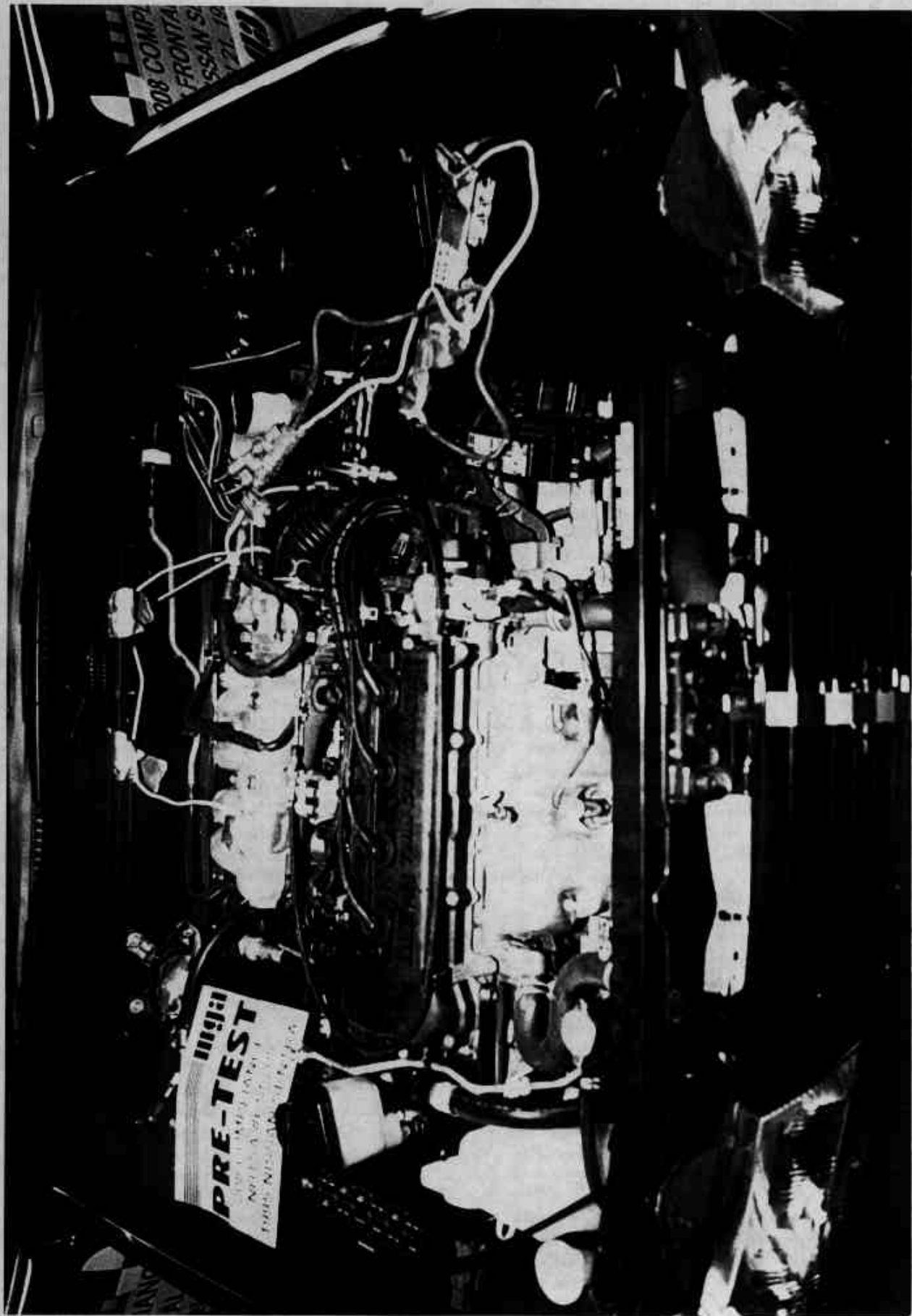
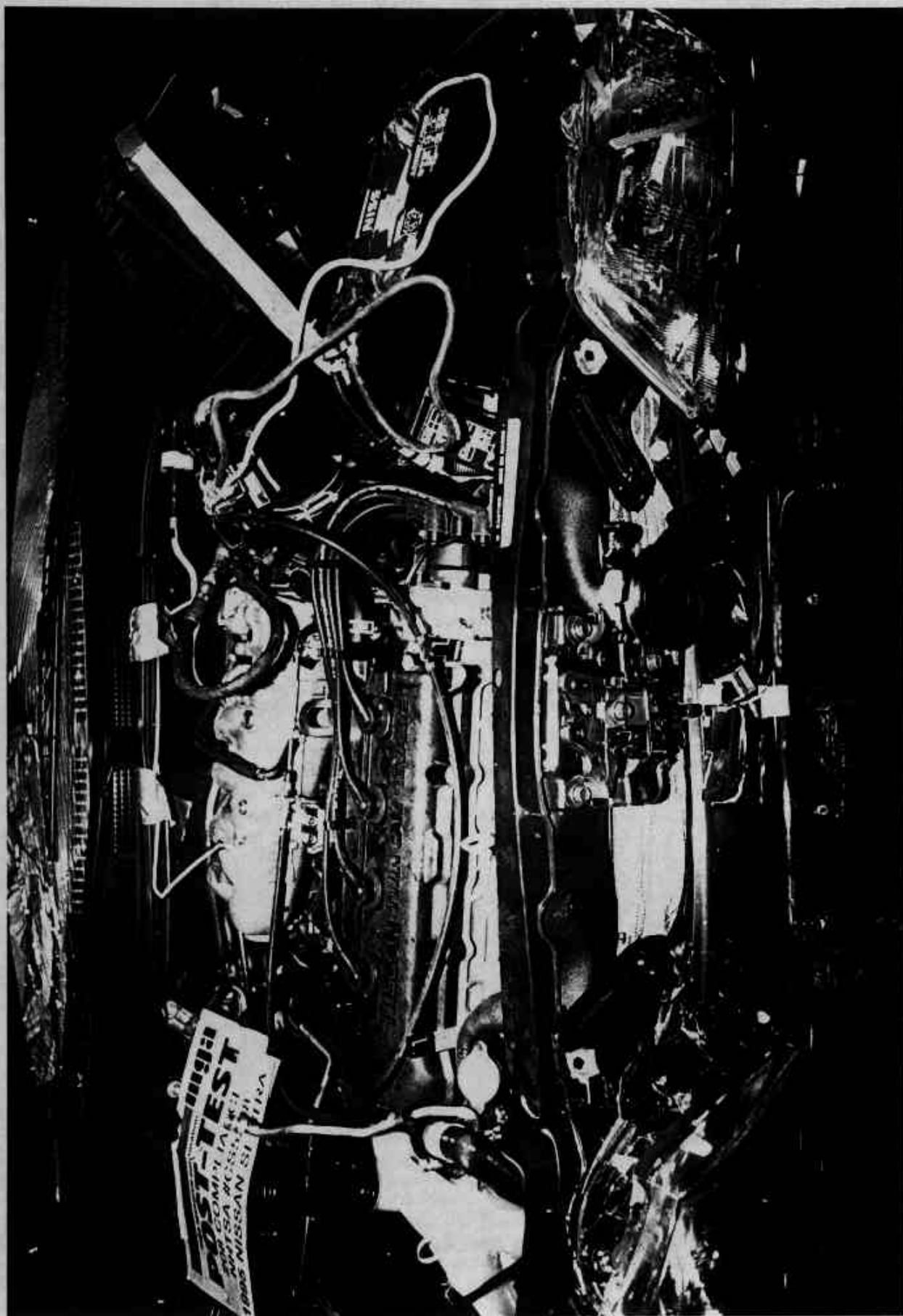


Photo No. A-16 - Post-Test Rear Underbody View



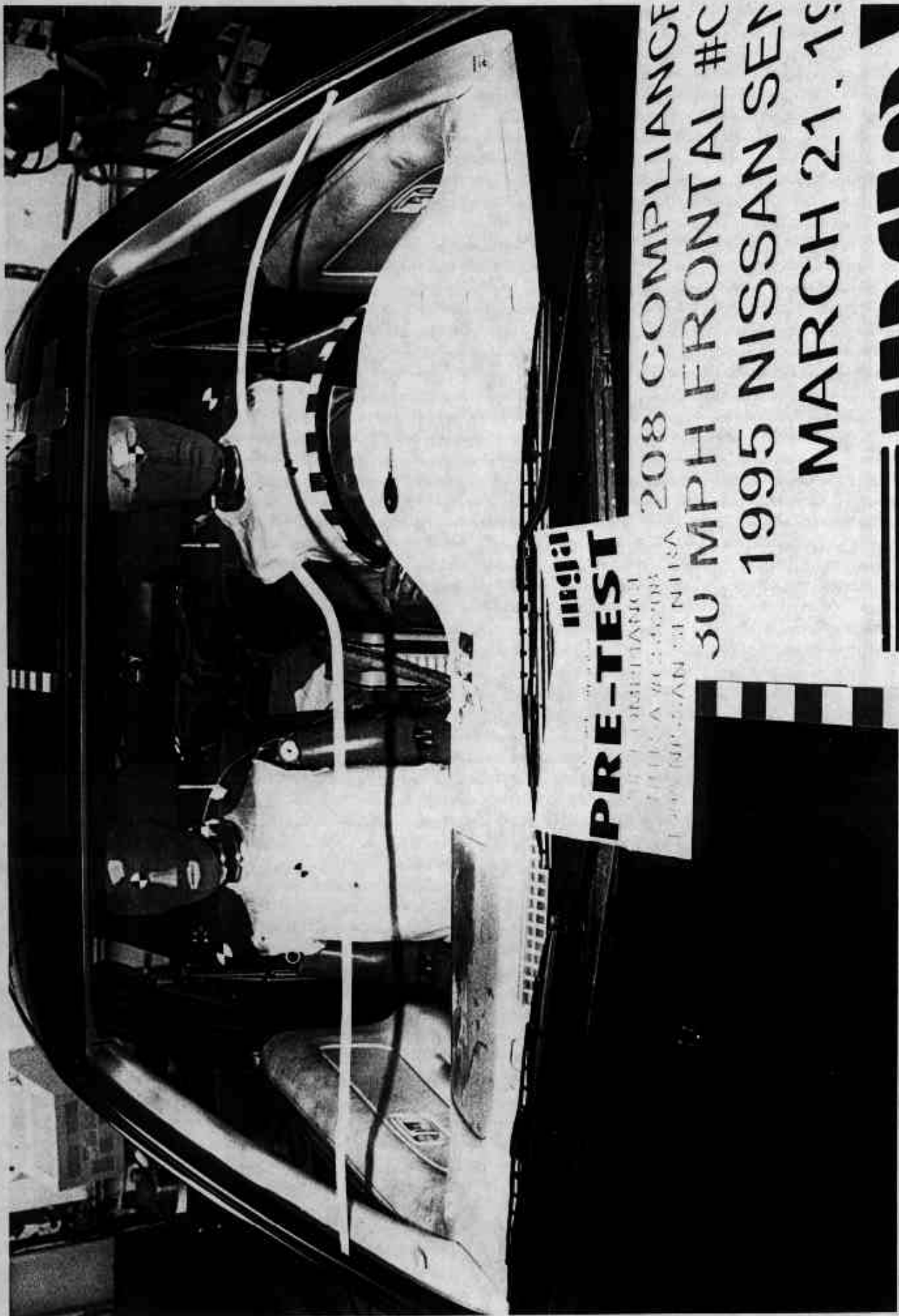
A-17

Photo No. A-17 - Pre-Test Engine Compartment View



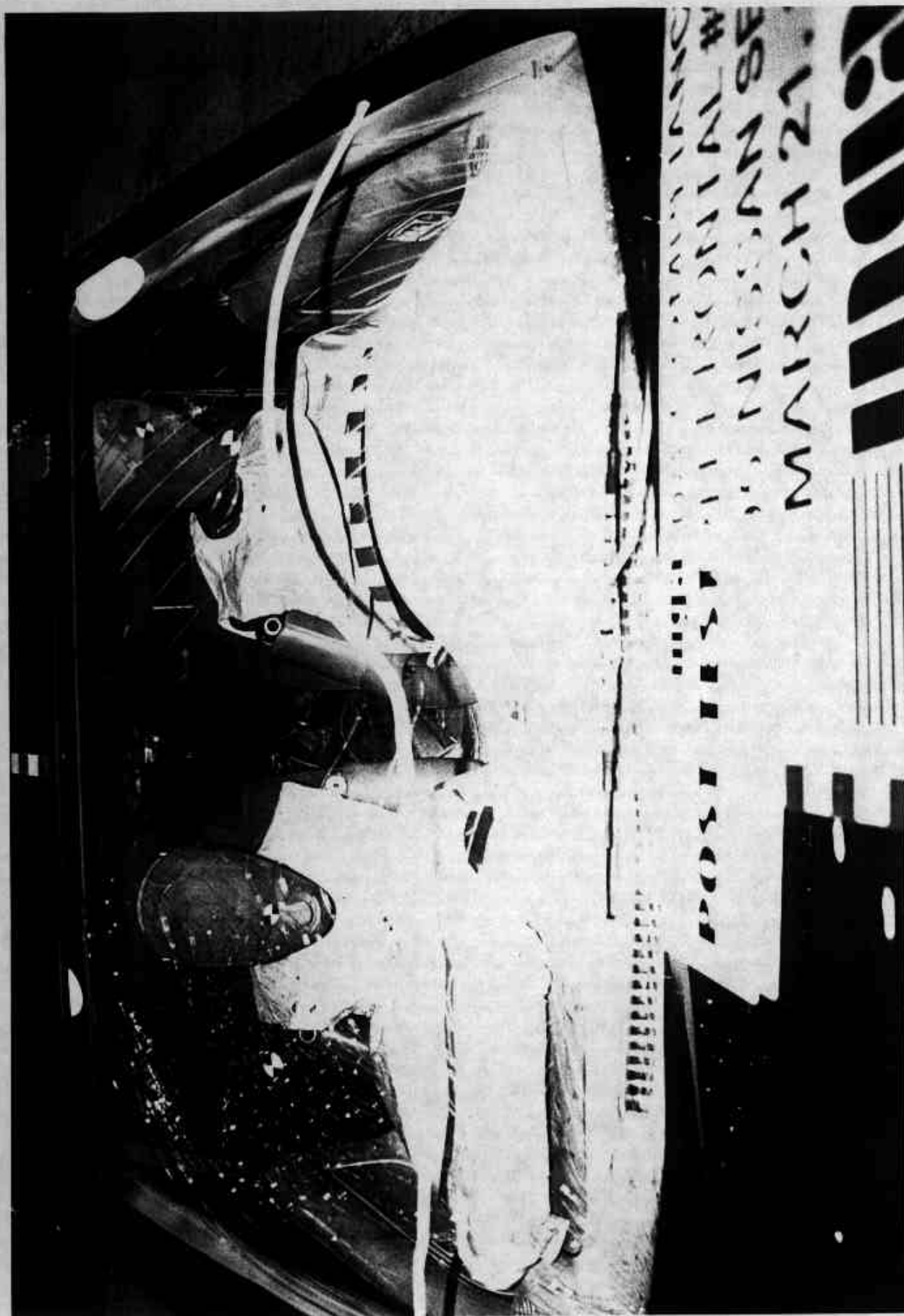
A-18

Photo No. A-18 - Post-Test Engine Compartment View



A-19

Photo No. A-19 - Pre-Test Windshield View



A-20

Photo No. A-20 - Post-Test Windshield View



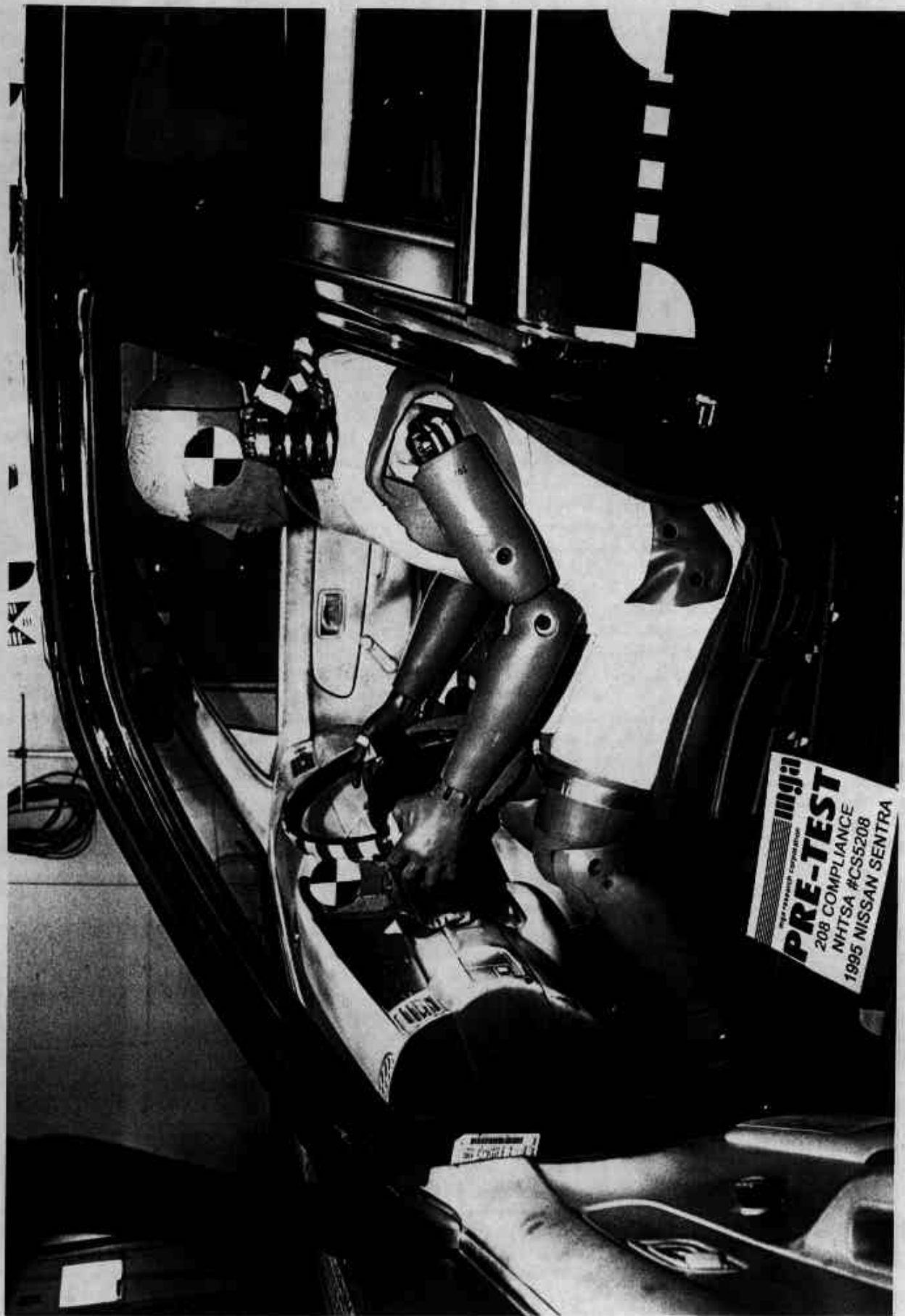
A-21

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Photo No. A-21 - Pre-Test Driver Dummy Position View



Photo No. A-22 - Post-Test Driver Dummy Position View



A-23

Photo No. A-23 - Pre-Test Driver Dummy Position View (Door Open)

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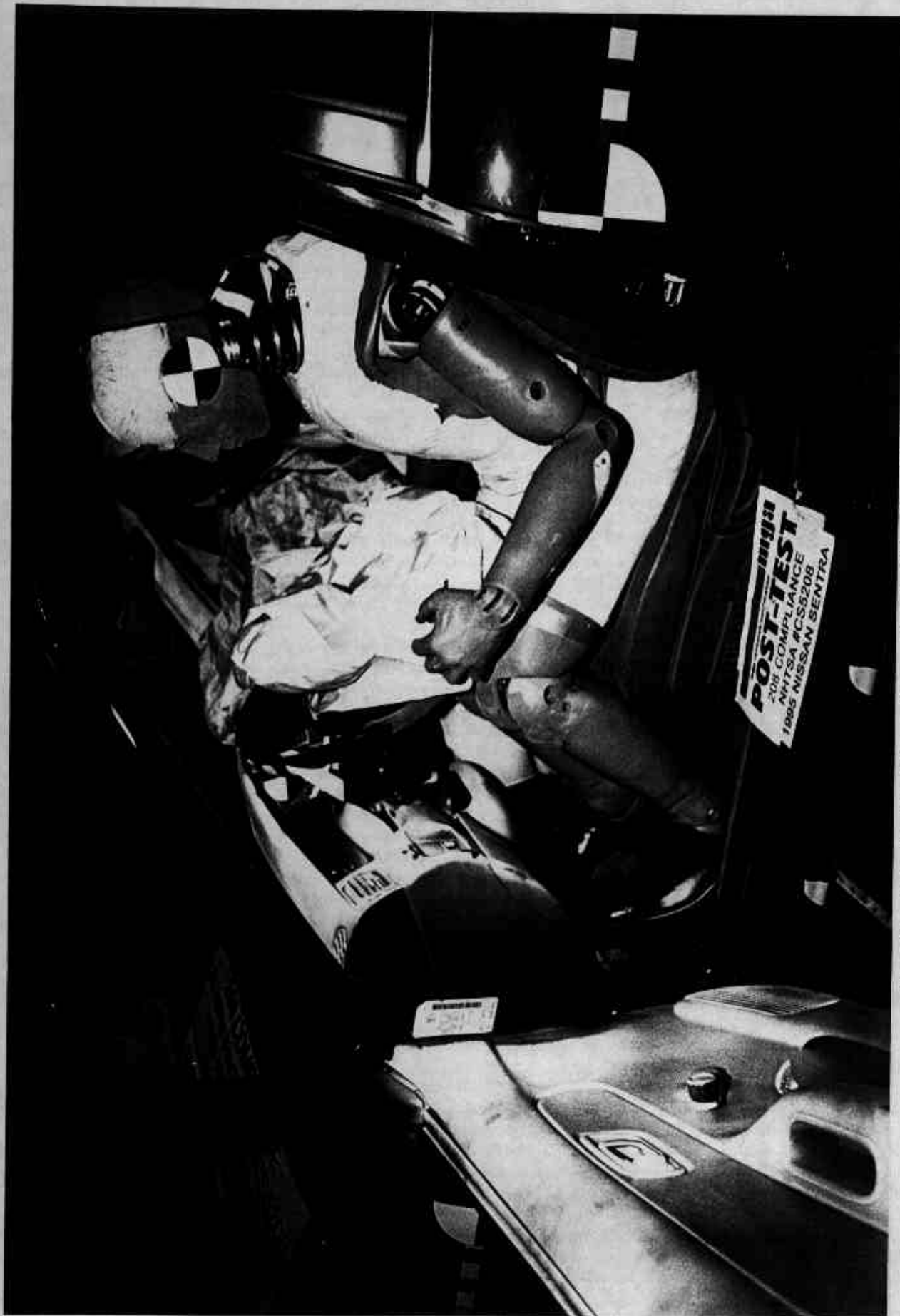
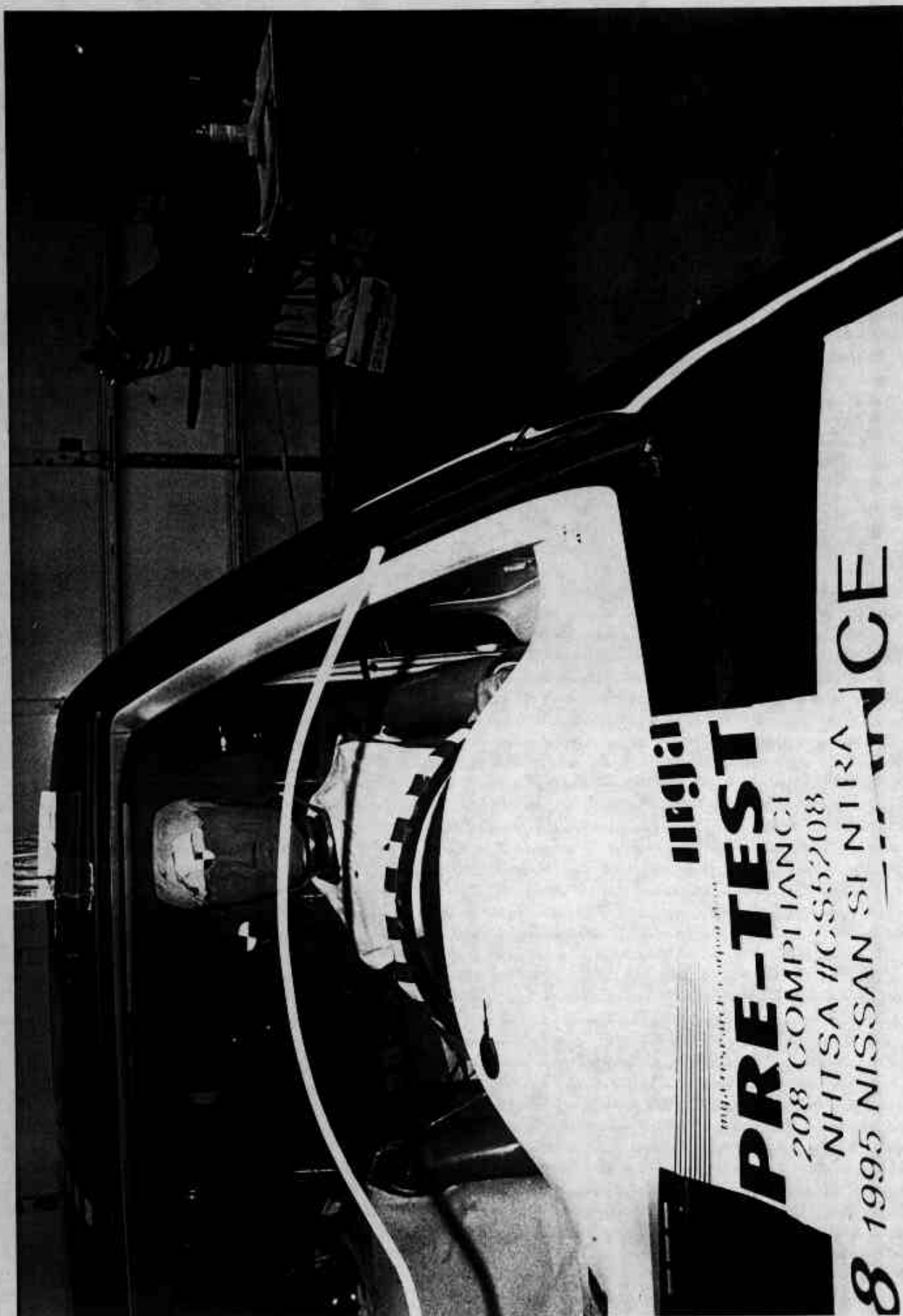


Photo No. A-24 - Post-Test Driver Dummy Position View (Door Open)



A-25

Photo No. A-25 - Pre-Test Driver Windshield View



Photo No. A-26 - Post-Test Driver Windshield View



A-27

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



Photo No. A-28 - Post-Test Driver Seat Position View

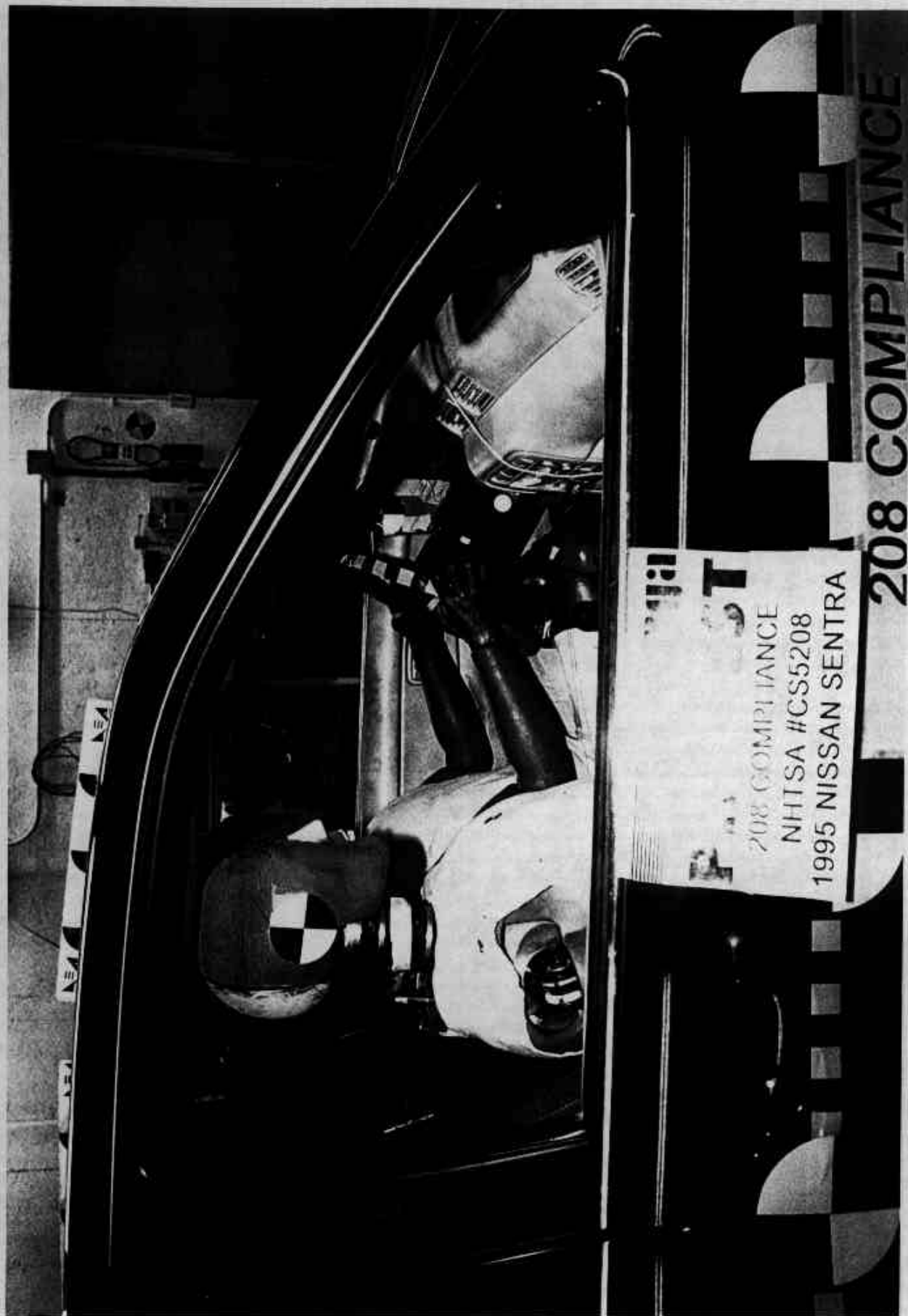


Photo No. A-29 - Pre-Test Passenger Dummy Position View



Photo No. A-30 - Post-Test Passenger Dummy Position View

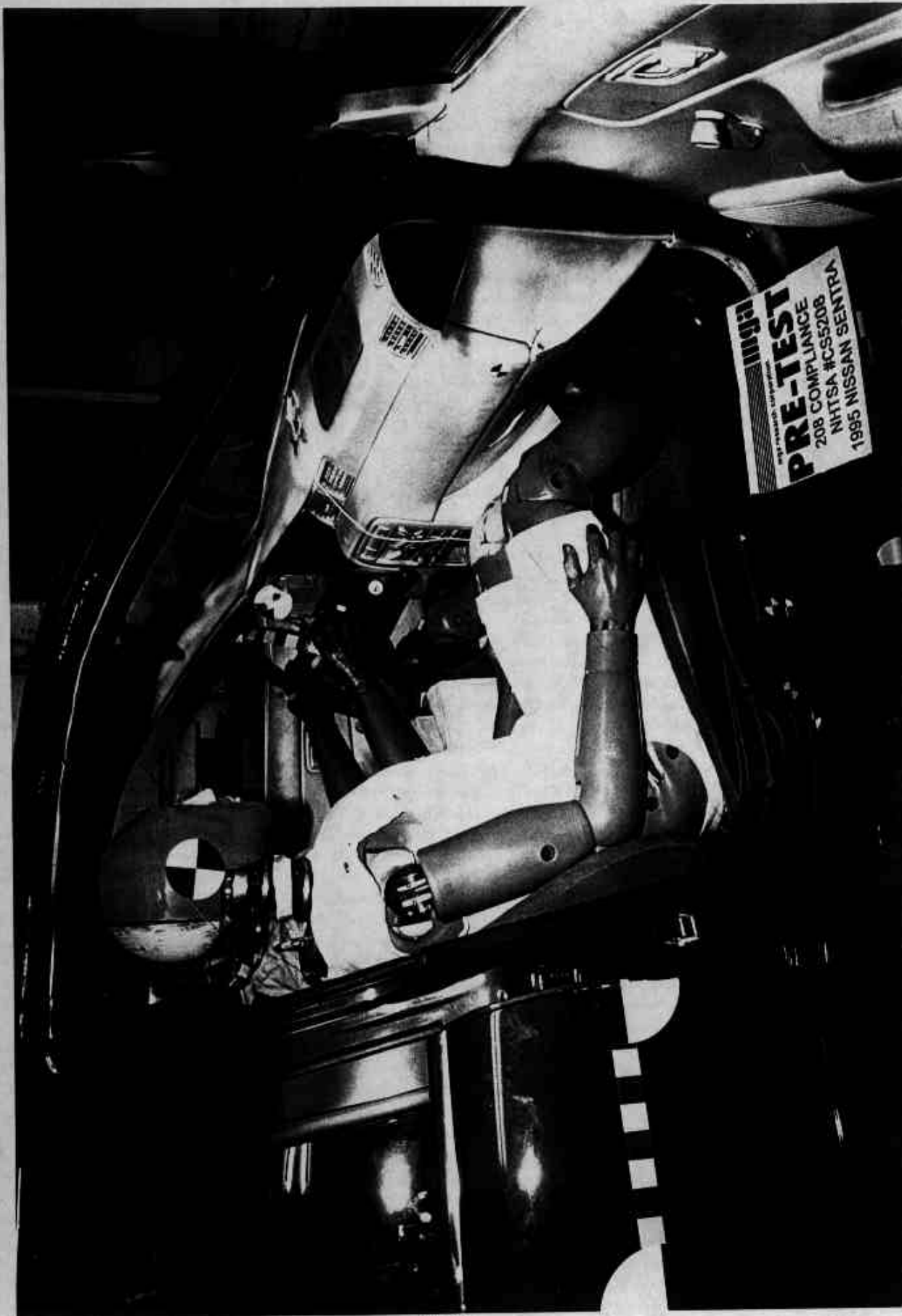


Photo No. A-31 - Pre-Test Passenger Dummy Position View (Door Open)



Photo No. A-32 - Post-Test Passenger Dummy Position View (Door Open)



Photo No. A-33 - Pre-Test Passenger Windshield View

A-33



Photo No. A-34 - Post-Test Passenger Windshield View

A-34



A-35

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



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



Photo No. A-37 - Pre-Test Driver Dummy Knee Bolster View



Photo No. A-38 - Post-Test Driver Dummy Knee Bolster View



Photo No. A-40 - Post-Test Passenger Dummy Knee Bolster View

A-40

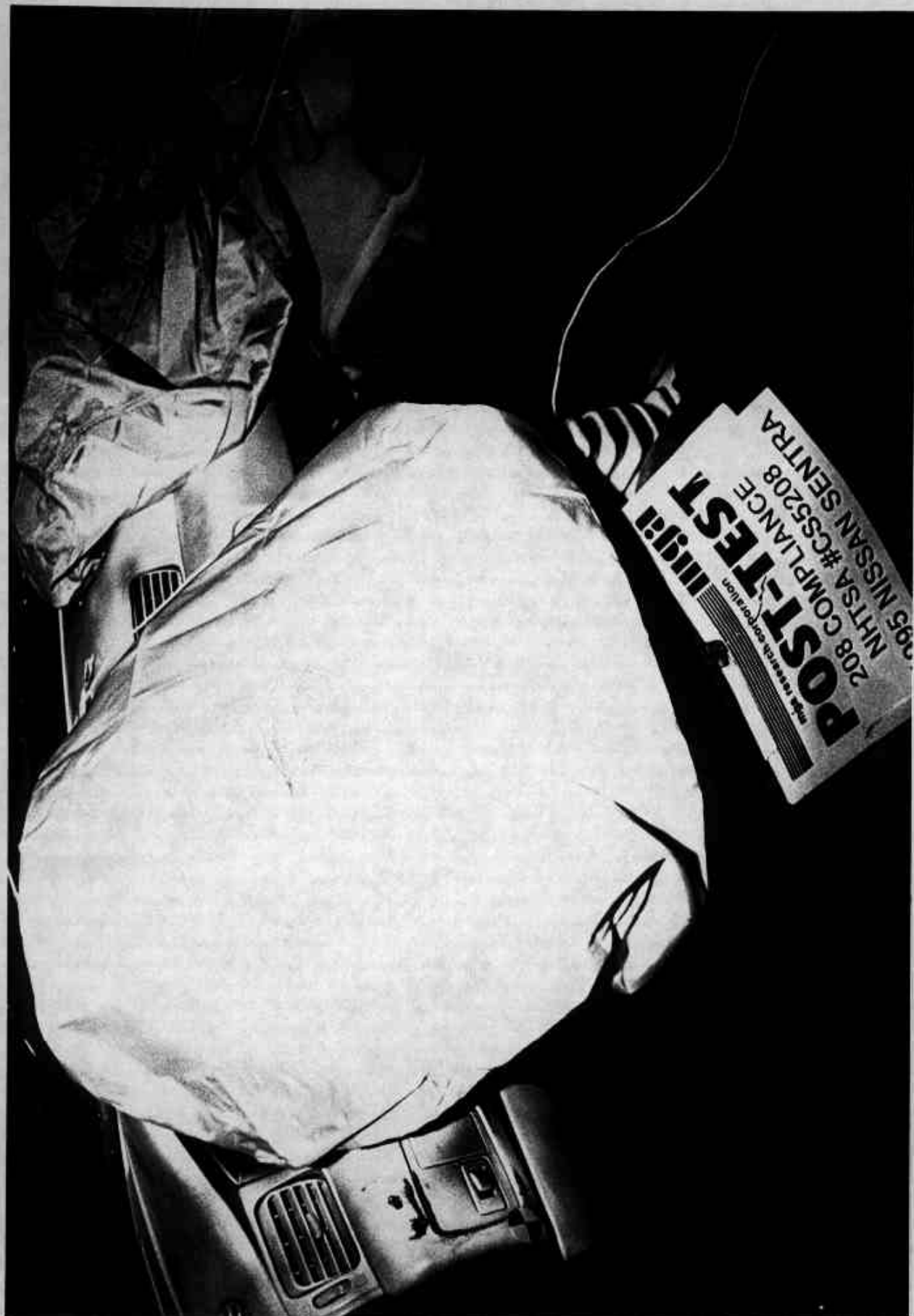


Photo No. A-41 - Driver Dummy Head Contact View - Airbag



Photo No. A-42 - Driver Dummy Head contact View - Headrest

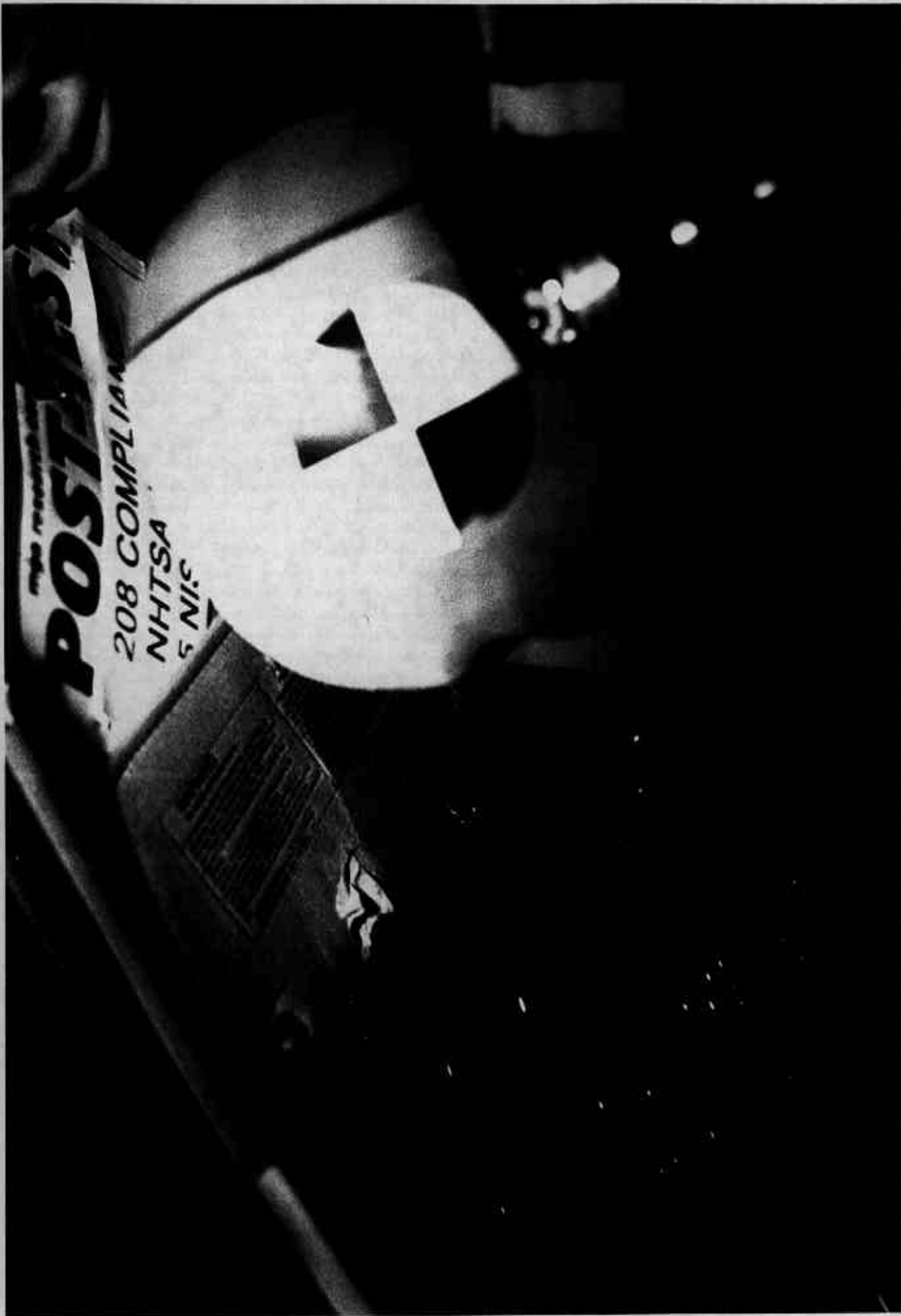


Photo No. A-43 - Driver Dummy Head Contact View - Visor

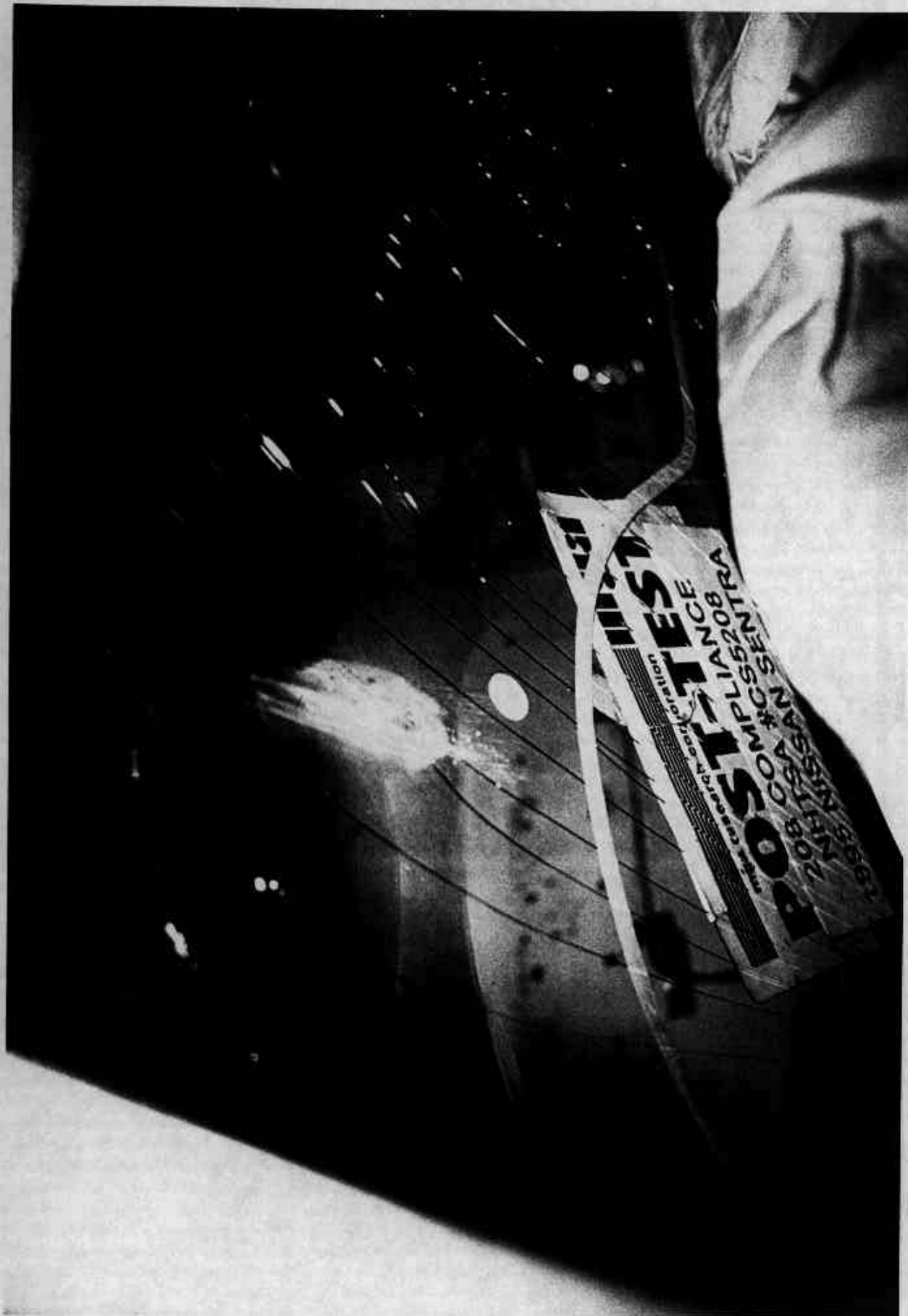


Photo No. A-44 - Driver Dummy Head Contact View - Windshield



A-45

Photo No. A-45 - Driver Dummy Knee Contact View

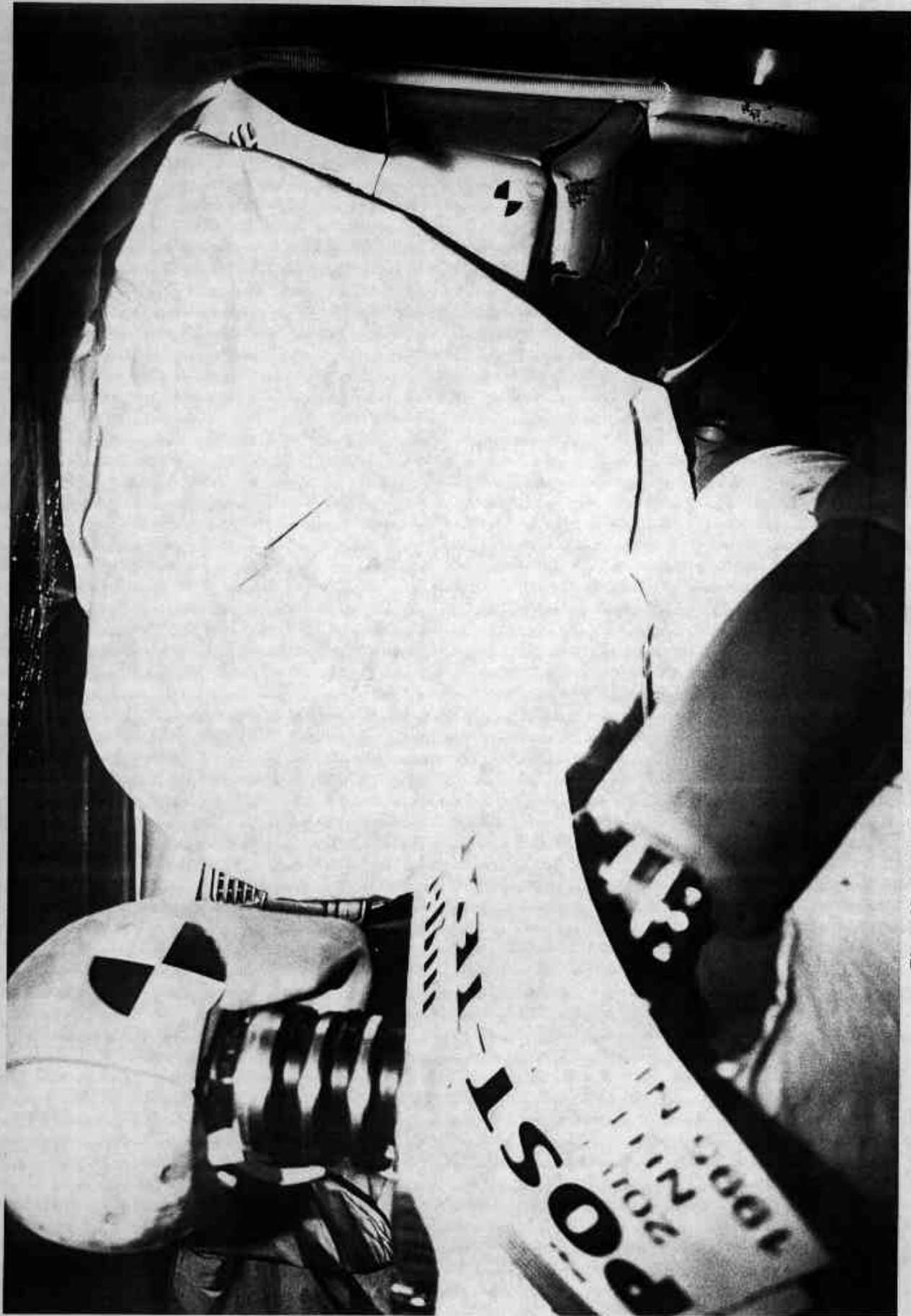


Photo No. A-46 - Passenger Dummy Head Contact View - Airbag



Photo No. A-47 - Passenger Dummy Head Contact View - Windshield

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FOR RESEARCH PURPOSES ONLY

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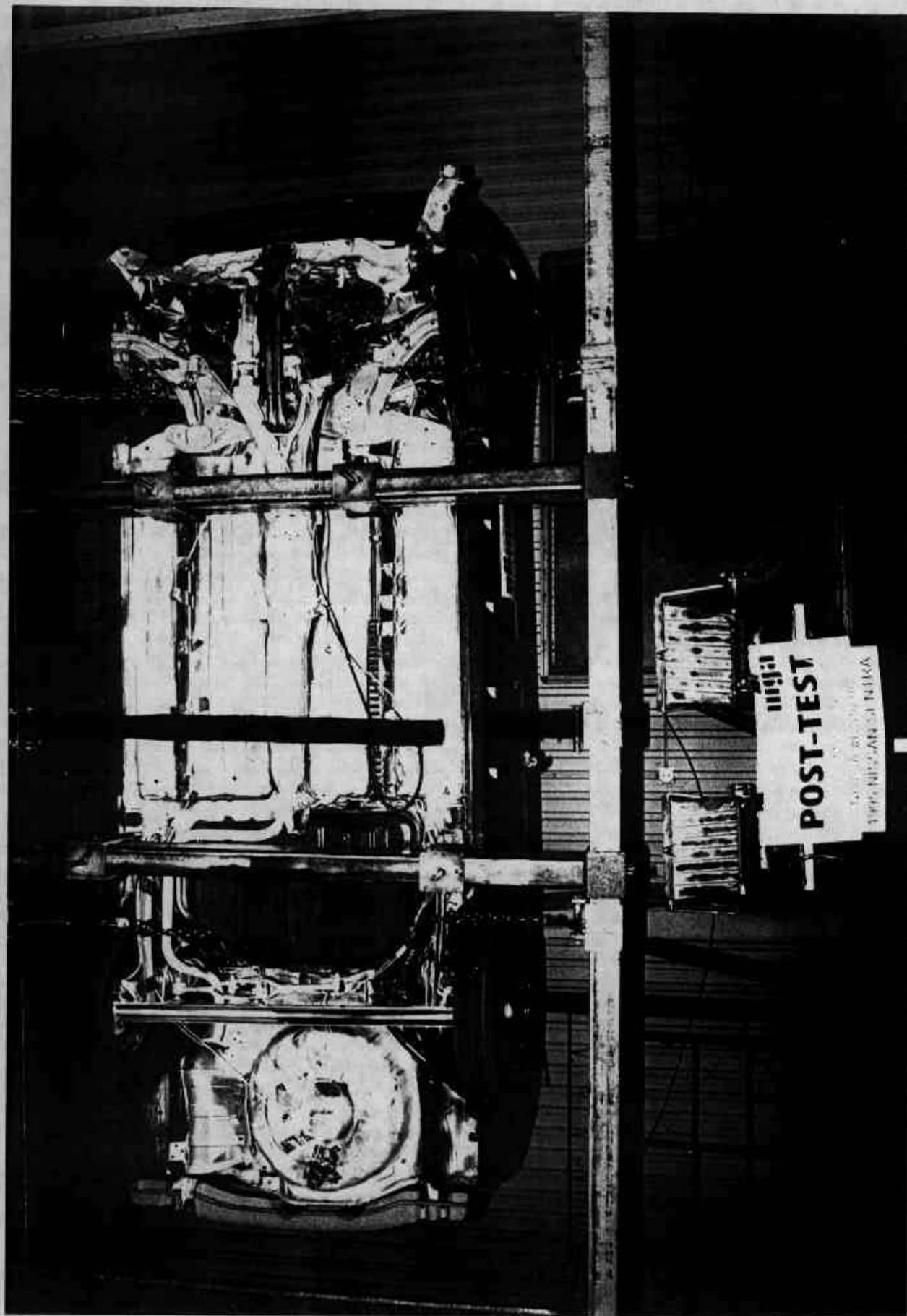
1995 NISSAN 300ZX

1995 NISSAN 300ZX

1995 NISSAN 300ZX

A-48

Photo No. A-48 - Passenger Dummy Knee Contact View



A-49

Photo No. A-49 - Rollover 0° - 90°

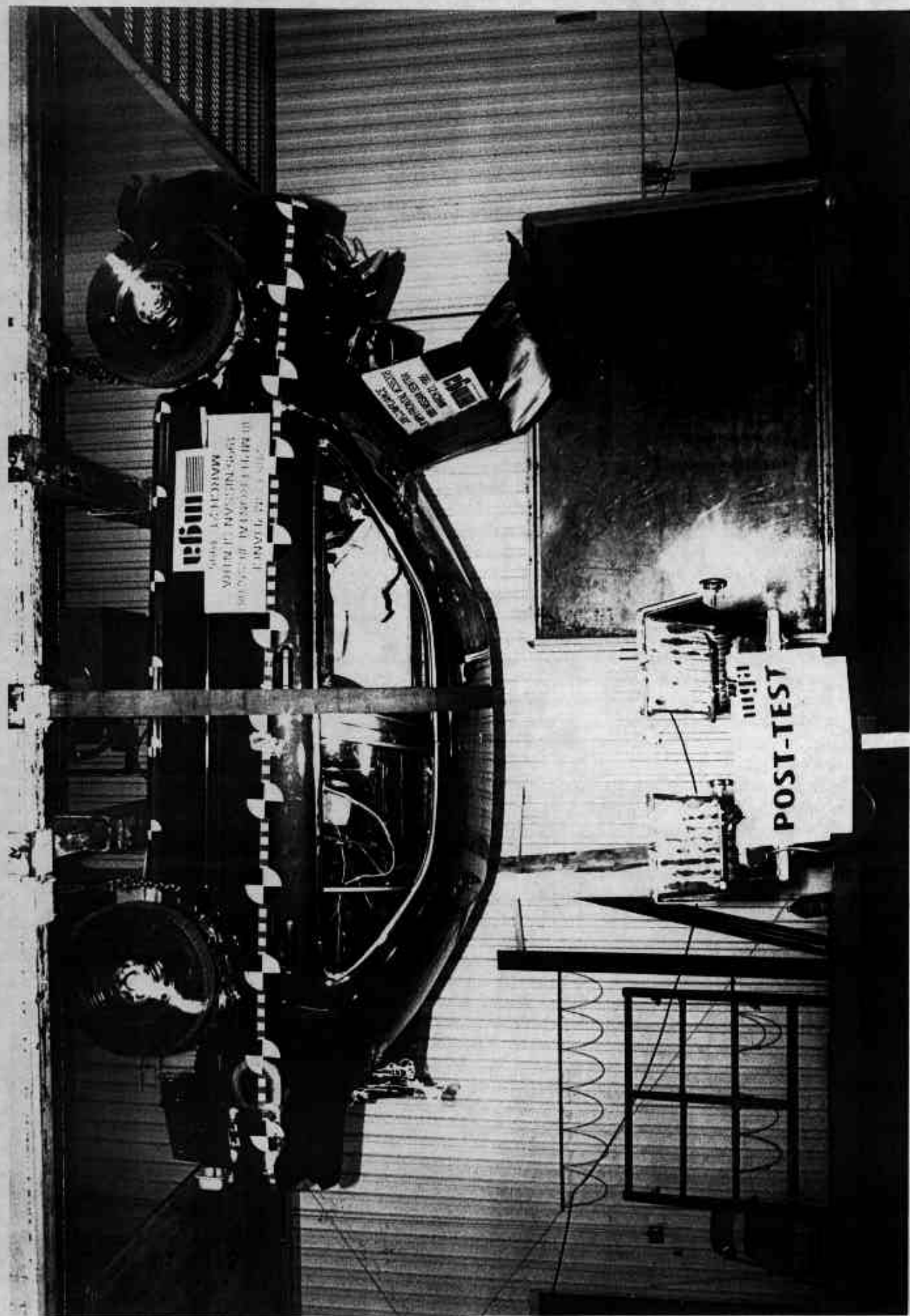
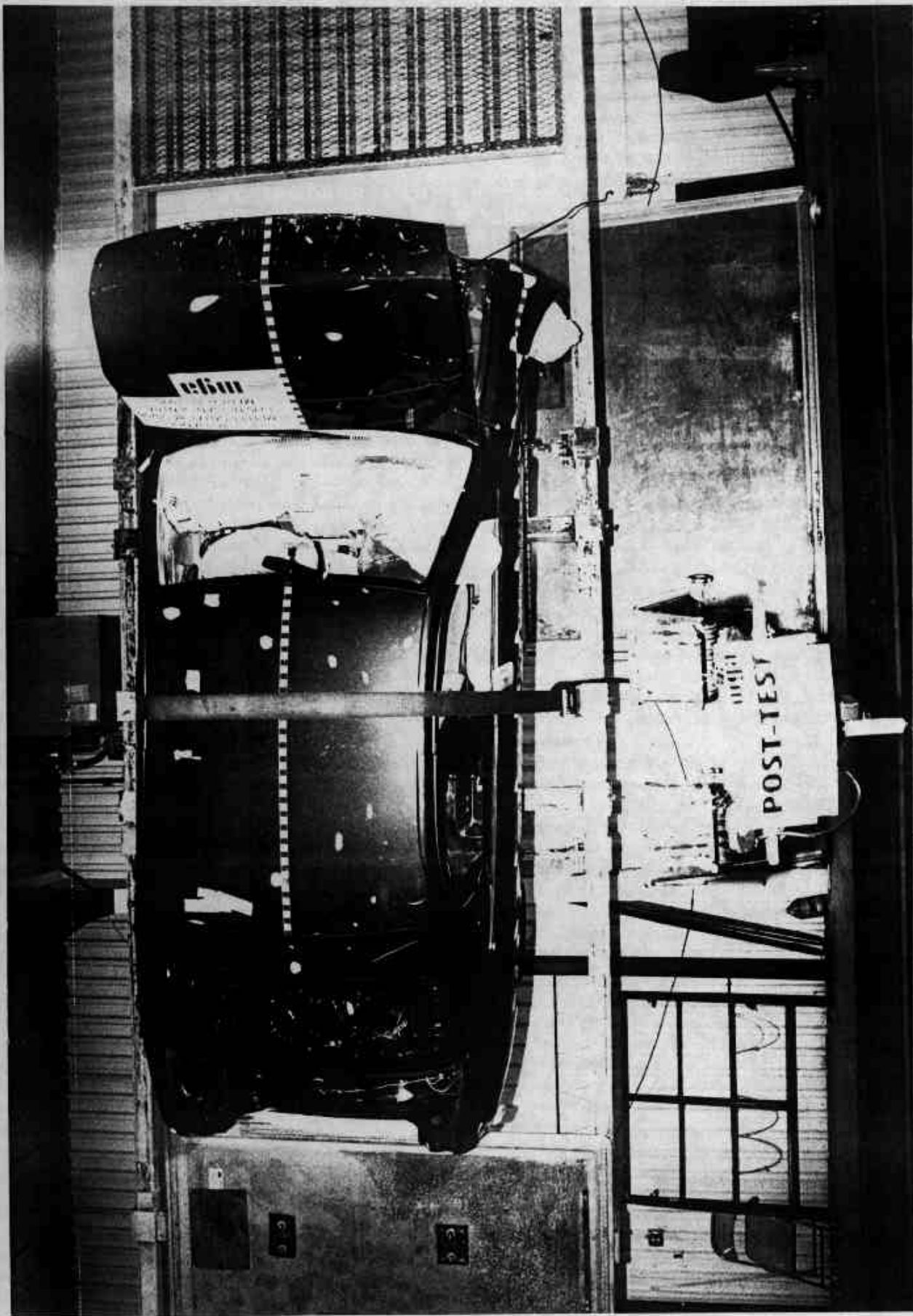


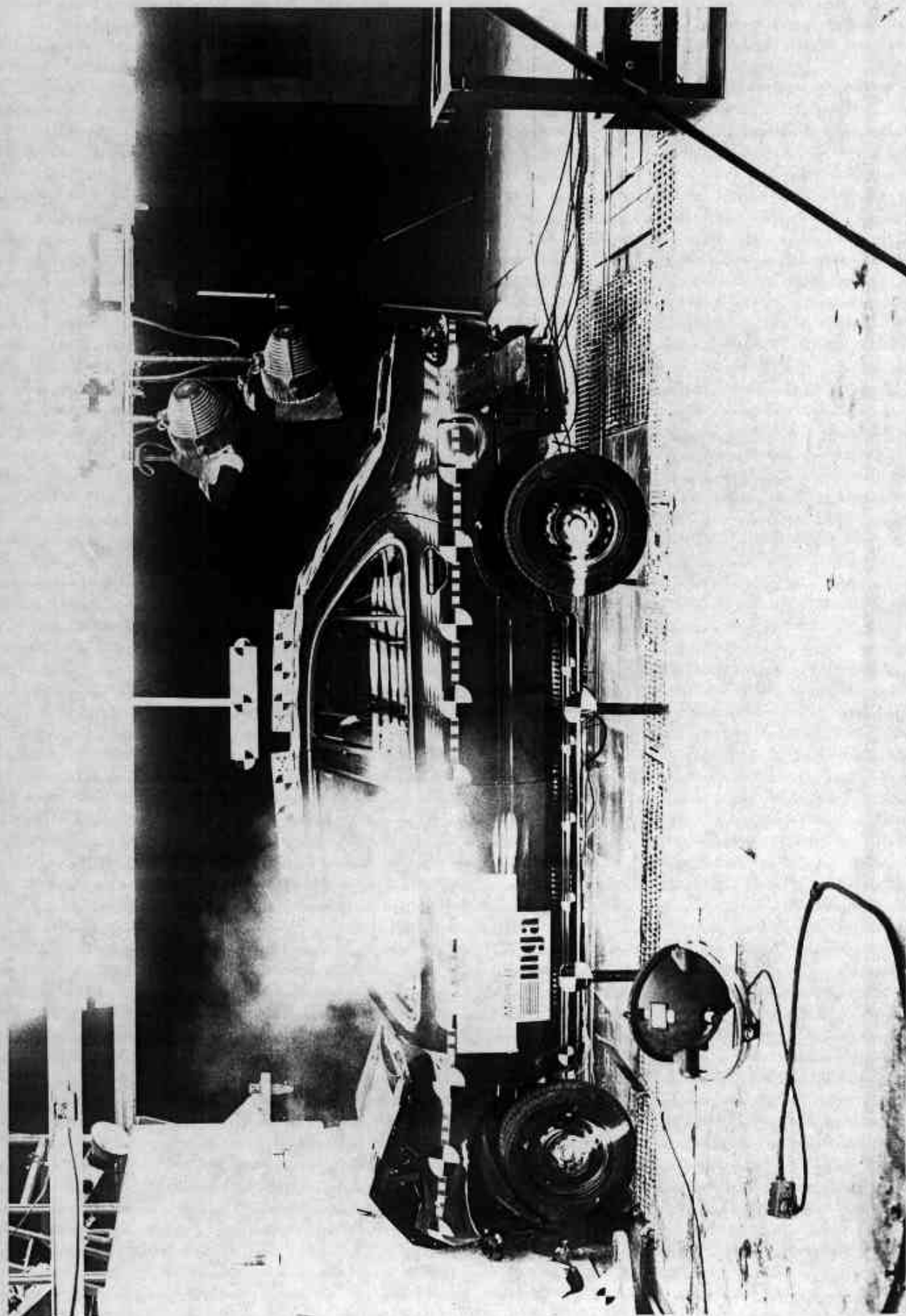
Photo No. A-50 - Rollover 90° - 180°

A-50



A-51

Photo No. A-51 - Rollover 180° - 270°



A-53

Photo No. A-53 - Vehicle Impact



Photo No. A-54 - Vehicle Certification Label

The document features a large, dark, and mostly illegible stamp in the upper right quadrant. Below this stamp is a table with several columns and rows of text. The text is difficult to decipher due to the image quality and the angle of the document.

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1964	13:00	...	...	...
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1964	16:00	...	...	...
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1964	21:00	...	...	...
1964	22:00	...	...	...
1964	23:00	...	...	...
1964	00:00	...	...	...
1964	01:00	...	...	...
1964	02:00	...	...	...
1964	03:00	...	...	...
1964	04:00	...	...	...
1964	05:00	...	...	...
1964	06:00	...	...	...
1964	07:00	...	...	...
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Photo No. A-55 - Tire Placard

APPENDIX B
DATA PLOTS

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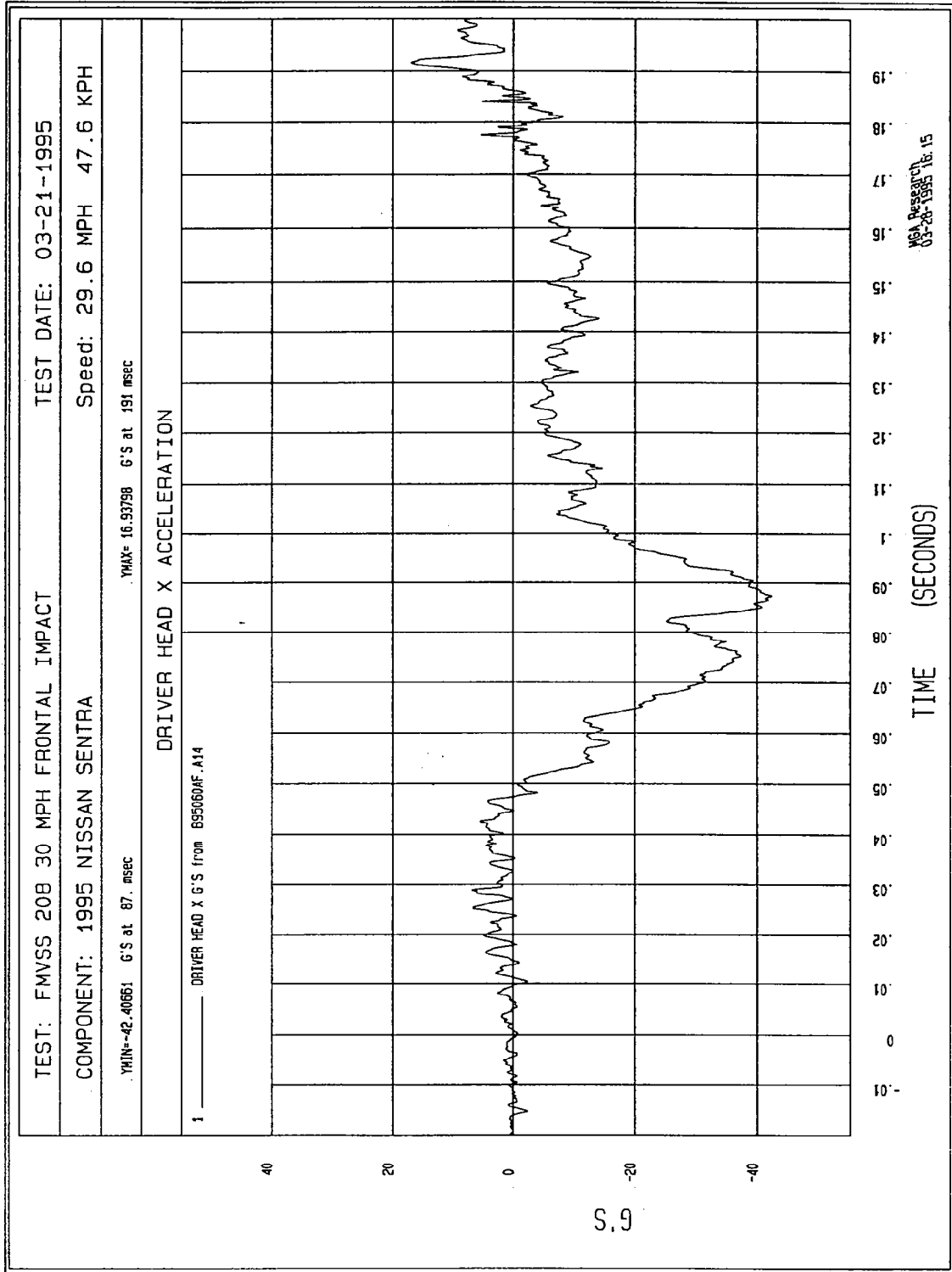


Figure B-1 - Driver Head X Acceleration vs. Time

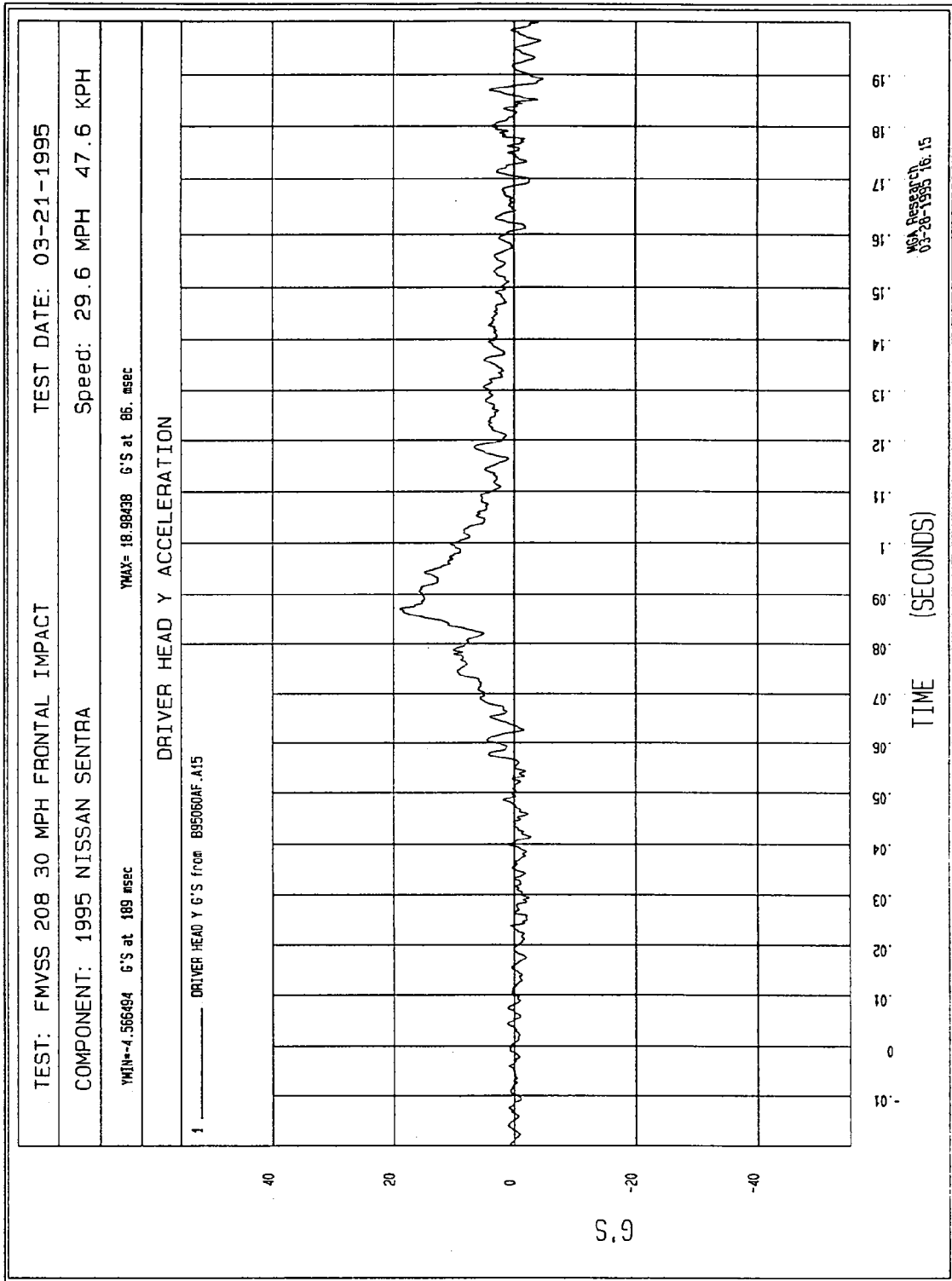


Figure B-2 - Driver Head Y Acceleration vs. Time

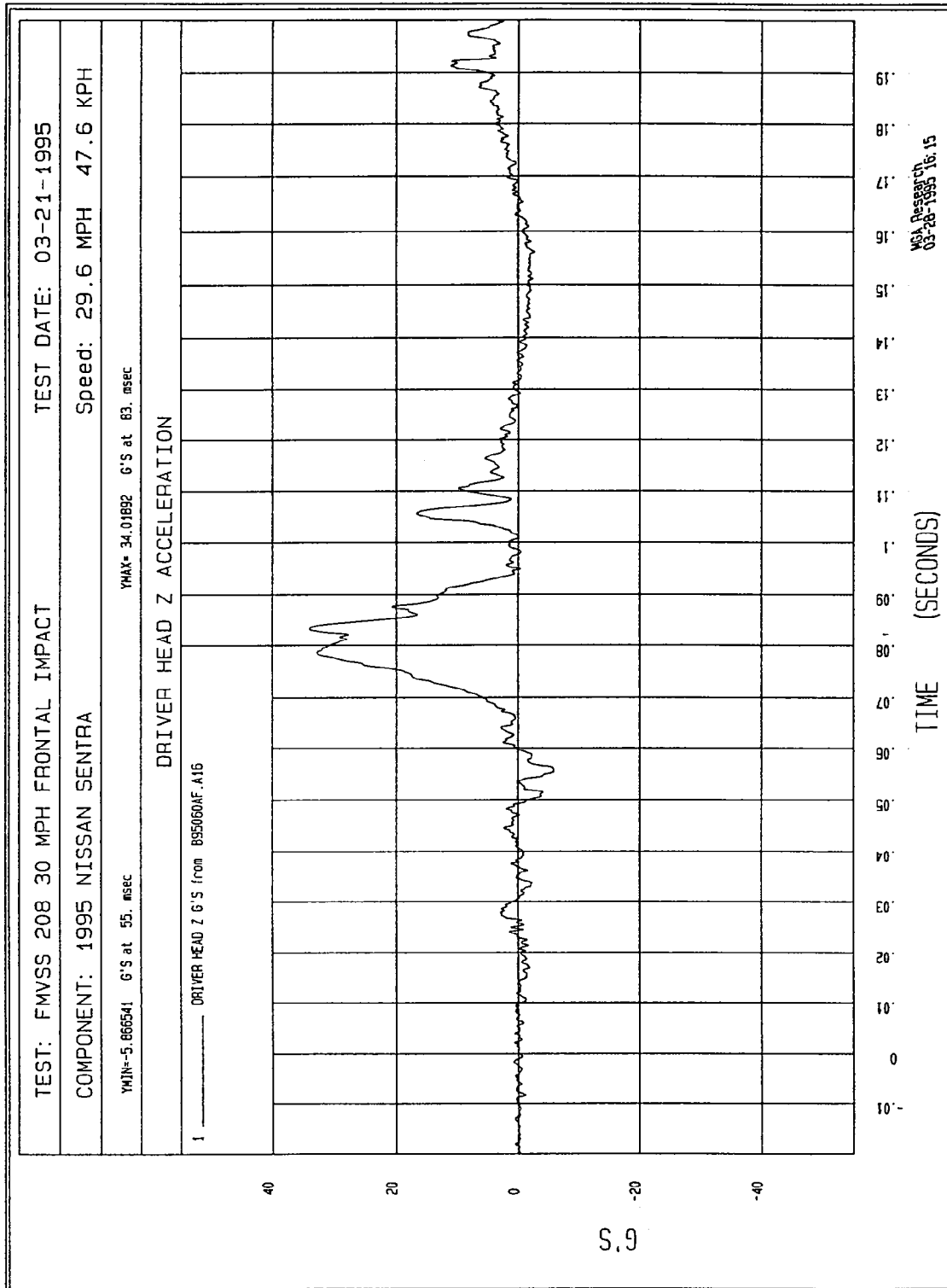


Figure B-3 - Driver Head Z Acceleration vs. Time

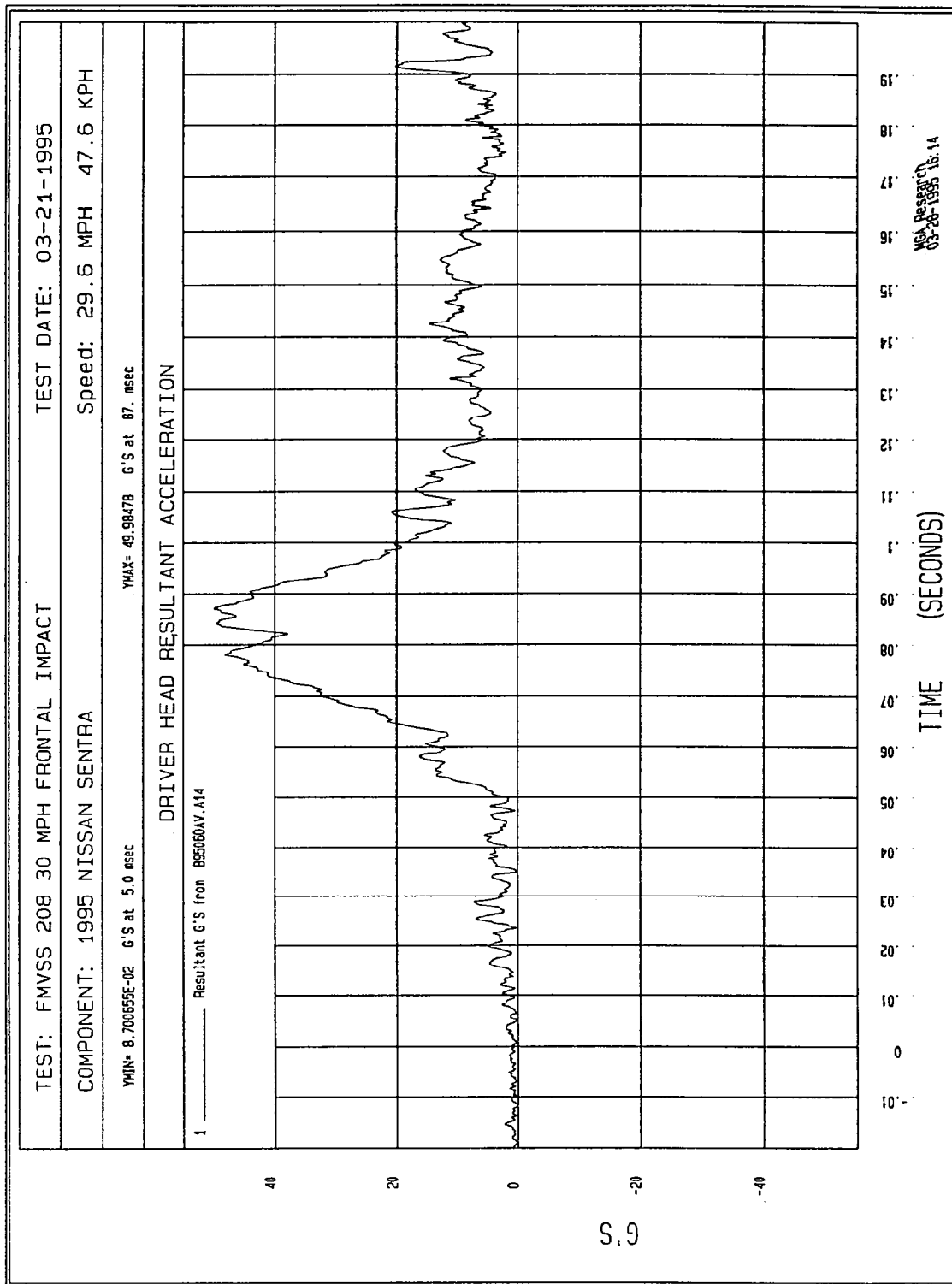


Figure B-4 - Driver Head Resultant Acceleration vs. Time

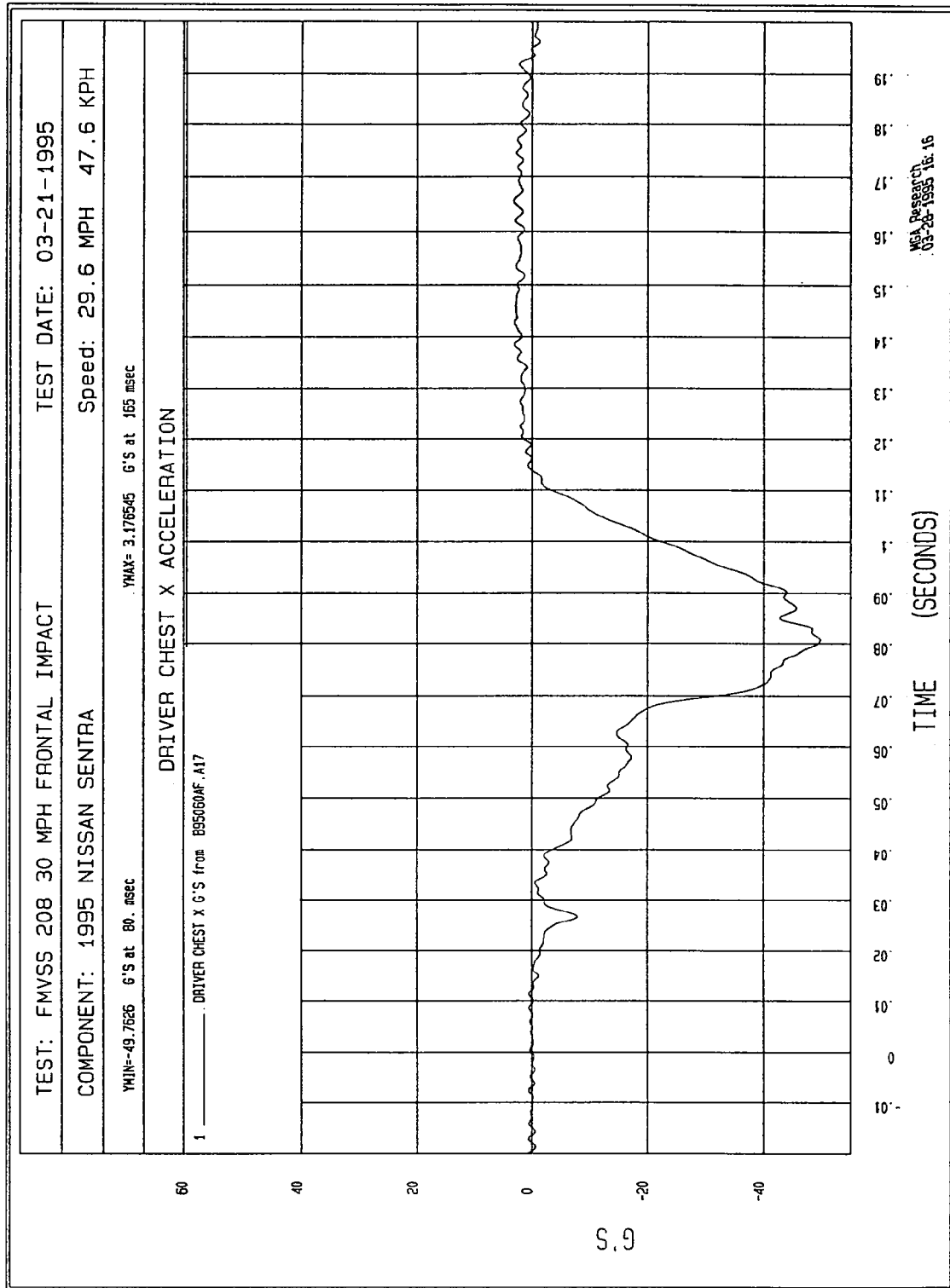


Figure B-5 - Driver Chest X Acceleration vs. Time

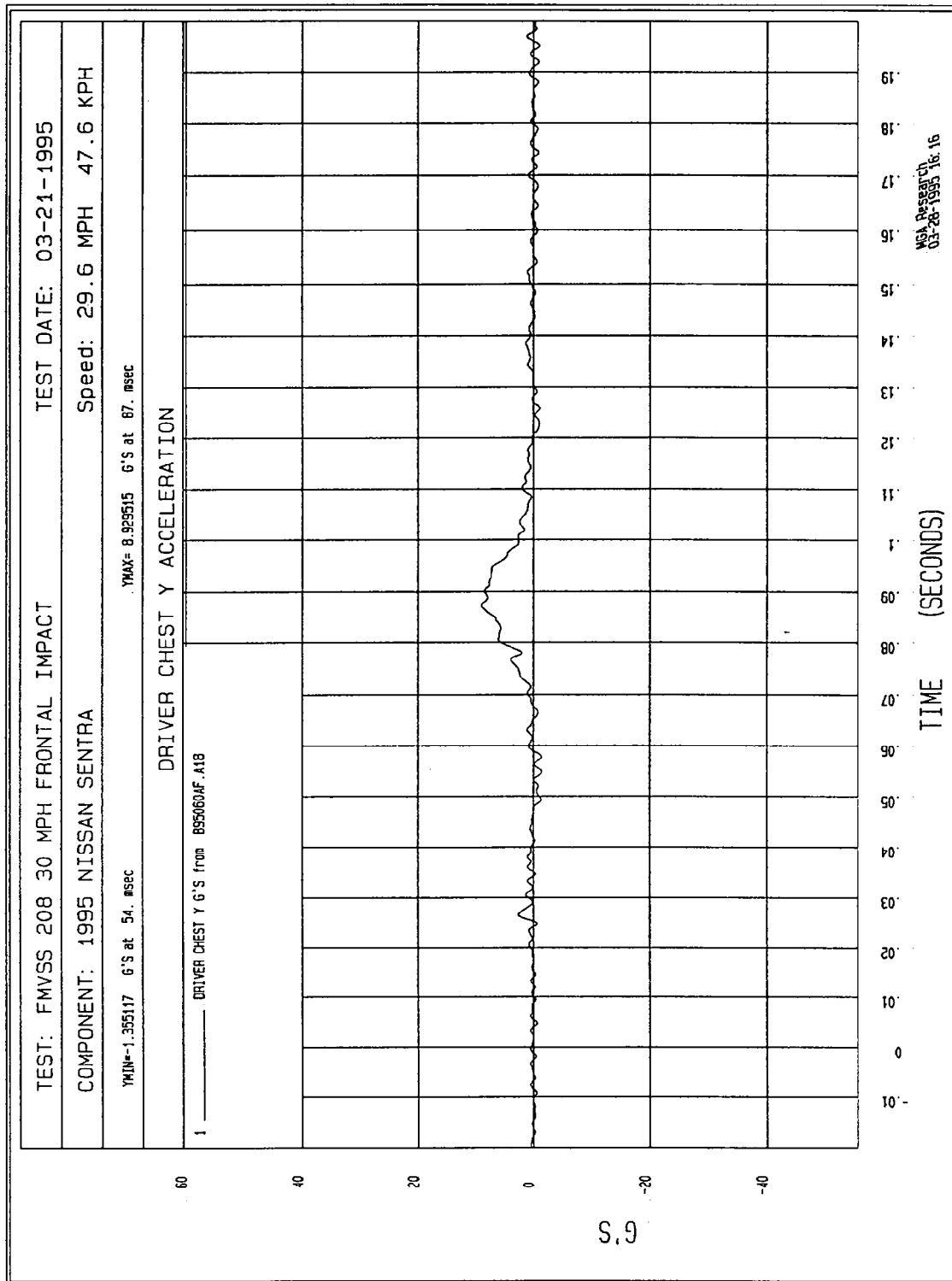


Figure B-6 - Driver Chest Y Acceleration vs. Time

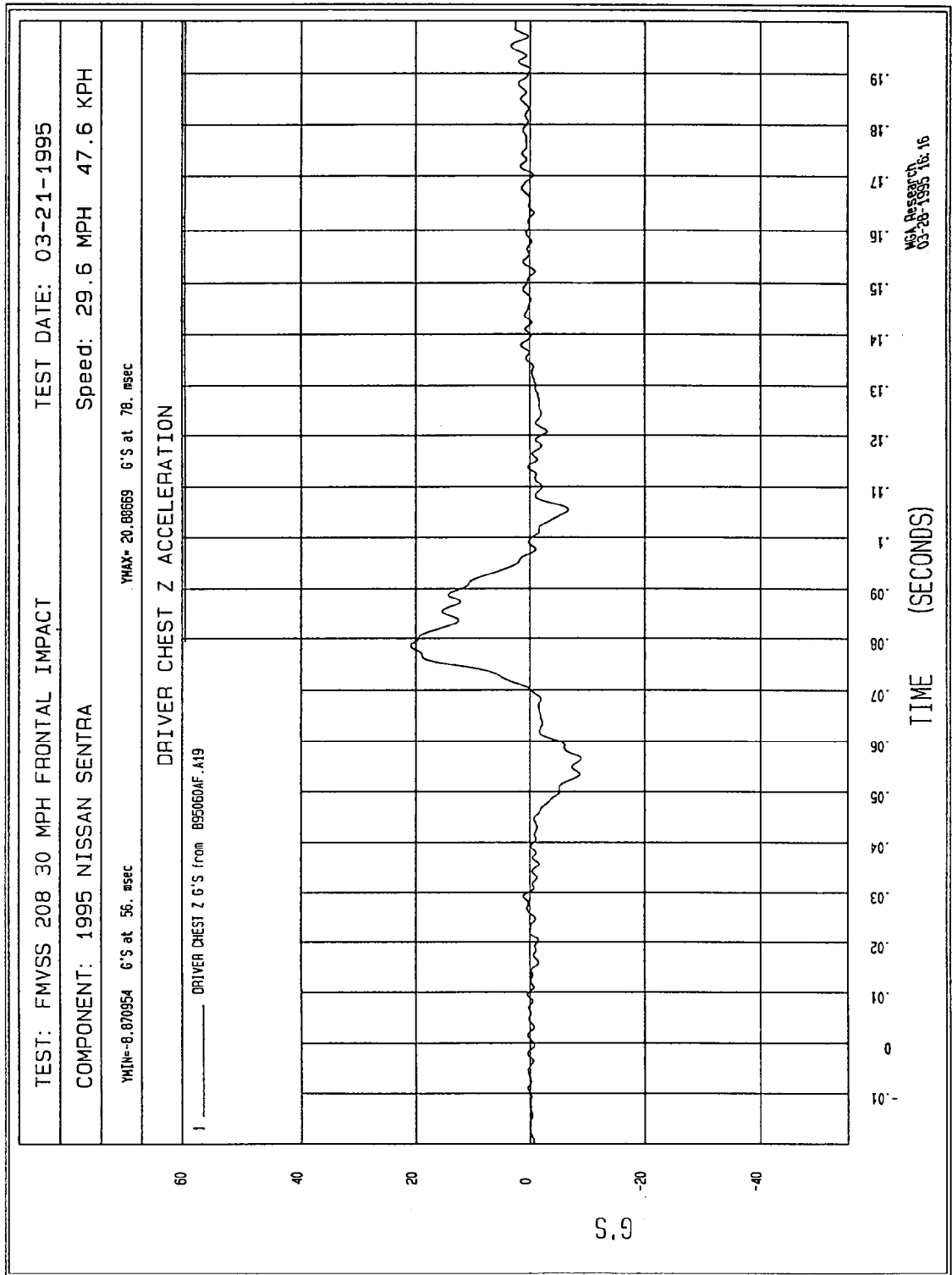


Figure B-7 - Driver Chest Z Acceleration vs. Time

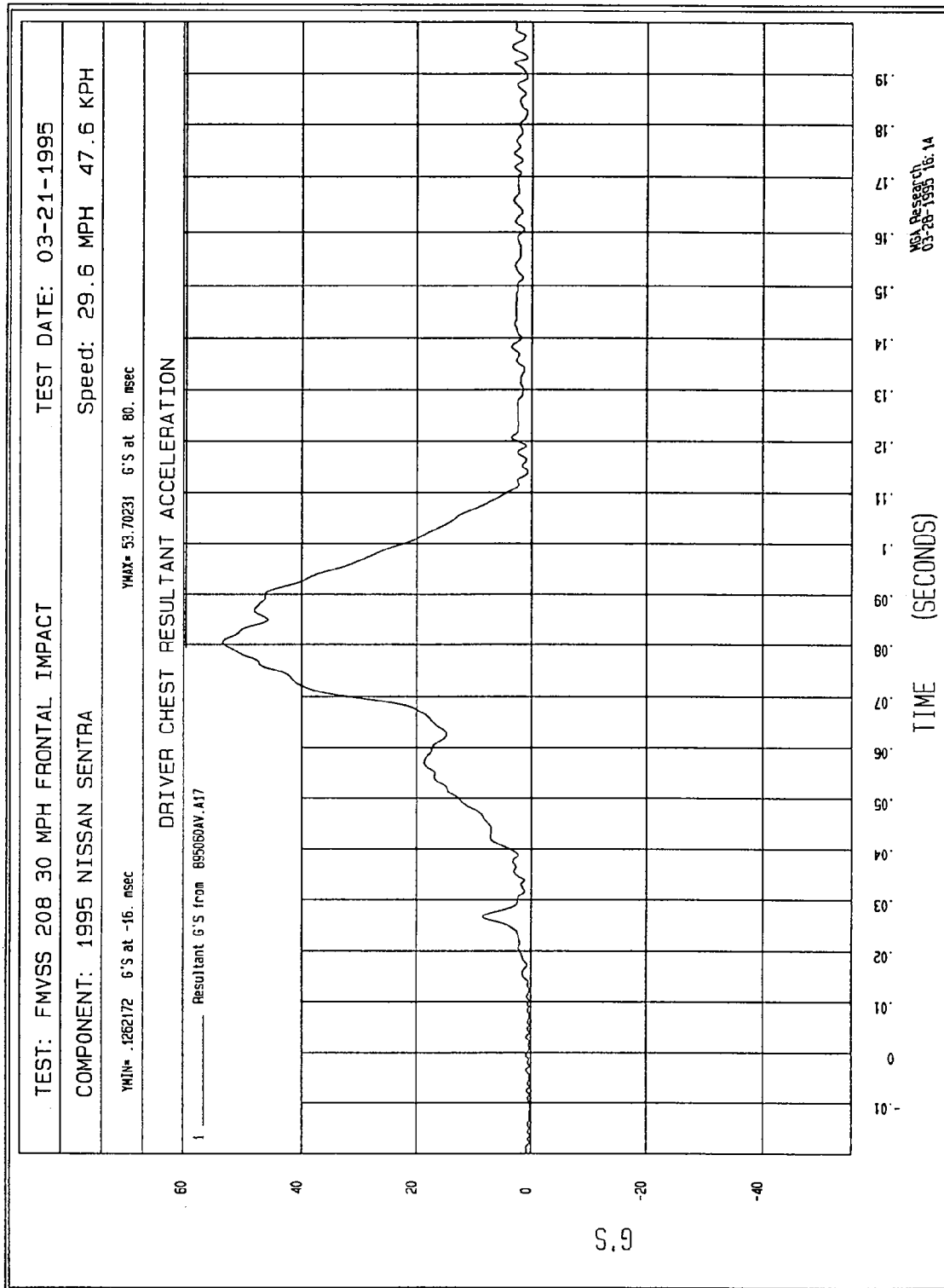


Figure B-8 - Driver Chest Resultant Acceleration vs. Time

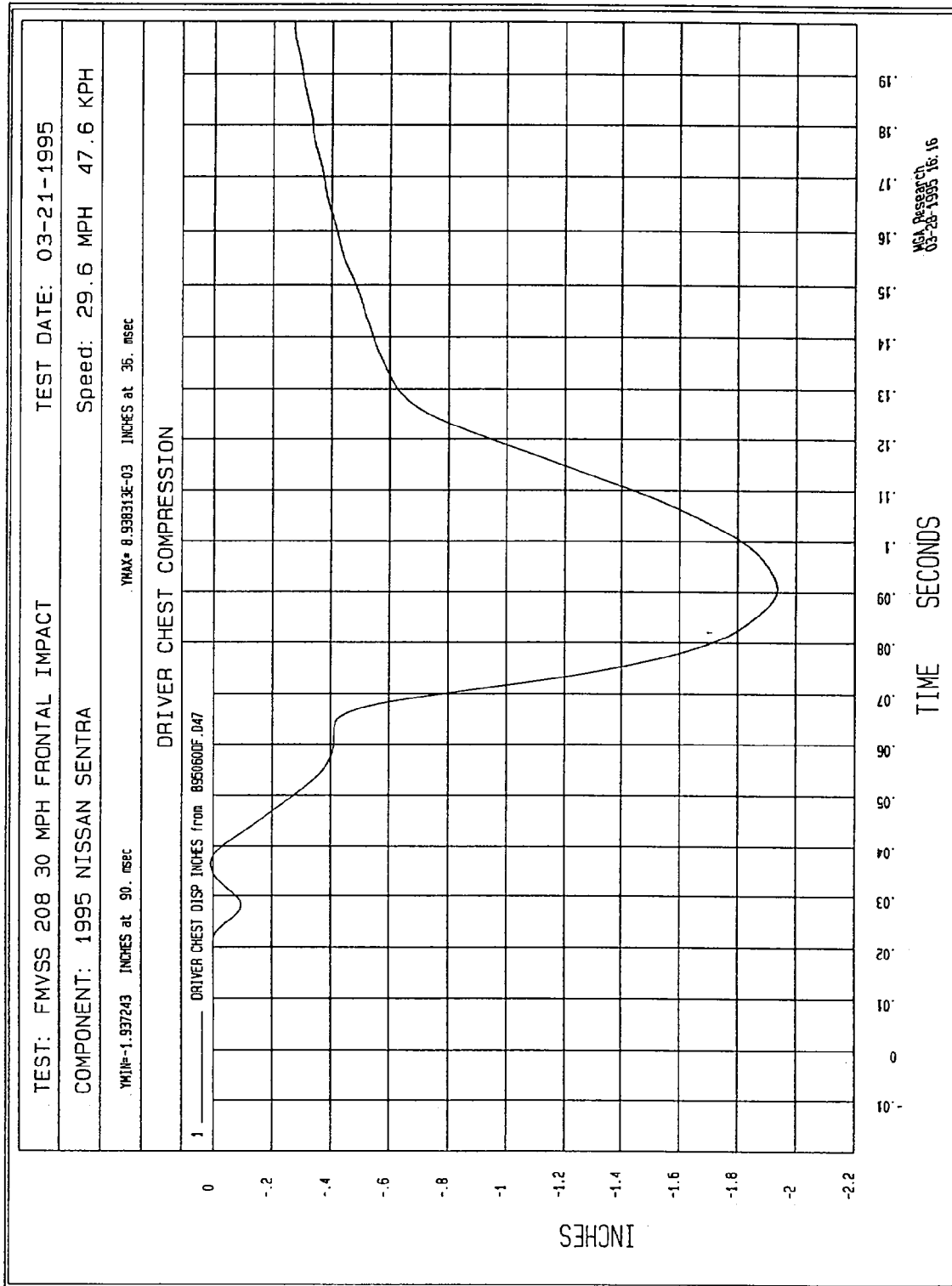


Figure B-9 - Driver Chest Compression vs. Time

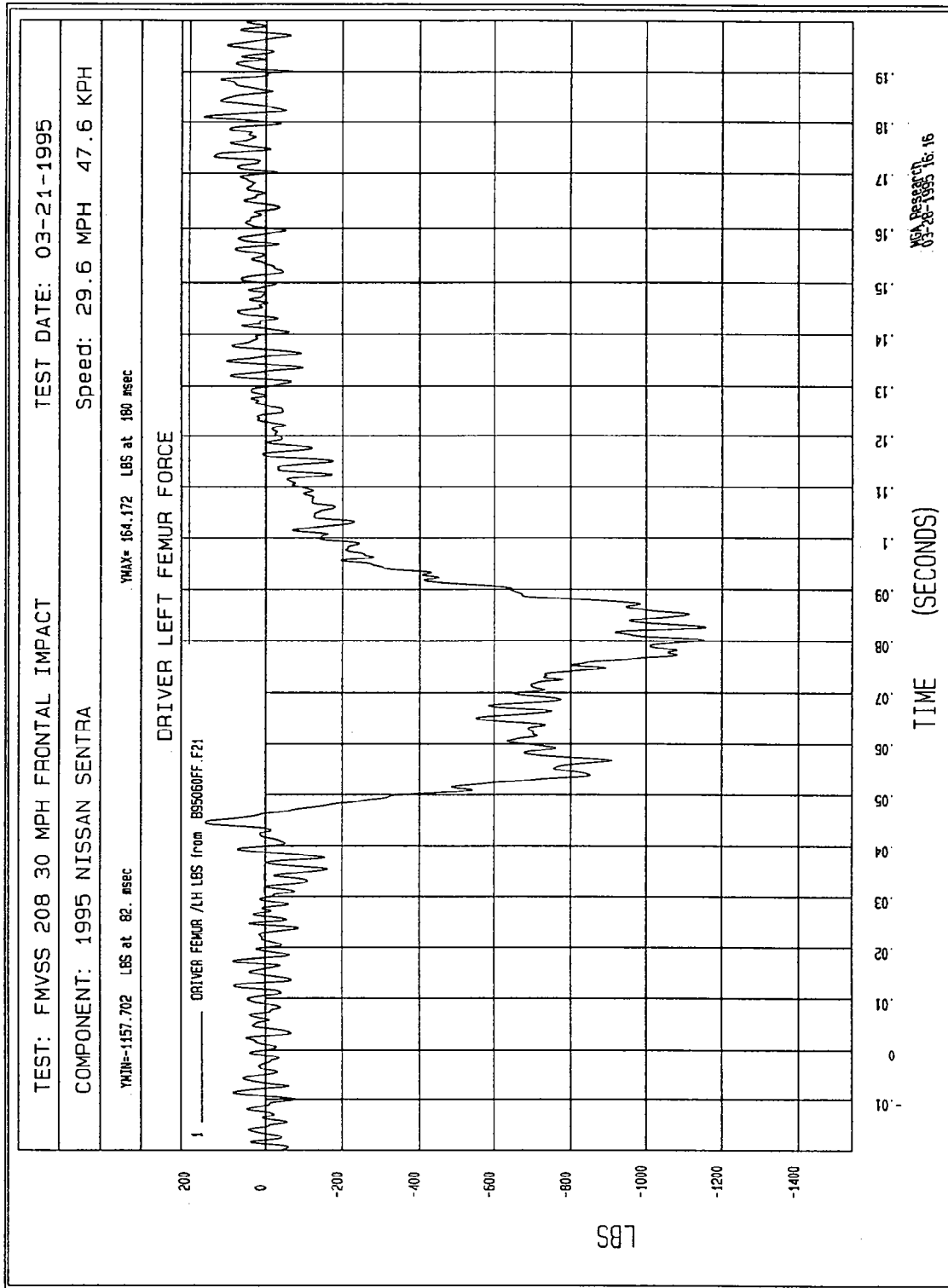


Figure B-10 - Driver Left Femur Force vs. Time

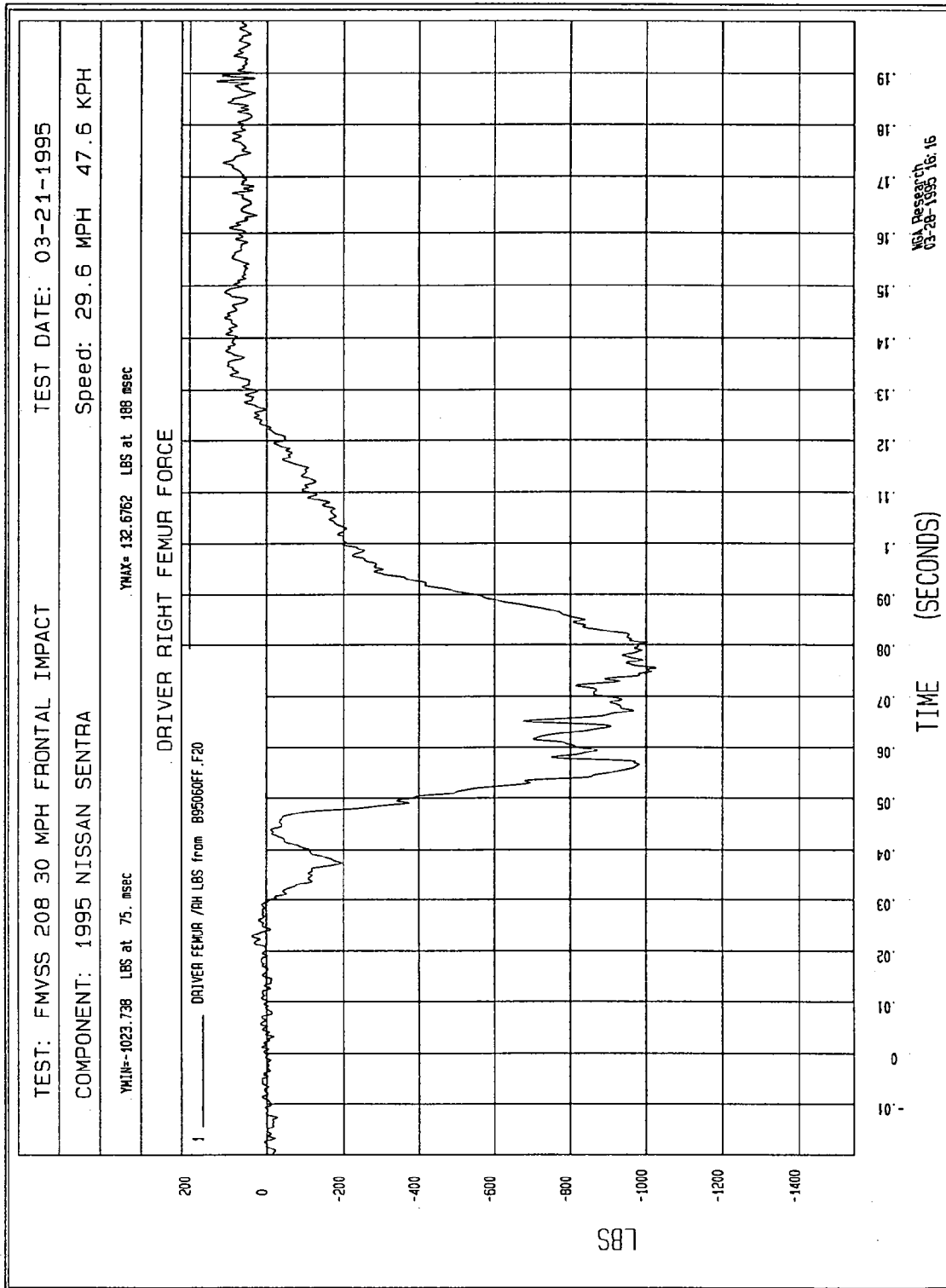


Figure B-11 - Driver Right Femur Force vs. Time

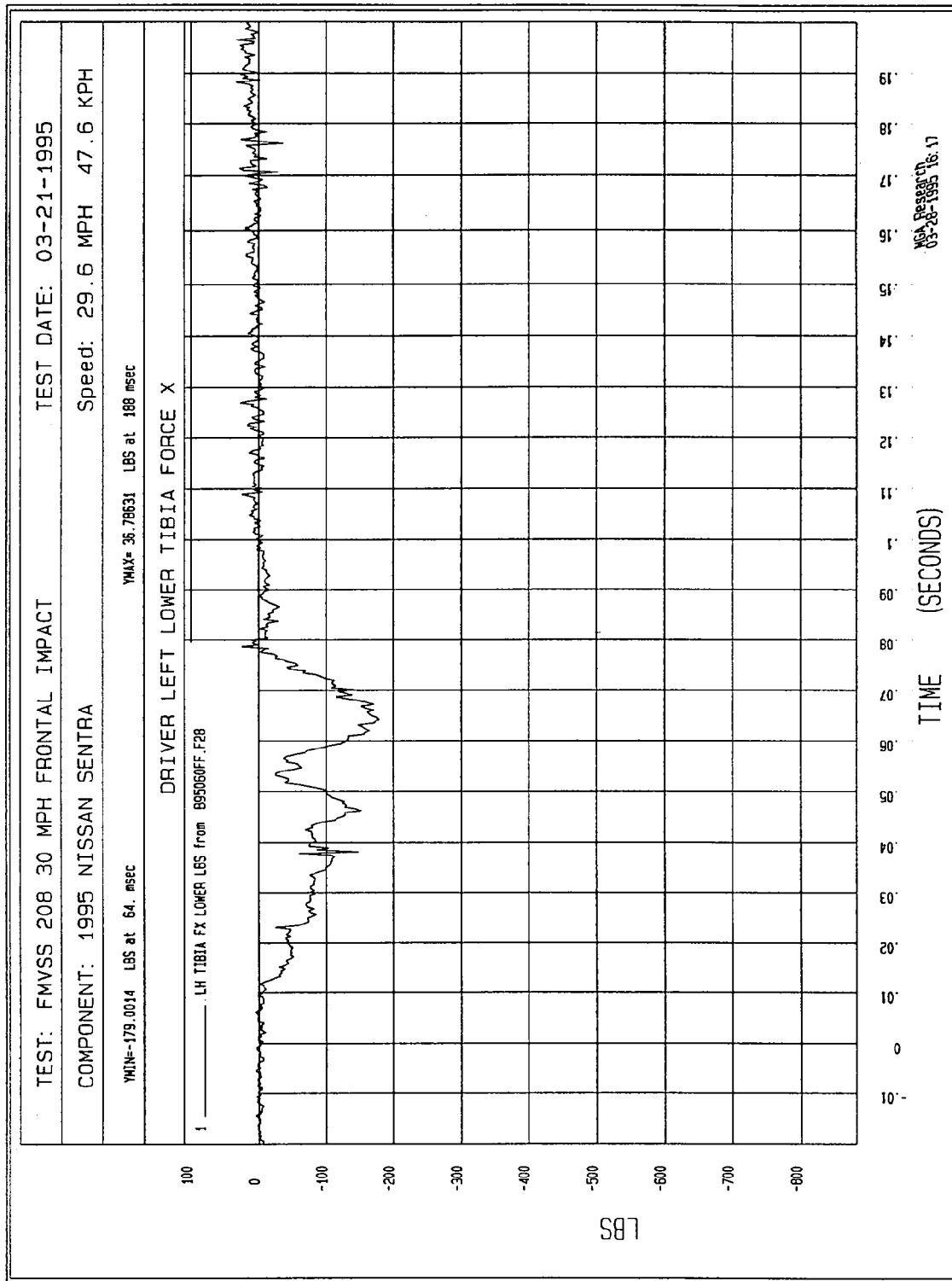


Figure B-12 - Driver Left Lower Tibia Force X vs. Time

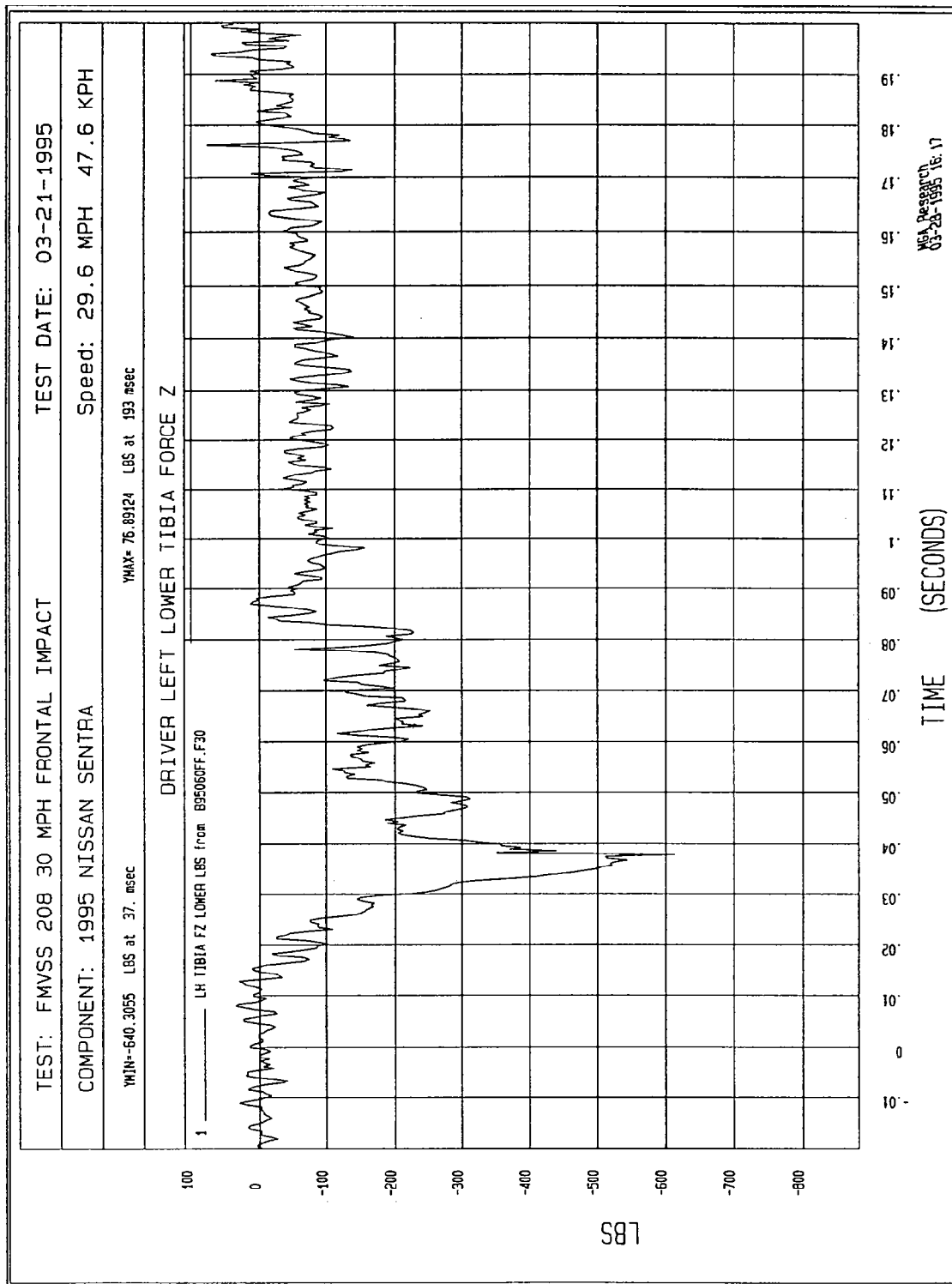


Figure B-13 - Driver Left Lower Tibia Force Z vs. Time

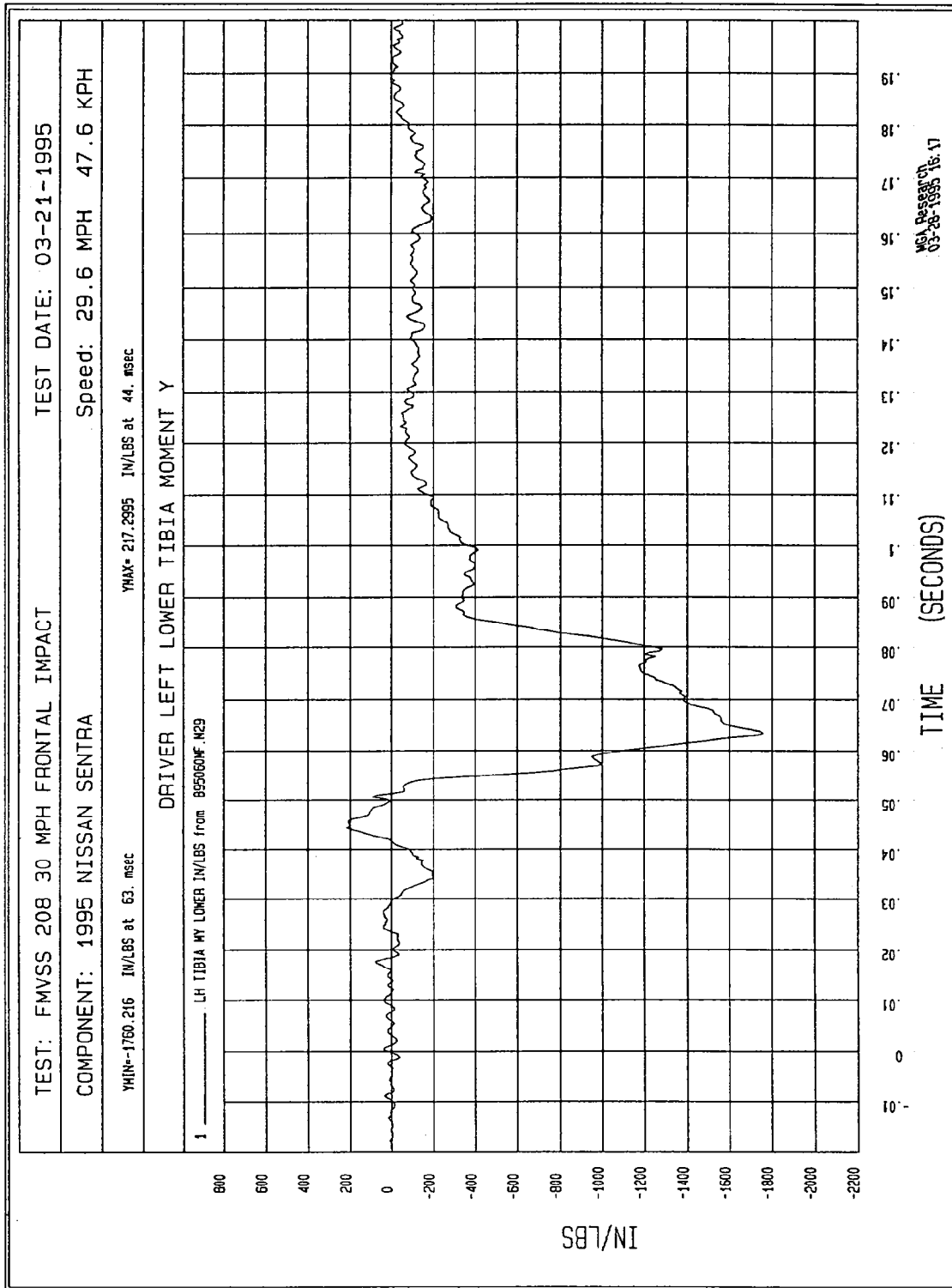


Figure B-14 - Driver Left Lower Tibia Moment Y vs. Time

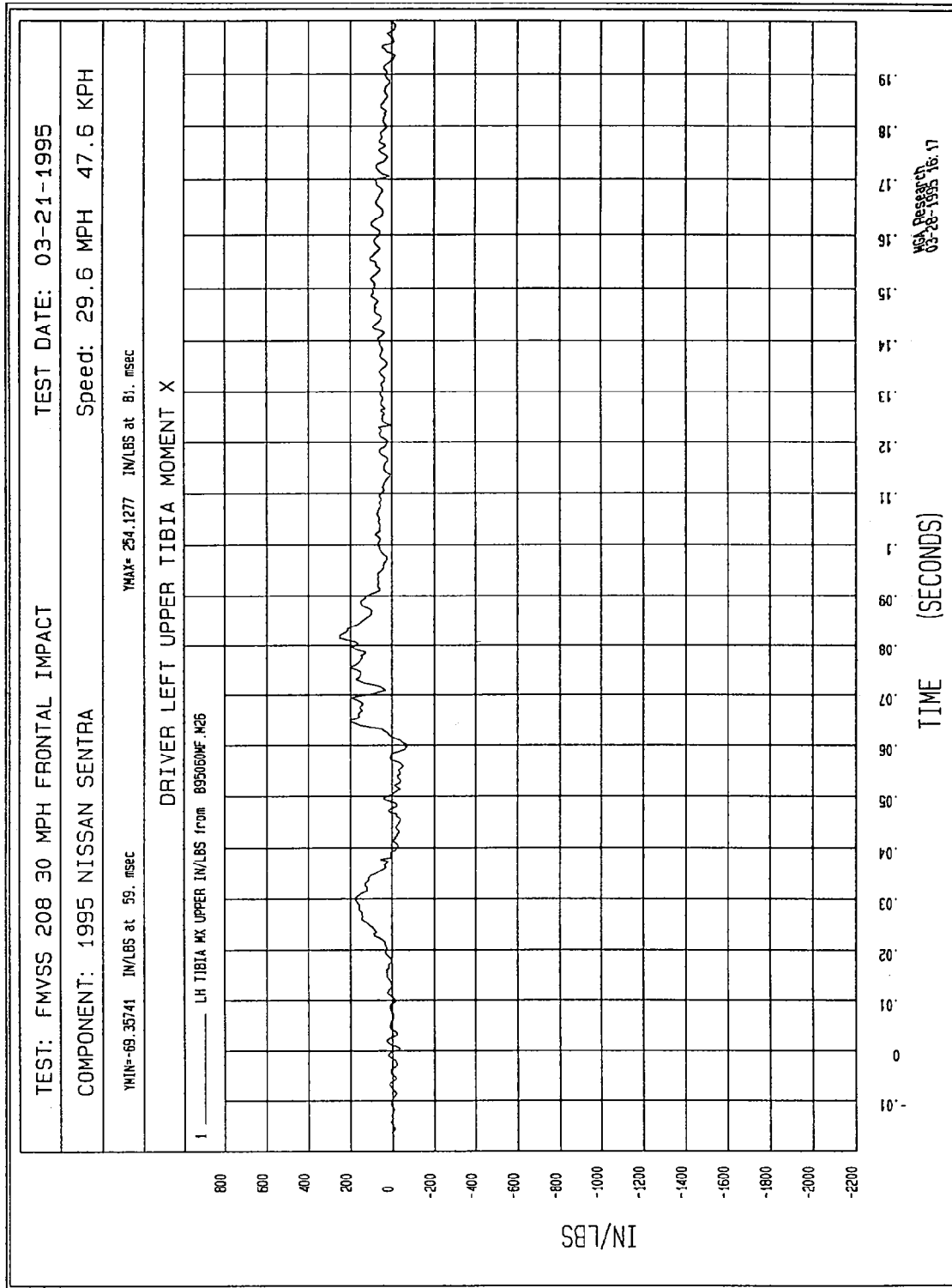


Figure B-15 - Driver Left Upper Tibia Moment X vs. Time

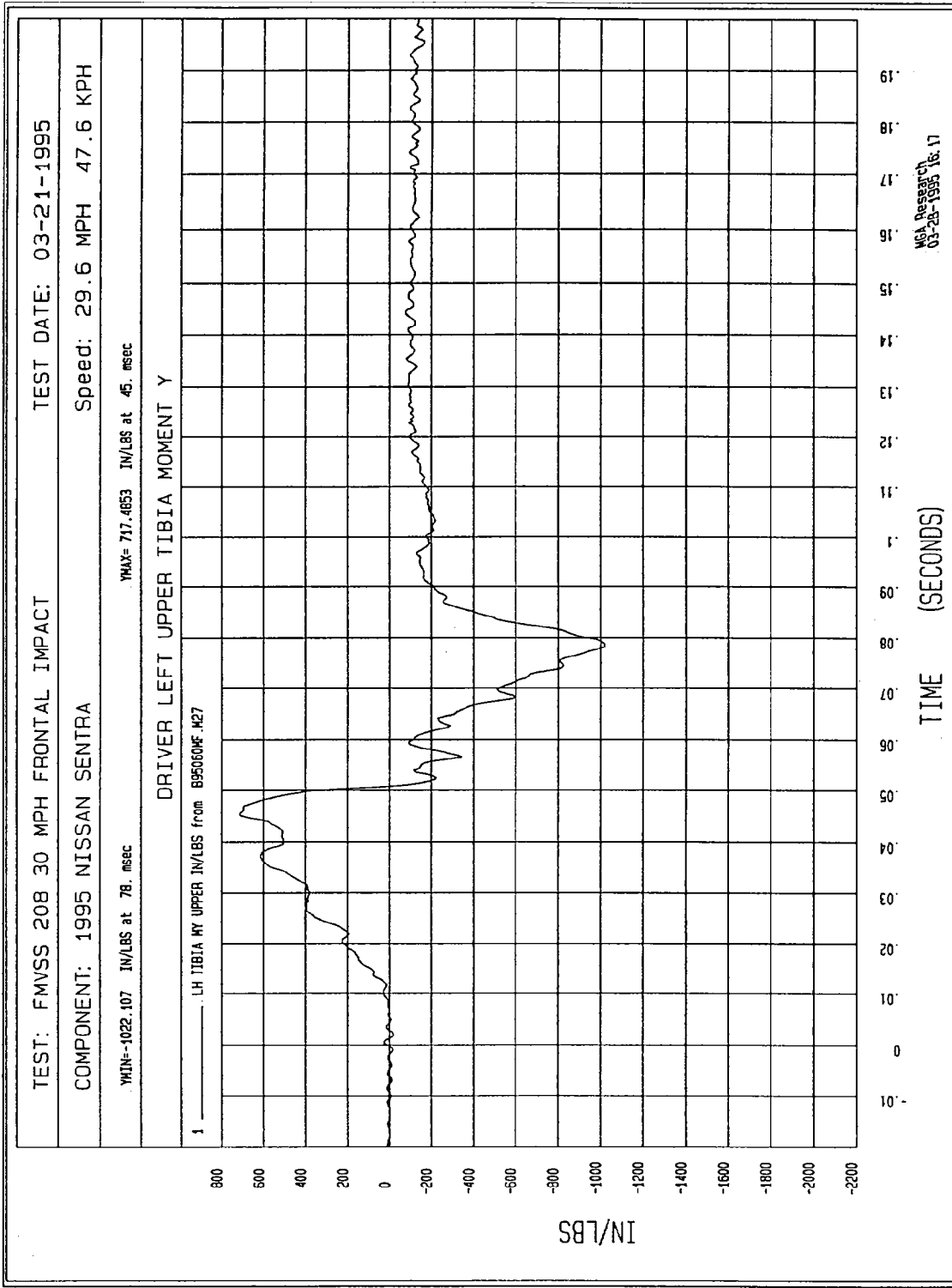


Figure B-16 - Driver Left Upper Tibia Moment Y vs. Time

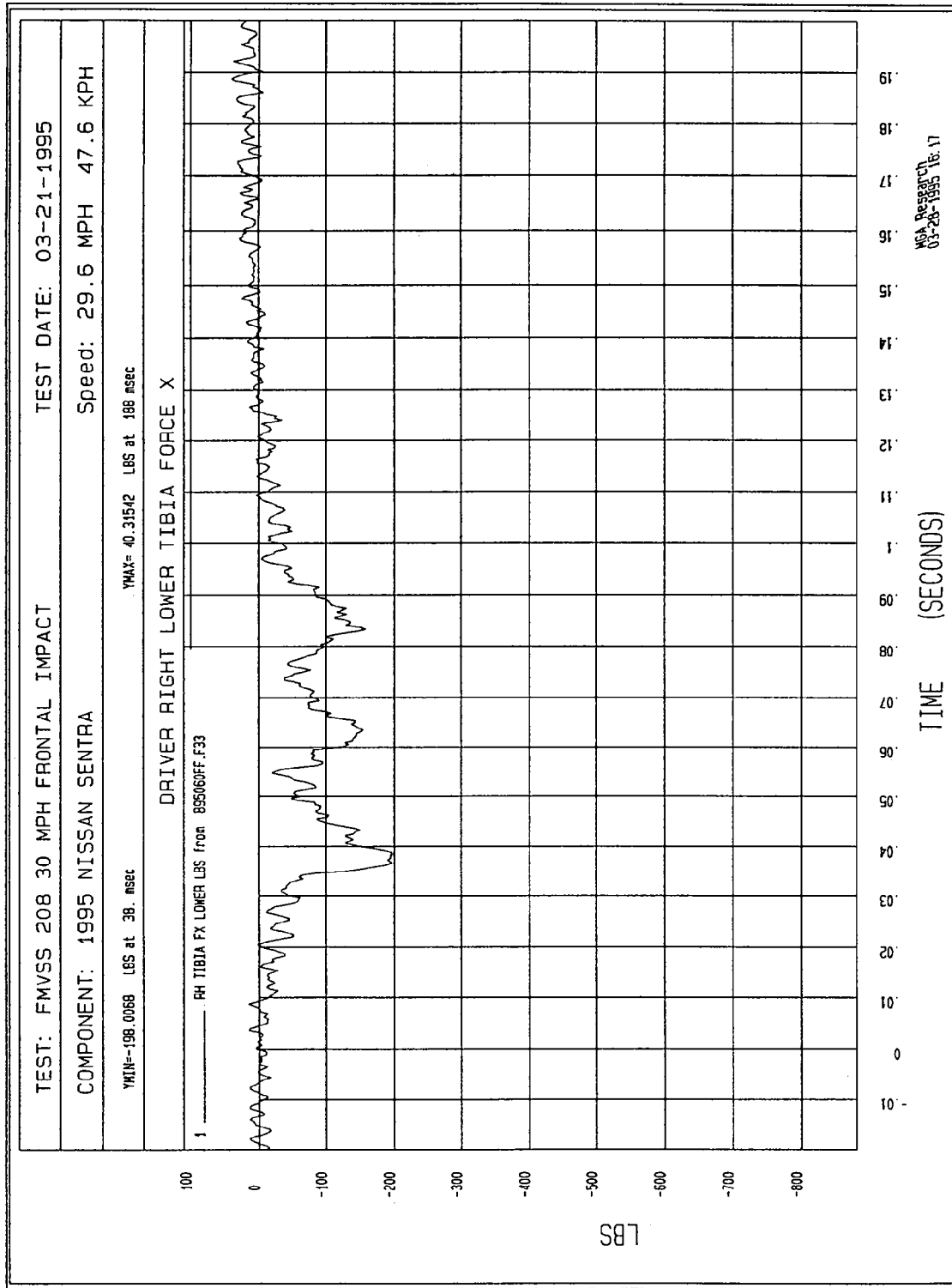


Figure B-17 - Driver Right Lower Tibia Force X vs. Time

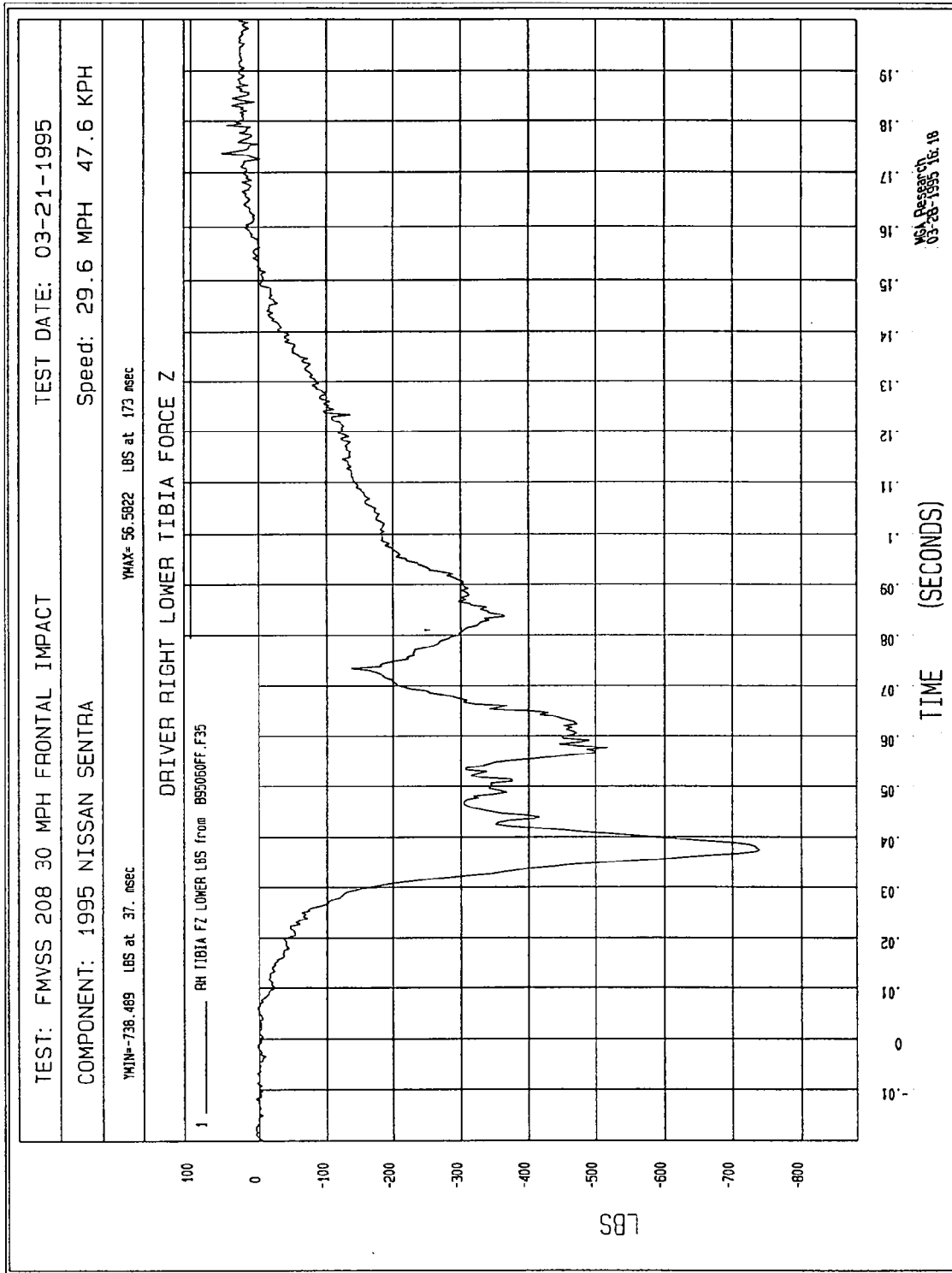


Figure B-18 - Driver Right Lower Tibia Force Z vs. Time

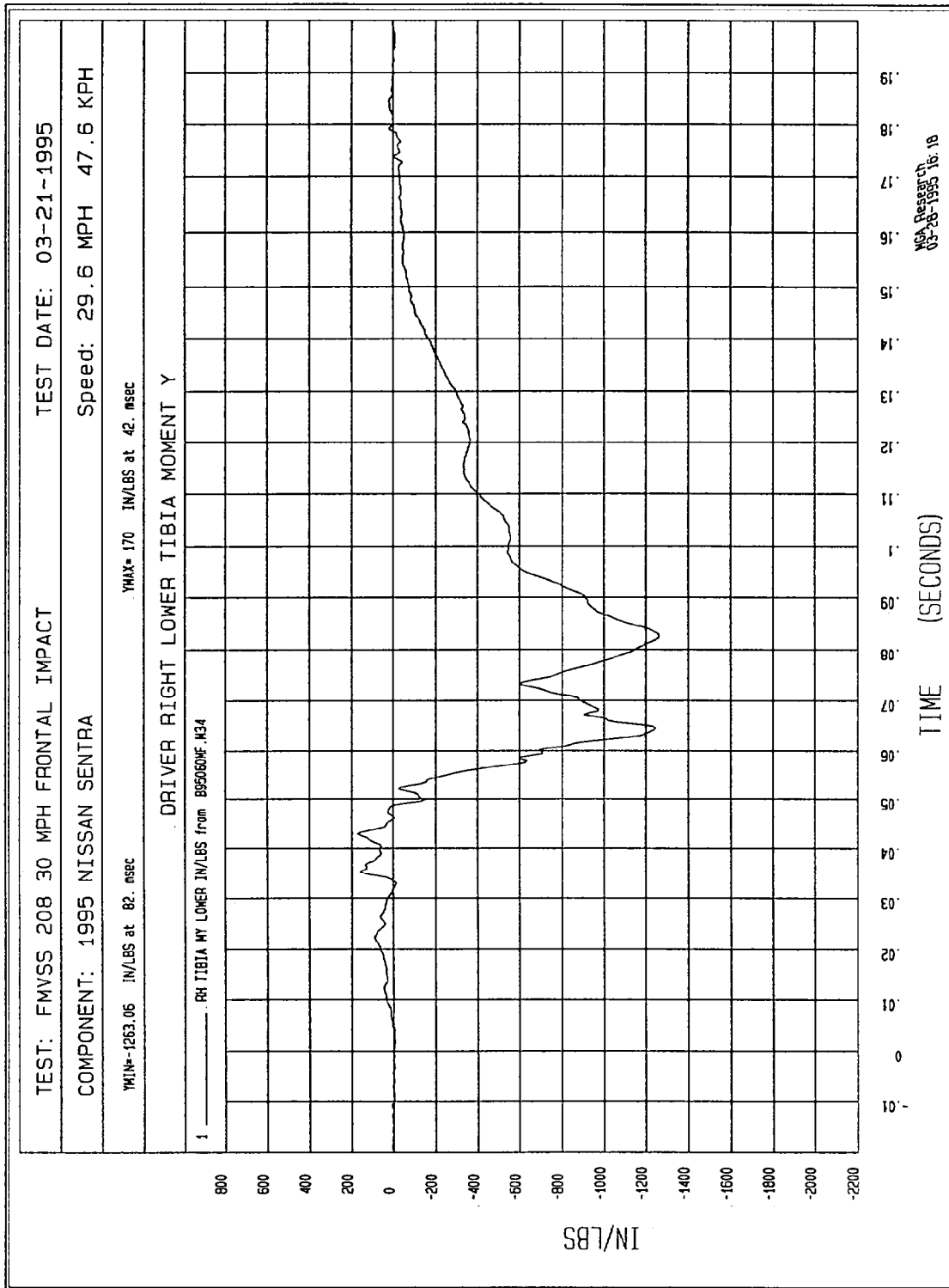


Figure B-19 - Driver Right Lower Tibia Moment Y vs. Time

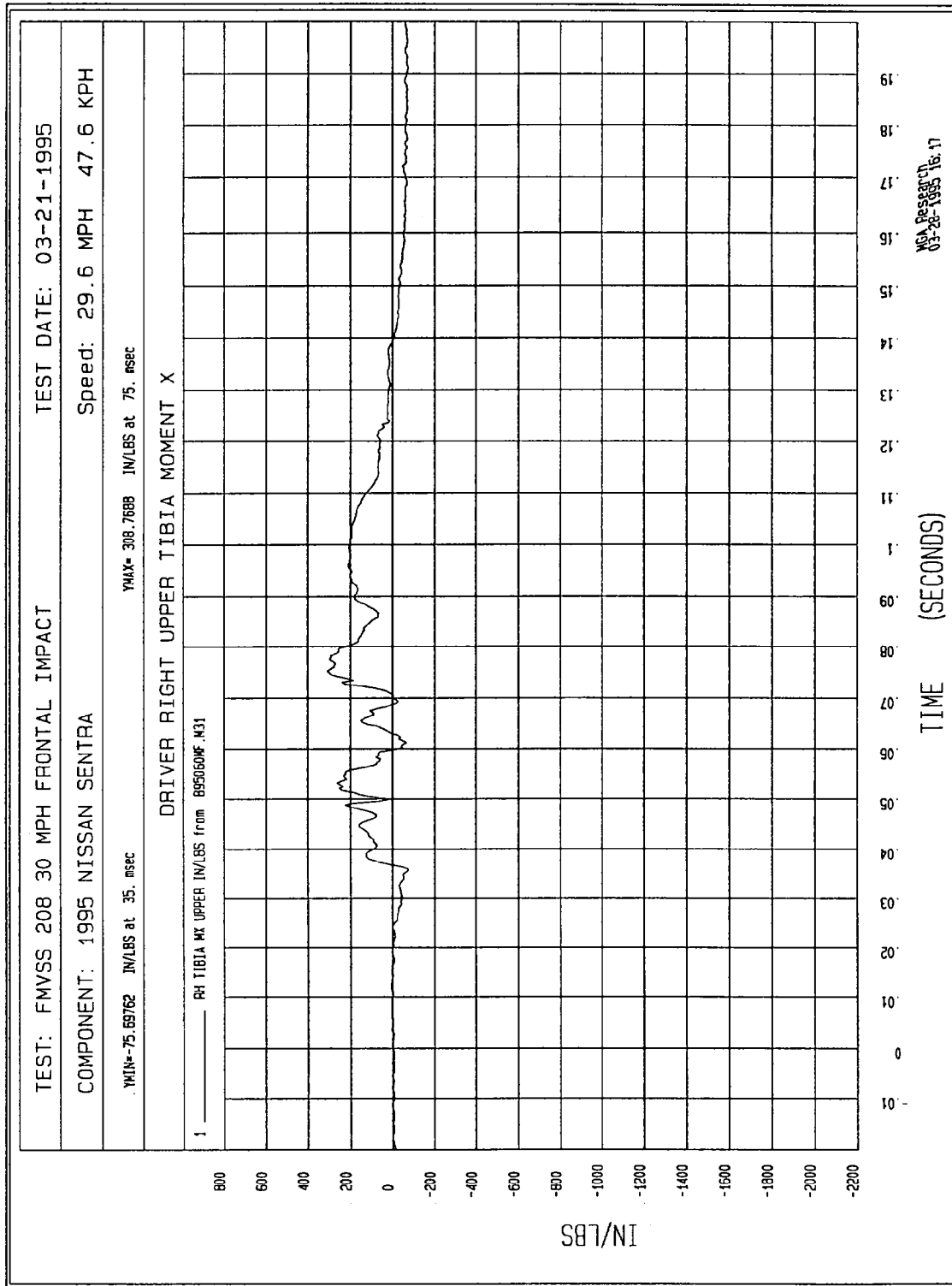


Figure B-20 - Driver Right Upper Tibia Moment X vs. Time

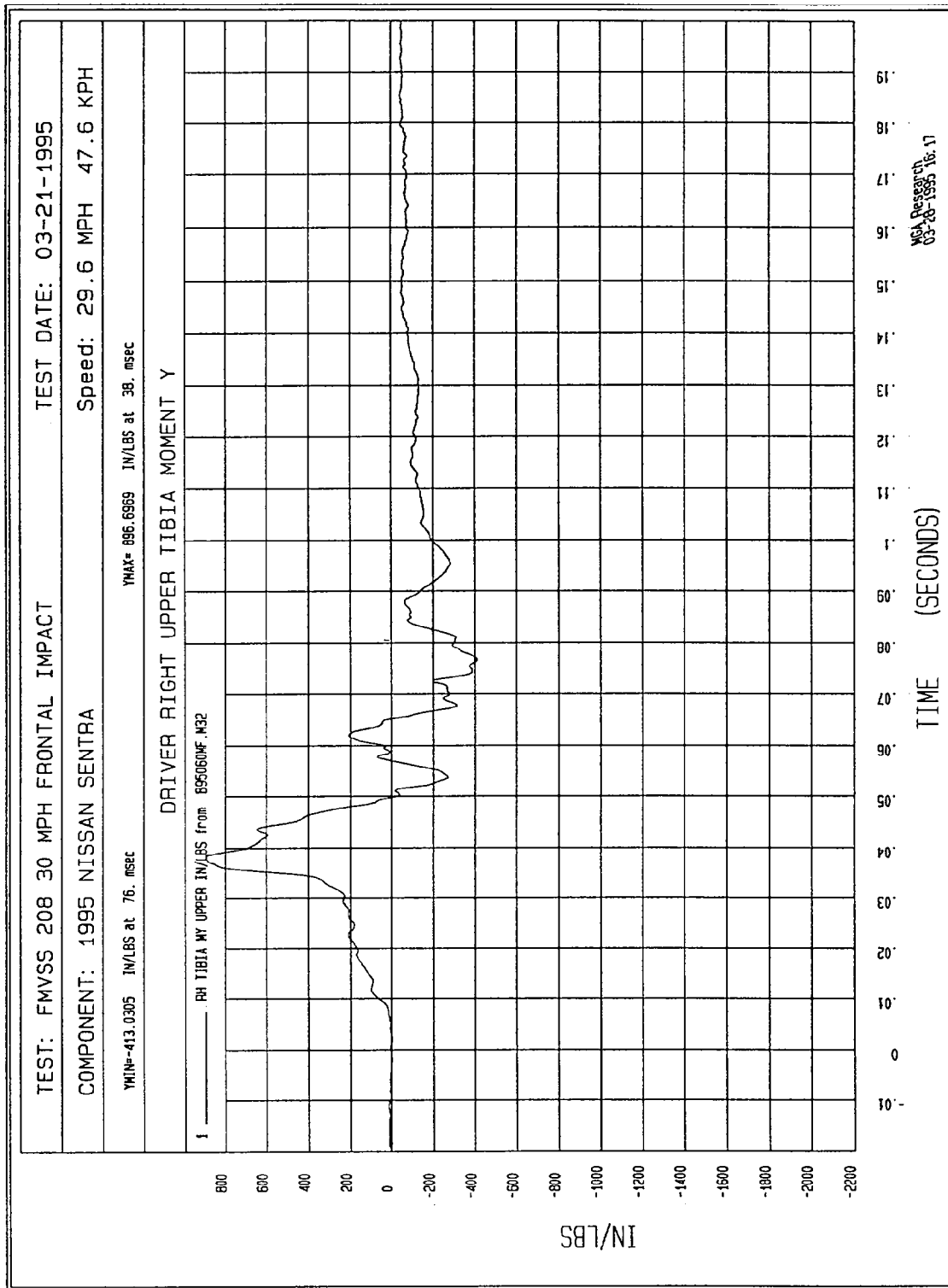


Figure B-21 - Driver Right Upper Tibia Moment Y vs. Time

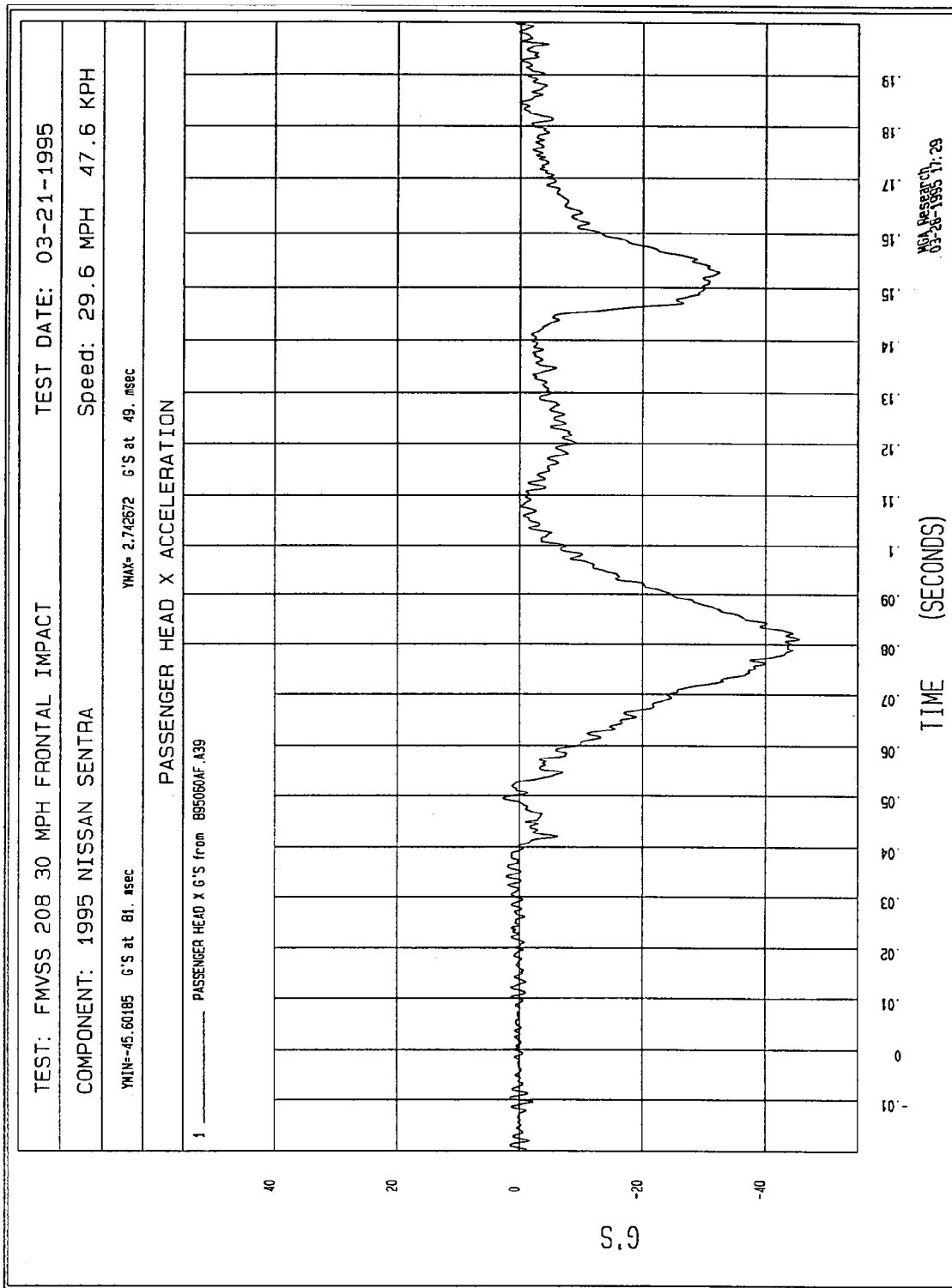


Figure B-22 - Passenger Head X Acceleration vs. Time

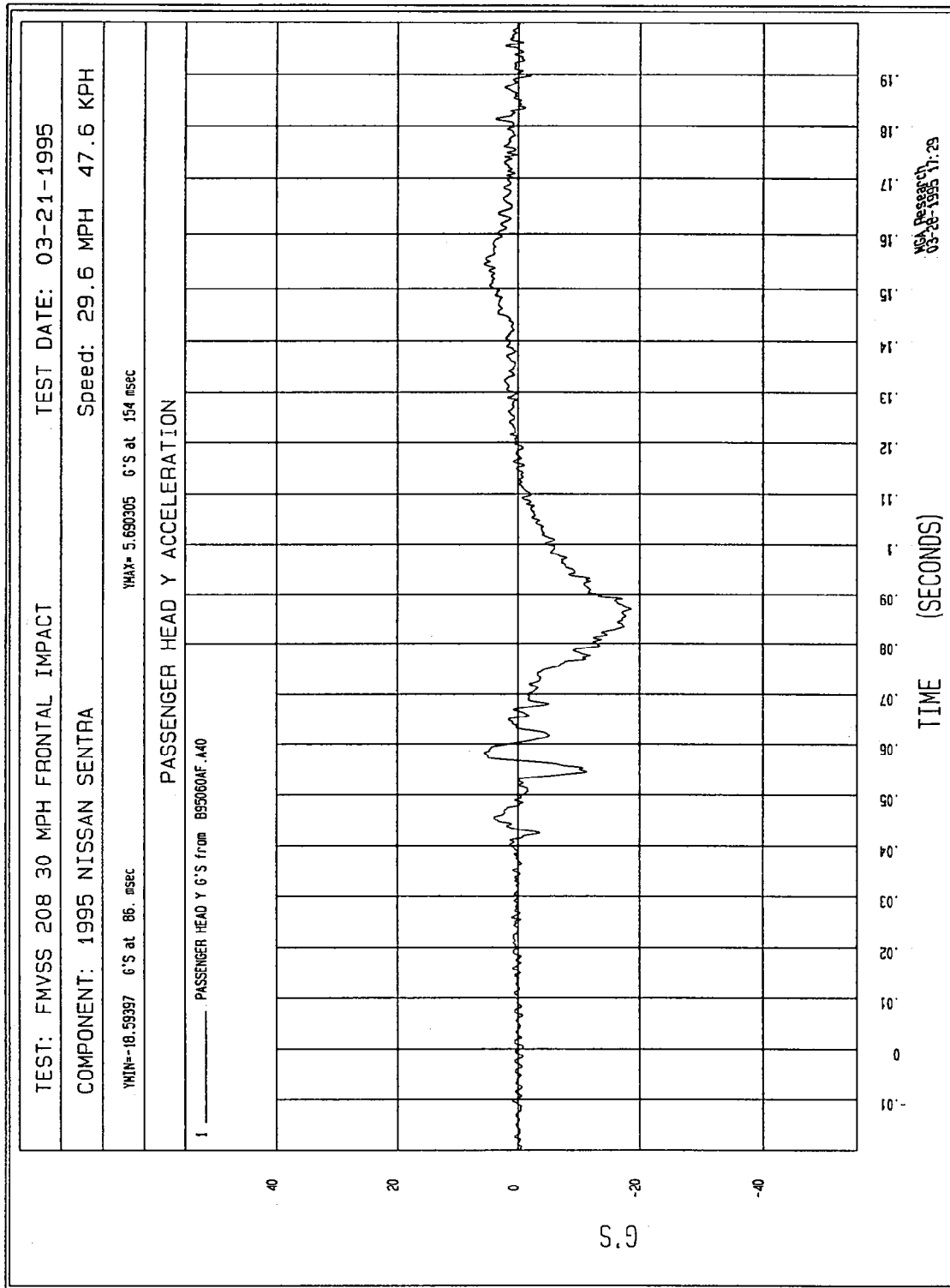


Figure B-23 - Passenger Head Y Acceleration vs. Time

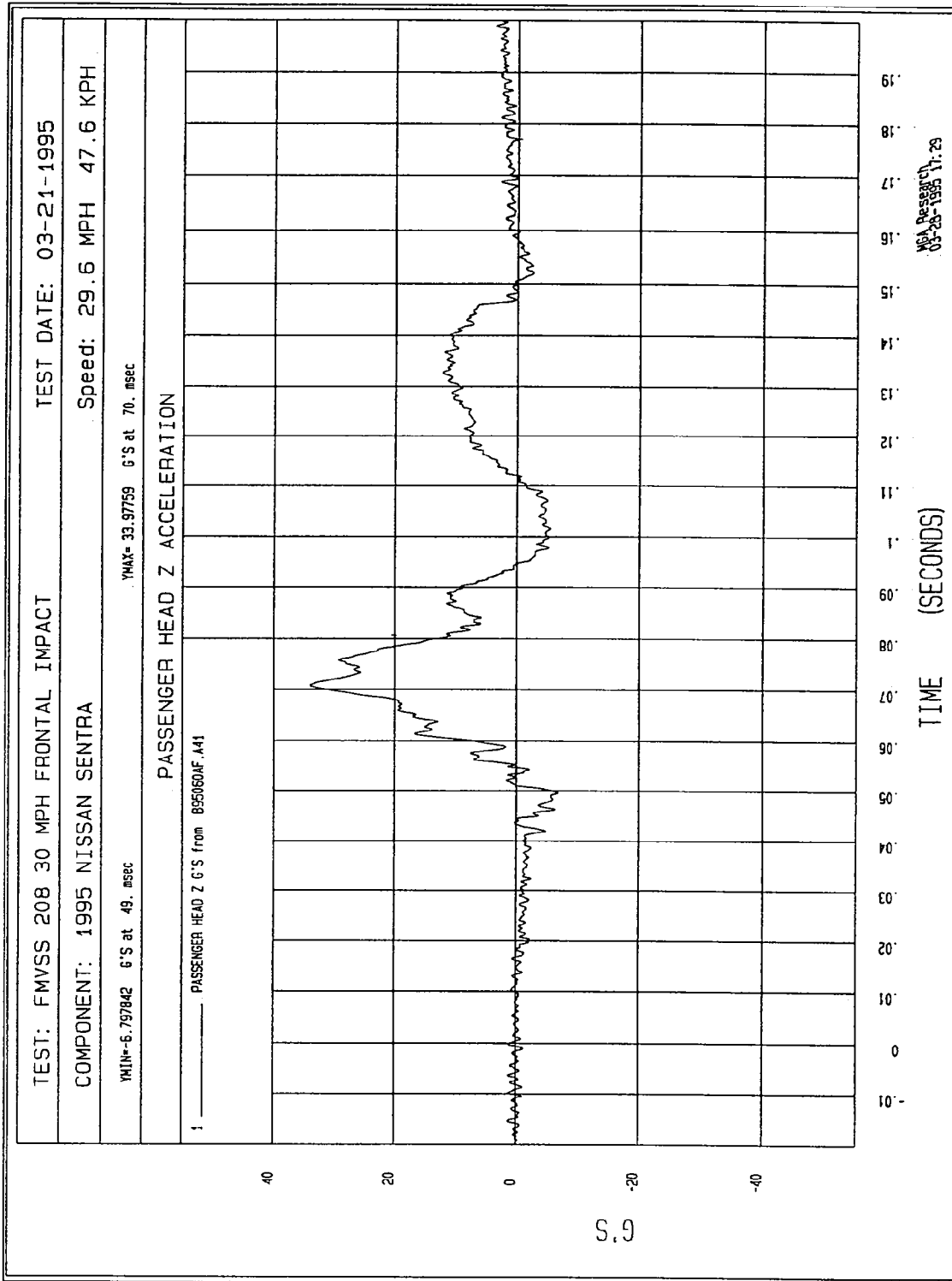


Figure B-24 - Passenger Head Z Acceleration vs. Time

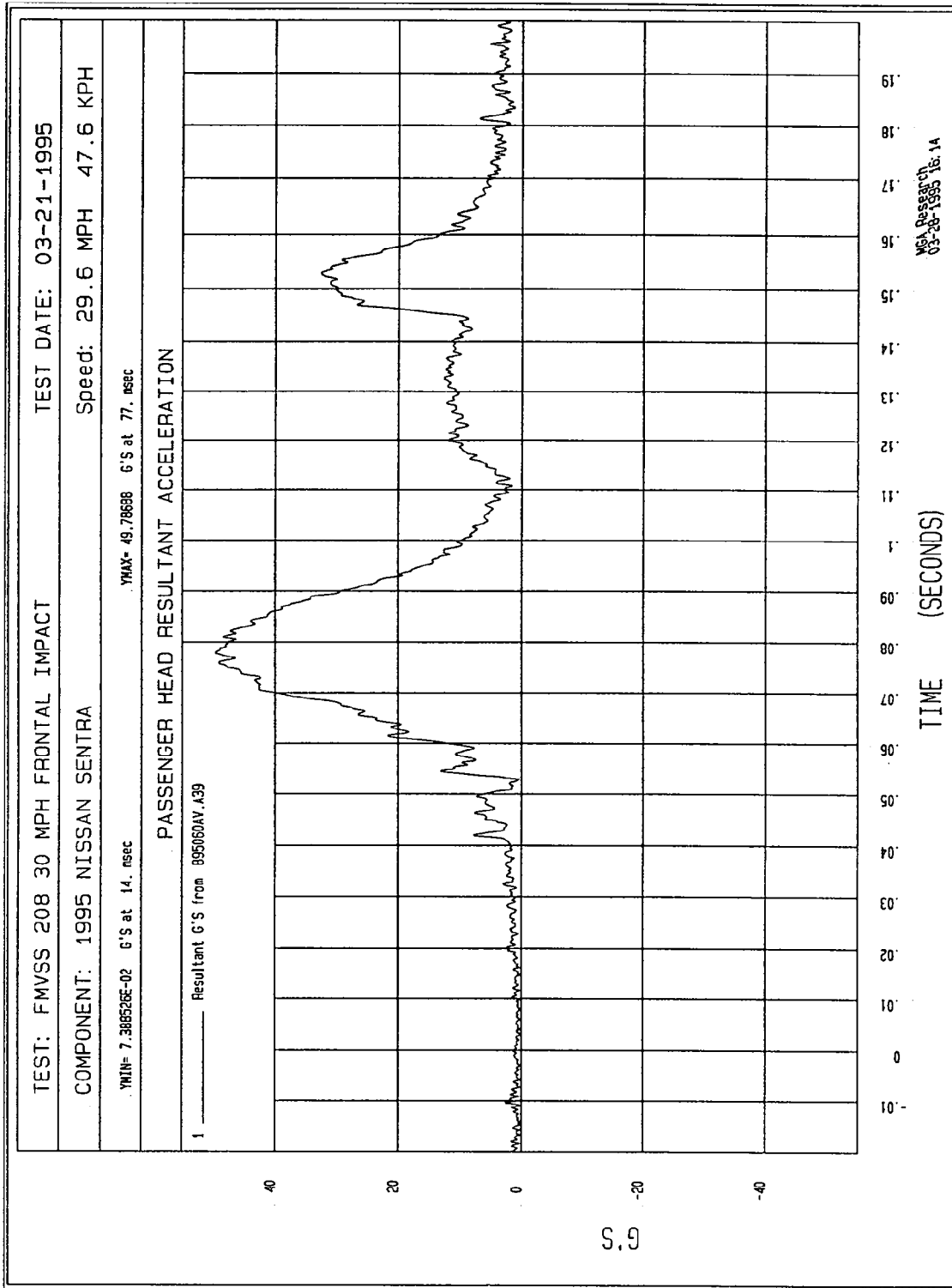


Figure B-25 - Passenger Head Resultant Acceleration vs. Time

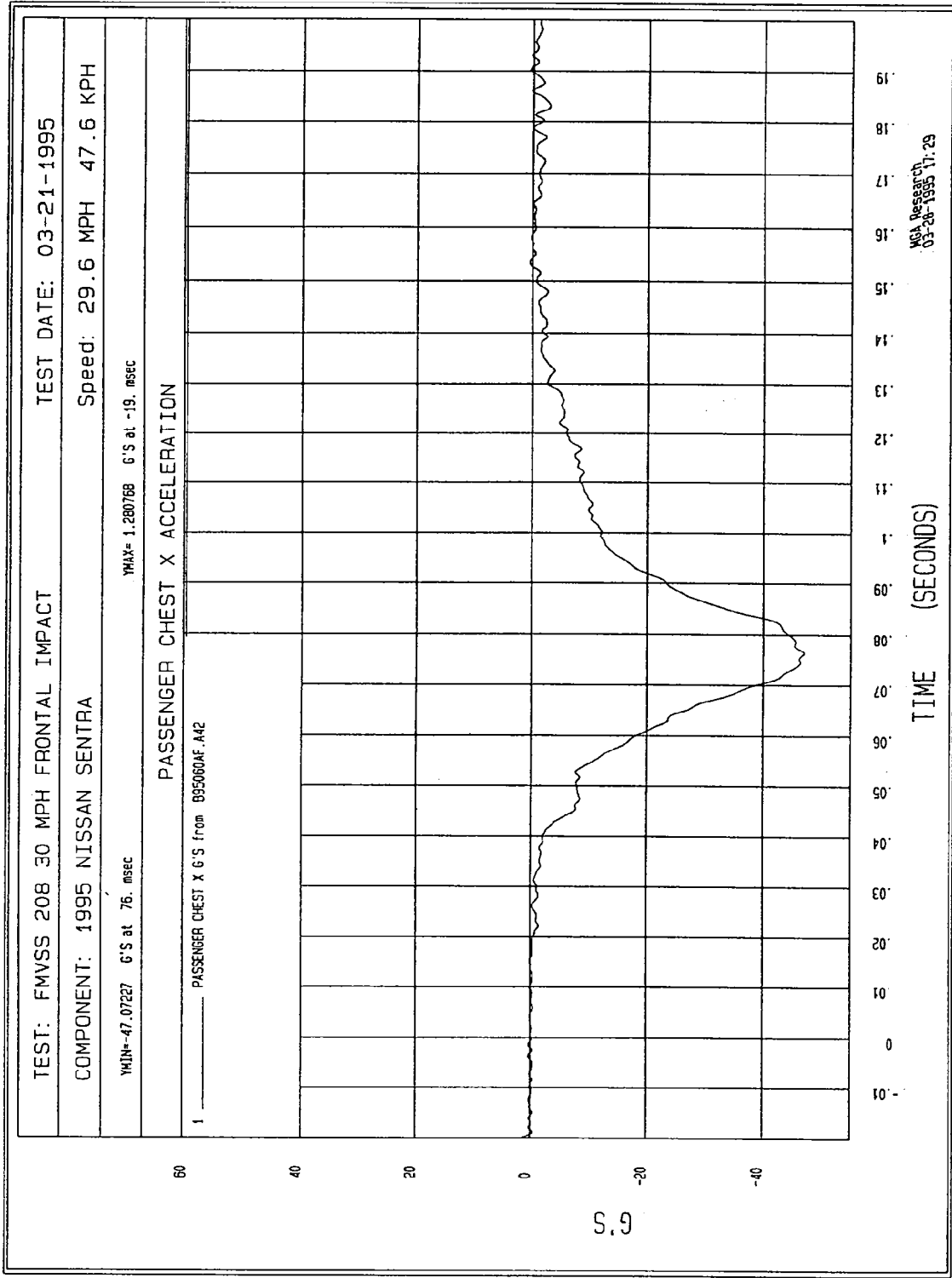


Figure B-26 - Passenger Chest X Acceleration vs. Time

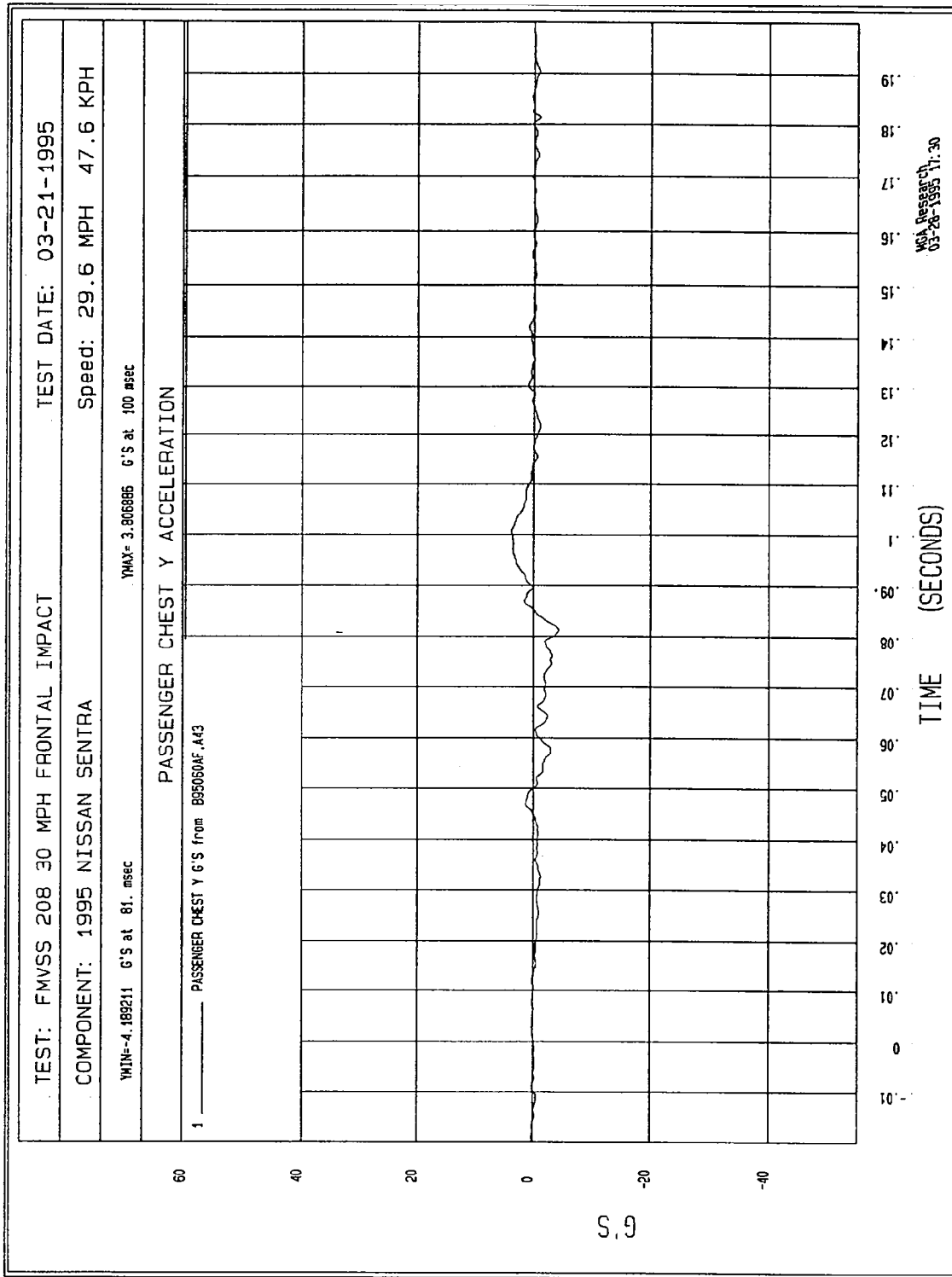


Figure B-27 - Passenger Chest Y Acceleration vs. Time

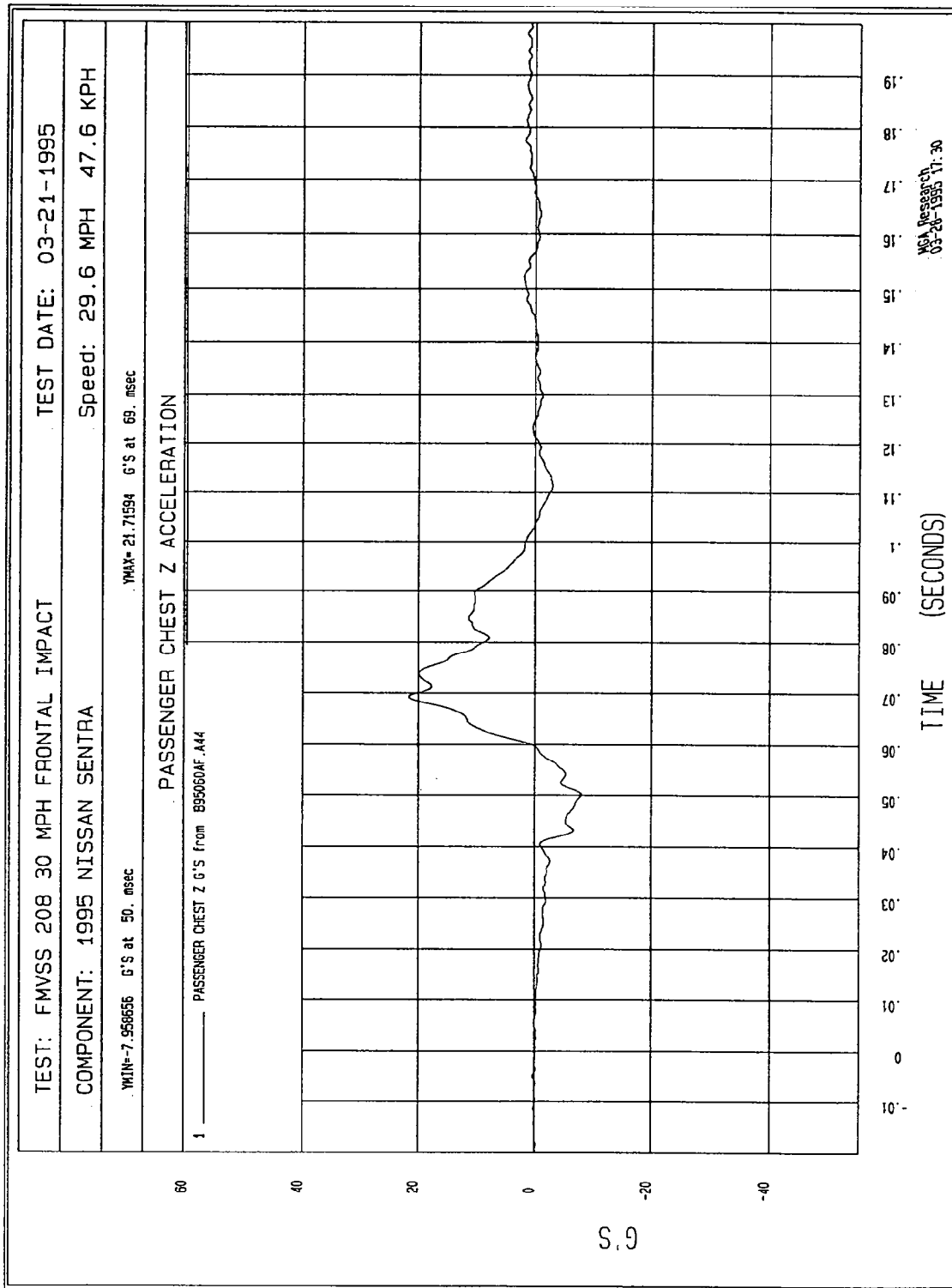


Figure B-28 - Passenger Chest Z Acceleration vs. Time

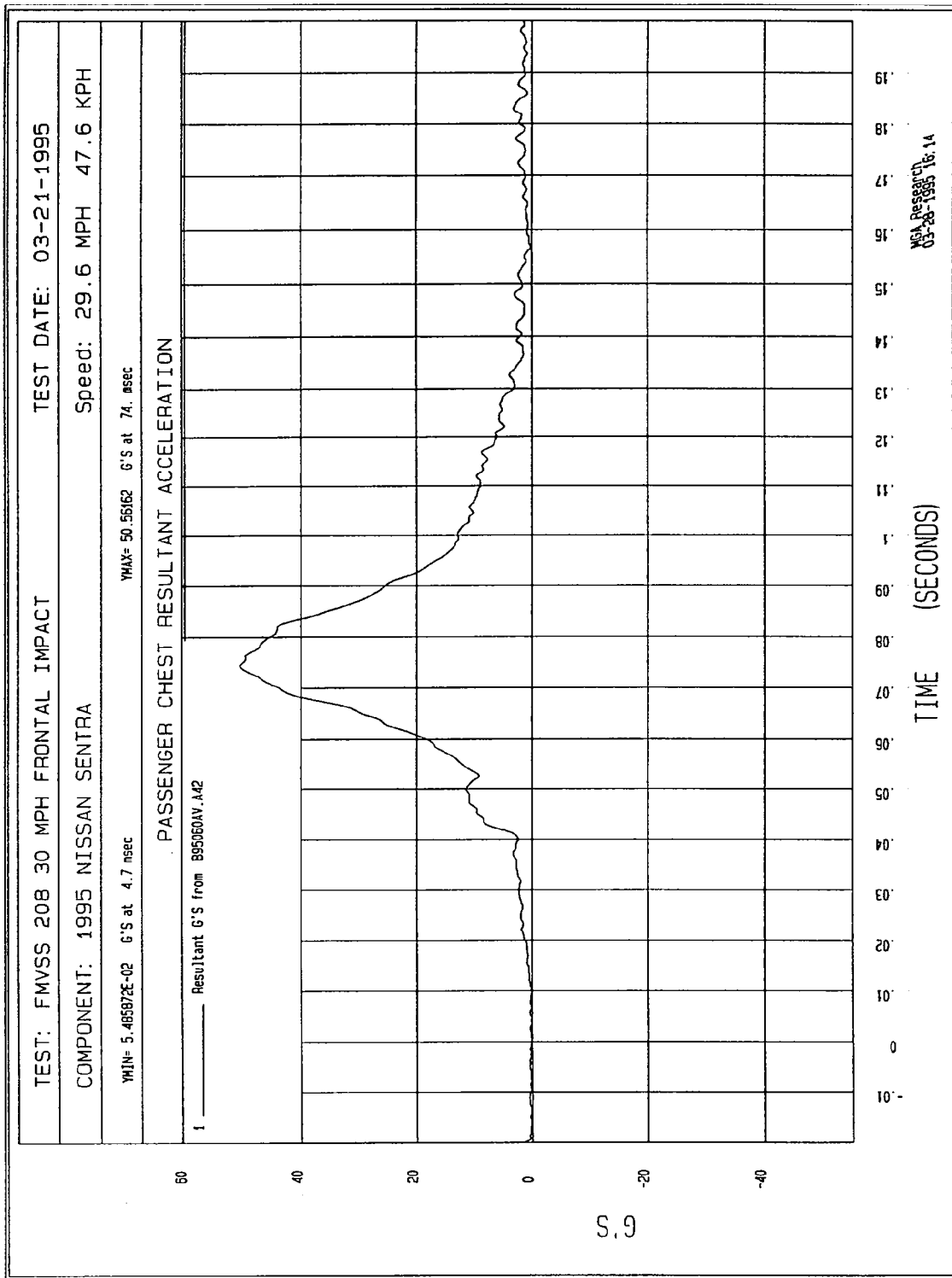


Figure B-29 - Passenger Chest Resultant Acceleration vs. Time

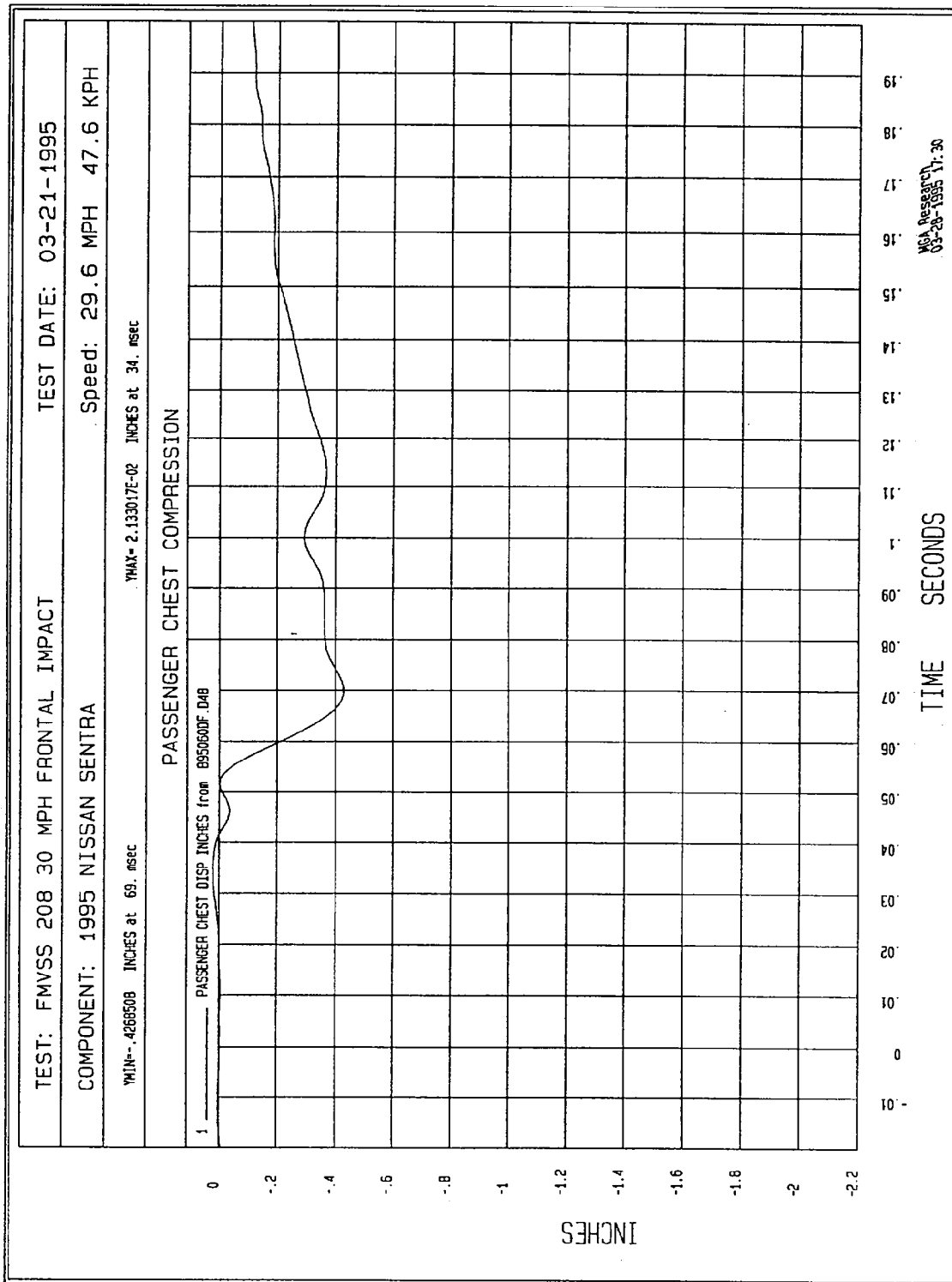


Figure B-30 - Passenger Chest Compression vs. Time

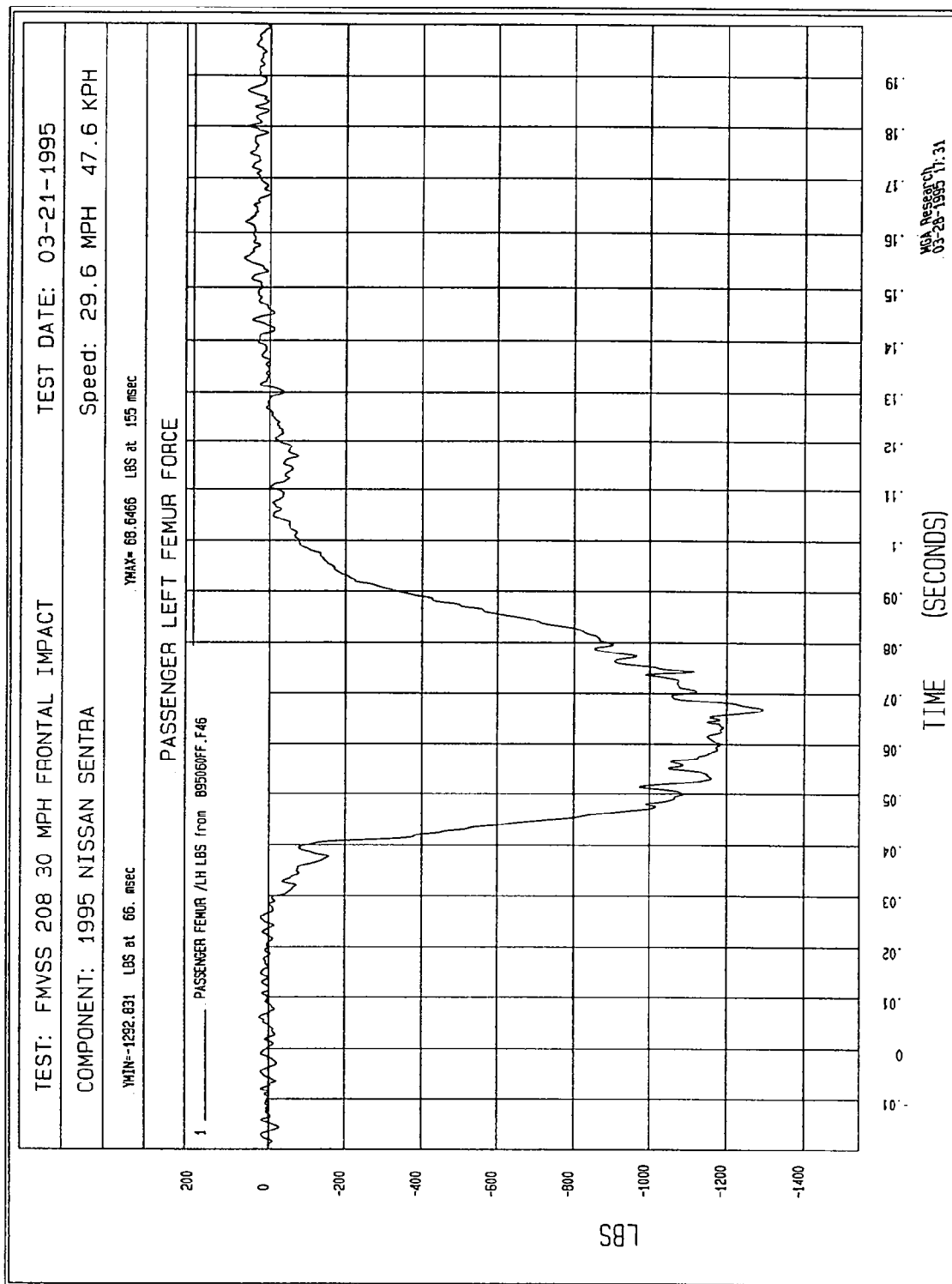


Figure B-31 - Passenger Left Femur Force vs. Time

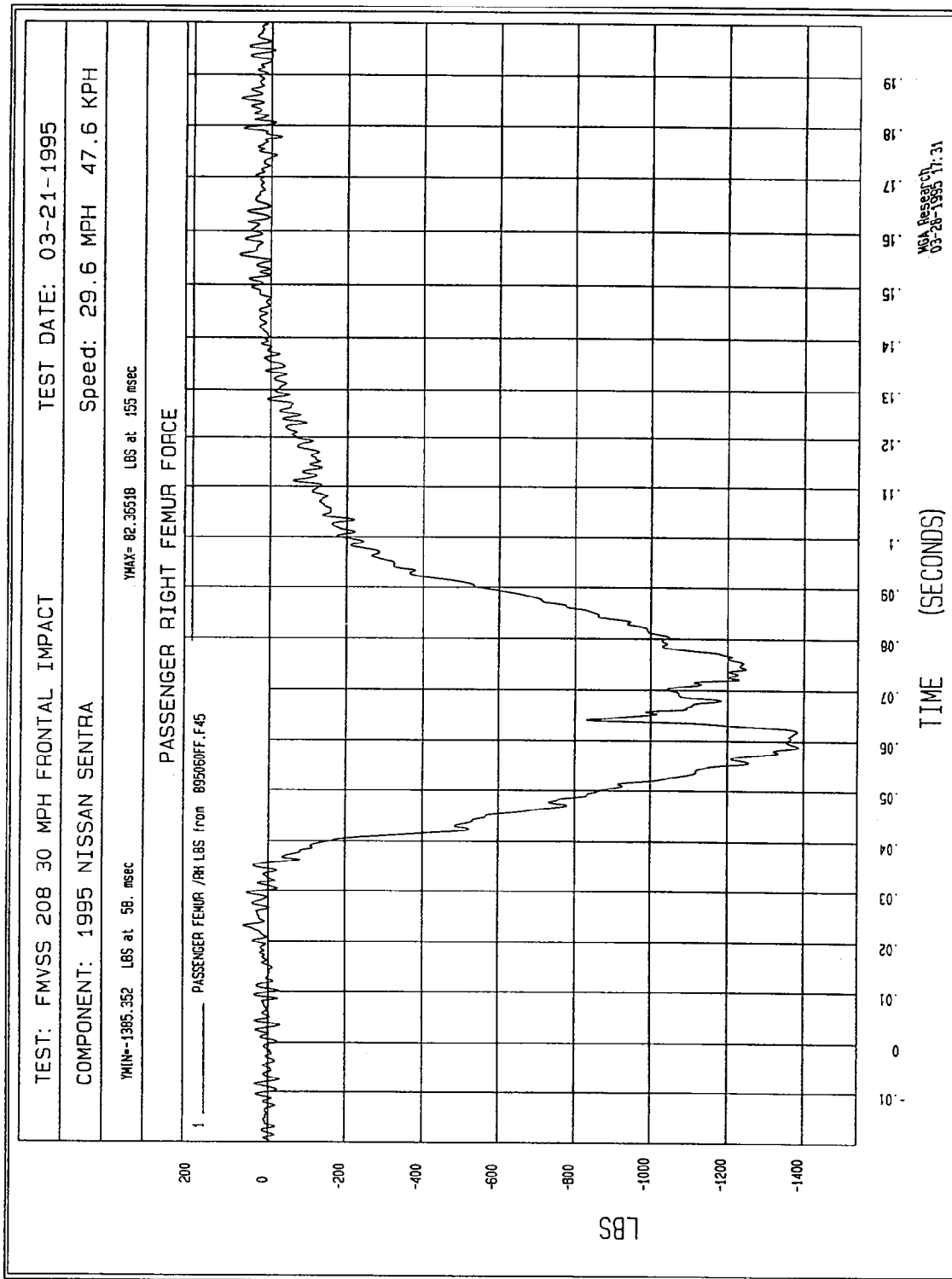


Figure B-32 - Passenger Right Femur Force vs. Time

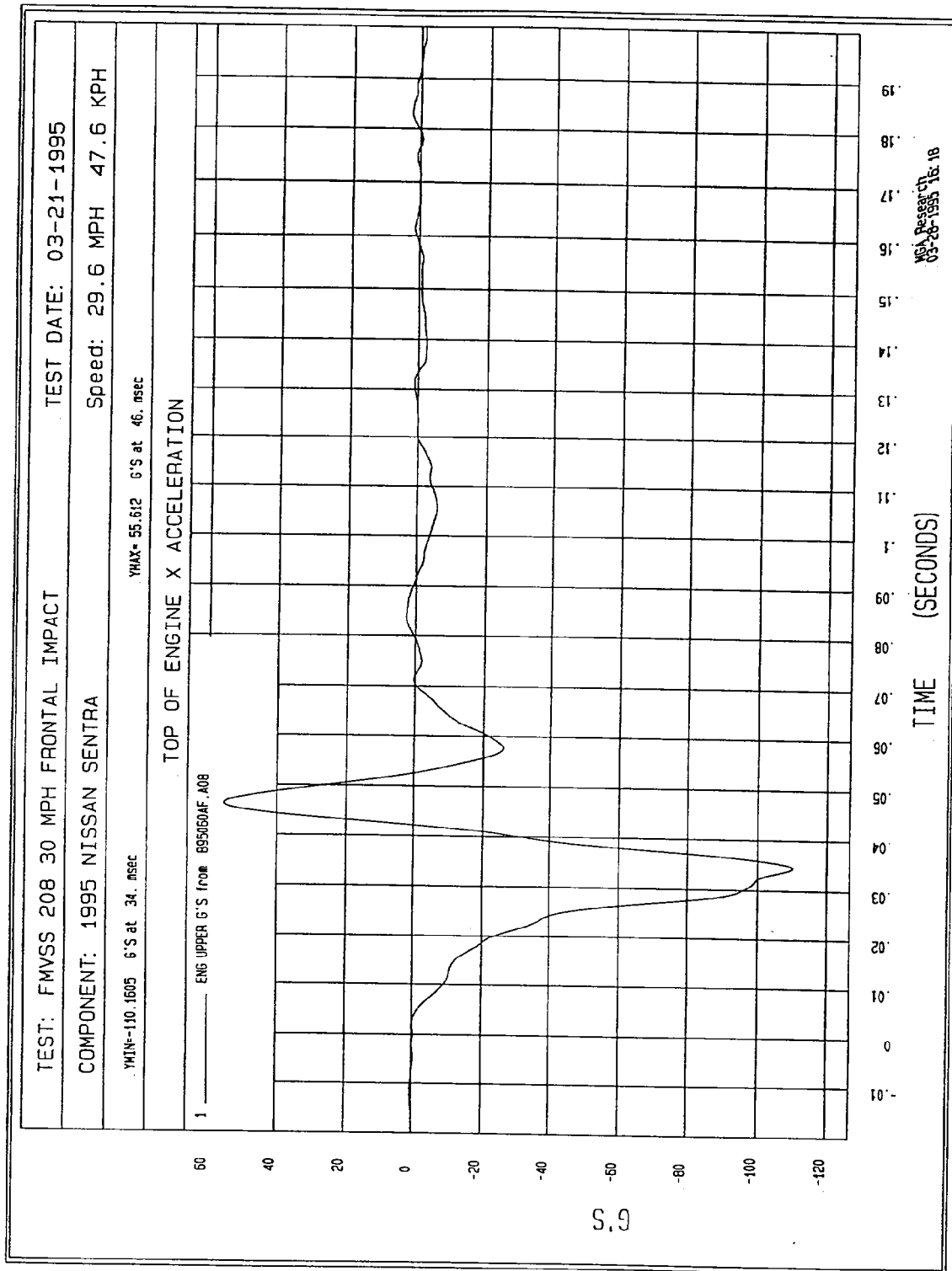


Figure B-33 - Top of Engine X Acceleration vs. Time

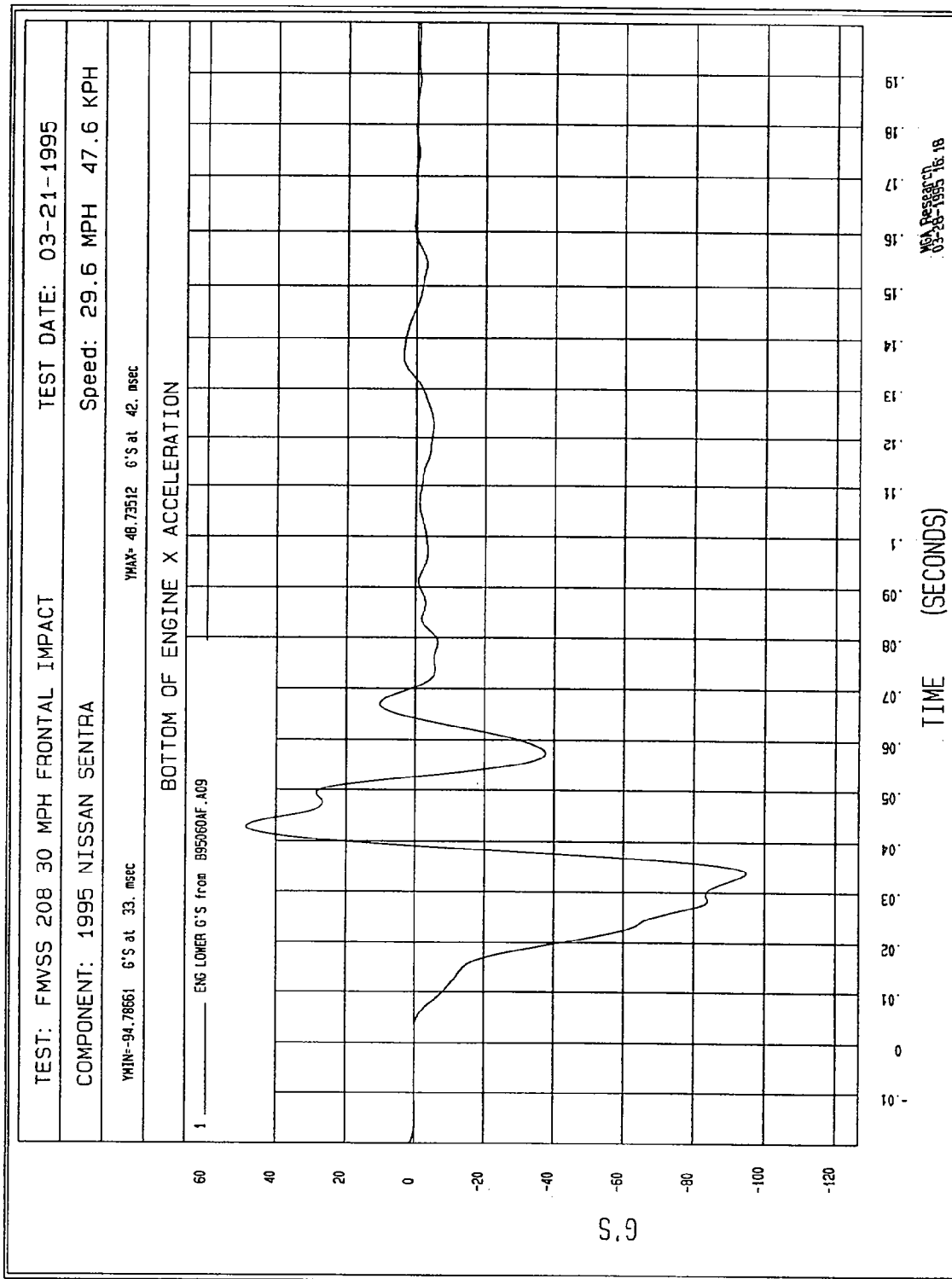


Figure B-34 - Bottom of Engine X Acceleration vs. Time

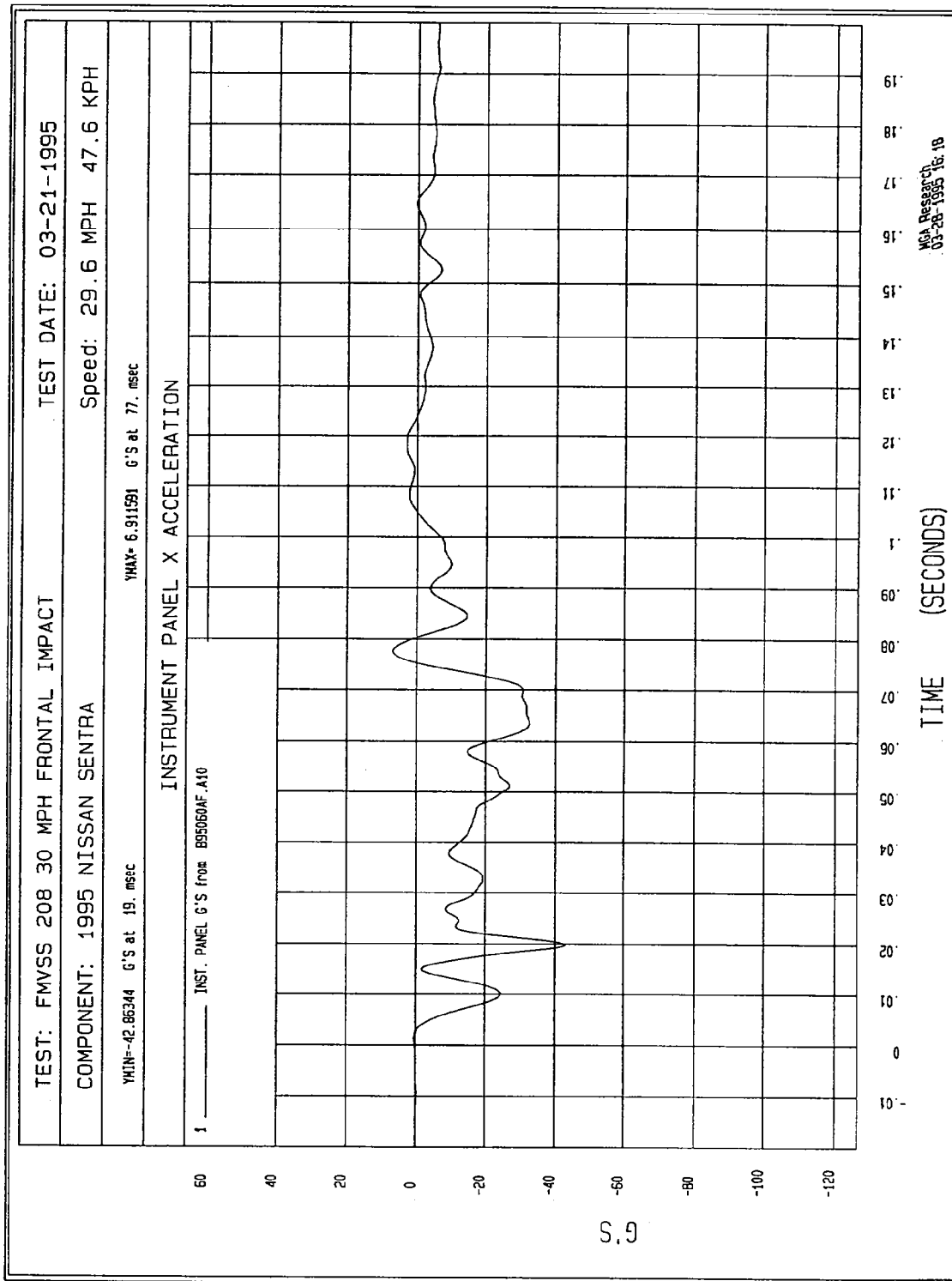


Figure B-35 - Instrument Panel X Acceleration vs. Time

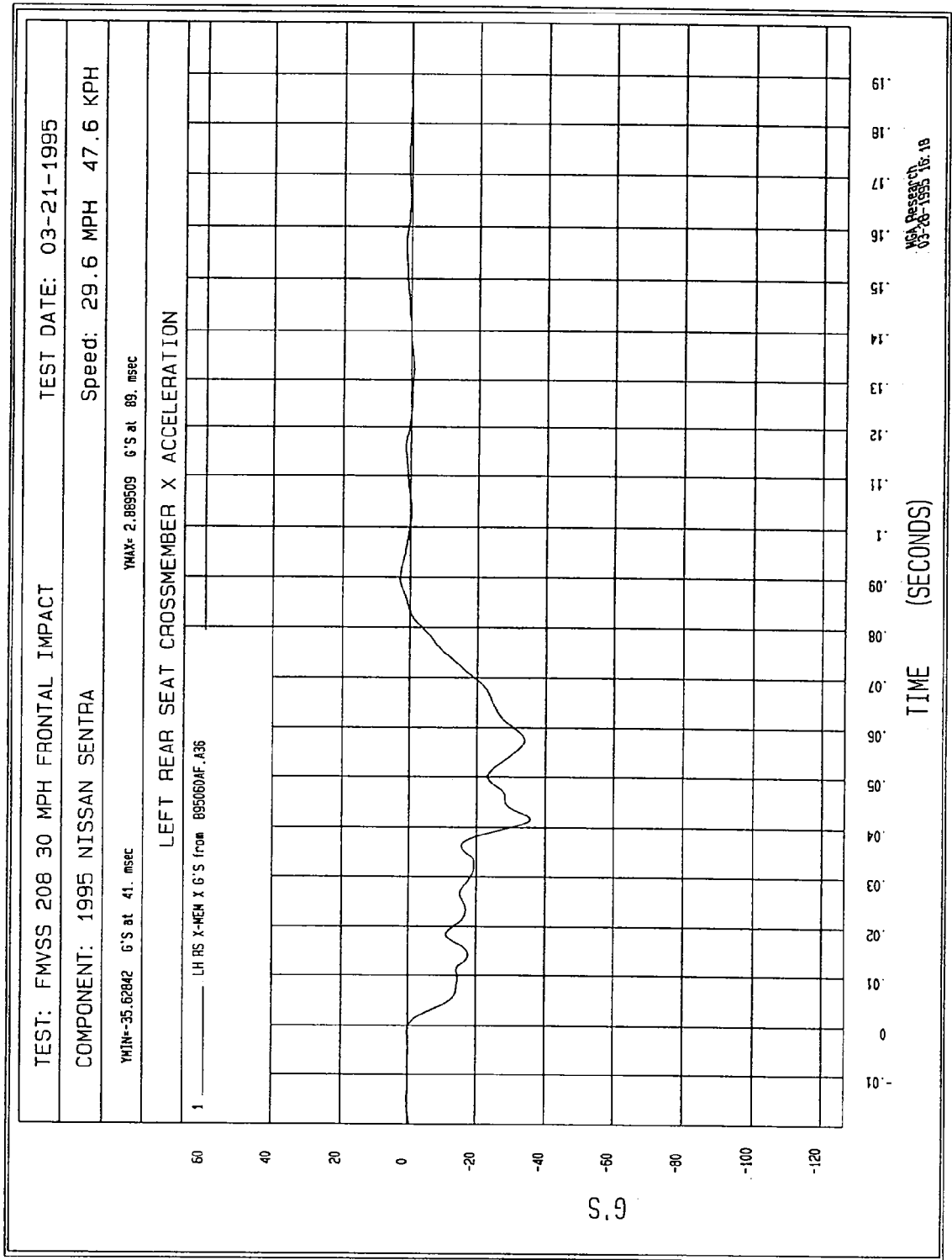


Figure B-36 - Left Rear Seat Crossmember X Acceleration vs. Time

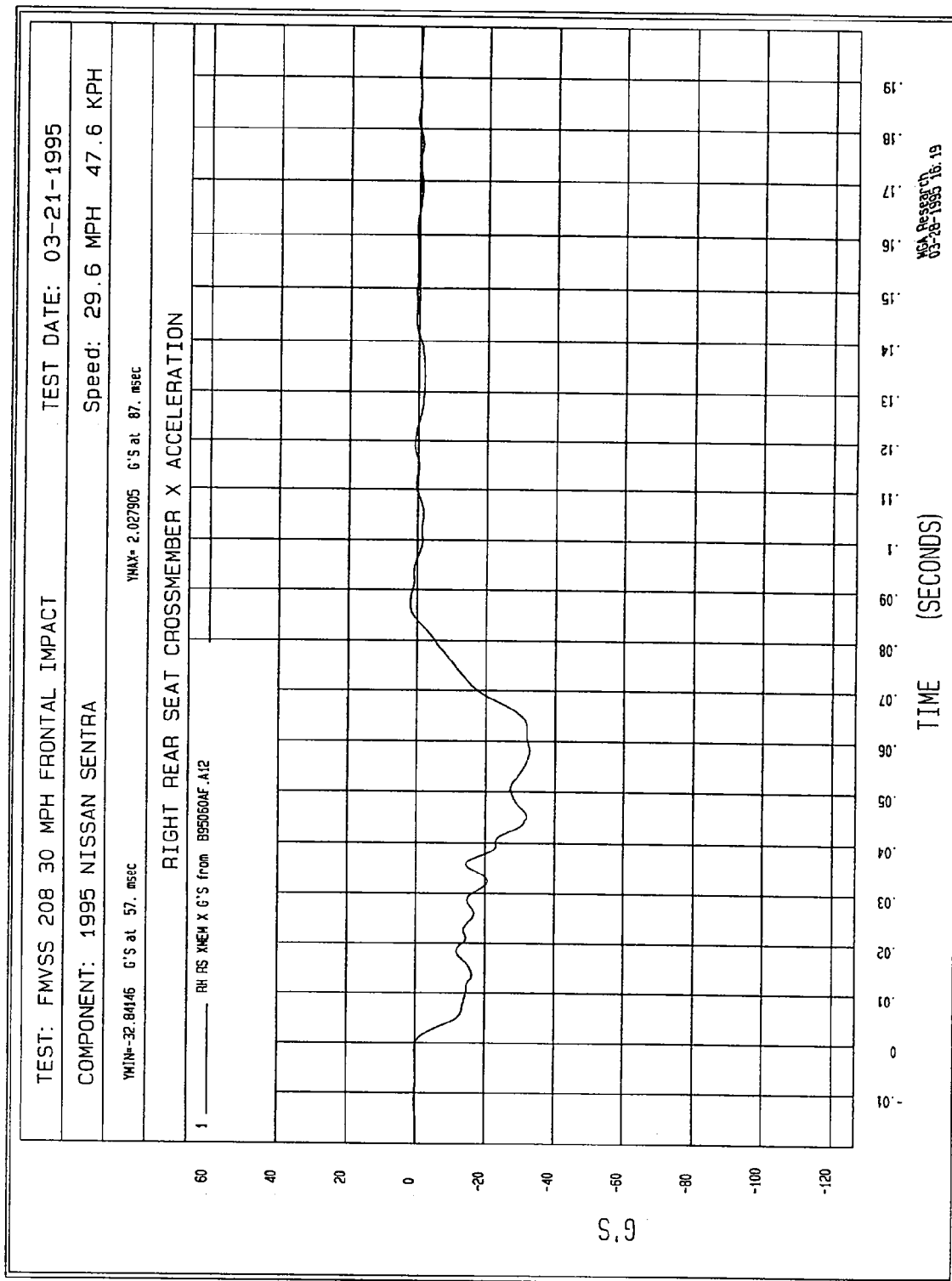


Figure B-37 - Right Rear Seat Crossmember X Acceleration vs. Time

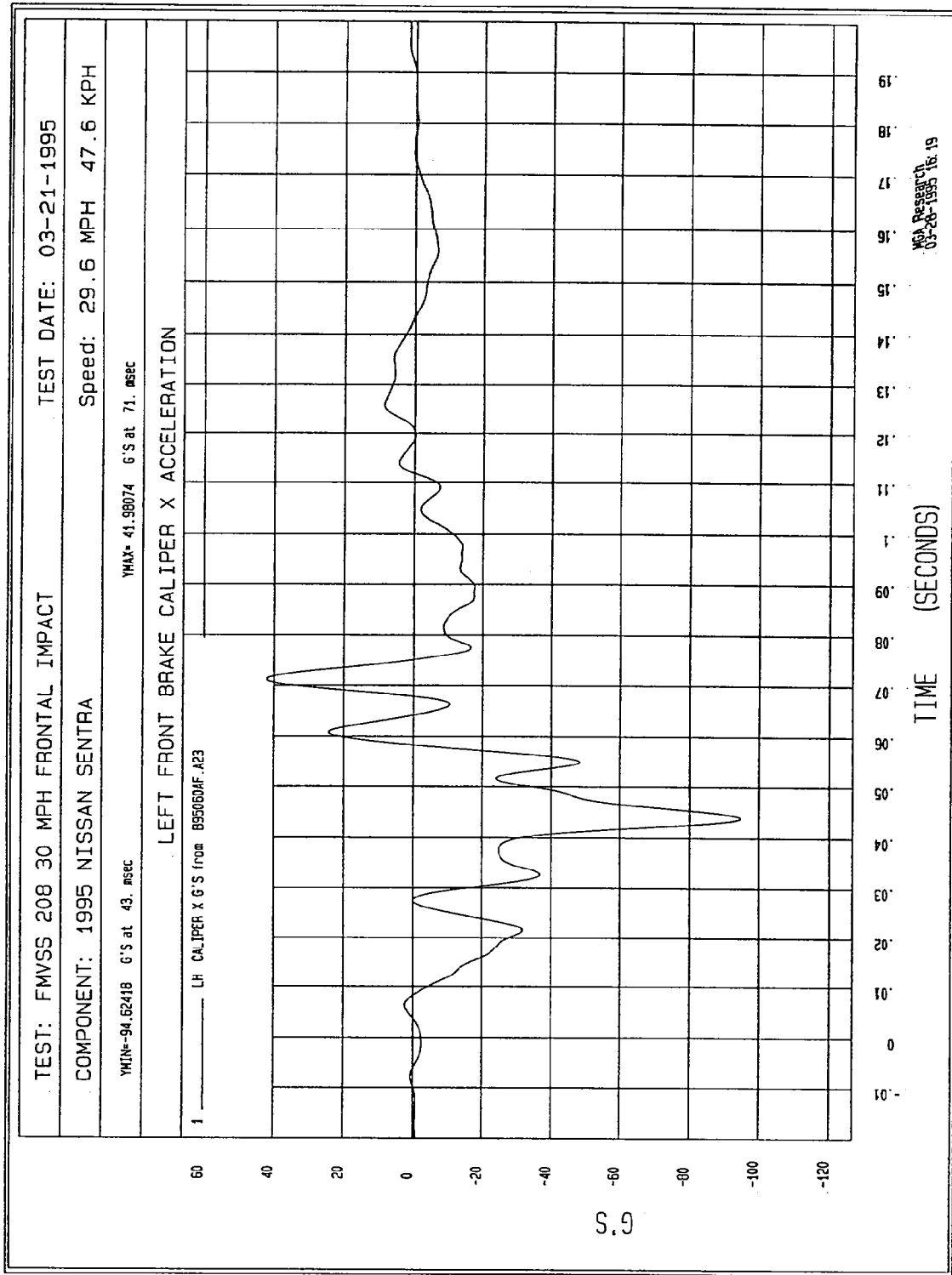


Figure B-38 - Left Front Brake Caliper X Acceleration vs. Time

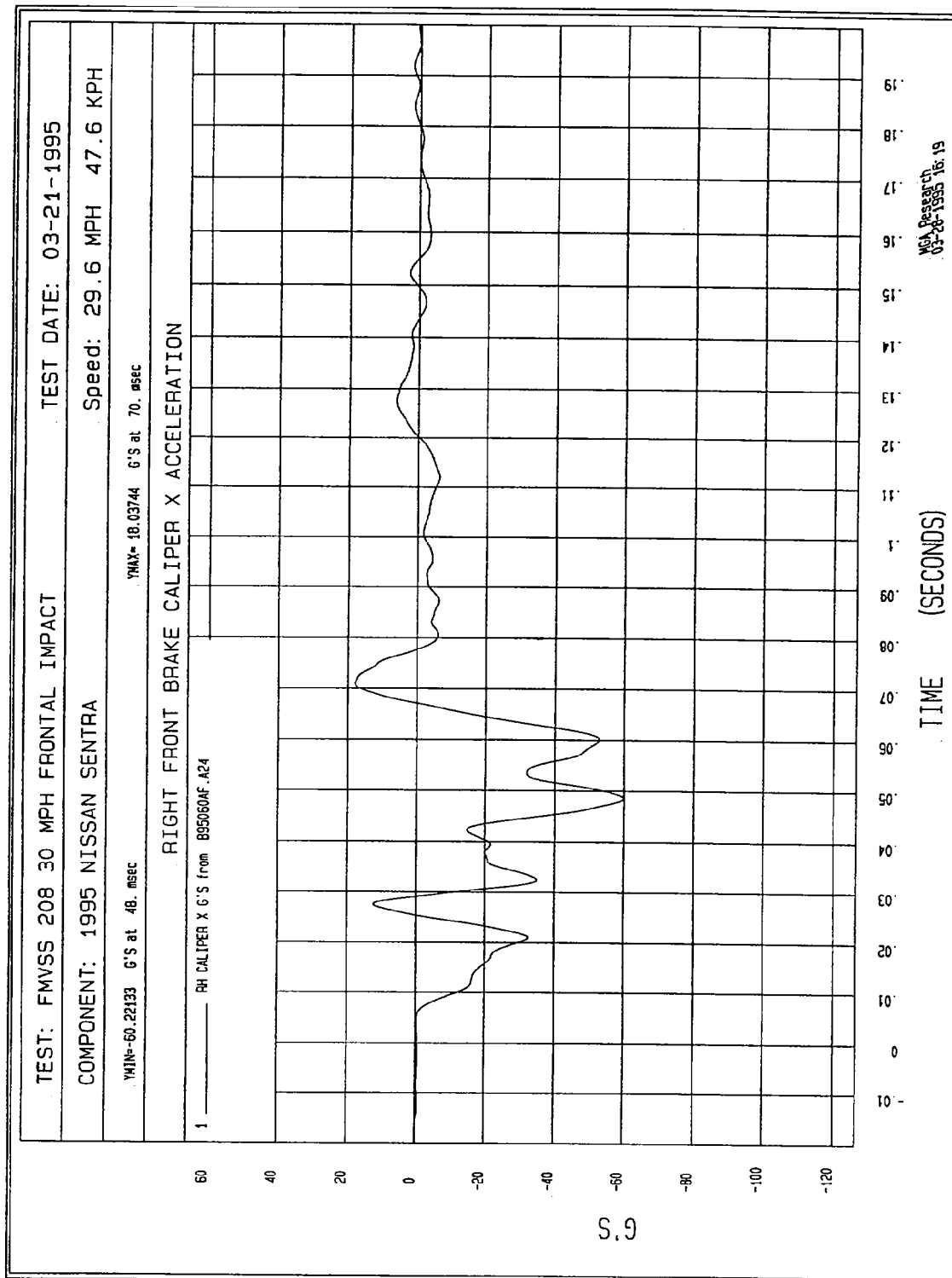


Figure B-39 - Right Front Brake Caliper X Acceleration vs. Time

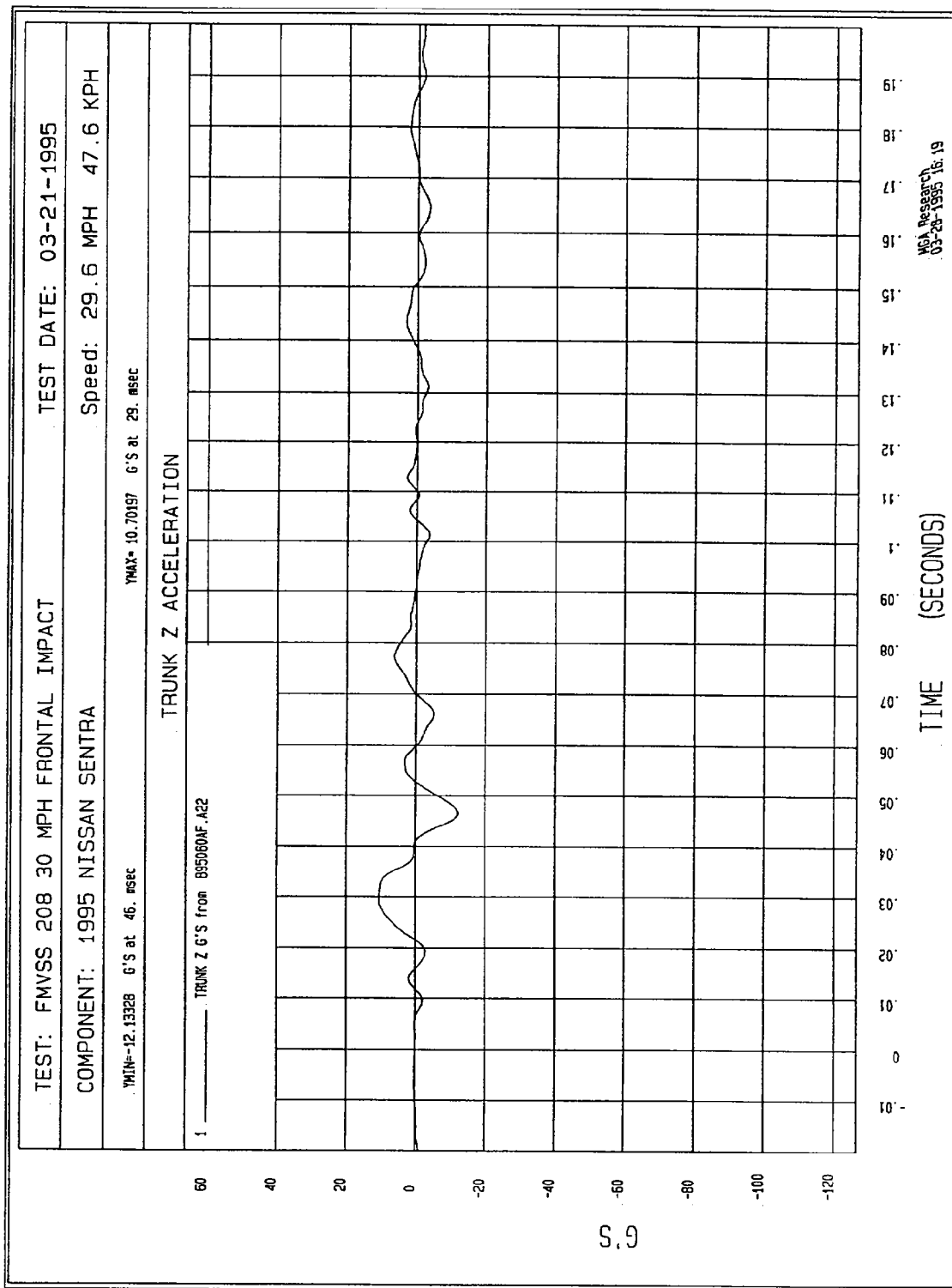


Figure B-40 - Trunk Floor Z Acceleration vs. Time

APPENDIX C

MANUFACTURER'S VEHICLE INFORMATION



NISSAN NORTH AMERICA, INC.

Washington Corporate Office
750 17th Street, N.W.
Suite 901
Washington, D.C. 20006-4607
Telephone: (202) 862-5523
FAX: (202) 659-2646

November 17, 1994

Ref: W-690-H

AST-080-2

Mr. Robert F. Hellmuth
Director, Office of Vehicle Safety Compliance
National Highway Traffic
Safety Administration
400 7th Street, S.W. Room 6113
Washington, D.C. 20590

RE: NEF 31CCa / IR 1544

Dear Mr. Hellmuth:

This letter is in response to your above referenced Information Request (IR 1544) regarding certification testing of the 1995 Nissan Sentra and 200 SX vehicles to the performance requirements of FMVSS No. 208 "Occupant Protection". Nissan North America, Inc. received IR 1544 from the NHTSA Office of Vehicle Safety Compliance (OVSC) on July 18th that requested a response to the questions within 20 calendar days of receipt. On July 26th, Nissan North America, Inc. responded to the IR by stating that, due to product planning related to the certification and launch of the 1995 Sentra and 200 SX models, the response to the IR would not be available until mid November. On July 27th, the OVSC informed Nissan North America, Inc. that its proposed plan for submission of the response to IR 1544 was acceptable.

With the specific authority from Nissan Motor Company, Ltd. of Tokyo, Japan ("Nissan"), Nissan North America, Inc. hereby transmits the following information, which has been formatted to correspond to the numbered questions in IR 1544.

- 1) The automatic restraint system provided at each front outboard seating position in the Nissan Sentra/200 SX vehicle is installed to meet the requirements of FMVSS No. 208, S.4.1.2.1(C)(2).
- 2) Not applicable.
- 3) The manual safety belt provided at each front outboard designated seating position is installed to meet the requirements of FMVSS No. 208, S.4.1.2.1(C)(2).

Tables #1 and #2 summarize Nissan's certification test data for each manual safety belt in the fastened and unfastened modes for the 1995 MY Sentra/200 SX vehicles.

4) Not applicable.

5) Not applicable.

6) An explosive device is used to inflate the air bags in the 1995 Nissan Sentra/200 SX. The certification letters from the air bag and module suppliers that indicate conformance to the requirements of S9.2 of FMVSS No. 208 are enclosed as Attachment #6 of this submission.

7) The safety belt system in the 1995 Nissan Sentra/200 SX is not equipped with tension relieving devices.

8) The windows were open during Nissan's certification testing. The 1995 Sentra/200 SX is not equipped with vents.

9) The Part 572(E) "Hybrid III" anthropomorphic test dummies (ATD), manufactured by Humanoid, were employed in the left angular impact test for the Sentra 4-door sedan. All other certification trials for the Sentra/200 SX were conducted using test dummies manufactured by ARL, Inc. The dummy seating positioning information is provided in Appendix C. The 1995 Sentra/200 SX vehicle is equipped with a driver foot rest. A split bench seat is not available for 1995.

10) The seating position, steering column positioning, and fuel tank capacity data are provided in the completed Form #1 that was supplied by the Office of Vehicle Safety Compliance (Attachment #1).

11) The nominal position of the adjustable upper shoulder belt webbing anchorages for a 50th percentile adult male is provided in Attachment #1.

12) Tables #1 and #2 contain data on impact speed, vehicle test weight and the resulting injury criteria that was recorded for all certification tests conducted to meet the requirements of S.4.1.2.1. The ATD head and chest acceleration-time traces and femur load-time traces for the full barrier frontal crash tests are provided in Annexes #1 and #2.

13) Attachment #5 shows the priority of order of removed components to obtain the proper test vehicle weights.

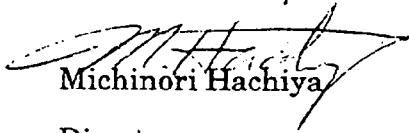
14) Table #3 contains the information that demonstrates compliance with the performance requirements of FMVSS No. 204. The diagram of the steering control system and the description of the energy management are provided as Attachment #2.

15) The 1995 Nissan Sentra/200 SX is not equipped with built-in child restraint system.

Nissan is also providing supplemental information relating to the dimensions for seat back angle and seat slide positioning (Appendix A), steering column positioning (Appendix B) and dummy setting (Appendix C).

If you have any questions or require further information regarding this submission, please contact Mr. Toshio Horiuchi of my staff at (202) 466-5284.

Respectfully submitted,



Michinori Hachiya

Director
Technical Affairs

Washington Corporate Office

enclosures

NISSAN MOTOR COMPANY, LTD.

1995 Model Year
Nissan Sentra/200 SX

Tables, Attachments, Appendices & Annexes

TABLES

Table #1 - Summary of Test Results - FMVSS No. 208 Certification for 1995 MY Sentra 4-Door Sedan Model

Table #2 - Summary of Test Results - FMVSS No. 208 Certification for 1995 MY 200 SX Model

Table #3 - FMVSS No. 204 Certification Test Report

ATTACHMENTS

Attachment #1 - Adjustable Front Seat Back Angle, Seat Slide Positioning, Adjustable Upper Anchorage Positioning & Tilt Steering Column Positioning Procedure & Fuel Tank Data (Form #1)

Attachment #2 - Steering Column Drawing & Energy Management System

Attachment #3 - Front Seat Back Positioning Procedure Photograph

Attachment #4 - Adjustable Belt Connections Positioning Procedure

Attachment #5 - Order of Priority for Component Removal

Attachment #6 - Certification Letter for Conformance to S9.2

APPENDICES

Appendix A - Dimensions & Photographs for Seat Back Angle & Seat Slide Positioning

Appendix B - Dimensions & Photographs for Tilt Steering Column Positioning

Appendix C - Dimensions & Photographs for Dummy Positioning

ANNEXES

Annex #1 - Acceleration -Time Plots for Driver Dummy

Annex #2 - Acceleration -Time Plots for Passenger Dummy

NISSAN MOTOR CO., LTD.

TITLE	1995 SENTRA THE CRASH TEST DATA CONCERNING TO DUMMY READING
-------	---

1. SUBJECT

- This is the summarized crash test results of FMVSS No. 208 conducted by NISSAN.
- Occupant restraint system in this vehicle is installed to meet the requirements of S4.1.2.1 (C) (2).
- Restraint system for each seating position is as follows:

APPLIED MODEL

B14
4D-SED
ALL Models

Driver	The active 3—point Safety belt and air bag.
Passenger	The active 3—point Safety belt and air bag.

2. SUMMARY OF TEST RESULTS

2.1 TEST RESULTS

Barrier	Airbag	Active 3-points safety belt	Driver					Passenger					Test condition	
			HIC	Chest G-3ms	Femur load (lbs.)		Chest deflection (in.)	HIC	Chest G-3ms	Femur load (lbs.)		Chest deflection (in.)	Velocity (mph)	Weights (lbs.)
					RH	LH				RH	LH			
Frontal barrier	With	Without ^{*1}	444	50	1029	1105	2.3	154	45	1416	1245	0.7	30.2	3040
		With	370	43	919	613	1.8	401	46	943	930	2.2	30.6	2913
Right side angular barrier (30°)	With	Without ^{*1}	177	33	907	1017	1.0	269	34	1574	949	0.2	30.1	3049
		With ^{*2}	324	44	781	932	1.8	411	46	999	848	1.4	30.4	2921
Left side angular barrier (30°)	With	Without ^{*1}	415	38	1012	806	1.4	202	33	1305	1521	0.4	30.1	3038
		With	359	44	689	389	1.4	161	38	709	1383	1.6	30.5	2913

*1; Test results are applied from test results of 200SX.

2.2 TYPE OF DUMMY

Subpart E of PART 572 (HYB-III) produced by ARL. INC.
(*2; Subpart E of PART 572 (HYB-III) produced by HUM. INC.)

2.3 POSITION OF MOVABLE WINDOWS

The windows were opened during Nissan's certification testing.

TEST VEHICLE INFORMATION

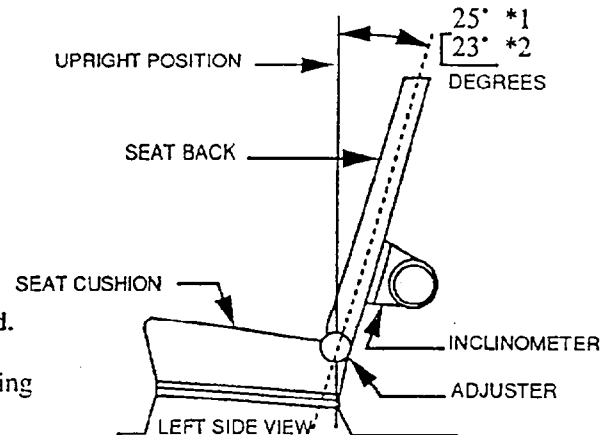
Vehicle Model Year & Make: 1995 NISSAN
Vehicle Model & Body Style: SENTRA / 200SX

1. NOMINAL DESIGN RIDING POSITION ••

For adjustable driver and passenger seat backs.
Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent if applicable. Indicate, if applicable, how the detents are numbered (Is the first detent "0" or "1"?). Indicate if the seat back angle is measured with the dummy in the seat.

Seat back angle for driver's seat = $25^{\circ} \text{ } ^{*1}$
 $23^{\circ} \text{ } ^{*2}$ degrees.
Measurement Instructions:

- 1) Pull the folded seat back until the lock position is attained.
- 2) Release the lock by actuating the reclining lever and pushing the seat back to the 7th rearward notch



*1: Nominal designated seat back angle
*2: Seat back angle measured as shown in Attachment 3.

Seat back angle for passenger's seat = $25^{\circ} \text{ } ^{*1}$
 $23^{\circ} \text{ } ^{*2}$ degrees.
Measurement Instructions:

Same as Driver Data

2. SEAT FOR & AFT POSITIONS ••

Provide instructions for positioning the driver and front outboard passenger seat(s) in the center of fore and aft travel. For example, indicate how the detents are numbered (Is the first detent "0" or "1"?). Provide information to locate the detent in which the seat track is to be locked.

Positioning of the driver's seat:

- 1) Actuate seat track slide mechanism by lifting the lock lever and push the seat to its forwardmost position on the track

- 2) With the initial position designated as "0", adjust the seat to the 10th detent to attain the proper position.

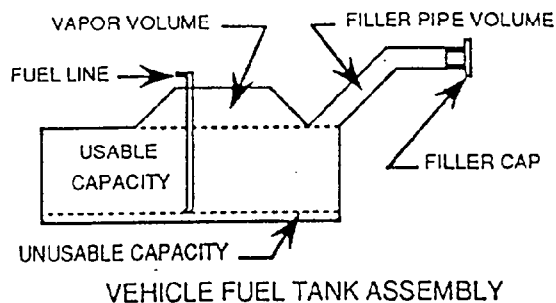
Positioning of the passenger's seat (if applicable):

Same as Driver Data

3. FUEL TANK DATA ••

- 3.1 A. "Usable Capacity" of standard equipment fuel tank = 13.2 gallons.
- B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.
- C. Capacity used when certification testing to requirements of FMVSS 301 = 13.2 gallons.

Operational Instructions:



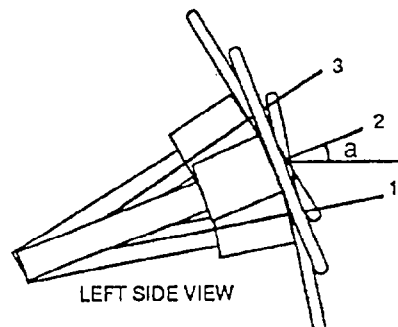
- 3.2 Amount of stoddard solvent added to vehicle for certification test = 12.9 gallons
- 3.3 Is vehicle equipped with electric fuel pump? X YES — NO
If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.
The fuel pump will pump fuel : 1) for 5 second after the ignition is switched to "on".
2) while the engine is running.
3) for 1.5 seconds after the engine stops.

4. STEERING COLUMN ADJUSTMENTS ••

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when it is moved through its full range of driving positions. If the tested vehicle has any of these adjustments, does your company use any specific procedures to determine the geometric center.

Operational Instructions: $a = 24^\circ$

- 1) Set the inclinometer on the steering column cover
- 2) Measure the column angle using the inclinometer with the steering column at the highest and lowest elevation and record the resultant angles.
- 3) Adjust the steering column to the mid position.



STEERING COLUMN ASSEMBLY

5. AUA positioning ••

1. Locate the lock release button on the B-pillar panel.
2. Actuate the release mechanism by depressing the button and position the adjuster to it's highest position.

ATTACHMENT 2
STEERING CONTROL SYSTEM
AND
ENERGY ABSORBING MECHANISM
FOR 1995 NISSAN SENTRA

*ENERGY MANAGEMENT OF THE STEERING CONTROL SYSTEM
IN FRONTAL IMPACT IS AS FOLLOWS*

The rearward movement of the steering gear is prevented by the steering post clamp on the steering column tube.

The upper steering shaft is prevented from the rearward displacement by the upper bearing on the steering column tube. (See Fig. b)

When the force reaches the specified value, the steering shaft contracts and then the lower steering shaft will not move rearward.

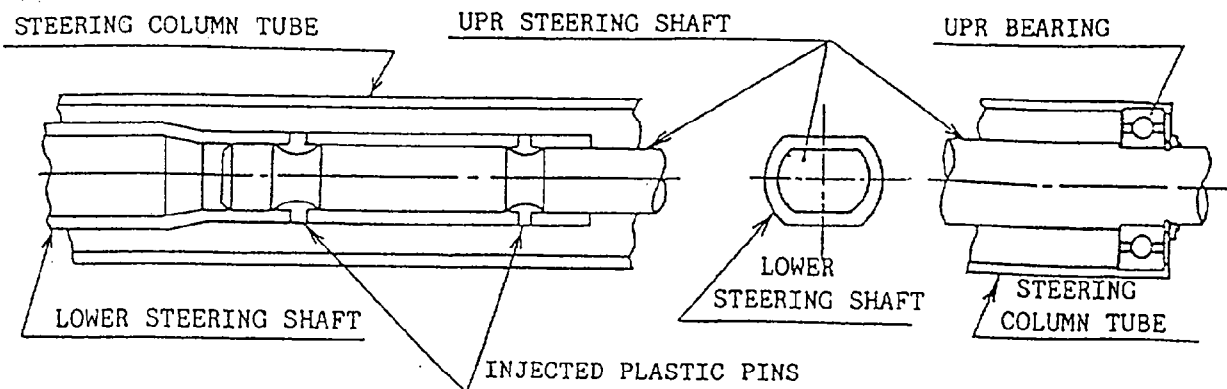


Fig.a INJECTED PLASTIC PINS TYPE STEERING SHAFT

Fig.b STOPPER FOR STEERING SHAFT

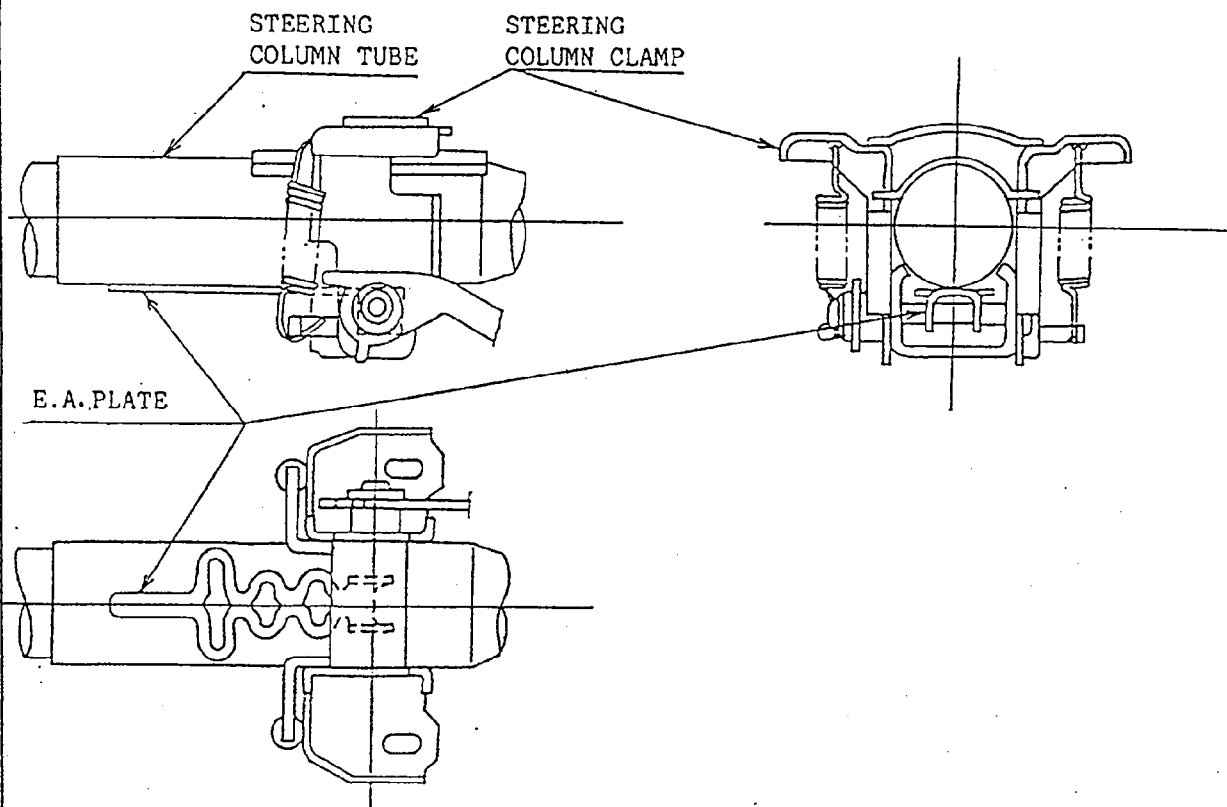
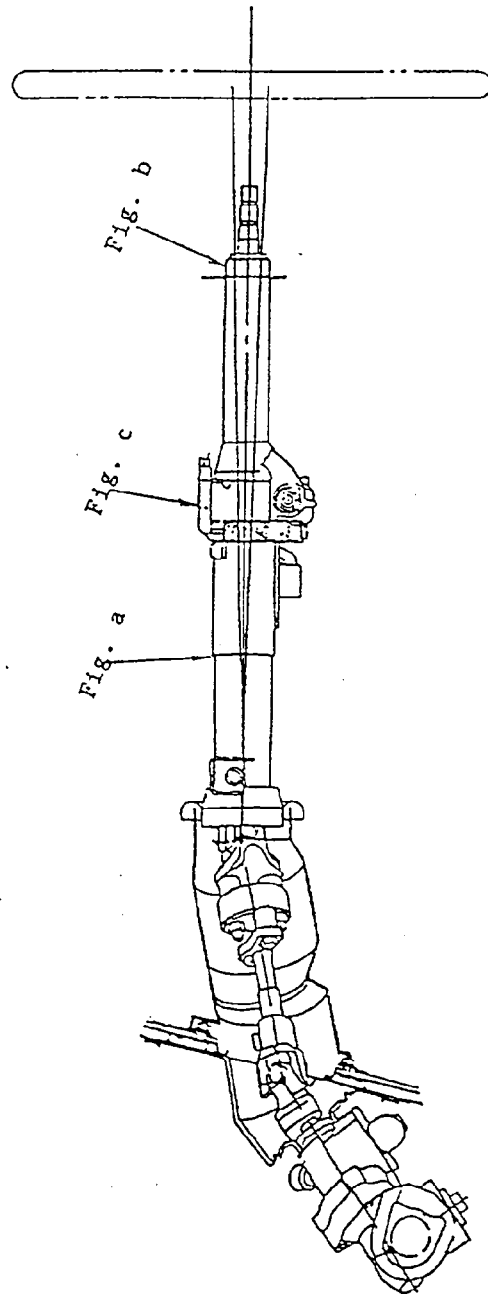


Fig.C ONE WAY SLIDE TYPE STEERING POST CLAMP

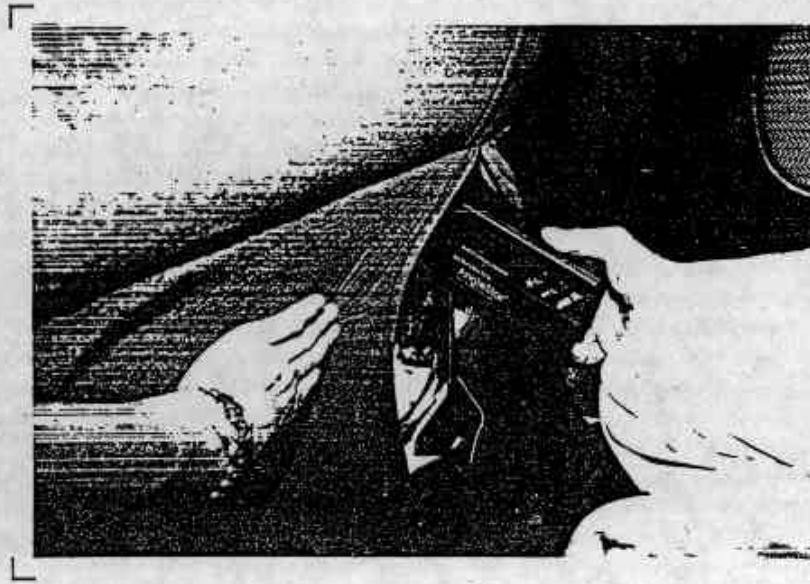


Attachment 3

ADJUSTABLE FRONT SEAT BACK ANGLE

(USE INCLINOMETER)

DATA FOR 1995 NISSAN SENTRA 4DOOR SEDAN/200SX 2DOOR COUPE



After adjusting the back according to Attachment 1, Seat back angle is 24° when measured at the position shown in the photograph.

*Only apply to a seat with zipper on its backside.

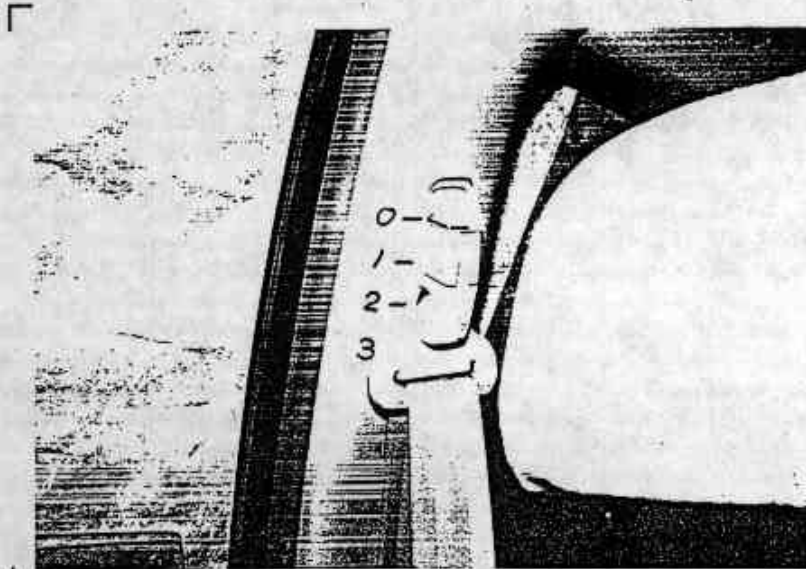
In case of a seat without zipper, it is impossible to measure the seat back angle directly on the seat frame: the seat cover and the padding must be cut to set inclinometer, but it may cause deformation of the seat shape.

Appendix A shows how to confirm whether the seat is set correctly.

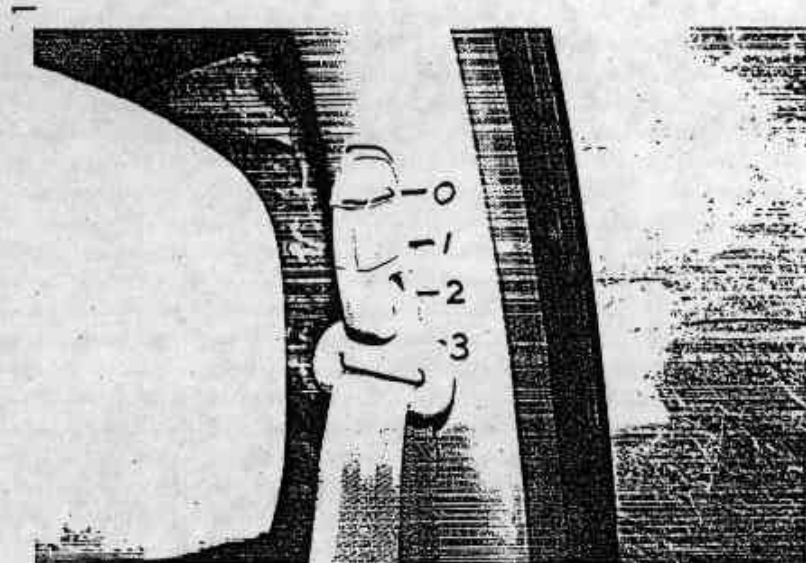
Attachment 4

ADJUSTABLE BELT CONNECTIONS
POSITIONING PROCEDURE
FOR 1995 NISSAN SENTRA 4DOOR SEDAN

Driver



Passenger



Attachment 5

PRIORITY ORDER OF REMOVED COMPONENTS
TO OBTAIN PROPER TEST WEIGHT
FOR 1995 NISSAN SENTRA/200SX

No.	REMOVED COMPONENTS
1	REAR BUMPER
2	SPARE TIRE AND TOOLS
3	TRUNK LID
4	REAR SEAT COMPONENTS
5	REAR COMBINATION LAMP
6	TRUNK COMPARTMENT TRIM PARTS

TOTAL 6 COMPONENTS

APPENDIX A

VEHICLE MODEL YEAR: 1995 VEHICLE MAKE: NISSAN VEHICLE MODEL & BODY STYLE: SENTRA 4DOOR SEDAN DIMENSIONS FOR SEAT BACK ANGLE AND SEAT SLIDE SETTING

Reset is required when each dimension you measured has more than 0.6 in. difference from the dimension below.
(Refer to Figs. 1 -4 and photographs)

		Measurements Points	Photographs	Dimensions	
Driver Side	A	Center of headrest stay - Upper point of instrument panel	1 to 4	35.5 in.	Seat back setting data
	B	Front of seat slide - Lower point of instrument panel	5 to 7	31.7 in.	Seat slide setting data
Passenger Side	C	Center of headrest stay - Corner point of ventilator	8 to 10	38.4 in.	Seat back setting data
	D	Front of seat slide - Lower point of instrument panel	11 to 13	30.6 in.	Seat slide setting data

Driver Seat (Dimension A)



Photo.3
Upper point of
instrument panel

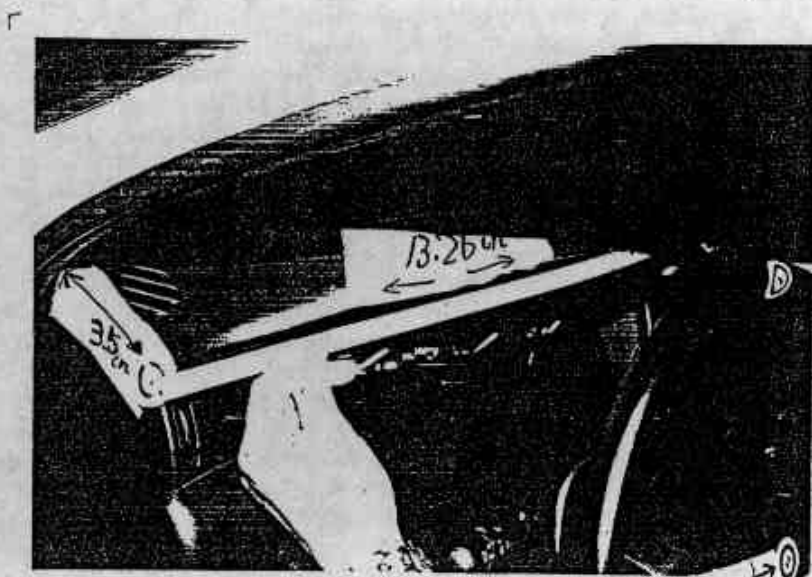


Photo.4
Upper point of
instrument panel

Driver Seat (Dimension B)



Photo. 5

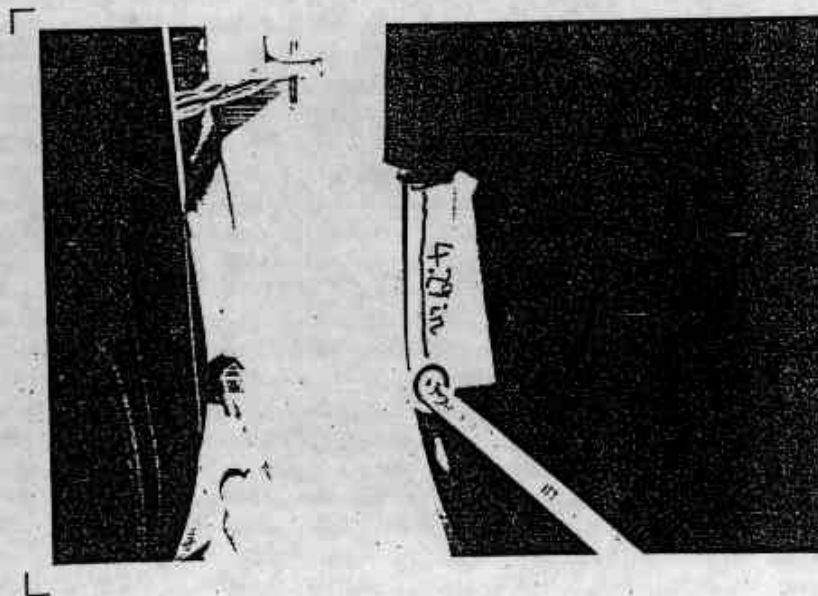


Photo. 6

Lower point of
instrument panel

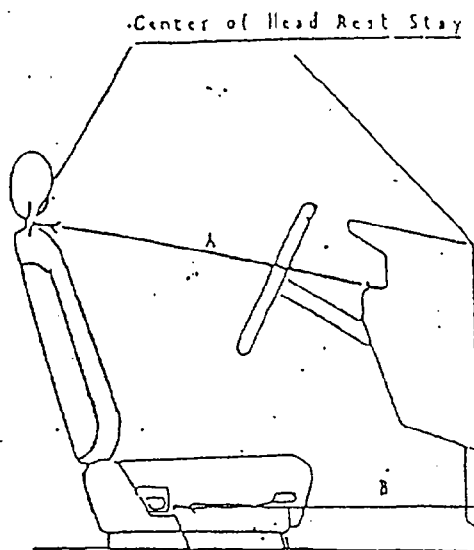


Fig. 1

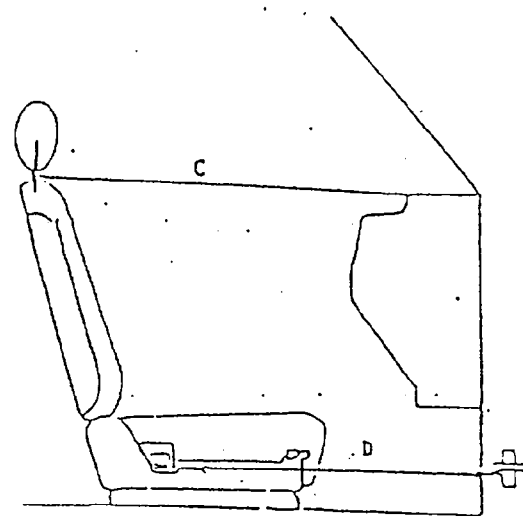


Fig. 2

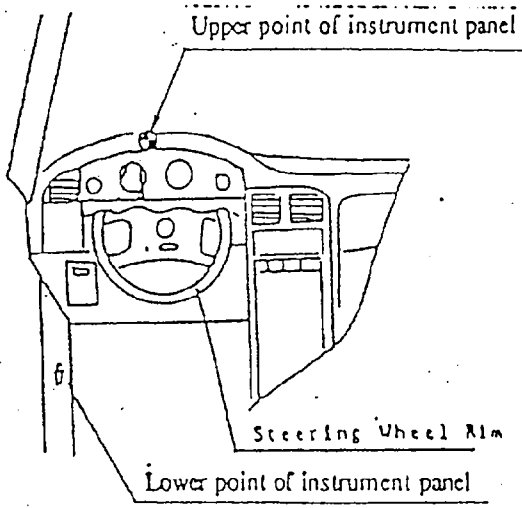


Fig. 3

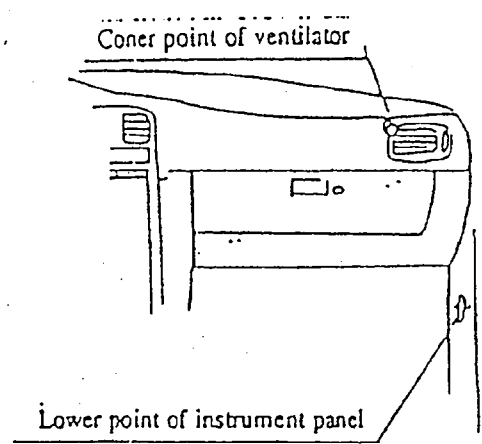


Fig. 4

Driver Seat (Dimension B)

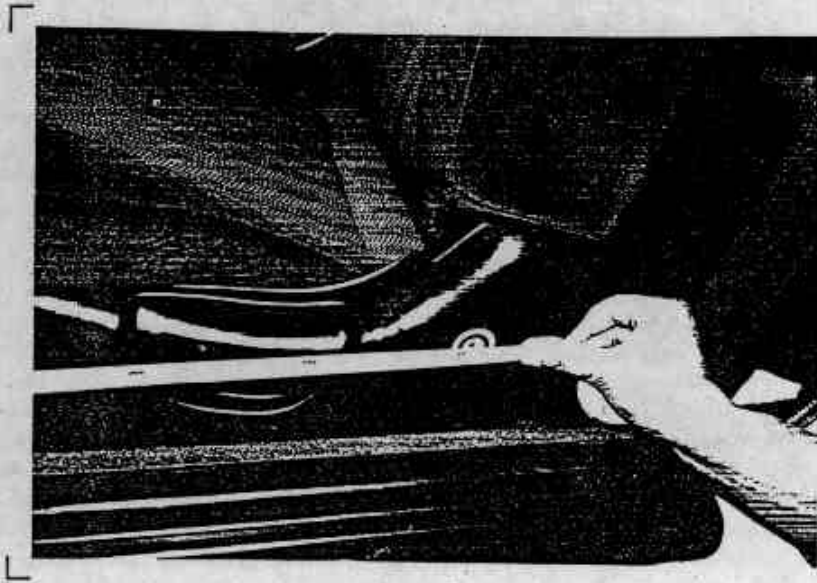


Photo. 7
Rear point of
seat side-cover

Passenger Seat (Dimension C)

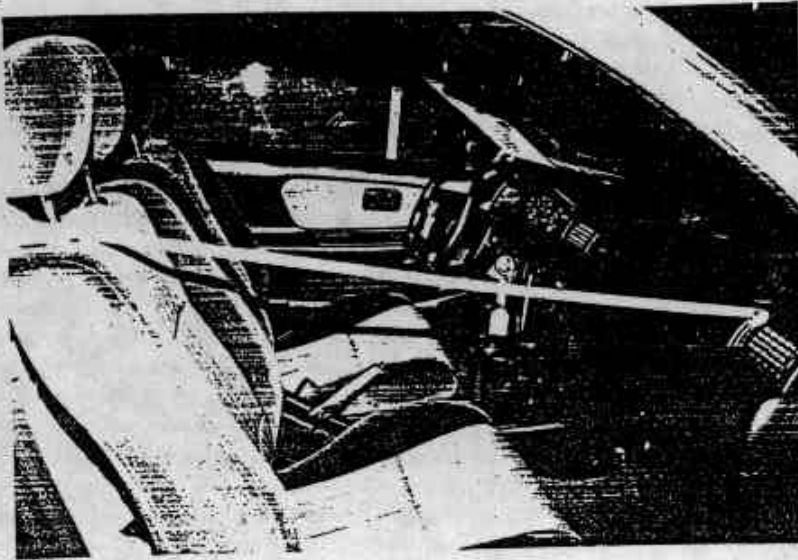


Photo.8

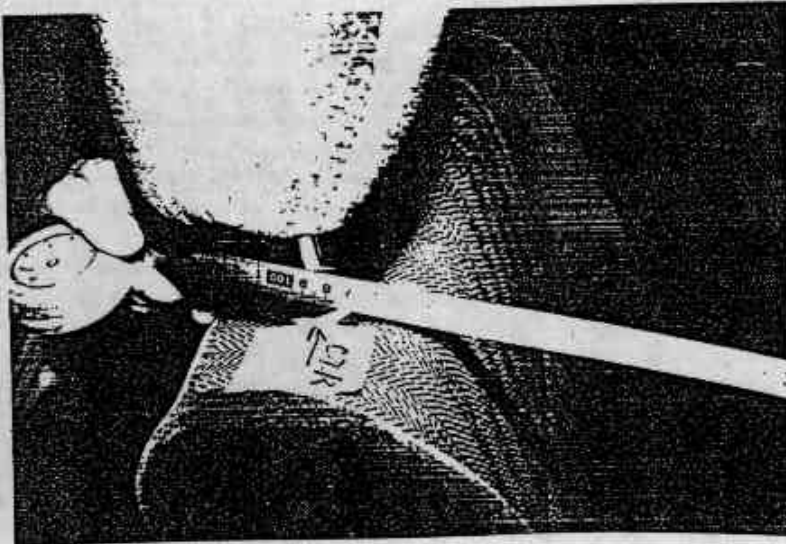


Photo.9
Corner of
headrest stay

Passenger Seat (Dimension C)

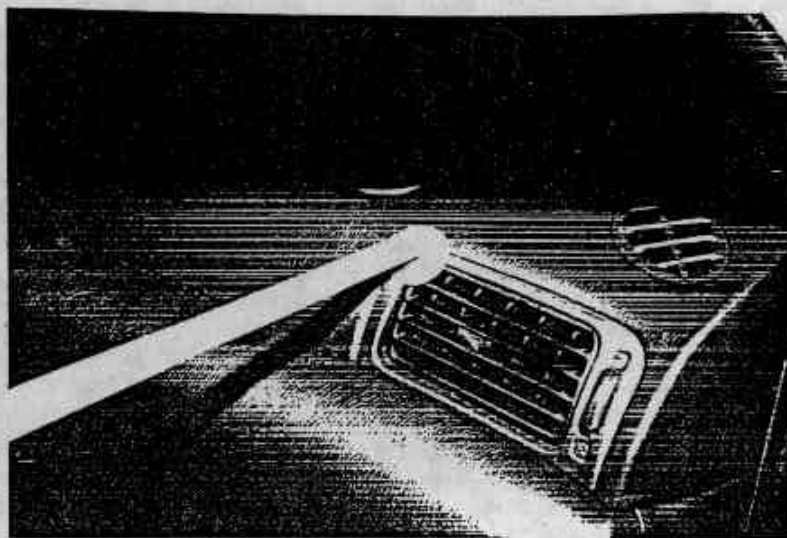


Photo. 10
Corner Point of
ventilator

Passenger Seat (Dimension D)

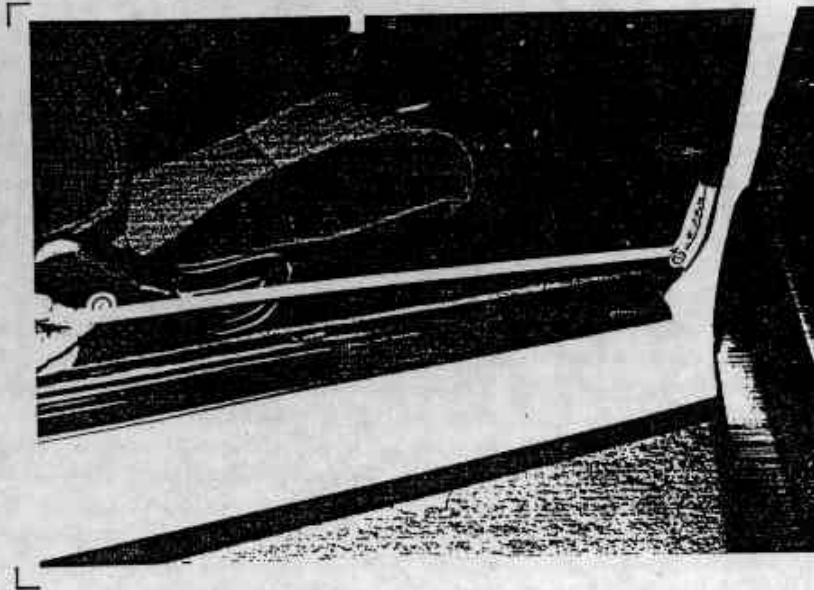


Photo. 11

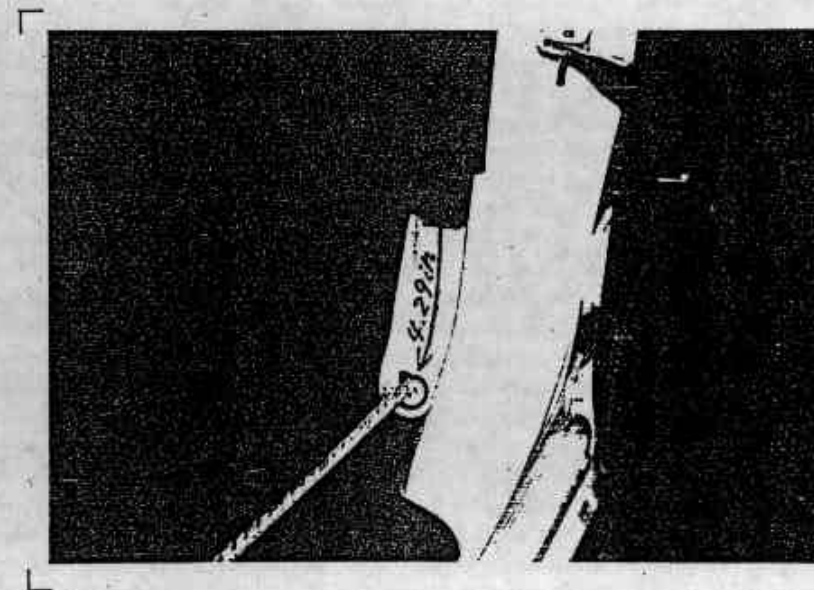


Photo.12

Lower point of
instrument panel

Passenger Seat (Dimension D)

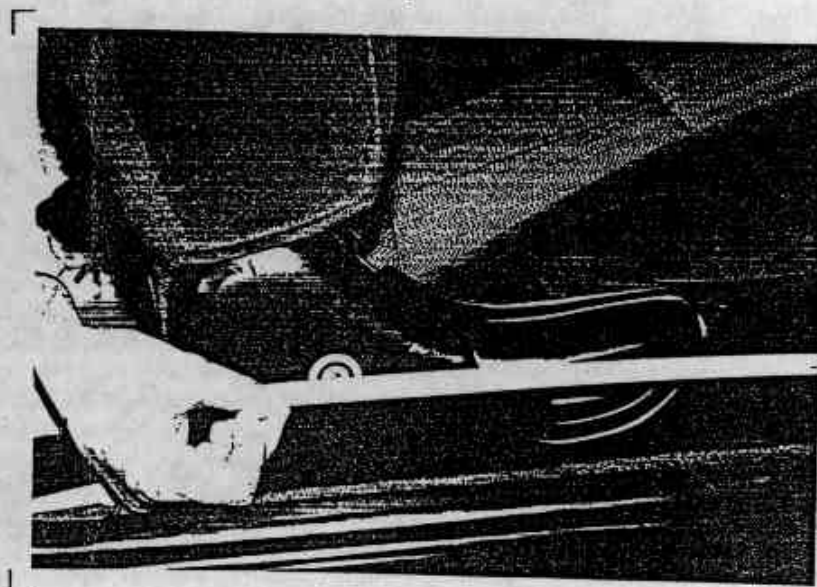


Photo. 13
Rear point of
seat side-cover

APPENDIX B

VEHICLE MODEL YEAR: 1995 VEHICLE MAKE: NISSAN
 VEHICLE MODEL & BODY STYLE: SENTRA 4DOOR SEDAN
 DIMENSIONS FOR TILT STEERING COLUMN POSITIONING

Reset is required when each dimension you measured has more than 0.6 in. difference from the dimension below.
 (Refer to Figs. 1 -2 and photographs.)

		Measurements Points	Photographs	Dimensions
Driver Side	A	Center of steering horn pad - Edge of header rail	1,2,3	16.9 in.
	B	Lower point of steering wheel rim - Edge of header rail	4,5	23.3 in.

APPENDIX C

DIMENSION FOR DUMMY SETTING (Refer to Figs. 1-3 and photographs)

VEHICLE MODEL YEAR : 1995 VEHICLE MAKE : NISSAN

VEHICLE MODEL & BODY STYLE : SENTRA 4DOOR SEDAN

Reset is required when each dimension you measured has more than 1 in. difference from the dimension bellow.

	Driver side		Passenger side	
	Photo No.	Dimensions	Photo No.	Dimensions
WA	-	-	-	-
SWA	1	66.1deg	-	-
SCA	1	23.9deg	-	-
SA *4	2	24.2deg	3	24.2deg
HZ	-	-	-	-
HH	4,8,10	13.5in	5,9,11	14.0in
HW	6,8,10	23.2in	7,9,11	23.7in
HR	12,14,	6.9in	13,15	6.6in
NR	10,16,17	16.8in	-	-
CD	18,20,24	20.3in	19,21,25	24.2in
CS	22,23,24	12.0in	-	-
RA	-	-	-	-
KDL	26,28,32	4.3in	30,33	4.1in
KDR	27,29	5.2in	31,33	4.1in
PA	-	-	-	-
TA	-	-	-	-
KK *5	34	10.3in	-	8.4in
ST	-	-	-	-
SK	-	-	-	-
SH	-	-	-	-
SHY	-	-	-	-
HS *1	35,37	10.8in	36,38	10.4in
HD *2	39,41	12.4in	40,42	12.4in
AD	43,45	5.8in	44,46	5.7in
HC *3	47,49	33.3in	48,50	33.3in
PBU	51	10.4in	52	10.5in
PBL	51	7.2in	52	7.3in

*1; HS—Head target to corner point of adjustable shoulder belt anchorage.

*2; HD—Navel to door , Center line of dummy(Navel) - Upper point of arm rest.

*3; HC—Center of angle gage hole - Check link pin of front door.

*4; SA—Only apply to a seat with zipper on its backside.

*5; KK—Center of right knee to center of left knee.

DUMMY MEASUREMENTS FOR FRONT SEAT PASSENGERS

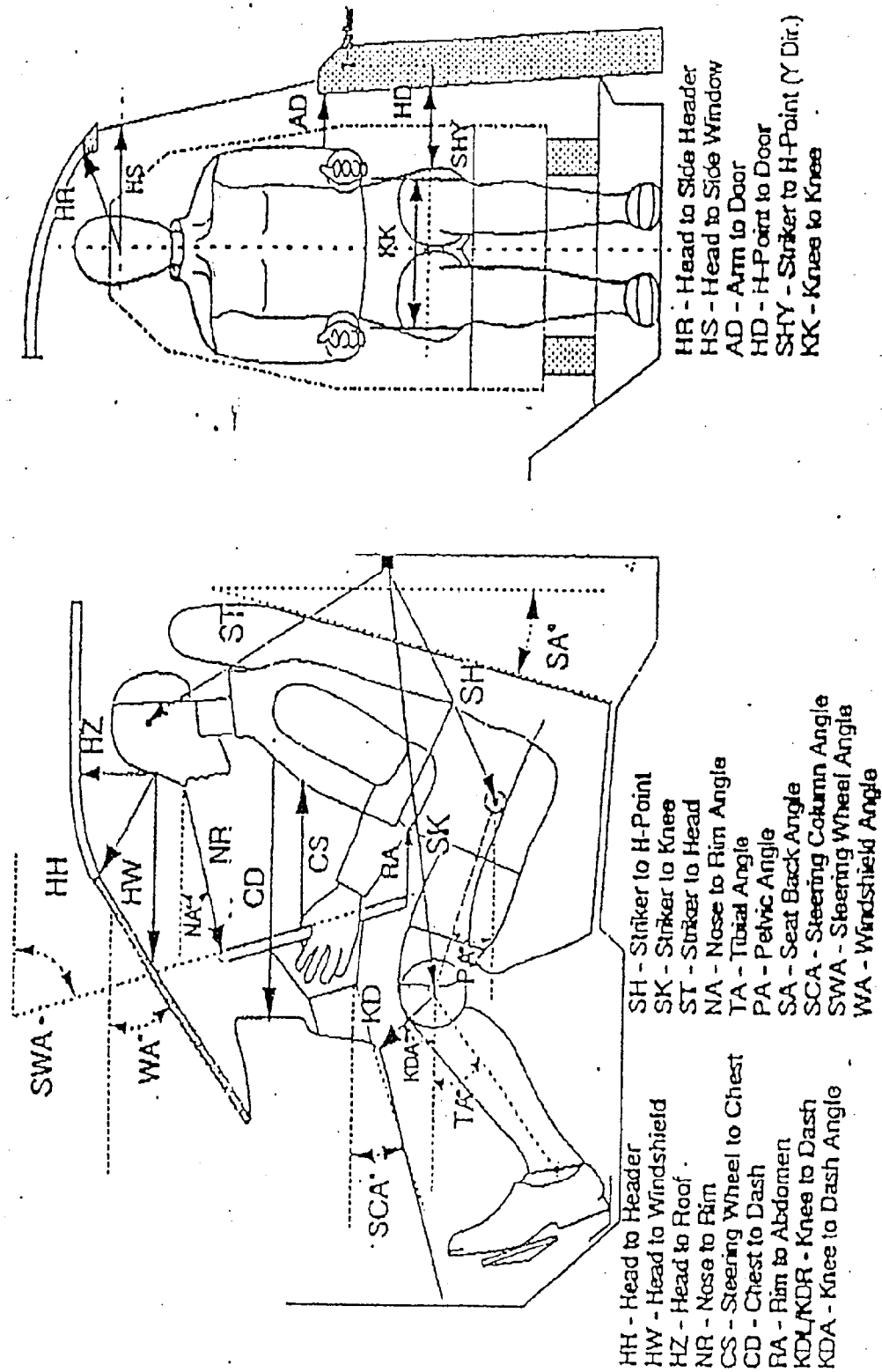


Fig. 1

Fig. 2

SEAT BELT POSITIONING DATA

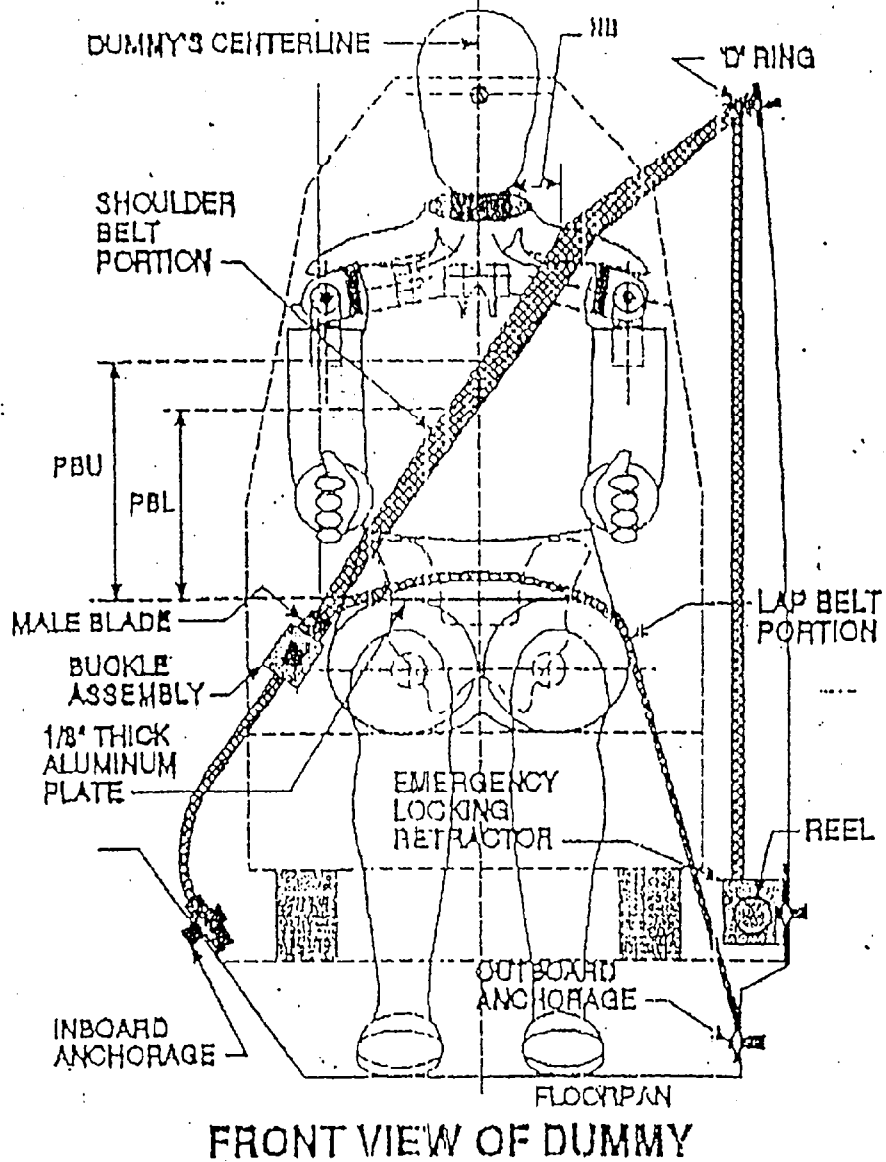


Fig.3